Hewlett Packard Enterprise

HPE 3PAR StoreServ 9000 Storage
Customer Self Install Guide

Abstract
This Hewlett Packard Enterprise (HPE) guide provides information and instructions to guide you through the installation of your HPE 3PAR StoreServ 9000 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 the HPE Deployment Services.
Notices

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Revision history

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<td>With HPE 3PAR OS 3.3.1 (MU1) Patch 09, Patch 11, and Patch 18 software, also known as HPE 3PAR OS 3.3.1 EMU1, and HPE 3PAR Service Processor 5.0.2.1 software or later software versions, CSI is supported for the HPE 3PAR StoreServ 9000 Storage.</td>
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Guidelines and responsibilities for a Customer Self Install

**IMPORTANT:**

- A Customer Self Install (CSI) of your HPE 3PAR StoreServ 9000 Storage is the installation of the storage system without the assistance of an authorized service provider. If installation assistance is needed, contact your HPE Sales Representative or HPE Channel Partner to purchase HPE Deployment Services.

- After this initial CSI installation, the installation of additional components (hardware upgrade) is not covered by CSI, such as adding drives and 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.

- When you perform a CSI according to the rules provided in this CSI guide, the storage system is fully supported by the warranty.

**CSI guidelines:**

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

- Two-node or four-node configurations
- Factory integrated in a single HPE Rack
- The CSI must be performed using the HPE 3PAR Guided Setup that is a feature of the HPE 3PAR OS.

**CSI installer technical profile:**

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

- Have a good understanding and knowledge of Storage Area Networks (SANs), Fiber Channel (FC) fundamentals, and a basic understanding of TCP/IP and other networking protocols (DNS/NTP).
- Have a good understanding of server virtualization technology, in particular of hypervisors such as VMware ESXi and Microsoft Hyper-V.
- Be able to maintain and install server hardware and Windows and/or Linux OSs.
- Have experience creating storage LUNs, presenting and/or exporting LUNs to a server, and formatting the LUNs to make them usable for applications.
- Be able to troubleshoot hardware and software issues using logs and documentation.
- Have the required tools and mechanical skills to unpack, roll, and install a heavy rack, up to ~900 kg (2000 pounds). Three people are recommended to remove the racked system from its shipping container.

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

- Review all the relevant documentation for the HPE 3PAR StoreServ 9000 Storage prior to initiating the installation.
- Ensure that the host and SAN environment is supported and compliant with HPE recommendations and best practices. Resolve any problems with the host and SAN environment prior to installing the HPE 3PAR StoreServ 9000 Storage. The *HPE 3PAR Implementation Guides* and the *HPE 3PAR Smart SAN User Guide* are available at the Hewlett Packard Enterprise Information Library website:
  
  [www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)

  The Support Matrix is available at the Single Point of Connectivity Knowledge (SPOCK) website:
  
  [www.hpe.com/storage/spock](http://www.hpe.com/storage/spock)

- Gather the required network and password information as indicated in the *Software Setup Worksheet* on page 12.
- Use the HPE 3PAR Guided Setup and HPE 3PAR StoreServ Management Console (SSMC) to set up and configure the storage system.
About the HPE 3PAR StoreServ 9000 Storage

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

Hosts (servers):
The host servers are connected to the storage system through the Host Adapters.

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

HPE 3PAR Service Processor (SP) software installed on a physical SP or virtual SP:
Each storage system requires an SP, either physical or virtual. The SP is designed to provide remote monitoring, error detection, error reporting, and support of diagnostic and maintenance activities involving the storage system. The SP only sends support data to HPE 3PAR Remote Support. The virtual SP is deployed as a virtual machine (VM). 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. Information about the system health and configuration is transferred securely to Hewlett Packard Enterprise. If HPE 3PAR Remote Support connectivity is enabled, it can also provide critical software updates to your storage system.

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

www.hpe.com/info/storage/docs

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

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.

