HPE 3PAR StoreServ 9000 Storage Customer Self Install Guide

Abstract

This document provides information and instructions to guide you through the installation of your HPE 3PAR StoreServ 9000 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 the HPE Deployment Services.

Notices

Acknowledgments

Revision history

Part Number	Publication date	Edition	Summary of changes
QL226-99978a	January 2019	4	• Updated "Guidelines for redundant power cabling" • Added "Checking enclosure power redundancy (optional)"
QL226-99978	December 2018	3	• Updated "Controller node LEDs and ports" • Updated "Guidelines for cabling"
QL226-99888	June 2018	2	• Support for a new physical service processor, HPE ProLiant DL360 Gen10 Server • HPE StoreFront Remote (SFRM) content replaced with HPE InfoSight content
Q0E92-90703	February 2018	1	With HPE 3PAR OS 3.3.1 (MU1) Patch 09, Patch 11, and Patch 18 software, also known as HPE 3PAR OS 3.3.1 EMU1, and HPE 3PAR Service Processor 5.0.2.1 software or later software versions, CSI supported for the HPE 3PAR StoreServ 9000 Storage

Contents

Guidelines for the Customer Self Install of the HPE 3PAR StoreServ 9000

> **① 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.

CSI guidelines:

The CSI option is only available for the HPE 3PAR StoreServ 9000 system that meets the following criteria:

- Two-node or four-node configurations
- Factory integrated in a single HPE Rack

  The factory integration configuration option includes the assembly of components, cabling, labeling, 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.

- The CSI of the HPE 3PAR StoreServ 9000 must be performed using the HPE 3PAR Guided Setup that is a feature of the HPE 3PAR OS 3.3.1.

CSI installer technical profile:

To install the HPE 3PAR StoreServ 9000 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

CSI installer responsibilities:

- Review all the relevant documentation for the HPE 3PAR StoreServ 9000 prior to initiating the installation.

- Ensure that the host and SAN environment is supported and compliant with HPE recommendations and best practices. Resolve any problems with the host and SAN environment prior to installing the HPE 3PAR StoreServ 9000. 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 Software Setup Worksheet*.

- Use the HPE 3PAR Guided Setup and HPE 3PAR StoreServ Management Console (SSMC) to set up and configure the storage system.

About the HPE 3PAR StoreServ 9000 Storage system
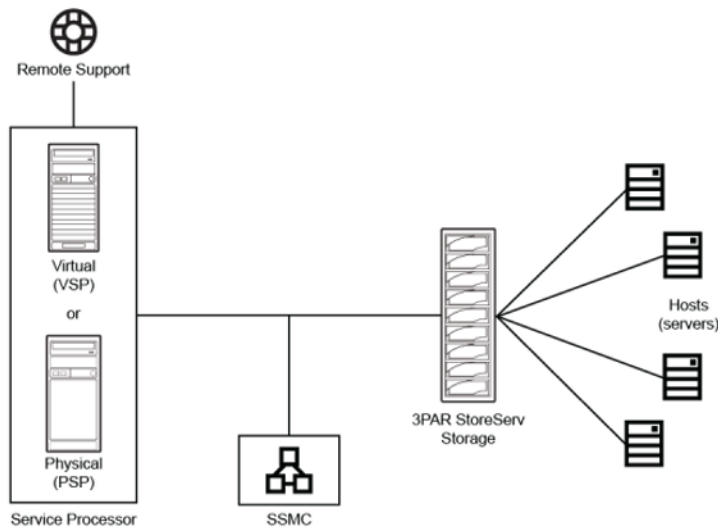
Figure 1: Architecture of the storage system

HPE 3PAR StoreServ 9000 Storage system:

The HPE 3PAR StoreServ 9000 Storage is an enterprise-class flash array. The storage system is made up of a Controller Node Enclosure (two or four Controller Nodes), SAS Adapters, Host Adapters; 2 to 48 Drive Enclosures with up to 24 small form factor (SFF) Solid-State Drives (SSDs) each, and a Service Processor. The Controller Nodes include network ports to provide administrative data-paths to the storage system.

Hosts (servers):

The host servers connect to the HPE 3PAR StoreServ 9000 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 HPE 3PAR StoreServ 9000 Storage system requires either an HPE 3PAR physical SP or HPE 3PAR virtual SP. The HPE 3PAR 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 HPE 3PAR virtual SP is deployed as a virtual machine (VM) 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 HPE 3PAR Remote Support connectivity is enabled, it can also provide critical software updates to your storage system.

For additional HPE 3PAR StoreServ 9000 Storage architecture information, see the *HPE 3PAR StoreServ Storage Concepts 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

Installation media

Installation DVDs are not typically shipped with the HPE 3PAR StoreServ 9000 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

The HPE 3PAR StoreServ 9000 Storage system has a 10-character serial number that is used with the software setup.

The storage system serial number can be found in these locations:

- A label at the top-left-rear of the controller node enclosure

- The outside of the corrugated shipping material

Forum for the storage system

For the latest HPE 3PAR StoreServ 9000 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 10.

2. Review **Regulatory information** on page 100.

3. Review **Customer Self Install videos** on page 11.

4. Complete the **HPE 3PAR StoreServ 9000 Storage Software Set up Worksheet** on page 95.

5. Review **Acclimatizing** on page 11.

6. Obtain the **Tools for the installation** on page 11.

7. Review **Unpacking the factory-integrated-in-rack option: Process overview** on page 12 and complete the process.

Site planning

Successful installation of the HPE 3PAR StoreServ 9000 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 9000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website: **www.hpe.com/info/storage/docs**

Customer Self Install videos

The HPE 3PAR StoreServ 9000 Storage Customer Self Install (CSI) videos are available at the HPE 3PAR StoreServ 9000 Storage Customer Self Install Video website:

www.hpe.com/support/3PAR9000CSIVideo

NOTE: The video may take a minute to load.

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 9000 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 for the installation

Table 1: Tools for the installation

Purpose	Tools
Safety	- ESD mat - ESD grounding strap
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 the rack
Physical Service Processor (SP) connection setup	Laptop for configuration of a physical Service Processor

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

Prerequisites

Review the information about the placement of the HPE 3PAR StoreServ 9000 Storage system and reserving room for service access in the *HPE 3PAR StoreServ 9000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Procedure

1. Complete **Unpacking the HPE rack factory-integrated with the storage system** on page 12.

2. Complete **Positioning and stabilizing the HPE rack** on page 20.

3. Drives are installed at the factory. However, if additional drives were received and not installed, complete: **Installing the drives: Process overview** on page 21.

4. Review **Cabling the factory-integrated-in-rack option: Process overview** on page 24 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 9000 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).
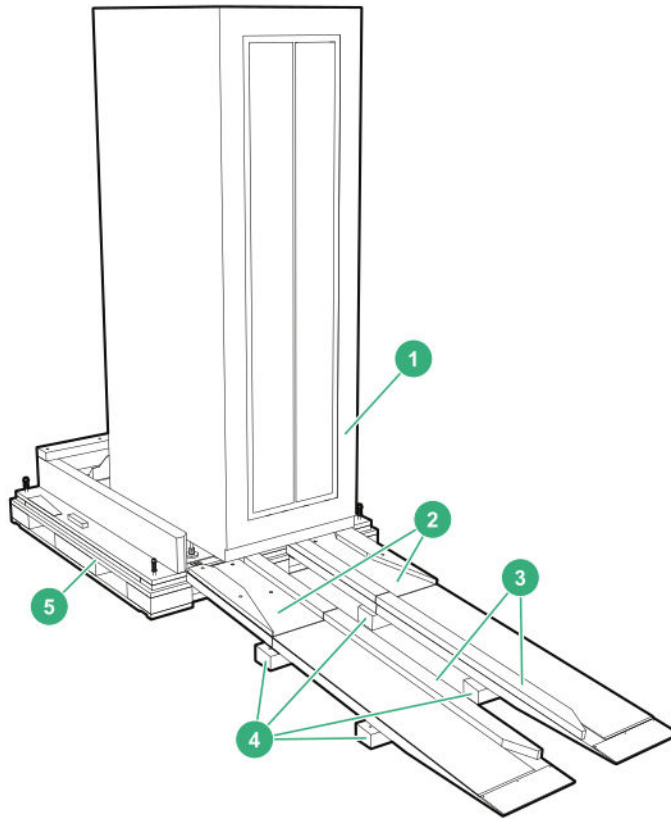
Figure 2: Items for unpacking an HPE rack

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.
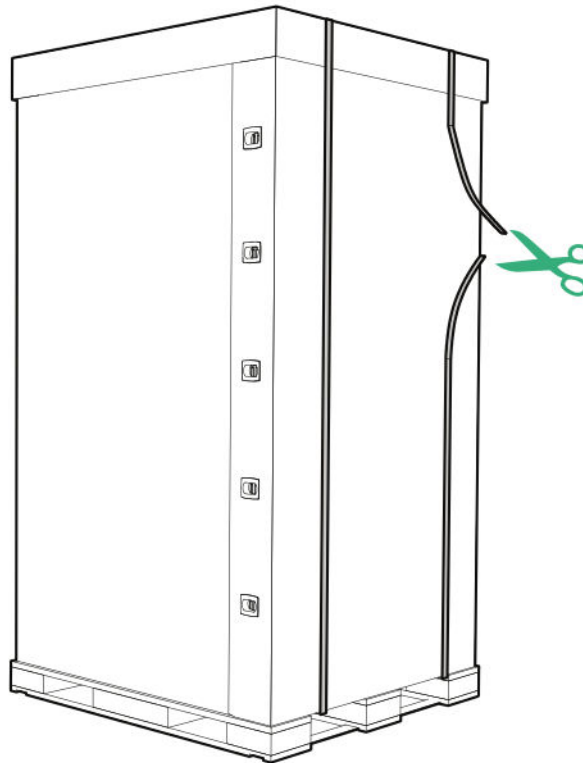
Figure 3: Removing the banding, HPE rack shipping container
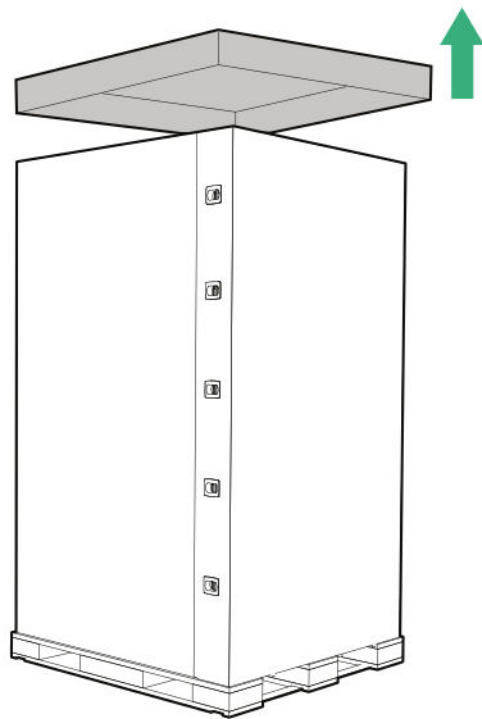
Figure 4: Removing the top, HPE rack shipping container

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.
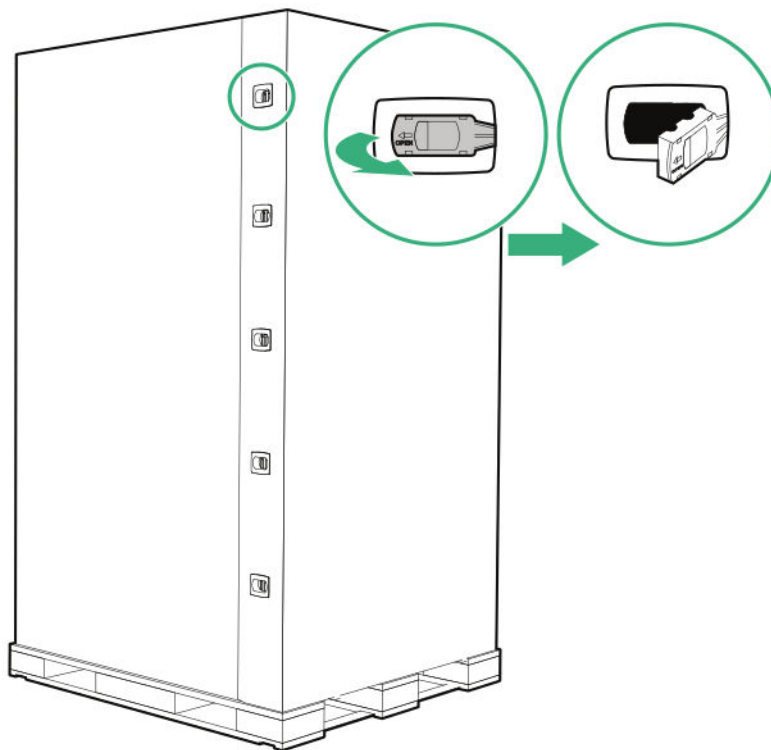
Figure 5: Removing the clips, HPE rack shipping container

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.
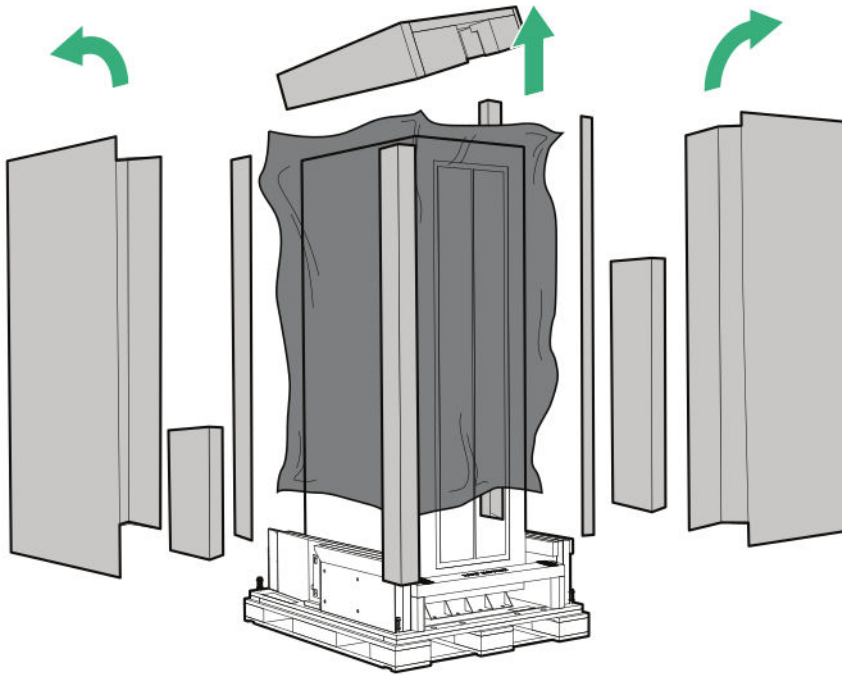
Figure 6: Removing the packing material, HPE rack shipping container

