



**Hewlett Packard
Enterprise**

HPE ProLiant ML30 Gen9 Server User Guide

Abstract

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

Part Number: 825546-004
Published: October 2017
Edition: 4

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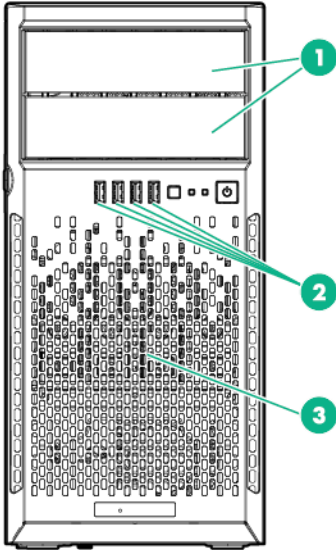
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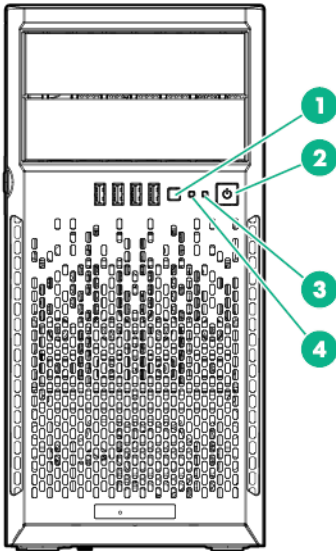
Component identification

Front panel components



Item	Description
1	Media drive bays
2	USB 3.0 connectors
3	Drive cage bay

Front panel LEDs and buttons



Item	Description	Status
1	UID button/LED ¹	Solid blue = Activated Flashing blue: <ul style="list-style-type: none"> • 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
2	Power On/Standby button and system power LED ¹	Solid green = System on Flashing green (1 flash per second) = Performing power on sequence Solid amber = System in standby Off = No power present ²
3	NIC status LED ¹	Solid green = Link to network Flashing green (1 flash per second) = Network active Off = No network activity
4	Health LED ¹	Solid green = Normal Flashing green (1 flash per second) = iLO is rebooting Flashing amber = System degraded ³ Flashing red = System critical ³

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 power button cable is disconnected.

³ If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status. For more information, see "**Integrated Management Log.**"

Power fault LEDs

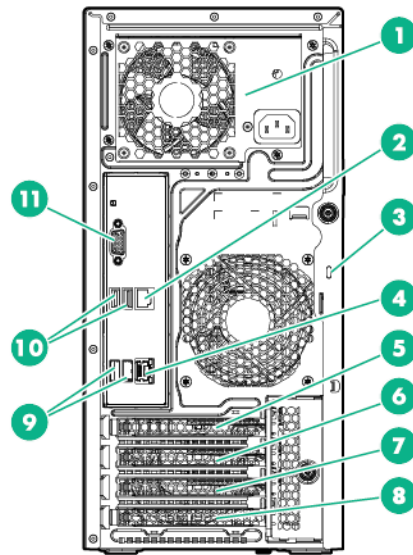
When all four front panel LEDs flash simultaneously, a power fault has occurred. The following table provides a list of power fault LEDs, and the subsystems that are affected. Not all power faults are used by all servers.

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

Table Continued

Subsystem	LED behavior
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

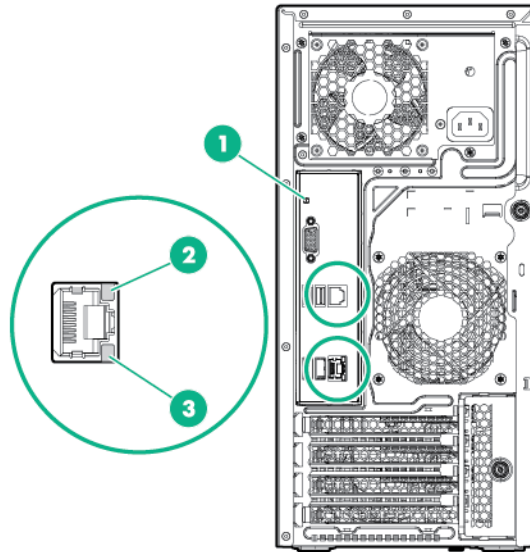
Rear panel components



Item	Description
1	Power supply
2	NIC connector 2
3	Kensington lock slot
4	Nic connector 1/ Shared iLO connector
5	PCIe slot 4, PCIe3 x16 (16,8,4,1), full-length*
6	PCIe slot 3, PCIe3 x4 (1), full-length*
7	PCIe slot 2, PCIe3 x4 (1), full-length*
8	PCIe slot 1, PCIe3 x8 (4,1), half-length*
9	USB 3.0 connectors
10	USB 2.0 connectors
11	Video connector

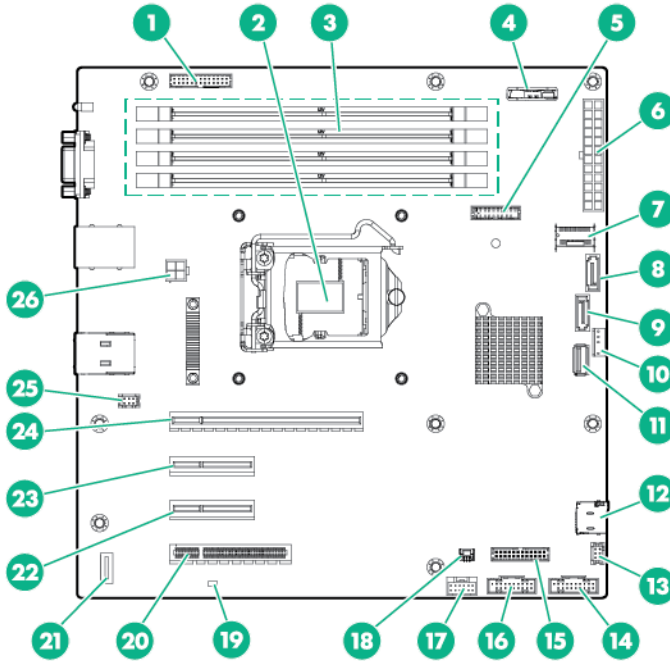
* For more information on the expansion slot specifications, see "[PCIe expansion slot definitions.](#)"

Rear panel LEDs and buttons



Item	Description	Status
1	UID LED	<p>Solid blue = Activated</p> <p>Flashing blue:</p> <ul style="list-style-type: none"> • 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 <p>Off = Deactivated</p>
2	NIC link LED	<p>Green = Network link</p> <p>Off = No network link</p>
3	NIC status LED	<p>Solid green = Link to network</p> <p>Flashing green = Network active</p> <p>Off = No network activity</p>

System board components



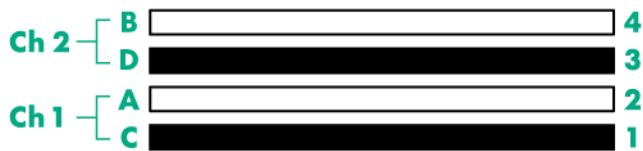
Item	Description
1	RPS connector
2	Processor
3	DIMM slots
4	System battery
5	Trusted platform module connector
6	24-power connector
7	Mini-SAS connector
8	SATA connector 5 (for M.2 SSD 1)
9	SATA connector 6 (for M.2 SSD 2)
10	Internal USB 2.0 connector(for tape drive)
11	Internal USB 2.0 connector
12	microSD card slot
13	Front PCI fan connector
14	Front panel USB connector
15	Front panel I/O connector
16	Front panel USB connector
17	Smart Storage Battery connector
18	Storage backup power connector

Table Continued

Item	Description
19	NMI header
20	PCIe slot 1 PCIe3 x8 (4,1), half-length*
21	System maintenance switch
22	PCIe slot2 PCIe3 x4 (1) full-length*
23	PCIe slot 3 PCIe3 x4 (1), full-length*
24	PCIe slot 4 PCIe3 x16 (16,8,4,1), full-length*
25	System fan connector
26	4-pin power connector

* For more information on the expansion slot specifications, see "[PCIe expansion slot definitions.](#)"

DIMM slot locations



The arrow points toward the front of the server.

DIMM slots are numbered 1 through 4. Letters are used for AMP mode DIMM ordering.

PCIe expansion slot definitions

Slot	Type	Length	Height	Connector link width	Negotiable link width
1	PCIe3	Half	Full	x8	4, 1
2	PCIe3	Full	Full	x4	1
3	PCIe3	Full	Full	x4	1
4	PCIe3	Full	Full	x16	16, 8, 4, 1

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	Off	Off = Set default boot mode to UEFI. On = Set default boot mode to legacy.
S8	—	Reserved
S9	—	Reserved
S10	—	Reserved
S11	—	Reserved
S12	—	Reserved

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

When system maintenance switch S6 is set to the On position, the system is prepared to erase all system configuration settings from both CMOS and NVRAM.

IMPORTANT:

Before using the S7 switch to change to Legacy BIOS Boot Mode, be sure the HPE Dynamic Smart Array B140i Controller is disabled. Do not use the B140i controller when the server is in Legacy BIOS Boot Mode.

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.

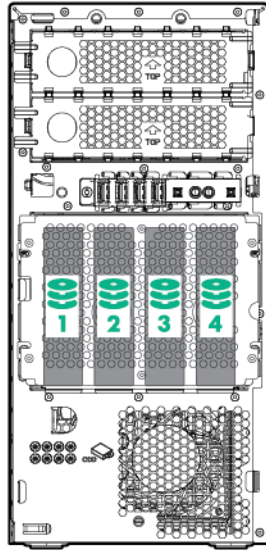
To force the system to invoke the NMI handler and generate a crash dump log, do one of the following:

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

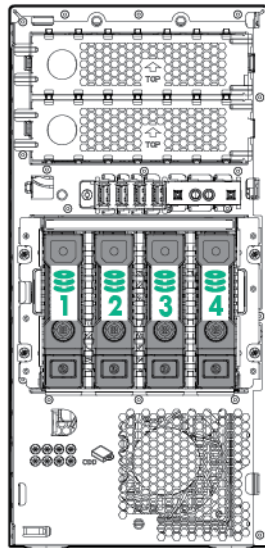
For more information, see the [Hewlett Packard Enterprise website](#).

Drive numbering

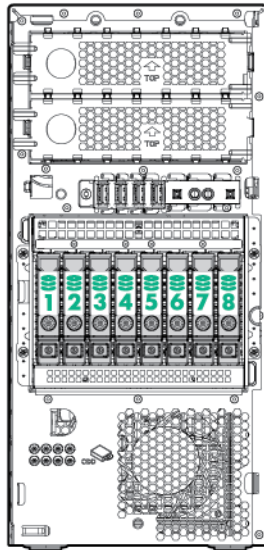
- Four-bay LFF non-hot-plug drive numbering



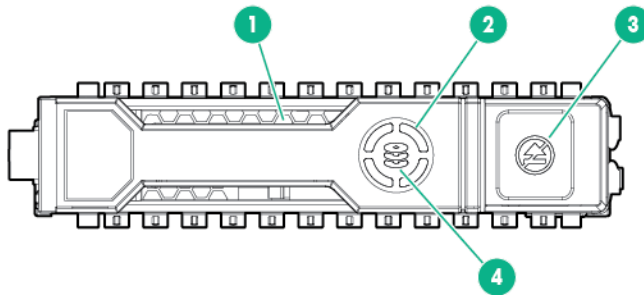
- Four-bay LFF hot-plug drive numbering



- Eight-bay SFF hot-plug drive numbering



Hot-plug drive 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.
		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.

Table Continued

Item	LED	Status	Definition
		Flashing amber	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller.

The blue Locate LED is behind the release lever and is visible when illuminated.

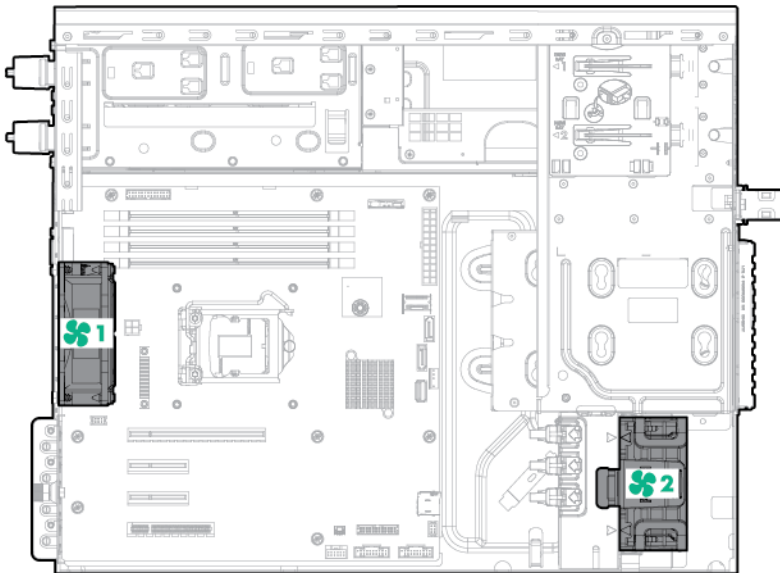
! **IMPORTANT:**

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).

Fan locations



Fan number	Fan type
1	System fan
2	Front PCI fan (optional)

Operations

Server warnings and cautions

**WARNING:**

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

**WARNING:**

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

**CAUTION:**

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

**CAUTION:**

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

Powering down the server

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

**IMPORTANT:**

When the server is in standby mode, auxiliary power is still being provided to the system.

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

- Press and release the Power On/Standby button.

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

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

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

- Use a virtual power button selection through iLO.

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

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

Powering up the server

Procedure

1. Connect each power cord to the server.
2. Connect each power cord to the power source.
3. Press the Power On/Standby button.

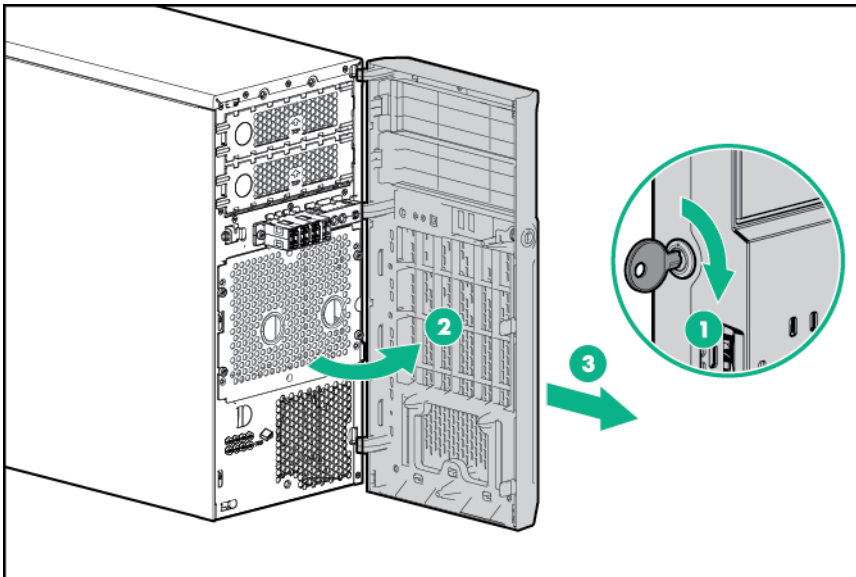
The server exits standby mode and applies full power to the system. The system power LED changes from amber to green.

Removing the bezel

The tower bezel must be unlocked and opened to access the drive cage and media bays. It must be unlocked to remove the access panel. The bezel must remain closed during normal server operations.

Procedure

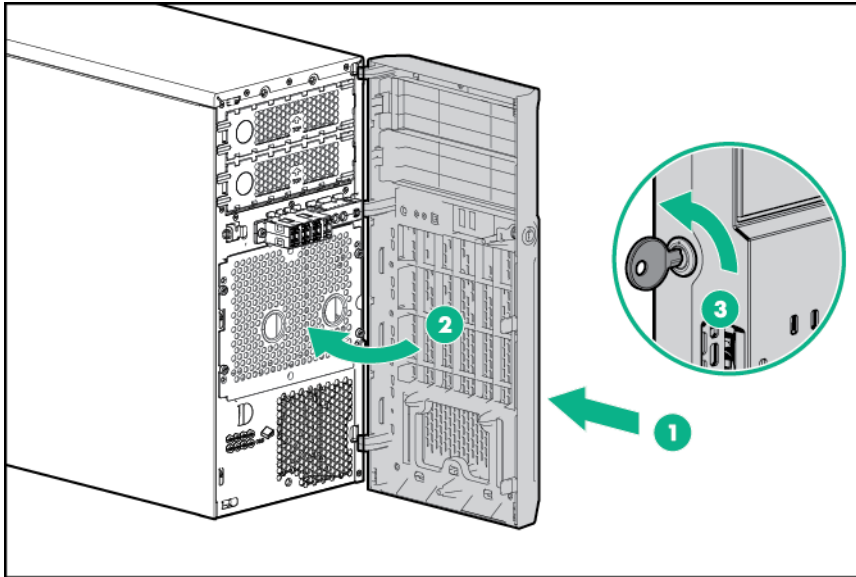
1. Unlock the bezel.
2. Open the bezel.
3. Pull the bezel away from the chassis.



Installing the bezel

Procedure

1. Insert the tabs on the bezel into the slots on the front chassis.
2. Close the bezel.
3. Lock the bezel.



Removing the access panel



WARNING:

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

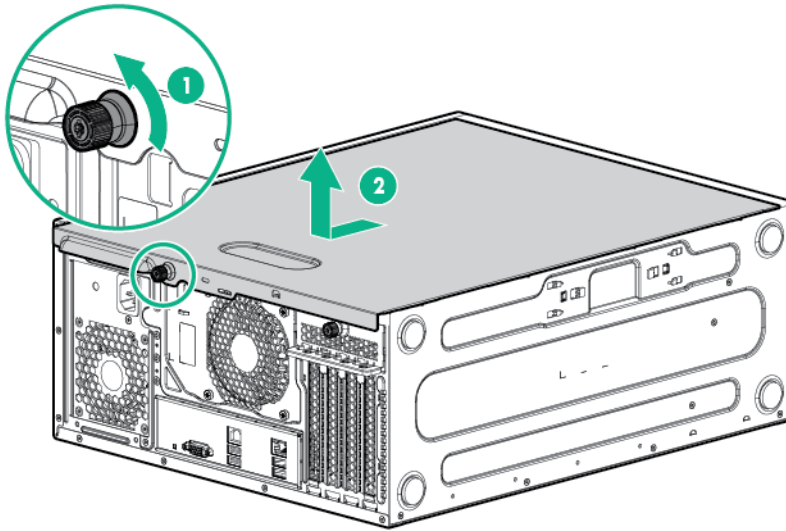


CAUTION:

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

Procedure

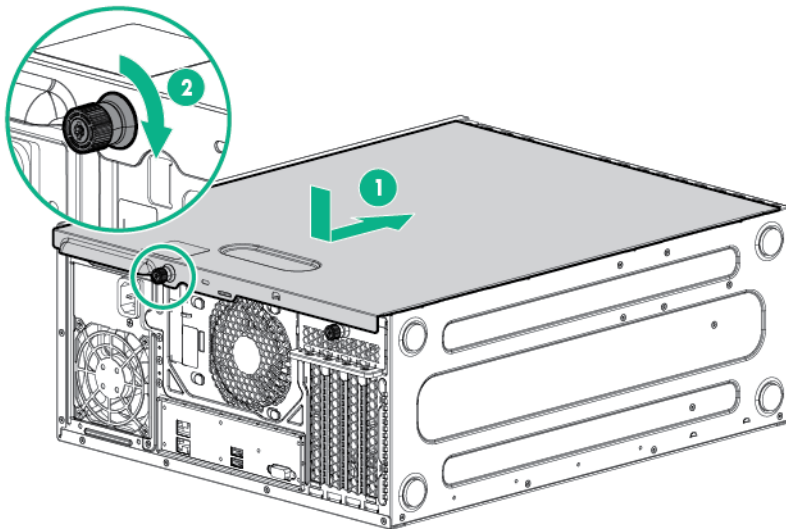
1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. If installed, unlock and remove the Kensington security lock.
6. Remove the access panel:
 - a. Loosen the access panel thumbscrew.
 - b. Slide the access panel back.
 - c. Lift the access panel away from the chassis.



Installing the access panel

Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. Install the access panel:
 - a. Place the access panel on the chassis and slide it toward the front of the server.
 - b. Tighten the thumbscrew.



6. **Install the bezel.**
7. Return the server to an upright position.
8. Connect the power cord to the power source and the server.
9. **Power up the server.**

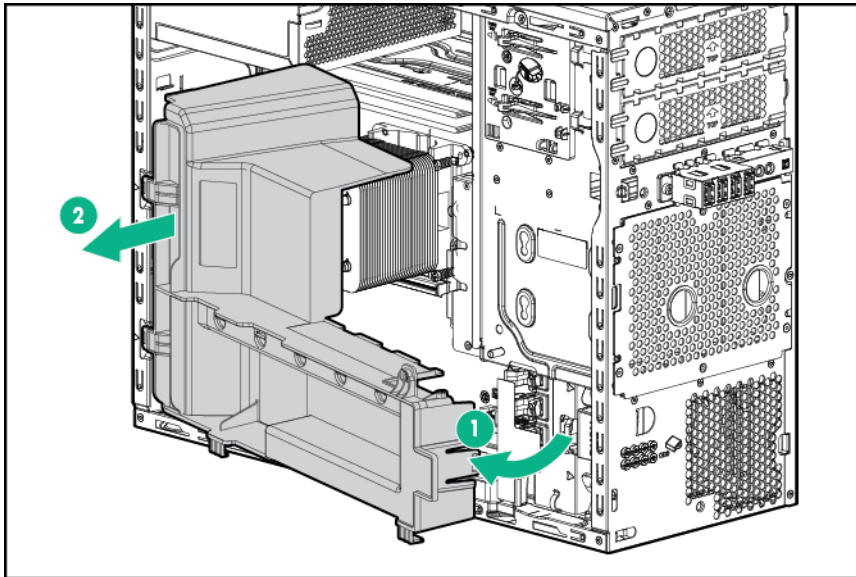
Removing the air baffle

⚠ CAUTION:

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

Procedure

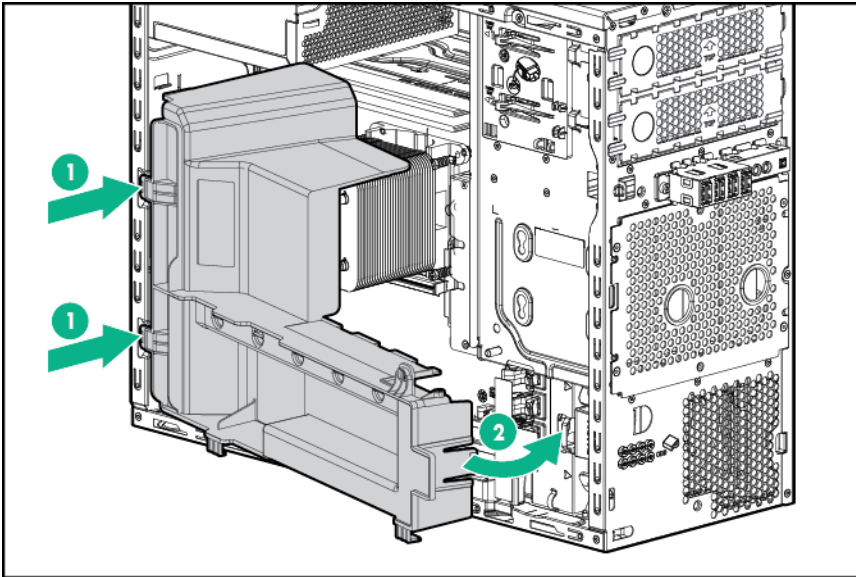
1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. Remove the air baffle.



Installing the air baffle

Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. Insert the tabs on the baffle into the slots on the rear chassis.
7. Press the front end of the baffle into the chassis.



8. **Install the access panel.**
9. **Install the bezel.**
10. Return the server to an upright position.
11. Connect the power cord to the power source and the server.
12. **Power up the server.**

Setup

Optional services

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

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

- Foundation Care – Keep systems running.
 - 6-Hour Call-to-Repair
 - 4-Hour 24x7
 - Next Business Day
- Proactive Care – Help prevent service incidents and get you to technical experts when there is one.
 - 6-Hour Call-to-Repair
 - 4-Hour 24x7
 - Next Business Day
- Startup and implementation services for both hardware and software
- HPE Education Services – Help train your IT staff.