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 the Hewlett Packard Enterprise Support Center and request assistance with the HPE 3PAR StoreServ 9000 Storage:

www.hpe.com/support/hpesc

Website for software downloads:

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

www.hpe.com/downloads/software

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

Serial number location for the HPE 3PAR StoreServ 9000 Storage

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

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

- A label at the top-left-rear of the Controller Node Enclosure
- The outside of the corrugated shipping material

HPE 3PAR StoreServ Storage forum

For the latest HPE 3PAR StoreServ 9000 Storage Customer Self Install (CSI) information, see the official HPE 3PAR StoreServ Storage forum website in the Hewlett Packard Enterprise community:
Use this forum to ask for help, share your installation experience, provide feedback, and search for solutions to issues encountered during the installation process.
Preparing for the installation: Process overview

To prepare for the installation of an HPE 3PAR StoreServ 9000 Storage system, complete the following process:

Procedure

1. Review Site planning on page 11.
2. Review Safety and regulatory compliance on page 12.
5. Review Acclimatizing the storage system on page 12.
7. Proceed to Unpacking a storage system that is factory integrated in an HPE Rack: Process overview on page 14.

Site planning

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

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

- Provide suitable space for unpacking, installing, and operating the storage system.
- Review the power and the heating, ventilation, and air-conditioning (HVAC) requirements. Provide adequate power facilities for the storage system and maintain proper environmental conditions for the storage system. Order any additional support equipment indicated by the power and HVAC review.
- Verify that the electrical service wiring has been installed at the predetermined location before installing the storage system. For detailed requirements, see the respective product specifications.
- Supply the network connections and external cabling required by the storage system.
- Ensure that all 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 9000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website: [www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs).

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:


Customer Self Install videos

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

[www.hpe.com/support/3PAR9000CSIVideo](http://www.hpe.com/support/3PAR9000CSIVideo)

**NOTE:**

The video may take a minute to load.

Software Setup Worksheet

The *Software Setup Worksheet* is to be used to prepare for the software setup that occurs after the hardware setup.

**Procedure**

1. Print the *HPE 3PAR StoreServ 9000 Storage Software Setup Worksheet* on page 60.
2. Complete the worksheet.

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

Before powering on the HPE 3PAR StoreServ 9000 Storage, the storage system might require up to 24 hours to acclimatize to the new operating environment when outside-to-inside conditions vary significantly.
Procedure

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

Tools for the installation

Table 1: Tools for the HPE 3PAR StoreServ 9000 Storagesystem installation

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Tools</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>• ESD mat&lt;br&gt;• ESD grounding strap</td>
</tr>
<tr>
<td>Rack unpacking</td>
<td>• Scissors or snips&lt;br&gt;• Box cutter&lt;br&gt;• Socket wrench with 13 mm (1/2 in) and 17 mm (11/16 in) sockets for removing L-bracket shipping clamps&lt;br&gt;• Adjustable wrench for leveling feet on the rack</td>
</tr>
<tr>
<td>Physical Service Processor (SP) connection setup</td>
<td>Laptop for configuration of a physical Service Processor</td>
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</table>
Unpacking a storage system that is factory integrated in an HPE Rack: Process overview

To unpack an HPE 3PAR StoreServ 9000 Storage system that is factory integrated in an HPE Rack, complete the following process:

Prerequisites

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

www.hpe.com/info/storage/docs

Procedure

1. Complete *Unpacking the HPE Rack* on page 14.

2. Proceed to *Installing the hardware that is factory integrated in an HPE Rack: Process overview* on page 22.

Unpacking the HPE Rack

NOTE:

The illustrations in this procedure are examples and might not be an exact representation of your HPE Rack (cabinet).
Figure 1: Front view of an unpacked HPE Rack and installed ramps

