



**Hewlett Packard
Enterprise**

HPE ProLiant ML110 Gen10 Server User Guide

Abstract

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

Part Number: 874623-004
Published: June 2019
Edition: 4

Notices

The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

Confidential computer software. Valid license from Hewlett Packard Enterprise required for possession, use, or copying. Consistent with FAR 12.211 and 12.212, Commercial Computer Software, Computer Software Documentation, and Technical Data for Commercial Items are licensed to the U.S. Government under vendor's standard commercial license.

Links to third-party websites take you outside the Hewlett Packard Enterprise website. Hewlett Packard Enterprise has no control over and is not responsible for information outside the Hewlett Packard Enterprise website.

Acknowledgments

microSD[®] is a trademark or a registered trademark of SD-3D in the United States, other countries of both.

Microsoft[®], Windows[®], and Windows Server[®] are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Linux[®] is the registered trademark of Linus Torvalds in the U.S. and other countries.

Red Hat[®] Enterprise Linux is a registered trademark of Red Hat, Inc. in the United States and other countries.

VMware[®] ESXi[™] and VMware vSphere[®] are registered trademarks or trademarks of VMware, Inc. in the United States and/or other jurisdictions.

Contents

Component identification.....	7
Front panel components.....	7
Front panel LEDs and buttons.....	8
Front panel LED power fault codes.....	9
Rear panel components.....	9
Rear panel LEDs and button.....	10
UID button functionality.....	11
System board components.....	12
System maintenance switch descriptions.....	14
DIMM label identification.....	14
DIMM slot locations.....	16
PCIe slot description.....	16
Drives.....	17
Low profile LFF drive LED definitions.....	17
Hot-plug drive LED definitions.....	18
Drive bay numbering.....	19
Fans.....	21
Fan locations.....	21
Fan mode behavior.....	21
Operations.....	23
Power up the server.....	23
Power down the server.....	23
Remove the server from the rack.....	23
Position the tower server for hardware configuration.....	25
Remove the access panel.....	25
Install the access panel.....	26
Remove the front bezel.....	27
Install the front bezel.....	28
Remove the PCI air baffle.....	29
Install the PCI air baffle.....	30
Remove the system air baffle.....	30
Install the system air baffle.....	31
Setup.....	33
Optional service.....	33
Initial server installation.....	33
HPE Installation Service.....	33
Setting up the server.....	34
Operational requirements.....	37
Space and airflow requirements.....	37
Temperature requirements.....	38
Power requirements.....	38
Electrical grounding requirements.....	38
Server warnings and cautions.....	38
Rack warnings and cautions.....	39
Electrostatic discharge.....	40
Setting up the server in tower mode.....	41

POST screen options.....	41
Installing or deploying an operating system.....	42

Hardware options installation..... 43

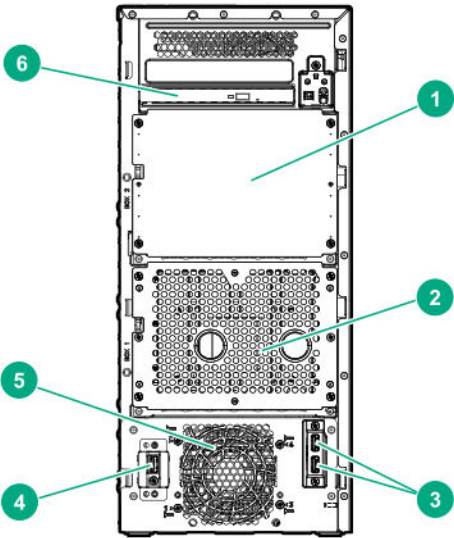
Introduction.....	43
Drive options.....	43
Drive installation guidelines.....	43
Drive support information.....	43
Installing an LFF non-hot-plug drive.....	44
Installing an LFF hot-plug drive.....	46
Installing an SFF hot-plug drive.....	47
Tower-to-rack conversion kit.....	48
Installing the tower-to-rack conversion kit.....	49
Prepare the server for rack installation.....	49
Install the rack rails and server tray.....	50
Install the server into the rack.....	53
Enable the increased cooling function.....	56
Power supply options.....	56
Hot-plug power supply calculations.....	56
Power supply warnings and cautions.....	57
Installing the ATX 550W non-hot-plug power supply.....	57
Redundant power supply enablement option.....	59
Installing the redundant power supply enablement option.....	59
Drive cage options.....	63
Installing the four-bay LFF non-hot-plug drive cage.....	63
Installing the four-bay LFF hot-plug drive cage.....	65
Installing the eight-bay SFF hot-plug drive cage.....	67
Installing the optical drive option.....	69
Storage controller options.....	71
Storage controller installation guidelines.....	71
Installing a standup PCIe plug-in Smart Array controller (type-p).....	71
Configuring an HPE Smart Array Gen10 controller.....	73
Energy pack options.....	74
HPE Smart Storage Battery.....	74
HPE Smart Storage Hybrid Capacitor.....	75
Minimum firmware versions.....	75
Installing an energy pack.....	75
Expansion board options.....	77
Installing an expansion board.....	77
Installing the GPU option.....	79
Redundant fan option kit.....	81
Installing the redundant fans.....	82
Memory options.....	84
DIMM population information.....	84
DIMM-processor compatibility.....	84
HPE SmartMemory speed information.....	85
Installing a DIMM.....	85
M.2 SSD enablement option.....	86
Installing an M.2 SATA SSD.....	86
Internal USB device option.....	89
Installing an internal USB device.....	90
Installing the serial port option.....	91
HPE Trusted Platform Module 2.0 Gen10 option.....	93
Overview.....	93
HPE Trusted Platform Module 2.0 Guidelines.....	93

Installing and enabling the HPE TPM 2.0 Gen10 Kit.....	94
Installing the Trusted Platform Module board.....	94
Enabling the Trusted Platform Module.....	97
Retaining the recovery key/password.....	98
Cabling.....	99
Cabling guidelines.....	99
Drive cabling.....	100
LFF non-hot-plug drive cabling.....	100
LFF hot-plug drive cabling.....	101
SFF hot-plug drive cabling.....	103
Storage controller cabling.....	104
Storage controller backup power cabling.....	106
Energy pack cabling.....	106
Optical drive cabling.....	107
M.2 SSD cabling.....	107
Front I/O cabling.....	108
Front USB 3.0 cabling.....	108
iLO Service Port cabling.....	109
Fan cabling.....	109
Serial port cabling.....	111
Power supply cabling.....	112
Software and configuration utilities.....	114
Server mode.....	114
Product QuickSpecs.....	114
Active Health System Viewer.....	114
Active Health System.....	114
Active Health System data collection.....	115
Active Health System Log.....	115
HPE iLO 5.....	115
iLO Federation.....	116
iLO Service Port.....	116
iLO RESTful API.....	117
RESTful Interface Tool.....	117
iLO Amplifier Pack.....	117
Integrated Management Log.....	117
Intelligent Provisioning.....	117
Intelligent Provisioning operation.....	118
Management Security.....	119
Scripting Toolkit for Windows and Linux.....	119
UEFI System Utilities.....	119
Selecting the boot mode	120
Secure Boot.....	120
Launching the Embedded UEFI Shell	121
HPE Smart Storage Administrator.....	121
HPE InfoSight for servers	122
USB support.....	122
External USB functionality.....	122
Redundant ROM support.....	123
Safety and security benefits.....	123
Keeping the system current.....	123
Updating firmware or system ROM.....	123
Service Pack for ProLiant.....	123

Updating firmware from the System Utilities	124
Updating the firmware from the UEFI Embedded Shell	125
Online Flash components.....	125
Drivers.....	126
Software and firmware.....	126
Operating system version support.....	126
HPE Pointnext Portfolio.....	126
Proactive notifications.....	127
System battery replacement.....	128
System battery information.....	128
Removing and replacing the system battery.....	128
Replace the system battery.....	129
Troubleshooting.....	131
NMI functionality.....	131
Troubleshooting resources.....	131
Safety, warranty, and regulatory information.....	132
Regulatory information.....	132
Notices for Eurasian Economic Union.....	132
Turkey RoHS material content declaration.....	133
Ukraine RoHS material content declaration.....	133
Warranty information.....	133
Specifications.....	134
Environmental specifications.....	134
Mechanical specifications.....	134
Power supply specifications.....	135
ATX 350W non-hot-plug power supply.....	135
ATX 550W non-hot-plug power supply.....	135
HPE 800W Flex Slot Platinum Hot-plug Low Halogen Power Supply.....	136
Websites.....	138
Support and other resources.....	139
Accessing Hewlett Packard Enterprise Support.....	139
ClearCARE technical support.....	139
Accessing updates.....	139
Customer self repair.....	140
Remote support.....	140
Documentation feedback.....	141
Acronyms and abbreviations.....	142

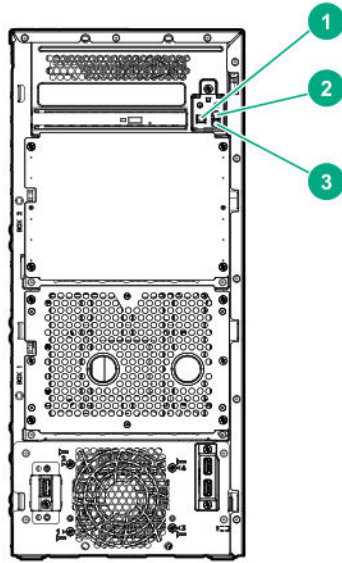
Component identification

Front panel components



Item	Description
1	Box 2
2	Box 1
3	USB 3.0 ports (2)
4	iLO Service Port
5	PCI fan
6	Slim optical drive (optional)

Front panel LEDs and buttons



Item	Description	Status	Definition
1	Power On/Standby button and system power LED ¹	Solid green	Normal
		Flashing green	Performing power-on sequence
		Solid amber	System in standby
		Off	No power present ²
2	Health LED ¹	Solid green	Normal
		Flashing green	iLO is rebooting.
		Flashing amber	System degraded ³
		Flashing red	System critical ³
3	NIC status LED ¹	Solid green	Linked to network
		Flashing green	Network active
		Off	No network activity

¹ When all three LEDs described in this table simultaneously, a power fault has occurred. For more information, see **Front panel LED power fault codes** on page 9.

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

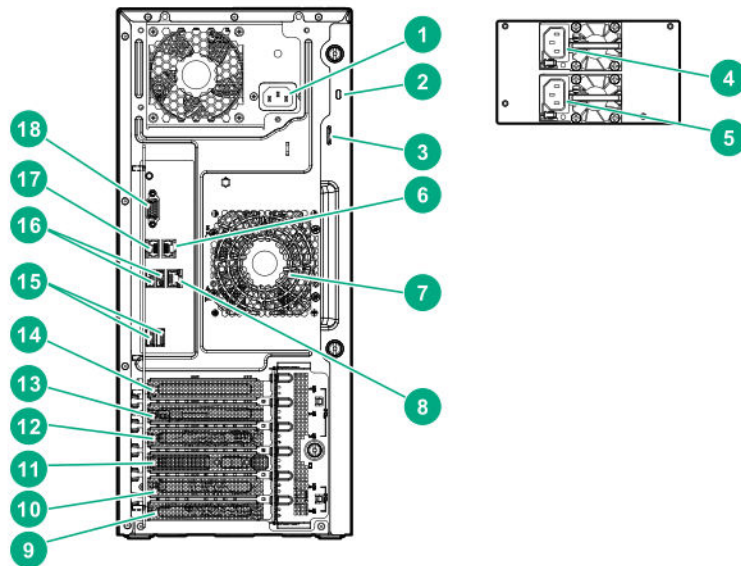
- 3 If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status.

Front panel LED power fault codes

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

Subsystem	LED behavior
System board	1 flash
Processor	2 flashes
Memory	3 flashes
Riser board PCIe slots	4 flashes
FlexibleLOM	5 flashes
Removable HPE Smart Array SR Gen10 controller	6 flashes
System board PCIe slots	7 flashes
Power backplane or storage backplane	8 flashes
Power supply	9 flashes

Rear panel components



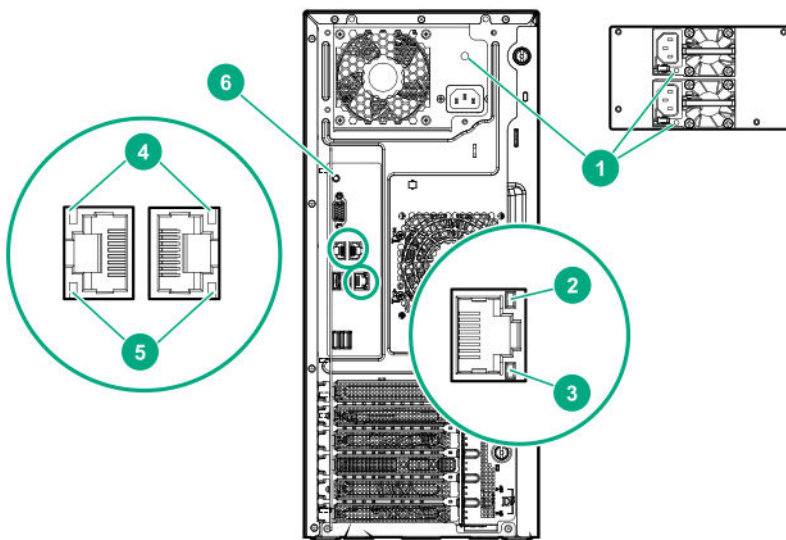
Item	Description
1	Standard power supply (non-hot-plug)
2	Kensington security slot
3	Padlock eye
4	Flexible Slot power supply 1 (hot-plug)
5	Flexible Slot power supply 2 (hot-plug)

Table Continued

Item	Description
6	NIC port 1 ¹
7	System fan
8	iLO Management Port
9	Slot 5 PCIe3 x8 (8, 4, 1)
10	Slot 4 PCIe3 x16 (16, 8, 4, 1)
11	Serial port (optional)
12	Slot 3 PCIe3 x8 (8, 4, 1)
13	Slot 2 PCIe3 x8 (4, 1)
14	Slot 1 PCIe3 x16 (16, 8, 4, 1)
15	USB 3.0 ports (2)
16	USB 2.0 ports (2)
17	NIC port 2 ¹
18	VGA port

¹ The Broadcom 5720-based embedded HPE 332i Ethernet LAN controller provides a PCIe 2.0 x1 host interface to the onboard NIC ports.

Rear panel LEDs and button

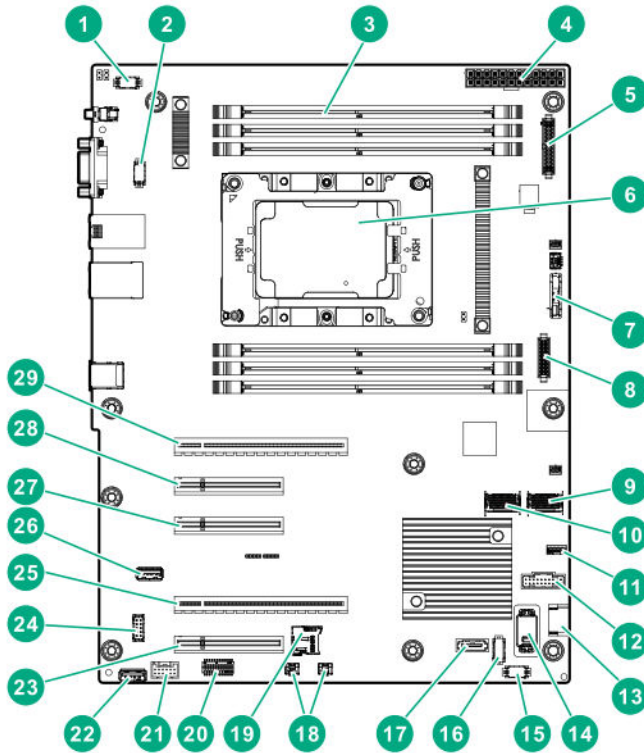


Item	Description	Status	Definition
1	Power supply LED	Solid green	Normal
		Off	One or more of following conditions exists: <ul style="list-style-type: none"> • Power is unavailable. • Power supply failed • Power supply is in standby mode. • Power supply error
2	iLO link LED	Solid green	Network link
		Off	No network link
3	iLO status LED	Solid green	Linked to network
		Flashing green	Network active
		Off	No network link
4	NIC link LED	Solid green	Network link
		Off	No network link
5	NIC status LED	Solid green	Linked to network
		Flashing green	Network active
		Off	No network link
6	UID button/LED	Solid blue	Activated
		Flashing blue	System is being managed remotely.
		Off	Deactivated

UID button functionality

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

System board components



Item	Description
1	Fan connector 4 for the redundant system fan
2	Fan connector 3 for the default and redundant system fans
3	DIMM slots
4	24-pin power supply connector
5	RPSU connector
6	Processor
7	System battery
8	Front I/O cable connector
9	x4 SATA port 1
10	x4 SATA port 2
11	iLO Service Port connector

Table Continued

Item	Description
12	Front USB 3.0 assembly connector
13	x1 SATA port 9
14	TPM connector
15	Fan connector 1 for the default and redundant PCI fans
16	Fan connector 2 for the redundant PCI fan
17	x1 SATA port 10
18	Controller backup power connectors (2)
19	microSD card slot ¹
20	System maintenance switch
21	Energy pack connector
22	Internal USB 2.0 port
23	Slot 5 PCIe3 x8 (4, 1)
24	Serial port connector
25	Slot 4 PCIe3 x16 (16, 8, 4, 1)
26	Internal USB 3.0 port
27	Slot 3 PCIe3 x8 (8, 4, 1)
28	Slot 2 PCIe3 x8 (4, 1)
29	Slot 1 PCIe3 x16 (16, 8, 4, 1)

¹ If the memory card connected to the microSD slot is not visible in Windows Device Manager, in the menu bar, click **View > Show hidden device**.

System maintenance switch descriptions

Position	Default	Function
S1 ¹	Off	Off = iLO 5 security is enabled. On = iLO 5 security is disabled.
S2	Off	Reserved
S3	Off	Reserved
S4	Off	Reserved
S5 ¹	Off	Off = Power-on password is enabled. On = Power-on password is disabled.
S6 ^{1, 2, 3}	Off	Off = No function On = Restore default manufacturing settings
S7	Off	Reserved
S8	—	Reserved
S9	—	Reserved
S10	—	Reserved
S11	—	Reserved
S12	—	Reserved

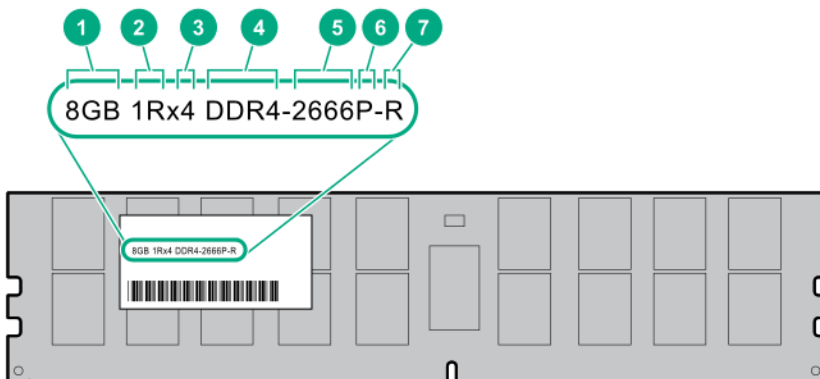
¹ To access the redundant ROM, set S1, S5, and S6 to On.

² When the system maintenance switch position 6 is set to the On position, the system is prepared to restore all configuration settings to their manufacturing defaults.

³ When the system maintenance switch position 6 is set to the On position and Secure Boot is enabled, some configurations cannot be restored. For more information, see **Secure Boot** on page 120.

DIMM label identification

To determine DIMM characteristics, see the label attached to the DIMM. The information in this section helps you to use the label to locate specific information about the DIMM.

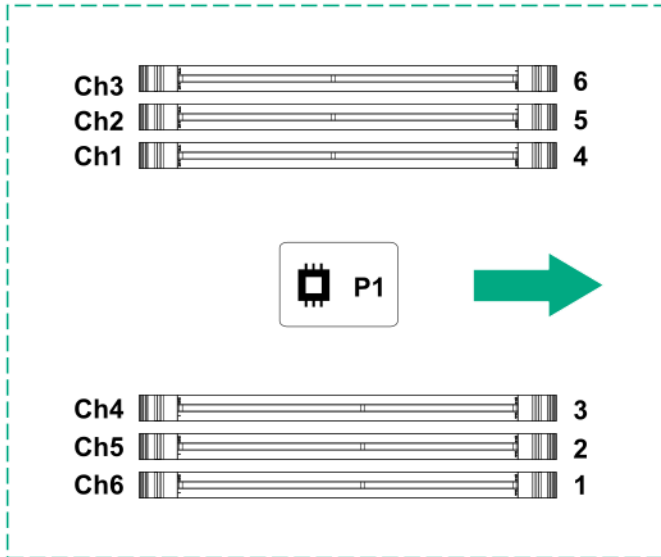


Item	Description	Example
1	Capacity	8 GB 16 GB 32 GB 64 GB 128 GB
2	Rank	1R = Single rank 2R = Dual rank 4R = Quad rank 8R = Octal rank
3	Data width on DRAM	x4 = 4-bit x8 = 8-bit x16 = 16-bit
4	Memory generation	PC4 = DDR4
5	Maximum memory speed	2133 MT/s 2400 MT/s 2666 MT/s 2933 MT/s
6	CAS latency	P = CAS 15-15-15 T = CAS 17-17-17 U = CAS 20-18-18 V = CAS 19-19-19 (for RDIMM, LRDIMM) V = CAS 22-19-19 (for 3DS TSV LRDIMM) Y = CAS 21-21-21 (for RDIMM, LRDIMM) Y = CAS 24-21-21 (for 3DS TSV LRDIMM)
7	DIMM type	R = RDIMM (registered) L = LRDIMM (load reduced) E = Unbuffered ECC (UDIMM)

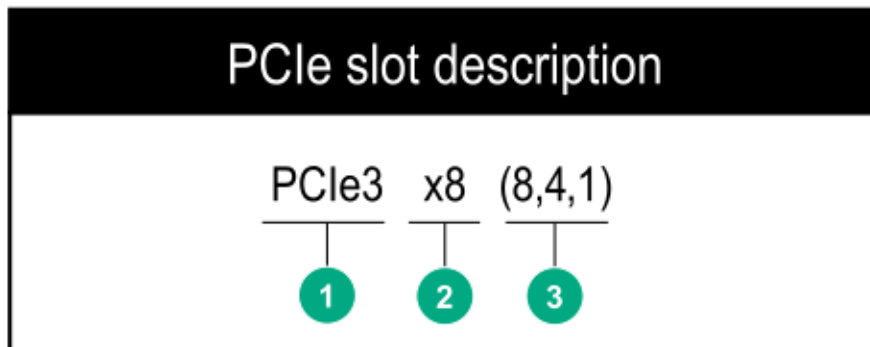
For more information about product features, specifications, options, configurations, and compatibility, see the HPE DDR4 SmartMemory QuickSpecs on the Hewlett Packard Enterprise website (<http://www.hpe.com/support/DDR4SmartMemoryQS>).

DIMM slot locations

The DIMM slots are numbered 1 through 6. The arrow in the following illustration points to the front of the server.



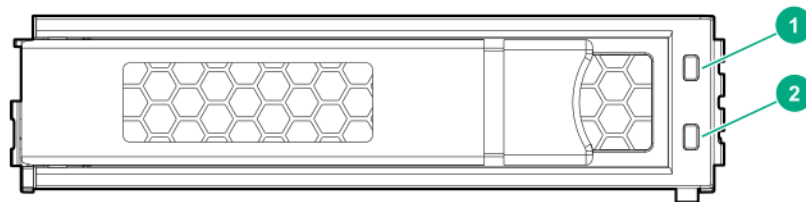
PCIe slot description



Item	Description	Definition
1	PCI Express version	<p>Each PCIe version corresponds to a specific data transfer rate between the processor and peripheral devices. Generally, a version update corresponds to an increase in transfer rate.</p> <ul style="list-style-type: none"> • PCIe 1.x • PCIe 2.x • PCIe 3.x <p>The PCIe technology is under constant development. For the latest information, see the PCI-SIG website.</p>
2	Physical connector link width	<p>PCIe devices communicate through a logical connection called an interconnect or link. At the physical level, a link is composed of one or more lanes. The number of lanes is written with an "x" prefix with x16 being the largest size in common use.</p> <ul style="list-style-type: none"> • x1 • x2 • x4 • x8 • x16
3	Negotiable link width	<p>These numbers correspond to the maximum link bandwidth supported by the slot.</p>

Drives

Low profile LFF drive LED definitions

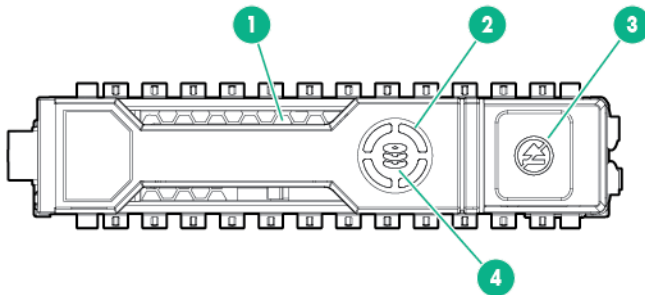


Item	LED	Status	Definition
1	Fault \Locate	Solid amber	The drive has failed.
		Solid blue	The drive is operating normally and being identified by a management application.

Table Continued

Item	LED	Status	Definition
		Flashing amber/blue (1 flash per second)	The drive has failed, or a predictive failure alert has been received for this drive; it also has been identified by a management application.
		Flashing amber (1 flash per second)	A predictive failure alert has been received for this drive. Replace the drive as soon as possible.
2	Online Activity	Solid green	The drive is online and has no activity.
		Flashing green (4 flashes per second)	The drive is operating normally and has activity.
		Flashing green (1 flash per second)	The drive is doing one of the following: <ul style="list-style-type: none"> • Rebuilding • Performing a RAID migration • Performing a strip size migration • Performing a capacity expansion • Performing a logical drive extension • Erasing • Spare part activation
		Off	The drive is not configured by a RAID controller or a spare drive.

Hot-plug drive LED definitions



Item	LED	Status	Definition
1	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue	The drive carrier firmware is being updated or requires an update.
2	Activity ring	Rotating green	Drive activity
		Off	No drive activity

Table Continued

Item	LED	Status	Definition
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 doing one of the following: <ul style="list-style-type: none"> • Rebuilding • Performing a RAID migration • Performing a strip size migration • Performing a capacity expansion • Performing a logical drive extension • Erasing • Spare part activation
		Flashing amber/green	The drive is a member of one or more logical drives and predicts the drive will fail.
		Flashing amber	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller or a spare drive.

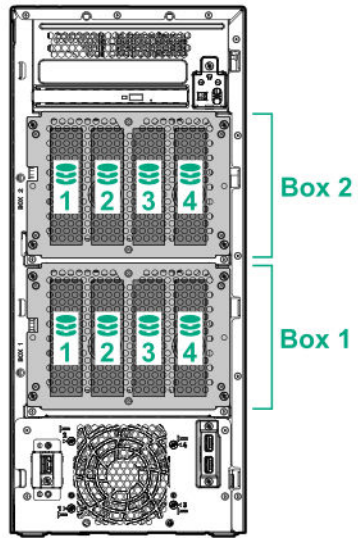
Drive bay numbering

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

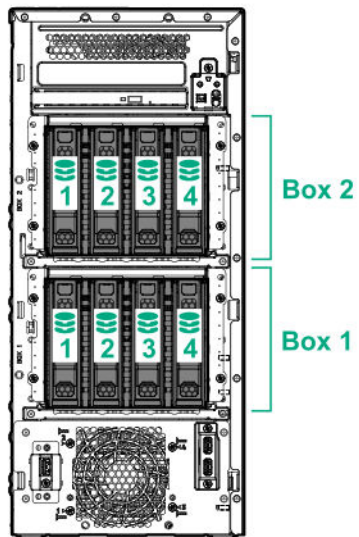
- Embedded Smart Array controller through the onboard SATA ports
- Smart Array type-p SR Gen10 controllers

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

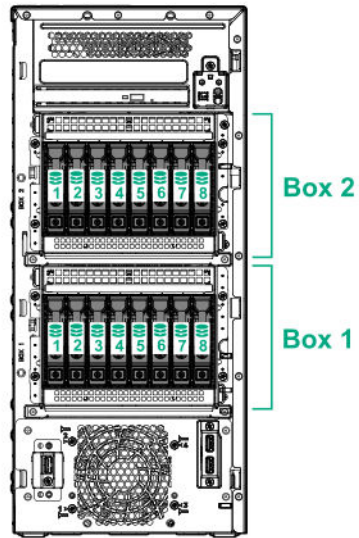
- LFF drive bay numbering: Smart Array controller



- LFF drive numbering: Smart Array controller

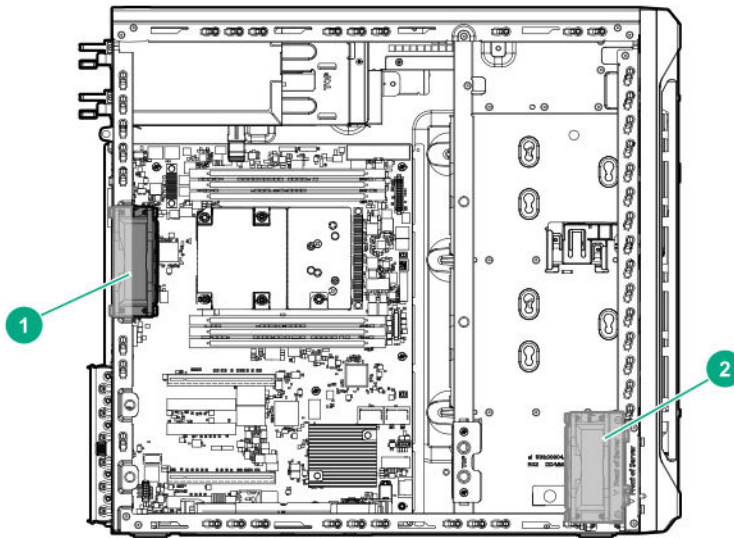


- SFF drive bay numbering: Smart Array controller



Fans

Fan locations



Item	Description
1	Default system fan
2	Default PCI fan

The server also supports the **Redundant fan option kit** on page 81.

