Hewlett Packard Enterprise

HPE 3PAR StoreServ 8000 Storage Customer Self Install Guide

HPE 3PAR OS 3.3.1 MU2

HPE 3PAR Service Processor 5.0.4

Abstract

This document provides information and instructions to guide you through the installation of your HPE 3PAR StoreServ 8000 Storage system without the assistance of an authorized service provider. If installation assistance is needed, contact your HPE sales representative or HPE Channel Partner to purchase HPE Deployment Services.

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Guidelines for the customer self installation

Customer Self Install (CSI) guidelines:

IMPORTANT:

- The customer self install (CSI) option is the self-installation of your storage system without the assistance of an authorized service provider. If installation assistance is needed, contact your Hewlett Packard Enterprise sales representative or channel partner to purchase Hewlett Packard Enterprise deployment services.
- When the initial installation is completed according to the rules provided in this CSI guide, the storage system is fully supported by the warranty.
- After the initial installation, the system might be ungradable to add specific components. Some components are designated as customer self upgrade (CSU) components. All non-CSU components require installation by an authorized service provider to satisfy the warranty.

The CSI option is available only for the HPE 3PAR StoreServ 8000 Storage systems that meet the following criteria:

- Configuration options:
  - Factory-integrated-in-rack: Two-node 8200, 8400, 8440, 8450
  - Factory-integrated-no-rack: Two-node 8200, 8400, 8440, 8450
  - Field-integrated: Two-node 8200, 8400, 8440, 8450

  For more information about the configuration options, see **Factory-integrated/Field-integrated options** on page 10.
- Maximum of four expansion drive enclosures allowed at initial order and must be installed at the time of the initial CSI of the system.

  NOTE: To add expansion drive enclosures after the initial CSI, Hewlett Packard Enterprise requires that an authorized service provider installs the additional expansion drive enclosures to satisfy the customer warranty.
- Single rack

  NOTE: If a physical service processor (SP) is order, this component is allowed in a separate rack.
- A Customer Self Install of the storage system must be performed using the HPE 3PAR Guided Setup that is a feature of the HPE 3PAR OS 3.3.1.

Customer technical profile:

To install the storage system, Hewlett Packard Enterprise recommends using an installer experienced in the following:

- Have a good understanding and knowledge of SANs, Fiber Channel (FC) fundamentals, and a basic understanding of TCP/IP and other networking protocols (DNS/NTP).
- Have a good understanding of server virtualization technology, in particular of hypervisors such as VMware ESXi and Microsoft Hyper-V.

- Be able to maintain and install server hardware and Windows and/or Linux OSs.
- Have experience creating storage LUNs, presenting and/or exporting LUNs to a server, and formatting the LUNs to make them usable for applications.
- Be able to troubleshoot hardware and software issues using logs and documentation.
- Have the required tools and mechanical skills to unpack, roll, and install a heavy rack, up to ~900 kg (2,000 pounds). Three people are recommended to remove the racked system from its shipping container.

If the installer does not meet the profile or is not comfortable with the CSI process, Hewlett Packard Enterprise recommends contacting your Hewlett Packard Enterprise sales representative or HPE Channel Partner to purchase HPE Deployment Services.

Customer responsibilities:

- Review all the relevant documentation for the HPE 3PAR StoreServ 8000 Storage system prior to initiating the installation.
- Ensure that the host and SAN environment is supported and compliant with HPE recommendations. Resolve any problems with the host and SAN environment prior to installing the storage system. The *HPE 3PAR Implementation Guides* and the *HPE 3PAR Smart SAN User Guide* are available at the Hewlett Packard Enterprise Information Library website:

  www.hpe.com/info/storage/docs

  The Support Matrix is available at the Single Point of Connectivity Knowledge (SPOCK) website:

  www.hpe.com/storage/spock
- Gather the required network and password information as indicated in the *HPE 3PAR StoreServ 8000 Storage Software Setup Worksheet*.

About the HPE 3PAR StoreServ 8000 Storage system

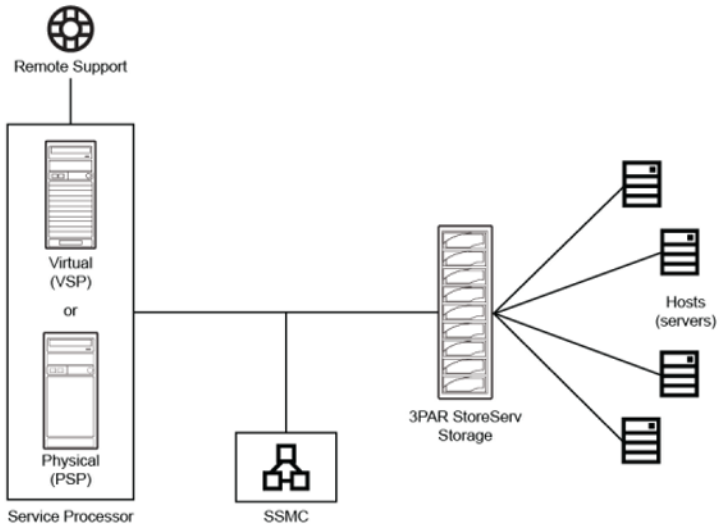


Figure 1: Architecture of the storage system

HPE 3PAR StoreServ 8000 Storage system:

This storage system includes Controller Nodes, physical Drives, and expansion Drive Enclosures (optional). The Controller Nodes include network ports to provide administrative datapaths to the storage system.

Hosts (servers):

The host servers connect to the storage system directly or through a switch with the following types of connections: FC, iSCSI, FCoE, or File Services.

HPE 3PAR StoreServ Management Console (SSMC) software:

The HPE 3PAR SSMC software defines, creates, and exports storage to your host servers. The HPE 3PAR SSMC also provides tools to monitor the health of your storage system.

HPE 3PAR Service Processor (SP) software:

Each storage system requires either a physical or virtual SP. The SP software is designed to provide remote monitoring, error detection, error reporting, and support of diagnostic and maintenance activities involving the storage system. The SP only sends support data to HPE 3PAR Remote Support. The virtual SP is deployed as a virtual machine and runs on a customer-owned, customer-provided server and communicates with the storage system over its Ethernet connection.

HPE 3PAR Remote Support connectivity:

HPE 3PAR Remote Support connectivity to HPE 3PAR Central is a utility that monitors the health of your storage system. Information about the system health and configuration is transferred securely to Hewlett Packard Enterprise. If Remote Support connectivity is enabled, it can also provide critical software updates to your storage system.

For additional storage system architecture information, see the *HPE 3PAR StoreServ StorageConcepts Guide* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

For information about supported hardware and operating system (OS) platforms, see the Hewlett Packard Enterprise Single Point of Connectivity Knowledge (SPOCK) website:

www.hpe.com/storage/spock

Factory-integrated/Field-integrated options

Factory-integrated-in-rack option

This factory-integrated-in-rack option includes the assembly of all components, labeling, cabling, the installation of software and licenses, the installation in an HPE rack, and then testing the storage system as a whole at the factory. The storage system is shipped in the HPE rack, ready for installation at the customer site.

Factory-integrated-no-rack option

The factory-integrated-no-rack option includes the assembly of all components, labeling, cabling, the installation of software and licenses, and then testing the storage system as a whole at the factory. Prior to shipment, the cables are disassembled and the enclosures, cables, and miscellaneous materials are shipped in separate packaging. The storage system is installed at the customer site in a customer-supplied, standard, four-post, EIA-310, 48.3 cm (19 in) rack with square mounting holes.

Field-integrated option

The field-integrated option includes the installation of software and licenses, testing components individually before shipment, and shipping them in separate packaging. The storage system is installed at the customer site in a customer-supplied, standard, four-post, EIA-310, 48.3 cm (19 in) rack with square mounting holes, and the customer installs the optional components, labeling, and cabling.

Installation media

Installation DVDs are not typically shipped with the HPE 3PAR StoreServ 8000 Storage system, and instead the following delivery methods are used:

- If you selected the License to Use (LTU) delivery method of physical delivery during ordering, installation media is shipped at the time of your order.
- If you selected electronic delivery, see the HPE e-Software Delivery Confirmation email for detailed instructions for downloading the software. The e-Software Delivery Confirmation email was sent at the time of purchase to your IT administrator, product manager, or purchasing agent.

If you require installation media, contact the *Hewlett Packard Enterprise Support Center*:

www.hpe.com/support/hpesc

Website for software downloads

Locate the software-receipt email that has the download link, or download the latest software from the *Hewlett Packard Enterprise Software updates and licensing* website:

www.hpe.com/downloads/software

An HPE Passport profile and a valid Service Agreement ID (SAID) are required to access downloads.

Serial number location on the storage system

The HPE 3PAR StoreServ 8000 Storage system has a 10-character serial number that is used with the software setup.

The serial number is at the rear of the storage system next to the power switch for the controller node enclosure power cooling module (PCM).

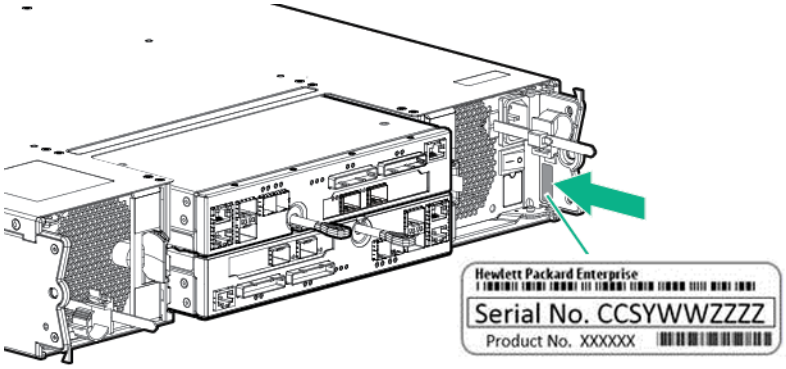


Figure 2: Serial number location, HPE 3PAR StoreServ 8000 Storage system

Forum for the storage system

For the latest HPE 3PAR StoreServ 8000 Storage Customer Self Install (CSI) information, see the official *HPE 3PAR StoreServ Storage* forum website in the Hewlett Packard Enterprise community:

www.hpe.com/forum/3PARCSIHELP

Use this forum to ask for help, share your installation experience, provide feedback, and search for solutions to issues encountered during the installation process.

Preparing: Process overview

Procedure

1. Review **Site planning** on page 12.
2. Review **Regulatory information** on page 141.
3. Review **Customer self install video** on page 13.
4. Print and complete the **HPE 3PAR StoreServ 8000 Storage Software Set up Worksheet** on page 136.
5. Identify the **Rack layout of the components and cabling instructions** on page 13.
6. Review **Acclimatizing** on page 13.
7. Obtain the **Tools** on page 14.
8. Review the **Unpacking: Process overview** on page 15 and complete the process.

Site planning

Successful installation of the HPE 3PAR StoreServ 8000 Storage system requires careful planning and supervision and may require collaboration with authorized Hewlett Packard Enterprise representatives. Proper site planning will help provide for a more efficient installation and greater reliability, availability, and serviceability.

Environment—For optimal performance at a specific location, controlled environmental conditions are recommended, and they can best be facilitated through raised flooring and under-floor air conditioning. It is the responsibility of the customer to monitor this environment to ensure continued conformance with the recommended environmental specifications.

Power—Adequate power is necessary for the reliable functioning of electronic equipment and for the safety of the installation. The customer is responsible for procuring, installing, and maintaining adequate power to the equipment.

- Provide suitable space for unpacking, installing, and operating the storage system.
- Review the power and the heating, ventilation, and air-conditioning (HVAC) requirements. Provide adequate power facilities for the storage system and maintain proper environmental conditions for the storage system. Order any additional support equipment indicated by the power and HVAC review.
- Verify that the electrical service wiring has been installed at the predetermined location before installing the storage system. For detailed requirements, see the respective product specifications.
- Supply the network connections and external cabling required by the storage system.
- Ensure that all units in the specified configuration and all cables of the required length have been ordered.
- Make a layout for the installation.
- Enable the appropriate HPE 3PAR Remote Support strategy.

Procedure

Review the specific information concerning server-room environments and for input electrical power and grounding requirements in the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website: **www.hpe.com/info/storage/docs**

Customer self install video

Procedure

To prepare for the installation, watch the HPE 3PAR StoreServ 8000 Storage Customer Self Install (CSI) video: **www.hpe.com/support/3PAR8000CSIVideo**

Rack layout of the components and cabling instructions

NOTE: This configuration information applies only to an HPE 3PAR StoreServ 8000 Storage system for either a factory-integrated-no-rack option or field-integrated option and that includes one or more expansion drive enclosures.

Hewlett Packard Enterprise provides cabling instructions that contain diagrams for the recommended rack-component layout and instructions for labeling and connecting SAS cables between the controller node enclosure and expansion drive enclosures (optional). If you ordered an HPE 3PAR StoreServ 8000 Storage system with expansion drive enclosures (optional), you will need to review the appropriate cabling diagram for your configuration.

The links to the cabling instructions based on system configurations are provided in the *HPE 3PAR StoreServ 8000 Storage Cabling Configuration Guide*:

www.hpe.com/support/3PAR8000Cabling

Acclimatizing

CAUTION: To prevent potential damage to storage system hardware, do not power on the storage system until it is fully acclimatized. The maximum acceptable rate of temperature change for a nonoperating storage system is 36° F/hour (20° C/hour). If the storage system or its components have experienced environmental changes during transit, allow enough time for the storage system to acclimatize before proceeding with the power-on sequence.

Before powering on the HPE 3PAR StoreServ 8000 Storage system, the storage system might require up to 24 hours to acclimatize to the new operating environment when outside-to-inside conditions vary significantly.

Procedure

If condensation is present even after the 24-hour acclimatization period, wait for all condensation to fully evaporate before completing the power-on sequence.

Tools

Table 1: Tools for the HPE 3PAR StoreServ 8000 Storage installation

Purpose	Tools
Safety	• ESD mat • ESD grounding strap
HPE rack unpacking	• Scissors or snips • Box cutter • Socket wrench with 13 mm (1/2 in) and 17 mm (11/16 in) sockets for removing L-bracket shipping clamps • Adjustable wrench for leveling feet on rack • Screwdriver for removing cable restraint shipping brackets
Rail kits and enclosures installation	• P1 and P2 Phillips screwdrivers • T25 Torx bit and driver
Physical service processor (SP) connection setup	Laptop for configuration of a physical service processor

Unpacking: Process overview

Procedure

1. Based on the system configuration, review the process overview and complete the process:
   - **Unpacking the factory-integrated-in-rack option: Process overview** on page 15
   - **Unpacking the factory-integrated-no-rack or field-integrated options: Process overview** on page 25

Unpacking the factory-integrated-in-rack option: Process overview

Procedure

1. Complete **Unpacking the HPE rack factory-integrated with the storage system** on page 15.
2. Complete **Positioning and stabilizing the HPE rack** on page 23.
3. Complete **Removing the cable restraint shipping brackets** on page 24.
4. Drives are installed at the factory. However, if additional drives were received and not installed, review the **Installing the drives: Process overview** on page 34 and complete the process.
5. Review the **Cabling: Process overview** on page 49 and complete the process.

Unpacking the HPE rack factory-integrated with the storage system

During this procedure, refer to the unpacking diagrams on the outside of the cardboard shipping container.

For more information about placement of the HPE 3PAR StoreServ Storage system and reserving room for service access, see the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

NOTE: The illustrations in this procedure are examples and might not be an exact representation of your HPE rack (cabinet).

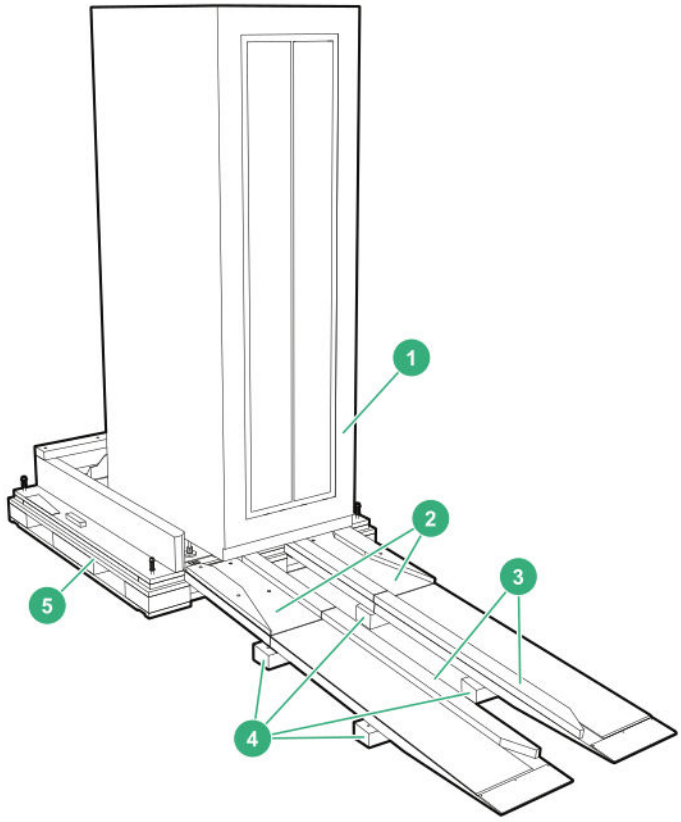


Figure 3: Items for unpacking an HPE rack

1. Rack (cabinet)
2. Ramps
3. Caster guides
4. Ramp supports
5. Pallet

Prerequisites

CAUTION: Ensure that precautions have been taken to ensure rack stability and safety. Observe all cautions and warnings included in the installation instructions.

- When the equipment arrives, verify that there is enough space to unload and unpack the HPE 3PAR StoreServ Storage system. The specific amount of space for unpacking the storage system is based on the dimensions of the container, ramp, and room. This space is required to access the storage system so that it can be removed from the crate and moved to its final location.
- Verify that the delivered shipment matches the order by referring to the packing slip and SKUs.
- Observe local occupational safety requirements and guidelines for heavy equipment handling.
- Verify that the total weight of the rack is within the floor loading limit.
- Due to the weight of the rack, use extreme caution when unpacking and moving the rack to avoid tipping the rack.
- When unloading the rack from the pallet, always use at least three people and do not stand in front of the rack.
- To make the rack bottom-heavy and more stable, always load the heaviest item first from the bottom of the rack and up.

Procedure

1. Inspect the packaging for damage and report any issues to the Hewlett Packard Enterprise Support Center.
2. From the cardboard shipping container, remove the banding and top cover.

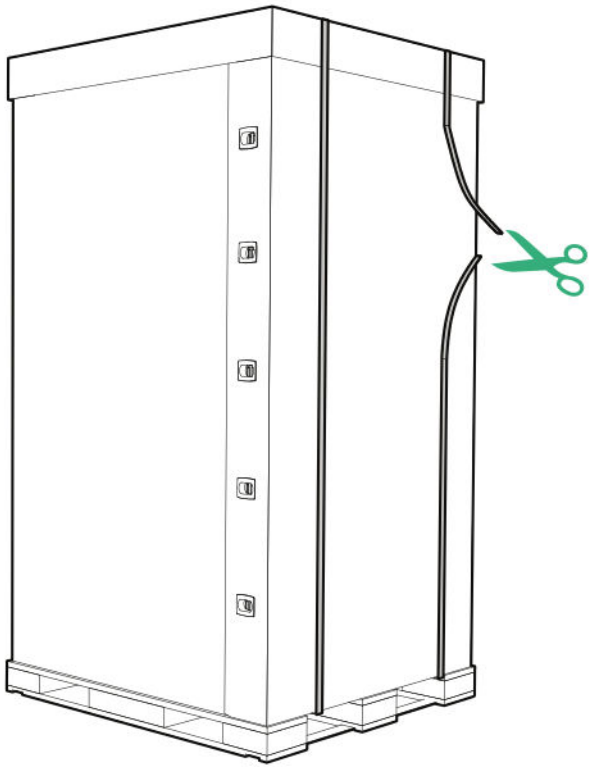


Figure 4: Removing the banding, HPE rack shipping container

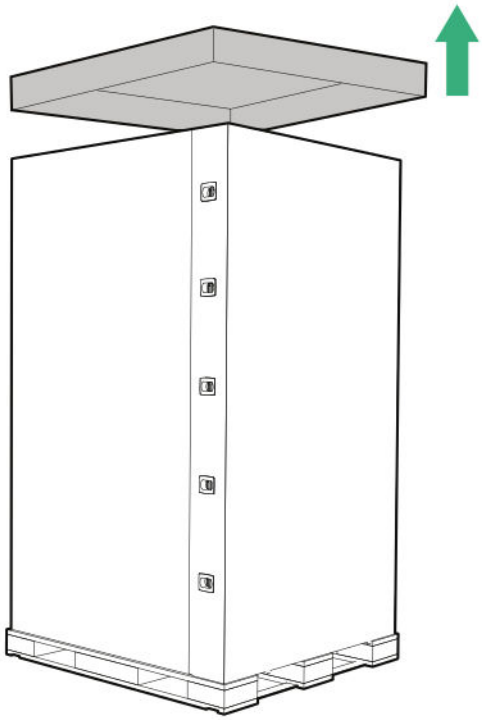


Figure 5: Removing the top, HPE rack shipping container

3. Remove the clips along the corrugated fiber board (CFB) walls and separate the CFB walls. Place the separated walls away from the storage system.

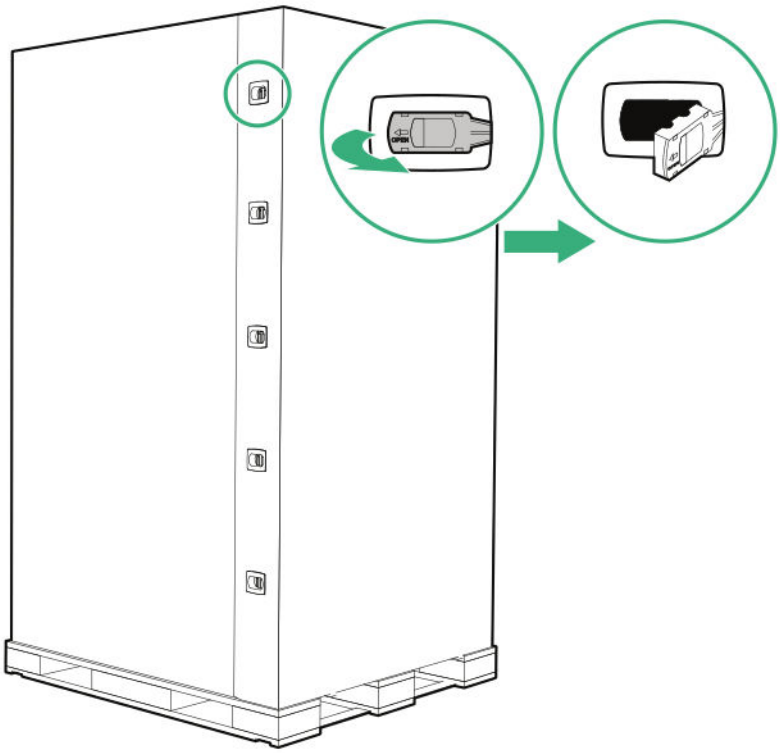


Figure 6: Removing the clips, HPE rack shipping container

4. Remove the packing material (wrapping material, foam pieces, plastic ESD cover), and then set aside the boxes that hold the ramps and additional installation hardware.

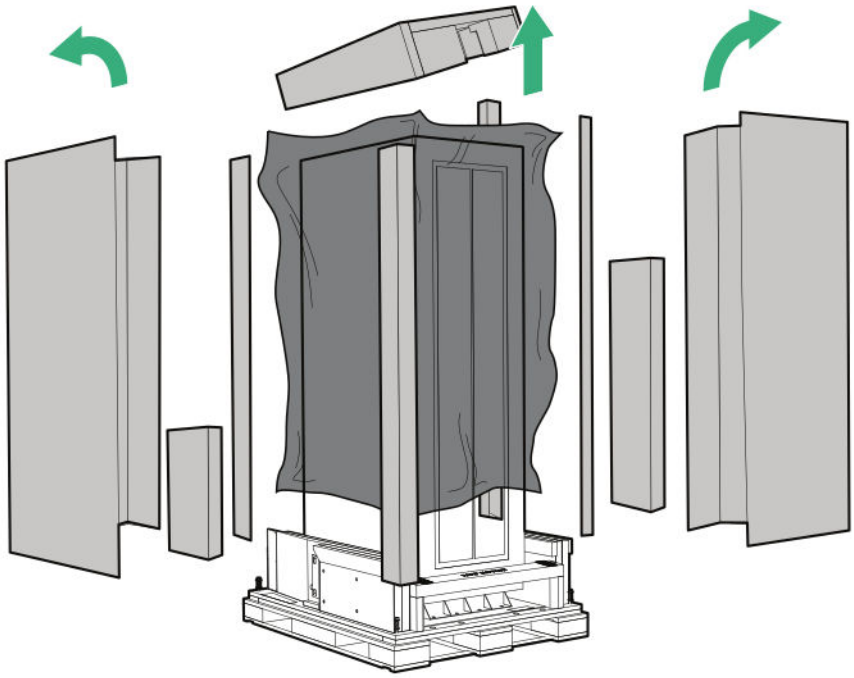


Figure 7: Removing the packing material, HPE rack shipping container

5. Remove the four shipping L-brackets that attach the rack to the pallet using a socket wrench with 13 mm (1/2 in) and 17 mm (11/16 in) sockets.

   a. Starting at the rack front, open the door and locate the two L-brackets.

   b. Remove the two 13 mm (1/2 in) bolts that secure the L-bracket to the rack.

   c. Remove the two 17 mm (11/16 in) bolts that secure the L-brackets to the pallet.

   d. At the rack rear, repeat this same procedure to remove the remaining two L-brackets.

6. Check that the leveling bolts are raised to provide sufficient clearance for removing the rack from the pallet.

   a. If it is necessary to raise a leveling bolt, use an adjustable wrench and turn the upper locking nut clockwise to loosen.

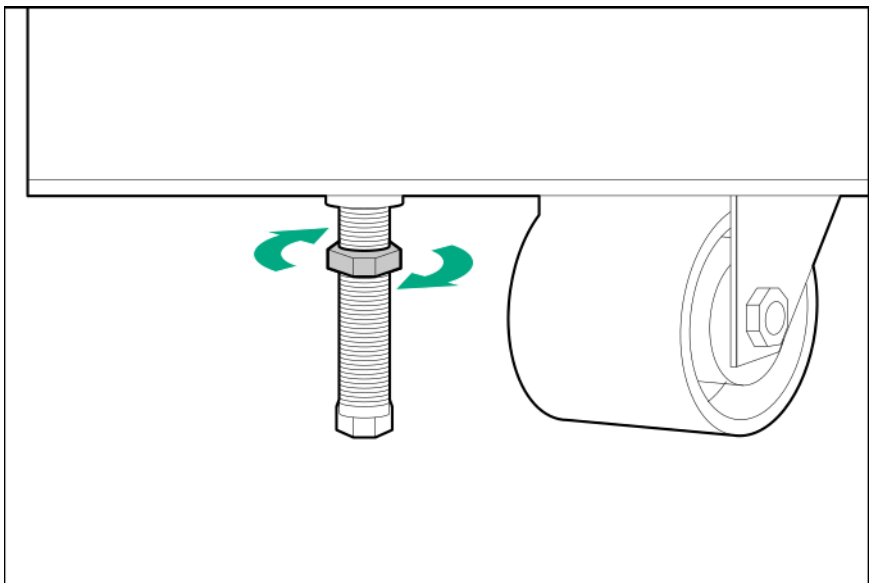


Figure 8: Releasing the locking nut, HPE rack leveling bolt

b. With an adjustable wrench, turn the leveling bolt counterclockwise until fully raised.

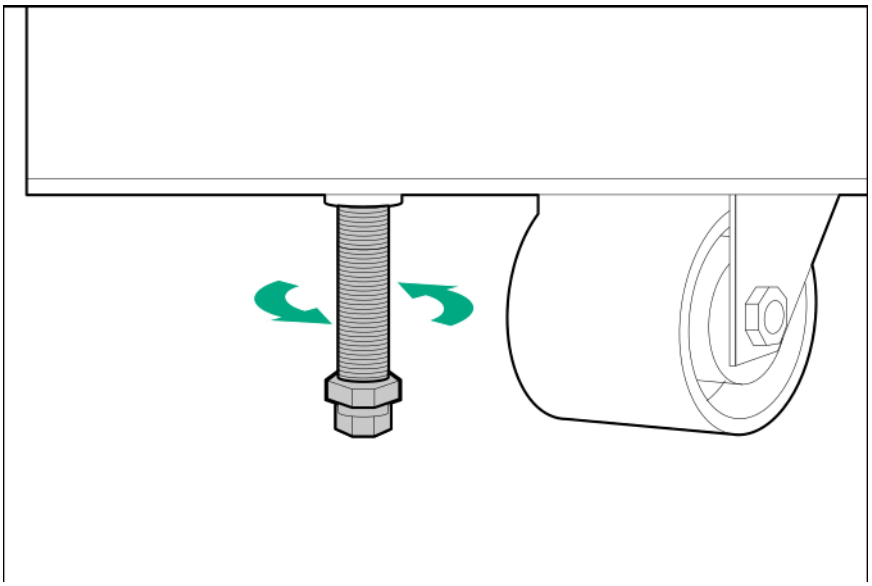


Figure 9: Raising the leveling bolt, HPE rack

7. Close and secure the rack front and rear doors.

8. Unpack the Ramp Assembly Kit and install the ramps and ramp supports at the front of the pallet.

a. Unpack the two ramps and four wooden supports.

b. Extend the ramps to their full length.

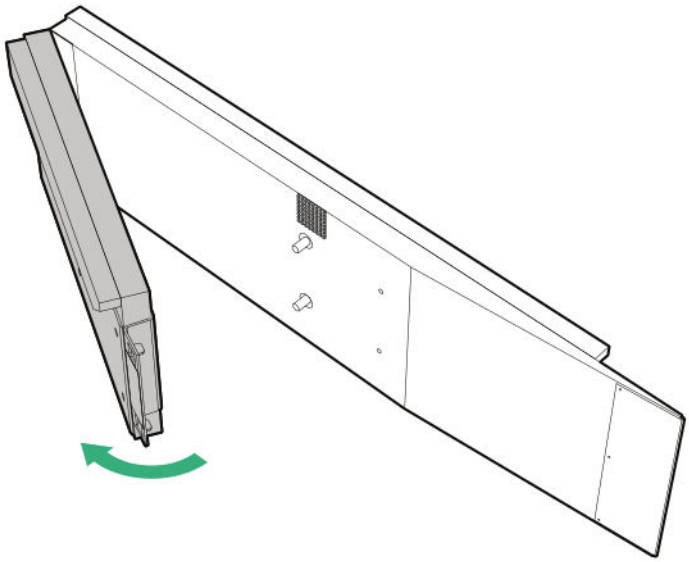


Figure 10: Extending the ramps, HPE rack shipping container

c. To install the ramps, match up the single arrow and double arrows on the pallet and ramps. The left ramp has the single arrow, and the right ramp has double arrows. Attach the metal brackets with the mounting holes along the front edge of the pallet, and then step firmly on the ramp and ensure that the ramp is secure to the pallet.

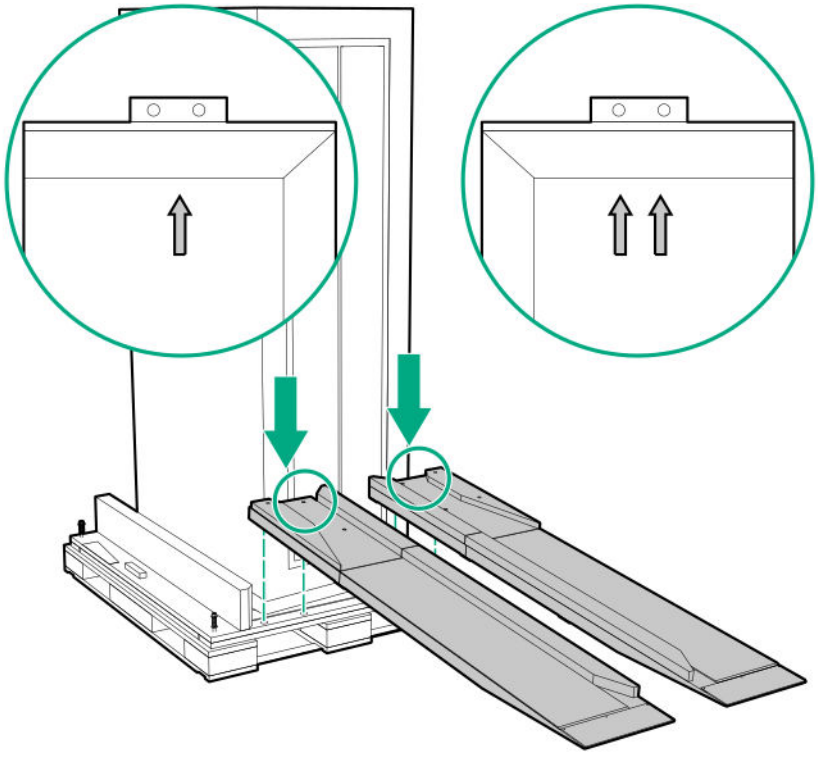


Figure 11: Installing the ramps onto the pallet, HPE rack shipping container

WARNING: Before rolling the rack from the pallet to the floor, correctly install the ramp supports underneath the ramps, which will prevent the ramps from collapsing or causing the rack to tip as it is moved down the ramps.

d. Attach the wooden ramp supports designated **A** and **B** to the locations on the ramps designated **A** and **B**. Ensure that the angle of the wooden ramp support is attached to the ramps at the same angle. The letters are marked on the ramp inside edge and support edge. Install support **A** beneath the general area marked **A** on the rack, and do the same for support **B**. Insert the ramp support beneath the ramp where the bottom of the ramp support touches the ground and the velcro on the top of the ramp support is secure to the velcro underneath the ramp. The wooden ramp supports must fit snugly between the ramp and the floor.

