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

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Guidelines and responsibilities for a customer self install

Guidelines for a customer self install:

**IMPORTANT:**

- A customer self install (CSI) of your HPE 3PAR StoreServ 8000 Storage is the installation of the storage system without the assistance of an authorized service provider. If installation assistance is needed, contact your Hewlett Packard Enterprise sales representative or HPE Channel Partner to purchase HPE Deployment Services.
- After this initial CSI installation, the installation of additional components (hardware upgrade) is not covered by CSI, such as adding drives and PCIe host adapters. Only some components are designated for a customer self upgrade (CSU). All non-CSU components require installation by an authorized service provider to satisfy the warranty.

The CSI option is only available for the HPE 3PAR StoreServ 8000 Storage which meets the following guidelines:

- A CSI of the HPE 3PAR StoreServ 8000 Storage must be performed using the HPE 3PAR SmartStart feature of HPE 3PAR OS 3.2.2. An out-of-the-box (OOTB) or moment-of-birth (MOB) installation is not permitted for a CSI and instead an authorized service provider must install the software.
- Only 2-node storage systems:
  - HPE 3PAR StoreServ 8200 Storage (2-node)
  - HPE 3PAR StoreServ 8400 Storage (2-node only)
  - HPE 3PAR StoreServ 8440 Storage (2-node only)
  - HPE 3PAR StoreServ 8450 Storage (2-node only)
- Storage systems purchased in these configurations:
  - Storage system factory integrated in an HPE rack.
  - Storage system factory integrated without a rack.
  - Storage system to be field integrated and no purchase of PCIe host adapters.
- Maximum of four expansion drive enclosures allowed at initial order. For these drive enclosures to be a CSI component, they must be installed at the time of the initial installation of the storage system. After the initial installation, the drive enclosures are not CSU. To satisfy the customer warranty, Hewlett Packard Enterprise requires that an authorized service provider upgrades the storage system.
- System components installed in a single rack that has four-posts and square RETMA rail holes.

Exception: a physical service processor can be installed in a separate rack.

Responsibilities of the customer:

- Ensure that all the relevant documentation for the HPE 3PAR StoreServ 8000 Storage has been reviewed prior to initiating the installation.
- Ensure that the host and storage area network (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 8000 Storage. The HPE 3PAR <host OS> Implementation Guides and the HPE 3PAR Smart SAN <version #> User Guide are available at the Hewlett Packard Enterprise Information Library Storage website.
  The Support Matrix is available at the Single Point of Connectivity Knowledge (SPOCK) website.
- Gather the required network and password information as indicated in the Software Setup Worksheet.
- Use HPE 3PAR SmartStart and HPE 3PAR StoreServ Management Console (SSMC) to configure and set up the storage system.
Recommendations for the installer:

To install the storage system successfully, Hewlett Packard Enterprise recommends that the installer is experienced with 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, hypervisors such as VMware ESXi and Microsoft Hyper-V).
- Be able to maintain and install server hardware and Windows and/or Linux operating systems.
- 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.

Related reference

Websites on page 104
About the HPE 3PAR StoreServ 8000 Storage

Architecture

Figure 1: Architecture of the HPE 3PAR StoreServ 8000 Storage

- **HPE 3PAR StoreServ 8000 Storage**—This storage system includes controller nodes, physical drives, and expansion drive enclosures (optional). The controller nodes include network ports to provide administrative datapaths to the HPE 3PAR StoreServ 8000 Storage.

- **Hosts (servers)**—The host servers connect to the HPE 3PAR StoreServ 8000 Storage directly or through a switch with various 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 HPE 3PAR StoreServ 8000 Storage.

- **HPE 3PAR Service Processor (SP) software installed on a physical SP or virtual SP**—Each storage system requires an SP. The SP can be either physical or virtual. The SP is designed to provide remote monitoring, error detection and reporting, and supports diagnostic and maintenance activities involving the storage system. The SP only sends support data to HPE 3PAR Remote Support. The virtual SP is deployed as a virtual machine (VM). 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 Hyper-V. The virtual SP runs on a customer-owned and 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. If you agree to be part of the support, this utility provides critical updates to your storage system through the service processor. Data related to storage system health and configuration is securely transferred to Hewlett Packard Enterprise for analysis.

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

For information about supported hardware and operating system (OS) platforms, see the Hewlett Packard Enterprise Single Point of Connectivity Knowledge (SPOCK) website.
Options for the storage base (controller node enclosure):

The HPE 3PAR StoreServ 8000 Storage requires one storage base (controller node enclosure).

- **HPE 3PAR StoreServ 8000 Storage 2-node Storage Base**: 2U controller node enclosure with 24 SFF 6.4 cm (2.5 in) drive bays at the front and two controller nodes at the rear
- **HPE 3PAR StoreServ 8000 Storage 4-node Storage Base**: Two 2U controller node enclosures totaling 48 SFF 6.4 cm (2.5 in) drive bays at the front and four controller nodes at the rear

Options for an upgrade of additional drives enclosures:

Expansion drive enclosures are available once all SFF bays are used in the base storage. These drive enclosures allow for the addition of SFF 6.4 cm (2.5 in) drives and LFF 8.9 cm (3.5 in) drives.

- **HPE 3PAR StoreServ 8000 Storage SFF SAS Drive Enclosure**: 2U expansion drive enclosure with 24 SFF 6.4 cm (2.5 in) drive bays at the front and two 12 Gb SAS I/O modules at the rear
- **HPE 3PAR StoreServ 8000 Storage LFF SAS Drive Enclosure**: 4U expansion drive enclosure with 24 LFF 8.9 cm (3.5 in) drive bays at the front and two 12 Gb SAS I/O modules at the rear

Options for an upgrade to a four-node storage system:

**IMPORTANT:**
An upgrade from a 2-node to a 4-node storage system applies only to the following models with a limit of four-nodes for a storage system:

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

- **HPE 3PAR StoreServ 8400 Storage Upgrade Node Pair**: 2U controller node enclosure with 24 SFF 6.4 cm (2.5 in) drive bays at the front and two controller nodes at the rear
- **HPE 3PAR StoreServ 8440 Storage Upgrade Node Pair**: 2U controller node enclosure with 24 SFF 6.4 cm (2.5 in) drive bays at the front and two controller nodes at the rear
- **HPE 3PAR StoreServ 8450 Storage Upgrade Node Pair**: 2U controller node enclosure with 24 SFF 6.4 cm (2.5 in) drive bays at the front and two controller nodes at the rear

Related reference

Websites on page 104

**Types of purchased configurations**

**Storage system that is factory integrated in an HPE rack**

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

**Storage system that is factory integrated without a rack**

The storage system is integrated and tested. The integration includes the assembly of components, cabling, labeling, the installation of software and licenses, and then testing the storage system as a whole. Prior to shipment, the cables are disassembled and the enclosures, cables, and miscellaneous materials are shipped in separate packaging. The storage system is field integrated at the customer site in a customer-supplied, standard, four-post, EIA-310, 48.3 cm (19 in) rack.
Storage system that is field integrated

The storage system components are tested individually and shipped in separate packaging. The storage system is field integrated at the customer site in a customer-supplied, standard, four-post, EIA-310, 48.3 cm (19 in) rack. The integration involves installation of storage system components, cabling, labeling, software, and licenses.

Installation media

Installation DVDs are not typically shipped with the 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 Hewlett Packard Enterprise Support Center and request assistance with the HPE 3PAR StoreServ 8000 Storage.

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.

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

Related reference

Websites on page 104

Serial number location for the HPE 3PAR StoreServ 8000 Storage

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

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

Figure 2: Serial number location for the HPE 3PAR StoreServ 8000 Storage
Customer self install forum

For the latest HPE 3PAR StoreServ 8000 Storage customer self install (CSI) information, see the official HPE 3PAR StoreServ 8000 Storage Self-Install forum website in the Hewlett Packard Enterprise community: [www.hpe.com/forum/3PAR8000CSIHELP](http://www.hpe.com/forum/3PAR8000CSIHELP)

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

**Related reference**

**Websites** on page 104
Preparation

Procedure

1. Review the Site planning on page 13.
2. Review the Safety and regulatory compliance on page 14.
4. Review the Preventing electrostatic discharge on page 14.
5. Watch the Customer self install video on page 15.
8. Review the Acclimatize the storage system on page 16.

Site planning

Environment—For optimal performance at a specific location, storage systems require controlled
environmental conditions that 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.

⚠️ CAUTION:

• 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 storage system units in the specified configuration and all cables of the required
  length have been ordered.
• Make a layout for the storage system installation.
• Enable the appropriate HPE 3PAR Remote Support strategy.

Procedure

• Review the specific information concerning server-room environments and for input electrical power
  and grounding requirements in the HPE 3PAR StoreServ 8000 Storage Site Planning Manual available
  at the Hewlett Packard Enterprise Information Library Storage website.

Related reference

Websites on page 104
Safety and regulatory compliance

For safety, environmental, and regulatory information, see Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products available at the Hewlett Packard Enterprise Safety and Compliance website.

Related reference
Websites on page 104

Power safety

Follow these safety precautions when connecting multiple hardware components to power sources:

⚠️ WARNING:
To reduce the risk of fire, electric shock and damage to power sources.
• Connect only to a circuit providing branch circuit overcurrent protection of appropriate current rating.
• Connect the input power cord into a grounded (earthed) electrical outlet that is located near the equipment and is easily accessible.
• Be sure that all circuit breakers are in the off position before connecting input power.
• Be sure that the load products connected to the power distribution unit (PDU) are adjusted for, or otherwise capable of operation from the same line voltage supplying the PDU. Failure to verify that the voltage can lead to severe equipment damage.
• Do not overload the PDU. The total input current rating of all equipment connected to each output cannot exceed the total output rating marked on the PDU.

⚠️ CAUTION:
To reduce the risk of personal injury from high-leakage current, verify earth connection before connecting the power supply.

The summation of input power for multiple pieces of information technology equipment through the use of power products can result in high-leakage currents.
If the total storage system leakage current for a storage system of components exceeds 3.5 mA:
• The use of a detachable input power cord is prohibited.
• The input power cord must be securely attached and be connected to the AC mains by hardwiring or through the use of a nonresidential, industrial-styled plug that maintains positive earth connection.
• If the total storage system leakage current through the ground conductor exceeds 5% of the input current per line under normal operating conditions, divide the storage system loads among multiple power connections.

Preventing electrostatic discharge

Electrostatic discharge (ESD) can damage electrostatic-sensitive devices and micro circuitry.
CAUTION:

- Keep static-sensitive parts in their containers until they arrive at static-free workstations.
- Transport products in electrostatic-safe containers, such as conductive tubes, bags, or boxes.
- Avoid contact between electronic components and clothing, which can carry an electrostatic charge.
- Cover workstations with approved static-dissipating material. Prepare an ESD work surface by placing an anti-static mat on the floor or on a table near the storage system. Attach the ground lead of the mat to an unpainted surface of the rack.
- Ensure that you are always properly grounded (earthed) when touching a static-sensitive component or assembly. Always use the ESD grounding strap and attach the grounding strap clip directly to an unpainted metal surface.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and foam packing.
- Use conductive field service tools.
- Avoid touching pins, leads, and circuitry.
- Always place drives with the printed circuit board assembly-side down.

Procedure

- Use proper packaging and grounding techniques to prevent damage.

Customer self install video

Procedure

- To prepare for the installation, watch the HPE 3PAR StoreServ 8000 Storage customer self install (CSI) video: www.hpe.com/support/3PAR8000CSIVideo

Software Setup Worksheet

Procedure

- Print the Software Setup Worksheet—HPE 3PAR OS 3.2.2 and HPE 3PAR SP 4.x on page 108 appendix in this guide, and to prepare for the software setup that occurs after the hardware setup, complete this worksheet.

Rack-component layout and SAS-cabling configuration

IMPORTANT:

This configuration information applies only to a storage system that is either factory integrated without a rack or field integrated and that includes one or more expansion drive enclosures.

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

See Cabling guidelines and diagrams for SAS cable connections on page 63.
The configurations for the storage system layout and SAS cabling are also provided in the *HPE 3PAR StoreServ 8000 Storage Cabling Configuration Guide* available at the *Hewlett Packard Enterprise Information Library Storage* website.

**Related reference**

**Websites** on page 104

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**Acclimatize the storage system**

⚠️ **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 the transit, allow enough time for the storage system to acclimatize before proceeding with the power-on sequence.

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**Procedure**

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

**Tools for the installation**

<table>
<thead>
<tr>
<th>Safety</th>
<th>• ESD mat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• ESD grounding strap</td>
</tr>
<tr>
<td>Unpacking the rack</td>
<td>• Socket wrench with 13 mm (1/2 in) and 17 mm (11/16 in) sockets for removing L-bracket shipping clamps</td>
</tr>
<tr>
<td></td>
<td>• Adjustable wrench for leveling feet on rack</td>
</tr>
<tr>
<td></td>
<td>• Screwdriver for removing cable restraint shipping brackets</td>
</tr>
<tr>
<td>Installing rail kits and enclosures</td>
<td>• P1 and P2 Phillips screwdrivers</td>
</tr>
<tr>
<td></td>
<td>• T25 Torx bit and driver</td>
</tr>
</tbody>
</table>
Shipment unpacking

Unpacking a system that is factory integrated in a rack

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, you must verify that there is enough space to unload and unpack the 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 allow access to the storage system so that it can be moved to its placement destination.
- 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.
- Provide unpacking space in the loading/unloading area, ramp, and destination room.
- 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.
  - Use more than two people guide the rack down the ramp.
  - Use at least two people to unload the rack from the pallet.
  - Never stand in front of the rack when it is rolling down the ramp from the pallet.
- Once the rack is in-place, extend the rack feet to the floor with leveling pads positioned underneath the feet to protect the floor.
- Be careful when sliding rack components with slide rails into the rack to avoid pinching your fingertips.
- Ensure that the rack is adequately stabilized before extending a rack component with slide rails outside the rack. Extend only one rack component at a time. If more than one component is extended, a rack can become unstable.
- Verify that the AC power supply branch circuit that provides power to the rack is not overloaded. Overloading AC power to the rack power supply branch circuit increases the risk of personal injury, fire, and damage to the equipment. Avoid a total rack load that exceeds 80% of the branch circuit rating. Consult the electrical authority with jurisdiction over your facility wiring and safety electrical requirements before starting the installation.
- To make the rack bottom-heavy and more stable, always load the heaviest item first from the bottom of the rack and up.

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

Procedure

1. Unpack the rack on page 18.
2. Remove cable restraint shipping brackets on page 18.
4. After unpacking the system, proceed to Hardware setup on page 49.

Related reference

Websites on page 104
Unpack the rack

Procedure

1. Inspect the packaging for damage and report any issues to the Hewlett Packard Enterprise Support Center.
2. Refer to the rack-unpacking diagrams on the outside of the cardboard shipping container during this procedure.
3. Remove any shrink wrap, banding, tape, plastic clips, or other items securing the cardboard shipping container to the rack and pallet.
4. Remove the cardboard shipping container, top cover first.
5. Set aside boxes holding rack ramps and additional rack hardware.
6. From the bottom rear of the rack and pallet, remove the L-bracket shipping clamps using a socket wrench with 13 mm (1/2 in) and 17 mm (11/16 in) sockets.
7. Unlock and open the rack front door.
8. From the bottom front of the rack and pallet, remove the L-bracket shipping clamps using a socket wrench with 13 mm (1/2 in) and 17 mm (11/16 in) sockets.
9. Using an adjustable wrench, raise the jack screws to provide sufficient clearance for removing the rack from the pallet.
10. Close and secure the rack front door.
11. Unpack the ramp kit and install the ramps on the front of the pallet.
12. Roll the rack off the pallet into its final location.

Remove cable restraint shipping brackets

The cable restraint shipping brackets support the connected data cables and connectors during transport. The brackets are not required if the storage system is in a stationary position, so remove and store the brackets for later use.

Procedure

1. Remove the cable restraint shipping brackets only when the rack is in its final location.
2. Remove the data cables from the hook and loop straps.
3. Loosen the captive screws.
4. Remove the brackets. Be careful not to damage the attached data cables.
Unpacking a system that is factory integrated without a rack, or field-integrated

Prerequisites

When the equipment arrives, you must verify that there is enough room to unload and unpack the storage system components.

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

⚠️ CAUTION:

- 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.
- Provide unpacking space in the loading/unloading area, ramp, and destination room.
- Always use at least two people to lift an enclosure or three if lifting above chest level. Use proper grounding techniques to prevent electrostatic discharge damage to the components.

Procedure

1. **Unpack the components** on page 19.
2. Review **Component identification** on page 20.
3. After unpacking the system, proceed to **Hardware setup** on page 49.