Fan mode behavior

- In nonredundant fan mode, a fan failure or a missing fan causes:

- The system Health LED to flash amber.
- The operating system to orderly shutdown.
- In redundant fan mode:
 - A fan rotor failure will switch the system to nonredundant fan mode.
This change is indicated by the Health LED flashing amber. The system continues to operate normally in this mode.
 - A second fan rotor failure or a missing fan causes the operating system to orderly shutdown.

Operations

This chapter describes the hardware operations carried out prior to and after installing or removing a hardware option, or performing a server maintenance or troubleshooting procedure.

Before performing these hardware operations, review and observe the server warnings and cautions.


Power up the server

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

- Press the Power On/Standby button.
- Use the virtual power button through iLO.

Power down the server

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


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

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

- Press and release the Power On/Standby button.
This method initiates a controlled shutdown of applications and the OS before the server enters standby mode.
- Press and hold the Power On/Standby button for more than 4 seconds to force the server to enter standby mode.
This method forces the server to enter standby mode without properly exiting applications and the OS. If an application stops responding, you can use this method to force a shutdown.
- Use a virtual power button selection through iLO 5.
This method initiates a controlled remote shutdown of applications and the OS before the server enters standby mode.

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

Remove the server from the rack

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

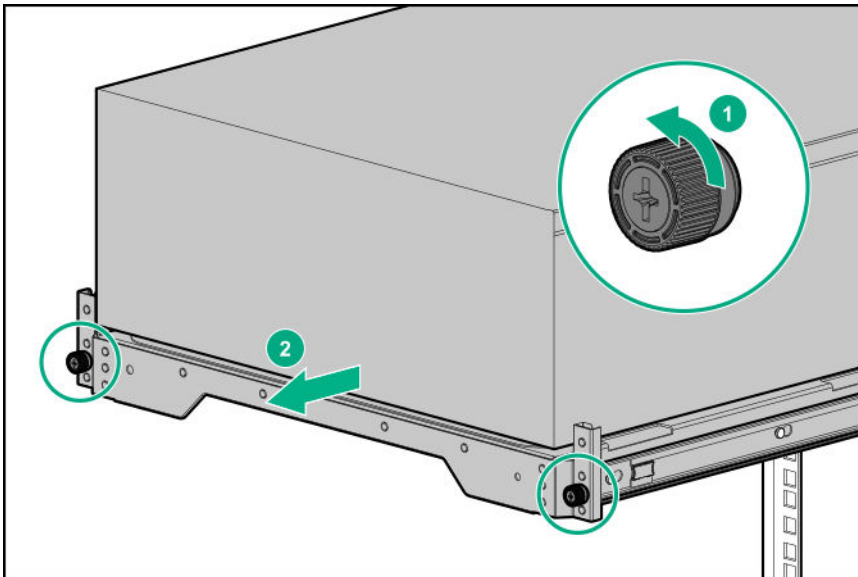
- Observe local occupational health and safety requirements and guidelines for manual material handling.
 - Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. Hewlett Packard Enterprise recommends that a minimum of two people are required for all rack server installations. A third person may be required to help align the server if the server is installed higher than chest level.
 - Use caution when installing the server in or removing the server from the rack; it is unstable when not fastened to the rails.
-

Prerequisites

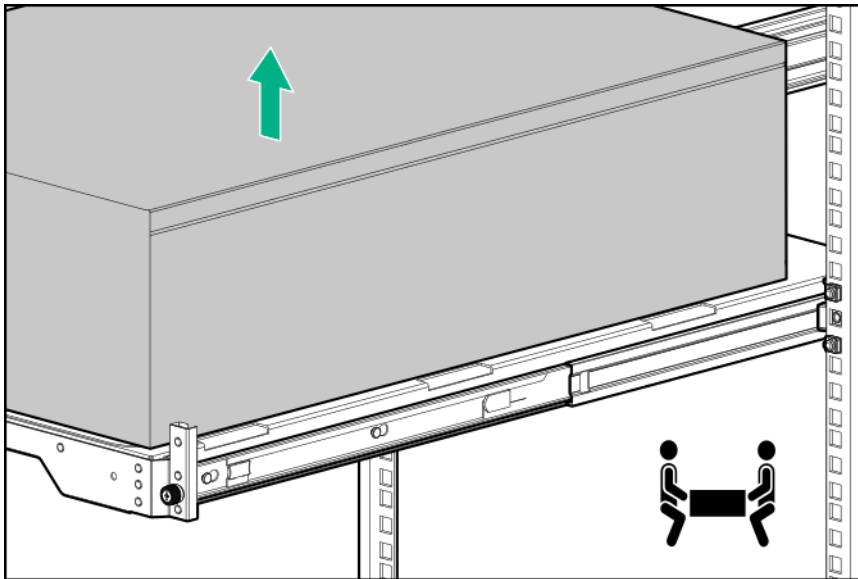
Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripherals cables from the server.
4. If a Kensington security cable is installed, disconnect it from the rear panel. See the security cable documentation for instructions.
5. Fully extend the server out of the rack:
 - a. Loosen the server tray thumbscrews.
 - b. Hold the tray notch to slide the server out of the rack.



6. Lift the server from the tray.

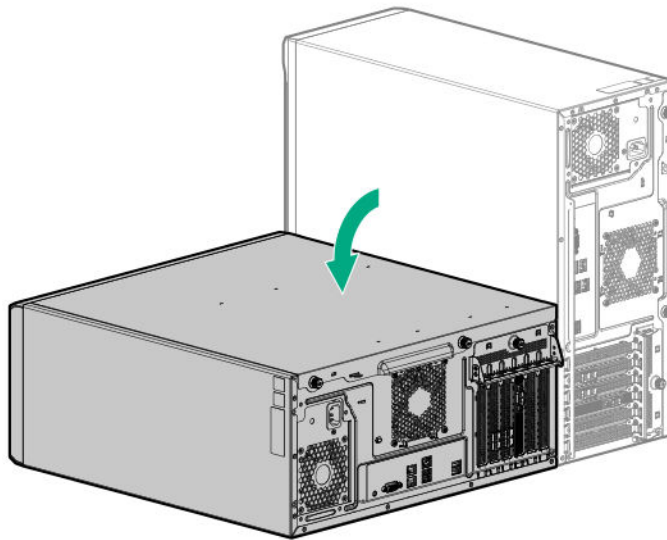


7. Place the server on a sturdy, level surface.

Position the tower server for hardware configuration

Procedure

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



Remove the access panel

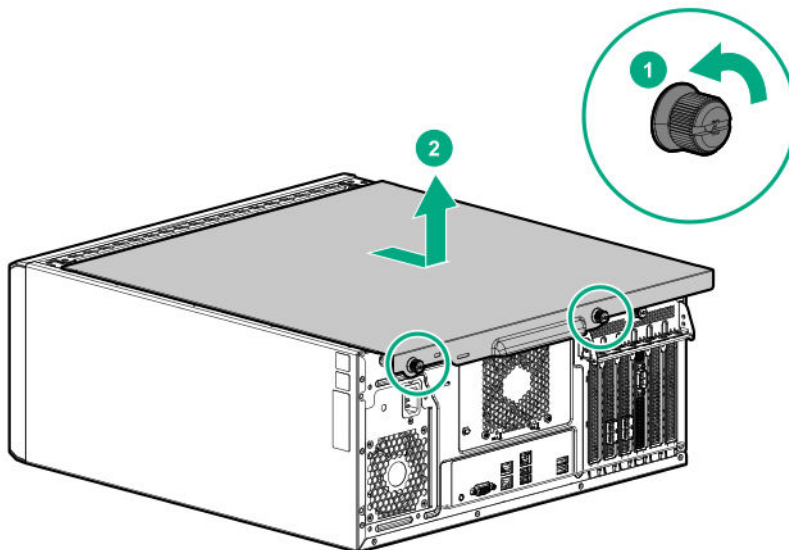
⚠ WARNING: To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

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

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

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripherals cables from the server.
4. If a Kensington security cable is installed, disconnect it from the rear panel. See the security cable documentation for instructions.
5. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
6. Remove the access panel:
 - a. Loosen the access panel thumbscrews.
 - b. Slide and remove the access panel from the server.

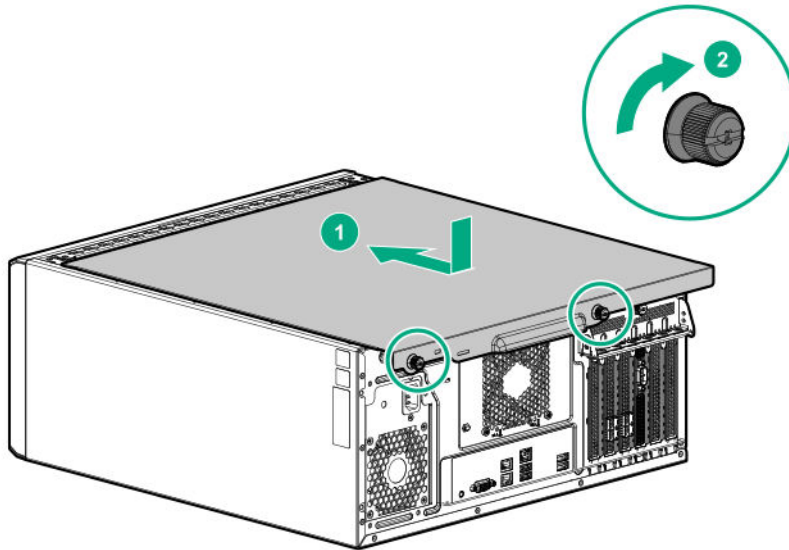


Install the access panel

Procedure

1. Install the access panel:

- a. Place the access panel on the chassis, and slide it towards the front of the server.
- b. Tighten the thumbscrews.



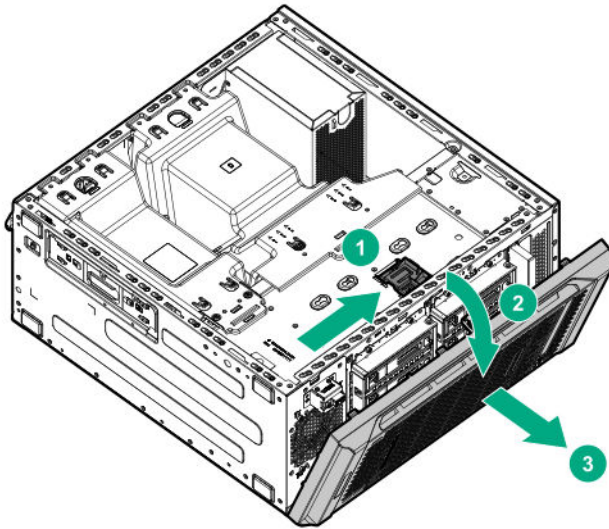
2. If a Kensington security cable was removed, connect it to the rear panel. See the security cable documentation for instructions.
3. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
4. Connect all peripheral cables to the server.
5. Connect each power cord to the server.
6. Connect each power cord to the power source.
7. **Power up the server** on page 23.

Remove the front bezel

Procedure

1. If the bezel is locked, **power down the server**.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. If the front bezel is locked by the internal locker, **remove the access panel**.
4. Open and remove the front bezel:

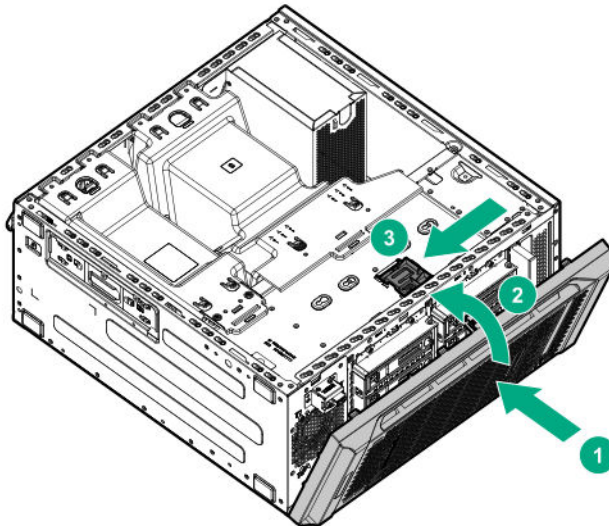
- a. Slide up the internal locker.
- b. Open the front bezel.
- c. Remove the front bezel.



Install the front bezel

Procedure

1. Install and close the front bezel.



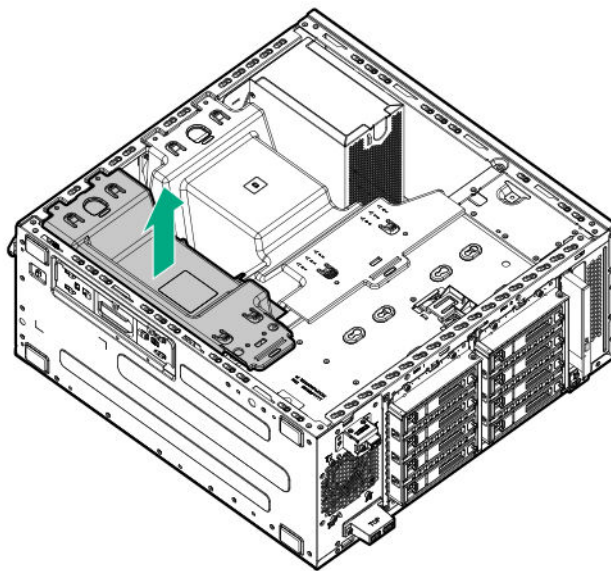
2. Do one of the following:
 - Lock the internal locker.
 - Leave the internal locker in unlock position if you want to access the front panel any time without removing the access panel.

3. **Install the access panel** on page 26.
4. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
5. Connect all peripheral cables to the server.
6. Connect each power cord to the server.
7. Connect each power cord to the power source.
8. **Power up the server** on page 23.

Remove the PCI air baffle

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. Remove the PCI air baffle.

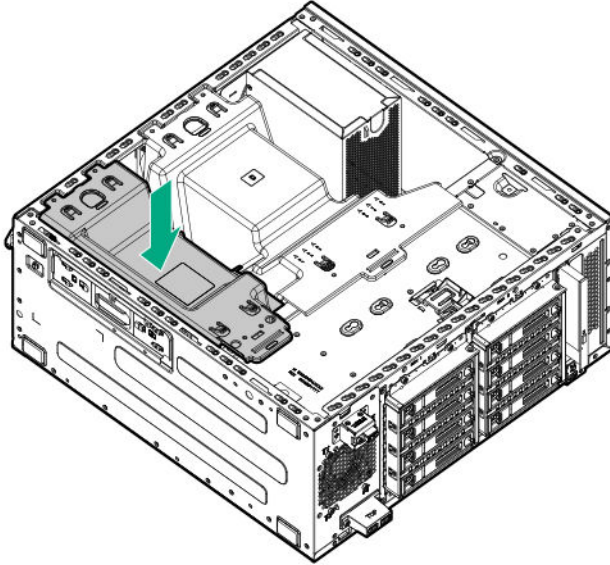


Install the PCI air baffle

⚠ CAUTION: For proper cooling do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed.

Procedure

1. Install the PCI air baffle.



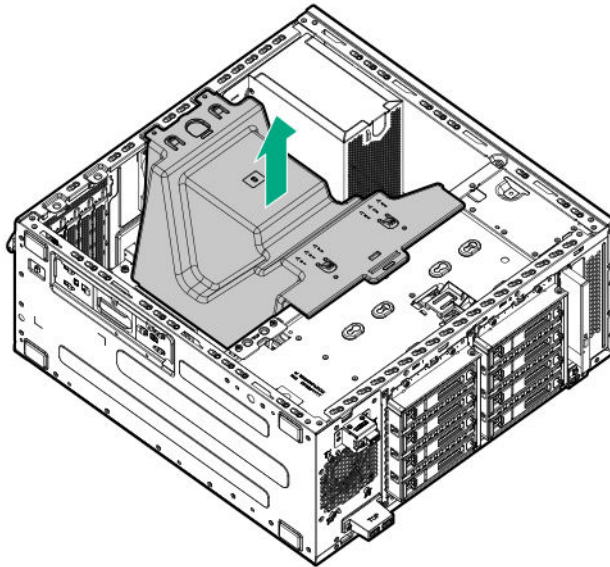
2. **Install the front bezel** on page 28.
3. **Install the access panel** on page 26.
4. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
5. Connect all peripheral cables to the server.
6. Connect each power cord to the server.
7. Connect each power cord to the power source.
8. **Power up the server** on page 23.

Remove the system air baffle

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.

3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. Remove the system air baffle.

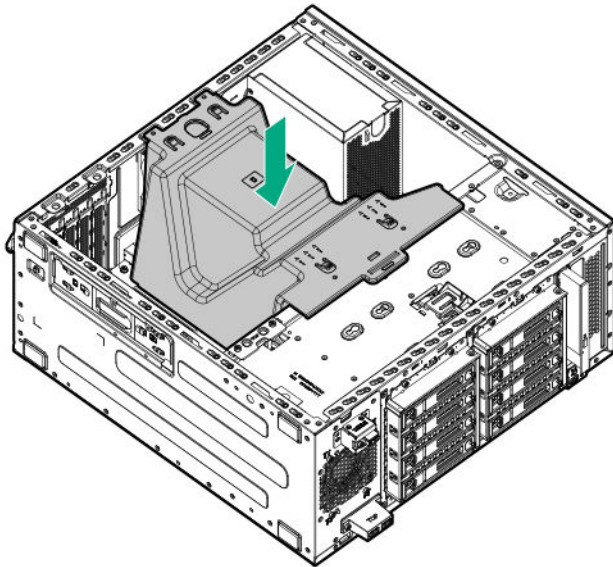


Install the system air baffle

⚠ CAUTION: For proper cooling do not operate the server without the access panel, baffles, expansion slot covers, or blanks installed.

Procedure

1. Install the system air baffle.



2. **Install the PCI air baffle** on page 30
3. **Install the front bezel** on page 28.
4. **Install the access panel** on page 26.
5. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
6. Connect all peripheral cables to the server.
7. Connect each power cord to the server.
8. Connect each power cord to the power source.
9. **Power up the server** on page 23.

Setup

Optional service

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

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

- Foundation Care – Keep systems running.
 - 6-Hour Call-to-Repair¹
 - 4-Hour 24x7
 - Next Business Day
- Proactive Care – Help prevent service incidents and get you to technical experts when there is one.
 - 6-Hour Call-to-Repair¹
 - 4-Hour 24x7
 - Next Business Day
- Deployment service for both hardware and software
- Hewlett Packard Enterprise Education Services – Help train your IT staff.

¹The time commitment for this repair service might vary depending on the geographical region of site. For more service information available in your site, contact your local **Hewlett Packard Enterprise support center**.

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

Initial server installation

Depending on the user technical expertise and the complexity of the product, for the initial server installation, the user can choose to:

- **Order the HPE Installation Service.**
- **Perform the initial server setup procedure.**

HPE Installation Service

HPE Installation Service provides basic installation of Hewlett Packard Enterprise branded equipment, software products, as well as HPE-supported products from other vendors that are sold by HPE or by HPE authorized resellers. The Installation Service is part of a suite of HPE deployment services that are designed to give users the peace of mind that comes from knowing that their HPE and HPE-supported products have been installed by an HPE specialist.

The HPE Installation Service provides the following benefits:

- Installation by an HPE authorized technical specialist.
- Verification prior to installation that all service prerequisites are met.
- Delivery of the service at a mutually scheduled time convenient to your organization.
- Allows your IT resources to stay focused on their core tasks and priorities.
- Full coverage during the warranty period for products that require installation by an HPE authorized technical specialist.

For more information on the features, limitations, provisions, and ordering information of the HPE Installation Service, see this Hewlett Packard Enterprise website:

<http://www.hpe.com/support/installation-service>

Setting up the server

Prerequisites

Before setting up the server:

- Download the latest SPP:
 - <http://www.hpe.com/servers/spp/download>
 - Support validation required
- Verify that your OS or virtualization software is supported:
 - <http://www.hpe.com/info/ossupport>
- Read the HPE UEFI requirements for ProLiant servers on the [Hewlett Packard Enterprise website](#). If the UEFI requirements are not met, you might experience boot failures or other errors when installing the operating system.
- Obtain the storage driver if needed:
 - Download it from the HPE Support Center website:
 - <http://www.hpe.com/support/hpesc>
 - Extract it from the SPP.
- Read the operational requirements for the server:
 - [Operational requirements](#) on page 37
- Read the safety and compliance information on the HPE website:
 - <http://www.hpe.com/support/safety-compliance-enterpriseproducts>
- If the tower-to-rack conversion kit is used, read the rack warnings and cautions:
 - [Rack warnings and cautions](#) on page 39

Procedure

Unbox the server

1. Unbox the server and verify the contents:

- Server
- Power cord
- Rack-mounting hardware (optional)
- Documentation

Install the hardware options

2. (Optional) Install hardware options. For installation instructions, see **Hardware options installation** on page 43.

Orient the server and connect the peripherals

3. Select the server orientation:

- **Tower orientation**
- **Rack orientation**

4. Decide how to manage the server:

- Locally: Use a KVM switch or a connect a keyboard, monitor, and mouse.
- Remotely: Connect to the iLO web interface and run a remote console:

- a. Verify the following:

- iLO is licensed to use the remote console feature.
If iLO is not licensed, visit <http://www.hpe.com/info/ilo>.
- The iLO Management Port is connected to a secure network.

- b. Using a browser, navigate to the iLO web interface, and then log in.

`https://<iLO hostname or IP address>`

Note the following:

- The iLO hostname is located on the serial number/iLO information label located on the top of the chassis.
- If a DHCP server assigns the IP address, the IP address appears on the boot screen.
- If a static IP address is assigned, use that IP address.
- The default login credentials are located on the serial number/iLO information label located on the top of the chassis.

- c. In the side navigation, click the **Remote Console & Media** link, and then launch a remote console.

Power on the server

5. Press the Power On/Standby button.

For remote management, use the iLO virtual power button.

Update the firmware

6. Using the SPP, **update the following**:

- System ROM
- Storage controller
- Network adapters
- Intelligent Provisioning

Set up the storage

7. Set up the storage. Do one of the following:

- To configure the server to boot from a SAN, see the following guide in the HPE website (<https://www.hpe.com/info/boot-from-san-config-guide>):
HPE Boot from SAN Configuration Guide
- If an HPE Smart Array SR controller is installed, use HPE Smart Storage Administrator to create arrays:
 - a. From the boot screen, press **F10** to run Intelligent Provisioning.
 - b. From Intelligent Provisioning, run **HPE Smart Storage Administrator**.
- If no controller option is installed, do one of the following:
 - AHCI is enabled by default. Deploy an OS or virtualization software.
 - Disable AHCI, enable software RAID, and then create an array:
 - a. From the boot screen, press **F9** to run UEFI System Utilities.
 - b. From the UEFI System Utilities screen, select **System Configurations > BIOS/Platform Configuration (RBSU) > Storage Options > SATA Controller Options > Embedded SATA Configuration > Smart Array SW RAID Support**.
 - c. Enable **Smart Array SW RAID Support**.
 - d. Save the configuration and reboot the server.
 - e. Create an array:
 - I. From the boot screen, press **F9** to run UEFI System Utilities.
 - II. From the UEFI System Utilities screen, select **System Configuration > Embedded Storage: HPE Smart Storage S100i SR Gen10 > Array Configuration > Create Array**.

Deploy an OS or virtualization software

8. Deploy an OS or virtualization software. Do one of the following:

- Press **F10** at the POST screen.
For Intelligent Provisioning 3.30 and later, you are prompted to select whether you want to enter the Intelligent Provisioning or HPE SMB Setup mode. After you have selected a mode, you must reprovision the server to change the mode that launches when you boot to **F10**.
- Manually deploy an OS.
 - a. Insert the installation media.

For remote management, click **Virtual Drives** in the iLO remote console to mount images, drivers, or files to a virtual folder. If a storage driver is required to install the OS, use the virtual folder to store the driver.

- b. Press **F11** at boot screen to select the boot device.
- c. After the OS installed, **update the drivers**.

Register the server

9. To experience quicker service and more efficient support, register the server at the HPE website:
<https://myenterpriselicense.hpe.com>

Operational requirements

Space and airflow requirements

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

- Leave a minimum clearance of 63.5 cm (25 in) in front of the rack.
- Leave a minimum clearance of 76.2 cm (30 in) behind the rack.
- Leave a minimum clearance of 121.9 cm (48 in) from the back of the rack to the back of another rack or row of racks.

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

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

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

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

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

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

- Front and rear doors—If the 42U rack includes closing front and rear doors, you must allow 5,350 sq cm (830 sq in) of holes evenly distributed from top to bottom to permit adequate airflow (equivalent to the required 64 percent open area for ventilation).
 - Side—The clearance between the installed rack component and the side panels of the rack must be a minimum of 7 cm (2.75 in).
-

Temperature requirements

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

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

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

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

Power requirements

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

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

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

Electrical grounding requirements

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

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

Server warnings and cautions

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

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

⚠ WARNING: To reduce the risk of fire or burns after removing the energy pack:

- Do not disassemble, crush, or puncture the energy pack.
- Do not short external contacts.
- Do not dispose of the energy pack in fire or water.

After power is disconnected, battery voltage might still be present for 1s to 160s.

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

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

⚠ CAUTION: To avoid data loss, Hewlett Packard Enterprise recommends that you back up all server data before installing or removing a hardware option, or performing a server maintenance or troubleshooting procedure.

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

Rack warnings and cautions

⚠ WARNING: When all components are removed, the server weighs 13.5 kg (29.82 lb). When all components are installed, the server can weigh up to 25.0 kg (55.00 lb).

Before configuring your rack solution, be sure to check the rack manufacturer weight limits and specifications. Failure to do so can result in physical injury or damage to the equipment and the facility.



WARNING: The server is heavy. To reduce the risk of personal injury or damage to the equipment, do the following:

- Observe local occupational health and safety requirements and guidelines for manual material handling.
 - Get help to lift and stabilize the product during installation or removal, especially when the product is not fastened to the rails. The server weighs more than 13.5 kg (29.82 lb), so at least two people must lift the server into the rack together. An additional person may be required to help align the server if the server is installed higher than chest level.
 - Use caution when installing the server in or removing the server from the rack.
 - Adequately stabilize the rack before extending a component outside the rack. Extend only one component at a time. A rack may become unstable if more than one component is extended.
 - Do not stack anything on top of rail-mounted component or use it as a work surface when extended from the rack.
-



WARNING: To reduce the risk of personal injury or damage to the equipment, observe the following precautions:

- The leveling jacks are extended to the floor.
 - The full weight of the rack rests on the leveling jacks.
 - The stabilizing feet are attached to the rack if it is a single-rack installation.
 - The racks are coupled together in multiple-rack installations.
-



WARNING: To reduce the risk of personal injury or equipment damage when unloading a rack:

- At least two people are needed to safely unload the rack from the pallet. An empty 42U rack can weigh as much as 115 kg (253 lb), can stand more than 2.1 m (7 ft) tall, and might become unstable when being moved on its casters.
 - Never stand in front of the rack when it is rolling down the ramp from the pallet. Always handle the rack from both sides.
-



CAUTION: Always plan the rack installation so that the heaviest item is on the bottom of the rack. Install the heaviest item first, and continue to populate the rack from the bottom to the top.



CAUTION: Before installing the server in a rack, be sure to properly scope the limitations of the rack. Before proceeding with the installation, consider the following:

- You must fully understand the static and dynamic load carrying capacity of the rack and be sure that it can accommodate the weight of the server.
 - Be sure sufficient clearance exists for cabling, installation and removal of the server, and movement of the rack doors.
-

Electrostatic discharge

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

To prevent electrostatic damage:

- Avoid hand contact by transporting and storing products in static-safe containers.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.
- Place parts on a grounded surface before removing them from their containers.
- Avoid touching pins, leads, or circuitry.
- Always be properly grounded when touching a static-sensitive component or assembly. Use one or more of the following methods when handling or installing electrostatic-sensitive parts:
 - Use a wrist strap connected by a ground cord to a grounded workstation or computer chassis. Wrist straps are flexible straps with a minimum of 1 megohm \pm 10 percent resistance in the ground cords. To provide proper ground, wear the strap snug against the skin.
 - Use heel straps, toe straps, or boot straps at standing workstations. Wear the straps on both feet when standing on conductive floors or dissipating floor mats.
 - Use conductive field service tools.
 - Use a portable field service kit with a folding static-dissipating work mat.

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

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

Setting up the server in tower mode

Procedure

1. **Remove the server from the rack.**
2. Turn the server to the upright position.
3. Place the server on a flat stable surface.
4. **Connect peripheral devices to the server.**



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
- Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Unplug the power cord from the power supply to disconnect power to the equipment.
- Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.

-
5. Connect the power cord to the rear of the server.
 6. Connect the power cord to the AC power source.

POST screen options

When the server is powered on, the POST screen is displayed. The following options are displayed:

- **System Utilities (F9)**
Use this option to configure the system BIOS.
- **Intelligent Provisioning (F10)**
Use this option to deploy an operating system or configure storage.
- **Boot order (F11)**
Use this option to make a one-time boot selection.
- **Network boot (F12)**
Use this option to boot the server from the network.