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.
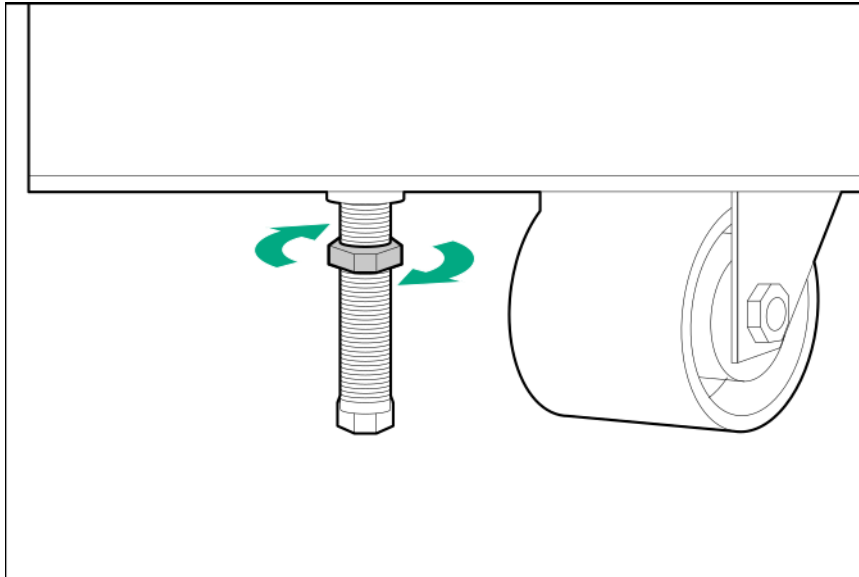
Figure 7: Releasing the locking nut, HPE rack leveling bolt

b. With an adjustable wrench, turn the leveling bolt counterclockwise until fully raised.
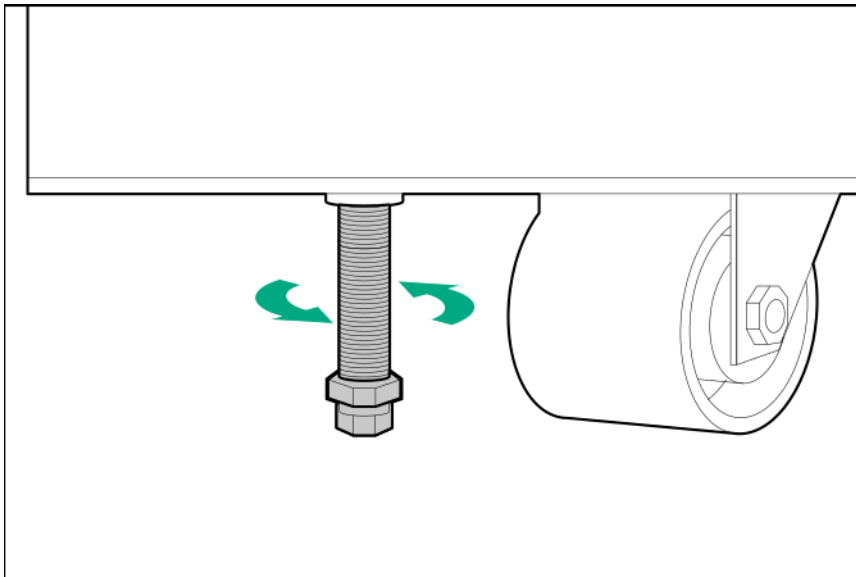
Figure 8: Raising the leveling bolt, HPE rack

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.
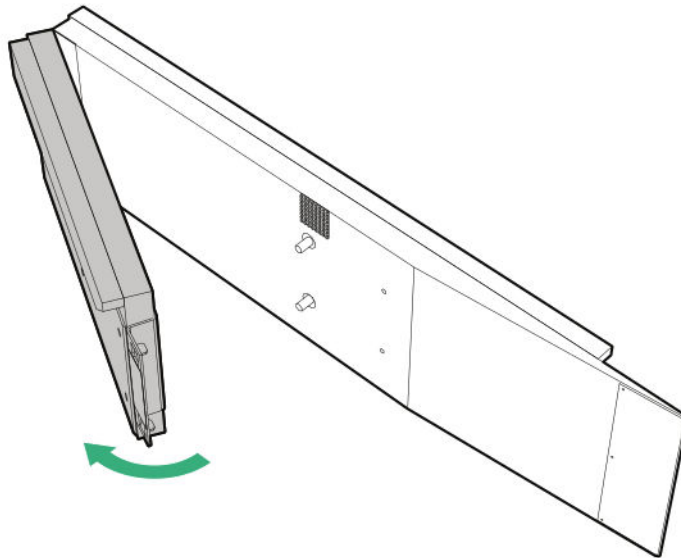
Figure 9: Extending the ramps, HPE rack shipping container

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.
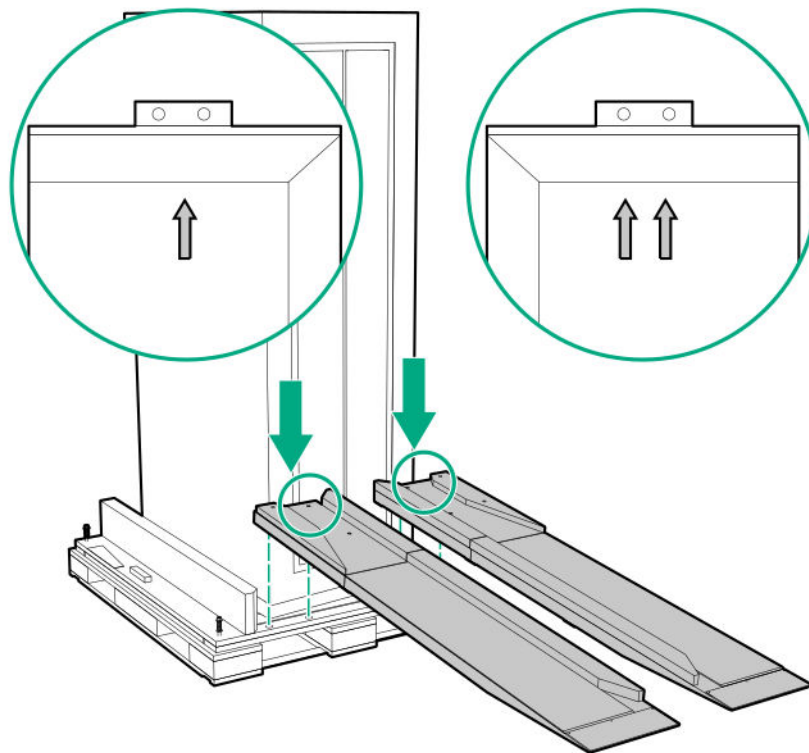
Figure 10: Installing the ramps onto the pallet, HPE rack shipping container

> ⚠️ **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.
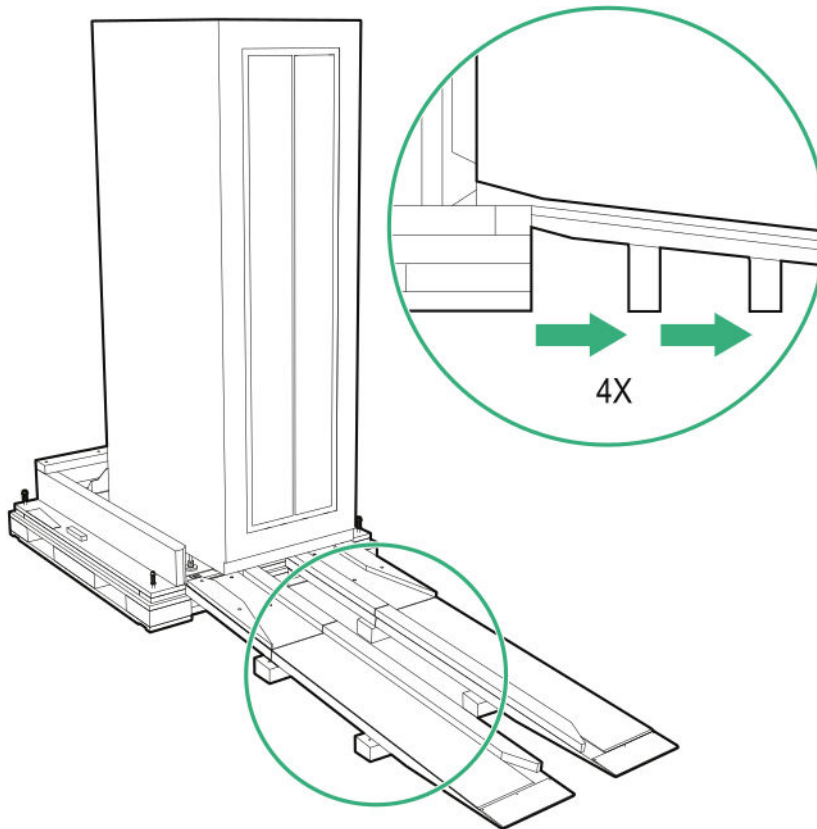
Figure 11: Installing the ramp supports, HPE rack shipping container

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.
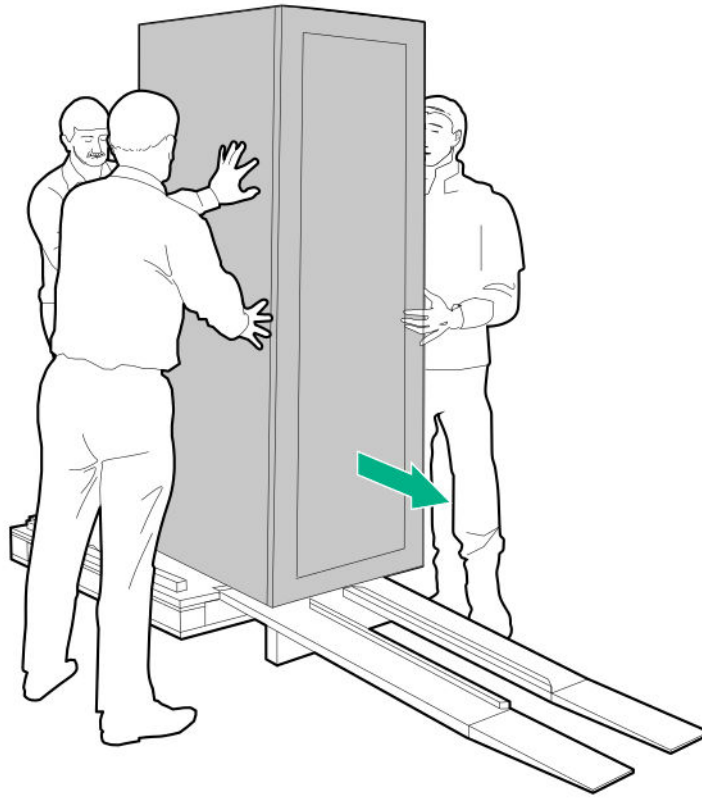
Figure 12: Unloading the HPE rack from the pallet

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 9000 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.
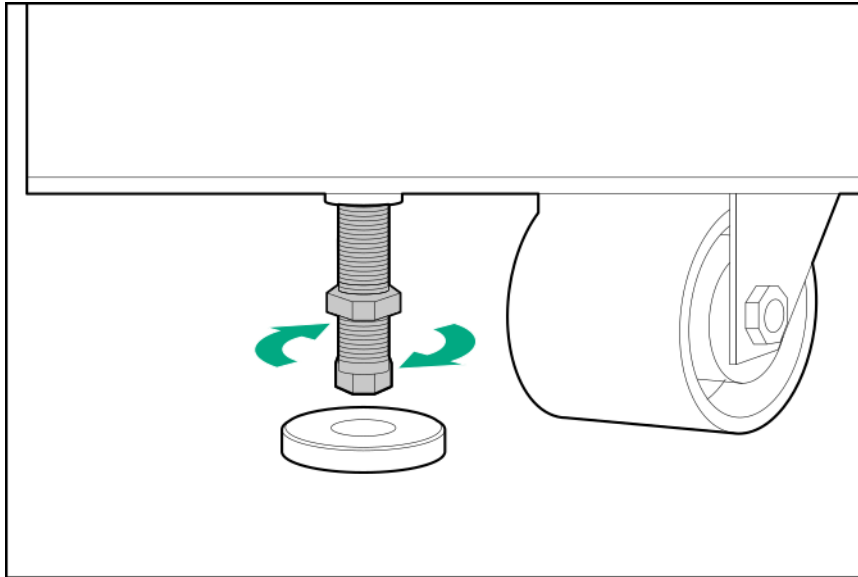
Figure 13: Lowering an HPE rack leveling bolt

c. Lock the leveling pad in place by turning the locking nut counterclockwise until tight.
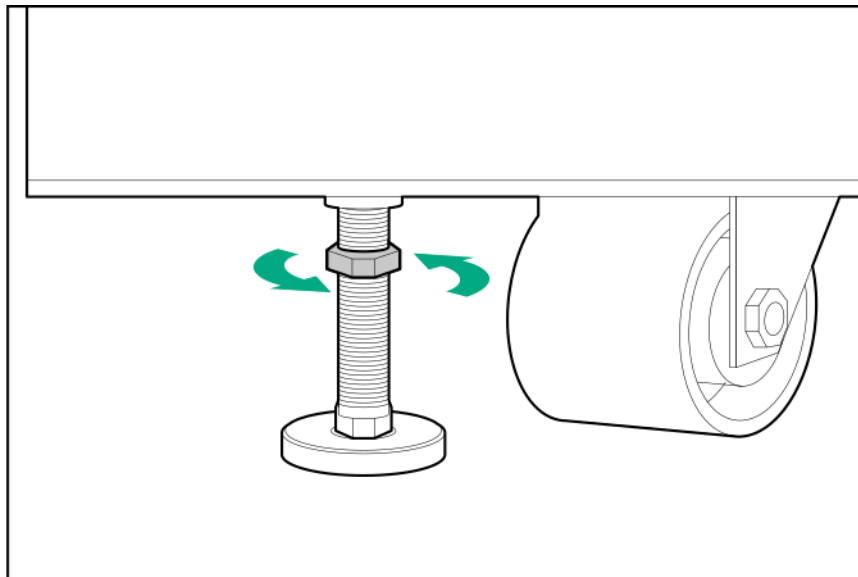
Figure 14: Tightening the locking nut on an HPE rack leveling bolt

d. Repeat for each leveling pad.

Installing the drives: Process overview

This process overview is for installing the drives.

If it is necessary to install additional drives, complete the following process:

Procedure

1. Review **Guidelines for the drive installation** on page 22.

2. Complete **Installing the SFF drives** on page 23.

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.

> ⚠ **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.

*   A pair or pairs of drives must be installed in consecutively numbered slots in a drive enclosure and must be of the same capacity and speed.

*   The recommended initial quantity is eight SSDs per controller node pair, with a required minimum of six SSDs per controller node pair.

*   With a four-node configuration, the best practice is to attach the same number of drives to each controller node pair.

*   All drive enclosures must contain an even number of drives, with a minimum of two.

*   Try to distribute an equal number of drives in all drive enclosures. If an equal distribution is not possible, get as close as possible while still following the guidelines for the drives.

*   RAID 6 is strongly recommended for all drive types.

SFF drive loading guidelines and examples:

The small form factor (SFF) drives are loaded starting at bay 0, left to right, leaving no empty space between drives. The bays are numbered 0 through 23.

