Hewlett Packard Enterprise

HPE ProLiant XL270d Gen9 Accelerator Tray User Guide

Abstract

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

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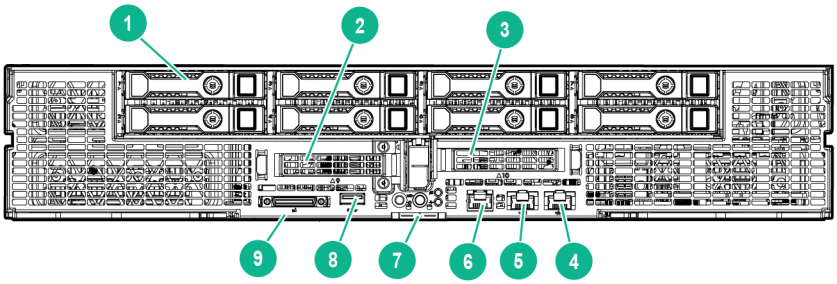
Contents

Component identification

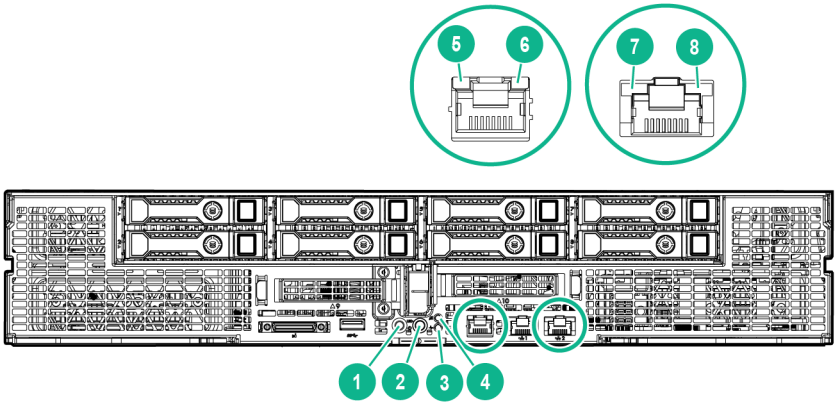
Front panel components



Item	Description
1	Drive bays
2	Slot 9 PCIe3 x16 (16, 8, 4, 1) [1]
3	Slot 10 PCIe3 x16 (16, 8, 4, 1)[1]
4	NIC port 2
5	NIC port 1
6	Dedicated iLO port (optional)
7	Serial number and iLO label pull tab
8	USB 3.0 connector
9	SUV connector

[1] For more information on the riser board slot specifications, see " **PCI riser module components**"

Front panel LEDs and buttons



Item	Description	Status
1	Power button/LED [1]	Solid green = System on Flashing green = Performing power on sequence Solid amber = System in standby Off = No power present[2]
2	UID button/LED[1]	Solid blue = Activated • 1 flash per second = Remote management or firmware upgrade in progress • 4 flashes per second = iLO manual soft reboot sequence initiated • 8 flashes per second = iLO manual hard reboot sequence in progress Off = Deactivated
3	Health LED[1]	Solid green = Normal Flashing amber = System degraded Flashing red = System critical[3]
4	Do not remove LED	Flashing white = Do not remove the node. Removing the node may terminate the current operation and cause data loss. Off = The node can be removed.

Table Continued

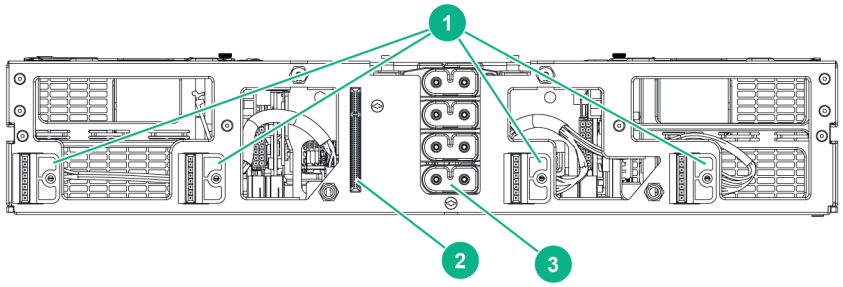
Item	Description	Status
5	iLO activity LED	Green or flashing green = Network activity Off = No network activity
6	iLO link LED	Green = Linked to network Off = No network connection
7	NIC link LED[1]	Green = Linked to network Off = No network connection
8	NIC activity LED[1]	Green or flashing green = Network activity Off = No network activity

[1] When the LEDs described in this table flash simultaneously, a power fault has occurred. For more information, see **Power Fault LEDs**.

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

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

Rear panel components



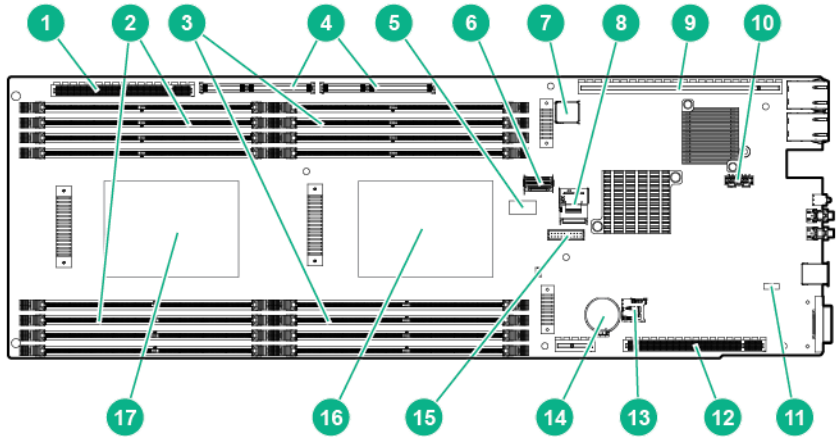
Item	Description
1	Fan connectors
2	Management riser connector
3	DC power cable module connectors

Power fault LEDs

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

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

System board components



Item	Description
1	Power riser connector
2	DIMMs for processor 2
3	DIMMs for processor 1
4	Right PCI riser module connector (PCIe x40)
5	System maintenance switch
6	Mini-SAS connector 1 (SATA x4)

Table Continued

Item	Description
7	Internal USB 3.0 connector
8	Mini-SAS connector 2 (SATA x4)
9	Right PCI riser module connector (PCIe x24)
10	Dedicated iLO port connector
11	NMI header
12	Left PCI riser module connector (PCIe x16)
13	microSD slot
14	System battery
15	TPM connector
16	Processor 1
17	Processor 2

System maintenance switch

Position	Default	Function
S1	Off	Off = iLO security is enabled. On = iLO security is disabled.
S2	Off	Off = System configuration can be changed. On = System configuration is locked.
S3	Off	Reserved
S4	Off	Reserved
S5	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6	Off	Off = No function On = ROM reads system configuration as invalid.
S7	—	Reserved
S8	—	Reserved
S9	—	Reserved
S10	—	Reserved
S11	—	Reserved
S12	—	Reserved

You can access the redundant ROM by setting S1, S5, and S6 to On.

When the system maintenance switch position 6 is set to the On position, the system is prepared to erase all system configuration settings from both CMOS and NVRAM.

CAUTION:
Clearing CMOS, NVRAM, or both deletes configuration information. Be sure to configure the server properly to prevent data loss.

NMI functionality

An NMI crash dump creates a crash dump log before resetting a system which is not responding.

Crash dump log analysis is an essential part of diagnosing reliability problems, such as failures of operating systems, device drivers, and applications. Many crashes freeze a system, and the only available action for administrators is to restart the system. Resetting the system erases any information which could support problem analysis, but the NMI feature preserves that information by performing a memory dump before a system reset.

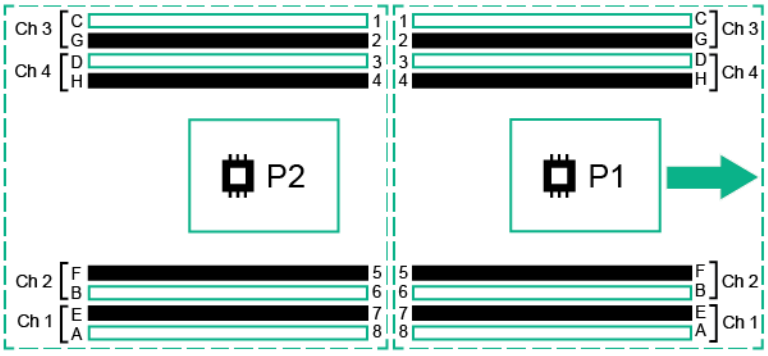
To force the system to invoke the NMI handler and generate a crash dump log, do one of the following:

- Use the iLO Virtual NMI feature.
- **Short the NMI header**.

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

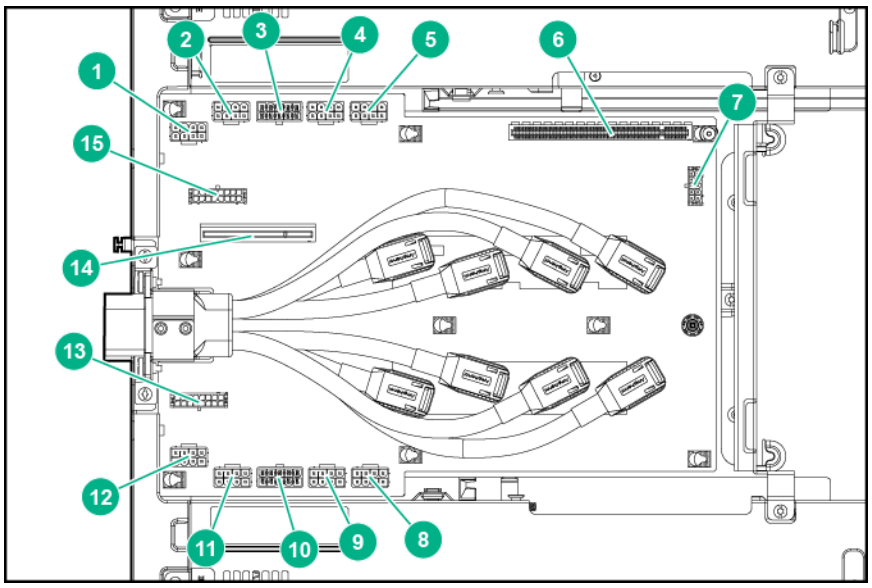
DIMM slot locations

DIMM slots are numbered sequentially (1 through 8) for each processor. The supported AMP modes use the letter assignments for population guidelines.



NOTE: The arrow indicates the front of the server.

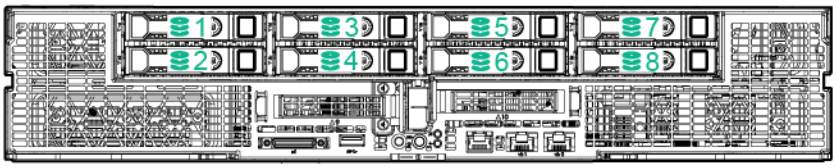
Power distribution board components



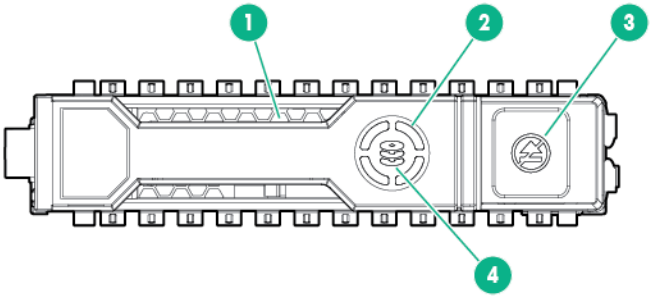
Item	Description
1	GPU 8 power connector
2	GPU 7 power conector
3	Right PCI riser module power connector
4	GPU 6 power connector
5	GPU 5 power connector
6	Power riser connector
7	Drive backplane power connector
8	GPU 1 power connector
9	GPU 2 power connector
10	Left PCI riser module power connector
11	GPU 3 power connector
12	GPU 4 power connector
13	Left fan power connector
14	Management riser slot
15	Right fan power connector

Drive bay numbering

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



Hot-plug drive LED definitions



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

Table Continued

Item	LED	Status	Definition
		Flashing green	The drive is 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.

IMPORTANT:

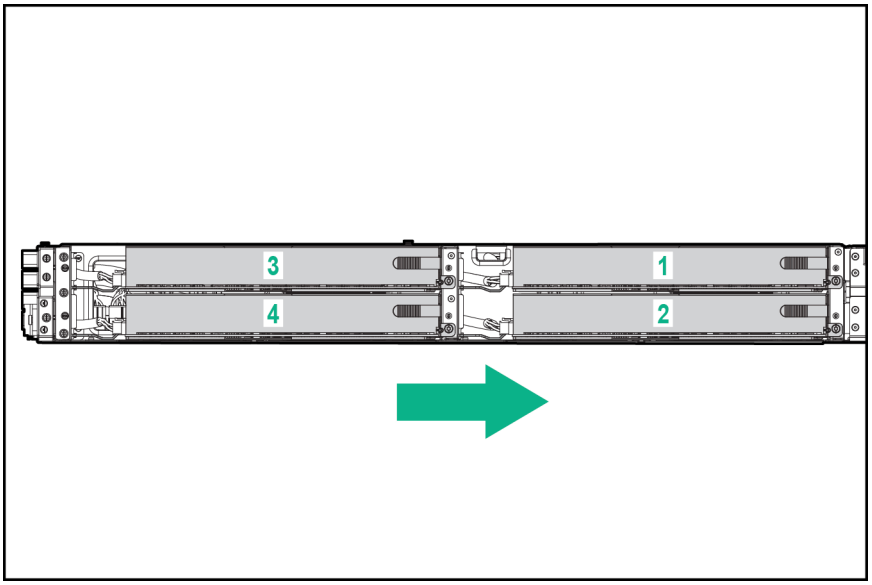
The Dynamic Smart Array B140i Controller is only available in UEFI Boot Mode. It cannot be enabled in Legacy BIOS Boot Mode. If the B140i controller is disabled, drives connected to the system board Mini-SAS connectors operate in AHCI or Legacy mode. Under this condition:

- The drives cannot be a part of a hardware RAID or a logical drive.
- The Locate, Drive status, and Do not remove LEDs of the affected drives are disabled.

  Use BIOS/Platform Configuration (RBSU) in the **UEFI System Utilities** to enable or disable the B140i controller (System Configuration ® BIOS/Platform Configuration (RBSU) ® System Options ® SATA Controller Options ® Embedded SATA Configuration).

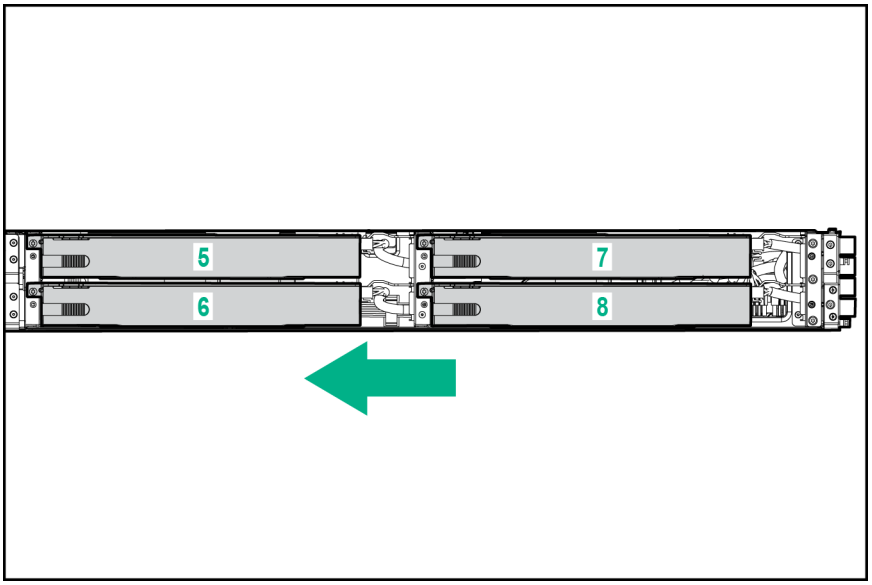
GPU accelerator numbering

- Server left GPU accelerator numbering



Item	Description
1	GPU 1
2	GPU 2
3	GPU 3
4	GPU 4

- Server right GPU accelerator numbering

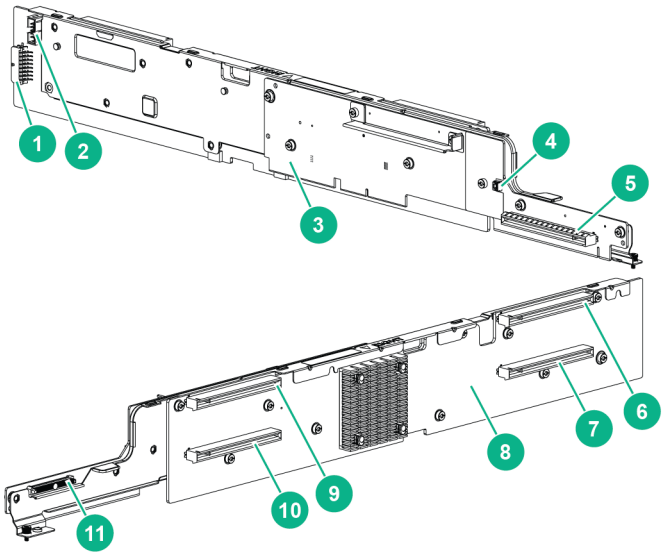


Item	Description
5	GPU 5
6	GPU 6
7	GPU 7
8	GPU 8

NOTE: The arrow indicates the front of the server.

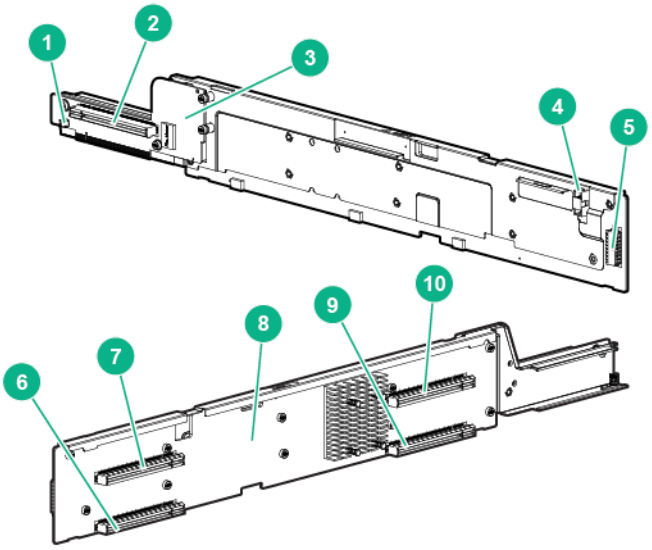
PCI riser module components

- Right 8:1 PCI riser module



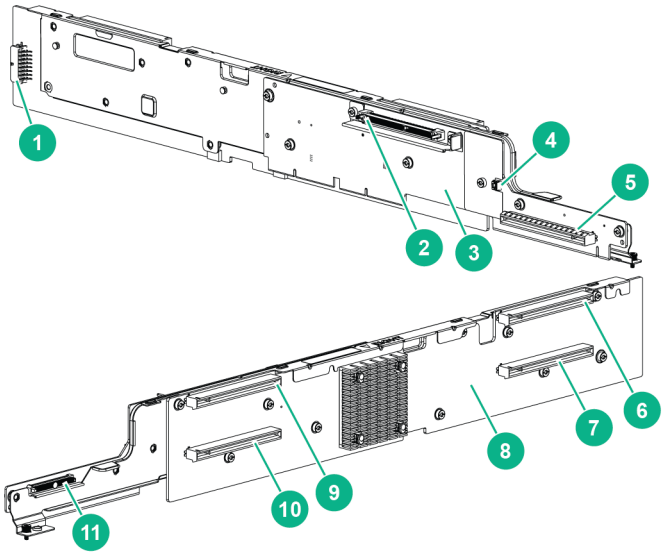
Item	Description
1	Riser module power connector
2	8:1 sideband cable connector
3	Right 8:1 interposer board
4	Storage backup power connector
5	Slot 10 PCIe3 x16 (16, 8, 4, 1) for Processor 1
6	GPU sllot 7 PCIe3 x16 (16, 8, 4, 1) for Processor 1
7	GPU slot 8 PCIe3 x16 (16, 8, 4, 1) for Processor 1
8	Right 8:1 GPU riser board
9	GPU slot 5 PCIe3 x16 (16, 8, 4, 1) for Processor 1
10	GPU slot 6 PCIe3 x16 (16, 8, 4, 1) for Processor 1
11	Slot 11 PCIe3 x16 (16, 8, 4, 1) for Processor 1

- Left 8:1 PCI riser module



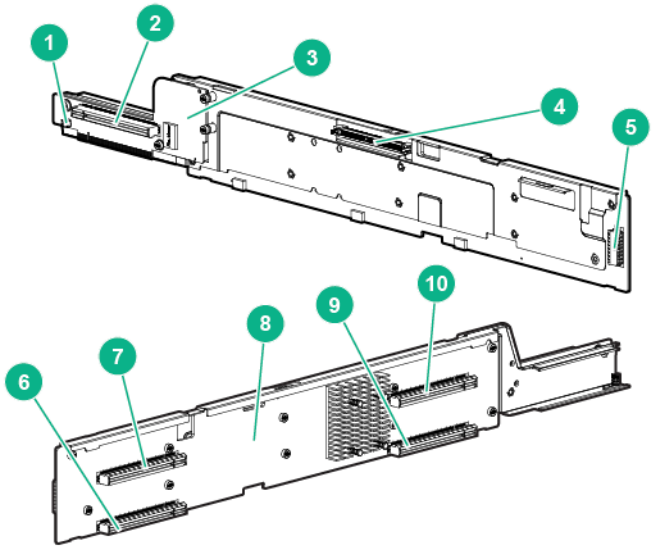
Slot number	Slot description
1	Storage backup power connector
2	Slot 9 PCIe3 x16 (16, 8, 4, 1) for Processor 1
3	Left 8:1 interposer board
4	8:1 sideband cable connector
5	Riser module power connector
6	GPU slot 4 PCIe3 x16 (16, 8, 4, 1) for Processor 1
7	GPU slot 3 PCIe3 x16 (16, 8, 4, 1) for Processor 1
8	Left 8:1 GPU riser board
9	GPU slot 2 PCIe3 x16 (16, 8, 4, 1) for Processor 1
10	GPU slot 1 PCIe3 x16 (16, 8, 4, 1) for Processor 1

- Right 4:1 PCI riser module



Item	Description
1	Riser module power connector
2	4:1 riser signal cable connector
3	Right 4:1 interposer board
4	Storage backup power connector
5	Slot 10 PCIe3 x16 (16, 8, 4, 1) for Processor 2
6	GPU slot 7 PCIe3 x16 (16, 8, 4, 1) for Processor 2
7	GPU slot 8 PCIe3 x16 (16, 8, 4, 1) for Processor 2
8	Right 4:1 GPU riser board
9	GPU slot 5 PCIe3 x16 (16, 8, 4, 1) for Processor 2
10	GPU slot 6 PCIe3 x16 (16, 8, 4, 1) for Processor 2
11	Slot 11 PCIe3 x16 (16, 8, 4, 1) for Processor 1

- Left 4:1 PCI riser module



Item	Description
1	Storage backup power connector
2	Slot 9 PCIe3 x16 (16, 8, 4, 1) for Processor 1
3	Left 4:1 interposer board
4	4:1 riser signal connector
5	Riser module power connector
6	GPU slot 4 PCIe3 x16 (16, 8, 4, 1) for Processor 1
7	GPU slot 3 PCIe3 x16 (16, 8, 4, 1) for Processor 1
8	Left 4:1 GPU riser board

Table Continued

9	GPU slot 2 PCIe3 x16 (16, 8, 4, 1) for Processor 1
10	GPU slot 1 PCIe3 x16 (16, 8, 4, 1) for Processor 1

Operations

Powering up the server

The SL/XL Chassis Firmware initiates an automatic power-up sequence when the servers are installed. If the default setting is changed, use one of the following methods to power up each server:

- Use a virtual power button selection through iLO .
- Press and release the Power On/Standby button.

When the server goes from the standby mode to the full power mode, the server power LED changes from amber to green.

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

Powering down the server

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

CAUTION:
Before powering down the server, perform a backup of critical server data and programs. Removing the server while the Do not remove LED is on may result in data loss or corruption. The server can be safely removed from the chassis only after the **Do not remove LED is off**.

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.

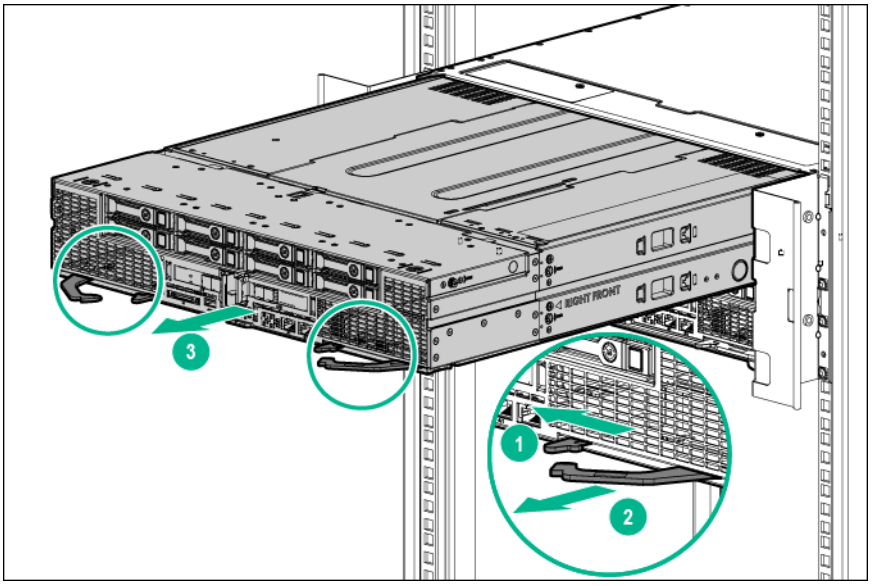
Removing the server from the chassis

CAUTION:
Before powering down the server, perform a backup of critical server data and programs. Removing the server while the Do not remove LED is on may result in data loss or corruption. The server can be safely removed from the chassis only after the **Do not remove LED is off**.

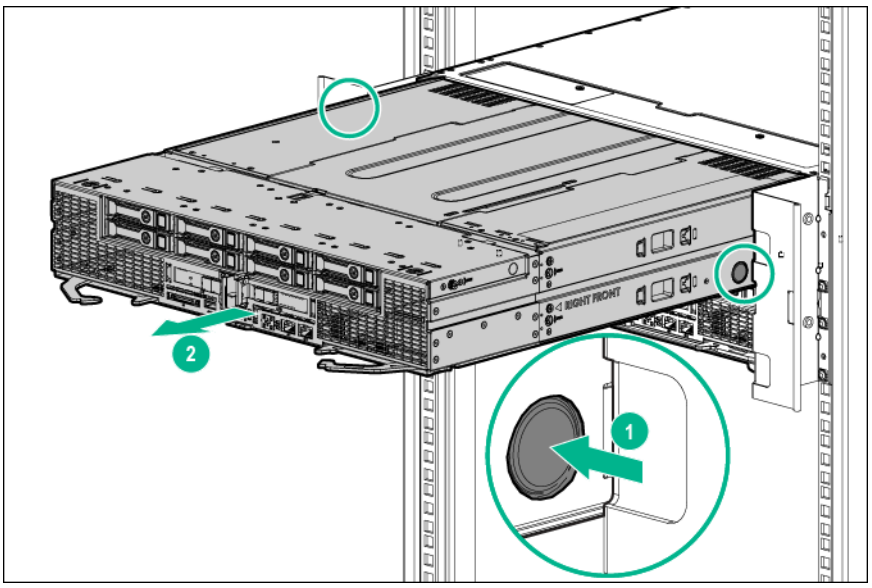
CAUTION:
To avoid damage to the server , always support the bottom of the server when removing it from the server .

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. Extend the server from the chassis:
   a. Release the safety latches.
   b. Pull back the handles.
   c. Extend the server from the chassis until the server locks are engaged.



5. Remove the server from the chassis:
   a. Press on the server release latches.
   b. Slide the server out of the chassis.

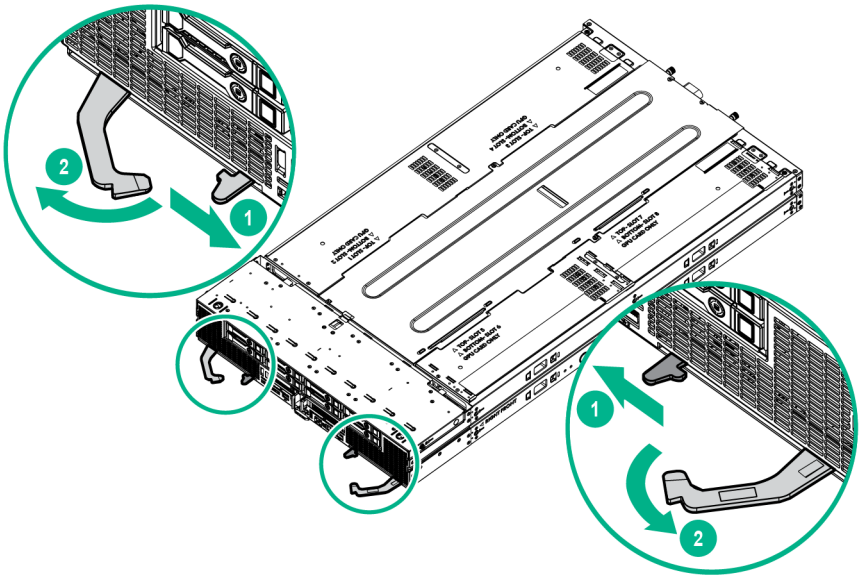


6. Place the server on a sturdy, level surface.

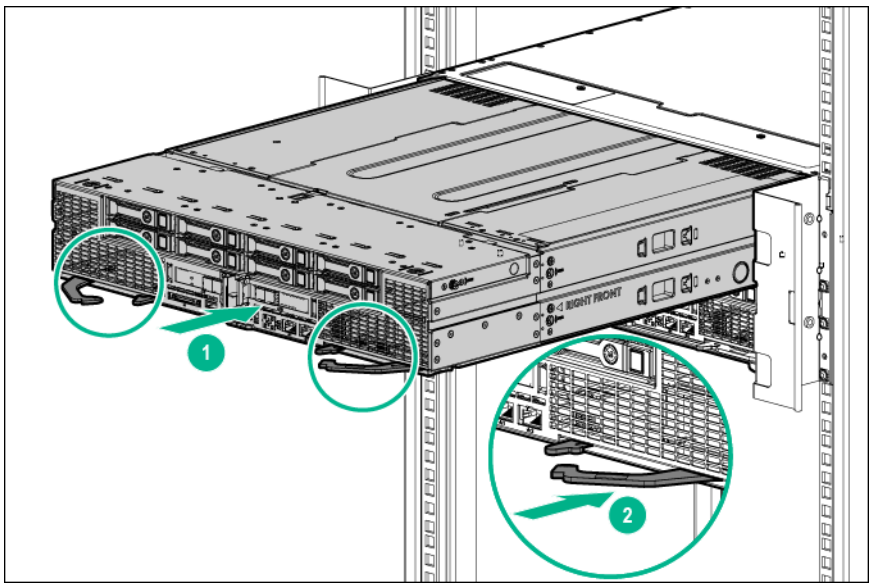
Installing the server into the chassis

Procedure

1. Prepare the server:
   a. Release the safety latches.
   b. Pull back the handles.



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

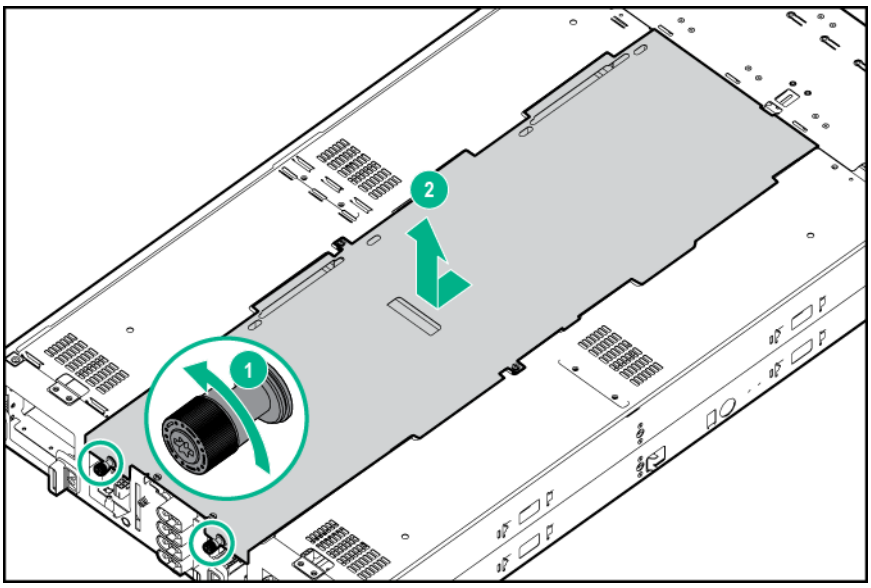


3. Connect all peripheral cables to the server .
4. **Power up the server** .

Removing the access panel

Procedure

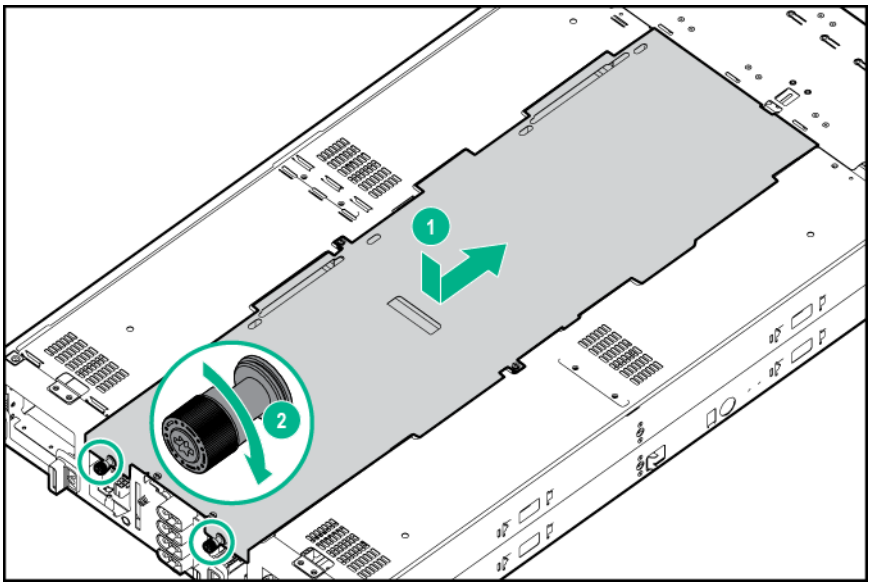
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. Remove the access panel:
   a. Loosen the thumbscrews.
   b. Slide the access panel towards the rear and lift it from the server.



Installing the access panel

Procedure

1. Install the access panel:
   a. Place the access panel on top of the server and slide it into place.
   b. Tighten the thumbscrews.



2. **Install the server into the chassis**.
3. Connect all peripheral cables to the server .
4. **Power up the server** .

Removing the side panel

Procedure

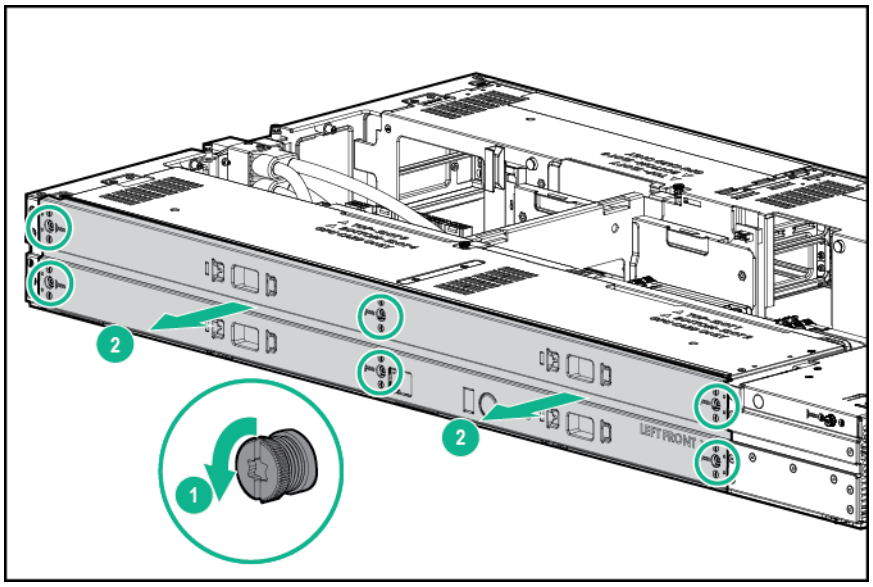
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis** .
5. Place the server on a sturdy, level surface.

   NOTE: To access GPU slots 1 to 4, remove the left side panel. To access GPU slots 5 to 8, remove the right side panel.

6. Remove the side panel:
   a. Loosen the six captive screws.

      CAUTION:
      To prevent damage to the server or components, do not rotate the side panel downward or upward.

   b. Using both hands, hold the four notches and remove the side panel in a horizontal motion.



Installing the side panel

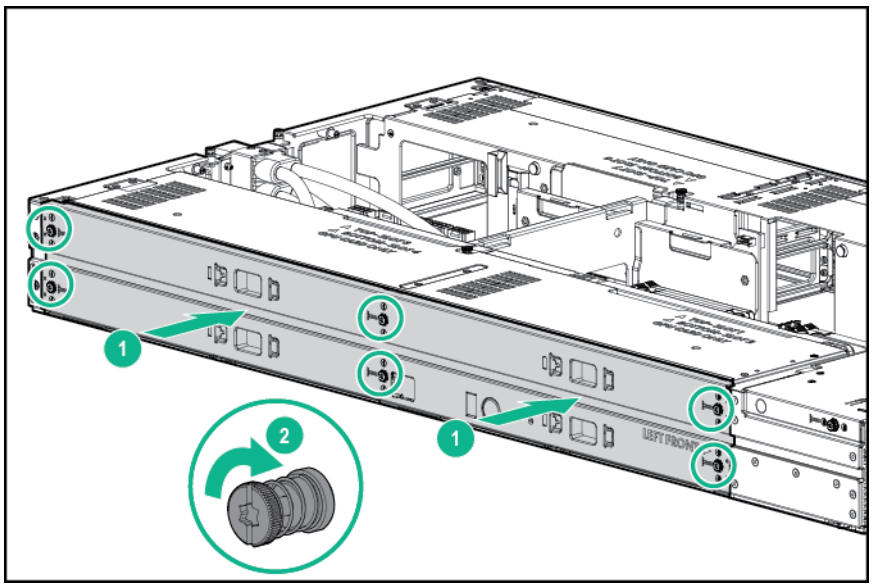
Procedure

1. Install the side panel:

CAUTION:
To prevent damage to the server or components, do not rotate the side panel downward or upward.

a. Using both hands, hold the four notches and install the side panel in a horizontal motion.

b. Tighten the six captive screws.

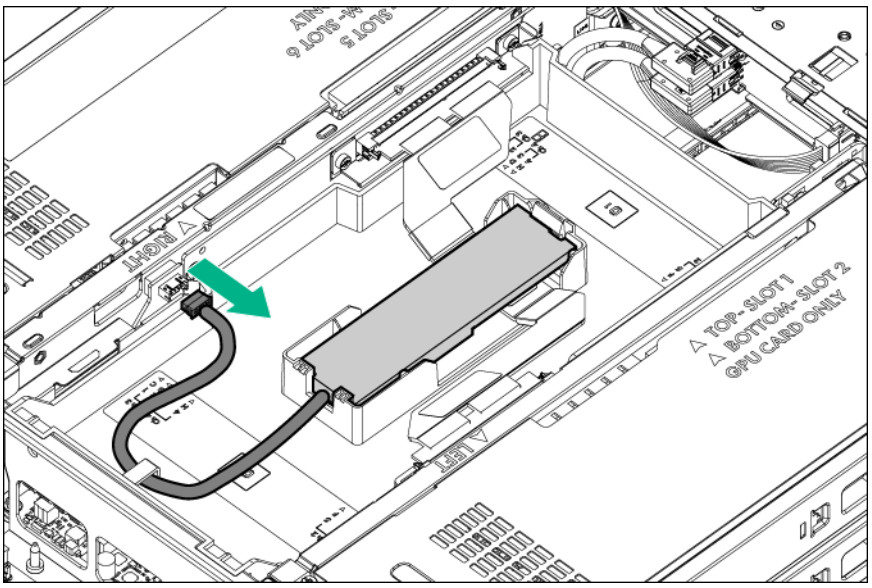


2. **Install the server into the chassis**.
3. Connect all peripheral cables to the server .
4. **Power up the server** .

Removing the air baffle

Procedure

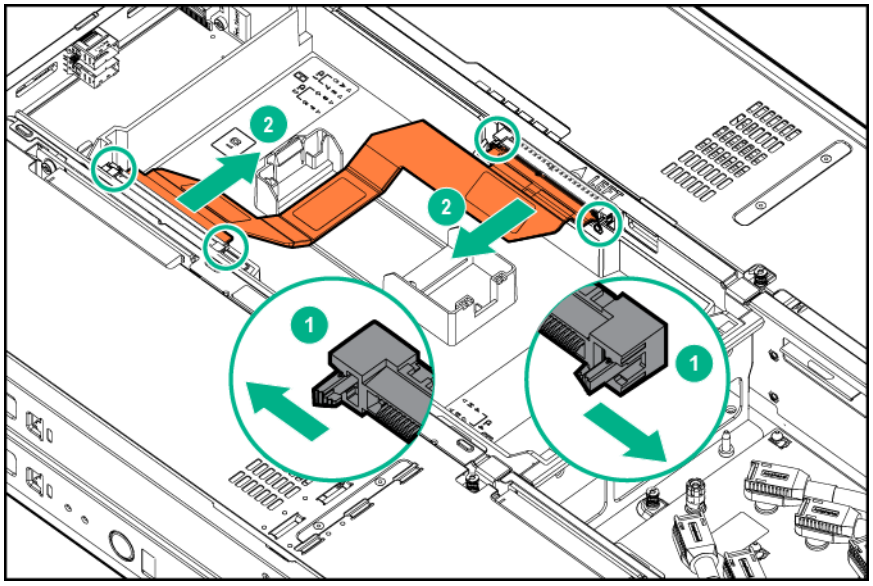
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. If a Smart Storage Battery is installed, disconnect the cable from the riser board.



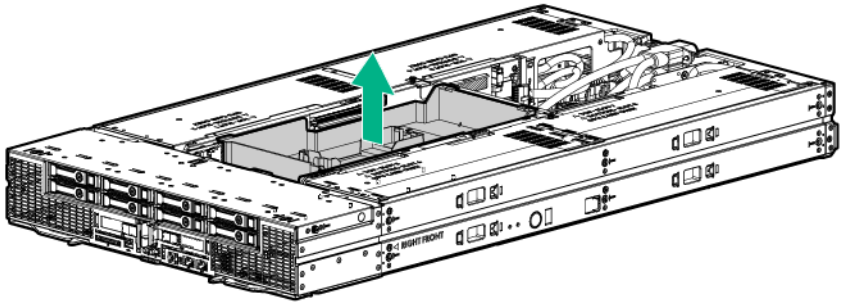
8. If installed, disconnect the 4:1 riser signal cable:

   a. Open the latches on the connectors.

   b. Disconnect the cable from the connectors.



9. Remove the air baffle.



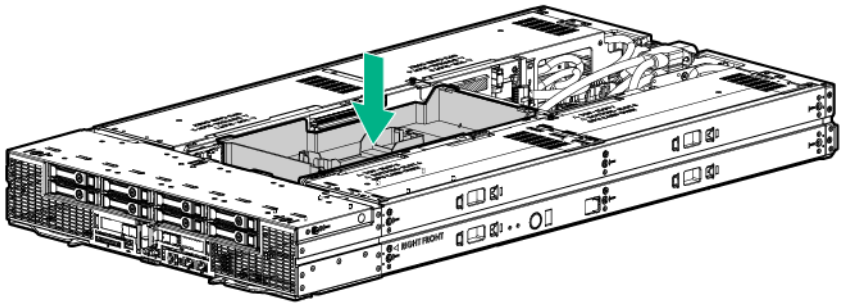
Installing the air baffle

Install the air baffle

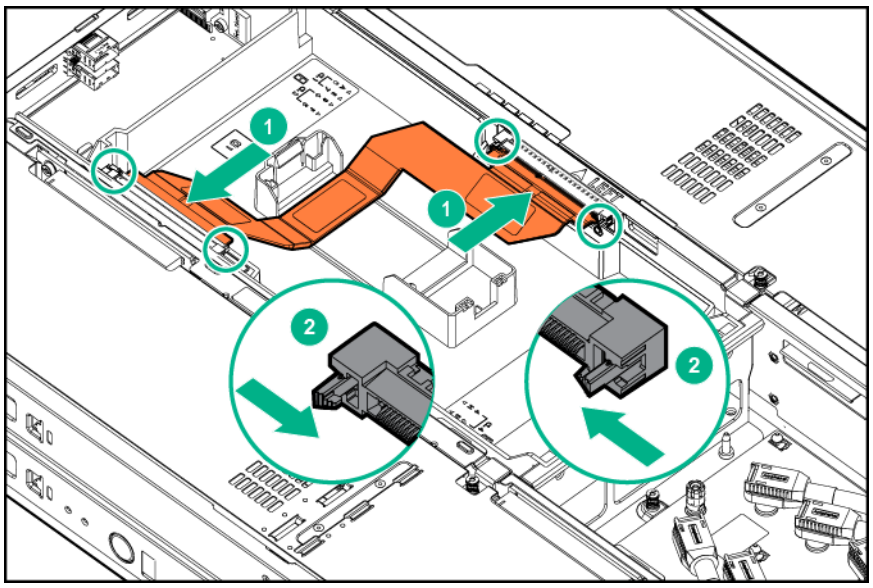
CAUTION:
To prevent damage to the server, ensure that all DIMM latches are in closed and locked position before installing the air baffle.