Related reference

Websites on page 104

Unpack the components

Procedure

1. Inspect the packaging for damage and report any issues to Hewlett Packard Enterprise Support.
2. Unpack the controller node enclosure box contents. The box has an Open First label on the exterior of the box.
   a. HPE 3PAR StoreServ 8000 Storage quick setup poster
   b. HPE 3PAR StoreServ 8000 Storage software setup worksheet
   c. With a 2-node HPE 3PAR StoreServ 8000 Storage models 8400/8440/8450, two 1U filler panels—Used to reserve 2Us of space above the controller node enclosure for a future upgrade to a 4-node storage system
   d. Accessories kit: Cable label kit, cable ties, M5 retention screws to secure the controller node enclosure to the rack, and with a 2-node HPE 3PAR StoreServ 8000 Storage models 8400/8440/8450, two stickers to place on the two 1U filler panels used to reserve space for a future upgrade to a 4-node storage system.
   e. 2U rail kit
   f. Controller node enclosure
3. Remove the bag and any tape from the enclosure.
4. If purchased, unpack any additional components shipped in separate boxes.
   a. Expansion drive enclosure: Contains either a 2U or 4U rail kit
   b. Physical Service Processor: Contains a 1U rail kit
5. Save shipping boxes and packing material.
Component identification

- The illustrations of components in this guide are examples only and might not accurately represent the configuration of your HPE 3PAR StoreServ 8000 Storage.
- Due to the large number of prospective configurations, component placement and internal cabling is standardized to simplify installation and maintenance. The components are placed in the rack according to the principles outlined in these topics, and are numbered according to their order and location in the rack.
- The components for the storage system have LEDs to indicate status of the hardware and whether it is functioning properly. These indicators help diagnose basic hardware problems. You can quickly identify hardware problems by examining the LEDs on all components.
- The components and ports for the storage system are assigned a number based on their location within the storage system.

Enclosures front view

The fronts of the controller node enclosure and expansion drive enclosure contain the bays for installing the drives for the storage system.

There is one type of controller node enclosure:

- HPE 3PAR StoreServ 8000 Storage 2-node SFF 6.4 cm (2.5 in), 2U, controller node enclosure:
  Provides 24 SFF drive bays arranged in a single row

![Figure 3: Front view of the 2-node SFF 2U controller node enclosure](image)

There are two types of expansion drive enclosures:

- HPE 3PAR StoreServ 8000 Storage SFF 6.4 cm (2.5 in), 2U, SAS expansion drive enclosure:
  Provides 24 SFF drive bays arranged in a single row

![Figure 4: Front view of the SFF 2U SAS expansion drive enclosure](image)

- HPE 3PAR StoreServ 8000 Storage LFF 8.9 cm (3.5 in), 4U, SAS expansion drive enclosure: Provides 24 LFF drive bays, arranged in four columns of six slots each

![Figure 5: Front view of the LFF 4U SAS expansion drive enclosure](image)
Figure 5: Front view of the LFF 4U SAS expansion drive enclosure

Figure 6: Front view details of both SFF and LFF enclosures

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Left Ear Cap</td>
<td>Location of the system LEDs and a lower-panel latch that opens to gain access to a captive screw for securing the enclosure to a rack</td>
</tr>
<tr>
<td>(bezel)</td>
<td></td>
</tr>
<tr>
<td>2 SFF Drive</td>
<td>SFF 6.4 cm (2.5 in) drives</td>
</tr>
<tr>
<td>3 LFF Drive</td>
<td>LFF 8.9 cm (3.5 in) drives</td>
</tr>
<tr>
<td>4 Right Ear Cap</td>
<td>Lower-panel latch that opens to gain access to a captive screw for securing the enclosure to a rack and the model information for the storage system</td>
</tr>
<tr>
<td>(bezel)</td>
<td></td>
</tr>
</tbody>
</table>
Figure 7: LEDs on the left ear cap (bezel) on the front of the SFF enclosures

Figure 8: LEDs on the left ear cap (bezel) on the front of the LFF enclosures

<table>
<thead>
<tr>
<th>LED Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>System Power</td>
<td>Green Solid</td>
<td>Power</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td></td>
<td>No power</td>
</tr>
<tr>
<td></td>
<td>System Standby</td>
<td>Amber Solid</td>
<td>Enclosure powered by the battery</td>
</tr>
<tr>
<td>2</td>
<td>Module Fault</td>
<td>Amber Solid</td>
<td>Fault</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td></td>
<td>No fault</td>
</tr>
</tbody>
</table>

Table Continued
<table>
<thead>
<tr>
<th>LED Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Drive Status</td>
<td>Amber Solid</td>
<td>Fault—An issue exists with one or more drives within the enclosure. To determine the affected drives, inspect the LEDs on each drive. This LED applies only to drives.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No fault</td>
<td></td>
</tr>
</tbody>
</table>

**Drive bays**

Drives mount in bays in the enclosure front and each bay is assigned a number for locating drives in the storage system.

![Figure 9: Numbers for the SFF drive bays](image)

![Figure 10: Numbers for the LFF drive bays](image)

**Drives**

Drives are installed in the drive bays at the front of either the controller node enclosures or expansion drive enclosures. Drives come in two physical sizes installed in carriers (magazines).

**Drive types:**

- Fast class (FC) drive
- Near line (NL) drive
- Solid state drive (SSD)

SFF drives are available in all three types: FC, NL, and SSD.

LFF drives are available only in types: NL or SSD.

For the HPE 3PAR StoreServ 8450 Storage, all flash array (AFA) model, only SSDs are supported.
Drive sizes:
- SFF 6.4 cm (2.5 in) drives
- LFF 8.9 cm (3.5 in) drives

Maximum drives supported:
- 24 SFF drives per enclosure
- 24 LFF drives per enclosure

LEDs on the drives:

Figure 11: LEDs on the SFF drives
Figure 12: LEDs on the LFF drives

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fault</td>
<td>Amber solid</td>
<td>Drive failed and ready for replacement</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>Locate active</td>
</tr>
<tr>
<td>2 Status</td>
<td>Green solid</td>
<td>Normal operation</td>
</tr>
<tr>
<td></td>
<td>Flashing</td>
<td>Activity</td>
</tr>
</tbody>
</table>

Controller node enclosure rear view

Figure 13: Rear view of the controller node enclosure
### Controller node

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

### IMPORTANT:

The controller nodes in the controller node enclosure are inverted 180° from each other, as well as the ports.
## LEDs on the controller node

<table>
<thead>
<tr>
<th>LED Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Status</td>
<td>Green Solid</td>
<td>Not a cluster member</td>
</tr>
</tbody>
</table>
|          | Green Rapid Flashing | • Booting  
                      | • Shutdown (halted)                                              |
|          | Green Slow Flashing | Cluster member and flashes slowly in synchronization with the other controller nodes in the cluster |
|          | UID/Service     | Blue Solid              | Shutdown (halted); not a cluster member; can be removed                  |
|          | Blue Flashing   | Locate active; **do not remove component** |
|          | Off            | Locate not active       |
|          | Fault          | Amber Solid             | Fault                                                                      |
|          |                | Amber Flashing          | In the cluster, one of the other controller nodes is shutdown (halted).  |
|          |                | Off                     | No fault                                                                  |

**Figure 14: LEDs on the controller node**

**Figure 15: Numbers for the controller nodes in a 2-node storage system**

**Component identification**
Figure 16: Numbers for the controller nodes in a 4-node storage system

Ports on the controller node

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

Figure 17: Ports on the controller node

<table>
<thead>
<tr>
<th>Port type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 PCI host adapter slot</td>
<td>PCIe slot used for optional host adapters (FC/CNA/NIC).</td>
</tr>
<tr>
<td>2 Fibre Channel ports</td>
<td>Two onboard 16 Gb FC ports (FC-1, FC-2) used for the host server connection.</td>
</tr>
<tr>
<td>3 Ethernet port (MGMT)</td>
<td>MGMT: Onboard 1 Gb Ethernet port used to connect to the network.</td>
</tr>
<tr>
<td>4 Ethernet port (RC-1)</td>
<td>RC-1: Onboard 1 Gb Ethernet port used for an HPE 3PAR Remote Copy or HPE 3PAR File Persona connection.</td>
</tr>
</tbody>
</table>

*Table Continued*
### Ports on the controller node

<table>
<thead>
<tr>
<th>Port type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5  SAS ports</td>
<td>Two onboard 12 Gb SAS ports (DP-1, DP-2) used for the expansion drive enclosure connection.</td>
</tr>
<tr>
<td>6  Cluster Interconnect Link</td>
<td>Cluster Interconnect Link ports (Intr0, Intr1) used only with 4-node storage systems for the controller nodes 0 and 1 to controller nodes 2 and 3 connection.</td>
</tr>
<tr>
<td>7  Console port</td>
<td>Console port (MFG) is a serial connection for service procedures.</td>
</tr>
</tbody>
</table>

#### Ethernet port on the controller node

The controller node has two built-in Ethernet ports:

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

![Figure 18: Ethernet ports on the controller nodes of the controller node enclosure](image)

#### LEDs for the Ethernet port

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link Up Speed</td>
<td>Green Solid</td>
<td>1 Gb Link</td>
</tr>
<tr>
<td></td>
<td>Amber Solid</td>
<td>100 Mb Link</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No link established or 10 Mb Link</td>
</tr>
</tbody>
</table>

*Table Continued*
### LEDs for the Ethernet port

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 Activity</td>
<td>Green Solid</td>
<td>No link activity</td>
</tr>
<tr>
<td></td>
<td>Green Flashing</td>
<td>Link activity</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No link established</td>
</tr>
</tbody>
</table>

### FC ports on the controller node

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

**NOTE:**
Incorrectly configured cables result in illuminated amber LEDs.

![Figure 20: Onboard FC ports on the controller node](image)

![Figure 21: LEDs for the onboard FC ports](image)

### LEDs for the onboard FC ports

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>All ports</td>
<td>Off</td>
<td>Wake up failure (dead device) or power not applied</td>
</tr>
<tr>
<td>1 Port Speed</td>
<td>Off</td>
<td>Not connected</td>
</tr>
<tr>
<td></td>
<td>3 Fast Amber Flashes</td>
<td>Connected at 8 Gb/s</td>
</tr>
</tbody>
</table>

*Table Continued*
### LEDs for the onboard FC ports

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4 Fast Amber Flashes</td>
<td>Connected at 16 Gb/s</td>
</tr>
<tr>
<td>2 Link Status</td>
<td>On</td>
<td>Normal/Connected—link up</td>
</tr>
<tr>
<td></td>
<td>Green Flashing</td>
<td>Link down or not connected</td>
</tr>
</tbody>
</table>

### Numbers for the onboard FC ports

<table>
<thead>
<tr>
<th>Port</th>
<th>Node:Slot:Port (N:S:P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC-1</td>
<td>N:0:1</td>
</tr>
<tr>
<td>FC-2</td>
<td>N:0:2</td>
</tr>
</tbody>
</table>

### SAS ports on the controller node

**IMPORTANT:**

For the DP-2 port with no SAS cable attached, the amber LED will be illuminated and the green LED will be off. This behavior is expected for the DP-2 port. For the DP-1 port with no SAS cable attached, both amber and green LEDs will be off.

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

Figure 22: SAS (DP-1 and DP-2) ports on the controller nodes of the controller node enclosure
Figure 23: LEDs for the SAS ports

<table>
<thead>
<tr>
<th>LED Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Activity</td>
<td>Green Solid</td>
<td>No link activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Flashing</td>
<td>Link activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>No link established</td>
</tr>
<tr>
<td>!</td>
<td>Fault</td>
<td>Amber Solid</td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Only for DP-2</td>
<td>no SAS cable connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>Locate active</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Normal operation</td>
</tr>
</tbody>
</table>

**Cluster interconnect link ports on the controller node**

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

**NOTE:**
- **4-node storage system**—Cluster interconnect link ports are used to connect nodes together.
- **2-node storage system**—Cluster interconnect link ports are not used and LEDs will be off.
### LEDs for the cluster interconnect link ports

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Fault</td>
<td>Amber Solid</td>
<td>Fault—No link established or the cable incorrectly configured</td>
</tr>
<tr>
<td></td>
<td>Amber Flashing</td>
<td>• Interconnect link cabling error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Controller node in wrong slot</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Serial number mismatch between controller nodes</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No fault</td>
</tr>
<tr>
<td>2 Status</td>
<td>Green Solid</td>
<td>Link established</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No link established</td>
</tr>
</tbody>
</table>

#### Console port on the controller node

The controller node has one console port (MFG) that is a serial connection.
**PCIe host adapters**

The types of PCIe host adapters available are dependent on the storage system model and type of controller node enclosure. These adapters are optional for the storage system.

**IMPORTANT:**
These PCIe host adapters are installed by an authorized service provider only.

<table>
<thead>
<tr>
<th>PCIe host adapters</th>
<th>Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-port 16 Gb Fibre Channel/10 Gb Ethernet (GbE) NIC combo adapter</td>
<td>SFP+</td>
</tr>
<tr>
<td><strong>IMPORTANT:</strong></td>
<td></td>
</tr>
<tr>
<td>- Two of the ports are FC, and two are Ethernet.</td>
<td></td>
</tr>
<tr>
<td>- The Ethernet ports on this PCIe host adapter can be configured for HPE 3PAR File Persona.</td>
<td></td>
</tr>
<tr>
<td>- There is no Fibre Channel over Ethernet (FCoE) support for this PCIe host adapter.</td>
<td></td>
</tr>
<tr>
<td>4-port 10 Gb iSCSI/10 GbE NIC combo adapter</td>
<td>SFP+</td>
</tr>
<tr>
<td><strong>IMPORTANT:</strong></td>
<td></td>
</tr>
<tr>
<td>- Two of the ports are iSCSI, and two are Ethernet.</td>
<td></td>
</tr>
<tr>
<td>- The Ethernet ports on this PCIe host adapter can be configured for HPE 3PAR File Persona.</td>
<td></td>
</tr>
<tr>
<td>- There is no FCoE support for this PCIe host adapter.</td>
<td></td>
</tr>
<tr>
<td>4-port 16 Gb Fibre Channel (FC) adapter</td>
<td>SFP+</td>
</tr>
<tr>
<td>The four ports of this FC adapter can be individually configured to connect to a host or to a remote storage system in an HPE 3PAR Remote Copy configuration.</td>
<td></td>
</tr>
<tr>
<td>2-port 10 Gb iSCSI/FCoE Converged Network Adapter (CNA)</td>
<td>SFP+</td>
</tr>
<tr>
<td>The two ports of this iSCSI/FCoE adapter can be individually configured as iSCSI or FCoE.</td>
<td></td>
</tr>
</tbody>
</table>

*Table Continued*
### PCIe host adapters

<table>
<thead>
<tr>
<th>PCIe host adapters</th>
<th>Connectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-port 10 GbE NIC adapter</td>
<td>SFP+</td>
</tr>
<tr>
<td>4-port 1 GbE NIC adapter</td>
<td>RJ45</td>
</tr>
</tbody>
</table>

#### 4-port 16 Gb/s FC PCIe host adapter

**Figure 27: Ports on the 4-port 16 Gb/s FC PCIe host adapter**

<table>
<thead>
<tr>
<th>Port</th>
<th>Node:Slot:Port (N:S:P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N:2:1</td>
</tr>
<tr>
<td>2</td>
<td>N:2:2</td>
</tr>
<tr>
<td>3</td>
<td>N:2:3</td>
</tr>
<tr>
<td>4</td>
<td>N:2:4</td>
</tr>
</tbody>
</table>

**Figure 28: LEDs on the 4-port 16 Gb/s FC PCIe host adapter**
### LEDs on the 4-port 16 Gb/s FC PCIe host adapter

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Port Speed</td>
<td>3 Fast Amber Flashes</td>
<td>Connected at 8 Gb/s</td>
</tr>
<tr>
<td></td>
<td>4 Fast Amber Flashes</td>
<td>Connected at 16 Gb/s</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Not connected</td>
</tr>
<tr>
<td>2 Link Status</td>
<td>Green Solid</td>
<td>Normal/Connected – link up</td>
</tr>
<tr>
<td></td>
<td>Green Flashing</td>
<td>Link down or not connected</td>
</tr>
</tbody>
</table>

#### 2-port 10 Gb/s iSCSI/FCoE CNA PCIe host adapter

**NOTE:**

On some of the 2-port 10 Gb/s iSCSI/FCoE CNAs, the faceplate labeling is reversed, with the port on the left identified as port 2, when oriented as in the following illustration. This illustration shows the corrected label with port 1 on the left.

![Figure 29: Ports on the 2-port 10 Gb/s iSCI/FCoE CNA PCIe host adapter](image)

**Figure 29: Ports on the 2-port 10 Gb/s iSCI/FCoE CNA PCIe host adapter**

<table>
<thead>
<tr>
<th>Port</th>
<th>Node:Slot:Port (N:S:P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N:2:1</td>
</tr>
<tr>
<td>2</td>
<td>N:2:2</td>
</tr>
</tbody>
</table>

![Figure 30: LEDs on the 2-port 10 Gb/s iSCSI/FCoE CNA PCIe host adapter](image)
LEDs on the 2-port 10 Gb/s iSCSI/FCoE CNA PCIe host adapter

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Link Status</td>
<td>Normal/Connected – link up</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Link down or not connected</td>
</tr>
<tr>
<td>2</td>
<td>Activity</td>
<td>Activity</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No activity</td>
</tr>
</tbody>
</table>

4-port 1 GbE NIC PCIe host adapter

**NOTE:**

On some of the 4-port 1 GbE NICs, the faceplate labeling is incorrect, indicating that the ports are numbered 0 through 3. The following illustration shows the corrected label, indicating that the ports are numbered 1 through 4.