NOTE: The top right bay in the SFF drive enclosure must not be used and is populated with a blank panel.

Table 2: Example slot order, SFF drive enclosure

20 (...)	21 (...)	22 (...)	23 (...)	24 (Do not use)
15 (...)	16 (...)	17 (...)	18 (...)	19 (...)
10 (...)	11 (...)	12 (...)	13 (...)	14 (...)
5 (SSD)	6 (SSD)	7 (SSD)	8 (...)	9 (...)
0 (SSD)	1 (SSD)	2 (SSD)	3 (SSD)	4 (SSD)

Installing the SFF drives

Prerequisites

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

- To avoid damaging any circuitry, wear an ESD grounding strap.

- Prepare a surface with an ESD safe mat for staging components for installation.

Procedure

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

2. 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.

3. 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).
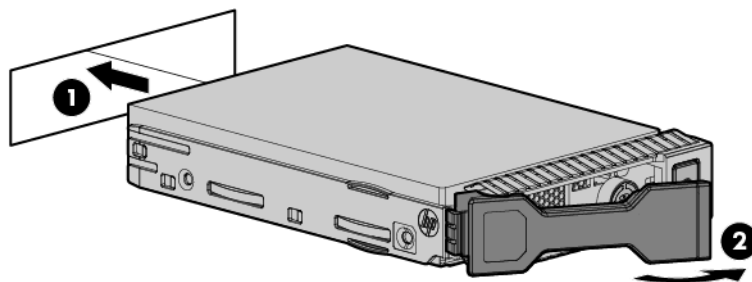
Figure 15: Installing an SFF drive

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

> ① **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.

> ① **IMPORTANT:** To enable access to components for servicing, neatly route and secure the cables along the sides of the rack.

For an HPE 3PAR StoreServ 9000 Storage system that is factory integrated in an HPE rack, the internal cabling for the data cables and power cables has been completed before shipment; however, you must complete the following additional cabling process:

Procedure

1. Review **Guidelines for cabling** on page 24.

2. Review **Guidelines for redundant power cabling** on page 26.

3. Complete **Cabling the physical service processor (if installed)** on page 27.

4. Complete **Cabling the controller nodes: Process overview** on page 28.

5. Complete **Cabling the power cords of the power distribution units to the power receptacles at the operating site** on page 32.

6. Review **Powering on: Process overview** on page 33 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.

> ① **IMPORTANT:** Minimum bend radius **is not** the same as minimum bend diameter.

Table 3: 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)

Table Continued

Cable type	Minimum bend radius
Network Cat 5/6 (Unshielded)	1.75 in (4.44 cm)
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 16: Redundant power configuration** on page 27.

- **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.
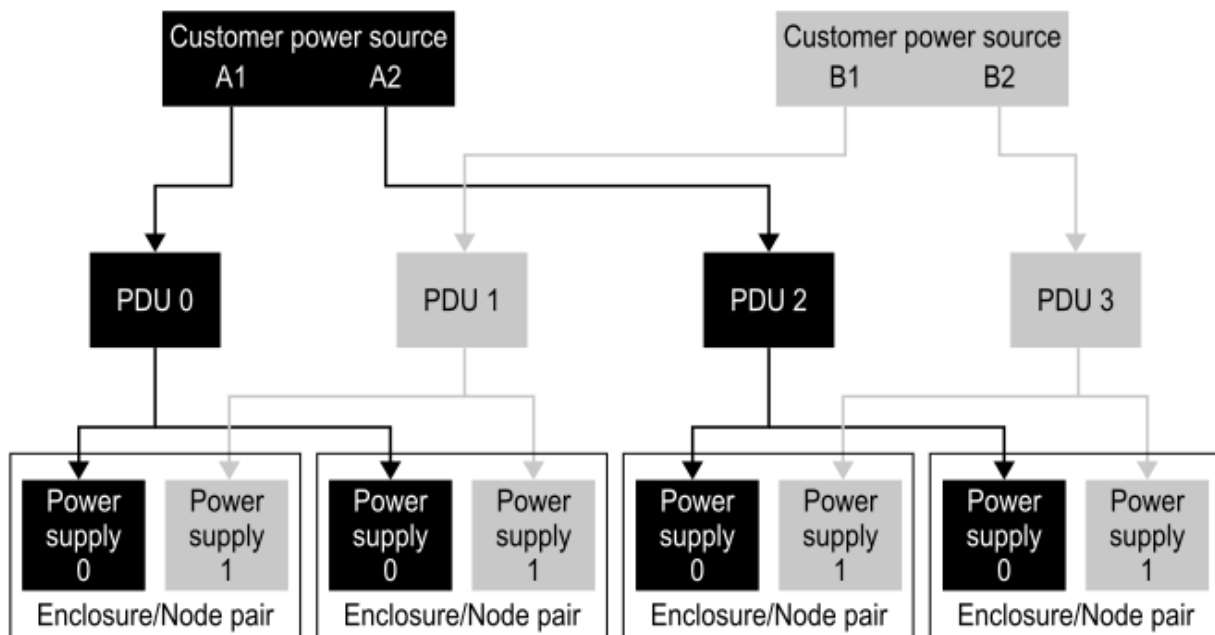
Figure 16: Redundant power configuration

Cabling the physical service processor (if installed)

The physical service processor is an optional component that can be used with the HPE 3PAR StoreServ 9000 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.
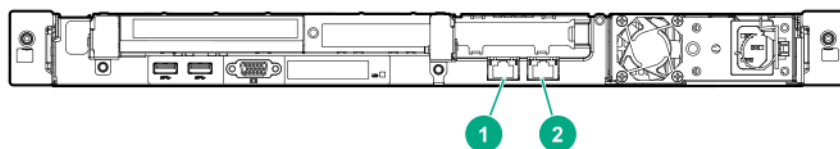
Figure 17: Physical service processor ports, HPE ProLiant DL120 Gen9 Server
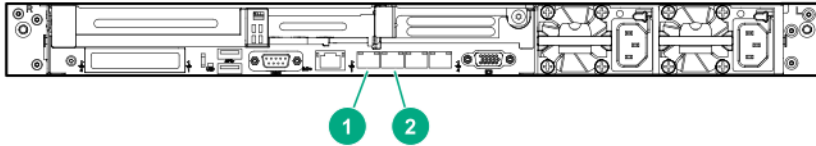
Figure 18: Physical service processor ports, HPE ProLiant DL360 Gen10 Server

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 controller nodes: 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.

ⓘ **IMPORTANT:** To enable access to components for servicing, neatly route and secure the cables along the sides of the rack.

Procedure

1. Complete **Cabling for the management connection** on page 28.

2. Complete **Cabling for the host connection** on page 29.

3. Complete **Cabling for the Remote Copy connection (optional feature)** on page 31.

4. Complete **Cabling for the File Persona connection (optional feature)** on page 31.

Cabling for the management connection

Procedure

• Connect a CAT-5e or Cat 6 Ethernet cable between the onboard MGMT port on each controller node and the network. At the rack rear, neatly route and secure the cables along the right side of the rack.

  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. 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.
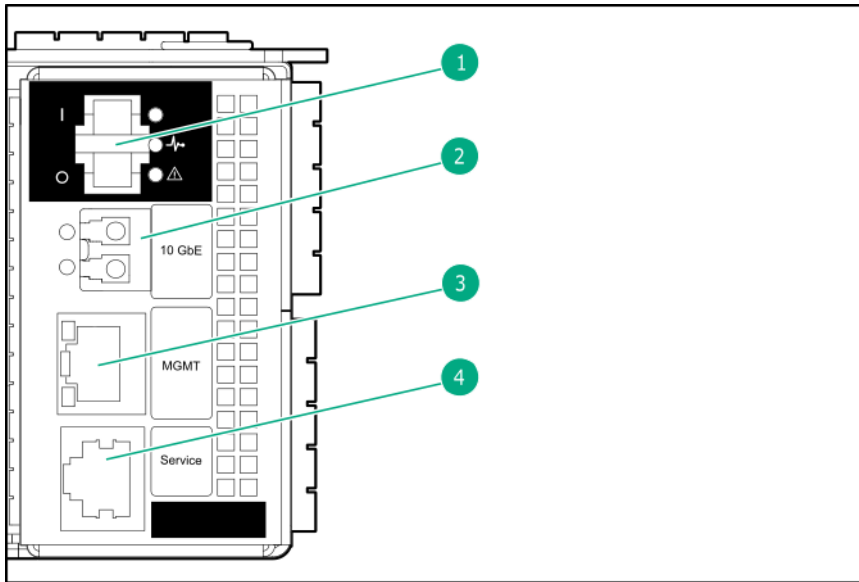
1. Power switch
2. 10 GbE port (RCIP)
3. 1 GbE Management (MGMT) port
4. Service port (Console)

Figure 19: Controller node ports

Cabling for the host connection

Prerequisites

Before connecting any FC or iSCSI cables, follow the guidelines provided for your host OS that are available in an HPE 3PAR host-OS implementation guide available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

For instance, the following are some of the available HPE 3PAR host-OS implementation guides:

- *HPE 3PAR AIX and IBM Virtual I/O Server Implementation Guide*
- *HPE 3PAR Apple OS X Implementation Guide*
- *HPE 3PAR Citrix XenServer Implementation Guide*
- *HPE 3PAR HP-UX Implementation Guide*
- *HPE 3PAR Solaris Implementation Guide*
- *HPE 3PAR SUSE Linux Enterprise Implementation Guide*
- *HPE 3PAR Red Hat Enterprise Linux and Oracle Linux Implementation Guide*
- *HPE 3PAR VMware ESX/ESXi Implementation Guide*
- *HPE 3PAR Windows Server 2016/2012/2008 Implementation Guide*

Procedure

- Connect a cable between a port on a host adapter (FC/iSCSI) and a switch or directly to the host; one or more cables per controller node. Hewlett Packard Enterprise recommends connecting each host to both controller nodes in a controller nodes pair (node pair: 0/1 or 2/3) using the same port number on the FC/iSCSI host adapters to provide redundancy. At the rack rear, neatly route and secure the cables along the left side of the rack. When possible, route and secure host cables towards the rear of the rack, separated from the internally routed SAS cables.

Recommended configurations for FC/iSCSI host connectivity

For optimal redundancy and I/O load balancing, Hewlett Packard Enterprise recommends the guidelines for connectivity from any given host-server (host) to the controller node pair (node pair) on the storage system:

- ◦ Depending on the number of host ports available, balance the host-server ports across both controller nodes in the node pair of the storage system at a minimum.

- ◦ From any given host, make a pair of connections from any given host to the same numbered slot and port (partner port) on each controller node in the node pair.

- ◦ If more than one host connection can be made per controller node, distribute connections of the same type (for example, FC) from any given host across host adapters in different slots (where available) on any given controller node.

NOTE: To provide redundancy and to permit online software upgrades, both controller nodes in a node pair (for example, controller nodes 0 and 1 or controller nodes 2 and 3) must maintain connections to each host server.

Host connectivity using a switch

- ◦ For an Ethernet switch, the recommended configuration for the connection is from the Ethernet switch or hub to two controller nodes (node pair).

- ◦ For an FC switch, you must set up FC fabric zoning to restrict WWNs seen by the system.

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 9000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs
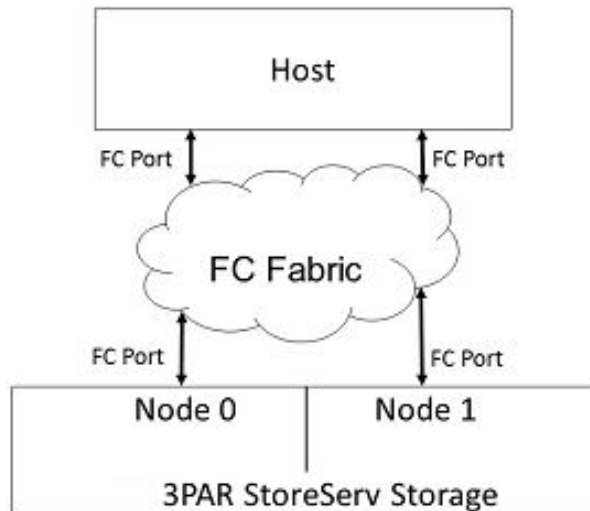
FC cable limitations for host connectivity		
Cable size	**Speed**	**Maximum cable length limit**
50 micron	16 Gb/s	50 meters

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

Cabling for the Remote Copy connection (optional feature)

Hewlett Packard Enterprise

For the optional HPE 3PAR Remote Copy connection with the HPE 3PAR StoreServ 9000 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 a cable between the onboard 10 GbE (RCIP) port or four-port 16Gb FC HBA (RCFC) and another HPE 3PAR StoreServ 9000 system. To provide redundancy, connect two or more controller nodes per storage system.

Cabling for the File Persona connection (optional feature)

Hewlett Packard Enterprise

For the optional HPE 3PAR File Persona connection with the HPE 3PAR StoreServ 9000 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 a cable between a port on a two-port 10Gb Ethernet NIC adapter and the network. To provide redundancy, connect two or more controller nodes per storage system.

Cabling the power cords of the power distribution units to the power receptacles at the operating site

> ⓘ **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.

Each AC power cord on the PDUs must connect to an appropriate outlet based on the cord type and power requirements for supplying power to the storage system.

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

1. Based on the location of the power receptacles at the operating site, route the PDU power cords through the top or bottom of the rack.

2. Connect the even-numbered PDUs to power receptacles from one power source (source A) and connect the odd-numbered PDUs to power receptacles from another power source (source B) with each power receptacle controlled and protected by its own circuit breaker.

Powering on: Process overview

Procedure

1. Review **Precautions for powering on the storage system** on page 33 .

2. Review **Checking AC power cable connections** on page 33 .

3. Complete **Powering on the storage system** on page 34 .

4. (Optional) Complete **Checking enclosure power redundancy (optional)** on page 35 .

5. Review **Setting up the service processor connection: Process overview** on page 37 and complete the process.

Precautions for powering on the 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 the storage system

Prerequisites

- The acclimatization process has completed for the storage system components. Do not power on 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 9000 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 PDU power cables under the bracket at the bottom rear of the rack.

Procedure

1. On all PDUs, turn on the power by setting all circuit breakers to the **ON** position.

   For a physical service processor (SP), the power starts automatically when the PDUs are powered on. Alternatively, use the power reset button. For the drive enclosures, the power starts automatically, because there is no power switch.