Installing or deploying an operating system

Before installing an operating system, observe the following:

- Be sure to read the HPE UEFI requirements for ProLiant servers on the **Hewlett Packard Enterprise website**. If UEFI requirements are not met, you might experience boot failures or other errors when installing the operating system.
- Update firmware before using the server for the first time, unless software or components require an older version. For more information, see "**Keeping the system current** on page 123."
- For the latest information on supported operating systems, see the **Hewlett Packard Enterprise website**.
- The server does not ship with OS media. All system software and firmware is preloaded on the server.

Hardware options installation

This chapter provides detailed instructions on how to install hardware options.

For more information on supported options, see the product QuickSpecs on the HPE ProLiant 110 Gen10 Server website at:

<http://www.hpe.com/servers/ml110-gen10>

To view the warranty for your server and supported options, see [Warranty information](#) on page 133.

Introduction

Install any hardware options before initializing the server. For options installation information, see the option documentation. For server-specific information, use the procedures in this section.

If multiple options are being installed, read the installation instructions for all the hardware options to identify similar steps and streamline the installation process.

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

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

Drive options

Drive installation guidelines

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

Observe the following general guidelines:

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

For drive numbering, see [Drive bay numbering](#) on page 19.

- Drives with the same capacity provide the greatest storage space efficiency when grouped into the same drive array.

Drive support information

Depending on the drive cage installed, the server supports the following drive types:

- Non-hot-plug LFF SATA drives
- Hot-plug LFF SATA or SAS drives
- Hot-plug SFF SATA or SAS drives

The server supports up to 16 drives in SFF configuration and 8 drives in LFF configuration.

The embedded HPE Smart Array S100i SR Gen10 Controller supports SATA drive installation. For SAS support, install a type-p standup plug-in Smart Array controller option.

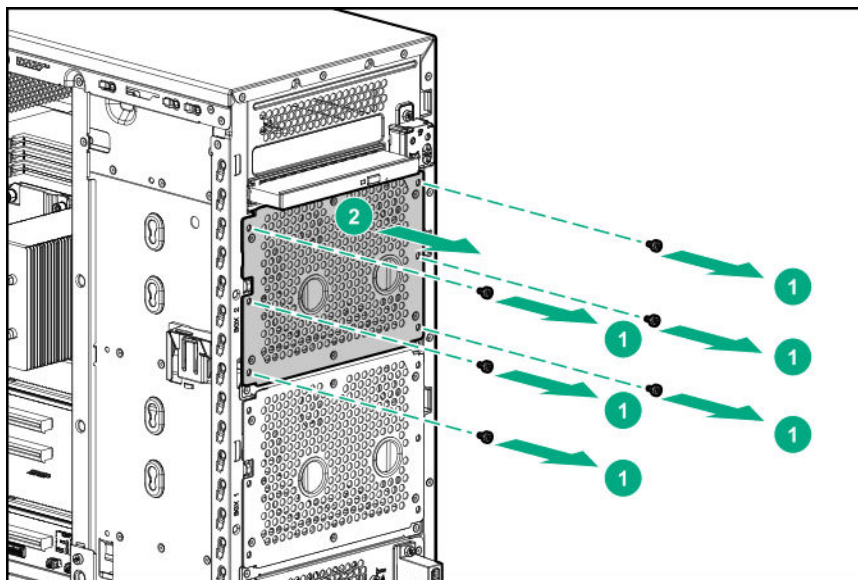
Installing an LFF non-hot-plug drive

Prerequisites

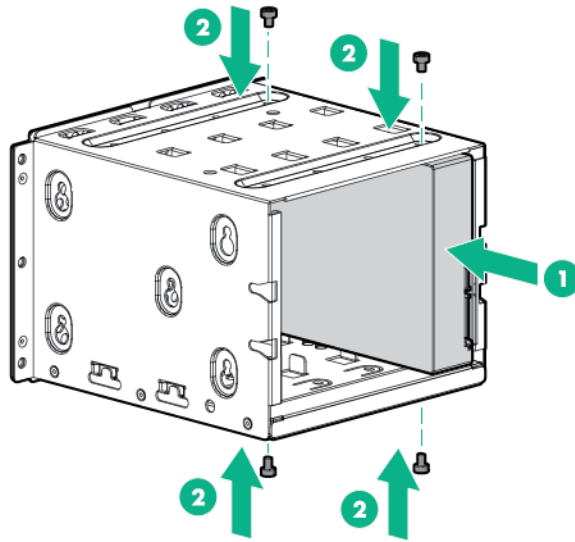
Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

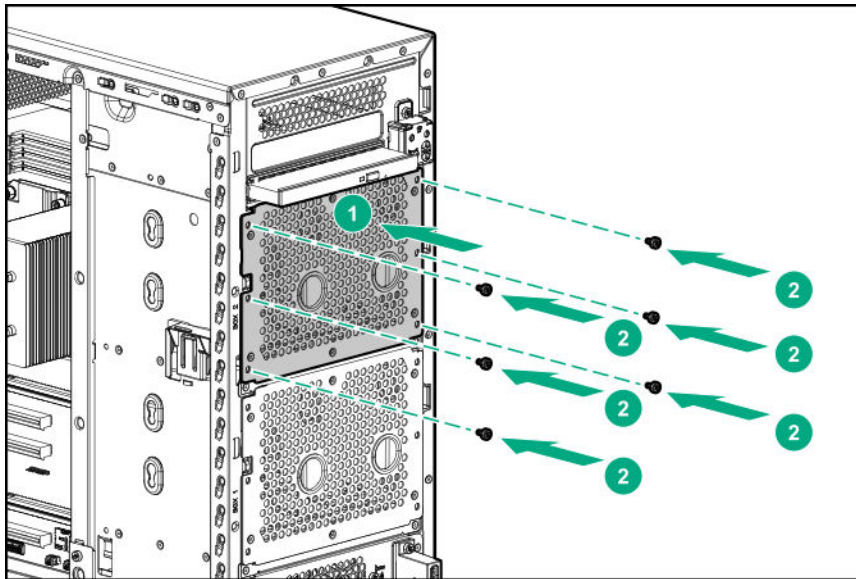
1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the front bezel** on page 27.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Disconnect all existing drive cage cables.
10. Remove the installed drive cage.



11. Use the screws on the non-hot-plug drive cage to install the drives.



12. Install the 4 LFF non-hot-plug drive cage assembly.



13. **Connect the drive cables.**

14. **Install the system air baffle** on page 31.

15. **Install the PCI air baffle** on page 30.

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

17. **Install the access panel** on page 26.

18. Do one of the following:

- Server in rack mode: **Install the server into the rack** on page 53.
- Server in tower mode: Return the server to an upright position.

19. Connect all peripheral cables to the server.

20. Connect each power cord to the server.

21. Connect each power cord to the power source.

22. **Power up the server** on page 23.

The installation is complete.

To configure arrays, see the *HPE Smart Array SR Gen10 Configuration Guide* at the [Hewlett Packard Enterprise website](#).

Installing an LFF hot-plug drive

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

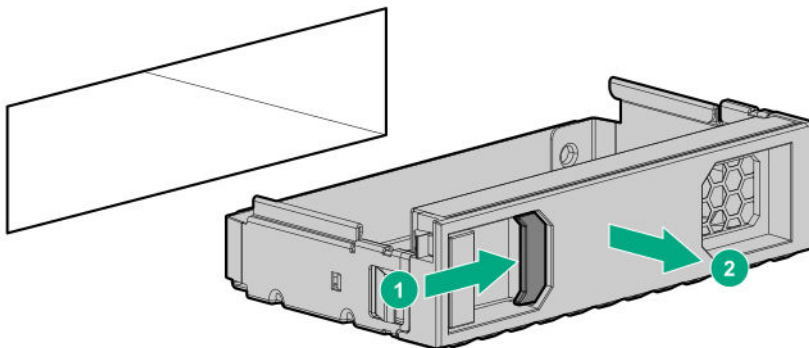
Prerequisites

Before you perform this procedure:

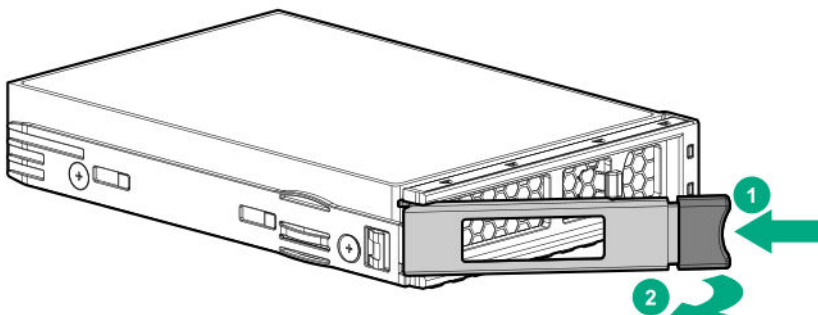
- **Verify that the LFF hot-plug drive cage is installed.**
- Make sure that you have the LFF hot-plug drive option is available.

Procedure

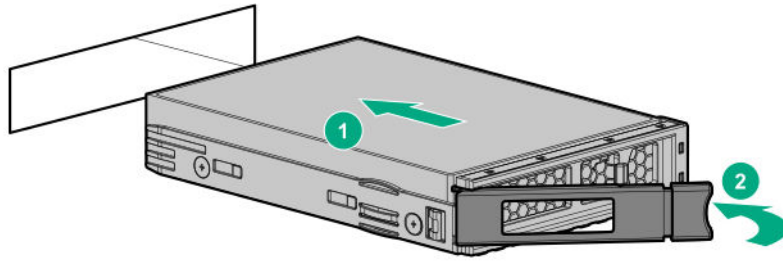
1. Open the front bezel.
2. Remove the drive blank.



3. Prepare the drive.



4. Install the drive.



5. If the drive is installed in an empty drive cage after the initial system boot, reboot the system to maintain optimal ventilation.
6. **Determine the status of the drive from the drive LED definitions.**
7. Close the front bezel.

The installation is complete.

To configure arrays, see the *HPE Smart Array SR Gen10 Configuration Guide* at the [Hewlett Packard Enterprise website](#).

Installing an SFF hot-plug drive

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

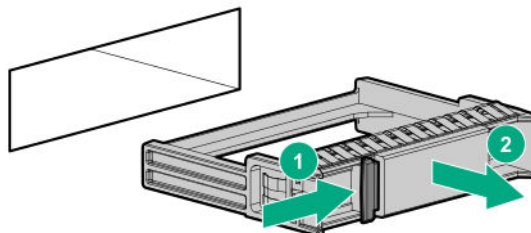
Prerequisites

Before you perform this procedure:

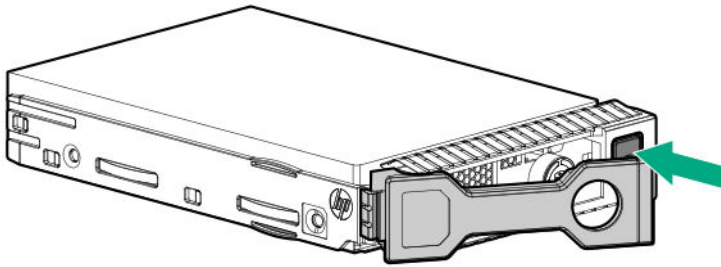
- **Verify that the SFF hot-plug drive cage is installed.**
- Make sure that you have the SFF hot-plug drive option is available.
- If you are installing an SFF hot-plug SAS drive or SSD, **make sure that the redundant fan option kit is installed.**

Procedure

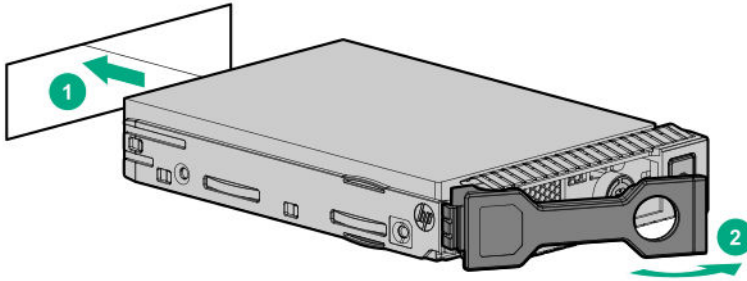
1. Open the front bezel.
2. Remove the drive blank.



3. Prepare the drive.



4. Install the SFF drive.



5. If a hot-plug drive is installed into an empty backplane after the initial boot, reboot the system to get optimal ventilation.
6. **Determine the status of the drive from the drive LED definitions.**
7. Close the front bezel.

The installation is complete.

To configure arrays, see the *HPE Smart Array SR Gen10 Configuration Guide* at the [Hewlett Packard Enterprise website](#).

Tower-to-rack conversion kit

Use the tower-to-rack conversion kit to switch the tower server to rack mode operation. After the kit is installed, complete in-rack serviceability for all server components is supported.

Kit contents

- Left and right rack rail assemblies
- Server tray

The following items included in the 874578-B21 option kit are not for use in this server:

- Cable management arm
- Chassis rear bracket screws (3)
- Shipping brackets (2)
- Shipping bracket screws (4)

- M5 square-hole cage nuts (4)
- Rear shipping screws (2)

Installing the tower-to-rack conversion kit

Use the tower-to-rack conversion kit to switch the tower server to rack mode operation. After the kit is installed, complete in-rack serviceability for all server components is supported.

Procedure

1. **Review the rack warnings and cautions.**
2. If the server is currently used in tower mode, **prepare the server for rack installation.**
3. **Install the rack rails and server tray** on page 50.
4. **Install the server into the rack** on page 53.
5. **Power up the server** on page 23.
6. **Enable the increased cooling function** on page 56.

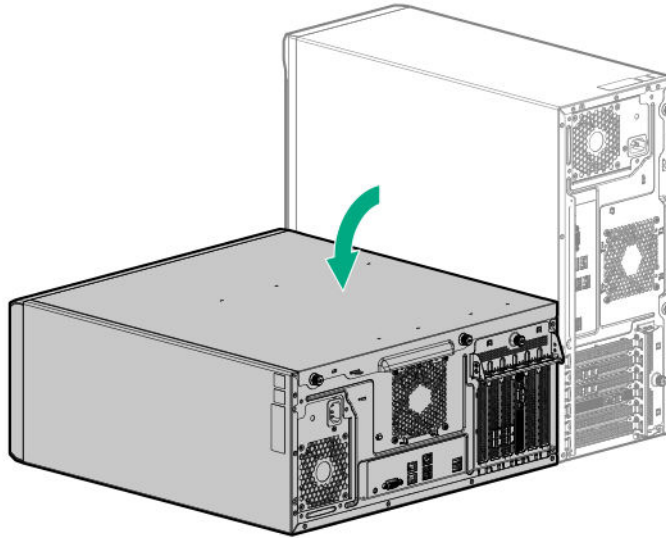
Prepare the server for rack installation

Prerequisites

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

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Place the server on the side with the access panel facing up.



Install the rack rails and server tray

These rack rails can be installed in both round- or square-hole racks.

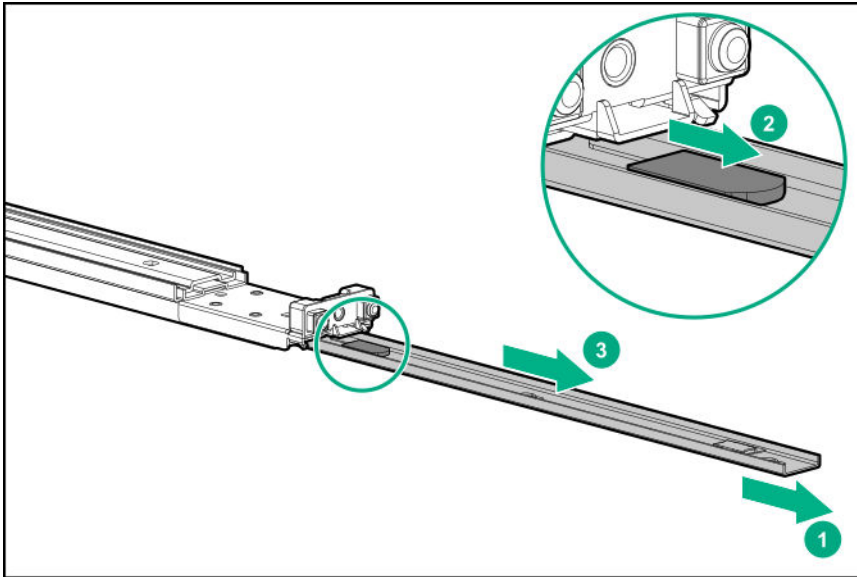
Prerequisites

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

- Left and right rack rail assemblies – These rails occupy 1U position on the rack.
- Server tray
- T-15 Torx screwdriver

Procedure

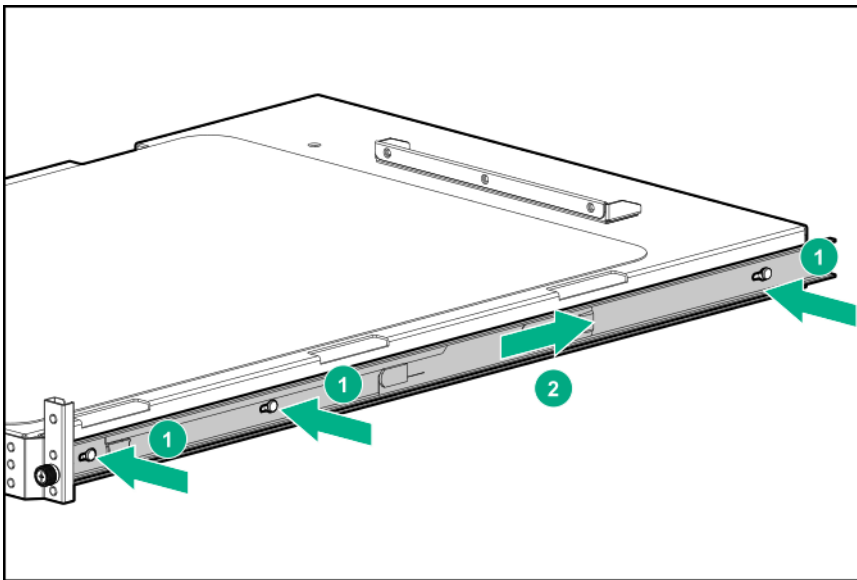
1. Disassemble the rail assemblies:
 - a. Pull out the inner rail until it is fully extended .
 - b. Slide and hold the white release tab in the direction shown, and then remove the inner sliding rail from the outer mounting rail.



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

2. Install the sliding rails on the server tray:

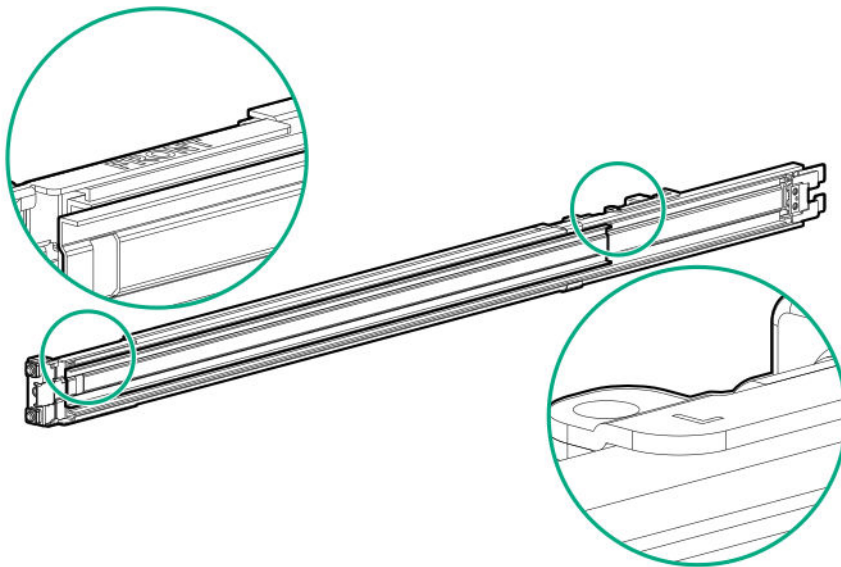
- a. Align the notches on the rail with the pins on the side.
- b. Slide the rail towards the rear of the tray to lock it into place.



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

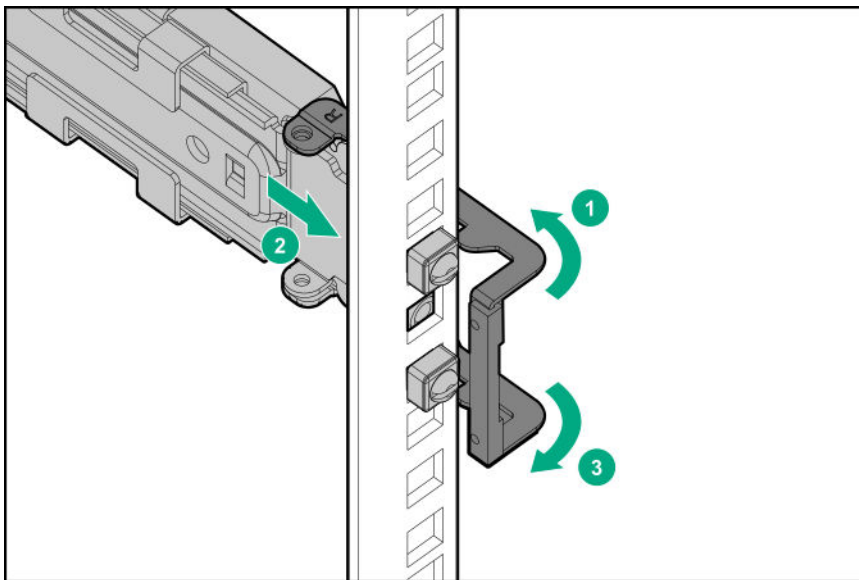
3. Locate the orientation markers on the mounting rails:

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

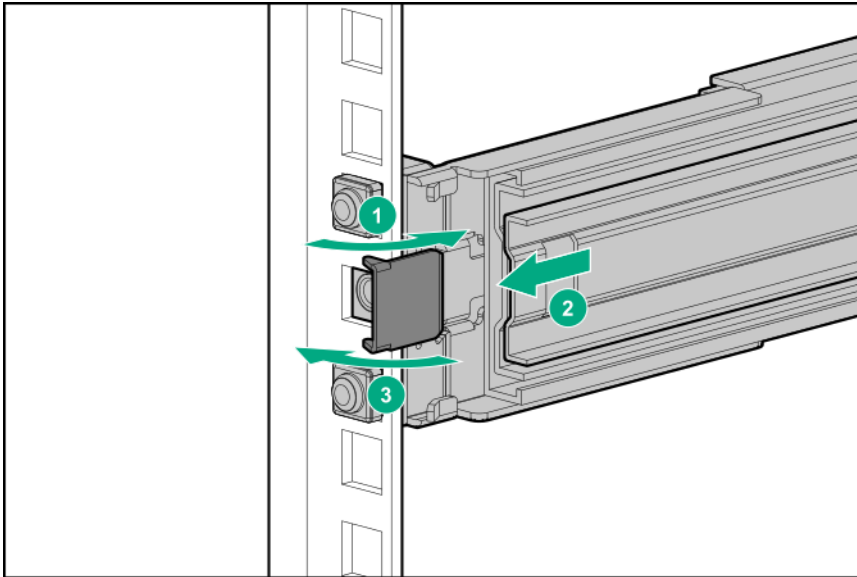


4. Fasten the mounting rails to the rack columns:

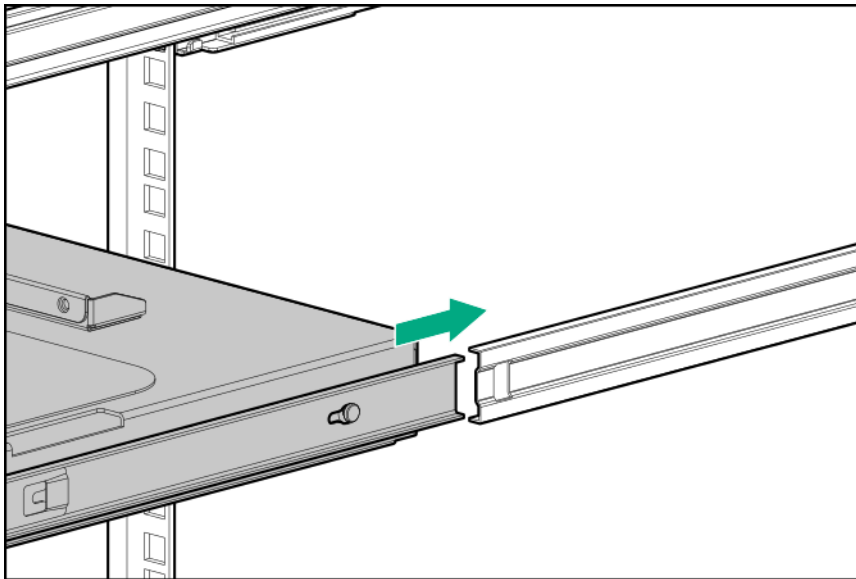
- a. Retract and hold the rear retention bracket.
- b. Insert the pegs on the mounting flange into the rack holes.
- c. Release the rear retention bracket.



- d. Retract and hold the front retention bracket.
- e. Insert the pegs on the mounting flange into the rack holes.
- f. Release the front retention bracket.



- g. Repeat steps a-f to fasten the other mounting rail.
 - h. Make sure that both rails are mounted at the same vertical position on both sides of the rack.
5. Slide the server tray into the rack.
The rails will click and lock into place when the tray is properly engaged.



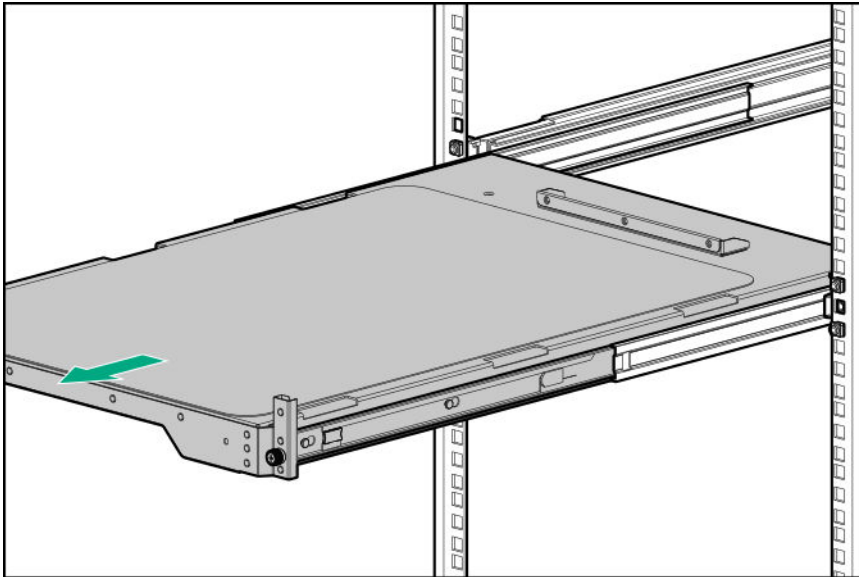
Install the server into the rack

Prerequisites

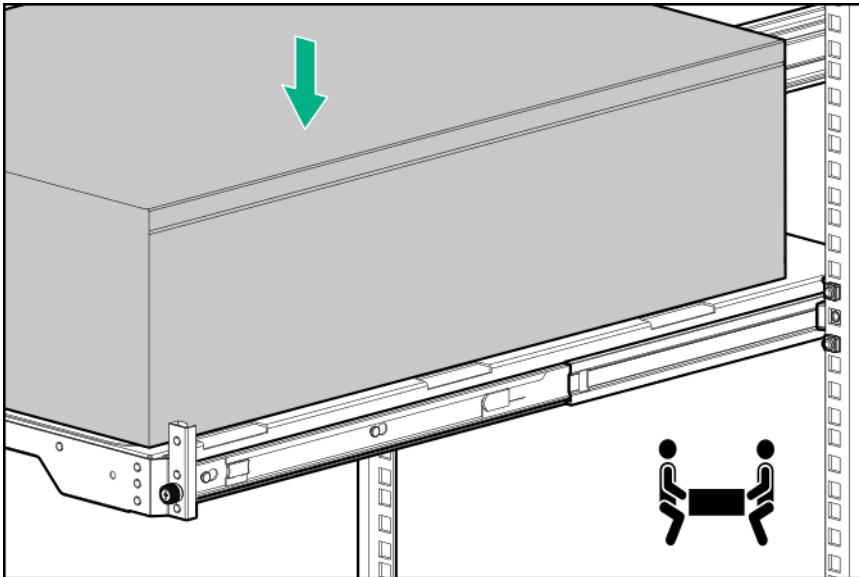
Before you perform this procedure, make sure that you have a T-15 Torx screwdriver available.

Procedure

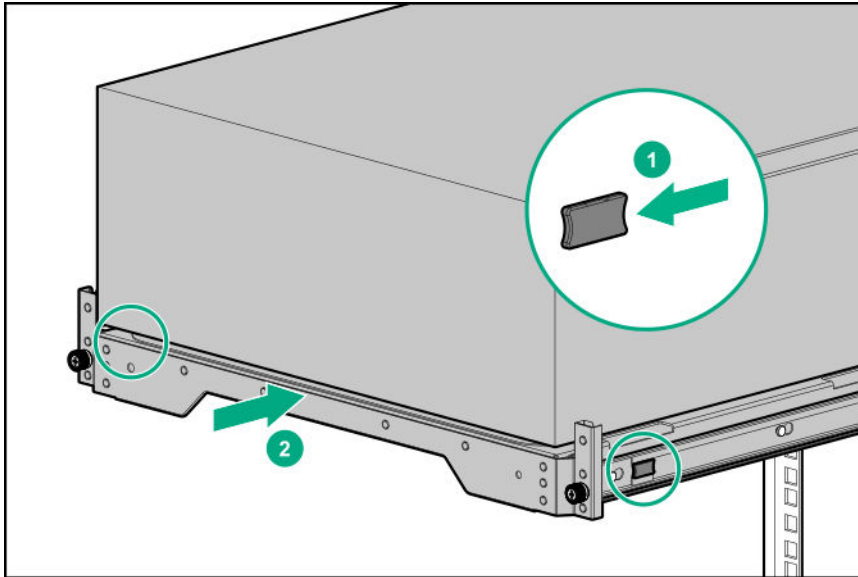
1. Grasp the tray notch and extend the server tray out of the rack.