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rack (cabinet)</td>
</tr>
<tr>
<td>2</td>
<td>Ramps</td>
</tr>
<tr>
<td>3</td>
<td>Caster guides</td>
</tr>
<tr>
<td>4</td>
<td>Ramp supports</td>
</tr>
<tr>
<td>5</td>
<td>Pallet</td>
</tr>
</tbody>
</table>
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 access the storage system so that it can be uncrated and moved to its final location.
- Verify that the delivered shipment matches the order by referring to the packing slip and SKUs.
- Observe local occupational safety requirements and guidelines for heavy equipment handling.
- Verify that the total weight of the rack is within the floor loading limit.
- Due to the weight of the rack, use extreme caution when unpacking and moving the rack to avoid tipping the rack.
- When unloading the rack from the pallet, always use at least three people and do not stand in front of the rack.

Procedure

1. Inspect the packaging for damage and report any issues to the Hewlett Packard Enterprise Support Center.
2. During this procedure, refer to the unpacking diagrams on the outside of the cardboard shipping container.
3. Remove any shrink wrap, banding, tape, plastic clips, or other items securing the cardboard shipping container to the rack and pallet.
4. From the cardboard shipping container, remove the top cover.

Figure 2: Removing the banding on the HPE Rack shipping container
5. Remove the clips along the corrugated fiber board (CFB) walls and separate the CFB walls. Place the separated walls away from the storage system.

6. Remove the packing material from the rack (wrapping material, foam pieces, plastic ESD cover) and set aside the boxes that hold the ramps and additional installation hardware.
7. Remove the four L-bracket shipping brackets that attach the rack to the pallet using a socket wrench with 13 mm (1/2 in) and 17 mm (11/16 in) sockets.
   
a. Starting at the rack front, open the rack door and locate the two L-brackets.
   
b. Remove the two 13 mm (1/2 in) bolts that secure the L-bracket to the rack.
   
c. Remove the two 17 mm (11/16 in) bolts that secure the L-brackets to the pallet.
   
d. At the rack rear, repeat this same procedure to remove the remaining two L-brackets.

8. Check that the leveling bolts are raised to provide sufficient clearance for removing the rack from the pallet.
   
a. If it is necessary to raise a leveling bolt, use an adjustable wrench and turn the upper locking nut clockwise to loosen.
b. With an adjustable wrench, turn the leveling bolt counterclockwise until fully raised.

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

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

   a. Unpack the two ramps and four wooden ramp supports.

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

![Figure 9: Installing the ramps onto the pallet](image)

**WARNING:**

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

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

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

**CAUTION:**

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

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

Positioning and stabilizing the HPE Rack on page 22
Installing the hardware that is factory integrated in an HPE Rack: Process overview

For installing the hardware for an HPE 3PAR StoreServ 9000 Storage system that is factory integrated in an HPE Rack, complete the following process:

Prerequisites

- Review the configuration specifications and installation requirements in the HPE 3PAR StoreServ 9000 Storage Site Planning Manual available at the Hewlett Packard Enterprise Information Library website:
  www.hpe.com/info/storage/docs
- Obtain an adjustable wrench.

Procedure

1. Complete Positioning and stabilizing the HPE Rack on page 22.
2. Drives are installed at the factory. However, if additional drives were received and not installed, complete: Installing the Drives: Process overview on page 23.
3. Proceed to Cabling the hardware that is factory integrated in an HPE Rack: Process overview on page 27.

Positioning and stabilizing the HPE Rack

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

Procedure

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

   For more information on the structural considerations for using raised flooring, see the HPE 3PAR StoreServ 9000 Storage Site Planning Manual available at the Hewlett Packard Enterprise Information Library website:
   www.hpe.com/info/storage/docs

2. Stabilize and level the HPE Rack.

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

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

![Figure 10: Lowering a leveling bolt](image)

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

![Figure 11: Tightening the locking nut](image)

d. Repeat for each leveling pad.