2. On each controller node, turn on the power by setting the power switch to the **ON** position.
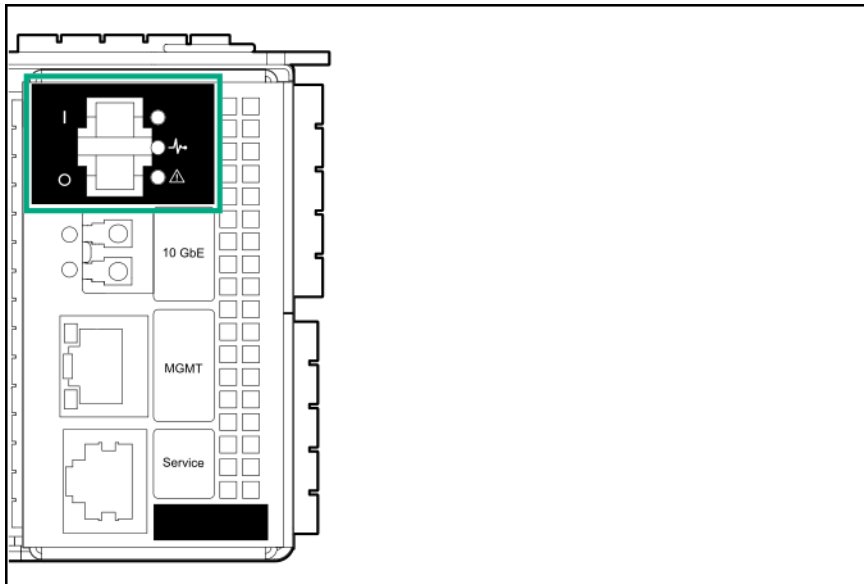
Figure 20: Controller node power switch

3. Wait approximately **10 minutes** for completion of the storage system power-on/boot sequence.

4. At the rear of the storage system, verify that all status LEDs are illuminated green. If any of the LEDs are amber, troubleshoot the issue before continuing to power on. There is an LED status for the controller nodes, drive enclosures, and power supply units.

> ! **IMPORTANT:** The Status LED at the storage system front is **not** illuminated green at this time. Instead, after the power on sequence, the UID/Service LED is illuminated blue and the Fault LED is illuminated amber. Later during the software Guided Setup, these LEDs turn off and the Status LED becomes illuminated 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 26.
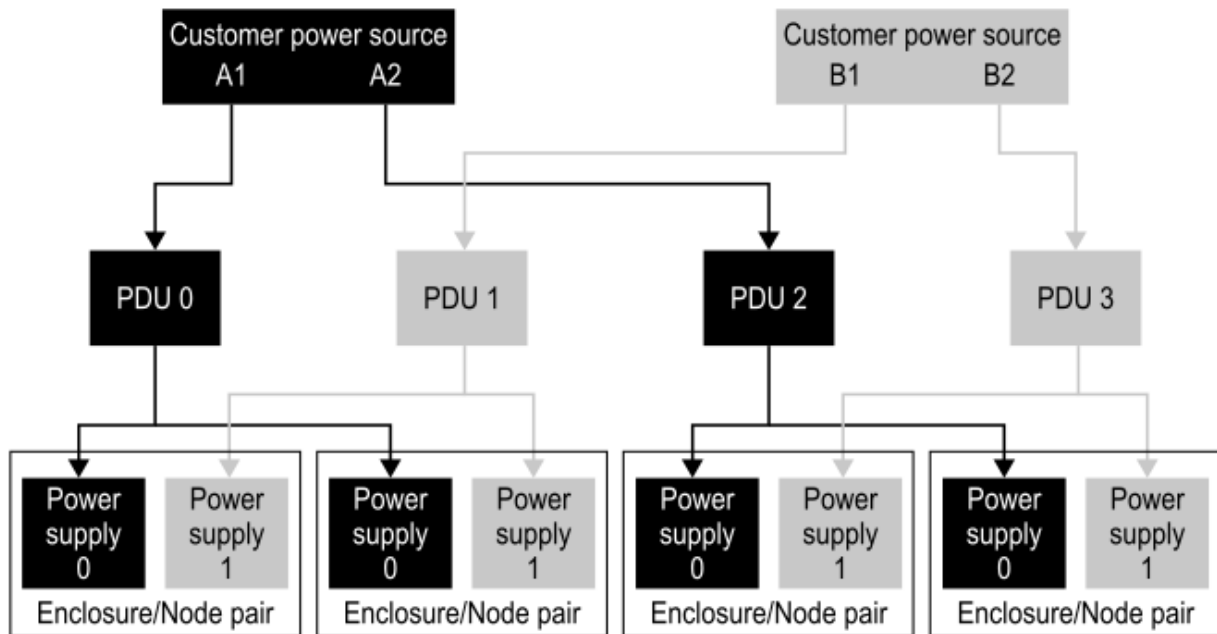
Figure 21: Redundant power configuration

Procedure

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

    - Review **Power supply unit LEDs, controller node enclosure** on page 82 .

    - Review **Power supply unit LEDs, drive enclosure** on page 83 .

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 21: Redundant power configuration** on page 35:

    - 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:

    - **Every enclosure**: At least one power supply is operating normally.

    - **Every power supply without input power**: The LEDs turn off.

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 detailed service processor (SP) 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

Procedure

1. Review **About the service processor** on page 37.

2. Ensure **Network and firewall support access** on page 38.

3. Based on your service processor, complete one of the following processes:

   a. **Setting up the physical service processor connection: Process overview** on page 40

   b. **Setting up the virtual service processor connection with VMware ESXi: Process overview** on page 42

   c. **Setting up the virtual service processor connection with Hyper-V: Process overview** on page 44

4. Review **Setting up the service processor and storage system software: Process overview** on page 46 and complete the process.

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 9000 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 38.

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 40.

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.

   > ① **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).
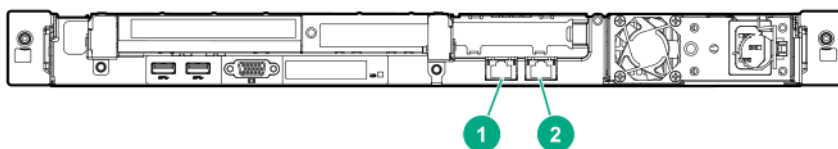
Figure 22: Physical service processor ports, HPE ProLiant DL120 Gen9 Server
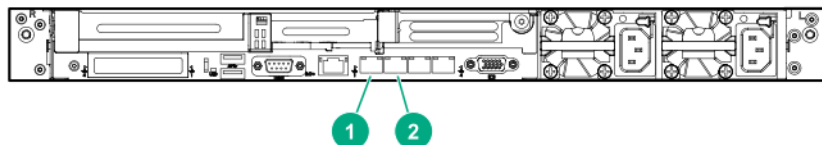
Figure 23: Physical service processor ports, HPE ProLiant DL360 Gen10 Server

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 42.

2. Complete **Locating or assigning an IP address to the virtual service processor with VMware ESXi** on page 43.

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 44.

2. Complete **Assigning an IP address to the virtual service processor with Hyper-V** on page 45.

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 9000 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 9000 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.

To set up the software for the service processor and the storage system, complete the following process:

Procedure

1. Review **Prerequisites for the HPE 3PAR Guided Setup** on page 46.

2. Complete **Setting up the service processor using the HPE 3PAR Guided Setup** on page 47.

3. Complete **Setting up the storage system using the HPE 3PAR Guided Setup** on page 48.

4. Review **Installing and setting up the HPE 3PAR StoreServ Management Console software: Process overview** on page 49 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 89. 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 50.

2. Complete **Registering the storage system with the HPE InfoSight web portal using the HPE 3PAR StoreServ Management Console** on page 51

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**.

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 53.

• 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**.

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:

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

NOTE:

- 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 is standardized to simplify installation and maintenance. The components are numbered according to their order and location in the rack.

Adapter information

SAS adapter

HPE 3PAR Four-Port 12Gb SAS Host Bus Adapter

NVMe module

HPE 3PAR 750GB NVMe Storage Class Memory Module

Host PCIe adapters

Adapters	Connectors
HPE 3PAR Two-Port 32Gb FC Host Bus Adapter	SFP28
HPE 3PAR Four-Port 16Gb FC Host Bus Adapter	SFP+
HPE 3PAR Two-Port 10Gb iSCSI Converged Network Adapter	SFP+
HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter	SFP+

Backup battery unit information

The storage system includes one backup battery unit (BBU) per controller node with a maximum of four BBUs per system.

Depending on the controller node configuration, the controller node enclosure may include two or four BBUs. The BBUs supply enough power to write the cache memory to the controller node drives during a power failure.
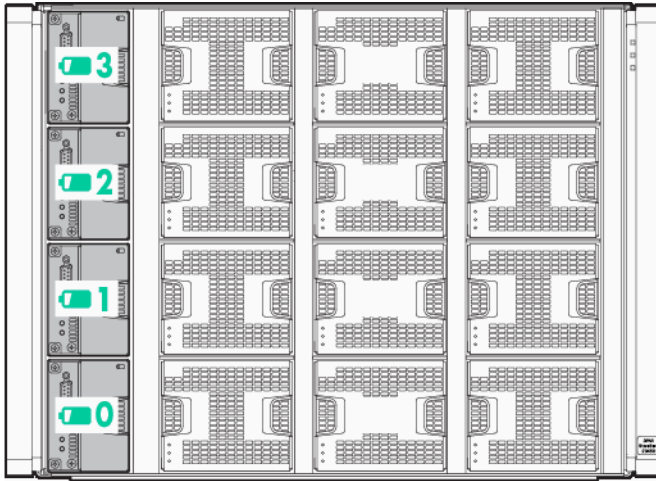
Figure 24: Backup battery unit numbering, controller node enclosure front view

Controller node information

The controller nodes (node) are a components of the storage system and are installed in the controller node enclosure. The controller node caches and manages data in a system and provides the hosts with a coherent, virtualized view of the system. The controller nodes are located in the rear of the controller node enclosure.

The storage system provides four controller node compartments (8U) and supports two or four controller nodes.

The controller nodes are installed in the rear of the controller node enclosure. The numbering sequence of the controller nodes begins with zero (0) and increments in ascending order from bottom to top.
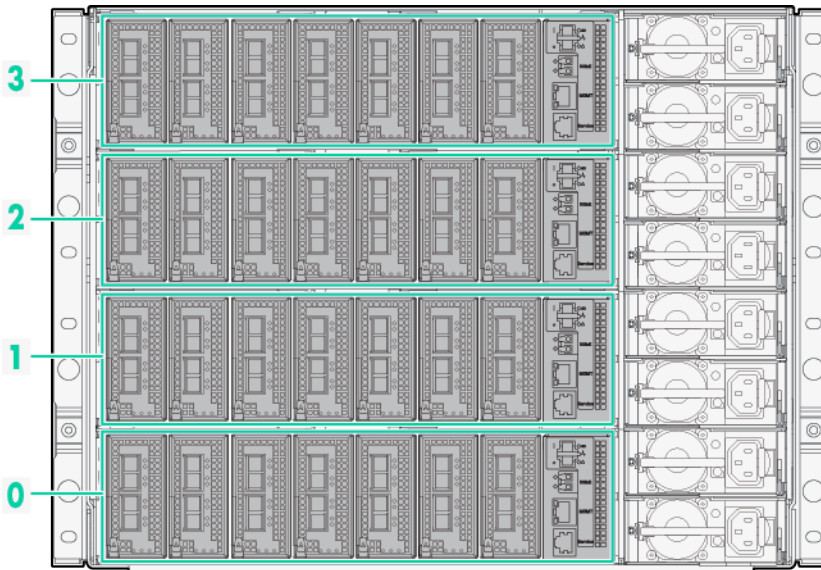
Figure 25: Controller node numbering, controller node enclosure rear view

Table 4: Controller node loading order

Storage system	Number of controller nodes	Loading order
HPE 3PAR StoreServ 9450 Storage	2	0, 1
	4	0, 1, 2, 3
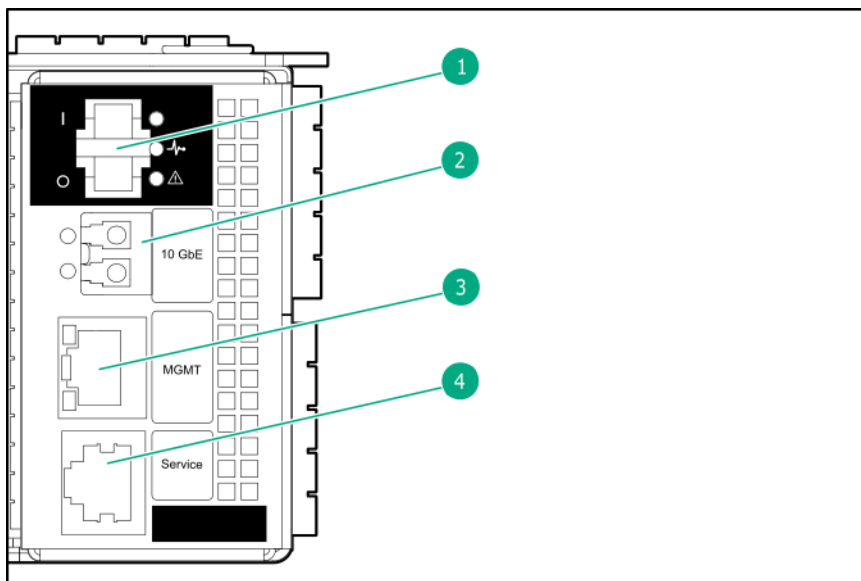
1. Power switch

2. 10 GbE port (RCIP)

3. 1 GbE Management (MGMT) port

4. Service port (Console)

Figure 26: Power switch and onboard ports, controller node rear view

Controller node internal components information
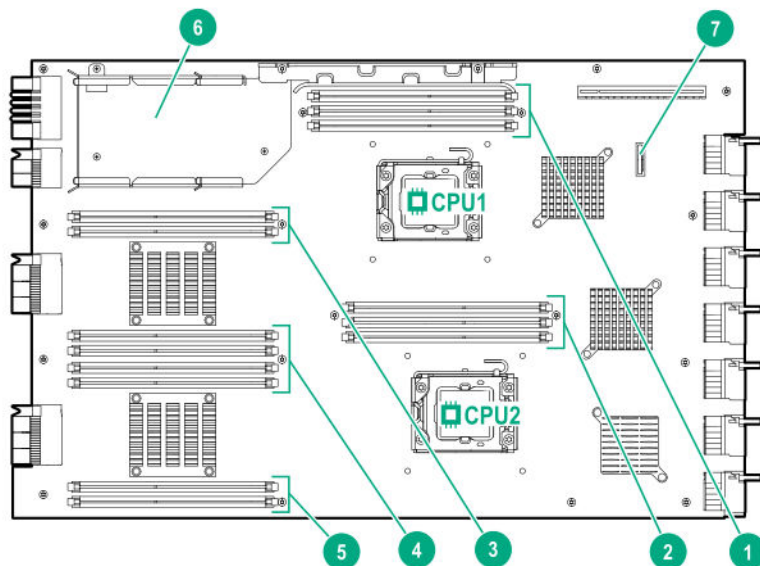
Figure 27: Internal components of the controller node

Item	Component	DIMM Location (Slot ID)	Description
1	Control cache DIMMs	J18000	CC DIMM 0:0:0
		J19000	CC DIMM 0:1:0
		J20000	CC DIMM 0:2:0
2	Control cache DIMMs	J18001	CC DIMM 1:0:0
		J19001	CC DIMM 1:1:0
		J20001	CC DIMM 1:2:0
3	Data cache DIMMs Bank 0:0	J14005	DC DIMM 0:0:0
		J15005	DC DIMM 0:0:1
4	Data cache DIMMs Bank 0:1	J17005	DC DIMM 0:1:1
		J16005	DC DIMM 0:1:0
	Data cache DIMMs Bank 1:0	J14006	DC DIMM 1:0:0
		J15006	DC DIMM 1:0:1
5	Data cache DIMMs Bank 1:1	J17006	DC DIMM 1:1:1
		J16006	DC DIMM 1:1:0
6	Removable node drive platform and drives		Two removable storage drives
7	Time of day (TOD) clock battery		Removable battery

Drive enclosure information

The SFF drive enclosure supports up to 24 small form factor (SFF) SAS drives.