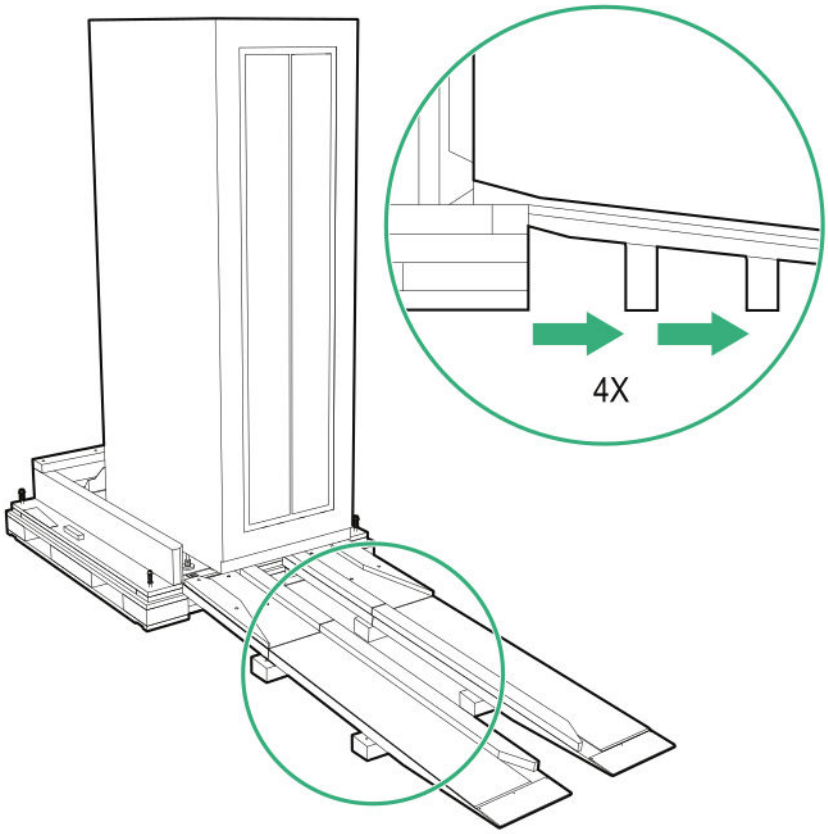


Figure 12: Installing the ramp supports, HPE rack shipping container

9. Roll the rack from the pallet to the floor.

CAUTION: When unloading the rack from the pallet, always use at least three people and do not stand in front of the rack.

To roll the rack off the pallet to the floor, each person must grasp the rack corners with two people guiding the rack down the ramp while a third person slowly pushes the rack from behind. Based on the weight of the rack, it may be necessary to have both people on the side carefully push the rack until it is completely on the ramp and adjust to guiding the rack the rest of the way down the ramps and onto the floor.

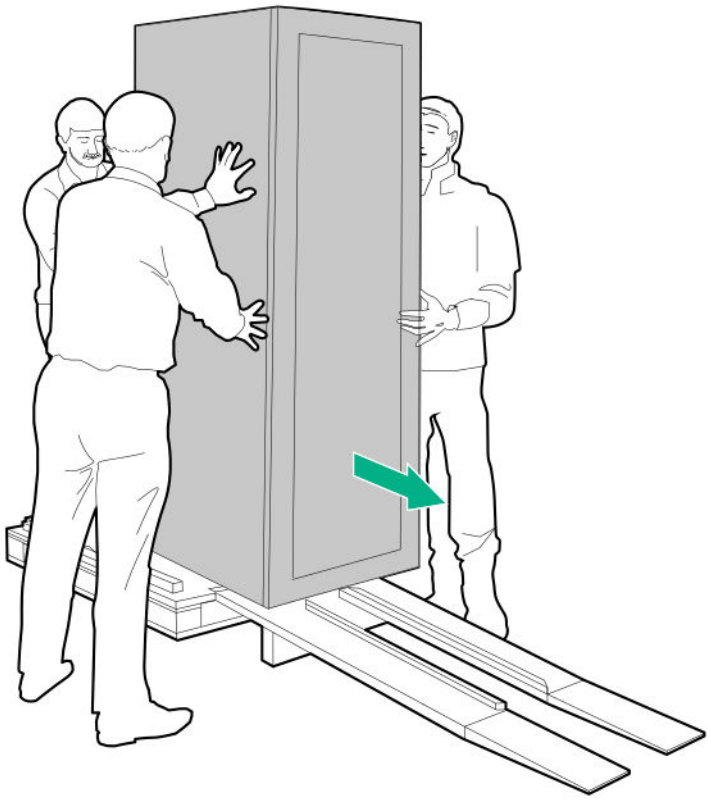


Figure 13: Unloading the HPE rack from the pallet

Positioning and stabilizing the HPE rack

CAUTION: To prevent potential damage to the storage system equipment, do not adjust the position of the HPE rack when the power is on.

Prerequisites

- Read and complete all the configuration specifications and installation requirements in the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

  http://www.hpe.com/info/storage/docs

- Obtain an adjustable wrench for leveling the feet on the HPE rack.

Procedure

1. Roll the HPE rack to the final operating location. If the operating location has raised floor tiles with cutouts to facilitate cable routing, position the rack over the cutouts in the tiles.
2. Stabilize and level the HPE rack.

   After properly positioning the storage system, four leveling pads must be installed underneath the four leveling bolts to stabilize the HPE rack and prevent movement during operation. The leveling pads are normally located in a plastic bag in the box that contains rack keys and accessory material. The leveling pads provide a wider base for supporting the rack and protecting the floor.

a. Position a leveling pad underneath the leveling bolt.

b. Using an adjustable wrench, turn the leveling bolt clockwise to extend the bolt until the entire weight of the rack rests on the leveling pad instead of the caster. The caster must be slightly off the floor, so it can swivel slightly by hand.

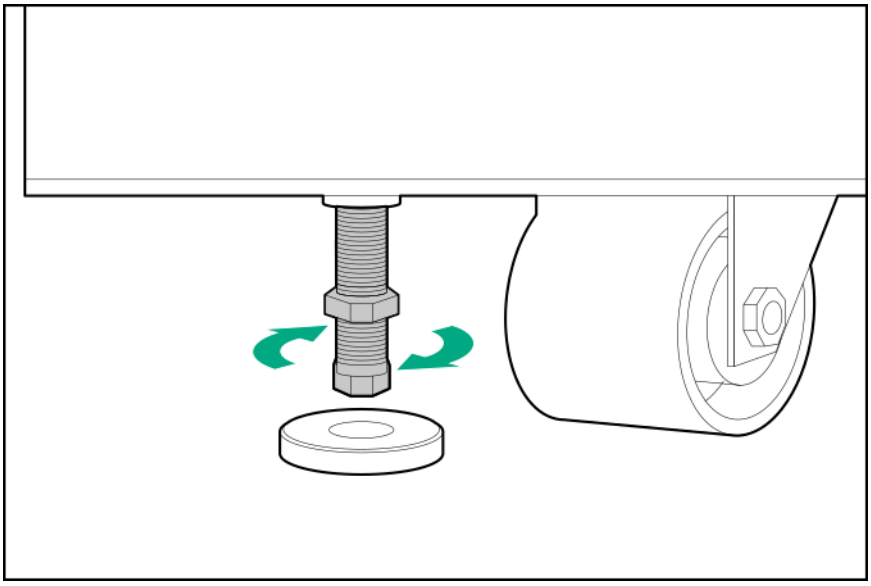


Figure 14: Lowering an HPE rack leveling bolt

c. Lock the leveling pad in place by turning the locking nut counterclockwise until tight.

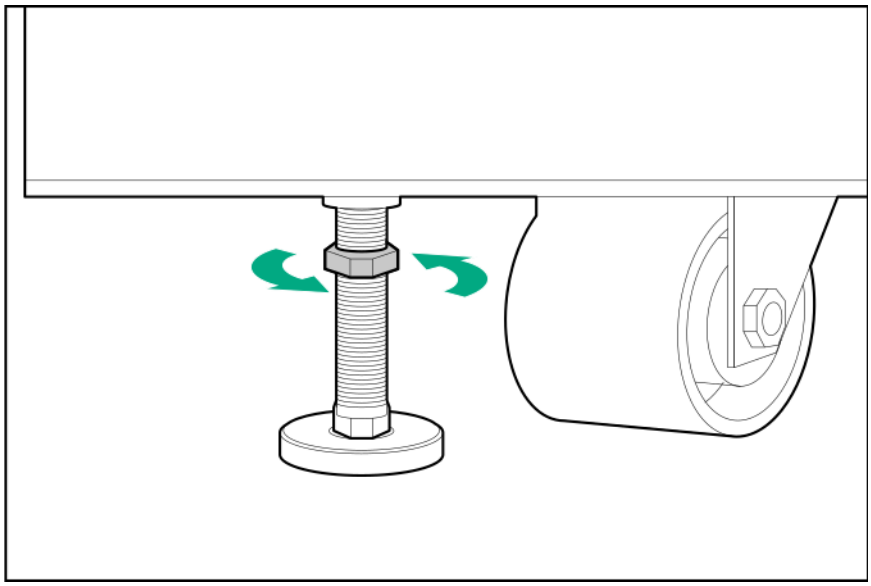


Figure 15: Tightening the locking nut on an HPE rack leveling bolt

d. Repeat for each leveling pad.

Removing the cable restraint shipping brackets

During transport, the cable restraint shipping brackets support the connected data cables and connectors for the HPE 3PAR StoreServ 8000 Storage system. When the storage system is in a stationary position,

the brackets are not required and may need to be removed to provide access to the components of the storage system. If you remove the brackets, store the brackets for later use.

Procedure

1. Remove the data cables from the hook and loop straps.
2. Loosen the captive screws.

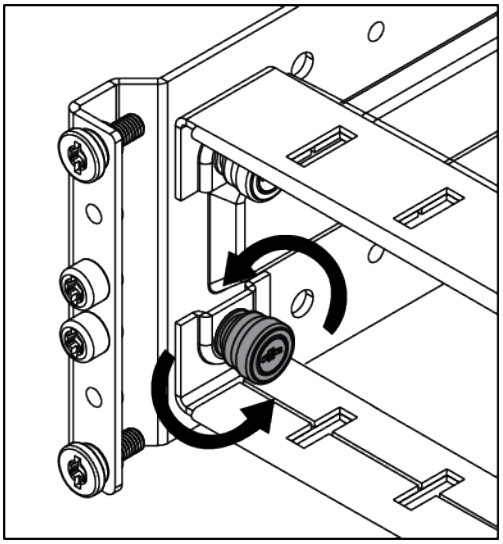


Figure 16: Loosening the captive screws on a cable restraint shipping brackets

3. Remove the brackets. Be careful not to damage the attached data cables.

Unpacking the factory-integrated-no-rack or field-integrated options: Process overview

Procedure

1. Complete **Unpacking the components** on page 25.
2. Review the **Installing: Process overview** on page 27 and complete the process.

Unpacking the components

This information applies to the storage system components.

CAUTION:

- Observe local occupational safety requirements and guidelines for heavy equipment handling.
- Always use at least two people to lift an enclosure or three if lifting above chest level. Use proper grounding techniques to prevent electrostatic discharge damage to the components.

Prerequisites

Provide unpacking space in the loading/unloading area, ramp, and destination room.

For more information about placement of the storage system and reserving room for service access, see the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Procedure

1. Inspect the packaging for damage and report any issues to Hewlett Packard Enterprise Support Center.
2. Verify that the delivered shipment matches the order by referring to the packing slip and SKUs.
3. Unpack the contents of the controller node enclosure box.
   - With a two-node storage system, two 1U filler panels—Used to reserve 2Us of space above the controller node enclosure for a future upgrade to a four-node storage system
   - Accessories kit—Cable label kit, cable ties, M5 retention screws to secure the controller node enclosure to the rack, and two stickers only for a two-node storage system to place on the two 1U filler panels used to reserve space for a future upgrade to a four-node storage system.
   - 2U rail kit
   - Controller node enclosure
4. Remove the bag and any tape from the enclosure.
5. Unpack any additional components shipped in separate boxes.
6. Save shipping boxes and packing material.

Installing: Process overview

Procedure

1. Review **Initializing the storage system when the SSDs are used exclusively for Adaptive Flash Cache** on page 27.
2. Based on the system configuration, review the process overview and complete the process:
   - **Installing the factory-integrated-no-rack or field-integrated options: Process overview** on page 28
   - **Installing the field-integrated option for a direct-current system: Process overview** on page 40

Initializing the storage system when the SSDs are used exclusively for Adaptive Flash Cache

IMPORTANT: If any SSDs are to be used for virtual volumes or common provisioning groups (CPGs), this procedure does **not** apply to the HPE 3PAR StoreServ 8000 Storage.

If the following statements are true for the SSDs that are part of the HPE 3PAR StoreServ Storage system, use the following procedure when installing and initializing the storage system:

- The storage system includes a mixture of SSDs and HDDs.
- If the SSDs exist **only** to be used with HPE 3PAR Adaptive Flash Cache and not for virtual volumes or CPGs.

Procedure

1. **If the SSDs are not already installed**, wait until after the storage system has been initialized to install the SSDs. **If the SSDs are already installed**, unseat the SSDs (or remove and install a blank) and keep the SSDs unseated until after the storage system has been initialized. To unseat each SSD, disengage the SSD connector from the enclosure midplane:
   a. To release the drive handle into the open position, release the securing mechanism on the handle.
   b. Pull the handle away from the enclosure, and slowly slide the drive out about 1-2 cm (1/2 in) from the enclosure.

   By waiting to install the SSDs until after the initialization of the storage system, the creation of logging logical disks (LDs) on the SSDs is prevented. These LDs would consume some of the SSD capacity which may be solely intended for HPE 3PAR Adaptive Flash Cache.
2. Complete the remaining installation process for the storage system.
3. After the storage system has been initialized using the HPE 3PAR Guide Setup or the out-of-the-box (OOTB) process, install or reinsert the SSDs.
4. Configure HPE 3PAR Adaptive Flash Cache on the storage system.

Installing the factory-integrated-no-rack or field-integrated options: Process overview

Procedure

1. Review **Guidelines for the storage system installation in a third-party RETMA rack** on page 28 .
2. If not already installed, complete **Installing the power source or power distribution unit** on page 28 .
3. Complete **Installing the enclosures in a third-party RETMA rack: Process overview** on page 29 .
4. Complete **Installing the enclosures in a third-party RETMA rack, 2U SFF and 4U LFF** on page 33.
5. Complete **Installing the drives: Process overview** on page 34.
6. If you are installing a physical service processor, review the **Installing the physical service processor: Process overview** on page 40 and complete the process.
7. Review the **Cabling: Process overview** on page 49 and complete the process.

Guidelines for the storage system installation in a third-party RETMA rack

- Review the specifications and meet all the requirements in the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

  www.hpe.com/info/storage/docs
- Ensure that the rack can support the total weight of all installed components and that the total weight is within the floor load limit.
- Refer to the diagrams on the outside of the cardboard shipping container and follow the instructions for removing the packaging.
- Ensure that the rack is compatible with the storage system. The storage system is compatible with most industry standard, four-post, EIA-310, 48.3 cm (19 in) racks with square mounting holes.
- Ensure that the rack has the appropriate power distribution units (PDUs) or power receptacles and has access to an adequate power source that provides the recommended level of redundancy.
- Always use at least two people to lift an enclosure, or three if lifting above chest level.
- If available, use a mechanical or electrical lift that can support the enclosure from underneath. Do not use a vacuum lift or physically lift from the top portion of the enclosure.
- Lift the enclosures from the bottom only. Lifting an enclosure from the top might damage the enclosure.
- Install a mounting kit in the rack for each enclosure in your storage system.
- For drive enclosures, wait to install drives in the enclosures until after the enclosure has been installed in the rack. A drive enclosure populated with drives might be too heavy to lift safely.

Installing the power source or power distribution unit

IMPORTANT: To protect against a storage system outage if one power source or PDU fails, Hewlett Packard Enterprise recommends supplying power from two or more redundant power sources.

Procedure

If it is necessary to install a power source or PDU, contact a qualified technician.

Installing the enclosures in a third-party RETMA rack: Process overview



Figure 17: Rail kit assembly 2U enclosure



Figure 18: Rail kit assembly 4U enclosure

Prerequisites

- To verify that the hardware is compatible with the rack, review the HPE 3PAR StoreServ 8000 Storage rail kit contents.
- To determine the correct location for installing the rail kits, locate and review the *HPE 3PAR StoreServ 8000 Storage Series Cabling Instructions* document that matches your storage system configuration.

Procedure

1. Review **Rail kit contents for the enclosure installation in a third-party RETMA rack** on page 29.
2. Review **Reserving rack space for an upgrade from a two-node to a four-node storage system** on page 30.
3. Complete **Installing the 2U rail kit in a third-party RETMA rack** on page 30.
4. Complete **Installing the 4U rail kit in a third-party RETMA rack** on page 31.
5. Complete **Installing the middle support bracket in a third-party RETMA rack** on page 32.
6. Complete **Installing the enclosures in a third-party RETMA rack, 2U SFF and 4U LFF** on page 33.

Rail kit contents for the enclosure installation in a third-party RETMA rack

Table 2: Contents of the rail kit assembly, 2U enclosure

Quantity	Description
8	M5, 12 mm, T25 Torx shoulder screws (long-flat) for rails
8	M5, 10 mm, T25 Torx screws (short-round) for middle support brackets

Table Continued

Quantity	Description
8	M5, 8 mm, T25 Torx screws
2	Rails: Right and left rails imprinted with FRONT RIGHT and FRONT LEFT
2	Middle support brackets: Installation of the support brackets is recommended to strengthen the rails.

Table 3: Contents of the rail kit assembly, 4U enclosure

Quantity	Description
2	M5 snap-in cage nuts
8	M5, 12 mm, T25 Torx shoulder screws (long-flat) for rails
8	M5, 10 mm, T25 Torx screws (short-round) for middle support brackets
8	M5, 8 mm, T25 Torx screws
2	Rails: Right and left rails imprinted with FRONT RIGHT and FRONT LEFT
2	Middle support brackets: Installation of the support brackets is recommended to strengthen the rails.

Reserving rack space for an upgrade from a two-node to a four-node storage system

With the two-node HPE 3PAR StoreServ 8000 Storage system models, you can later upgrade the storage system by installing an additional two-node controller node enclosure (and additional expansion drive enclosures):

- Two-node HPE 3PAR StoreServ 8400 Storage
- Two-node HPE 3PAR StoreServ 8440 Storage
- Two-node HPE 3PAR StoreServ 8450 Storage

Procedure

During this initial installation of the components in the rack, reserve two-unit (2U) rack space by installing the 1U filler panels into the 2U rack space above the installed controller node enclosure.

Installing the 2U rail kit in a third-party RETMA rack

The 2U rail kit is used with the controller node enclosure and SFF expansion drive enclosures.

IMPORTANT: When the installed front and rear RETMA rails are extended 73.7 cm (29 in) or more, installation of the middle support bracket (reinforcing rail) is recommended to strengthen the rails. The M5, 10 mm, T25 Torx screws (short-round) are used to install the middle support bracket.

Procedure

1. Determine the "U" position for installing the enclosure in the rack.
2. **At the rack front**, engage the rail with the front column.

   Labels denote the **FRONT RIGHT** and **FRONT LEFT** of the rails.

a. Align the front of the rail with the chosen "U" position.

b. Push the rail toward the front column until the guide pins are through the rack holes.

3. **At the rack rear**, engage the rail with the rear column.

a. Align the rear of the rail with the chosen "U" position.

b. Expand the rail to align and connect to the rear column.

4. Secure the front and rear of the rail assembly to the rack columns using four M5, 12 mm, T25 Torx (long-flat) shoulder screws (two in front and two in rear).

See **Figure 19: Securing the front and rear rail assembly of the rail kit to the rack** on page 31.

a. Insert shoulder screws in the top and bottom holes for the rail.

b. Tighten the shoulder screws with a 19-in-lbs torque.

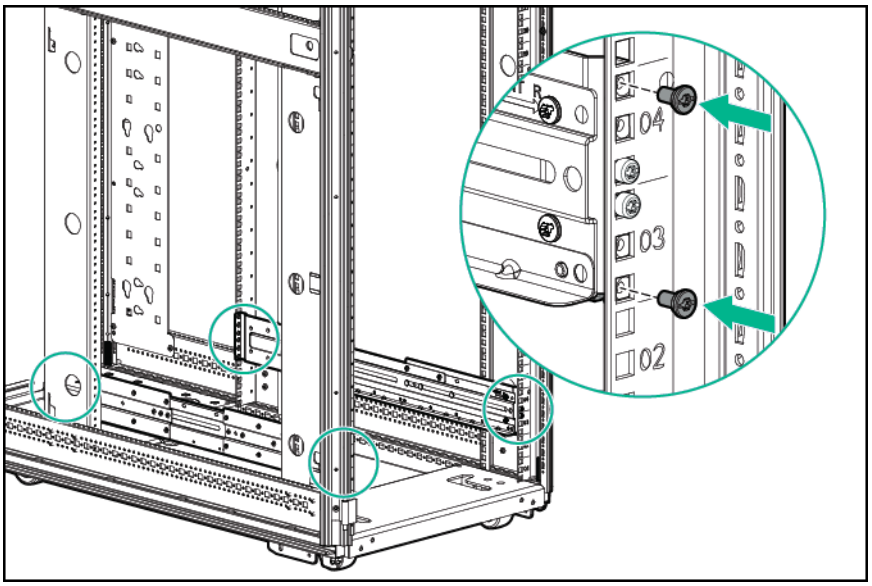


Figure 19: Securing the front and rear rail assembly of the rail kit to the rack

5. Repeat step 1 through step 4 for the other rail.

Installing the 4U rail kit in a third-party RETMA rack

The 4U rail kit is used with the LFF expansion drive enclosures.

IMPORTANT: When the installed front and rear RETMA rails are extended 73.7 cm (29 in) or more, installation of the middle support bracket (reinforcing rail) is recommended to strengthen the rails. The M5, 10 mm, T25 Torx screws (short-round) are used to install the middle support bracket.

Procedure

1. Determine the "U" position for installing the enclosure in the rack.
2. **At the rack front**, engage the rail with the front column.

Labels denote the **FRONT RIGHT** and **FRONT LEFT** of the rails.

   a. Align the front of the rail with the chosen "U" position.

   b. Push the rail toward the front column until the guide pins are through the rack holes.

3. **At the rack rear**, engage the rail with the rear column.

   a. Align the rear of the rail with the chosen "U" position.

   b. Expand the rail to align and connect to the rear column.

4. Secure the front and rear of the rail assembly to the rack post using four M5, 12 mm, T25 Torx (large-flat) shoulder screws (two in front and two in rear).

   a. Insert shoulder screws in the top and bottom holes for the rail.

   b. Tighten the shoulder screws with a 19-in-lbs torque.

5. Repeat step 1 through step 3 for the other rail.

6. Install snap-in cage nuts in the front left and right of the rack, 2U (six holes) above the lower securing screw location (typically next to the rack unit number).

   See **Figure 20: Installing the cage nuts of the rail kit in the rack front** on page 32.

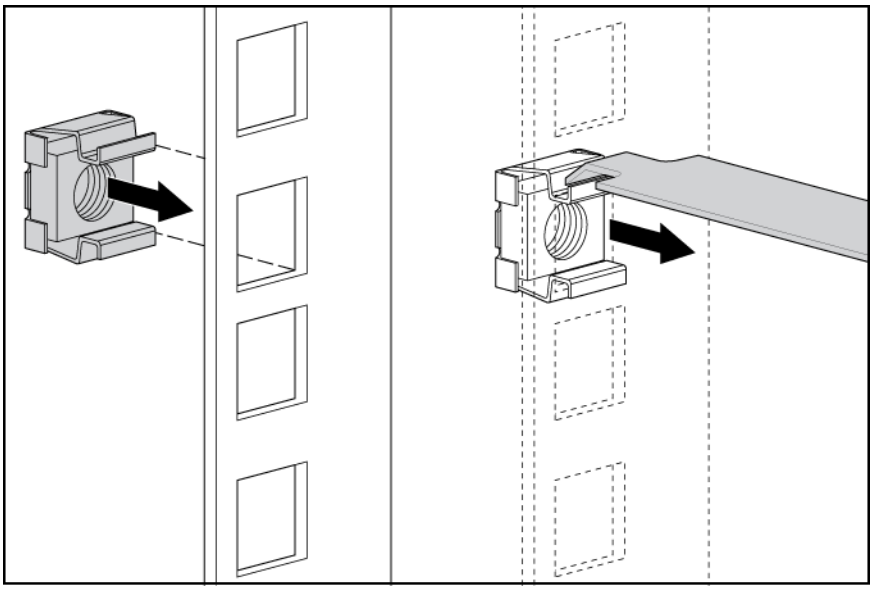


Figure 20: Installing the cage nuts of the rail kit in the rack front

Installing the middle support bracket in a third-party RETMA rack

IMPORTANT: When the installed front and rear RETMA rails are extended 73.7 cm (29 in) or more, installation of the middle support bracket (reinforcing rail) is recommended to strengthen the rails. The M5, 10 mm, T25 Torx screws (short-round) are used to install the middle support bracket.

Procedure

1. Align the middle support bracket holes with the top holes of the rails.

The orientation of the middle support bracket is neutral.

See **Figure 21: Inserting and tightening the screws for the middle support bracket** on page 33.

2. Insert and tighten the screws.

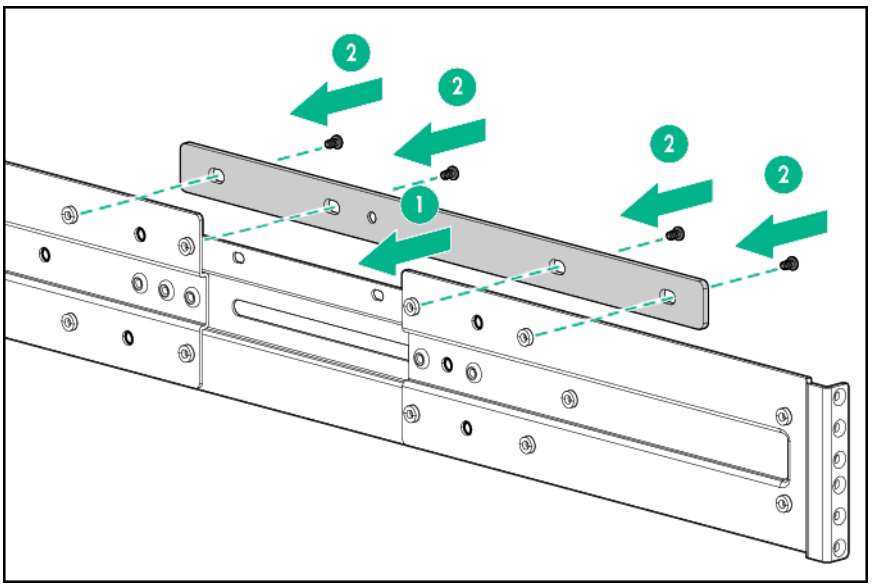


Figure 21: Inserting and tightening the screws for the middle support bracket

Installing the enclosures in a third-party RETMA rack, 2U SFF and 4U LFF

IMPORTANT: Do not turn on power to the components at this time. Connect the power cables and keep the power off until you power on the components.

This procedure applies to the following types of enclosures:

- Controller node enclosure—A 2U enclosure that contains small form factor (SFF) drives.
- Drive enclosure—Either a 2U SFF or a 4U LFF enclosure.

Prerequisites

Review **Guidelines for the storage system installation in a third-party RETMA rack** on page 28.

Procedure

1. Verify that the enclosure is right-side up.

   The enclosure top has caution and regulatory labels, and the bottom has no labels.

2. **At the enclosure front**, expose the mounting holes on the enclosure by temporarily removing the ear caps (bezels) on each front side.
3. **At the rack front**, align the enclosure with the rails and slide all the way into the rack.
4. **At the rack front**, secure the enclosure front to the rack.

- **2U enclosure front**—Insert two M5 12 mm (long-flat) T25 Torx shoulder screws into the mounting holes on each front side and tighten the screws with a 13-in-lbs torque.
- **4U enclosure front**—Install four M5 12 mm (long-flat) T25 Torx shoulder screws into the mounting holes and cage nuts on each front side and tighten the screws with a 13-in-lbs torque.

5. **At the enclosure front**, replace the ear caps (bezels) on each front side.
6. **At the rack rear**, secure the enclosure rear to the rack.

   Install two M5 12 mm (long-flat) T25 Torx shoulder screws on each rear side and tighten the screws with a 13-in-lbs torque.

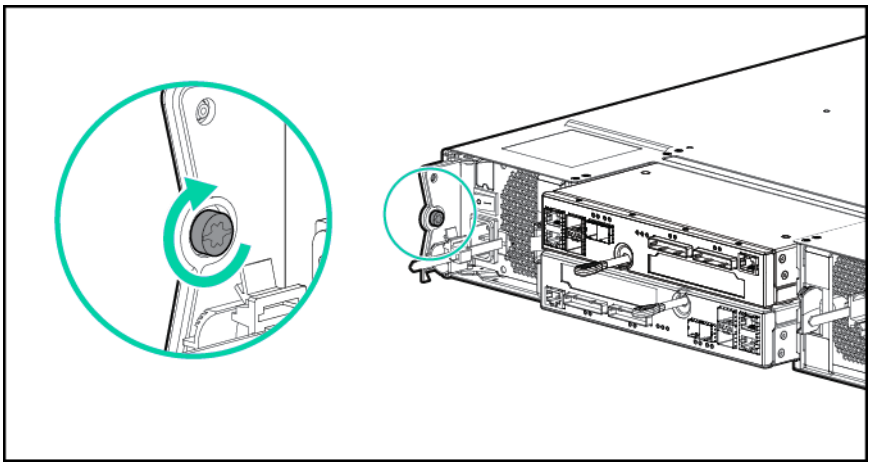


Figure 22: Installing rear hold-down screws, enclosure rear view

Installing the drives: Process overview

CAUTION:

- To ensure proper thermal control, slot-filler blanks are provided with the enclosures and must be inserted in all unused drive bays in the enclosure. Operate the enclosure only when all drive bays are populated with either a drive or a blank.
- If the storage system is enabled with the Data-at-Rest (DAR) encryption feature, only use Federal Information Processing Standard (FIPS) capable encrypted drives.
- Before installing drives into enclosures, make sure that the enclosures are free of obstructions (such as loose screws, hardware, or debris). Inspect the drives before installing them in the enclosure to make sure that they are not damaged.
- To avoid errors when powering on the storage system, all enclosures must have at least one pair of identical drives installed by following the guidelines for installing, allocating, and balancing drives.

Prerequisites

IMPORTANT: The guidelines for how the drives are installed, allocated, and balanced are critical to the performance and reliability of your storage system.

Determine an installation plan for allocating and loading the drives based on the provided guidelines, number of drives, and drive types to install.

Procedure

1. Review **Guidelines for the drive installation** on page 35.
2. Complete **Installing the drives** on page 39.

Guidelines for the drive installation

IMPORTANT: The guidelines for how the drives are installed, allocated, and balanced are critical to the performance and reliability of your storage system.

- An encrypted storage system, for example any storage system that has the HPE 3PAR Data Encryption license activated or intended to be activated, must have only self-encrypted drives installed.
- A nonencrypted storage system can have a mix of encrypted and nonencrypted drives.
- A pair or pairs identical drives must be installed together and must be of the same capacity, speed, and type. Never install an uneven number of drives of one type within a single enclosure.
- Different drive types can be loaded next to each other in the same enclosure, but load all the drives of one drive type before loading drives of a different drive type.
- For each drive type installed in the array, the following are the minimum recommended initial quantities:
  - For SSD and SAS performance HDDs, the recommended initial quantity is eight drives per pair of controller nodes. The required minimum is six drives per pair of controller nodes.
  - For Nearline HDDs, the recommended initial quantity is 12 drives per pair of controller nodes and is the same for required minimum.

  NOTE: Eight drives support RAID 1 and RAID 5. For RAID 6, choose 12 drives.
- RAID 6 is recommended for all drive types, SSDs, and HDDs (both Fast Class and Nearline).
- The minimum number of SSDs for Adaptive Flash Cache (AFC) is two.
- Minimum upgrade quantity is four drives per pair of controller nodes or two drives per enclosure, whichever is larger. The best practice is to run Autonomic Rebalance (also known as tunesys) after adding the drives.
- All controller node enclosures must contain either zero or an even number of the same type of drives (FC, NL, SSD).
- All drive enclosures must contain an even number of drives, with a minimum of two.
- Try to distribute an equal number of drives to all enclosures compatible with the drive type being added. If an equal distribution is not possible, get as close as possible while still following the guidelines for the drives.
- With a four-node configuration, the best practice is to attach the same number and type of drives to each pair of controller nodes.

Small form factor (SFF) configuration

- SFF drives may be loaded into the "Storage Base enclosures", the "Upgrade Node Pair enclosure", and the "2U SAS drive enclosure".
- SFF drives must be loaded in pairs of identical drives, beginning with the leftmost slot, slot 0, and filling to the right, leaving no empty slots between drives.

Large form factor (LFF) configuration

- LFF drives may be loaded into the 4U SAS drive enclosure.
- LFF drives must be loaded in pairs of identical drives starting at the bottom of a column, leaving no empty slots between drives in the column.
- Intermixing SSDs and spinning media in an LFF drive enclosure is allowed as long as each drive type is installed in even pairs in the same column.
- It is permitted to have empty columns between columns containing drives. Different columns do not have to contain the same number of drives.
- An all LFF drive configuration is permitted, leaving the Storage Base enclosure empty.

SFF drive loading and examples

SFF drives are loaded starting at bay 0, left to right, leaving no empty slots between drives. The drive bays are numbered 0 through 23.