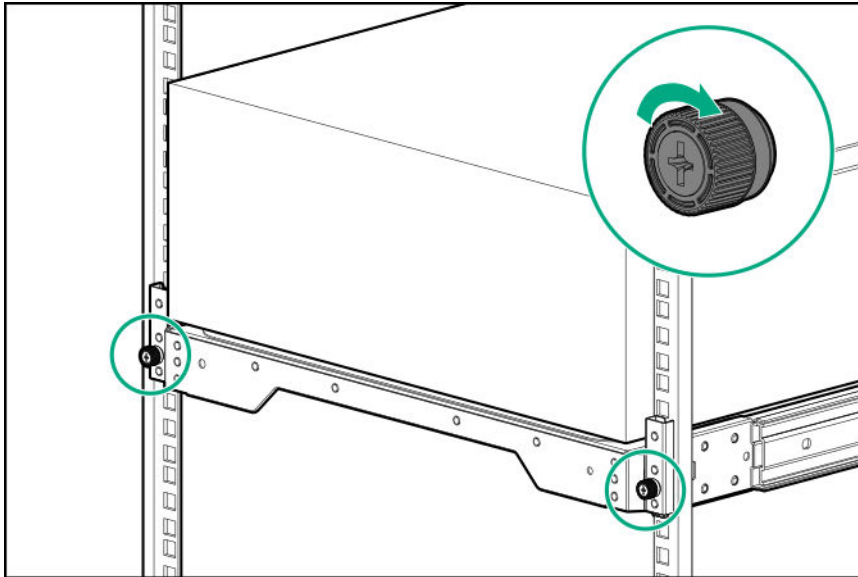
2. Place the server at the center of the server tray.
Align the front panel of the server with the edge of the tray.



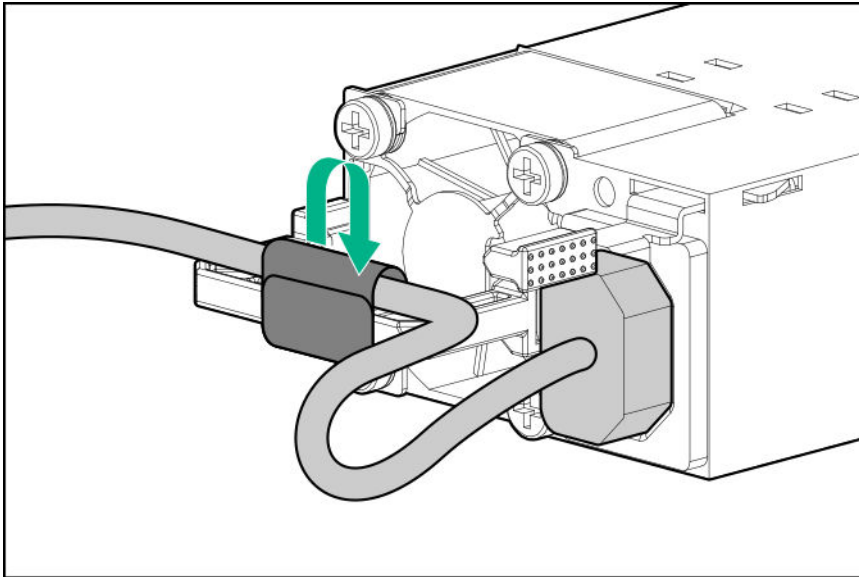
3. Press and hold the blue rail-release tabs, and then slide the server tray back into the rack.



4. Tighten the server tray thumbscrews.



5. Connect all peripheral cables and power cords to the rear panel.
6. Secure the power cord with the strain relief strap. Roll the extra length of the strap around the power input module handle.



7. Connect each power cord to the power source.
8. **Power up the server** on page 23.
9. **Enable the increased cooling function** on page 56.

The installation is complete.

Enable the increased cooling function

The server generates more heat when it is installed in a rack. To maintain proper cooling, increase the fan speed.

Procedure

1. From the **System Utilities** screen, select **System Configuration > BIOS/Platform Configuration (RBSU) > Advanced Options > Fan and Thermal Options > Thermal Configuration**.
2. Select **Increased Cooling**
3. Save your setting.

Power supply options

Depending on the installed options and the regional location where the server was purchased, the server can be configured with one of the following **power supplies**.

Hot-plug power supply calculations

For more information on the hot-plug power supply and calculators to determine server power consumption in various system configurations, see the Hewlett Packard Enterprise Power Advisor website (<http://www.hpe.com/info/poweradvisor/online>).

Power supply warnings and cautions



WARNING: To reduce the risk of electric shock or damage to the equipment:

- Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
 - Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
 - Unplug the power cord from the power supply to disconnect power to the equipment.
 - Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the server.
-



WARNING: To reduce the risk of injury from electric shock hazards, do not open power supplies. Refer all maintenance, upgrades, and servicing to qualified personnel



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



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



CAUTION: Mixing different types of power supplies in the same server might:

- Limit or disable some power supply features including support for power redundancy.
- Cause the system to become unstable and might shut down.

To ensure access to all available features, all power supplies in the same server should have the same output and efficiency ratings. Verify that all power supplies have the same part number and label color.

Installing the ATX 550W non-hot-plug power supply

Prerequisites

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

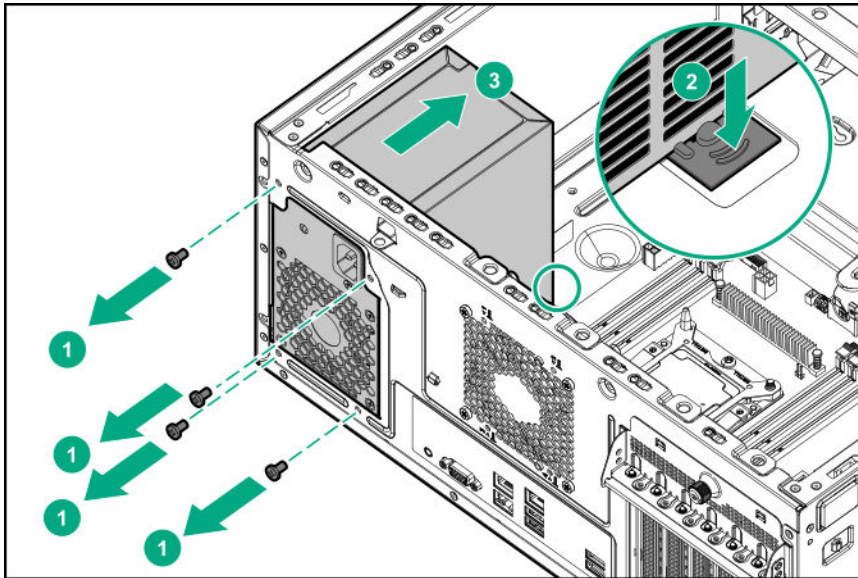
- ATX 550W non-hot-plug power supply
- T-15 Torx screwdriver

Procedure

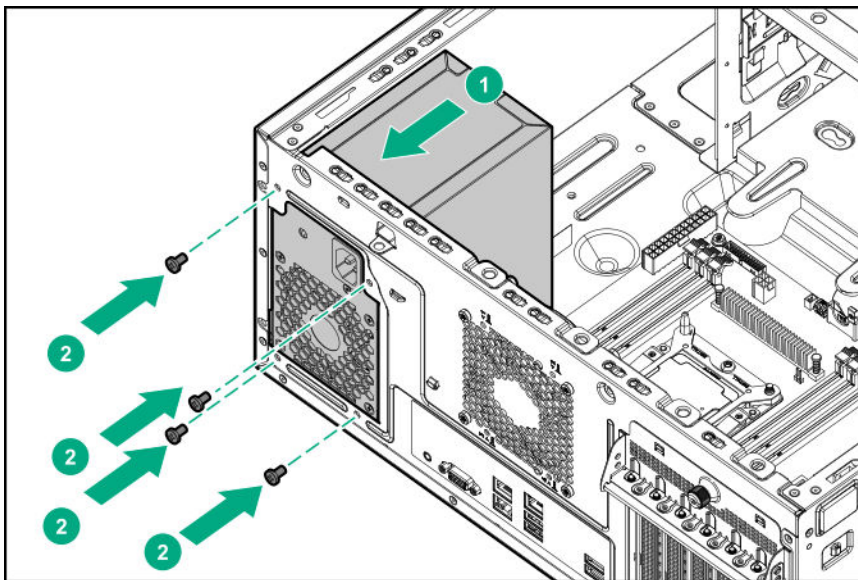
1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:

- Server in rack mode: **Remove the server from the rack** on page 23.
- Server in tower mode: **Position the tower server for hardware configuration** on page 25.

5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. Disconnect all the power supply cables connected to the system board.
9. Remove the existing power supply.



10. Install the ATX 550W non-hot-plug power supply.



11. **Connect the power supply cables.**
12. **Install the system air baffle** on page 31.
13. **Install the PCI air baffle** on page 30.

14. **Install the access panel** on page 26.
15. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
16. Connect all peripheral cables to the server.
17. Connect each power cord to the server.
18. Connect each power cord to the power source.
19. **Power up the server** on page 23.

The installation is complete.

Redundant power supply enablement option

The RPS enablement option supports the installation of two Gen10 Flexible Slot (Flex Slot) power supplies.

Adding a second power supply provides redundant power support to the server if one power supply fails. You do not have to power down the server before removing or installing a redundant hot-plug power supply.

Installing the redundant power supply enablement option

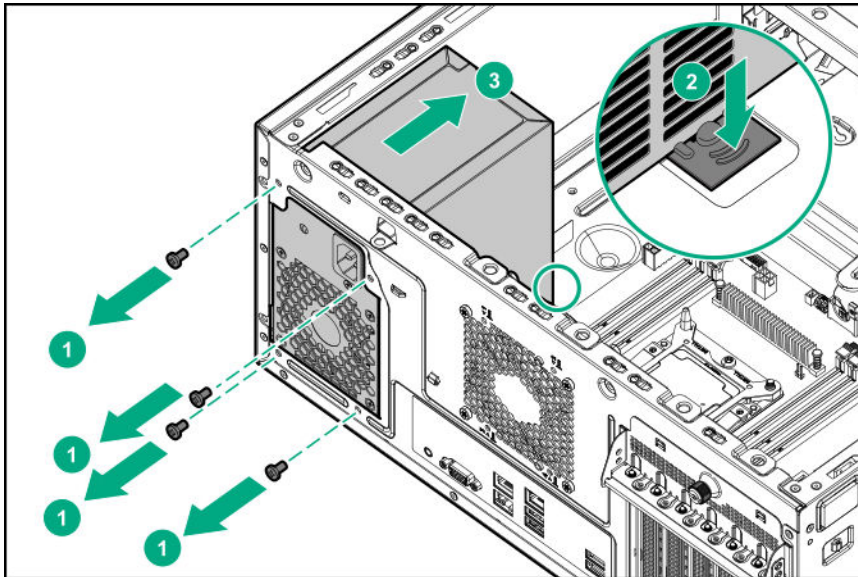
Prerequisites

- Before installing the redundant power supply enablement, read the **power supply warnings and cautions**.
- Before you perform this procedure, make sure that you have the following items available:
 - Redundant power supply enablement option
 - Flexible slot power supply
 - T-15 Torx screwdriver

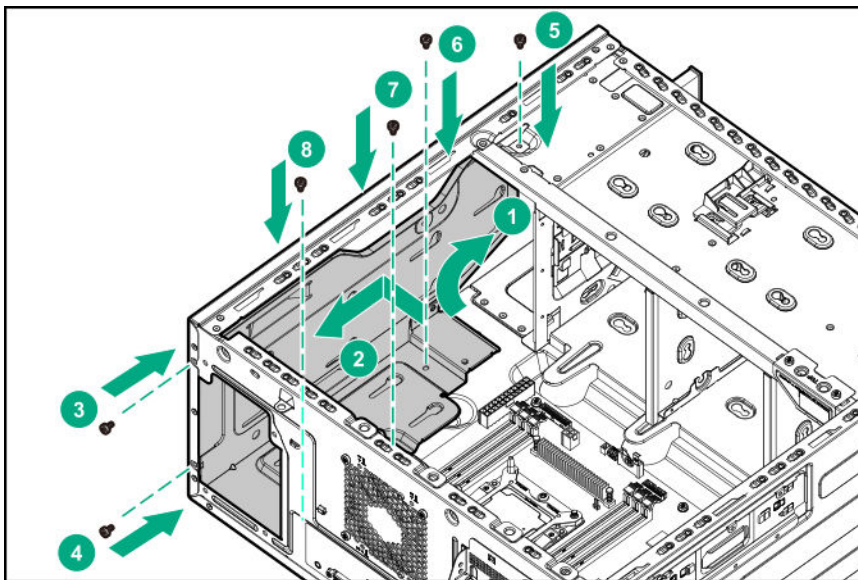
Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.

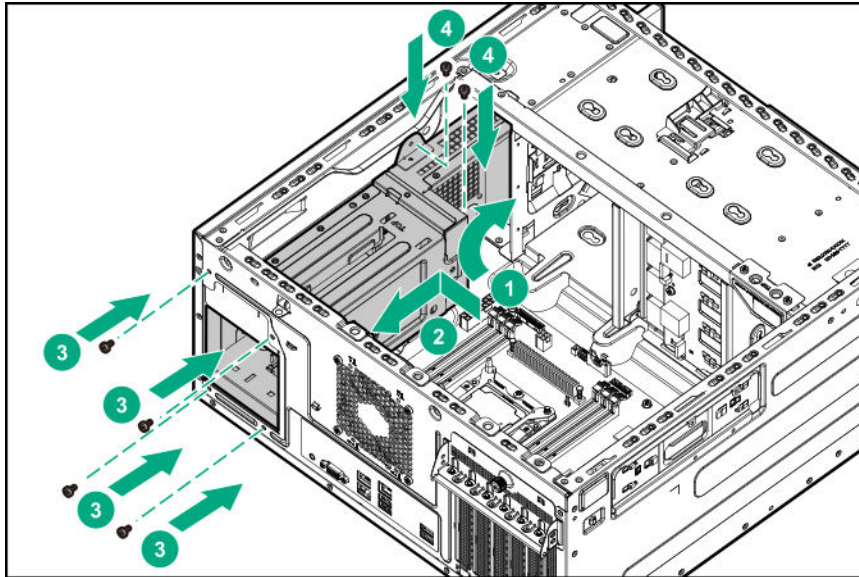
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. Disconnect all power supply cables from the system board, drive cages, and devices.
9. Remove the non-hot-plug power supply.



10. Install the RPS bracket.



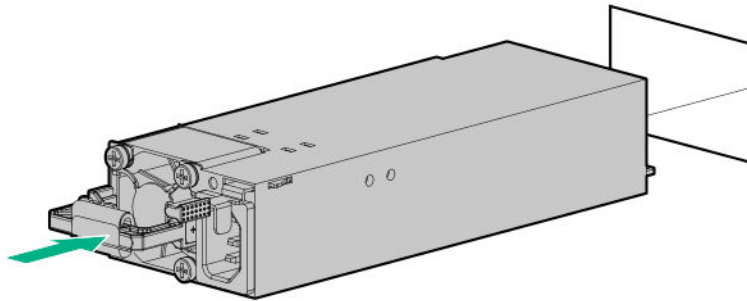
11. Install the RPS backplane.



12. Connect the RPS backplane cables.

13. Install a hot-plug power supply in the power supply bay 1.

When facing the rear of the server in an upright position, the upper level of power supply bay is bay 1 and the lower level is bay 2.



14. To enable power redundancy in the server, install a second power supply in the power supply bay 2:

- a. Remove the power supply blank from bay 2.**

20. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
21. Connect all peripheral cables to the server.
22. Connect each power cord to the power source.
23. **Power up the server** on page 23.

The installation is complete.

Drive cage options

The server supports the following drive cage options:

- **Four-bay LFF non-hot-plug drive cage**
- **Four-bay LFF hot-plug drive cage**
- **Eight-bay SFF hot-plug drive cage**

If only one drive cage is installed, install it in box 1. Mixing LFF and SFF drive cages in the same server is not supported.

Installing the four-bay LFF non-hot-plug drive cage

Prerequisites

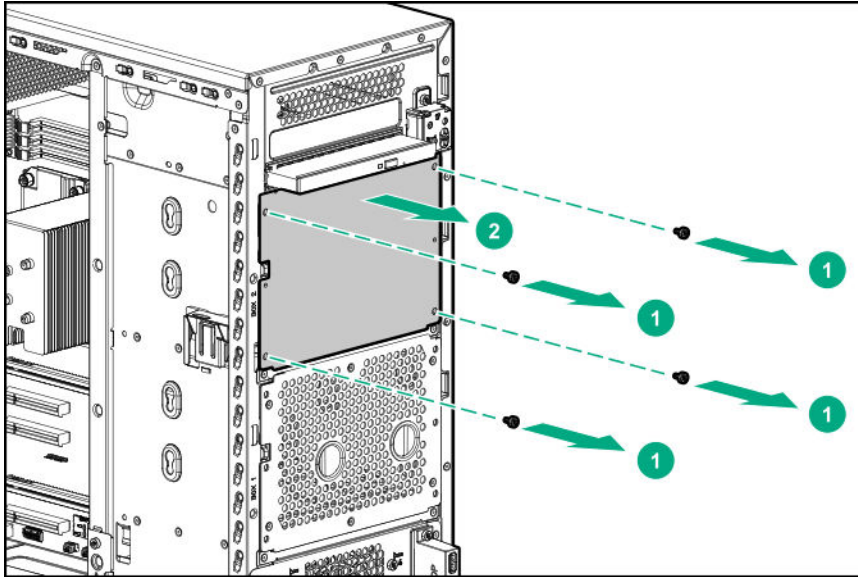
Before you perform this procedure, make sure that you have the following items available:

- Four-bay LFF non-hot-plug drive cage option
- LFF non-hot-plug drive option
- T-15 Torx Screwdriver

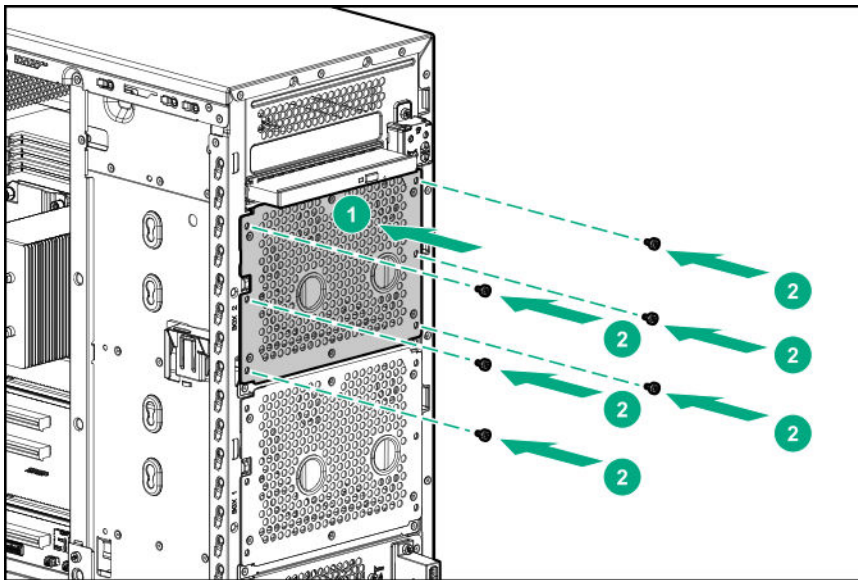
Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.

6. **Remove the front bezel** on page 27.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Remove the drive bay cover from box 2.



10. **Install the non-hot-plug drives.**
11. Install the drive cage in box 2.



12. **Connect the drive cables.**
13. **Install the system air baffle** on page 31.
14. **Install the PCI air baffle** on page 30.
15. **Install the front bezel** on page 28.
16. **Install the access panel** on page 26.
17. Do one of the following:

- Server in rack mode: **Install the server into the rack** on page 53.
- Server in tower mode: Return the server to an upright position.

18. Connect all peripheral cables to the server.
19. Connect each power cord to the server.
20. Connect each power cord to the power source.
21. **Power up the server** on page 23.

The installation is complete.

Installing the four-bay LFF hot-plug drive cage

The four-bay LFF hot-plug drive cage can be installed in both box 1 and box 2.

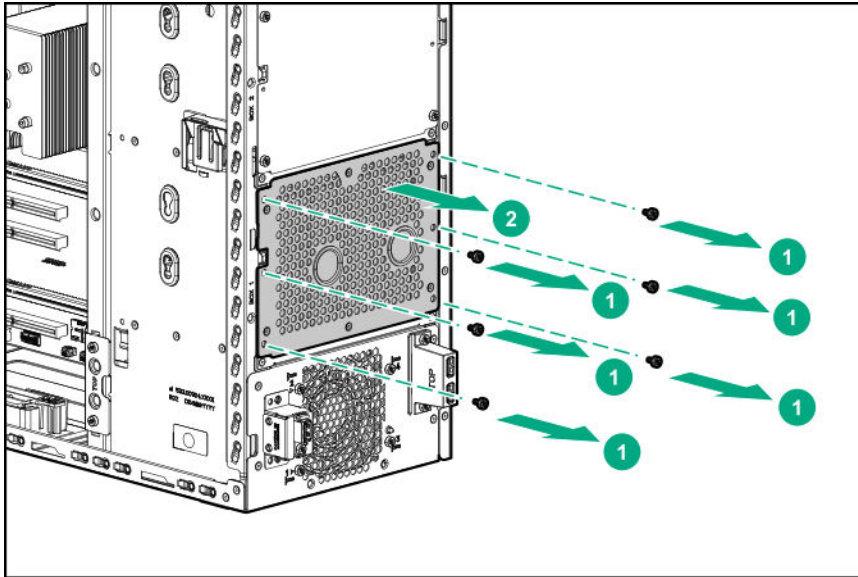
Prerequisites

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

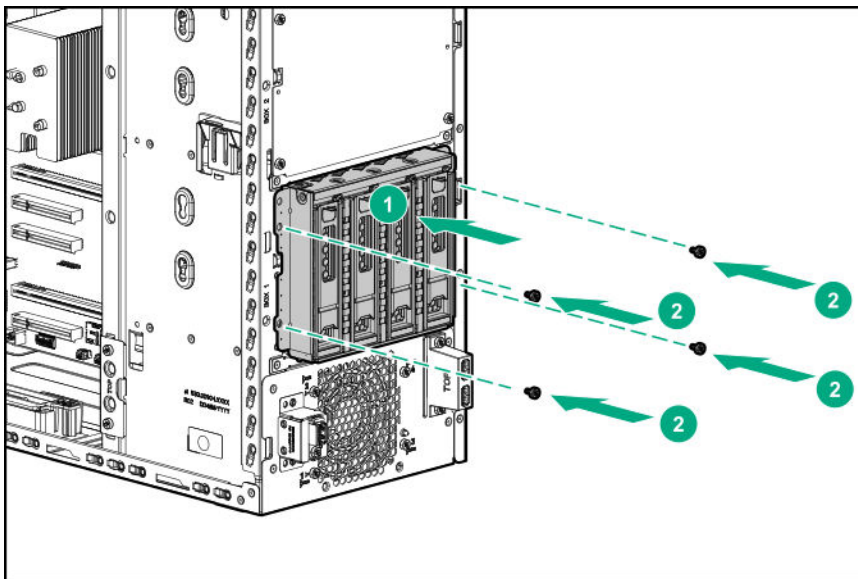
- Four-bay LFF hot-plug drive cage option
- LFF hot-plug drive option
- T-15 Torx Screwdriver

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the front bezel** on page 27.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Disconnect all existing drive cage cables.
10. Remove the installed drive cage assembly.



11. Install the drive cage in box 1.



12. **Connect the drive cables.**

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

14. **Install the system air baffle** on page 31.

15. **Install the PCI air baffle** on page 30.

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

17. **Install the access panel** on page 26.

18. Do one of the following:

- Server in rack mode: **Install the server into the rack** on page 53.
- Server in tower mode: Return the server to an upright position.

19. Connect all peripheral cables to the server.

20. Connect each power cord to the server.
21. Connect each power cord to the power source.
22. **Power up the server** on page 23.

The installation is complete.

Installing the eight-bay SFF hot-plug drive cage

The eight-bay SFF hot-plug drive cage can be installed in both box 1 and box 2.

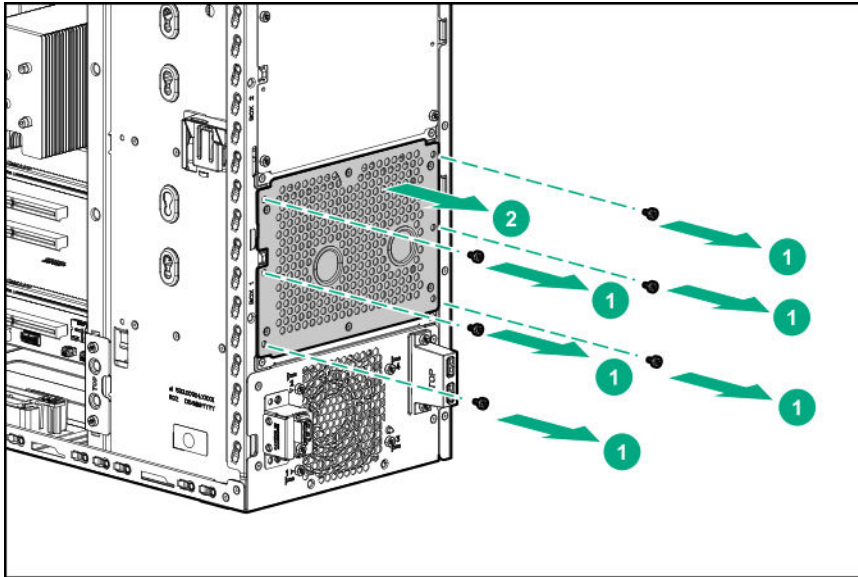
Prerequisites

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

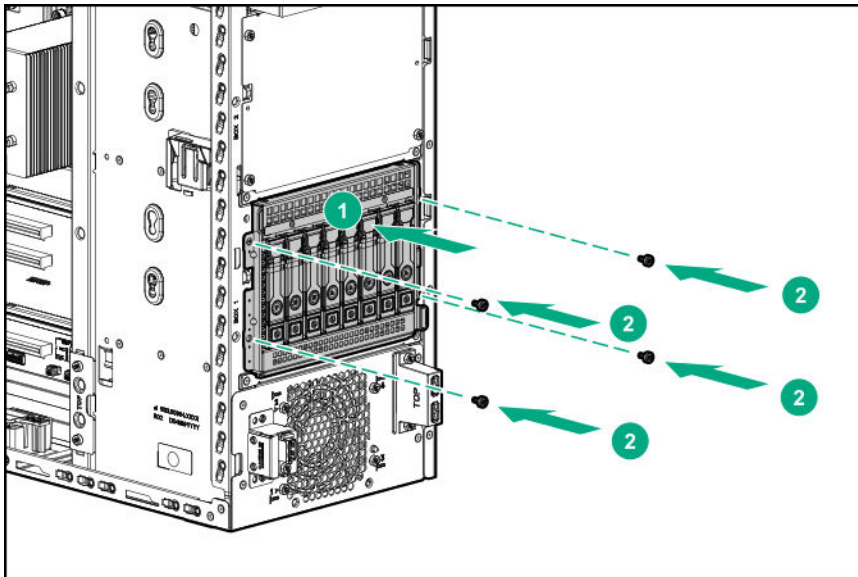
- Eight-bay SFF hot-plug drive cage option
- SFF hot-plug drive option
- T-15 Torx Screwdriver

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the front bezel** on page 27.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Disconnect all existing drive cage cables.
10. Remove the installed drive cage assembly.



11. Install the drive cage in box 1.



12. **Connect the drive cables.**

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

14. **Install the system air baffle** on page 31.

15. **Install the PCI air baffle** on page 30.

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

17. **Install the access panel** on page 26.

18. Do one of the following:

- Server in rack mode: **Install the server into the rack** on page 53.
- Server in tower mode: Return the server to an upright position.

19. Connect all peripheral cables to the server.

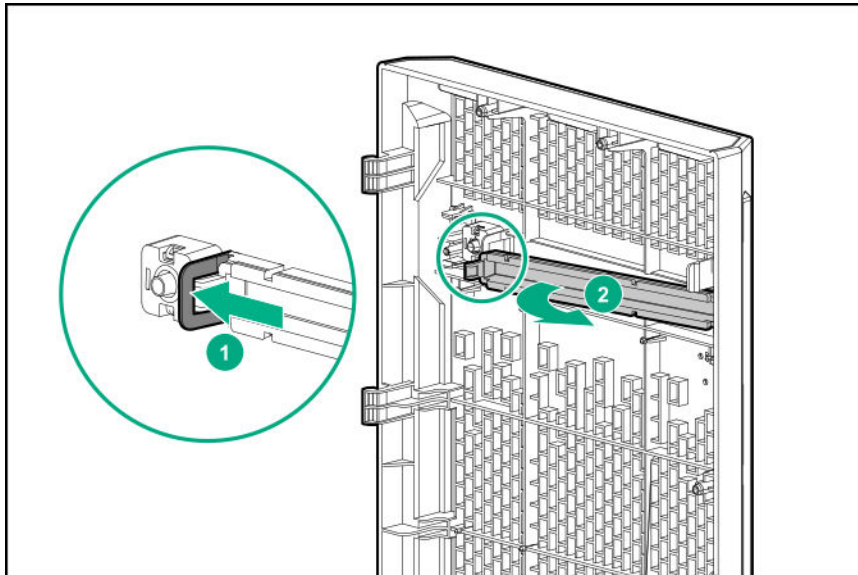
20. Connect each power cord to the server.
21. Connect each power cord to the power source.
22. **Power up the server** on page 23.