1. Left bezel ear cap

2. SFF drive bays

3. Right bezel ear cap

Figure 28: SFF drive enclosure details front view
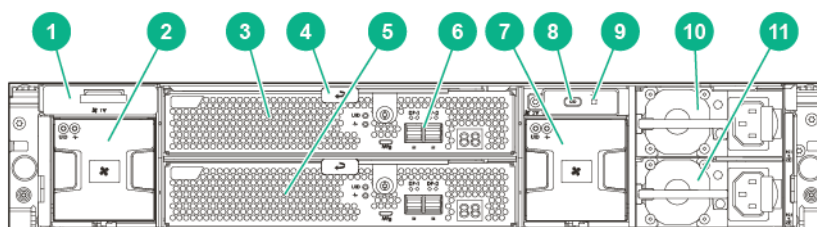
1. Pullout tab with serial number

2. Fan module 0

3. I/O module 1

4. I/O module ejector handle

5. I/O module 0

6. SAS data ports

7. Fan module 1

8. System-locate UID/push button

9. System status LED

10. Power supply unit 1

11. Power supply unit 0

Figure 29: SFF drive enclosure details rear view

Drive bay numbering

The drives are installed in the drive bays at the front of the drive enclosure.

NOTE: The drive enclosure contains 25 SFF drive bays (slots); however, do not use the upper-right bay (slot 24).
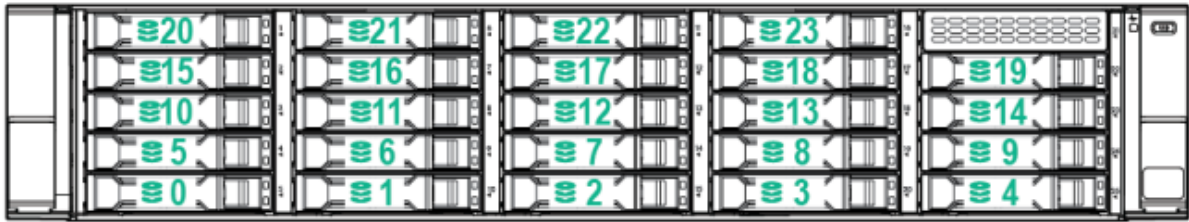
Figure 30: SFF drive bay numbering, drive enclosure front view

Drive information

- **Drive type:** Solid state drives (SSDs) only
- **Drive size:** 2.5 inch small form factor (SFF) SSD
- **Maximum drives supported:** 24 SFF SSDs per drive enclosure

Fan module information, controller node enclosure

There are three fan modules per controller node in a controller node enclosure.

The fan module numbering sequence is the same for all controller nodes.
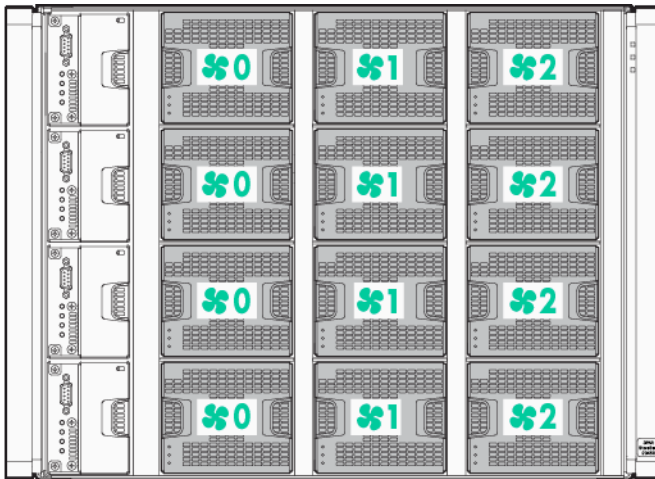
Figure 31: Fan module numbering, controller node enclosure front view

Fan module information, drive enclosure
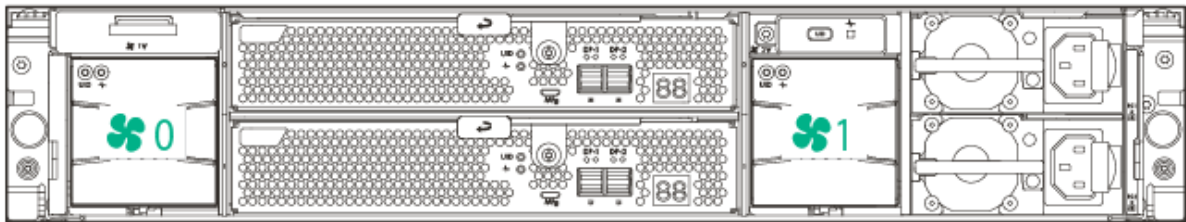
Figure 32: Fan module numbering, drive enclosure rear view

I/O module information
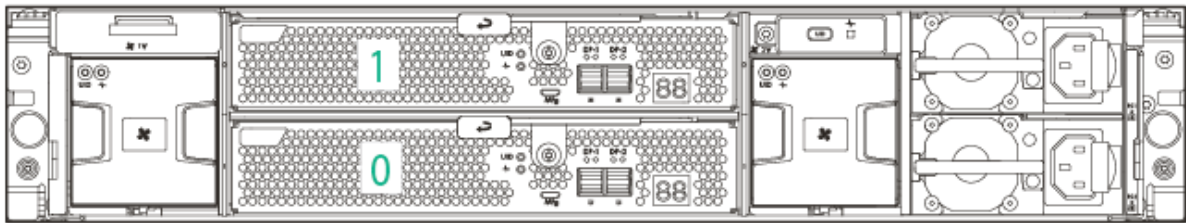
Figure 33: I/O module numbering, drive enclosure rear view

Power supply unit information, controller node enclosure

There are two power supply units (PSUs) for each controller node. The following illustration displays the numbering sequence of the PSUs.
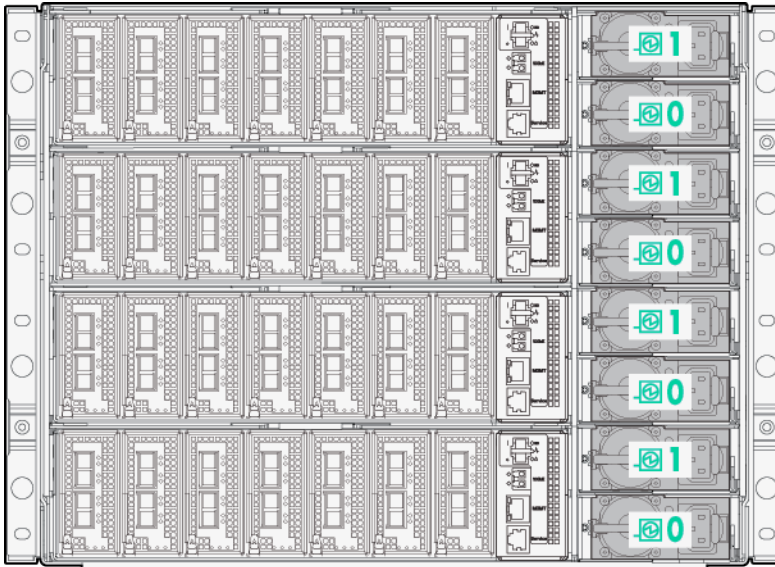
Figure 34: Power supply unit numbering, controller node enclosure rear view

Power supply unit information, drive enclosure
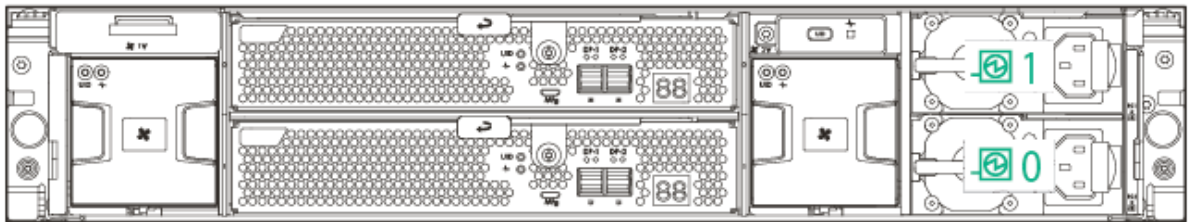
Figure 35: Power supply unit numbering, drive enclosure rear view

Power distribution unit information

For a storage system that is factory integrated in an HPE rack, the power distribution units (PDUs) are factory installed with circuit breakers and all cabling is accessible from the rack rear.

⚠ **WARNING:** Do not connect unsupported components to the PDUs.

The PDUs can be single phase or three phase and are regionally specific.

• With the storage system installed in a 42U 1,075 mm HPE rack, horizontal-modular PDUs are used and up to 12 drive enclosures are supported in the base rack.

• With the storage system installed in a 42U 1,200 mm HPE rack, vertical PDUs are used and up to 16 drive enclosures are supported in the base rack.

Alternatively, an HPE 3PAR StoreServ Third Party Rack Mount Kit can be purchased for installation of the storage system in a supported rack other than an HPE rack.

Rack information

The HPE 3PAR StoreServ 9000 Storage system comes installed in either a 42U, 1,075 mm, or 1,200 mm HPE rack or as individually packaged components for installation in a customer-supplied rack.

When multiple racks are in use, the racks are configured as follows:

- The first rack (known as the **controller node rack**) contains the storage system controller node enclosure (containing a pair or pairs of controller nodes) and drive enclosures.

- Any additional racks (**expansion rack**) are for storing the additional drive enclosures for expansion of the storage system.

Table 5: Rack numbering

Rack	Number
Controller node rack	R0
Drive enclosure expansion racks connecting to the controller node rack	R1, R2, R3,...

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
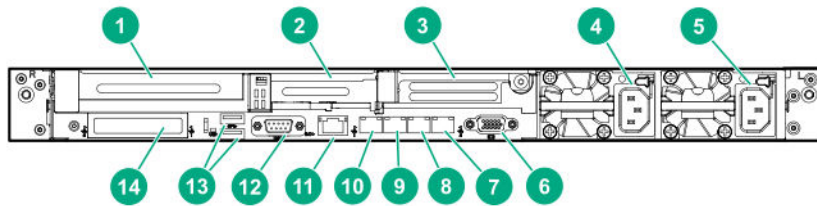
- Direct-current HPE ProLiant DL360 Gen10 Server

Physical service processor information, HPE ProLiant DL120 Gen9 Server

The physical service processor can be used instead of using a virtual service processor.
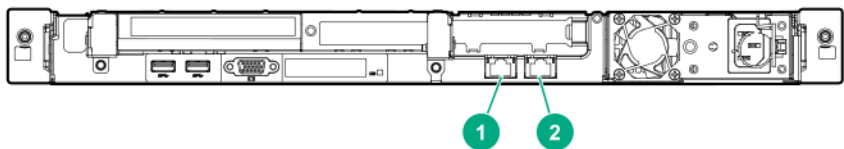
Figure 36: Physical service processor ports, HPE ProLiant DL120 Gen9 Server

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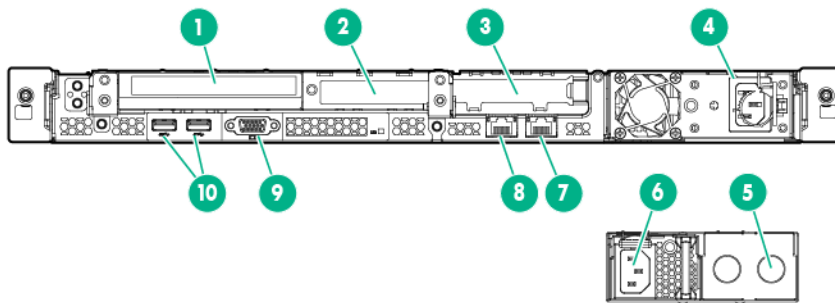
2. Service port; NIC 2

Figure 37: 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.
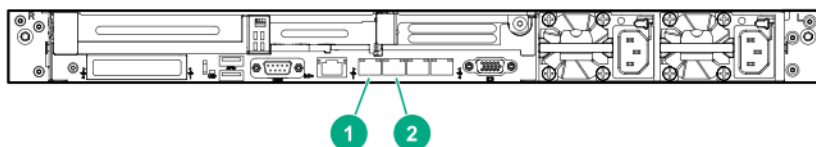
Figure 38: Physical service processor ports, HPE ProLiant DL360 Gen10 Server

1. Management (MGMT) port; NIC 1

2. Service port; NIC 2

Figure 39: 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)

System information front view (typical component configuration)

Standardized placement of Storage components in a 1,075 mm HPE rack

NOTE:

• A virtual SP can be used with the storage system instead of a physical SP.

• With the 1,200 mm HPE rack, the power distribution units (PDUs) are mounted vertically at the rack rear along the right edge.
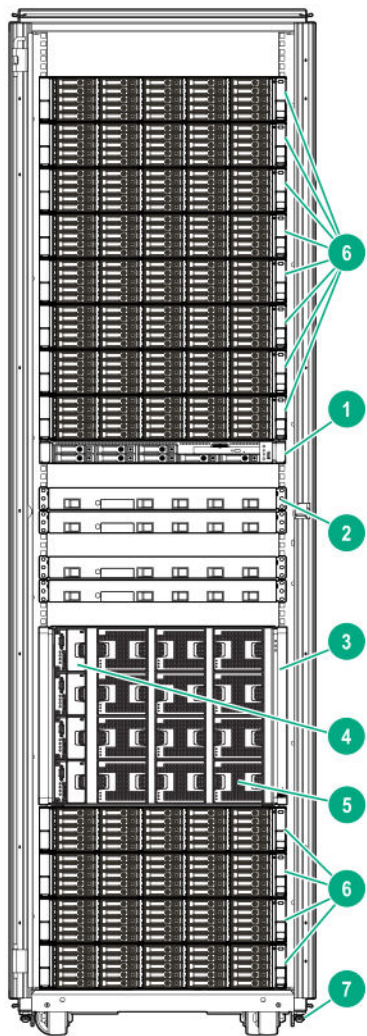
1. Physical service processor (SP)
2. Power distribution units (PDUs)
3. Controller node enclosure
4. Backup battery units (BBUs)
5. Fan modules
6. Drive enclosures
7. Leveling bolt