### Installing the Drives: Process overview

This process overview is for installing the HPE 3PAR StoreServ 9000 Storage Drives.

- **If all of the drives were factory installed**, proceed to Cabling the hardware that is factory integrated in an HPE Rack: Process overview on page 27.

- **If it is necessary to install additional Drives**, complete the following process:
Procedure

2. Complete Installing the SFF Drives on page 25.
3. Proceed to Cabling the hardware that is factory integrated in an HPE Rack: Process overview on page 27.

Guidelines for the Drives

These guidelines are for HPE 3PAR StoreServ 9000 Storage Drives.

**IMPORTANT:**

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

**CAUTION:**

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

- A pair or pairs of Drives must be installed in consecutively numbered slots in a Drive Enclosure and must be of the same capacity and speed.
- The recommended initial quantity is eight SSDs per Controller Node pair, with a required minimum of six SSDs per Controller Node pair.
- With a four-node configuration, the best practice is to attach the same number of Drives to each Controller Node pair.
- All Drive Enclosures must contain an even number of Drives, with a minimum of two.
- Try to distribute an equal number of Drives in all Drive Enclosures. If an equal distribution is not possible, get as close as possible while still following the guidelines for the Drives.
- RAID 6 is recommended.

**SFF drive loading guidelines and examples:**

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

**NOTE:**

The top right bay in the SFF Drive Enclosure must not be used and is populated with a blank panel.
Table 2: Example slot order for the HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure

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

Installing the SFF Drives

This procedures is for the HPE 3PAR StoreServ 9000 Storage SFF Drives.

Prerequisites

- Determine an installation plan for allocating and loading the drives based on the provided guidelines, number of drives, and drive types to install.
- To avoid damaging any circuitry, wear an ESD grounding strap.
- Prepare a surface with an ESD safe mat for staging components for installation.

Procedure

1. Unpack the component and place on an ESD safe mat.
2. Remove the slot-filler Blanks from where you will be installing the Drive pairs.

   **IMPORTANT:**

   For proper airflow and cooling, a slot-filler Blank must remain installed in all unused Drive bays.

3. Install the pair or pairs of Drives.
   
   a. On the Drive, press the release button to open the handle.
   
   b. With the latch handle of the Drive fully extended, align and slide the Drive into the bay until the handle begins to engage (1).
   
   c. To seat the Drive into the Drive bay, close the handle (2).
Figure 12: Installing an HPE 3PAR StoreServ 9000 Storage SFF Drive
Cabling the hardware that is factory integrated in an HPE Rack: Process overview

**IMPORTANT:**

Do not turn on power to the components at this time. Connect the power cables and keep power off until you proceed to the specific power-on sequence for powering on the HPE 3PAR StoreServ Storage components.

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

**Procedure**

1. Review [Guidelines for cabling](#) on page 27.
2. Complete [Cabling the physical SP (if installed)](#) on page 27.
4. Complete [Cabling the PDU power cables to power receptacles](#) on page 32.

**Guidelines for cabling**

Follow these guidelines for cabling the HPE 3PAR StoreServ 9000 Storage system.

- Label all cables 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 the physical SP (if installed)**

This procedure is for the HPE physical Service Processor (SP), which is an optional component that can be used with the HPE 3PAR StoreServ 9000 Storage instead of a virtual Service Processor.
IMPORTANT:
Do not turn on power to the components at this time. Connect the power cables and keep power off until you proceed to the specific power-on sequence for powering on the HPE 3PAR StoreServ Storage components.

Procedure

Connect an Ethernet cable between the MGMT port (Eth0) on the Service Processor and the network. At the rack rear, neatly route and secure the cables along the right side of the rack.

IMPORTANT:
For the initial setup, the HPE 3PAR SP must be on the same subnet as the storage system.