![Figure 31: Ports on the 4-port 1 GbE NIC PCIe host adapter](image)

Figure 31: Ports on the 4-port 1 GbE NIC PCIe host adapter

<table>
<thead>
<tr>
<th>Port</th>
<th>Node:Slot:Port (N:S:P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N:2:1</td>
</tr>
<tr>
<td>2</td>
<td>N:2:2</td>
</tr>
<tr>
<td>3</td>
<td>N:2:3</td>
</tr>
<tr>
<td>4</td>
<td>N:2:4</td>
</tr>
</tbody>
</table>

![Figure 32: LEDs on the 4-port 1 GbE NIC PCIe host adapter](image)

Figure 32: LEDs on the 4-port 1 GbE NIC PCIe host adapter
### LEDs on the 4-port 1 GbE NIC PCIe host adapter

<table>
<thead>
<tr>
<th>LED Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Green Solid</td>
<td>Link speed 1 Gb/s</td>
</tr>
<tr>
<td>Off</td>
<td>Link speed 100 Mb/s</td>
</tr>
<tr>
<td>2 Green Solid</td>
<td>Link up</td>
</tr>
<tr>
<td>Green Flashing</td>
<td>Link activity</td>
</tr>
<tr>
<td>Off</td>
<td>Link down</td>
</tr>
</tbody>
</table>

### 2-port 10 GbE NIC PCIe host adapter

**NOTE:**

On some of the 2-port 10 GbE NICs, the faceplate labeling is reversed, with the port on the left identified as port 2, when oriented as in the following illustration. This illustration shows the corrected label with port 1 on the left.

![Figure 33: Ports on the 2-port 10 GbE NIC PCIe host adapter](image)

<table>
<thead>
<tr>
<th>Port</th>
<th>Node:Slot:Port (N:S:P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>N:2:1</td>
</tr>
<tr>
<td>2</td>
<td>N:2:2</td>
</tr>
</tbody>
</table>

![Figure 34: LEDs on the 2-port 10 GbE NIC PCIe host adapter](image)
### LEDs on the 2-port 10 GbE NIC PCIe host adapter

<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Amb=10 G</td>
<td>Amber Solid</td>
<td>Link speed 10 Gb/s</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Link speed 1 Gb/s</td>
</tr>
<tr>
<td>2 ACT/Port</td>
<td>Green Solid</td>
<td>Link up</td>
</tr>
<tr>
<td></td>
<td>Green Flashing</td>
<td>Link activity</td>
</tr>
</tbody>
</table>

### Power cooling modules for the controller node enclosure

The 764 watt (W) alternating current (AC) power cooling module (PCM) is an integrated power supply and cooling fan that includes a replaceable battery and is a component of the controller node enclosure.

**NOTE:**

Labels on the PCM for the expansion drive enclosure state: 760W PCM Gold Series.

![Figure 35: LEDs on the AC PCM for the controller node enclosure](image-url)

### LEDs on the AC PCM for the controller node enclosure

<table>
<thead>
<tr>
<th>LED Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image-url" alt="" /></td>
<td>AC Input Fail</td>
<td>Amber Solid</td>
<td>No AC power or PCM fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>• Firmware Download</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Locate active</td>
</tr>
<tr>
<td>![image-url]</td>
<td>PCM OK</td>
<td>Green Solid</td>
<td>AC present and PCM On / OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Flashing</td>
<td>Standby mode</td>
</tr>
<tr>
<td>![image-url]</td>
<td>Fan Fail</td>
<td>Amber Solid</td>
<td>PCM fail or PCM fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>Firmware download</td>
</tr>
<tr>
<td><img src="image-url" alt="" /></td>
<td>DC Output Fail</td>
<td>Amber Solid</td>
<td>• No AC power</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Out of tolerance</td>
</tr>
</tbody>
</table>

*Table Continued*
### LEDs on the AC PCM for the controller node enclosure

<table>
<thead>
<tr>
<th>LED Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>Firmware download</td>
</tr>
<tr>
<td>🔄️</td>
<td>Battery Fail</td>
<td>Amber Solid</td>
<td>Hard fault (not recoverable)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>Soft fault (recoverable)</td>
</tr>
<tr>
<td>🔄️</td>
<td>Battery Good</td>
<td>Green Solid</td>
<td>Present and charged</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Flashing</td>
<td>Charging or disarmed</td>
</tr>
</tbody>
</table>

**Figure 36: AC PCM numbers for a 2-node storage system**

**Figure 37: AC PCM numbers for a 4-node storage system**

### Expansion drive enclosure rear view

**IMPORTANT:**

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

- In the SFF drive enclosure, the I/O modules in the enclosure are inverted 180° from each other, as well as the SAS ports.
- In the LFF drive enclosure, the I/O modules in the enclosure are installed in the same direction, as well as the SAS ports.
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
</table>
| 1      | Power connection 0  
This power connection requires a power cable to be attached between the power supply and an independent electrical source capable of supporting of the entire power load of the enclosure and controlled by its own circuit breaker.                                                                                                                                                                                                                     |
| 2      | Power cooling module 0  
The power cooling module (PCM) is an integrated power supply and cooling fan. One PCM can supply enough power for the enclosure. Each PCM needs to draw power from different mains, which allows for continued operation if any one main fails.                                                                                                                                                                                      |
| 3      | I/O module 0  
The I/O modules connect the controller nodes to the drive enclosures using mini-SAS cables, enabling the transfer of data between the controller nodes, drives, PCMs, and enclosures.  
I/O Module 0 has a red label.                                                                                                                                                                                                                                                                                     |
| 4      | SAS ports  
The SAS ports connect the I/O modules to the controller nodes using mini-SAS cables.                                                                                                                                                                                                                                                                                                                                                                |
| 5      | I/O module 1  
The I/O modules connect the controller nodes to the drive enclosures using mini-SAS cables, enabling the transfer of data between the controller nodes, drives, PCMs, and enclosures.  
I/O Module 1 has a green label.                                                                                                                                                                                                                                                                                     |
Rear view of the SFF and LFF expansion drive enclosures

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Power cooling module 1</td>
</tr>
<tr>
<td>7</td>
<td>Power connection 1</td>
</tr>
</tbody>
</table>

I/O Module

**IMPORTANT:**

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

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

Figure 39: LEDs on the I/O Module (example shows an SFF 2U drive enclosure)

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Power LED" /></td>
<td>Power</td>
<td>Green Solid</td>
<td>Power</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Off</td>
<td>No power</td>
</tr>
<tr>
<td><img src="image" alt="UID/Service LED" /></td>
<td>UID/Service</td>
<td>Blue Flashing</td>
<td>Locate active</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Off</td>
<td>Locate not active</td>
</tr>
<tr>
<td><img src="image" alt="Fault LED" /></td>
<td>Fault</td>
<td>Amber Solid</td>
<td>Fault</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Off</td>
<td>No fault</td>
</tr>
</tbody>
</table>
SAS ports on the I/O module

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

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

- In the SFF drive enclosure, the I/O modules in the enclosure are inverted 180° from each other, as well as the SAS ports.
- In the LFF drive enclosure, the I/O modules in the enclosure are installed in the same direction, as well as the SAS ports.
Figure 43: SAS (DP-1 and DP-2) ports on the I/O modules of the LFF expansion drive enclosure

Figure 44: LEDs on the SAS ports—I/O module

<table>
<thead>
<tr>
<th>LED Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Activity</td>
<td>Green On</td>
<td>Links up, but no activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>No cable, bad cable, not ready or no power</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Flashing</td>
<td>Activity</td>
</tr>
<tr>
<td></td>
<td>Fault</td>
<td>Amber On</td>
<td>Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Off</td>
<td>No fault</td>
</tr>
</tbody>
</table>
Power cooling modules for the expansion drive enclosure

The 580 watt (W) alternating current (AC) power cooling module (PCM) is an integrated power supply and cooling fan and is a component of the expansion drive enclosure.

NOTE:

Labels on the PCM for the expansion drive enclosure state: 580W PCM Gold Series.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>☹</td>
<td>AC input fail</td>
<td>Amber On</td>
<td>No AC power or PCM fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>• Partner PCM Faulty/Off or Firmware Download</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Locate active</td>
</tr>
<tr>
<td>☐</td>
<td>PCM OK</td>
<td>Green On</td>
<td>AC Present and PCM On / OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green Flashing</td>
<td>Standby mode</td>
</tr>
<tr>
<td>⚡</td>
<td>Fan Fail</td>
<td>Amber On</td>
<td>PCM fail or PCM fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>Firmware download</td>
</tr>
<tr>
<td>⚡</td>
<td>DC Output Fail</td>
<td>Amber On</td>
<td>• No AC power</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber Flashing</td>
<td>• Out of tolerance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Firmware download</td>
</tr>
</tbody>
</table>

Figure 45: LEDs on the AC PCM for the expansion drive enclosures

Figure 46: AC PCM numbers for the SFF (2.5 in) 2U SAS expansion drive enclosure
Physical Service Processor

There are two types of HPE 3PAR Service Processor (SP) hardware (physical SP):

- Physical SP with a single power supply (SPS)
- Physical SP with a redundant power supply (RPS)

<table>
<thead>
<tr>
<th>Port</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Left port is the MGMT port (Eth0/Port 1)</td>
</tr>
<tr>
<td>2</td>
<td>Right port is the Service port (Eth1/Port 2/iLO)</td>
</tr>
</tbody>
</table>
### LEDs on the rear panel of the physical SP

<table>
<thead>
<tr>
<th>LED/Port Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 UID/Service</td>
<td>Blue On</td>
<td>Activated</td>
</tr>
<tr>
<td></td>
<td>Blue Flashing</td>
<td>SP managed remotely</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Deactivated</td>
</tr>
<tr>
<td>2 NIC Link</td>
<td>Green On</td>
<td>Network link</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No network link</td>
</tr>
<tr>
<td>3 NIC Activity</td>
<td>Green On</td>
<td>Link to network</td>
</tr>
<tr>
<td></td>
<td>Green Flashing</td>
<td>Network activity</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No network activity</td>
</tr>
<tr>
<td>4 Power Supply</td>
<td>Green On</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Off represents one or more of the following conditions:</td>
</tr>
<tr>
<td>NOTE:</td>
<td></td>
<td>• Power unavailable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Power supply failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Power supply in standby mode</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Power supply error</td>
</tr>
</tbody>
</table>

Figure 50: LEDs on the front panel of the physical SP
<table>
<thead>
<tr>
<th>LED/Port Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Power On/Standby</strong> button and SP power</td>
<td><strong>Green Solid</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Green Flashing</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Amber Solid</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Off</strong></td>
</tr>
<tr>
<td>2</td>
<td><strong>Health</strong></td>
<td><strong>Green Solid</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Amber Flashing</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Red Flashing</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Off</strong></td>
</tr>
<tr>
<td>3</td>
<td><strong>NIC Status</strong></td>
<td><strong>Green Solid</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Green Flashing</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Off</strong></td>
</tr>
<tr>
<td>4</td>
<td><strong>UID/Service</strong></td>
<td><strong>Blue Solid</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Blue Flashing</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Off</strong></td>
</tr>
</tbody>
</table>

**Related reference**

Websites on page 104

**Power distribution units**

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

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

The HPE 3PAR StoreServ 8000 Storage systems are ordered in one of the following configurations, and the tasks involved to complete the hardware setup vary by the configuration type.

- Factory integrated in an HPE rack
- Factory integrated without a rack
- Field-integrated

Hardware setup for a storage system that is factory integrated in a rack

Prerequisites

- Read and complete all the configuration specifications and installation requirements in the HPE 3PAR StoreServ 8000 Storage Site Planning Manual available at the Hewlett Packard Enterprise Information Library Storage website.
- Obtain an adjustable wrench for leveling the feet on the rack.

⚠️ CAUTION:
Do not use this procedure if you are installing storage system components into an existing or partially populated rack.

The following topics describe the procedures for setting up a storage system that is delivered in a factory-integrated HPE rack with all the components installed.

Procedure

1. Position and stabilize the rack on page 49.
2. After completing the hardware setup, proceed to Cabling setup on page 63.

Related reference
Websites on page 104

Position and stabilize the rack

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

Procedure

1. Wheel the 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.

For more information on the structural considerations for using raised flooring, see the HPE 3PAR StoreServ 8000 Storage Site Planning Manual available at the Hewlett Packard Enterprise Information Library Storage website.

2. Stabilize and level the rack.

After positioning the storage system, use the four leveling feet and four leveling pads positioned under the feet to stabilize the rack and prevent movement during operation. The leveling pads provide a wider base for supporting the rack and protecting the floor.
a. Position a leveling pad underneath each leveling foot.
b. Using an adjustable wrench, turn each leveling foot clockwise until the weight of the rack rests on the leveling pads, instead of the casters.
c. Lock the leveling feet in place by turning the locking nut on each foot counterclockwise until tight.
d. Verify that the rack is stationary.

Related reference
Websites on page 104

Hardware setup for a storage system that is factory integrated without a rack, or field integrated

Prerequisites

- Read and complete all the configuration specifications and installation requirements in the HPE 3PAR StoreServ 8000 Storage Site Planning Manual available at the Hewlett Packard Enterprise Information Library Storage website.
- Verify that the rack can support the total weight of all installed components and that the total weight is within the floor loading limit.
- Prepare the anti-static protection devices. Place unpacked components on an ESD mat and wear an ESD grounding strap during the installations.

The storage system is compatible with most industry standard, 4-post, EIA-310, 48.3 cm (19 in) racks with square mounting holes, including the HPE Intelligent Series Rack and the HPE 10000 G2 Series Rack. The rack must be equipped with the appropriate power distribution units (PDUs) or power receptacles and have access to an adequate power source that provides the recommended level of redundancy.

Two-post racks are not supported. Only four-post racks with square RETMA rail holes are supported for the installation of your storage system.

Procedure

1. If not already installed, Power distribution unit on page 50.
2. Review Installing rails in the rack for the enclosures on page 51, and then follow the installation process overview.
3. If you are installing a physical service processor, review Install a 1U rail kit in the rack—Physical service processor only on page 55, and then install the 1U rail kit.
4. Install enclosures in a rack on page 55.
5. Review Installing drives on page 56, and then follow the installation process overview.
6. Install a physical service processor in a rack on page 62.
7. After completing the setup, proceed to Cabling setup on page 63.

Related reference
Websites on page 104

Power distribution unit

If your installation requires a power distribution unit (PDU), a qualified technician must install the PDU.

IMPORTANT:

- This PDU is intended only for ITE loads with linear and Power Factor Correction input current. If nonlinear loads are connected, reduce the nameplate current rating of the PDU by a factor of 0.8.
- To protect against having a storage system outage if one power source or PDU fails, Hewlett Packard Enterprise recommends supplying power from two or more redundant power sources.
Related reference

Websites on page 104

Installing rails in the rack for the enclosures

Prerequisites

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

Enclosures are installed on rails in the rack. Do not stack enclosures directly on top of other enclosures or components. Install a rail kit in the rack for each enclosure in your storage system.

<table>
<thead>
<tr>
<th>Type</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rail kit assembly 2U enclosure</td>
<td>PN 793950-001</td>
</tr>
<tr>
<td>Rail kit assembly 4U enclosure</td>
<td>PN 793951-001</td>
</tr>
</tbody>
</table>

Procedure

1. Review Enclosure rail kit contents on page 51.
2. Reserve rack space for an upgrade from a 2-node to a 4-node storage system on page 52.
3. Install a 2U rail kit in the rack on page 52.
4. Install a 4U rail kit in the rack on page 53.
5. Install a middle support bracket on page 54.

Enclosure rail kit contents

The hardware provided with the rail kits is intended for installation in most industry standard, 4-post, EIA-310, 48.3 cm (19 in) racks with square RETMA rail holes.
Contents of the 2U and 4U rail kits

<table>
<thead>
<tr>
<th>Rail kit assembly 2U enclosure</th>
<th>Rail kit assembly 4U enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Eight M5, 12 mm, T25 Torx shoulder screws (long-flat) for rails</td>
<td>• Two M5 snap-in cage nuts</td>
</tr>
<tr>
<td>• Eight M5, 10 mm, T25 Torx screws (short-round) for middle support brackets</td>
<td>• Eight M5, 12 mm, T25 Torx shoulder screws (long-flat) for rails</td>
</tr>
<tr>
<td>• Eight M5, 8 mm, T25 Torx screws</td>
<td>• Eight M5, 10 mm, T25 Torx screws (short-round) for middle support brackets</td>
</tr>
<tr>
<td>• Two Rails: Right and left rails imprinted with FRONT RIGHT and FRONT LEFT</td>
<td>• Eight M5, 8 mm, T25 Torx screws</td>
</tr>
<tr>
<td>• Two middle support brackets: Installation of the support brackets is recommended to strengthen the rails.</td>
<td>• Two Rails: Right and left rails imprinted with FRONT RIGHT and FRONT LEFT</td>
</tr>
<tr>
<td></td>
<td>• Two middle support brackets: Installation of the support brackets is recommended to strengthen the rails.</td>
</tr>
</tbody>
</table>

Reserve rack space for an upgrade from a 2-node to a 4-node storage system

With a 2-node HPE 3PAR StoreServ Storage models 8400/ 8440/ 8450 system, you can later upgrade the storage system by installing an additional 2-node controller node enclosure (and additional expansion drive enclosures).