Figure 40: 1,075 mm HPE Rack front view

Standardized placement of components in a 1,200 mm HPE rack
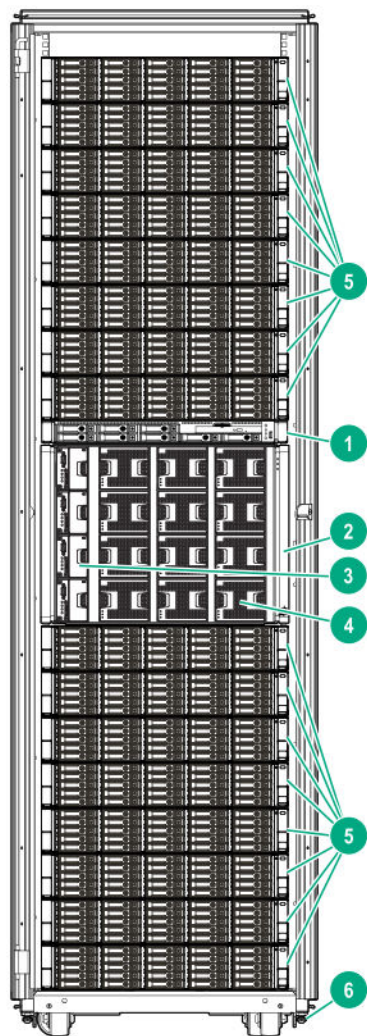
1. Physical service processor (SP)
2. Controller node enclosure
3. Backup battery units (BBUs)
4. Fan modules
5. Drive enclosures
6. Leveling bolt

Figure 41: 1,200 mm HPE Rack front view

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

NVMe SCM Module LEDs
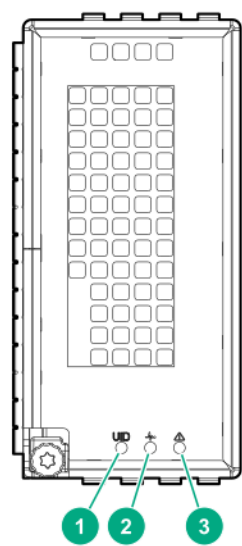
Figure 42: HPE 3PAR 750GB NVMe Storage Class Memory Module LEDs

Table 6: HPE 3PAR 750GB NVMe Storage Class Memory Module LEDs

LED		Function	Status	Port state
1	**UID**	UID/Service	Blue solid	Locate active; safe to remove
			Blue flashing	Locate active; **do not remove component**
2	-\/\-	Status	Green solid	Normal operation; no fault
3	⚠	Fault	Amber solid	Fault

Two-port 32 Gb FC HBA LEDs
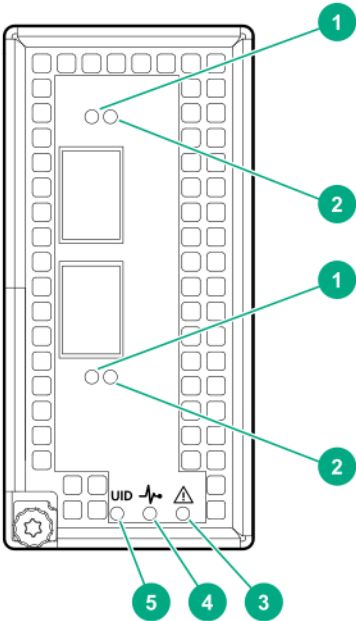
Figure 43: HPE 3PAR Two-Port 32Gb FC Host Bus Adapter LEDs

Table 7: 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
3 ⚠	Fault	Amber solid	Fault
4 ⎓	Status	Green solid	Normal operation; no fault
5 **UID**	UID/Service	Blue solid	Locate active and/or safe to remove
		Blue flashing	Locate active; **do not remove component**

Two-port 10 Gb iSCSI CNA LEDs
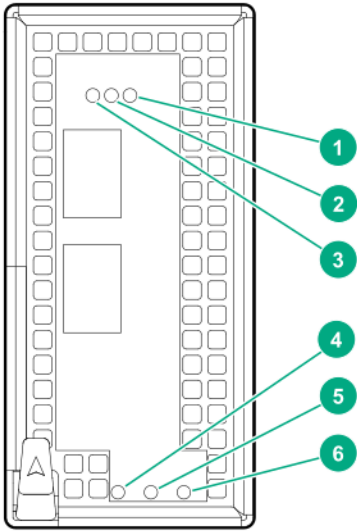
1. Ethernet LED

2. Activity LED

3. Link LED

4. Fault LED

5. Status LED

6. UID/Service LED

**Figure 44: HPE 3PAR Two-Port 10Gb iSCSI Converged Network Adapter LEDs**

Table 8: HPE 3PAR Two-Port 10Gb iSCSI Converged Network Adapter LEDs

Ethernet LED	Activity LED	Link LED	Port state
Off	Off	Off	Power off
Green solid	Off	Off	Power on; no link
Green solid	Green solid	Green solid	Power on; 10 Gb/s link established; no activity
Green solid	Green flashing	Green solid	Power on; 10 Gb/s link established; receive/transmit activity
Green solid	Off	Amber solid	Firmware fault

Table 9: HPE 3PAR Two-Port 10Gb iSCSI Converged Network Adapter LEDs

LED	Function	Status	Indicates
⚠	Fault	Amber Solid	Fault
⎺⋁⋏⎯	Status	Green Solid	Normal operation; no fault
UID	UID/Service	Blue Solid	Locate active; safe to remove
		Blue Flashing	Locate active; **do not remove component**

Two-port 10 Gb Ethernet NIC adapter LEDs
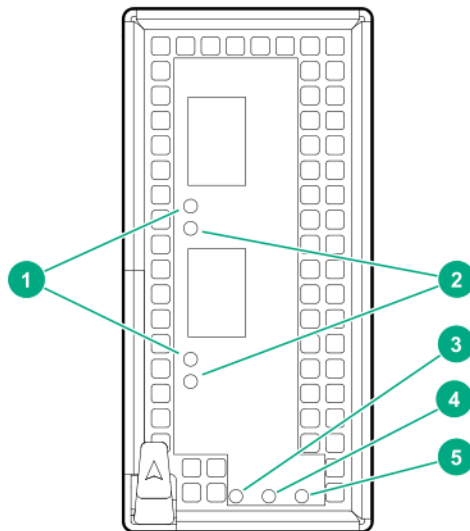
Figure 45: HPE 3PAR Two-Port 10Gb Ethernet NIC Adapter LEDs

Table 10: HPE 3PAR Two-Port 10Gb Ethernet NIC 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
3 ⚠	Fault	Amber solid	Fault
4 ⎺⋁⋏⎯	Status	Green solid	Normal operation; no fault

Table Continued

LED	Function	Status	Port state
5 UID	UID/Service	Blue solid	Locate active and/or safe to remove
		Blue flashing	Locate active; **do not remove component**

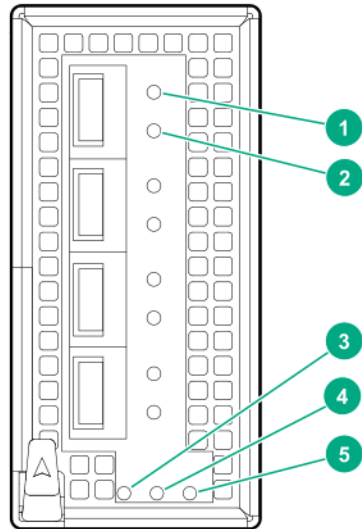## Four-port 16 Gb FC HBA LEDs

Figure 46: HPE 3PAR Four-Port 16Gb FC Host Bus Adapter LEDs

Table 11: HPE 3PAR Four-Port 16Gb FC Host Bus Adapter LEDs

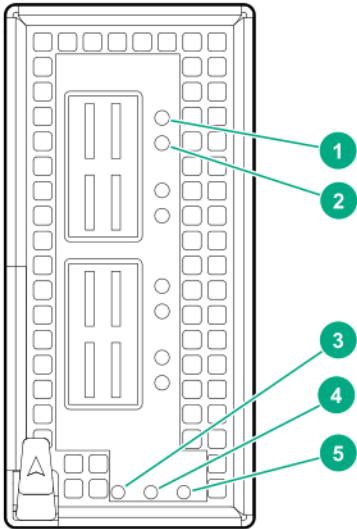| LED	Function	Status	Port state
1	Link/Status	Green solid	Normal/connected; link up
		Green flashing	Link down or not connected
2	Port/Speed	Amber flashing	Connecting at high speed
		Off	Not connected; port failed or power not applied
3 ⚠	Fault	Amber solid	Fault
4 ⎍⋏⋏⋏	Status	Green solid	Normal operation; no fault
5 UID	UID/Service	Blue solid	Locate active; safe to remove
		Blue flashing	Locate active; **do not remove component**

Four-port 12 Gb SAS HBA LEDs

Figure 47: HPE 3PAR Four-Port 12Gb SAS Host Bus Adapter LEDs

Table 12: HPE 3PAR Four-Port 12Gb SAS Host Bus Adapter LEDs

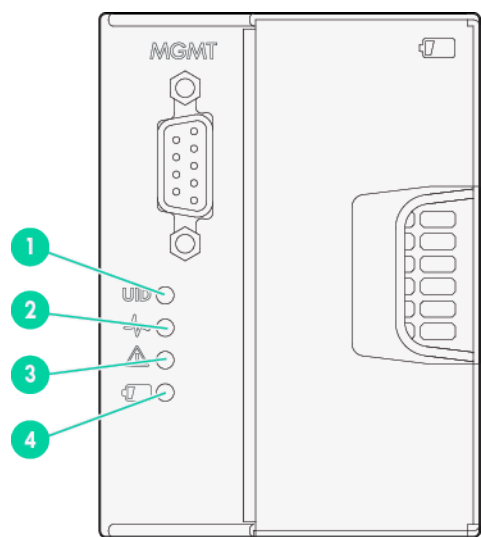| LED	Function	Status	Port state
1	Port speed	Amber solid	Not connected
		Off	Connected
2	Link status	Green solid	Normal/connected; link up
		Off	Not connected
3 ⚠	Fault	Amber solid	Fault
4 ⟋ᐧ	Status	Green solid	Normal operation; no fault
5 **UID**	UID/ Service	Blue solid	Locate active and/or safe to remove
		Blue flashing	Locate active; **do not remove component**

Backup battery unit LEDs

Figure 48: Backup battery unit LEDs

Table 13: Backup battery unit LEDs

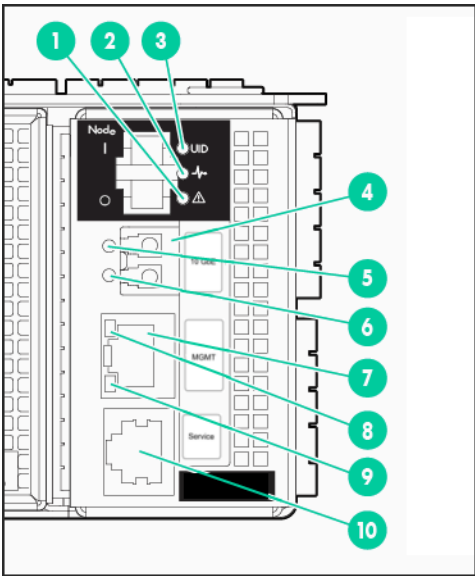| LED	Function	Status	State
1 **UID**	UID/ Service	Blue solid	Locate active and/or safe to remove
		Blue flashing	Locate active; **do not remove component**
2	Status	Green solid	Battery functioning
3	Fault	Amber solid	Fault
4	Battery	Green solid	Battery charging

Controller node LEDs and ports

Figure 49: Controller node LEDs and ports, controller node enclosure rear view

1. Fault LED

2. Status LED

3. UID/Service LED

4. 10 GbE SFP port (RCIP) - optical SFP/connector

5. Link activity LED

6. Speed LED

7. 1 GbE MGMT port (management) - standard CAT-5/RJ-45 connector

8. Link activity LED - Activity/Link

9. Speed LED - Speed

10. Service port (console)

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

Callout		LED Status	State
1	Controller node: Fault LED	Green solid	Booting; not a cluster member
2	Controller node: Status LED	Green flashing (1 blink/sec)	Normal operation
		Amber solid	Fault with the controller node or component
3	Controller node: UID/Service LED	Blue solid	Locate active and/or shutdown (halted); not a cluster member; safe to remove
		Blue flashing	Locate active; **do not remove component**

Table Continued

Callout		LED Status	State
4	**10 GbE port**		
5	10 GbE port: Link activity LED	Off	Link down
		Green solid	Link up
		Green flashing	Link activity
6	10 GbE port: Speed LED	Off	100 MB or none
		Green solid	1 GB
		Amber solid	10 GB
7	**MGMT port**		
8	MGMT port: Link activity LED	Off	Link down
		Green solid	Link up
		Green flashing	Link activity
9	MGMT port: Speed LED	Off	10 MB or none
		Green solid	100 MB
		Amber solid	1000 MB
10	**Service port**		

Drive enclosure LEDs
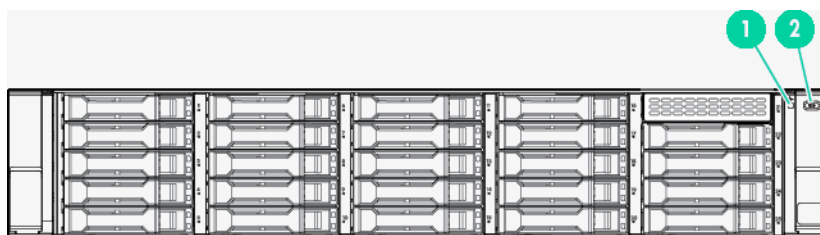
Figure 50: Drive enclosure LEDs, front view

Table 15: Drive enclosure LEDs, front view

LED	Function	Status	State
1 ⎍	Status	Green solid	Normal operation; no faults detected
		Amber solid	Critical fault detected
		Amber flashing	Noncritical fault detected within the enclosure Example: failed or removed Fan Module
2 **UID**	UID/Service	💡 **TIP:** This UID push button activates or deactivates the Blue UID LED on the rear and front of the Drive Enclosure.	
		Blue solid	Locate active

Figure 51: Drive enclosure LEDs, rear view

Table 16: Drive enclosure LEDs, rear view

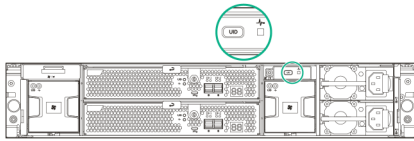| LED function	Display	State
UID Locate UID	💡	**TIP:** This UID push button activates or deactivates the Blue UID LED on the rear and front of the Drive Enclosure.
	Blue solid	Location activated
⎍ Status	Green solid	Normal operation
	Amber solid	Critical fault
	Amber flashing	Noncritical fault

Drive LEDs
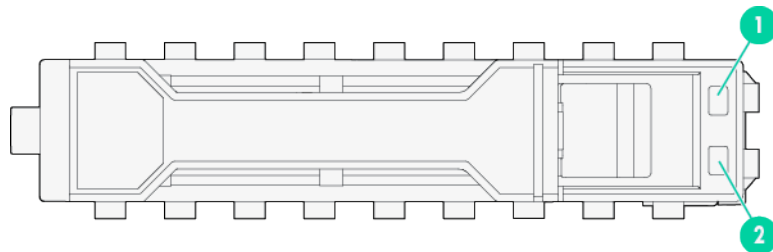
Figure 52: SFF drive LEDs

Table 17: SFF drive LEDs

LED	Function	Status	State
1	UID/Service	Blue solid	Locate active; safe to remove
		Blue flashing	Locate active; **do not remove component**
2	Status/Activity	Green solid	Normal operation; drive in **OK** state; admitted by theHPE 3PAR OS
		Green flashing	Drive activity
		Amber solid	• Critical fault • Solid amber in conjunction with the blue indicates the drive being admitted or serviced