For more information on HPE support services, see the [Hewlett Packard Enterprise website](#).

Optimum environment

When installing the server in a rack, select a location that meets the environmental standards described in this section.

Space and airflow requirements

Leave at least a 7.6cm (3in.) clearance space at the front of the back of the server for proper ventilation.

Temperature requirements

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

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

△ CAUTION:

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

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

Power requirements

Installation of this equipment must comply with local and regional electrical regulations governing the installation of information technology equipment by licensed electricians. This equipment is designed to

operate in installations covered by NFPA 70, 1999 Edition (National Electric Code) and NFPA-75, 1992 (code for Protection of Electronic Computer/Data Processing Equipment). For electrical power ratings on options, refer to the product rating label or the user documentation supplied with that option.



WARNING:

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



CAUTION:

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

When installing more than one server, you might need to use additional power distribution devices to safely provide power to all devices. Observe the following guidelines:

- Balance the server power load between available AC supply branch circuits.
- Do not allow the overall system AC current load to exceed 80% of the branch circuit AC current rating.
- Do not use common power outlet strips for this equipment.
- Provide a separate electrical circuit for the server.

For more information on the hot-plug power supply and calculators to determine server power consumption in various system configurations, see the [Hewlett Packard Enterprise Power Advisor website](#).

Electrical grounding requirements

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

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

Identifying the contents of the server shipping carton

Unpack the server shipping carton and locate the materials and documentation necessary for installing the server.

The contents of the server shipping carton include:

- Server
- Power cord

In addition to the supplied items, you might need:

- T-10/T-15 Torx screwdriver
- Hardware options
- Operating system or application software

Installing hardware options

Install any hardware options before initializing the server. For options installation information, refer to the option documentation. For server-specific information, refer to [Hardware options installation](#).

Installing the operating system

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

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

Failure to observe UEFI requirements for ProLiant Gen9 servers can result in errors installing the operating system, failure to recognize boot media, and other boot failures. For more information on these requirements, see the *HPE UEFI Requirements* on the [Hewlett Packard Enterprise website](#).

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

- Intelligent Provisioning—For single-server deployment, updating, and provisioning capabilities.

To install an operating system on the server with Intelligent Provisioning (local or remote):

1. Connect the Ethernet cable between the network connector on the server and a network jack.
2. Press the Power On/Standby button.
3. During server POST, press **F10**.

4. Complete the initial Preferences and Registration portion of [Intelligent Provisioning](#).

5. At the 1 Start screen, click **Configure and Install**.

6. To finish the installation, follow the onscreen prompts. An Internet connection is required to update the firmware and systems software.

- Insight Control server provisioning—For multi-server remote OS deployment, use Insight Control server provisioning for an automated solution. For more information, see the Insight Control documentation on the [Hewlett Packard Enterprise website](#).

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

For more information, see "[Keeping the system current](#)."

For more information on using these installation methods, see the [Hewlett Packard Enterprise website](#).

Selecting boot options in UEFI Boot Mode

On servers operating in UEFI Boot Mode, the boot controller and boot order are set automatically.

Procedure

1. Press the Power On/Standby button.

2. During the initial boot:

- To modify the server configuration ROM default settings, press the **F9** key in the ProLiant POST screen to enter the UEFI System Utilities screen. By default, the System Utilities menus are in the English language.
- If you do not need to modify the server configuration and are ready to install the system software, press the **F10** key to access Intelligent Provisioning.

For more information on automatic configuration, see the UEFI documentation on the [Hewlett Packard Enterprise website](#).

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

Introduction

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

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

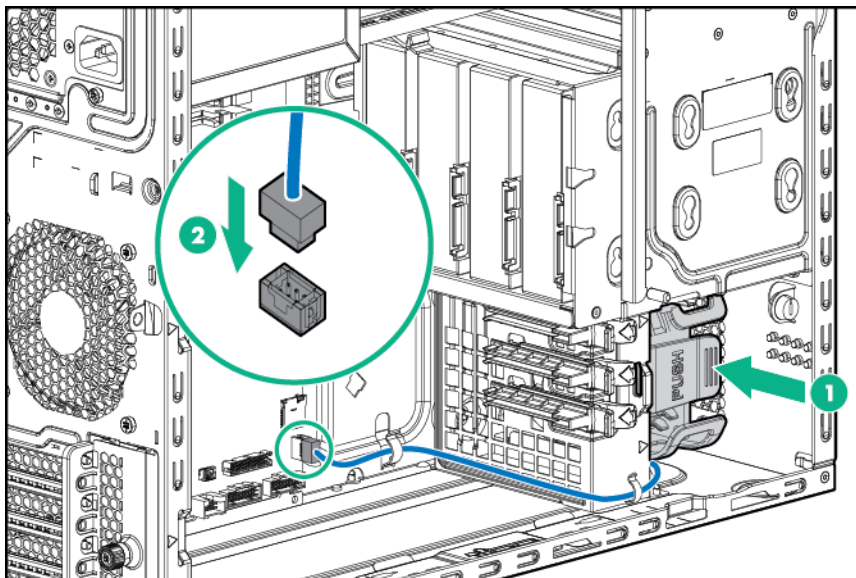
⚠ CAUTION:
To prevent damage to electrical components, take the appropriate anti-static precautions before beginning any installation, removal, or replacement procedure. Improper grounding can cause electrostatic discharge.

Installing a front PCI fan option

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Install the front PCI fan.
 - a. Slide the front PCI fan into the fan bay.
 - b. Route the front PCI fan cable through the cable clips and connect the cable to the system board.



8. **Install the air baffle.**

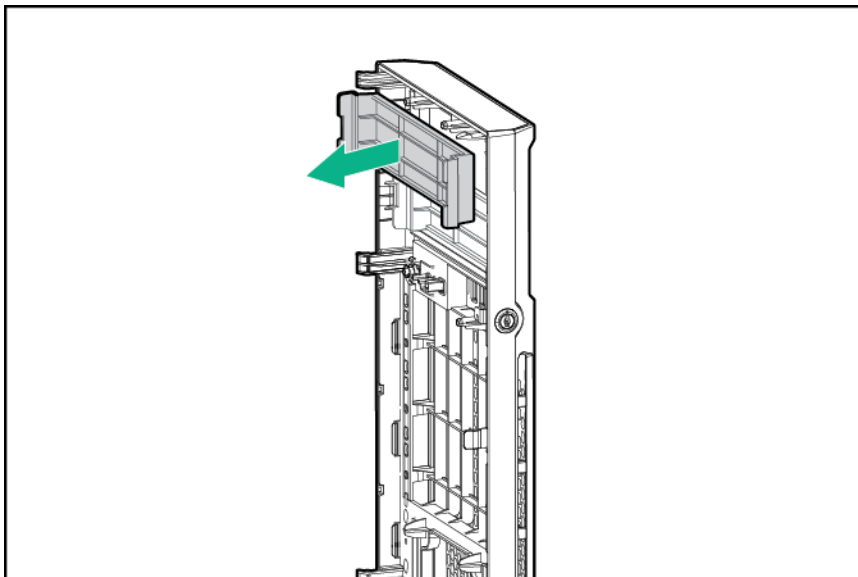
9. **Install the access panel.**
10. **Install the bezel.**
11. Return the server to an upright position.
12. Connect the power cord to the power source and the server.
13. **Power up the server.**

Installing a slim optical disk drive option

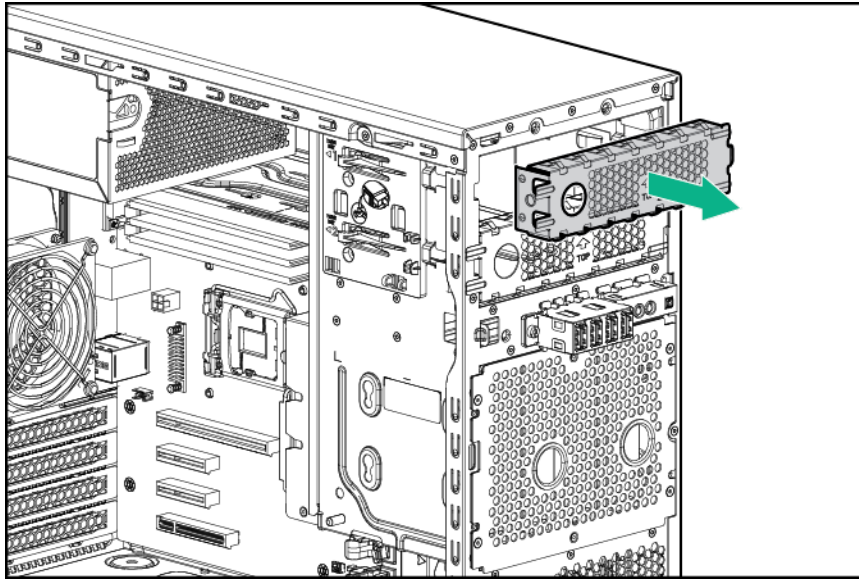
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

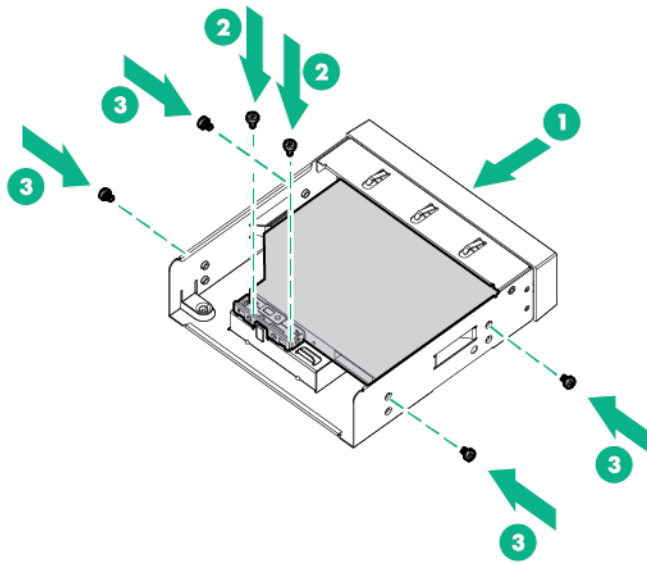
1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Remove the media drive bay blank.



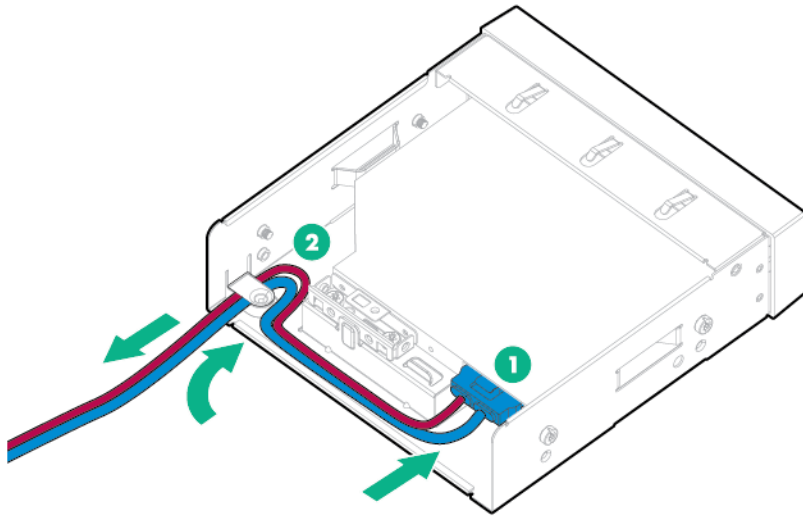
8. Remove the EMI shield.



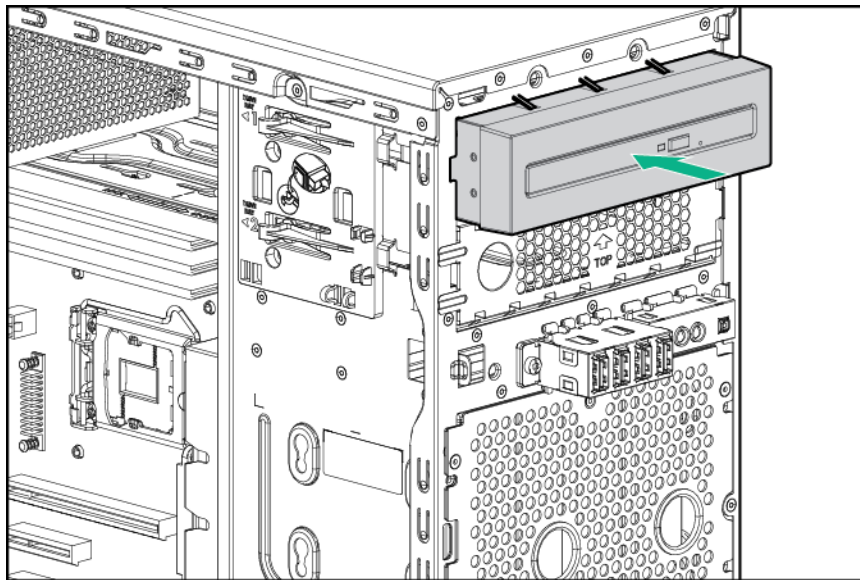
9. Install the slim optical disk drive into the drive cage.
 - a. Slide the slim optical disk drive into the drive cage.
 - b. Install the two T-15 screws and secure the drive into the cage.
 - c. Install four M3 screws from the server front panel to each side of the drive cage.



10. Connect the SATA/Power Y cables to the rear of the drive, then route the cable through the clip on the drive cage.



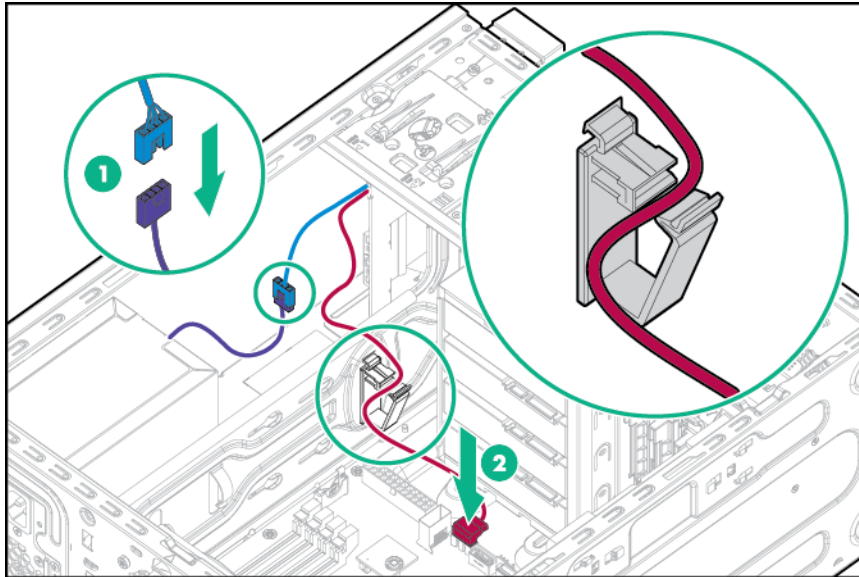
11. Insert the optical drive assembly into the media bay until it clicks into place.



12. Connect the SATA/power Y-cable.
 - a. Connect the 4-pin end of the SATA/Power Y-cable to the 4-pin cable from the power supply.
 - b. Connect the right angle SATA end of the SATA/Power Y-cable to the system board.
 - c. Route the SATA cable through the cable management clips.

If a redundant power supply is installed, connect the 4-pin to 4-pin extension cable to the redundant power supply cable.

For cable routing information, see "[Slim optical disk drive cabling](#)."



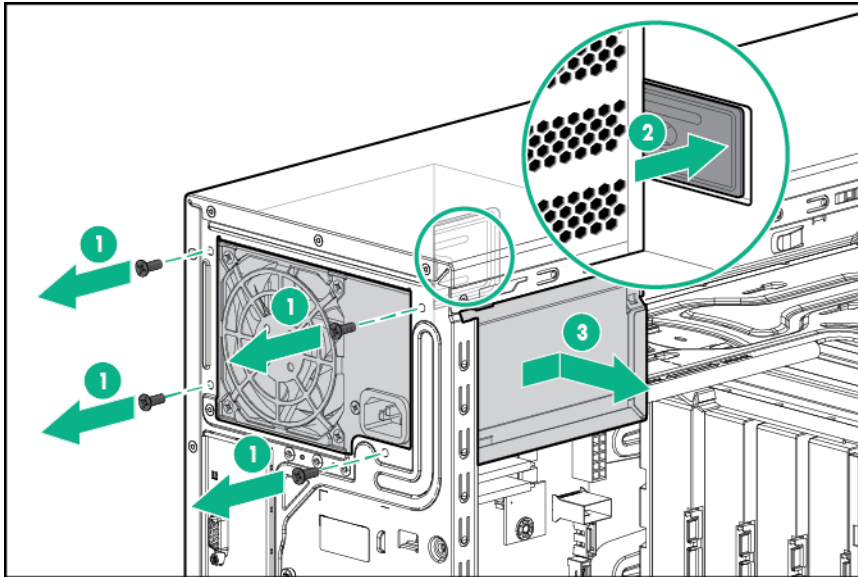
13. **Install the air baffle.**
14. **Install the access panel.**
15. **Install the bezel.**
16. Return the server to an upright position.
17. Connect the power cord to the power source and the server.
18. **Power up the server.**

Installing a 350W (E-star 2.0) non-hot-plug power supply option

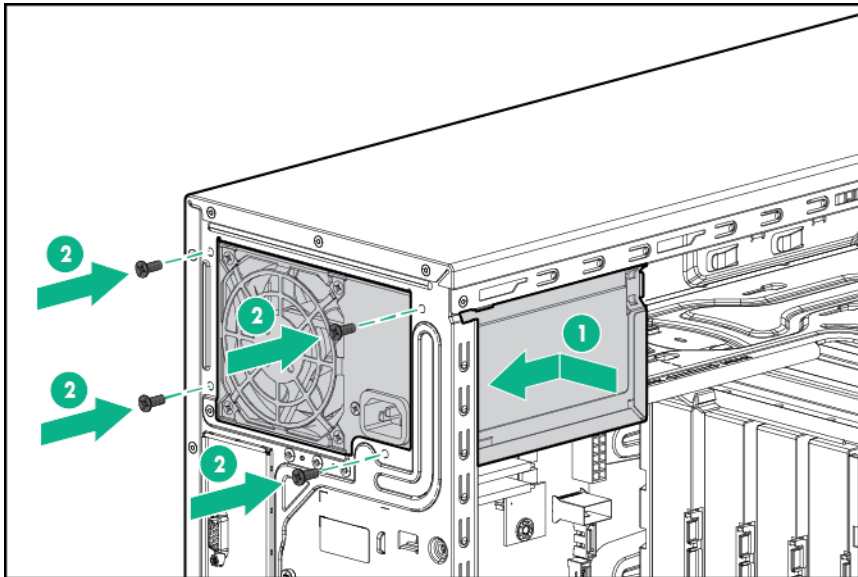
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

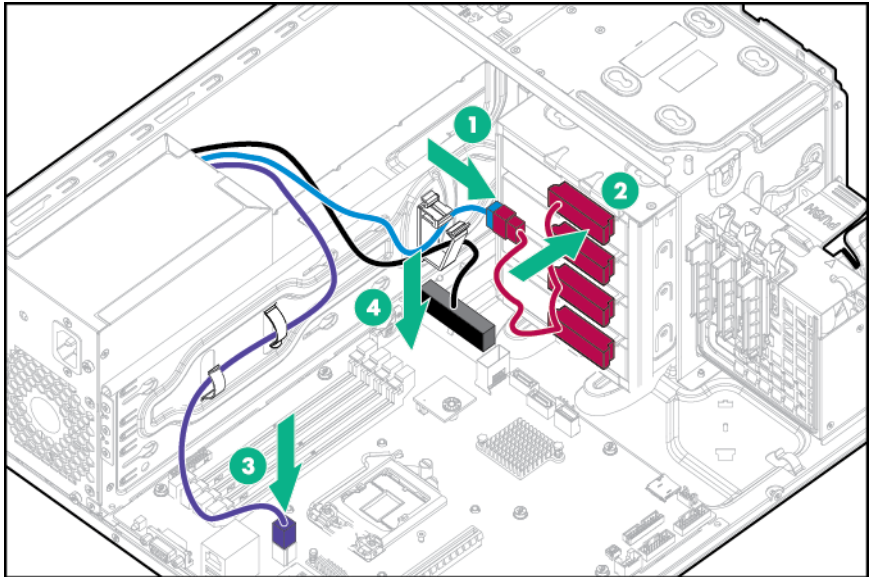
1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Disconnect all power supply cables from the system board, drive cages, and devices.
8. Remove the power supply.



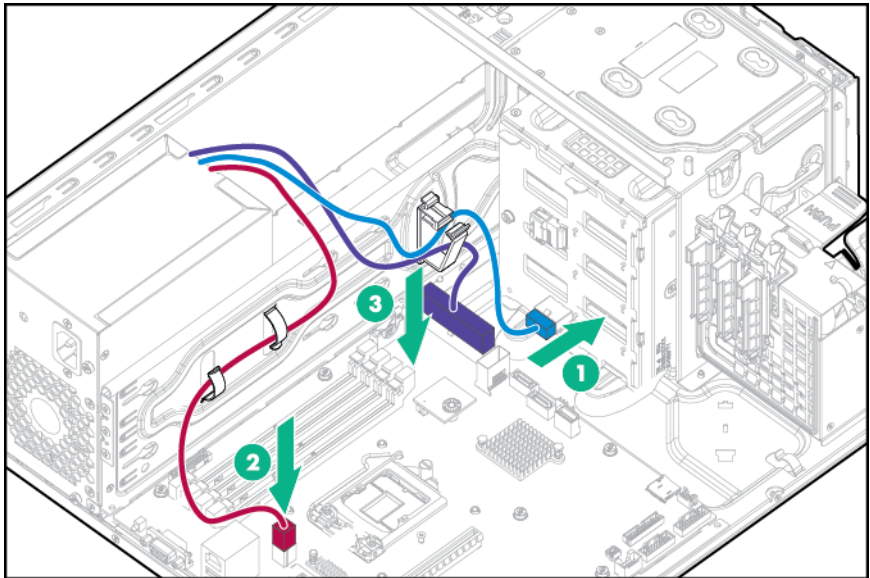
9. Install the 350W power supply.
 - a. Slide the power supply into the chassis.
 - b. Secure the power supply with four screws.



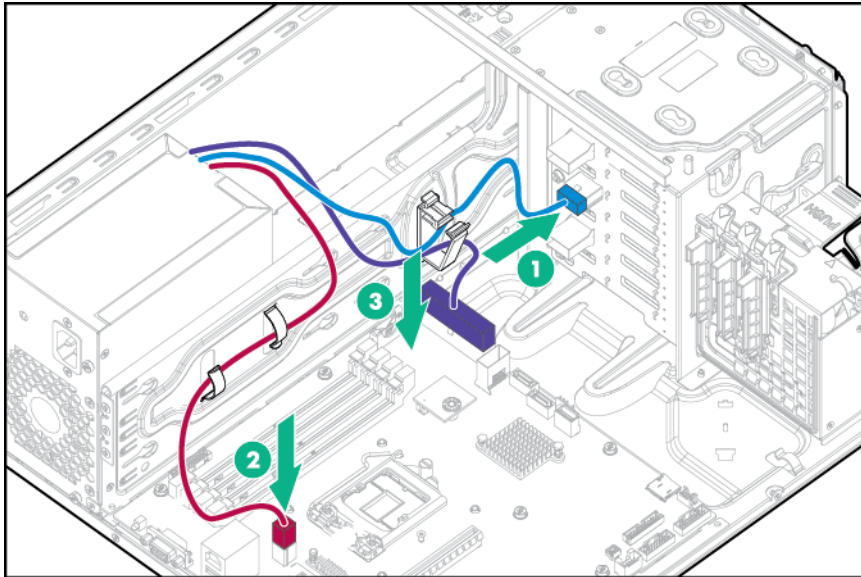
10. Connect the power supply cables.
 - a. 24-pin power cable to the system board.
 - b. 4-pin power cable to the system board.
 - c. 8-pin power cable to the drive cage backplane or non-hot-plug drive power cable.
 - Four-bay LFF non-hot-plug configuration



- Four-bay LFF hot-plug drive configuration



- Eight-bay SFF hot-plug drive configuration



11. **Install the air baffle.**
12. **Install the access panel.**
13. **Install the bezel.**
14. Return the server to an upright position.
15. Connect the power cord to the power source and the server.
16. **Power up the server.**

Installing a redundant power supply enablement option

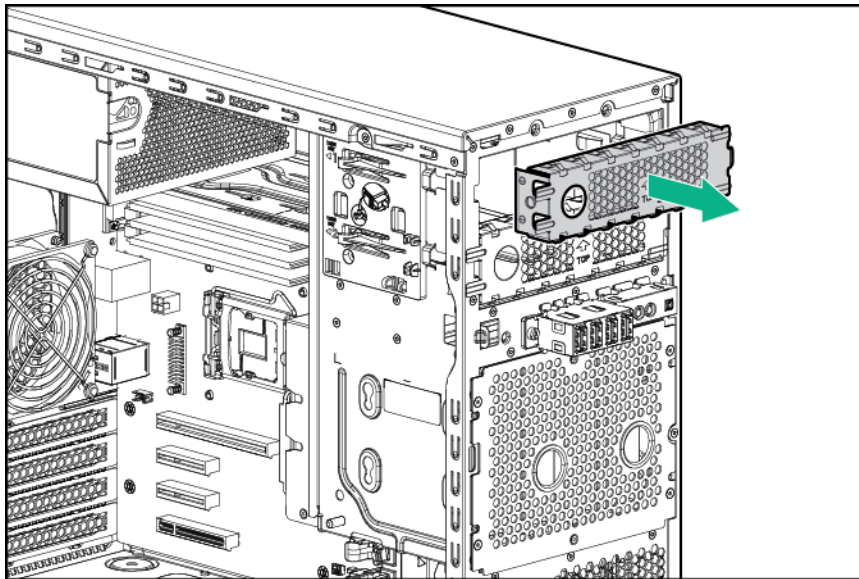
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Install the RPS enablement option to improve power efficiency and enable power redundancy. Power redundancy requires the installation of two power supply modules. This module is a separately purchased option and is not part of the RPS enablement kit. When the RPS enablement option is installed, the lower media bay drive will not be available.