Procedure

1. During this initial installation of the storage system in a rack, reserve two-unit (2U) rack space installing the 1U filler panels provided in the Open First box into the 2U rack space above the installed controller node enclosure.

Install a 2U rail kit in the rack

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

Procedure

1. Align the front end of the rail with the chosen starting point, and then push the guide pins through the rack holes.
   
   Labels denote the FRONT RIGHT and FRONT LEFT of the rails.

2. Expand the rail to align and connect to the other end of rack post.

3. Secure the front and rear of the rail assembly to the rack posts using four M5, 12 mm, T25 Torx (long-flat) shoulder screws (two in front and two in rear) in the top and bottom holes. Tighten the shoulder screws with a 19-in-lbs torque.

   **IMPORTANT:**
   
   When the installed front and rear RETMA rails are extended 73.7 cm (29 in) or more, installation of the middle support bracket (reinforcing rail) is recommended to strengthen the rails. The M5, 10 mm, T25 Torx screws (short-round) are used to install the middle support bracket.
4. Repeat step 1 through step 3 for the other rail.
5. To ensure that all screws are installed properly, check both sides at the front and rear of the rack.

Install a 4U rail kit in the rack

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

Procedure

1. Align one end of the rail with the holes of the rack post, and then push to seat the locating pins in the rack.
   Labels denote the FRONT RIGHT and FRONT LEFT of the rails.

2. Expand the rail to connect to the other end of the rack post.

3. Secure the front and rear of the rail assembly to the rack post using four M5, 12 mm, T25 Torx (large-flat) shoulder screws (two in front and two in rear) in the top and bottom holes. Tighten the shoulder screws with a 19-in-lbs torque.

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

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

5. Install snap-in cage nuts in the front left and right of the rack, 2U (six holes) above the lower securing screw location (typically next to the rack unit number).
6. Check both sides at the front and rear of the rack to ensure that all screws are installed properly.

Install a middle support bracket

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

Procedure

1. Align the middle support bracket holes with the top holes of the rails. The orientation of the middle support bracket is neutral.
2. Insert and tighten screws.
Install a 1U rail kit in the rack—Physical service processor only

<table>
<thead>
<tr>
<th>Type</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1U Mounting Kit (Rail Kit)</td>
<td>PN 734806-B21</td>
</tr>
</tbody>
</table>

Procedure

1. Adjust the length of the mounting rails.
2. On the front of each rail, install two cage nuts and two rail mounting pins.
3. On the rear of each rail, install two cage nuts and two rail mounting pins.
4. Align the mounting rail with the cage nuts, and then fasten the mounting rails to the rack with the proper screws.
5. Repeat step 1 through step 3 for the other mounting rail.

⚠️ WARNING:
To prevent the risk of injury or equipment damage, inspect the rack to ensure that it is adequately stabilized.

Install enclosures in a rack

⚠️ CAUTION:
Always use at least two people to lift an enclosure, or three if lifting above chest level. Use proper grounding techniques to prevent electrostatic discharge damage to the components.

⚠️ IMPORTANT:
Do not power on without completing the remainder of the physical installation.

The storage system can contain the following types of enclosures:

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

Procedure

1. Verify that the enclosure is right-side up.
   - The enclosure top has caution and regulatory labels, and the bottom has no labels.
2. At the front, expose the mounting holes on the enclosure.
   - At the front of the enclosure, temporarily remove the ear caps (bezels) on each side of the enclosure front to expose the mounting holes.
3. At the front, insert the enclosure onto the rail shelf.
   - From the front of the rack, use both hands to support the enclosure, and then align and slide the enclosure into the appropriate 2U rail shelf.
4. At the front, install mounting screws.
   - **2U enclosure front**—Install two M5 12 mm (long-flat) T25 Torx shoulder screws. At the enclosure front, insert screws into the mounting holes on each side to secure the enclosure front to the rack. Tighten the screws with a 13-in-lbs torque.
   - **4U enclosure front**—Install four M5 12 mm (long-flat) T25 Torx shoulder screws. At the enclosure front, insert screws into the mounting holes and cage nuts on each side to secure the enclosure front to the rack. Tighten the screws with a 13-in-lbs torque.
5. At the front, replace the ear caps (bezels) on each side of the enclosure.
6. At the rear, install hold-down screws.

**2U and 4U enclosure rear**—Install two M5 12 mm (long-flat) T25 Torx shoulder screws. At the enclosure rear, insert the screws on each side to secure the enclosure rear to the rack. Tighten the screws with a 13-in-lbs torque.

---

## Installing drives

### Prerequisites

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

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

> **CAUTION:**
>
• To avoid potential damage to equipment and loss of data, handle drives carefully following industry-standard practices and ESD precautions. Internal storage media can be damaged when drives are shaken, dropped, or roughly placed on a work surface.
• To ensure proper thermal control, drive blanks are provided with the enclosures and must be inserted in all unused drive bays in the enclosure. Operate the enclosure only when all bays are populated with either a drive or a drive blank.
• If the storage system is enabled with the Data-at-Rest (DAR) encryption feature, only use Federal Information Processing Standard (FIPS) capable drives.
• Before inserting drives into enclosures, make sure that the enclosures are free of obstructions (such as loose screws, hardware, or debris). Inspect the drives before inserting them in the enclosure to make sure that they are not damaged.
• To avoid any cabling errors when powering on the storage system, all enclosures must have at least one drive pair installed by following the allocating and loading guidelines provided in this document.

### Procedure

1. Review **Guidelines for allocating and loading drives** on page 57.
2. **Install SFF drives** on page 60.
3. **Install LFF drives** on page 61.
Guidelines for allocating and loading drives

- A pair or pairs of drives must be installed together and must be of the same capacity, speed, and type. Never install an uneven number of drives of one type within a single enclosure.
- While making sure to load drives in pairs of the same drive type, try to distribute the same number of drives and drive types in all enclosures. An even distribution may not always be possible.
- Different drive types can be loaded next to each other in the same enclosure, but load all the drives of one drive type before loading drives of a different drive type.

1 IMPORTANT:
When adding new drives to an existing configuration, keep existing drives in their slots. For the newly added drives, install the drives in the next available slots, following the rules for allocation and balancing between enclosures.

SFF drive loading guidelines and examples

SFF drives are loaded starting at bay 0, left to right. The bays are numbered 0 through 23.

Figure 51: SFF numbering of drive bays

![Figure 51: SFF numbering of drive bays](image)

Figure 52: SFF drive loading order

<table>
<thead>
<tr>
<th>Example of a correct drive allocation in one SFF enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>This example demonstrates an SFF enclosure loaded correctly with these drives: two pairs of FC, three pairs of NL, and two pairs of SSD.</td>
</tr>
</tbody>
</table>

![Example of a correct drive allocation in one SFF enclosure](image)
Example of a correct drive allocation in two SFF enclosures

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

![Correct Drive Allocation Diagram]

Example of an unbalanced allocation in two SFF enclosures

⚠️ **CAUTION:**

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

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

![Unbalanced Drive Allocation Diagram]

LFF drive loading guidelines and examples

⚠️ **IMPORTANT:**

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

LFF drives are loaded starting at bay 0, bottom to top in the left-most column, then bottom to top in the next column, and so on. Note bay numbering does not follow how the bays are loaded. The bays are
numbered left to right, and then the next row up, left to right, and so on, from 0 to 23. The first four LFF drives are loaded into bays 0, 4, 8, and 12.

**Figure 53: LFF numbering of drive bays**

**Figure 54: LFF drive loading order**

<table>
<thead>
<tr>
<th>Example of a correct drive allocation in one LFF enclosure</th>
</tr>
</thead>
<tbody>
<tr>
<td>This example demonstrates an LFF enclosure loaded correctly with these drives: three pairs of NL (six drives) and one pair of SSD (two drives).</td>
</tr>
</tbody>
</table>

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

Procedure

1. Preparation:
   1. Wear an ESD grounding strap and attach the clip directly to an unpainted surface of the rack.
   2. Remove the drive blanks where you will be installing your drives.

2. Installation:
   3. To open the handle on the drive, press the handle latch.
   4. With the latch handle of the drive fully extended, align and push the drive from the end near the latch hinge to slide the drive into the bay (1) until the handle begins to engage. To seat the drive into the drive bay, close the latch handle (2).
5. Repeat the steps for each storage drive.

Install LFF drives

Procedure

1. Preparation:
   1. Wear an ESD grounding strap and attach the clip directly to an unpainted surface of the rack.
   2. Remove the drive blanks where you will be installing your drives.

2. Installation:
   3. To open the handle on the drive, press the handle latch.
   4. With the latch handle of the drive fully extended, align and push the drive from the end near the latch hinge to slide the drive into the bay (1) until the handle begins to engage. To seat the drive into the drive bay, close the handle (2).

5. Repeat the steps for each storage drive.
Install a physical service processor in a rack

Procedure

1. At the front, fully extend the 1U rails.
2. Using two people, attach the SP to the 1U rails.
   Align the service processor (SP) side guide pins (four points each side) with the drive bays on the rails, and then snap the SP into place. The spring tabs will lock the rail into place.

3. Release the lock on rails (1) to slide the SP into the rack (2).

4. Attach the SP to the rack.
5. (Optional) Install the cable management arm. See the instructions provided in the kit.
Cabling setup

Cabling best practices

• Label all cables as directed in the HPE 3PAR StoreServ 8000 Series Cabling Instructions document that matches your storage system configuration if not already applied by the factory.
• Use the shortest possible cable between devices. Shorter cables reduce the possibility of signal degradation that might occur over longer distances. In addition, shorter cables are easier to manage and route along the rear of the rack.
• To prevent damage to the connector and cable and ensure that the connector remains seated in the port, bind and support cables in a manner that eliminates stress on connectors and tight bends of the cables.
• To ensure that the cabling in the rear of the rack does not interfere with storage system operation or maintenance, restrain cables. Bind cables loosely with cable ties and route the cables out of the way, along the side of the rack. With nylon cable ties, cut the cable ties flush with the cable tie head to prevent scratches or cuts during future service interactions.

When the cables are tied together and routed down the side of the rack, verify that storage system components and indicators are easily visible and accessible. When cabling the device, use holes provided in the rear rack rails, install velcro tie wraps, and route external cables as required.

Cabling guidelines and diagrams for SAS cable connections

⚠️ IMPORTANT:

This cabling information applies only to storage system that is either factory integrated without a rack or field integrated and that includes one or more expansion drive enclosures.

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

⚠️ IMPORTANT:

If the diagrams shown in the HPE 3PAR StoreServ 8000 Series Cabling Instructions do not reflect the hardware-component layout necessary for your rack, you can shift the installation of the storage system to above or below the center of the rack as necessary. It is critical that the port-cable connections match the diagrams in the guides to ensure proper operation and redundancy.

Procedure

• From the following table, select the link that matches your 2-node storage system configuration based on the type and number of purchased expansion drive enclosures. The types of expansion drive enclosures are either small form factor (SFF) or large form factor (LFF).
Table 1: Rack-component layout and SAS-cable configuration

<table>
<thead>
<tr>
<th>Expansion drive enclosure cabling instructions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2-node storage system and SFF only expansion drive enclosures</td>
<td></td>
</tr>
<tr>
<td>• 1 SFF expansion drive enclosure</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792980</td>
</tr>
<tr>
<td>• 2 SFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792981</td>
</tr>
<tr>
<td>• 3 SFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792983</td>
</tr>
<tr>
<td>• 4 SFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792984</td>
</tr>
<tr>
<td>2-node storage system and LFF only expansion drive enclosures</td>
<td></td>
</tr>
<tr>
<td>• 1 LFF expansion drive enclosure</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792861</td>
</tr>
<tr>
<td>• 2 LFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792887</td>
</tr>
<tr>
<td>• 3 LFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792912</td>
</tr>
<tr>
<td>• 4 LFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792922</td>
</tr>
<tr>
<td>2-node storage system and mix of both SFF and LFF expansion drive enclosures</td>
<td></td>
</tr>
<tr>
<td>• 1 SFF + 1 LFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792949</td>
</tr>
<tr>
<td>• 1 SFF + 2 LFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792966</td>
</tr>
<tr>
<td>• 2 SFF + 1 LFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792973</td>
</tr>
<tr>
<td>• 2 SFF + 2 LFF expansion drive enclosures</td>
<td>h20564.www2.hpe.com/portal/site/hpsc/public/kb/docDisplay/?docId=c04792975</td>
</tr>
</tbody>
</table>

These links to the configurations are also provided in the HPE 3PAR StoreServ 8000 Storage Cabling Configuration Guide available at the Hewlett Packard Enterprise Information Library Storage website.

Related reference
Websites on page 104

Cabling setup for a storage system that is factory integrated in a rack

For a storage system that was factory integrated, most of the cabling setup has been completed before shipment. Do not turn the power on at this time and keep power off until you proceed to the power on
setup that follows a specific sequence for powering on the components for the HPE 3PAR StoreServ Storage system.

A storage system factory integrated in an HPE rack is preinstalled with all intra-rack cables connected and you must complete the following additional cabling:

Procedure

1. Connect the management cables on page 65.
2. Connect the power cables on the controller node enclosure on page 68.
3. Connect the power cables to the expansion drive enclosure on page 69.
4. Cabling for a physical service processor (optional) on page 69.
5. Cabling for power distribution units and power strips on page 70.
6. After completing the hardware setup, proceed to Power-on setup on page 72.

Cabling setup for a storage system that is either factory integrated without a rack, or field integrated

Storage systems either factory integrated without a rack or field integrated require the following cable connections:

Procedure

1. Cabling for the controller node enclosure on page 65.
2. Cabling for the expansion drive enclosure on page 68.
3. Cabling for a physical service processor (optional) on page 69.
4. Cabling for power distribution units and power strips on page 70.
5. After completing the setup, proceed to Power-on setup on page 72.

Cabling for the controller node enclosure

IMPORTANT:
Do not power on at this time. Only connect the power cables and keep power off until you later complete the "Power-on setup" that follows a specific sequence for powering on the components of the storage system.

Procedure

1. Connect the management cables on page 65.
2. Connect the host connection cables on page 66.
3. Connect the cables for HPE 3PAR Remote Copy (optional software) on page 67.
4. Connect the cables for the HPE 3PAR File Persona (optional software) on page 68.
5. Connect the power cables on the controller node enclosure on page 68.

Connect the management cables

Procedure

- Connect the cable for the storage system management connection.

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

Figure 55: MGMT ports on the controller nodes

Connect the host connection cables

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

<table>
<thead>
<tr>
<th>Connection type</th>
<th>Minimum configuration</th>
<th>Recommended configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethernet</td>
<td>Connection from the Ethernet switch or hub to two controller nodes</td>
<td>See “Supported Network Topologies” in the <strong>HPE 3PAR StoreServ 8000 Storage Site Planning Manual</strong> available at the <a href="https://www.hpe.com/">Hewlett Packard Enterprise Information Library Storage</a> website.</td>
</tr>
</tbody>
</table>

**NOTE:**
With HPE 3PAR File Persona or HPE 3PAR Remote Copy, an additional Ethernet connection is required.

<table>
<thead>
<tr>
<th>Connection type</th>
<th>Minimum configuration</th>
<th>Recommended configuration</th>
</tr>
</thead>
<tbody>
<tr>
<td>FC</td>
<td>Connection from a host computer to one controller node</td>
<td>Separate connections from host computers to each controller node, through a switch, with connections distributed evenly across all controller nodes. Example: SAN Switch A connected to even ports and SAN Switch B connected to odd ports.</td>
</tr>
<tr>
<td>FCoE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iSCSI</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FC cable limitations for host connectivity

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

<table>
<thead>
<tr>
<th>Cable size</th>
<th>Speed</th>
<th>Cable length limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>50 micron</td>
<td>16 Gb/s</td>
<td>50 meters</td>
</tr>
</tbody>
</table>

### Connect the cables for HPE 3PAR Remote Copy (optional software)

For the optional HPE 3PAR Remote Copy connection, see the **HPE 3PAR Remote Copy Software User Guide** available at the [Hewlett Packard Enterprise Information Library Storage](https://www.hpe.com/) website.