Procedure

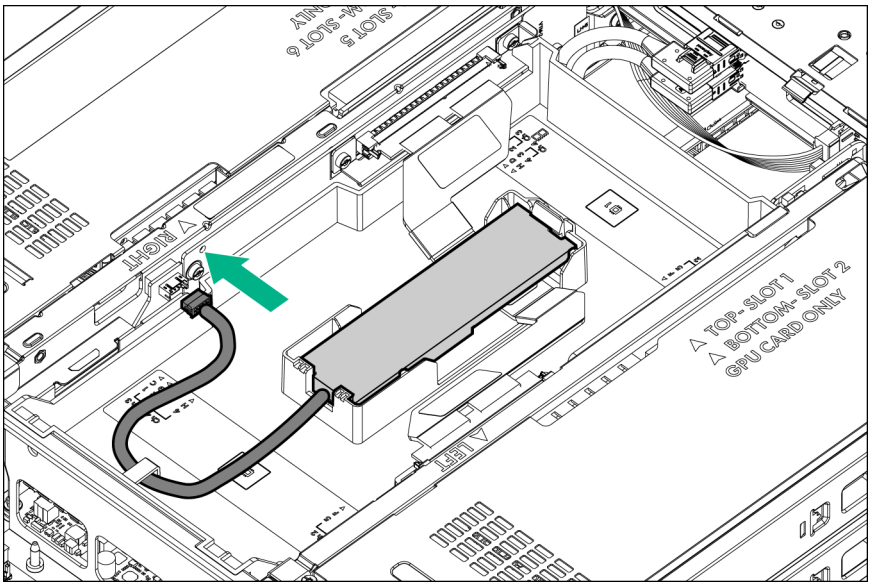
1. Install the air baffle.



2. If removed, connect the 4:1 riser signal cable:
   a. Connect the cable to both the connectors.
   b. Ensure that the latches are closed.



3. If a Smart Storage Battery is installed, reconnect the cable to the riser board.



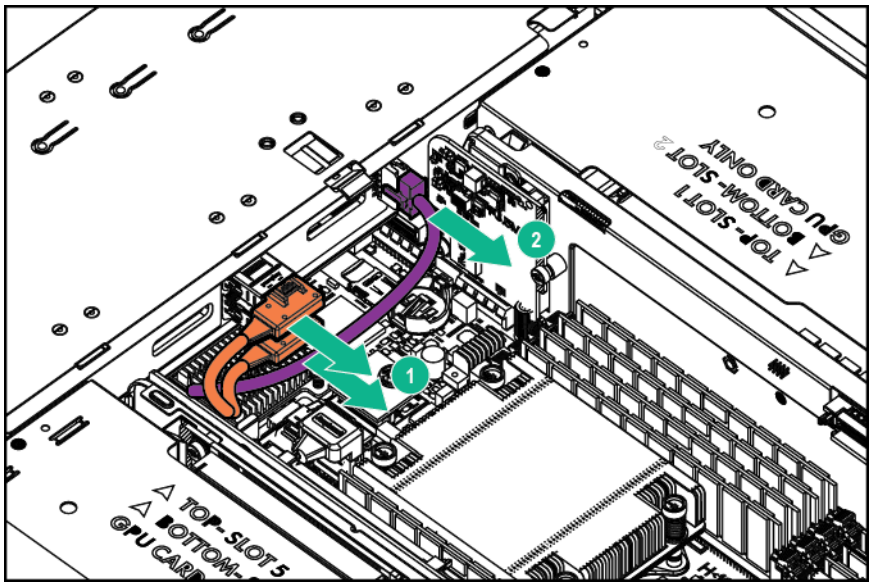
4. **Install the access panel**.
5. **Install the server into the chassis**.
6. Connect all peripheral cables to the server.
7. **Power up the server** .

Removing the drive cage assembly

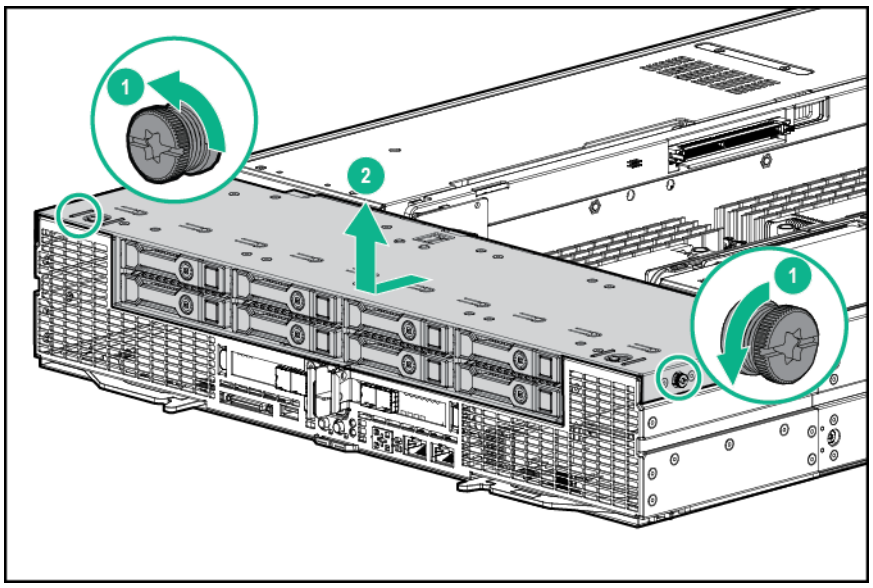
Procedure

1. Back up all server data.
2. **Power down the server** .

3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis** .
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Disconnect the cables from the drive backplane:
   a. Disconnect the Mini-SAS cables.
   b. Disconnect the power cable.



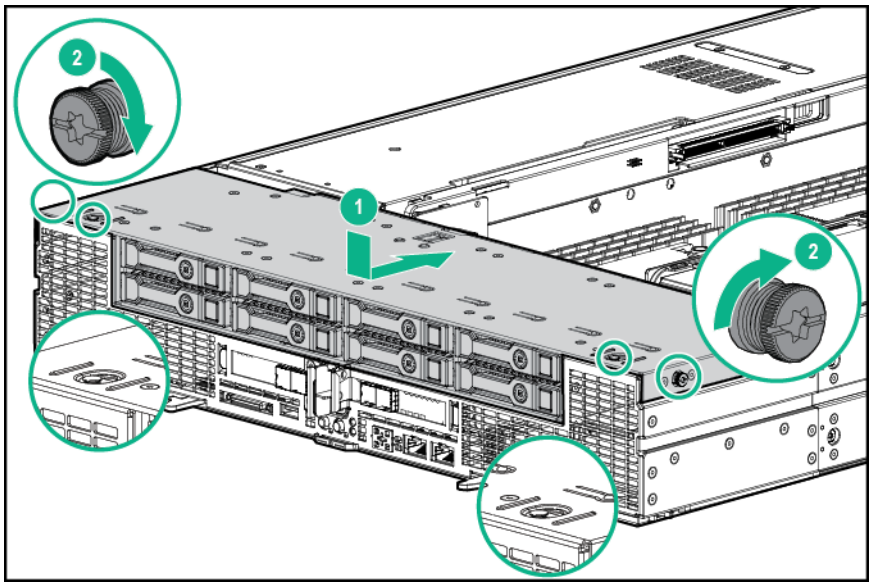
9. Remove the drive cage assembly:
   a. Loosen the captive screws.
   b. Slide the drive cage assembly towards the front and lift it from the server.



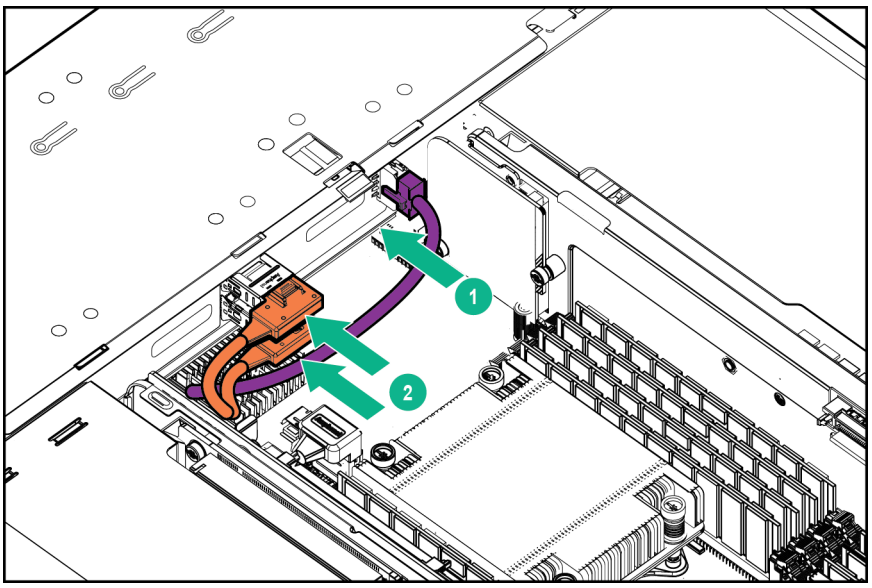
Installing the drive cage assembly

Procedure

1. Install the drive cage assembly:
   a. Lower the drive cage assembly into the server and slide it towards the rear to align the screw holes with the captive screws.
   b. Tighten the captive screws.



2. Connect the cables to the drive backplane.



3. **Install the air baffle**.

   If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."

4. **Install the access panel**.
5. **Install the server into the chassis**.
6. Connect all peripheral cables to the server .
7. **Power up the server** .

Setup

Optional service

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[1]
  - 4-Hour 24x7
  - Next Business Day
- Proactive Care – Help prevent service incidents and get you to technical experts when there is one.
  - 6-Hour Call-to-Repair[1]
  - 4-Hour 24x7
  - Next Business Day
- Deployment service for both hardware and software
- HPE Education Services – Help train your IT staff.

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

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

Server warnings and cautions

WARNING:

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

- Observe local occupational health and safety requirements and guidelines for manual handling.
- Reduce the weight of the server by removing the drives before installing or removing the server from the chassis.
- Obtain adequate assistance to lift and stabilize the server during installation or removal. Hewlett Packard Enterprise recommends that a minimum of two people are required for installing or removing the server from the chassis. A third person might be required to help align the server if the server is installed higher than chest level.
- Use caution when installing or removing the server from the chassis; it is unstable when the server locks are not engaged with the chassis.

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:
Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning this procedure.

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.

Server shipping carton contents

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server. All the rack mounting hardware necessary for installing the server into the rack is included with the rack or the server.

The contents of the server shipping carton include:

- Server
- Printed setup documentation
- Accessory kit

Prerequisites for installing the options

In addition to the supplied items, you might need:

- T-25 Torx screwdriver (to secure the chassis in the rack)
- T-10/T-15 Torx screwdriver
- Flathead screwdriver (to remove the knockout on the dedicated iLO connector opening)
- Hardware options

Installation overview

Installation of a server requires the following steps:

1. Install the chassis into a rack.
2. **Install any server options** .
3. **Install the server into the chassis**.
4. **Install an operating system**.
5. **Install system software**.
6. **Register the product**.

Installing the chassis into a rack

To install the server into a rack, see the *Setup and Installation Guide* on the **Hewlett Packard Enterprise website**. For more information, see the instructions included with the rail kit.

Installing hardware options

Before installing and initializing the server , install any hardware options. For options installation information, see the documentation that ships with the option. For server -specific information, see "**Hardware options installation**."

Installing the operating system

To operate properly, the server must have a supported operating system installed. For the latest information on operating system support, see the Hewlett Packard Enterprise website (**http://www.hpe.com/info/supportos**).

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 *HPE Intelligent Provisioning User Guide* and online help.

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

- Manual installation—Insert the operating system CD into the USB-attached DVD-ROM drive (user provided) and reboot the server. You must download the Service Pack for ProLiant from the SPP download site (**http://www.hpe.com/servers/spp/download**) and create SPP media so that you can install the drivers.
- Remote deployment installation—Use Insight Control server provisioning for an automated solution to remotely deploy an operating system.

For additional system software and firmware updates, download the Service Pack for ProLiant from the Hewlett Packard Enterprise website (**http://www.hpe.com/servers/spp/download**). Software and firmware should be updated before using the node for the first time, unless any installed software or components require an older version.

For more information on using these installation methods, see the Hewlett Packard Enterprise website (**http://www.hpe.com/info/ilo**).

Installing the system software

To access and configure Intelligent Provisioning on a single server:

Procedure

1. Access Intelligent Provisioning by rebooting the server and pressing **F10**.
2. The first time you log into Intelligent Provisioning, follow the steps to set preferences and activate Intelligent Provisioning.
3. From the Home screen, click **Perform Maintenance**, and then click **Firmware Update**.
4. Ensure the latest drivers are available for installation. Select **Intelligent Provisioning Software** from the list of firmware, and click **Update**. If the check box is not selected, the latest drivers are already installed.

Registering the server

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

Hardware options installation

Product QuickSpecs

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

Introduction

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

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

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

Drive options

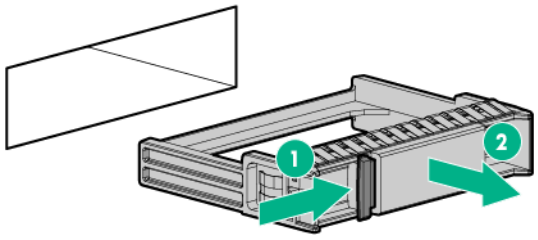
The embedded Dynamic Smart Array B140i Controller only supports SATA devices. For SAS drive installation, install a **Host Bus Adapter or a Smart Array Controller**.

To accurately estimate the power consumption of the server and select the appropriate power configuration and other system components, see the **Hewlett Packard Enterprise Power Advisor website**.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

Removing a drive blank

Remove the drive blank.

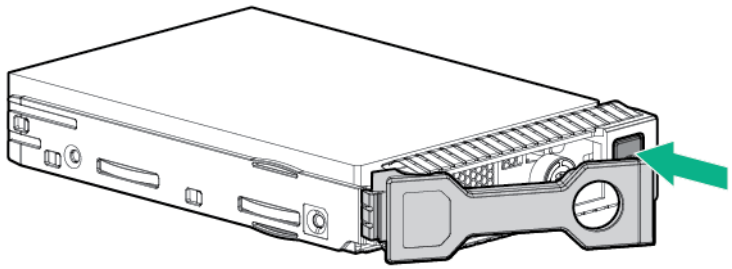


Installing a hot-plug drive

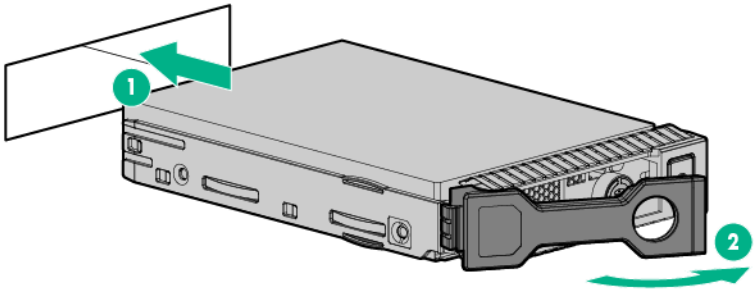
WARNING:
To reduce the risk of injury from electric shock, do not install more than one drive carrier at a time.

Procedure

1. **Remove the drive blank**.
2. Prepare the drive.



3. Install the drive.



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

To configure arrays, see the *HPE Smart Storage Administrator User Guide* on the **Hewlett Packard Enterprise website**.

Processor option

Processor and heatsink installation warnings and cautions

CAUTION:
To avoid damage to the processor and 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:
The heatsink thermal interface media is not reusable and must be replaced if the heatsink is removed from the processor after it has been installed.

IMPORTANT:
Processor socket 1 must be populated at all times or the server does not function.

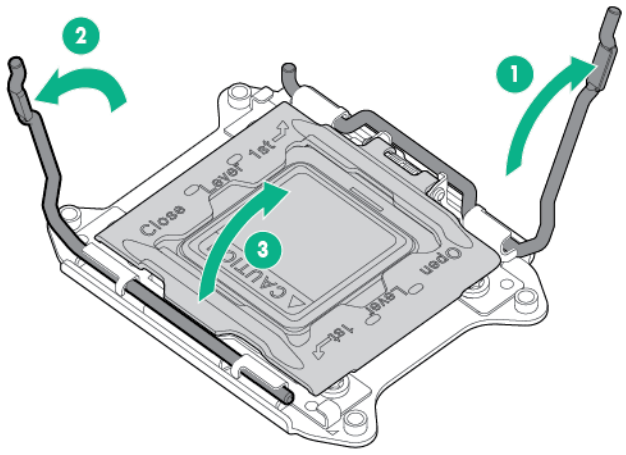
Installing the processor and heatsink

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

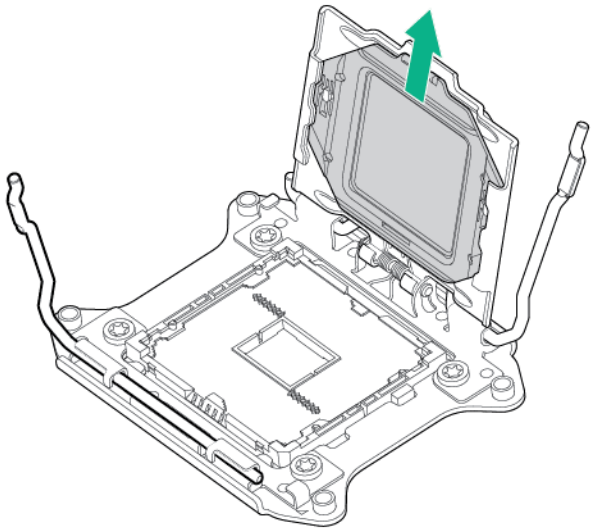
To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis** .
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Open each of the processor locking levers in the order indicated in the following illustration, and then open the processor retaining bracket.

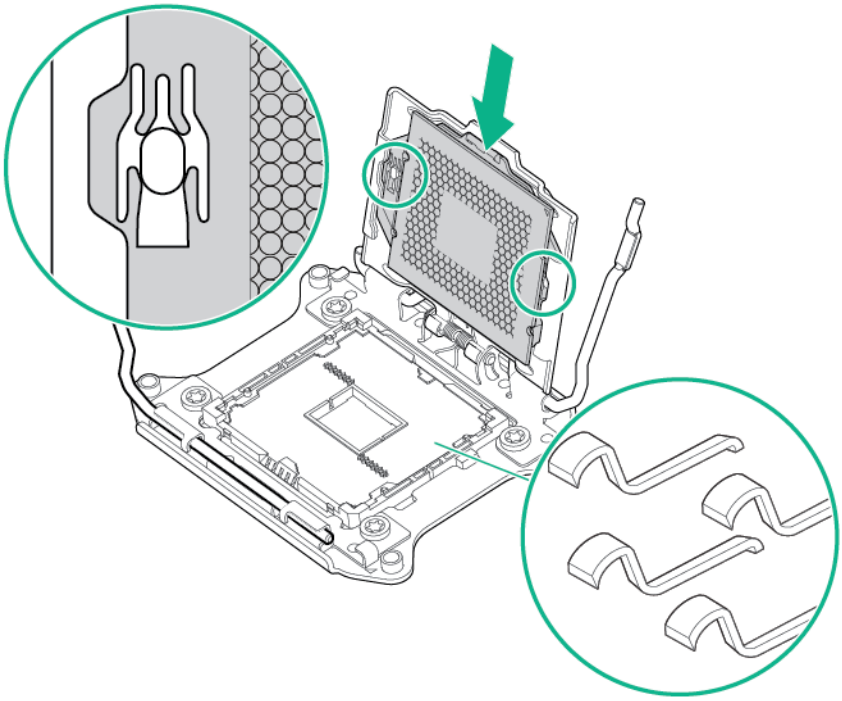


9. Remove the clear processor socket cover. Retain the processor socket cover for future use.



CAUTION:
To avoid damage to the processor, do not touch the bottom of the processor, especially the contact area.

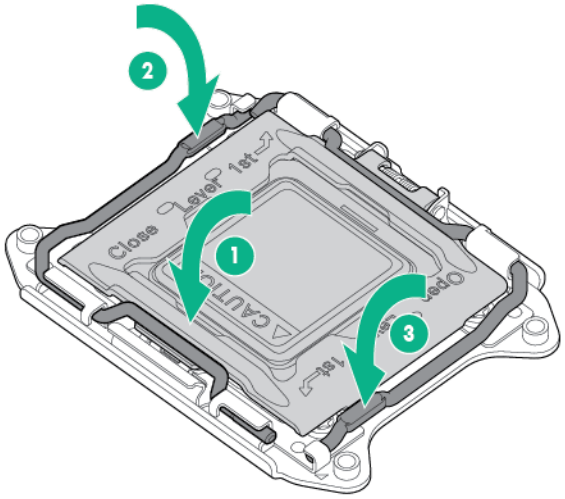
10. Install the processor. Verify that the processor is fully seated in the processor retaining bracket by visually inspecting the processor installation guides on either side of the processor. **THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED**.



CAUTION:
THE PINS ON THE SYSTEM BOARD ARE VERY FRAGILE AND EASILY DAMAGED. To avoid damage to the system board, do not touch the processor or the processor socket contacts.

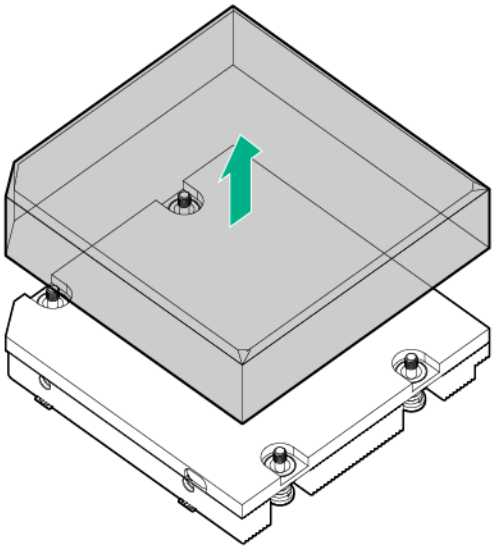
CAUTION:
Do not press down on the processor. Pressing down on the processor might damage the processor socket and the system board. Press only in the area indicated on the processor retaining bracket.

11. Close the processor retaining bracket. When the processor is installed properly inside the processor retaining bracket, the processor retaining bracket clears the flange on the front of the socket.
12. Press and hold the processor retaining bracket in place, and then close each processor locking lever. Press only in the area indicated on the processor retaining bracket.



CAUTION:
Always use a new heatsink when replacing processors. Failure to use new components can cause damage to the processor.

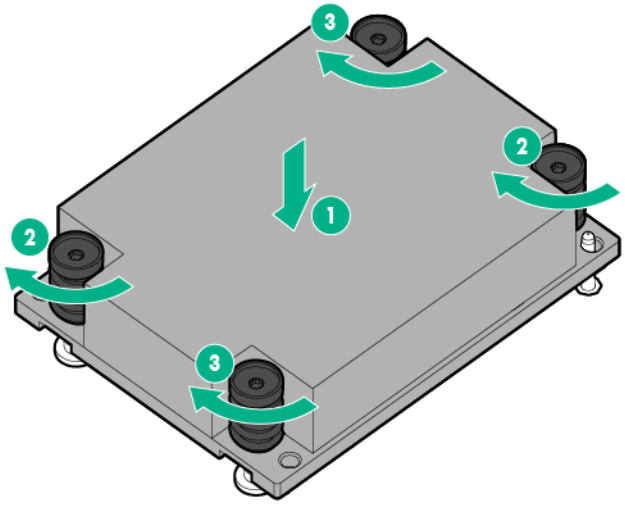
13. Remove the thermal interface protective cover from the heatsink.



CAUTION:
Heatsinks specified for processor 1 and 2 are not interchangeable. Be sure to note the appropriate orientation on the heatsink label.

CAUTION:
Heatsink retaining screws should be tightened or loosened in diagonally opposite pairs (in an "X" pattern). Do not overtighten the screws as this can damage the board, connectors, or screws.

14. Install the heatsink:
    a. Position the heatsink on the processor backplate.
    b. Tighten one pair of diagonally opposite screws halfway, and then tighten the other pair of screws.
    c. Finish the installation by completely tightening the screws in the same sequence.



15. **Install the air baffle**.
    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
16. **Install the access panel**.
17. **Install the server into the chassis**.
18. Connect all peripheral cables to the server .
19. **Power up the server** .

Memory options

IMPORTANT:
This server does not support mixing LRDIMMs or RDIMMs. Attempting to mix any combination of these DIMMs can cause the node to halt during BIOS initialization.

The memory subsystem in this node can support LRDIMMs and RDIMMs:

- RDIMMs offer address parity protection.
- LRDIMMs support higher densities than single- and dual-rank RDIMMs, and higher speeds than quad-rank RDIMMs. This support enables you to install more high capacity DIMMs, resulting in higher system capacities and higher bandwidth.

All types are referred to as DIMMs when the information applies to all types. When specified as LRDIMM or RDIMM, the information applies to that type only. All memory installed in the node must be the same type.

DIMM specifications

DIMM specifications

Type	Rank	Capacity (GB)	Native speed (MT/s)	Voltage
RDIMM	Single	8	2400	STD
RDIMM	Single	16	2400	STD
RDIMM	Dual	32	2400	STD
LRDIMM	Dual	32	2400	STD
LRDIMM	Quad	64	2400	STD

Populated DIMM speed (MT/s)

Operating memory speed is a function of rated DIMM speed, the number of DIMMs installed per channel, processor model, and the speed selected in the BIOS/Platform Configuration (RBSU) of the **UEFI System Utilities**

Type	Rank	1 DIMM per channel (MT/s)	2 DIMMs per channel (MT/s)
RDIMM	Single	2400	2133
RDIMM	Dual	2400	2133
LRDIMM	Dual	2400	2400
LRDIMM	Quad	2400	2400

Maximum memory capacity

Maximum memory capacity is a function of DIMM capacity, number of installed DIMMs, memory type, and number of installed processors.

DIMM type	DIMM rank	Capacity (GB)	Maximum capacity for one processor (GB)	Maximum capacity for two processors (GB)
RDIMM	Single-rank	8	64	128
RDIMM	Single-rank	16	128	256
RDIMM	Dual-rank	32	256	512
LRDIMM	Dual-rank	32	256	512
LRDIMM	Quad-rank	64	512	1024

SmartMemory

SmartMemory authenticates and unlocks certain features available only on Qualified memory and verifies whether installed memory has passed Hewlett Packard Enterprise qualification and test processes. Qualified memory is performance-tuned for ProLiant and BladeSystem servers and provides future enhanced support through Active Health and manageability software.

Memory subsystem architecture

The memory subsystem in this server is divided into channels. Each processor supports four channels, and each channel supports two DIMM slots, as shown in the following table.

Channel	Population order	Slot number
1	A	8
	E	7
2	B	6
	F	5
3	C	1
	G	2
4	D	3
	H	4

Single-, dual-, and quad-rank DIMMs

To understand and configure memory protection modes properly, an understanding of single-, dual-, and quad-rank DIMMs is helpful. Some DIMM configuration requirements are based on these classifications.

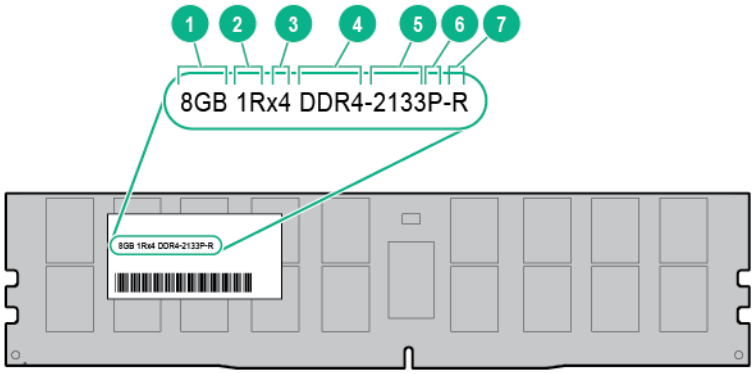
A single-rank DIMM has one set of memory chips that is accessed while writing to or reading from the memory. A dual-rank DIMM is similar to having two single-rank DIMMs on the same module, with only one rank accessible at a time. A quad-rank DIMM is, effectively, two dual-rank DIMMs on the same module. Only one rank is accessible at a time. The node memory control subsystem selects the proper rank within the DIMM when writing to or reading from the DIMM.

Dual- and quad-rank DIMMs provide the greatest capacity with the existing memory technology. For example, if current DRAM technology supports 8-GB single-rank DIMMs, a dual-rank DIMM would be 16 GB, and a quad-rank DIMM would be 32 GB.

LRDIMMs are labeled as quad-rank DIMMs. There are four ranks of DRAM on the DIMM, but the LRDIMM buffer creates an abstraction that allows the DIMM to appear as a dual-rank DIMM to the system. The LRDIMM buffer isolates the electrical loading of the DRAM from the system to allow for faster operation. This allows higher memory operating speed compared to quad-rank RDIMMs.

DIMM identification

To determine DIMM characteristics, use the label attached to the DIMM and the following illustration and table.



Item	Description	Definition
1	Capacity	4 GB 8 GB 16 GB 32 GB
2	Rank	1R = Single-rank 2R = Dual-rank 4R = Quad-rank
3	Data width	x4 = 4-bit x8 = 8-bit
4	Memory generation	DDR4
5	Maximum memory speed	2133 MT/s
6	CAS latency	P=15
7	DIMM type	R = RDIMM (registered) L = LRDIMM (load reduced)

Memory configurations

To optimize server availability, the server supports the following AMP modes:

- Advanced ECC—Provides up to 4-bit error correction and enhanced performance over Lockstep mode. This mode is the default option for this server .
- Online spare memory—Provides protection against failing or degraded DIMMs. Certain memory is reserved as spare, and automatic failover to spare memory occurs when the system detects a DIMM that is degrading. This allows DIMMs that have a higher probability of receiving an uncorrectable memory error (which would result in system downtime) to be removed from operation.

Advanced Memory Protection options are configured in the BIOS/Platform Configuration (RBSU). If the requested AMP mode is not supported by the installed DIMM configuration, the server boots in Advanced

ECC mode. For more information, see the *HPE UEFI System Utilities User Guide for ProLiant Gen9 Servers* on the **Hewlett Packard Enterprise website**.

Advanced ECC memory configuration

Advanced ECC memory is the default memory protection mode for this server . Standard ECC can correct single-bit memory errors and detect multi-bit memory errors. When multi-bit errors are detected using Standard ECC, the error is signaled to the server and causes the server to halt.

Advanced ECC protects the server against some multi-bit memory errors. Advanced ECC can correct both single-bit memory errors and 4-bit memory errors if all failed bits are on the same DRAM device on the DIMM.

Advanced ECC provides additional protection over Standard ECC because it is possible to correct certain memory errors that would otherwise be uncorrected and result in a server failure. Using HPE Advanced Memory Error Detection technology, the server provides notification when a DIMM is degrading and has a higher probability of uncorrectable memory error.

Online Spare memory configuration

Online spare memory provides protection against degraded DIMM s by reducing the likelihood of uncorrected memory errors. This protection is available without any operating system support.

Online spare memory protection dedicates one rank of each memory channel for use as spare memory. The remaining ranks are available for OS and application use. If correctable memory errors occur at a rate higher than a specific threshold on any of the non-spare ranks, the server automatically copies the memory contents of the degraded rank to the online spare rank. The server then deactivates the failing rank and automatically switches over to the online spare rank.

General DIMM slot population guidelines

Observe the following guidelines for all AMP modes:

- Install DIMMs only if the corresponding processor is installed.
- When two processors are installed, balance the DIMMs across the two processors.
- White DIMM slots denote the first slot of a channel (Ch 1-A, Ch 2-B, Ch 3-C, Ch 4-D)
- Do not mix RDIMMs and LRDIMMs.
- When one processor is installed, install DIMMs in sequential alphabetic order: A, B, C, D, E, F, and so forth.
- When two processors are installed, install the DIMMs in sequential alphabetic order balanced between the two processors: P1-A, P2-A, P1-B, P2-B, P1-C, P2-C, and so forth.
- When single-rank, dual-rank, and quad-rank DIMMs are populated for two DIMMs per channel or three DIMMs per channel, always populate the higher number rank DIMM first (starting from the farthest slot). For example, first quad-rank DIMM, then dual-rank DIMM, and then lastly single-rank DIMM.
- DIMMs should be populated starting farthest from the processor on each channel.
- For DIMM spare replacement, install the DIMMs per slot number as instructed by the system software.

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

Advanced ECC population guidelines

For Advanced ECC mode configurations, observe the following guidelines:

- Observe the general DIMM slot population guidelines.
- DIMMs may be installed individually.

Online spare population guidelines

For Online Spare memory mode configurations, observe the following guidelines:

- Observe the general DIMM slot population guidelines.
- Each channel must have a valid online spare configuration.
- Each channel can have a different valid online spare configuration.
- Each populated channel must have a spare rank. A single dual-rank DIMM is not a valid configuration.

Population order

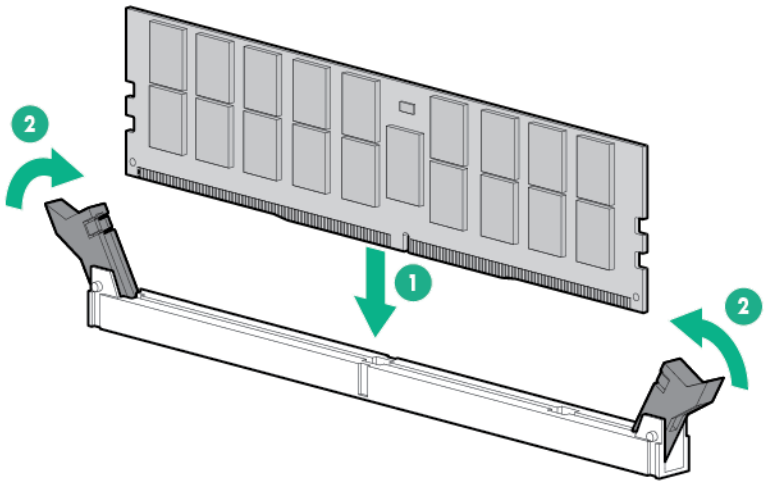
For memory configurations with a single processor or multiple processors, DIMMs must be populated sequentially in alphabetical order (A through H).

After installing the DIMMs, use the BIOS/Platform Configuration (RBSU) in the UEFI System Utilities to configure supported AMP modes.

Installing a DIMM

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis** .
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Open the DIMM slot latches.
9. Install the DIMM.



CAUTION:
To prevent damage to the server, ensure that all DIMM latches are in closed and locked position before installing the air baffle.

10. **Install the air baffle**.

    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
11. **Install the access panel**.
12. **Install the server into the chassis**.
13. Connect all peripheral cables to the server .
14. **Power up the server** .

PCI riser module options

For more information on installing GPU accelerators, see "**GPU accelerator options**."

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

Installing the 4:1 PCI riser modules

To install the component:

Procedure

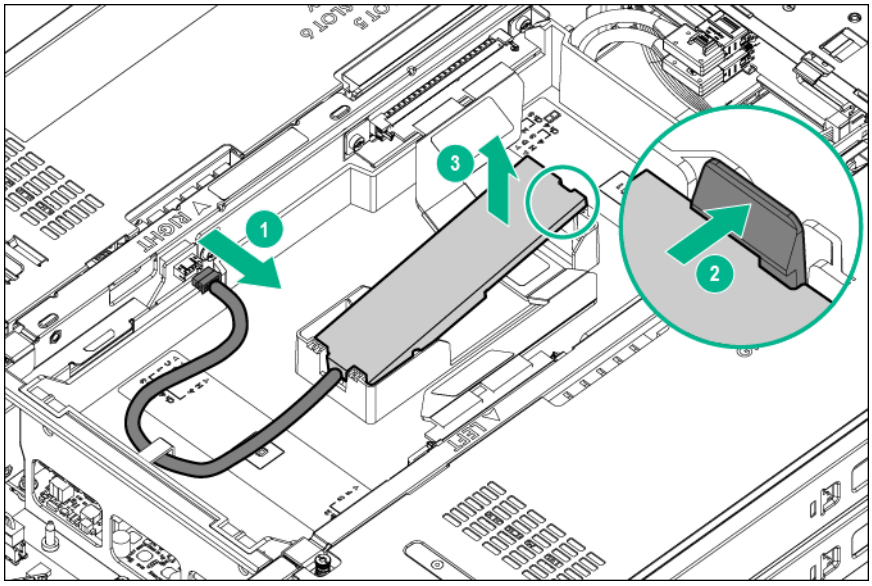
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis** .
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.

7. If installed, remove the Smart Storage Battery:

   a. Disconnect the cable from the riser connector.

   b. Pull back the release clip.

   c. Lift the Smart Storage Battery from the holder.



8. **Remove the air baffle**.

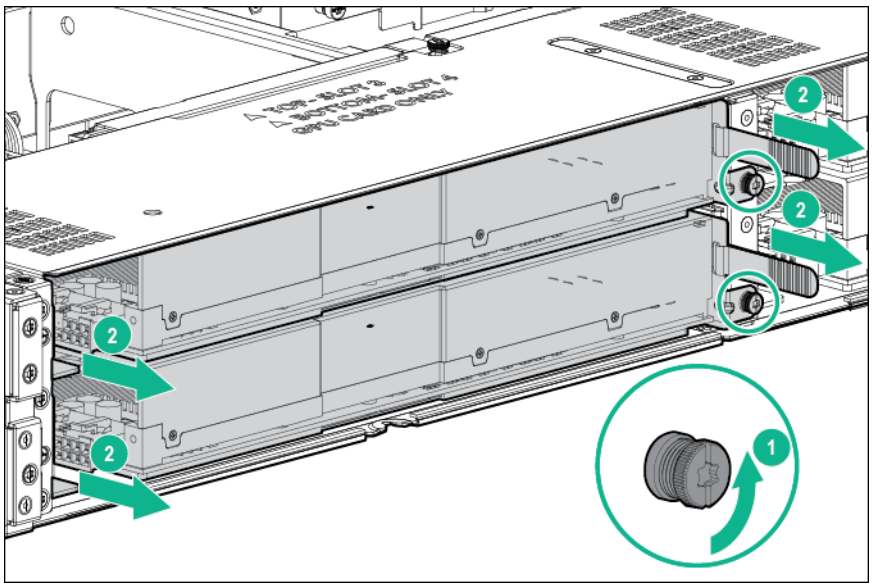
   IMPORTANT:
   Remove all GPUs, GPU blanks, and expansion boards before removing the PCI riser modules.

9. **Remove the side panel**.

10. Remove all GPUs:

    a. Loosen the captive screw.

    b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.

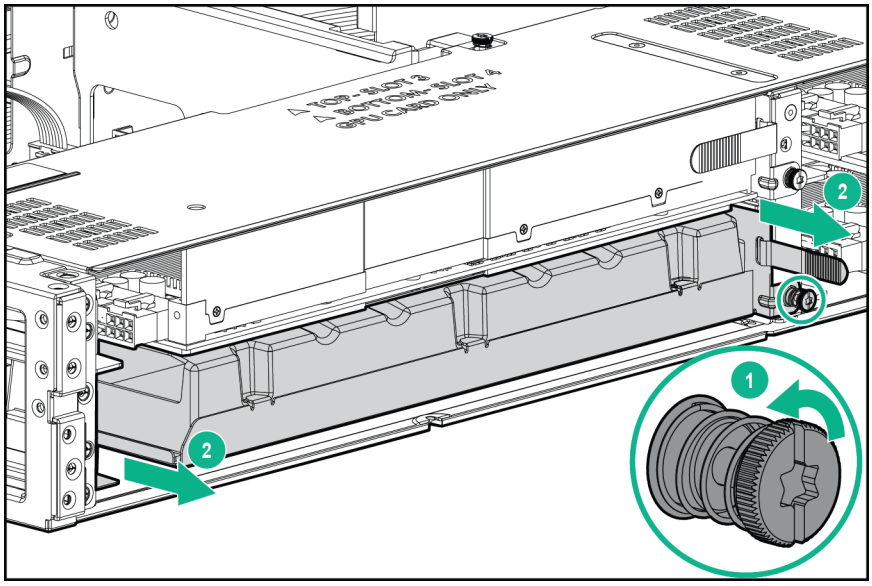


c. Disconnect the power cable from the GPU, and then remove the GPU from the server.

11. Remove all GPU blanks:

a. Loosen the captive screw.

b. Using both hands, gently pull the tab and the rear of the GPU blank.



c. Slide out the GPU blank from the server.

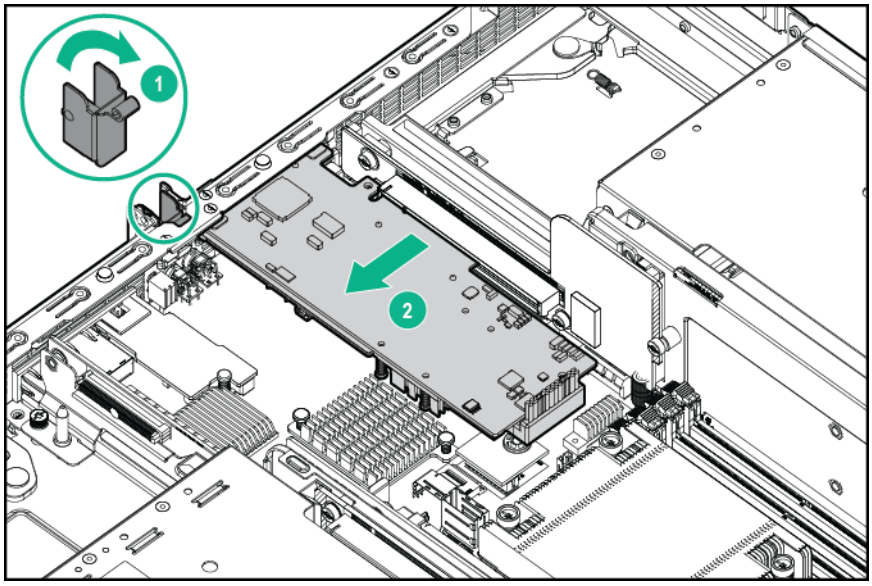
12. **Remove the drive cage assembly**.

13. Remove all expansion boards:

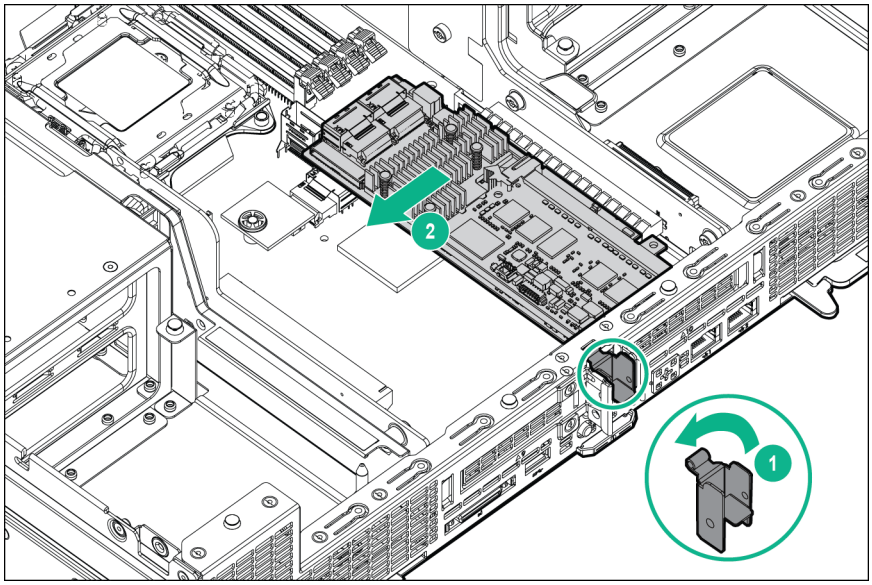
a. Disconnect any internal cables that are connected to the riser modules.

b. Remove the expansion board.