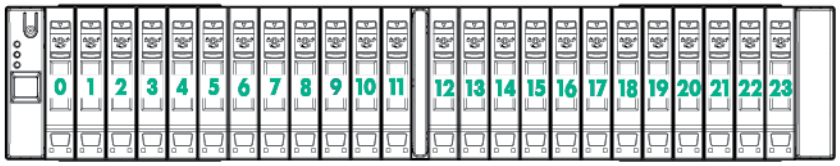
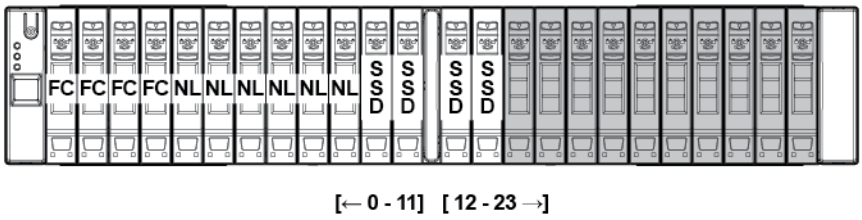


Figure 23: Drives bay numbering, SFF drives, SFF enclosure front view

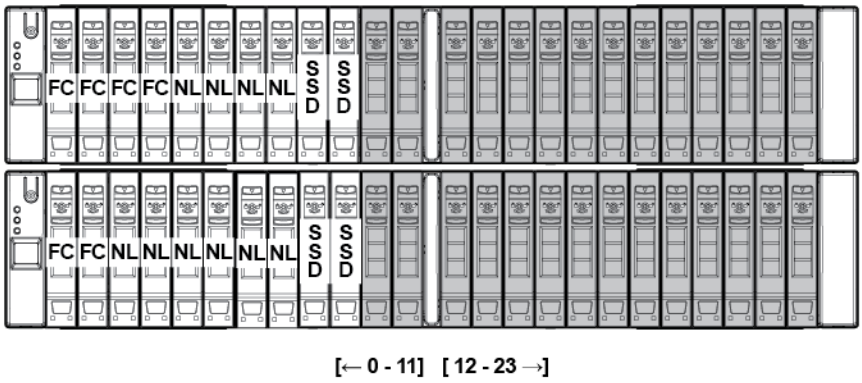


Figure 24: Loading order, SFF drives, SFF enclosure front view



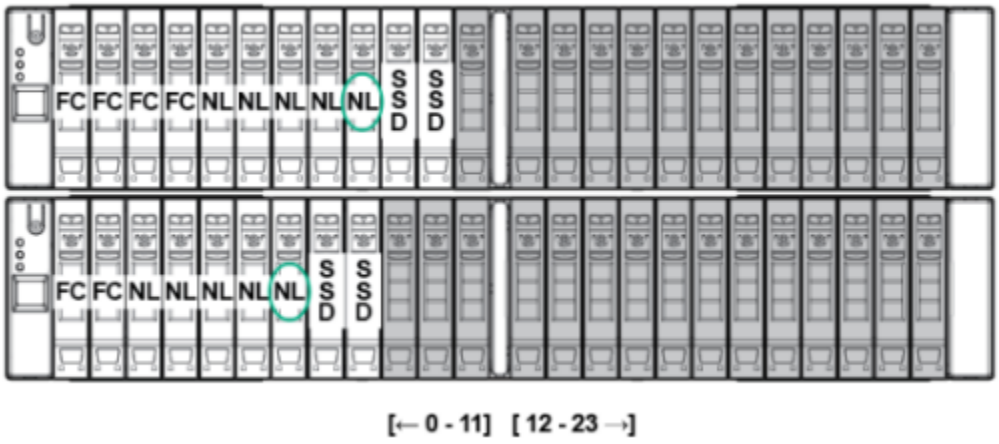
This example demonstrates an SFF enclosure loaded correctly with these drives: two pairs of FC, three pairs of NL, and two pairs of SSD.

Figure 25: Example of a correct SFF drive allocation in one SFF enclosure



This example demonstrates two SFF enclosures loaded correctly with these drives: three pairs of FC (six drives), five pairs of NL (10 drives), and two pairs of SSD (four drives).

Figure 26: Example of a correct SFF drive allocation in two SFF enclosures



CAUTION: This example demonstrates an unbalanced allocation due to the NL drives **not** being installed in even pairs.

Avoid having an odd number of drives allocated in the drive enclosures.

Figure 27: Example of an unbalanced SFF drive allocation in two SFF enclosures

LFF drive loading and examples

IMPORTANT: Notice that the numbering for the order and direction that drives are installed in the LFF enclosure do not follow the same number order used to identify drives from the storage system management software. Drives are installed in vertical columns instead of by sequential numbering.

LFF drives are loaded starting at bay 0, bottom to top in the leftmost column, then bottom to top in the next column, and so on, leaving no empty slots between drives. Note bay numbering does not follow how the bays are loaded. The bays are numbered left to right, and then the next row up, left to right, and so on, from 0 to 23. The first four LFF drives are loaded into bays 0, 4, 8, and 12.

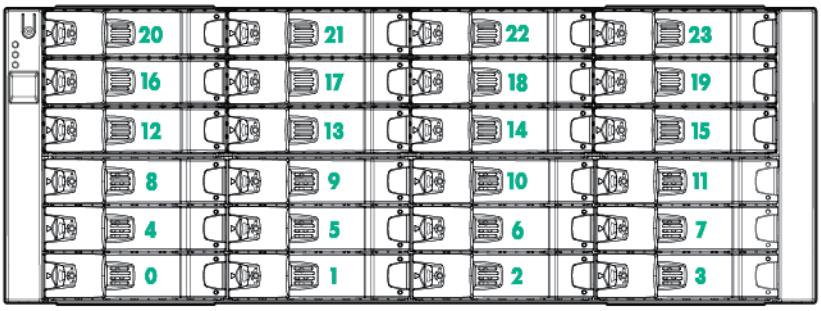


Figure 28: Drives bay numbering, LFF drives, LFF enclosure front view

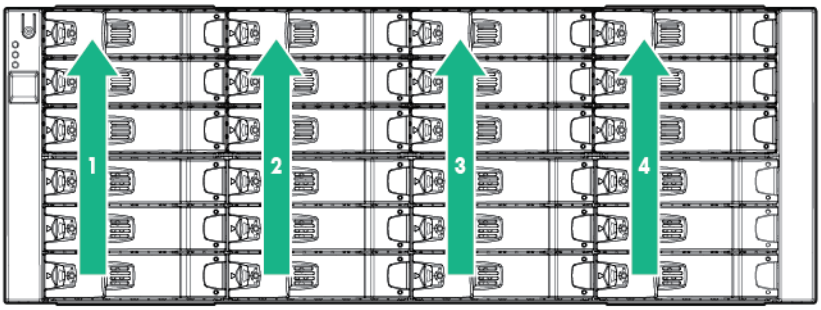
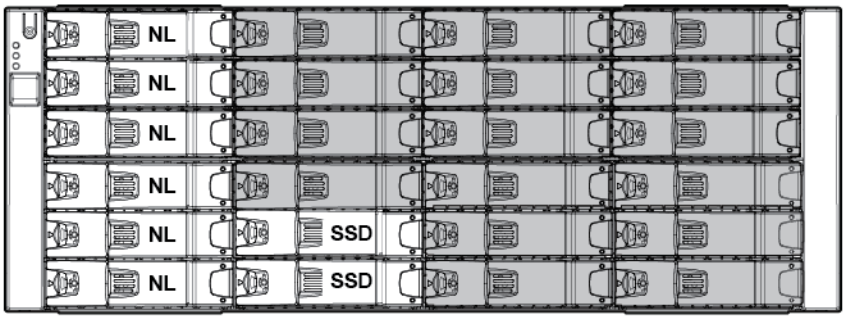
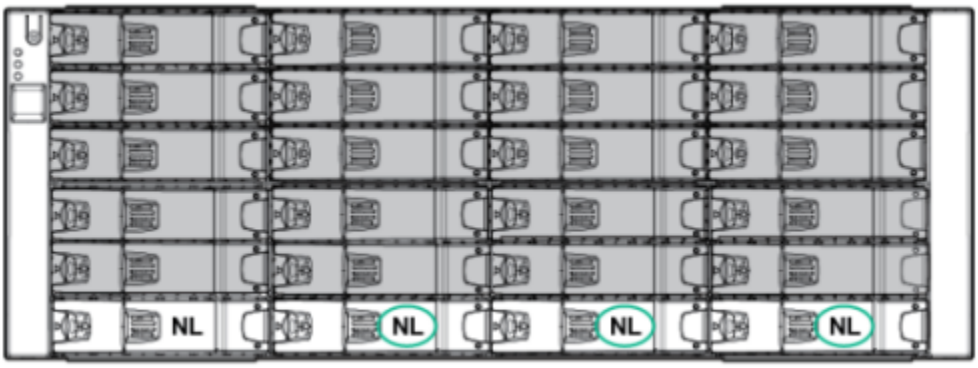


Figure 29: Loading order, LFF drives, LFF enclosure front view



This example demonstrates an LFF enclosure loaded correctly with these drives: three pairs of NL (six drives) and one pair of SSD (two drives).

Figure 30: Example of a correct LFF drive allocation in one LFF enclosure



CAUTION: This example demonstrates an unbalanced allocation due to the NL drives being installed across all four columns.

Instead, the correct way to load the drives is loading in the first column before moving to the next column to the right.

Figure 31: Example of an unbalanced LFF drive allocation in one LFF enclosure

Installing the drives

Procedure

Preparation:

1. Unpack the components and place on an ESD safe mat.
2. Attach the clip on the ESD grounding strap directly to an unpainted surface of the rack and wear the strap when working with components of the system.
3. Remove the slot-filler blanks from where you will be installing the pairs of drives.

IMPORTANT: For proper airflow and cooling, a slot-filler blank must remain installed in all unused drive bays.

Installation:

4. Install the pair or pairs of drives.
   a. On the drive, press the release button to open the handle.
   b. With the latch handle of the drive fully extended, align and slide the drive into the bay until the handle begins to engage (1).
   c. To seat the drive into the drive bay, close the handle (2).

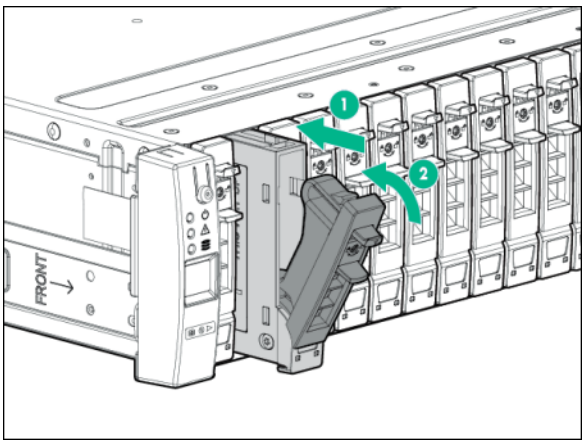


Figure 32: Installing an SFF drive

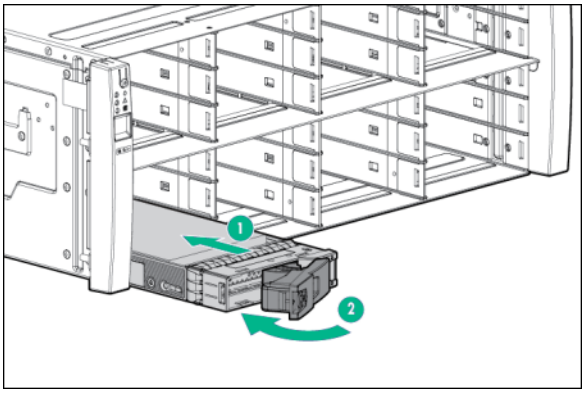


Figure 33: Installing an LFF drive

Installing the physical service processor: Process overview

The following physical service processor models are supported for the HPE 3PAR StoreServ Storage system:

- HPE ProLiant DL120 Gen9 Server
- HPE ProLiant DL360 Gen10 Server

Procedure

For installing the rail kit and physical service processor, see the installation instructions that ship with the rail system.

Installing the field-integrated option for a direct-current system: Process overview

WARNING: Since there is a risk of injury from electric shock or high energy levels, only a certified electrician who knows about the procedures, precautions, and hazards associated with direct-current (DC) power should perform the power wiring, cabling, routine maintenance, and service of a storage system installed in a direct-current power environment. Hewlett Packard Enterprise and partner service personnel are not authorized to perform DC power wiring or cabling.

IMPORTANT: The storage system ordered for installation in a direct-current (DC) power environment requires the installation of DC-specific components. Use of components with alternating-current (AC) power in the DC storage system is prohibited.

IMPORTANT: The direct-current components are qualified and supported only with a direct-current HPE 3PAR StoreServ 8000 Storage system running HPE 3PAR OS 3.3.1 and later versions.

Procedure

1. Install the direct-current power cooling modules.
   - Complete **Installing the direct-current power cooling modules in a controller node enclosure—Field-integrated, direct-current storage systems** on page 42.
   - Complete **Installing the direct-current power cooling modules in an expansion drive enclosure—Field-integrated, direct-current storage systems** on page 45.
2. Install the direct-current breaker panel.

   Complete **Installing the direct-current breaker panel—Field-integrated, direct-current storage systems** on page 47.
3. Install the rail kits for the enclosures.

   Review the **Installing the enclosures in a third-party RETMA rack: Process overview** on page 29 and complete the process.
4. Install the enclosures.

   Complete **Installing the enclosures in a third-party RETMA rack, 2U SFF and 4U LFF** on page 33.
5. Install the drives.

   Review the **Installing the drives: Process overview** on page 34 and complete the process.
6. If ordered, install the direct-current physical service processor.

   Complete **Installing the direct-current physical service processor—Field-integrated, direct-current storage systems** on page 47.
7. If ordered, install the direct-current switch.

   Complete **Installing the direct-current switch—Field-integrated, direct-current storage systems** on page 47.
8. Complete the cabling.

   Review the **Cabling: Process overview** on page 49 and complete the process.
9. Complete powering on the storage system.

   Review the **Powering on: Process overview** on page 61 and complete the process.
10. Complete the service processor connection setup.

    Review the **Setting up the service processor connection: Process overview** on page 66 and complete the process.
11. Complete the software setup for the service processor and storage system.

Review the **Setting up the service processor and storage system software: Process overview** on page 75 and complete the process.

12. Review the **Cabling: Process overview** on page 49 and complete the process.

Installing the direct-current power cooling modules in a controller node enclosure—Field-integrated, direct-current storage systems

CAUTION: Connecting to a direct-current power source outside the designated -48V DC nominal range (-36V DC to -72V DC) may damage the direct-current power cooling module.

NOTE:

- The power switch on the HPE 3PAR -48VDC 764W Power Cooling Module is inverted 180° from the orientation of the power switch on the alternating-current (AC) power cooling module.
- Labels on the HPE 3PAR -48VDC 764W Power Cooling Module show the model as -48VDC INPUT 764W PCM.

Prerequisites

With a direct-current (DC) HPE 3PAR StoreServ 8000 Storage system, the controller node enclosure is shipped with alternating-current (AC) power cooling modules (PCMs) installed. After shipment, the AC PCMs must be replaced with -48V DC PCMs that are shipped separately.

- Arrange to have a certified electrician available during the installation to complete the wiring of the direct-current (DC) power cooling module (PCM) to the storage system.
- Power off the storage system and disconnect all power cables from the AC PCMs.

Procedure

Preparation:

1. Unpack the direct-current (DC) PCM and place on an ESD mat with the battery compartment facing up to prepare for inserting the battery that will be reused from the alternating current (AC) PCM.

Removal:

2. Remove the AC PCM.
   a. With thumb and forefinger, grasp and squeeze the PCM latch to release the handle (1).
   b. Rotate the PCM release handle (2).
   c. Slide the PCM out of the enclosure (3).
   d. Place the PCM on the ESD mat with the battery compartment facing up.

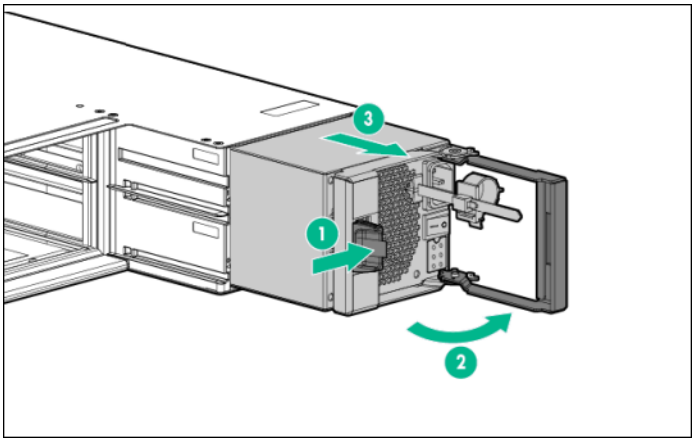


Figure 34: Removing the AC power cooling module

3. Remove the battery from the AC PCM.

   a. At the back of the PCM, lift the battery release handle (1).

   b. Remove the battery from the battery compartment (2).

   c. Place on the ESD safe mat.

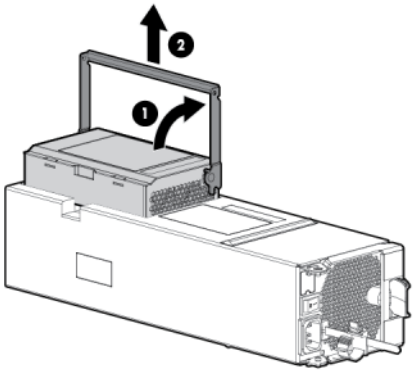


Figure 35: Removing the battery, AC power cooling module, controller node enclosure

Installation:

4. Install the battery in the DC PCM.

   a. With the battery handle in the upright position, insert the battery into the -48V DC PCM.

   b. Push down the handle to install.

      When the battery is correctly seated, the battery and handle are aligned with the surface of the -48V DC PCM.

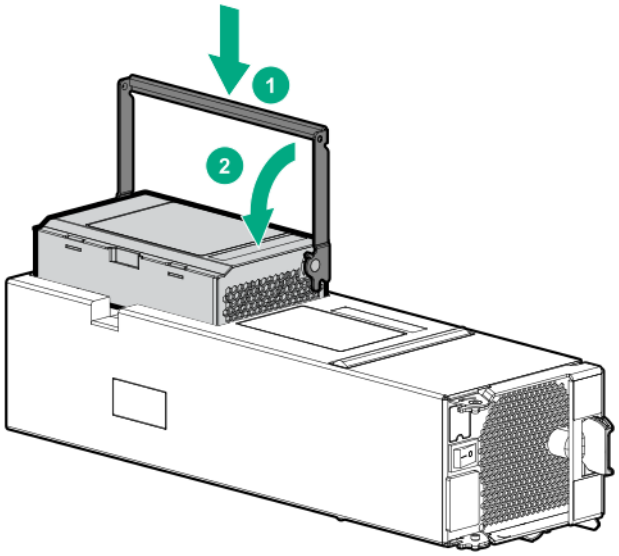


Figure 36: Installing the battery, DC power cooling module, controller node enclosure

5. Install the DC PCM.

   a. On the ESD mat, rotate the -48V DC PCM release handle to the open position and then carry it to the enclosure.

   b. Slide the -48V DC PCM into the enclosure, and then push until the insertion mechanism starts to engage (the handle starts to rotate).

   > **IMPORTANT:** Ensure that no cables get caught in the PCM insertion mechanism.

   c. Close the handle until the latch clicks to fully seat the -48V DC PCM in the enclosure.

   d. Once inserted, pull back lightly on the PCM to ensure that it is properly engaged.

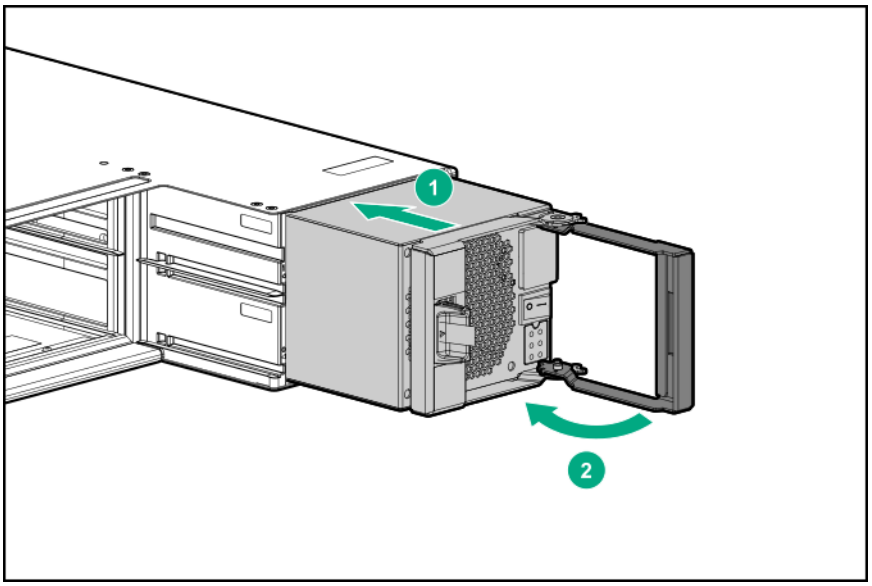


Figure 37: Installing the DC power cooling module, controller node enclosure

6. Repeat this installation procedure for the other PCM in the enclosure. For a four-node system, complete this procedure for each of the PCMs in the second controller node enclosure.
7. **Only to be completed by a certified electrician provided by the customer:** Install the wiring.

   TIP: When the plastic cap over the terminal connections is removed, it reveals the symbols for the terminals.

   The power cable is connected to the -48V DC PCM with connections to the positive terminal (+), negative terminal (—), and ground terminal (⏚).

Installing the direct-current power cooling modules in an expansion drive enclosure—Field-integrated, direct-current storage systems

CAUTION: Connecting to a direct-current power source outside the designated -48V DC nominal range (-36V DC to -72V DC) may damage the direct-current power cooling module.

NOTE:

- The power switch on the HPE 3PAR -48VDC 764W Power Cooling Module is inverted 180° from the orientation of the power switch on the alternating-current (AC) power cooling module.
- Labels on the HPE 3PAR -48VDC 764W Power Cooling Module show the model as -48VDC INPUT 764W PCM.

Prerequisites

With a direct-current (DC) HPE 3PAR StoreServ 8000 Storage system, the expansion drive enclosures (cages) are shipped with alternating-current (AC) power cooling modules (PCMs) installed. After shipment, the AC PCMs must be replaced with -48V DC PCMs that are shipped separately.

- Arrange to have a certified electrician available during the installation to complete the wiring of the direct-current (DC) power cooling module (PCM) to the storage system.
- Power off the storage system and disconnect all power cables from the AC PCMs.

Procedure

Preparation:

1. Unpack the component and place on an ESD safe mat.

Removal:

2. Remove the AC PCM.
   a. With thumb and forefinger, grasp and squeeze the PCM latch to release the handle (1).
   b. Rotate the PCM release handle (2).
   c. Slide the PCM out of the enclosure (3).
   d. Place the PCM on the ESD mat.

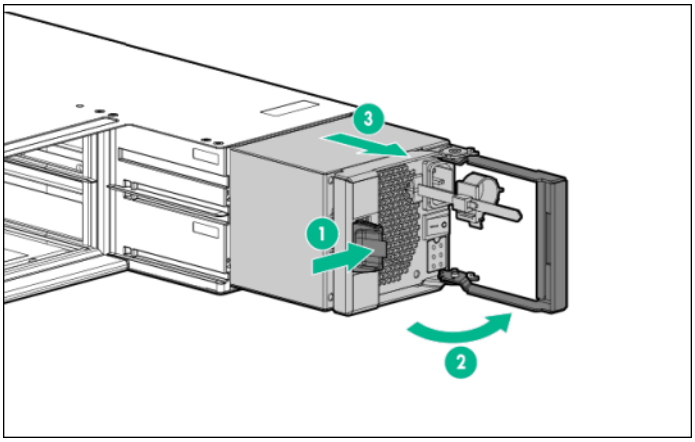


Figure 38: Removing the AC power cooling module

Installation:

3. Install the DC PCM.

   a. On the ESD mat, rotate the -48V DC PCM release handle to the open position, and then carry it to the enclosure.

   b. Slide the -48V DC PCM into the enclosure, and then push until the insertion mechanism starts to engage (the handle starts to rotate).

      Ensure that no cables get caught in the PCM insertion mechanism.

   c. Close the handle until the latch clicks to fully seat the -48V DC PCM in the enclosure.

   d. Once inserted, pull back lightly on the PCM to ensure that it is properly engaged.

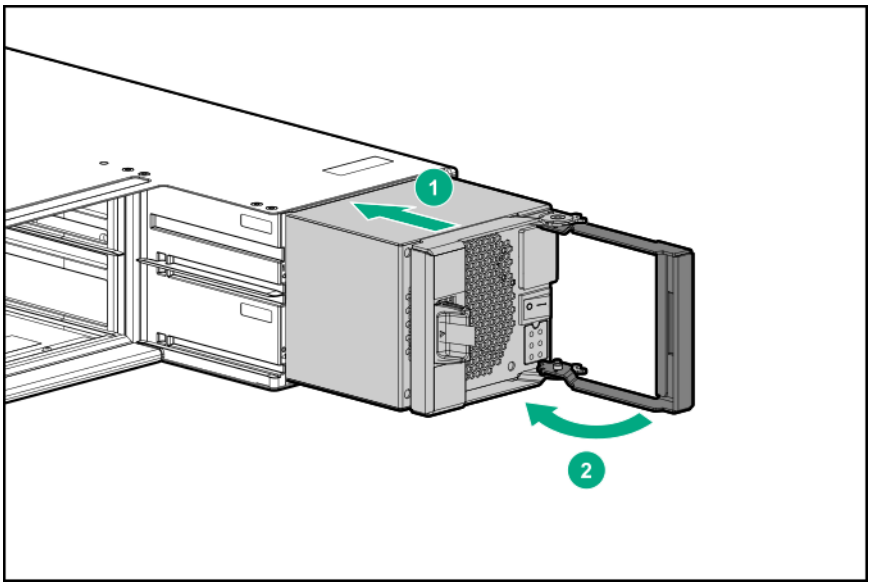


Figure 39: Installing the DC power cooling module, drive enclosure

4. Repeat this installation procedure for all PCMs in all of the expansion drive enclosures.
5. **Only to be completed by a certified electrician provided by the customer:** Install the wiring.

TIP: When the plastic cap over the terminal connections is removed, it reveals the symbols for the terminals.

The power cable is connected to the -48V DC PCM with connections to the positive terminal (+), negative terminal (—), and ground terminal (⏚).

Installing the direct-current breaker panel—Field-integrated, direct-current storage systems

Procedure

1. Install the rail kit. See the installation instructions in the shipment.
2. Attach the grounding bar to the breaker panel.

   See the installation guide available at the E-T-A website:

   www.e-t-a.de/grounding_bar_set_Q9N54A
3. Install the direct-current breaker panel.

   See the installation guide available at the E-T-A website:

   www.e-t-a.de/S541_breaker_panel_set_G2H95A
4. **Only to be completed by a certified electrician**: Install the wiring.
5. Connect the following components to the direct-current breaker panel:
   - For each controller node enclosure, two connections
   - For each drive enclosure, two connections
   - For the direct-current physical service processor, two connections
   - For each direct-current switch, two connections

Installing the direct-current physical service processor—Field-integrated, direct-current storage systems

Procedure

1. Install the rail kit and direct-current physical service processor. See the installation instructions in the shipment.
2. **Only to be completed by a certified electrician**: Install the wiring.

Installing the direct-current switch—Field-integrated, direct-current storage systems

For more information about the Brocade 6510 Switch, see the product page:

www.broadcom.com/products/fibre-channel-networking/switches/6510-switch

Procedure

1. Install the rail kit and direct-current switch. See the installation instructions in the shipment.
2. **Only to be completed by a certified electrician:** Install the wiring.

Cabling: Process overview

Procedure

- Based on the system configuration, review the process overview and complete the process:
  - **Cabling the factory-integrated-in-rack option: Process overview** on page 49
  - **Cabling the factory-integrated-no-rack or field-integrated options: Process overview** on page 49

Cabling the factory-integrated-in-rack option: Process overview

IMPORTANT: Do not turn on power to the components at this time. Connect the power cables and keep the power off until you power on the components.

For a factory-integrated-in-rack system, the internal cabling for the data cables and power cables has been completed before shipment; however, you must complete the following additional cabling:

Procedure

1. Review **Guidelines for cabling** on page 50.
2. Review **Guidelines for redundant power cabling** on page 52.
3. Complete **Cabling the physical service processor (if installed)** on page 53.
4. Complete cabling for the controller node enclosure:
   a. Complete **Cabling the management connection** on page 54.
   b. Complete **Cabling the host connection** on page 55.
   c. Complete **Cabling the Remote Copy connection (optional feature)** on page 56.
   d. Complete **Cabling for the File Persona connection (optional feature)** on page 56.
   e. Complete **Cabling power to the controller node enclosure** on page 56.
5. Complete **Cabling power to the expansion drive enclosures** on page 59.
6. Complete **Cabling PDUs and power strips to power receptacles** on page 59.
7. Review the **Powering on: Process overview** on page 61 and complete the process.

Cabling the factory-integrated-no-rack or field-integrated options: Process overview

IMPORTANT: Do not turn on power to the components at this time. Connect the power cables and keep the power off until you power on the components.

Procedure

1. Review **Guidelines for cabling** on page 50.
2. Review **Guidelines for redundant power cabling** on page 52.
3. Complete **Cabling the physical service processor (if installed)** on page 53.
4. Complete cabling for the controller node enclosure:
   a. Complete **Cabling the management connection** on page 54.
   b. Complete **Cabling the host connection** on page 55.
   c. Complete **Cabling the Remote Copy connection (optional feature)** on page 56.
   d. Complete **Cabling for the File Persona connection (optional feature)** on page 56.
   e. Complete **Cabling power to the controller node enclosure** on page 56.
5. Complete cabling for the expansion drive enclosures:
   a. Review **Guidelines and instructions for cabling the SAS connections** on page 57.
   b. Complete **Cabling the SAS connections between the drive enclosures and the controller nodes** on page 58.
   c. Complete **Cabling power to the expansion drive enclosures** on page 59.
6. Complete **Cabling PDUs and power strips to power receptacles** on page 59 .
7. Review the **Powering on: Process overview** on page 61 and complete the process.

Guidelines for cabling

Guidelines for the minimum bend radius of the cable

Bend radius is defined as the minimum radius to which the cable may safely be bent during installation without the risk of permanent damage resulting in excessive attenuation or even breakage.

Use the manufacturer guidelines for the minimum bend radius of a cable. If manufacturer guidelines have not been provided, use the general guidelines provided in the following table.

CAUTION: Bending optical cables tightly can damage the internal fibers, causing signal loss, reduced reliability, and performance problems.

IMPORTANT: Minimum bend radius **is not** the same as minimum bend diameter.

Table 4: General minimum bend radius by cable type

Cable type	Minimum bend radius
Standard power cable	1 in (2.5 cm)
Active optical cable (AOC)	2 in (5.08 cm)
Fiber optical cable	1.75 in (4.44 cm)
Network Cat 5/6 (Unshielded)	1.75 in (4.44 cm)

Table Continued

Cable type	Minimum bend radius
Network Cat 5/6 (Shielded)	3.5 in (8.90 cm)
Coaxial (50W)	1.2 in (3 cm)
Coaxial (75W)	1.7 in (4.31 cm)
R1 InfiniBand - at connector	4.6 in (11.68 cm)
R2 InfiniBand - away from connector	2.6 in (6.60 cm)

- Power cable: Minimum bend radius prevents disconnection from power socket and possible arcing under high-voltage conditions. When there is a high voltage or high current on the cable, sharp edges or turns can cause puncturing of the cable jacket or arcing to equipment at local potential.
- Copper cable: Too sharp a radius will stress the center conductor, and may cause the cable outer conductor to collapse or buckle. A sharp radius will cause impedance discontinuities at the bends resulting in reflections and leads to signal degradation and circuit problems. An excessive bending of cable can affect the geometry of the twists and increase the sensitivity to external noise and cause stress on cable terminations.
- Fiber optic: Tighter bends may cause micro-bending of individual fibers that allow light to escape the signal path, resulting in signal attenuation. More severe bends can break fiber strands completely, resulting in signal loss.

General guidelines for cabling

- If not already applied by the factory, label all cables.
- Use the shortest possible cable between devices. Shorter cables reduce the possibility of signal degradation over longer distances and are easier to route along the rear of the rack.
- Cables cannot have any obvious kinks, deformation, or damage to the connector housing or sheathing. To prevent these issues, use extra care when unpacking, unwinding, routing, and storing cables.
- To prevent mechanical damage or depositing contaminants from your hands, do not touch the ends of the cable connectors.
- Before connecting a cable to a port, lay the cable in place to verify the length of the cable.
- Some data cables are prebent. Do not unbend or manipulate the cables.
- For components that must be movable while powered on, ensure that a full range of motion (frequently called a service loop) is possible without cable interference or disconnection.
- Leave some slack in the cable (service loop). The slack provides room to remove and replace components, allows for minor, inadvertent movement of the rack, and helps prevent the cables from being bent to less than the minimum bend radius. The slack can be addressed by forming loops or using a take-up spool as long as the minimum bend radius is maintained.

Guidelines for connecting, routing, and restraining cables

- When routing cables, always be sure that the cables are not in a position where they can be pinched or crimped.
- When routing cables onto a management arm, secure the cables enough to prevent interference or pinch areas during movement, yet not so tight as to cause binding.

- Restrain and support cables in a manner that eliminates stress on connectors and eliminates tight bends of the cables.
- Secure fiber and AOC cables with loose fitting Velcro straps, instead of wire or cable ties.
- For cable ties, ensure that the cables are **not** compressed when cinching the tie, and cut the cable ties flush with the cable tie head to prevent scratches or cuts during future service interactions.
- When the cables are restrained together, verify that storage system components and LED indicators are easily visible and accessible for operation and maintenance.

Guidelines for disconnecting cables

To prevent damage to the internal wires of the cable or the port pins, operate the release latch on the cable connector, and then grip the body of the cable connector to disconnect the cable instead of pulling on the cable.

Guidelines for redundant power cabling

Power should be supplied to each component of the storage system using redundant power supplies and redundant power distribution units (PDUs). If the power connections for the system are correctly configured for power redundancy, the system will stay operational if a power failure occurs with an input power source, a PDU, or a power supply.

WARNING: To avoid possible injury, damage to storage system equipment, and potential loss of data, do not use the surplus PDU outlets. Never use PDU outlets to power components that do not belong to the storage system or that reside in other racks.

To achieve redundant power, the storage system must have the following redundant power configuration. See **Figure 40: Redundant power configuration** on page 53.

- **Customer power source**: Each main, independent, grounded-electrical power source should be controlled and protected by its own circuit breaker.
- **PDU**:
  - The even-numbered PDUs should be connected to customer power source (A)
  - The odd-numbered PDUs should be connected to customer power source (B).

  NOTE: The number of PDUs in a rack can vary depending on the rack and power type (such as, single- or three-phase power).
- **Power supply**:

  NOTE: The generic term "power supply" refers to various types of power components, such as a power supply unit (PSU), power cooling module (PCM), or a power cooling battery module (PCBM).

  - **Controller node pair**: Each power supply should be connected to a separate PDU.
  - **Drive enclosure**: Each power supply should be connected to a separate PDU.
  - **Even-numbered power supplies**: Each power supply 0 should be connected to an even-numbered PDU using a black power cable.
  - **Odd-numbered power supplies**: Each power supply 1 should be connected to an odd-numbered PDU using a gray power cable.