**Related reference**

**Websites** on page 104
Connect the cables for the HPE 3PAR File Persona (optional software)

For the optional HPE 3PAR File Persona connection, see the HPE 3PAR File Persona User Guide available at the Hewlett Packard Enterprise Information Library Storage website.

Related reference
Websites on page 104

Connect the power cables on the controller node enclosure

⚠️ CAUTION:
- The power cables must each be connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker or redundancy. Additionally, each power cable must be plugged into an outlet capable of supporting the entire power load of its enclosure.
- The power cooling module (PCM) latch can damage any cables that are routed in such a way that when the PCM latch handle is closed, it will cut into any cable that becomes wedged between the latch and the rack post. Keep the cables clear from the PCM latch mechanism.
- When routing PCM power cables, use black (connect to left PCM 0) and gray (connect to right PCM 1) power cables each connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker.

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

⚠️ IMPORTANT:
Do not power on at this time. Only connect the power cables and keep power off until you complete the “Power-on setup” process that follows a specific sequence for powering on storage system components.

Cabling for the expansion drive enclosure

⚠️ IMPORTANT:
Do not power on at this time. Only connect the power cables and keep power off until you later complete the "Power-on setup" that follows a specific sequence for powering on the components of the storage system.

Procedure
1. Connect SAS cables between the I/O module and controller node on page 69.
2. Connect the power cables to the expansion drive enclosure on page 69.
Connect SAS cables between the I/O module and controller node

Prerequisites

Review the HPE 3PAR StoreServ 8000 Series Cabling Instructions document that matches your storage system configuration and have it available during the SAS cabling procedure. See Cabling guidelines and diagrams for SAS cable connections on page 63.

Procedure

• Use SAS cables to connect the controller nodes (DP ports) and expansion drive enclosures.

For cabling the expansion drive enclosures, follow the HPE 3PAR StoreServ 8000 Series Cabling Instructions document that matches your storage system configuration.

Connect the power cables to the expansion drive enclosure

IMPORTANT:

Do not power on at this time. Only connect the power cables and keep power off until you later complete the "Power-on setup" process that follows a specific sequence for powering on the components of the storage system.

CAUTION:

• The power cables must each be connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker. Additionally, each power cable must be plugged into an outlet capable of supporting the entire power load of its enclosure for redundancy.

• The power cooling module (PCM) latch can damage any cables that are routed in such a way that when the PCM latch handle is closed, it will cut into any cable that becomes wedged between the latch and the rack post. Keep the cables clear from the PCM latch mechanism.

• When routing PCM power cables, use black (connect to left PCM 0) and gray (connect to right PCM 1) power cables each connected to an independent power source (PDUs) with each controlled and protected by its own circuit breaker. Additionally, each power cable must be plugged into an outlet capable of supporting the entire power load of its enclosure for redundancy.

Procedure

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

Cabling for a physical service processor (optional)

IMPORTANT:

Do not power on at this time. Only connect the power cables and keep power off until you later complete the "Power-on setup" that follows a specific sequence for powering on the components of the storage system.
Procedure

1. Connect the cable for the service processor (SP) management connection.

   Service processor management connection—Connect an Ethernet cable between the service-processor MGMT port and the network using the same subnet as the storage system.

2. Connect the cable for the power connection.

   Power connection—Connect a power cable to a power source, but do not turn on the power yet.

Cabling for power distribution units and power strips

Important:

Do not power on at this time. Only connect the power cables and keep power off until you later complete the "Power-on setup" that follows a specific sequence for powering on the components of the storage system.

PDUs can be mounted in various locations, such as vertically along the rear of the rack or horizontally below the enclosures at the bottom of the rack. Each PDU AC cord connects to the appropriate outlet.
based on the type of cord and power requirements to supply power to the storage system. Power strips can be on the side of the rack to supply power to the PCMs. Do not exceed the capabilities of power strips and PDUs.

Procedure

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

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

Prerequisites

• The acclimatization process is completed for the storage system components.
• The storage system does not exceed the ratings of the power sources and adheres to the guidelines in
  the HPE 3PAR StoreServ 8000 Storage Site Planning Manual available at the Hewlett Packard
  Enterprise Information Library Storage website.
• Input power for each power supply in any given enclosure is obtained from an independent AC
  electrical circuit. Use independent power sources for connecting each power cooling module (PCM) to
  ensure power redundancy in any given enclosure.
• Drives or drive blanks are in all bays for proper thermal control.
• If necessary, route the PDU power cables under the bracket at the bottom rear of the rack.

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

CAUTION:

• Protect the storage system from power fluctuations and temporary interruptions with a regulating
  uninterruptible power supply. This device protects the hardware from damage caused by power
  surges and voltage spikes and keeps the storage system in operation during a power failure.
• Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
• Plug the power cord into a grounded (earthed) electrical outlet that is easily accessible at all
  times.
• To disconnect power to the equipment, unplug the power cord from the power supply.
• Do not route the power cord where it can be walked on or pinched by items placed against it.
  Pay particular attention to the plug, electrical outlet, and the point where the cord extends from
  the storage system.
• Verify that there is clear access to all storage system components for servicing by tying all power
  cords to restrain them behind the rack column.

Procedure

1. **Power on the storage system** on page 72.
2. Continue to the **Service Processor connection setup** on page 74.

Related reference
Websites on page 104

Power on the storage system

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

Procedure

1. Confirm that the circuit breakers on the PDUs have the power turned on.
2. If applicable, turn on the power to the power strips, and then verify that the LEDs are green.
3. If a physical service processor is being used, turn on the power.
4. Turn on power for all the drive enclosure PCMs, and then verify that each PCM OK LED is green.
5. Turn on power for all the controller node enclosure PCMs, and then verify that each PCM OK LED is
green.
IMPORTANT:
The controller node LEDs may be flashing green indicating that the battery is charging. Once fully charged, the LED will be solid green.

Allow up to **10 minutes** for completion of the storage system boot, self-test routines, and cache batteries to charge.

6. From the front of the system, locate and verify that the ear cap System Power green LED is On and the Drive Status amber LED is off.

The cage numbers may not reflect actual cage numbers at this point.

7. Return to the rear of the system and verify the following LEDs are solid green:
   - The status LEDs on the controller nodes are green.
   - The status LEDs for all I/O modules are green.
   - The status LEDs for all PCMs are green.
Service Processor connection setup

Prerequisites

Before you connect a virtual SP to an ESXi host, review and complete the following tasks:

- Verify that you have the virtual 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 both the virtual 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.
  - For VMware ESXi, the time and date can be set manually through the ESXi console.
  - For Hyper-V, the time and date can be set manually through the Windows OS date and time settings.
- For VMware ESXi, 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 All Downloads website.
- For VMware ESXi, 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 HPE 3PAR StoreServ 8000 Storage LUNs.
- Do not install the virtual SP on the same storage system, because it might lead to the inability of properly managing the array when connectivity to the storage is unavailable.
- Verify that you have administrative privileges.
  - With Windows systems, you must have administrative privileges and be a member of the Administrators group.
  - With Linux systems, you must have superuser access.

For detailed Service Processor connection setup instructions, see the HPE 3PAR Service Console and StoreServ Management Console 2.x Quick Setup Guide and HPE 3PAR Service Processor Software User Guide available at the Hewlett Packard Enterprise Information Library Storage website.

Procedure

1. Review About the HPE 3PAR Service Processor on page 74.
2. Choose a setup option, and then complete the tasks associated with that option:
   a. Connection setup for the virtual service processor with VMware ESXi on page 75
   b. Connection setup for the virtual service processor with Hyper-V on page 77
   c. Connection setup for the physical Service Processor on page 78
3. Continue to the Software setup using the HPE 3PAR SmartStart on page 80.

Related reference

Websites on page 104

About the HPE 3PAR Service Processor

Each storage system requires a HPE 3PAR Service Processor (SP), which can be either physical or virtual. Both the physical SP and virtual SP provide remote monitoring and report storage system errors, and provide methods for diagnostic and maintenance activities involving the storage system.

Once the SP is connected to the network, you can then use this IP address to connect to the HPE 3PAR SP through a browser.
For more detailed information about the SP, see the HPE 3PAR SP documents available at the Hewlett Packard Enterprise Information Library Storage website.

Service processor types

Physical SP:

A physical SP is a dedicated service appliance located within the storage rack providing proximity to the storage system. A physical SP requires the service personnel to have a direct connection to the SP. If you choose a physical SP, each storage system installed at the operating site includes a physical SP installed in the same rack as the storage system controller nodes.

A physical SP uses two physical network connections:

- The MGMT port (eth0/Port 1) requires a connection to the network to communicate with the storage system.
- The Service port (eth1/Port 2) is for maintenance purposes only and is not connected to the network.

Virtual service processor:

A virtual SP is deployed as a virtual machine (VM). 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:

Do not install the virtual HPE 3PAR SP software on a host server that is also using storage from the storage system, so that the management of the storage system by the HPE 3PAR SP is independent of other host servers connected to the storage system. The virtual SP uses the local boot disk of the assigned VMware server and not boot from the storage system LUNs.

Related reference

Websites on page 104

Connection setup for the virtual service processor with VMware ESXi

Procedure

1. Deploy the virtual Service Processor on a host—VMware ESXi on page 75.
2. Locate or assign an IP address to a virtual service processor—VMware ESXi on page 76.
3. Continue to the Software setup using the HPE 3PAR SmartStart on page 80.

Deploy the virtual Service Processor on a host—VMware ESXi

⚠️ CAUTION:

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 system service.

Procedure

1. Insert the VMware ESXi virtual SP software DVD.
NOTE:
If physical installation media was not delivered with the storage system, then download the software using the links provided in the software receipt email.

2. In the VMware vSphere Client window, select File > Deploy OVF template.
3. On the Source screen, click Browse to locate the OVF file on the DVD or downloaded location.
4. Select the OVF file, click Open, and then click Next.
5. On the OVF Template Details screen, verify that the OVF template is selected, and then click Next.
6. On the Name and Location screen, create a name for the virtual SP, and then click Next.
7. If the Storage screen is present, select a storage destination for the virtual machine files, and then click Next.

NOTE:
When deploying from the VMware VirtualCenter, specify the host to deploy the virtual SP from the Host/Cluster screen.

8. On the Disk Format screen, select Thin Provision, and then click Next.
9. If the Network Mapping screen is present, map the virtual machine to the networks in your inventory, and then click Next.
10. On the Ready to Complete page, follow these steps:
    a. Review the deployment settings.
    b. Select the Power on after Deployment check box. Selecting this option powers on the virtual SP after the installation is complete.
    c. Click Finish.
11. A Deployment Completed Successfully message appears after a few minutes.
12. Click Close.
13. On the left navigation pane, verify that the system is on and the green icon is displaying on the new virtual SP. If necessary, expanding navigation tree to find the deployed virtual SP.
    a. Right-click the virtual SP in the virtual machine list.
    b. Select Open Console.

Locate or assign an IP address to a virtual service processor—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 HPE 3PAR SP configuration.

Obtain the IP address of the 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 on as setupusr. Press Enter. A password is not required to configure the network settings.
  3. From the Software Setup Worksheet, enter the SP name and press Enter.
  4. From the Software Setup Worksheet, enter the SP IP address and press Enter.
5. From the Software Setup Worksheet, enter the subnet mask and press **Enter**.
6. From the Software Setup Worksheet, enter the default gateway address and press **Enter**.
7. To configure the network, enter **Y**.
8. Review the configuration confirmation and record the virtual SP IP address for reference during subsequent setup procedures with HPE 3PAR SmartStart or the Service Processor Setup wizard.
9. Press **Enter** to exit.
10. To release the cursor, press **Ctrl-Alt**.

**Connection setup for the virtual service processor with Hyper-V**

**Procedure**

1. **Deploy the virtual Service Processor on a host—Hyper-V** on page 77.
2. **Assign an IP address to a virtual Service Processor—Hyper-V** on page 77.
3. Continue to the **Software setup using the HPE 3PAR SmartStart** on page 80.

**Deploy the virtual Service Processor on a host—Hyper-V**

**NOTE:**

Ensure that the date and time on the Hyper-V Server is set correctly. If they are not set correctly, the installation might fail.

**Procedure**

1. As an administrator, execute the self-extractable `.exe` file from the Microsoft Hyper-V virtual SP installation media.
2. Make sure that two physical Ethernet adapters are available on the host machine and that they are connected, enabled, and up.
3. If you are using the default settings while configuring the Hyper-V role on a Windows Server OS, one virtual network adapter is created and bound to the first physical Ethernet adapter.
4. To bind virtual network switches to a physical Ethernet adapter, make sure that two virtual network switches are available and bound to the two physical Ethernet adapters. Follow these steps:
   a. In the **Actions** pane of the Hyper-V Manager application, click **Virtual Network Manager**.
   b. In the **Virtual Network Manager** dialog box, click **New virtual network**, select **External**, and then click **Add**.
   c. In the **Virtual Network Properties** area, enter a name for the virtual network in the **Name** field. Then, click to select **External** and enter the name of the adapter you want to connect the network to. Make sure that the **Allow management operating system to share this network adapter** check box is selected.
   d. Click **Apply**.
5. To deploy the virtual SP into a Windows Server 2012 R2, Windows Server 2012, or Windows Server 2008 Hyper-V Server using the Hyper-V virtual SP deployment package, follow these steps:

The virtual SP is now set up.

**Assign an IP address to a virtual Service Processor—Hyper-V**

**Prerequisites**

The virtual Service Processor (SP) must be on the same subnet as the storage system.
Procedure

1. In the Hyper-V Manager, right-click the virtual SP (VM) from the Virtual Machines list, and then click Connect.... The virtual SP console appears.
2. Click the green on/off button labeled Start in the virtual SP console menu.

NOTE:
It might take a minute or two for the login prompt to appear.

3. Log on as setupusr. Press Enter. A password is not required to configure the network settings.
4. Enter the SP IP address and press Enter.
5. Enter the netmask address and press Enter.
6. Enter the default gateway address and press Enter.
7. To configure the network, enter y and press Enter.
8. Review the configuration confirmation and record the virtual SP IP address for reference during subsequent setup procedures with HPE 3PAR SmartStart or the Service Processor Setup wizard.
9. Press Enter to exit.
10. To release the cursor, press Ctrl-Alt.

Connection setup for the physical Service Processor

- Storage system that is factory integrated in a rack—If purchased, a physical service processor (SP) is integrated in the rack at the factory.
- Storage system that is either factory integrated without a rack or field integrated—If purchased, a physical SP ships in a separate box to be installed in the field.

Procedure

1. Assign a static IP address to a physical Service Processor on page 78.
2. Continue to the Software setup using the HPE 3PAR SmartStart on page 80.

Assign a static IP address to a physical Service Processor

The following example uses a laptop with Microsoft Windows 7 to configure the physical Service Processor (SP) IP address and the procedures might vary depending on the type of OS being used.

Procedure

1. At the rear of the physical Service Processor (SP), connect a customer-supplied Ethernet cable between the MGMT port (eth0/port 1) on the physical SP and an Ethernet port of a laptop.

2. Connect the other end of the cable to a hub or a switch. Connect a cable from the hub or switch to the Ethernet port on the laptop.
3. Configure LAN settings on the laptop:
a. Select Control Panel > Network and Internet > Network and Sharing Center, and then click Change adapter settings.
b. Right-click the connection name for the port, and select Properties.
c. In the Properties dialog box, on the Networking tab, double-click Internet Protocol Version 4 (TCP/IPv4) in the list.
e. Select Use the following IP address, and enter the following:
   • IP address: 192.168.0.2
   • Subnet mask: 255.255.255.0
   • Default gateway: 192.168.0.1

f. To confirm and activate your changes, click OK and Close.
4. In a browser window, enter https://192.168.0.100/sp/SetIpAddress.html.
5. Log in with the user ID setupusr. Leave the password box blank.
6. The Service Processor IP Setup wizard is displayed.

**NOTE:***
The Service Processor Setup wizard might not display correctly when using Microsoft Internet Explorer 10 with default security settings. If the wizard continues to display incorrectly, try refreshing the browser page.

**IMPORTANT:**
The physical SP must be on the same subnet as the HPE 3PAR StoreServ Storage.

7. In the Assign IP Address pane, enter the SP IP address to be used on the customer LAN.
8. While you are entering an IP address, the IP Address field indicates an error. After you have entered a valid IP address, the Subnet Mask and Gateway fields are automatically populated.
9. If required, you can customize settings for the Subnet Mask and Gateway.
10. Select Next, review the Summary screen, and then select Next when you are ready.
11. The settings are applied.**

**NOTE:**
You might see a dialog box indicating that the laptop is unable to connect to the SP. This dialog box remains displayed until the adapter settings have been changed in the SP and verified. No action is necessary; the dialogue box closes within three minutes.

**NOTE:**
If the Service Processor IP Setup wizard fails, see Service Processor IP Setup wizard fails or hangs on page 94 for resolution.