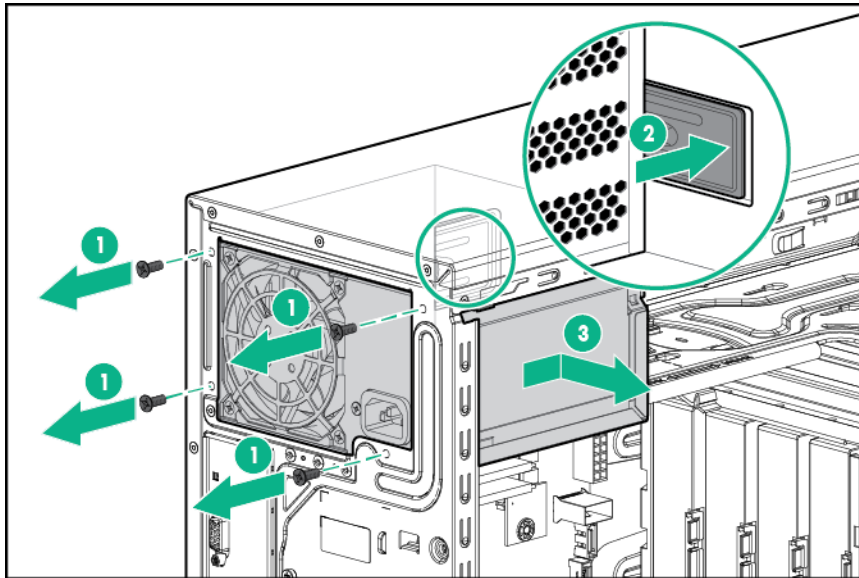
Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Disconnect all power supply cables from the system board, drive cages, and devices.
8. Remove all installed devices and any EMI shields from the two media drive bays.

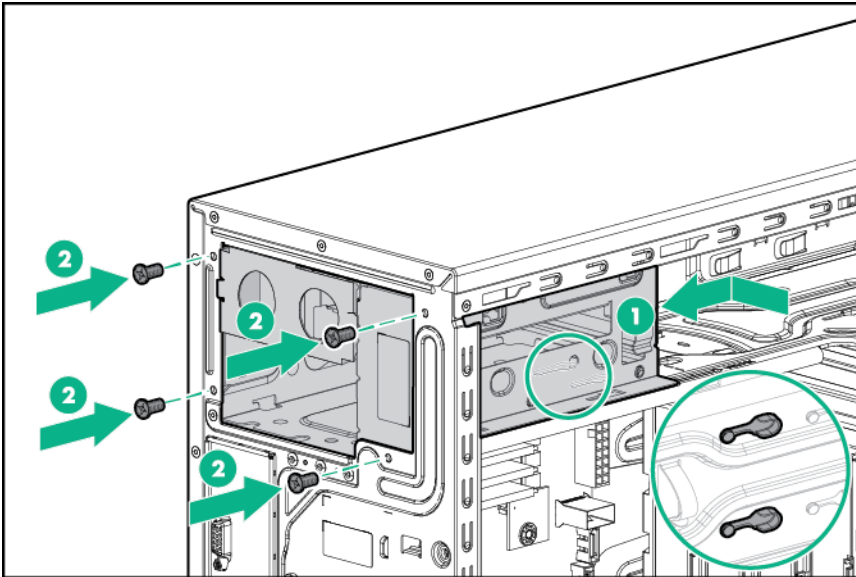
When the RPS enablement is installed, only the upper media drive bay will be available.



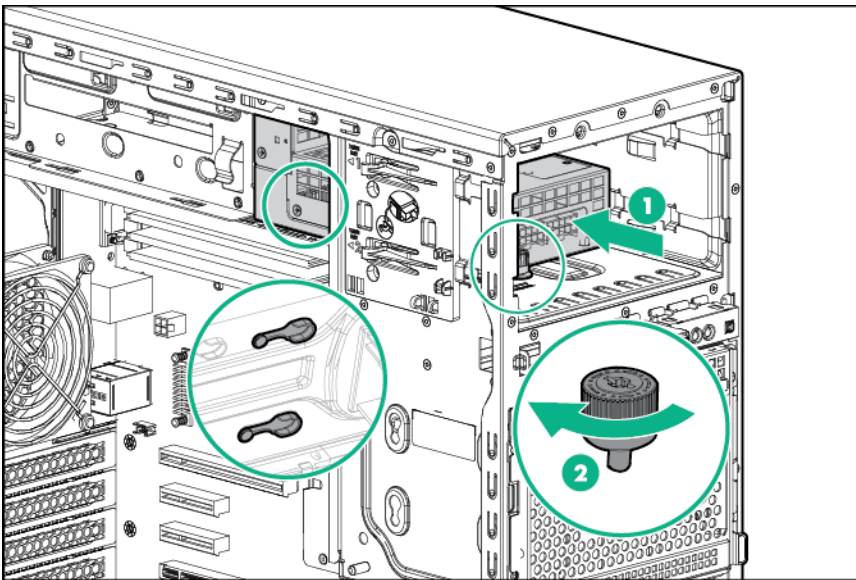
9. Remove the power supply.



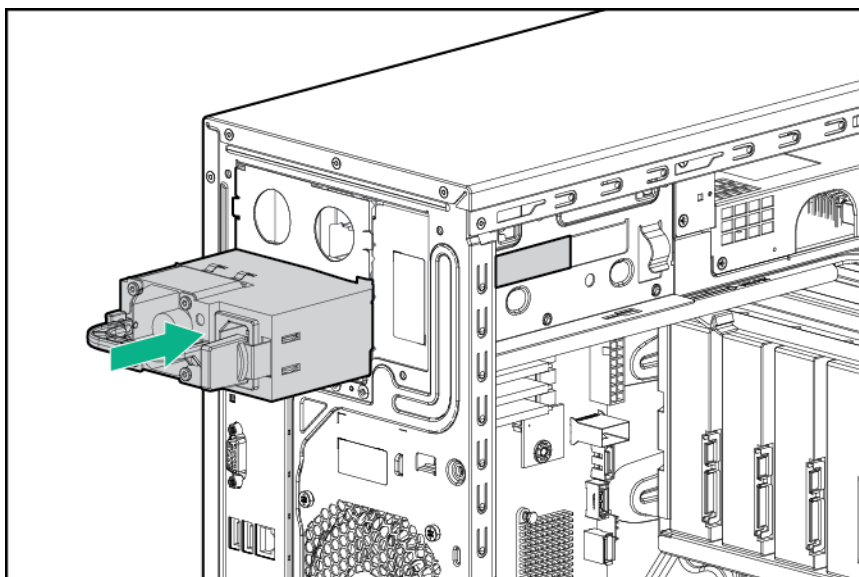
10. Install the RPS cage.
 - a. Slide the RPS cage into the chassis.
 - b. Secure the RPS cage with four screws.



11. Install the RPS backplane module:
 - a. Route the power supply cables through the media drive bays.
 - b. Align the pins on the chassis and slide the RPS backplane module through the media drive bays.
 - c. Tighten the thumbscrew.



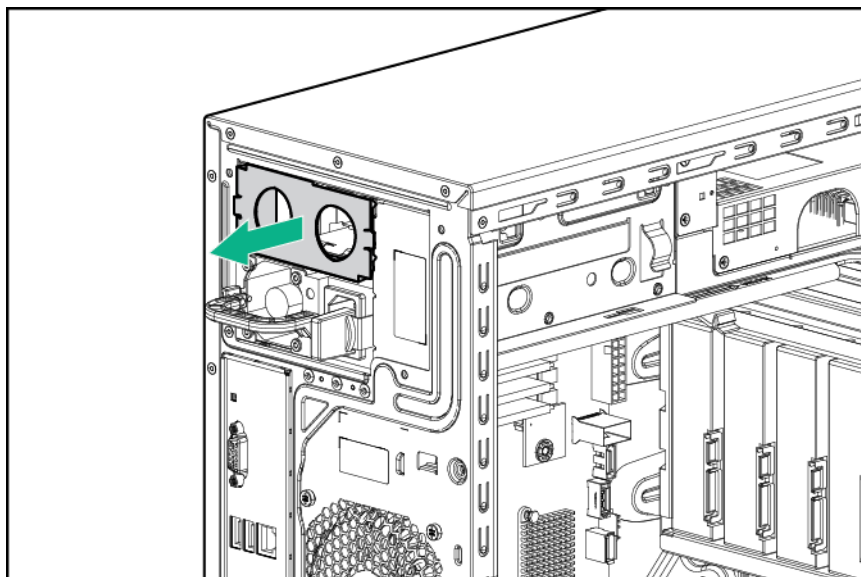
12. Install the first power input module into the lower bay.



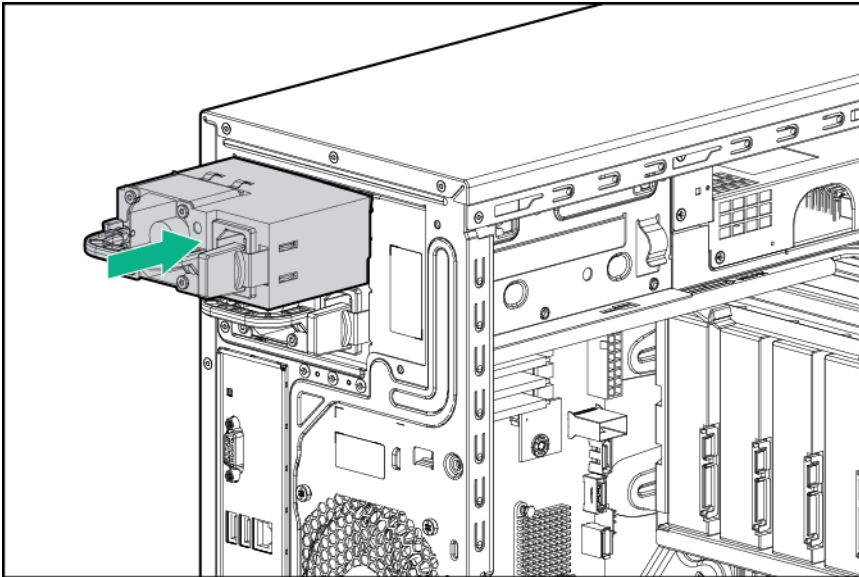
⚠ CAUTION:

The default and redundant power supplies in the server must have the same output power capacity. Verify that all power supplies have the same part number and label color. The system becomes unstable and might shut down if it detects mismatched power supplies.

13. To enable the redundant power supply configuration:
 - a. Remove the blank from the upper bay.

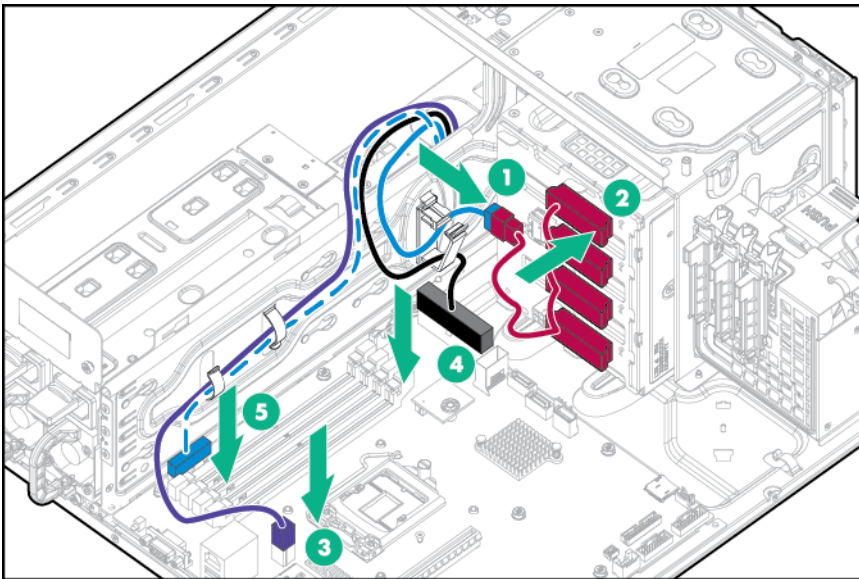


- b. Install a second power input module into the upper bay.

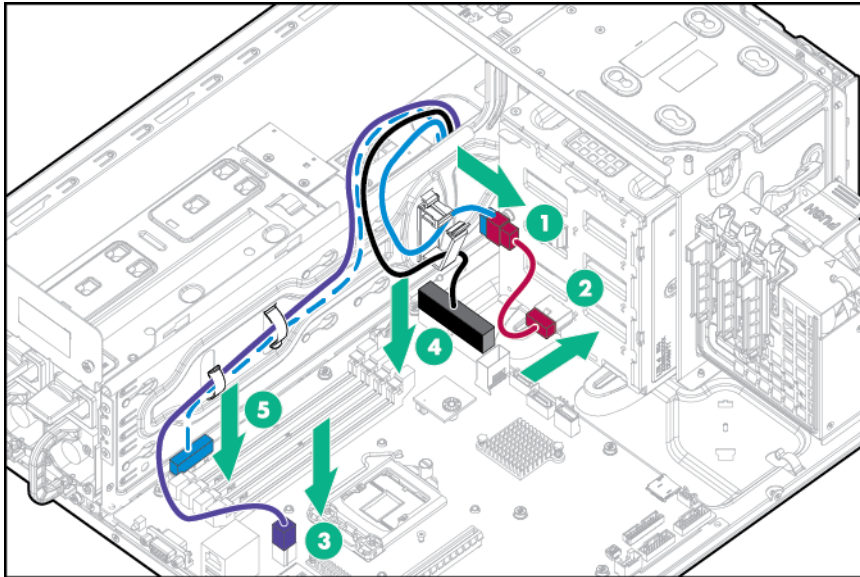


14. Connect the power supply cables.
 - a. 24-pin power cable to the system board.
 - b. 4-pin power cable to the system board.
 - c. 10-pin to 8-pin power cable to the drive cage backplane or non-hot-plug drive cable.
 - d. RPS cable to the system board.

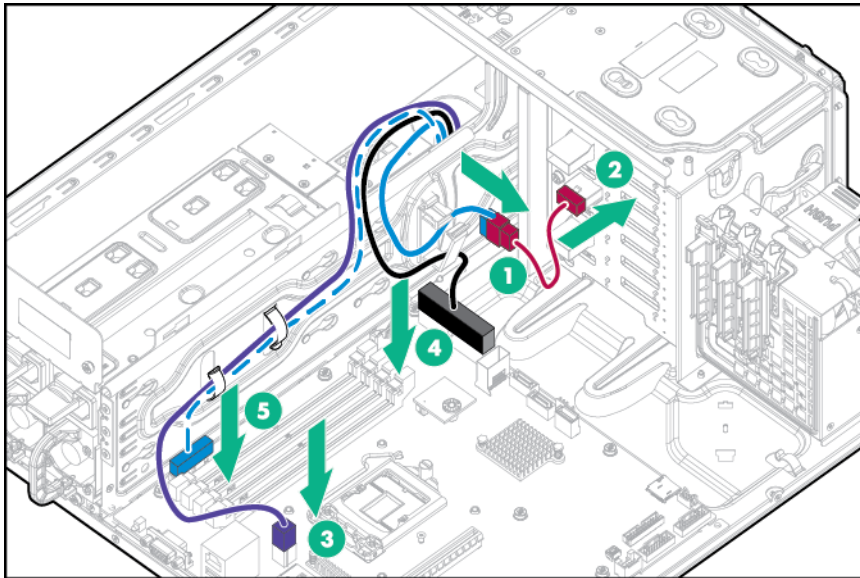
 - Four-bay LFF non-hot-plug drive configuration



- Four-bay LFF hot-plug drive configuration



- Eight-bay SFF hot-plug drive configuration



For RPS cable routing to a slim optical disk drive or a drive enablement option, see "[Storage cabling](#)."

15. **Install the air baffle.**
16. **Install the access panel.**
17. **Install the bezel.**
18. Return the server to an upright position.
19. Connect the power cord to the power source and the server.
20. **Power up the server.**

Drive options

The server supports up to four non-hot-plug LFF drives in the default configuration.

The embedded storage controller supports SATA drives only. To support SAS drives, install an HPE Host Bus Adapter or an HPE Smart Array Controller.

The default drive cage may be replaced with an optional four-bay LFF hot-plug drive cage to support up to four hot-plug LFF drives.

The default drive cage may alternatively be replaced with an optional eight-bay SFF hot-plug drive cage to support up to eight hot-plug SFF drives. If the optional eight-bay SFF drive cage is installed, the server supports four SFF drives using the embedded storage controller. An optional storage controller is required to support up to eight SFF drives.

An optional drive enablement kit may be installed in each of the two media bays to support up to two additional LFF drives connected to the embedded SATA controller. If the RPS option is installed, only the upper media drive bay will be available for option installation.

Drive installation guidelines

When adding drives to the server, observe the following general guidelines:

- If installing a drive in a server that previously has no drive installed, reboot the server after the new drive installation. This action enables the drive thermal protection feature. This feature applies to all drives supported in this server.
- The system automatically sets all device numbers.
Populate drive bays, based on the drive numbering sequence. Start from the drive bay with the lowest device number. For more information, see "**Drive numbering.**"
- All drives grouped into the same drive array must meet the following criteria:
 - They must be either all SAS or all SATA.
 - They must be either all hard drives or all solid-state drives.
 - Drives should be the same capacity to provide the greatest storage space efficiency when drives are grouped together into the same drive array.

Installing a non-hot-plug drive

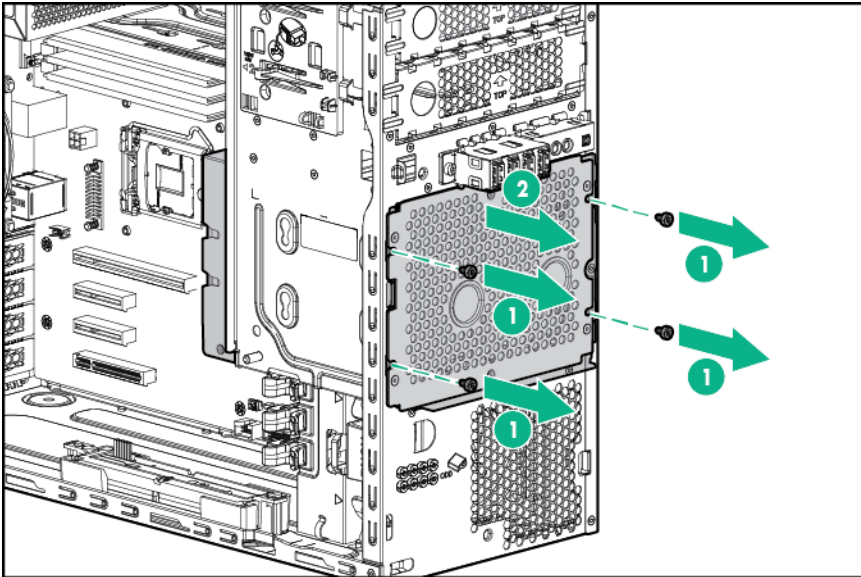
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

CAUTION:

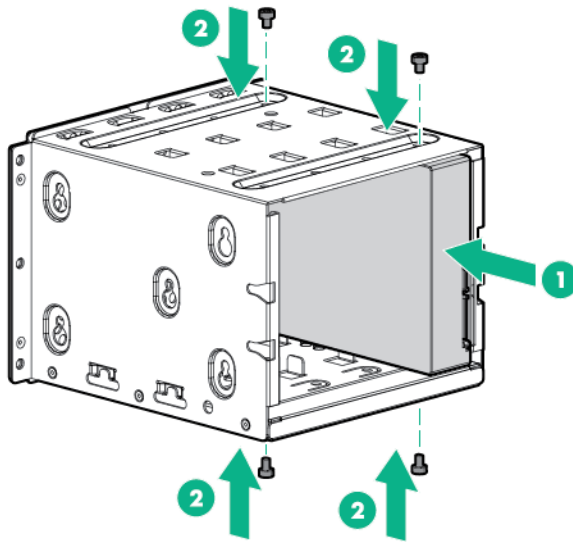
To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

Procedure

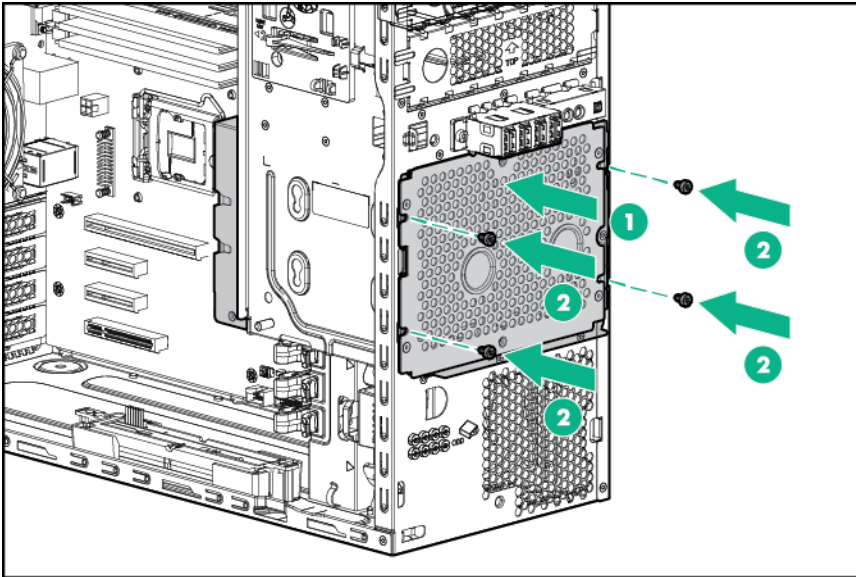
1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. **Remove the access panel.**
5. **Remove the air baffle.**
6. Disconnect all cables connected to any installed drives.
7. Remove the installed drive cage assembly.



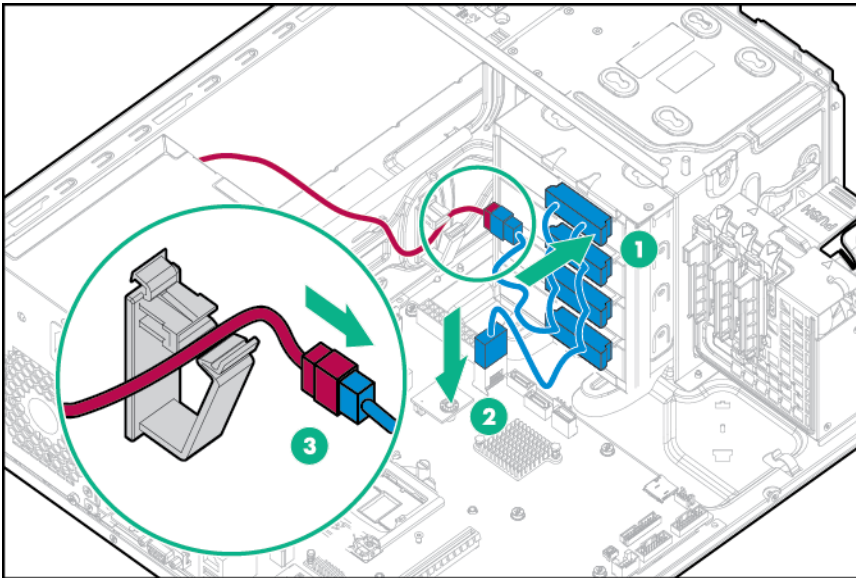
8. Use the screws on the drive cage to install the drives.