The installation is complete.

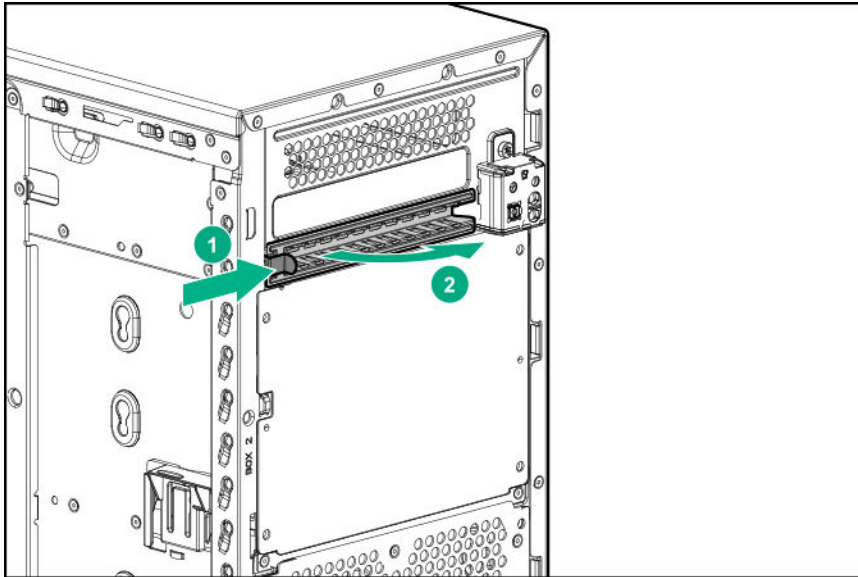
Installing the optical drive option

Procedure

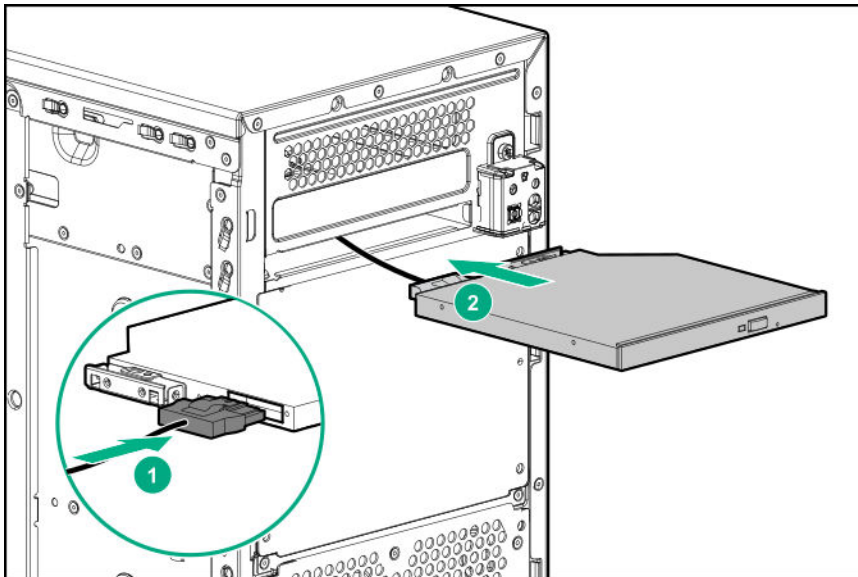
1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. Remove the optical drive cover.



9. Remove the EMI shield from the front panel.



10. Connect the cable to the rear of the drive and then route the cable through the drive bay.



11. **Connect the optical drive SATA and power cable to the system board and power supply.**

12. **Install the system air baffle** on page 31.

13. **Install the PCI air baffle** on page 30.

14. **Install the access panel** on page 26.

15. Do one of the following:

- Server in rack mode: **Install the server into the rack** on page 53.
- Server in tower mode: Return the server to an upright position.

16. Connect all peripheral cables to the server.

17. Connect each power cord to the server.

18. Connect each power cord to the power source.

19. **Power up the server** on page 23.

The installation is complete.

Storage controller options

The server supports the following storage controllers:

- For SATA drives only – Embedded HPE Smart Array S100i SR Gen10 Controller
- For SAS and SATA drives – Smart Array type-p SR Gen10 controllers

For the location and description of the PCIe3 expansion slots, see **System board components** on page 12.

For more information on PCIe slot descriptions, see **PCIe slot description** on page 16.

Storage controller installation guidelines

To maintain optimal thermal conditions when installing a Smart Array Gen10 type-p controller, Hewlett Packard Enterprise recommends the following guidelines.

Storage controller option	Recommended PCIe slot	Cable option
E208i-p E208e-p	Slot 1, 3 or 4	Mini-SAS cable option
P408i-p P408e-p	Slot 1, 3 or 4	Mini-SAS cable option

Installing a standup PCIe plug-in Smart Array controller (type-p)

Prerequisites

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

- Smart Array standup controller option kit
- If you are installing a Smart Array P-class type-p Gen10 controller, **an energy pack option is required**.
- T-15 Torx screwdriver

Before you perform this procedure, perform the following steps:

1. Back up data on the system.
2. Close all applications.
3. **Update the server firmware if it is not the latest revision.**
4. Do one of the following:

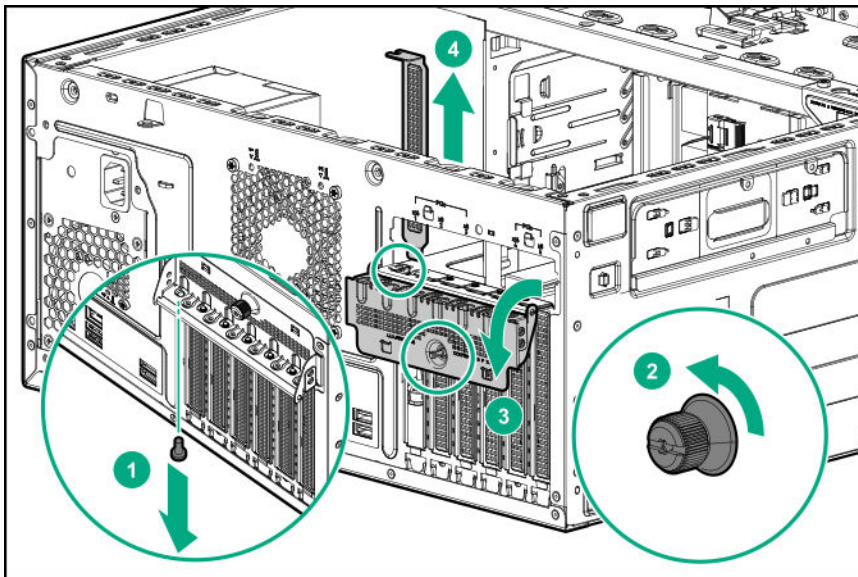
- If the new Smart Array is the new boot device, install the device drivers.
- If the new Smart Array is not the new boot device, go to the next step.

5. Ensure that users are logged off and that all tasks are completed on the server.

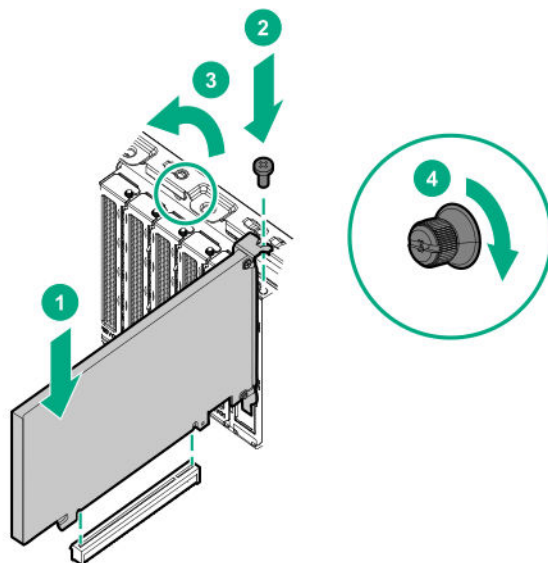
⚠ CAUTION: In systems that use external data storage, be sure that the server is the first unit to be powered down and the last to be powered back up. Taking this precaution ensures that the system does not erroneously mark the drives as failed when the server is powered up.

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. If you are installing a Smart Array P-class type-p Gen10 controller, **install an energy pack now**.
9. Open the PCIe slot cover retainer and remove a slot blank.



10. Install the standup storage controller and close the slot cover retainer.



11. Make sure that the controller board is firmly seated in the slot.
12. **Cable the controller.**
13. To enable HPE Smart Array SR SmartCache in a Smart Array P-class type-p Gen10 controller, **connect the storage controller backup power cable.**
 SmartCache and CacheCade enable solid-state drives to be used as caching devices for hard drive media. These features accelerate access to frequently used data by caching hot data from the hard drives onto the solid-state drives.
14. **Install the system air baffle** on page 31.
15. **Install the PCI air baffle** on page 30.
16. **Install the access panel** on page 26.
17. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
18. Connect all peripheral cables to the server.
19. Connect each power cord to the server.
20. Connect each power cord to the power source.
21. **Power up the server** on page 23.
22. **Configure the storage controller.**

The installation is complete.

Configuring an HPE Smart Array Gen10 controller

Procedure

1. **Power down the server** on page 23.
2. If you are running the server in UEFI Boot Mode, select the boot options.

3. **Update the drive firmware if it is not the latest revision.**
4. (Optional) If running the server in Legacy Boot Mode, set the controller as the boot controller.
5. (Optional) If running the server in Legacy Boot Mode, change the controller boot order.
6. If the new controller is not the new boot device, install the device drivers.
7. If the controller firmware is not the latest version, use SPP to update it.
8. Use UEFI System Utilities or HPE Smart Storage Administrator (HPE SSA) to create arrays and logical drives.

See the following resources for more information:

- SPP – See the product documentation in the information library:
<http://www.hpe.com/info/spp/docs>
- UEFI System Utilities or HPE Smart Storage Administrator – See the following guide in the information library (<http://www.hpe.com/info/smartstorage-docs>):

HPE Smart Array SR Gen10 Configuration Guide

Energy pack options

Hewlett Packard Enterprise offers two centralized backup power source options to back up write cache content on P-class type-p Smart Array controllers in case of an unplanned server power outage.

- **HPE Smart Storage Battery**
- **HPE Smart Storage Hybrid Capacitor**

❗ **IMPORTANT:** The HPE Smart Storage Hybrid Capacitor is only supported on Gen10 and later servers that support the 96W HPE Smart Storage Battery.

One energy pack option can support multiple devices. An energy pack option is required for P-class type-p Smart Array controllers. Once installed, the status of the energy pack displays in HPE iLO. For more information, see the HPE iLO user guide on the Hewlett Packard Enterprise website (<http://www.hpe.com/support/ilo-docs>).

HPE Smart Storage Battery

The HPE Smart Storage Battery supports the following devices:

HPE Smart Array SR controllers

A single 96W battery can support up to 24 devices.

After the battery is installed, it might take up to two hours to charge. Controller features requiring backup power are not re-enabled until the battery is capable of supporting the backup power.

This server supports the 96W HPE Smart Storage Battery with the 260mm cable.

HPE Smart Storage Hybrid Capacitor

The HPE Smart Storage Hybrid Capacitor supports the following devices:

HPE Smart Array SR controllers

The capacitor pack can support up to three devices.

This server supports the HPE Smart Storage Hybrid Capacitor with the 260mm cable.

Before installing the HPE Smart Storage Hybrid Capacitor, verify that the system BIOS meets the minimum firmware requirements to support the capacitor pack.

! **IMPORTANT:** If the system BIOS or controller firmware is older than the minimum recommended firmware versions, the capacitor pack will only support one device.

The capacitor pack is fully charged after the system boots.

Minimum firmware versions

Product	Minimum firmware version
HPE ProLiant ML110 Gen10 Server system ROM	2.00
HPE Smart Array SR controllers	1.90

Installing an energy pack

Prerequisites

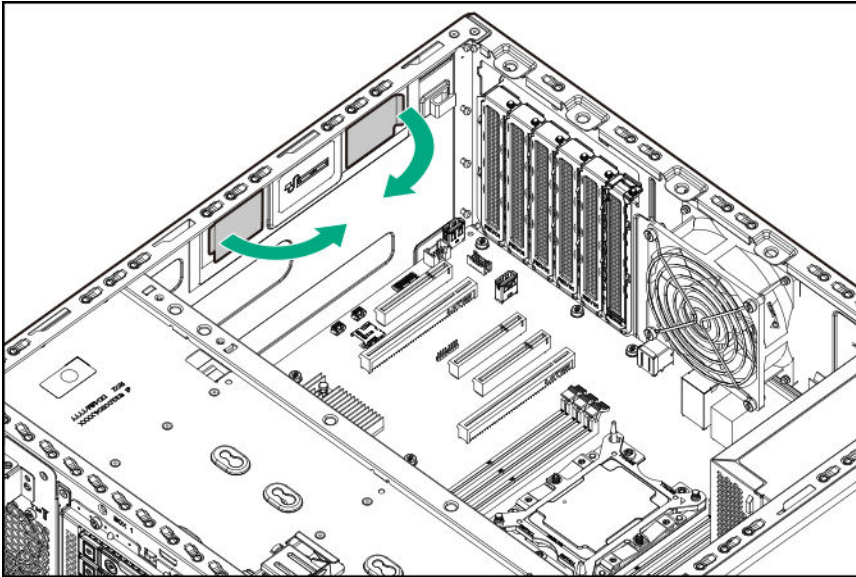
- **Make sure that a Smart Array P-class type-p Gen10 controller is installed.**
- Make sure that you have the following items available:
 - Storage controller backup power cable (ships with the controller)
 - Energy pack option
- If you are installing the HPE Smart Storage Hybrid Capacitor, **verify that the system BIOS meets the minimum firmware requirements.**

Procedure

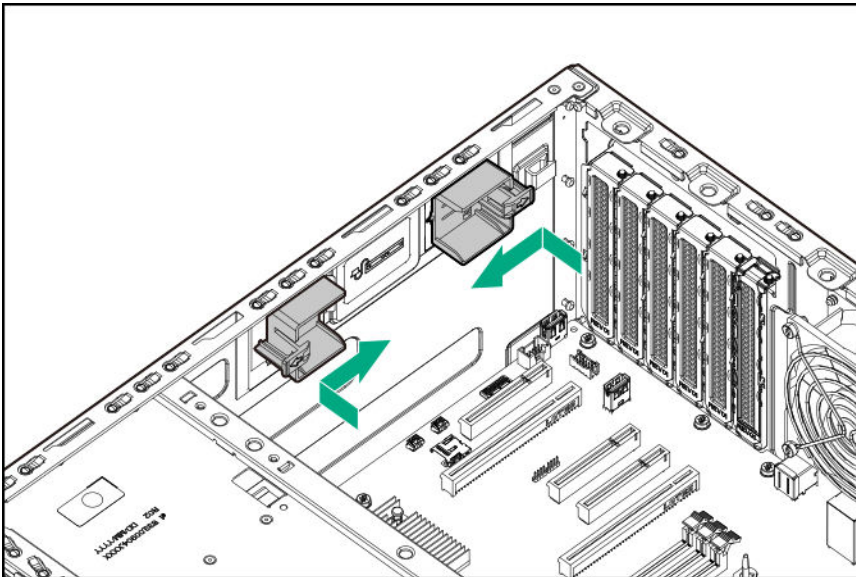
1. Back up all server data.
2. **Power down the server** on page 23.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:

- Server in rack mode: **Remove the server from the rack** on page 23.
- Server in tower mode: **Position the tower server for hardware configuration** on page 25.

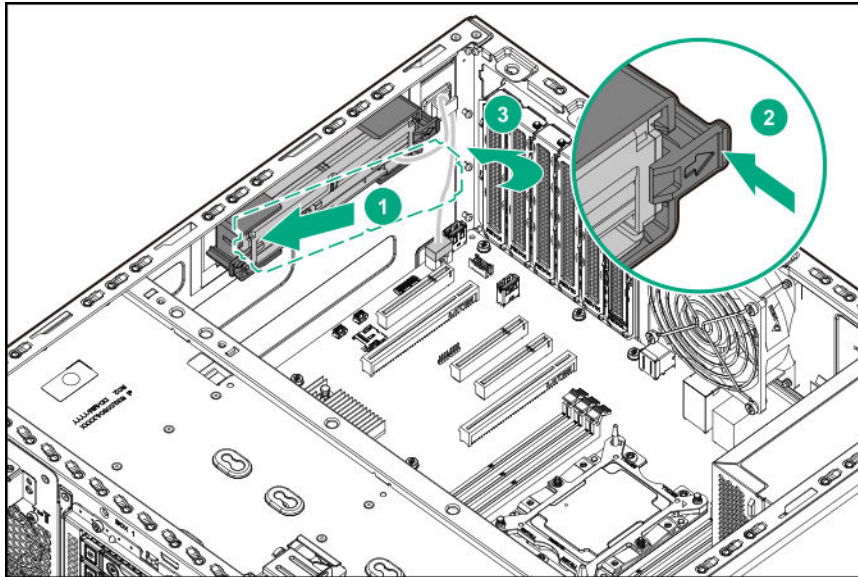
6. **Remove the access panel** on page 25.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Remove the slot covers.



10. Install the energy pack holder.



11. Install the energy pack:
 - a. Install the energy pack into the holder.
 - b. Route the energy pack cable through the cable clip and connect to the system board.



12. **Connect the storage controller backup power cable.**
13. **Install the system air baffle** on page 31.
14. **Install the PCI air baffle** on page 30.
15. **Install the access panel** on page 26.
16. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
17. Connect all peripheral cables to the server.
18. Connect each power cord to the server.
19. Connect each power cord to the power source.
20. **Power up the server** on page 23.

The installation is complete.

Expansion board options

The server has five PCIe 3 expansion slots that support different form factor expansion boards.

For the location and description of the PCIe3 expansion slots, see **System board components** on page 12.

For more information on the PCIe slot specifications, see **PCIe slot description** on page 16.

Installing an expansion board

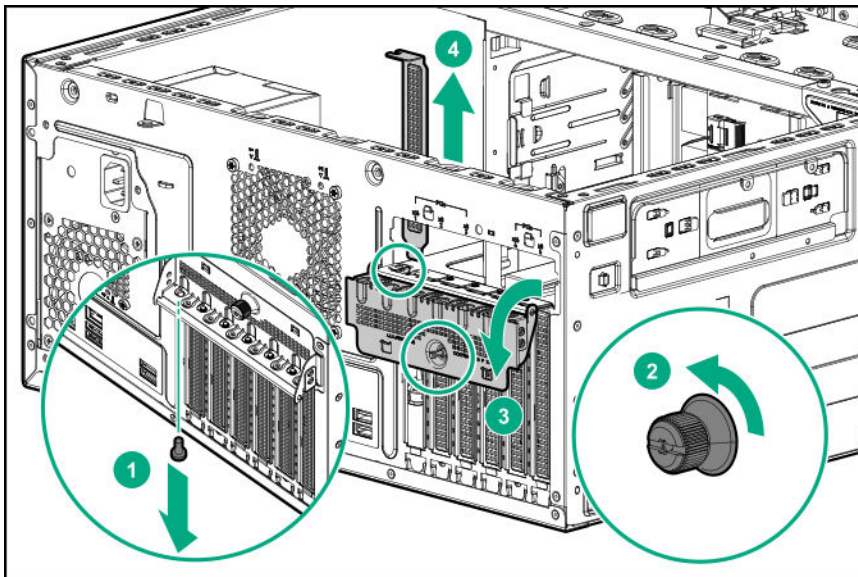
Prerequisites

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

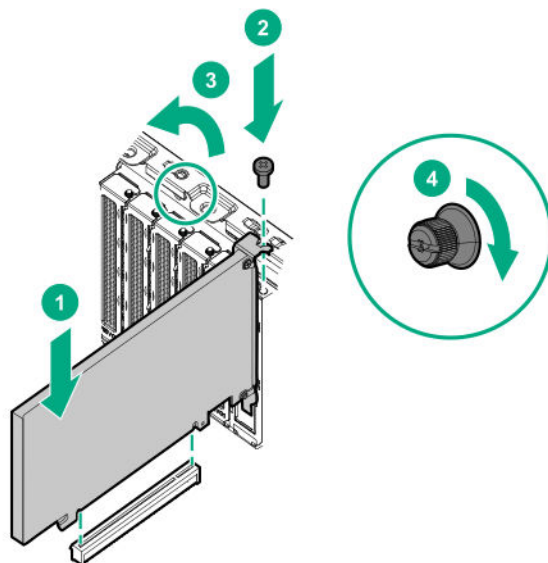
- Expansion board option kit
- Internal and external cabling required by the expansion board
- T-15 Torx screwdriver

Procedure

1. Back up all server data.
2. **Power down the server** on page 23.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
6. **Remove the access panel** on page 25.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Open the PCIe slot cover retainer and remove a slot blank.



10. Install the expansion board.



11. Close the PCIe slot cover retainer.
12. **Install the system air baffle** on page 31.
13. **Install the PCI air baffle** on page 30.
14. **Install the access panel** on page 26.
15. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
16. Connect all peripheral cables to the server.
17. Connect each power cord to the server.
18. Connect each power cord to the power source.
19. **Power up the server** on page 23.

The installation is complete.

Installing the GPU option

The server PCIe3 slots 1 and 4 support GPUs.

In general, 75W GPUs draw power from PCIe slots. GPUs that have a power requirement higher than 75W require an external auxiliary power cable connection. For specific information about power requirements of a GPU, see the GPU user documentation.

For a list of specific GPU models supported, see the product QuickSpecs on the server product page at <http://www.hpe.com/servers/ml110-gen10>.

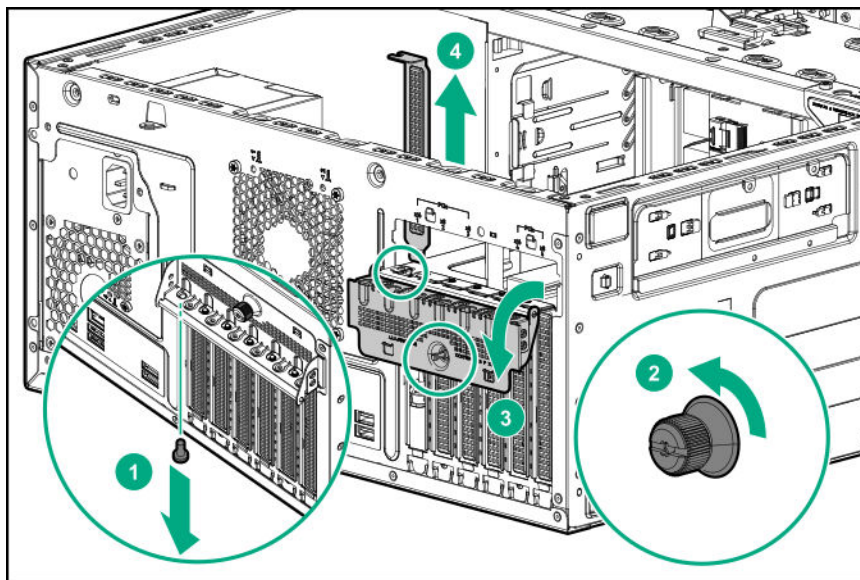
Prerequisites

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

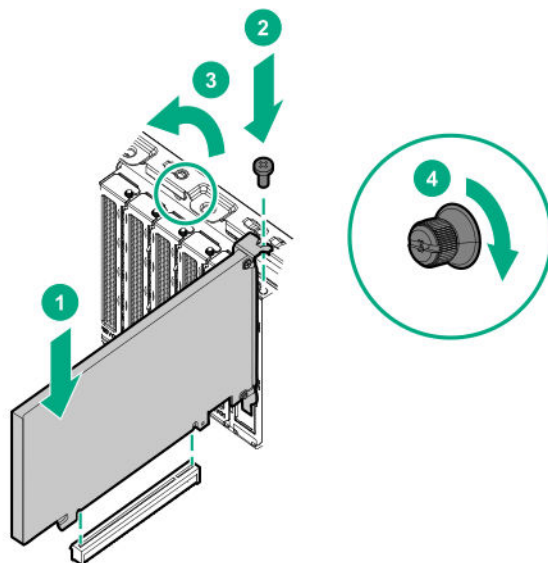
- GPU option kit
- T-15 Torx screwdriver

Procedure

1. Back up all server data.
2. **Power down the server** on page 23.
3. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
4. Disconnect all peripheral cables from the server.
5. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
6. **Remove the access panel** on page 25.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Open the PCIe slot cover retainer and remove a slot blank.



10. Install the GPU.



11. Make sure that the GPU is firmly seated in the slot.
12. Close the PCIe slot cover retainer.
13. **Install the system air baffle** on page 31.
14. **Install the PCI air baffle** on page 30.
15. **Install the access panel** on page 26.
16. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
17. Connect all peripheral cables to the server.
18. Connect each power cord to the server.
19. Connect each power cord to the power source.
20. **Power up the server** on page 23.

The installation is complete.

Redundant fan option kit

The redundant fan option kit contains the redundant system and PCI fans. Mixed default fan + redundant fan configuration in the same server is not supported.

Redundant fan mode is required to meet the system thermal requirements under the following conditions:

- Server with the following options installed:
 - SFF hot-plug SAS SSD
 - SFF hot-plug SAS drives in box 2
- The ambient temperature reaches 35°C (95°F) to 40°C (104°F).

Installing the redundant fans

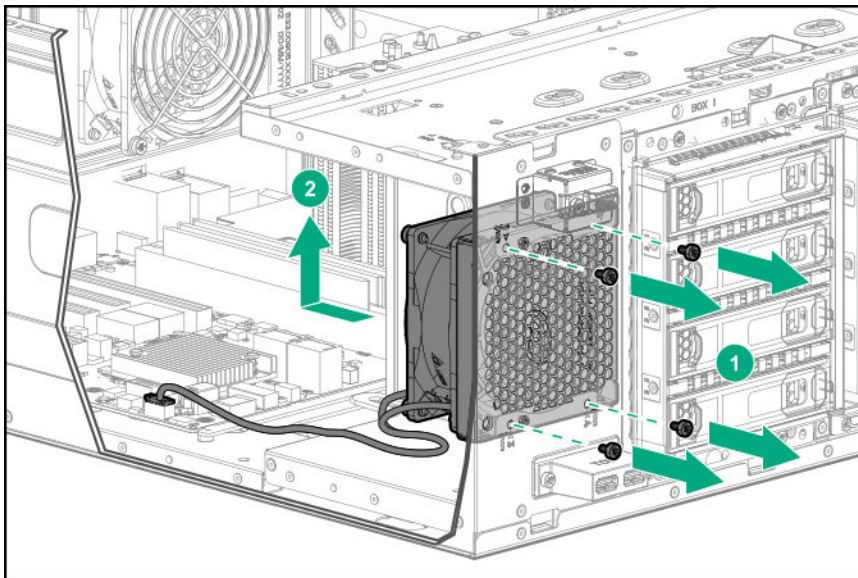
Prerequisites

Before you perform this procedure, make sure that:

- The **redundant power supply is installed**.
- You have a T-15 Torx screwdriver available.

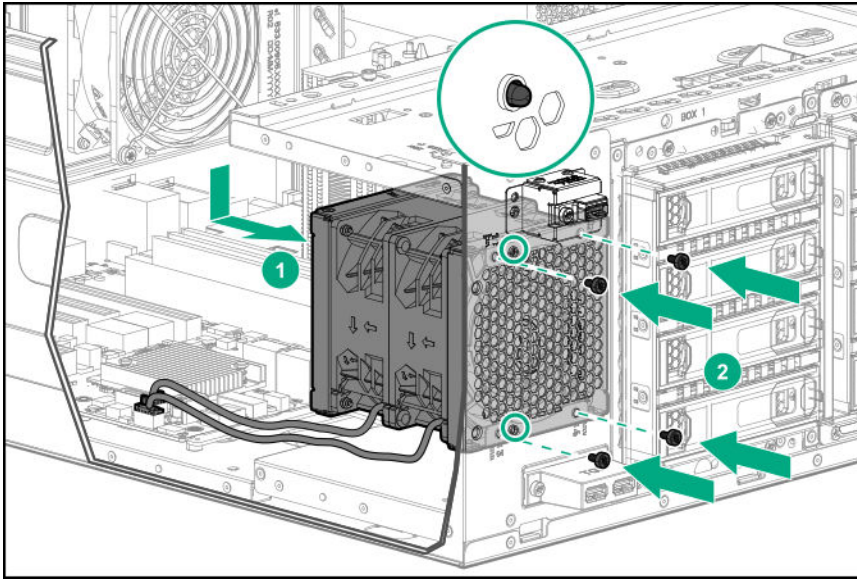
Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the front bezel** on page 27.
7. **Remove the PCI air baffle** on page 29.
8. **Remove the system air baffle** on page 30.
9. Remove the default PCI fan.