Figure 13: Connecting the Ethernet cable to the MGMT port of the HPE physical SP

Cabling the Controller Nodes: Process overview

To cable the HPE 3PAR StoreServ 9000 Storage Controller Nodes, complete the following process:

Procedure

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

Cabling for the management connection

Procedure

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

Each Controller Node supports one Ethernet connection to a switch or hub. Separate connections from the Ethernet switch or hub to at least two Controller Nodes are required to support redundancy. One IP address is shared between the two connections, and only one network connection is active at a time. If the active network connection fails, the IP address is automatically moved to the surviving network connection.
1. Power switch
2. 10 GbE port (RCIP)
3. 1 GbE Management (MGMT) port
4. Service port (Console)

Figure 14: HPE 3PAR StoreServ 9000 Storage Controller Node ports

Cabling for the host connection

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

www.hpe.com/info/storage/docs

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

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

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

**Recommended configurations for FC/iSCSI host connectivity:**

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

- Depending on the number of host ports available, balance the host-server ports across both Controller Nodes in the node pair of the storage system at a minimum.
- From any given host, make a pair of connections from any given host to the same numbered slot and port (partner port) on each Controller Node in the node pair.
- If more than one host connection can be made per Controller Node, distribute connections of the same type (for example, FC) from any given host across Host Adapters in different slots (where available) on any given Controller Node.

**NOTE:**

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

**Host connectivity using a switch:**

- For an Ethernet switch, the recommended configuration for the connection is from the Ethernet switch or hub to two Controller Nodes (node pair).
- For an FC switch, you must set up FC fabric zoning to restrict WWNs seen by the system.

**NOTE:**

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

See “Supported Network Topologies” in the *HPE 3PAR StoreServ 9000 Storage Site Planning Manual* available at the Hewlett Packard Enterprise Information Library website:

[www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)
FC cable limitations for host connectivity

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

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

Cabling for a Remote Copy connection (optional feature)

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 website:

[www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)

**Procedure**

Connect a cable between the onboard 10 GbE (RCIP) port or 16 Gb FC Host Adapter (RCFC) and another HPE 3PAR StoreServ Storage system. To provide redundancy, connect two or more Controller Nodes per storage system.

Cabling for a File Persona connection (optional feature)

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

[www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)

**Procedure**

Connect a cable between a port on a 10 GbE NIC Host Adapter and the network. To provide redundancy, connect two or more Controller Nodes per storage system.
Cabling the PDU power cables to power receptacles

IMPORTANT:
Do not turn on power to the components at this time. Connect the power cables and keep power off until you proceed to the specific power-on sequence for powering on the HPE 3PAR StoreServ Storage components.

PDUs can be installed in various locations, such as vertically along the rear of the rack or horizontally within 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 PSUs. Do not exceed the capabilities of power strips and PDUs.

Prerequisites

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

IMPORTANT:
Verify that the operating site provides redundant power.

Procedure

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

2. Connect the main power cords to the operating site power receptacles. For redundancy, connect even-numbered PDUs to one power source (source A) and odd-numbered PDUs to another power source (source B).
Powering on the storage system: Process overview

Procedure

1. Review Precautions for powering on the storage system on page 33.
2. Complete Powering on the storage system on page 33.
3. Proceed to Setting up the SP connection: Process overview on page 35.

Precautions for powering on the storage system

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

⚠️ CAUTION:

- Do not disable the power 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.
- 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.
- To avoid potential damage to system equipment, do not adjust the positioning of the rack after powering on the system.

Powering on the storage system

Prerequisites

- The acclimatization process has completed for the storage system components. Do not power on the storage system until it is fully acclimatized. Allow up to 24 hours, and if condensation is still present, wait until fully evaporated before powering on. If small drops of water can be seen on any of the surfaces, condensation is present.
- The storage system does not exceed the ratings of the power sources and adheres to the guidelines in the HPE 3PAR StoreServ 9000 Storage Site Planning Manual available at the Hewlett Packard Enterprise Information Library website: [www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)
- Drives or slot-filler blanks are in all bays for proper thermal control.
- If power connections are underneath the rack, route the PDU power cables under the bracket at the bottom rear of the rack.
Procedure

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

   For a physical Service Processor (SP), the power starts automatically when the PDUs are powered on, or use the power reset button. For the Drive Enclosures, the power starts automatically, because there is no power switch.