9. Install the drive cage into the chassis.



10. Connect all drive cables.



11. **Install the air baffle.**
12. **Install the access panel.**
13. **Install the bezel.**
14. Connect the power cord to the power source and the server.
15. **Power up the server.**

Installing a hot-plug drive

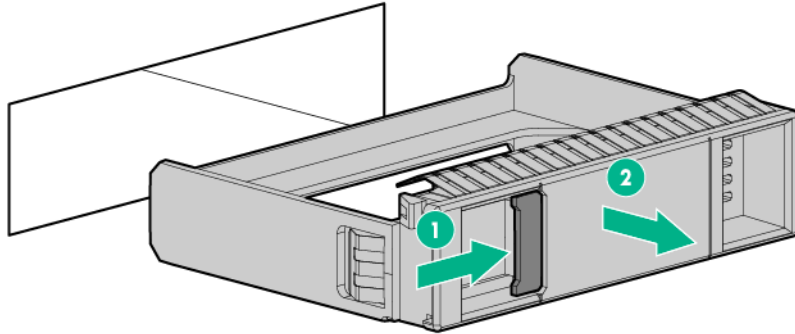
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

⚠ CAUTION:

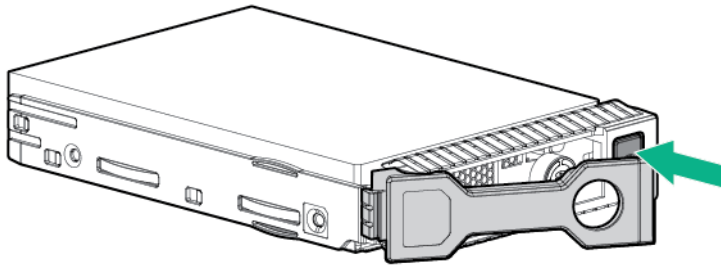
To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

Procedure

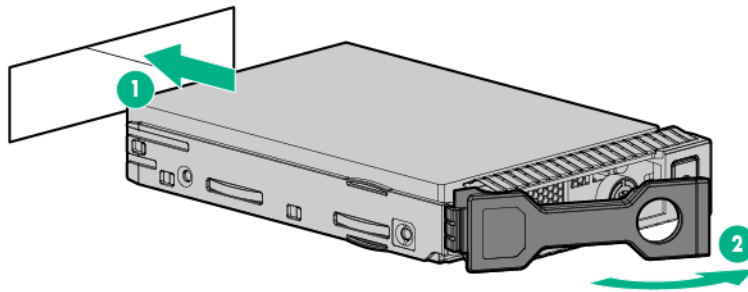
1. **Remove the bezel.**
2. Remove the drive blank.



3. Prepare the drive.



4. Install the drive.



5. **Determine the status of the drive LEDs.**

To configure arrays, see the [HPE Smart Storage Administrator User Guide](#).

Drive cable options

Use these drive cable options to support a Host Bus Adapter or a Smart Array Controller.

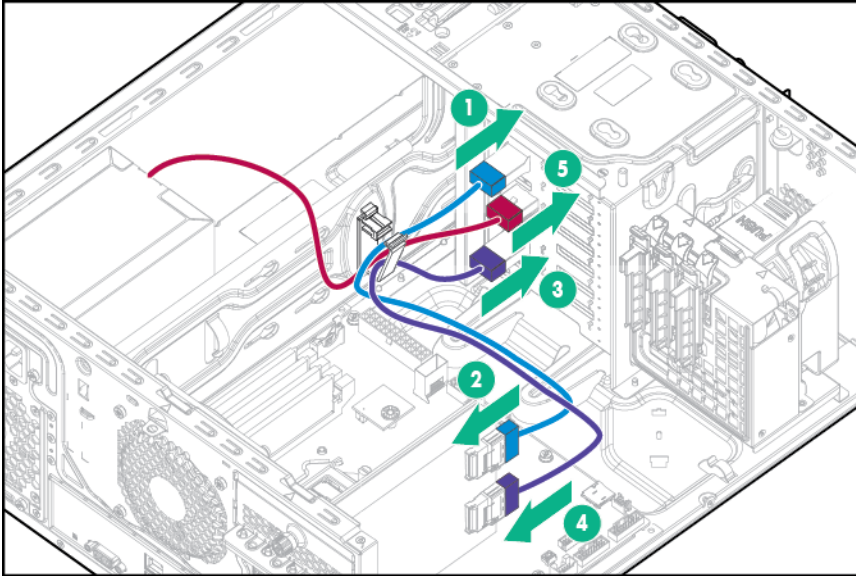
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Installing a Host Bus Adapter Mini-SAS cable option

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

1. Back up all server data.
2. **Power down the server.**
3. Disconnect the power cord from the power source and the server.
4. **Remove the bezel.**
5. Place the server on its side with the access panel facing up.
6. **Remove the access panel.**
7. **Remove the air baffle.**
8. Disconnect the existing Mini-SAS cables from the drive backplane and the Mini-SAS connectors on the system board.
9. Connect one end of the cables to the Host Bus Adapter, route the cables through the cable clip, then connect the cables to the drive backplane.



Item	Description
1	Port 1 drive backplane connection
2	Port 1 controller connection
3	Port 2 drive backplane connection
4	Port 2 controller connection
5	Power cable connection

10. **Install the Host Bus Adapter.**

Storage controllers may be installed in PCIe slot 1 or 4. HPE recommends the H240/H241 Host Bus Adapter in slot 4 for optimal performance.

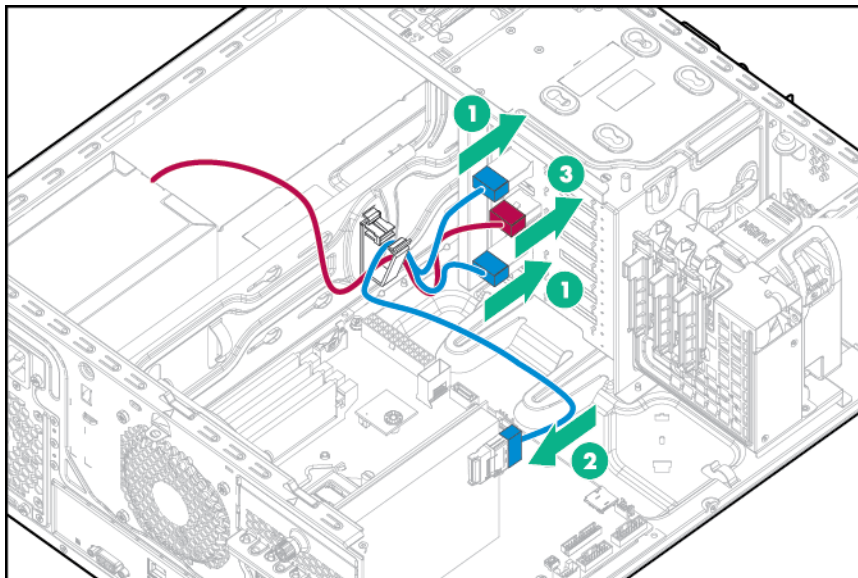
11. **Install the air baffle.**
12. **Install the access panel.**
13. **Install the bezel.**
14. Return the server to an upright position.
15. Connect the power cord to the power source and the server.
16. **Power up the server.**

Installing a Smart Array Controller Mini-SAS cable option

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

1. Back up all server data.
2. **Power down the server.**
3. Disconnect the power cord from the power source and the server.
4. **Remove the bezel.**
5. Place the server on its side with the access panel facing up.
6. **Remove the access panel.**
7. **Remove the air baffle.**
8. Disconnect the existing Mini-SAS cables from the drive backplane and the Mini-SAS connectors on the system board.
9. Connect one end of the cables to the Smart Array Controller, route the cables through the cable clip, then connect the cables to the drive backplane.



Item	Description
1	Port 1 and 2 drive backplane connection
2	Smart Array controller connection
3	Power cable connection

10. **Install the Smart Array Controller.**
Storage controllers may be installed in PCIe slot 1 or 4. HPE recommends the H240/H241 Host Bus Adapter in slot 4 for optimal performance.
11. **Install the air baffle.**
12. **Install the access panel.**
13. **Install the bezel.**
14. Return the server to an upright position.
15. Connect the power cord to the power source and the server.
16. **Power up the server.**

Storage controller options

The server ships with an embedded Dynamic Smart Array B140i Controller. This embedded controller is supported in UEFI Boot Mode only. 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](#).

Upgrade options exist for an integrated array controller. For a list of supported options, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

To configure arrays, see the HPE Smart Storage Administrator User Guide on the [Hewlett Packard Enterprise website](#).

The server supports FBWC. FBWC consists of a cache module and a Smart Storage Battery Pack. The DDR cache module buffers and stores data being written by an integrated Gen9 P-series Smart Array Controller.

This server supports the 96W Smart Storage Battery Pack. This battery pack can support up to 24 devices. Devices in this context refer to the Smart Array Controller or NVDIMM associated with the cache module.

The battery pack might have a low charge when installed. If the battery does have low charge, a POST error message appears when the server is powered up, indicating that the battery pack is temporarily disabled. No action is necessary. The internal circuitry automatically recharges the batteries and enables the battery pack. When the system is powered on this process might take approximately 2 hours.

If a system power failure occurs, a fully charged battery pack provides power for up to 150 seconds. During that interval, the controller transfers the cached data from DDR memory to flash memory, where the data remains indefinitely or until a controller retrieves the data. The data protection and the time limit also apply if a power outage occurs. When power is restored to the system, an initialization process writes the preserved data to the storage drives.

⚠ CAUTION:

The cache module connector does not use the industry-standard DDR3 mini-DIMMs. Do not use the controller with cache modules designed for other controller models, because the controller can malfunction and you can lose data. Also, do not transfer this cache module to an unsupported controller model, because you can lose data.

⚠ CAUTION:

To prevent a server malfunction or damage to the equipment, do not add or remove the battery pack while an array capacity expansion, RAID level migration, or stripe size migration is in progress.

⚠ CAUTION:

After the server is powered down, wait for 30 seconds, and then check the amber LED before unplugging the cable from the cache module. If the amber LED flashes after 30 seconds, do not remove the cable from the cache module. The cache module is backing up data. Data will be lost if the cable is detached when the amber LED is still flashing.

Storage controller installation guidelines

Storage controllers may be installed in slot 1 or 4. Hewlett Packard Enterprise recommends installing a storage controller in PCIe slot 4 for optimal performance.

An optional front PCI fan must be installed if any PCI cards are installed in the system.

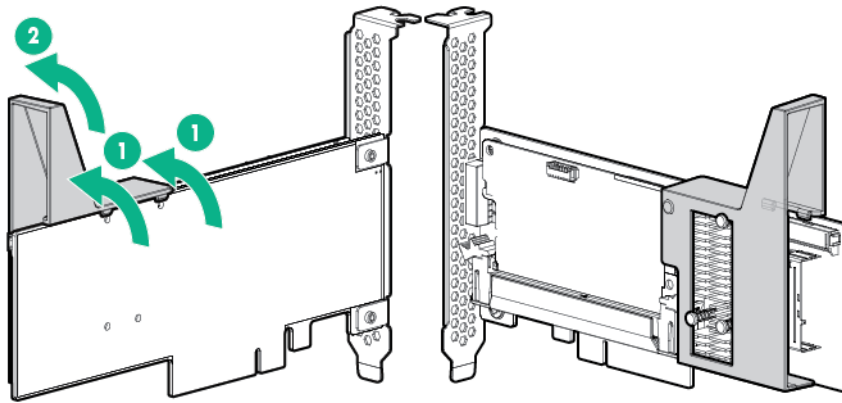
Storage controllers additionally require the appropriate optional cables to connect to storage devices.

Installing a storage controller and FBWC module options

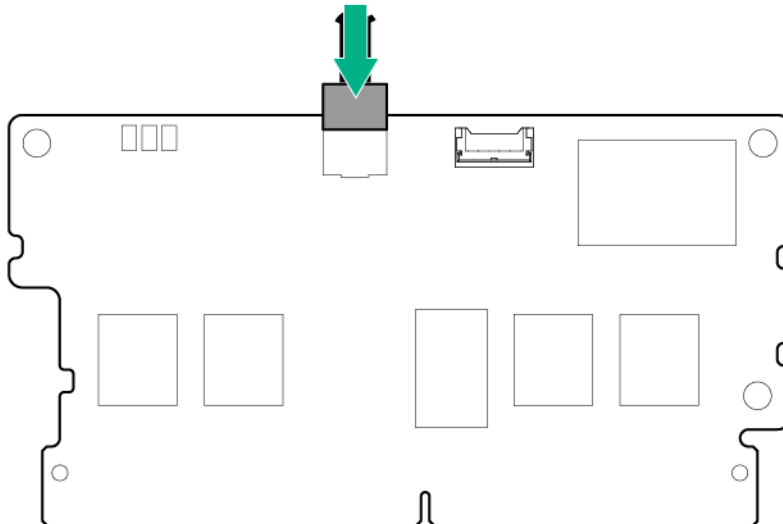
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

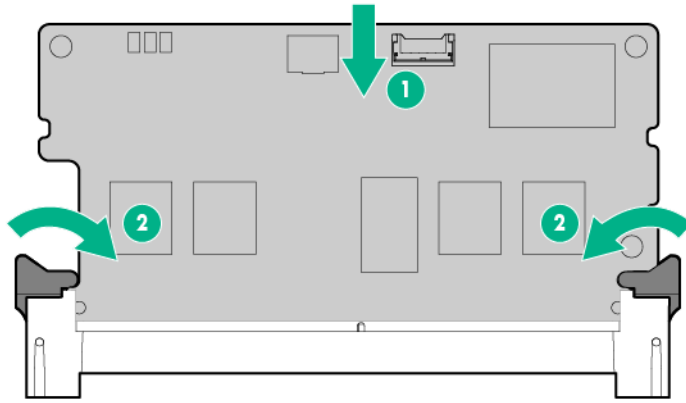
1. Back up all server data.
2. **Power down the server.**
3. Disconnect the power cord from the power source and the server.
4. **Remove the bezel.**
5. Place the server on its side with the access panel facing up.
6. **Remove the access panel.**
7. **Remove the air baffle.**
8. If you intend to use an FBWC module, install the module on the storage controller.
 - a. If you are installing a Smart Array P440 Controller, remove the air scoop.



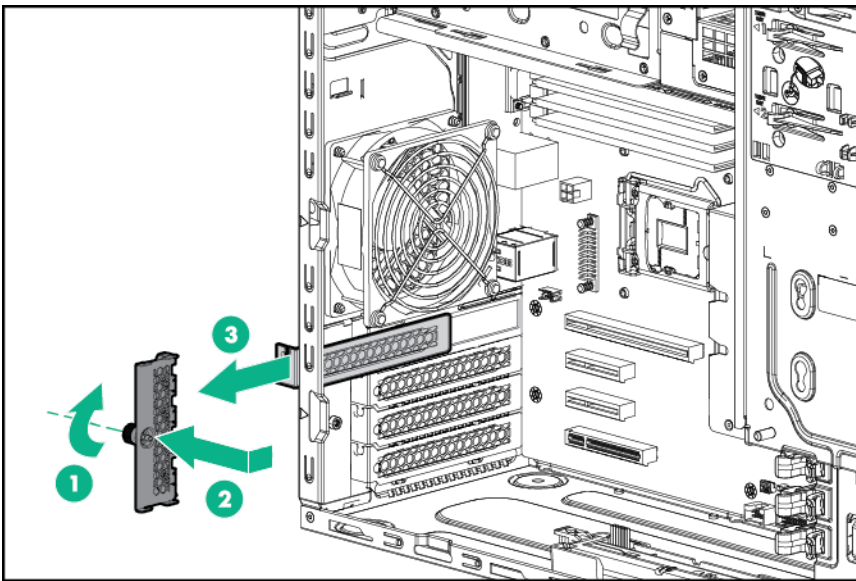
- b. Connect the cache module backup power cable to the module.



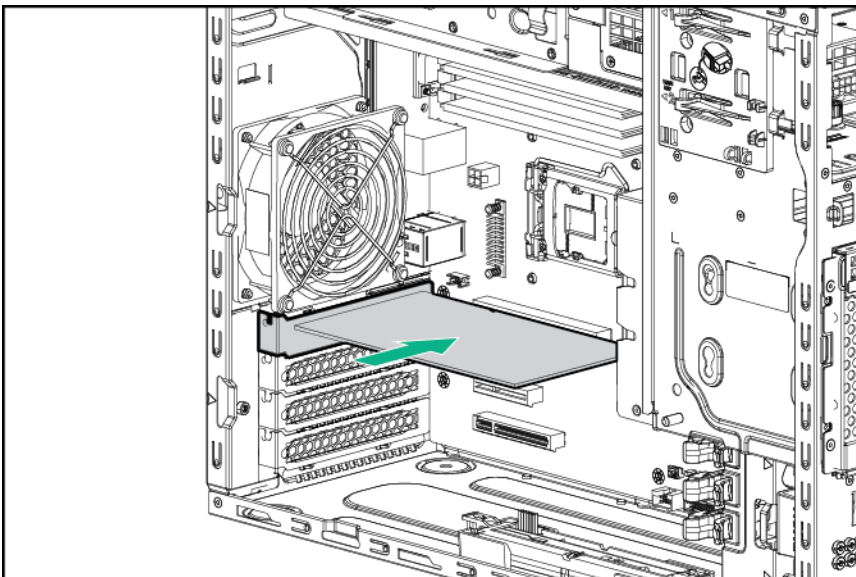
- c. Install the cache module on the storage controller.



9. Locate the appropriate PCIe slot on the **system board**.
10. Open the PCIe slot cover retainer and remove the slot blank.



11. Install the storage controller.



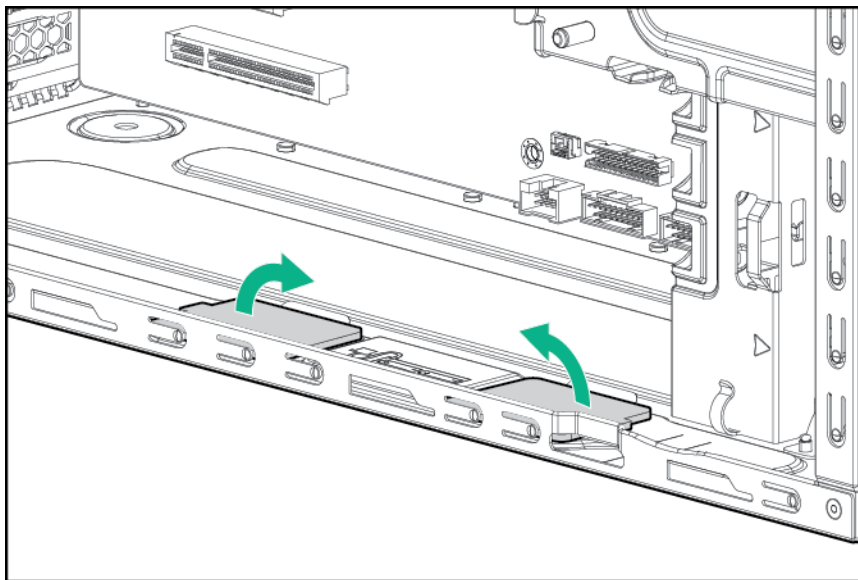
12. Install the PCIe slot cover retainer.
13. If you installed a cache module on the storage controller, connect the cache module cable to the system board connector. For cache module cabling information, see "**FBWC cabling.**"
14. Connect all necessary cables to the storage controller and drive cage backplane. For internal drive cabling information, see "**Storage cabling.**"
15. **Install a front PCI fan.**
16. **Install the air baffle.**
17. **Install the access panel.**
18. **Install the bezel.**
19. Return the server to an upright position.
20. Connect the power cord to the power source and the server.
21. **Power up the server.**

Installing a Smart Storage Battery

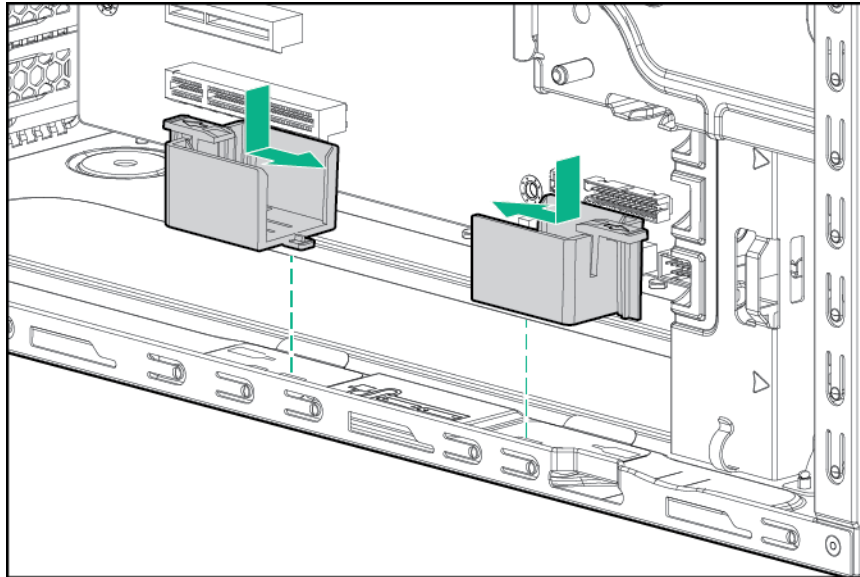
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

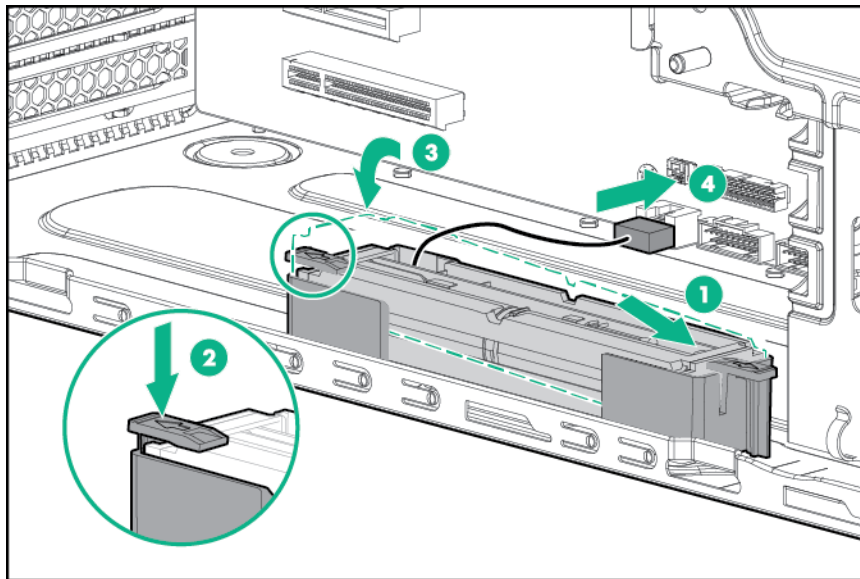
1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Remove the slot covers.



8. Install the Smart Storage Battery holders.



9. Install the Smart Storage Battery, then connect the battery cable to the Smart Storage Battery connector on the **system board**.