Table Continued

LED	Function	Status	State
		Amber flashing	Noncritical fault
		Off	No power

Fan module LEDs

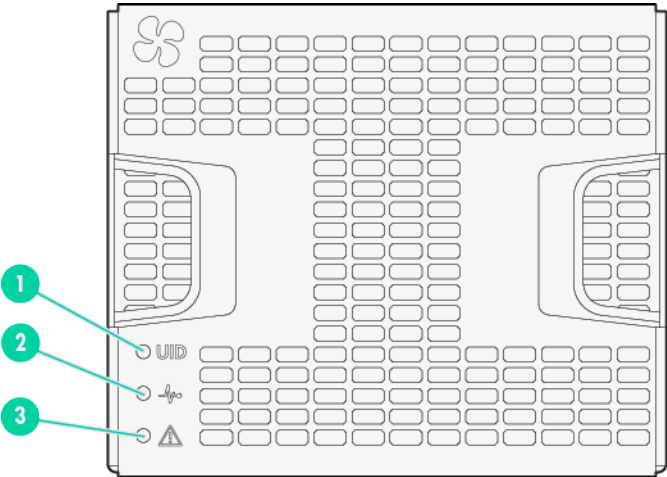### Fan module LEDs, controller node enclosure

Figure 53: Fan module LEDs, controller node enclosure front view

Table 18: Fan module LEDs, controller node enclosure front view

LED	Function	Status	State
1	**UID** UID/Service	Blue solid	Locate active and/or safe to remove
		Blue flashing	Locate active; **do not remove component**
2	Status	Green solid	Normal operation; no fault
3	Fault	Amber solid	Fault

Fan module LEDs, drive enclosure
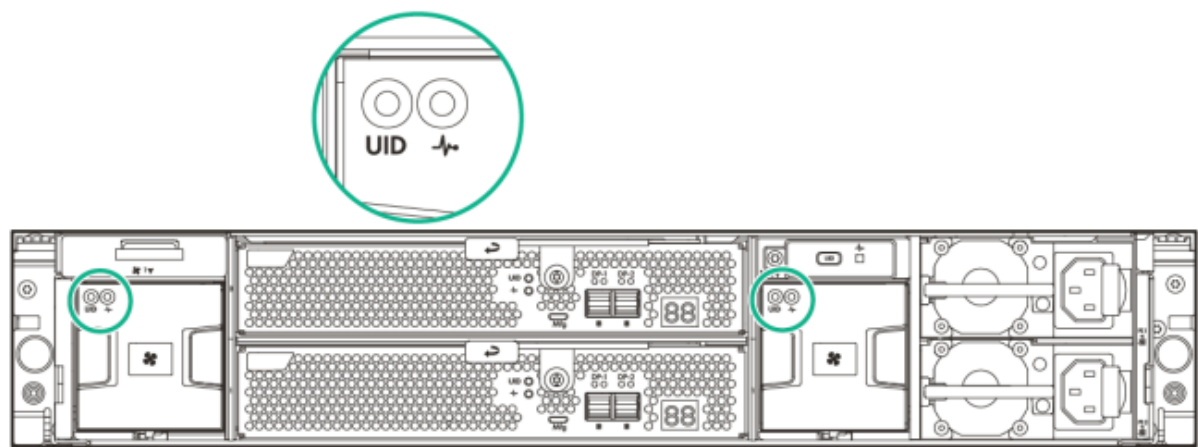
Figure 54: Fan module LEDs, drive enclosure rear view

Table 19: Fan module LEDs, drive enclosure rear view

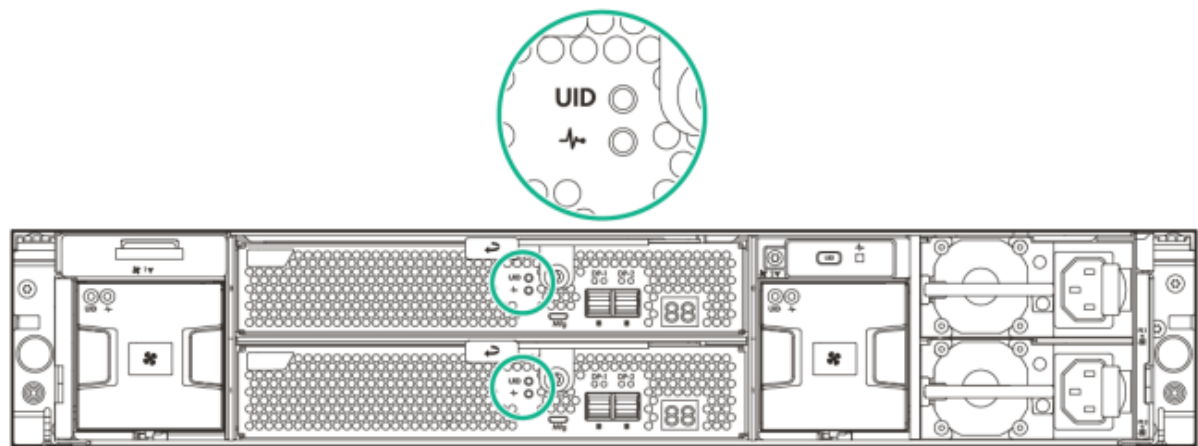| LED function	Status	State
UID Locate UID	Blue solid	Locate activate; safe to remove
	Blue flashing	Locate activate ; **do not remove component**
⟋⟍ Status	Green solid	Normal operation
	Amber solid	Fault
	Off	No power

I/O module LEDs

Figure 55: I/O modules LEDs, drive enclosure rear view

Table 20: I/O modules LEDs, drive enclosure rear view

LED function		Display	State
⎍ᴧ	Health/Fault	Green solid	Normal operation
		Amber solid	Fault
UID	UID/Service	Blue solid	Location requested; safe to remove
		Blue flashing	Location requested; **do not remove** Indicates maintenance in progress; for example, firmware updating
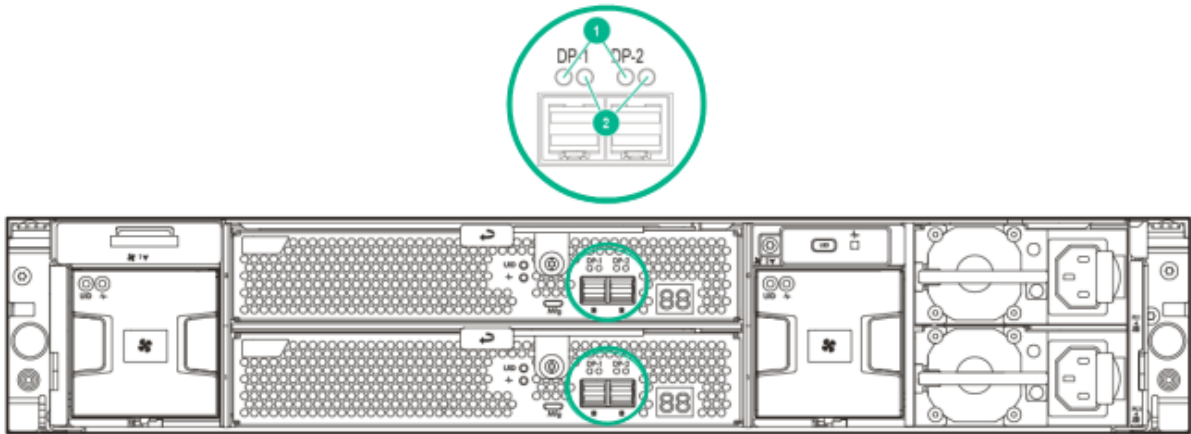
Figure 56: SAS port LEDs, drive enclosure rear view

LED Function		Status	State
1	Activity	Green solid	• With amber Fault LED off, link at high speed with no activity. • With solid amber Fault LED, link at low speed with no activity.
		Green flashing	• With amber Fault LED off, link at high speed with activity. • With solid amber Fault LED, link at low speed with activity. • With flashing amber Fault LED, locate requested.
		Off	With solid amber Fault LED, no link or no cable connected.

Table Continued

LED Function	Status	State
2 Fault	Amber solid	• With solid green Activity LED, link at low speed with no activity.
		• With flashing green Activity LED, link at low speed with activity.
		• With green Activity LED off, no link or no cable connected.
	Amber flashing	With flashing green Activity LED, locate requested.
	Off	• With solid green Activity LED, link at high speed with no activity.
		• With flashing green Activity LED, link at high speed with activity.

Power supply unit LEDs

Power supply unit LEDs, controller node enclosure

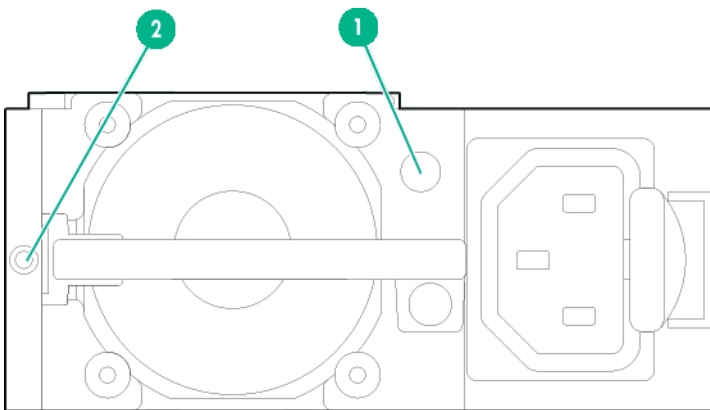**Figure 57: Power Supply Units LEDs, controller node enclosure rear view**

Table 21: Power Supply Units LEDs, controller node enclosure rear view

LED function	Status	State
1 Status	Green solid	Normal operation
	Amber solid	PSU failed
2 UID/Service	Blue solid	Locate active and/or safe to remove
	Blue flashing	Locate active; **do not remove component**

Power supply unit LEDs, drive enclosure
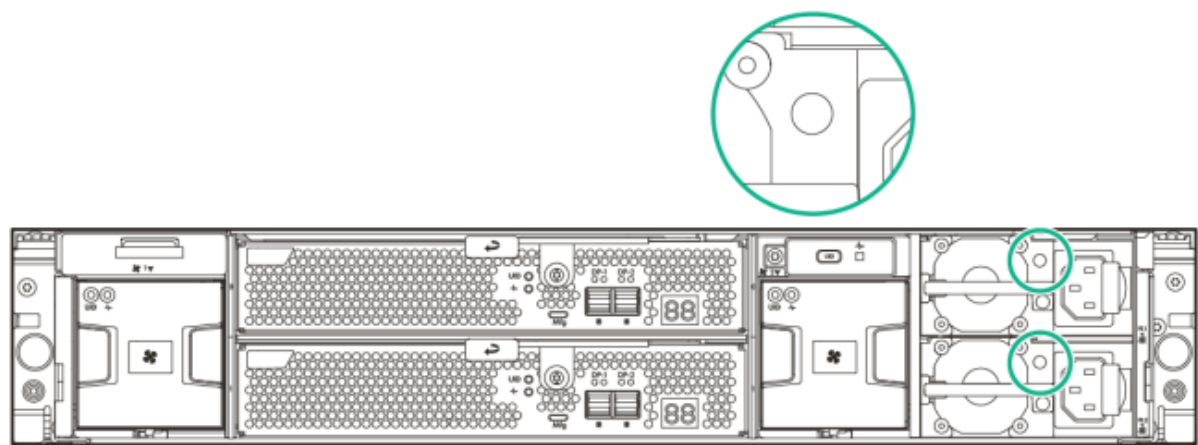
Figure 58: Power supply unit LEDs, drive enclosure rear view

Table 22: Power supply unit LEDs, drive enclosure rear view

LED function	Display	State
Status	Green solid	Normal operation
	Amber flashing	Non-critical fault
	Amber solid	Critical fault
	Off	No power

Service processor LEDs

Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server

Figure 59: Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server rear view

Table 23: Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server rear view

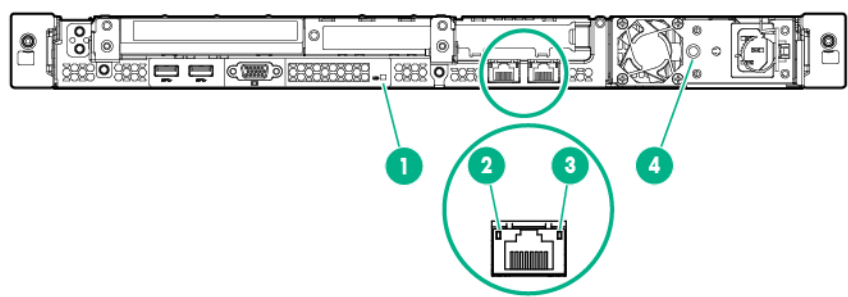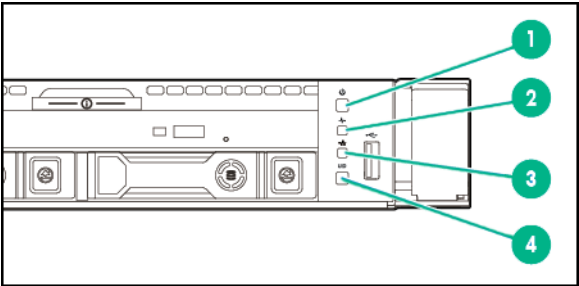|	LED/Port function	Status	State
1	UID/Service	Blue solid	Activated
		Blue flashing	Service processor managed remotely
		Off	Deactivated
2	NIC link	Green solid	Network link
		Off	No network link
3	NIC activity	Green solid	Network link
		Green flashing	Network activity
		Off	No network activity
4	Power 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 60: Physical service processor LEDs, HPE ProLiant DL120 Gen9 Server front view

Table 24: 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

Table Continued

LED/Port function	Status	State
	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

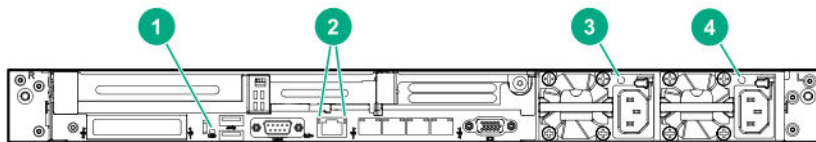## Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server

Figure 61: Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server rear view

Table 25: 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.