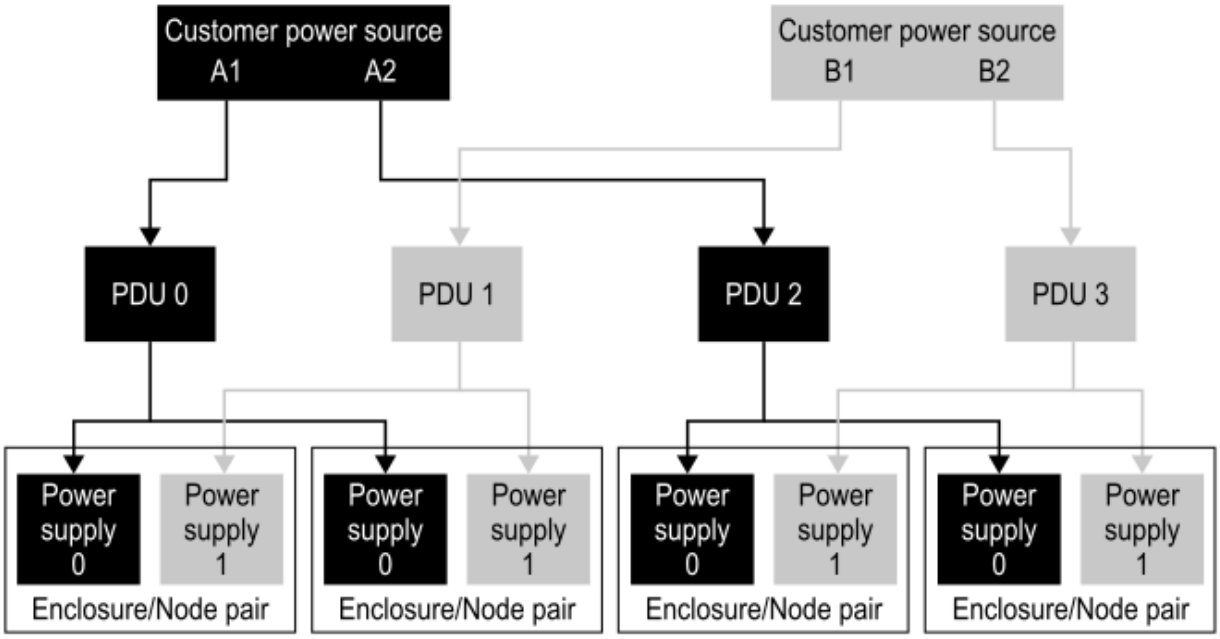


Figure 40: Redundant power configuration

Cabling the physical service processor (if installed)

The physical service processor is an optional component that can be used with the HPE 3PAR StoreServ 8000 Storage system instead of using a virtual service processor.

IMPORTANT: Do not turn on power to the components at this time. Connect the power cables and keep the power off until you power on the components.

Procedure

1. Connect the cable for the management connection.
   a. Connect an Ethernet cable between the Management port and the network using the same subnet as the storage system.
   b. At the rack rear, neatly route and secure the cables along the right side of the rack.

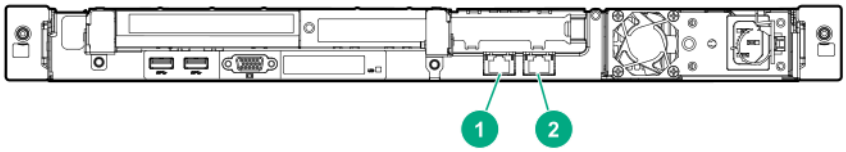


Figure 41: Physical service processor ports, HPE ProLiant DL120 Gen9 Server

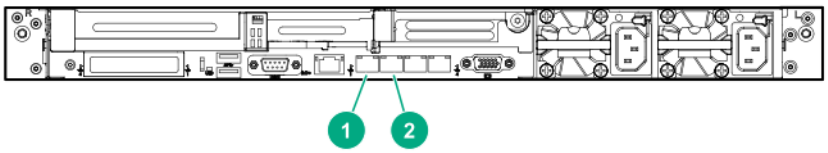


Figure 42: Physical service processor ports, HPE ProLiant DL360 Gen10 Server

1	Management (MGMT) port; NIC 1
2	Service port; NIC 2

2. Connect and secure the cable for the power connection.

   Power connection—Connect a power cable to a power source, but **do not turn on the power yet**. For dual power supplies, connect power cables to both power supplies and each to an independent power source.

Cabling the management connection

Procedure

Connect the cables for the HPE 3PAR StoreServ 8000 Storage management connection.

Use an Ethernet cable to connect each controller node MGMT port to the network. Each controller node supports one Ethernet connection to a switch or hub. Separate connections from the Ethernet switch or hub to at least two controller nodes are required to support redundancy. With redundancy, one IP address is shared between the two connections, and only one network connection is active at a time. If the active network connection fails, the IP address is automatically moved to the surviving network connection.

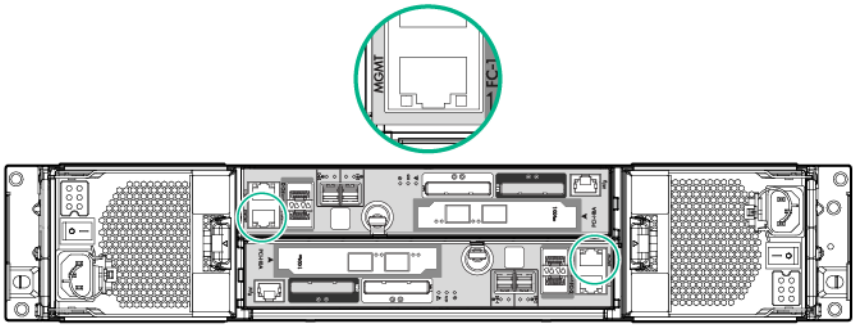


Figure 43: MGMT ports, controller node enclosure rear view

Cabling the host connection

Table 5: External controller node connections

Connection type	Minimum configuration	Recommended configuration
Ethernet	Connection from the Ethernet switch or hub to two controller nodes **NOTE:** With HPE 3PAR File Persona or HPE 3PAR Remote Copy, an additional Ethernet connection is required.	See “Supported Network Topologies” in the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website: **www.hpe.com/info/storage/docs**
FC FCoE iSCSI	Connection from a host computer to one controller node	Separate connections from host computers to each controller node, through a switch, with connections distributed evenly across all controller nodes Example: SAN Switch A connected to even ports and SAN Switch B connected to odd ports. **NOTE:** To provide redundancy and to permit online software upgrades, both controller nodes in a controller node Pair (for example, controller nodes 0 and 1 or controller nodes 2 and 3) must maintain connections to each host server.

FC cable limitations for host connectivity

The maximum supported Fibre Channel cable length is based on the cable size and port speed.

Table 6: FC cable limitations for host connectivity

Cable size	Speed	Cable length limit
50 micron	16 Gb/s	50 meters

Procedure

Connect the cables for the host connection

Use an FC cable to connect one controller node FC port to a host (minimum) or connect each controller node to separate adapters on the host to provide redundancy and permit online software upgrades (recommended). With a CNA, the connection can be FCoE or iSCSI.

Cabling the Remote Copy connection (optional feature)

For the optional HPE 3PAR Remote Copy connection with the HPE 3PAR StoreServ 8000 Storage, see the *HPE 3PAR Remote Copy Software User Guide* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Procedure

Connect an Ethernet cable between the controller-node RC-1 port and another HPE 3PAR StoreServ 8000 system. To provide redundancy, connect two or more controller nodes per storage system.

Cabling for the File Persona connection (optional feature)

For the optional HPE 3PAR StoreServ File Persona connection with the HPE 3PAR StoreServ 8000 Storage, see the *HPE 3PAR File Persona User Guide* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Procedure

Connect an Ethernet cable between the controller-node RC-1 port (or optional host adapters) and the network.

Cabling power to the controller node enclosure

CAUTION:

- The power cables for the system must each be connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker for redundancy. Additionally, each power cable must be plugged into an outlet capable of supporting the entire power load of a connected enclosure.
- Keep the cables clear from the PCM latch mechanism. A cable can be cut if it becomes wedged between the PCM latch handle and the rack post.
- When routing the PCM power cables, use a black power cable (connect to left PCM 0) and a gray power cable (connect to right PCM 1) each connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker.

IMPORTANT: Do not turn on power to the components at this time. Connect the power cables and keep the power off until you power on the components.

Procedure

1. Locate the power cable for each PCM. Before inserting the power cable into the PCM, verify that the PCM power switch is set to 0 (off).
2. Connect the black cable to the left PCM 0 and the gray cable to the right PCM 1.
3. Route and insert the power cable from the PCM to a power strip or PDU and ensure that the routed cables maintain proper service clearance.
4. Repeat for each expansion drive enclosure.
5. Fasten the cable using the retaining clip on each PCM.

Guidelines and instructions for cabling the SAS connections

IMPORTANT: This information applies only to a storage system that is factory integrated without a rack (field install, third-party rack) and includes one or more drive enclosures.

For each possible storage system configuration, instructional documents are available for cabling your HPE 3PAR StoreServ 8000 Storage. These *HPE 3PAR StoreServ 8000 Storage Cabling Instructions* documents contain diagrams for the recommended rack-component layout and instructions for labeling and connecting SAS cables between the controller node enclosure and expansion drive enclosures (optional). If you ordered an HPE 3PAR StoreServ 8000 Storage with expansion drive enclosures (optional), you will need to review the appropriate cabling instructions and diagrams for your HPE 3PAR StoreServ 8000 Storage configuration.

IMPORTANT: If the diagrams in the cabling instructions documents do not reflect the hardware-component layout for your rack, install the storage system above or below the center of the rack as needed. To ensure proper operation and redundancy, it is critical to cable the port-cable connections as shown in the diagrams.

Table 7: HPE 3PAR StoreServ 8000 Storage cabling instructions

Two-node HPE 3PAR StoreServ 8000 Storage with only SFF expansion drive enclosures
• 1 SFF expansion drive enclosure: **h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792980** • 2 SFF expansion drive enclosures: **h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792981** • 3 SFF expansion drive enclosures: **h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792983** • 4 SFF expansion drive enclosures: **h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792984**
Two-node HPE 3PAR StoreServ 8000 Storage with only LFF expansion drive enclosures

Table Continued

- 1 LFF expansion drive enclosure:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792861
- 2 LFF expansion drive enclosures:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792887
- 3 LFF expansion drive enclosures:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792912
- 4 LFF expansion drive enclosures:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792922

Two-node HPE 3PAR StoreServ 8000 Storage with both SFF and LFF expansion drive enclosures

- 1 SFF + 1 LFF expansion drive enclosures:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792949
- 1 SFF + 2 LFF expansion drive enclosures:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792966
- 2 SFF + 1 LFF expansion drive enclosures:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792973
- 2 SFF + 2 LFF expansion drive enclosures:

  h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792975

These links to the configurations are also provided in the *HPE 3PAR StoreServ 8000 Storage Cabling Configuration Guide*:

www.hpe.com/support/3PAR8000Cabling

Cabling the SAS connections between the drive enclosures and the controller nodes

Prerequisites

Locate the *HPE 3PAR StoreServ 8000 Storage Cabling Instructions* document that matches your HPE 3PAR StoreServ 8000 Storage configuration.

The links to these cabling instructions documents are provided in the *HPE 3PAR StoreServ 8000 Storage Cabling Configuration Guide*:

www.hpe.com/support/3PAR8000Cabling

Procedure

1. Review the *HPE 3PAR StoreServ 8000 Storage Cabling Instructions* document.
2. To cable the SAS connections between the expansion drive enclosures and the controller nodes, complete the cabling instructions.

Cabling power to the expansion drive enclosures

CAUTION:

- The power cables for the system must each be connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker for redundancy. Additionally, each power cable must be plugged into an outlet capable of supporting the entire power load of a connected enclosure.
- Keep the cables clear from the PCM latch mechanism. A cable can be cut if it becomes wedged between the PCM latch handle and the rack post.
- When routing the PCM power cables, use a black power cable (connect to left PCM 0) and a gray power cable (connect to right PCM 1) each connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker.

IMPORTANT: Do not turn on power to the components at this time. Connect the power cables and keep the power off until you power on the components.

Procedure

1. Locate the power cable for each PCM. Before inserting the power cable into the PCM, verify that the PCM power switch is set to 0 (off).
2. Connect the black cable to the left PCM 0 and the gray cable to the right PCM 1.
3. Route and insert the power cable from the PCM to a power strip or PDU and ensure that the routed cables maintain proper service clearance.
4. Repeat for each expansion drive enclosure.
5. Fasten the cable using the retraining clip on each PCM.

Cabling PDUs and power strips to power receptacles

IMPORTANT: Do not turn on power to the components at this time. Connect the power cables and keep the power off until you power on the components.

- The power distribution units (PDUs) can be mounted in various locations, such as vertically along the rear of the rack or horizontally below the enclosures at the bottom of the rack.
- The number of PDUs in a rack can vary depending on the rack and power type (such as, single- or three-phase power).
- Each PDU cable connects to the appropriate outlet based on the type of cable and power requirements to supply power to the storage system.
- Power strips can be on the side of the rack to supply power to the PCMs.
- Do not exceed the capabilities of power strips and PDUs.

Prerequisites

WARNING: Before connecting a main power cable, confirm that the circuit breakers for all internal PDUs are set to the **OFF** position to prevent danger of electric shock and potential damage to equipment.

IMPORTANT: Verify that the operating site provides redundant power.

Procedure

Cabling for the PDU:

1. Switch the power to off on the PDU.
2. Connect the power cable from the PDU to an independent-power source (for optimal redundancy) that is controlled and protected by its own circuit breaker, but **do not turn on the power yet**.
3. Repeat for each PDU.

Cabling for the power strip:

4. Switch the power to off on the power strip.
5. Connect the power cable from the power strip to an independent-power source (for optimal redundancy) that is controlled and protected by its own circuit breaker, but **do not turn on the power yet**.
6. Repeat for each power strip.

Powering on: Process overview

Procedure

1. Review **Precautions for powering on the HPE 3PAR StoreServ Storage system** on page 61 .
2. Review **Checking AC power cable connections** on page 61 .
3. Based on the system configuration, complete one of the following procedures:
   a. **Powering on an alternating-current storage system** on page 62
   b. **Powering on a direct-current storage system** on page 63
4. (Optional) Complete **Checking enclosure power redundancy (optional)** on page 64 .
5. Review the **Setting up the service processor connection: Process overview** on page 66 and complete the process.

Precautions for powering on the HPE 3PAR StoreServ Storage system

To reduce the risk of electric shock or damage to the equipment, follow these precautions.

CAUTION:

- Do not disable the power cable grounding plug. The grounding plug is an important safety feature.
- Plug the power cable into a grounded (earthed) electrical outlet that is easily accessible at all times.
- Do not route the power cable 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 cable extends from the storage system.
- Verify that there is clear access to all components for servicing by tying all power cables to restrain them behind the rack column.
- To avoid potential damage to equipment, do not adjust the positioning of the rack after powering on the HPE 3PAR StoreServ Storage.

Checking AC power cable connections

A factory-integrated storage system arrives with all internal power cables configured and connected.

Procedure

1. Ensure that the alternating-current (AC) power cables are properly configured and connected to the components.
2. Ensure that the cable locks and cable ties on the AC power cables are properly connected on the power distribution units (PDUs) and power supplies.
3. Ensure that all of the power cables are properly secured with restraints.

Powering on an alternating-current storage system

As you complete the powering on procedure for the storage system, check that the power/health LEDs for each component are green after the component is powered on and no amber LEDs are illuminated. If a component LED is amber after powering on, troubleshoot the issue before continuing with the powering on procedure.

Prerequisites

- The acclimatization process has completed for the storage system components. Do not turn on power to the storage system until it is fully acclimatized. Allow up to 24 hours, and if condensation is still present, wait until fully evaporated before powering on. If small drops of water can be seen on any of the surfaces, condensation is present.
- The storage system does not exceed the ratings of the power sources and adheres to the guidelines in the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

  www.hpe.com/info/storage/docs
- Drives or slot-filler blanks are in all bays for proper thermal control.
- If power connections are underneath the rack, route the power cables under the bracket at the bottom rear of the rack.

Procedure

1. Confirm that the circuit breakers on the power distribution units (PDUs) have the power turned on.
2. If applicable, turn on the power to the power strips, and then verify that the LEDs are green.
3. If a physical service processor (SP) is being used, turn on the power.
4. Turn on power for all the power cooling modules in the drive enclosures, and then verify that each PCM OK LED is green.
5. Turn on power for all the power cooling modules in the controller node enclosure, and then verify that each PCM OK LED is green.

   IMPORTANT: The Controller Node LEDs may be flashing green indicating that the battery is charging. Once fully charged, the LED will be solid green.

   Allow up to **10 minutes** for completion of the storage system boot and self-test routines.
6. From the front of the system, locate and verify that the ear cap System Power green LED is on and the Drive Status amber LED is off.

   The drive enclosure numbers may not reflect the actual drive enclosure numbers at this point.
7. Return to the rear of the storage system and verify the following LEDs are solid green:
   - The status LEDs on the controller nodes are green.
   - The status LEDs for all I/O modules are green.
   - The status LEDs for all PCMs are green.

Powering on a direct-current storage system

As you complete the powering on procedure for the storage system, check that the power/health LEDs for each component are green after the component is powered on and no amber LEDs are illuminated. If a component LED is amber after powering on, troubleshoot the issue before continuing with the powering on procedure.

Prerequisites

- A certified electrician has completed the wiring for all the direct-current components.
- The acclimatization process has completed for the storage system components. Do not turn on power to the storage system until it is fully acclimatized. Allow up to 24 hours, and if condensation is still present, wait until fully evaporated before powering on. If small drops of water can be seen on any of the surfaces, condensation is present.
- The storage system does not exceed the ratings of the power sources and adheres to the guidelines in the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

  www.hpe.com/info/storage/docs
- Drives or slot-filler blanks are in all bays for proper thermal control.
- If power connections are underneath the rack, route the power cables under the bracket at the bottom rear of the rack.

Procedure

1. Confirm that the direct-current power is turned on for the storage system.
2. If a physical service processor (SP) is being used, turn on the power.
3. Turn on power for all the power cooling modules in the drive enclosures, and then verify that each PCM OK LED is green.
4. Turn on power for all the power cooling modules in the controller node enclosure, and then verify that each PCM OK LED is green.

   IMPORTANT: The Controller Node LEDs may be flashing green indicating that the battery is charging. Once fully charged, the LED will be solid green.

   Allow up to **10 minutes** for completion of the storage system boot and self-test routines.
5. From the front of the system, locate and verify that the ear cap System Power green LED is on and the Drive Status amber LED is off.

   The drive enclosure numbers may not reflect the actual drive enclosure numbers at this point.
6. Return to the rear of the storage system and verify the following LEDs are solid green:
   - The status LEDs on the controller nodes are green.
   - The status LEDs for all I/O modules are green.
   - The status LEDs for all power cooling modules are green.

Checking enclosure power redundancy (optional)

To verify that the storage system has been correctly configured to achieve power redundancy, complete the following procedure:

CAUTION:

- Hewlett Packard Enterprise recommends checking for power redundancy before the system is initialized. If the system is already initialized, checking the power redundancy could cause an outage.
- To maintain power to the storage system during this procedure, **only one** power distribution unit (PDU) should be powered off at a time.

NOTE: The generic term "power supply" refers to various types of power components, such as a power supply unit (PSU), power cooling module (PCM), or a power cooling battery module (PCBM).

Prerequisites

Ensure that the power cabling for the storage system follows the guidelines for redundant power cabling.

See **Guidelines for redundant power cabling** on page 52.

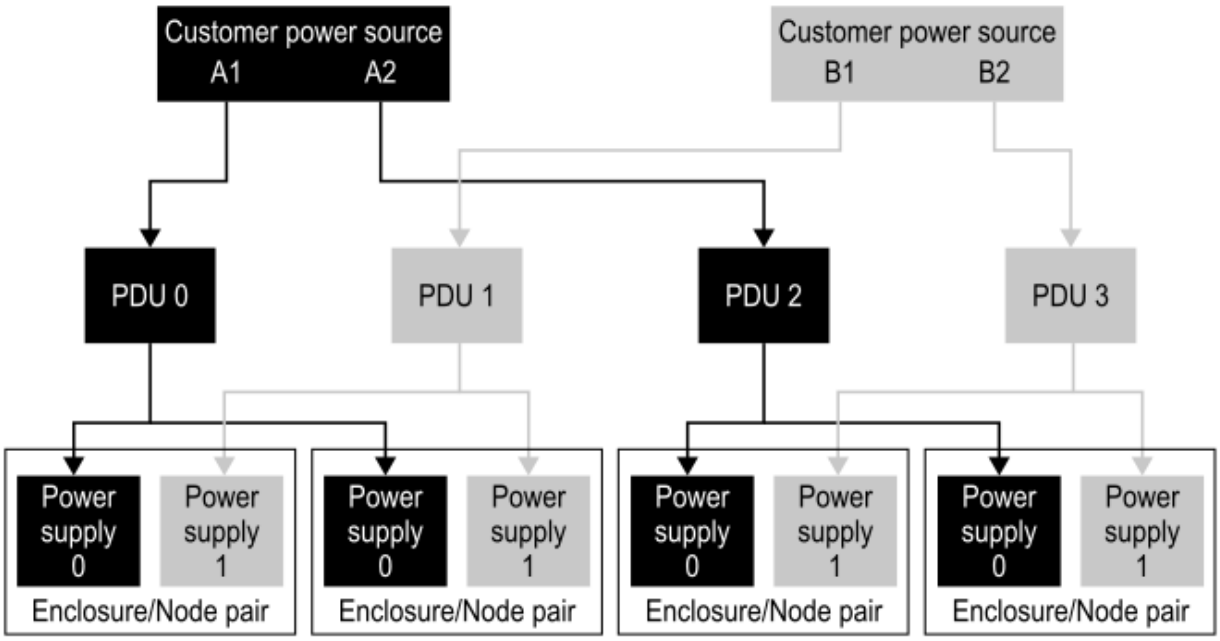


Figure 44: Redundant power configuration

Procedure

1. Ensure that all power supplies (power cooling modules) for the enclosures (controller node enclosure and drive enclosure) have a solid-green status LED indicating a normal operation state.

- Review **Power cooling module LEDs, alternating-current, controller node enclosure** on page 118 .
- Review **Power cooling module LEDs, alternating-current, drive enclosure** on page 119 .
- Review **Power cooling module LEDs, direct-current system** on page 120 .

2. Turn off the power source at the panel that provides input power to **one** PDU. Alternatively, the circuit breaker(s) on the PDU can be set to the OFF position.

   For example, as represented in **Figure 44: Redundant power configuration** on page 64:

   - When **Customer power source A1** is turned off, the power supplies connected to **PDU-0** turn off.
   - When **Customer power source B2** is turned off, the power supplies connected to **PDU-3** turn off.

3. Ensure that the following expected behavior has occurred:

   Drive enclosures:

   - At least one power supply is operating normally.
   - On the power supplies **without** input power:
     - **AC input fail** LED ~ turns solid amber
     - **DC output fail** LED ⎓ turns solid amber
     - **PCM OK** LED ⏻ turns off

   Controller Node pair:

   - At least one power supply is operating normally.
   - On the power supplies **without** input power:
     - **AC input fail** LED ~ turns solid amber
     - **DC output fail** LED ⎓ turns solid amber
     - **PCM OK** LED ⏻ turns off
   - Depending on the charge level of the power supply battery, the **Battery good** LED 🔋 might stay green.

4. After confirmation of the expected behavior, turn back on the power source at the panel for the PDU and **wait 30-60 seconds**.
5. **Before moving to the next PDU**, ensure that the green status LED is illuminated on all components.
6. For each PDU, repeat the prior steps.

Setting up the service processor connection: Process overview

For first-time installations, the HPE 3PAR Guided Setup is used for the service processor (SP) connection setup. For detailed service processor connection setup instructions, see the *HPE 3PAR Service Console and StoreServ Management Console Quick Setup Guide* and *HPE 3PAR Service Processor Software User Guide* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

The following procedure is the process overview for setting up the service processor connection:

Procedure

1. Review **About the service processor** on page 66.
2. Ensure **Network and firewall support access** on page 67.
3. Based on your type of service processor, review the process overview and complete the process:
   - **Setting up the physical service processor connection: Process overview** on page 69
   - **Setting up the virtual service processor connection with VMware ESXi: Process overview** on page 71
   - **Setting up the virtual service processor connection with Hyper-V: Process overview** on page 73

About the service processor

Each storage system requires a service processor (SP), which can be either physical or virtual. Both the physical SP and the virtual SP provide remote monitoring and report storage system errors, and can perform diagnostic and maintenance activities involving the storage system. With HPE 3PAR SP 5.x software, only one standalone HPE 3PAR StoreServ 8000 Storage system can be added to the service processor.

The preferred service processor setup method is to connect to the service processor using the preconfigured, nonroutable IP address through a local network using a browser, which starts the HPE 3PAR Guided Setup automatically.

For service events performed by a service technician, the customer must provide the following to the technician:

- For a physical SP, access to the physical SP for a direct connection to the Service port.
- For a virtual SP, access to their network and the IP address to the virtual SP.

For detailed information about the service processor, see the documents available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Service processor types

Physical SP

A physical SP is a dedicated service appliance located within the storage rack providing proximity to the storage system. For access to the physical SP by an authorized service provider, a direct connection to

the physical SP is required. If you choose a physical SP at the time of ordering, your storage system will include a physical SP installed in the same rack as the controller nodes.

A physical SP has two physical network connections:

- The Management (MGMT) port requires a connection to the network to communicate with the storage system.
- The Service port is for maintenance purposes only and is not connected to the network.

Virtual SP

A virtual SP is deployed as a virtual machine. For access to the virtual SP by an authorized service provider, a network connection to the virtual SP is required. The virtual SP software is provided in an Open Virtual Format (OVF) for VMware vSphere Hypervisor and self-extractable virtual hard disk (VHD) package for Microsoft Hyper-V.

CAUTION: To ensure that the management of the storage system by the virtual SP is independent of other host servers connected to the storage system, do not install the virtual SP software on a host server that is also using storage from the storage system. The virtual SP must use the local boot disk of the assigned VMware server and not boot from the storage system LUNs.

The HPE 3PAR Text-based User Interface

The HPE 3PAR Text-based User Interface (TUI) is a utility on the HPE 3PAR SP that enables limited configuration and management of the SP and access to the HPE 3PAR CLI of an attached storage system. The intent of the HPE 3PAR TUI is not to duplicate the functionality of the HPE 3PAR SP Service Console interface, but to allow a way to fix problems that may prevent you from using the Service Console interface.

The TUI appears when you log in to the Linux console opened from the VMware vSphere Client or through a terminal emulator using SSH to a physical or virtual SP. Prior to SP initialization, you can log in to the TUI with the user name **`admin`** and no password. To access the TUI after the SP has been initialized, you will need to log in to the console with the **`admin`** user name and the password you created during the initialization.

The SP ID and model are always displayed in the heading. Before the SP is initialized, the SP ID is displayed as `SP00000`. After initialization, the actual ID assigned to the SP during initialization is displayed.

Network and firewall support access

Before performing the service processor (SP) connection setup, ensure that there are no customer firewall restrictions to the existing HP servers and the new HPE servers on port 443. Firewall and proxy server configuration must be updated to enable outbound connections from the service processor to the existing HP servers and the new HPE servers.

For a list of HP and HPE server host names and IP addresses, see **Firewall and proxy server configuration** on page 67.

Firewall and proxy server configuration

Firewall and proxy server configuration must be updated on the customer network to enable outbound connections from the service processor to the existing HP servers and the new HPE servers.

HP and HPE server host names and IP addresses

- HPE Remote Support Connectivity Collector Servers:

- **https://storage-support.glb.itcs.hpe.com** (16.248.72.63)
- **https://storage-support2.itcs.hpe.com** (16.250.72.82)

- HPE Remote Support Connectivity Global Access Servers:
  - **https://c4t18808.itcs.hpe.com** (16.249.3.18)
  - **https://c4t18809.itcs.hpe.com** (16.249.3.14)
  - **https://c9t18806.itcs.hpe.com** (16.251.3.82)
  - **https://c9t18807.itcs.hpe.com** (16.251.4.224)

- HP Remote Support Connectivity Global Access Servers:
  - **https://g4t2481g.houston.hp.com** (15.201.200.205)
  - **https://g4t2482g.houston.hp.com** (15.201.200.206)
  - **https://g9t1615g.houston.hp.com** (15.240.0.73)
  - **https://g9t1616g.houston.hp.com** (15.240.0.74)

- HPE RDA Midway Servers:
  - **https://midway5v6.houston.hpe.com** (2620:0:a13:100::105)
  - **https://midway6v6.houston.hpe.com** (2620:0:a12:100::106)
  - **https://midway7v6.houston.hpe.com** (2620:0:a13:100::108)
  - **https://midway9v6.houston.hpe.com** (2620:0:a13:100::109)
  - **https://midway8v6.houston.hpe.com** (2620:0:a12:100::109)
  - **https://g4t8660g.houston.hpe.com** (15.241.136.80)
  - **https://s79t0166g.sgp.ext.hpe.com** (15.211.158.65)
  - **https://s79t0165g.sgp.ext.hpe.com** (15.211.158.66)
  - **https://g9t6659g.houston.hpe.com** (15.241.48.100)
  - **https://g9t7157g.houston.hpe.com** (15.241.48.251)
  - **https://g9t7158g.houston.hpe.com** (15.241.48.252)
  - **https://g4t9581g.houston.hpe.com** (15.241.136.208)
  - **https://s54t0109g.sdc.ext.hpe.com** (15.203.174.94)
  - **https://s54t0108g.sdc.ext.hpe.com** (15.203.174.95)
  - **https://s54t0107g.sdc.ext.hpe.com** (15.203.174.96)

- HPE InfoSight Servers:
  - **https://sfrm-production-llb-austin1.itcs.hpe.com** (16.252.64.51)
  - **https://sfrm-production-llb-houston9.itcs.hpe.com** (16.250.64.99)
  - **https://infosight1.itcs.hpe.com** (16.248.65.16)

- For communication between the service processor and the HPE 3PAR StoreServ Storage system, the customer network must allow access to the following ports on the storage system.
  - Port 22 (SSH)
  - Port 5781 (Event Monitor)
  - Port 5783 (CLI)
- For communication between the browser and the service processor, the customer network must enable access to port 8443 on the SP.
- For communication between the vCenter instance and the service processor, the customer network must enable access to port 443 (default port) on the SP and vCenter server.

Setting up the physical service processor connection: Process overview

Procedure

Complete **Assigning an IP address to the physical service processor with a functional network using the Guided Setup—SP5.x** on page 69.

Assigning an IP address to the physical service processor with a functional network using the Guided Setup—SP5.x

Prerequisites

- The physical service processor (SP) and the HPE 3PAR StoreServ Storage are connected to a network with a gateway.
- The service processor must be on the same subnet as the HPE 3PAR StoreServ Storage system.

Procedure

1. Connect a service laptop to the physical service processor.

   With an Ethernet cable, connect a private Ethernet switch/hub between an Ethernet port on a service laptop and the service port on the physical service processor.

   IMPORTANT: Hewlett Packard Enterprise recommends using a private Ethernet switch/hub for connection between a service laptop and a physical service processor to ensure that the service laptop does not lose its network connection during the procedure. The loss of a network connection can result in a failure of the procedure. Any Ethernet switch/hub with four to eight ports is supported, such as the HPE 1405-5G Switch (J97982A).

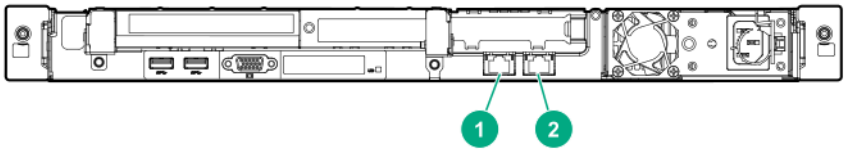


Figure 45: Physical service processor ports, HPE ProLiant DL120 Gen9 Server

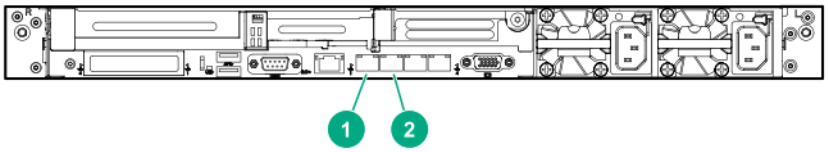


Figure 46: Physical service processor ports, HPE ProLiant DL360 Gen10 Server

1	Management (MGMT) port; NIC 1
2	Service port; NIC 2

2. Temporarily configure the LAN connection of the service laptop as follows:

   IP Address: `10.255.155.49`

   Subnet mask: `255.255.255.248`

3. To begin the HPE 3PAR Guided Setup, access the service processor from the service laptop:

   a. In a browser window, enter: **`https://10.255.155.54:8443/`**

   b. Read the **HPE End-User License Agreement** and then click **Accept**.

   c. Click **Continue** and then click **Connect Service Processor**.

   d. Enter the information for the service processor network connection from the *Software Setup Worksheet* and click **OK**.

   e. Wait for the **Step 1 Completed** message, but **do not** click **Continue**. Instead, disconnect the laptop Ethernet cable that you directly connected to the service port on the physical service processor in step 1.

   f. Reconnect your service laptop to the same network as the service processor and HPE 3PAR StoreServ Storage system.

Setting up the virtual service processor connection with VMware ESXi: Process overview

Prerequisites

- Verify that you have the virtual service processor (SP) installation software on either a DVD or from an email that was sent with a link to download the software, which might have gone to the email account responsible for purchasing the storage system.
- Verify that you have administrative privileges. With Linux systems, you must have superuser access.
- Verify that both the SP and the storage system are on the same subnet.
- Verify that the host server time and date are properly set, either through the Network Time Protocol (NTP) server or manually. Setting the correct date and time ensures virtual SP real-time monitoring and access. If the host server virtual SP is set to a date older than the date in the virtual SP installation package, the installation will fail. The time and date can be set manually through the VMware ESXi console.
- Verify that the VMware vSphere client is available before deploying the virtual SP OVF file. Access your ESXi server to download the VMware vSphere client or see the VMware website:

  my.vmware.com/web/vmware/downloads
- Provision the virtual SP on a VMware server and ensure that the virtual SP boots from the local disk of the assigned VMware server, not from the storage system LUNs.
- Do not install the virtual SP on the storage system, because it might lead to the inability of properly managing the storage system when connectivity to the storage system is unavailable.