10. **Install a front PCI fan.**
11. **Install the air baffle.**
12. **Install the access panel.**
13. **Install the bezel.**
14. Return the server to an upright position.
15. Connect the power cord to the power source and the server.
16. **Power up the server.**

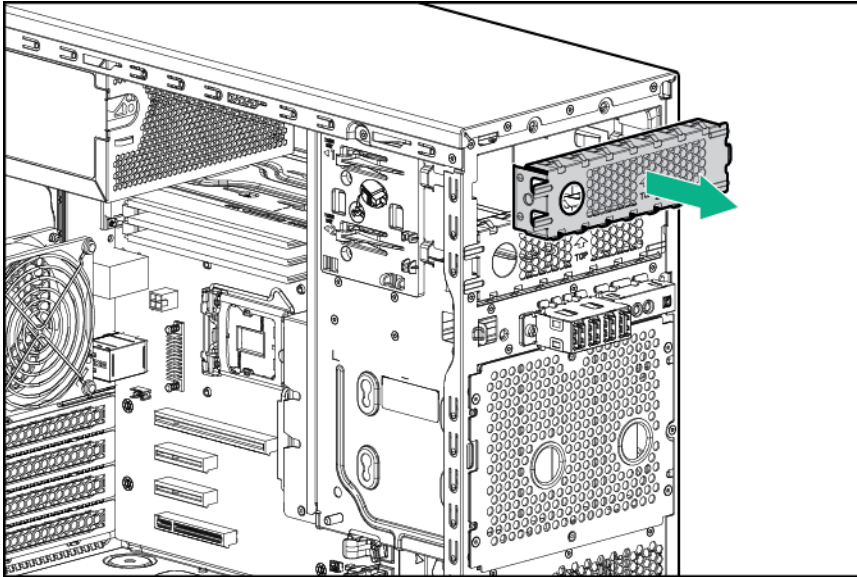
Installing a drive enablement option

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

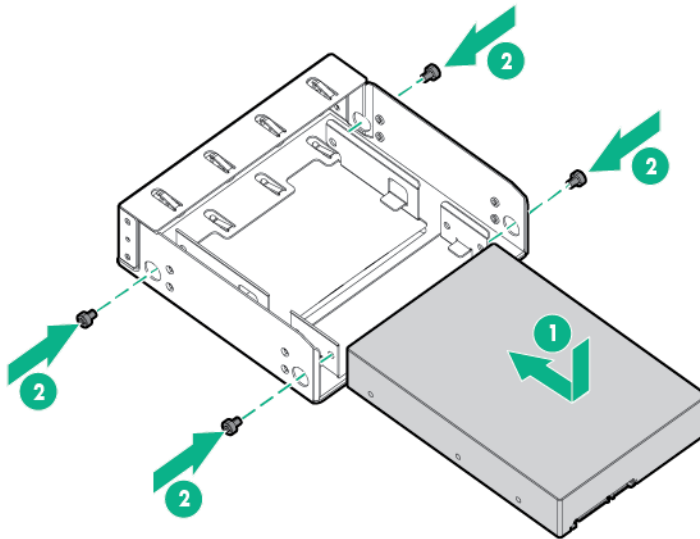
Each drive enablement option allows adding an additional SATA LFF drive to the server.

Procedure

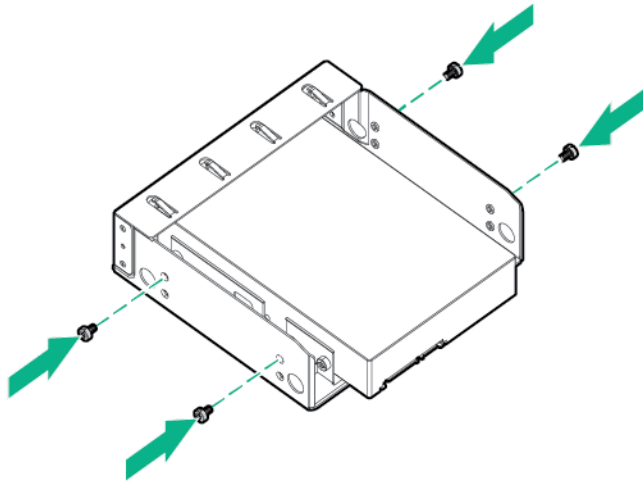
1. Back up all server data.
2. **Power down the server.**
3. Disconnect the power cord from the power source and the server.
4. **Remove the bezel.**
5. Place the server on its side with the access panel facing up.
6. **Remove the access panel.**
7. **Remove the air baffle.**
8. Remove the EMI shield.



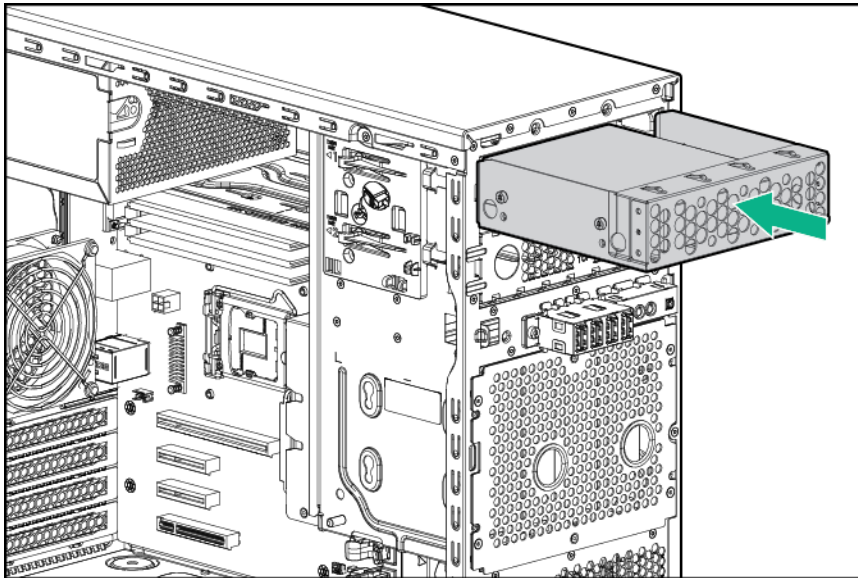
9. Install the drive into the drive carrier and secure it with four T-15 screws included with the option.



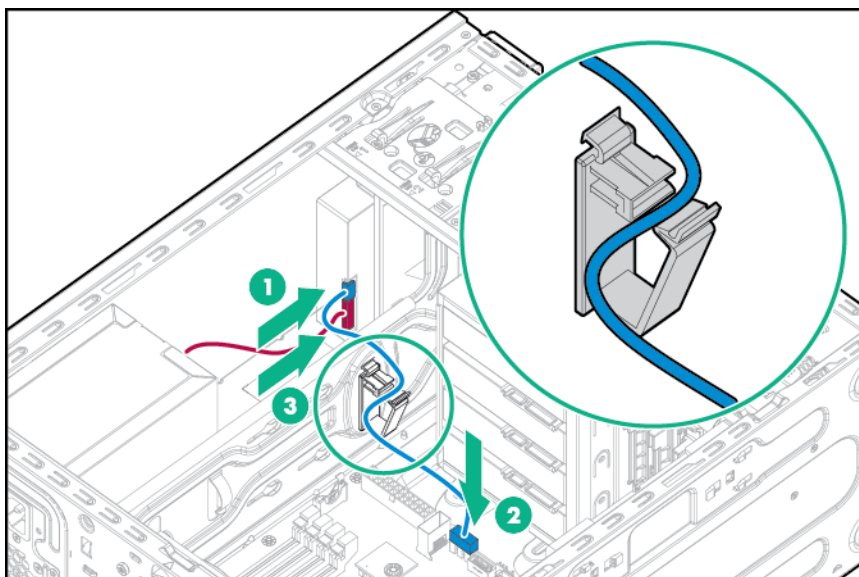
10. Secure M3 screws to the drive carrier. M3 screws can be found on the server front panel.



11. Insert the drive carrier into the media drive bay until the carrier locks into place.



12. Connect the drive cables.
a. Connect and secure the SATA cable.
b. Connect the power cable.



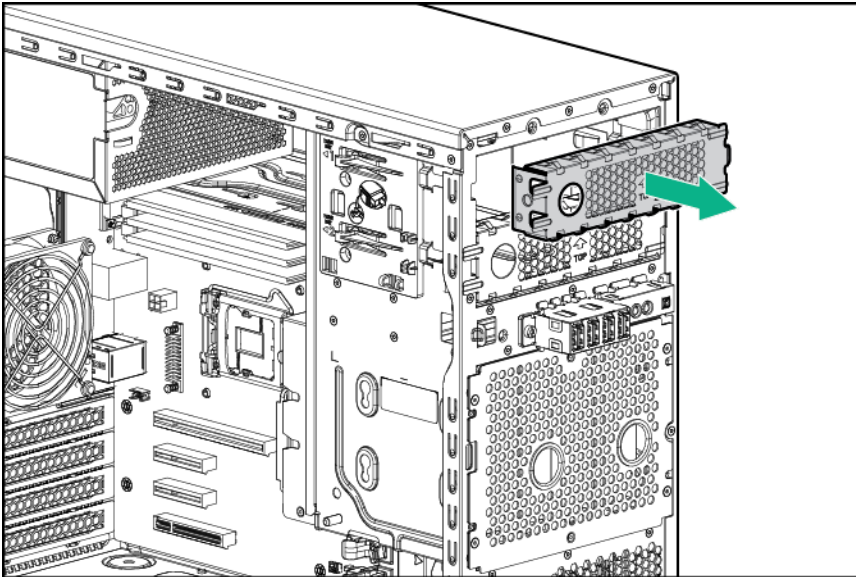
13. **Install a front PCI fan.**
14. **Install the air baffle.**
15. **Install the access panel.**
16. **Install the bezel.**
17. Return the server to an upright position.
18. Connect the power cord to the power source and the server.
19. **Power up the server.**

Installing a tape drive option

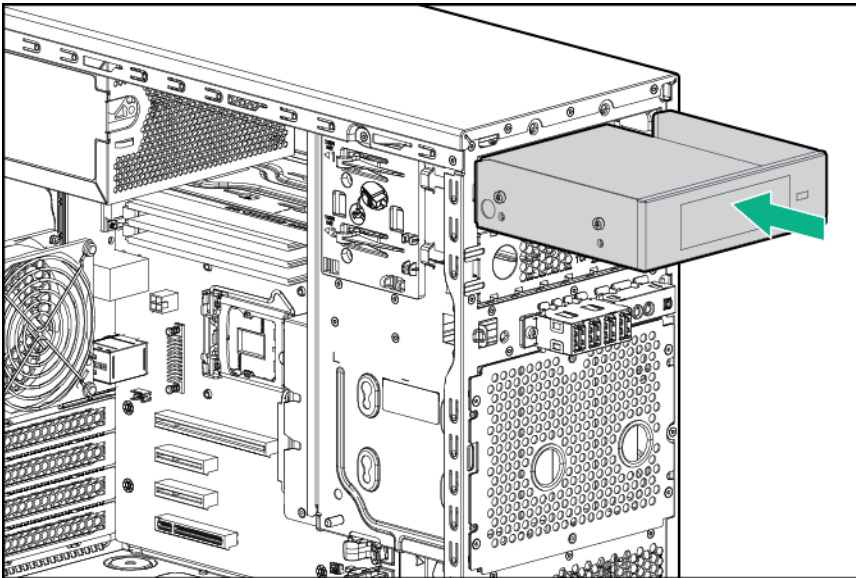
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

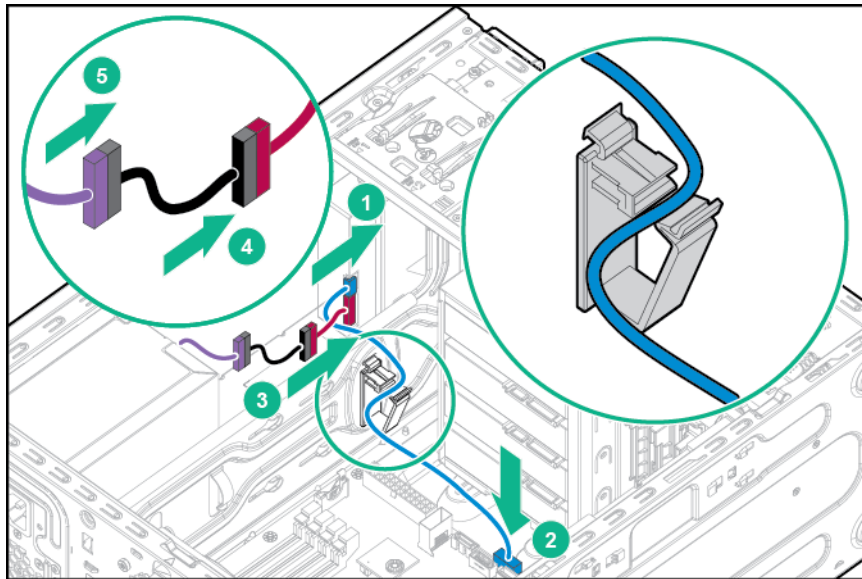
1. Back up all server data.
2. **Power down the server.**
3. Disconnect the power cord from the power source and the server.
4. **Remove the bezel.**
5. Place the server on its side with the access panel facing up.
6. **Remove the access panel.**
7. **Remove the air baffle.**
8. Remove the EMI shield.



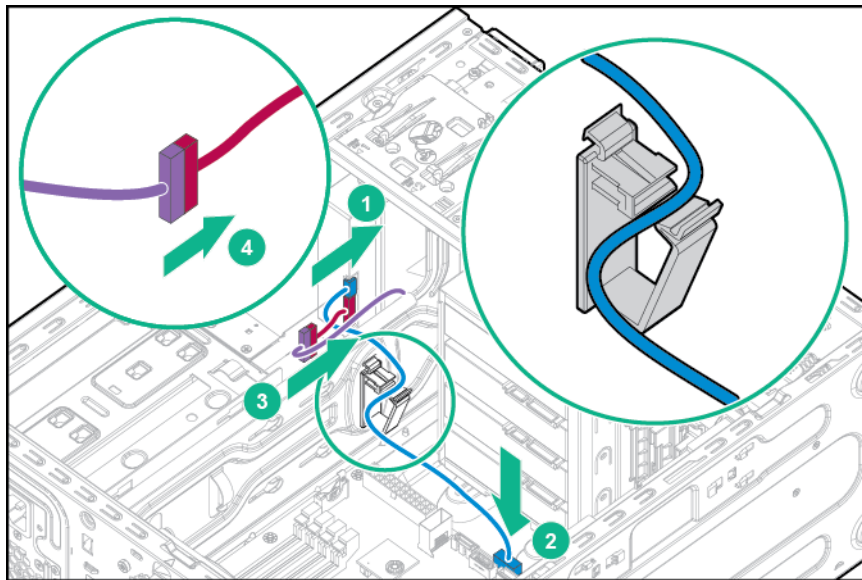
9. Insert the tape drive into the media drive bay.



10. Connect the drive cables.
 - a. Connect and secure the USB cable.
 - b. Connect the power cables.
 - 350W non redundant-power supply configuration



- Redundant power supply configuration



11. **Install a front PCI fan.**
12. **Install the air baffle.**
13. **Install the access panel.**
14. **Install the bezel.**
15. Return the server to an upright position.
16. Connect the power cord to the power source and the server.
17. **Power up the server.**

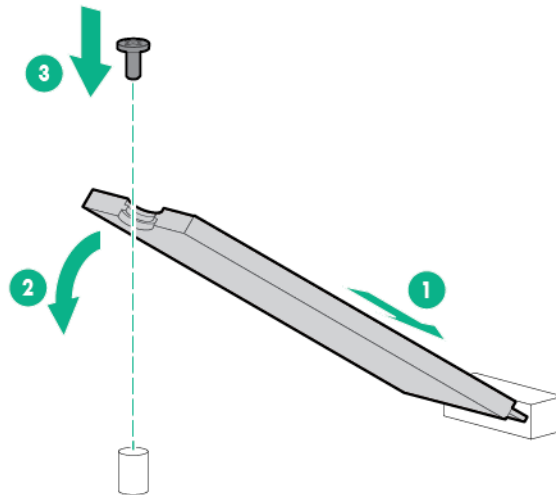
Installing an M.2 SSD enablement option

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

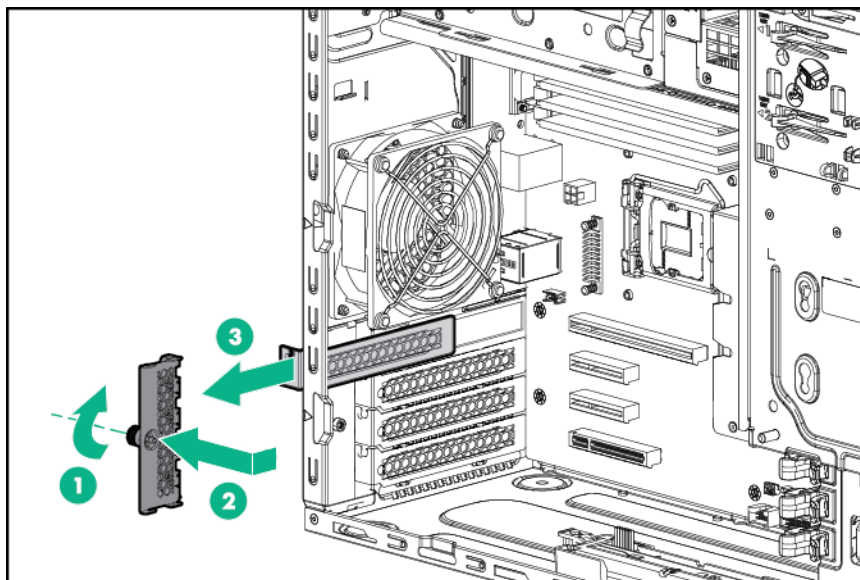
Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.

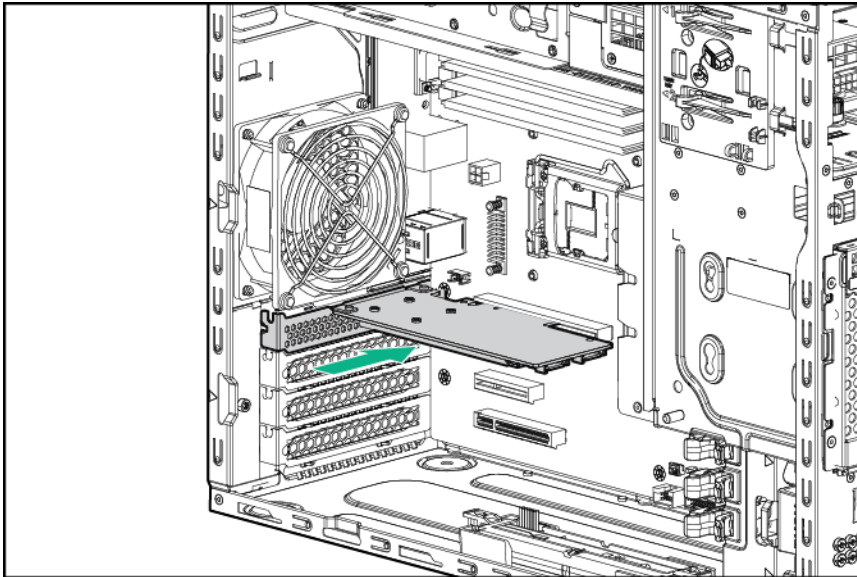
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Install the SSD module onto the M.2 SSD snablement board.
 - a. Insert the SSD module into the SSD slot at a 45 degree angle, then gently press the module down against the M.2 SSD enablement board.
 - b. Secure the SSD module to the M.2 SSD enablement board with a screw.
 - c. Repeat the process if you are installing a second SSD module.



8. Open the PCIe slot cover retainer and remove the slot cover.

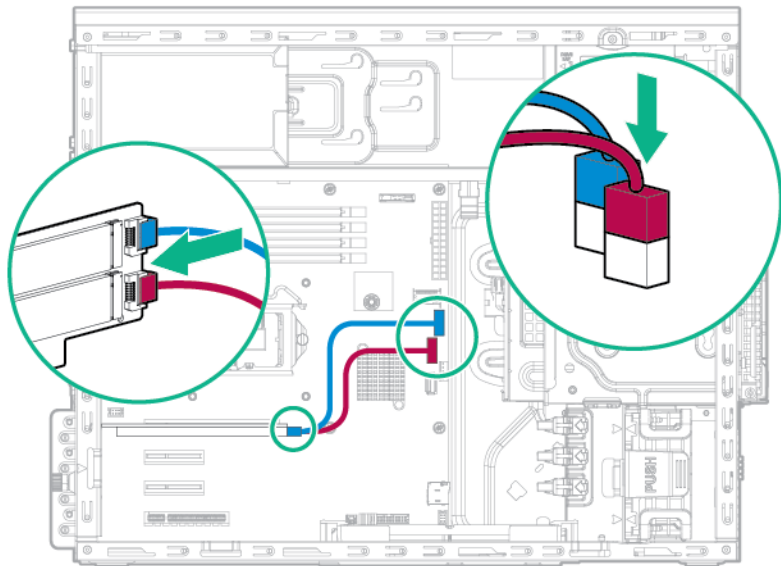


9. Install the M.2 SSD enablement board with SSD modules installed into PCIe slot 1 or 4.



10. Close the PCIe slot cover retainer.
11. Connect one end of the SATA cables to the enablement board and connect the other end to the SATA connectors on the system board.

Port 1 connects to SATA 5 and port 2 connects to SATA 6.



12. **Install the air baffle.**
13. **Install the access panel.**
14. **Install the bezel.**
15. Return the server to an upright position.
16. Connect the power cord to the power source and the server.
17. **Power up the server.**

Installing a four-bay LFF hot-plug drive cage option

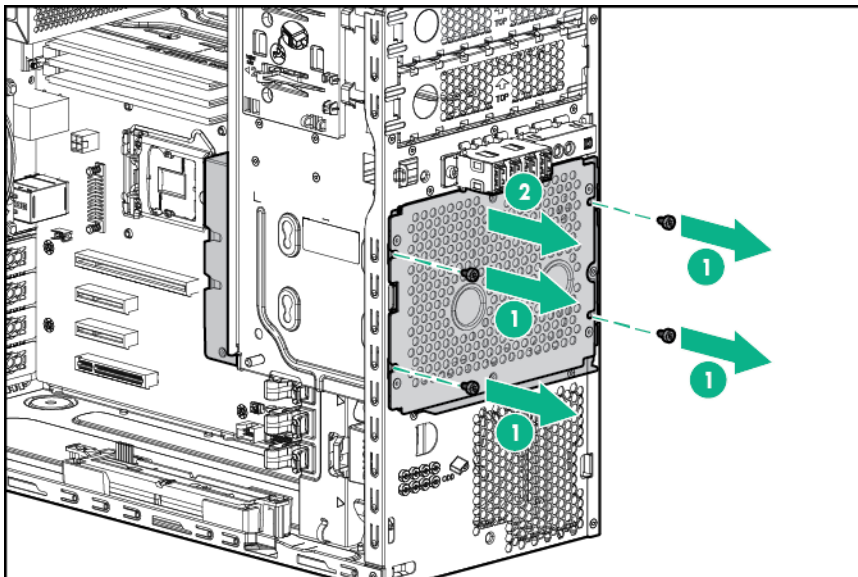
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

△ CAUTION:

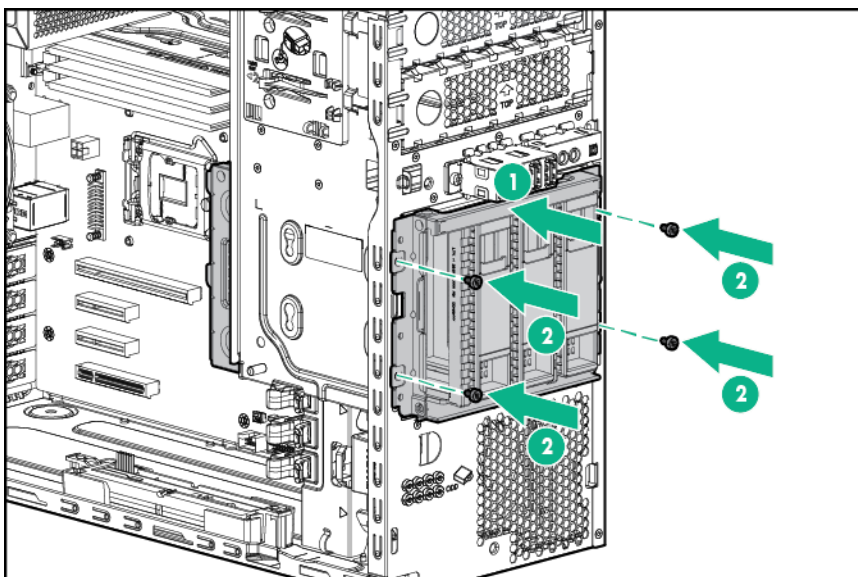
To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Disconnect all cables connected to any installed drives.
8. Remove the installed drive cage assembly.