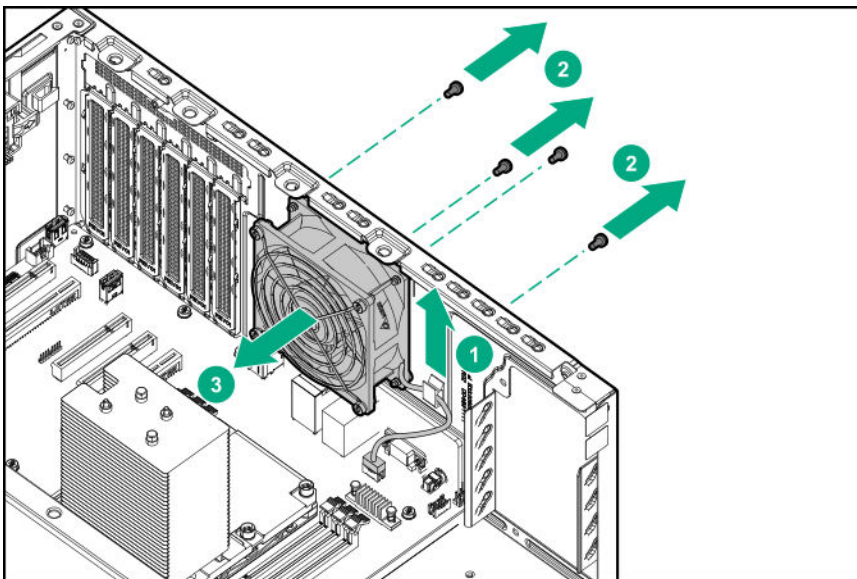
10. Install the redundant PCI fan:

- a. Insert the fan guard pins into the front chassis openings.
- b. Tighten the four T-15 screws.



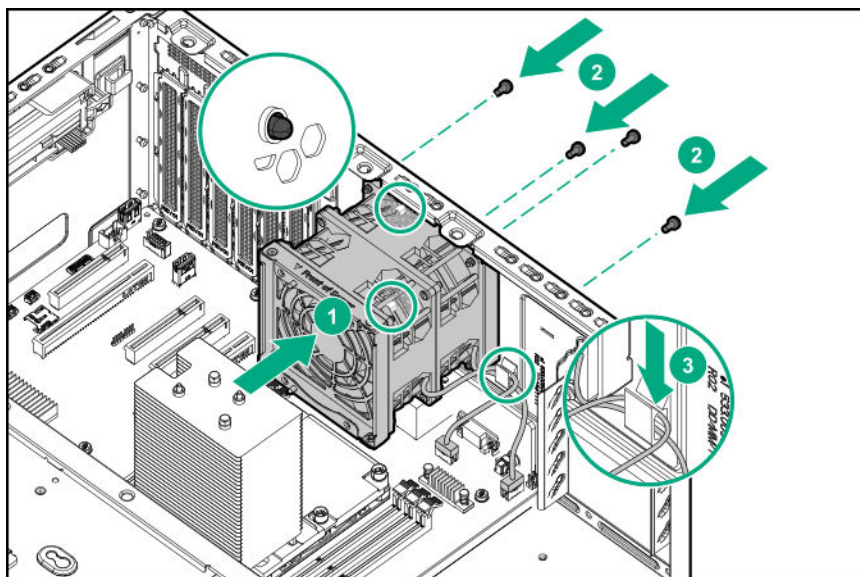
11. Connect the redundant PCI fan cables.

12. Remove the default system fan.



13. Install the redundant system fan:

- a. Insert the fan guard pins into the rear chassis openings.
- b. Tighten the four T-15 screws.



14. **Connect the redundant system fan cables.**
15. **Install the system air baffle** on page 31.
16. **Install the PCI air baffle** on page 30.
17. **Install the front bezel** on page 28.
18. **Install the access panel** on page 26.
19. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
20. Connect all peripheral cables to the server.
21. Connect each power cord to the server.
22. Connect each power cord to the power source.
23. **Power up the server** on page 23.

The installation is complete.

Memory options

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

DIMM population information

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

DIMM-processor compatibility

The installed processor determines the type of DIMM that is supported in the server:

- First-generation Intel Xeon Scalable processors support DDR4-2666 DIMMs.
- Second-generation Intel Xeon Scalable processors support DDR4-2933 DIMMs.

Mixing DIMM types is not supported. Install only the supported DDR4-2666 or DDR4-2933 DIMMs in the server.

HPE SmartMemory speed information

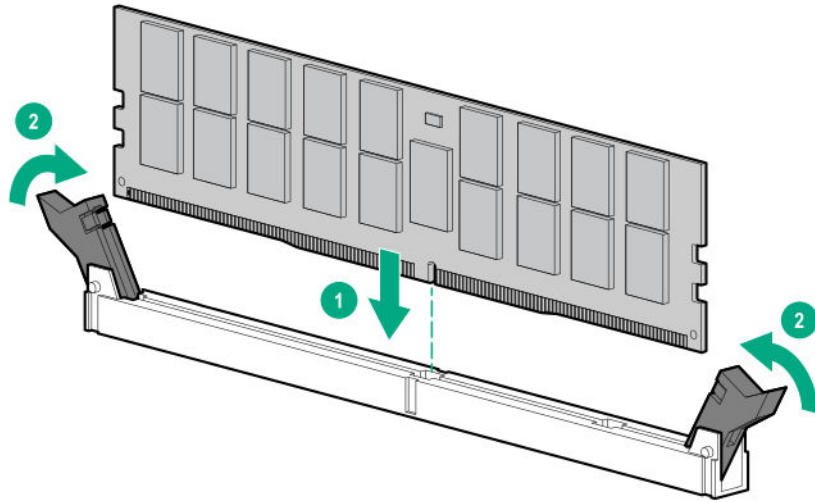
For more information about memory speed information, see the Hewlett Packard Enterprise website (<https://www.hpe.com/docs/memory-speed-table>).

Installing a DIMM

Only the 32 GB, dual-rank x4 PC4-2666V-R and 32 GB PC4-2933Y-R DIMMs supports the ADDDC RAS feature.

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. Install the DIMM:
 - a. Open the DIMM slot latches.
 - b. Align the notch on the bottom edge of the DIMM with the keyed surface of the DIMM slot, and then fully press the DIMM into the slot until the latches snap back into place.



The DIMM slots are structured to ensure proper installation. If you try to insert a DIMM but it does not fit easily into the slot, you might have positioned it incorrectly. Reverse the orientation of the DIMM and insert it again.

9. **Install the system air baffle** on page 31.
10. **Install the PCI air baffle** on page 30.
11. **Install the access panel** on page 26.
12. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
13. Connect all peripheral cables to the server.
14. Connect each power cord to the server.
15. Connect each power cord to the power source.
16. **Power up the server** on page 23.

The installation is complete.

After installing the DIMMs, use the **System Utilities > System Configuration > BIOS/Platform Configuration (RBSU) > Memory Options** to configure the memory settings.

M.2 SSD enablement option

The M.2 SSD enablement board is supported in the **PCIe3 expansion slots 1, 3, and 4**. This enablement board is not a detectable option in the **System Utilities > System Configuration > BIOS/Platform Configuration (RBSU) > Storage Options > PCIe Storage Boot Policy** setting.

Installing an M.2 SATA SSD

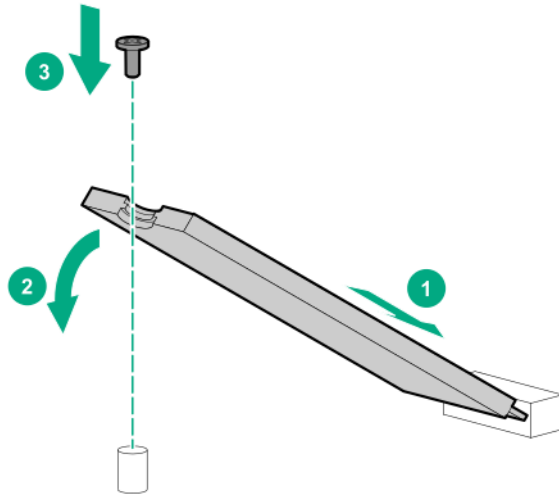
Prerequisites

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

- M.2 SSD enablement option
- M.2 SSD
- T-15 Torx screwdriver
- Phillips No.1 screwdriver

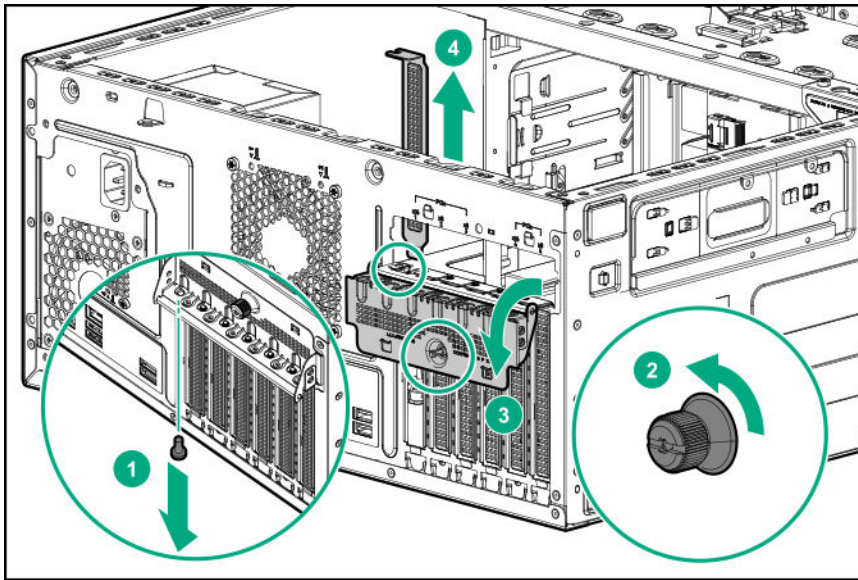
Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. Install the SSD on the M.2 SSD enablement board:
 - a. Insert the SSD into the SSD slot at a 45° angle.
 - b. Carefully press the SSD down to the horizontal position.
 - c. Secure the SSD with a screw.



d. If you are installing a second SSD, repeat steps a–b.

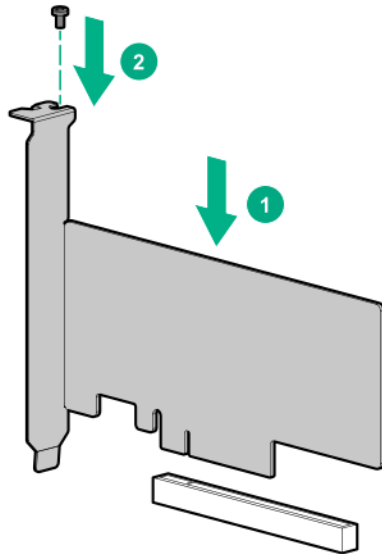
9. Open the PCIe slot cover retainer and remove a slot blank.



10. Locate the appropriate PCIe slot to install the M.2 SSD enablement board.

The recommended slots are 1, 3, and 4.

11. Install the M.2 SSD enablement board.



12. Make sure that the board is firmly seated on the slot.
13. Close the PCIe slot cover retainer.
14. **Connect the M.2 SATA SSD cables.**
15. **Install the system air baffle** on page 31.
16. **Install the PCI air baffle** on page 30.
17. **Install the access panel** on page 26.
18. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
19. Connect all peripheral cables to the server.
20. Connect each power cord to the server.
21. Connect each power cord to the power source.
22. **Power up the server** on page 23.

The installation is complete.

To configure the M.2 SATA SSDs, see the *HPE Smart Array SR Gen10 Configuration Guide* at the **Hewlett Packard Enterprise website**.

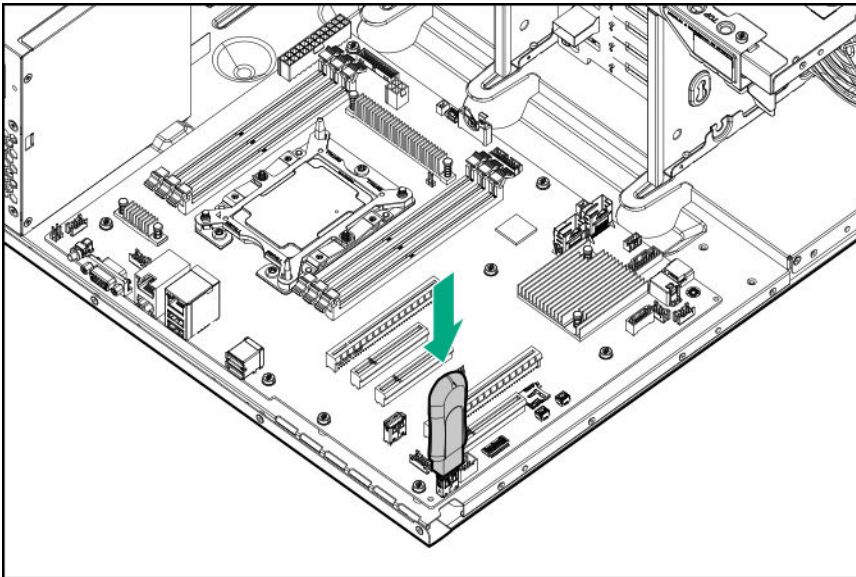
Internal USB device option

The server has one internal USB 2.0 port and one USB 3.0 port. You can use these two ports to install internal USB devices, that are intended to be rarely removed, such as USB flash media devices for booting up from flash solutions or for data backup/redundancy.

Installing an internal USB device

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. **Locate the internal USB connector.**
9. Plug in the USB device into the internal USB port.



10. **Install the system air baffle** on page 31.
11. **Install the PCI air baffle** on page 30.
12. **Install the access panel** on page 26.
13. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.

14. Connect all peripheral cables to the server.
15. Connect each power cord to the server.
16. Connect each power cord to the power source.
17. **Power up the server** on page 23.

The installation is complete.

Installing the serial port option

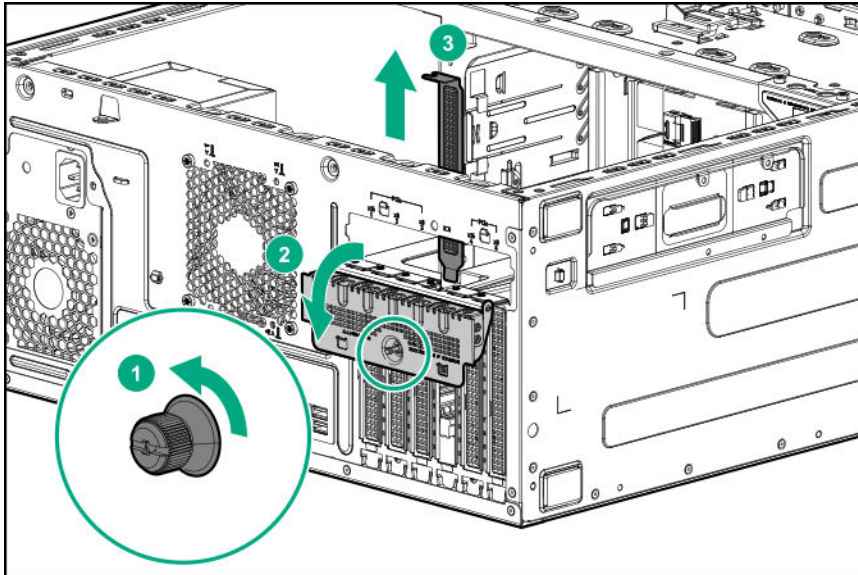
Prerequisites

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

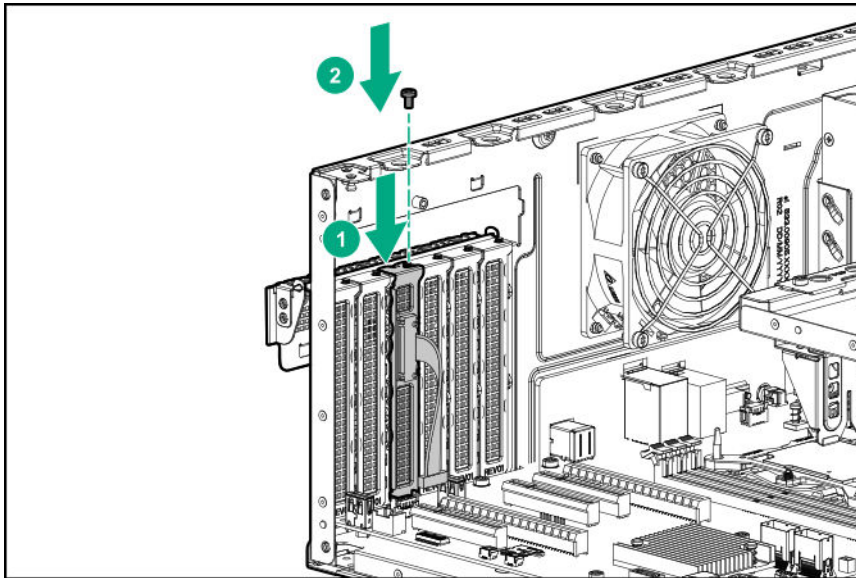
- Serial port option
- T-15 Torx screwdriver

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. Open the PCIe slot cover retainer and remove the **serial port slot blank**.



9. Install the serial port:
 - a. Slide the serial port bracket into the fourth slot blank opening.
 - b. Secure the serial port bracket with the T-15 screw.



10. Close the PCIe slot cover retainer.
11. **Connect the serial port cable.**
12. **Install the system air baffle** on page 31.
13. **Install the PCI air baffle** on page 30.
14. **Install the access panel** on page 26.
15. Do one of the following:

- Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
16. Connect all peripheral cables to the server.
 17. Connect each power cord to the server.
 18. Connect each power cord to the power source.
 19. **Power up the server** on page 23.

The installation is complete.

HPE Trusted Platform Module 2.0 Gen10 option

Overview

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

This procedure includes three sections:

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

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

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

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

HPE Trusted Platform Module 2.0 Guidelines

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

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

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

慧与特别提醒：在您启用系统中的TPM功能前，请务必确认您对TPM的使用遵守当地相关法律、法规及政策，并已事先获得所需的一切批准及许可（如适用），因您未获得相应的操作/使用许可而导致的违规问题，皆由您自行承担全部责任，与慧与无涉。

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

- Do not remove an installed TPM. Once installed, the TPM becomes a permanent part of the system board.
- When installing or replacing hardware, Hewlett Packard Enterprise service providers cannot enable the TPM or the encryption technology. For security reasons, only the customer can enable these features.
- When returning a system board for service replacement, do not remove the TPM from the system board. When requested, Hewlett Packard Enterprise Service provides a TPM with the spare system board.
- Any attempt to remove the cover of an installed TPM from the system board can damage the TPM cover, the TPM, and the system board.
- If the TPM is removed from the original server and powered up on a different server, data stored in the TPM including keys will be erased.
- When using BitLocker, always retain the recovery key/password. The recovery key/password is required to complete Recovery Mode after BitLocker detects a possible compromise of system integrity.
- Hewlett Packard Enterprise is not liable for blocked data access caused by improper TPM use. For operating instructions, see the TPM documentation or the encryption technology feature documentation provided by the operating system.


Installing and enabling the HPE TPM 2.0 Gen10 Kit

Installing the Trusted Platform Module board

Preparing the server for installation

Procedure


1. Observe the following warnings:

 **WARNING:** The front panel Power On/Standby button does not shut off system power. Portions of the power supply and some internal circuitry remain active until AC power is removed.

To reduce the risk of personal injury, electric shock, or damage to the equipment, remove power from the server:

For rack and tower servers, remove the power cord.

For server blades and compute modules, remove the server blade or compute module from the enclosure.

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

2. Update the system ROM.

Locate and download the latest ROM version from the [Hewlett Packard Enterprise Support Center website](#). Follow the instructions on the website to update the system ROM.

3. Power down the server (**Power down the server** on page 23).
4. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
5. Disconnect all peripheral cables from the server.
6. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
7. **Remove the access panel** on page 25.
8. **Remove the PCI air baffle** on page 29.
9. **Remove the system air baffle** on page 30.
10. Remove any components or cables that may prevent access to the TPM connector.
11. Proceed to **Installing the TPM board and cover** on page 95.

Installing the TPM board and cover

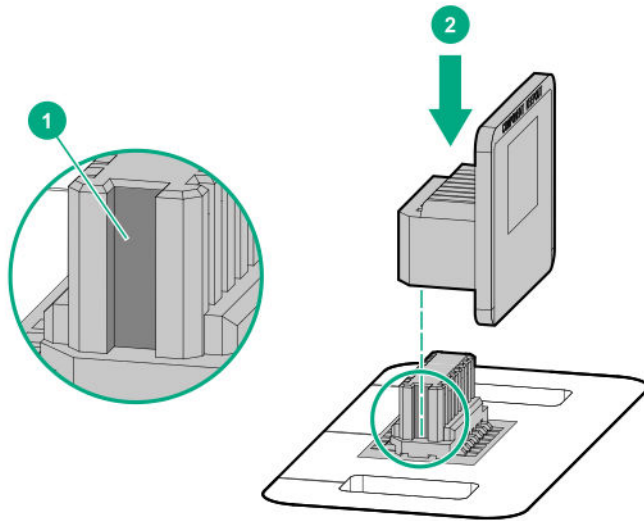
Procedure

1. Observe the following alerts:

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

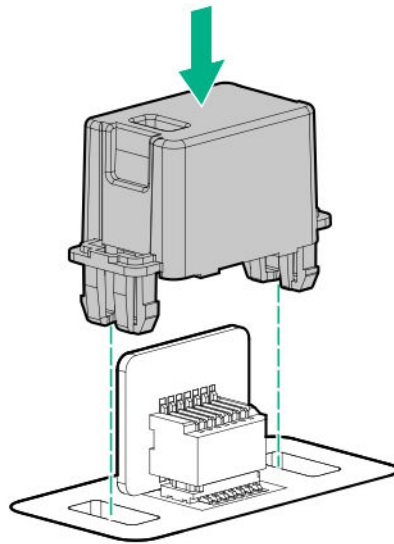
⚠ CAUTION: The TPM is keyed to install only in the orientation shown. Any attempt to install the TPM in a different orientation might result in damage to the TPM or system board.

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



3. Install the TPM cover:

- a. Line up the tabs on the cover with the openings on either side of the TPM connector.
- b. To snap the cover into place, firmly press straight down on the middle of the cover.



4. Proceed to **Preparing the server for operation** on page 96.

Preparing the server for operation

Procedure

1. **Install the system air baffle** on page 31.
2. **Install the PCI air baffle** on page 30.
3. **Install the access panel** on page 26.
4. Do one of the following:

- Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
5. Connect all peripheral cables to the server.
 6. Connect each power cord to the server.
 7. Connect each power cord to the power source.
 8. **Power up the server** on page 23.

Enabling the Trusted Platform Module

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

- By default, the Trusted Platform Module is enabled as TPM 2.0 when the server is powered on after installing it.
- In UEFI Boot Mode, the Trusted Platform Module can be configured to operate as TPM 2.0 or TPM 1.2.
- In Legacy Boot Mode, the Trusted Platform Module configuration can be changed between TPM 1.2 and TPM 2.0, but only TPM 1.2 operation is supported.

Enabling the Trusted Platform Module as TPM 2.0

Procedure

1. During the server startup sequence, press the **F9** key to access **System Utilities**.
2. From the System Utilities screen, select **System Configuration > BIOS/Platform Configuration (RBSU) > Server Security > Trusted Platform Module options**.
3. Verify the following:
 - "Current TPM Type" is set to **TPM 2.0**.
 - "Current TPM State" is set to **Present and Enabled**.
 - "TPM Visibility" is set to **Visible**.
4. If changes were made in the previous step, press the **F10** key to save your selection.
5. If F10 was pressed in the previous step, do one of the following:
 - If in graphical mode, click **Yes**.
 - If in text mode, press the **Y** key.
6. Press the **ESC** key to exit System Utilities.
7. If changes were made and saved, the server prompts for reboot request. Press the **Enter** key to confirm reboot.

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

- Changing from TPM 1.2 and TPM 2.0
 - Changing TPM bus from FIFO to CRB
 - Enabling or disabling TPM
 - Clearing the TPM
8. Enable TPM functionality in the OS, such as Microsoft Windows BitLocker or measured boot.
For more information, see the [Microsoft website](#).

Enabling the Trusted Platform Module as TPM 1.2

Procedure

1. During the server startup sequence, press the **F9** key to access **System Utilities**.
2. From the System Utilities screen select **System Configuration > BIOS/Platform Configuration (RBSU) > Server Security > Trusted Platform Module options**.
3. Change the "TPM Mode Switch Operation" to **TPM 1.2**.
4. Verify "TPM Visibility" is **Visible**.
5. Press the **F10** key to save your selection.
6. When prompted to save the change in System Utilities, do one of the following:
 - If in graphical mode, click **Yes**.
 - If in text mode, press the **Y** key.
7. Press the **ESC** key to exit System Utilities.

The server reboots a second time without user input. During this reboot, the TPM setting becomes effective.
8. Enable TPM functionality in the OS, such as Microsoft Windows BitLocker or measured boot.
For more information, see the [Microsoft website](#).

Retaining the recovery key/password

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

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

- Always store the recovery key/password in multiple locations.
- Always store copies of the recovery key/password away from the server.
- Do not save the recovery key/password on the encrypted hard drive.

Cabling

Cabling guidelines

The cable colors in the cabling diagrams used in this chapter are for illustration purposes only. Most of the server cables are black.

Observe the following guidelines when working with server cables.

Before connecting cables

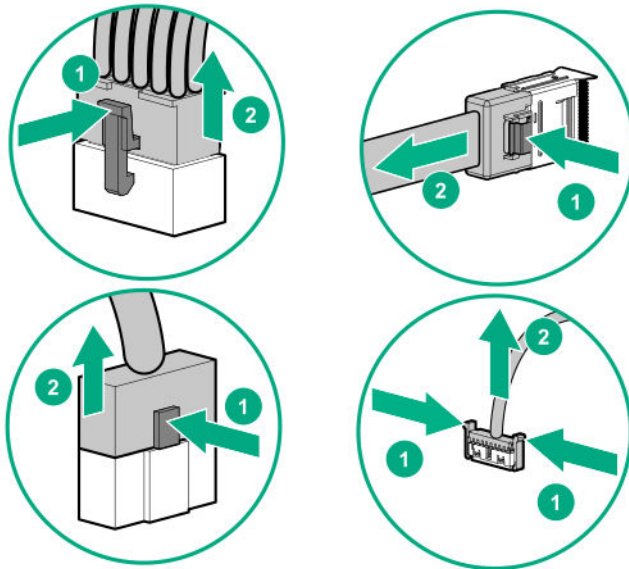
- Note the port labels on the PCA components. Not all of these components are used by all servers:
 - System board ports
 - Drive and power supply backplane ports
 - Expansion board ports (controllers, adapters, expanders, risers, and similar boards)
- Note the label near each cable connector. This label indicates the destination port for the cable connector.
- Some data cables are pre-bent. Do not unbend or manipulate the cables.
- To prevent mechanical damage or depositing oil that is present on your hands, and other contamination, do not touch the ends of the connectors.

When connecting cables

- Before connecting a cable to a port, lay the cable in place to verify the length of the cable.
- Use the internal cable management features to properly route and secure the cables.
- When routing cables, be sure that the cables are not in a position where they can be pinched or crimped.
- Avoid tight bend radii to prevent damaging the internal wires of a power cord or a server cable. Never bend power cords and server cables tight enough to cause a crease in the sheathing.
- Make sure that the excess length of cables are properly secured to avoid excess bends, interference issues, and airflow restriction.
- To prevent component damage and potential signal interference, make sure that all cables are in their appropriate routing position before installing a new component and before closing up the server after hardware installation/maintenance.

When disconnecting cables

- Grip the body of the cable connector. Do not pull on the cable itself because this action can damage the internal wires of the cable or the pins on the port.
- If a cable does not disconnect easily, check for any release latch that must be pressed to disconnect the cable.

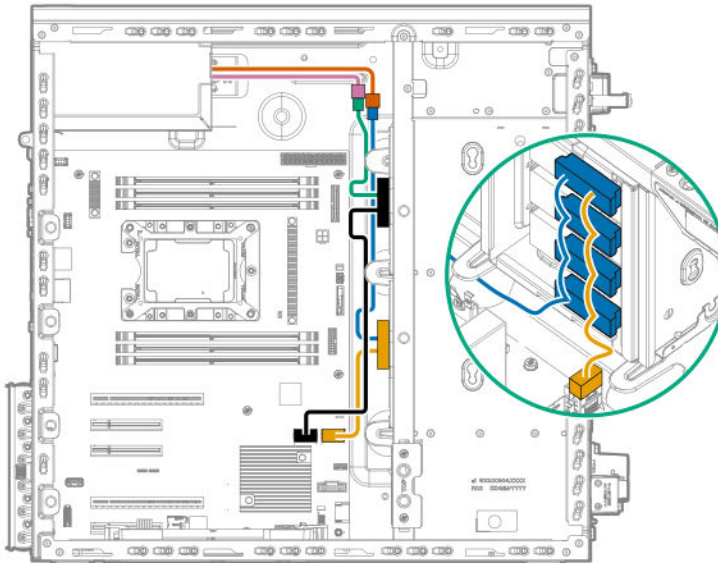


- Remove cables that are no longer being used. Retaining them inside the server can restrict airflow. If you intend to use the removed cables later, label and store them for future use.