Procedure

1. Complete **Deploying the virtual service processor on a host with VMware ESXi** on page 71.
2. Complete **Locating or assigning an IP address to the virtual service processor with VMware ESXi** on page 72.

Deploying the virtual service processor on a host with VMware ESXi

CAUTION: Do not install the virtual service processor (SP) on a host that is using storage from the same storage system as the SP manages. Doing so may lead to the inability to properly manage the array if connectivity to the storage is unavailable. Provision the virtual SP on a VMware server. Ensure that the virtual SP uses the local boot disk of the assigned VMware server and does not boot from the storage system LUNs.

VMware vMotion is not a supported application. Do not use vMotion to migrate the virtual service processor (SP) from one physical server to another. Using vMotion might cause communication failure and interrupt storage system service.

You can deploy the virtual SP on VMware by importing an OVF file.

For information about the system requirements and installation process for VMware vSphere, see the VMware vSphere documentation available at the VMware vSphere Documentation website:

www.vmware.com/support/pubs/vsphere-esxi-vcenter-server-pubs.html

NOTE: These steps might vary depending on the version of VMware ESXi.

Procedure

1. Start the VMware vSphere Client, and then select the IP address of the vSphere server from the **IP address/Name** list.
2. Enter the user name and password, and then click **Login**.
3. On the **File** menu, click **Deploy OVF Template**.

   The **Deploy OVF Wizard** opens.
4. Enter or select the OVF file that you want to deploy, and then click **Open**.
5. On the **Source** screen, verify that the correct file is entered in the **Deploy from a file or URL** field, and then click **Next**.
6. On the **Name and Location** screen, you can change the name of the virtual SP, and then click **Next**.

   The default virtual SP name is the same as the OVF file name.
7. On the **Resource Pool** screen, select the resource pool within which you want to deploy the template.
8. On the **Storage** screen, select the storage destination for the virtual machine files.
9. On the **Disk Format** screen, click to select the type of provisioning to use for storing the virtual disks (thin provisioning is the default), and then click **Next**.
10. On the **Ready to Complete** screen, select **Power on after deployment**, and then click **Finish**. The deployment may take several minutes to complete.

Locating or assigning an IP address to the virtual service processor with VMware ESXi

NOTE: This network configuration is temporary. If the virtual service processor (SP) is rebooted, you will need to repeat this procedure before continuing to the configuration.

Obtain the IP address of the virtual SP through the VMware console using one of the following options:

- **Option A: DHCP network—Locate the temporary IP address using the VMware vSphere Client**
  1. In the VMware vSphere Client window, select the **Summary** tab, and then find the IP address in the **General** section, **IP address** field.
  2. Make a note of this temporary IP address for your virtual SP.
- **Option B: Non-DHCP network—Assign an IP address to the virtual SP using the Text-based User Interface for the SP**
  1. In the VMware vSphere Client window, select the virtual SP that you installed earlier, click the **Console** tab, click anywhere on the screen, and then press **Enter**.
  2. Log in with **`admin`** as the username and leave the password field blank. A password is not required to configure the network settings.
  3. Choose option **1 Configure Network** and press **Enter**.
  4. From the *Software Setup Worksheet*, enter the SP name and press **Enter**.
  5. From the *Software Setup Worksheet*, enter the SP IP address and press **Enter**.
  6. From the *Software Setup Worksheet*, enter the subnet mask and press **Enter**.

7. From the *Software Setup Worksheet*, enter the default gateway address and press **Enter**.
8. To configure the network, enter **Y**.

   The full URL that you will need for accessing the SP is displayed. For example, **https://<sp_ip_address>:8443**.
9. To return to the main menu, press **X**.
10. To exit, press **X**.

Setting up the virtual service processor connection with Hyper-V: Process overview

Prerequisites

- Verify that you have the virtual service processor (SP) installation software on either a DVD or from an email that was sent with a link to download the software, which might have gone to the email account responsible for purchasing the storage system.
- Verify that you have administrative privileges and are a member of the Administrators group.
- Verify that both the SP and the storage system are on the same subnet.
- Verify that the host server time and date are properly set, either through the Network Time Protocol (NTP) server or manually. Setting the correct date and time ensures virtual SP real-time monitoring and access. If the host server virtual SP is set to a date older than the date in the virtual SP installation package, the installation will fail. The time and date can be set manually through the Windows OS date and time settings.
- Do not install the virtual SP on the storage system, because it might lead to the inability of properly managing the storage system when connectivity to the storage system is unavailable.

Procedure

1. Complete **Deploying the virtual service processor on a host with Hyper-V** on page 73.
2. Complete **Assigning an IP address to the virtual service processor with Hyper-V** on page 74.

Deploying the virtual service processor on a host with Hyper-V

CAUTION: Do not install the virtual service processor on a host that is using storage from the same storage system as the service processor manages. Doing so may lead to the inability to properly manage the array if connectivity to the storage is unavailable. Provision the virtual service processor on a Hyper-V Server. Ensure that the virtual service processor uses the local boot disk of the assigned Hyper-V Server and does not boot from the storage system LUNs.

Prerequisites

- Windows Server 2012/2012 R2/2016 must have enough main memory to host virtual machines configured with 4 GB of memory.
- The Hyper-V deployment installation file must be saved on your local drive.

Procedure

1. Execute the Hyper-V deployment executable as administrator.
2. Click **Install**.
3. Enter the name of the virtual machine to be created.
4. Select the interface from the available virtual network switches by entering the index associated with the switch. (Available only if there is more than one virtual switch configured.)
5. After the virtual machine is configured, press **Enter** to continue.
6. In the Hyper-V Manager, select the virtual machine, and then click **Start** in the Actions pane.
7. Once the virtual machine has booted up, log in as **`admin`** (no password) and note the virtual machine IP address.
8. Connect to the service processor through a browser with the service processor IP address using the format **`https://<sp_ip_address>:8443`**, where **`<sp_ip_address>`** is the IP address you noted in the previous step.

Assigning an IP address to the virtual service processor with Hyper-V

Procedure

1. In the Hyper-V Manager, right-click the virtual machine from the **Virtual Machines** list and then click **Connect...**.
2. Click the green on/off button labeled **Start** in the virtual service processor console menu.

   It might take a minute or two for the login prompt to appear.
3. Log in with the **`admin`** credentials and then press **Enter**.

   A password is not required to configure the network settings.
4. Enter the service processor IP address and then press **Enter**.
5. Enter the netmask address and then press **Enter**.
6. Enter the default gateway address and then press **Enter**.
7. Review the configuration confirmation and record the service processor IP address on to the *HPE 3PAR StoreServ 8000 Storage Software Setup Worksheet* for reference during subsequent setup procedures with the software HPE 3PAR Guided Setup.
8. To exit, press **Enter**.

Setting up the service processor and storage system software: Process overview

IMPORTANT: For the first-time installation, the HPE 3PAR Guided Setup utility is used to configure the HPE 3PAR Service Processor and the HPE 3PAR StoreServ 8000 Storage. If the installation is to be performed again (for example, due to a relocation of the storage system), contact your Hewlett Packard Enterprise support representative.

For more information, refer to the *HPE 3PAR Service Processor Software User Guide* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

The storage system is configured with the help of the HPE 3PAR Guided Setup. By completing the HPE 3PAR Guided Setup, the storage system will be operational.

Procedure

1. Review **Prerequisites for the HPE 3PAR Guided Setup** on page 75.
2. Complete **Setting up the service processor using the HPE 3PAR Guided Setup** on page 76
3. Complete **Setting up the storage system using the HPE 3PAR Guided Setup** on page 77
4. Review the **Installing and setting up the HPE 3PAR StoreServ Management Console software: Process overview** on page 78 and complete the process.

Prerequisites for the HPE 3PAR Guided Setup

Prerequisites

- The cabling is complete.
- The storage system is connected to the network and the service processor is on the same network subnet as the storage system.
- The network connections are active.
- The power supplies are powered on.
- The storage system components are powered on.
- The storage system LEDs indicate the following:
  - Components are powered on.
  - Cables are properly installed.
  - Network connections are active.
  - All cabled SAS ports have green Activity LEDs.
  - All controller nodes have solid green Status LEDs.
- With either IPv4 or IPv6 DNS, verify that the network infrastructure of the data center has been configured and that DNS is running.
- The access privileges to the storage system are obtained.

- The service processor setup is complete for the service processor.
- The service processor and storage system are connected to the network and the service processor is on the same network subnet as the storage system.

Setting up the service processor using the HPE 3PAR Guided Setup

Procedure

1. To access the HPE 3PAR Guided Setup, connect to the service processor (SP) through a browser with the SP IP address: **`https://<sp_ip_address>:8443/`**.

   IMPORTANT: If you receive a warning from your browser when you enter the SP URL, see **Browser warning when connecting to the service processor** on page 128. Later, you will be able to install appropriate certificates so that you do not see this warning message in the future.

   The Guided Setup window opens and displays three steps. Notice that you have already completed Step 1, **Connect Service Processor**. You can now proceed with Step 2, **Setup the Service Processor**.

2. To close the Guided Setup window, click **Continue**.
3. Click **Setup Service Processor**.
4. Follow the instructions in the **Setup Service Processor** window. Setup either a new uninitialized SP or restore the existing SP using a recovery file.

   Under network settings, you have a chance to review and correct any information that you entered in Step 1. If you check **IPv6**, you will be prompted to enter the IPv6 address, subnet prefix length, and gateway. More network speed, domain, and DNS adjustments to the SP network configuration can also be set.

   Scroll down to complete each section in the window. You can enter the following information:

   - Date and Time settings
   - The **`admin`** and **`hpepartner`** login credentials from the *Software Setup Worksheet*
   - Support settings, including enabling email notifications

5. To apply the settings, click **Setup**.

   The Guided Setup window displays describing the status and next steps.

   You will be able to follow the setup progress on the **Service Processor Setup** screen. The full list of initialization steps are displayed on the right side the screen with the status, while the steps that have not yet been completed are listed on the left side of the screen.

   If the setup remains incomplete due to an error, the checklist displays the error with a link to the section of the setup dialog related to the error condition.

   If a **WARNING** is displayed instead of an error, continuing with the setup is an option.

6. Click **Continue** to be taken to the **Service Processor Setup** page to monitor the initialization of the SP.

7. Follow the setup progress. The full list of initialization steps is displayed on the right side the screen with its status. The steps that have not yet been completed are listed on the left side of the screen.
8. Once the setup is complete, reboot the SP by clicking the **Reboot** link at the top of the screen. The SP Service Console automatically reconnects to the login screen. Allow several minutes for the reboot.

Setting up the storage system using the HPE 3PAR Guided Setup

Procedure

1. Once the service processor (SP) has restarted after setting up the service processor using the HPE 3PAR Guided Setup, the Service Console login page is displayed with a single button and the Guided Setup window open.
2. Click **Continue**, enter the **admin** credentials you previously assigned in the Guided Setup, and then click Login.

   A window opens that has more information and instructions.
3. If no storage system is added to the Service Console, you will be taken to the **Systems** page and the **Setup StoreServ** dialog opens.
4. Click **Next**.

   A window opens that has more information and instructions.
5. To close the Guided Setup window, click **Continue**.

   You will then be able to fill in the required information for adding a storage system. This process includes accepting and caching a security certificate; entering system settings, date, and time settings; storage system credentials; entering information about the installation site, and adding a system support contact.
6. Follow the instructions on the dialog that opens. You will have the option of adding a new uninitialized storage system or one that has already been initialized.
7. Once you have completed filling in the required settings, click **Setup**.

   A window opens that has information about the setup process and how the process can be monitored. You will be able to follow the setup progress on the **StoreServ Setup** screen, which is similar to the **Service Processor Setup** screen. Once the setup is complete, a window opens that explains the next steps to take in the process.



TIP: If the Guided Setup remains incomplete due to an error, the checklist displays the error with a link to the section of the setup dialog related to the error condition.

Installing and setting up the HPE 3PAR StoreServ Management Console software: Process overview

The HPE 3PAR StoreServ Management Console (SSMC) software provides browser-based interfaces for monitoring HPE 3PAR StoreServ Storage systems. The HPE 3PAR SSMC is available for various Windows and Linux environments, and includes silent install options for both. The HPE 3PAR SSMC does not support remote installation, installation using a symbolic link, or other installation methods.

To download the latest Hewlett Packard Enterprise software, see the Hewlett Packard Enterprise Software Depot website:

www.hpe.com/support/softwaredepot

Prerequisites

- Review the HPE 3PAR SSMC documentation:
  - *HPE 3PAR StoreServ Management Console Release Notes*
  - *HPE 3PAR StoreServ Management Console Administrator Guide*
  - *HPE 3PAR StoreServ Management Console User Guide*

  The HPE 3PAR SSMC documentation is available at the Hewlett Packard Enterprise Information Library website:

  www.hpe.com/info/storage/docs

  To filter the table for the HPE 3PAR SSMC documentation, select **3PAR StoreServ Management Console** in the **Models/Subcategories** filter.
- Confirm that the setup requirements in the *HPE 3PAR StoreServ Management Console Administrator Guide* have been met before installing the HPE 3PAR SSMC.

Procedure

1. Use the *HPE 3PAR StoreServ Management Console Administrator Guide* for installing the HPE 3PAR StoreServ Management Console (SSMC) software.
2. Use the *HPE 3PAR StoreServ Management Console User Guide* and the HPE 3PAR SSMC Online Help for setting up and managing your HPE 3PAR StoreServ Storage system.

   The HPE 3PAR SSMC Online Help is available from the Help window from any location within the **Main Console**. To open the Help window, click the question mark (**?**) in the upper right corner of the dashboard window.

   See the **Provisioning Tutorial** available from the Help window in the **Main Console**.

Post-installation tasks

Accessing the HPE InfoSight platform and registering the storage system: Process overview

For accessing the HPE InfoSight cloud-based predictive analytics platform and registering the HPE 3PAR StoreServ Storage system, complete the following process:

Procedure

1. Go the **infosight.hpe.com** web portal and log in with an HPE Passport account.

   Hewlett Packard Enterprise recommends using the Google Chrome browser to access the HPE InfoSight web portal.

   - If you created an HPE Passport account to access HPE StoreFront Remote (SFRM), this account is supported with HPE InfoSight.
   - If you must create an account, complete **Creating an account to access the HPE InfoSight web portal** on page 79.

2. Complete **Registering the storage system with the HPE InfoSight web portal using the HPE 3PAR StoreServ Management Console** on page 80

About the HPE InfoSight platform

Overview

HPE InfoSight is a cloud-based predictive analytics platform that can be used with your HPE 3PAR StoreServ Storage system for planning, managing, monitoring, and troubleshooting.

The HPE InfoSight web portal is available at **infosight.hpe.com**.

IMPORTANT: HPE InfoSight replaces HPE StoreFront Remote (SFRM).

The SFRM functionality has been embedded in HPE InfoSight.

Registration of a storage system with InfoSight

The registration process validates ownership of the HPE 3PAR StoreServ Storage system and makes the system data available to those who are authorized.

Systems that are registered with HPE InfoSight must be added to a system group, and then users in the organization can be added to the system group. Typically, a single system group is all that is necessary to manage multiple systems through the process of assigning users and setting their roles and permissions for the system group.

Registration token for a system group

Each system group has a unique HPE InfoSight registration token provided from the **Register Systems** page. This token is used to register the HPE 3PAR StoreServ Storage system to a specific system group by adding the token to the software for the HPE 3PAR StoreServ Storage system.

Creating an account to access the HPE InfoSight web portal

This procedure is for creating an HPE Passport account to access the HPE InfoSight web portal.

IMPORTANT: To gain access to the HPE InfoSight web portal, Hewlett Packard Enterprise recommends the Google Chrome browser.

Procedure

1. Connect to the HPE InfoSight web portal: **infosight.hpe.com**
2. To create an HPE Passport account, click **Create Account**.
3. To complete the process, follow the online instructions.

Registering the storage system with the HPE InfoSight web portal using the HPE 3PAR StoreServ Management Console

This procedure is for registering an HPE 3PAR StoreServ Storage system with HPE InfoSight using the HPE 3PAR StoreServ Management Console (SSMC).

IMPORTANT: To gain access to the HPE InfoSight web portal, Hewlett Packard Enterprise recommends the Google Chrome browser.

TIP: For additional information about the features of the HPE InfoSight web portal, located the question mark (?) icons throughout the portal to access context-specific help content.

Prerequisites

From the HPE 3PAR Service Processor (SP) software in the **Support** settings, verify that the **Send support data to HPE** option (call-home feature) is enabled.

For more information about the HPE 3PAR Service Processor software settings, see the *HPE 3PAR Service Processor Software 5.0.x User Guide* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Procedure

1. Connect to the HPE InfoSight web portal: **infosight.hpe.com**
2. Log in using the credentials for your HPE Passport account.
3. Select **Register Systems** from the settings menu (gear icon).
4. From the **Register Systems** page, select a previously created system group or create a system group, and then click **I Accept** to agree you are registering one or more systems that you own or administer.

   To create a system group, select the **Create New Group** option from the drop-down menu.
5. Copy the generated registration token to your clipboard by clicking the clipboard button located to the left of the field containing the token.

   This token is text beginning with `StoreFrontRemoteAccess` and will be pasted into a **Token** field in the Main Console interface.
6. From the server on which the HPE 3PAR SSMC software is installed, access the Main Console:

   a. Browse to **`https://<IP address or FQDN>:8443`**.

TIP: The default port number is 8443. Another port might have been assigned during installation of the software.

The login screen opens.

b. Enter a user name and password, make sure the check box for **Administrator Console** is clear, and then click **Login**.

The **Dashboard** screen is displayed.

7. From the Main Console interface dashboard, complete the following steps:

a. From the main menu under **Storage Systems**, click **Systems**.

b. Select the storage system from the list pane view.

c. From the detail pane view for that system, hover over the **General** detail area, and then click the edit icon () that appears near the panel name.

d. Scroll down to the **Descriptors** section, and then paste the token in the **Comments** field.

With this token added, the next time the storage system calls home, StoreFront Remote will see the storage system and associate it with the corresponding group. This process can take 24–48 hours.

Adding workstations to the public firewall rules

If `Permissive Mode` is enabled, adding workstations to the public firewall rules is not necessary.

After verifying the service processor (SP) connectivity, add the management workstation (host) IP address to the service processor public firewall rules to allow access to the service processor. For example, you can use a management workstation to connect to the service processor to stop or start external communications.

Procedure

1. Connect and log in to the service processor.

a. Browse to the IP address **`https://<sp_ip_address>:8443/`**.

b. Enter the account credentials and then click **Login**.

2. Open the Service Console (SC) main menu by clicking **3PAR StoreServ Service Console** in the upper-left corner.
3. From the main menu, select **Service Processor**.
4. On the **Service Processor** page, select **Actions** > **Edit SP configuration**.
5. From the **Service Processor Firewall** section of the **Service Processor Settings** dialog, click the **Add** button under **Rules**.
6. To add the workstations, enter the IP address or range of at least one management workstation, and click the **Add** button. (Or, click the **Add +** button to continue adding addresses.)
7. Verify the addresses in the **Service Processor Settings** dialog.
8. If not already disabled, disable **Permissive mode**.

NOTE: Once **Permissive mode** is disabled, only those systems with IP addresses in the rules will be able to connect to the service processor.

9. Click **OK** at the bottom of the **Service Processor Settings** dialog.
10. The **Service Processor** setup page will show the process of reconfiguring the service processor.

Configuring the host and SAN: Process overview

Procedure

- Complete **Configuring a host using a host-OS implementation guide** on page 82.
- Only for HPE 3PAR Smart SAN, see the *HPE 3PAR Smart SAN User Guide* available at the Hewlett Packard Enterprise Information Library website: **www.hpe.com/info/storage/docs**.

Creating a host, HPE 3PAR StoreServ Management Console

Procedure

1. Log in to the HPE 3PAR StoreServ Management Console (SSMC) **Main Console**.
2. To open the main menu, select **3PAR StoreServ** in the upper-left corner of the **Main Console**.
3. From the main menu, select **BLOCK PERSONA** > **Hosts**.
4. On the **Hosts** page, click **+ Create host** or select **Actions** > **Create**.
5. In the **General** section of the **Create Host** dialog, enter the host name, select the storage system on which the host will be created, the host set of which the host will be a member (if any), and the host OS. The host persona is automatically selected based on the host OS.
6. In the **Paths** section, select a path (if listed), or click **Add FC** or **Add iSCSI** to add a port.

   Remember, you connected FC or iSCSI host cables during the cabling setup. Commonly, FC cables are connected from FC ports on the storage system to FC switches or switch fabrics. Zoning the FC switch, which was done prior to cabling, appropriately restricts the Worldwide Names (WWNs) seen by the storage system when the FC cables are connected.

   - If FC is chosen, select an existing WWN path or hold down the shift key to select multiple WWNs at once, then click **Add**.
   - If iSCSI is chosen, select an exiting iSCSI name and click **Add** or click **Add+** if adding multiple connections. If an iSCSI connection is created, you will also need to add CHAP settings.

7. After making your selections, click **Create** to start the action and close the dialog, or click **Create +** to start the action again and keep the dialog open.

   The status bar updates when the Host has been created.

Configuring a host using a host-OS implementation guide

Procedure

To configure your servers as hosts for your storage system, use the HPE 3PAR host-OS implementation guides.

These host-OS implementation guides, the *HPE 3PAR StoreServ Storage best practices guide* white paper, and additional HPE 3PAR documentation are available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Enhancing security with data encryption

The HPE 3PAR Data Encryption security feature enables you to encrypt all specifically formatted drives with an authentication key and the use of Federal Information Processing Standard (FIPS) capable HPE 3PAR StoreServ Storage drives.

When a Data Encryption license is registered, you must manually enable the encryption feature on the HPE 3PAR StoreServ Storage system. When the encryption feature is enabled successfully, all the installed drives become automatically set in an encrypted state.

NOTE: To review the encryption status of individual drives, use the HPE 3PAR StoreServ Management Console (SSMC).

This feature allows you to perform the following encryption-related tasks:

- Check encryption status
- Enable encryption
- Back up an authentication key
- Restore an authentication key
- Generate a new key
- Recover a key

For more information about enabling the feature, see the *HPE 3PAR StoreServ Management Console User Guide* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Validating the HPE 3PAR Remote Support connectivity to HPE 3PAR Central

Hewlett Packard Enterprise strongly recommends configuring HPE 3PAR Remote Support connectivity (also known as the Call Home feature) to HPE 3PAR Central when installing your HPE 3PAR StoreServ Storage system. The remote support connection is set during the software HPE 3PAR Guided Setup. If needed, remote support connectivity can be tested using the HPE 3PAR Service Processor (SP) software Service Console interface, which might need to be checked after making any network changes.

Service Console Health pane

From the Service Console, the health of the **Transfer status** to Hewlett Packard Enterprise is shown for the storage system in the **Health** pane of the **Overview** page.

Service Console Test SP connectivity action

The Service Console allows you to check connectivity on demand. The **Test SP connectivity** action runs tests to the Public Network, the HPE 3PAR Secure Service Collector Server, and the HPE 3PAR Secure Service Policy Server.

After a connectivity test has been started, the Service Console shows the process as a task in a notifications box displayed in the **detail pane**. To see the results of the test, click the notification box, and

then click the **Details** link. This notification pane shows the progress of the test and when the test has completed.

For more information about the Service Console, select the **Help** feature in console or see the *HPE 3PAR Service Processor Software User Guide* at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Testing the service processor connectivity to the storage system using the Service Console

Procedure

1. Connect and log in to the service processor (SP).
   a. Browse to the IP address **`https://<sp_ip_address>:8443/`**.
   b. Enter the account credentials, and then click **Login**.
2. Open the Service Console main menu by clicking **3PAR StoreServ Service Console** in the upper-left corner.
3. From the main menu, select **Service Processor**.
4. Select **Actions** > **Test SP connectivity**.
5. Switch to **Activity** view to monitor the test progress.
6. When the test has finished, click the **Details** link to see the test results. When the service processor has connectivity, all tests state `...test passed`.

```
2016-08-29 11:14:01 PDT    Created
2016-08-29 11:14:01 PDT    Start user operation
2016-08-29 11:14:04 PDT    SP localhost test passed.
2016-08-29 11:14:07 PDT    SP public interface test passed.
2016-08-29 11:14:10 PDT    SP gateway test passed.
2016-08-29 11:14:10 PDT    Policy Server connectivity test skipped: policy server not
configured.
2016-08-29 11:14:10 PDT    Proxy Server connectivity test skipped: proxy server not
configured.
2016-08-29 11:14:12 PDT    Collection Server test passed.
2016-08-29 11:14:13 PDT    Global Access Server test passed.
2016-08-29 11:14:13 PDT    Completed
```

More information

Component information

- The illustrations of components are examples only and might not accurately represent the configuration of your HPE 3PAR StoreServ Storage system.
- Due to the large number of prospective configurations, component placement and internal cabling have been standardized to simplify installation and maintenance. The components are placed in the rack and then numbered according to their order and location in the rack.

Adapters information (optional component)

The types of host PCIe adapters available are dependent on the model and configuration of the HPE 3PAR StoreServ 8000 Storage system. The host PCIe adapters are optional for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: Only an Hewlett Packard Enterprise authorized service provider is permitted to install the adapters.

Four-Port 16 Gb FC Host PCIe Adapter information

This information applies only to the HPE 3PAR Four-Port 16Gb FC Host Bus Adapter for the HPE 3PAR StoreServ 8000 Storage systems.

Use 16 Gb SFP+ transceiver connectors with the ports.

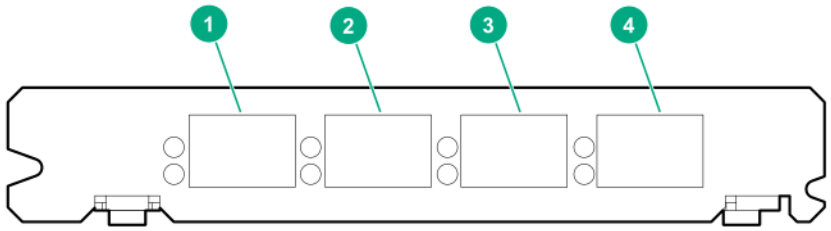


Figure 47: HPE 3PAR Four-Port 16Gb FC Host Bus Adapter ports

Table 8: HPE 3PAR Four-Port 16Gb FC Host Bus Adapter ports

Port	Node:Slot:Port (N:S:P)
1	N:2:1
2	N:2:2
3	N:2:3
4	N:2:4

Two-Port 10 Gb iSCSI/FCoE CNA Host PCIe Adapter information

This information applies only to the HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter for the HPE 3PAR StoreServ 8000 Storage systems.

IMPORTANT: For the HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter, some of the adapters have the faceplate labeling reversed, with the port on the left identified as port 2, when oriented as in the following illustration. This illustration shows the corrected label with port 1 on the left.

Use SFP+ transceiver connectors with the ports.

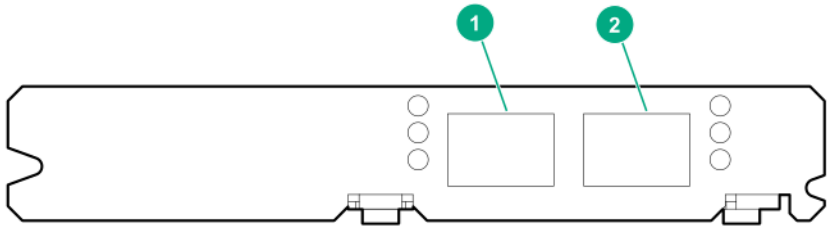


Figure 48: HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter ports

Table 9: HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter ports

Port	Node:Slot:Port (N:S:P)
1	N:2:1
2	N:2:2

Two-Port 10 GbE NIC Host PCIe Adapter information

This information applies only to the HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter for the HPE 3PAR StoreServ 8000 Storage systems.

IMPORTANT: For the HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter, some of the adapters have the faceplate labeling reversed, with the port on the left identified as port 2, when oriented as in the following illustration. This illustration shows the corrected label with port 1 on the left.

Use SFP+ transceiver connectors with the ports.

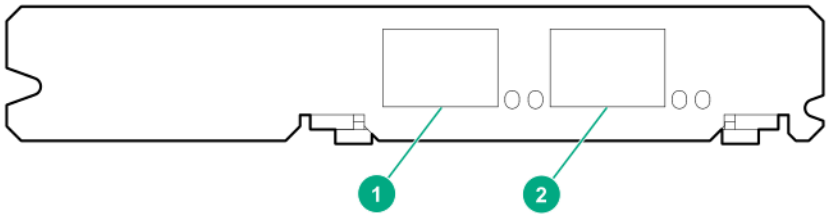


Figure 49: HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter ports

Table 10: HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter ports

Port	Node:Slot:Port (N:S:P)
1	N:2:1
2	N:2:2

Four-Port 1 GbE NIC Host PCIe Adapter information

This information applies only to the HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter for the HPE 3PAR StoreServ 8000 Storage systems.

IMPORTANT: For the HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter, some of the adapters have the faceplate labeling incorrect, indicating that the ports are numbered 0 through 3. The following illustration shows the corrected label, indicating that the ports are numbered 1 through 4.

For HPE 3PAR File Persona configuration of the NIC Ethernet ports, see the *HPE 3PAR File Persona User Guide* available at the Hewlett Packard Enterprise Information Library website: **www.hpe.com/info/storage/docs**

Use RJ45 connectors with the ports.

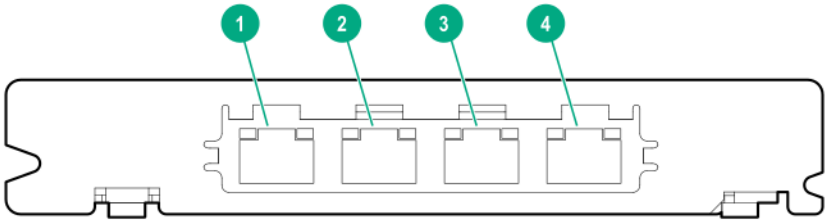


Figure 50: HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter ports

Table 11: HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter ports

Port	Node:Slot:Port (N:S:P)
1	N:2:1
2	N:2:2
3	N:2:3
4	N:2:4

Four-port 16 Gb FC/10 Gb Ethernet Combo Adapter information

This information applies only to the HPE 3PAR Four-Port 16Gb FC/10Gb Ethernet Combo Adapter for the HPE 3PAR StoreServ 8000 Storage systems.

IMPORTANT: There is no FCoE support for the four-port combo adapter.

Use 16 Gb SFP+ transceiver connectors with the ports.

Table 12: HPE 3PAR Four-Port 16Gb FC/10Gb Ethernet Combo Adapter ports

Port	Node:Slot:Port (N:S:P)
1 (Fibre Channel)	N:2:1
2 (Fibre Channel)	N:2:2
3 (Ethernet)	N:2:3
4 (Ethernet)	N:2:4

Four-port 10 Gb iSCSI/10 Gb Ethernet Combo Adapter information

This information applies only to the HPE 3PAR Four-Port 10Gb iSCSI/10Gb Ethernet Combo Adapter for the HPE 3PAR StoreServ 8000 Storage systems.

IMPORTANT: There is no FCoE support for the four-port combo adapter.

Use SFP+ transceiver connectors with the ports.

Table 13: HPE 3PAR Four-Port 10Gb iSCSI/10Gb Ethernet Combo Adapter ports,

Port	Node:Slot:Port (N:S:P)
1 (iSCSI)	N:2:1
2 (iSCSI)	N:2:2
3 (Ethernet)	N:2:3
4 (Ethernet)	N:2:4

Two-port 32Gb FC HBA information

This information applies only to the HPE 3PAR Two-Port 32Gb FC Host Bus Adapter for the HPE 3PAR StoreServ 8000 Storage systems.

Use 32Gb SFP28 transceiver connectors with the ports.

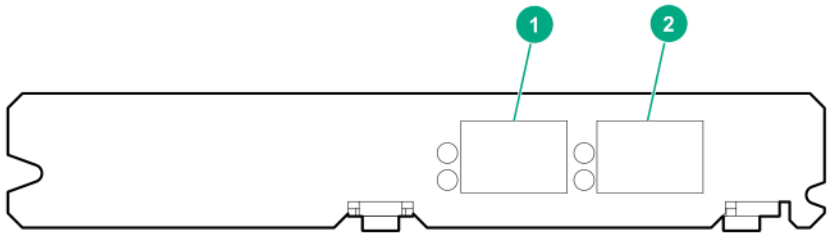


Figure 51: HPE 3PAR Two-Port 32Gb FC Host Bus Adapter ports

Port	Node:Slot:Port (N:S:P)
1	N:2:1
2	N:2:2

Breaker panel information

Direct-current E-T-A Breaker Panel and Grounding Bar information

The direct-current (DC) E-T-A Breaker Panel is supported for the HPE 3PAR StoreServ 8000 Storage system when installing the system in a direct-current power environment.

For installation in the DC HPE 3PAR StoreServ 8000 Storage system, two DC Breaker Panels and two Grounding Bars are installed as a set. This provides a total of 32 outputs (or 16 redundant outputs).

- The DC Breaker Panel is the DC equivalent to the AC Power Distribution Unit (PDU).
- The Grounding Bar is installed on the Breaker Panel and is the central ground to which all components and the rack itself will be grounded. The grounding bars are then connected to the facility ground (as opposed to connecting the grounding bar to the rack and grounding the rack to the facility).

Controller node information

This information applies only to the controller nodes for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: The controller nodes in the controller node enclosure are inverted 180° from each other, as well as the ports.