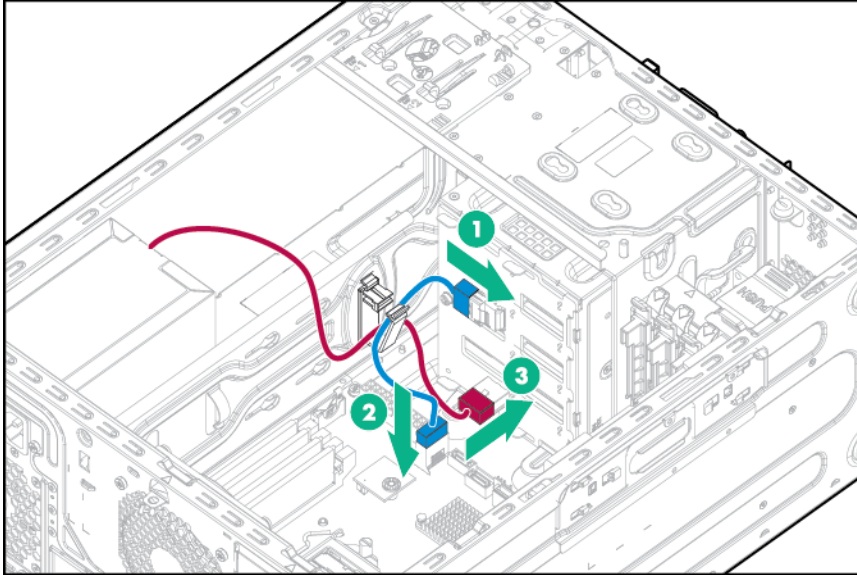


9. Install the drive cage assembly.



10. Connect the drive backplane cables.

- a. Connect one end of the Mini-SAS cable to the backplane and the other end to the system board.
- b. Connect the power cable to the backplane.



11. Install the hot-plug drives.

The hot-plug drive cage allows accessing storage drives from the server front bezel. The hot-plug drive cage only supports hot-plug drives. Non-hot-plug drives installed in a hot-plug drive cage will fail.

Populate drive bays, based on the drive numbering sequence. Start from the drive bay with the lowest device number. For more information, see "[Drive numbering](#)."

12. **Install the air baffle.**
13. **Install the access panel.**
14. **Install the bezel.**
15. Return the server to an upright position.
16. Connect the power cord to the power source and the server.
17. **Power up the server.**
18. **Determine the status of the drive LEDs.**

Installing a eight-bay SFF hot-plug drive cage option

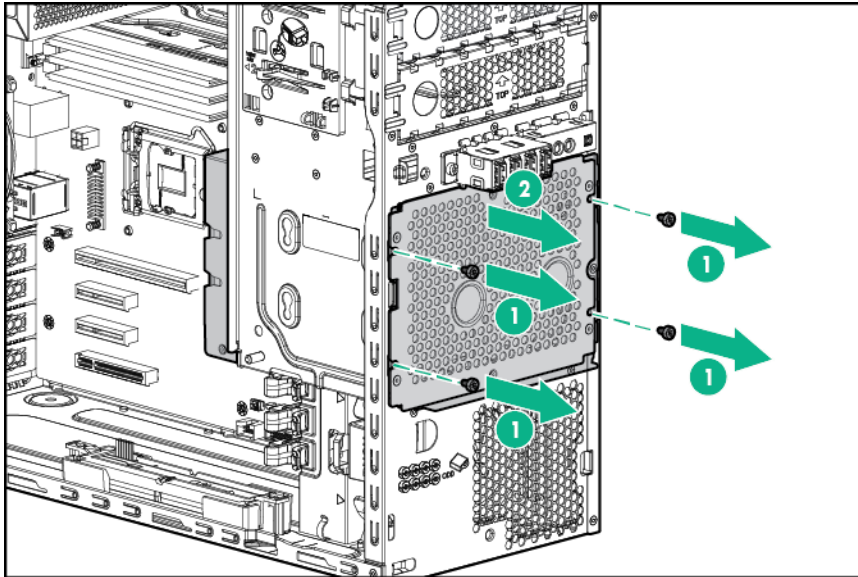
For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

⚠ CAUTION:

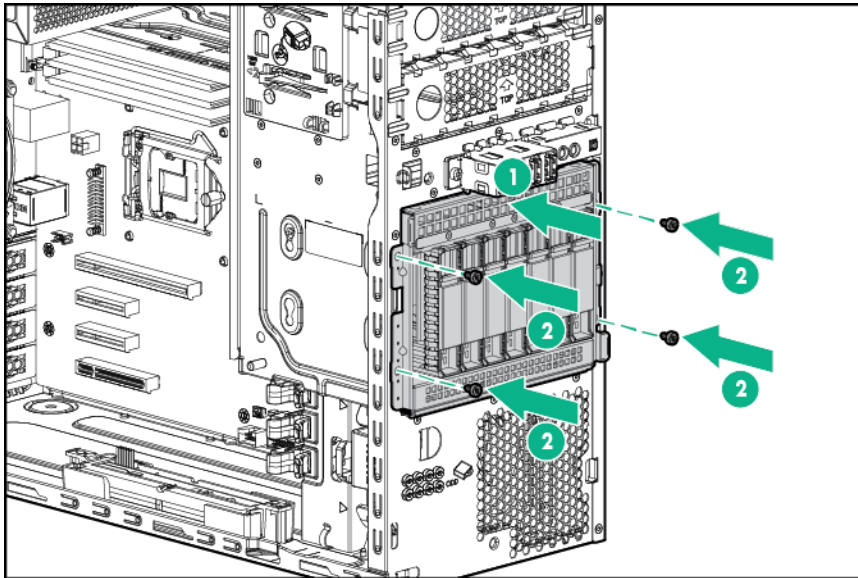
To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Disconnect all cables connected to any installed drives.
8. Remove the installed drive cage assembly.



9. Install the drive cage assembly.



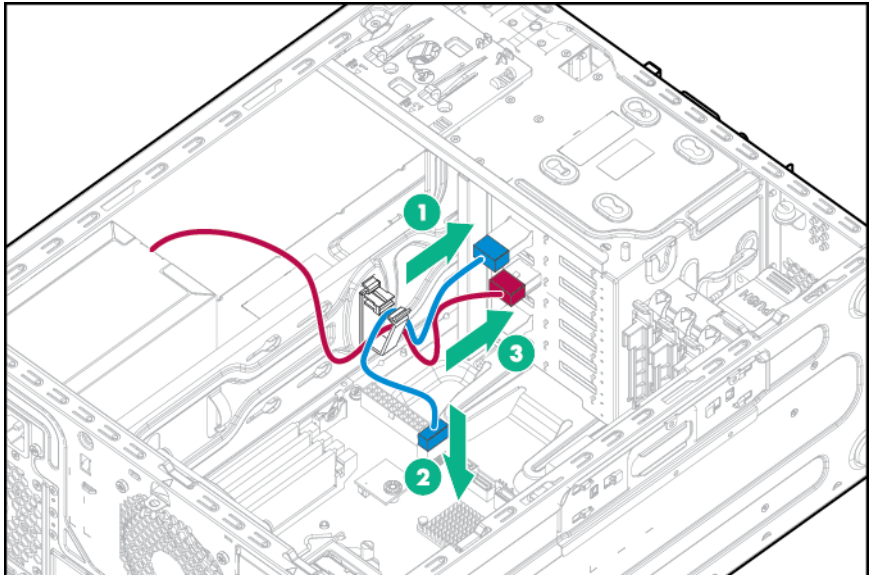
10. Connect the drive backplane cables.

a. Connect one end of the Mini-SAS cable to the backplane and the other end to the system board.

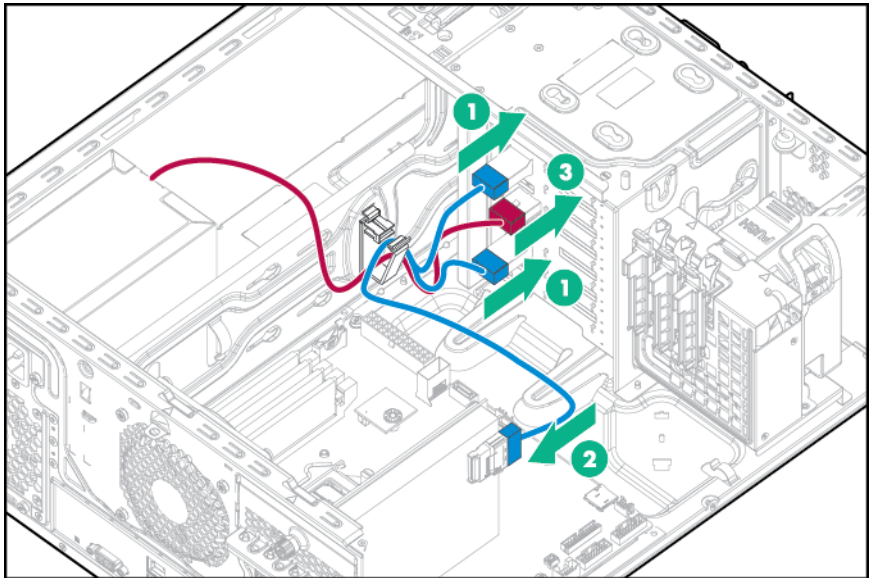
Port 1 of the hot-plug drive backplane supports drives 1 to 4. Port 2 of the hot-plug drive backplane supports drives 5-8.

b. Connect the power cable to the backplane.

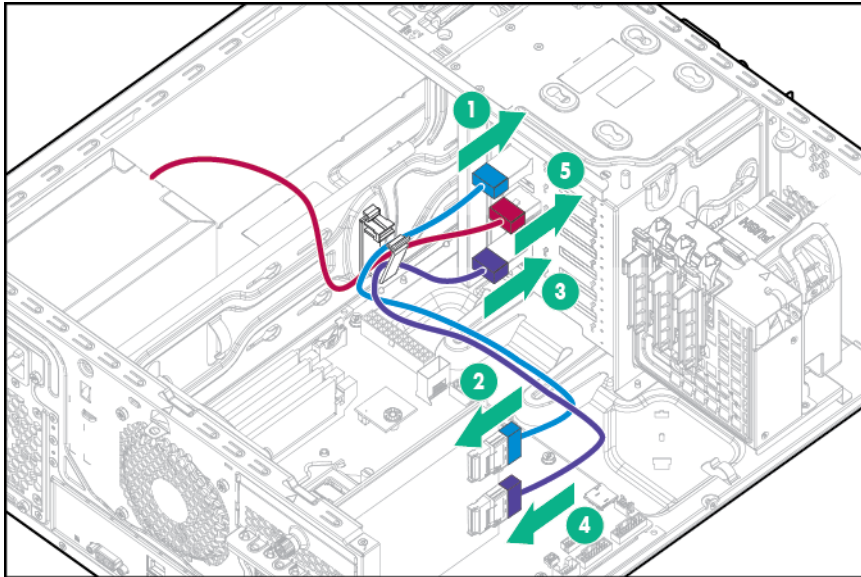
- Mini-SAS cable connected from backplane connector 1 to the system board (4 drives supported)



- Mini-SAS Y-cable connected from backplane connectors 1 and 2 to a Smart Array Controller



- Mini-SAS cables connected from backplane connectors 1 and 2 to a Host Bus Adapter



NOTE:

A storage controller option is required to support more than 4 drives.

11. Install the hot-plug drives.

The hot-plug drive cage allows accessing storage drives from the server front bezel. The hot-plug drive cage only supports hot-plug drives. Non-hot-plug drives installed in a hot-plug drive cage will fail.

Populate drive bays, based on the drive numbering sequence. Start from the drive bay with the lowest device number. For more information, see "[Drive numbering](#)."

12. **Install a front PCI fan option.**
13. **Install the air baffle.**
14. **Install the access panel.**
15. **Install the bezel.**
16. Return the server to an upright position.
17. Connect the power cord to the power source and the server.
18. **Power up the server.**
19. **Determine the status of the drive LEDs.**

Installing a microSD USB device option

This server supports the installation of the Dual 8Gb microSD Enterprise Midline USB device on the server internal USB connector.

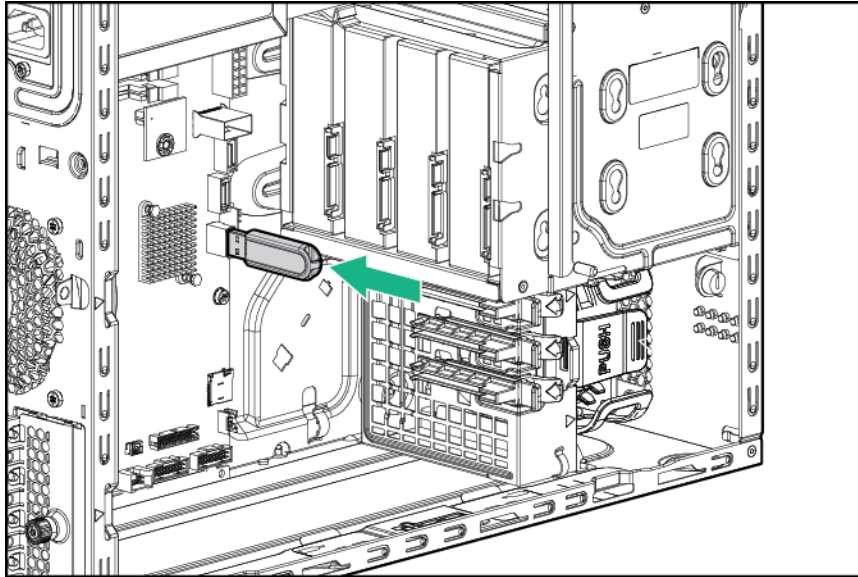
This USB storage device contains a dual-SD card module that supports up to two SD, SDHC, or SDXC storage cards providing data redundancy through a mirrored RAID-1 configuration. This USB storage device connects to an internal USB connector and is configured upon boot.

To locate the internal USB connector, see "[System board components](#)." For more information, see the Dual 8Gb microSD EM USB storage device documentation on the [Hewlett Packard Enterprise website](#).

Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**

6. **Remove the air baffle.**
7. Install the device adapter on the system board.



8. **Install the air baffle.**
9. **Install the access panel.**
10. **Install the bezel.**
11. Return the server to an upright position.
12. Connect the power cord to the power source and the server.
13. **Power up the server.**

Memory options

Memory and processor information

The memory subsystem in this server supports UDIMMs only.

The following processors are optimized for single-rank and dual-rank PC4-2133 (DDR4-2133) UDIMMs operating at up to 2133 MT/s:

- Intel Xeon E3-1200 v5 processors
- 3.30-GHz Intel Pentium G4400 processor and 3.50-GHz Intel Pentium G4500 processor
- 3.7-GHz Intel Core i3-6100 processor and 3.80-GHz Intel Core i3-6300 processor

The following processors are optimized for single-rank and dual-rank PC4-2400T (DDR4-2400) UDIMMs operating at up to 2400 MT/s:

- Intel Xeon E3-1200 v6 processors
- 3.50-GHz Intel Pentium G4560 processor and 3.60-GHz Intel Pentium G4600 processor
- 3.90-GHz Intel Core i3-7100 processor and 4.00-GHz Intel Core i3-7300 processor

For the latest memory configuration information, see the product QuickSpecs on the [**Hewlett Packard Enterprise website**](#).

DIMM specifications

Intel Xeon E3-1200 v5 processor, 3.30-GHz Intel Pentium G4400 processor, 3.50-GHz Intel Pentium G4500 processor, 3.70-GHz Intel Core i3-6100 processor, 3.80-GHz Intel Core i3-6300 processor:

Type	Rank	Capacity	Native speed	Voltage
UDIMM	Single	4 GB	2133 MT/s	STD
UDIMM	Single	8 GB	2133 MT/s	STD
UDIMM	Dual	8 GB	2133 MT/s	STD
UDIMM	Dual	16 GB	2133 MT/s	STD

Intel Xeon E3-1200 v6 processor, 3.50-GHz Intel Pentium G4560 processor, 3.60-GHz Intel Pentium G4600 processor, 3.90-GHz Intel Core i3-7100 processor, or 4.00-GHz Intel Core i3-7300 processor:

Type	Rank	Capacity	Native speed	Voltage
UDIMM	Single	8 GB	2400 MT/s	STD
UDIMM	Dual	16 GB	2400 MT/s	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**.

Intel Xeon E3-1200 v5 processor, 3.30-GHz Intel Pentium G4400 processor, 3.50-GHz Intel Pentium G4500 processor, 3.70-GHz Intel Core i3-6100 processor, 3.80-GHz Intel Core i3-6300 processor:

Type	Rank	1 DIMM per channel	2 DIMM per channel
UDIMM	Single	2133 MT/s	2133 MT/s
UDIMM	Dual	2133 MT/s	2133 MT/s

Intel Xeon E3-1200 v6 processor, 3.50-GHz Intel Pentium G4560 processor, 3.60-GHz Intel Pentium G4600 processor, 3.90-GHz Intel Core i3-7100 processor, or 4.00-GHz Intel Core i3-7300 processor:

Type	Rank	1 DIMM per channel	2 DIMM per channel
UDIMM	Single	2400 MT/s	2400 MT/s
UDIMM	Dual	2400 MT/s	2400 MT/s

Maximum memory capacity

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

Intel Xeon E3-1200 v5 processor, 3.30-GHz Intel Pentium G4400 processor, 3.50-GHz Intel Pentium G4500 processor, 3.70-GHz Intel Core i3-6100 processor, 3.80-GHz Intel Core i3-6300 processor:

DIMM type	DIMM rank	Maximm capacity
UDIMM	Single-rank (4 GB)	16
UDIMM	Single-rank (8 GB)	32
UDIMM	Dual-rank (8 GB)	32
UDIMM	Dual-rank (16 GB)	64

Intel Xeon E3-1200 v6 processor, 3.50-GHz Intel Pentium G4560 processor, 3.60-GHz Intel Pentium G4600 processor, 3.90-GHz Intel Core i3-7100 processor, or 4.00-GHz Intel Core i3-7300 processor:

DIMM type	DIMM rank	Maximm capacity
UDIMM	Single-rank (8 GB)	32
UDIMM	Dual-rank (16 GB)	64

Memory subsystem architecture

Channel	Population order	Slot number
1	C	1
	A	2
2	D	3
	B	4

DIMM slots are identified by number and by letter. Letters identify the population order. Slot numbers are reported by ROM messages during boot and are used for error reporting.

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

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.

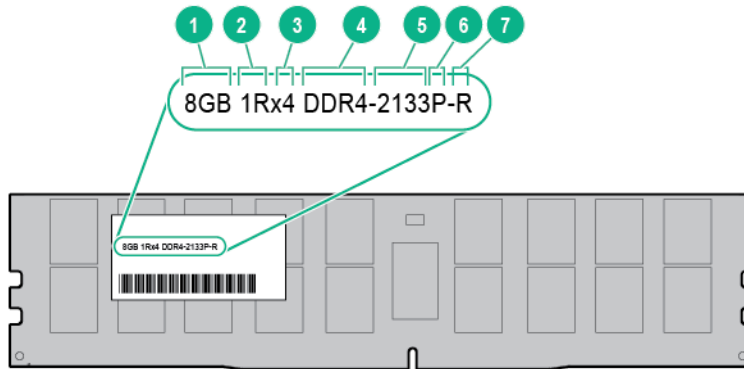
A single-rank DIMM has one set of memory chips that is accessed while writing to or reading from the memory. A dual-rank DIMM is similar to having two single-rank DIMMs on the same module, with only one rank accessible at a time. A quad-rank DIMM is, effectively, two dual-rank DIMMs on the same module. Only one rank is accessible at a time. The server 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, see the label attached to the DIMM and the following illustration and table.



Item	Description	Definition
1	Capacity	8 GB 16 GB 32 GB 64 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 2400 MT/s
6	CAS latency	P=15 T=17
7	DIMM type	R = RDIMM (registered) L = LRDIMM (load reduced)

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

ECC memory

The server supports the standard ECC memory correction mode. Standard ECC can correct single-bit memory errors and detect multi-bit memory errors. When multi-bit errors are detected, the error is signaled to the server and causes the server to halt.

General DIMM slot population guidelines

- The server has four DIMM slots.
- The server supports two channels with two DIMM slots per channel.
 - Memory channel 1 consists of the two DIMMs that are closest to the processor.
 - Memory channel 2 consists of the two DIMMs that are farthest from the processor.

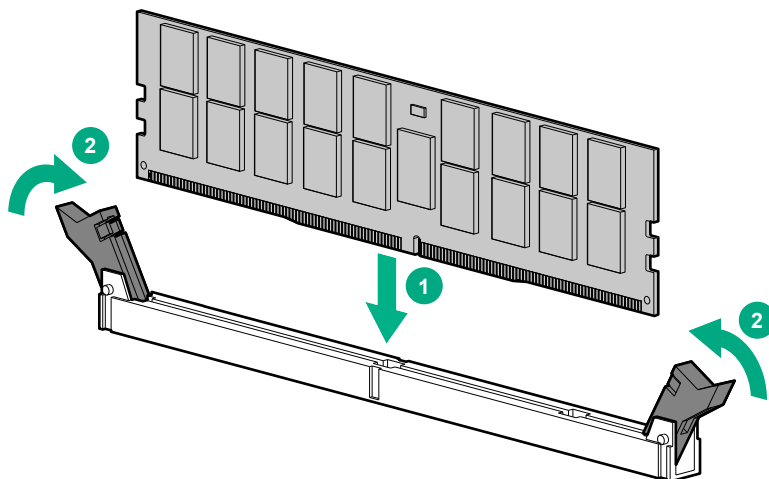
- A white DIMM slot indicates the first slot of a channel (2-A, 4-B).
- Memory speed support depends on the type of processor installed. For more information, see the technical specification of the installed processor.
- The server supports up to 2400 MT/s ECC UDIMMs.
- The server supports up to 64 GB (4x16 GB) UDIMMs.
- The server does not support:
 - RDIMMs
 - Non-ECC UDIMMs
- When installing DIMMs:
 - Populate the DIMM slots in this sequence: 2-A, 4-B, 1-C, 3-D.
 - Use HPE-qualified UDIMMs.

Installing a DIMM

For more information about product features, specifications, options, configurations, and compatibility, see the product QuickSpecs on the [Hewlett Packard Enterprise website](#).

Procedure

1. Back up all server data.
2. **Power down the server.**
3. Disconnect the power cord from the power source and the server.
4. **Remove the bezel.**
5. Place the server on its side with the access panel facing up.
6. **Remove the access panel.**
7. **Remove the air baffle.**
8. Open the DIMM slot latches.
9. Install the DIMM.



10. **Install the air baffle.**
11. **Install the access panel.**
12. **Install the bezel.**
13. Return the server to an upright position.
14. Connect the power cord to the power source and the server.
15. **Power up the server.**

Use the BIOS/Platform Configuration (RBSU) in the UEFI System Utilities to configure the memory mode.

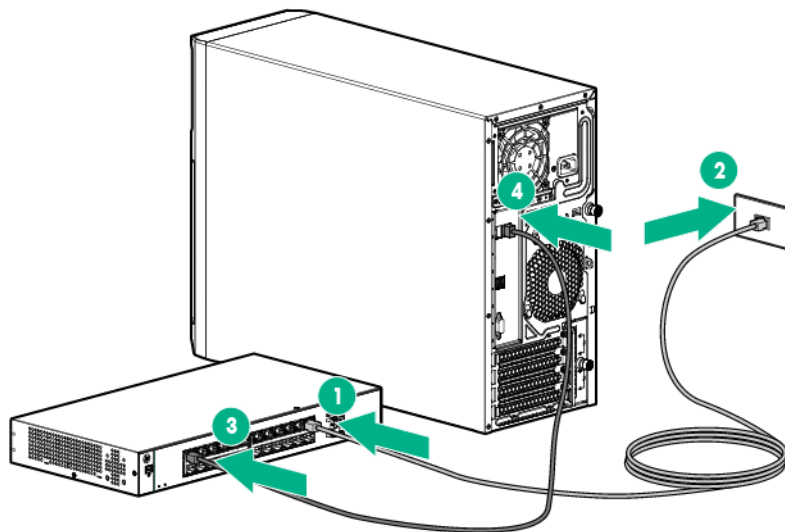
Setting up the HPE PS1810-24G Switch (optional)

If you intend to use the server with the companion PS 1810-24G Switch, follow the procedures in this section.

For more information on switch-related settings and operational procedures, see the documentation for your switch model on the [Hewlett Packard Enterprise website](#).