Drive cabling

LFF non-hot-plug drive cabling

Eight bay LFF non-hot-plug drive cabling



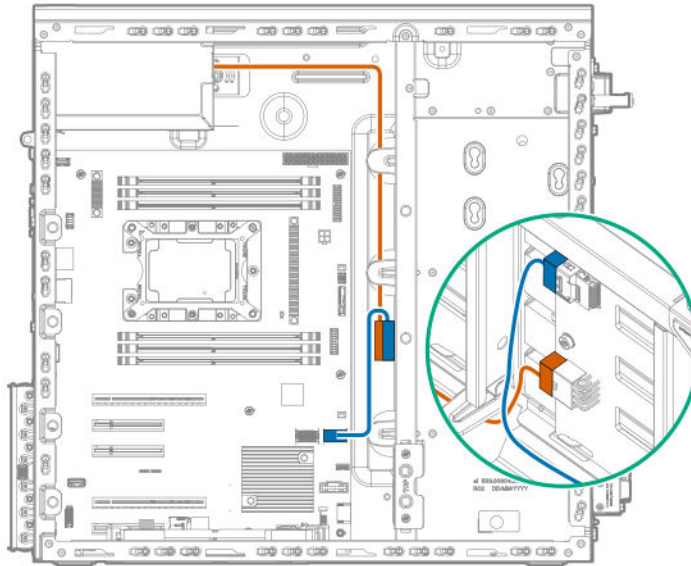
Cable Color	Description
Orange	Power supply cable
Pink	Power supply cable

Table Continued

Cable Color	Description
Green	Box 2 drive power supply cable
Blue	Box 1 drive power supply cable
Black	Box 2 non-hot-plug drive to system board x4 SATA port 2
Gold	Box 1 non-hot-plug drive to system board x4 SATA port 1

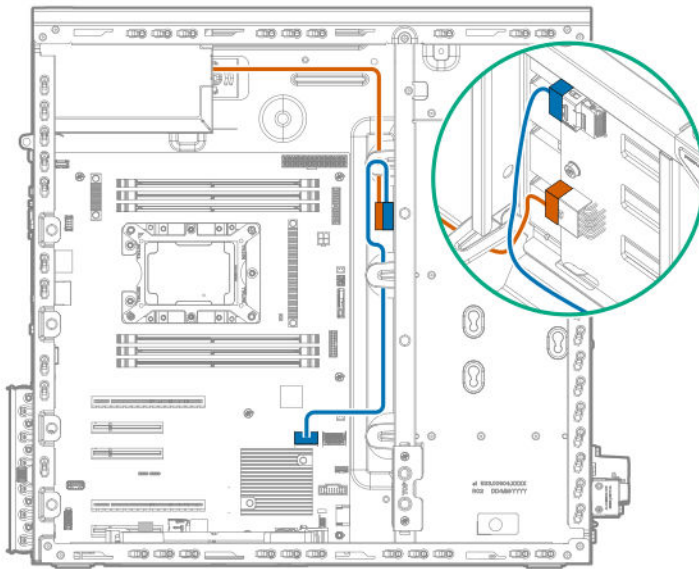
LFF hot-plug drive cabling

Box 1 drive backplane connected to the system board



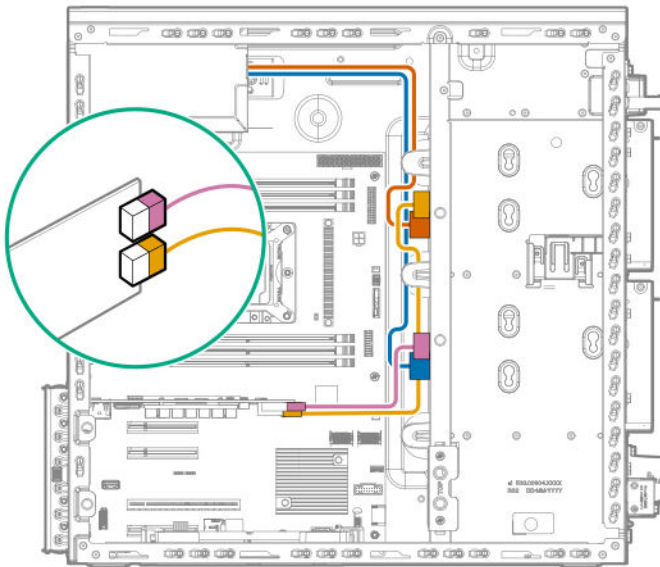
Cable Color	Description
Orange	Drive power supply cable
Blue	Box 1 drive backplane Mini-SAS cable to system board x4 SATA port 1

Box 2 drive backplane connected the system board



Cable Color	Description
Orange	Drive power supply cable
Blue	Box 2 drive backplane Mini-SAS cable to system board x4 SATA port 2

Box 1 and Box 2 drive backplanes connected to a Smart Array controller



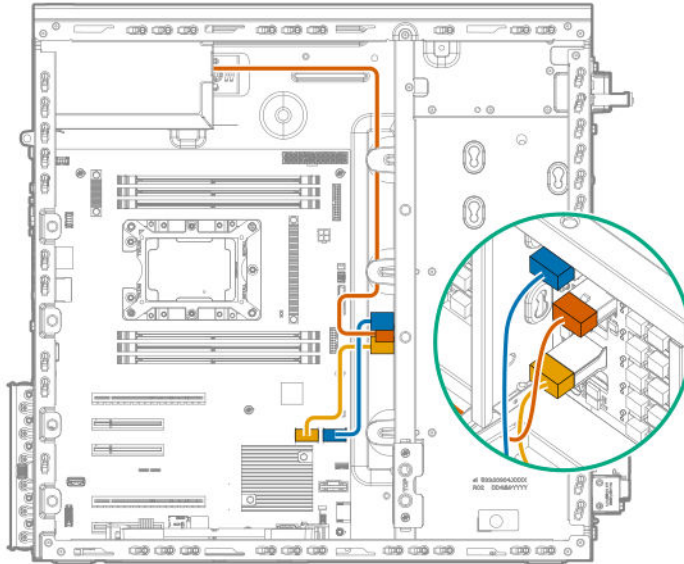
Cable Color	Description
Orange	Box 2 drive power supply cable
Blue	Box 1 drive power supply cable

Table Continued

Cable Color	Description
Gold	Box 2 drive backplane Mini-SAS cable to controller port 2
Pink	Box 1 drive backplane Mini-SAS cable to controller port 1

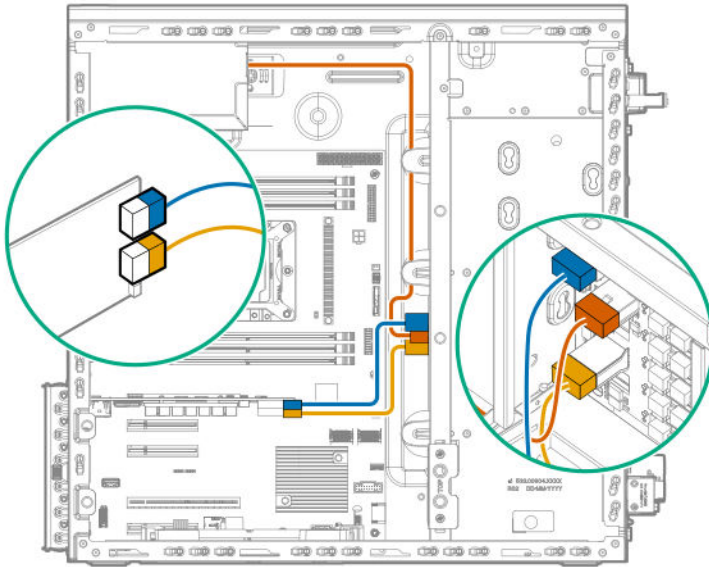
SFF hot-plug drive cabling

Box 1 drive backplane connected to the system board



Cable color	Description
Orange	Drive power supply cable
Blue	Box 1 drive backplane port 1 Mini-SAS cable to system board x4 SATA port 1
Gold	Box 1 drive backplane port 2 Mini-SAS cable to system board x4 SATA port 2

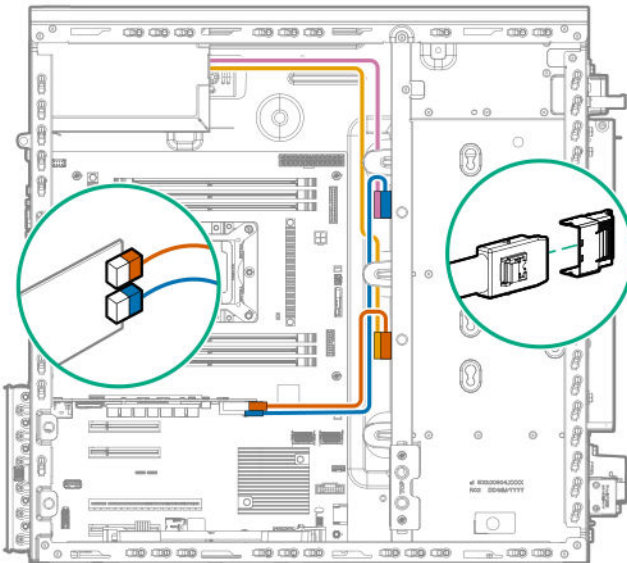
Box 1 drive backplane connected to a Smart Array controller



Cable color	Description
Orange	Drive power supply cable
Blue	Box 1 drive backplane port 1 Mini-SAS cable to type-p controller port 1
Gold	Box 1 drive backplane port 2 Mini-SAS cable to type-p controller port 2

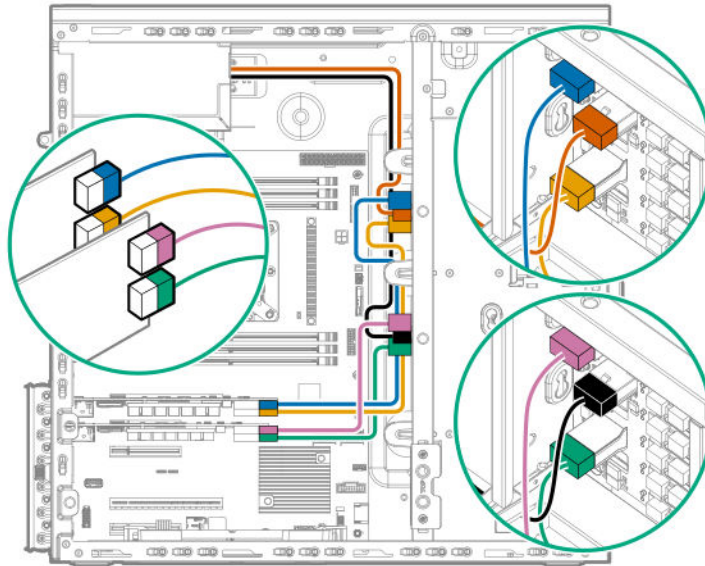
Storage controller cabling

Smart Array controller connected to the two 4-bay LFF hot-plug drive cage



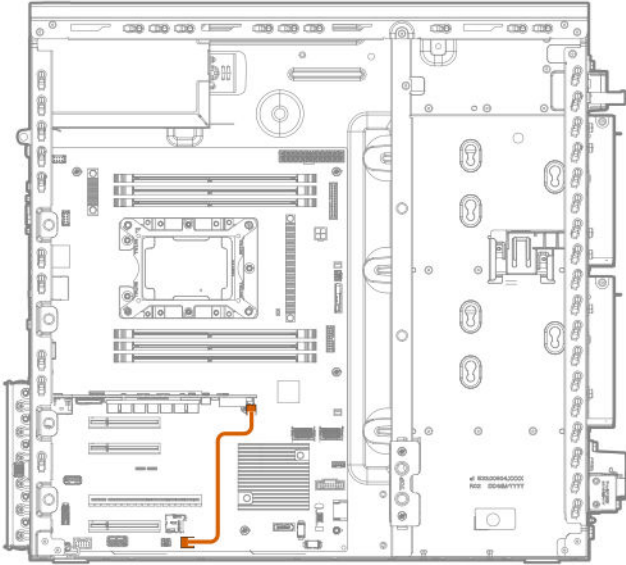
Cable color	Description
Orange	Box 1 drive backplane Mini-SAS cable to type-p controller port 1
Blue	Box 2 drive backplane Mini-SAS cable to type-p controller port 2
Gold	Box 1 drive power supply cable
Pink	Box 2 drive power supply cable

Smart Array controllers connected to the 16-bay SFF hot-plug drive cage

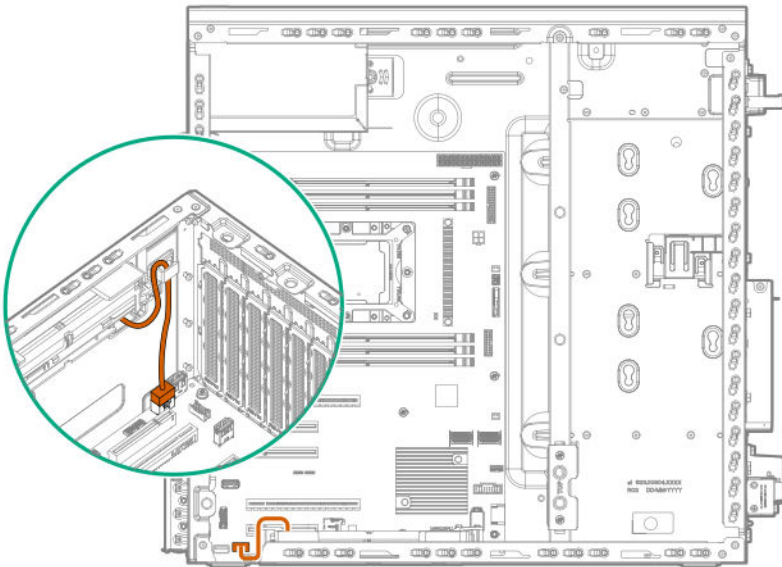


Cable color	Description
Blue	Box 2 drive backplane port 1 Mini-SAS cable to slot 1 type-p controller port 1
Gold	Box 2 drive backplane port 2 Mini-SAS cable to slot 1 type-p controller port 2
Pink	Box 1 drive backplane port 1 Mini-SAS cable to slot 2 type-p controller port 1
Green	Box 1 drive backplane port 2 Mini-SAS cable to slot 2 type-p controller port 2
Black	Box 1 drive power supply cable
Orange	Box 2 drive power supply cable

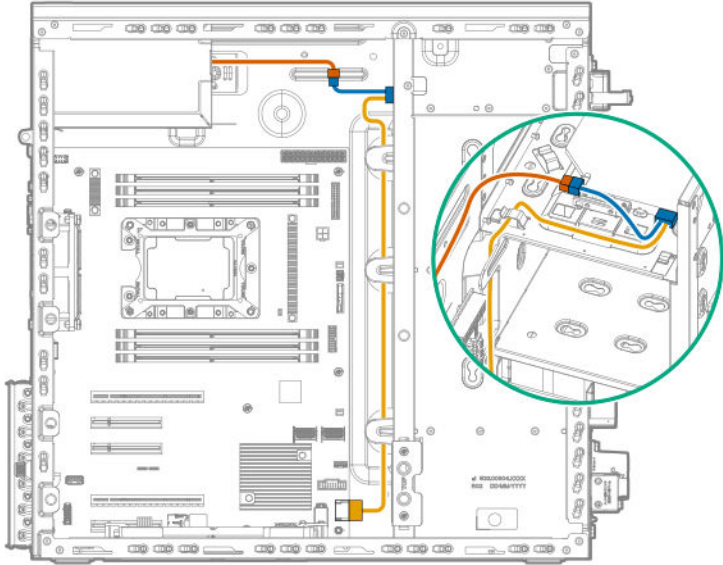
Storage controller backup power cabling



Energy pack cabling

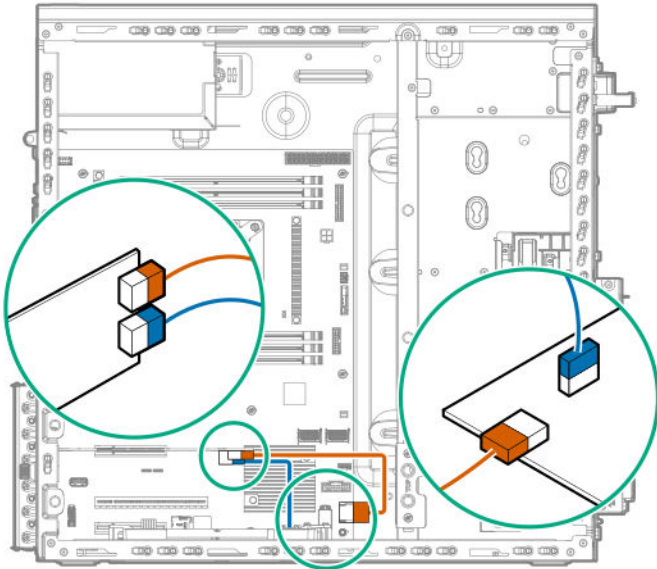


Optical drive cabling



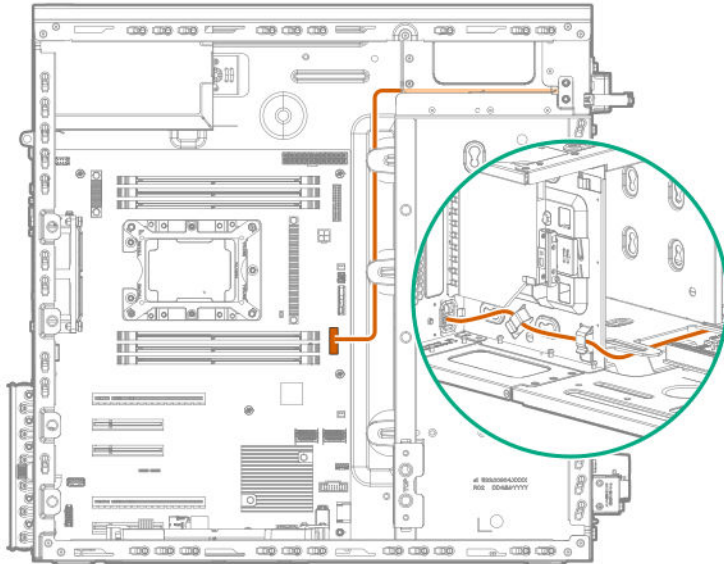
Cable color	Description
Orange	Power supply cable
Blue	Drive power supply cable
Gold	SATA cable

M.2 SSD cabling

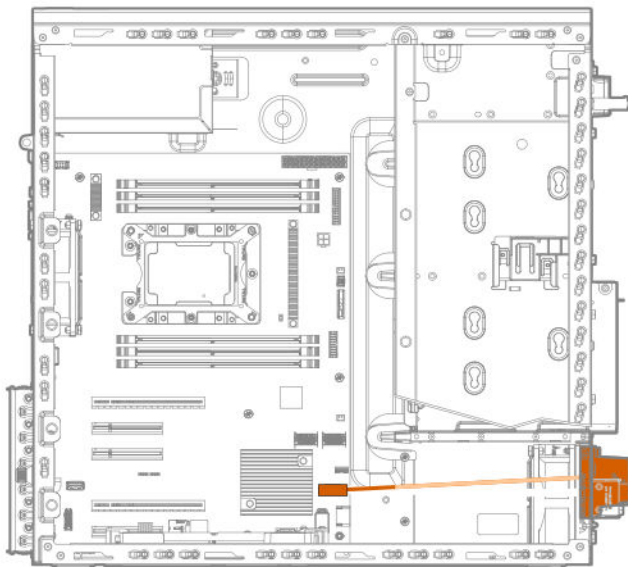


Cable Color	Description
Orange	SATA cable from M.2 SSD enablement board port 1 to system board SATA port 9
Blue	SATA cable from M.2 SSD enablement board port 2 to system board SATA port 10

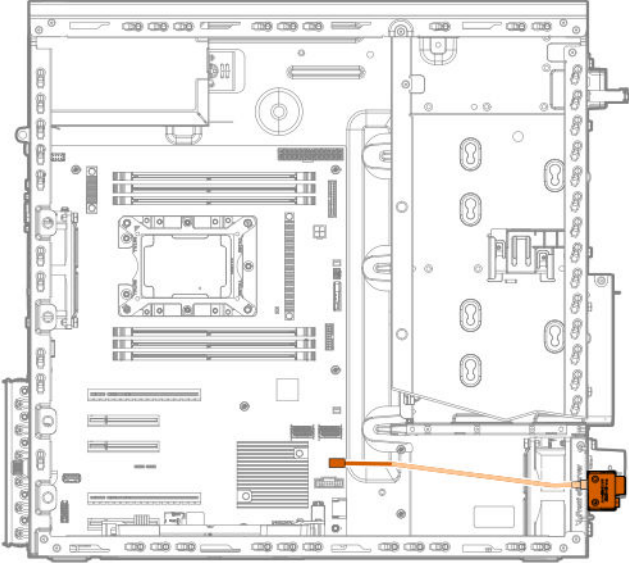
Front I/O cabling



Front USB 3.0 cabling

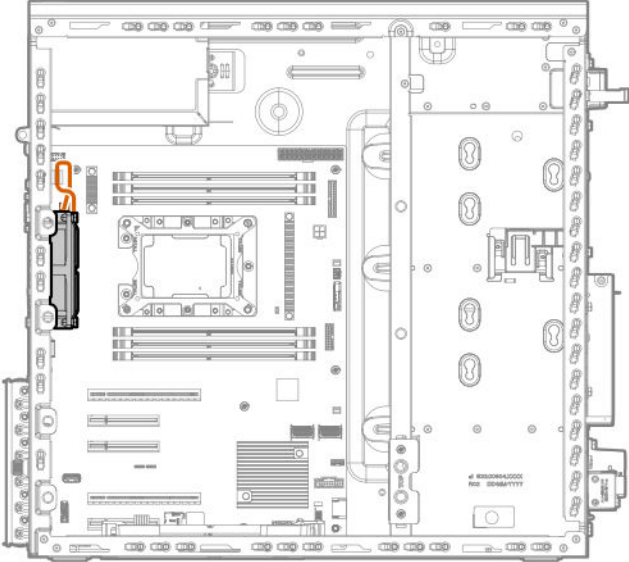


iLO Service Port cabling

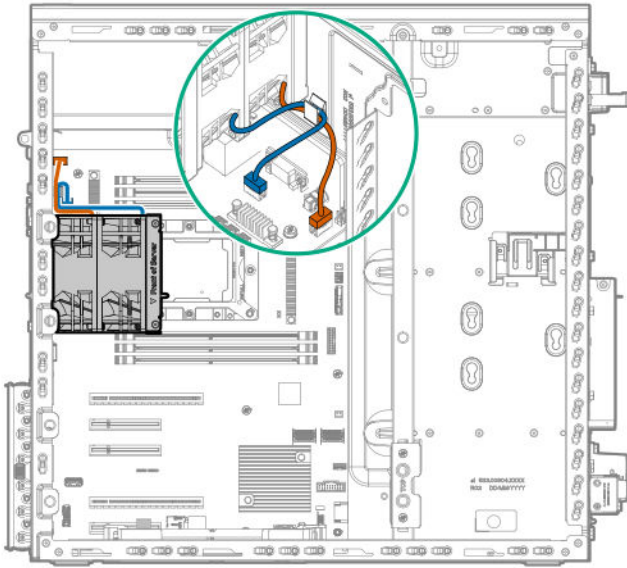


Fan cabling

Default system fan cabling

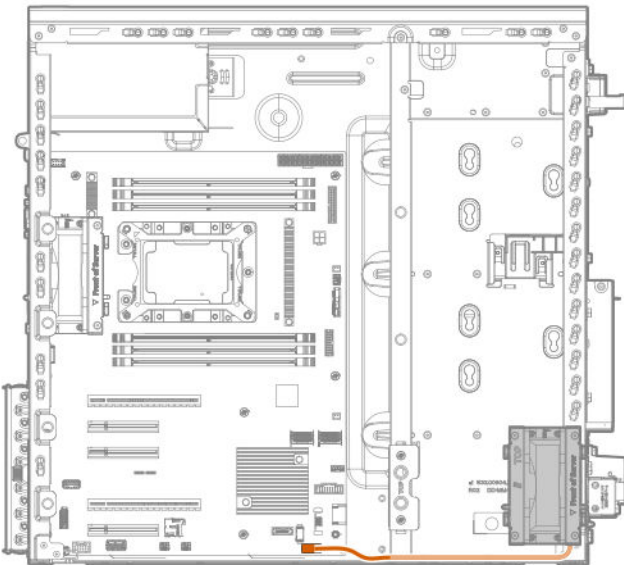


Redundant system fan cabling

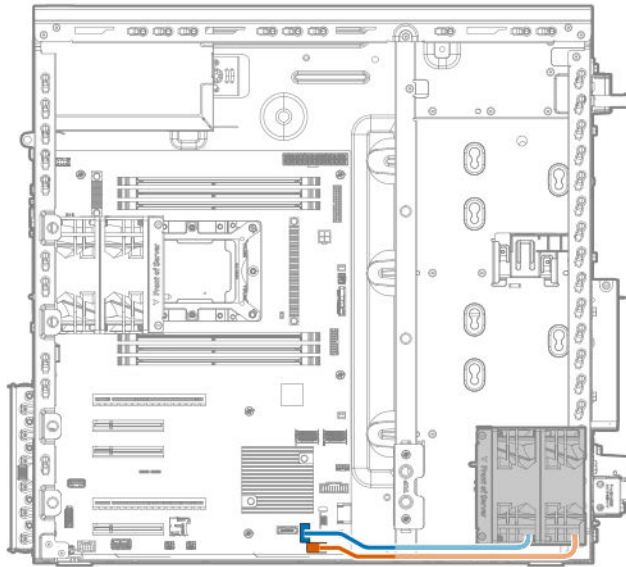


Cable color	Description
Orange	System fan cable to fan connector 4
Blue	System fan cable to fan connector 3

Default PCI fan cabling

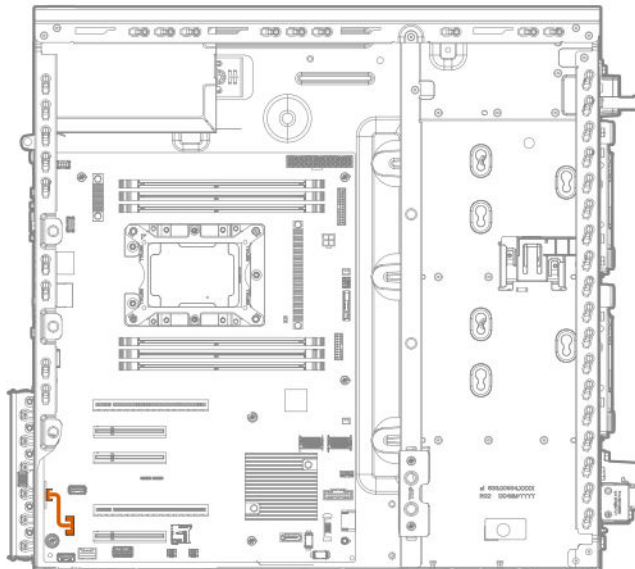


Redundant PCI fan cabling



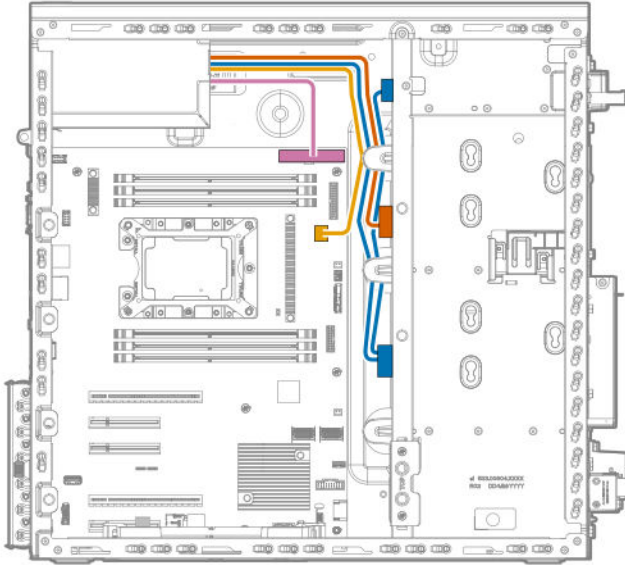
Cable color	Description
Orange	PCI fan cable to fan connector 1
Blue	PCI fan cable to fan connector 2

Serial port cabling



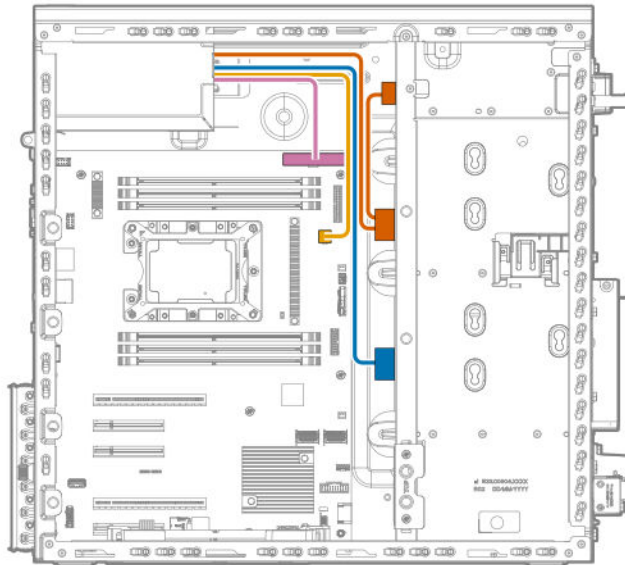
Power supply cabling

ATX 350W non-hot-plug power supply



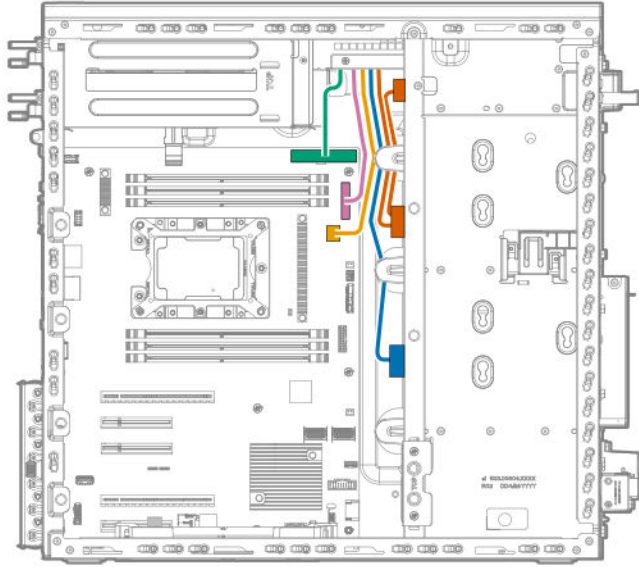
Cable Color	Description
Orange	8-pin power supply cable to box 2 drive backplane
Blue	8-pin power supply cable to box 1 drive backplane and optical drive
Gold	4-pin power supply cable to system board
Pink	24-pin power supply cable

ATX 550W non-hot-plug power supply



Cable Color	Description
Orange	8-pin power supply cable to box 2 drive backplane and optical drive
Blue	8-pin power supply cable to box 1 drive backplane
Gold	4-pin power supply cable to system board
Pink	24-pin power supply cable

Flexible slot power supply (hot-plug)



Cable Color	Description
Pink	Power supply cable
Blue	Box 1 drive backplane power supply cable
Gold	4-pin power supply cable to system board
Orange	Box 2 drive backplane and optical drive power cable
Green	24-pin power supply cable

Software and configuration utilities

Server mode

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

Software or configuration utility	Server mode
Active Health System on page 114	Online and Offline
HPE iLO 5 on page 115	Online and Offline
HPE Smart Storage Administrator on page 121	Online and Offline
iLO RESTful API on page 117	Online and Offline
Intelligent Provisioning on page 117	Online and Offline
Scripting Toolkit for Windows and Linux on page 119	Online
Service Pack for ProLiant on page 123	Online and Offline
Smart Update Manager on page 123	Online and Offline
UEFI System Utilities on page 119	Offline

Product QuickSpecs

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

Active Health System Viewer

Active Health System Viewer (AHSV) is an online tool used to read, diagnose, and resolve server issues quickly using AHS uploaded data. AHSV provides Hewlett Packard Enterprise recommended repair actions based on experience and best practices. AHSV provides the ability to:

- Read server configuration information
- View Driver/Firmware inventory
- Review Event Logs
- Respond to Fault Detection Analytics alerts
- Open new and update existing support cases

Active Health System

The Active Health System monitors and records changes in the server hardware and system configuration.