- Slot 9



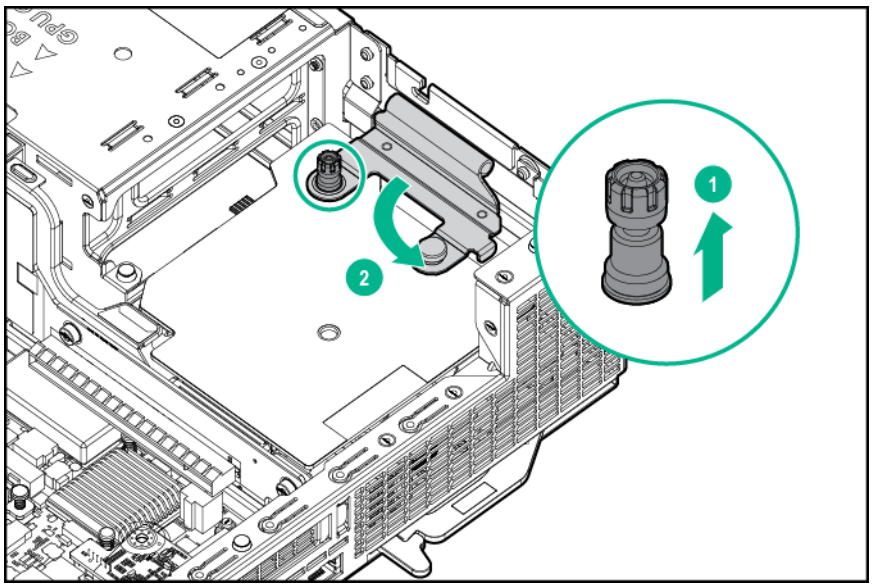
- Slot 10



14. If installed, remove the HPE Smart Array P542D controller module:

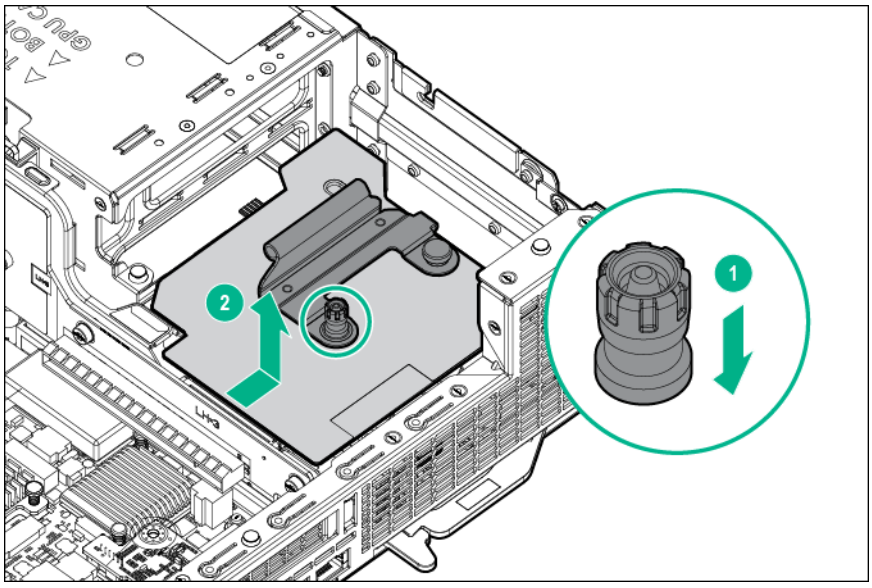
a. Pull up the pin.

b. Rotate the handle counter-clockwise.

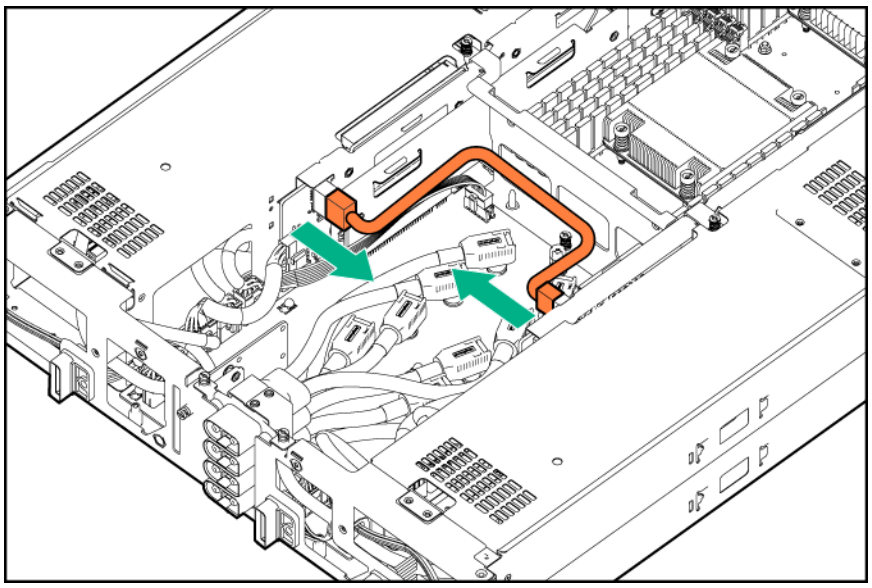


c. Push down the pin.

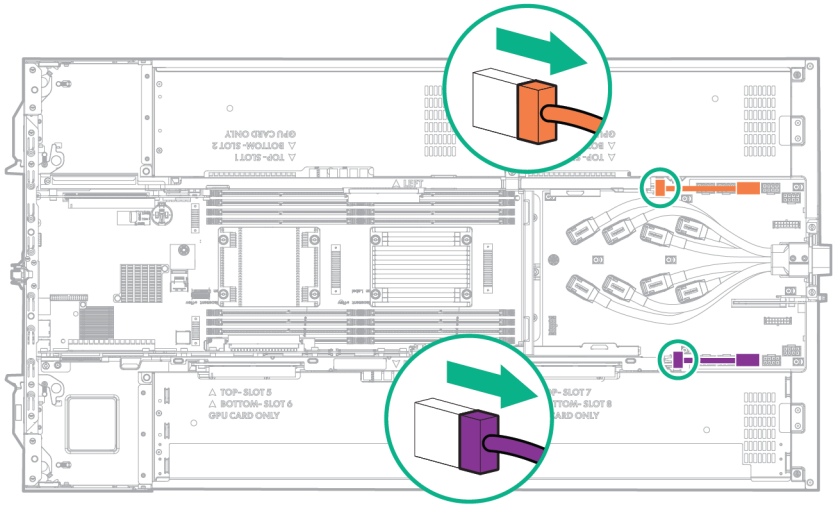
d. Slide the module out of the PCIe slot and remove it from the server.



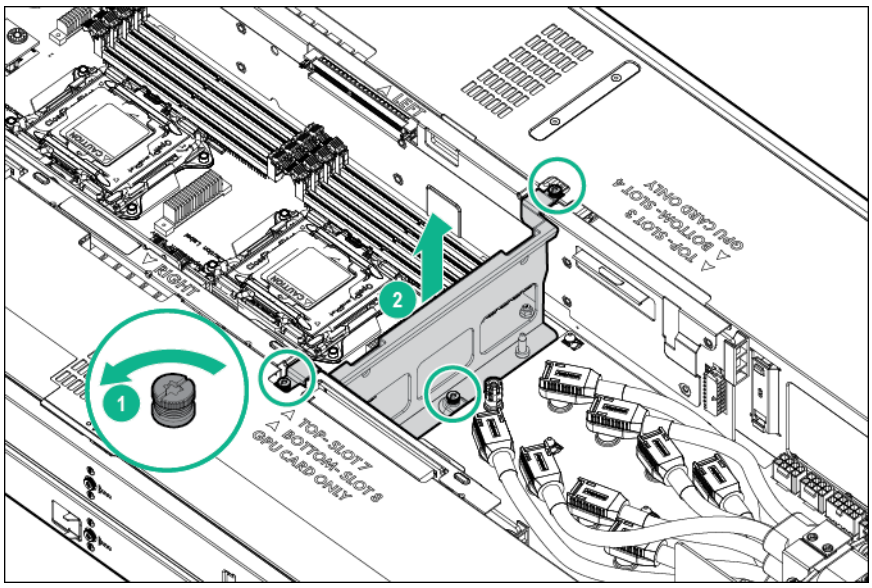
15. Disconnect and remove the 8:1 riser sideband cable.



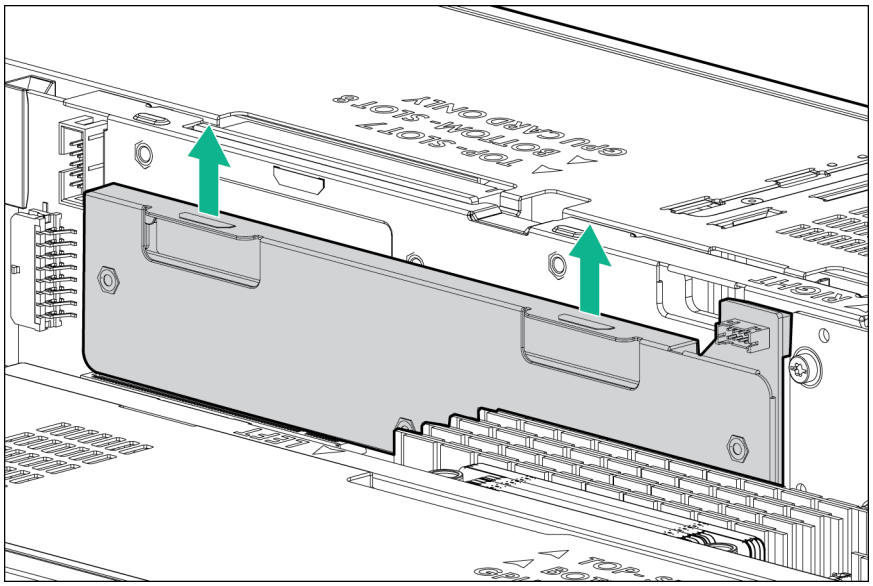
16. Disconnect the power cables from the 8:1 risers.



17. Remove the riser cross bracket:
    a. Loosen the captive screws.
    b. Remove the bracket from the server.



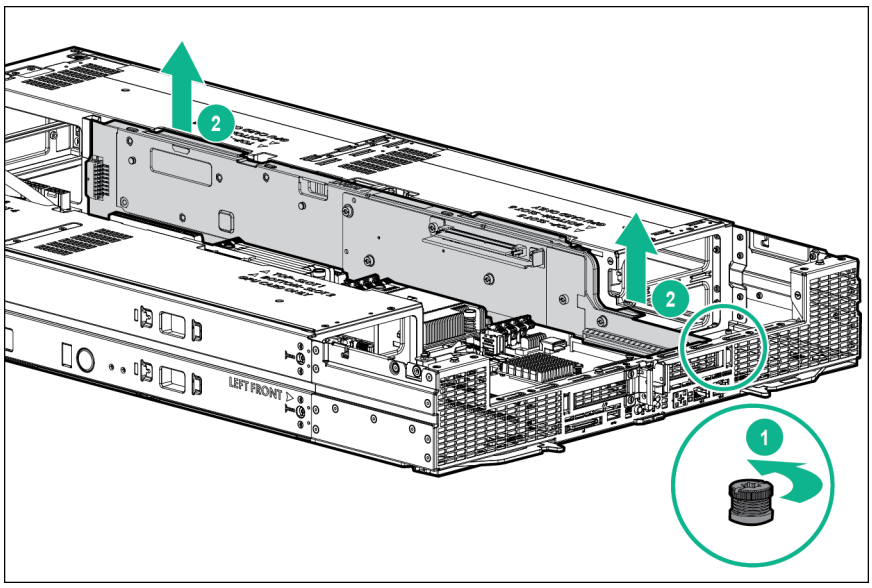
18. Remove the power riser.



19. Remove the right 8:1 PCI riser module:

    a. Loosen the captive screw.

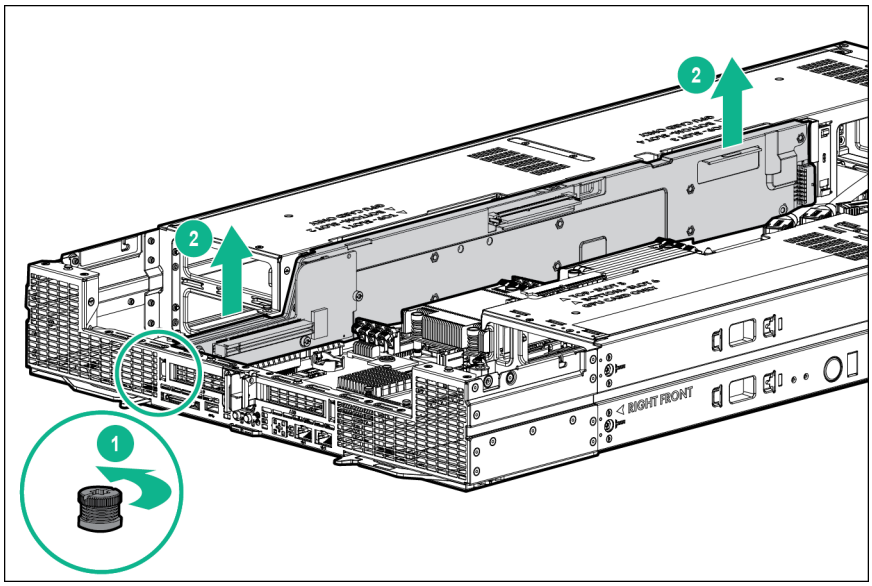
    b. Using both hands, lift and remove the PCI riser module from the server.



20. Remove the left 8:1 PCI riser module:

    a. Loosen the captive screw.

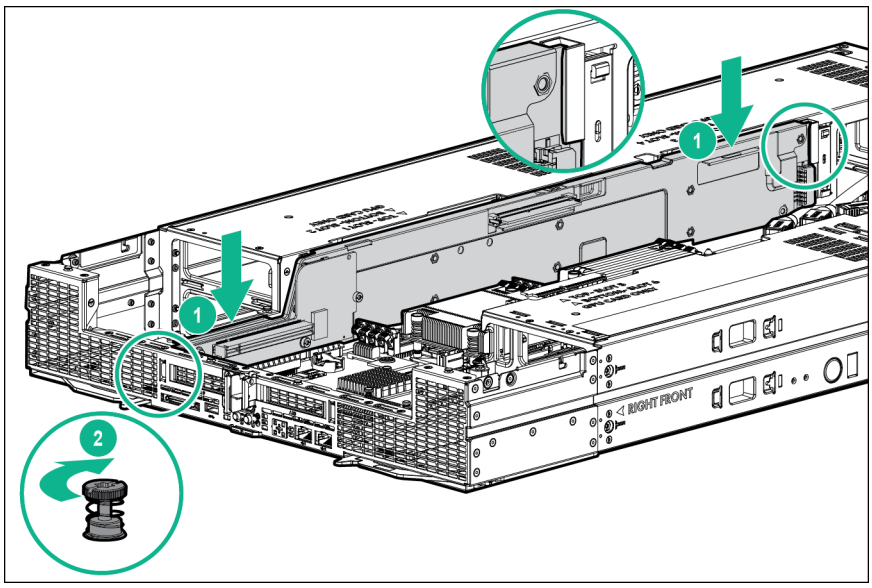
    b. Using both hands, lift and remove the PCI riser module from the server.



21. Install the left 4:1 PCI riser module:

    a. Slide the PCI riser module into the server, and then use both hands to press downward to secure the PCI riser module in the connectors.

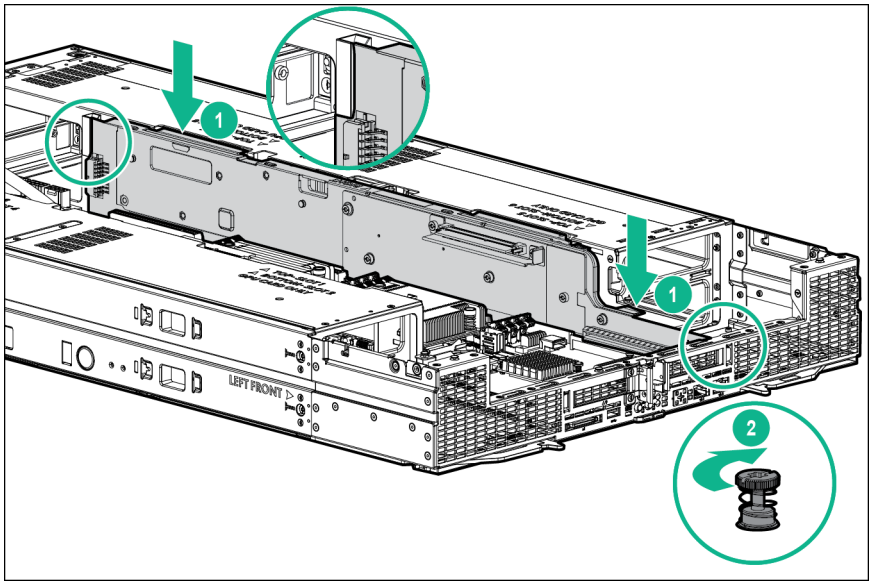
    b. Tighten the captive screw.



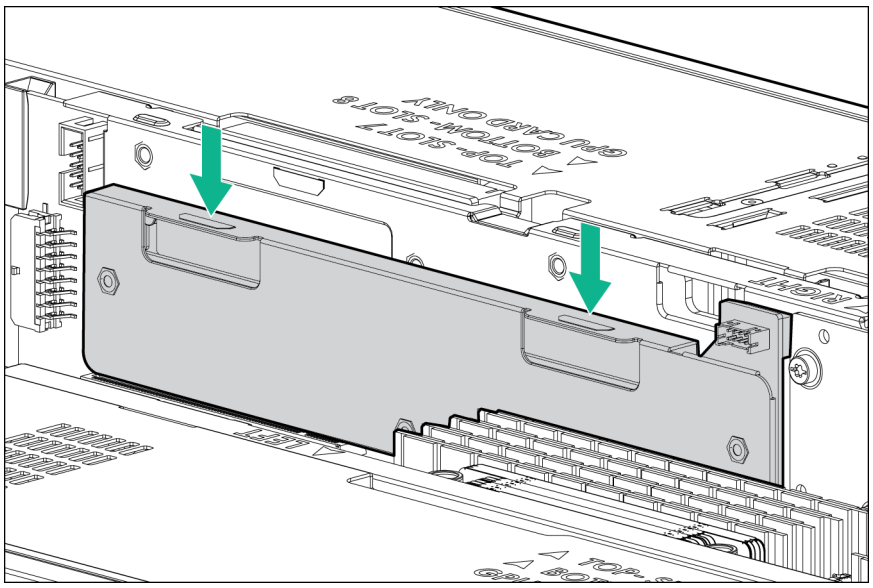
22. Install the right 4:1 PCI riser module:

a. Slide the PCI riser module into the server, and then use both hands to press downward to secure the PCI riser module in the connectors.

b. Tighten the captive screw.



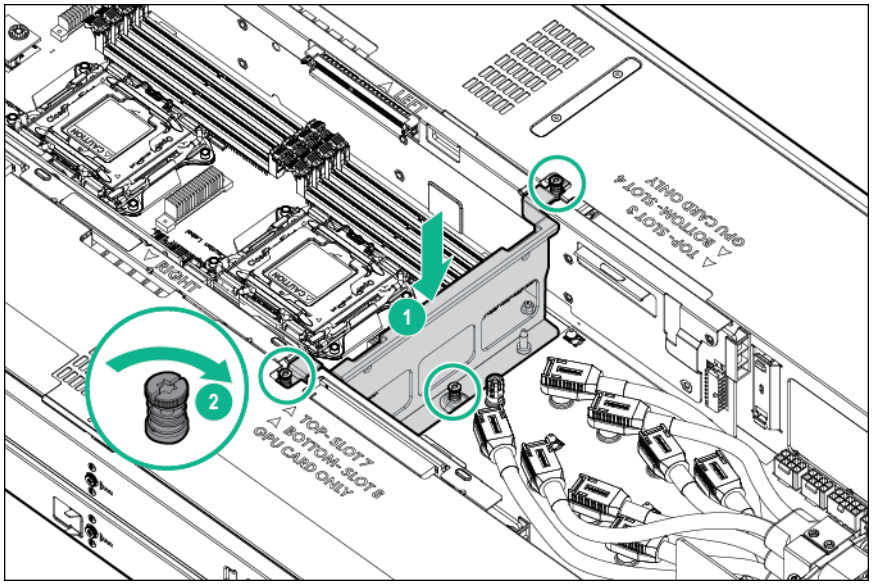
23. Install the power riser.



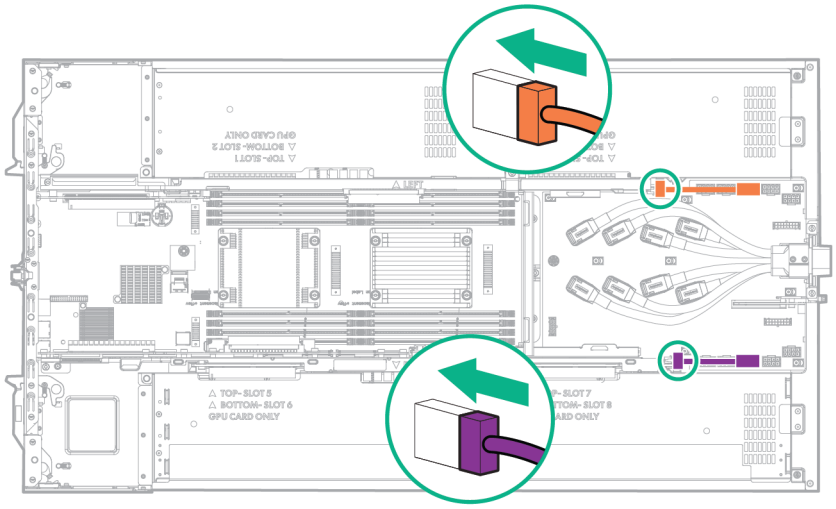
24. Install the riser cross bracket:

    a. Align the captive screws with the screw holes.

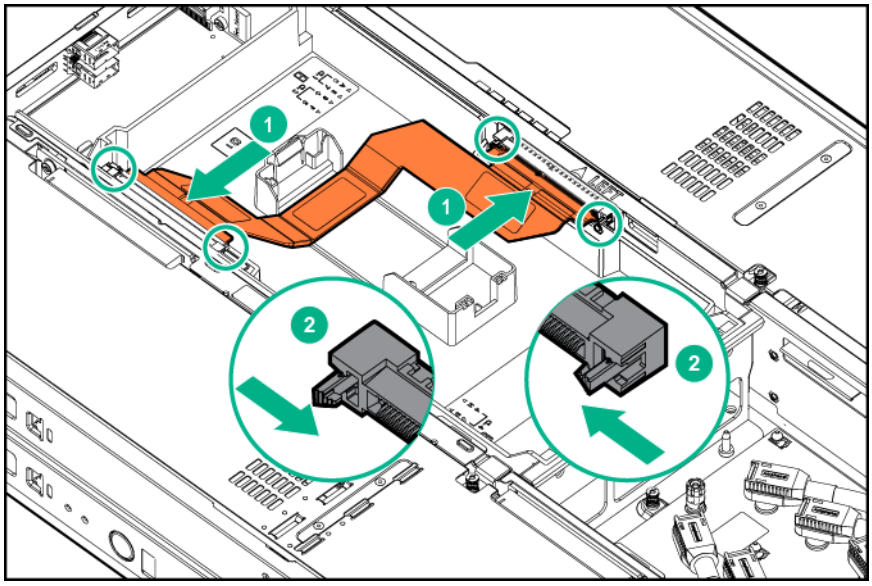
    b. Tighten the captive screws.



25. Connect the power cables to the right and left PCI riser modules.



26. If removed, **install the HPE Smart Array P542D controller module**.
27. If removed, **install the expansion board**.
28. Connect any required internal cables.
29. **Install the drive cage assembly**.
30. Connect all cables to the drive backplane.
31. **Install all GPUs and GPU blanks**.
32. **Install the side panel**.
33. **Install the air baffle**.
34. Route and connect the 4:1 riser signal cable:
    a. Connect the cable to both connectors.
    b. Ensure that the latches are closed.



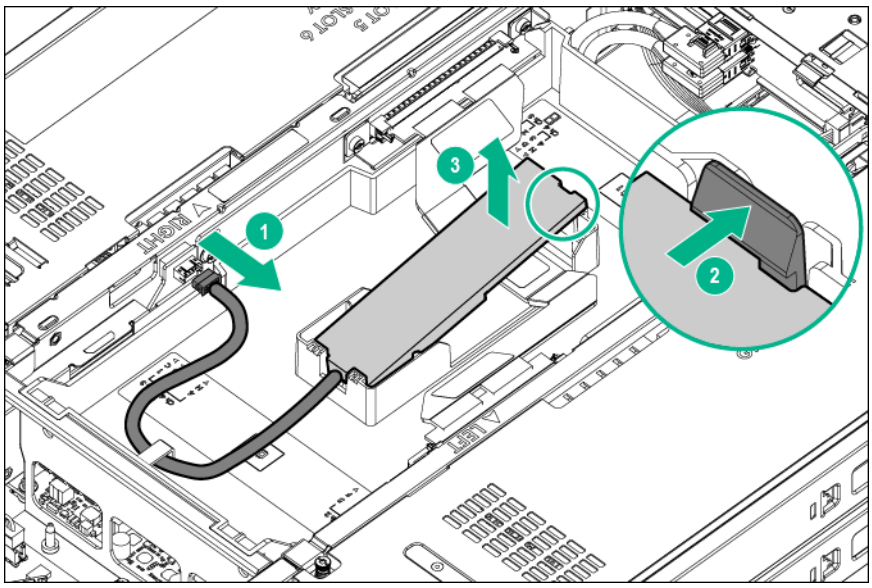
35. If removed, **install the Smart Storage Battery and connect the cable to the riser connector**.
36. **Install the access panel**.
37. **Install the server into the chassis**.
38. Connect all peripheral cables to the server .
39. **Power up the server** .

Installing the 8:1 PCI riser modules

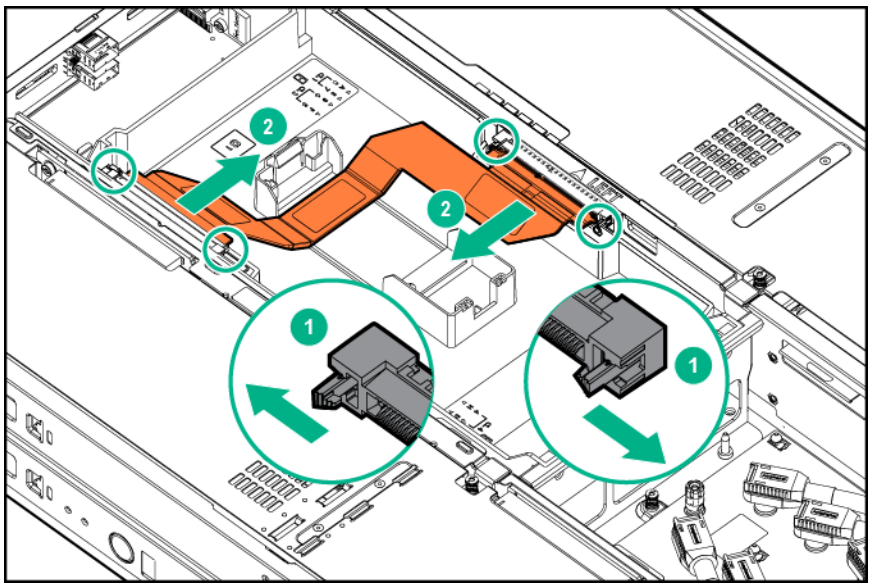
To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis** .
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. If installed, remove the Smart Storage Battery:
   a. Disconnect the cable from the riser connector.
   b. Pull back the release clip.
   c. Lift the Smart Storage Battery from the holder.



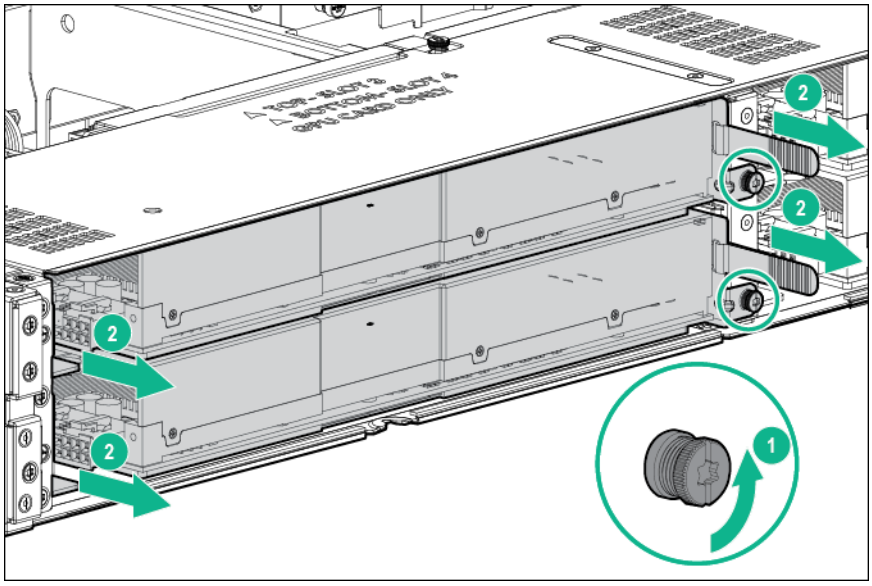
8. Disconnect and remove the 4:1 riser signal cable.



9. **Remove the air baffle**.

> **IMPORTANT:**
> Remove all GPUs, GPU blanks, and expansion boards before removing the PCI riser modules.

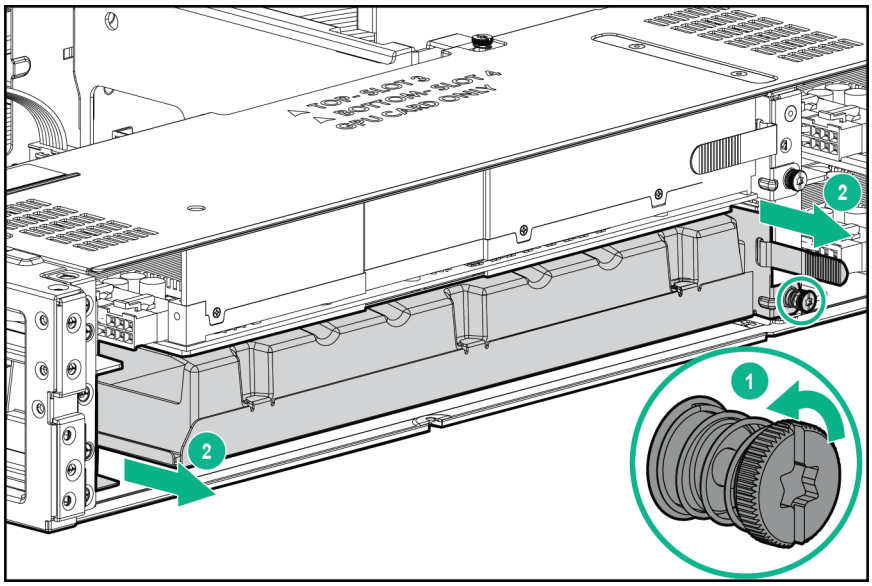
10. **Remove the side panel**.
11. Remove all GPUs:
    a. Loosen the captive screw.
    b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.



    c. Disconnect the power cable from the GPU, and then remove the GPU from the server.
12. Remove all GPU blanks:

a. Loosen the captive screw.

b. Using both hands, gently pull the tab and the rear of the GPU blank.



c. Slide out the GPU blank from the server.

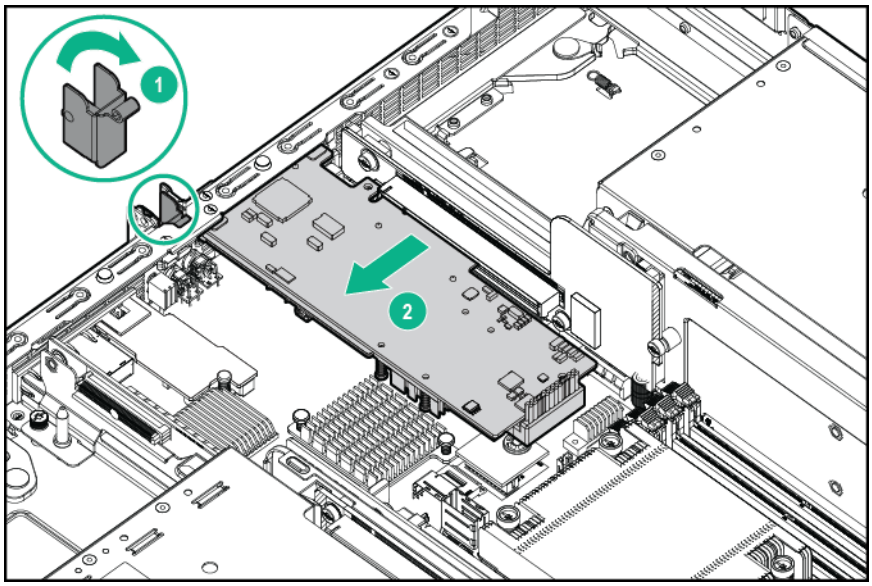
13. **Remove the drive cage assembly**.

14. Remove all expansion boards:

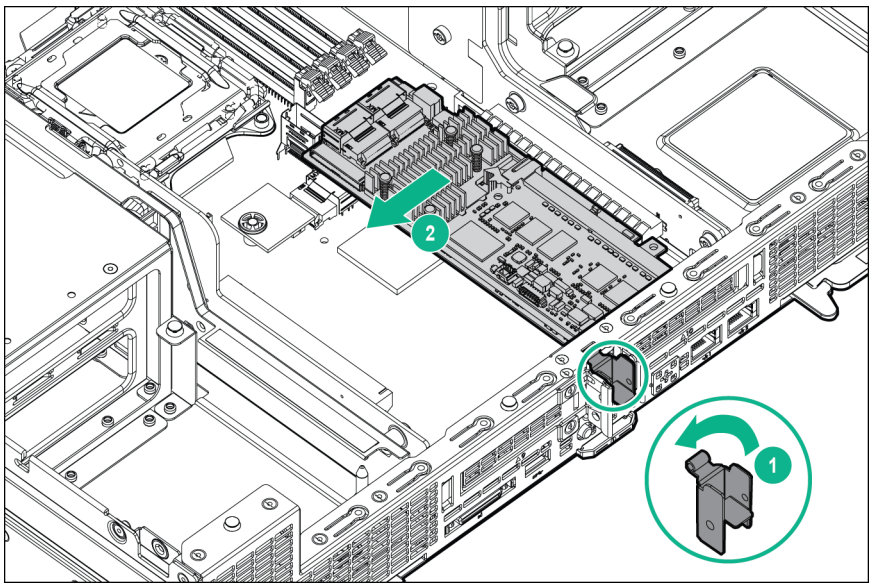
a. Disconnect any internal cables that are connected to the riser modules.

b. Remove the expansion board.

- Slot 9



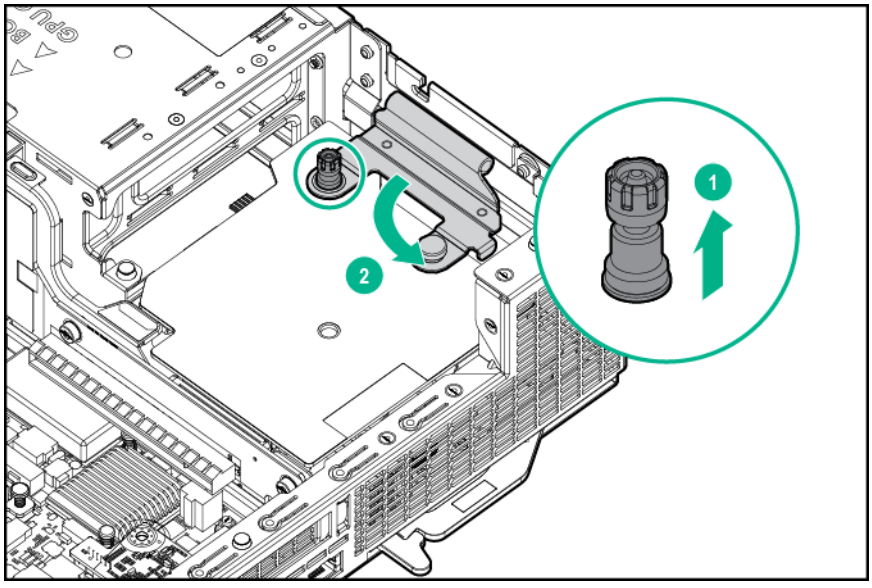
- Slot 10



15. If installed, remove the HPE Smart Array P542D controller module:

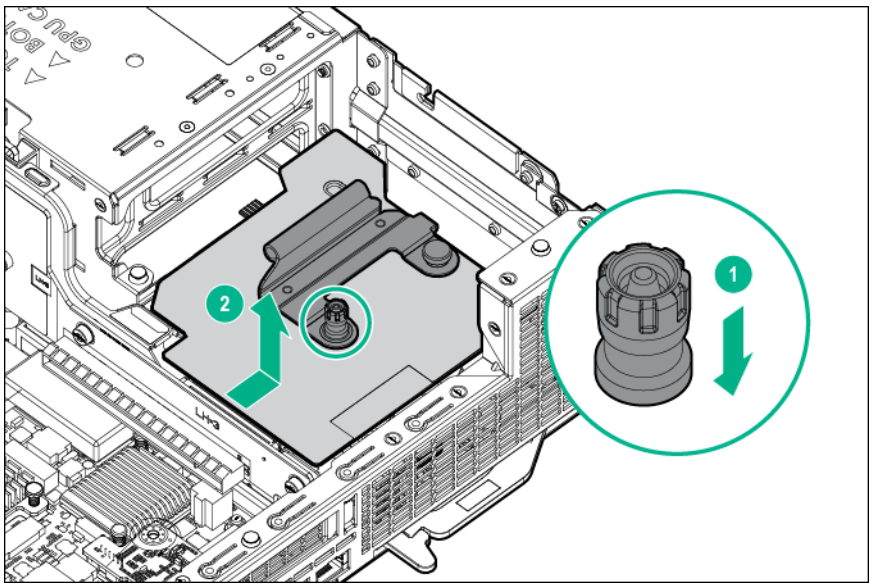
    a. Pull up the pin.

    b. Rotate the handle counter-clockwise.

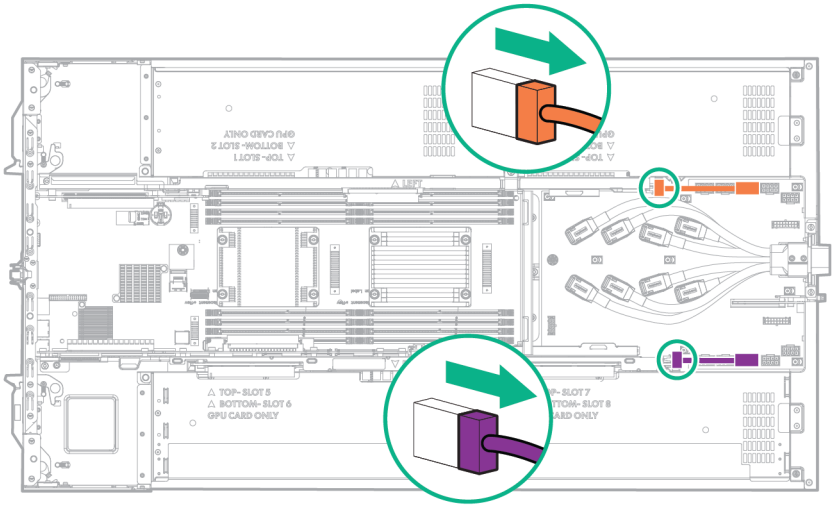


    c. Push down the pin.

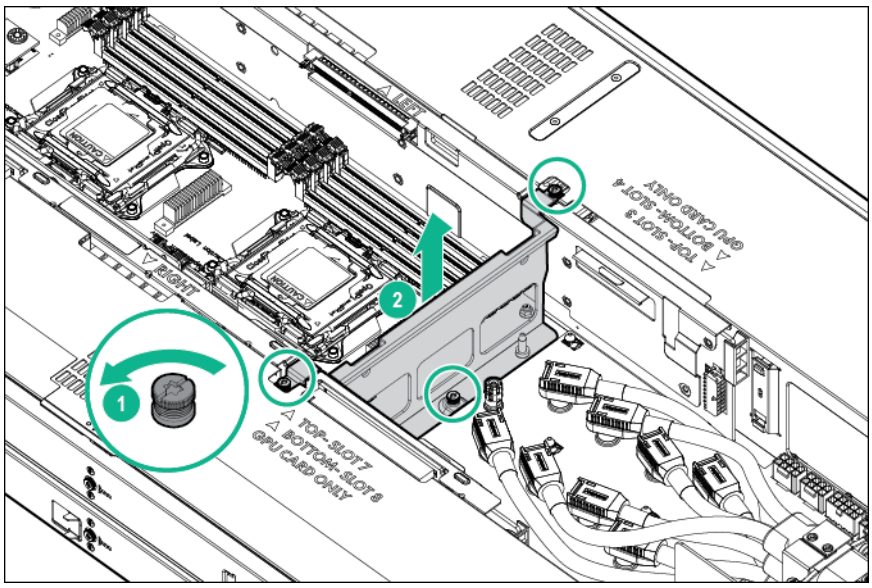
    d. Slide the module out of the PCIe slot and remove it from the server.



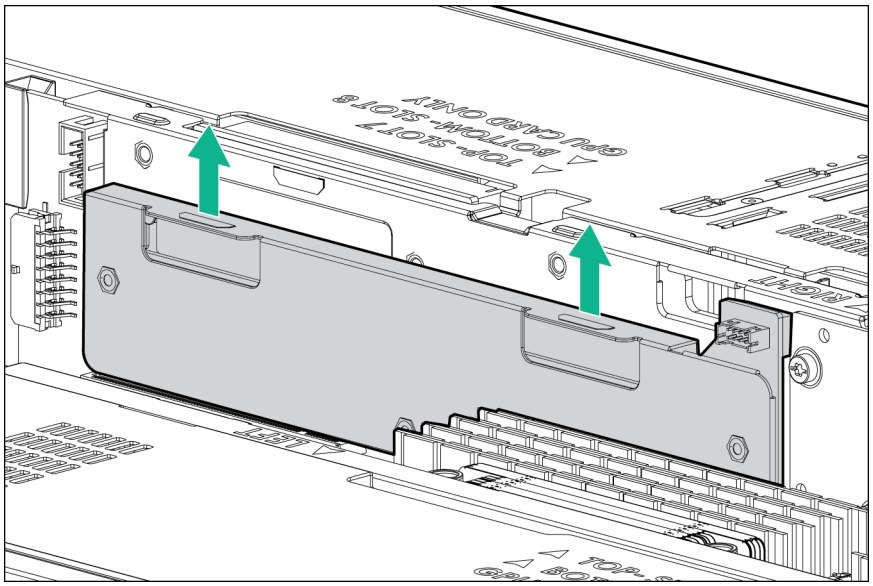
16. Disconnect the power cables from the 4:1 risers.



17. Remove the riser cross bracket:
    a. Loosen the captive screws.
    b. Remove the bracket from the server.



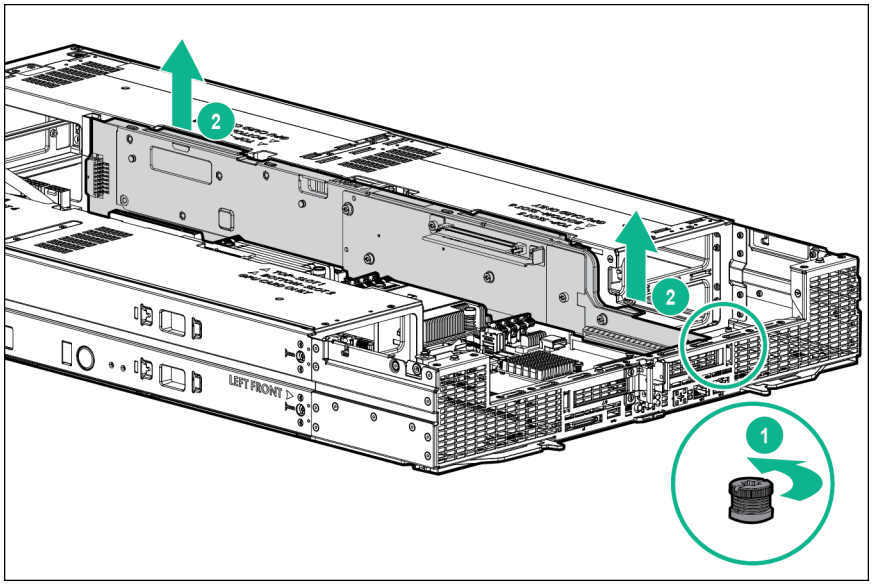
18. Remove the power riser.



19. Remove the right 4:1 PCI riser module:

    a. Loosen the captive screw.