2. On each Controller Node, turn on the power by setting the power switch to the **ON** position.

![Figure 15: Controller Node power switch](image)

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

4. At the storage system rear, verify all the Status LEDs are illuminated green for the Controller Nodes, Drive Enclosures, and Power Supply Units. If any of these LEDs are amber, troubleshoot the issue before continuing with the powering on procedure.

---

**IMPORTANT:**

The Status LED at the storage system front is **not** illuminated green at this time. Instead, after the power on sequence, the UID/Service LED is illuminated blue and the Fault LED is illuminated amber. Later during the software Guided Setup, these LEDs turn off and the Status LED becomes illuminated green.
For detailed HPE 3PAR StoreServ 9000 Storage Service Processor (SP) connection setup instructions, see the *HPE 3PAR Service Console and StoreServ Management Console Quick Setup Guide* and *HPE 3PAR Service Processor Software User Guide* available at the Hewlett Packard Enterprise Information Library website:

[www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)

**Procedure**

1. Review *About the Service Processor* on page 35.
2. Ensure *Network and firewall support access* on page 36.
3. Choose a setup option, and then complete the procedure:
   a. *Setting up the physical SP connection: Process overview* on page 38
   b. *Setting up the virtual SP connection with VMware ESXi: Process overview* on page 39
   c. *Setting up the virtual SP connection with Hyper-V: Process overview* on page 41
4. Proceed to *Setting up the SP and storage system software: Process overview* on page 44.

**About the Service Processor**

Each storage system requires an HPE 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 can perform diagnostic and maintenance activities involving the storage system. With HPE 3PAR SP 5.x software, only one standalone storage system can be added to the SP.

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

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

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

For more detailed information about the HPE 3PAR SP, see the HPE 3PAR SP documents available at the Hewlett Packard Enterprise Information Library website:

[www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)

**Service processor types**

**Physical SP:**
A physical SP is a dedicated service appliance located within the storage rack providing proximity to the storage system. For access to the physical SP by an authorized service provider, a direct connection to the HPE 3PAR SP is required. If you choose a physical SP at the time of ordering, your storage system will include a physical SP installed in the same rack as the Controller Nodes.
A physical SP has two physical network connections:

- The MGMT port (Eth0/Port 1) requires a connection to the customer's 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 SP:**

A virtual SP is deployed as a virtual machine (VM). For access to the virtual SP by an authorized service provider, a network connection to the HPE 3PAR SP is required. The virtual SP software is provided in an Open Virtual Format (OVF) for VMware vSphere Hypervisor and self-extractable virtual hard disk (VHD) package for Microsoft Hyper-V.

⚠️ **CAUTION:**

Do not install the virtual 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 must use the local boot disk of the assigned VMware server and not boot from the storage system LUNs.

---

**The HPE 3PAR Text-based User Interface**

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

The TUI appears when you log in to the Linux console opened from the VMware vSphere Client or through a terminal emulator using SSH to a physical or virtual SP. Prior to HPE 3PAR SP initialization, you can log in to the TUI with the user name `admin` and no password. To access the TUI after the HPE 3PAR SP has been initialized, you will need to log in to the console with the `admin` user name and the password you created during the initialization.

The SP ID and model are always displayed in the heading. Before the HPE 3PAR SP is initialized, the SP ID is displayed as `SP00000`. After initialization, the actual ID assigned to the HPE 3PAR SP during initialization is displayed.

---

**Network and firewall support access**

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

For a list of HP and HPE server host names and IP addresses, see [Firewall and Proxy server configuration](#) on page 36.