12. Select Finish when completed.
13. Reconfigure the original LAN settings on the laptop.
14. Disconnect the network cable from the laptop, and connect the SP to the customer LAN.
15. Continue to Initialize the Service Processor using the HPE 3PAR SmartStart on page 81 and set up the SP with HPE 3PAR SmartStart over the public network.
Software setup using the HPE 3PAR SmartStart

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.
- Requirements for using a virtual service processor:
  - Powered on
  - Deployed
  - Storage system time set to the same time on the ESXi host
  - Assigned a temporary IP address to be changed during the HPE 3PAR SmartStart software setup.
- Requirements for using a physical service processor:
  - Installed
  - Powered on
  - Assigned an IP address
- The storage system LEDs indicate the following:
  - Components are powered on.
  - Cables are properly installed.
  - Network connections are active.
  - All SAS connection indicator lights are green.
  - Cluster LEDs are solid green.
- With DNS for either IPv4 or IPv6, verify that the network infrastructure of the data center has been configured and that DNS is running.
- Obtained the access privileges to the storage system.

IMPORTANT:

The HPE 3PAR SmartStart software can be run only once. If the storage system requires another installation due to a relocation of the system, see the Relocation of the storage system with data preservation on page 112 procedure to be used instead of the HPE 3PAR SmartStart software.

Using HPE 3PAR SmartStart software, set up the HPE 3PAR StoreServ Storage and Service Processor (SP) only once for each new storage system.

For more information about the HPE 3PAR SmartStart software, see the HPE 3PAR StoreServ Storage SmartStart Software User Guide available at the Hewlett Packard Enterprise Information Library Storage website.

The software setup consists of the following tasks:

- Customize the communication settings of the SP using the Service Processor Setup wizard.
- Set up the storage system using the Storage System Setup wizard.
Procedure

1. Initialize the **Service Processor using the HPE 3PAR SmartStart** on page 81
2. Initialize the **storage system using HPE 3PAR SmartStart** on page 82
3. Continue to **SSMC installation** on page 84.

**Related reference**

**Websites** on page 104

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**Initialize the Service Processor using the HPE 3PAR SmartStart**

**NOTE:**

The setup takes about 15 minutes.

To launch the **Service Processor Setup** wizard, follow these steps:

**Procedure**

1. Install and open the HPE 3PAR SmartStart on a supported host.
2. In HPE 3PAR SmartStart, click the **Initialize Service Processor** link.
3. If HPE 3PAR SmartStart is not available, launch a web browser and enter the HPE SP URL address. For example: `https://10.0.120.227/sp/SpSetupWizard.html`
4. The following browsers are supported:
   - Microsoft Internet Explorer 10 or 11
   - Mozilla Firefox 33 or 34

   For up-to-date support information, see the SPOCK website.

To set up the service processor communication settings, follow these steps:

- Enter the SP IP address, and then click **OK**.

**NOTE:**

- When configuring in a DHCP network environment, enter the virtual SP temporary IP address.
- A security certificate error might occur when there is a problem with the web server trying to use the certificate and a blocking page appearing. You can ignore the warning and continue to go to the website.

- In the browser window, enter `setupusr` in the **User Name** box, and leave the password box blank.
- Click **OK**.

**NOTE:**

The **Service Processor Setup** wizard might not display correctly when using Microsoft Internet Explorer 10 with default security settings. If the wizard continues to display incorrectly, try refreshing the browser page.

The **Service Processor Setup** wizard proceeds through the following screens:

1. **Welcome**
2. **Generate SP ID**
3. **Networking**
4. **Remote Support**
5. **System Support Information**
6. Time and Region

NOTE:
Time, date, and region must match the HPE 3PAR StoreServ Storage.

7. Change Password

Change the setupusr and 3parcust account passwords.

8. Summary

9. Applying Settings

10. Finish

Related reference

Websites on page 104

**Initialize the storage system using HPE 3PAR SmartStart**

NOTE:
The setup takes about one hour.

Launch the Storage System Setup wizard:

**Procedure**

1. In HPE 3PAR SmartStart, on the **Setup storage system** screen, click the **Setup storage system** link.
2. If HPE 3PAR SmartStart is not available, launch a web browser and enter the HPE 3PAR Service Processor (SP) URL address. For example: [https://10.0.120.227/sp/StorageSystemSetupWizard.html](https://10.0.120.227/sp/StorageSystemSetupWizard.html)

To set up the storage system, follow these steps:

- Enter the SP IP address, and then click **OK**.

**NOTE:**
- When configuring in a DHCP network environment, enter the virtual SP temporary IP address.
- The Storage System Setup wizard might not display correctly when using Microsoft Internet Explorer 10 with default security settings. If the wizard continues to display incorrectly, try refreshing the browser page.

- In the **Windows Security** dialog box, enter **setupusr** in the **User Name** box, and enter the password previously set during the SP setup.
- Click **OK**.

The Storage System Setup wizard proceeds through the following screens:

1. Welcome
2. Enter Serial Number
   - Enter the HPE 3PAR StoreServ Storage serial number.
3. Verify Storage System
4. Configure Networking
5. Configure Time
6. Change Password
   - Change the **3paradm** user account password.
7. Verify Configuration
8. Progress
9. Results

NOTE:

As of HPE 3PAR OS 3.2.2, additional security measures have been implemented by using strong passwords for access by HPE 3PAR service user accounts. By default, time-based strong passwords are enabled for HPE 3PAR service user accounts. For additional information about strong passwords, see the HPE 3PAR StoreServ Storage Concepts Guide available at the Hewlett Packard Enterprise Information Library Storage website.

Related reference

Websites on page 104
SSMC installation

For detailed HPE 3PAR StoreServ Management Console (SSMC) setup instructions, see the HPE 3PAR Service Console and StoreServ Management Console Quick Setup Guide, HPE 3PAR StoreServ Management Console Administrator Guide, and HPE 3PAR StoreServ Management Console Release Notes available at the Hewlett Packard Enterprise Information Library Storage website.

HPE 3PAR SSMC is available for various Windows and Linux environments, and also includes an HPE 3PAR SSMC silent install option.

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

With Windows environments, you must have administrative privileges and be a member of the Administrators group. With Linux environments, you must have superuser access.

Procedure

1. Install the HPE 3PAR SSMC:
   - Install SSMC in a Windows environment on page 84.
   - Install SSMC in a Linux environment on page 84.

2. Continue to Post-installation tasks on page 86.

Related reference

Websites on page 104

Install SSMC in a Windows environment

Procedure

1. To start the installation wizard, double-click the setup file on your local computer.
2. Follow the instructions on the dialog that opens.

When the installation is complete, the following message is displayed:

If you are using a firewall to protect this system, please ensure that the inbound SSMC TCP port 8443 is accessible from an outside system.

Use the silent install option with Windows

Procedure

- To install HPE 3PAR StoreServ Management Console (SSMC) using other than the default settings, generate a response file by opening a Command Prompt window, and then run the installer with the \( -r \ <\text{response file}> \) option.
- To install the HPE 3PAR SSMC server silently using the default settings, open a Command Prompt window and run the installer with the \( -i \) silent option.
- To install the HPE 3PAR SSMC server silently using the response file you generated in step 1, open a Command Prompt window and run the installer with the \( -i \) silent \( -f \ <\text{response file}> \) option.

Install SSMC in a Linux environment

Procedure

1. To start the installation, execute the following command:
sh HPESSMC-<version number>-linux-x86_64.bin.HPb
2. Type Yes to accept the displayed license agreement.
3. Enter the number of the secure TCP port on your computer that the browser will use to access SSMC, or press the Enter key to accept the default port 8443 (recommended).
   The summary message displays the settings you selected plus the amount of disk space required for installation.
4. To accept these settings and continue with the installation, enter Yes. To cancel the installation, enter No.
   If the local computer does not meet the minimum installation requirements, the installer displays an error message.

Use the silent install option with Linux

Procedure

1. Extract the files from the bin.HPb package using the Linux command:
   sh HPESSMC-2.0.0.10734-linux-x86_64.bin.HPb --tar xvf
   This command will extract the file hpessmc-2.0.0.10734-x86_64.rpm.
2. To install the product, execute the following Linux commands:
   chmod 775 hpessmc-2.0.0.10734-x86_64.rpm
   rpm -i hpessmc-2.0.0.10734-x86_64.rpm
   If you want to change the default secure port, you must do it manually after the installation.
3. Once installed, start the service by entering the Linux command:
   service ssmc start
Post-installation tasks

For more information, see the HPE 3PAR Service Processor (SP) documentation (version 4.x) and HPE 3PAR StoreServ Management Console (SSMC) documentation available at the Hewlett Packard Enterprise Information Library Storage website.

Related reference
Websites on page 104

Log in the first time to the SSMC

The first time you open the HPE 3PAR StoreServ Management Console (SSMC) after installation, you must set up the credentials for the administrator account. After setting the administrator account credentials, you must log in to the Administrator Console and add a storage system before you can continue.

Procedure

1. Open the HPE 3PAR SSMC.
   - To access the HPE 3PAR SSMC from the computer on which it is installed:
     - **Windows**: Double-click the HPE 3PAR SSMC program icon on your desktop. Your browser opens to the URL https://localhost:8443 (or the secure port number you entered during installation, if different).
     - **Linux**: Open your browser and go to https://localhost:8443 or the secure port number you entered during installation if different.
   - To access the HPE 3PAR SSMC from a remote computer, open a supported browser and enter https://<SSMC IP address or FQDN>:8443. A fully qualified domain name (FQDN) is the complete domain name for a computer or host on the Internet.

2. Click Set credential in the dialog that appears.

3. In the Set Administrator Credential dialog, enter the user name for the administrator account. User names must be at least two characters long and contain no spaces. You can use any characters, including UTF-8.

4. Enter the password for the account, enter it again to confirm, and then click Set.
   - Passwords must be 8 to 32 characters and contain at least one uppercase character, one lowercase character, one digit, and one non-alpha-numeric character.

5. Log out of the HPE 3PAR Administrator Console interface.
   - Click the Session icon in the main menu, and then click Logout and close.
   - When the Logout confirmation dialog box appears, click Yes or click the X in the upper right corner of the confirmation window to return to the login screen.

6. Open the HPE 3PAR SSMC again and the Administrator Console check box is selected by default. Enter the Administrator Console using the credentials you set, and then click Login.
   - The Administrator Console displays in a new browser window.

7. Select Actions > Add.

8. In the Add Storage Systems dialog box, enter the DNS names or IP addresses of the storage system to add, separated by commas or spaces, from the Software Setup Worksheet.

9. Login using the 3paradm credentials from the Software Setup Worksheet. The 3paradm credentials are used to access the storage system from the HPE 3PAR SSMC.

10. Click Add.

11. Click to highlight this newly added storage system, click Actions > Accept Certificate, and then click Accept and Cache to accept the certificate.
After making the connection to the storage system, the **Connection State** column in the detail panel displays a green icon and the text **Connected**.

12. When you have finished adding storage systems, click **Close** to return to the HPE 3PAR SSMC login screen.

After adding and making the connection between the storage system to the HPE 3PAR SSMC, the next time you log in, the **Administrator Console** check box is cleared to allow for logging in to the **Management Console**. To log in to the **Management Console**, use the same 3paradm credentials from the Software Setup Worksheet.

**Host and SAN configuration**

**Procedure**

1. Configure a host from the SSMC on page 87.
2. Configure a host using the host OS implementation guide on page 87.
3. Only for HPE 3PAR Smart SAN, see the HPE 3PAR Smart SAN User Guide available at the Hewlett Packard Enterprise Information Library Storage website.

Related reference

Websites on page 104

**Configure a host from the SSMC**

**Procedure**

1. Log in to the HPE 3PAR StoreServ Management Console (SSMC).
2. From HPE 3PAR SSMC main menu under **BLOCK PERSONA**, select **Hosts**.
3. On the **Hosts** page, click **+ Create host** or select **Actions > Create**.
4. Follow the instructions on the dialog that opens.

**Configure a host using the host OS implementation guide**

Hewlett Packard Enterprise provides specific host OS implementation guides to help you configure your servers as hosts for your storage system.

- 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 FalconStor CDP NSS Implementation Guide
- HPE 3PAR HP-UX Implementation Guide
- HPE 3PAR NetApp V-Series Implementation Guide
- HPE 3PAR OpenVMS 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 Ubuntu Operating System Implementation Guide
- HPE 3PAR VMware ESX/ESXi Implementation Guide
- HPE 3PAR Windows Server 2003 Implementation Guide
- HPE 3PAR Windows Server 2016/2012/2008 Implementation Guide

**Procedure**

- Use the Hewlett Packard Enterprise host-specific OS implementation guides to help you configure your servers as hosts for your storage system.
License setup or verification

Licenses are either preinstalled by Hewlett Packard Enterprise or might still need to be installed. Use the HPE 3PAR StoreServ Management Console (SSMC) to check for preinstalled licenses and install any purchased licenses that were not preinstalled. Hewlett Packard Enterprise recommends retaining the information that you received about all acquired software product licenses for later reference and maintenance purposes. For assistance with redeeming and registering licenses, contact Hewlett Packard Enterprise or see the HPE Licensing website.

License keys are required to enable licensed features on storage systems. You can use the HPE 3PAR SSMC to add licenses to connected storage systems.

Printed license Entitlement Certificates systems include an Entitlement Order Number.

Procedure

1. To register licenses and receive license keys, see the Hewlett Packard Enterprise Support Center website: [www.hpe.com/support/hpesc](http://www.hpe.com/support/hpesc).
2. Under My HPE Support Center, click Manage my contracts and warranties.

Check for preinstalled licenses from the SSMC

Procedure

1. Log in to the HPE 3PAR StoreServ Management Console (SSMC).
2. On the HPE 3PAR SSMC main menu, select Storage System, and then select Systems. Any installed licenses are shown in the detail pane view.

Setting a license from the SSMC

To add a license, you must be able to access a license key file or copy and paste the encrypted license key characters into the HPE 3PAR StoreServ Management Console (SSMC) interface.

Procedure

1. Log in to the HPE 3PAR SSMC.
2. On the HPE 3PAR SSMC main menu, select Storage System, and then select Systems.
3. In the list pane, select the storage system, and then select Add license on the Actions menu.
4. Follow the instructions on the dialog that opens.

Common provisioning groups creation

A common provisioning group (CPG) is a virtual pool of logical disks that allocates space to virtual volumes on demand. Virtual volumes draw their resources from CPGs and are exported to hosts as logical unit numbers (LUNs). Virtual volumes are the only data layer visible to hosts.

For more information about CPGs, see the HPE 3PAR StoreServ Storage best practices guide white paper available at the Hewlett Packard Enterprise Information Library Storage website.
Create a CPG from the SSMC

If you choose not to use the default common provisioning groups (CPGs) and instead want to create a custom CPG, use this procedure.

Procedure
1. Log in to HPE 3PAR StoreServ Management Console (SSMC).
2. From HPE 3PAR SSMC main menu, select BLOCK PERSONA > Common Provisioning Groups.
   If Common Provisioning Groups is not displayed under Block Persona, click Show All on the right, and then click Common Provisioning Groups.
   Several default system CPGs display.
3. Click Actions > Create.

Virtual volumes creation and exporting

Create virtual volumes from the SSMC

Procedure
1. Log in to the HPE 3PAR StoreServ Management Console (SSMC).
2. From the HPE 3PAR SSMC main menu, select Block Persona > Virtual Volumes.
   Notice that the system comes with some default virtual volumes.
3. On the Virtual Volumes page, click + Create virtual volume or select Actions > Create.
4. Follow the instructions on the dialog that opens.

Export virtual volumes to a host from the SSMC

Exporting a virtual volume (VV) means to present that virtual volume to a host. Exporting makes a volume available to a host by creating an association between the name of the volume and a LUN (logical unit number) for the specified host and port.

Procedure
1. Log in to the HPE 3PAR StoreServ Management Console (SSMC).
2. On the HPE 3PAR SSMC main menu, select Block Persona > Virtual Volumes.
3. In the list pane, select the virtual volume, and then select Actions > Export.
4. Follow the instructions on the dialog that opens.
Optional tasks

Register the storage system with StoreFront Remote

To register the storage system with Hewlett Packard Enterprise StoreFront Remote, the HPE 3PAR Remote Support feature must be enabled in the Service Processor (also known as the Call Home feature).

Procedure

2. Use the links provided on this page to learn about using StoreFront Remote.
4. Log in to StoreFront Remote with your HPE Passport account.
   
   If you do not have an account, click the Create Account link, and complete the creation of an HPE Passport account.
5. Complete the process shown in the tutorial video. A unique registration token is generated for the storage system group you have created or joined. This one token can be used any number of times to register any number of storage systems to that group. This token is copied from the StoreFront Remote screen to be pasted into the storage system Comments field of the SSMC. With this token added, the next time your storage system calls home, StoreFront Remote will see your storage system and associate it with the corresponding group. This process can take 24–48 hours.

Validate 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 storage system.

After making networking changes or if the Service Processor Setup wizard is unable to verify remote support connectivity, use the HPE 3PAR SPMaint interface to test the communication with HPE 3PAR Remote Support.