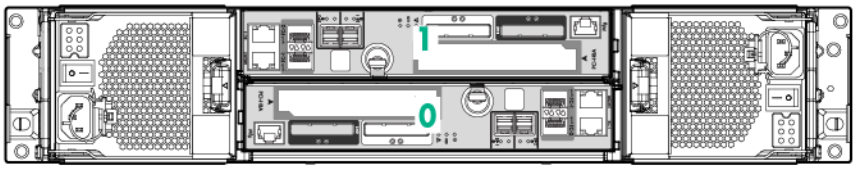


Figure 52: Controller node numbering, two-node controller node enclosure rear view

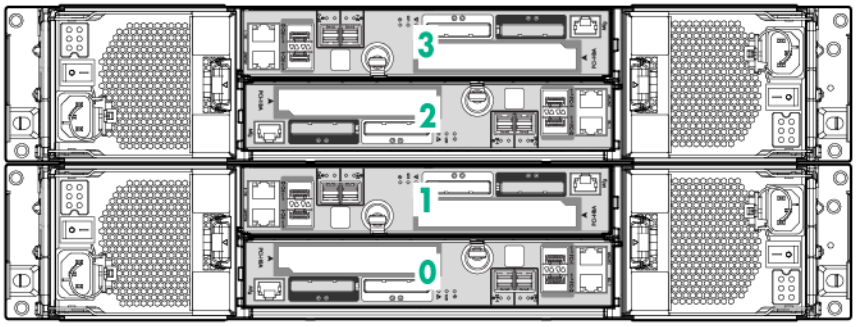


Figure 53: Controller node numbering, four-node controller node enclosure rear view

Controller node ports

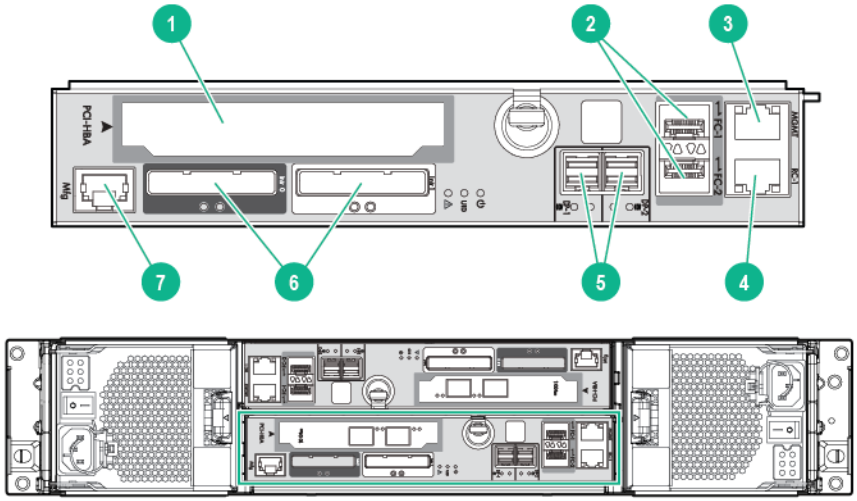


Figure 54: Controller node ports, controller node enclosure rear view

Table 14: Controller node ports, controller node enclosure rear view

Port type		Description
1	PCIe host adapter slot	PCIe slot used for optional host adapters (FC/CNA/NIC).
2	Fibre Channel ports	Two 16 Gb FC onboard ports (FC-1, FC-2) used for the host server connection.
3	Ethernet port (MGMT)	MGMT: 1 Gb Ethernet onboard port used to connect to the network.
4	Ethernet port (RC-1)	RC-1: 1 Gb Ethernet onboard port used for an HPE 3PAR Remote Copy or HPE 3PAR File Persona connection.
5	SAS ports	Two 12 Gb SAS onboard ports (DP-1, DP-2) used for the expansion drive enclosure connection.
6	Cluster Interconnect Link	Cluster Interconnect Link ports (Intr0, Intr1) used only with 4-node storage systems for the controller nodes 0 and 1 to controller nodes 2 and 3 connection.
7	Console port	Console port (MFG) is a serial connection for service procedures.

Ethernet onboard ports

The controller node has two Ethernet onboard (built-in) ports:

- **MGMT**—Onboard port for the network connection
- **RC-1**—Onboard port for an HPE 3PAR Remote Copy or HPE 3PAR File Persona connection

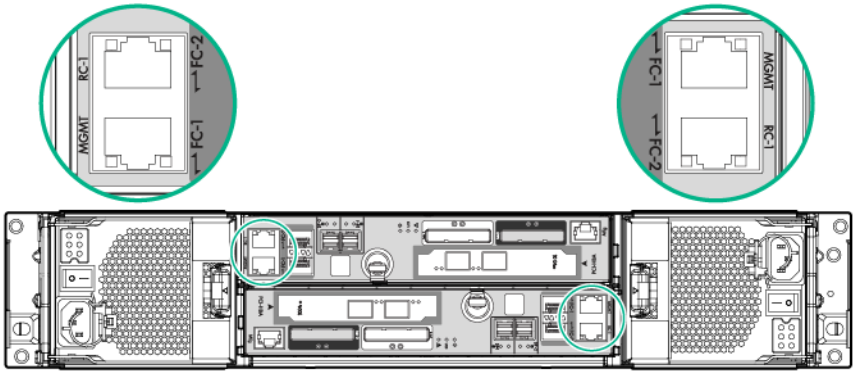


Figure 55: Ethernet onboard ports, controller node enclosure rear view

FC onboard ports

The controller node has two Fibre Channel (FC) onboard ports and each port includes two LEDs. The arrow head-shaped LEDs point to the port they are associated with.

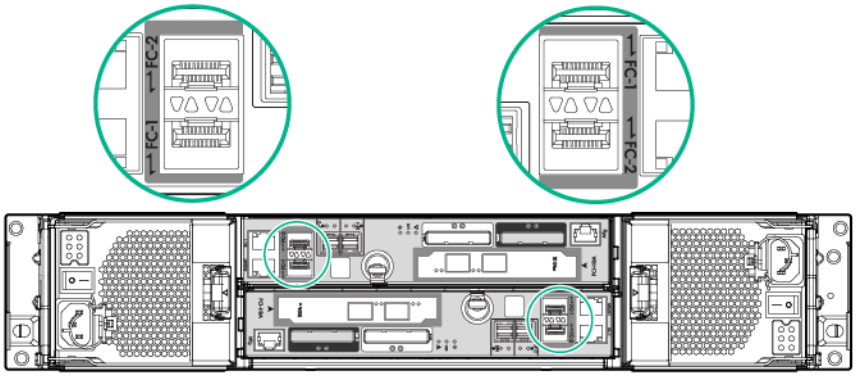


Figure 56: FC onboard ports, controller node enclosure rear view

Table 15: FC onboard ports numbering

Port	Node:Slot:Port (N:S:P)
FC-1	N:0:1
FC-2	N:0:2

SAS onboard ports

The controller node has two SAS onboard ports (DP-1 and DP-2) and each includes two LEDs.

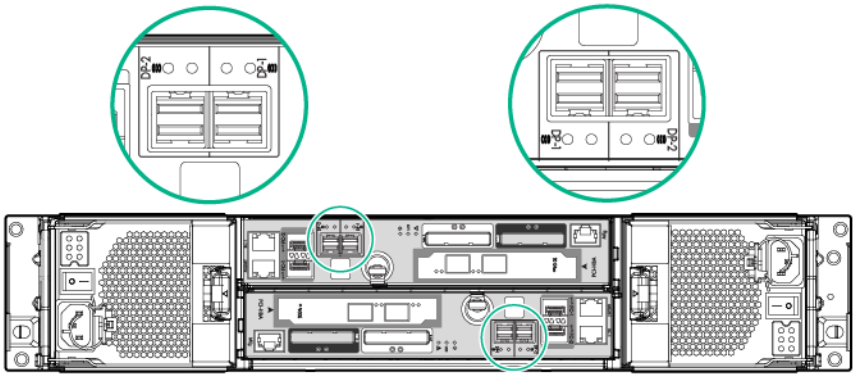


Figure 57: SAS onboard ports (DP-1 and DP-2), controller node enclosure rear view

Cluster Interconnect Link onboard ports

The controller node has two Cluster Interconnect Link onboard ports and each includes two LEDs.

NOTE:

- **4-node storage system**—Cluster Interconnect Link onboard ports are used to connect nodes together.
- **2-node storage system**—Cluster Interconnect Link onboard ports are **not** used and LEDs will be off.

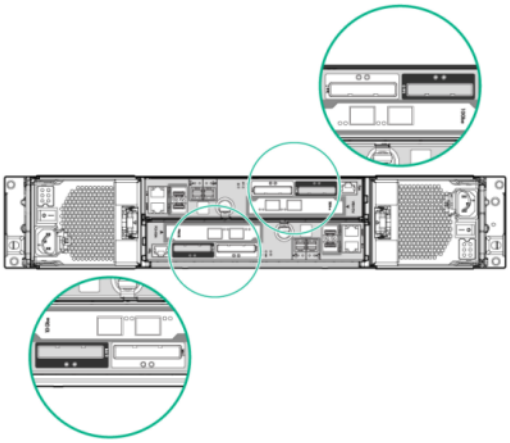


Figure 58: Cluster Interconnect Link onboard, controller node enclosure rear view

Console onboard port

The controller node has one Console onboard port (MFG) that is a serial connection.

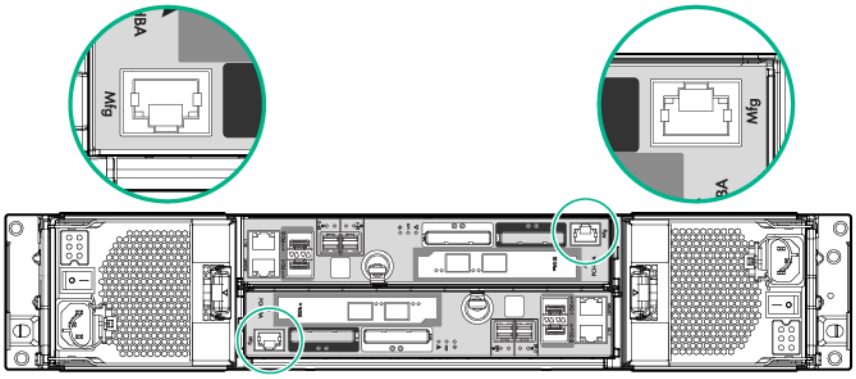


Figure 59: Console onboard port, controller node enclosure rear view

Drive information

This information applies only to the drives for the HPE 3PAR StoreServ 8000 Storage system.

The drives are installed in the drive bays at the front of either the controller node enclosures or expansion drive enclosures.

Drive types:

For the all-flash-array (AFA) model of the storage system, only SSDs are supported.

- HPE 3PAR SSD
- HPE 3PAR SAS HDD
- HPE 3PAR Near line (NL) SAS HDD
- HPE 3PAR FIPS Encrypted SSD/HDD

Drive sizes:

The drives come in two physical sizes installed in carriers (magazines).

- SFF 6.4 cm (2.5 in) drives
- LFF 8.9 cm (3.5 in) drives

Maximum drives supported:

- 24 SFF drives per SFF enclosure
- 24 LFF drives per LFF enclosure

Enclosures information

Controller node enclosure and drive enclosures information front view

The fronts of the controller node enclosure and expansion drive enclosures contain the drive bays for installing the drives. Each drive bay is assigned a number for locating drives in the HPE 3PAR StoreServ 8000 Storage system.

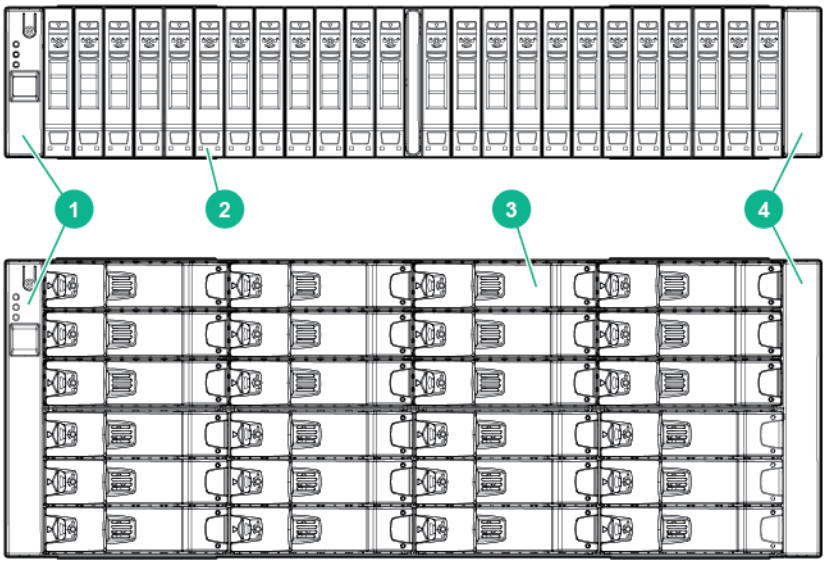


Figure 60: SFF and LFF enclosures front view

Table 16: SFF and LFF enclosures front view

Item		Description
1	Left bezel ear cap	Location of the system LEDs and a lower-panel latch that opens to gain access to a captive screw for securing the enclosure to a rack
2	SFF drive	SFF 6.4 cm (2.5 in) drives
3	LFF drive	LFF 8.9 cm (3.5 in) drives
4	Right bezel ear cap	Lower-panel latch that opens to gain access to a captive screw for securing the enclosure to a rack and the model information for the storage system

Controller node enclosure:

There is one type of controller node enclosure:

SFF 6.4 cm (2.5 in), 2U, controller node enclosure: Provides 24 SFF drive bays arranged in a single row



Figure 61: SFF controller node enclosure front view

Drive enclosure:

There are two types of expansion drive enclosures:

- SFF 6.4 cm (2.5 in), 2U, SAS expansion drive enclosure: Provides 24 SFF drive bays arranged in a single row

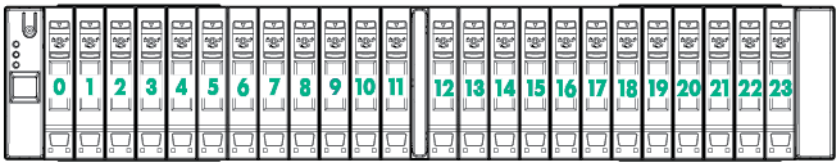


Figure 62: Drive bays numbering, SFF drive enclosure front view

- LFF 8.9 cm (3.5 in), 4U, SAS expansion drive enclosure: Provides 24 LFF drive bays, arranged in four columns of six slots each

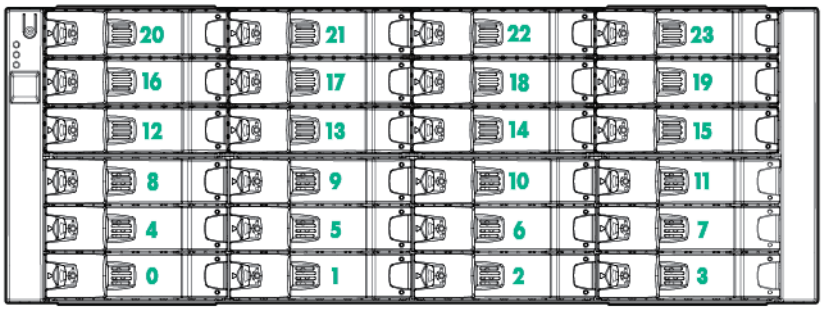


Figure 63: Drive bays numbering, LFF drive enclosure front view

Controller node enclosure information rear view

This information applies only to the controller node enclosure for the HPE 3PAR StoreServ 8000 Storage system.

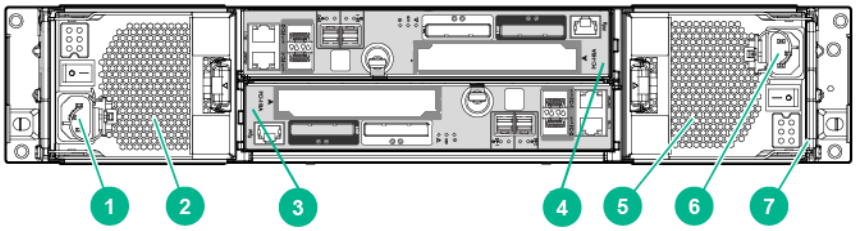


Figure 64: Controller node enclosure rear view

Table 17: Controller node enclosure rear view

Item		Description
1	Power connection 0	This power connection requires a power cable to be attached between the power supply and an independent electrical source. This electrical source must support the entire power load of the enclosure and have its own circuit breaker.
2	Power cooling module 0	The power cooling module (PCM) is an integrated power supply and cooling fan and also contains a replaceable battery. The PCM battery is shipped fully charged, but the batteries might lose some charge and show a degraded status immediately when power is applied. One PCM can supply enough power for the controller node enclosure. Connect each PCM to draw power from different mains to allow for continued operation if one main fails.
3	Controller node 0	The Controller Node caches and manages data from the storage system and provides hosts with a coherent, virtualized view of the storage system.
4	Controller node 1	The Controller Node caches and manages data from the storage system and provides hosts with a coherent, virtualized view of the storage system.
5	Power cooling module 1	The power cooling module (PCM) is an integrated power supply and cooling fan and also contains a replaceable battery. The PCM battery is shipped fully charged, but the batteries might lose some charge and show a degraded status immediately when power is applied. One PCM can supply enough power for the controller node enclosure. Connect each PCM to draw power from different mains to allow for continued operation if one main fails.
6	Power connection 1	This power connection requires a power cable to be attached between the power supply and an independent electrical source. This electrical source must support the entire power load of the enclosure and have its own circuit breaker.
7	Serial number	The 10-character serial number for the storage system is required for the software setup. The serial number is on the controller node enclosure next to the rightmost power cooling module (PCM 1) power switch.

Drive enclosure information rear view

This information applies only to the drive enclosure for the HPE 3PAR StoreServ 8000 Storage system.

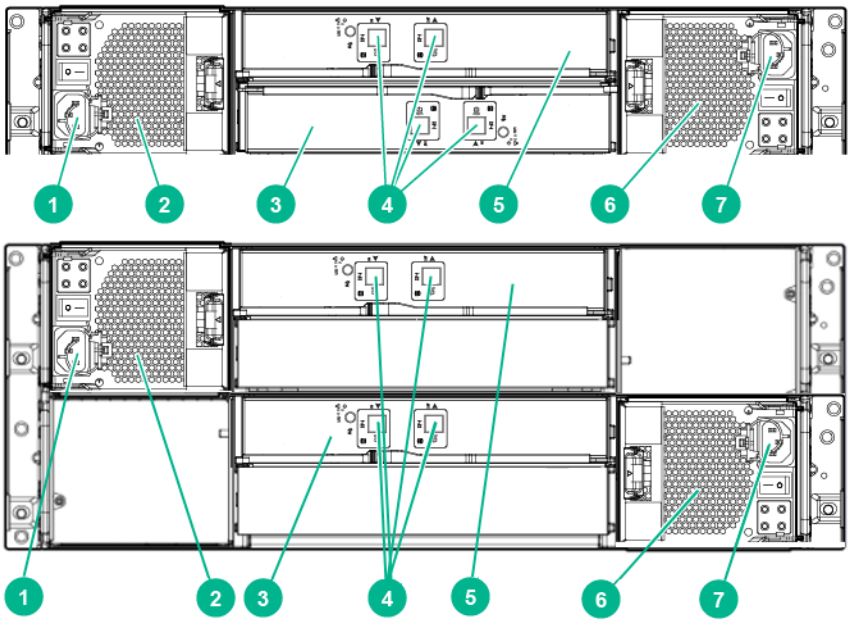


Figure 65: SFF and LFF expansion drive enclosures rear view

Table 18: SFF and LFF expansion drive enclosures rear view

Item		Description
1	Power connection 0	This power connection requires a power cable to be attached between the power supply and an independent electrical source capable of supporting of the entire power load of the enclosure and controlled by its own circuit breaker.
2	Power cooling module 0	The power cooling module (PCM) is an integrated power supply and cooling fan. One PCM can supply enough power for the enclosure. Each PCM must draw power from different mains. If one main fails, operation of the other PCM continues.
3	I/O module 0	The I/O modules connect the controller nodes to the drive enclosures using mini-SAS cables, enabling the transfer of data between the controller nodes, drives, PCMs, and enclosures. I/O module 0 has a red label.
4	SAS ports	The SAS ports connect the I/O modules to the controller nodes using mini-SAS cables.
5	I/O module 1	The I/O modules connect the controller nodes to the drive enclosures using mini-SAS cables, enabling the transfer of data between the controller nodes, drives, PCMs, and enclosures. I/O module 1 has a green label.

Table Continued

Item		Description
6	Power cooling module 1	The power cooling module (PCM) is an integrated power supply and cooling fan. One PCM can supply enough power for the enclosure. Each PCM must draw power from different mains. If one main fails, operation of the other PCM continues.
7	Power connection 1	This power connection requires a power cable to be attached between the power supply and an independent electrical source capable of supporting the entire power load of the enclosure and controlled by its own circuit breaker.

I/O module information

This information applies only to the I/O module for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: Notice that the I/O modules are installed differently between the SFF drive enclosure and the LFF drive enclosure.

- In the SFF drive enclosure, the I/O modules in the enclosure are inverted 180° from each other, as well as the SAS ports.
- In the LFF drive enclosure, the I/O modules in the enclosure are installed in the same direction, as well as the SAS ports.

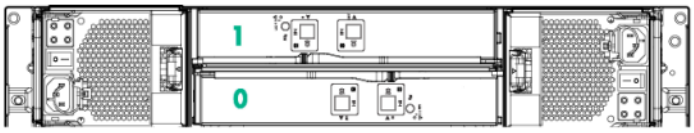


Figure 66: I/O module numbering, SFF drive enclosure rear view



Figure 67: I/O module numbering, LFF drive enclosure rear view

SAS ports

The I/O module has two SAS ports (DP-1 and DP-2) and each includes two LEDs.

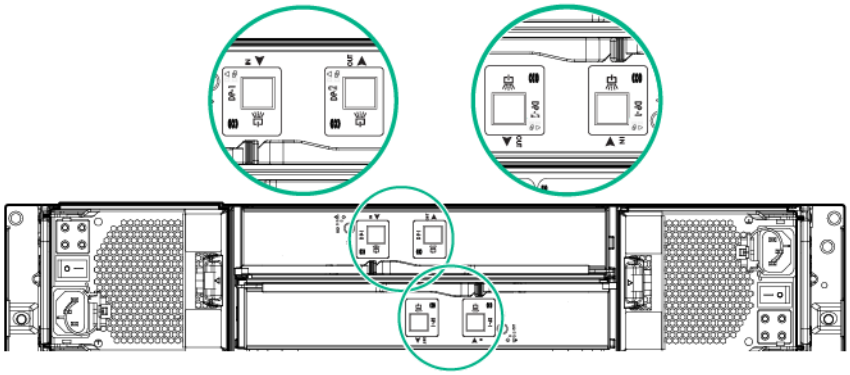


Figure 68: SAS ports (DP-1 and DP-2), SFF drive enclosure rear view

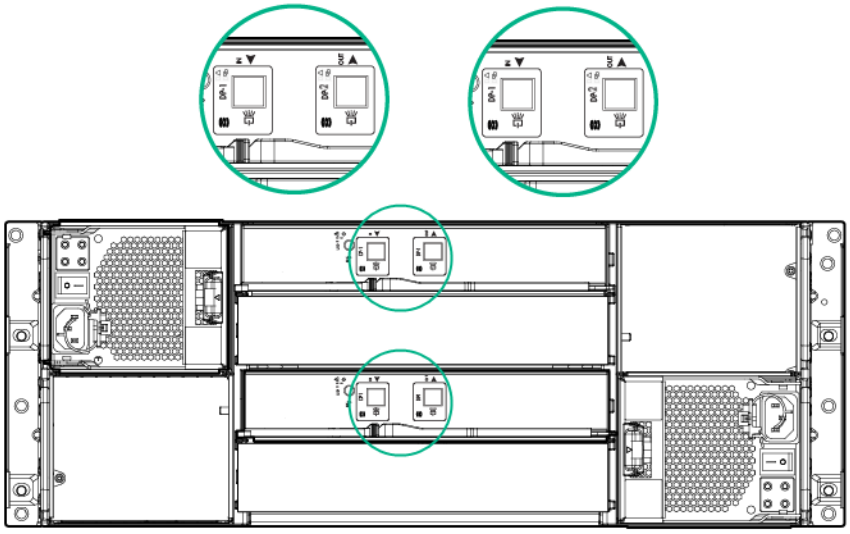


Figure 69: SAS ports (DP-1 and DP-2), LFF drive enclosure rear view

Power cooling module information

The HPE 3PAR StoreServ 8000 Storage system supports the following power cooling modules based on whether the system is installed in either an alternating-current or direct-current power environment:

- Alternating-current HPE 3PAR 764W power cooling module for use with the controller node enclosure
- Alternating-current HPE 3PAR 580W power cooling module for use with the expansion drive enclosures.
- Direct-current HPE 3PAR -48VDC 764W Power Cooling Module for use with both the controller node enclosure and expansion drive enclosures.

Power cooling module information, alternating-current, controller node enclosure

The alternating-current (AC) HPE 3PAR 764W power cooling module (PCM) is a component for the HPE 3PAR StoreServ 8000 Storage controller node enclosures when installing the system in an alternating-current power environment. The 764 W PCM is an integrated power supply and cooling fan that includes a replaceable battery.

NOTE: Labels on the PCM for the controller node enclosure show the model as 760W PCM Gold Series.

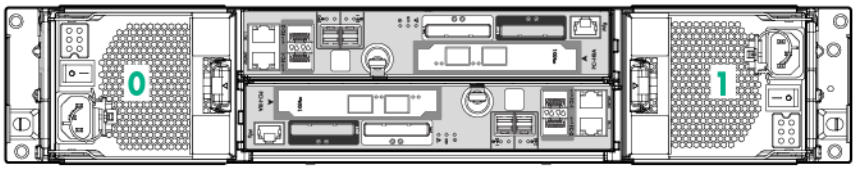


Figure 70: PCM numbering, alternating-current, two-node controller node enclosure rear view

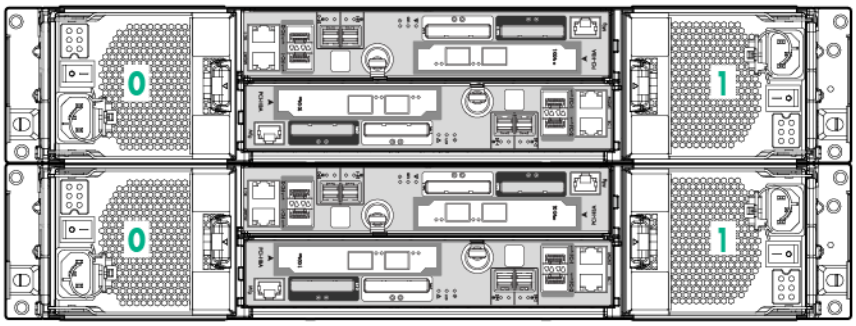


Figure 71: PCM numbering, alternating-current, four-node controller node enclosure rear view

Power cooling module information, alternating-current, drive enclosure

The alternating-current (AC) HPE 3PAR 580W power cooling module is a component for the HPE 3PAR StoreServ 8000 Storage drive enclosure when installing the system in an alternating-current power environment. The 580 W PCM is an integrated power supply and cooling fan.

NOTE: Labels on the PCM for the drive enclosure show the model as 580W PCM Gold Series.

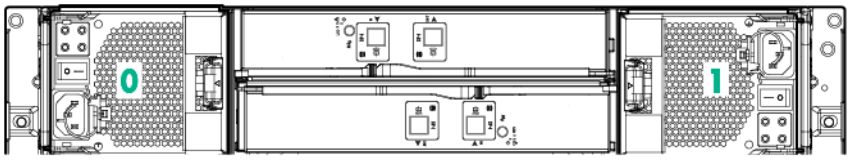


Figure 72: PCM numbering, alternating-current, SFF drive enclosure rear view



Figure 73: PCM numbering, alternating-current, LFF drive enclosure rear view

Power cooling module information, direct-current system

The direct-current (DC) HPE 3PAR -48VDC 764W Power Cooling Module (PCM) is used with an HPE 3PAR StoreServ 8000 Storage system in both the controller node enclosures and expansion drive enclosures when installing the system in a direct-current power environment. The -48V DC PCM is an integrated power supply and cooling fan that has a compartment for adding a replaceable battery when it is installed in a controller node enclosure.

NOTE:

- The power switch on the HPE 3PAR -48VDC 764W Power Cooling Module is inverted 180° from the orientation of the power switch on the alternating-current (AC) power cooling module.
- Labels on the HPE 3PAR -48VDC 764W Power Cooling Module show the model as -48VDC INPUT 764W PCM.

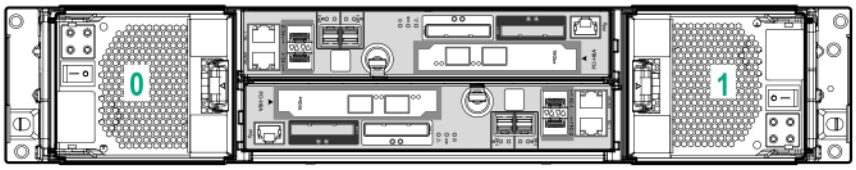


Figure 74: PCM numbering, direct current, two-node SFF controller node enclosure rear view

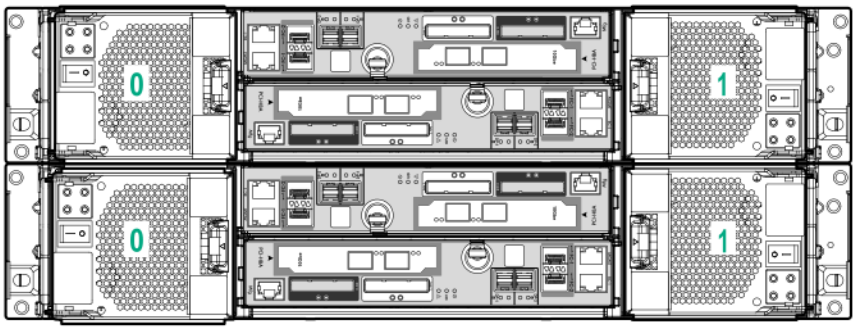


Figure 75: PCM numbering, direct current, four-node SFF controller node enclosure rear view

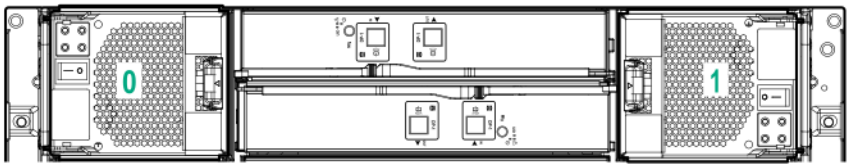


Figure 76: PCM numbering, direct current, 2U SFF drive enclosure rear view

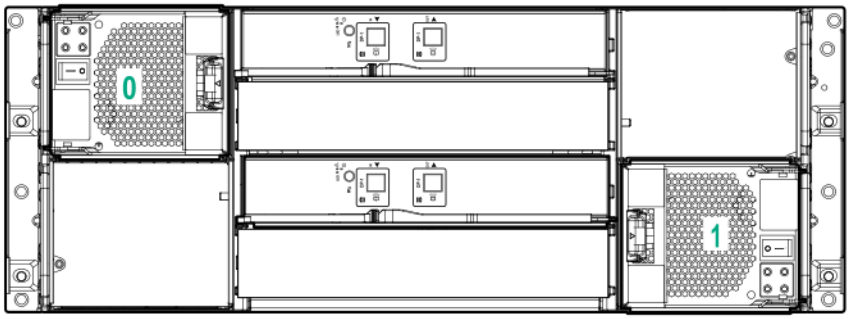


Figure 77: PCM numbering, direct current, LFF 4U drive enclosure rear view

Power distribution unit information

For a storage system that is factory integrated in an HPE rack, there are four power distribution units (PDUs) mounted at the bottom of the rack.

For more information, see the *HPE 3PAR StoreServ 8000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Service processor information

The physical service processor (SP) is an optional component for the storage system that can be used instead of a virtual service processor. The storage system supports the following physical service processors based on whether the system is installed in either an alternating-current or direct-current power environment:

- Alternating-current HPE ProLiant DL120 Gen9 Server
- Alternating-current HPE ProLiant DL360 Gen10 Server
- Direct-current HPE ProLiant DL360 Gen10 Server

Physical service processor information, HPE ProLiant DL120 Gen9 Server

The physical service processor can be used instead of using a virtual service processor.

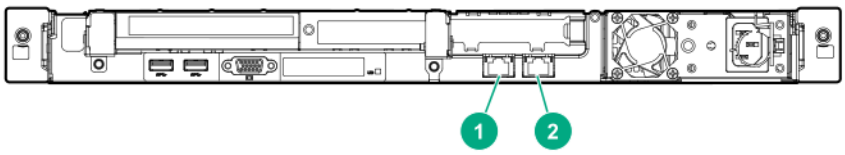


Figure 78: Physical service processor ports, HPE ProLiant DL120 Gen9 Server

1. Management (MGMT) port; NIC 1
2. Service port; NIC 2

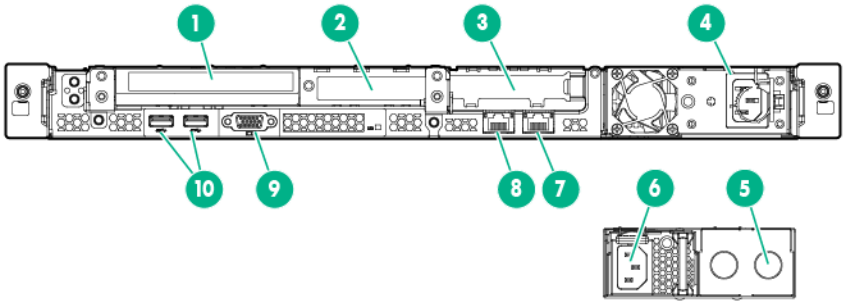


Figure 79: HPE ProLiant DL120 Gen9 Server details

NOTE: For the HPE ProLiant DL120 Gen9 Server, the NIC port 2 is configured for shared mode to either be configured for use as the Service port or configured for use as an iLO (virtual serial) port.

1. Slot 3 PCIe3 x8 (8, 4, 1); If the GPU riser cage is installed, Slot 3 supports PCIe x16 (16, 8, 4, 1).
2. Slot 2 PCIe3 x8 (8, 4, 1)
3. Slot 3 PCIe3 x16 (16, 8, 4, 1)
4. Non-hot-plug power supply
5. Power supply blank (bay 2 of optional redundant power supply module)
6. Hot-plug power supply (bay 1 of optional redundant power supply module)
7. NIC 2; iLO (virtual serial) port; Service port (Eth1)
8. NIC 1; Management port (Eth0)

9. Video port
10. USB 3.0 port

Physical service processor information, HPE ProLiant DL360 Gen10 Server

The physical service processor) can be used instead of using a virtual service processor.