Procedure

1. Mount the switch in a rack, on a wall, or on top of or under a horizontal surface. For detailed instructions, see the PS1810-24G Switch Quick Setup Guide.
2. Connect an Ethernet cable to the switch, then connect the cable to a network jack.
3. Connect an Ethernet cable to the server NIC connector 1 or 2.
4. Connect the table to any switch network port.



5. Complete the switch Self-Test.
 - a. Connect the power adapter to the switch.
 - b. Connect the power adapter to the AC power source.
 - c. Check the status of the Power LED. This LE is solid green to indicate that the power connection is established.
6. Check the status of the following switch LEDs:
 - a. Link/ACT LED on the switch network port that is being used - Initially, solid green to indicate successful connection, and then flashing green to indicate active communication with the network.
 - b. Fault LED - Remains off to indicate successful Self-Test completion.

For more information on the location of the switch LEDs and their behavior during the Self-Test process, see the switch documentation.
7. Complete the switch setup.
 - a. Ensure the NIC status LED on the server front panel is solid green.
 - b. Ensure the Link/Act LED on the switch's network connector is solid green to indicate successful connection and flashing green to indicate active communication with the network.

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 in the following chapter:

- Installing the Trusted Platform Module board.
- Retaining the recovery key/password.
- Enabling the Trusted Platform Module.

Enabling the TPM requires accessing the BIOS/Platform Configuration 9RBSU0 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.

When installing or replacing TPM, observe the following guidelines:

- Do not remove an installed TPM. Once installed, the TPM becomes a permanent part of the system board.
- When installing or replacing hardware, Hewlett Packard Enterprise service providers cannot enable the TPM or the encryption technology. For security reasons, only the customer can enable these features.
- When returning a system board for service replacement, do not remove the TPM from the system board. When requested, Hewlett Packard Enterprise Service provides a TPM with the spare system board.
- Any attempt to remove 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.
- 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.
- Hewlett Packard Enterprise is not liable for blocked data access caused by improper TPM use. For operating instructions, see the encryption technology feature documentation provided by the operating system.

Installing a 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.

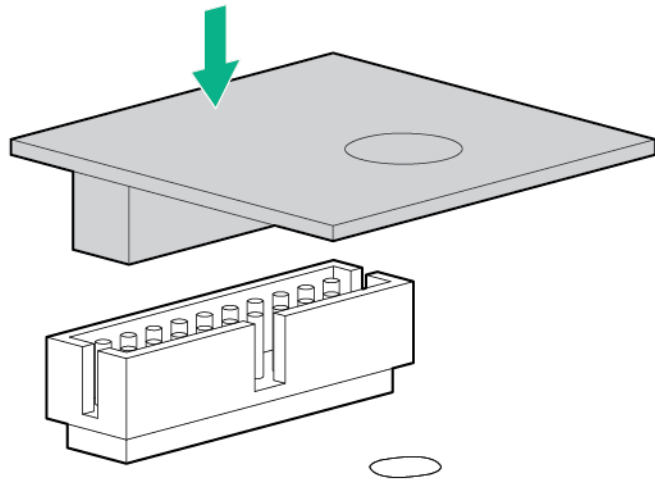
⚠ CAUTION:

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.

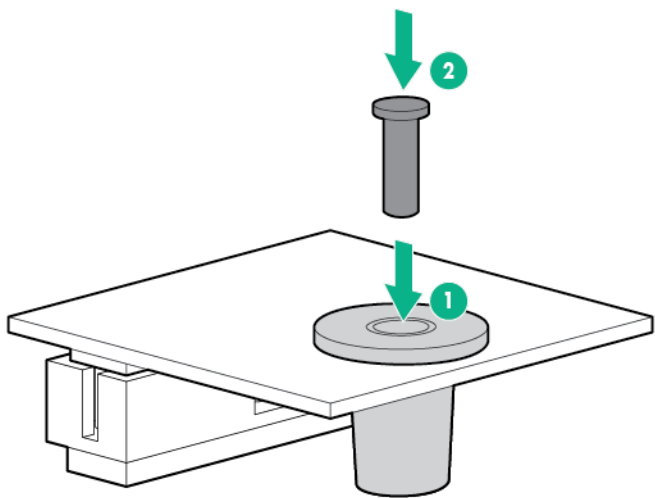
Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Install the TPM board by pressing the board into the connector.

For the location of the TPM connector, see "[System board components](#)."



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



9. **Install the air baffle.**
10. **Install the access panel.**
11. **Install the bezel.**
12. Return the server to an upright position.
13. Connect the power cord to the power source and the server.
14. **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

Procedure

1. During the server startup sequence, press the **F9** key to access System Utilities.
2. From the System Utilities screen, select **System Configuration > BIOS/Platform Configuration (RBSU) > Server Security**.
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 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

Cabling overview

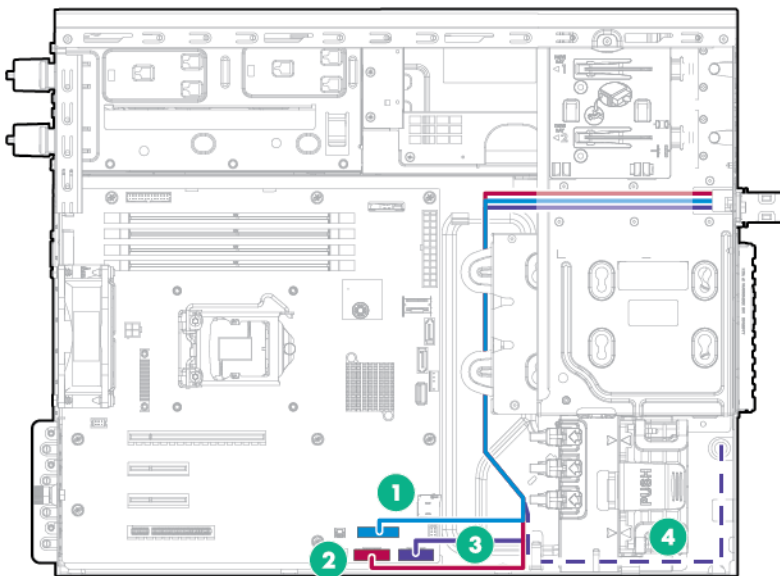
This section provides guidelines to help make informed decisions about cabling the server and hardware options to optimize performance.

For information on cabling peripheral components, see the white paper on high-density deployment at the [Hewlett Packard Enterprise website](#).

⚠ CAUTION:

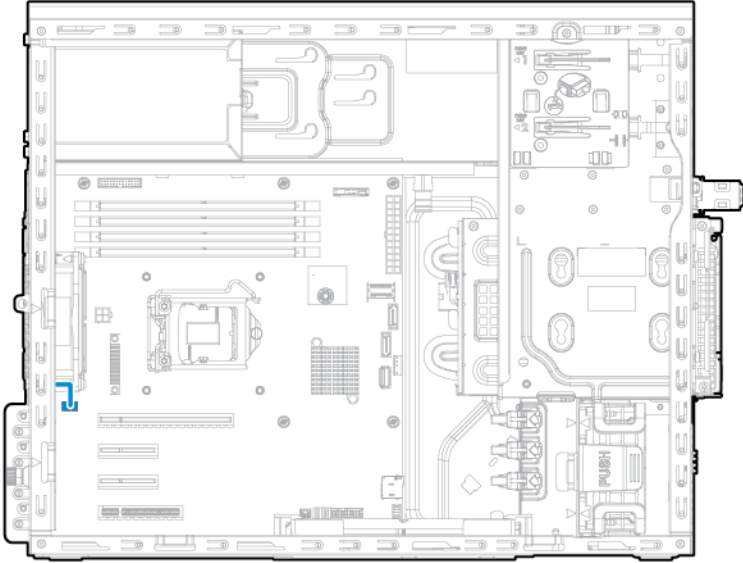
When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.

Front I/O module cabling

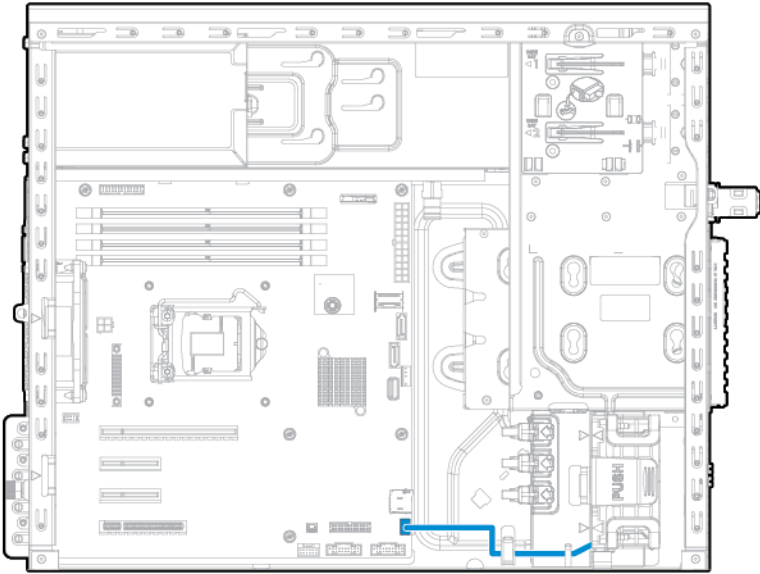


Item	Description
1	Front I/O cable
2	Front USB cable
3	Front USB cable
4	Ambient temperature sensor cable (shared connector with front I/O cable)

System fan cabling

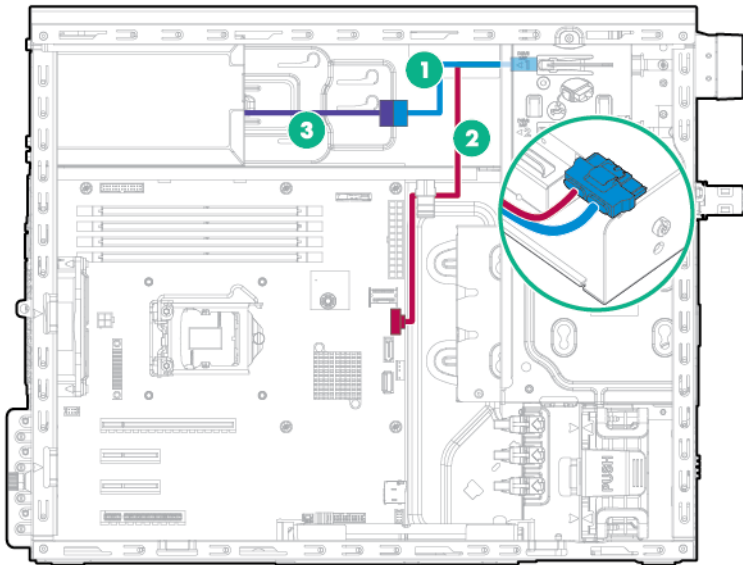


Front PCI fan option cabling



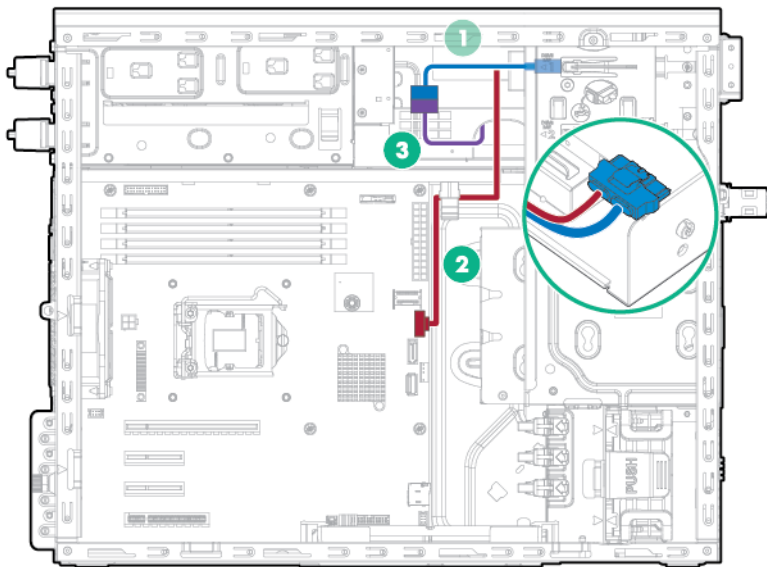
Slim optical disk drive option cabling

- Slim optical disk drive to 350W non-redundant power supply



Item	Description
1	Optical disk drive power cable
2	SATA cable
3	4-pin power cable to 4-pin power supply extension cable

- Slim optical disk drive to redundant power supply

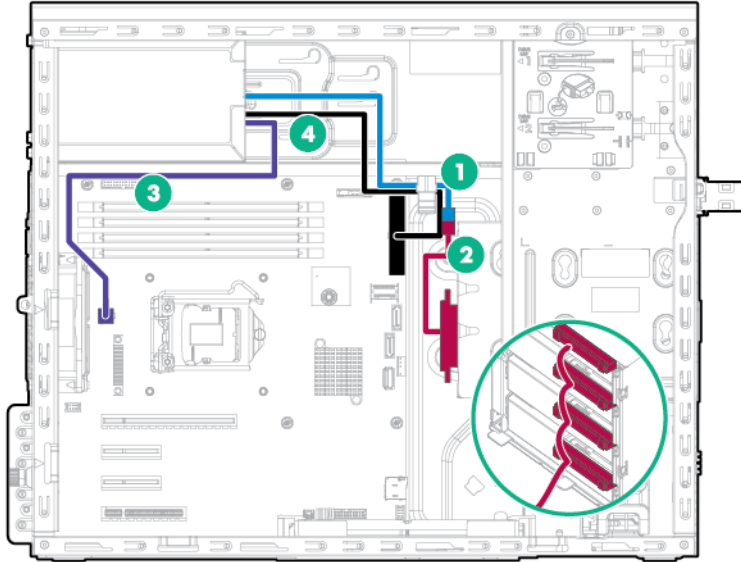


Item	Description
1	Optical disk drive power cable
2	SATA cable
3	4-pin power cable to 4-pin power supply extension cable

Power supply cabling

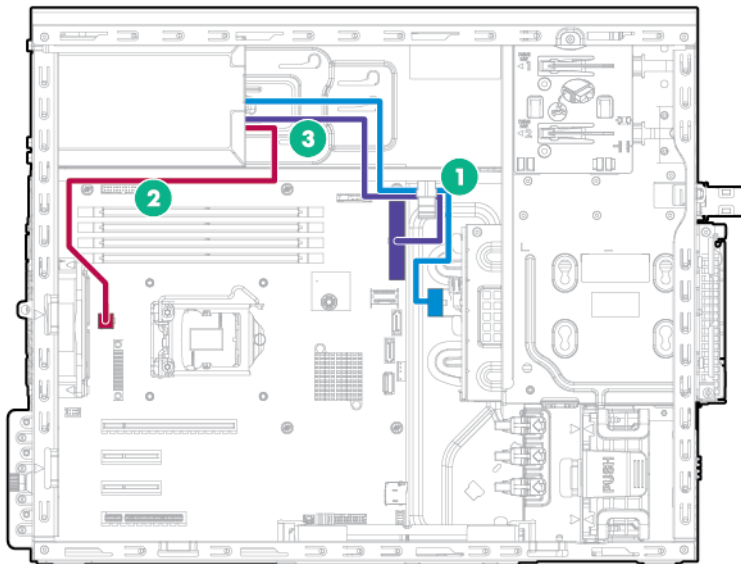
HPE 350W (E-star 1.0/2.0) non-hot-plug power supply cabling

- Four-bay LFF non-hot-plug drive configuration



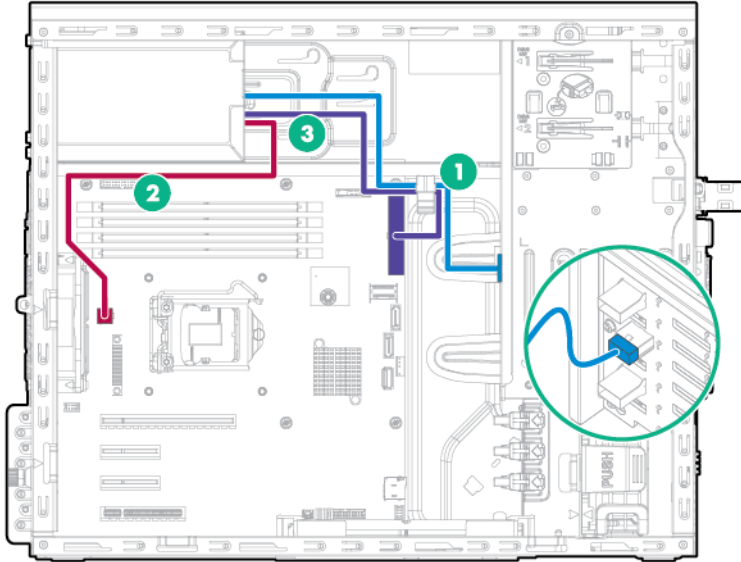
Item	Description
1	8-pin drive power cable
2	Non-hot-plug drive power cable
3	4-pin power cable
4	24-pin power cable

- Four-bay LFF hot-plug drive configuration



Item	Description
1	8-pin drive power cable
2	4-pin power cable
3	24-pin power cable

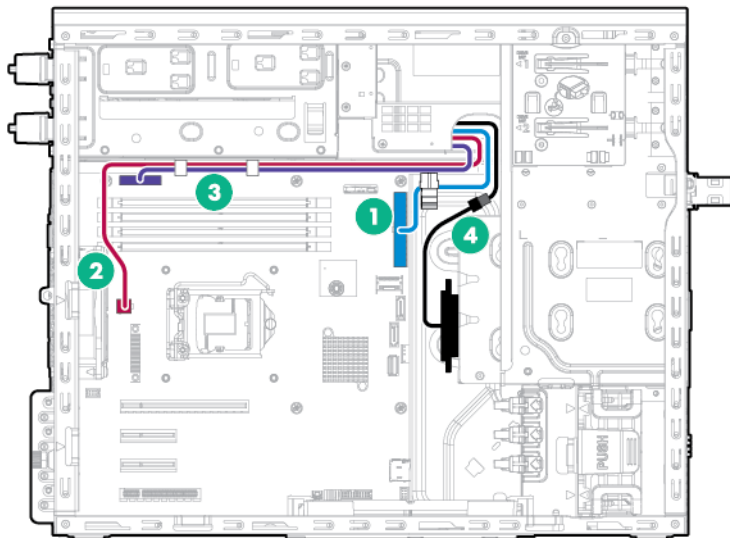
- Eight-bay SFF hot-plug drive configuration



Item	Description
1	8-pin drive power cable
2	4-pin power cable
3	24-pin power cable

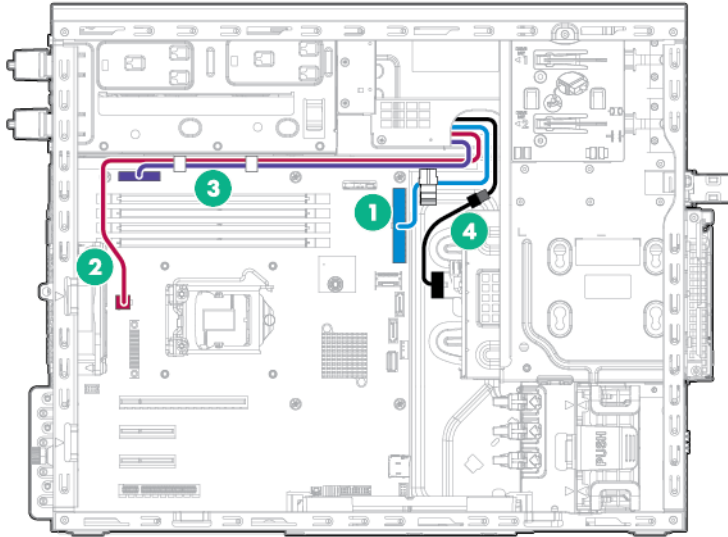
Redundant power supply cabling

- Four-bay LFF non-hot-plug drive configuration



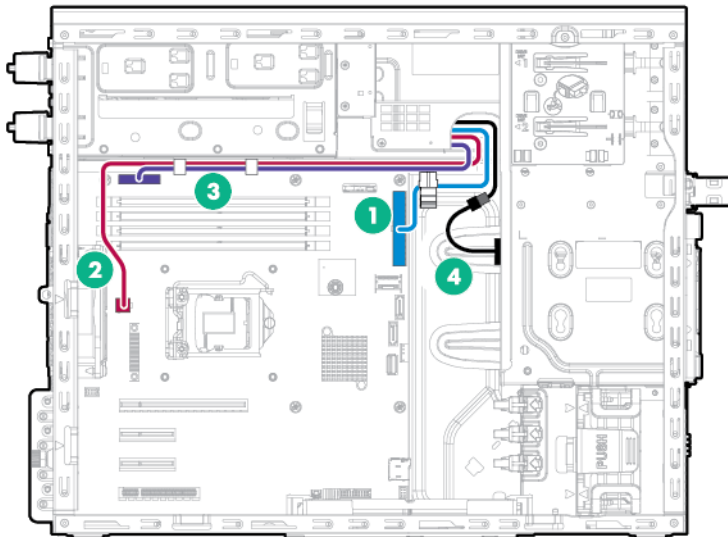
Item	Description
1	24-pin power supply cable
2	4-pin power supply cable
3	RPS sideband signal cable
4	10-pin to 8-pin power supply cable

- Four-bay LFF hot-plug drive configuration



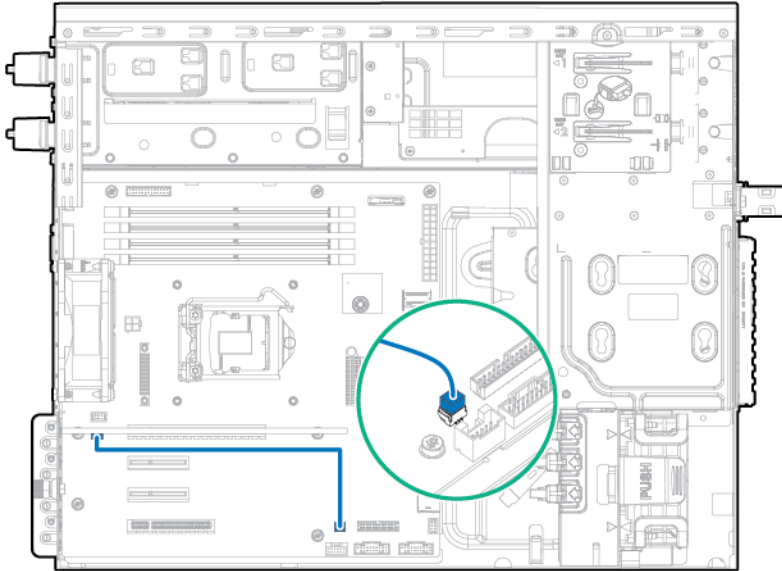
Item	Description
1	24-pin power supply cable
2	4-pin power supply cable
3	RPS sideband signal cable
4	10-pin to 8-pin power supply cable

- Eight-bay SFF hot-plug drive configuration

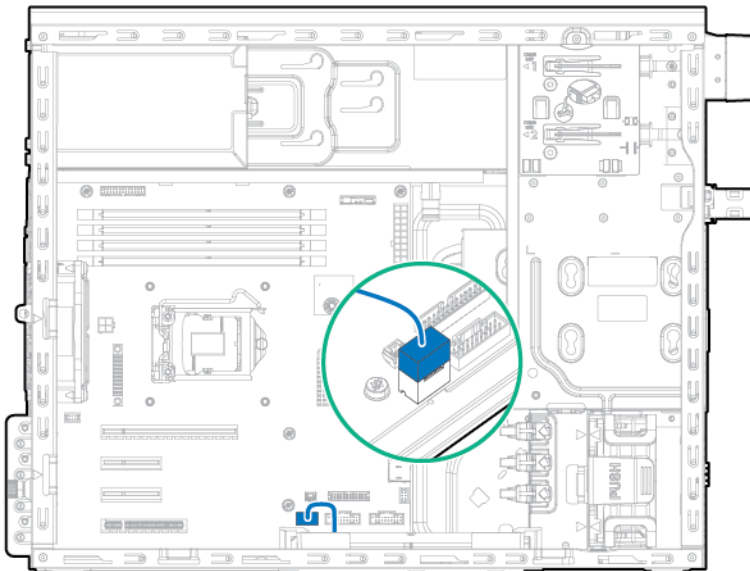


Item	Description
1	24-pin power supply cable
2	4-pin power supply cable
3	RPS sideband signal cable
4	10-pin to 8-pin power supply cable