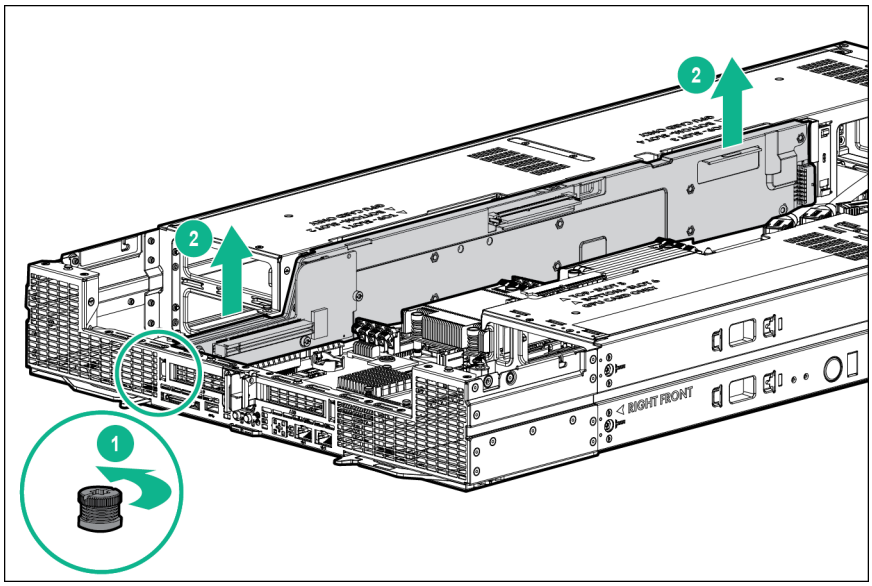
    b. Using both hands, lift and remove the PCI riser module from the server.



20. Remove the left 4:1 PCI riser module:

    a. Loosen the captive screw.

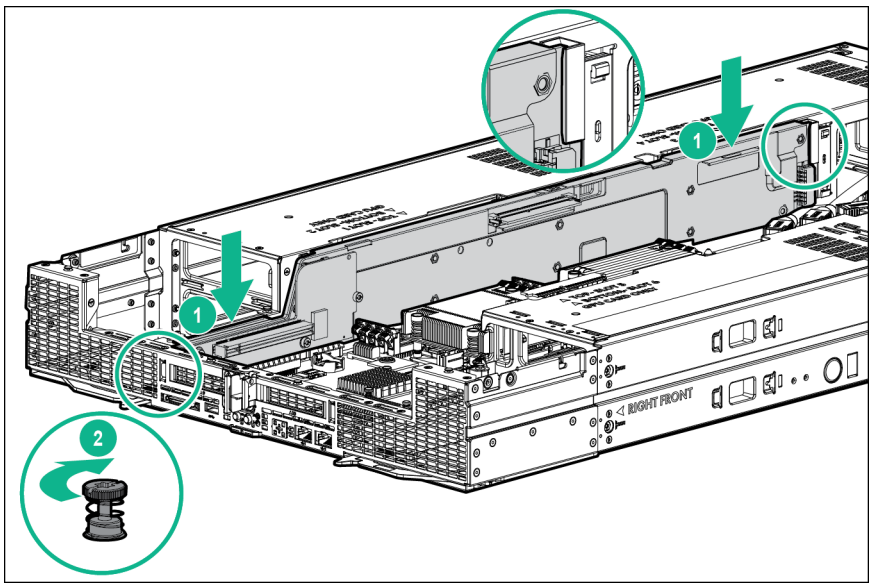
    b. Using both hands, lift and remove the PCI riser module from the server.



21. Install the left 8:1 PCI riser module:

    a. Slide the PCI riser module into the server, and then use both hands to press downward to secure the PCI riser module in the connectors.

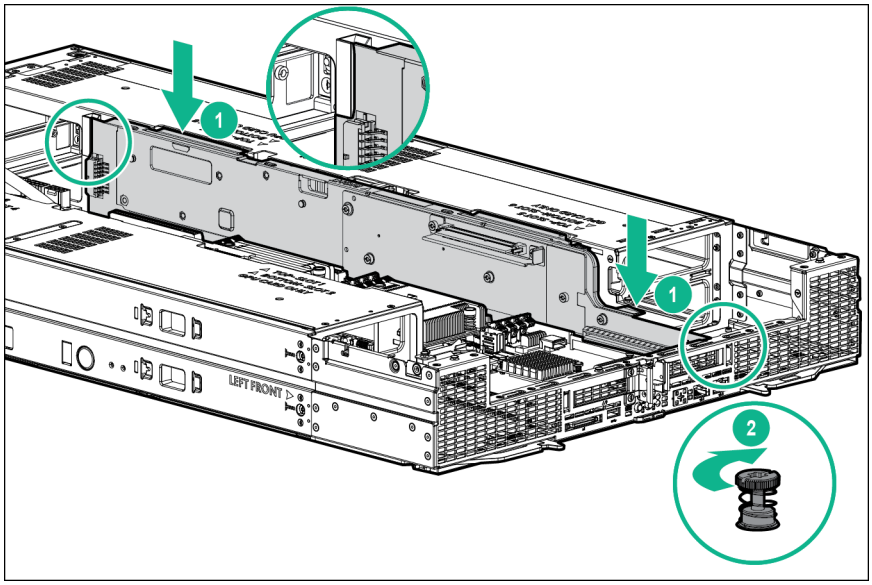
    b. Tighten the captive screw.



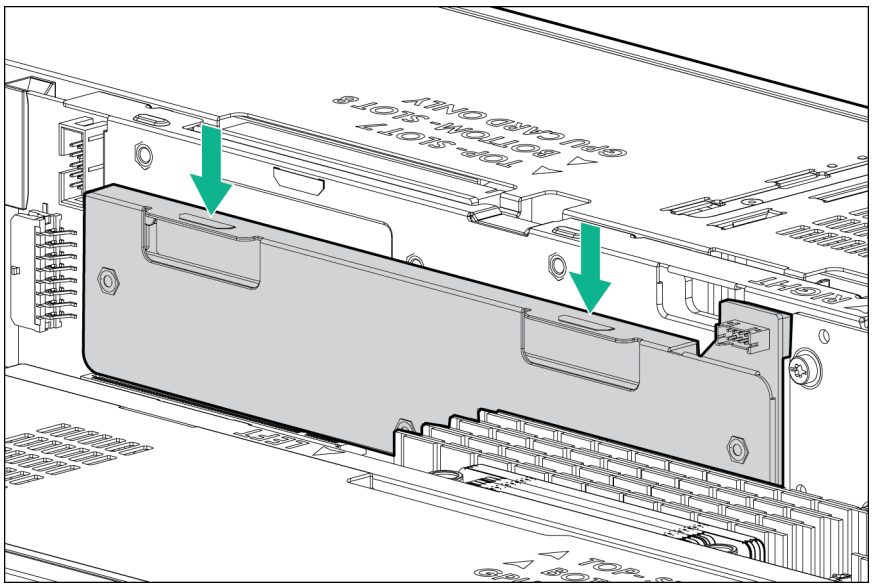
22. Install the right 8:1 PCI riser module:

a. Slide the PCI riser module into the server, and then use both hands to press downward to secure the PCI riser module in the connectors.

b. Tighten the captive screw.



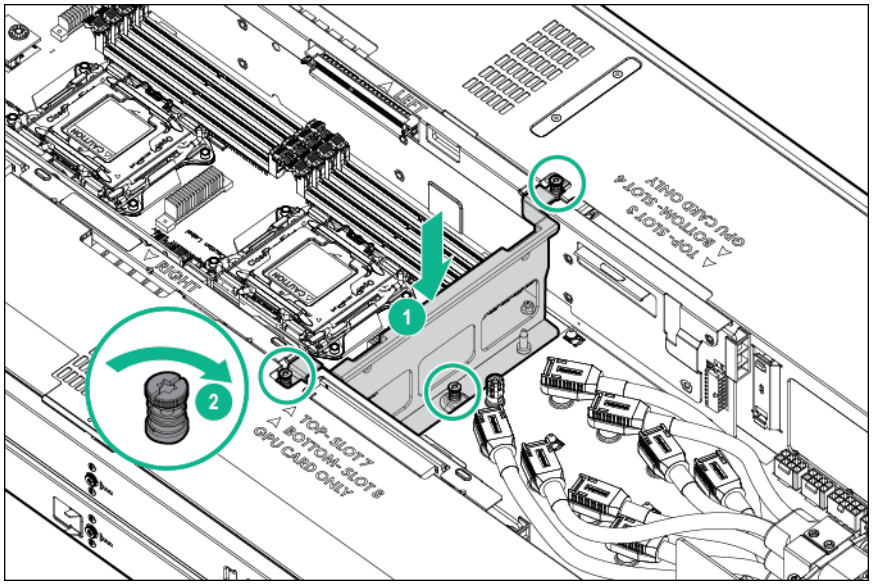
23. Install the power riser.



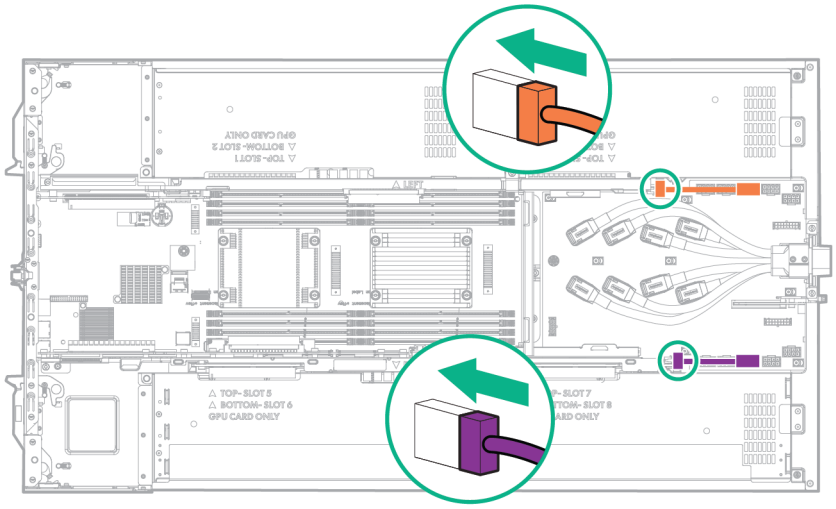
24. Install the riser cross bracket:

    a. Align the captive screws with the screw holes.

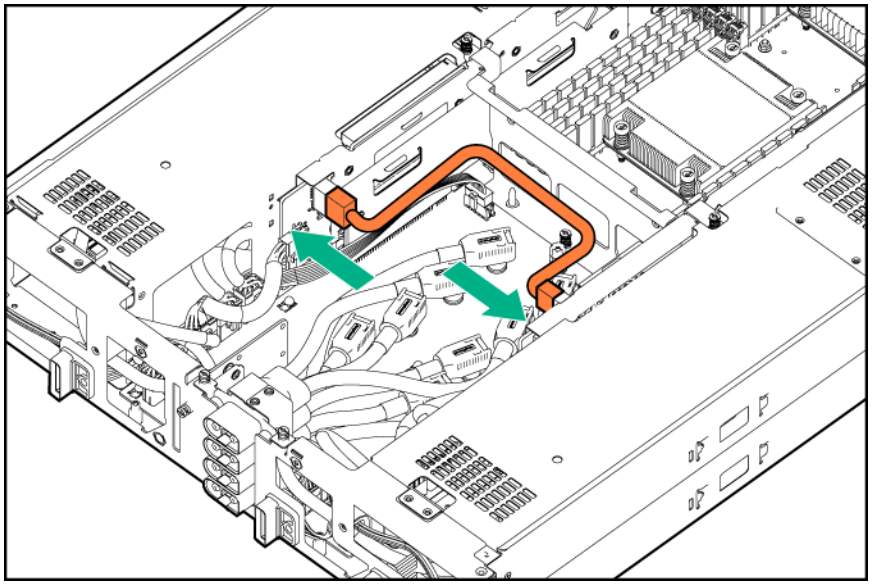
    b. Tighten the captive screws.



25. Connect the power cables to the right and left PCI riser modules.



26. If removed, **install the HPE Smart Array P542D controller module**.
27. If removed, **install the expansion board**.
28. Connect any required internal cables.
29. **Install the drive cage assembly**.
30. Connect all cables to the drive backplane.
31. **Install all GPUs and GPU blanks**.
32. **Install the side panel**.
33. Connect the 8:1 riser sideband cable to the 8:1 PCI riser modules.



34. **Install the air baffle**.
35. If removed, **install the Smart Storage Battery and connect the cable to the riser connector**.
36. **Install the access panel**.
37. **Install the server into the chassis**.

38. Connect all peripheral cables to the server .
39. **Power up the server** .

Storage controller options

The server includes an embedded Dynamic Smart Array B140i Controller. For more information about the controller and its features, see the *HPE Dynamic Smart Array B140i RAID Controller User Guide* on the **Hewlett Packard Enterprise website**.

IMPORTANT:
The Dynamic Smart Array B140i Controller supports UEFI Boot Mode only. It does not support Legacy BIOS Boot Mode.

To configure arrays, see the *HPE Smart Storage Administrator User Guide* on the **Hewlett Packard Enterprise website**.

Storage controller installation guidelines

To maintain optimal thermal conditions and efficiency, Hewlett Packard Enterprise recommends the following guidelines:

- Install one storage controller per server.
- The HPE H240/H241 host bus adapter or HPE P440/P441 Smart Array controller can be installed in slot 9 or slot 10.
- Install the P542D Storage Controller module into slot 11.

For more information on the riser board slot specifications, see "**PCI riser module components**."

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

Installing the HPE Smart Array P542D Controller module

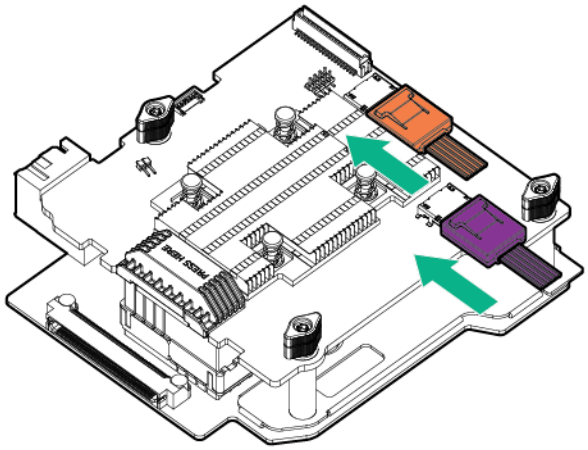
CAUTION:
Hewlett Packard Enterprise recommends performing a complete backup of all server data before performing a controller or adapter installation or removal.

To install the component:

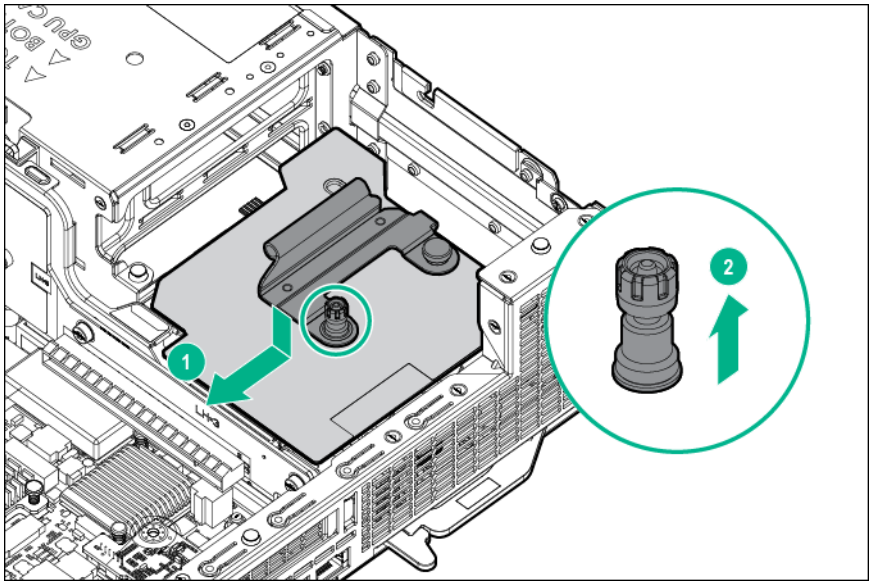
Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.

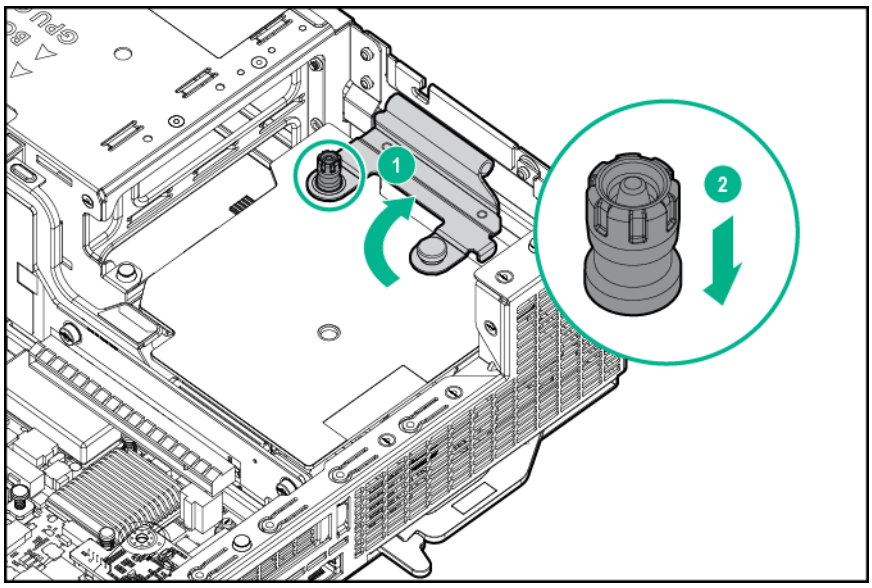
8. Disconnect all cables from the drive backplane.
9. **Remove the drive cage assembly**.
10. Connect the Mini-SAS cables to the storage controller. Install the cables according to their labels as Port 3 or Port 4. The labels are on both the cables and their connections.



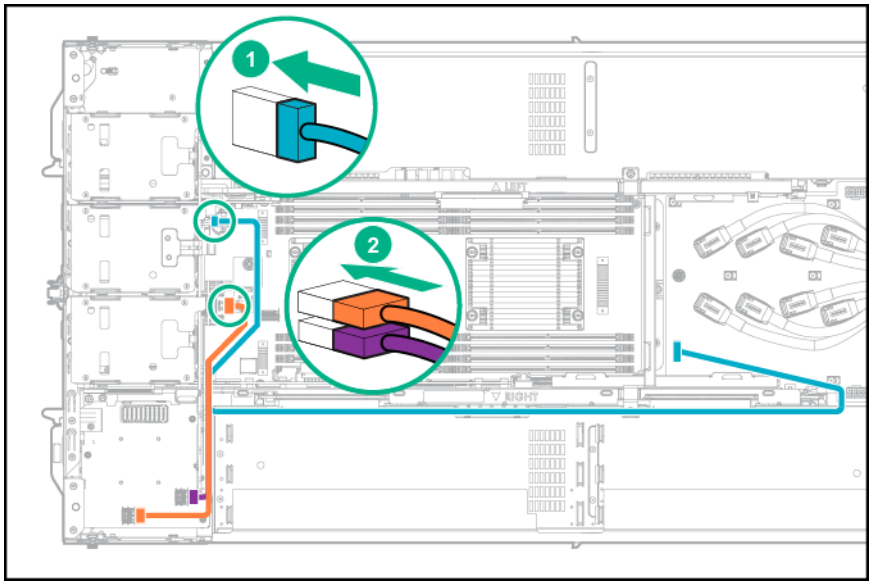
11. Install the HPE Smart Array P542D Controller module:
    a. Slide the module into the PCIe slot.
    b. Pull up the pin.



    c. Rotate the handle clockwise.
    d. Push down the pin.



12. **Install the drive cage assembly**.
13. Connect the cables to the drive backplane:
    a. Connect the power cable.
    b. Connect the Mini-SAS cables. Install the cables according to their labels as MINI-SAS 0 or MINI-SAS 1. The labels are on both the cables and their connections.



14. **Install the air baffle**.

    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
15. **Install the access panel**.
16. **Install the server into the chassis**.

17. Connect all peripheral cables to the server .
18. **Power up the server** .

Installing an HPE Host Bus Adapter

To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Disconnect all cables from the drive backplane.
9. **Remove the drive cage assembly**.

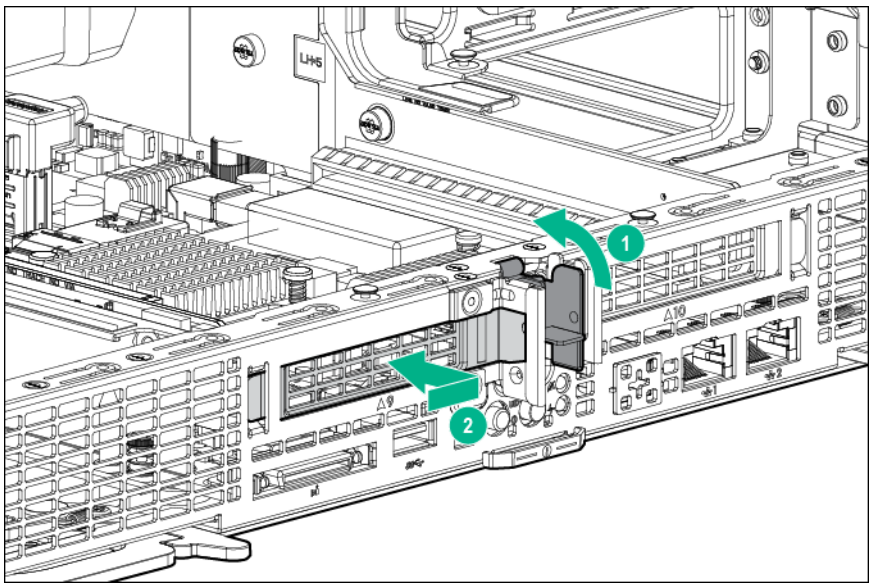
   NOTE: A second processor is required to install a storage controller in slot 10 of the right 4:1 PCI riser module.

10. Remove the full-height bracket from the storage controller and attach the low-profile bracket.

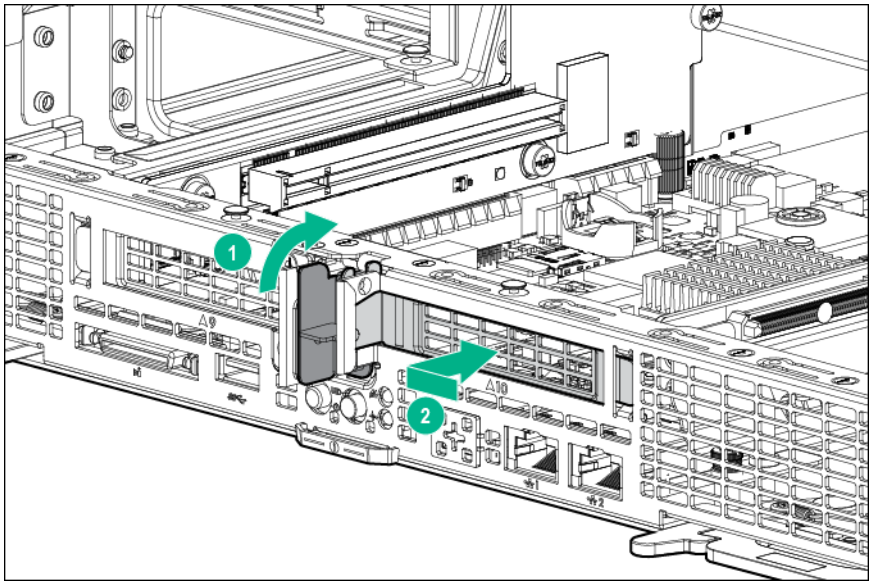
    For more information, see the documentation that ships with the option.

11. Remove the PCI blank.

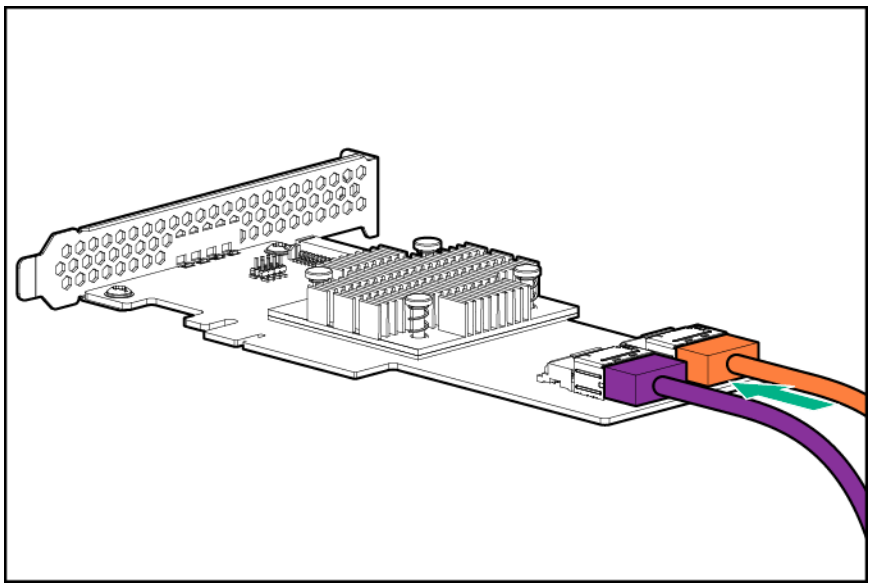
    - Slot 9



- Slot 10

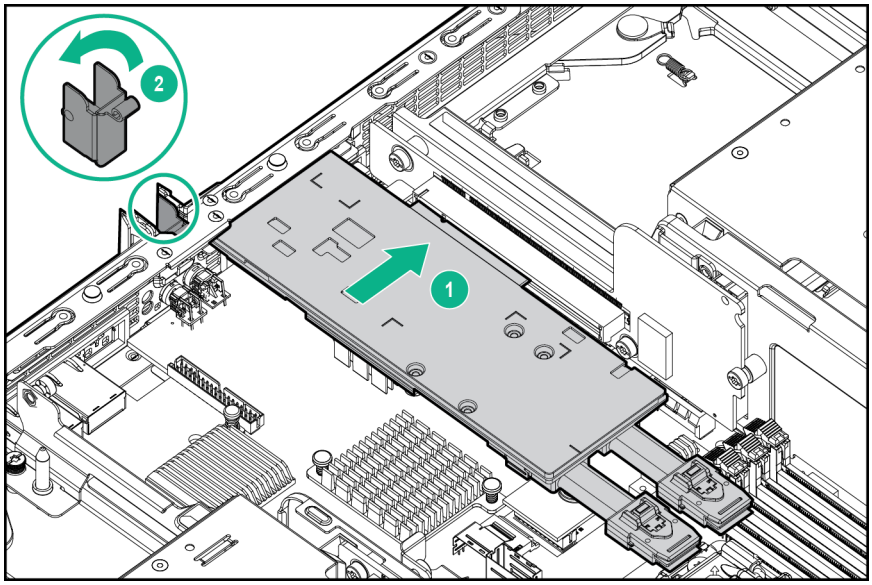


12. Connect the Mini-SAS cables to the host-bus adapter. Install the cables according to their labels as Port 1 or Port 2. The labels are on both the cables and their connections.

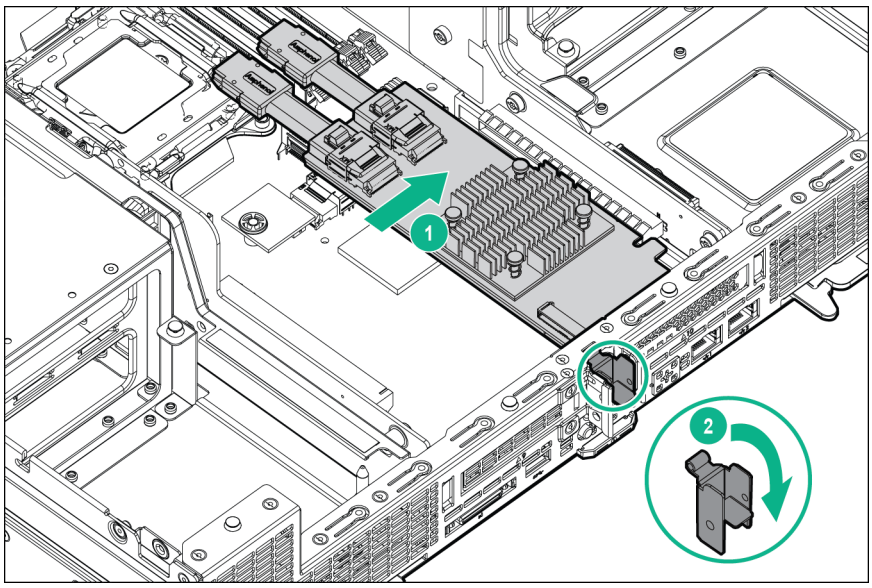


13. Install the host-bus adapter.

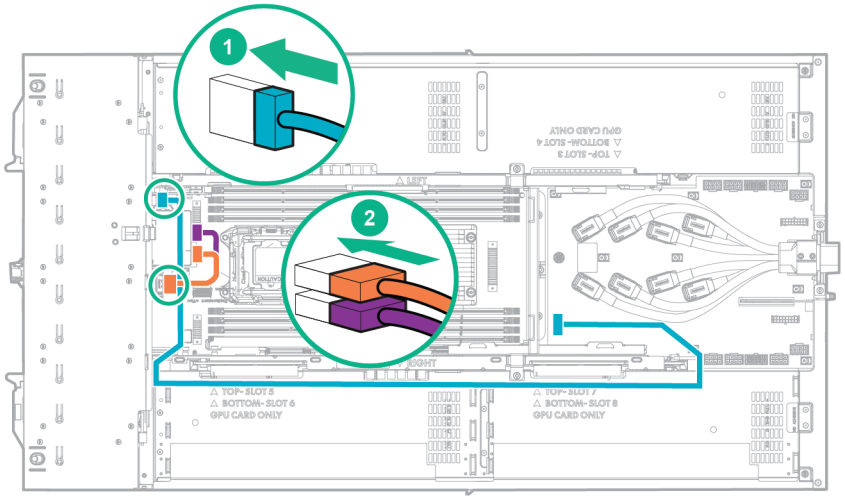
- Slot 9



- Slot 10



14. **Install the drive cage assembly**.
15. Connect the cables to the drive backplane:
    a. Connect the power cable.
    b. Connect the Mini-SAS cables. Install the cables according to their labels as MINI-SAS 0 or MINI-SAS 1. The labels are on both the cables and their connections.



16. **Install the air baffle**.

    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
17. **Install the access panel**.
18. Connect all peripheral cables to the server .
19. **Power up the server** .

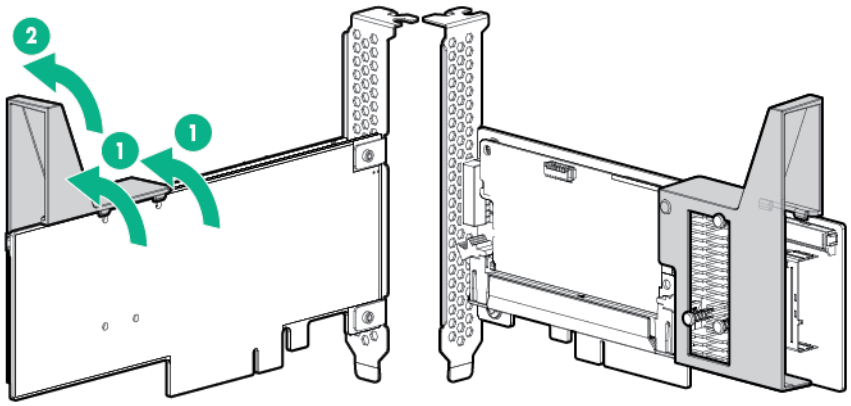
Installing the Smart Array P440 Controller

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

To install the component:

Procedure

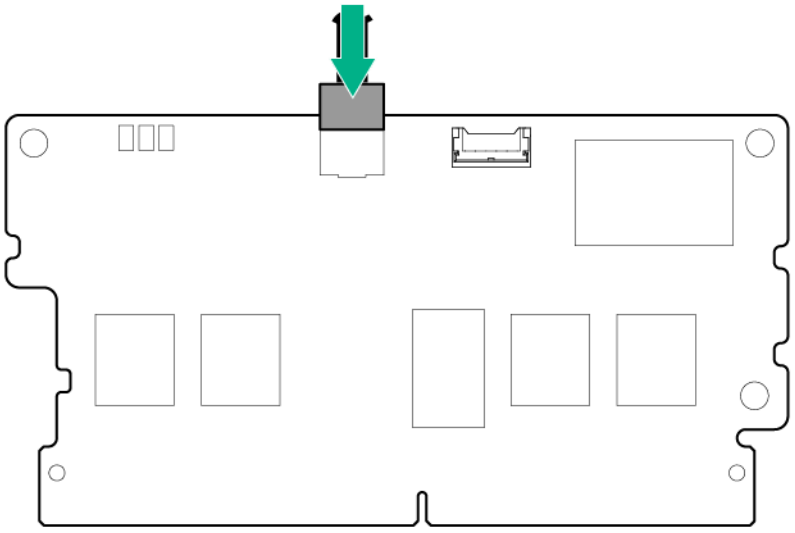
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Disconnect all cables from the drive backplane.
9. **Remove the drive cage assembly**.
10. Remove the air scoop from the storage controller.



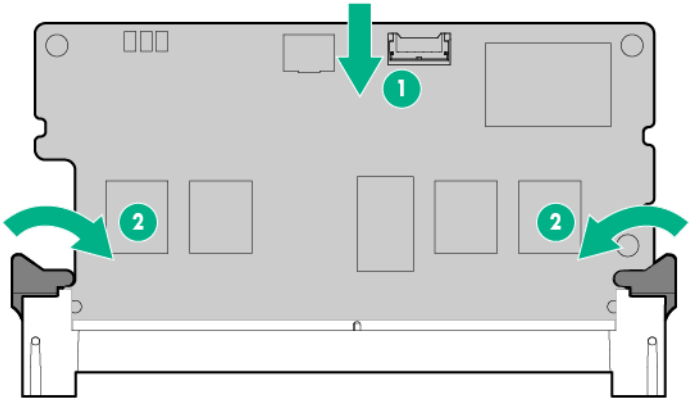
11. Remove the full-height bracket from the storage controller and attach the low-profile bracket.

    For more information, see the documentation that ships with the option.
12. If you intend to use an FBWC module, install the module on the storage controller. Depending on the controller model, the cable connector on the cache module might be facing up or down when the module is installed on the controller board.

    a. Connect the cache module backup power cable to the module.



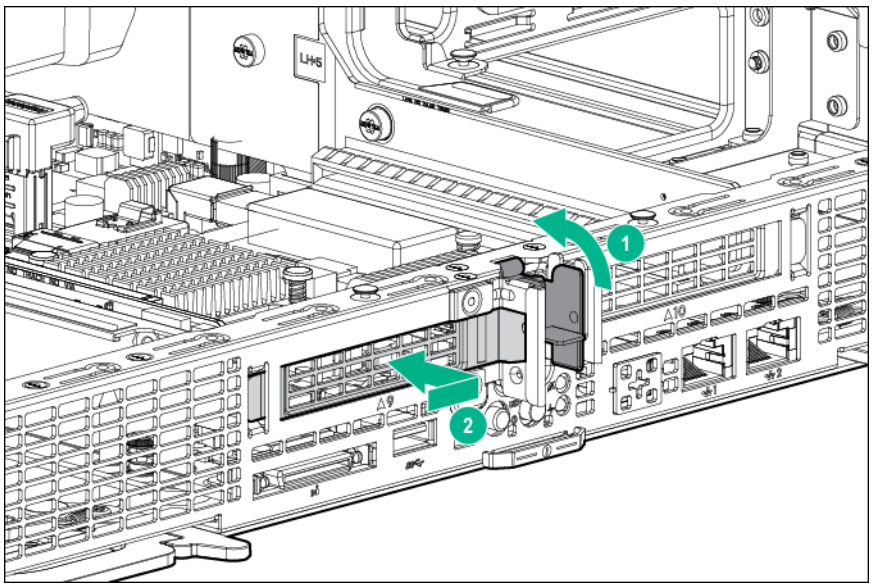
b. Install the cache module on the storage controller.



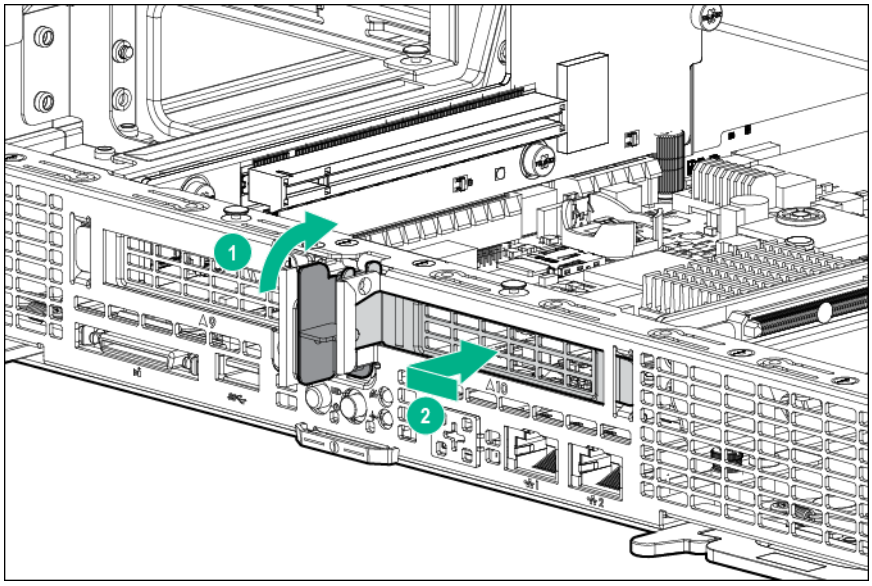
NOTE: A second processor is required to install a storage controller in slot 10 of the right 4:1 PCI riser module.

13. Remove the PCI blank.

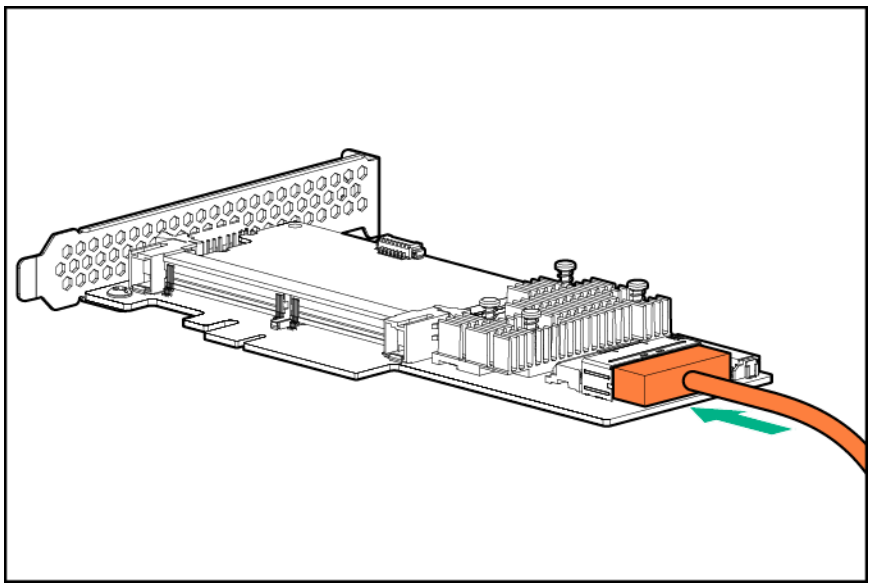
- Slot 9



- Slot 10

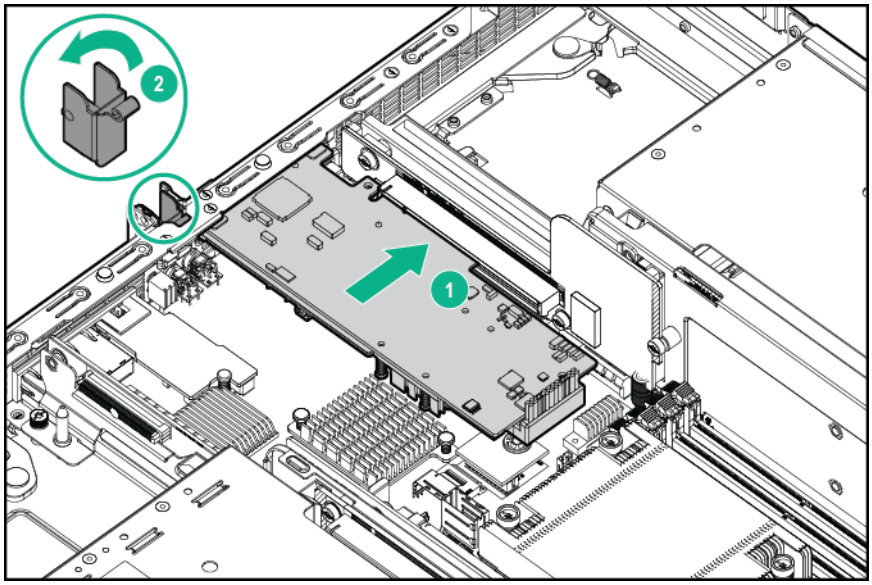


14. Connect the Mini-SAS Y-cable to the storage controller.

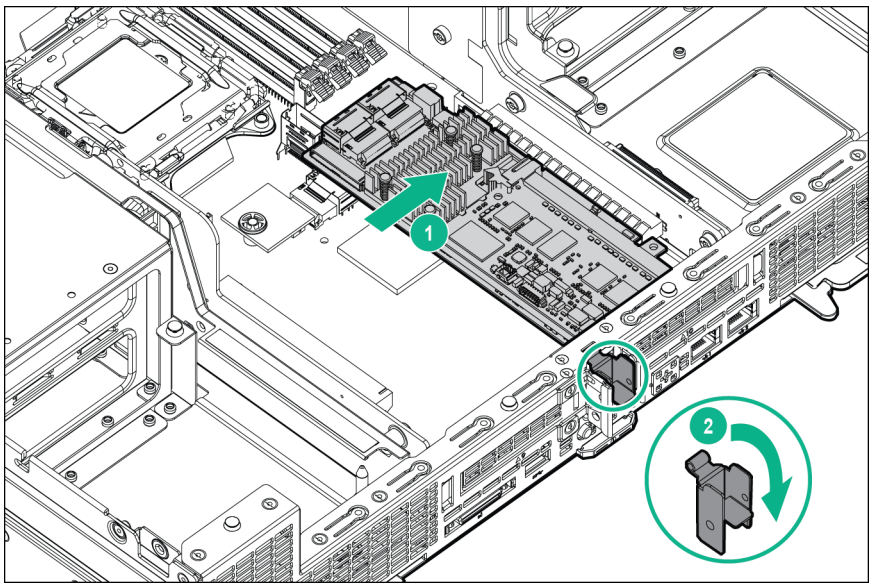


15. Install the storage controller.

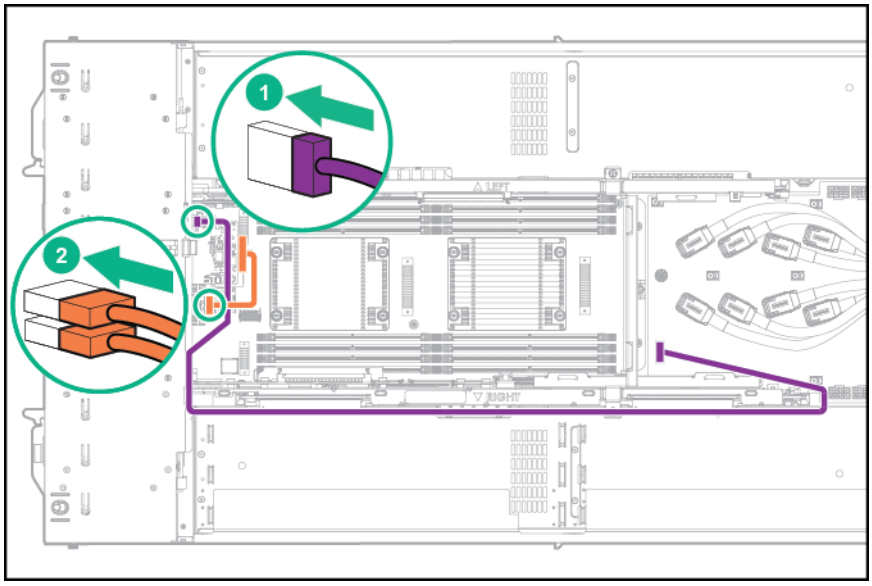
- Slot 9



- Slot 10



16. If the cache module is installed on the Smart Array controller, **connect the cache module backup power cable to the riser board**.
17. **Install the drive cage assembly**.
18. Connect the cables to the drive backplane:
    a. Connect the power cable.
    b. Connect the Mini-SAS Y-cable. Install the cables according to their labels as MINI-SAS 0 or MINI-SAS 1. The labels are on both the cables and their connections.



19. **Install the air baffle**.

    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
20. **Install the access panel**.
21. **Install the server into the chassis**.

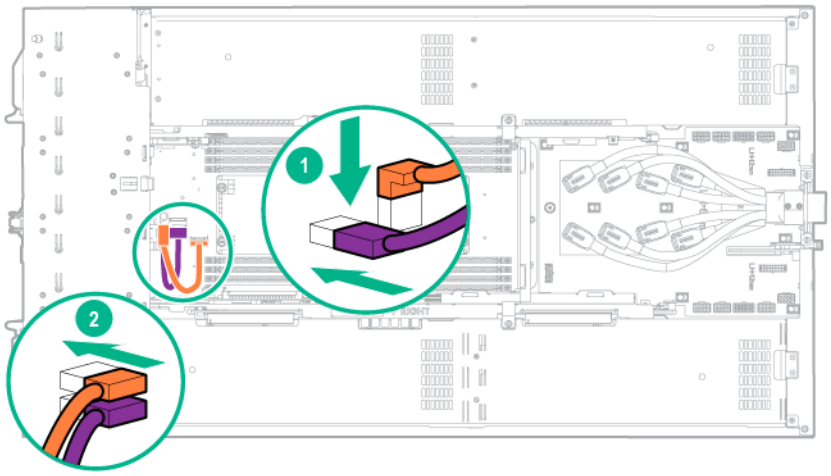
22. Connect all peripheral cables to the server .
23. **Power up the server** .