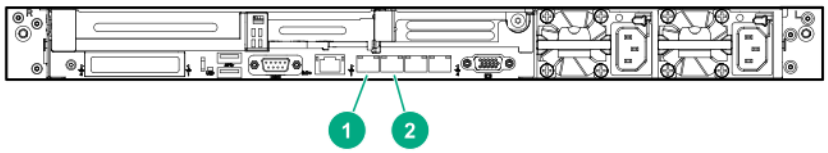


Figure 80: Physical service processor ports, HPE ProLiant DL360 Gen10 Server

1. Management (MGMT) port; NIC 1
2. Service port; NIC 2

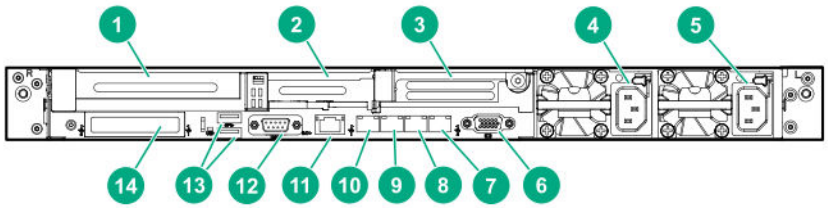


Figure 81: HPE ProLiant DL360 Gen10 Server details

For the HPE ProLiant DL360 Gen10 Server, the Service port, iLO Management port, and Serial port are dedicated ports

NOTE: The ports are different than the HPE ProLiant DL120 Gen9 Server.

1. Slot 1 PCIe3
2. Slot 2 PCIe3
3. Slot 3 PCIe3 (optional - requires second processor)
4. Power supply 2 (PS2)
5. Power supply 1 (PS1)
6. Video port
7. NIC 4
8. NIC 3
9. NIC 2; Service port (Eth1)
10. NIC 1; Management port (Eth0)

11. iLO Management port
12. Serial port
13. USB 3.0 ports
14. FlexibleLOM (optional)

Switch information

Direct-current switch information

The direct-current (DC) Brocade 6510 Switch is supported for the HPE 3PAR StoreServ 8000 Storage system when installing the system in a direct-current power environment.

For more information about the Brocade 6510 Switch, see the product page:

www.broadcom.com/products/fibre-channel-networking/switches/6510-switch

Component LEDs

IMPORTANT: The HPE 3PAR StoreServ Storage system components have LEDs to indicate whether the hardware is functioning properly and to help identify errors. The LEDs help diagnose basic hardware problems.

Adapter LEDs

Four-Port 16 Gb FC Host PCIe Adapter LEDs

This information applies only to the HPE 3PAR Four-Port 16Gb FC Host Bus Adapter for the HPE 3PAR StoreServ 8000 Storage system.

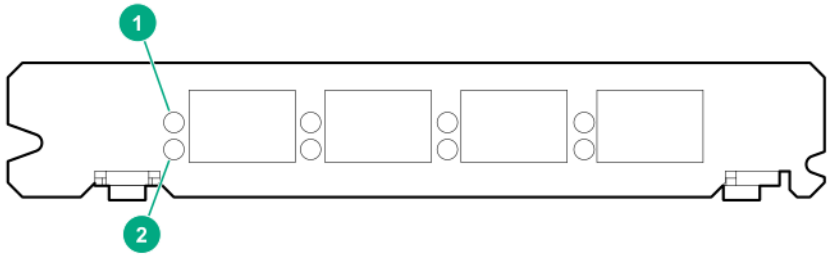


Figure 82: HPE 3PAR Four-Port 16Gb FC Host Bus Adapter LEDs

Table 19: HPE 3PAR Four-Port 16Gb FC Host Bus Adapter LEDs

LED function		Status	Port state
1	Port Speed	3 Fast amber flashes	Connected at 8 Gb/s
		4 Fast amber flashes	Connected at 16 Gb/s

Table Continued

LED function		Status	Port state
		Off	Not connected
2	Link Status	Green solid	Normal/Connected – link up
		Green flashing	Link down or not connected

Two-Port 10 Gb iSCSI/FCoE CNA Host PCIe Adapter LEDs

This information applies only to the HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: For the HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter, some of the adapters have the faceplate labeling reversed, with the port on the left identified as port 2, when oriented as in the following illustration. This illustration shows the corrected label with port 1 on the left.

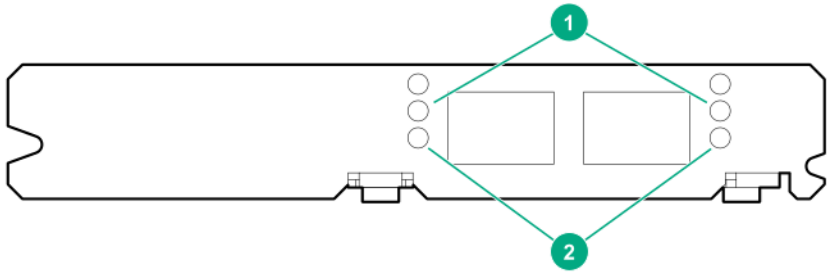


Figure 83: HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter LEDs

Table 20: HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter LEDs

LED function		Status	Port state
1	Link status	Green solid	Normal/Connected – link up
		Off	Link down or not connected
2	Activity	Green solid	Activity
		Off	No activity

Two-Port 10 GbE NIC Host PCIe Adapter LEDs

This information applies only to the HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: For the HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter, some of the adapters have the faceplate labeling reversed, with the port on the left identified as port 2, when oriented as in the following illustration. This illustration shows the corrected label with port 1 on the left.

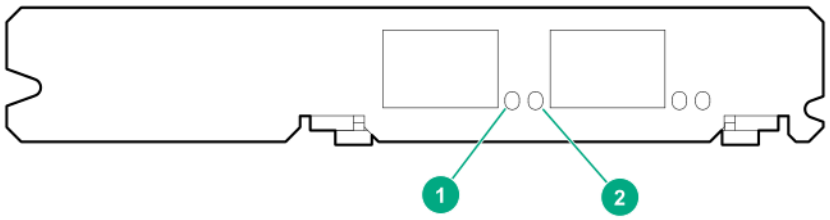


Figure 84: HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter LEDs

Table 21: HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter LEDs

LED function		Status	Port state
1	Amb=10 G	Amber solid	Link speed 10 Gb/s
		Off	Link speed 1 Gb/s
2	ACT/Port	Green solid	Link up
		Green flashing	Link activity

Four-Port 1 GbE NIC Host PCIe Adapter LEDs

This information applies only to the HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: For the HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter, some of the adapters have the faceplate labeling incorrect, indicating that the ports are numbered 0 through 3. The following illustration shows the corrected label, indicating that the ports are numbered 1 through 4.



Figure 85: HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter LEDs

Table 22: HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter LEDs

LED status		Port state
1	Green solid	Link speed 1 Gb/s
	Off	Link speed 100 Mb/s
2	Green solid	Link up

Table Continued

LED status	Port state
Green flashing	Link activity
Off	Link down

Four-Port 16 Gb FC/10 GbE NIC Host PCIe Combo Adapter LEDs

This information applies only to the HPE 3PAR Four-Port 16Gb FC/10Gb Ethernet Combo Adapter for the HPE 3PAR StoreServ 8000 Storage system.

Table 23: 16 Gb FC port LEDs

Green LED	Amber LED	Port state
Off	Off	No Link
Off	Amber solid	Post failure
Green solid	• Off • Amber solid	Failure in common code module
Green solid	1 fast amber flashes 2 fast amber flashes 3 fast amber flashes 4 fast amber flashes	Link up and activity at 2 Gb/s Link up and activity 4 Gb/s Link up and activity 8 Gb/s Link up and activity 16 Gb/s

Table 24: 10 GbE NIC port LEDs

Green LED	Amber LED	Port state
Off	Off	No link
Off	Amber solid	Link at the highest speed, 10 GbE
Green flashing	Amber solid	Link at the highest speed and activity
Green solid	Off	Link at the highest speed, 1 GbE
Green flashing	Off	Link at lowest speed and activity

Four-port 10 Gb iSCSI/10 Gb Ethernet Combo Adapter LEDs

This information applies only to the HPE 3PAR Four-Port 10Gb iSCSI/10Gb Ethernet Combo Adapter for the HPE 3PAR StoreServ 8000 Storage system.

Table 25: 10 Gb iSCSI port LEDs

Green LED	Amber LED	Port state
Off	Off	No link
Off	Amber solid	Boot failure
Green solid	Amber solid	Link up at 10 Gb/s, without traffic
Green flashing	Amber solid	Link up at 10 Gb/s, with traffic

Table 26: 10 GbE NIC port LEDs

Green LED	Amber LED	Port state
Off	Off	No link
Off	Amber solid	Link at the highest speed, 10 GbE
Green flashing	Amber solid	Link at the highest speed and activity
Green solid	Off	Link at the highest speed, 1 GbE
Green flashing	Off	Link at lowest speed and activity

Two-Port 32 Gb FC HBA LEDs

This information applies only to the HPE 3PAR Two-Port 32Gb FC Host Bus Adapter for the HPE 3PAR StoreServ 8000 Storage system.

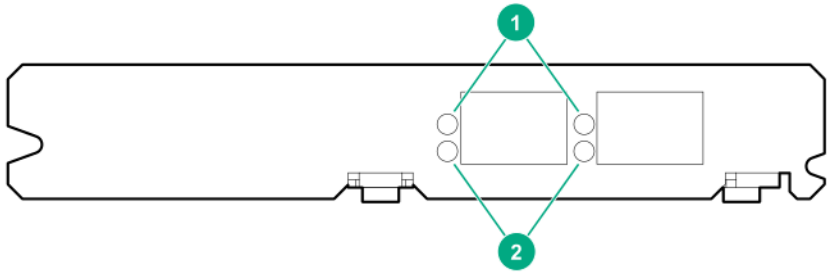


Figure 86: HPE 3PAR Two-Port 32Gb FC Host Bus Adapter ports

Table 27: HPE 3PAR Two-Port 32Gb FC Host Bus Adapter LEDs

LED	Function	Status	Port state
1	Link/Status	Green solid	Normal/connected; link up
		Green flashing	Link down or not connected
2	Port/Speed	Amber flashing	Connected at high speed
		Off	Not connected - port failed or power not applied

Controller node LEDs

This information applies only to the controller nodes for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: The controller nodes in the controller node enclosure are inverted 180° from each other, as well as the ports.

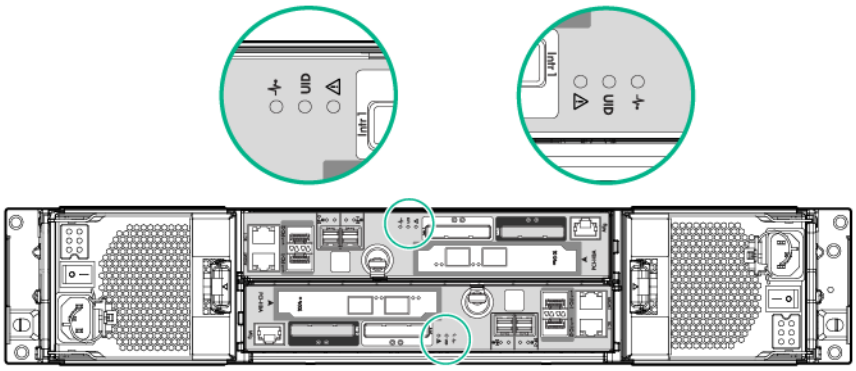


Figure 87: Controller node LEDs, controller node enclosure rear view

Table 28: Controller node LEDs, controller node enclosure rear view

LED	Function	Status	State
	Status	Green solid	Not a cluster member
		Green rapid flashing	• Booting • Shutdown (halted)
		Green slow flashing	Cluster member and flashes slowly in synchronization with the other controller nodes in the cluster
UID	UID/Service	Blue solid	Shutdown (halted); not a cluster member; can be removed
		Blue flashing	Locate active; **do not remove component**
		Off	Locate not active
	Fault	Amber solid	Fault
		Amber flashing	In the cluster, one of the other controller nodes is shut down (halted).
		Off	No fault

Ethernet onboard ports LEDs, controller node enclosure rear view

The controller node has two Ethernet onboard (built-in) ports:

- **MGMT**—Onboard port for the network connection
- **RC-1**—Onboard port for an HPE 3PAR Remote Copy or HPE 3PAR File Persona connection

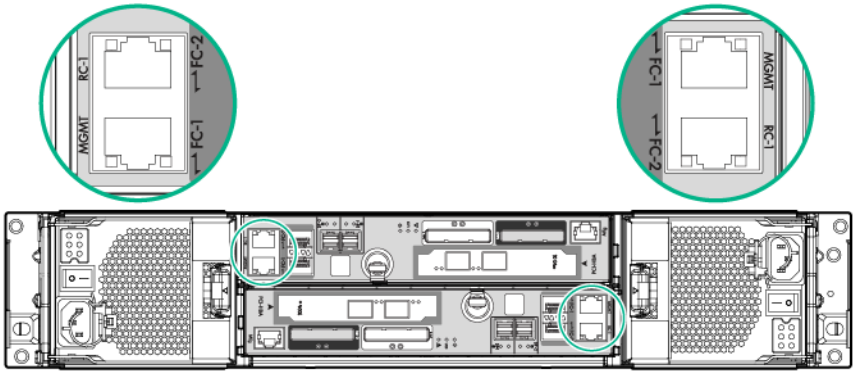


Figure 88: Ethernet onboard ports, controller node enclosure rear view

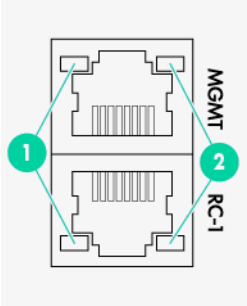


Figure 89: Ethernet onboard ports LEDs, controller node enclosure rear view

Table 29: Ethernet onboard ports LEDs, controller node enclosure rear view

LED function		Status	State
1	Link up speed	Green solid	1 Gb Link
		Amber solid	100 Mb Link
		Off	No link established or 10 Mb Link
2	Activity	Green solid	No link activity
		Green flashing	Link activity
		Off	No link established

FC onboard ports LEDs, controller node enclosure rear view

The controller node has two Fibre Channel (FC) onboard ports and each port includes two LEDs. The arrow head-shaped LEDs point to the port they are associated with.

NOTE: Incorrectly configured cables result in illuminated amber LEDs on the ports.

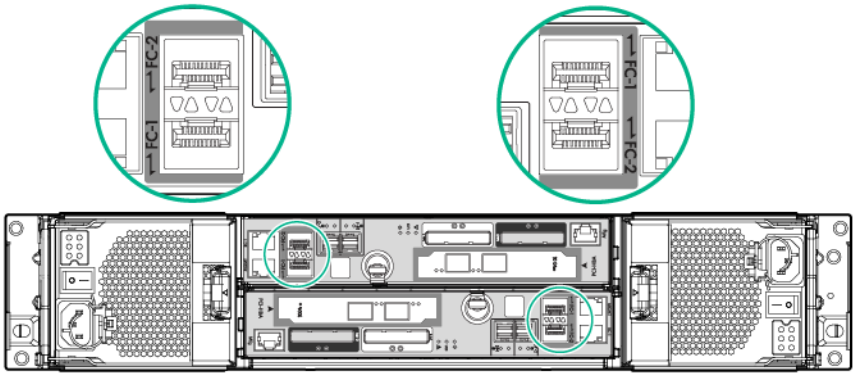


Figure 90: FC onboard ports, controller node enclosure rear view

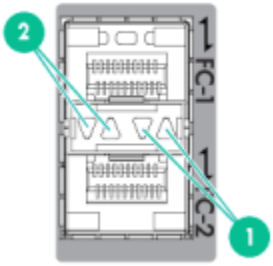


Figure 91: FC onboard ports LEDs, controller node enclosure rear view

Table 30: FC onboard ports LEDs, controller node enclosure rear view

LED function	Status	State
All ports	Off	Wake up failure (dead device) or power not applied
1 Port speed	Off	Not connected
	3 Fast amber flashes	Connected at 8 Gb/s
	4 Fast amber flashes	Connected at 16 Gb/s
2 Link status	On	Normal/Connected—link up
	Green flashing	Link down or not connected

SAS onboard ports LEDs

The controller node has two SAS onboard ports (DP-1 and DP-2) and each includes two LEDs.

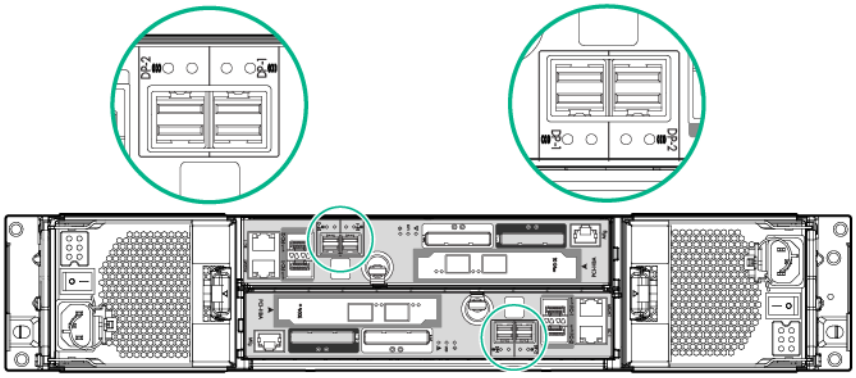


Figure 92: SAS onboard ports (DP-1 and DP-2), controller node enclosure rear view

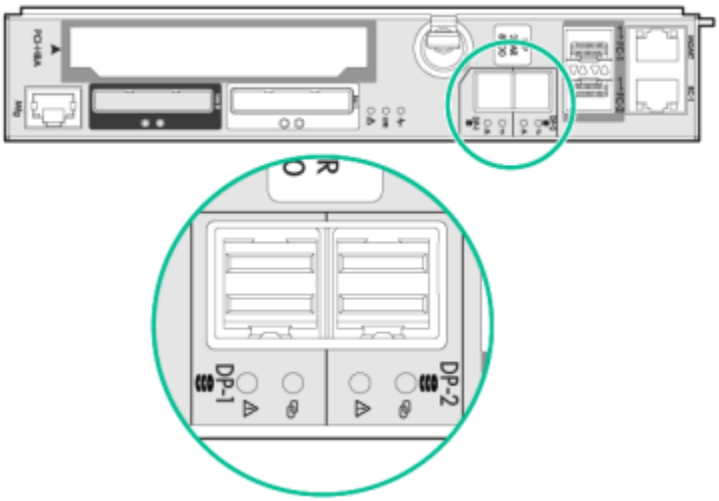


Figure 93: SAS onboard ports LEDs, controller node rear view

IMPORTANT: For the SAS DP-2 port without an SAS cable attached, the amber LED is illuminated and the green LED is off. This behavior is expected for the DP-2 port. For the SAS DP-1 port without an SAS cable attached, both amber and green LEDs are off.

Table 31: SAS onboard ports LEDs, controller node rear view

LED	Function	Status	State
	Activity	Green solid	No link activity
		Green flashing	Link activity
		Off	No link established
	Fault	Amber solid	• Fault • **Only for DP-2**: no SAS cable connected
		Amber flashing	Locate active
		Off	Normal operation

Cluster Interconnect Link onboard ports LEDs

The controller node has two cluster interconnect link onboard ports and each includes two LEDs.

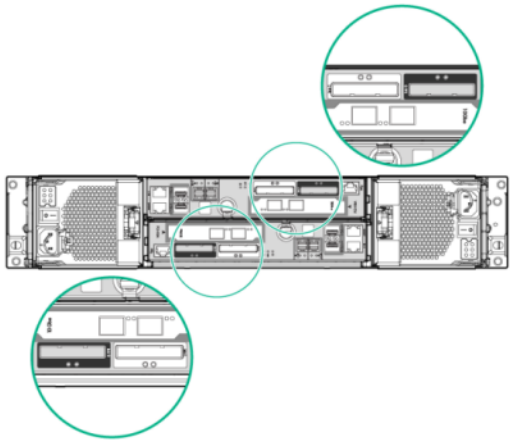


Figure 94: Cluster Interconnect Link onboard port, controller node enclosure rear view

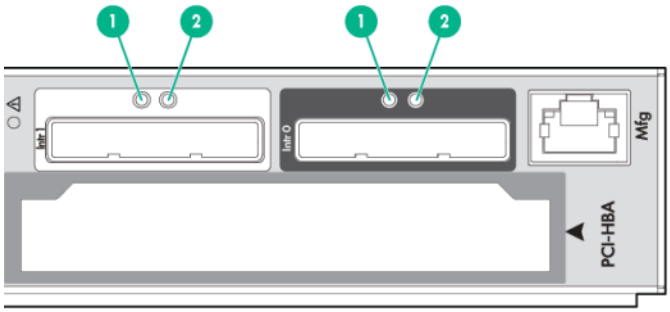


Figure 95: Cluster Interconnect Link onboard port LEDs, controller node enclosure rear view

Table 32: Cluster Interconnect Link onboard port LEDs, controller node enclosure rear view

LED function		Status	State
1	Fault	Amber solid	Fault—No link established or the cable incorrectly configured
		Amber flashing	• Interconnect link cabling error • Controller node in wrong slot • Serial number mismatch between controller nodes
		Off	No fault
2	Status	Green solid	Link established
		Off	No link established

Drive LEDs

This information applies only to the drives for the HPE 3PAR StoreServ 8000 Storage system.

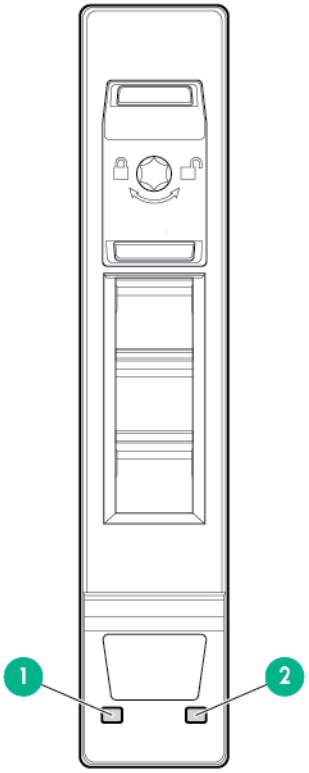


Figure 96: SFF drive LEDs

Table 33: SFF drive LEDs

LED function		Status	State
1	Fault	Amber solid	Fault; ready for replacement
		Amber flashing	Locate active; amber LED flashes on all drives in **OK** state
			NOTE: On failed drives, the Fault amber LED does not flash.
2	Status	Green solid	Normal operation; drive in an **OK** state; admitted by the HPE 3PAR OS
		Green flashing	Drive activity

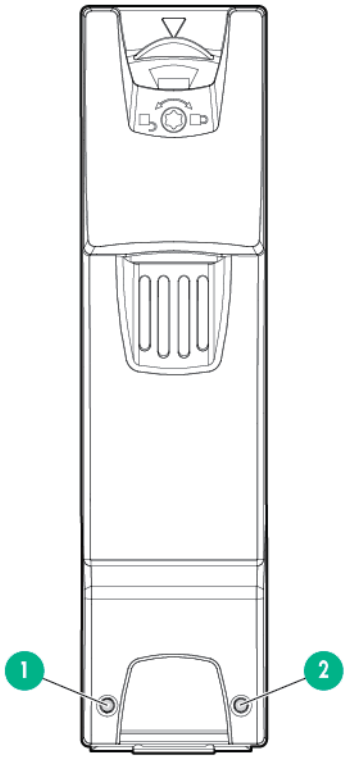


Figure 97: LFF drive LEDs

Table 34: LFF drive LEDs

LED function		Status	State
1	Fault	Amber solid	Fault; ready for replacement
		Amber flashing	Locate active; amber LED flashes on all drives in **OK** state
			NOTE: On failed drives, the Fault amber LED does not flash.
2	Status	Green solid	Normal operation; drive in an **OK** state; admitted by the HPE 3PAR OS
		Green flashing	Drive activity

I/O module LEDs

This information applies only to the I/O modules for the HPE 3PAR StoreServ 8000 Storage system.

IMPORTANT: Notice that the I/O modules are installed differently between the SFF drive enclosure and the LFF drive enclosure.

- In the SFF drive enclosure, the I/O modules in the enclosure are inverted 180° from each other, as well as the SAS ports.
- In the LFF drive enclosure, the I/O modules in the enclosure are installed in the same direction, as well as the SAS ports.

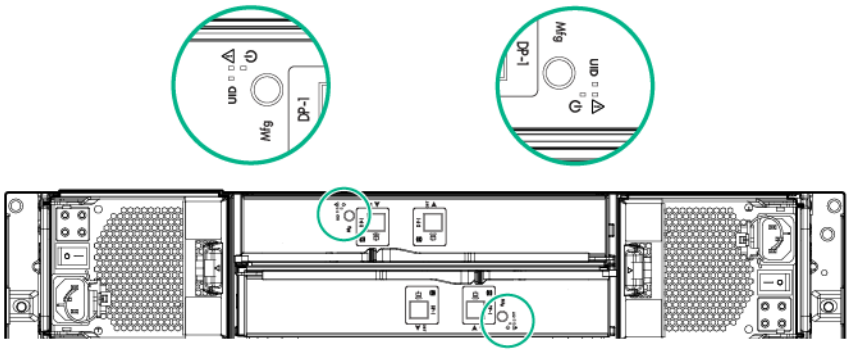


Figure 98: I/O module LEDs, SFF drive enclosure rear view

Table 35: I/O module LEDs, SFF drive enclosure rear view

LED	Function	Status	State
⏻	Power	Green solid	Power
		Off	No power
UID	UID/Service	Blue flashing	Locate active
		Off	Locate **not** active
⚠	Fault	Amber solid	Fault
		Off	No fault

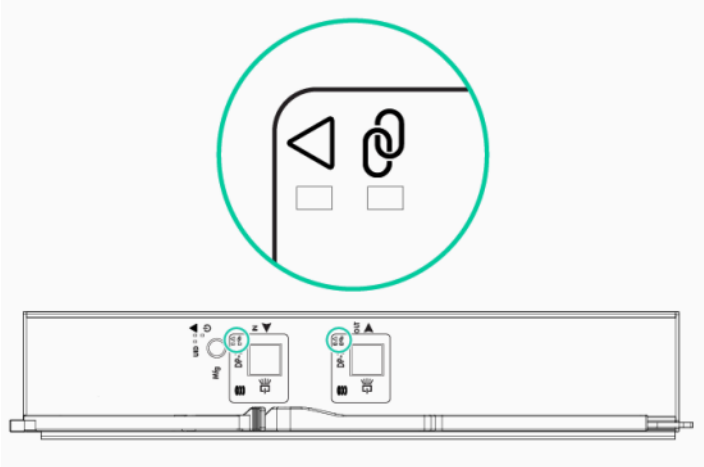


Figure 99: SAS ports LEDs, I/O module

Table 36: SAS ports LEDs, I/O module

LED	Function	Status	State
	Activity	Green solid	Links up, but no activity
		Off	No cable, bad cable, not ready or no power
		Green flashing	Activity
	Fault	Amber solid	Fault
		Off	No fault

Power cooling module LEDs

Power cooling module LEDs, alternating-current, controller node enclosure

This information applies only to the HPE 3PAR 764W power cooling module for the HPE 3PAR StoreServ 8000 Storage system.

NOTE: Labels on the PCM for the controller node enclosure show the model as 760W PCM Gold Series.

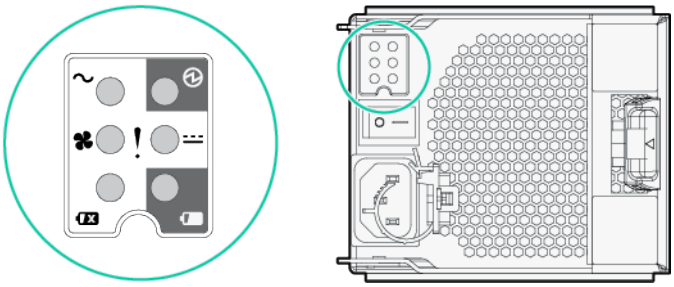


Figure 100: 764W PCM LEDs, alternating-current, controller node enclosure rear view

Table 37: 764W PCM LEDs, alternating-current, controller node enclosure rear view

LED	Function	Status	State
	AC input fail	Amber solid	No AC power or PCM fault
		Amber flashing	• Firmware Download • Locate active
	PCM OK	Green solid	AC present and PCM On / OK
		Green flashing	Standby mode
	Fan fail	Amber solid	PCM fail or PCM fault
		Amber flashing	Firmware download
	DC output fail	Amber solid	• No AC power • Fault • Out of tolerance
		Amber flashing	Firmware download
	Battery fail	Amber solid	Hard fault (not recoverable)
		Amber flashing	Soft fault (recoverable)
	Battery good	Green solid	Present and charged
		Green flashing	Charging or disarmed

Power cooling module LEDs, alternating-current, drive enclosure

This information applies only to the HPE 3PAR 580W power cooling module for the HPE 3PAR StoreServ 8000 Storage system.

NOTE: Labels on the PCM for the drive enclosure show the model as 580W PCM Gold Series.

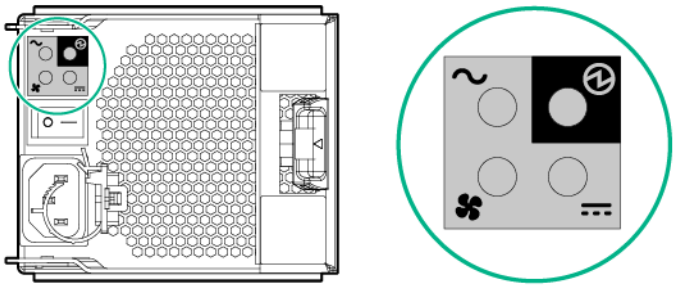


Figure 101: 580W PCM LEDs, alternating-current, drive enclosure rear view

Table 38: 580W PCM LEDs, drive enclosure rear view

LED	Function	Status	State
	AC input fail	Amber solid	No AC power or PCM fault
		Amber flashing	• Partner PCM Faulty/Off or Firmware Download • Locate active
	PCM OK	Green solid	AC Present and PCM On / OK
		Green flashing	Standby mode
	Fan fail	Amber solid	PCM fail or PCM fault
		Amber flashing	Firmware download
	DC output fail	Amber solid	• No AC power • Fault • Out of tolerance
		Amber flashing	Firmware download

Power cooling module LEDs, direct-current system

This information applies only to the HPE 3PAR -48VDC 764W Power Cooling Module for the HPE 3PAR StoreServ 8000 Storage system.

NOTE:

- The power switch on the HPE 3PAR -48VDC 764W Power Cooling Module is inverted 180° from the orientation of the power switch on the alternating-current (AC) power cooling module.
- Labels on the HPE 3PAR -48VDC 764W Power Cooling Module show the model as -48VDC INPUT 764W PCM.

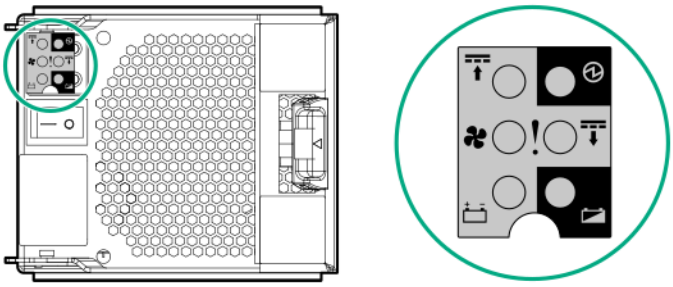


Figure 102: -48VDC 764W PCM LEDs

Table 39: -48VDC 764W PCM LEDs

DC input fail	Power	Fan fail	DC output fail	State
				
Off	Off	Off	Off	No DC power on any PCM
On	Off	Off	**On**	No DC power on this PCM only
Off	**On**	Off	Off	DC present; PCM OK
Off	**On**	Off	**On**	PCM fan speed is outside acceptable limits
Off	Off	**On**	Off	PCM fan has failed
On	Off	**On**	**On**	PCM fault (over temp, over voltage, over current)
Off	**Flashing**	Off	Off	Standby mode
Flashing	Off	**Flashing**	**Flashing**	PCM firmware download

Table 40: -48VDC 764W PCM LEDs

LED	Function	Status	State
	Battery fail	Amber solid	Hard fault (not recoverable)
		Amber flashing	Soft fault (recoverable)
	Battery good	Green solid	Present and charged
		Green flashing	Charging or disarmed

Service processor LEDs

Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server

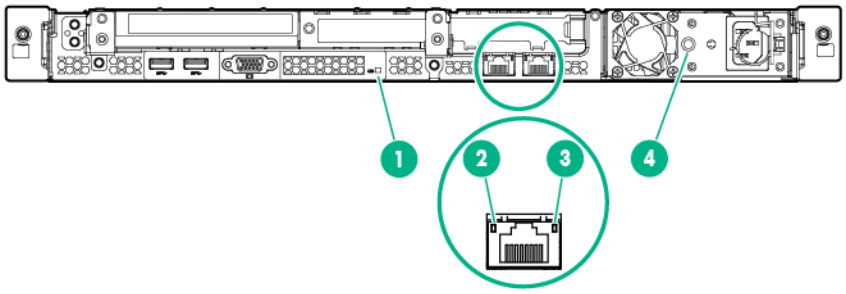


Figure 103: Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server rear view

Table 41: Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server rear view

LED/Port function		Status	State
1	UID/Service	Blue solid	Activated
		Blue flashing	Service processor managed remotely
		Off	Deactivated
2	NIC link	Green solid	Network link
		Off	No network link
3	NIC activity	Green solid	Network link
		Green flashing	Network activity
		Off	No network activity
4	Power supply	Green solid	Normal
		Off	The physical service processor has redundant power supplies (RPS) and the LEDs are the same on both. Off represents one or more of the following conditions: • Power unavailable • Power supply failure • Power supply in standby mode • Power supply error

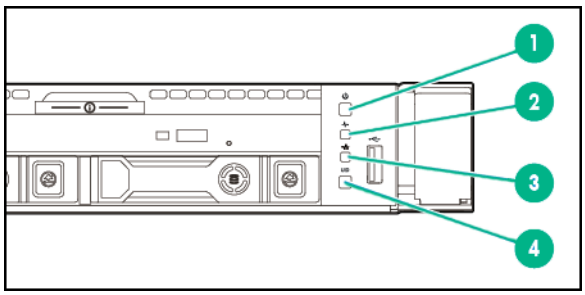


Figure 104: Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server front view

Table 42: Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server front view

LED/Port function		Status	State
1	Power on/Standby button	Green solid	Service processor on
		Green flashing	Performing power-on sequence
		Amber solid	Service processor in standby, power still on
		Off	Power cord not attached, no power supplies installed, or power failure
2	Health	Green solid	Service processor on and health normal
		Amber flashing	Service processor health degraded
		Red flashing	Service processor health critical
		Off	Service processor power off
3	NIC status	Green solid	Link to network
		Green flashing	Network activity
		Off	No network link/activity
4	UID/Service	Blue solid	Active
		Blue flashing	Either remote management, firmware upgrade in progress, or iLO manual reboot sequence initiated

Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server

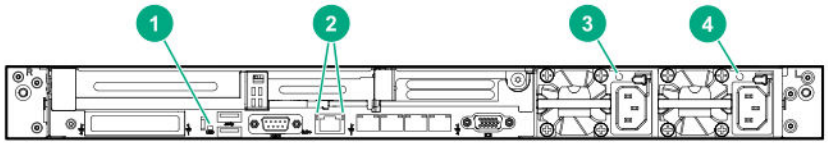


Figure 105: Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server rear view

Table 43: Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server rear view

LED function		Status	State
1	UID LED	Blue solid	Identification is activated.
		Blue flashing	System is being managed remotely.
		Off	Identification is deactivated.
2R	iLO 5/Standard NIC activity LED	Green solid	Activity exists.
		Green flashing	Activity exists.
		Off	No activity exists.
2L	iLO 5/Standard NIC link LED	Green solid	Link exists.
		Off	No link exists.
3	Power supply 2 LED	Green solid	Normal
		Off	One or more of the following conditions exists: • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit.
4	Power supply 1 LED	Green solid	Normal
		Off	One or more of the following conditions exists: • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded current limit.