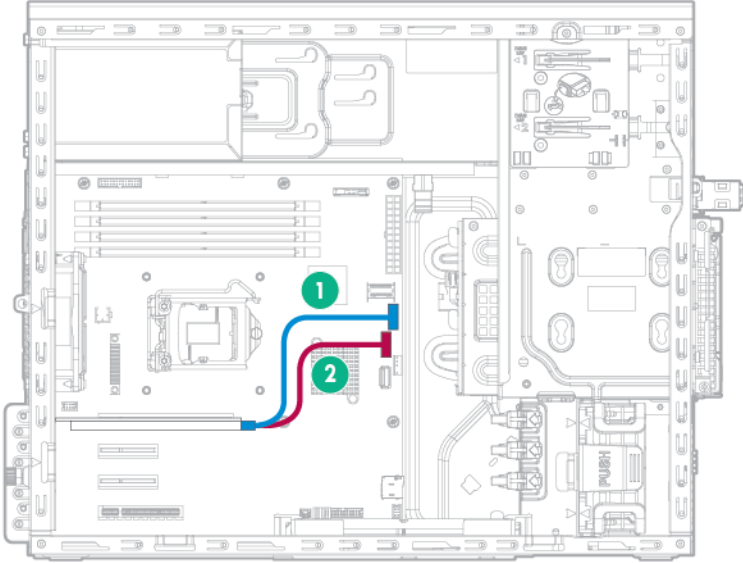
FBWC option cabling



Smart Storage Battery option cabling



M.2 SSD option cabling

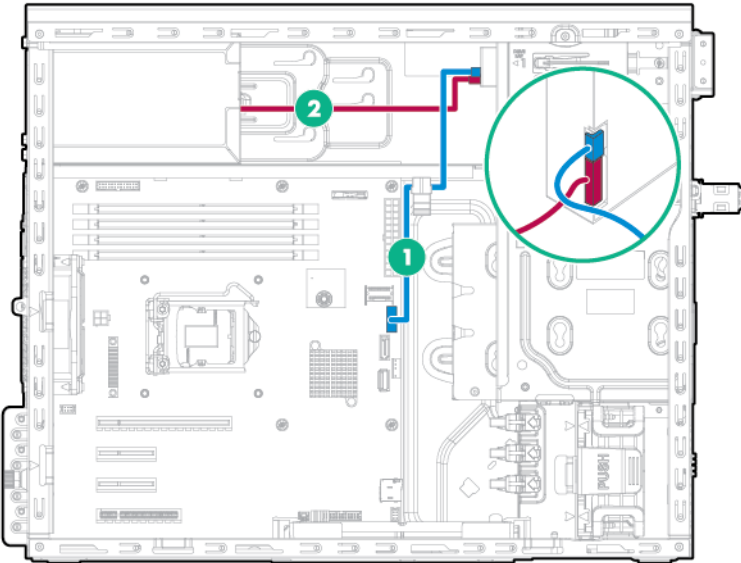


Item	Description
1	M.2 SSD 1 SATA cable
2	M.2 SSD 2 SATA cable

Storage cabling

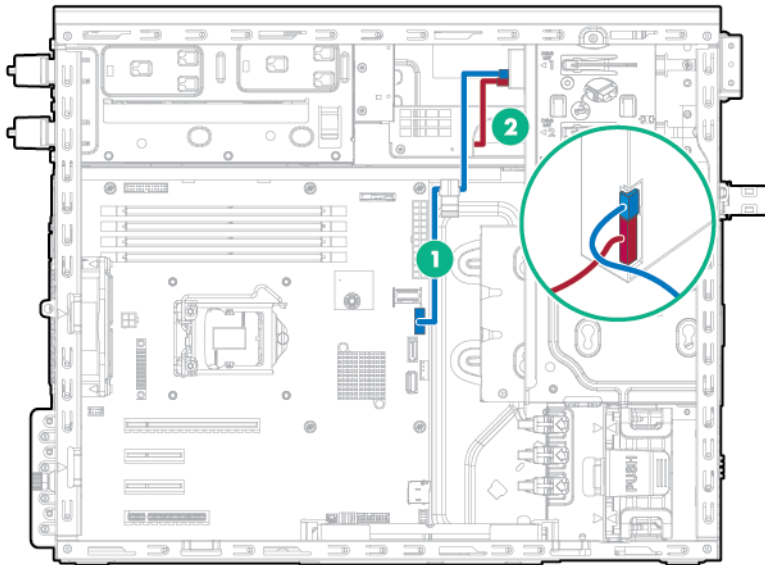
Drive enablement option cabling

- Drive enablement option to 350W non-hot-plug power supply



Item	Description
1	SATA cable
2	Drive power cable

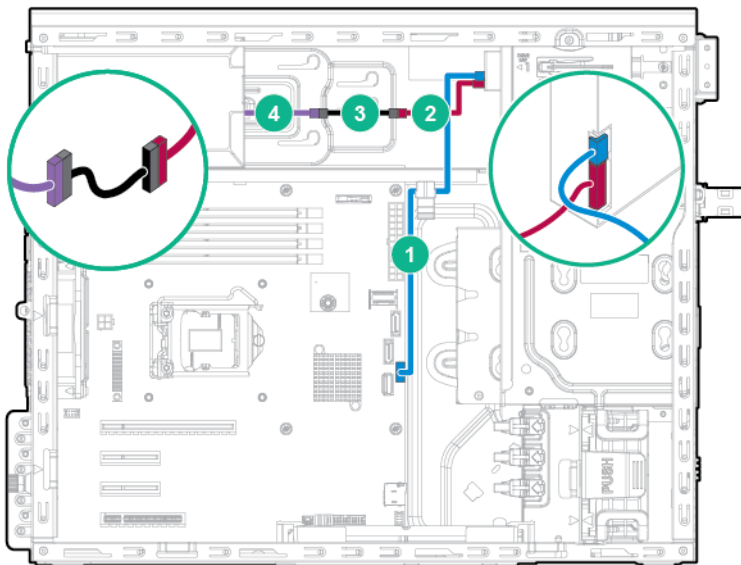
- Drive enablement option to redundant power supply



Item	Description
1	SATA cable
2	Drive power cable

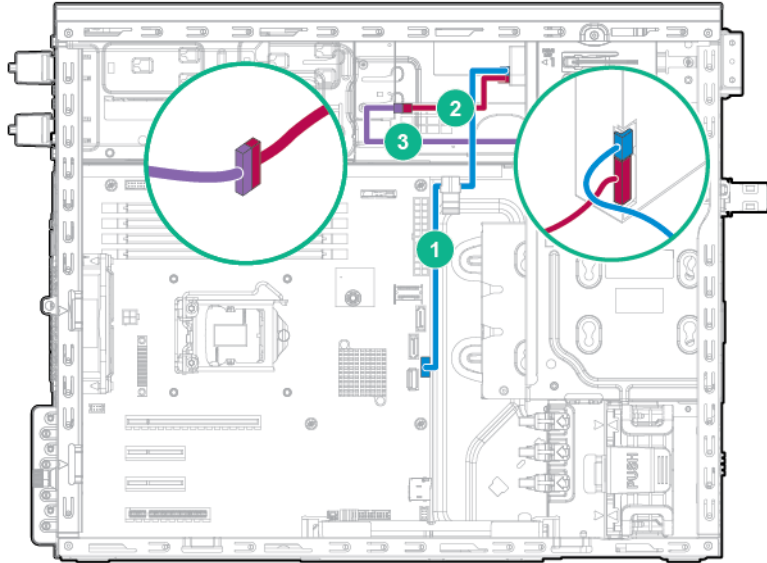
Tape drive option cabling

- Tape drive option to 350W non-redundant power supply



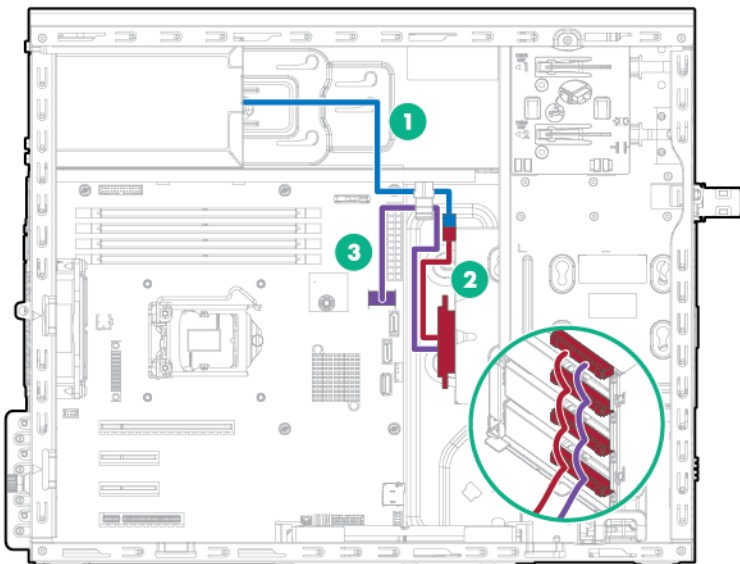
Item	Description
1	USB cable
2	Drive power cable
3	Power extension cable
4	Power supply cable

- Tape drive option to redundant power supply



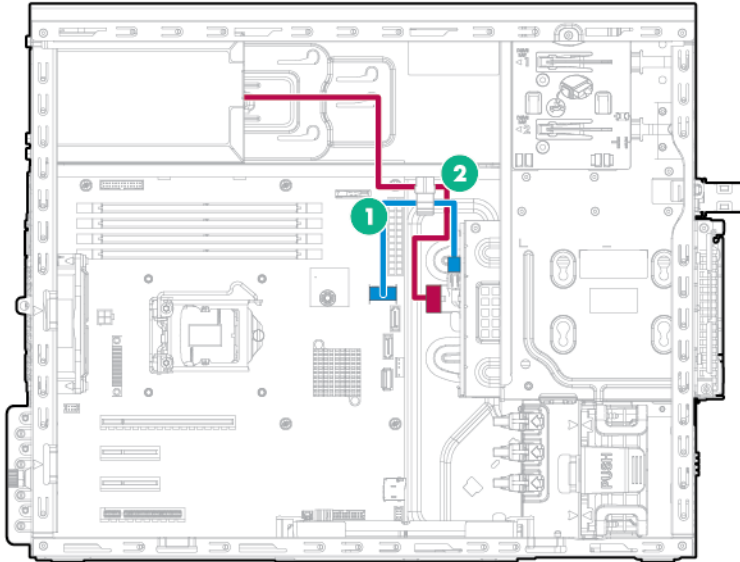
Item	Description
1	USB cable
2	Drive power cable
3	Power supply cable

Four-bay LFF non-hot-plug drive cage cabling



Item	Description
1	Power cable
2	10-pin to 8-pin power extension cable
3	Mini-SAS cable

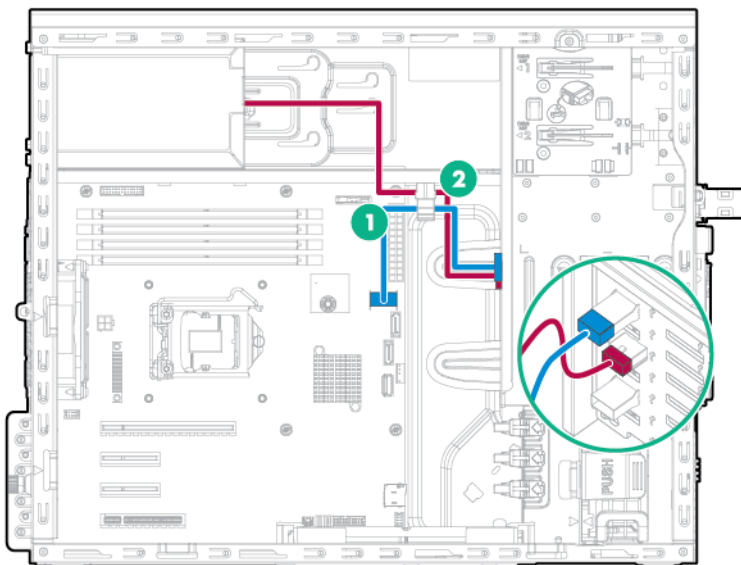
Four-bay LFF hot-plug drive cage option cabling



Item	Description
1	Mini-SAS cable
2	Power cable

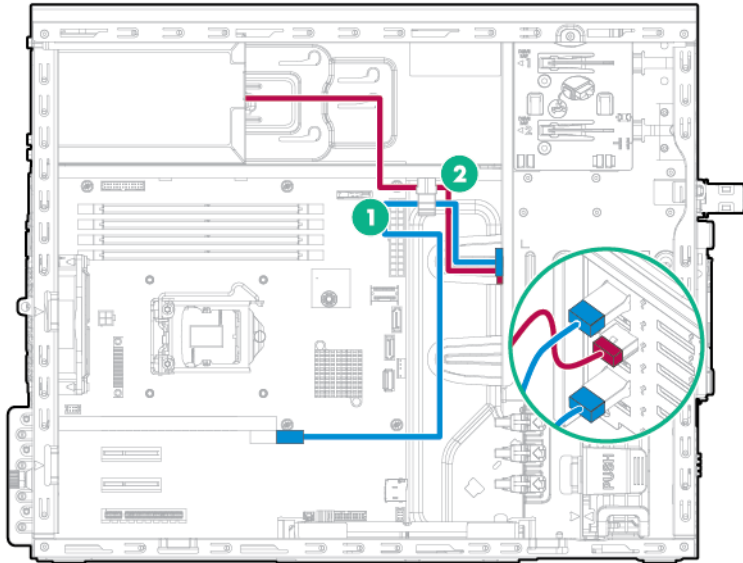
Eight-bay SFF hot-plug drive cage option cabling

- Eight-bay SFF hot-plug drive cage cabling to system board (supports up to 4 drives)



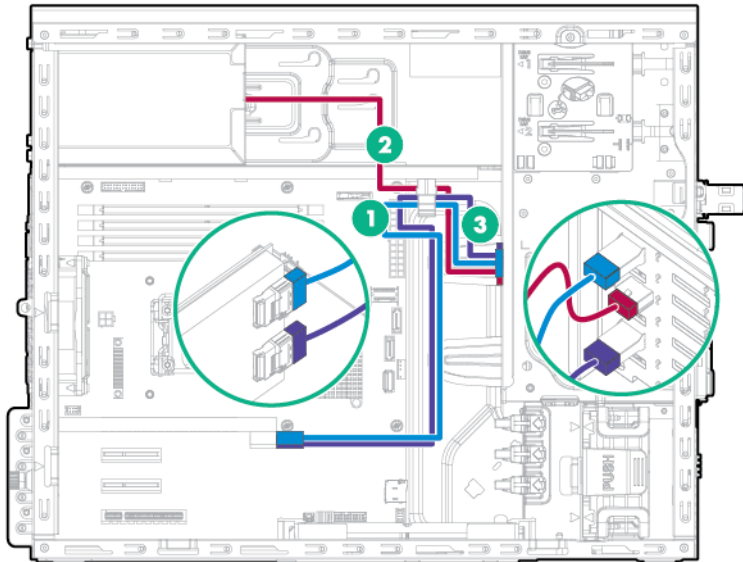
Item	Description
1	SATA cable
2	Drive power cable

- Eight-bay SFF hot-plug drive cage cabling to Smart Array controller (supports up to 8 drives)



Item	Description
1	Mini-SAS Y-cable
2	Power cable

- Eight-bay SFF hot-plug drive cage cabling to Host Bust Adapter (supports up to 8 drives)



Item	Description
1	Mini-SAS cable
2	Power cable
3	Mini-SAS 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. Depending on the server model, your server may not support all of the tools and solutions in this section.

Software or configuration utility	Server mode
<u>HP iLO</u>	Online and Offline
<u>Active Health System</u>	Online and Offline
<u>Integrated Management Log</u>	Online and Offline
<u>Intelligent Provisioning</u>	Offline
<u>HP Insight Diagnostics</u>	Online and Offline
<u>HP Insight Remote Support software</u>	Online
<u>HP Insight Online</u>	Online
<u>Erase Utility</u>	Offline
<u>Scripting Toolkit for Windows and Linux</u>	Online
<u>Service Pack for ProLiant</u>	Online and Offline
<u>Smart Update Manager</u>	Online and Offline
<u>UEFI System Utilities</u>	Offline
HP ROM-Based Setup Utility	Offline
Array Configuration Utility	Online and Offline
<u>HP Smart Storage Administrator</u>	Online and Offline
Option ROM Configuration for Arrays	Offline
ROMPaq 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 tower 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 tower 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 servers.

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 servers 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.

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

Keeping the system current

Updating firmware or System ROM

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 [HPE website](#).

For more information about support services, see the [HPE 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 [HPE 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](#).

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](#)

Replacing the system battery

WARNING:

The server contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery that provides power to the real-time clock. If this battery is not properly handled, a risk of the fire and burns exists. To reduce the risk of personal injury:

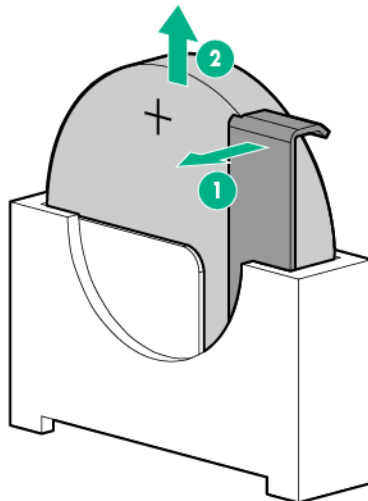
- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.
- If the server no longer automatically displays the correct date and time, then replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

IMPORTANT:

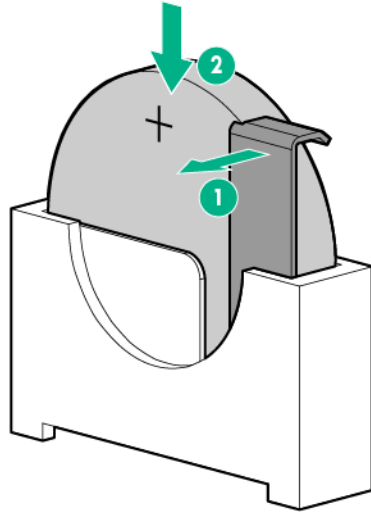
Replacing the system board battery resets the system ROM to its default configuration. After replacing the battery, reconfigure the system through RBSU.

Procedure

1. **Power down the server.**
2. Disconnect the power cord from the power source and the server.
3. **Remove the bezel.**
4. Place the server on its side with the access panel facing up.
5. **Remove the access panel.**
6. **Remove the air baffle.**
7. Locate the battery on the **system board**.
8. Slightly push the metal tab, and then use the small flat-nose pliers to remove the system battery from its socket.



9. Slightly push the metal tab, then install the system battery in the socket.



10. **Install the air baffle.**
11. **Install the access panel.**
12. **Install the bezel.**
13. Return the server to an upright position.
14. Connect the power cord to the power source and the server.
15. **Power up the server.**

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

Warranty and regulatory information

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

Belarus Kazakhstan Russia marking



Manufacturer and Local Representative Information

Manufacturer information:

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

Local representative information Russian:

- Russia:

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

- Belarus:

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

- Kazakhstan:

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

Local representative information Kazakh:

- Russia:

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

- Belarus:

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

- Kazakhstan:

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

Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (serial number format for this product)

Valid date formats include:

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

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: EEE Yönetmeliğine Uygundur

Ukraine RoHS material content declaration

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

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.

To prevent electrostatic damage:

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

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

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

Specifications

Environmental specifications

Specification	Value
Temperature range*	
Operating	10° C to 35° C (50° F to 95° F)
Nonoperating	-30° C to 60° C (-22° F to 140° F)
Relative humidity (noncondensing)	
Operating, maximum wet bulb temperature of 28°C (82.4°F)	10% to 90%
Nonoperating, maximum wet bulb temperature of 38.7°C (101.7°F)	5% to 95%

* All temperature ratings shown are for sea level. An altitude derating of 1.0° per 304.8 m (1.8°F per 1000 ft) to 3048 m (10,000 ft) is applicable. No direct sunlight allowed.

Server specifications

Specification	Value
Height	36.83 cm (14.50 in)
Depth	47.50 cm (18.70 in)
Width	17.50 cm (6.89 in)
Weight (full load, approximate values)	—
Four-bay LFF non-hot-plug drive model	13.1 kg (28.82 lb)
Four-bay LFF hot-plug drive model	13.6 kg (29.92 lb)
Eight-bay SFF hot-plug drive model	12.4 kg (27.28 lb)

Power supply specifications

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

- HPE 350W non-hot-plug power supply (E-star 1.0)
- HPE 350W non-hot-plug power supply (E-star 2.0)
- HPE 460 W CS Gold hot-plug power supply (92% efficiency)

This power input module is only supported when the two-bay redundant power supply assembly option is installed.

CAUTION:

Check the system and power supply input ratings before powering up the server.

For detailed power supply specifications, see the QuickSpecs on the [Hewlett Packard Enterprise website](#).

HPE 350 W Power Supply (E-star 1.0)

Specification	Value
Input requirements	—
Rated input voltage	100 V AC to 240 V AC
Rated input frequency	47 Hz to 63 Hz
Rated input current	6 A to 3 A
Rated input power	427 W at 115 V AC input 427 W at 240 V AC input
Efficiency	No less than 82% at 100% load No less than 85% at 50% load No less than 82% at 20% load
Power supply output	—
Rated steady-state power	350 W at 115 V AC input 350 W at 230 V AC input
Maximum peak power	350 W at 115 V AC input 350 W at 230 V AC input
Rated output power	350 W

HPE 350W non-hot-plug power supply (E-star 2.0)

Specification	Value
Input requirements	—
Rated input voltage	100 V AC to 240 V AC
Rated input frequency	47 Hz to 63 Hz
Rated input current	5 A to 2.5 A
Rated input power	412 W at 115 V AC input 412 W at 230 V AC input
Efficiency	No less than 85% at 100% load No less than 88% at 50% load No less than 85% at 20% load
Power supply output	—
Rated steady-state power	350 W at 115 V AC input 350 W at 230 V AC input

Table Continued

Specification	Value
Maximum peak power	350 W at 115 V AC input 350 W at 230 V AC input
Rated output power	350 W

HPE 460W CS Gold hot-plug power supply

Specification	Value
Input requirements	—
Rated input voltage	100 V AC to 240 V AC
Rated input frequency	50 Hz to 60 Hz
Rated input current	6 A to 3 A
Rated input power	526 W at 115 V AC input 523 W at 230 V AC input
Efficiency	No less than 87.5% at 100% load No less than 89.5% at 50% load No less than 87.5% at 20% load
Power supply output	—
Rated steady-state power	460 W at 100 V to 120 V AC input 460 W at 200 V to 240 V AC input
Maximum peak power	460 W at 100 V to 120 V AC input 460 W at 200 V to 240 V AC input
Rated output power	460 W

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

Websites

General websites

Hewlett Packard Enterprise Information Library	www.hpe.com/info/EIL
Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix	www.hpe.com/storage/spock
Storage white papers and analyst reports	www.hpe.com/storage/whitepapers

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

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
AMP	Advanced Memory Protection
API	application program interface
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASR	Automatic Server Recovery
AWG	American wire gauge
CAS	column address strobe
CSA	Canadian Standards Association
CSR	Customer Self Repair
DDR3	double data rate-3
DDR4	double data rate-4
FAT	file allocation table
FBWC	flash-backed write cache
HBA	host bus adapter
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
JBOD	just a bunch of disks
JSON	JavaScript Object Notation
LFF	large form factor
LOM	Lights-Out Management
LRDIMM	load reduced dual in-line memory module

NAND	Not AND
NMI	nonmaskable interrupt
NVDIMM	non-volatile dual in-line memory module
NVRAM	nonvolatile memory
OA	Onboard Administrator
PCIe	Peripheral Component Interconnect Express
PDU	power distribution unit
POST	Power-On Self-Test
QR code	quick response code
RBSU	ROM-Based Setup Utility
RDIMM	registered dual in-line memory module
REST	representational state transfer
RoHS	Restriction of Hazardous Substances
SAS	serial attached SCSI
SATA	serial ATA
SD	Secure Digital
SELV	separated extra low voltage
SFF	small form factor
SPP	Service Pack for ProLiant
SSD	solid-state device
STD	standard (DIMM voltage)
TMRA	recommended ambient operating temperature
TNV	telephone network voltage
TPM	Trusted Platform Module
UEFI	Unified Extensible Firmware Interface
UID	unit identification
VC	Virtual Connect
VCA	Version Control Agent

VCRM Version Control Repository Manager