Installing the B140i SATA cables

To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Connect the B140i SATA cables:
   a. Connect the cables to the system board. Install the cables according to their labels as MB-SATA 1 or MB-SATA 2. The labels are on both the cables and their connections.
   b. Connect the cables to the drive backplane. Install the cables according to their labels as Mini-SAS 0 or Mini-SAS 1. The labels are on both the cables and their connections.



9. **Install the air baffle**.

   If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
10. **Install the access panel**.
11. **Install the server into the chassis**.

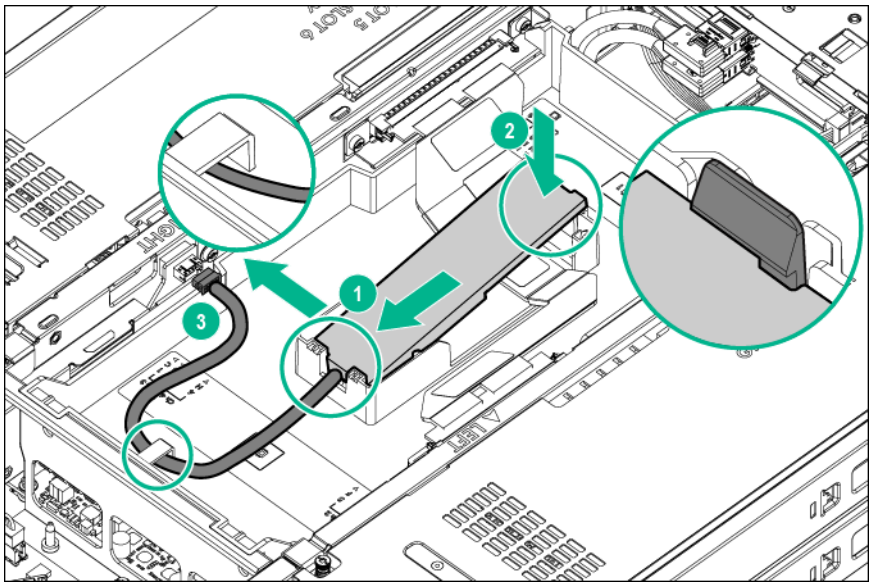
12. Connect all peripheral cables to the server .
13. **Power up the server** .

Installing an HPE Smart Storage Battery

To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. **Remove the server from the chassis**.
4. Place the server on a sturdy, level surface.
5. **Remove the access panel**.
6. Install the HPE Smart Storage Battery:
   a. Install the battery into the holder.
   b. Ensure that the release clip is closed and locked.
   c. Connect the cable to the riser connector.



7. **Install the access panel**.
8. **Install the server into the chassis**.
9. **Power up the server** .

GPU accelerator options

This section provides instructions for installing GPU accelerator options into the server.

To accurately estimate the power consumption of the server and select the appropriate power configuration and other system components, see the **Hewlett Packard Enterprise Power Advisor website**.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

Supported GPU accelerator power cables

GPU accelerator power cables are installed in the server. Before installing GPU accelerators, ensure that the supported power cables are installed.

- To install NVIDIA Tesla K40 GPUs or AMD FirePro S9150 GPUs, four long GPU power cables (PN 857501-001) and four short GPU power cables (PN 853655-001) are required.
- To install NVIDIA Tesla K80 GPUs, NVIDIA Tesla M40 GPUs, NVIDIA Tesla P40 GPUs, NVIDIA Tesla P100 GPUs, or NVIDIA Tesla V100 GPUs, four long GPU power cables (PN 857500-001) and four short GPU power cables (PN 853650-001) are required.

For more information, see "**GPU power cabling**."

GPU accelerator population guidelines

Population guidelines vary depending on the type of PCI riser modules installed and the number of GPU accelerators installed.

- High-performance mode enables optimal communication between the GPU and the server processor.
- Peer-to-peer mode enables optimal GPU-to-GPU communication.
- The mixing of different GPU accelerator models is not supported.
- If NVIDIA Tesla P4 GPU is to be installed along with the NVIDIA P4 GPU adapter kit, the adapter can be installed only in the slots 1, 2, 5, and 6.
- If three or more NVIDIA Tesla K80 GPUs, NVIDIA Tesla P4 GPUs, or NVIDIA Tesla P40 GPUs are installed on one side of the HPE ProLiant XL270d Gen9 Accelerator Tray, the inlet ambient temperature must be maintained at or below 30°C (86°F).
- If three or more NVIDIA Tesla P100 GPUs or NVIDIA Tesla V100 GPUs are installed on one side of the HPE ProLiant XL270d Gen9 Accelerator Tray, the inlet ambient temperature must be maintained at or below 25°C (77°F).
- A maximum of four K80 GPUs are allowed in a 8:1 PCI riser module configuration.
- A maximum of eight K80 GPUs are allowed in a 4:1 PCI riser module configuration. A second processor is required.

High-performance mode for 4:1 and 8:1 PCI riser modules

Number of GPUs	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8
2	GPU	Blank	Blank	Blank	GPU	Blank	Blank	Blank
4	GPU	GPU	Blank	Blank	GPU	GPU	Blank	Blank
6	GPU	GPU	GPU	Blank	GPU	GPU	GPU	Blank
8	GPU	GPU	GPU	GPU	GPU	GPU	GPU	GPU

Peer-to-peer mode for 4:1 PCI riser modules

Number of GPUs	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8
2	GPU	GPU	Blank	Blank	Blank	Blank	Blank	Blank
4	GPU	GPU	Blank	Blank	GPU	GPU	Blank	Blank
6	GPU	GPU	GPU	GPU	GPU	GPU	Blank	Blank
8	GPU	GPU	GPU	GPU	GPU	GPU	GPU	GPU

Peer-to-peer mode for 8:1 PCI riser modules

Number of GPUs	Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8
2	GPU	GPU	Blank	Blank	Blank	Blank	Blank	Blank
4	GPU	GPU	GPU	GPU	Blank	Blank	Blank	Blank
6	GPU	GPU	GPU	GPU	GPU	GPU	Blank	Blank
8	GPU	GPU	GPU	GPU	GPU	GPU	GPU	GPU

NVIDIA Tesla P4 GPU support matrix

Number of GPUs	**Left Side**				**Right Side**			
	Slot 1	**Slot 2**	**Slot 3**	**Slot 4**	**Slot 5**	**Slot 6**	**Slot 7**	**Slot 8**
Baffle	Required	Required	NA	NA	Required	Required	NA	NA
2	GPU	GPU	Blank	Blank	Blank	Blank	Blank	Blank
4	GPU	GPU	Blank	Blank	GPU	GPU	Blank	Blank
6	GPU	GPU	GPU	GPU	GPU	GPU	Blank	Blank
8	GPU	GPU	GPU	GPU	GPU	GPU	GPU	GPU

Installing the GPU accelerator blank

To install the component:

Procedure

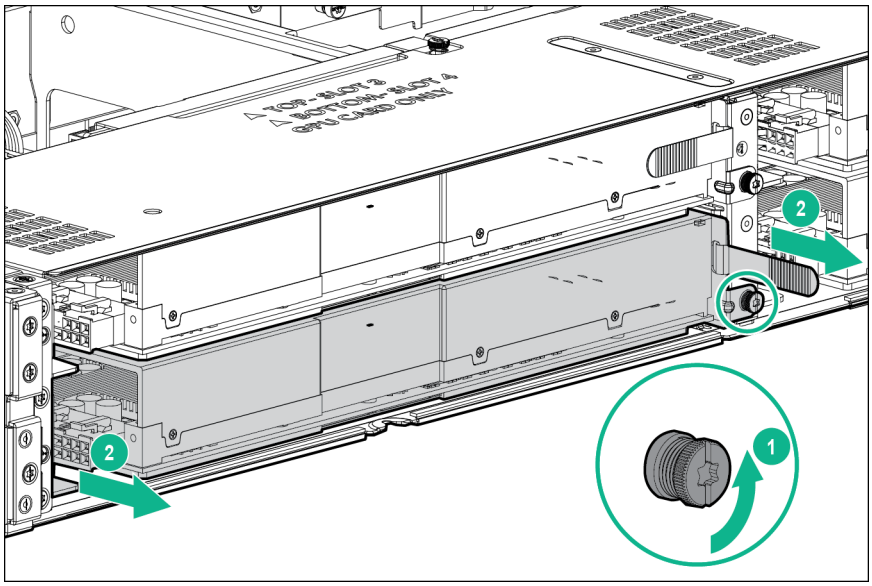
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the side panel**.

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

7. Remove the GPU:

   a. Loosen the captive screw.

   b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.

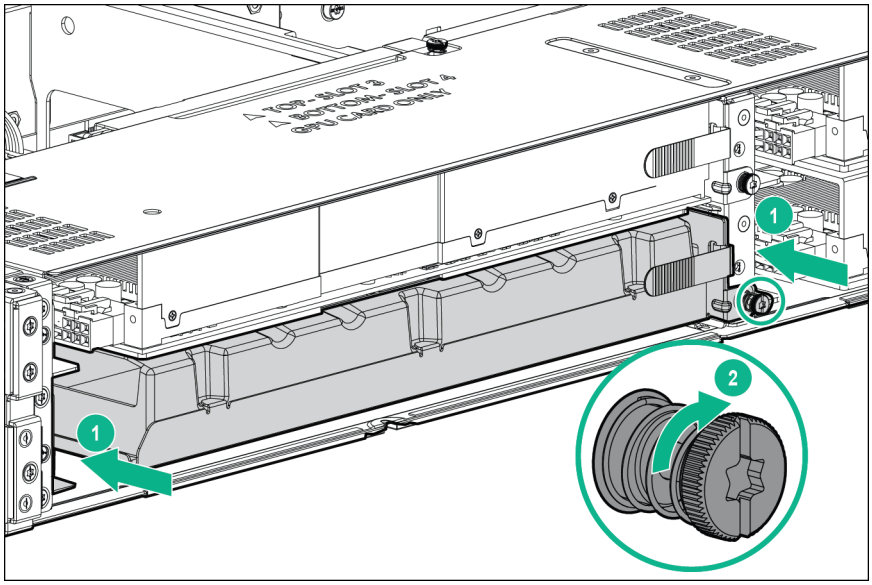


   c. Disconnect the power cable from the GPU, and then remove the GPU from the server.

8. Install the GPU blank:

   a. Slide the GPU blank into the server.

   b. Tighten the captive screw.



9. **Install the side panel**.

10. **Install the server into the chassis**.

11. Connect all peripheral cables to the server .
12. **Power up the server** .

Installing the NVIDIA K40 GPU enablement kit

Depending on the existing server configuration, some or all of the following procedures may apply.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

To install the component:

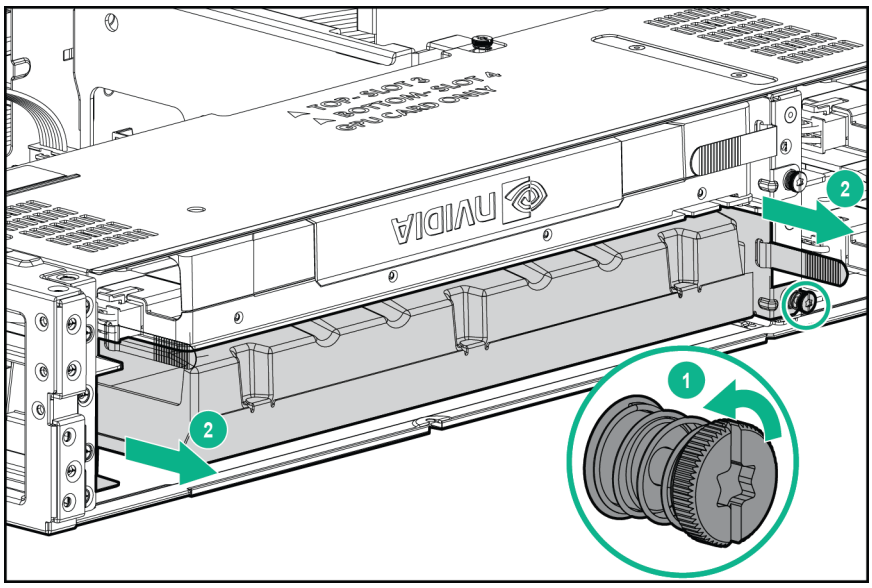
Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the side panel**.

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

CAUTION:
The mixing of different GPU accelerator models is not supported.

8. If NVIDIA K40 GPUs are already installed in the server, and additional K40 GPUs are now being installed, remove the GPU blank:
   a. Loosen the captive screw.
   b. Using both hands, gently pull the tab and the rear of the GPU blank.

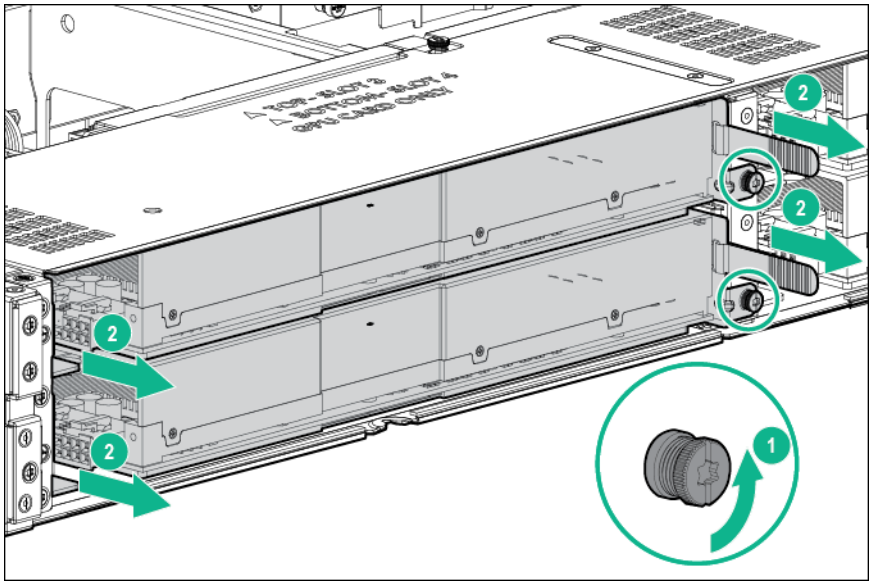


c. Slide out the GPU blank from the server.

9. If NVIDIA K40 GPUs are not installed in the server, remove all GPUs:

a. Loosen the captive screw.

b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.



c. Disconnect the power cable from the GPU, and then remove the GPU from the server.

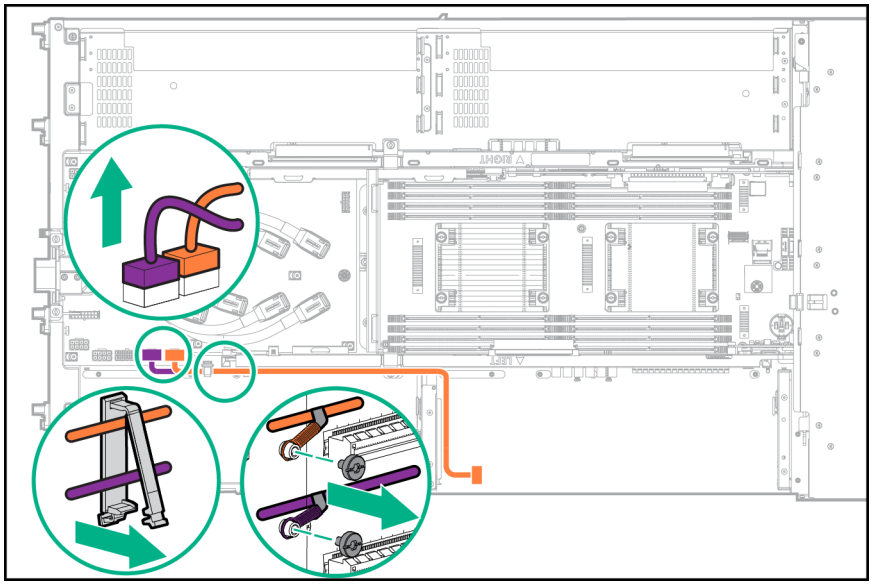
10. If the existing GPU power cables do not support the NVIDIA K40 GPUs, remove the cables from the server:

a. Remove the screws to release the retention springs. Keep the screws for later use.

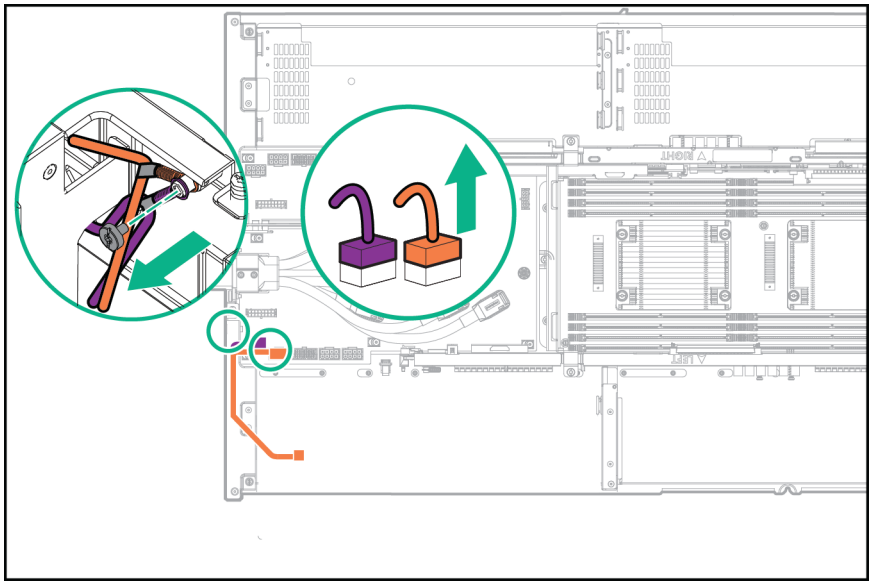
b. Release the long GPU power cables from the clip.

c. Disconnect the power cables from the power distribution board.

- Long GPU power cables



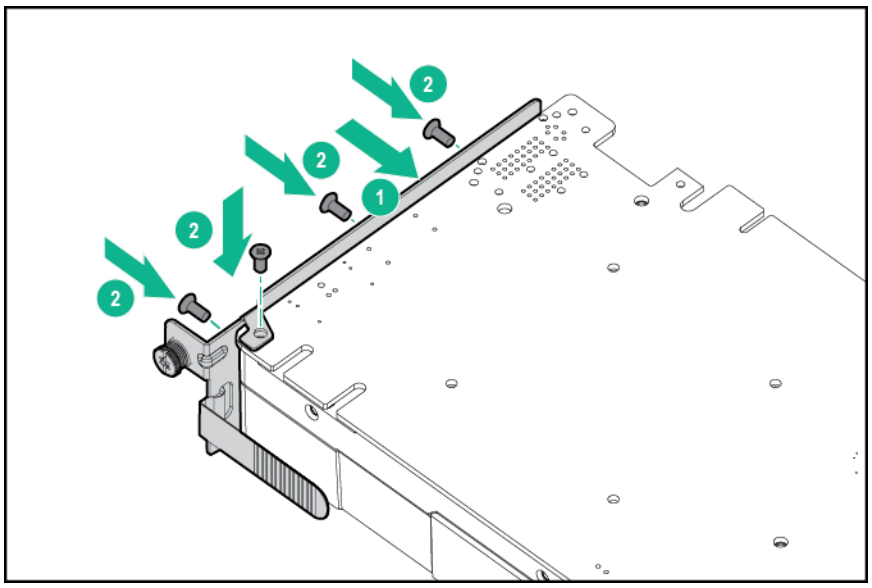
- Short GPU power cables



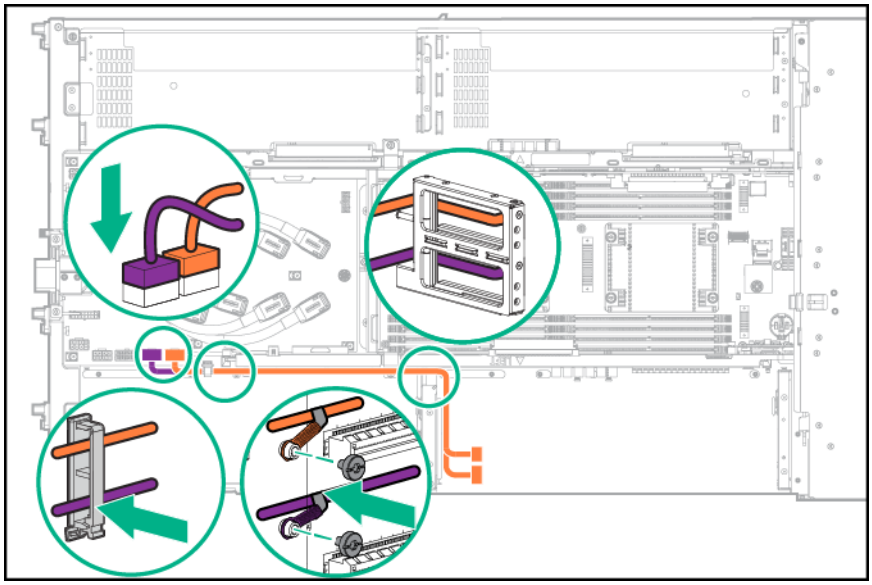
d. Remove the power cables from the server.

e. Repeat the procedure on the other side of the server.

11. Install the front support bracket onto the GPU.

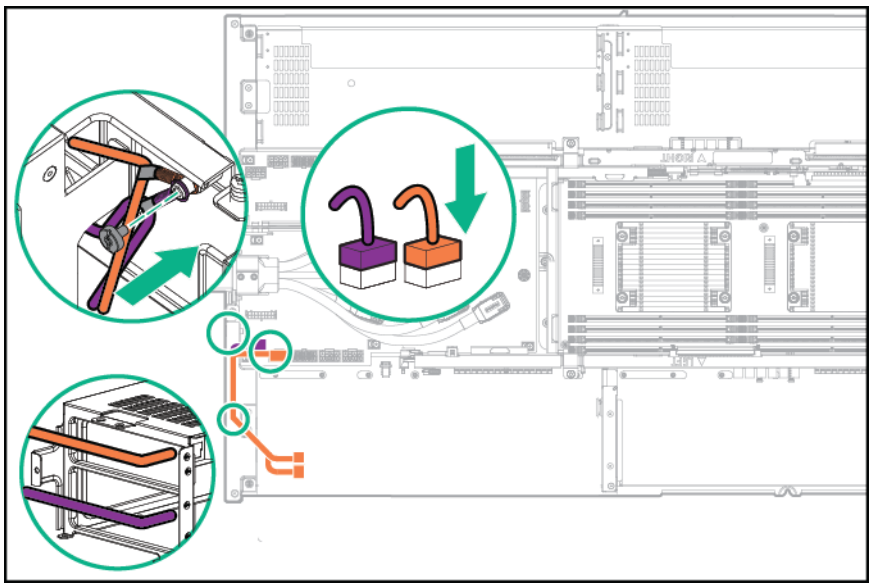


12. To install the long GPU power cables for slots 1 and 2, do the following:
    a. Route the long GPU power cables into the server.
    b. Connect the power cables to the power distribution board.
    c. Secure the power cables in the clip.
    d. Install and secure each retention spring with a screw.



    e. To install the long GPU power cables for slots 5 and 6, repeat the procedure on the other side of the server.

13. To install the short GPU power cables for slots 3 and 4, do the following:
    a. Route the short GPU power cables into the server.
    b. Connect the power cables to the power distribution board.
    c. Install and secure the retention springs for both cables with the screw.

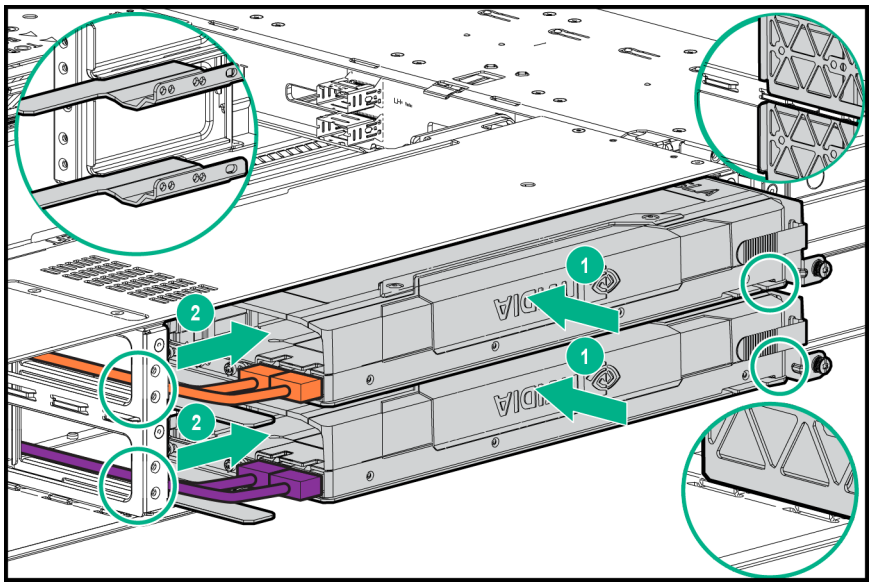


d. To install the short GPU power cables for slots 7 and 8, repeat the procedure on the other side of the server.

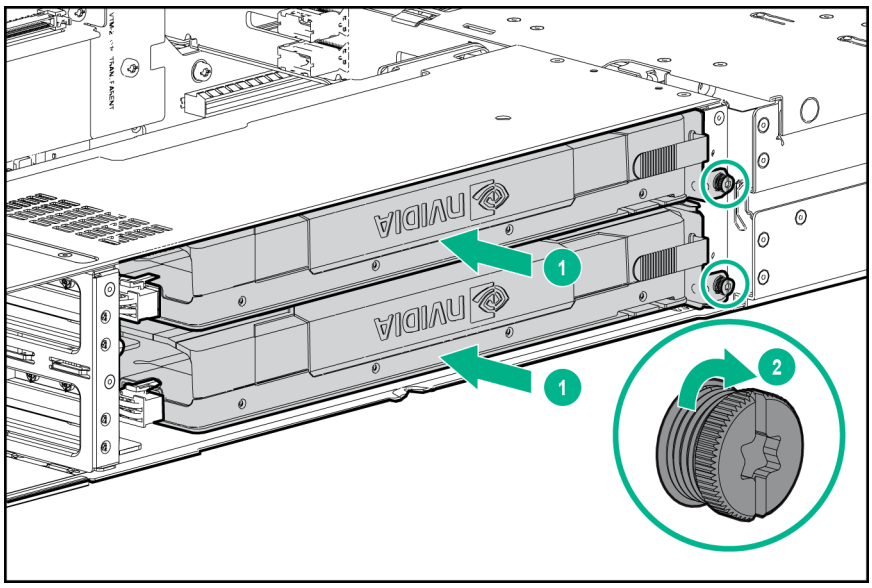
14. To install GPUs into slots 1 and 2, do the following:

a. Align each GPU with the guide features in the server, and then slide the GPUs halfway into the server.

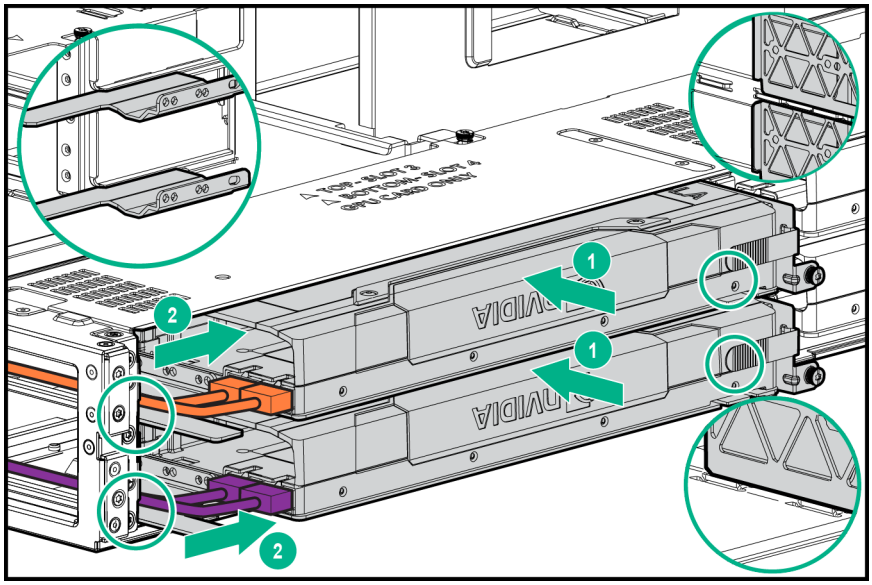
b. Connect the power cables to the GPUs.



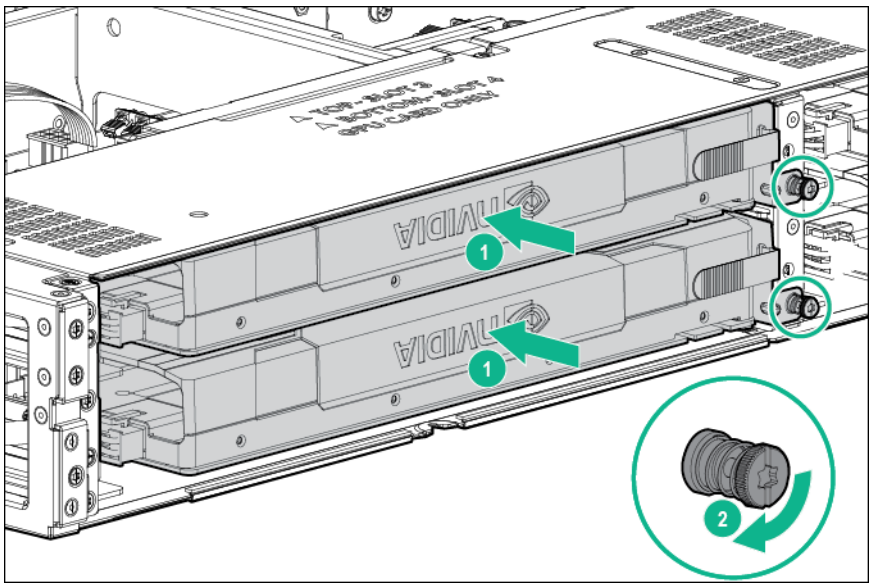
c. Install the GPUs and tighten the thumbscrews.



15. If installing GPUs into slots 5 and 6, repeat the procedure on the other side of the server.
16. To install GPUs into slots 3 and 4, do the following:
    a. Align each GPU with the guide features in the server, and then slide the GPUs halfway into the server.
    b. Connect the power cables to the GPUs.



    c. Install the GPUs and tighten the thumbscrews.



17. If installing GPUs into slots 7 and 8, repeat the procedure on the other side of the server.

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

18. **Install the side panel**.
19. **Install the access panel**.
20. **Install the server into the chassis**.
21. Connect all peripheral cables to the server .
22. **Power up the server** .

Installing the NVIDIA K80/M40/P40/P100/V100 GPU enablement Kit

Depending on the existing server configuration, some or all the following procedures may apply.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the side panel**.

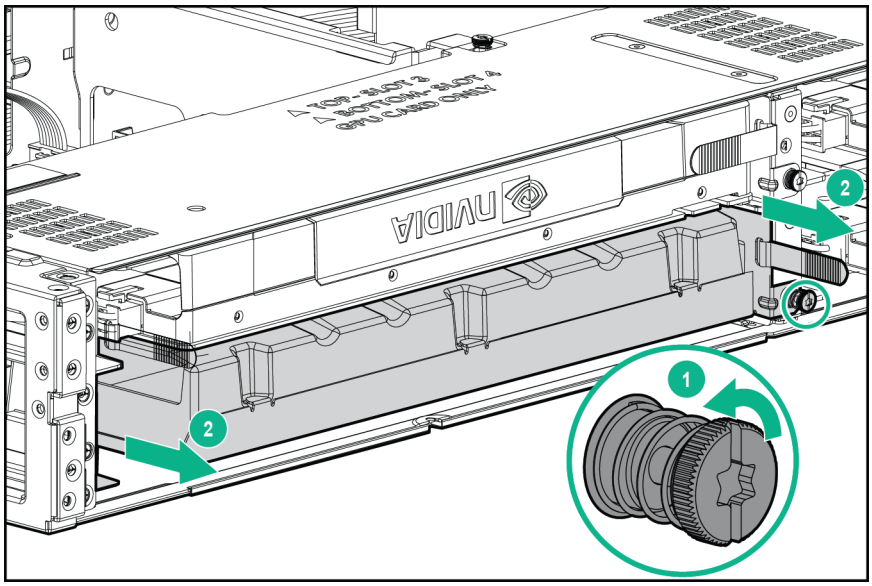
CAUTION:
To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

CAUTION:
The mixing of different GPU accelerator models is not supported.

CAUTION:
If three or more NVIDIA Tesla K80 GPUs or NVIDIA Tesla P40 GPUs are installed on one side of the server, the inlet ambient temperature must be maintained at or below 30°C (86°F).

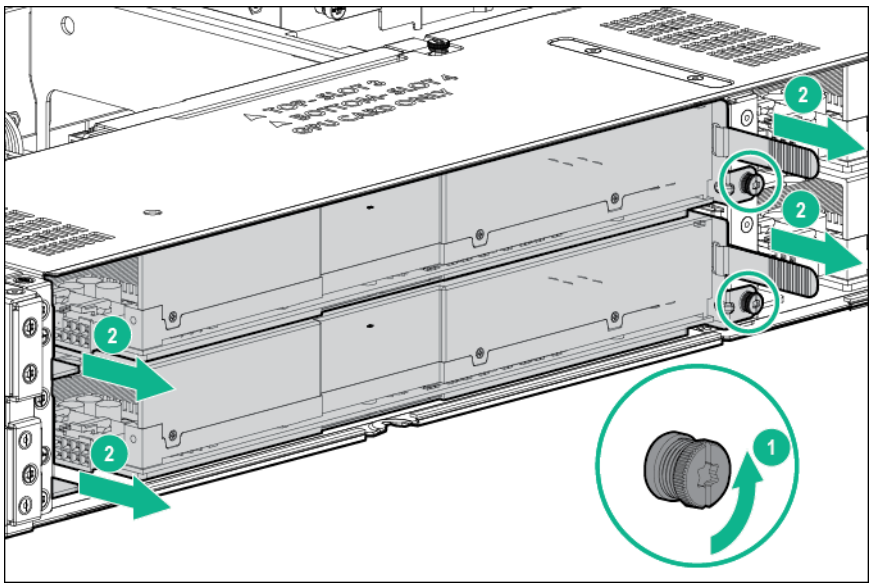
CAUTION:
If three or more NVIDIA Tesla P100 or NVIDIA Tesla V100 GPUs are installed on one side of the server, the inlet ambient temperature must be maintained at or below 25°C (77°F).

8. If there are already NVIDIA K80/M40/P40/P100/V100 GPUs installed in the server, and additional K80/M40/P40/P100/V100 GPUs are now being installed, remove the GPU blank:
   a. Loosen the captive screw.
   b. Using both hands, gently pull the tab and the rear of the GPU blank.



   c. Slide out the GPU blank from the server.

9. If NVIDIA K80/M40/P40/P100/V100 GPUs are not installed in the server, remove all GPUs:
   a. Loosen the captive screw.
   b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.



c. Disconnect the power cable from the GPU, and then remove the GPU from the server.

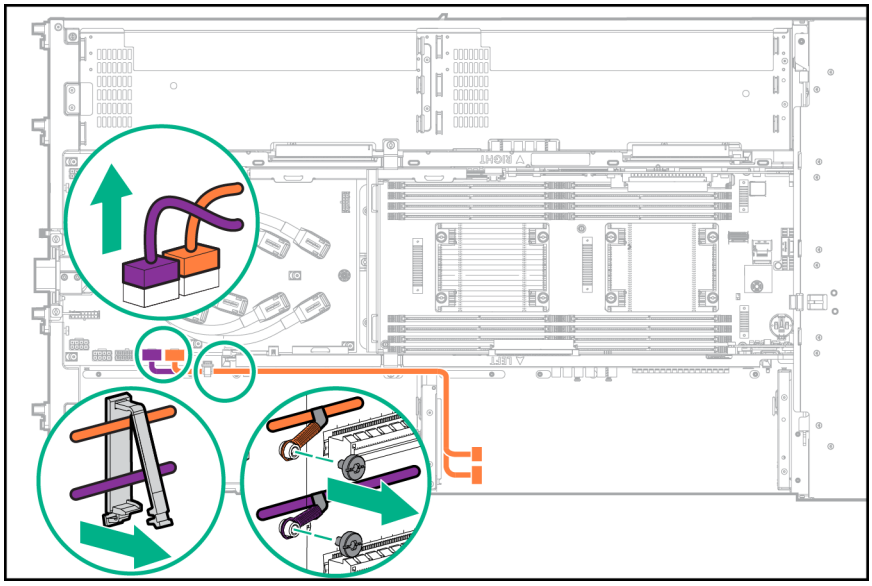
10. If the existing GPU power cables do not support the NVIDIA K80/M40/P40/P100/V100 GPUs, remove the cables from the server:

a. Remove the screws to release the retention springs. Keep the screws for later use.

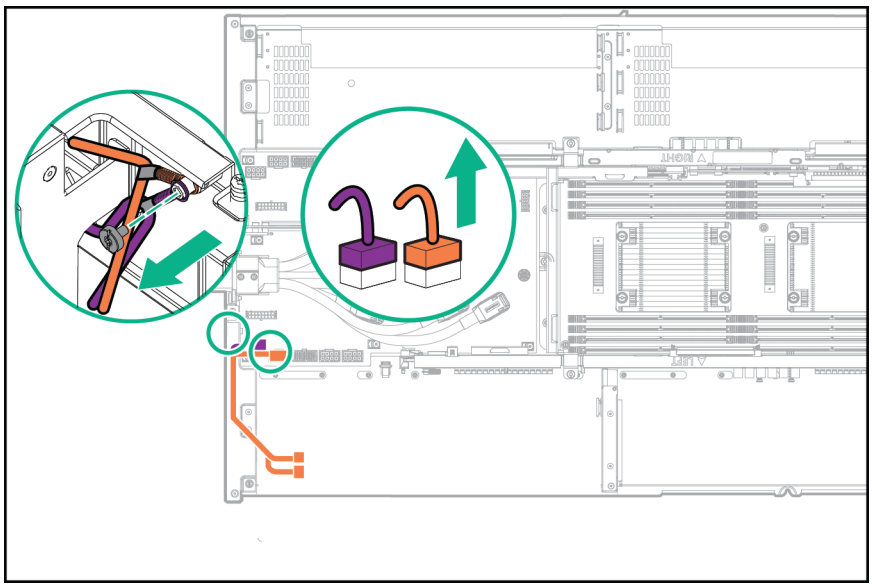
b. Release the long GPU power cables from the clip.

c. Disconnect the power cables from the power distribution board.

- Long GPU power cables



- Short GPU power cables

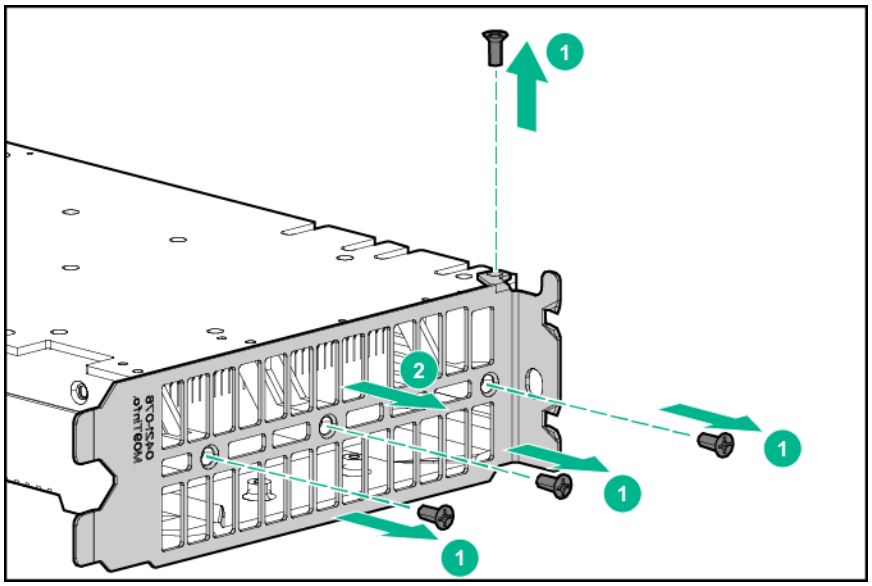


d. Remove the power cables from the server.

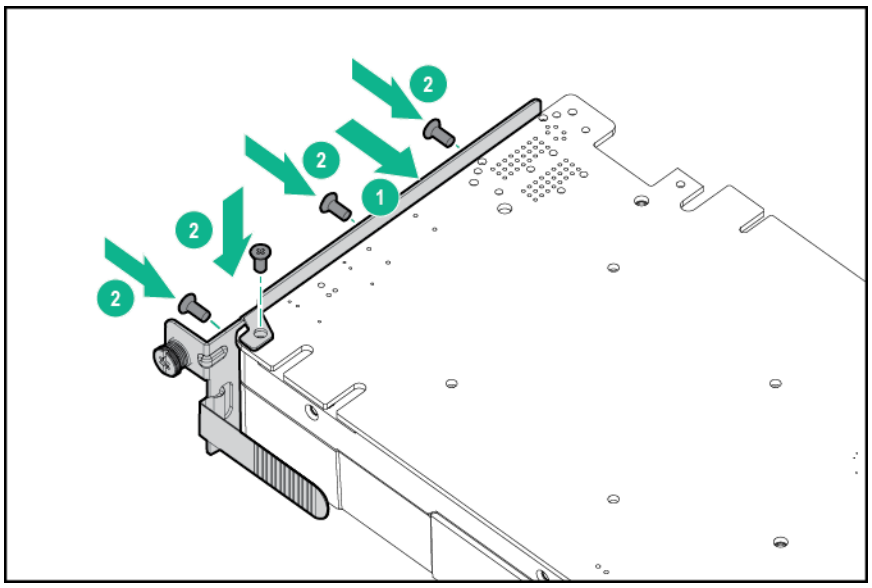
e. Repeat the procedure on the other side of the server.

11. Remove the existing front support bracket.

The support bracket seen in the illustration may vary depending on the GPU model.



12. Install the front support bracket onto the GPU.



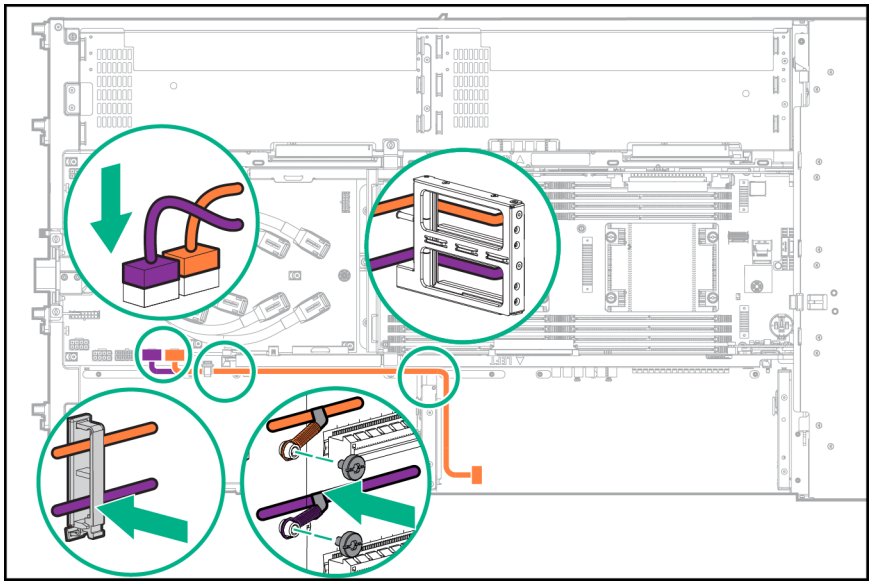
13. To install the long GPU power cables for slots 1 and 2, do the following:

    a. Route the long GPU power cables into the server.

    b. Connect the power cables to the power distribution board.

    c. Secure the power cables in the clip.

    d. Install and secure each retention spring with a screw.