The Active Health System provides:

- Continuous health monitoring of over 1600 system parameters
- Logging of all configuration changes
- Consolidated health and service alerts with precise time stamps
- Agentless monitoring that does not affect application performance

For more information about the Active Health System, see the iLO user guide at the following website: <http://www.hpe.com/support/ilo-docs>.

Active Health System data collection

The Active Health System does not collect information about your operations, finances, customers, employees, or partners.

Examples of information that is collected:

- Server model and serial number
- Processor model and speed
- Storage capacity and speed
- Memory capacity and speed
- Firmware/BIOS and driver versions and settings

The Active Health System does not parse or change OS data from third-party error event log activities (for example, content created or passed through the OS).

Active Health System Log

The data collected by the Active Health System is stored in the Active Health System Log. The data is logged securely, isolated from the operating system, and separate from customer data. Host resources are not consumed in the collection and logging of Active Health System data.

When the Active Health System Log is full, new data overwrites the oldest data in the log.

It takes less than 5 minutes to download the Active Health System Log and send it to a support professional to help you resolve an issue.

When you download and send Active Health System data to Hewlett Packard Enterprise, you agree to have the data used for analysis, technical resolution, and quality improvements. The data that is collected is managed according to the privacy statement, available at <http://www.hpe.com/info/privacy>.

HPE iLO 5

iLO 5 is a remote server management processor embedded on the system boards of HPE ProLiant servers and Synergy compute modules. iLO enables the monitoring and controlling of servers from remote locations. iLO management is a powerful tool that provides multiple ways to configure, update, monitor, and repair servers remotely. iLO (Standard) comes preconfigured on Hewlett Packard Enterprise servers without an additional cost or license.

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

For more information about iLO, see the iLO user guide at the following website: <http://www.hpe.com/support/ilo-docs>.

iLO Federation

iLO Federation enables you to manage multiple servers from one system using the iLO web interface.

When configured for iLO Federation, iLO uses multicast discovery and peer-to-peer communication to enable communication between the systems in iLO Federation groups.

When you navigate to one of the iLO Federation pages, a data request is sent from the iLO system running the web interface to its peers, and from those peers to other peers until all data for the selected iLO Federation group is retrieved.

iLO supports the following features:

- Group health status—View server health and model information.
- Group Virtual Media—Connect URL-based media for access by a group of servers.
- Group power control—Manage the power status of a group of servers.
- Group power capping—Set dynamic power caps for a group of servers.
- Group firmware update—Update the firmware of a group of servers.
- Group license installation—Enter a license key to activate iLO licensed features on a group of servers.
- Group configuration—Add iLO Federation group memberships for multiple iLO systems.

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

For more information about iLO Federation, see the iLO user guide at the following website: <http://www.hpe.com/support/ilo-docs>.

iLO Service Port

To find out if your server model supports this feature, see the server specifications document at the following website: <http://www.hpe.com/info/qs>.

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

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

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

When you use the iLO Service Port:

- Actions are logged in the iLO Event Log.
- The server UID flashes to indicate the Service Port status.
You can also retrieve the Service Port status by using a REST client and the iLO RESTful API.
- You cannot use the Service Port to boot any device within the server, or the server itself.
- You cannot access the server by connecting to the Service Port.
- You cannot access the connected device from the server.

For more information about the iLO Service Port, see the iLO user guide at the following website: <http://www.hpe.com/support/ilo-docs>.

iLO RESTful API

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

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

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

RESTful Interface Tool

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

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

iLO Amplifier Pack

The iLO Amplifier Pack is an advanced server inventory, firmware and driver update solution that enables rapid discovery, detailed inventory reporting, firmware, and driver updates by leveraging iLO advanced functionality. The iLO Amplifier Pack performs rapid server discovery and inventory for thousands of supported servers for the purpose of updating firmware and drivers at scale.

For more information about iLO Amplifier Pack, see the *iLO Amplifier Pack User Guide* at the following website: <http://www.hpe.com/support/ilo-ap-ug-en>.

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 the iLO web interface

Intelligent Provisioning

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

Intelligent Provisioning 3.30 and later includes HPE SMB Setup. When you launch F10 mode from the POST screen, you are prompted to select whether you want to enter the Intelligent Provisioning or HPE SMB Setup mode.

NOTE: After you have selected a mode, you must reprovision the server to change the mode that launches when you boot to F10.

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

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

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

To access Intelligent Provisioning:

- Press **F10** from the POST screen and enter either Intelligent Provisioning or HPE SMB Setup.
- From the iLO web interface using **Always On**. **Always On** allows you to access Intelligent Provisioning without rebooting your server.

Intelligent Provisioning operation

Intelligent Provisioning includes the following components:

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

! **IMPORTANT:**

- Although your server is preloaded with firmware and drivers, Hewlett Packard Enterprise recommends updating the firmware upon initial setup. Also, downloading and updating the latest version of Intelligent Provisioning ensures the latest supported features are available.
- For ProLiant servers, firmware is updated using the Intelligent Provisioning Firmware Update utility.
- Do not update firmware if the version you are currently running is required for compatibility.

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

Intelligent Provisioning provides installation help for the following operating systems:

- Microsoft Windows Server
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server
- VMware ESXi/vSphere Custom Image
- ClearOS

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

Management Security

HPE ProLiant Gen10 servers are built with some of the industry's most advanced security capabilities, out of the box, with a foundation of secure embedded management applications and firmware. The management security provided by HPE embedded management products enables secure support of modern workloads, protecting your components from unauthorized access and unapproved use. The range of embedded management and optional software and firmware available with the iLO Advanced and iLO Advanced Premium Security Edition licenses provides security features that help ensure protection, detection, and recovery from advanced cyber-attacks. For more information, see the *HPE Gen10 Server Security Reference Guide* on the Hewlett Packard Enterprise Information Library at <http://www.hpe.com/support/gen10-security-ref-en>.

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

Scripting Toolkit for Windows and Linux

The STK for Windows and Linux is a server deployment product that delivers an unattended automated installation for high-volume server deployments. The STK is designed to support ProLiant servers. The toolkit includes a modular set of utilities and important documentation that describes how to apply these tools to build an automated server deployment process.

The STK provides a flexible way to create standard server configuration scripts. These scripts are used to automate many of the manual steps in the server configuration process. This automated server configuration process cuts time from each deployment, making it possible to scale rapid, high-volume server deployments.

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

UEFI System Utilities

The UEFI System Utilities is embedded in the system ROM. Its features enable you to perform a wide range of configuration activities, including:

- Configuring system devices and installed options.
- Enabling and disabling system features.
- Displaying system information.
- Selecting the primary boot controller or partition.
- Configuring memory options.
- Launching other preboot environments.

HPE servers with UEFI can provide:

- Support for boot partitions larger than 2.2 TB. Such configurations could previously only be used for boot drives when using RAID solutions.
- Secure Boot that enables the system firmware, option card firmware, operating systems, and software collaborate to enhance platform security.
- UEFI Graphical User Interface (GUI)

- An Embedded UEFI Shell that provides a preboot environment for running scripts and tools.
- Boot support for option cards that only support a UEFI option ROM.

Selecting the boot mode

This server provides two **Boot Mode** configurations: UEFI Mode and Legacy BIOS Mode. Certain boot options require that you select a specific boot mode. By default, the boot mode is set to **UEFI Mode**. The system must boot in **UEFI Mode** to use certain options, including:

- Secure Boot, UEFI Optimized Boot, Generic USB Boot, IPv6 PXE Boot, iSCSI Boot, and Boot from URL
- Fibre Channel/FCoE Scan Policy

NOTE: The boot mode you use must match the operating system installation. If not, changing the boot mode can impact the ability of the server to boot to the installed operating system.

Prerequisite

When booting to **UEFI Mode**, leave **UEFI Optimized Boot** enabled.

Procedure

1. From the **System Utilities** screen, select **System Configuration > BIOS/Platform Configuration (RBSU) > Boot Options > Boot Mode**.
2. Select a setting.
 - **UEFI Mode** (default)—Configures the system to boot to a UEFI compatible operating system.
 - **Legacy BIOS Mode**—Configures the system to boot to a traditional operating system in Legacy BIOS compatibility mode.
3. Save your setting.
4. Reboot the server.

Secure Boot

Secure Boot is a server security feature that is implemented in the BIOS and does not require special hardware. Secure Boot ensures that each component launched during the boot process is digitally signed and that the signature is validated against a set of trusted certificates embedded in the UEFI BIOS. Secure Boot validates the software identity of the following components in the boot process:

- UEFI drivers loaded from PCIe cards
- UEFI drivers loaded from mass storage devices
- Preboot UEFI Shell applications
- OS UEFI boot loaders

When Secure Boot is enabled:

- Firmware components and operating systems with boot loaders must have an appropriate digital signature to execute during the boot process.
- Operating systems must support Secure Boot and have an EFI boot loader signed with one of the authorized keys to boot. For more information about supported operating systems, see <http://www.hpe.com/servers/ossupport>.

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

You can configure Secure Boot:

- Using the **System Utilities** options described in the following sections.
- Using the iLO RESTful API to clear and restore certificates. For more information, see the Hewlett Packard Enterprise website (<http://www.hpe.com/info/redfish>).
- Using the `secboot` command in the Embedded UEFI Shell to display Secure Boot databases, keys, and security reports.

Launching the Embedded UEFI Shell

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

Prerequisites

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

Procedure

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

The **Embedded UEFI Shell** screen appears.

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

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

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

The `Shell>` prompt appears.

4. Enter the commands required to complete your task.
5. Enter the `exit` command to exit the Shell.

HPE Smart Storage Administrator

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

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

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

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

- Accessing HPE SSA in the offline environment

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

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

- Accessing HPE SSA in the online environment

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

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

HPE InfoSight for servers

The HPE InfoSight portal is a secure web interface hosted by HPE that allows you to monitor supported devices through a graphical interface.

HPE InfoSight for servers:

- Combines the machine learning and predictive analytics of HPE InfoSight with the health and performance monitoring of Active Health System (AHS) and HPE iLO to optimize performance and predict and prevent problems
- Provides automatic collection and analysis of the sensor and telemetry data from AHS to derive insights from the behaviors of the install base to provide recommendations to resolve problems and improve performance

For more information on getting started and using HPE InfoSight for servers, go to: **<http://www.hpe.com/info/infosight-servers-docs>**.

USB support

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

External USB functionality

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

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

Redundant ROM support

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

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

Safety and security benefits

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

Keeping the system current

Updating firmware or system ROM

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

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

Service Pack for ProLiant

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

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

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

The preferred method for downloading an SPP is using the SPP Custom Download at <https://www.hpe.com/servers/spp/custom>.

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

Smart Update Manager

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

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

Key features of SUM include:

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

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

Integrated Smart Update Tools

Integrated Smart Update Tools (iSUT) is a software utility used with iLO 4, iLO 5, iLO Amplifier Pack, HPE OneView, Service Pack for ProLiant (SPP), and Smart Update Manager (SUM) to stage, install, and activate firmware and driver updates.

- **iSUT:** Polls iLO to check for requests from HPE OneView, SUM, or iLO Amplifier Pack for updates through the management network and orchestrates staging, deploying, and activating updates. You can adjust the polling interval by issuing the appropriate command-line option provided by iSUT. Performs inventory on target servers, stages deployment, deploys updates, and then reboots the servers.
- **iLO 5 with integrated Smart Update** (Gen10 servers only): Performs iLO Repository-based updates by downloading the components from iLO Repository when iLO Installation Queue has the components which can be updated by iSUT.
- **iLO Amplifier Pack:** Displays available updates for servers. Communicates with iSUT (or SUT 1.x) to initiate updates using the iLO Redfish interface. iSUT reports the status of updates to iLO Amplifier Pack via iLO Restful Interface.
- **HPE OneView:** Displays available updates for servers. Communicates with iSUT (or SUT 1.x) to initiate updates, reports the status on the **Firmware** section of the **Server Profile** page of HPE OneView. HPE OneView provides automated compliance reporting in the dashboard.
- **SPP:** A comprehensive systems software and firmware update solution, which is delivered as a single ISO image.
- **SUM:** A tool for firmware and driver maintenance for HPE ProLiant servers and associated options.

NOTE: SUM, iLO Amplifier Pack, and HPE OneView should not manage the same nodes.

Updating firmware from the System Utilities

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

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center.
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server.
4. Launch the **System Utilities**, and select **Embedded Applications > Firmware Update**.
5. Select a device.
The **Firmware Updates** screen lists details about your selected device, including the current firmware version in use.
6. Select **Select Firmware File**.
7. Select the flash file in the **File Explorer** list.
The firmware file is loaded and the **Firmware Updates** screen lists details of the file in the **Selected firmware file** field.
8. Select **Image Description**, and then select a firmware image.
A device can have multiple firmware images.
9. Select **Start firmware update**.

Updating the firmware from the UEFI Embedded Shell

Procedure

1. Access the System ROM Flash Binary component for your server from the Hewlett Packard Enterprise Support Center (<http://www.hpe.com/support/hpesc>).
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server.
4. Boot to the UEFI Embedded Shell.
5. To obtain the assigned file system volume for the USB key, enter `map -r`.
6. Change to the file system that contains the System ROM Flash Binary component for your server. Enter one of the `fsx` file systems available, such as `fs0:` or `fs1:`, and press **Enter**.
7. Use the `cd` command to change from the current directory to the directory that contains the binary file.
8. Flash the system ROM by entering `fwupdate -d BIOS -f filename`.
9. Reboot the server. A reboot is required after the firmware update in order for the updates to take effect and for hardware stability to be maintained.

Online Flash components

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

Drivers

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

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

- Download the latest Service Pack for ProLiant (includes Smart Update Manager)
- Create a custom SPP download
- Download Smart Update Manager for Linux
- Download specific drivers

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

Software and firmware

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

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

- Download the SPP from the Hewlett Packard Enterprise website (<http://www.hpe.com/servers/spp/download>).
- Download individual drivers, firmware, or other system software components from the server product page in the Hewlett Packard Enterprise Support Center website (<http://www.hpe.com/support/hpesc>).

Operating system version support

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

HPE Pointnext Portfolio

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

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

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

Utilize the Advisory and Transformation Services in the following areas:

- Private or hybrid cloud computing
- Big data and mobility requirements
- Improving data center infrastructure
- Better use of server, storage, and networking technology

For more information, see the Hewlett Packard Enterprise website:

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

Proactive notifications

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

- Hardware, firmware, and software changes
- Bulletins
- Patches
- Security alerts

You can subscribe to proactive notifications on the [**Hewlett Packard Enterprise website**](#).

System battery replacement

System battery information

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 the battery 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.

Removing and replacing the system battery

Procedure

1. **Power down the server** on page 23.
2. Remove all power:
 - a. Disconnect each power cord from the power source.
 - b. Disconnect each power cord from the server.
3. Disconnect all peripheral cables from the server.
4. Do one of the following:
 - Server in rack mode: **Remove the server from the rack** on page 23.
 - Server in tower mode: **Position the tower server for hardware configuration** on page 25.
5. **Remove the access panel** on page 25.
6. **Remove the PCI air baffle** on page 29.
7. **Remove the system air baffle** on page 30.
8. **Replace the system battery.**
9. **Install the system air baffle** on page 31.
10. **Install the PCI air baffle** on page 30.
11. **Install the access panel** on page 26.
12. Do one of the following:
 - Server in rack mode: **Install the server into the rack** on page 53.
 - Server in tower mode: Return the server to an upright position.
13. Connect all peripheral cables to the server.

14. Connect each power cord to the server.
15. Connect each power cord to the power source.
16. **Power up the server** on page 23.

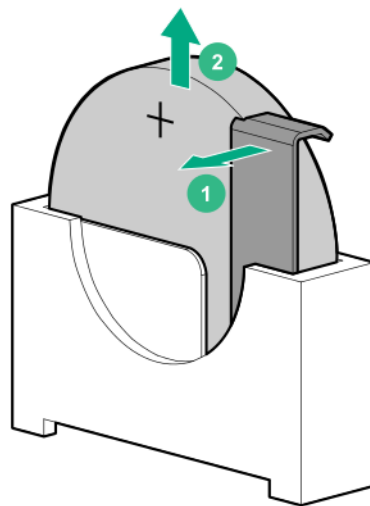
Replace the system battery

Prerequisites

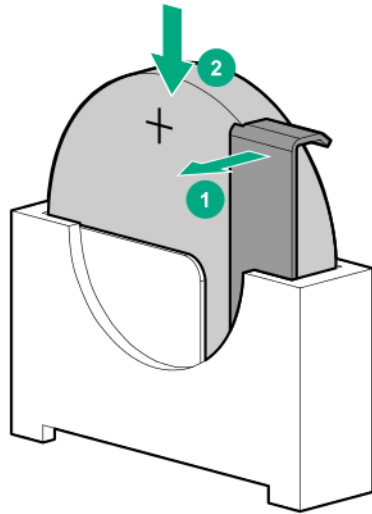
Before you perform this procedure make sure you have a small flat-bladed, nonconductive tool available.

Procedure

1. **Locate the battery on the system board.**
2. Use a small flat-bladed, nonconductive tool to carefully lift the front of the battery from the socket.
3. Remove the battery.



4. Install the system battery.



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

Troubleshooting

NMI functionality

An NMI crash dump enables administrators to create crash dump files when a system is hung and not responding to traditional debugging methods.

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

To force the OS to invoke the NMI handler and generate a crash dump log, the administrator can use the iLO Virtual NMI feature.

Troubleshooting resources

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

- *Troubleshooting Guide for HPE ProLiant Gen10 servers* provides procedures for resolving common problems and comprehensive courses of action for fault isolation and identification, issue resolution, and software maintenance.
- *Error Message Guide for HPE ProLiant Gen10 servers and HPE Synergy* provides a list of error messages and information to assist with interpreting and resolving error messages.
- *Integrated Management Log Messages and Troubleshooting Guide for HPE ProLiant Gen10 and HPE Synergy* provides IML messages and associated troubleshooting information to resolve critical and cautionary IML events.

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

Safety, warranty, and regulatory information

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

Notices for Eurasian Economic Union



Manufacturer and Local Representative Information

Manufacturer information:

Hewlett Packard Enterprise, 6280 America Center Drive, San Jose, CA 95002 U.S.

Local representative information Russian:

- **Russia**

ООО "Хьюлетт Паккард Энтерпрайз", Российская Федерация, 125171, г. Москва, Ленинградское шоссе, 16А, стр.3, Телефон: +7 499 403 4248 Факс: +7 499 403 4677

- **Kazakhstan**

ТОО «Хьюлетт-Паккард (К)», Республика Казахстан, 050040, г. Алматы, Бостандыкский район, проспект Аль-Фараби, 77/7, Телефон/факс: + 7 727 355 35 50

Local representative information Kazakh:

- **Russia**

ЖШС "Хьюлетт Паккард Энтерпрайз", Ресей Федерациясы, 125171, Мәскеу, Ленинград тас жолы, 16А блок 3, Телефон: +7 499 403 4248 Факс: +7 499 403 4677

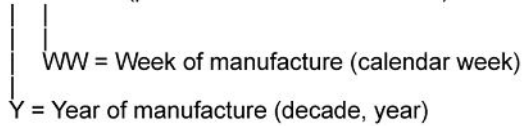
- **Kazakhstan**

ЖШС «Хьюлетт-Паккард (К)», Қазақстан Республикасы, 050040, Алматы қ., Бостандық ауданы, Өл-
Фараби даңғылы, 77/7, Телефон/факс: +7 727 355 35 50

Manufacturing date:

The manufacturing date is defined by the serial number.

CCSYWWZZZZ (product serial number format)



If you need help identifying the manufacturing date, contact tre@hpe.com.

Turkey RoHS material content declaration

Türkiye Cumhuriyeti: AEEE 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

Warranty information

To view the warranty information for your product, see the links provided below:

HPE ProLiant and IA-32 Servers and Options

www.hpe.com/support/ProLiantServers-Warranties

HPE Enterprise and Cloudline 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

Specifications

Environmental specifications

Specification	Value
Temperature range¹	—
Operating	10°C to 35°C (41°F to 95°F)
Nonoperating	-30°C to 60°C (-22°F to 140°F)
Relative humidity (noncondensing)	—
Operating	8% to 90% 28°C (82.4°F), maximum wet bulb temperature
Nonoperating	5% to 95% 38.7°C (101.7°F), maximum wet bulb temperature

¹ All temperature ratings shown are for sea level. An altitude derating of 1.0°C per 305 m (1.8°F per 1000 ft) to 3050 m (10,000 ft) is applicable. No direct sunlight allowed. Maximum rate of change is 20°C per hour (36°F per hour). The upper limit and rate of change might be limited by the type and number of options installed.

For certain approved hardware configurations, the supported system inlet temperature range is extended:

- 5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F) at sea level with an altitude derating of 1.0°C per every 175 m (1.8°F per every 574 ft) above 900 m (2953 ft) to a maximum of 3050 m (10,000 ft)
- Redundant fans are required when the ambient temperature reaches 35°C (95°F) to 40°C (104°F).

The approved hardware configurations for this system are listed on the Hewlett Packard Enterprise website (<http://www.hpe.com/servers/ASHRAE>).

Mechanical specifications

Dimension (with feet/bezel)	Value
Height	44.00 cm (17.32 in)
Depth	48.05 cm (18.92 in)
Width	19.50 cm (7.68 in)
Weight (approximate)	
Minimum (one drive, power supply, and processor installed)	13.5 kg (29.82 lb)
Maximum (all drives, power supplies, and processors installed)	25.0 kg (55.00 lb)

Power supply specifications

Depending on the installed options and/or the regional location where the server was purchased, the server is configured with one of the following power supplies:

- [ATX 350W non-hot-plug power supply](#) on page 135
- [ATX 550W non-hot-plug power supply](#) on page 135
- [HPE 800W Flex Slot Platinum Hot-plug Low Halogen Power Supply](#) on page 136

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

ATX 350W non-hot-plug power supply

Specification	Value
Input requirements	
Rated input voltage	100 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	4.5 A at 100 VAC 1.9 A at 240 VAC
Maximum rated input power	437 W at 100 VAC 416 W at 240 VAC
BTUs per hour	1491 at 100 VAC 1419 at 240 VAC
Power supply output	
Rated steady-state power	350 W at 100VAC to 240VAC
Maximum peak power	385 W at 100VAC to 240VAC

ATX 550W non-hot-plug power supply

Specification	Value
Input requirements	
Rated input voltage	100 VAC to 240 VAC
Rated input frequency	50 Hz to 60 Hz
Rated input current	6.4 A at 100 VAC 2.62 A at 240 VAC

Table Continued

Specification	Value
Maximum rated input power	634 W at 100 VAC
	613 W at 240 VAC
BTUs per hour	1876 at 100 VAC
	1876 at 240 VAC
Power supply output	
Rated steady-state power	550 W at 100VAC to 240VAC
Maximum peak power	575 W at 100VAC to 240VAC

HPE 800W Flex Slot Platinum Hot-plug Low Halogen Power Supply

Specification	Value
Input requirements	—
Rated input voltage	100 VAC to 127 VAC
	200 VAC to 240 VAC
	240 VDC for China only
Rated input frequency	50 Hz to 60 Hz
	Not applicable to 240 VDC
Rated input current	9.1 A at 100 VAC
	4.4 A at 200 VAC
	3.6 A at 240 VDC for China only
Maximum rated input power	899 W at 100 VAC
	867 W at 200 VAC
	864 W at 240 VDC for China only
BTUs per hour	3067 at 100 VAC
	2958 at 200 VAC
	2949 at 240 VAC for China only
Power supply output	—

Table Continued

Specification	Value
Rated steady-state power	800 W at 100 VAC to 127 VAC input
	800 W at 100 VAC to 240 VAC input
	800 W at 240 VDC input for China only
Maximum peak power	800 W at 100 VAC to 127 VAC input
	800 W at 100 VAC to 240 VAC input
	800 W at 240 VDC input for China only

Websites

General websites

Hewlett Packard Enterprise Information Library

www.hpe.com/info/EIL

Subscription Service/Support Alerts

www.hpe.com/support/e-updates

Single Point of Connectivity Knowledge (SPOCK) Storage compatibility matrix

www.hpe.com/storage/spock

Storage white papers and analyst reports

www.hpe.com/storage/whitepapers

For additional general support websites, see [Support and other resources](#) on page 139.

Product websites

Product QuickSpecs

<http://www.hpe.com/servers/ml110-gen10>

HPE ProLiant ML110 Gen10 support page

<http://www.hpe.com/support/ml110gen10>

HPE ProLiant ML110 Gen10 documents

<http://www.hpe.com/info/ml110gen10-docs>

Support and other resources

Accessing Hewlett Packard Enterprise Support

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

Information to collect

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

ClearCARE technical support

Support for ClearOS and ClearVM is not provided by Hewlett Packard Enterprise. Support for ClearOS and ClearVM is purchased and delivered by ClearCenter. You can purchase single support incidents by submitting a support ticket to ClearCenter, or you can purchase a Bronze, Silver, Gold, or Platinum ClearCARE subscription. For more information, go to the ClearOS website:

<https://www.clearos.com/>

Several levels of professional technical support are available to licensed users. For more information, go to the ClearCARE support website:

<https://www.clearos.com/products/support/clearcare-overview>

Accessing updates

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

Hewlett Packard Enterprise Support Center

www.hpe.com/support/hpesc

Hewlett Packard Enterprise Support Center: Software downloads

www.hpe.com/support/downloads

Software Depot

www.hpe.com/support/softwaredepot

- To subscribe to eNewsletters and alerts:

www.hpe.com/support/e-updates

- To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center **More Information on Access to Support Materials** page:

www.hpe.com/support/AccessToSupportMaterials

-
- !** **IMPORTANT:** Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Passport set up with relevant entitlements.
-

Customer self repair

Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider or go to the CSR website:

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

Remote support

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

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

Remote support and Proactive Care information

HPE Get Connected

www.hpe.com/services/getconnected

HPE Proactive Care services

www.hpe.com/services/proactivecare

HPE Proactive Care service: Supported products list

www.hpe.com/services/proactivecaresupportedproducts

HPE Proactive Care advanced service: Supported products list

www.hpe.com/services/proactivecareadvancedsupportedproducts

Proactive Care customer information

Proactive Care central

www.hpe.com/services/proactivecarecentral

Proactive Care service activation

www.hpe.com/services/proactivecarecentralgetstarted

Documentation feedback

Hewlett Packard Enterprise is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (docsfeedback@hpe.com). When submitting your feedback, include the document title, part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.

Acronyms and abbreviations

3DS TSV

three-dimensional stacked through-silicon via (integrated circuit packaging technology)

ADDDC

adaptive double device data correction

AHCI

advanced host controller interface

AHS

Active Health System

AHSV

Active Health System Viewer

API

application program interface

ASHRAE

American Society of Heating, Refrigerating and Air-Conditioning Engineers

CAS

column address strobe

CSA

Canadian Standards Association

CSR

customer self repair

DDR4

double data rate-4

GPU

graphics processing unit

HPE SSA

HPE Smart Storage Administrator

IEC

International Electrotechnical Commission

iLO

Integrated Lights-Out

IML

Integrated Management Log

ISO

International Organization for Standardization

iSUT

Integrated Smart Update Tools

LFF

large form factor

LRDIMM

load reduced dual in-line memory module

NMI

nonmaskable interrupt

PCA

printed circuit assembly

PCIe

Peripheral Component Interconnect Express

PDU

power distribution unit

POST

Power-On Self-Test

PXE

Preboot eXecution Environment

RAS

Reliability, Accessibility, Serviceability

RBSU

ROM-Based Setup Utility

RDIMM

registered dual in-line memory module

REST

representational state transfer

RoHS

Restriction of Hazardous Substances

RPS

redundant power supply

SD

secure digital

SAS

serial attached SCSI

SATA

serial ATA

SFF

small form factor

STK

scripting toolkit

StorCLI

Storage Command Line Interface

SPP

Service Pack for ProLiant

SSD

solid state drive

SUM

Smart Update Manager

TMRA

recommended ambient operating temperature

TPM

Trusted Platform Module

UDIMM

unregistered dual in-line memory module

UEFI

Unified Extensible Firmware Interface

UID

unit identification