Table Continued

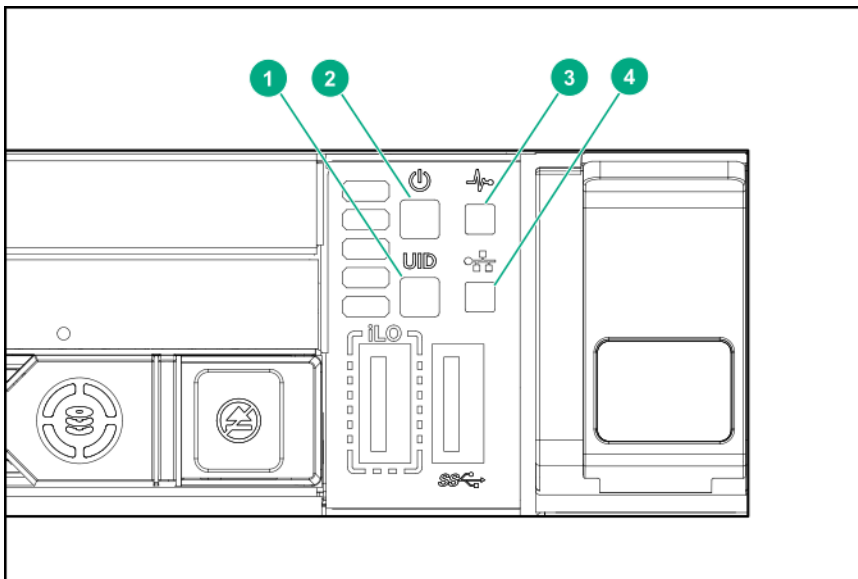| LED function		Status	State
2L	iLO 5/Standard NIC link LED	Green solid	Link exists.
		Off	No link exists.
3	Power supply 2 LED	Green solid	Normal
		Off	One or more of the following conditions exists: • AC power unavailable • Power supply failed • Power supply in standby mode • Power supply exceeded 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 62: Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server front view

Table 26: Physical service processor LEDs, HPE ProLiant DL360 Gen10 Server front view
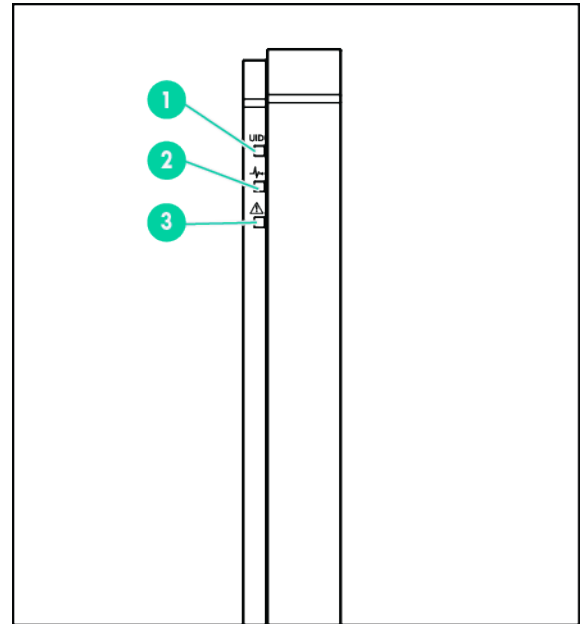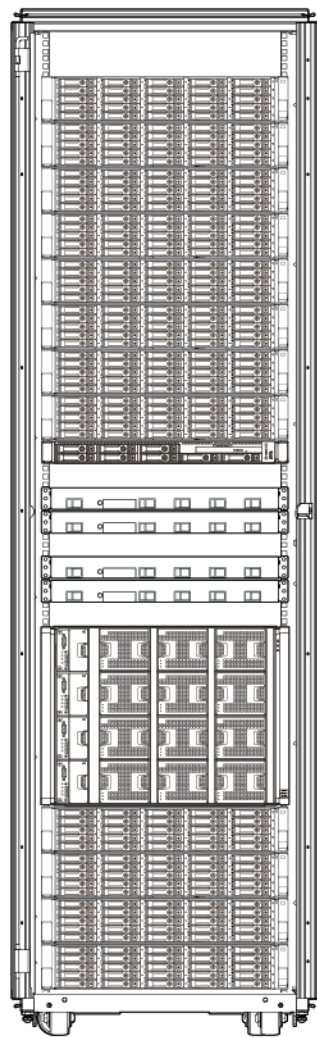
	LED function	Status	State
1	UID button/ LED*	Blue solid	Activated
		Blue flashing	1 Hz = Remote management or firmware upgrade in progress
			4 Hz = iLO manual reboot sequence initiated
			8 Hz = iLO manual reboot sequence in progress
			Off = Deactivated
2	Power on/ Standby button and power LED*	Green 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
		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—controller node enclosure

The HPE 3PAR StoreServ 9000 Storage system status LEDs are at the front, right corner of the controller node enclosure.

Figure 63: System status LEDs, controller node enclosure front view

Table 27: System status LEDs, controller node enclosure front view

LED		Function	Status	State
1	**UID**	UID/Service	Blue solid	Locate active
2		Status	Green solid	Normal operation; no fault
3		Fault	Amber solid	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)**.
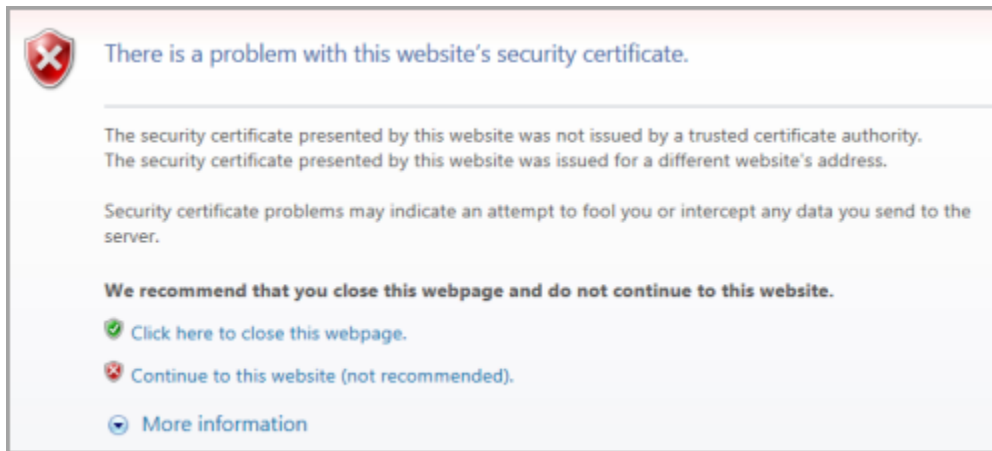
Solution 2

Cause

Warning message in Google Chrome browser.

Action

1. Click the **Advanced** link.
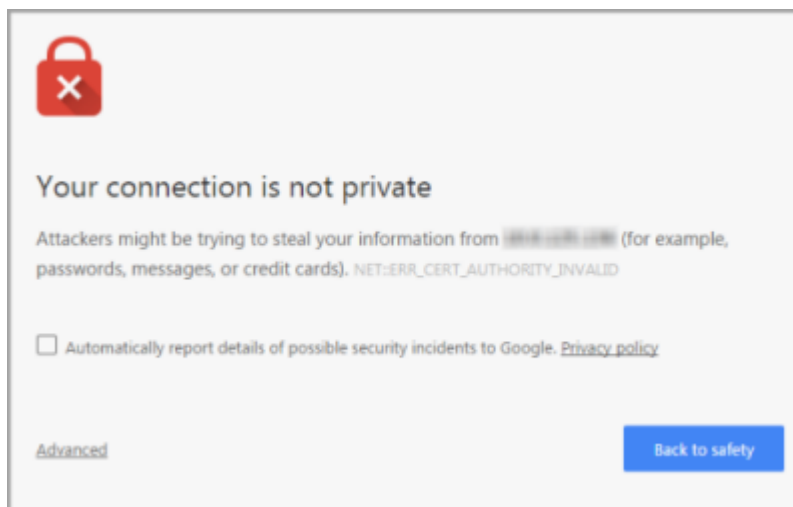
2. Click **Proceed to <sp_ip_address> (unsafe)**.
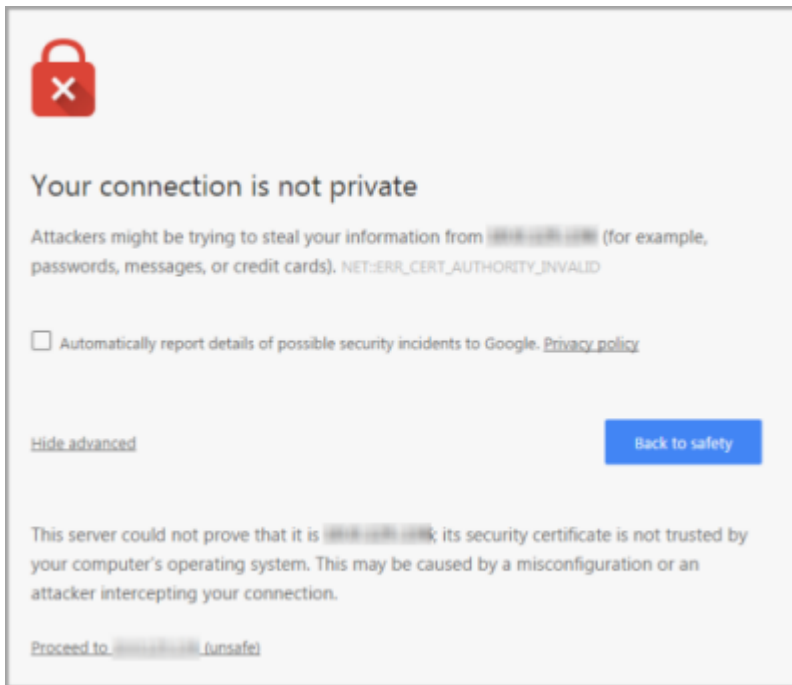
Solution 3

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/`.
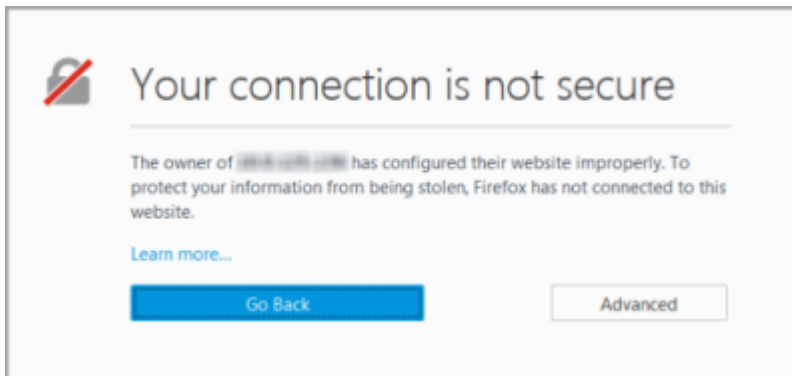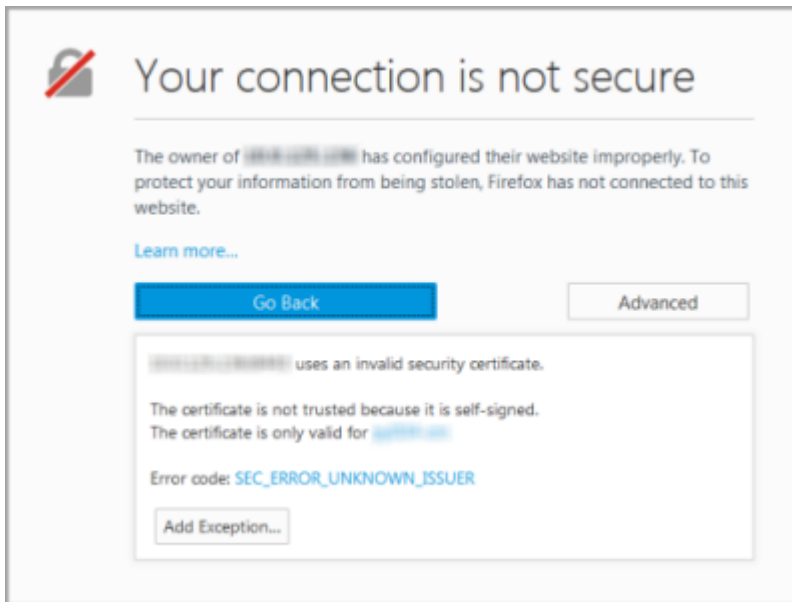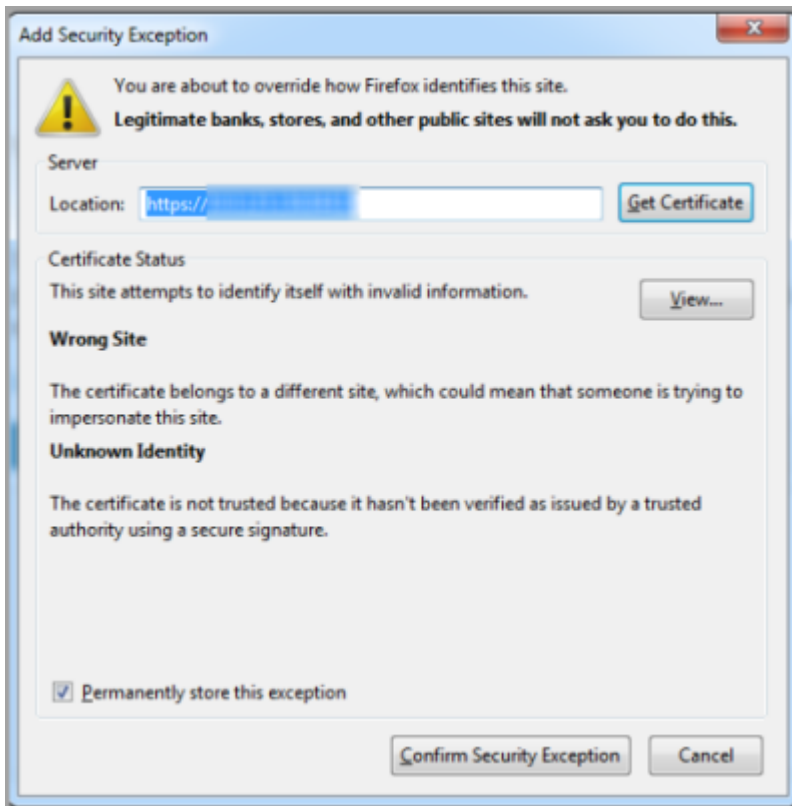
   b. Enter the account credentials, and then click **Login**.

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 software

Symptom

During the software installation of the storage system, 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.

Identification numbers are assigned during the software installation to the drive enclosures based on a scan of the DP1 port first and then the DP2 port on a given controller node pair.

Example:

With a two controller node storage system that includes three 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:

1. Connect and log in to the HPE 3PAR 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. On the 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 bezel ear cap and also has all of 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>`.

HPE 3PAR StoreServ 9000 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 9000 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 9000 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 9000 Storage system—Installation Site

Company name	
Address	

HPE 3PAR StoreServ 9000 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

BBU

Battery Backup Unit

CC

Control Cache (DIMMs)

CDA

confidential disclosure agreement

CLI

command line interface

CNA

converged network adapter

CSI

Customer Self Install

DAR

data at rest

DHCP

dynamic host configuration protocol

DNS

domain name system

ESD

electrostatic discharge

FC

Fibre Channel (protocol) or fast class (drive type)

FIPS

Federal Information Processing Standard

FRU

field replaceable unit

GB

Gigabyte

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

LUN

logical unit number

NIC

network interface card

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

PSU

Power Supply Unit

RAID

redundant array of independent disks

RPS

redundant power supply

SAN

storage area network

SAS

serial attached SCSI

SC

HPE 3PAR Service Console

SFF

small form factor

SFP

small form-factor pluggable

SFRM

HPE StoreFront Remote

SP

Service Processor

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 Text-based User Interface

U

unit of space in a rack

UID

unit identification

VM

virtual machine

VV

virtual volume

W

watt