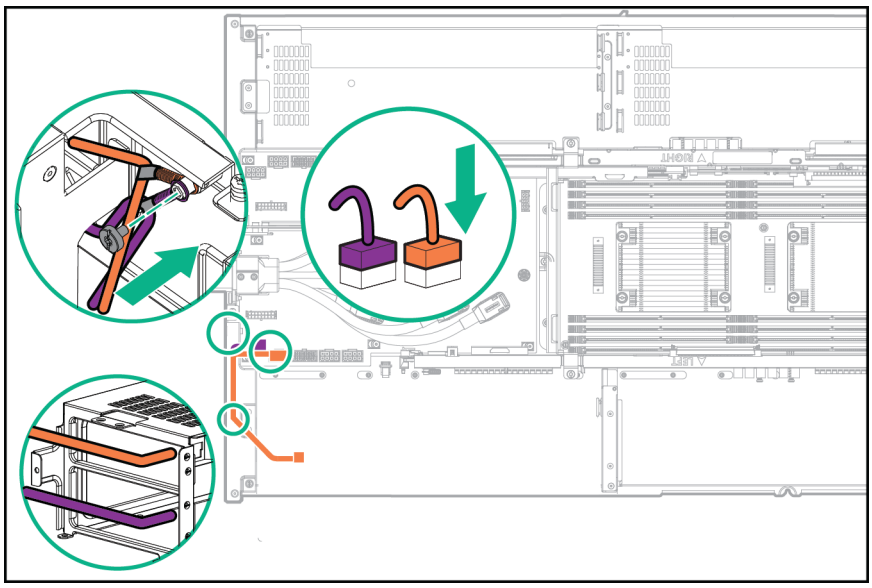
    e. To install the long GPU power cables for slots 5 and 6, repeat the procedure on the other side of the server.

14. To install the short GPU power cables for slots 3 and 4, do the following:

    a. Route the short GPU power cables into the server.

    b. Connect the power cables to the power distribution board.

    c. Install and secure the retention springs for both cables with the screw.

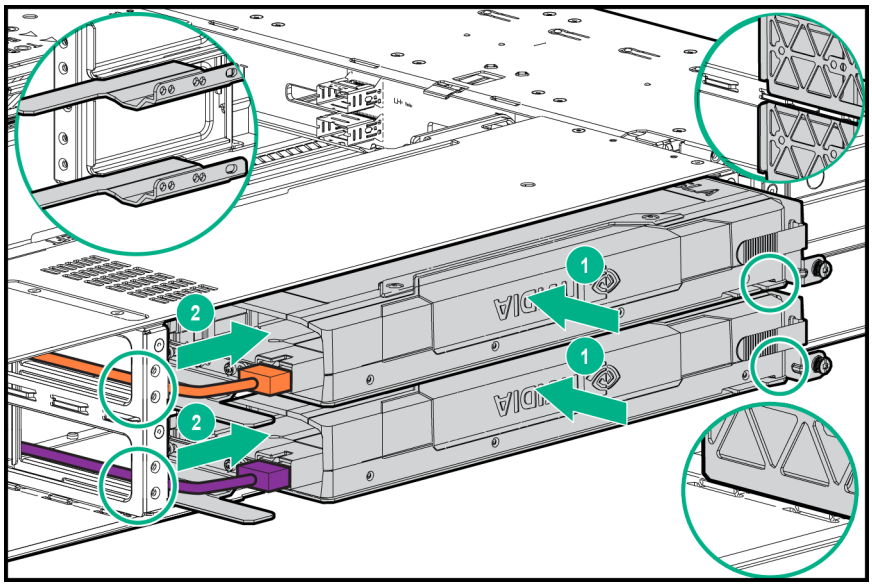


d. To install the short GPU power cables for slots 7 and 8, repeat the procedure on the other side of the server.

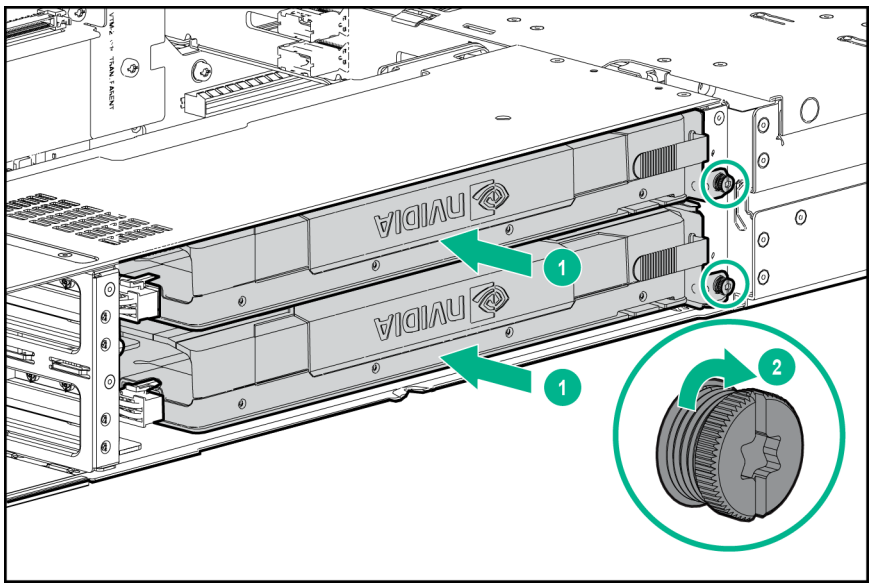
15. To install GPUs into slots 1 and 2, do the following:

a. Align each GPU with the guiding features in the server, and then slide the GPUs halfway into the server.

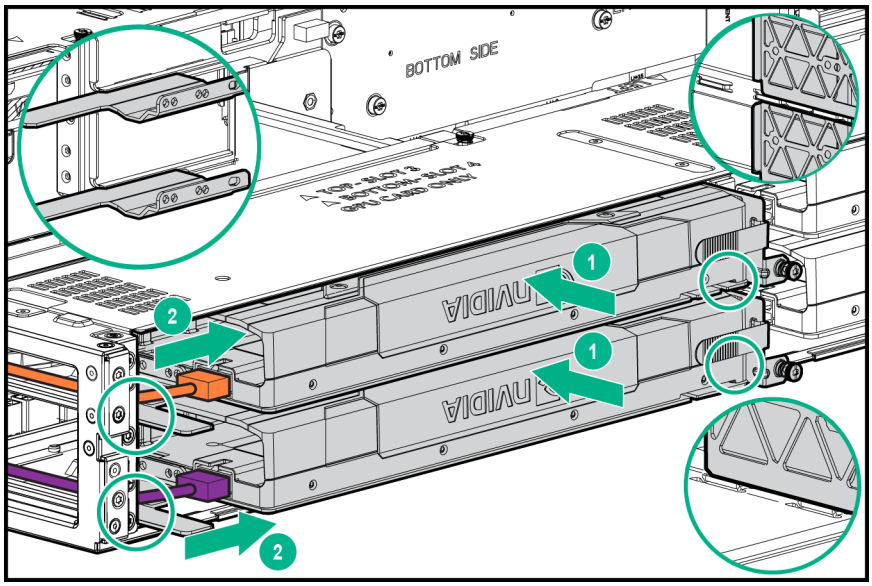
b. Connect the power cables to the GPUs.



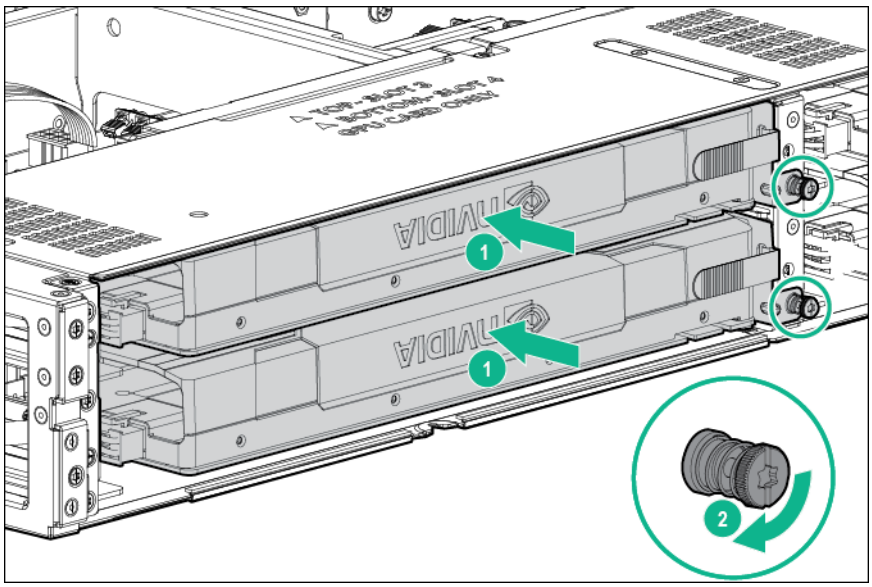
c. Install the GPUs and tighten the thumbscrews.



16. If installing GPUs into slots 5 and 6, repeat the procedure on the other side of the server.
17. To install GPUs into slots 3 and 4, do the following:
    a. Align each GPU with the guiding features in the server, and then slide the GPUs halfway into the server.
    b. Connect the power cables to the GPUs.
    Connect the power cables to the GPUs.



    c. Install the GPUs and tighten the thumbscrews.



18. If installing GPUs into slots 7 and 8, repeat the procedure on the other side of the server.

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

19. **Install the side panel**.
20. **Install the access panel**.
21. **Install the server into the chassis**.
22. Connect all peripheral cables to the server .
23. **Power up the server** .

Installing the NVIDIA P4 GPU adapter kit

> **NOTE:**
>
> Install NVIDIA P4 GPU adapter before installing the GPU, if you are installing NVIDIA P4 GPU in the slot 1, 2, 5, and 6. For more information, see **NVIDIA Tesla P4 GPU support matrix**.

Depending on the existing server configuration, some or all the following procedures may apply.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.

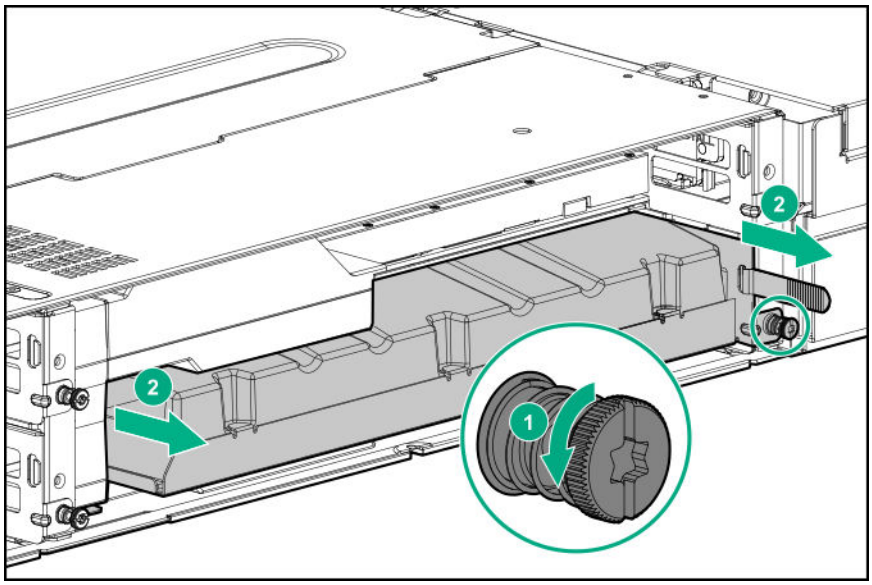
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the side panel**.

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

CAUTION:
The mixing of different GPU accelerator models is not supported.

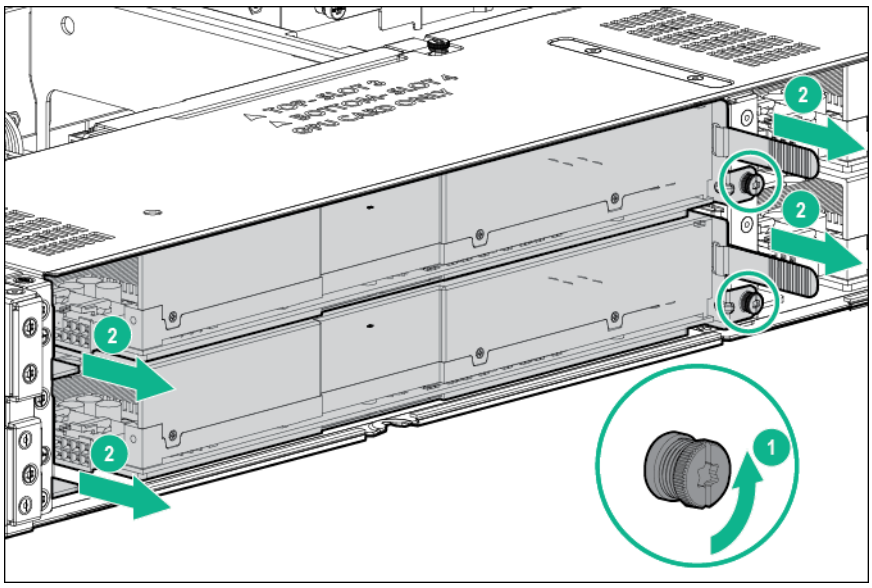
CAUTION:
If three or more NVIDIA Tesla P4 GPUs are installed on one side of the server, the inlet ambient temperature must be maintained at or below 30°C (86°F).

8. If NVIDIA P4 GPUs are already installed in the server, and additional P4 GPUs are now being installed, remove the GPU blank:
   a. Loosen the captive screw.
   b. Using both hands, gently pull the tab and the rear of the GPU blank.



   c. Slide out the GPU blank from the server.

9. If NVIDIA P4 GPUs are not installed in the server, remove all GPUs:
   a. Loosen the captive screw.
   b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.



c. Disconnect the power cable from the GPU, and then remove the GPU from the server.

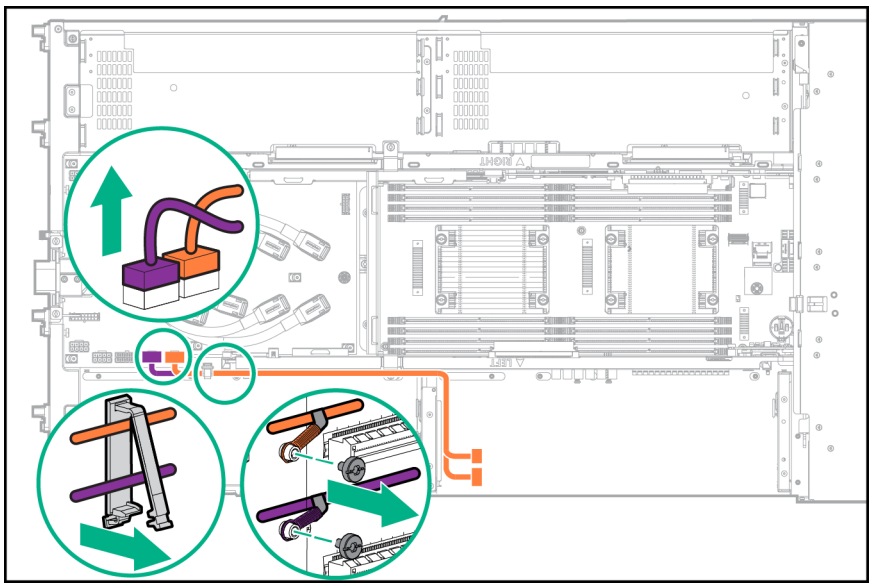
10. Remove the existing GPU power cables from the server:

a. Remove the screws to release the retention springs. Keep the screws for later use.

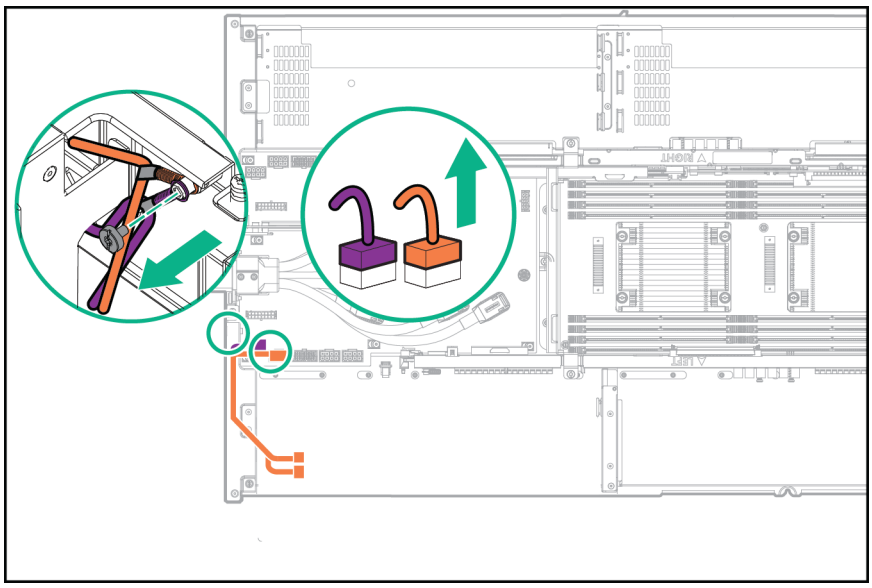
b. Release the long GPU power cables from the clip.

c. Disconnect the power cables from the power distribution board.

- Long GPU power cables



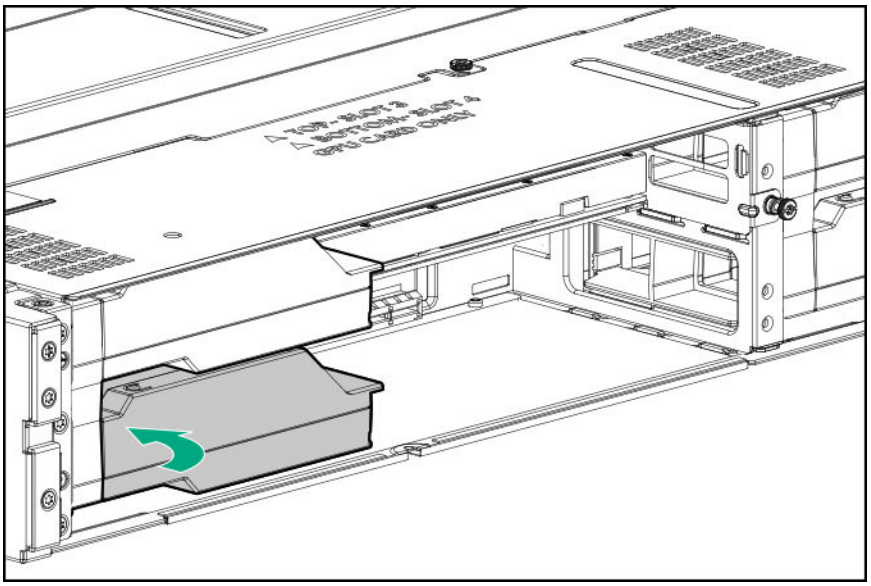
- Short GPU power cables



d. Remove the power cables from the server.

e. Repeat the procedure on the other side of the server.

11. Install the GPU adapter in the slot (slot 1, 2, 5, and 6 only) in which you want to install NVIDIA P4 GPU.



12. **Install the side panel**.
13. **Install the access panel**.
14. **Install the server into the chassis**.
15. Connect all peripheral cables to the server .
16. **Power up the server** .

Installing the NVIDIA P4 GPU enablement Kit

Depending on the existing server configuration, some or all the following procedures may apply.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

To install the component:

Procedure

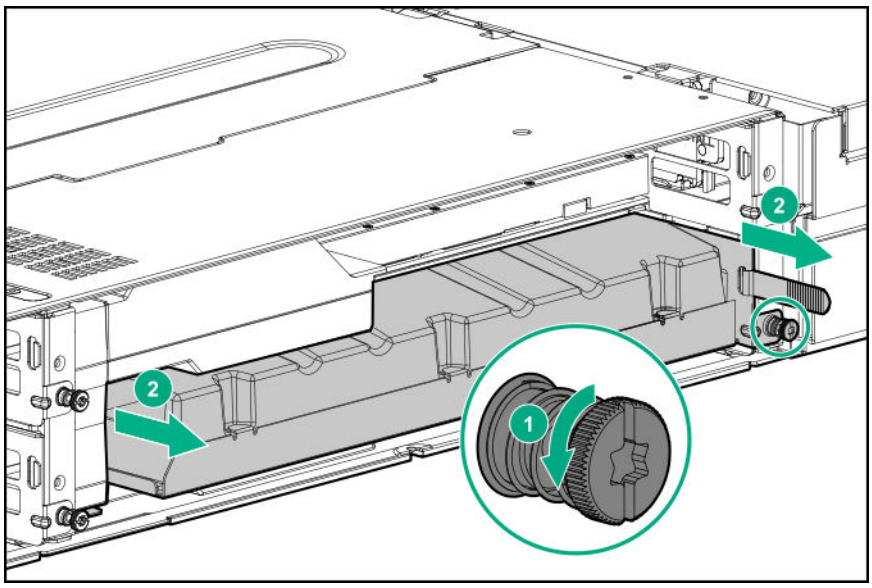
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the side panel**.

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

   CAUTION:
   The mixing of different GPU accelerator models is not supported.

   CAUTION:
   If three or more NVIDIA Tesla P4 GPUs are installed on one side of the server, the inlet ambient temperature must be maintained at or below 30°C (86°F).

8. If NVIDIA P4 GPUs are already installed in the server, and additional P4 GPUs are now being installed, remove the GPU blank:
   a. Loosen the captive screw.
   b. Using both hands, gently pull the tab and the rear of the GPU blank.

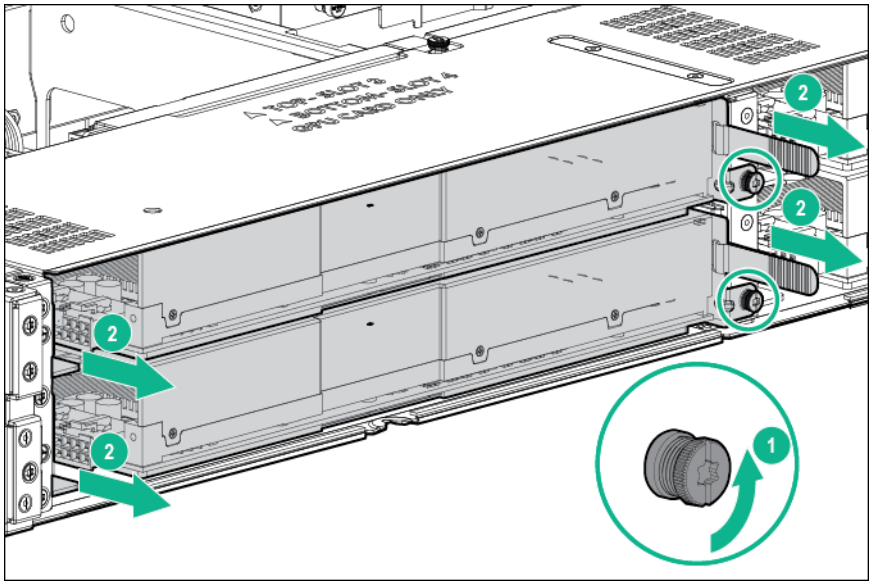


c. Slide out the GPU blank from the server.

9. If NVIDIA P4 GPUs are not installed in the server, remove all GPUs:

a. Loosen the captive screw.

b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.



c. Disconnect the power cable from the GPU, and then remove the GPU from the server.

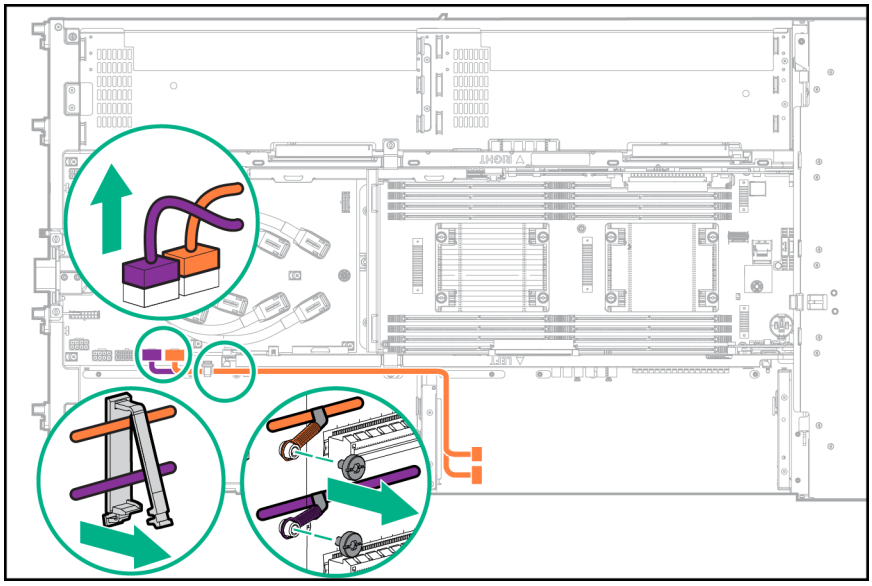
10. Remove the existing GPU power cables from the server:

a. Remove the screws to release the retention springs. Keep the screws for later use.

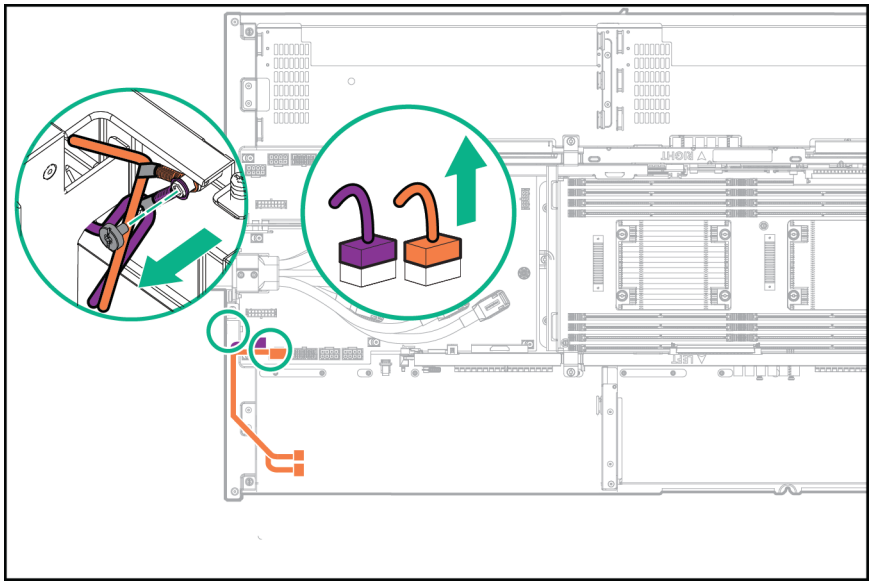
b. Release the long GPU power cables from the clip.

c. Disconnect the power cables from the power distribution board.

- Long GPU power cables



- Short GPU power cables



d. Remove the power cables from the server.

e. Repeat the procedure on the other side of the server.

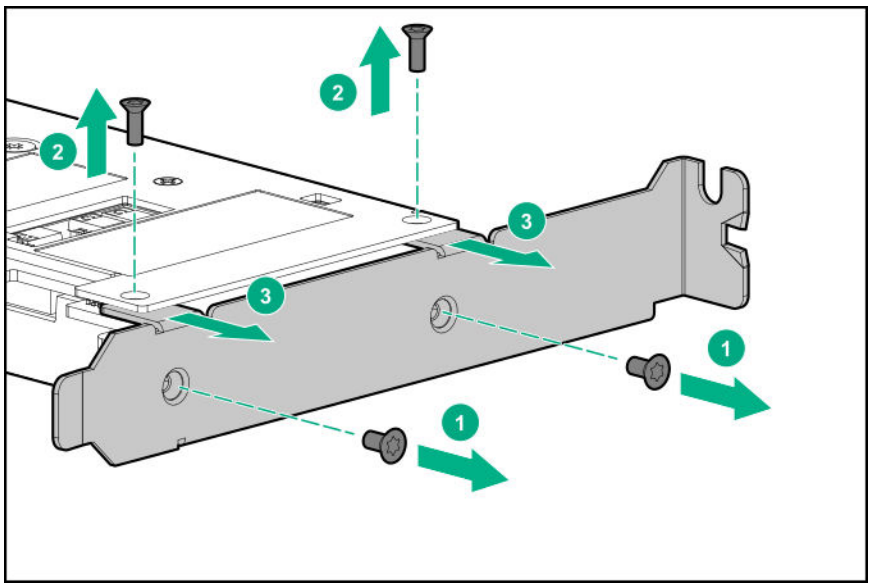
11. If GPU is to be installed in the slot 1, 2, 5, or 6, **Install the GPU adapter in the slot**.

12. Remove the existing front support bracket on the GPU.

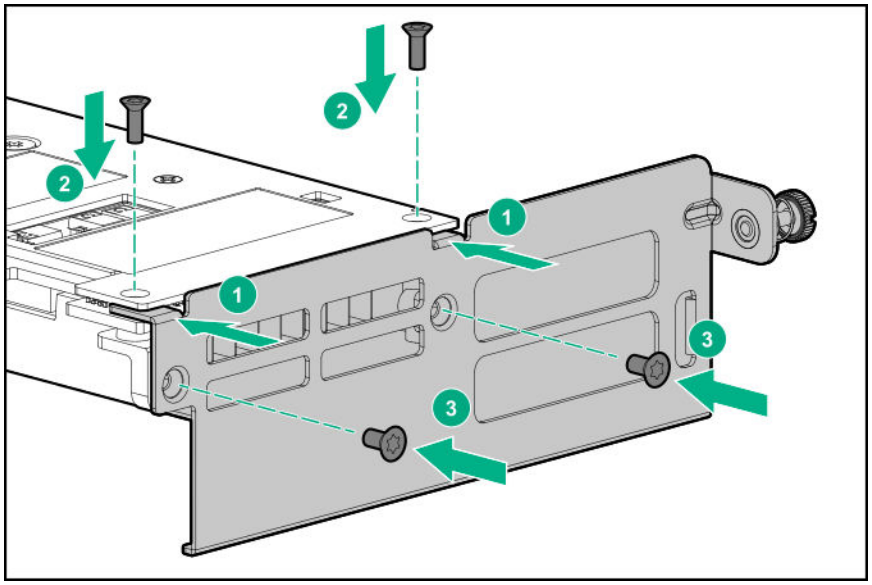
a. Remove the support bracket front screws.

b. Remove the support bracket side screws.

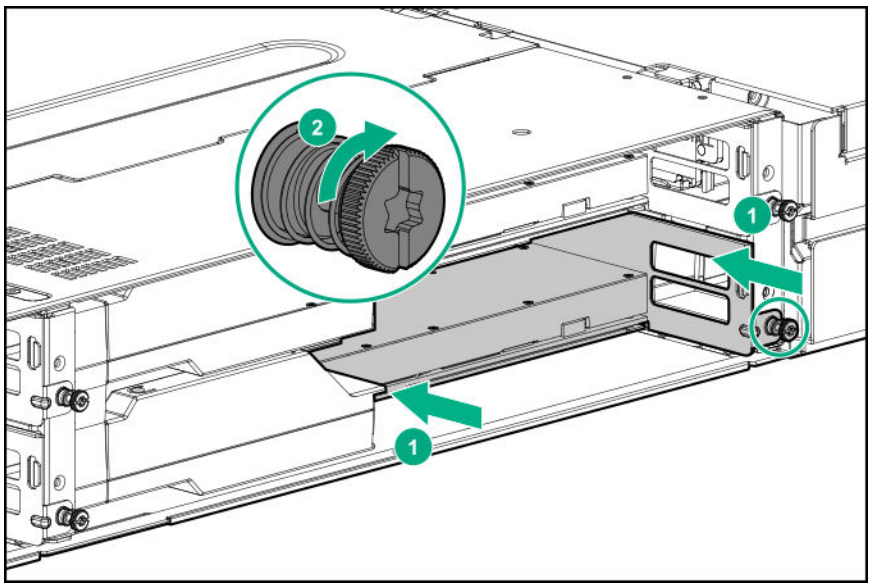
c. Pull out the front support bracket.



13. Install the new front support bracket on the GPU.
    a. Slide the front support bracket and align holes on the bracket with the holes on the GPU.
    b. Install two long screws to secure the GPU to the bracket.
    c. Install two short screws to secure the GPU to the bracket.



14. Install the GPU in the slot.
    a. Slide the GPU in the slot.
    b. Tighten the thumbscrew to secure the GPU to the chassis.



15. **Install the side panel**.
16. **Install the access panel**.
17. **Install the server into the chassis**.
18. Connect all peripheral cables to the server .
19. **Power up the server** .

Installing the AMD FirePro S9150 GPU enablement kit

Depending on the existing server configuration, some or all of the following procedures may apply.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

To install the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the side panel**.

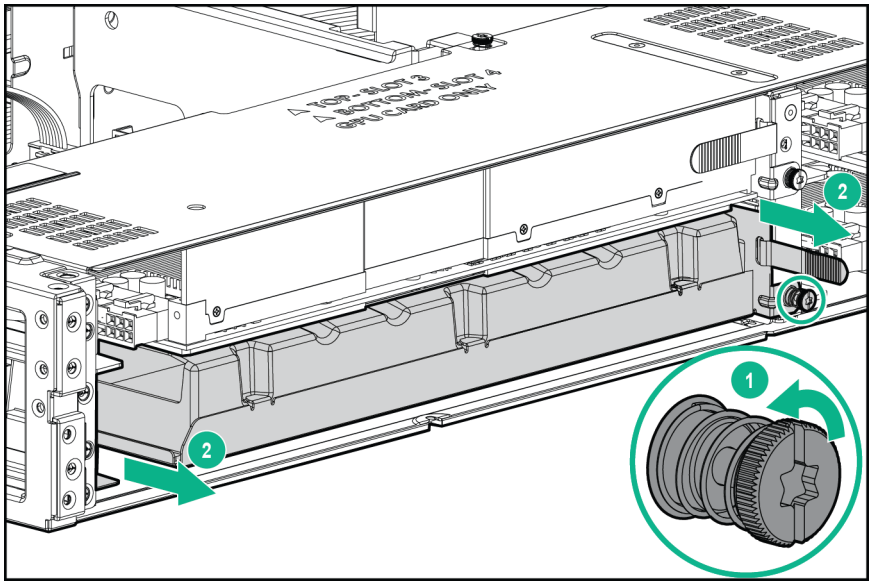
> **CAUTION:**
> To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

CAUTION:
The mixing of different GPU accelerator models is not supported.

8. If AMD FirePro S9150 GPUs are already installed in the server, and additional AMD FirePro S9150 GPUs are now being installed, remove the GPU blank:

   a. Loosen the captive screw.

   b. Using both hands, gently pull the tab and the rear of the GPU blank.

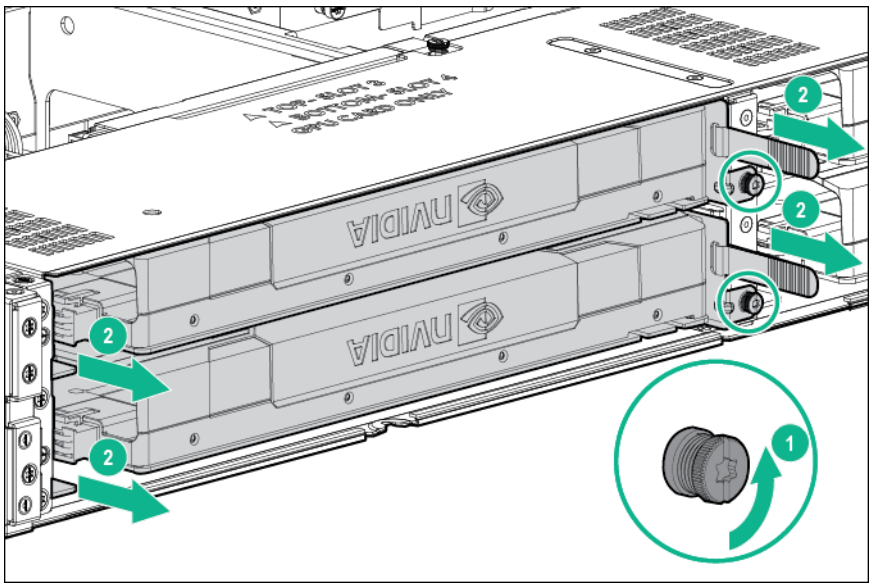


   c. Slide out the GPU blank from the server.

9. If AMD FirePro S9150 GPUs are not installed in the server, remove all GPUs:

   a. Loosen the captive screw.

   b. Using both hands, gently pull the tab and the rear support bracket to slide out the GPU to access the power cable.



c. Disconnect the power cable from the GPU, and then remove the GPU from the server.

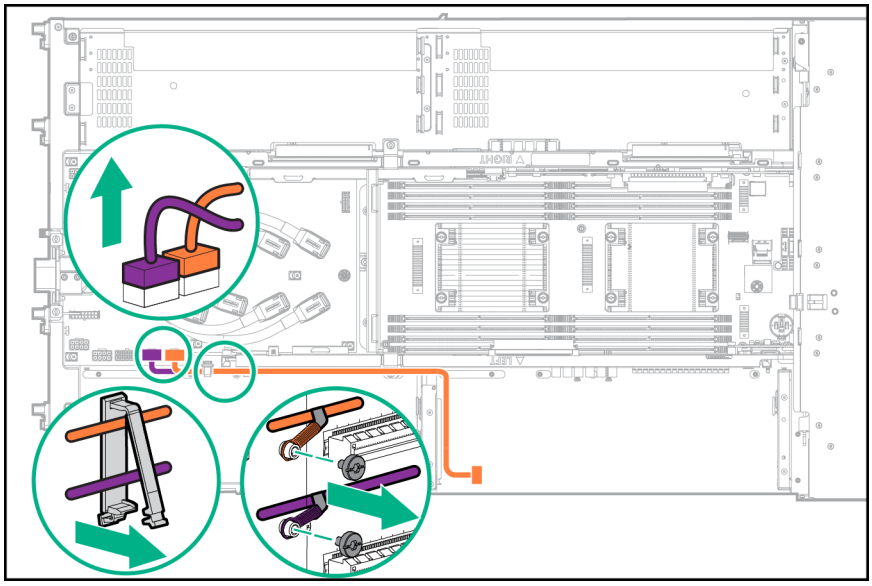
10. If the existing GPU power cables do not support the AMD FirePro S9150 GPUs, remove the cables from the server:

a. Remove the screws to release the retention springs. Retain the screws for later use.

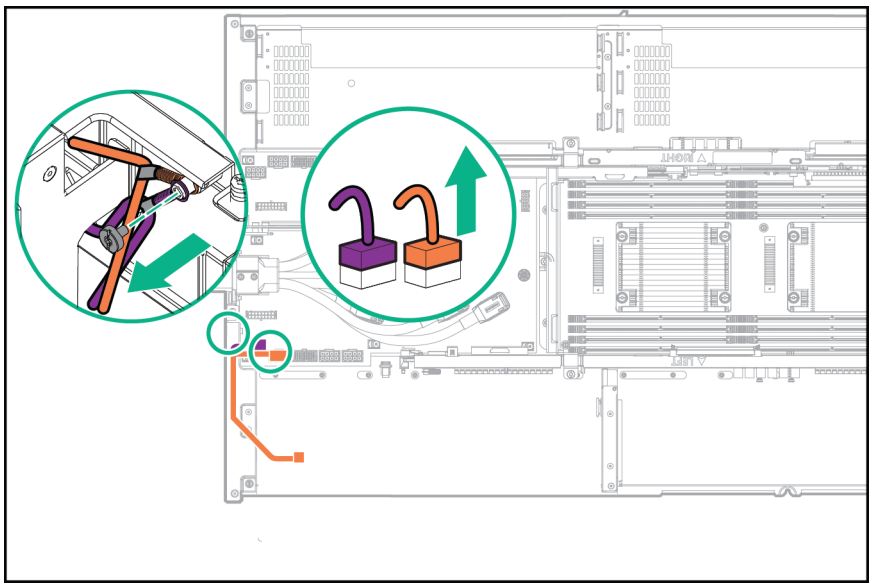
b. Release the long GPU power cables from the clip.

c. Disconnect the power cables from the power distribution board.

- Long GPU power cables



- Short GPU power cables

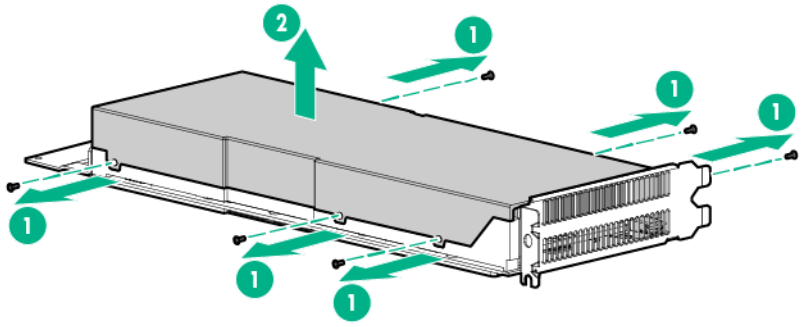


d. Remove the power cables from the server.

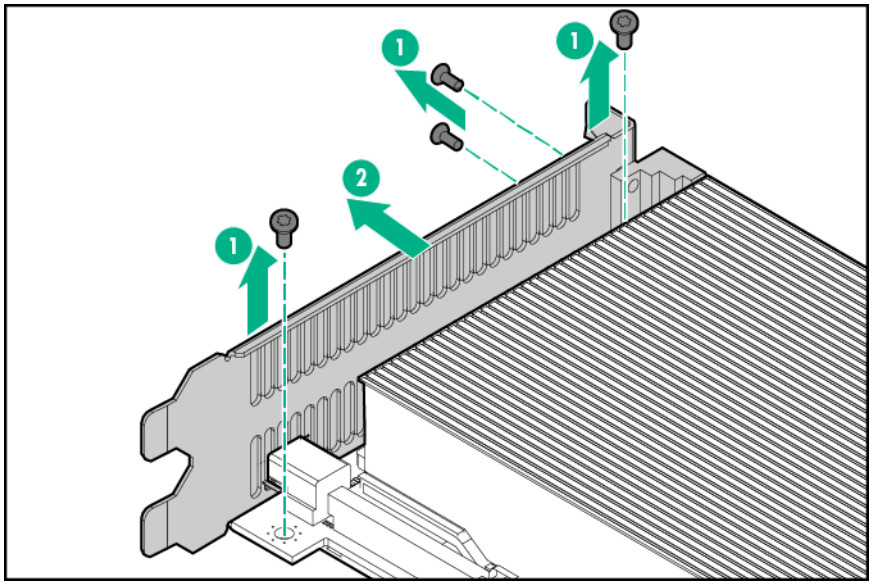
e. Repeat the procedure on the other side of the server.

11. To install the front support bracket onto the GPU:

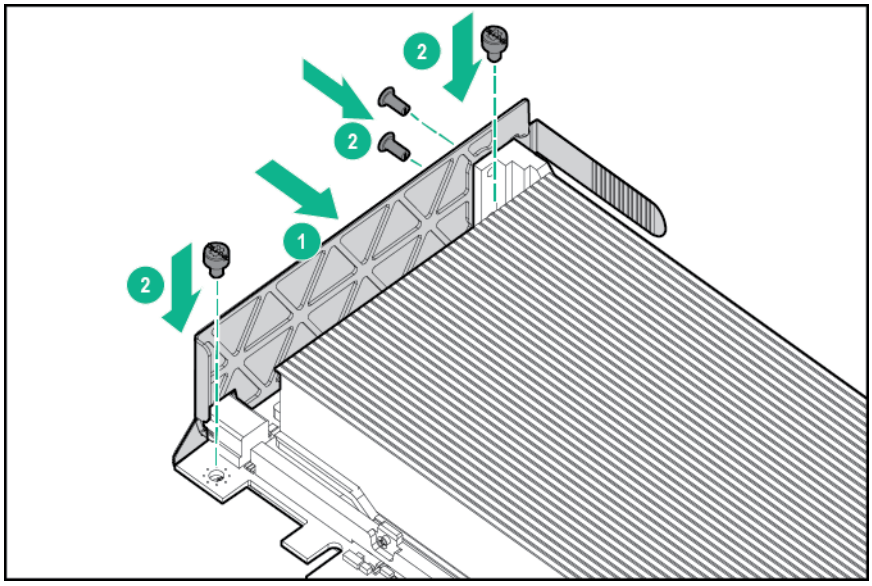
a. Remove the cover.



b. Remove the existing front support bracket.



c. Install the front support bracket onto the GPU.



d. Reinstall the accelerator cover.

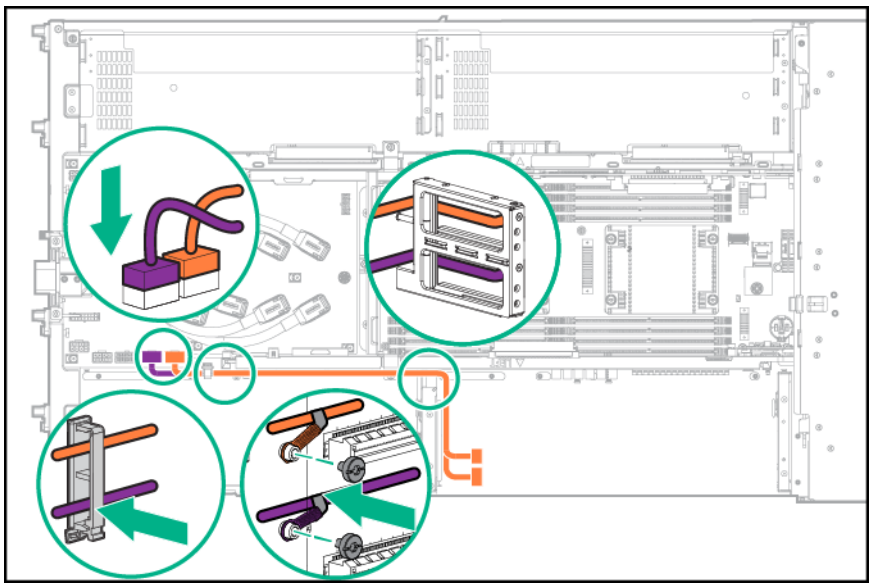
12. To install the long GPU power cables for slots 1 and 2, do the following:

a. Route the long GPU power cables into the server.

b. Connect the power cables to the power distribution board.

c. Secure the power cables in the clip.

d. Install and secure each retention spring with a screw.