NOTE:
For a current list of supported browsers for HPE 3PAR SPOCC, see the SPOCK website.

For more information about HPE 3PAR Remote Support connectivity, see the Remote Connectivity for HPE 3PAR StoreServ Storage document at h20195.www2.hpe.com/v2/getpdf.aspx/4AA5-3528ENW.pdf.

Related reference
Websites on page 104

Connecting to the SP from a web browser

Procedure

1. Browse to the HPE 3PAR Service Processor (SP) IP address https://<sp_ip_address>:8443.
2. Enter the account credentials, and then click Login.
Accessing the SP 4.x SPOCC interface

Procedure

1. Connect to the HPE 3PAR Service Processor (SP) 4.x from a web browser.
2. Log in to gain access to the HPE 3PAR Service Processor Onsite Customer Care (SPOCC) interface.

Accessing the SP 4.x SPMaint interface through SPOCC

Procedure

1. Connect to the HPE 3PAR Service Processor (SP) 4.x from a web browser.
2. Log in to gain access to the HPE 3PAR Service Processor Onsite Customer Care (SPOCC) interface.
3. From the HPE 3PAR SPOCC main menu, select SPMaint from the left navigation pane.

Test service processor connectivity using the SPMaint interface through the SPOCC interface

Procedure

1. From HPE 3PAR SPMaint page of the HPE 3PAR Service Processor Onsite Customer Care (SPOCC) interface, click Network Configuration.
2. Click Test 3PAR Secure Service Collector Server.
3. Verify that the Connectivity test to HPE 3PAR Secure Service Collector Server successful output displays.
4. Verify that the HPE 3PAR SP is transferring files successfully by doing the following steps:
   a. To return to the HPE 3PAR SPOCC home page, click Home.
   b. To access the HPE 3PAR SP File Transfer Monitor, click Transfer Status.
   c. Verify that the HPE 3PAR SP file transfer is successful:
      • The Last transfer status entry includes information about the last HPE 3PAR SP transfer, including the date and time and a status of Ok.
      • The Number of files on transfer queue and retry queue are 0 (zero), which indicates the HPE 3PAR SP is able to pass files to the transport layer.
      • The Service Processor upload queue and SSAgent upload queue show the number of files in the queue and display the date, time, and filename of the most-recent uploaded file.

Enhance security with data encryption

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

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

NOTE:

To review the encryption status of individual drives within the storage system, 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 Storage website.

**Related reference**

Websites on page 104

---

**Service and upgrade of components**

See the *HPE 3PAR StoreServ 8000 Storage Service and Upgrade Guide* available at the Hewlett Packard Enterprise Information Library Storage website.

**Related reference**

Websites on page 104
Troubleshooting

Troubleshooting issues with HPE 3PAR SmartStart

Serial number incorrect in the Storage System Setup wizard

**Symptom**

After completion of the HPE 3PAR Service Processor (SP) setup using the *Service Processor Setup* wizard, the *Storage System Setup* wizard **Serial Number** field is prepopulated with a bogus serial number, -r, which cannot be edited.

**Cause**

This issue occurs when you have clicked the **Prev** button, and then you try to edit previously entered values.

**Action**

**Procedure**

- Rebuild the virtual SP, and then start the *Service Processor Setup* wizard again, ensuring that all values are entered correctly the first time. If you have a physical SP, or if the problem persists, contact your Hewlett Packard Enterprise Support representative.

Service Processor Setup wizard cannot configure the IP address

**Symptom**

The *Service Processor Setup* wizard cannot configure the IP address. The HPE 3PAR Service Processor (SP) might display a message like the following: *Page Not Found*.

**Solution 1**

**Cause**

The IP address is already in use.

**Action**

**Procedure**

1. To stop the **Apply Settings** process and return to the *Service Processor Setup* wizard, click **Stop**.
2. Click the **Prev** button until you return to Step 2: *SP Networking*.
3. Determine an available IPv4 address for use with the SP and enter that IP address in the **IP Address** text box.
4. Click the **Next** button until you continue to Step 7: **Apply Settings**. (You do not need to enter any other SP settings again.)

   The wizard automatically begins to apply the settings again.
Solution 2

Cause

If the SP displays a Page Not Found or similar message, the permanent SP IP address you entered is not a valid address. Set up the SP again.

Action

Procedure

1. Restart the Service Processor Setup wizard:
   • If you are using a physical SP, return to the Set IP Address wizard and set up a new, valid IP address. After you have set up the new IP address, use that new permanent IP address to restart the Service Processor Setup wizard. Enter the URL: https://<permanent SP IP address>/sp/SpSetupWizard.html.
   • If you are using a virtual SP, use the temporary SP IP address to restart the Service Processor Setup wizard. Enter the URL: https://<temporary SP IP address>/sp/SpSetupWizard.html.

2. Proceed through the Service Processor Setup wizard, and enter your SP settings again. The SP ID is already set, so you do not need to reset the ID.

Service Processor Setup wizard cannot detect the storage system

Symptom

The Service Processor Setup wizard is unable to detect the storage system.

Cause

• The storage system and the HPE 3PAR Service Processor (SP) are not on the same subnet.
• The storage system serial number was entered incorrectly.
• There is a network infrastructure issue.

Action

Procedure

• Ensure that the storage system serial number is correct and that the storage system and the SP are on the same subnet, and then try running discovery of the storage system again.

Service Processor IP Setup wizard fails or hangs

Cause

Symptom

When you configure the IP address for a physical Service Processor (SP) using the Service Processor IP Setup wizard, the wizard fails with the following message: "Configuring IP address failed with the following error: Failed to set SP IP address."

Workaround

Wait for 7–10 minutes before clicking the Retry button.

Symptom

The wizard hangs at the Configuring IP address step, and no message appears after more than 10 minutes.
Workaround
Close the browser and relaunch the Service Processor IP Setup wizard.

Storage System Setup wizard hangs

Symptom
The Storage System Setup wizard hangs for more than two hours.

Action

Procedure
• Close the browser and restart the Storage System Setup wizard. The hostname and network information must be the same as in the previous attempt. If the next attempt also hangs, contact your Hewlett Packard Enterprise support representative.

Storage System Setup wizard yields an error

Cause
The Storage System Setup wizard displays an error while you are upgrading cage firmware, admitting physical disks, or creating system volumes.

Action

Procedure
• Retry the task if a Retry button is available. If the retry fails or no button is available, close the browser and restart the Storage System Setup wizard. The hostname and network information must be the same as in the previous attempt. If the next attempt also fails, contact your Hewlett Packard Enterprise support representative.

Troubleshooting issues with the components

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.

Drive enclosure (cage) identification numbers are assigned during the software installation based on a scan of the DP1 port first and then the DP2 port on a given controller node pair.

Example:
With a 2-node system that includes three expansion drive enclosures cabled to the controller node enclosure through ports DP1 and DP2, the identification numbers are assigned in the order 0, 2, 3, 1. These numbers appear in the cage ID LED screen (on the enclosure front).
This method of assigning the cage ID numbers based on port connections is the expected behavior and cannot be changed. However, you can add a description in the software to describe the physical location of the enclosure within the rack.

**Action**

**Procedure**

1. Locate a drive enclosure in the rack using the software to illuminate the blue locate LED:
   1. On the HPE 3PAR StoreServ Management Console (SSMC) main menu, select **Drive Enclosures**.
   2. Select **Actions > Locate**.
      The blue UID LED will illuminate on the drive enclosure.
   3. Using the blue UI LED to locate the physical location of the drive enclosure (cage), record the cage number, the rack number, and the rack unit numbers that contain the enclosure, so that you can add this information in the software as a position description for the cage.

2. To describe the physical location of each expansion drive enclosure in the rack, add a description in the software:
   4. On the main menu of the HPE 3PAR SSMC, select **Storage Systems > Drive Enclosures**.
   5. Select an expansion drive enclosure, and then select **Actions > Edit**.
   6. 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>**.

**Incorrect labeling on 2-port 10 Gb iSCSI/FCoE CNA PCIe host adapter**

**Symptom**

1. **IMPORTANT:**
   This labeling error has been corrected with some shipments from the factory. Use the following images to make a visual inspection of the PCIe host adapter to determine if you have an incorrect label.

For some of the 2-port 10 Gb iSCSI/FCoE CNA PCIe host adapters, the faceplate port labeling is incorrect and does not match what is reported in the software output.

On the incorrect label, the port 1 is incorrectly labeled as **PORT 2**, and the port 2 is incorrectly labeled as **PORT 1**.

The incorrect port labeling does not cause any run-time issues. However, when connected to an incorrectly labeled adapter, the correct port numbers stated in the software output do not match the label numbering.

**Cause**

The following image represents an incorrect label on an adapter installed in controller node 0. The arrows point to the incorrect port numbering on the label. (For controller node 1, the adapter orientation is inverted.)
**Incorrect labeling on a 2-port 10 Gb iSCSI/FCoE CNA**

**Action**

**Procedure**

- Mark the adapter with the correct port numbers: PORT 1 and PORT 2.

**Incorrect labeling on the 4-port 1 GbE NIC PCIe host adapter**

**Symptom**

**IMPORTANT:**

This labeling error has been corrected with some shipments from the factory. Use the following images to make a visual inspection of the PCIe host adapter to determine if you have an incorrect label.

For some of the 4-port 1 GbE NIC PCIe host adapters, the faceplate port labeling is incorrect and does not match what is reported in the software output.

On the incorrect label, the port 1 is incorrectly labeled as 0, and port 4 is incorrectly labeled as 3.
The incorrect port labeling does not cause any run-time issues. However, when connected to an incorrectly labeled adapter, the correct port numbers stated in the software output do not match the label numbering.

**Cause**

The following image represents an incorrect label on an adapter installed in controller node 0. The arrows point to the incorrect port numbering on the label. (For controller node 1, the adapter orientation is inverted.)

![Incorrect port labeling on a 4-port 1 GbE NIC](image)

**Figure 58: Incorrect port labeling on a 4-port 1 GbE NIC**

**Action**

**Procedure**

- Mark the adapter with the correct port numbers: 1 and 4.

![Correct port labeling on a 4-port 1 GbE NIC](image)

**Figure 59: Correct port labeling on a 4-port 1 GbE NIC**

**Troubleshooting issues with the storage system**

**Alerts issued by the storage system**

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 documents available at the Hewlett Packard Enterprise Information Library Storage website.

Alerts are processed by the HPE 3PAR Service Processor (SP). The Hewlett Packard Enterprise Support Center (HPESC) takes action on alerts that are not customer administration alerts. Customer administration alerts are managed by customers.
Troubleshooting issues with the Service Processor

Browser warning with service processor connection

Symptom
When connecting to your HPE 3PAR 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
Procedure
• Click Continue to this website (not recommended).

Solution 2
Cause
Warning message in Google Chrome browser.

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

Solution 3

**Cause**

Warning message in Mozilla Firefox browser.

**Action**

**Procedure**

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.

Failed configuration of HPE 3PAR Remote Support

Symptom

A warning appears during the HPE 3PAR Service Processor (SP) setup:

```
error:
Remote Support Configuration failed
To continue Service Processor setup, click Continue.
Troubleshooting recommendation:
1. Verify the Service Processor is connected to a network that can access the internet.
2. If a Proxy Server is required to access the internet verify proxy configuration.
3. Verify Firewall and/or Proxy Server rules allow connections to the HP Collector and Global Access Servers.
4. For more information on configuring Remote Support, see the HPE 3PAR StoreServ 8000 Storage Installation Guide.
NOTE: Until remote connectivity is established to HPE 3PAR Central the Service Processor will be unable to send alerts and files to HPE 3PAR Central.
```

Action

Procedure

1. Follow the troubleshooting recommendations shown in the warning.
2. Click Retry.
If the issue persists, click **Continue**, and then finish the HPE 3PAR SP initialization.

3. Log in to HPE 3PAR SPOCC interface.
4. Click the **SPMaint** tab.
5. Select **Option 2 — Connection Portal Control**.
6. To ensure that the ping test is successful, select **Option 7 — Test 3PAR Secure Service Collector Server**.

**Failed installation of a virtual SP with Hyper-V**

**Cause**

Installation of the 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**

**Procedure**

- Before you install the virtual SP, 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 SP real-time monitoring and access.
Websites

Hewlett Packard Enterprise general websites

Information Library
Customer Self Repair Services Media Library Videos
HPE Licensing
Safety and Compliance
Software Depot home
Software updates and licensing
Support Center
SPOCK
StoreFront Remote
White papers and analyst reports

www.hpe.com/info/EIL
www.hpe.com/support/sml-csr
enterpriselicense.hpe.com/
www.hpe.com/support/Safety-Compliance-EnterpriseProducts
www.hpe.com/support/softwaredepot
www.hpe.com/downloads/software
www.hpe.com/support/hpesc
www.hpe.com/storage/spock
www.storefrontremote.com
www.hpe.com/storage/whitepapers

Hewlett Packard Enterprise storage websites

Information Library Storage
Storage

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

Hewlett Packard Enterprise HPE 3PAR StoreServ 8000 Storage websites

Customer Self Install forum

www.hpe.com/forum/3PAR8000CSIHELP

Non-Hewlett Packard Enterprise websites

VMware Support
VMware All Downloads
VMware vSphere Documentation

www.vmware.com/support.html
my.vmware.com/web/vmware/downloads
www.vmware.com/support/pubs/vsphere-esxi-vcenter-server-pubs.html
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: 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
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](http://www.hpe.com/services/getconnected)
- **HPE Proactive Care services**
  - [www.hpe.com/services/proactivecare](http://www.hpe.com/services/proactivecare)
- **HPE Proactive Care service: Supported products list**
  - [www.hpe.com/services/proactivecaresupportedproducts](http://www.hpe.com/services/proactivecaresupportedproducts)
- **HPE Proactive Care advanced service: Supported products list**
  - [www.hpe.com/services/proactivecareadvancedsupportedproducts](http://www.hpe.com/services/proactivecareadvancedsupportedproducts)

Proactive Care customer information

- **Proactive Care central**
  - [www.hpe.com/services/proactivecarecentral](http://www.hpe.com/services/proactivecarecentral)
- **Proactive Care service activation**
  - [www.hpe.com/services/proactivecarecentralgetstarted](http://www.hpe.com/services/proactivecarecentralgetstarted)

Warranty information

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


Additional warranty information

- **HPE ProLiant and x86 Servers and Options**
  - [www.hpe.com/support/ProLiantServers-Warranties](http://www.hpe.com/support/ProLiantServers-Warranties)
- **HPE Enterprise Servers**
  - [www.hpe.com/support/EnterpriseServers-Warranties](http://www.hpe.com/support/EnterpriseServers-Warranties)
- **HPE Storage Products**
  - [www.hpe.com/support/Storage-Warranties](http://www.hpe.com/support/Storage-Warranties)
- **HPE Networking Products**
  - [www.hpe.com/support/Networking-Warranties](http://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:

Additional regulatory information

Hewlett Packard Enterprise is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (Regulation EC No 1907/2006 of the European Parliament and the Council). A chemical information report for this product can be found at:

www.hpe.com/info/reach

For Hewlett Packard Enterprise product environmental and safety information and compliance data, including RoHS and REACH, see:

www.hpe.com/info/ecodata

For Hewlett Packard Enterprise environmental information, including company programs, product recycling, and energy efficiency, see:

www.hpe.com/info/environment

Documentation feedback

Hewlett Packard Enterprise is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (docsfeedback@hpe.com). When submitting your feedback, include the document title, part number, edition, and publication date located on the front cover of the document. For online help content, include the product name, product version, help edition, and publication date located on the legal notices page.
Complete this worksheet to prepare for the software-setup process that includes configuring the Service Processor (SP) and HPE 3PAR StoreServ Storage system and installing the HPE 3PAR StoreServ Management Console (SSMC) software. For detailed installation information, see:

www.hpe.com/support/sml-csr

**IMPORTANT:**
The HPE 3PAR SmartStart software is available only once. If the installation needs to be performed again (for example, due to a relocation of the system), contact your Hewlett Packard Enterprise support representative. Record user names and passwords only in a secure location.