---

**Firewall and Proxy server configuration**

Firewall and proxy server configuration must be updated on the customer network to allow outbound connections from the Service Processor to the existing HP servers and new HPE servers.

HP and HPE server host names and IP addresses:

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

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

• **HPE RDA Midway Servers:**
  - [https://midway5v6.houston.hpe.com](https://midway5v6.houston.hpe.com) (2620:0:a13:100::105)
  - [https://midway6v6.houston.hpe.com](https://midway6v6.houston.hpe.com) (2620:0:a12:100::106)
  - [https://s54t0109g.sdc.ext.hpe.com](https://s54t0109g.sdc.ext.hpe.com) (15.203.174.94)
  - [https://s54t0108g.sdc.ext.hpe.com](https://s54t0108g.sdc.ext.hpe.com) (15.203.174.95)
  - [https://s54t0107g.sdc.ext.hpe.com](https://s54t0107g.sdc.ext.hpe.com) (15.203.174.96)
  - [https://g4t8660g.houston.hpe.com](https://g4t8660g.houston.hpe.com) (15.241.136.80)
  - [https://s79t0166g.sgp.ext.hpe.com](https://s79t0166g.sgp.ext.hpe.com) (15.211.158.65)
  - [https://s79t0165g.sgp.ext.hpe.com](https://s79t0165g.sgp.ext.hpe.com) (15.211.158.66)
  - [https://g9t6659g.houston.hpe.com](https://g9t6659g.houston.hpe.com) (15.241.48.100)

• **HPE InfoSight Servers:**
  - [https://sfrm-production-llb-austin1.itcs.hpe.com](https://sfrm-production-llb-austin1.itcs.hpe.com) (16.252.64.51)

• For communication between the Service Processor and the HPE 3PAR StoreServ Storage system, the customer network must allow access to the following ports on the storage system.
• Port 22 (SSH)
• Port 5781 (Event Monitor)
• Port 5783 (CLI)

• For communication between the browser and the Service Processor, the customer network must allow access to port 8443 on the SP.
• For communication between the vCenter instance and the Service Processor, the customer network must allow access to port 443 on the SP and vCenter server.

### Setting up the physical SP connection: Process overview

**Procedure**

1. Complete [Configuring a physical SP with a functional network](#) on page 38.
2. Proceed to [Setting up the SP and storage system software: Process overview](#) on page 44.

### Configuring a physical SP with a functional network

**Prerequisites**

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

**Procedure**

1. Connect an Ethernet cable between the physical SP Service port (Eth1) and a laptop Ethernet port.
   
   ![Figure 16: Connecting an Ethernet cable to the physical SP Service port](image)

2. Temporarily configure the LAN connection of the laptop as follows:
   
   a. IP Address: 10.255.155.49
   
   b. Subnet mask: 255.255.255.248

3. To begin the HPE 3PAR Guided Setup, access the physical SP from the service laptop:
a. In a browser window, enter: \texttt{https://10.255.155.54:8443/}.

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

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

d. Enter the information for the SP network connection from the Software Setup Worksheet, and click OK.

e. Wait for the Step 1 Completed message, but do not click Continue. Instead, disconnect the laptop Ethernet cable that you directly connected to the SP Service port (Eth1) in step 1.

f. Reconnect your laptop to the same network as the SP and storage system.