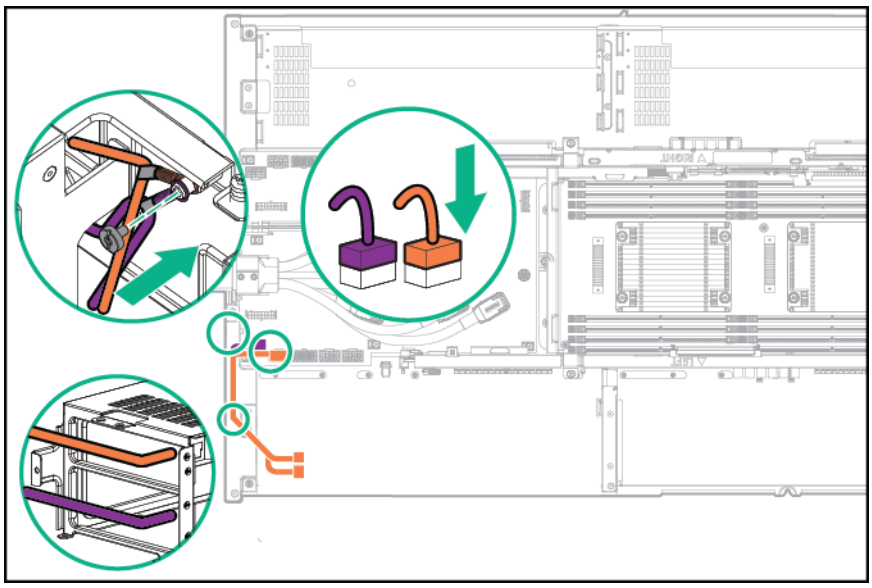
e. To install the long GPU power cables for slots 5 and 6, repeat the procedure on the other side of the server.

13. To install the short GPU power cables for slots 3 and 4, do the following:

a. Route the short GPU power cables into the server.

b. Connect the power cables to the power distribution board.

c. Install and secure the retention springs for both cables with the screw.

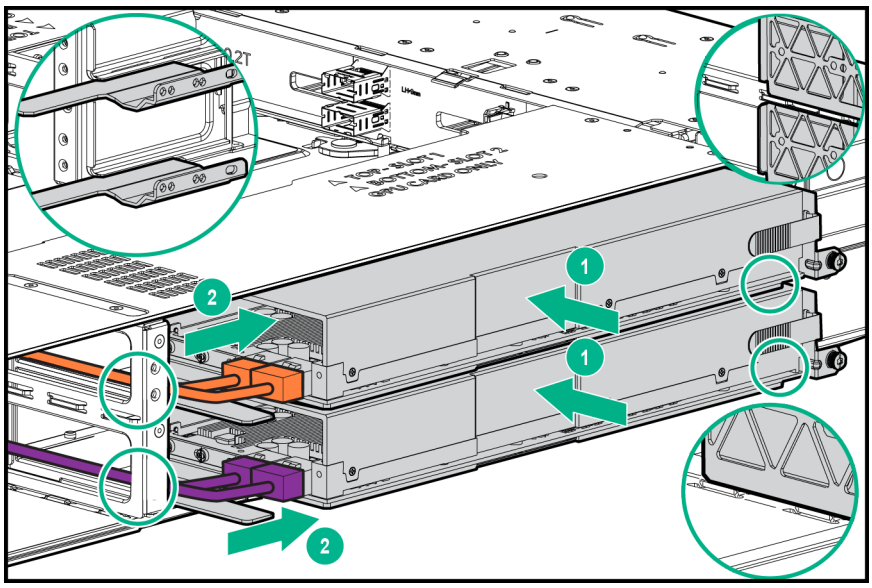


d. To install the short GPU power cables for slots 7 and 8, repeat the procedure on the other side of the server.

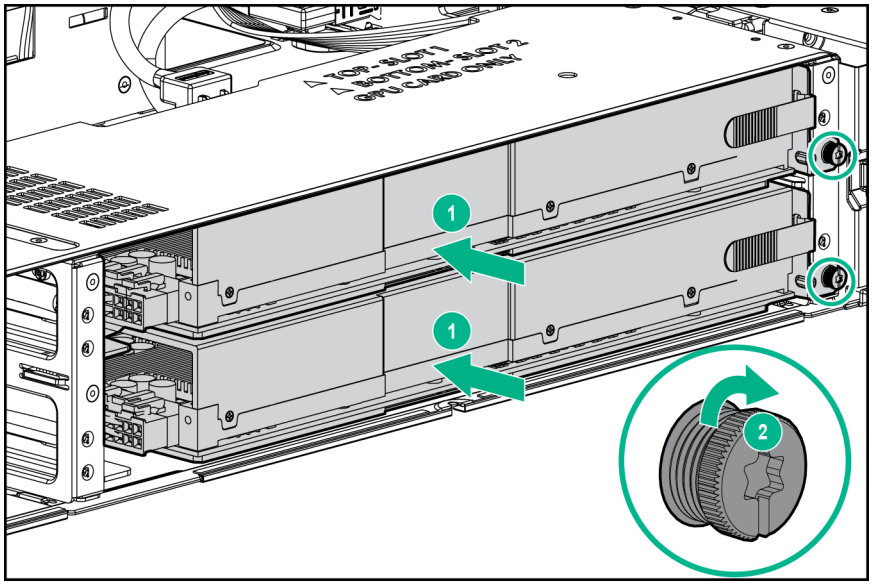
14. To install GPUs into slots 1 and 2, do the following:

a. Align each GPU with the guiding features in the server, and then slide the GPUs halfway into the server.

b. Connect the power cables to the GPUs.



c. Install the GPUs and tighten the thumbscrews.

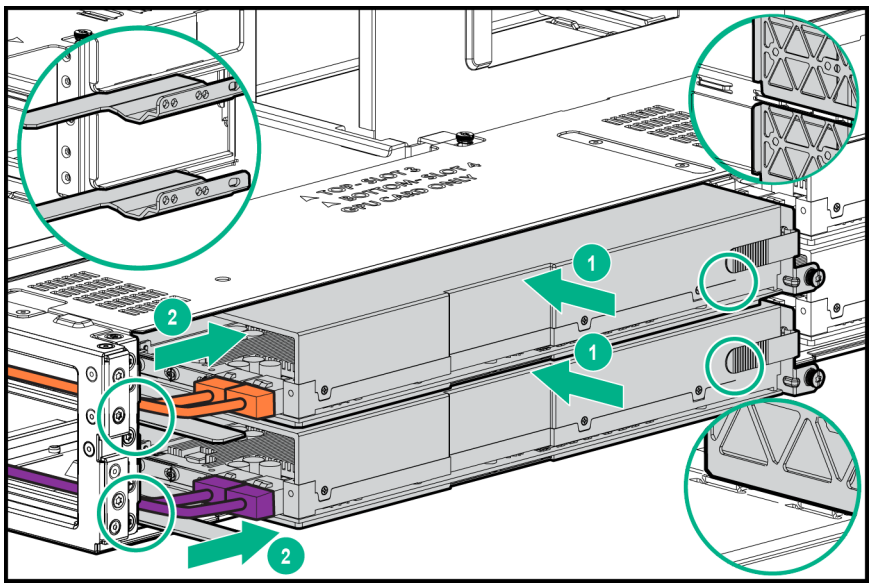


15. If installing GPUs into slots 5 and 6, repeat the procedure on the other side of the server.

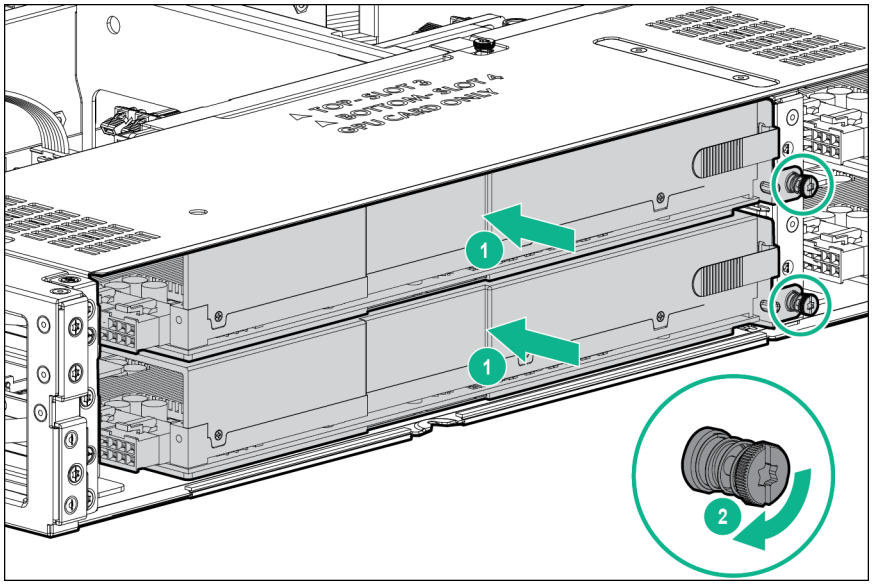
16. To install GPUs into slots 3 and 4, do the following:

a. Align each GPU with the guiding features in the server, and then slide the GPUs halfway into the server.

b. Connect the power cables to the GPUs.



c. Install the GPUs and tighten the thumbscrews.



17. If installing GPUs into slots 7 and 8, repeat the procedure on the other side of the server.

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

18. **Install the side panel**.
19. **Install the access panel**.
20. **Install the server into the chassis**.
21. Connect all peripheral cables to the server .
22. **Power up the server** .

Expansion board options

This section provides instructions for installing an expansion board option into the server.

Expansion board installation guidelines

Population guidelines vary depending on the type of PCI riser modules installed and the number of GPU accelerators installed.

- Install low-profile storage controllers or PCIe NIC cards into slot 9 and slot 10. For more information on installing a storage controller, see "**Storage controller options**."
- Install GPU accelerator options into slots 1 through 8. For more information, see "**GPU accelerator options**."
- Install the P542D Smart Array Storage Controller module into slot 11. For more information, see "**Installing the HPE Smart Array P542D Controller module**."

For more information on the riser board slot specifications, see "**PCI riser module components**."

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

Installing the expansion board

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

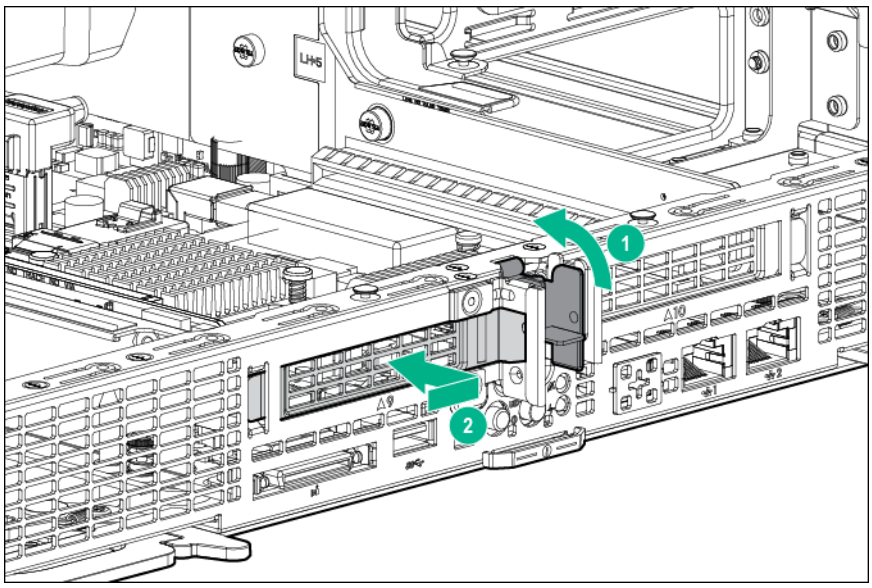
To install the component:

Procedure

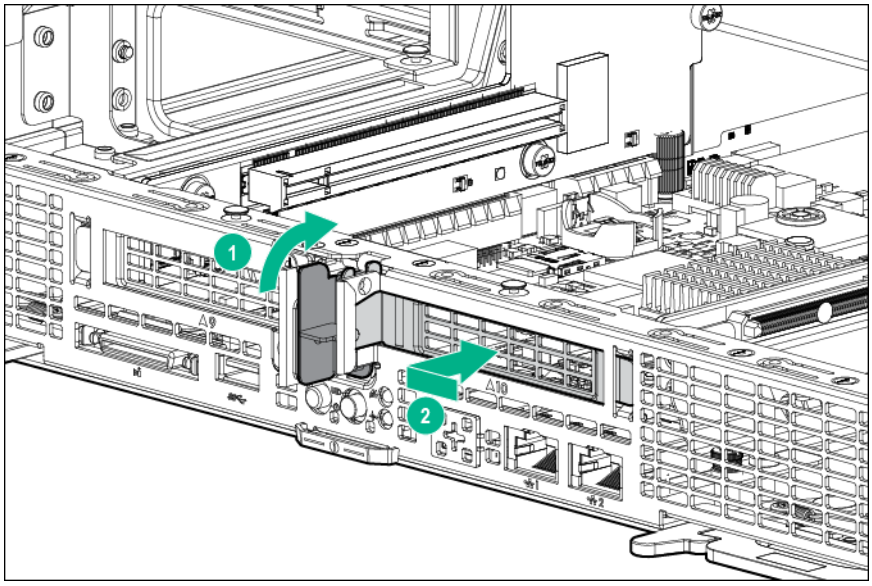
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Disconnect all cables from the drive backplane.
9. **Remove the drive cage assembly**.

   NOTE: A second processor is required to install an expansion board in slot 10 of the right 4:1 PCI riser module.

10. Identify the expansion slot compatible with the new option, and then remove the PCI blank.
    - Slot 9

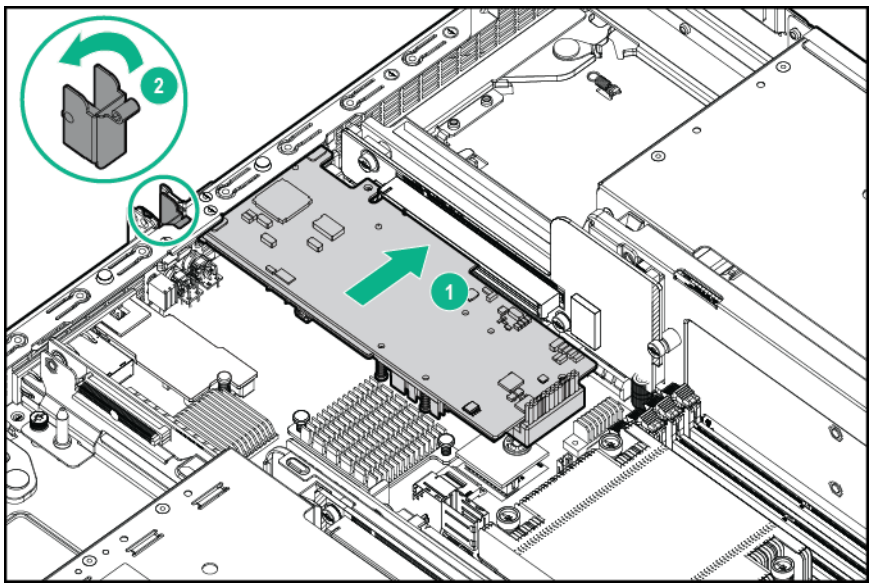


- Slot 10

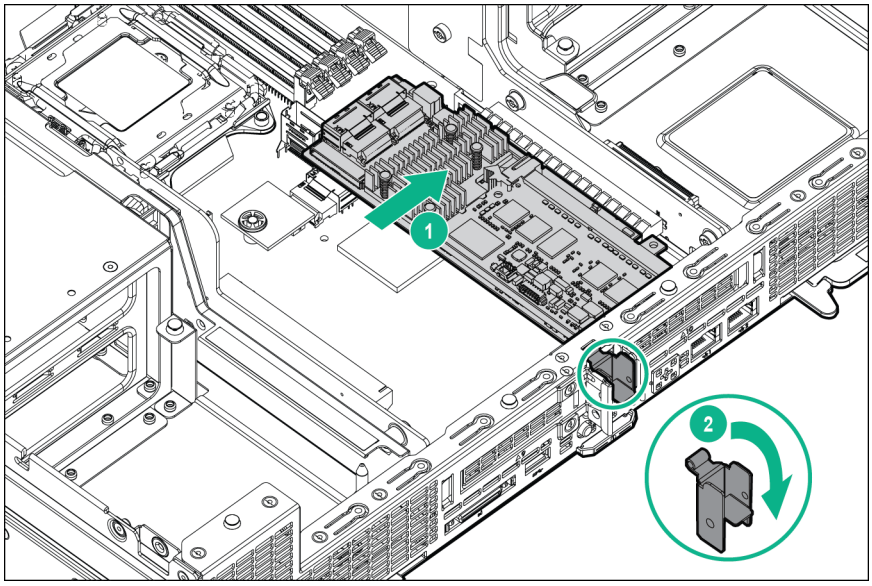


11. Connect any required cables to the expansion board.
12. Install the expansion board.

    - Slot 9



- Slot 10



13. Connect all necessary internal cabling to the expansion board. For more information on these cabling requirements, see the documentation that ships with the option.
14. **Install the drive cage assembly**.
15. Connect all cables to the drive backplane.
16. **Install the air baffle**.

    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
17. **Install the access panel**.
18. **Install the server into the chassis**.
19. Connect all peripheral cables to the server .
20. **Power up the server** .

Dedicated iLO management port module option

Rules and limitations for installing the dedicated iLO management port module

Observe the following rules and limitations when installing an dedicated iLO management port module:

- If a dedicated iLO management port module is installed in the server:
  - The server can only connect to a network through the dedicated iLO management port module.
  - The server cannot be accessed through the chassis management module.
- If using the chassis management module iLO ports or the dedicated iLO management port module to connect to a network, the network must operate at a speed of 1 Gb/s. The server cannot connect to the network if the network is operating at a speed of 10/100 Mb/s or 10 Gb/s.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

Installing a dedicated iLO management port module

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

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

CAUTION:
Electrostatic discharge can damage electronic components. Be sure you are properly grounded before beginning this procedure.

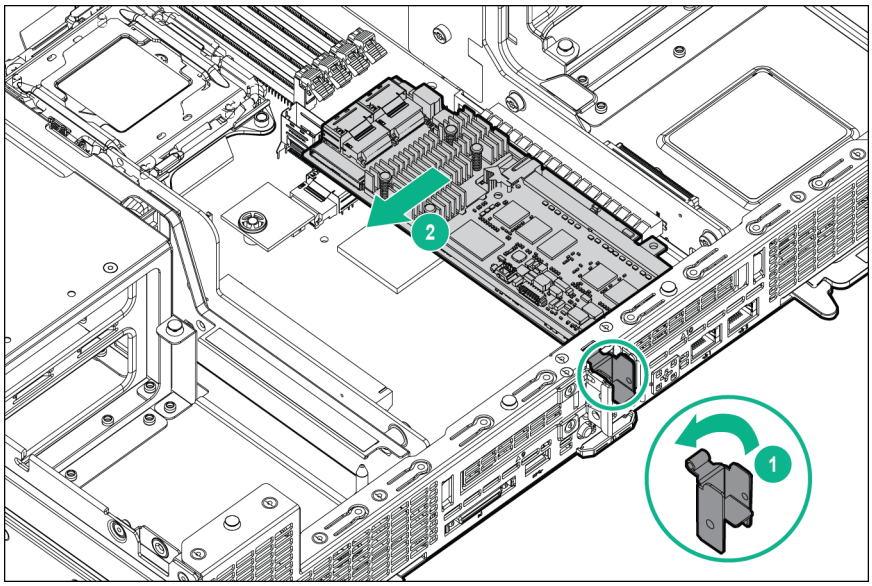
To install the component:

Procedure

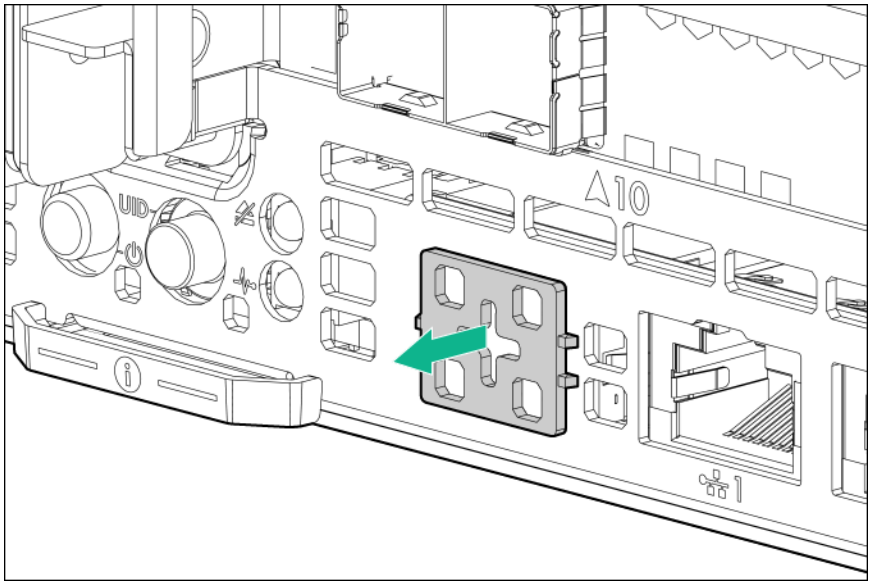
1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis**.
5. Place the server on a flat, level work surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. Disconnect all cables from the drive backplane.
9. **Remove the drive cage assembly**.
10. If installed in slot 10, remove the expansion board.

a. Disconnect any internal cables that are connected to the riser module.

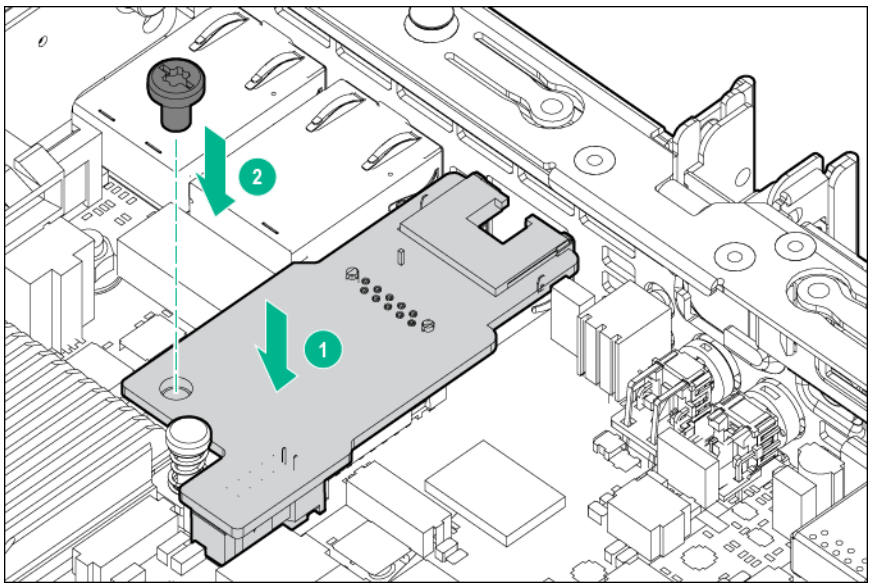
b. Remove the expansion board.



11. Insert a flat screwdriver into the knockout.
12. Twist and pull to remove the knockout.



13. Install the dedicated iLO management port card.



14. If removed from slot 10, **install the expansion board**.
15. Connect any required cables.
16. **Install the drive cage assembly**.
17. Connect all cables to the drive backplane.
18. **Install the air baffle**.

    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
19. **Install the access panel**.
20. **Install the server into the chassis**.
21. Connect all peripheral cables to the server .
22. **Power up the server** .

Enabling the dedicated iLO management module

The onboard NIC 1/shared iLO connector is set as the default system iLO connector. To enable the dedicated iLO management module, use the iLO 4 Configuration Utility accessible within the UEFI System Utilities.

For more information on the UEFI System Utilities, see the UEFI documentation on the **Hewlett Packard Enterprise website**.

IMPORTANT:
If the iLO configuration settings are reset to the default values, remote access to the machine will be lost. Access the physical machine and repeat the procedure described in this section to re-enable the dedicated iLO management connector.

To enable the dedicated iLO management module:

Procedure

1. During the server startup sequence after installing the module, press **F9** in the POST screen.

The System Utilities screen appears.

2. Select **System Configuration** | **iLO 4 Configuration Utility**.

   The iLO 4 Configuration Utility screen appears.

3. Select **Network Options**, and then press **Enter**.

   The Network Options screen appears.

4. Set the **Network Interface Adapter** field to **ON**, and then press **Enter**.

5. Press **F10** to save your changes.

   A message prompt to confirm the iLO settings reset appears.

6. Press **Enter** to reboot the iLO settings.

7. Press **Esc** until the main menu is displayed.

8. Select **Reboot the System** to exit the utility and resume the boot process.

   The IP address of the enabled dedicated iLO connector appears on the POST screen on the subsequent boot-up. Access the Network Options screen again to view this IP address for later reference.

HP Trusted Platform Module option

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website** .

Use these instructions to install and enable a TPM on a supported server . This procedure includes three sections:

1. Installing the Trusted Platform Module board.
2. **Retaining the recovery key/password**.
3. **Enabling the Trusted Platform Module**.

   Enabling the TPM requires accessing BIOS/Platform Configuration (RBSU) in the **UEFI System Utilities**.

TPM installation requires the use of drive encryption technology, such as the Microsoft Windows BitLocker Drive Encryption feature. For more information on BitLocker, see the **Microsoft website**.

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

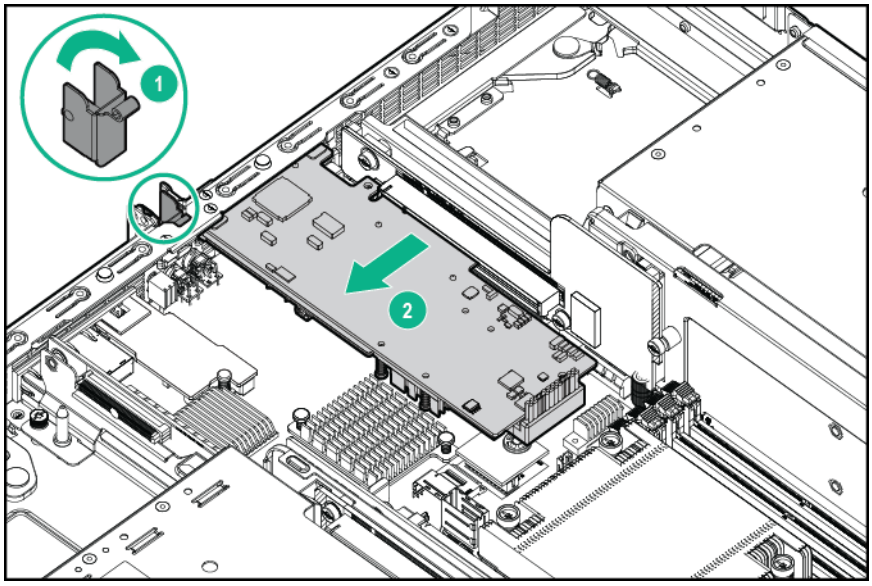
Installing the Trusted Platform Module board

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

To install the component:

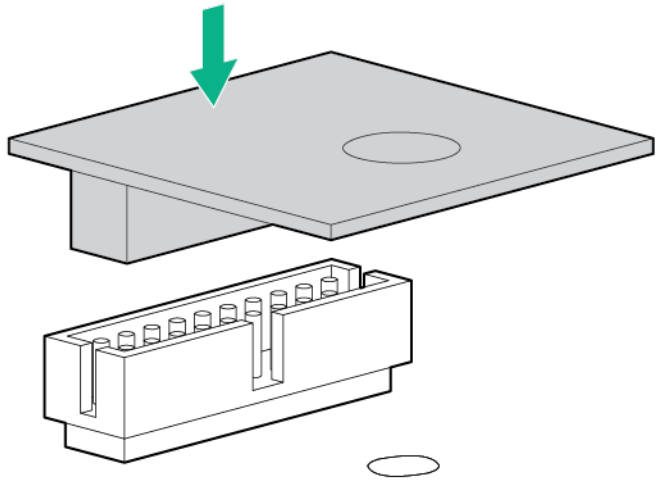
Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server .
4. **Remove the server from the chassis**.
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. If an expansion board is installed in slot 9, do the following:
   a. **Remove the drive cage assembly**.
   b. Disconnect any internal cables that are connected to the riser module.
   c. Remove the expansion board.

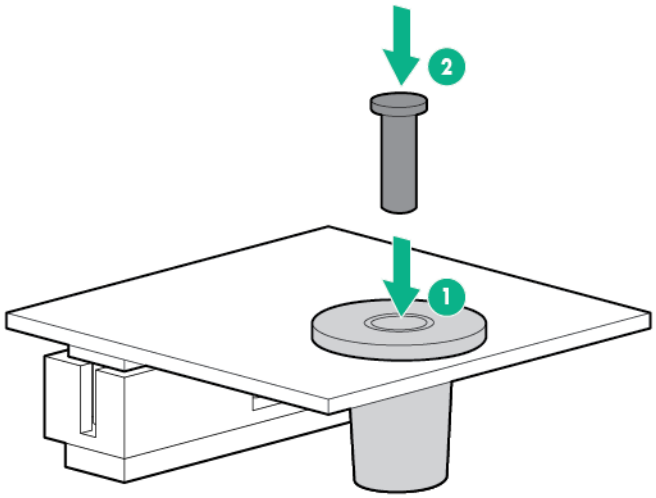


CAUTION:
Any attempt to remove an installed TPM from the system board breaks or disfigures the TPM security rivet. Upon locating a broken or disfigured rivet on an installed TPM, administrators should consider the system compromised and take appropriate measures to ensure the integrity of the system data.

9. Install the TPM board. **Press down on the connector to seat the board**.



10. Install the TPM security rivet by pressing the rivet firmly into the system board.



11. If removed from slot 9, **install the expansion board**.
12. Connect any required internal cables.
13. **Install the drive cage assembly**.
14. Connect all cables to the drive backplane.
15. **Install the air baffle**.

    If the 4:1 riser signal cable or Smart Storage Battery are installed in the air baffle, reconnect the cables to the risers. For more information, see "**Installing the air baffle**."
16. **Install the access panel**.
17. **Install the server into the chassis**.
18. Connect all peripheral cables to the server .
19. **Power up the server** .

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.

Enabling the Trusted Platform Module

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**.
3. Select **Trusted Platform Module Options** and press the **Enter** key**.**
4. Select **Enabled** to enable the TPM and BIOS secure startup. The TPM is fully functional in this mode.
5. Press the **F10** key to save your selection.
6. When prompted to save the change in System Utilities, press the **Y** key.
7. Press the **ESC** key to exit System Utilities. Then, press the **Enter** key when prompted to reboot the server .

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

You can now enable TPM functionality in the OS, such as Microsoft Windows BitLocker or measured boot.

CAUTION:
When a TPM is installed and enabled on the server , data access is locked if you fail to follow the proper procedures for updating the system or option firmware, replacing the system board, replacing a hard drive, or modifying OS application TPM settings.

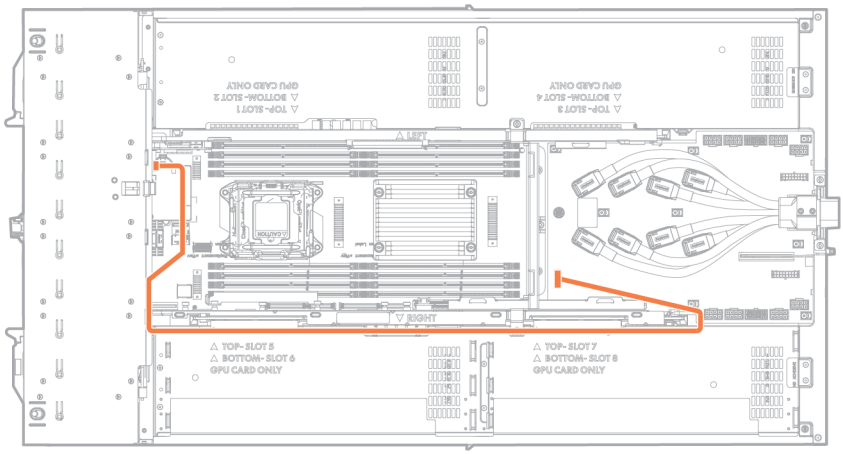
For more information on firmware updates and hardware procedures, see the *HP Trusted Platform Module Best Practices White Paper* on the **Hewlett Packard Enterprise Support Center website**.

For more information on adjusting TPM usage in BitLocker, see the **Microsoft website**.

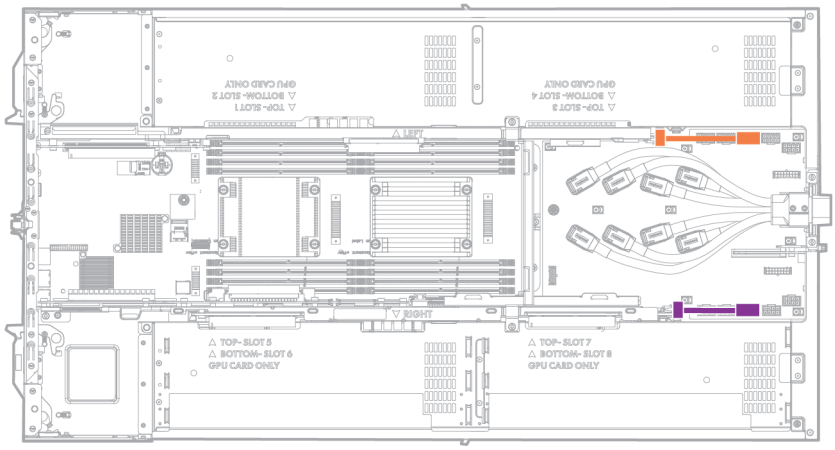
Cabling

Power cabling

Drive backplane power cabling



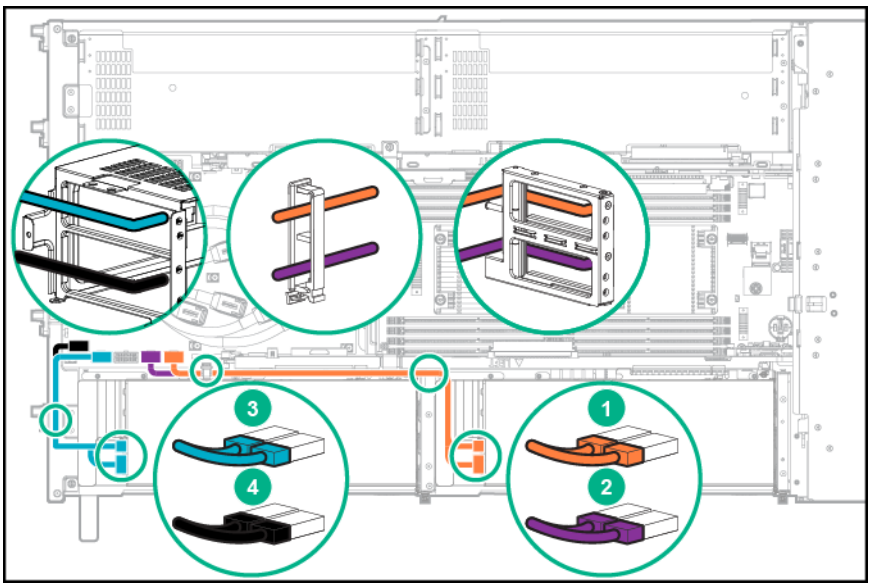
PCI riser module power cabling



GPU power cabling

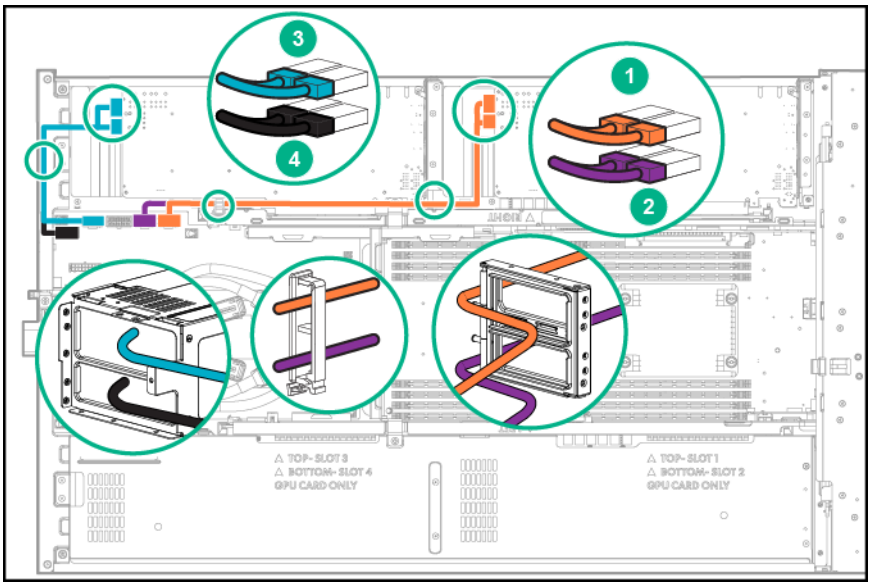
The GPU power cables have retention springs. For more information on installing the GPU power cables, see "**GPU accelerator options**."

- Left GPU power cabling for NVIDIA K40 and AMD S9150 GPUs



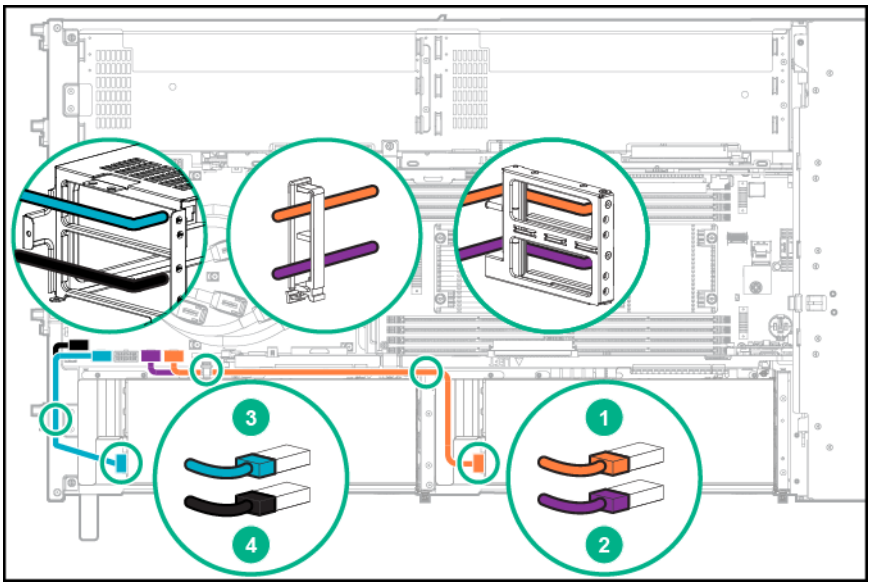
Item	Description	Part number
1	GPU 1 power cable (8 pin and 6 pin to 8 pin long)	857501-001
2	GPU 2 power cable (8 pin and 6 pin to 8 pin long	857501-001
3	GPU 3 power cable (8 pin and 6 pin to 8 pin short)	853655-001
4	GPU 4 power cable (8 pin and 6 pin to 8 pin short)	853655-001

- Right GPU power cabling for NVIDIA K40 and AMD S9150 GPUs



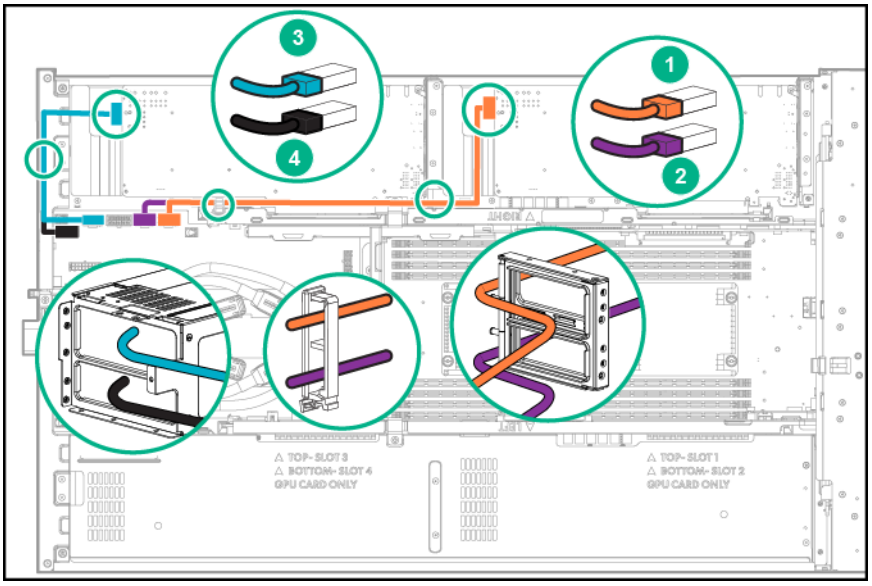
Item	Description	Part number
1	GPU 5 power cable (8 pin and 6-pin to 8 pin long)	857501-001
2	GPU 6 power cable (8 pin and 6-pin to 8 pin long	857501-001
3	GPU 7 power cable (8 pin and 6-pin to 8 pin short)	853655-001
4	GPU 8 power cable (8 pin and 6-pin to 8 pin short)	853655-001

- Left GPU power cabling for NVIDIA K80/M40/P40/P100 GPUs



Item	Description	Part number
1	GPU 1 power cable (8 pin to 8 pin long)	857500-001
2	GPU 2 power cable (8 pin to 8 pin long)	857500-001
3	GPU 3 power cable (8 pin to 8 pin short)	853650-001
4	GPU 4 power cable (8 pin to 8 pin short)	853650-001

- Right GPU power cabling for NVIDIA K80/M40/P40/P100 GPUs

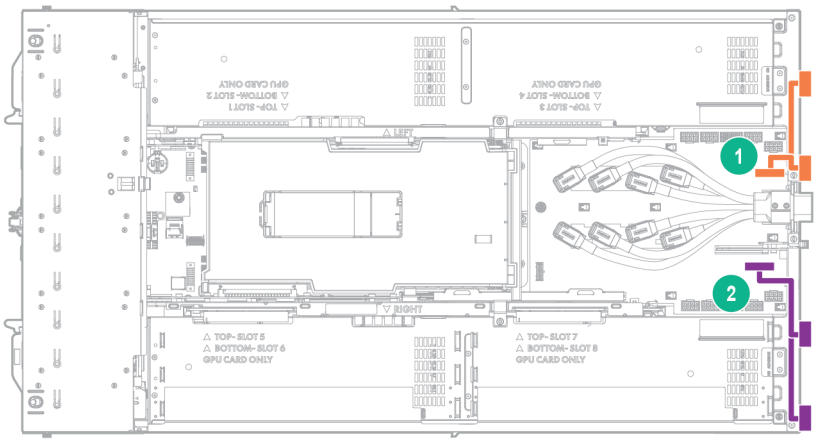


Item	Description	Part number
1	GPU 5 power cable (8 pin to 8 pin long)	857500-001
2	GPU 6 power cable (8 pin to 8 pin long)	857500-001

Table Continued

Item	Description	Part number
3	GPU 7 power cable (8 pin to 8 pin short)	853650-001
4	GPU 8 power cable (8 pin to 8 pin short)	853650-001