### Service Processor (SP)

<table>
<thead>
<tr>
<th>SP Name</th>
<th>SP IPv4 address, subnet, and gateway or SP IPv6 address</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SP DNS server <em>(optional)</em> Record DNS server addresses</td>
</tr>
<tr>
<td></td>
<td>Set date and time using an NTP server <em>(optional)</em> Record network time server addresses</td>
</tr>
<tr>
<td></td>
<td>SP IP Setup wizard password ¹ <em>(Preset user name is setupusr)</em> Account used to access the setup wizards</td>
</tr>
<tr>
<td></td>
<td>SP Administrator account password¹ <em>(Preset user name is 3parcust)</em> Account used to access the SP and HPE 3PAR Service Processor Onsite Customer Care (SPOCC)</td>
</tr>
<tr>
<td></td>
<td>Remote Support proxy <em>(optional)</em> Record proxy name, IP address, and port</td>
</tr>
<tr>
<td></td>
<td>Send email notifications of system alerts <em>(optional)</em> Record mail host name, IP address, and domain</td>
</tr>
</tbody>
</table>

¹ The password must be 7–32 characters in length and can consist of alphanumeric characters and the following special characters: period (.), plus (+), dash (-), equal (=), and forward slash (/).
<table>
<thead>
<tr>
<th><strong>HPE 3PAR StoreServ Storage System</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE 3PAR StoreServ Storage serial number</td>
</tr>
<tr>
<td>HPE 3PAR StoreServ Storage name</td>
</tr>
<tr>
<td>HPE 3PAR StoreServ Storage IPv4 address, subnet, and gateway or IPv6 address</td>
</tr>
<tr>
<td>HPE 3PAR StoreServ Storage DNS server <em>(optional)</em></td>
</tr>
<tr>
<td>Record DNS server addresses.</td>
</tr>
<tr>
<td>Set date and time using an NTP server <em>(optional)</em></td>
</tr>
<tr>
<td>Record network time server addresses.</td>
</tr>
<tr>
<td>HPE 3PAR StoreServ Storage Administrator account password</td>
</tr>
<tr>
<td>(Preset user name is <em>3paradm</em>)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>HPE 3PAR StoreServ Storage—Installation Site</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Company name</td>
</tr>
<tr>
<td>Address</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>HPE 3PAR StoreServ 8000 Storage—Support Contact</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>First and last name</td>
</tr>
<tr>
<td>Company name</td>
</tr>
<tr>
<td>Email</td>
</tr>
<tr>
<td>Phone</td>
</tr>
<tr>
<td>Fax <em>(optional)</em></td>
</tr>
</tbody>
</table>

1. Locate the 10-character system serial number on the controller node enclosure next to the power switch for the rightmost power cooling module (PCM 1).

2. The password is restricted to all printable characters and be 6–8 characters in length.

<table>
<thead>
<tr>
<th><strong>HPE 3PAR StoreServ Management Console (SSMC)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>SSMC Administrator account user name</td>
</tr>
<tr>
<td>SSMC Administrator account password</td>
</tr>
</tbody>
</table>

1. The user name must be at least two characters long using any characters (including UTF-8) and contain no spaces.

2. The password must be 8–32 characters in length and contain at least one uppercase character, one lowercase character, one digit, and one non-alphanumeric character.
Software setup when HPE 3PAR SmartStart is unavailable

Prerequisites
If you are not using HPE 3PAR SmartStart or it is unavailable, you must manually launch the setup wizards.

- Cabling must be completed, and the storage system LEDs indicate that cables are properly installed and the storage system is operating normally.
- The Service Processor (SP) is on the same subnet as the storage system.
- Either the SP is powered on, or the virtual SP is deployed and powered on.
- The storage system must be connected to the same subnet of the SP, powered on, and in a non-initialized state for the setup process to verify the storage system.

Procedure

1. **Manually launching the Service Processor Setup wizard** on page 110
2. **Manually launching the Storage System Setup wizard** on page 110
3. **Installing the SSMC when HPE 3PAR SmartStart is unavailable** on page 110

**Manually launching the Service Processor Setup wizard**

Procedure

1. To manually launch the Service Processor Setup wizard, browse to the HPE 3PAR Service Processor (SP) URL address. For example: https://10.0.120.227/sp/SpSetupWizard.html.
2. In the User Name text box, enter setupusr and leave the password blank. You can change the password in the Service Processor Setup wizard.
3. To finish the setup, complete the wizard steps.

**Manually launching the Storage System Setup wizard**

Procedure

1. To manually launch the Storage System Setup wizard:
2. Launch a web browser.
3. Enter the HPE 3PAR Service Processor (SP) URL address. For example: https://10.0.120.227/sp/StorageSystemSetupWizard.html.
4. In the User Name text box, enter setupusr and enter the password previously set during the SP setup.
5. To finish the setup, complete the wizard steps.

**Installing the SSMC when HPE 3PAR SmartStart is unavailable**

Prerequisites

- With Windows systems, you must have administrative privileges and be a member of the administrators group.
- With Linux systems, you must have super-user access.
For more information about the HPE 3PAR StoreServ Management Console (SSMC), see the *HPE 3PAR StoreServ Management Console Administrator Guide* available at the Hewlett Packard Enterprise Information Library Storage website.

**Procedure**

1. Install from a downloaded software package. Download the latest HPE 3PAR SSMC installation package available at the Hewlett Packard Enterprise *Software Depot* website.
2. Install from a DVD. Insert the HPE 3PAR SSMC DVD, and then follow the setup instructions.

**NOTE:**

The first time you open the HPE 3PAR SSMC after installation, you must set up the user name and password for the administrator account. Click **Set credential** in the dialog that appears. After setting the administrator credential, you must log in to the Administrator Console, and then add the storage system.

**Related reference**

**Websites** on page 104
Relocation of the storage system with data preservation

Prerequisites

Ensure that no host I/O is running.

⚠️ CAUTION:

Do not connect the relocated storage system and service processor to the network at the new location until new IP Addresses are configured.

Procedure

1. **Shutdown the hosts, storage system, and disconnect power:**
   1. Shutdown all hosts connected to the array (or unmount volumes exported from the array to the hosts).
   2. Shutdown the storage system with data preservation by completing the System shutdown with data preservation on page 113.

   A relocation of a storage system with data preservation involves the physical relocation of the system with the expectation that the system data is preserved after shutdown, relocation, and powering on in the new location.

2. **Relocate the storage system:**
   6. Only if your storage system is to be transferred to a different rack or the system layout is changed in the existing rack, complete the following tasks:
      a. Label (if required) and disconnect all cables from the nodes and expansion drive enclosures (if any).
      b. Label the expansion drive enclosures (if any).
      c. Install cable restraint shipping brackets on page 113.
      d. Remove the enclosures and rail kits from the rack.
      e. Remove the physical service processor if installed.
      f. Install the rail kits in the new location, and mount the enclosures in the new location in the correct order.

3. **Wait for Safe-to-Remove UID (blue) LEDs on all controller nodes turn solid blue.**

4. **Shutdown the physical service processor if installed.**

5. **Disconnect power from the controller node enclosures, followed by the expansion drive enclosures (if any). Only for a storage system that is factory-integrated in a rack, disconnect power to the rack.**

2. **Relocate the storage system:**

6. Only if your storage system remains unchanged in the rack and the entire rack is being relocated, move the rack to the new location.

8. **Complete the Cabling setup on page 63, except for the network cables.**

9. **Complete the Power-on setup on page 72.**

⚠️ IMPORTANT:

Before powering on the storage system, verify that the network cables are disconnected from the storage system and service processor.

10. **Change the IP address for the storage system and service processor:**
    a. Complete the Change the IP address for the storage system on page 115.
    b. Complete the Change the IP address for the physical Service Processor using SPOCC on page 116.
For a virtual service processor, it must re-instantiated in the Hypervisor environment at the new site and configured with a new IP address.

3. Connect the storage system and service processor to the network.
   - For the controller nodes, connect an Ethernet cable between the controller node MGMT port and the network.
   - For a physical service processor, connect an Ethernet cable between the MGMT port (Eth0/Port 1) on the SP and the network using the same subnet as the storage system.
   - For a virtual service processor, connect it to the network using the same subnet as the storage system.

12. Update the service processor connection to storage system. See Updating the service processor to the same configuration as the storage system using SPOCC on page 117.

13. Verify health of the storage system.
   Physically verify LEDs on the storage system for any degraded or failed components (amber or blue LEDs). Take corrective action, if required.

14. Reconnect to the hosts.
   a. Power on the hosts, or re-mount the volumes exported from the system on the host.
   b. Resume the host I/O.

System shutdown with data preservation

Shut down a system with data preservation

Prerequisites

Verify with a system administrator that the storage system is prepared for shutdown.

Procedure

1. From the HPE 3PAR Service Processor (SP) on the main menu of the HPE 3PAR Service Console (SC), select Storage Systems > Systems.
2. Select Actions > Shutdown > All Nodes.
3. Follow the instructions on the dialog that opens.

Install cable restraint shipping brackets

Hewlett Packard Enterprise recommends installing the cable restraint shipping brackets before transporting the storage system to another location to prevent damage to the connectors.

Procedure

1. Connect the data cables to the enclosure.
2. Attach the hook and loop straps to the brackets.
3. Align the brackets so that they are parallel to the edges of the enclosure link connectors. Adjust the brackets to the height of the screw holes located on the side rails.
4. Attach the brackets to the side rails.

5. Tighten the captive screws.

**NOTE:**

Verify that the cable restraint shipping brackets are aligned and leveled with the link connectors before tightening the captive screws. Hewlett Packard Enterprise recommends tightening the screws to 19 in-lbs.
Change the IP address for the storage system

Prerequisites

⚠️ CAUTION:
Do not connect the storage system from the network at the new site until after completing the following procedure.

Procedure

1. Connect to the storage system with either of these methods:
   • Connect a laptop to the storage system with a serial cable:
     a. Configure the laptop COM port to the following settings using a terminal emulator:

     | Setting     | Value   |
     |-------------|---------|
     | Baud rate   | 38400   |
     | Data bits   | 8       |
     | Parity      | None    |
     | Stop bits   | 1       |
     | Flow control| Xon/Xoff|

     b. Connect the serial cable (either a serial or usb-to-serial connector) to a laptop.
     c. Connect the serial cable to the Console port (MFG) on the highest-numbered controller node.
     d. Once connected, log in using the 3paradmin account credentials.
   • Connect a laptop to the storage system over a private network:
a. Connect a red crossover cable (or with a small switch in between if using a straight cable) to Ethernet MGMT port on the highest numbered controller node and to the LAN port of a laptop.
b. Configure the LAN for the laptop with the same subnet as the network for the storage system.
c. Use a terminal emulator application (such as PuTTY) to establish a Secure Shell (SSH) communication to the storage system from laptop using `3paradm` account credentials.

2. Power on the storage system.
3. To display the initial information, enter `shownet`.
4. To view the help text for the `setnet` command (optional), enter `setnet -h`.
5. To change the IP address, enter `setnet startaddr oldIP newIP newNetmask`.
6. To update the Gateway, enter `setnet startgateway`.
7. To display the interim state and verify that the status of the new IP address is `unverified`, enter `shownet`.
8. Access the storage system CLI shell through the new IP address. This access will verify that the storage system can be reached at the new IP address.
9. To display the new interim state, enter `shownet`. (The status of the new IP address is changed to `verified`.
10. To complete the change, enter `setnet finish`. If you want to force the IP address change without verifying the change, use `setnet finish -f`.
11. To verify the final state, enter `shownet`.

## Change the IP address for the physical Service Processor using SPOCC

### Prerequisites

⚠️ **CAUTION:**

Do not connect the service processor (SP) from the network at the new site until after completing the following procedure.

The HPE 3PAR Service Processor Onsite Customer Care (SPOCC) software is a suite of service tool applications that provide a web-based user interface for support of the Service Processor (SP) and the HPE 3PAR StoreServ Storage system (array). Use SPOCC to access the SPMaint (Service Processor Maintenance) interactive CLI session. The SPMaint interface allows you to affect the status and configuration of both the system and the SP. For this reason, only one instance of the SPMaint interface can be run at a time on a given system.

### Procedure

1. At the rear of the physical service processor (SP), connect a customer-supplied red crossover cable (or with a small switch in between if using a straight cable) between the MGMT port (eth0/Port 1) on the SP and an Ethernet port of a laptop.
2. Configure the LAN settings of the laptop with same subnet as the network for the physical service processor.
3. Power on the SP.
4. On the laptop, log in to the SPOCC using the 3parcust account credentials.
5. In the left pane of SPOCC, click SPmaint.
6. Under Service Processor - SP Maintenance, click Network Configuration.
8. Change required settings, for example, Default Route, IP Address, Netmask, Gateway, NIC Speed.
9. After changing required settings, click Save and Activate. Now the SPOCC can be accessed using the new IP address of the physical Service Processor.
10. Disconnect the Ethernet cable from the laptop, and then reconfigure the original LAN settings on the laptop.
11. Connect the cable between the SP MGMT port (eth0/port 1) and the network.
12. Continue to Change the IP address for the storage system on page 115.

Updating the service processor to the same configuration as the storage system using SPOCC

Prerequisites

Connect the storage system and the HPE 3PAR Service Processor (SP) to the network before completing this procedure.

Procedure

1. Connect to the HPE 3PAR SP using the new IP address.
2. Log in to HPE 3PAR Service Processor Onsite Customer Care (SPOCC) interface using the 3parcust account credentials.
3. In the left pane, click SPmaint.
4. Under Service Processor - SP Maintenance, click StoreServ Configuration Management.
5. Click Remove and OK twice to confirm the operation.
6. Under Service Processor - StoreServ Configuration, click Add New StoreServ.
7. Enter the new IP address for the storage system and the 3paradm account credentials.
8. Click Add IP Address.

To make sure that the update has been completed successfully, monitor the progress on the screen.
9. To test connection between the SP and the storage system, click SPmaint, and then click Execute a CLI command. Execute a command such as shownet to confirm the successful connection between the SP and the storage system, and then verify the output.
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2U</td>
<td>two-unit rack space</td>
</tr>
<tr>
<td>4U</td>
<td>four-unit rack space</td>
</tr>
<tr>
<td>AC</td>
<td>alternating current</td>
</tr>
<tr>
<td>AFA</td>
<td>all flash array</td>
</tr>
<tr>
<td>CC</td>
<td>control cache (DIMMs)</td>
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<tr>
<td>CDA</td>
<td>confidential disclosure agreement</td>
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<tr>
<td>CLI</td>
<td>command line interface</td>
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<tr>
<td>CNA</td>
<td>converged network adapter</td>
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<tr>
<td>DAR</td>
<td>data at rest</td>
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<tr>
<td>DC</td>
<td>direct current (power) or data cache (DIMMs)</td>
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<tr>
<td>DHCP</td>
<td>dynamic host configuration protocol</td>
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<tr>
<td>DNS</td>
<td>domain name system</td>
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<tr>
<td>ESD</td>
<td>electrostatic discharge</td>
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<tr>
<td>FC</td>
<td>Fibre Channel (protocol) or fast class (drive type)</td>
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<tr>
<td>FCoE</td>
<td>Fibre Channel over Ethernet (protocol)</td>
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<tr>
<td>FIPS</td>
<td>Federal Information Processing Standard</td>
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<tr>
<td>FRU</td>
<td>field replaceable unit</td>
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<tr>
<td>Gb</td>
<td>Gigabits</td>
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<tr>
<td>Gb/s</td>
<td>Gigabits per second</td>
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<td>GbE</td>
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<tr>
<td>GUI</td>
<td>graphical user interface</td>
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<tr>
<td>HBA</td>
<td>host bus adapter</td>
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<tr>
<td>I/O</td>
<td>input/output</td>
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<tr>
<td>iLO</td>
<td>integrated lights out</td>
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<tr>
<td>iSCSI</td>
<td>Internet small computer systems interface</td>
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<td>LAN</td>
<td>local area network</td>
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<tr>
<td>Acronym</td>
<td>Description</td>
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<tr>
<td>LFF</td>
<td>large form factor</td>
</tr>
<tr>
<td>LUN</td>
<td>logical unit number</td>
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<td>MOB</td>
<td>moment of birth</td>
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<tr>
<td>NIC</td>
<td>network interface controller</td>
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<tr>
<td>NL</td>
<td>near line (drive type)</td>
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<tr>
<td>NTP</td>
<td>network time protocol</td>
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<tr>
<td>OOTB</td>
<td>out of the box</td>
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<tr>
<td>OVF</td>
<td>open virtual format</td>
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<tr>
<td>PCIe</td>
<td>peripheral component interconnect express</td>
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<tr>
<td>PCM</td>
<td>power cooling module</td>
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<td>PDU</td>
<td>power distribution unit</td>
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<tr>
<td>RAID</td>
<td>redundant array of independent disks</td>
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<td>RPS</td>
<td>redundant power supply</td>
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<td>SAN</td>
<td>storage area network</td>
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<td>SP</td>
<td>HPE 3PAR Service Processor</td>
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<td>SPOCK</td>
<td>Single Point of Connectivity Knowledge</td>
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<td>SPS</td>
<td>single power supply</td>
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<td>SSA</td>
<td>secure service agent</td>
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<td>SSD</td>
<td>solid state drive (drive type)</td>
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<td>SSH</td>
<td>Secure Shell</td>
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<td>SSMC</td>
<td>HPE 3PAR StoreServ Management Console</td>
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<tr>
<td>TCP</td>
<td>transmission control protocol</td>
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<td>TOTP</td>
<td>time-based password</td>
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<td>U</td>
<td>unit of space in a rack</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>UID</td>
<td>unit identification</td>
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<td>VM</td>
<td>virtual machine</td>
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<td>VV</td>
<td>virtual volume</td>
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<td>W</td>
<td>watt</td>
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