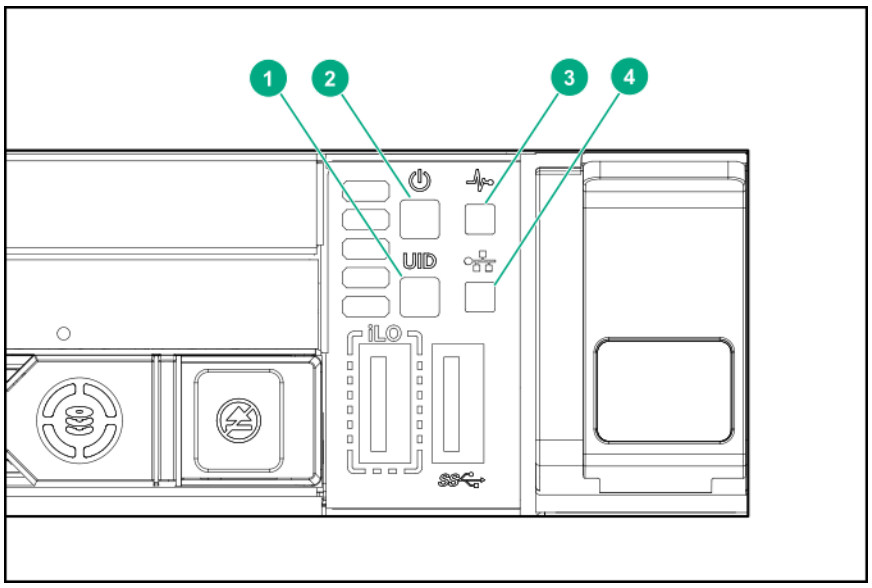


Figure 106: Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server front view

Table 44: Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server front view

LED function		Status	State
1	UID button/ LED*	Blue solid	Activated
		Blue flashing	1 Hz = Remote management or firmware upgrade in progress 4 Hz = iLO manual reboot sequence initiated 8 Hz = iLO manual reboot sequence in progress Off = Deactivated
2	Power on/ Standby button and power LED*	Green solid	System on
		Green flashing	Performing power on sequence
		Amber solid	System in standby
		Off	No power present Facility power is not present, power cord is not attached, no power supplies are installed, power supply failure has occurred, or the power button cable is disconnected.
3	Health LED*	Green solid	Normal
		Green flashing	iLO is rebooting
		Amber flashing	System degraded

Table Continued

LED function		Status	State
		Red flashing	System critical If the health LED indicates a degraded or critical state, review the system IML or use iLO to review the system health status.
4	NIC status LED*	Green solid	Link to network
		Green flashing	Network active
		Off	No network activity

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

System status LEDs

This information applies only to the HPE 3PAR StoreServ 8000 Storage system. The controller node enclosures and drive enclosures have system status LEDs at the front, left corner of the enclosures.

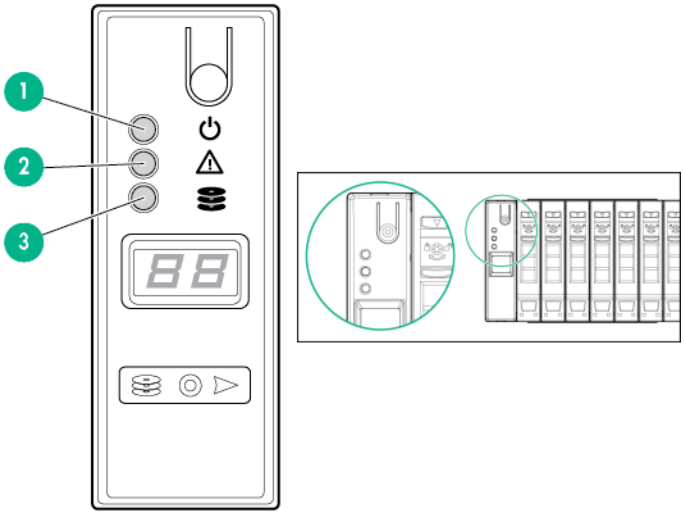


Figure 107: System status LEDs, left bezel ear cap, SFF enclosures front view

Table 45: System status LEDs, left bezel ear cap, SFF enclosures front view

LED		Function	Status	State
1	⏻	System power	Green solid	Power
			Off	No power
		System standby	Amber solid	Enclosure powered by the battery
2	⚠	Module fault	Amber solid	Fault
			Off	No fault

Table Continued

LED	Function	Status	State
3	Drive status	Amber solid	Fault—An issue exists with one or more drives within the enclosure. To determine the affected drives, inspect the LEDs on each drive. This LED applies only to drives.
		Off	No fault

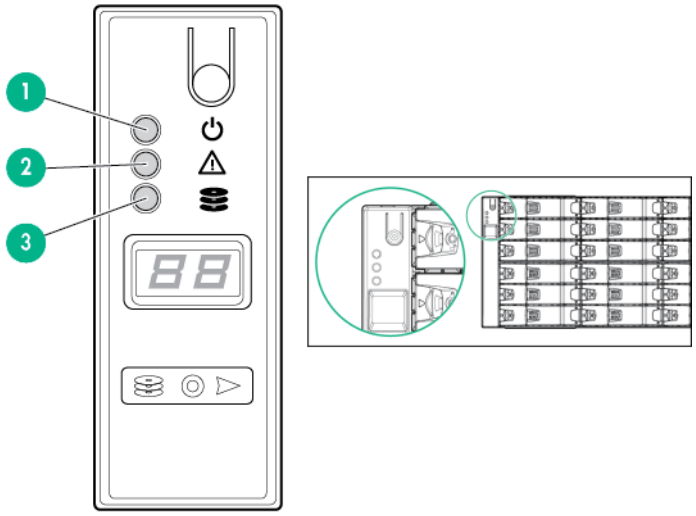


Figure 108: System status LEDs, left bezel ear cap, LFF enclosures front view

Table 46: System status LEDs, left bezel ear cap, LFF enclosures front view

LED	Function	Status	State
1	System power	Green solid	Power
		Off	No power
	System standby	Amber solid	Enclosure powered by the battery
2	Module fault	Amber solid	Fault
		Off	No fault
3	Drive status	Amber solid	Fault—An issue exists with one or more drives within the enclosure. To determine the affected drives, inspect the LEDs on each drive. This LED applies only to drives.
		Off	No fault

Troubleshooting

Alerts issued by the storage system and processed by the service processor

Alerts are triggered by events that require intervention by the system administrator. To learn more about alerts, see the *HPE 3PAR Alerts Reference: Customer Edition* and *HPE 3PAR StoreServ Storage Concepts Guide* documents available at the Hewlett Packard Enterprise Information Library website or the Hewlett Packard Enterprise Support Center website:

www.hpe.com/info/storage/docs

www.hpe.com/support/hpesc

Alerts are processed by the service processor (SP). The Hewlett Packard Enterprise Support Center acts on alerts that are not customer administration alerts. Customer administration alerts are managed by customers.

Browser warning when connecting to the service processor

Symptom

When connecting to your service processor (SP) IP address, you might receive a warning from your browser that there is a problem with the security certificate or that the connection is not private.

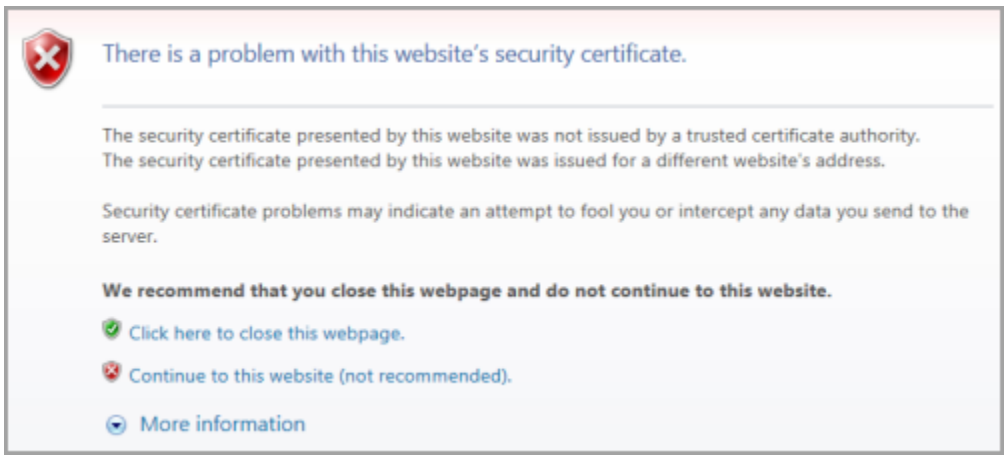
Solution 1

Cause

Warning message in Internet Explorer browser.

Action

Click **Continue to this website (not recommended)**.



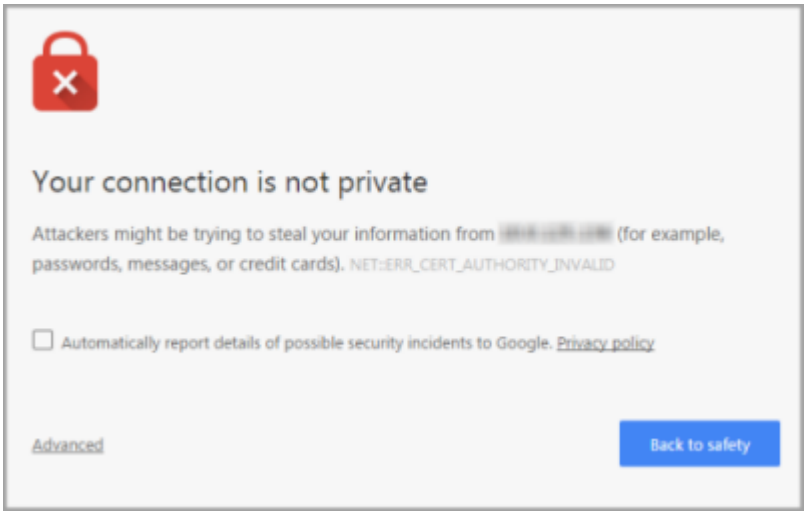
Solution 2

Cause

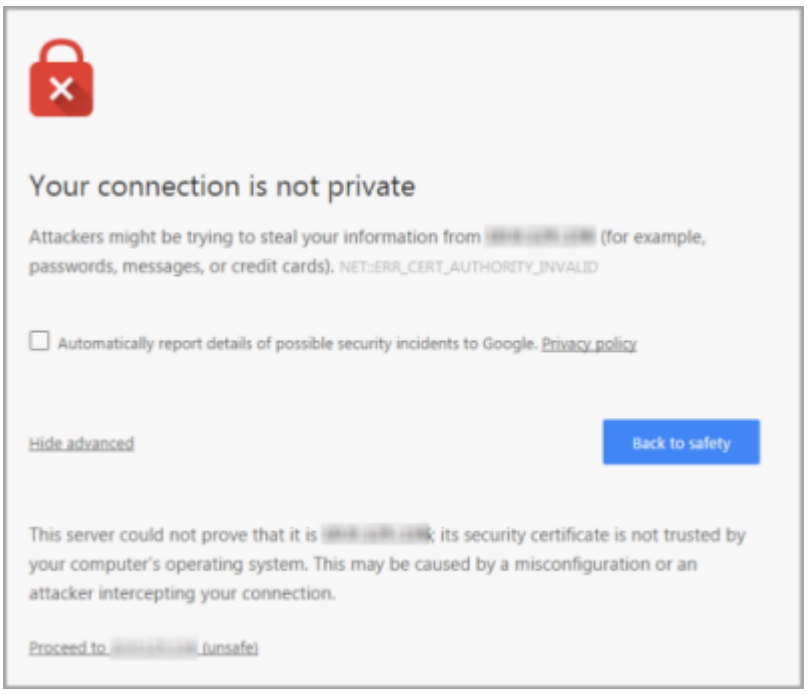
Warning message in Google Chrome browser.

Action

1. Click the **Advanced** link.



2. Click **Proceed to <sp_ip_address> (unsafe)**.



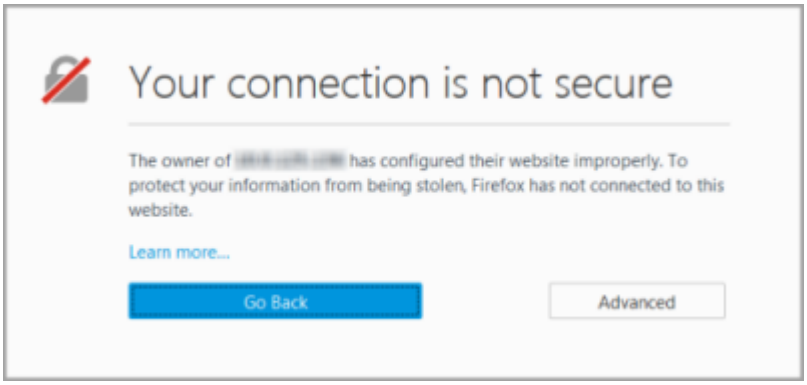
Solution 3

Cause

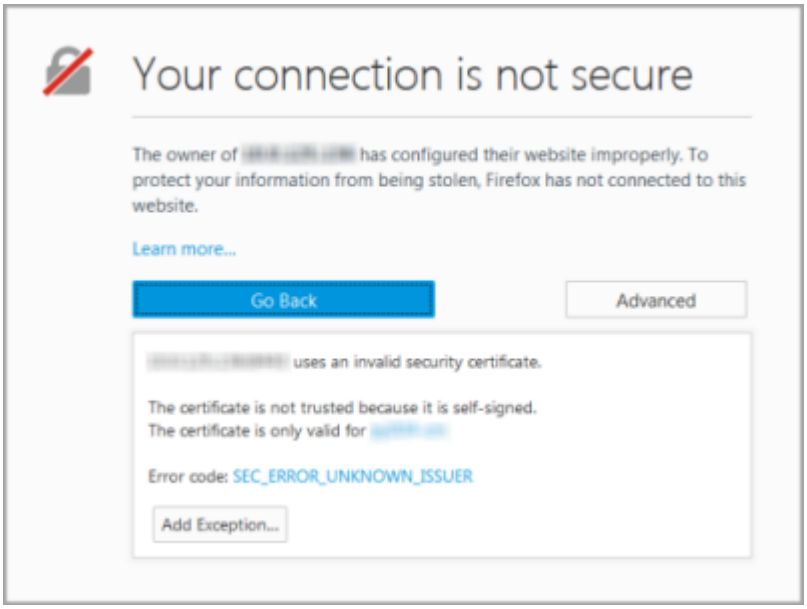
Warning message in Mozilla Firefox browser.

Action

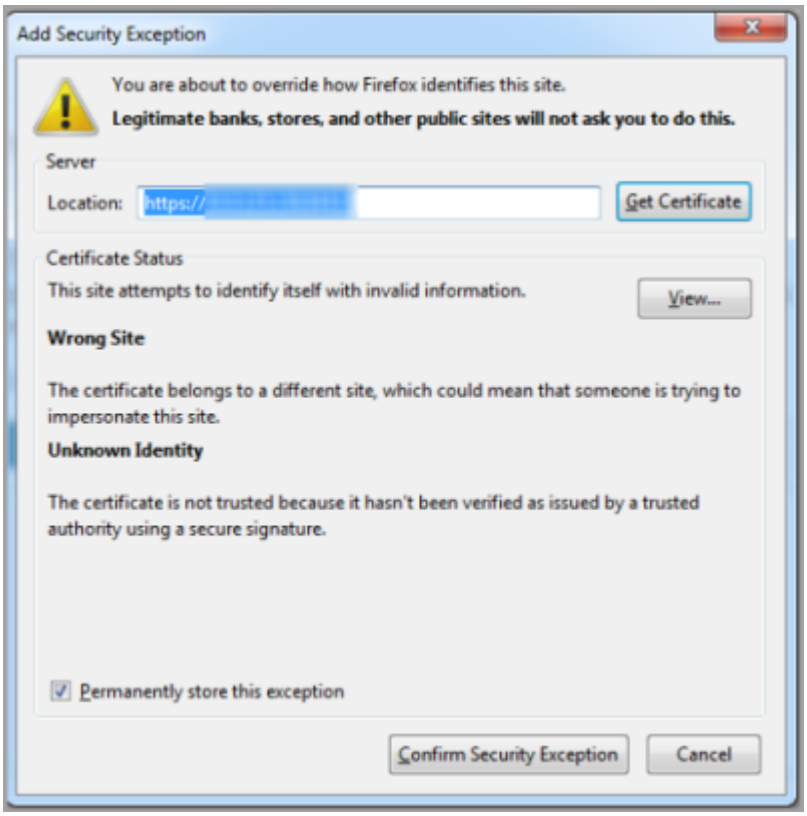
1. Click **Advanced**.



2. Click **Add Exception...**.



3. (Optional) To remove the warning for this site in the future, select **Permanently store this exception** in the **Add Security Exception** dialog.



4. In the **Add Security Exception** dialog, click **Confirm Security Exception**.

Checking the system health, HPE 3PAR Service Processor 5.x software, Service Console interface

Procedure

1. Connect and log in to the HPE 3PAR Service Processor (SP) 5.x software, Service Console interface.
   a. Browse to the IP address **`https://<sp_ip_address>:8443/`**.
   b. Enter the account credentials, and then click **Login**.
2. Open the Service Console (SC) main menu by clicking **3PAR StoreServ Service Console** in the upper-left corner.
3. From the main menu, select **Systems**.
4. Select **Actions** > **Check health**.

Failed installation of a virtual service processor with Hyper-V

Cause

Installation of a virtual service processor (SP) fails with a Hyper-V installation. The following message appears: `/dev/sda5: UNEXPECTED INCONSISTENCY; Run fsck MANUALLY`

The date and time were set incorrectly on a Windows Server.

Action

Before you install a virtual service processor, make sure that the Hyper-V Server time and date are properly set, either by using the NTP server or manually through the Windows OS date and time settings. Setting the correct date and time ensures virtual service processor real-time monitoring and access.

Identifying drive enclosure (cage) numbering in the HPE 3PAR Service Processor software

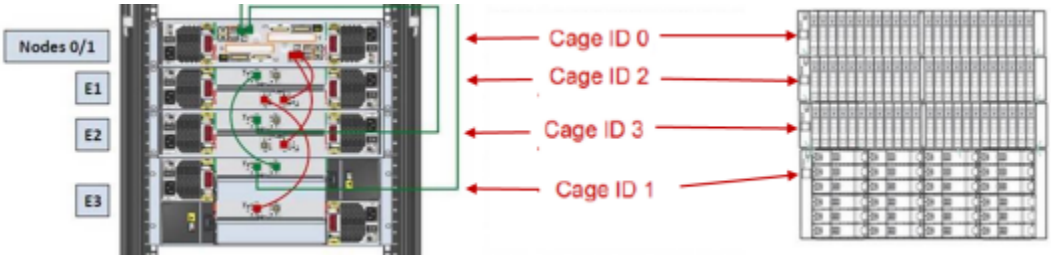
Symptom

During the setup of the service processor and HPE 3PAR StoreServ 8000 Storage software, the expansion drive enclosure (cage) identification numbers are assigned based on a port scan and might not reflect the order of their physical location within the rack.

Drive enclosure (cage) identification numbers are assigned during the software installation based on a scan of the DP1 port first and the DP2 port next on a given controller node pair.

Example:

With a two-node system that includes three expansion drive enclosures cabled to the controller node enclosure through ports DP1 and DP2, the identification numbers are assigned in the order 0, 2, 3, 1. These numbers appear in the cage ID LED screen (on the enclosure front).



This method of assigning the cage ID numbers based on port connections is the expected behavior and cannot be changed. However, you can add a description in the software to describe the physical location of the enclosure within the rack.

Action

Identification of a drive enclosure in the rack using the HPE 3PAR Service Processor software:

1. Connect to the service processor in the Service Console interface:

   Browse to the IP address: **`https://<sp_ip_address>:8443`**

2. Log in to the HPE 3PAR SP and enter the **`admin`** account credentials.
3. On the Service Console main menu, select **drive enclosures**, select one of the drive enclosures from the list, and then select **Actions** > **Locate**.
4. With locate active, check the front of the storage system, and locate the drive enclosure that has the Module Fault LED lit solid amber on the left ear cap (bezel) and also has all the drives in the enclosure with their Fault LEDs flashing amber. At the rear of the storage system on the identified drive enclosure, the UID LED will be flashing blue.
5. Make a note of the physical location of this drive enclosure in the rack.

Add a description in the software to describe the physical location of the drive enclosures in the rack:

6. On the Service Console main menu, select **Drive Enclosures**, select the drive enclosures from the list, and then select **Actions** > **Edit**.
7. Follow the instructions on the dialog that opens. For example, you can enter the description of the physical location of the expansion drive enclosure as `Rack <xx> Rack-Unit <yy>`.

Label verification on the two-port 10Gb iSCSI/FCoE CNA

Symptom

IMPORTANT: This labeling error has been corrected with some shipments from the factory. To determine if you have an incorrect label, use the following images to make a visual inspection of the HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter.

For some of the two-port 10Gb iSCSI/FCoE CNAs, the faceplate port labeling is incorrect and does not match what is reported in the software output.

On the incorrect label, the port 1 is incorrectly labeled as **PORT 2**, and the port 2 is incorrectly labeled as **PORT 1**.

The incorrect port labeling does not cause any run-time issues. However, when connected to an incorrectly labeled adapter, the correct port numbers stated in the software output do not match the label numbering.

Cause

The following image represents an incorrect label on an adapter installed in controller node 0. The arrows point to the incorrect port numbering on the label. (For controller node 1, the adapter orientation is inverted.)

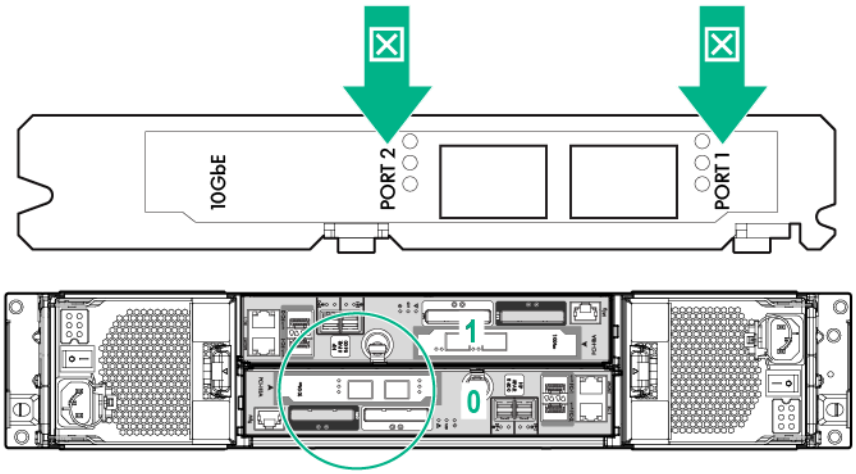


Figure 109: Incorrect port labeling, HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter

Action

Mark the adapter with the correct port numbers: **PORT 1** and **PORT 2**.

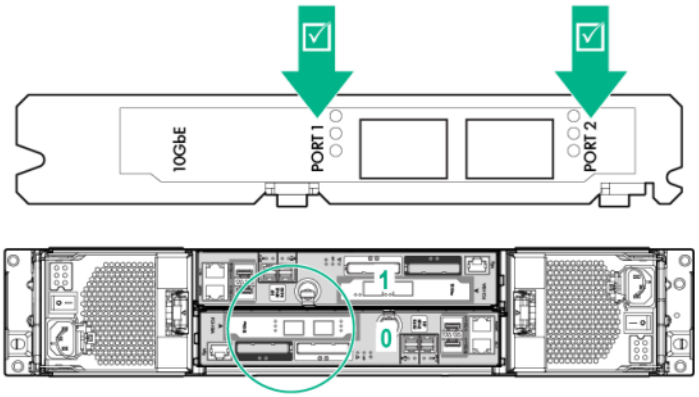


Figure 110: Correct port labeling, HPE 3PAR Two-Port 10Gb iSCSI/FCoE Converged Network Adapter

Label verification on the four-port 1Gb Ethernet NIC adapter

Symptom

IMPORTANT: This labeling error has been corrected with some shipments from the factory. Use the following images to make a visual inspection of the HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter to determine if you have an incorrect label.

For some of the four-port 1Gb Ethernet NIC adapters, the faceplate port labeling is incorrect and does not match what is reported in the software output.

On the incorrect label, the port 1 is incorrectly labeled as **0**, and port 4 is incorrectly labeled as **3**.

The incorrect port labeling does not cause any run-time issues. However, when connected to an incorrectly labeled adapter, the correct port numbers stated in the software output do not match the label numbering.

Cause

The following image represents an incorrect label on an adapter installed in controller node 0. The arrows point to the incorrect port numbering on the label. (For controller node 1, the adapter orientation is inverted.)

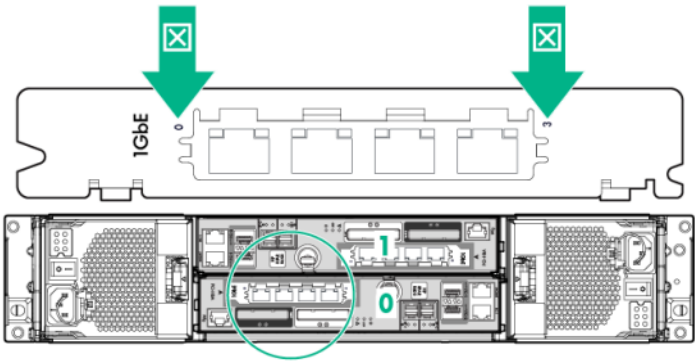


Figure 111: Incorrect port labeling, HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter

Action

Mark the adapter with the correct port numbers: **1** and **4**.

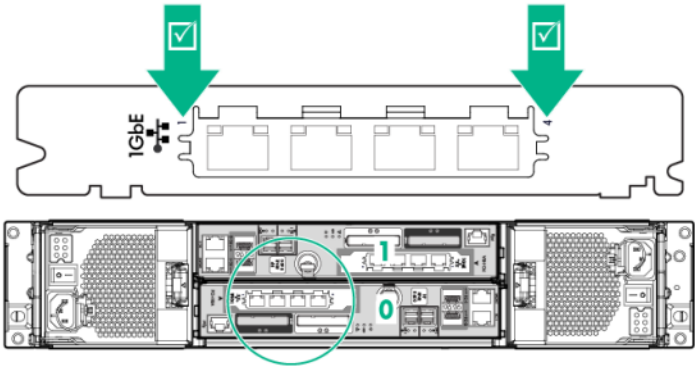


Figure 112: Correct port labeling, HPE 3PAR Four-Port 1Gb Ethernet NIC Adapter

HPE 3PAR StoreServ 8000 Storage Software Set up Worksheet

To prepare for the software setup using the HPE 3PAR Guided Setup software, complete this worksheet. Information is needed for the HPE 3PAR Service Processor, the HPE 3PAR StoreServ 8000 Storage system, and the HPE 3PAR StoreServ Management Console (SSMC).

IMPORTANT: The HPE 3PAR Guided Setup software is available for the initial installation. If the installation must be performed again (for example, due to a relocation of the storage system), contact your Hewlett Packard Enterprise support representative. Record user names and passwords only in a secure location.

HPE 3PAR Service Processor	
Name	
IPv4 (required): address, subnet mask, gateway, network speed IPv6 (optional): address, subnet prefix length, gateway	
DNS server (optional) Record DNS server addresses.	
NTP server (optional) Record network time server addresses.	
Administrator account password[1] (Preset user name is **admin**.)	
HPE Partner account password[1] (Preset user name is **hpepartner**.)	
Remote Support proxy (optional) Record proxy name, IP address, and port.	
Send email notifications of alerts (optional) Record mail host name, IP address, domain, and email addresses.	

[1] The password can be 8-32 characters in length and must contain at least one uppercase letter and one lowercase letter, one digit, and one nonalphanumeric character.

HPE 3PAR StoreServ 8000 Storage system	
Serial number[1]	
Name	
IPv4 (required): address, subnet mask, gateway, network speed IPv6 (optional): address, subnet prefix length, gateway	
DNS server (optional) Record DNS server addresses.	
NTP server (optional) Record network time server addresses.	
Administrator account password[2] (Preset user name is **`3paradm`**.)	
HPE 3PAR StoreServ 8000 Storage system—Installation Site	
Company name	
Address	
HPE 3PAR StoreServ 8000 Storage system—Support Contact	
First and last name	
Company name	
Email	
Phone	

1 To locate the serial number, see the HPE 3PAR StoreServ Storage documentation.

2 The password is restricted to 31 characters in length and can contain alphanumeric characters and the following special characters: plus (+), dash (-), underscore (_), asterisk (*), and “at” symbol (@).

HPE 3PAR StoreServ Management Console	
Administrator account user name[1]	
Administrator account password[2]	

1 The user name must be at least two characters long using any characters (including UTF-8) and contain no spaces.

2 The password can be 8-32 characters in length and must contain at least one uppercase character, one lowercase character, one digit, and one nonalphanumeric character.

Websites

Hewlett Packard Enterprise general websites:

Information Library

www.hpe.com/info/EIL

Customer Self Repair Services Media Library

www.hpe.com/support/sml-csr

InfoSight

infosight.hpe.com

Safety and Compliance

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

Software Depot

www.hpe.com/support/softwaredepot

Software License Manager

enterpriselicense.hpe.com/

Software updates and licensing

www.hpe.com/downloads/software

Support Center

www.hpe.com/support/hpesc

SPOCK

www.hpe.com/storage/spock

White papers and analyst reports

www.hpe.com/storage/whitepapers

Hewlett Packard Enterprise storage websites:

Data Storage

www.hpe.com/info/storage

Information Library Storage

www.hpe.com/info/storage/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/assistance

- To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:

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

Information to collect

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

Accessing updates

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

  Hewlett Packard Enterprise Support Center

  www.hpe.com/support/hpesc

  Hewlett Packard Enterprise Support Center: Software downloads

  www.hpe.com/support/downloads

  Software Depot

  www.hpe.com/support/softwaredepot

- To subscribe to eNewsletters and alerts:

  www.hpe.com/support/e-updates

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

  www.hpe.com/support/AccessToSupportMaterials

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

Customer self repair

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

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

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

Remote support

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

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

Remote support and Proactive Care information

HPE Get Connected

www.hpe.com/services/getconnected

HPE Proactive Care services

www.hpe.com/services/proactivecare

HPE Proactive Care service: Supported products list

www.hpe.com/services/proactivecaresupportedproducts

HPE Proactive Care advanced service: Supported products list

www.hpe.com/services/proactivecareadvancedsupportedproducts

Proactive Care customer information

Proactive Care central

www.hpe.com/services/proactivecarecentral

Proactive Care service activation

www.hpe.com/services/proactivecarecentralgetstarted

Warranty information

To view the warranty 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

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

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Acronyms

1U

one-unit rack space

2U

two-unit rack space

4U

four-unit rack space

AC

alternating current

AFA

all flash array

CC

control cache (DIMMs)

CDA

confidential disclosure agreement

CLI

command line interface

CNA

converged network adapter

CSI

Customer Self Install

CSR

Customer Self Repair

CSU

Customer Self Upgrade

DAR

data at rest

DC

direct current (power) or data cache (DIMMs)

DHCP

dynamic host configuration protocol

DNS

domain name system

ESD

electrostatic discharge

FC

Fibre Channel (protocol) or fast class (drive type)

FCoE

Fibre Channel over Ethernet (protocol)

FIPS

Federal Information Processing Standard

FRU

field replaceable unit

Gb/s or Gbps

Gigabits per second

GbE

Gigabit Ethernet

GUI

graphical user interface

HBA

host bus adapter

I/O

input/output

iLO

integrated lights out

IOM

I/O Module

LAN

local area network

LFF

large form factor

LUN

logical unit number

MOB

moment of birth

NIC

network interface card

NL

near line (drive type)

NTP

network time protocol

OOTB

out of the box

OVF

open virtual format

PCIe

peripheral component interconnect express

PCM

Power Cooling Module

PDU

Power Distribution Unit

RAID

redundant array of independent disks

RPS

redundant power supply

SAN

storage area network

SAS

serial attached SCSI

SC

HPE 3PAR SP Service Console

SFF

small form factor

SFP

small form-factor pluggable

SFRM

Hewlett Packard Enterprise StoreFront Remote

SP

Service Processor

SPOCC

HPE 3PAR Service Processor Onsite Customer Care

SPOCK

Single Point of Connectivity Knowledge

SPS

single power supply

SSA

secure service agent

SSD

solid state drive (drive type)

SSH

Secure Shell

SSMC

HPE 3PAR StoreServ Management Console

TCP

transmission control protocol

TOTP

time-based one-time password

TUI

HPE 3PAR SP Text-based User Interface

U

unit of space in a rack

UID

unit identification

VM

virtual machine

VV

virtual volume

W

watt