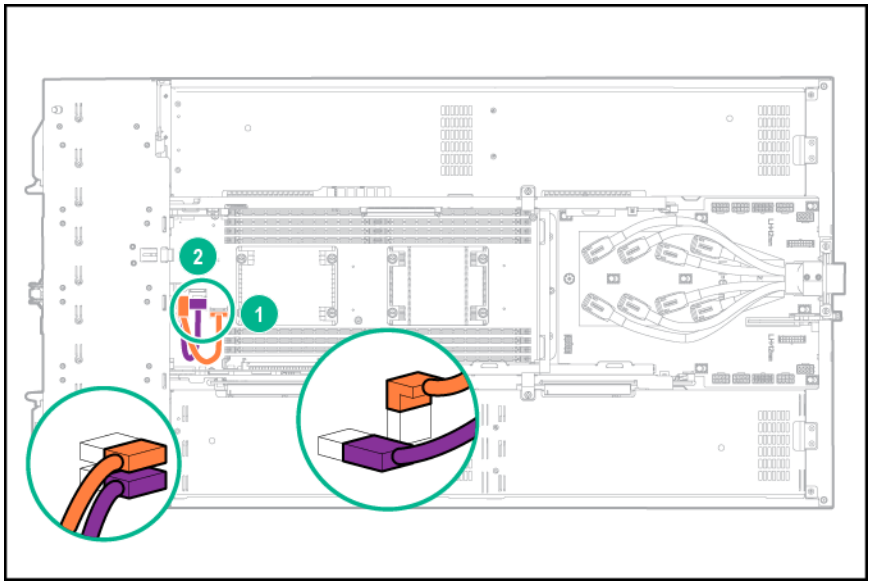
Fan power cabling



Item	Description
1	Left fan power cable
2	Right fan power cable

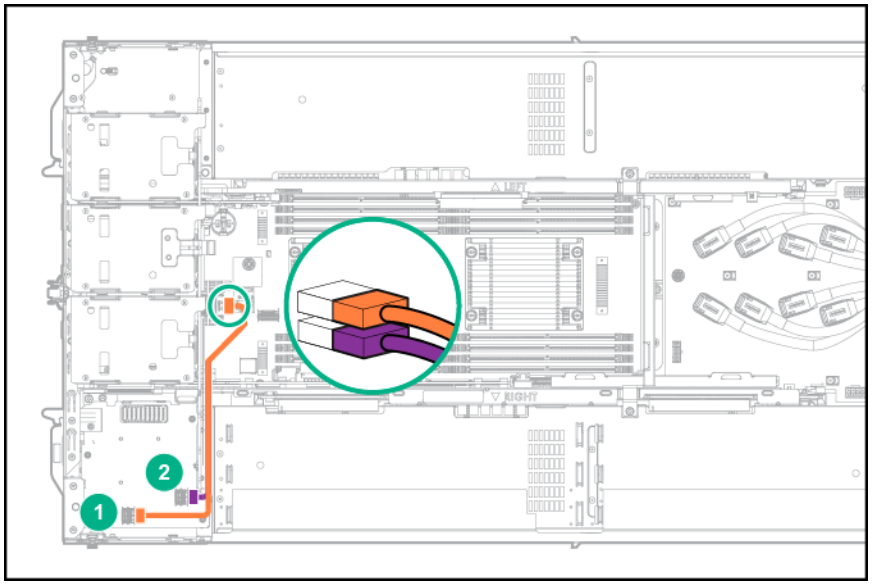
Storage cabling

B140i SATA cabling



Item	Description	Connection
1	SATA cable	MB_SATA1 on the system board to Mini_SAS_0 on the drive backplane
2	SATA cable	MB_SATA2 on the system board to Mini_SAS_1 on the drive backplane

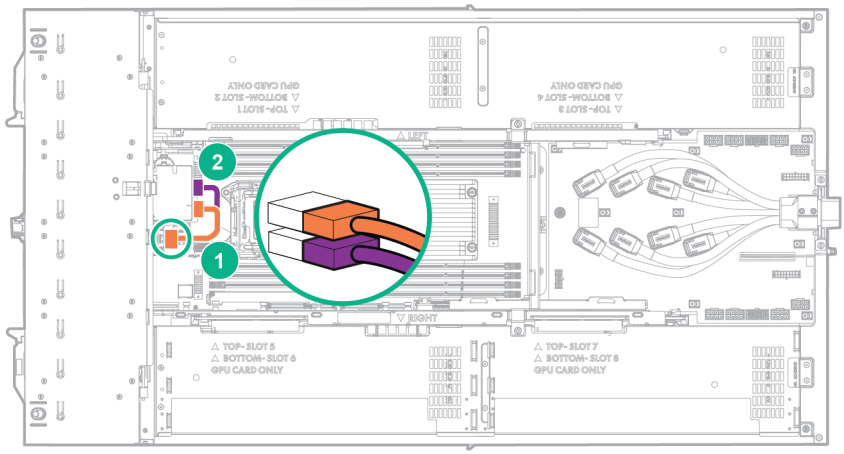
Smart Array P542D Controller cabling



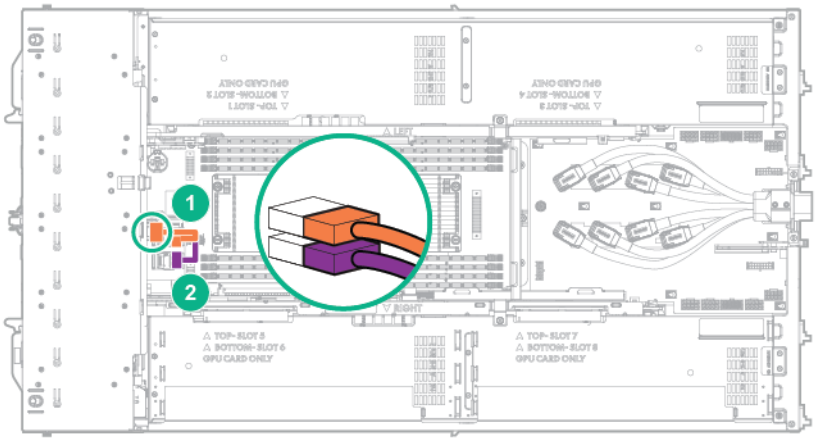
Item	Description	Connection
1	Mini-SAS cable	Port 3 connector to Mini_SAS_0 connector on the drive backplane
2	Mini-SAS cable	Port 4 connector to Mini_SAS_1 connector on the drive backplane

H240 Smart Host Bus Adapter cabling

- Slot 9



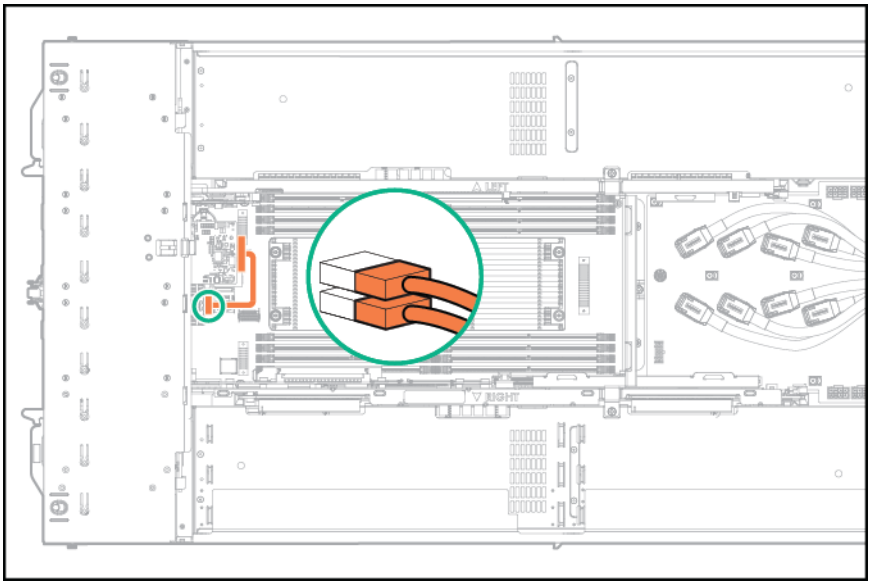
- Slot 10



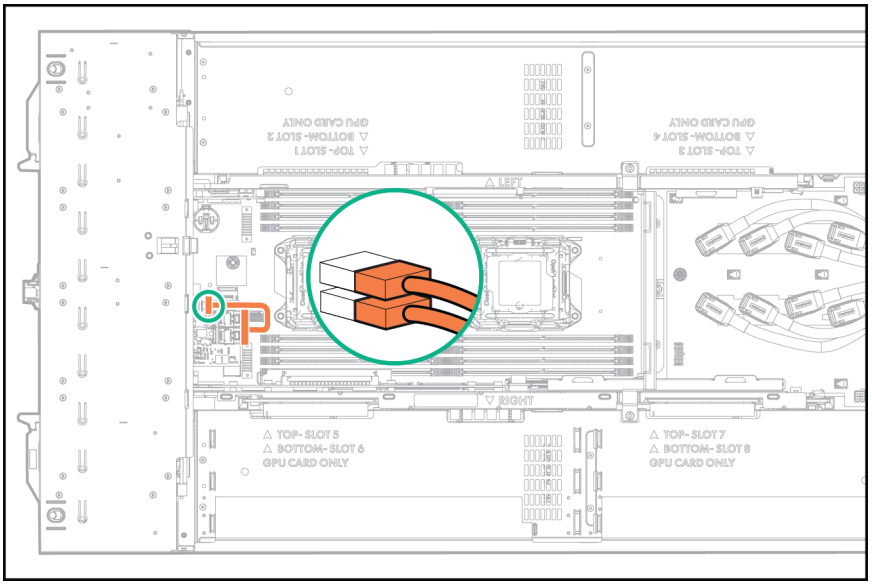
Item	Description	Connection
1	Mini-SAS cable	Port 1 to Mini_SAS_0 connector on the drive backplane
2	Mini-SAS cable	Port 2 to Mini_SAS_1 connector on the drive backplane

Smart Array P440 Controller cabling

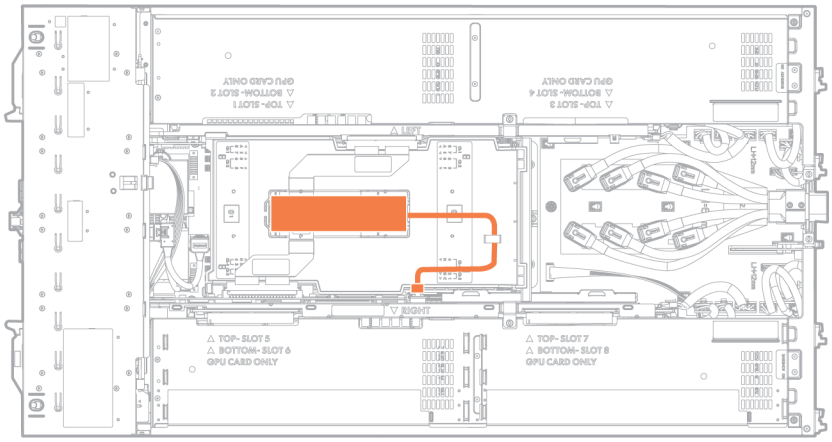
- Slot 9



- Slot 10



Smart Storage Battery cabling

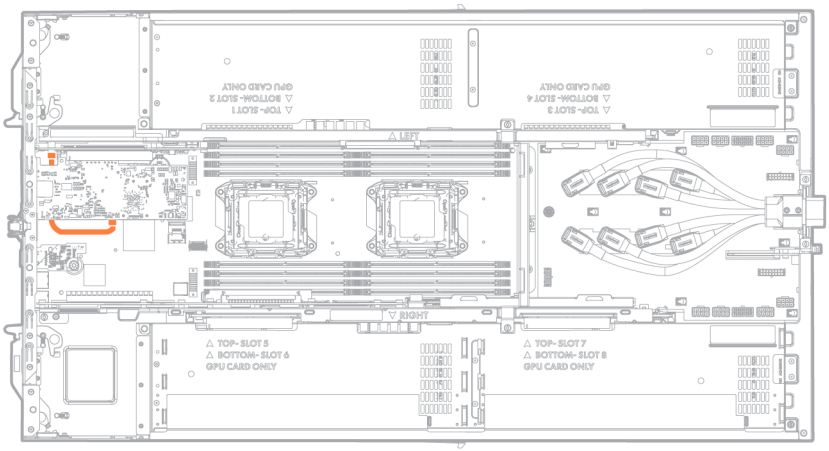


FBWC module cabling

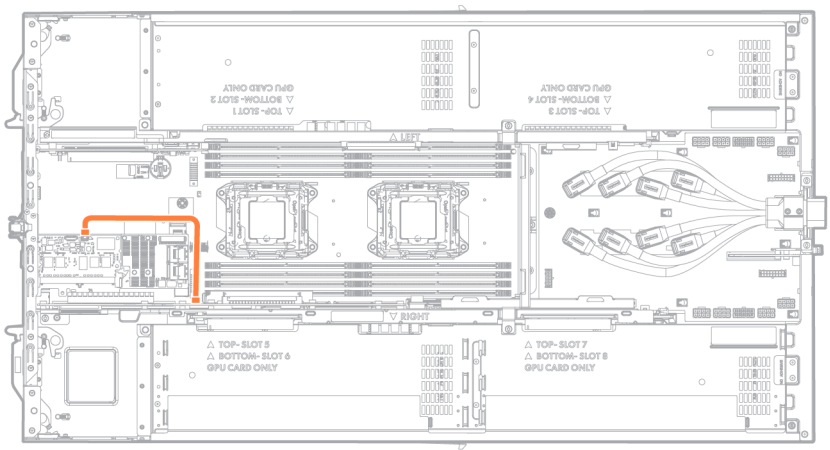
The FBWC solution is a separately purchased option. This server only supports **FBWC module installation** when a Smart Array P-Series controller is installed.

Depending on the controller option installed, the actual storage controller connectors might look different from what is shown in this section.

Smart Array P440 Controller in slot 9

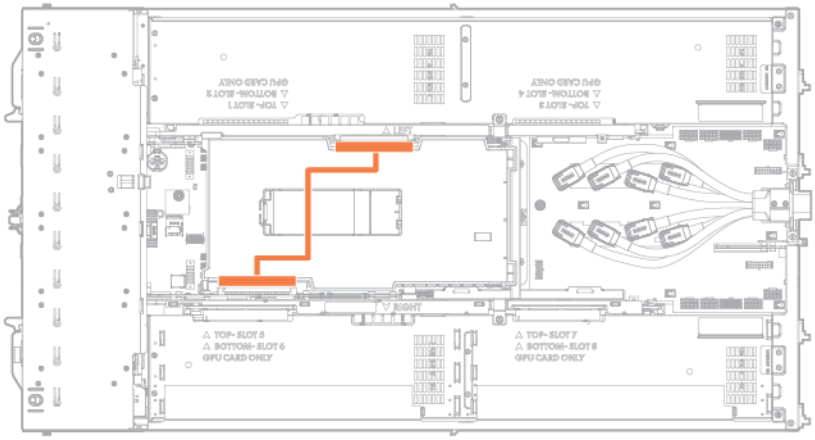


Smart Array P440 Controller in slot 10

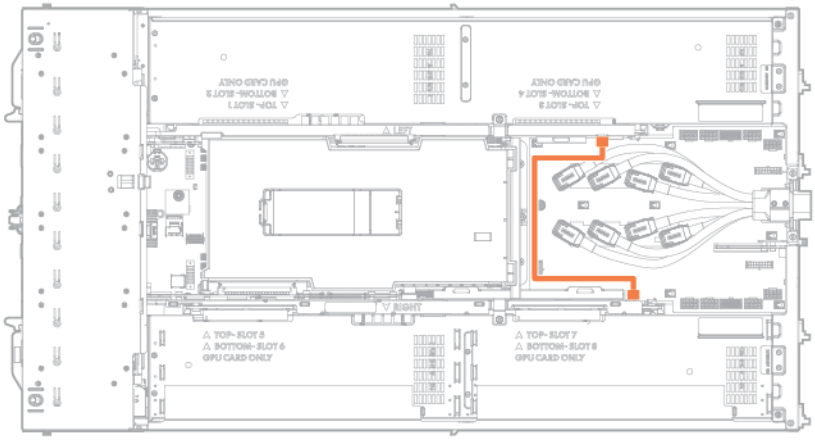


PCI riser module signal cabling

4:1 riser signal cable



8:1 riser sideband cable



Software and configuration utilities

Server mode

The software and configuration utilities presented in this section operate in online mode, offline mode, or in both modes.

Software or configuration utility	Server mode
HPE iLO	Online and Offline
Active Health System	Online and Offline
RESTful API support for iLO	Online and Offline
Integrated Management Log	Online and Offline
Intelligent Provisioning	Offline
HPE Insight Diagnostics	Online and Offline
Erase Utility	Offline
Scripting Toolkit for Windows and Linux	Online
Service Pack for ProLiant	Online and Offline
Smart Update Manager	Online and Offline
HPE UEFI System Utilities	Offline
HPE Smart Storage Administrator	Online and Offline
FWUPDATE utility	Offline

Product QuickSpecs

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the **Hewlett Packard Enterprise website**.

HPE iLO

iLO is a remote server management processor embedded on the system boards of HPE ProLiant and Synergy servers. iLO enables the monitoring and controlling of servers from remote locations. HPE iLO management is a powerful tool that provides multiple ways to configure, update, monitor, and repair servers remotely. iLO (Standard) comes preconfigured on HPE servers **without an additional cost or license**.

Features that enhance server administrator productivity are licensed. For more information, see the iLO documentation on the **Hewlett Packard Enterprise website**.

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

The Agentless Management Service is available in the SPP, which can be downloaded from the **Hewlett Packard Enterprise website**. The Active Health System log can be downloaded manually from iLO 4 or Intelligent Provisioning and sent to Hewlett Packard Enterprise.

For more information, see the following documents:

- *iLO User Guide* on the **Hewlett Packard Enterprise website**
- *Intelligent Provisioning User Guide* on the **Hewlett Packard Enterprise website**

iLO RESTful API support

HPE iLO 4 firmware version 2.00 and later includes the iLO RESTful API. The iLO RESTful API is a management interface that server management tools can use to perform configuration, inventory, and monitoring of the ProLiant server via iLO. The iLO RESTful API uses basic HTTPS operations (GET, PUT, POST, DELETE, and PATCH) to submit or return JSON-formatted data with iLO web server.

HPE iLO 4 2.30 and later is Redfish 1.0-conformant while remaining backward compatible with the existing iLO RESTful API.

HPE iLO 4 supports the iLO RESTful API with ProLiant Gen8 and later servers. For more information about the iLO RESTful API, see the **Hewlett Packard Enterprise website**.

Integrated Management Log

The IML records hundreds of events and stores them in an easy-to-view form. The IML timestamps each event with one-minute granularity.

You can view recorded events in the IML in several ways, including the following:

- From within HPE SIM
- From within the UEFI System Utilities
- From within the Embedded UEFI shell
- From within operating system-specific IML viewers:
  - For Windows: IML Viewer
  - For Linux: IML Viewer Application
- From within the iLO web interface
- From within Insight Diagnostics

HPE Insight Remote Support

Hewlett Packard Enterprise strongly recommends that you register your device for remote support to enable enhanced delivery of your Hewlett Packard Enterprise warranty, HPE support services, or Hewlett Packard Enterprise contractual support agreement. Insight Remote Support supplements your monitoring continuously to ensure maximum system availability by providing 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. Notifications can be sent to your authorized Hewlett Packard Enterprise Channel Partner for onsite service, if configured and available in your country.

For more information, see *Insight Remote Support and Insight Online Setup Guide for ProLiant Servers and BladeSystem c-Class Enclosures* on the **Hewlett Packard Enterprise website**. Insight Remote Support is available as part of Hewlett Packard Enterprise Warranty, HPE support services, or Hewlett Packard Enterprise contractual support agreement.

HPE Insight Remote Support central connect

When you use the embedded Remote Support functionality with ProLiant Gen8 and later server models and BladeSystem c-Class enclosures, you can register a server or server to communicate to Hewlett Packard Enterprise through an Insight Remote Support centralized Hosting Device in your local environment. All configuration and service event information is routed through the Hosting Device. This information can be viewed by using the local Insight Remote Support user interface or the web-based view in Insight Online.

For more information, see *Insight Remote Support Release Notes* on the **Hewlett Packard Enterprise website**.

HPE Insight Online direct connect

When you use the embedded Remote Support functionality with ProLiant Gen8 and later server models and BladeSystem c-Class enclosures, you can register a server or server to communicate directly to Insight Online without the need to set up an Insight Remote Support centralized Hosting Device in your local environment. Insight Online will be your primary interface for remote support information.

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

Insight Online

HPE Insight Online is a capability of the Support Center portal. Combined with Insight Remote Support central connect or Insight Online direct connect, it automatically aggregates device health, asset, and support information with contract and warranty information, and then secures it in a single, personalized dashboard that is viewable from anywhere at any time. The dashboard organizes your IT and service data to help you understand and respond to that information more quickly. With specific authorization from you, an authorized Channel Partner can also view your IT environment remotely using Insight Online.

For more information about using Insight Online, see *Insight Online User's Guide* on the **Hewlett Packard Enterprise website**.

Intelligent Provisioning

Intelligent Provisioning is a single-server deployment tool embedded in ProLiant Gen8 and later servers. Intelligent Provisioning simplifies ProLiant server setup and provides a reliable and consistent way to deploy ProLiant server configurations:

- Intelligent Provisioning prepares the system for installing "off-the-shelf" and Hewlett Packard Enterprise branded versions of operating system software and integrates optimized ProLiant server support software.
- Intelligent Provisioning provides installation help for Microsoft Windows, Red Hat and SUSE Linux, and VMware operating systems. For specific OS support, see the *Intelligent Provisioning Release Notes* on the **Hewlett Packard Enterprise website**.
- Intelligent Provisioning provides maintenance-related tasks using the Perform Maintenance window.

For more information about Intelligent Provisioning software and recovery media downloads, see the **Hewlett Packard Enterprise website**. For consolidated drive and firmware update packages, see the Smart Update: Server Firmware and Driver Updates page on the **Hewlett Packard Enterprise website**.

Insight Diagnostics

The Insight Diagnostics is a proactive server management tool, available in both offline and online versions. The tool provides diagnostics and troubleshooting capabilities to assist IT administrators who verify server installations, troubleshoot problems, and perform repair validation.

The Insight Diagnostics Offline Edition performs various in-depth system and component testing while the OS is not running. To run this utility, boot the server using Intelligent Provisioning.

The Insight Diagnostics Online Edition is a web-based application that captures system configuration and other related data needed for effective server management. Available in Microsoft Windows and Linux versions, the utility helps to ensure proper system operation.

For more information or to download the utility, see the **Hewlett Packard Enterprise website**. The Insight Diagnostics Online Edition is also available in the SPP.

Insight Diagnostics survey functionality

Insight Diagnostics provides survey functionality that gathers critical hardware and software information on ProLiant server s.

This functionality supports operating systems that the server supports. For operating systems supported by the server , see the **Hewlett Packard Enterprise website**.

If a significant change occurs between data-gathering intervals, the survey function marks the previous information and overwrites the survey data files to reflect the latest changes.

Survey functionality is installed with every Intelligent Provisioning-assisted Insight Diagnostics installation, or it can be installed through the SPP.

Erase Utility

CAUTION:

Perform a backup before running the Erase Utility. The utility completes the following:

- Sets the system to its original factory state
- Deletes the current hardware configuration information, including array setup and disk partitioning
- Erases all connected hard drives completely.

  Before using this utility, see the instructions in the Intelligent Provisioning User Guide.

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**.

Service Pack for ProLiant

The SPP is a comprehensive systems software (drivers and firmware) solution delivered as a single package with major server releases. This solution uses SUM as the deployment tool and is tested on all supported ProLiant servers including HPE ProLiant Gen8 and later servers.

SPP allows the following operating modes:

- Online mode – The installation occurs while the host processor is running in the normal server environment.
- Offline mode – Boots a small Linux kernel and enables updates to occur on a single server .

For more information or to download SPP, see one of the following pages on the Hewlett Packard Enterprise website:

- **Service Pack for ProLiant download page**
- **Smart Update: Server Firmware and Driver Updates page**

Smart Update Manager

SUM is a product used to install and update firmware, drivers, and systems software on ProLiant servers. SUM provides a GUI, a command-line scriptable interface, and an interactive command-line scriptable interface. The interfaces allow you to deploy firmware, drivers, and software for supported servers.

For more information about SUM, see the product page on the **Hewlett Packard Enterprise website**.

To download SUM, see the **Hewlett Packard Enterprise website**.

To access the *Smart Update Manager User Guide*, see the **Hewlett Packard Enterprise Information Library**.

UEFI System Utilities

The UEFI System Utilities is embedded in the system ROM. The UEFI System Utilities 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
- Configuring memory options
- Selecting a language
- Launching other preboot environments such as the Embedded UEFI Shell and Intelligent Provisioning

For more information, see the UEFI System Utilities user guide for your product on the **Hewlett Packard Enterprise website**.

To access mobile-ready online help for the UEFI System Utilities and UEFI Shell, scan the QR code at the bottom of the screen. For on-screen help, press the **F1** key.

Using UEFI System Utilities

To use the System Utilities, use the following keys.

Action	Key
Access System Utilities	F9 during server POST
Navigate menus	Up and Down arrows
Select items	Enter
Save selections	F10
Access Help for a highlighted configuration option[1]	F1

[1] Scan the QR code on the screen to access online help for the UEFI System Utilities and UEFI Shell.

Default configuration settings are applied to the server at one of the following times:

- Upon the first system power-up
- After defaults have been restored

Default configuration settings are sufficient for typical server operations; however, you can modify configuration settings as needed. The system prompts you for access to the UEFI System Utilities each time the system is powered up.

Flexible boot control

This feature enables you to do the following:

- Add Boot Options:
  - Browse all FAT16 and FAT32 file systems.
  - To add a new UEFI boot option, select an X64 UEFI application with an .EFI extension. For example, adding an OS boot loader or other UEFI application as a new UEFI boot option.

    The new boot option is appended to the boot-order list. When you select a file, you are prompted to enter the boot option description. This description, and any optional data to be passed to an .EFI application, is then displayed in the boot menu.
- Boot to System Utilities

  After pre-POST, the boot options screen appears. During this time, you can access the UEFI System Utilities by pressing the **F9** key.
- Choose between supported modes:
  - Legacy BIOS Boot Mode
  - UEFI Boot Mode

IMPORTANT:
If the default boot mode settings are different than the user-defined settings, the system might not boot the OS installation if the defaults are restored. To avoid this issue, use the User Defined Defaults feature in UEFI System Utilities to override the factory default settings.

For more information, see the UEFI System Utilities user guide for your product on the **Hewlett Packard Enterprise Information Library**.

Restoring and customizing configuration settings

You can reset all configuration settings to the factory default settings, or you can restore and use the system default configuration settings.

You can also configure default settings as necessary, and then save the configuration as the custom default configuration. When the system loads the default settings, it uses the custom default settings instead of the factory defaults.

Secure Boot configuration

Secure Boot is integrated in the UEFI specification on which the Hewlett Packard Enterprise implementation of UEFI is based. Secure Boot 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. Secure Boot also ensures 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 enabled, only firmware components and operating systems with boot loaders that have an appropriate digital signature can execute during the boot process. Only operating systems that support Secure Boot and have an EFI boot loader signed with one of the authorized keys can boot. For more information about supported operating systems, see the UEFI System Utilities and Shell release notes for your server on the **Hewlett Packard Enterprise website**.

A physically present user can customize the certificates embedded in the UEFI BIOS by adding or removing their own certificates.

When Secure Boot is enabled, the System Maintenance Switch does not restore all manufacturing defaults when set to the ON position. For security reasons, the following are not restored to defaults when the System Maintenance Switch is in the ON position:

- Secure Boot is not disabled and remains enabled.
- The Boot Mode remains in UEFI Boot Mode even if the default boot mode is Legacy Boot Mode.
- The Secure Boot Database is not restored to its default state.
- iSCSI Software Initiator configuration settings are not restored to defaults.

Embedded UEFI shell

The system BIOS in all ProLiant Gen9 servers includes an Embedded UEFI Shell in the ROM. The UEFI Shell environment provides an API, a command-line prompt, and a set of CLIs that allow scripting, file manipulation, and system information. These features enhance the capabilities of the UEFI System Utilities.

For more information, see the following documents:

- *UEFI Shell User Guide for HPE ProLiant Gen9 Servers* on the **Hewlett Packard Enterprise website**
- *UEFI Shell Specification* on the **UEFI website**

Embedded Diagnostics option

The system BIOS in all ProLiant Gen9 servers includes an Embedded Diagnostics option in the ROM. The Embedded Diagnostics option can run comprehensive diagnostics of the server hardware, including processors, memory, drives, and other server components.

For more information on the Embedded Diagnostics option, see the UEFI System Utilities user guide for your server on the **Hewlett Packard Enterprise website**.

iLO RESTful API support for UEFI

The ProLiant Gen9 servers include support for a UEFI-compliant System BIOS, along with UEFI System Utilities and Embedded UEFI Shell preboot environments. ProLiant Gen9 servers also support configuring the UEFI BIOS settings using the iLO RESTful API, a management interface that server management tools can use to perform configuration, inventory, and monitoring of a ProLiant server. The iLO RESTful API uses basic HTTPS operations (GET, PUT, POST, DELETE, and PATCH) to submit or return JSON-formatted data with iLO web server.

For more information about the iLO RESTful API and the RESTful Interface Tool, see the **Hewlett Packard Enterprise website**.

Re-entering the server serial number and product ID

After you replace the system board, you must re-enter the server serial number and the product ID:

Procedure

1. During the server startup sequence, press the **F9** key to access UEFI System Utilities.
2. Select **System Configuration** > **BIOS/Platform Configuration (RBSU)** > **Advanced Options** > **Advanced System ROM Options** > **Serial Number**, and then press the **Enter** key.
3. Enter the serial number and press the **Enter** key.

   The following message appears:

   ```
   The serial number should only be modified by qualified service personnel.
   This value should always match the serial number located on the chassis.
   ```

4. To clear the warning, press the **Enter** key.
5. Enter the serial number and press the **Enter** key.
6. Select **Product ID**.

   The following warning appears:

```
Warning: The Product ID should ONLY be modified by qualified service
personnel. This value should always match the Product ID located on the
chassis.
```

7. Enter the product ID and press the **Enter** key.
8. To confirm exiting System Utilities, press the **F10** key.

   The server automatically reboots.

Utilities and features

HPE Smart Storage Administrator

The HPE SSA is a configuration and management tool for HPE Smart Array controllers. Starting with HPE ProLiant Gen8 servers, HPE SSA replaces ACU with an enhanced GUI and additional configuration features.

The HPE SSA exists in three interface formats: the HPE SSA GUI, the HPE SSA CLI, and HPE SSA Scripting. Although all formats provide support for configuration tasks, some of the advanced tasks are available in only one format.

Some HPE SSA features include the following:

- Supports online array capacity expansion, logical drive extension, assignment of online spares, and RAID or stripe size migration
- Provides diagnostic and SmartSSD Wear Gauge functionality on the Diagnostics tab
- For supported controllers, provides access to additional features.

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

Automatic Server Recovery

ASR is a feature that causes the system to restart when a catastrophic operating system error occurs, such as a blue screen, ABEND, or panic. A system fail-safe timer, the ASR timer, starts when the System Management driver, also known as the Health Driver, is loaded. When the operating system is functioning properly, the system periodically resets the timer. However, when the operating system fails, the timer expires and restarts the server.

ASR increases server availability by restarting the server within a specified time after a system hang. You can disable ASR from the System Management Homepage or through UEFI System Utilities.

USB support

Hewlett Packard Enterprise server s support both USB 2.0 ports and USB 3.0 ports. Both port types support installing all types of USB devices (USB 1.0, USB 2.0, and USB 3.0), but might run at lower speeds in specific situations:

- USB 3.0 capable devices operate at USB 2.0 speeds when installed in a USB 2.0 port.
- In UEFI Boot Mode, Hewlett Packard Enterprise provides legacy USB support in the preboot environment before the operating system loading for USB 1.0, USB 2.0, and USB 3.0 speeds.
- In Legacy BIOS Boot Mode, Hewlett Packard Enterprise provides legacy USB support in the preboot environment before the operating system loading for USB 1.0 and USB 2.0 speeds. USB 3.0 ports can be used with all devices in Legacy BIOS Boot Mode but are not available at USB 3.0 speeds in the preboot environment. Standard USB support (USB support from within the operating system) is

provided by the OS through the appropriate USB device drivers. Support for USB 3.0 varies by operating system.

For maximum compatibility of USB 3.0 devices with all operating systems, Hewlett Packard Enterprise provides a configuration setting for USB 3.0 Mode. Auto is the default setting. This setting impacts USB 3.0 devices when connected to USB 3.0 ports in the following manner:

- **Auto (default)**—If configured in Auto Mode, USB 3.0 capable devices operate at USB 2.0 speeds in the preboot environment and during boot. When a USB 3.0 capable OS USB driver loads, USB 3.0 devices transition to USB 3.0 speeds. This mode is compatible with operating systems that do not support USB 3.0 while allowing USB 3.0 devices to operate at USB 3.0 speeds with state-of-the-art operating systems.
- **Enabled**—If Enabled, USB 3.0 capable devices operate at USB 3.0 speeds at all times (including the preboot environment) when in UEFI Boot Mode. Do not use this mode with operating systems that do not support USB 3.0. If operating in Legacy Boot BIOS Mode, the USB 3.0 ports cannot function in the preboot environment and are not bootable.
- **Disabled**—If configured for Disabled, USB 3.0 capable devices function at USB 2.0 speeds at all times.

The pre-OS behavior and default operation of the USB ports is configurable in the UEFI System Utilities. For more information, see the UEFI System Utilities user guide for your product on the **Hewlett Packard Enterprise website**.

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, ROMPaq 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

Access to Hewlett Packard Enterprise Support Materials

Access to some updates for ProLiant Servers may require product entitlement when accessed through the Hewlett Packard Enterprise Support Center support portal. Hewlett Packard Enterprise recommends

that you have an HP Passport set up with relevant entitlements. For more information, see the **Hewlett Packard Enterprise website**.

Updating firmware or System ROM

Multiple methods exist to update the firmware or System ROM:

- **Service Pack for ProLiant**
- **FWUPDATE utility**
- **FWUpdate command from within the Embedded UEFI Shell**
- **Firmware Update application in the UEFI System**
- **Online Flash components**

Product entitlement is required to perform updates.

FWUPDATE utility

The FWUPDATE utility enables you to upgrade the system firmware (BIOS).

To use the utility to upgrade the firmware:

1. Download the FWUPDATE flash component from the **Hewlett Packard Enterprise Support Center website**.
2. Save the FWUPDATE flash components to a USB key.
3. Set the boot order so that the USB key will boot first using one of the following options:
   - Configure the boot order so that the USB key is the first bootable device.
   - Press the **F11** key (Boot Menu) when prompted during system boot to access the **One-Time Boot Menu**. This menu allows you to select the boot device for a specific boot and does not modify the boot order configuration settings.
4. Insert the USB key into an available USB port.
5. Boot the system.

   The FWUPDATE utility checks the system and provides a choice (if more than one exists) of available firmware revisions.

To download the flash components, see the **Hewlett Packard Enterprise Support Center website**.

For more information about One-Time Boot Menu, see the UEFI System Utilities user guide for your product on the **Hewlett Packard Enterprise website**.

FWUpdate command from within the Embedded UEFI Shell

For systems configured in either boot mode, update the firmware:

1. Access the System ROM Flash Binary component for your server from the **Hewlett Packard Enterprise Support Center website**. When searching for the component, always select **OS Independent** to locate the binary file.
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server .

4. Boot to Embedded Shell.
5. To obtain the assigned file system volume for the USB key, enter the `Map –r` command.

   For more information about accessing a file system from the shell, see the UEFI Shell user guide on the **Hewlett Packard Enterprise website**.
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 the **Enter** key.
7. Use the `cd` command to change from the current directory to the directory that contains the binary file.
8. Enter the `fwupdate –d BIOS –f <filename>` command to flash the system ROM.

   For help on the FWUPDATE command, enter the following command:

   ```
   help fwupdate -b
   ```
9. Reboot the server .

   A reboot is required after the firmware update for the updates to take effect, and for hardware stability to be maintained.

For more information about the commands used in this procedure, see the UEFI Shell user guide on the **Hewlett Packard Enterprise website**.

Firmware Update application in the UEFI System Utilities

For systems configured in either boot mode, update the firmware:

1. Access the System ROM Flash Binary component for your server from the **Hewlett Packard Enterprise Support Center website**. When searching for the component, always select **Cross operating system** to locate the binary file.
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server .
4. During POST, press **F9** to enter System Utilities.
5. Select **Embedded Applications** - **Firmware Update** - **System ROM** - **Select Firmware File**.
6. Select the device containing the flash file.
7. Select the flash file. This step may take a few moments to complete.
8. Select **Start firmware update** and allow the process to complete.
9. Reboot the server . A reboot is required after the firmware update for the updates to take effect and for hardware stability to be maintained.

Online Flash components

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

Drivers

IMPORTANT:
Always perform a backup before installing or updating device drivers.

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

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

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

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

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

Software and firmware

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

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

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

Operating System Version Support

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

Version control

The VCRM and VCA are web-enabled Insight Management Agents tools that SIM uses to schedule software update tasks to the entire enterprise.

- VCRM manages the repository for SPP. Administrators can do the following:
  - View the SPP contents
  - Configure VCRM to update the repository automatically with internet downloads of the latest software and firmware from Hewlett Packard Enterprise
- VCA compares installed software versions on the server with updates available in the VCRM managed repository. Administrators configure VCA to point to a repository managed by VCRM.

For more information about version control tools, see the following documents on the **Hewlett Packard Enterprise website**:

- Systems Insight Manager User Guide
- Version Control Agent User Guide
- Version Control Repository Manager User Guide

To locate the documents, do the following:

1. Select **Insight Management** from the available options in Products and Solutions.
2. Select **Version Control** from the available options in Models / Subcategories.
3. Locate and download the latest document.

Operating systems and virtualization software support for ProLiant servers

For information about specific versions of a supported operating system, see the **Hewlett Packard Enterprise website**.

HPE Technology Service Portfolio

HPE Technology Services deliver confidence, reduces risk and helps customers realize agility and stability. We help customers succeed through Hybrid IT by simplifying and enriching the on-premise experience, informed by public cloud qualities and attributes. HPE Support Services enables you to choose the right service level, length of coverage, and response time to fit your business needs. Connect to HPE to help prevent problems and solve issues faster. By connecting, you will receive 24x7 monitoring, prefailure alerts, automatic call logging, and automatic parts dispatch. To learn more about getting connected, see the **Hewlett Packard Enterprise website**.

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

Utilize our consulting expertise 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**.

Change control and proactive notification

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

- Upcoming hardware and software changes
- Bulletins
- Patches

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

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

System battery

System battery overview

If the server no longer automatically displays the correct date and time, then replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

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:

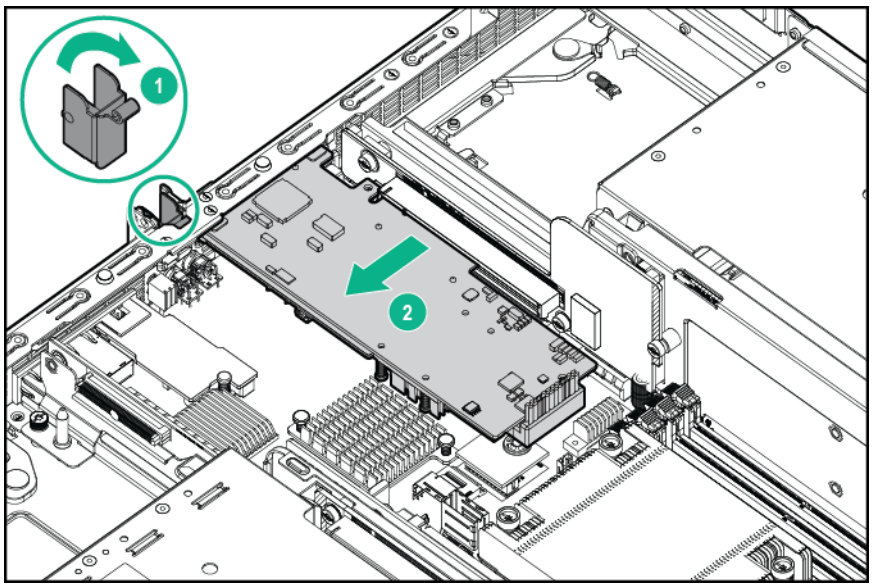
- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- Replace only with the spare designated for this product.

Removing the system battery

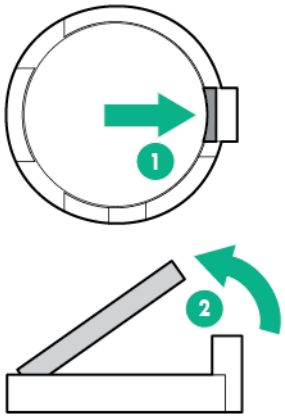
To remove the component:

Procedure

1. Back up all server data.
2. **Power down the server** .
3. Disconnect all peripheral cables from the server front panel.
4. **Remove the server from the chassis** .
5. Place the server on a sturdy, level surface.
6. **Remove the access panel**.
7. **Remove the air baffle**.
8. If an expansion board is installed in slot 9, do the following:
   a. **Remove the drive cage assembly**.
   b. Disconnect any internal cables that are connected to the riser module.
   c. Remove the expansion board.



9. **Locate the battery on the system board**.
10. If the system battery is secured by a metal tab, do the following:
    a. Use your finger or a small flat-bladed, nonconductive tool to press the metal tab. This will partially release the battery from the socket.
    b. Remove the battery.



IMPORTANT:
Replacing the system board battery resets the system ROM to its default configuration. After replacing the battery, reconfigure the system through RBSU.

To replace the component, reverse the removal procedure.

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

Troubleshooting

Troubleshooting resources

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

- **English**
- **French**
- **Spanish**
- **German**
- **Japanese**
- **Simplified Chinese**

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

- **English**
- **French**
- **Spanish**
- **German**
- **Japanese**
- **Simplified Chinese**

Warranty and regulatory information

Warranty information

HPE ProLiant and x86 Servers and Options

HPE Enterprise Servers

HPE Storage Products

HPE Networking Products

Regulatory information

Belarus Kazakhstan Russia marking

Manufacturer and Local Representative Information

Manufacturer information:

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

Local representative information Russian:

- **Russia:**

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

- **Belarus:**

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

- **Kazakhstan:**

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Local representative information Kazakh:

- **Russia:**

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

- **Belarus:**

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- **Kazakhstan:**

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Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (serial number format for this product)

Valid date formats include:

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

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine RoHS material content declaration

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

Electrostatic discharge

Preventing electrostatic discharge

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

Procedure

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

Grounding methods to prevent electrostatic discharge

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

- Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm ±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 the **Hewlett Packard Enterprise Support Center**.

Specifications

Environmental specifications

Specification	Value
Temperature range[1]	—
Operating[2],[3]	10°C to 35°C (50°F to 95°F)
Nonoperating	-30°C to 60°C (-22°F to 140°F)
Relative humidity (noncondensing)	—
Operating	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
Nonoperating	5% to 95% 38.7°C (101.7°F), maximum wet bulb temperature

[1] All temperature ratings shown are for sea level. An altitude derating of 1.0°C per 304.8 m (1.8°F per 1,000 ft) to 3,048 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.

[2] If three or more NVIDIA Tesla K80 GPUs, NVIDIA Tesla P4 GPUs, or NVIDIA Tesla P40 GPUs are installed on one side of the server, the inlet ambient temperature must be maintained at or below 30°C (86°F). For more information, see " **GPU accelerator population guidelines**"

[3] If three or more NVIDIA Tesla P100 GPUs or NVIDIA Tesla V100 GPUs are installed on one side of the HPE ProLiant XL270d Gen9 Accelerator Tray, the inlet ambient temperature must be maintained at or below 25°C (77°F). For more information, see " **GPU accelerator population guidelines**."

Mechanical specifications

Specification	Value
Height	8.40 cm (3.31 in)
Depth	85.50 cm (33.66 in)
Width	44.50 cm (17.52 in)
Weight (maximum)	26.32 kg (58.02 lb)
Weight (minimum)	19.94 kg (43.96 lb)

Support and other resources

Websites

- **Hewlett Packard Enterprise Information Library**
- **Hewlett Packard Enterprise Support Center**
- **Contact Hewlett Packard Enterprise Worldwide**
- **Subscription Service/Support Alerts**
- **Software Depot**
- **Customer Self Repair**
- **Insight Remote Support**
- **Serviceguard Solutions for HP-UX**
- **Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix**
- **Storage white papers and analyst reports**

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, see the *Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products* document, available at the Hewlett Packard Enterprise Support Center:

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.

Acronyms and abbreviations

ABEND

abnormal end

ACU

Array Configuration Utility

ADM

Advanced Data Mirroring

AMP

Advanced Memory Protection

ASR

Automatic Server Recovery

CSA

Canadian Standards Association

CSR

Customer Self Repair

DDR

double data rate

DPC

DIMMs per channel

EAC

EuroAsian Economic Commission

FBWC

flash-backed write cache

GPU

graphics processing unit

HPE APM

HPE Advanced Power Manager

HPE SIM

HPE Systems Insight Manager

HPE SSA

HPE Smart Storage Administrator

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

ISO

International Organization for Standardization

LFF

large form factor

LOM

LAN on Motherboard

LRDIMM

load reduced dual in-line memory module

NMI

nonmaskable interrupt

NVRAM

nonvolatile memory

OA

Onboard Administrator

PCIe

Peripheral Component Interconnect Express

PDB

power distribution board

PDU

power distribution unit

POST

Power-On Self-Test

RBSU

ROM-Based Setup Utility

RCM

Rack control management

RDIMM

registered dual in-line memory module

RDP

Remote Desktop Protocol

RoHS

Restriction of Hazardous Substances

RPS

redundant power supply

SAS

serial attached SCSI

SATA

serial ATA

SFF

small form factor

SIM

Systems Insight Manager

SPP

Service Pack for ProLiant

SUM

Smart Update Manager

SUV

serial, USB, video

TMRA

recommended ambient operating temperature

TPM

Trusted Platform Module

UEFI

Unified Extensible Firmware Interface

UID

unit identification

USB

universal serial bus

VCA

Version Control Agent

VCRM

Version Control Repository Manager

VM

Virtual Machine