### Setting up the virtual SP connection with VMware ESXi:

#### Process overview

**Prerequisites**

- Verify that you have the virtual Service Processor (SP) installation software on either a DVD or from an email that was sent with a link to download the software, which might have gone to the email account responsible for purchasing the storage system.
- Verify that you have administrative privileges. With Linux systems, you must have superuser access.
- Verify that both the SP and the storage system are on the same subnet.
- Verify that the host server time and date are properly set, either through the Network Time Protocol (NTP) server or manually. Setting the correct date and time ensures virtual SP real-time monitoring and access. If the host server virtual SP is set to a date older than the date in the virtual SP installation package, the installation will fail. The time and date can be set manually through the VMware ESXi console.
- Verify that the VMware vSphere client is available before deploying the virtual SP OVF file. Access your ESXi server to download the VMware vSphere client or see the VMware website: [my.vmware.com/web/vmware/downloads](http://my.vmware.com/web/vmware/downloads)
- Provision the virtual SP on a VMware server and ensure that the virtual SP boots from the local disk of the assigned VMware server, not from the storage system LUNs.
- Do not install the virtual SP on the storage system, because it might lead to the inability of properly managing the storage system when connectivity to the storage system is unavailable.

**Procedure**

1. Complete Deploying the virtual SP on a host—VMware ESXi on page 40.
2. Complete Locating or assigning an IP address to a virtual SP—VMware ESXi on page 40.
3. Proceed to Setting up the SP and storage system software: Process overview on page 44.
Deploying the virtual SP 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 storage system service.

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

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

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

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

Procedure

1. Start the VMware vSphere Client, and then select the IP address of the vSphere server from the IP address/Name list.
2. Enter the user name and password, and then click Login.
3. On the File menu, click Deploy OVF Template.
4. Enter or select the OVF file that you want to deploy, and then click Open.
   The Deploy OVF Wizard opens.
5. On the Source screen, verify that the correct file is entered in the Deploy from a file or URL field, and then click Next.
6. On the Name and Location screen, you can change the name of the virtual SP, and then click Next.
   The default virtual SP name is the same as the OVF file name.
7. On the Resource Pool screen, select the resource pool within which you want to deploy the template.
8. On the Storage screen, select the storage destination for the virtual machine files.
9. On the Disk Format screen, click to select the type of provisioning to use for storing the virtual disks (thin provisioning is the default), and then click Next.
10. On the Ready to Complete screen, select Power on after deployment, and then click Finish. The deployment may take several minutes to complete.

Locating or assigning an IP address to a virtual SP—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 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 in with admin as the username and leave the password field blank. A password is not required to configure the network settings.

3. Choose option 1 Configure Network and press Enter.

4. From the Software Setup Worksheet, enter the SP name and press Enter.

5. From the Software Setup Worksheet, enter the SP IP address and press Enter.

6. From the Software Setup Worksheet, enter the subnet mask and press Enter.

7. From the Software Setup Worksheet, enter the default gateway address and press Enter.

8. To configure the network, enter Y.

   The full URL that you will need for accessing the virtual SP is displayed. For example, https://<sp_ip_address>:8443.

9. To return to the main menu, press X.

10. To exit, press X.

---

**Setting up the virtual SP connection with Hyper-V: Process overview**

**Prerequisites**

- Verify that you have the virtual Service Processor (SP) installation software on either a DVD or from an email that was sent with a link to download the software, which might have gone to the email account responsible for purchasing the storage system.

- Verify that you have administrative privileges and are a member of the Administrators group.

- Verify that both the SP and the storage system are on the same subnet.

- Verify that the host server time and date are properly set, either through the Network Time Protocol (NTP) server or manually. Setting the correct date and time ensures virtual SP real-time monitoring and access. If the host server virtual SP is set to a date older than the date in the virtual SP installation package, the installation will fail. The time and date can be set manually through the Windows OS date and time settings.

- Do not install the virtual SP on the storage system, because it might lead to the inability of properly managing the storage system when connectivity to the storage system is unavailable.
Deploying the virtual SP on a host—Hyper-V

Prerequisites

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

Procedure

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

Assigning an IP address to a virtual SP—Hyper-V

Procedure

1. In the Hyper-V Manager, right-click the 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 in with the admin credentials. A password is not required to configure the network settings. Press Enter.
4. Enter the SP IP address, and then press Enter.
5. Enter the netmask address, and then press Enter.
6. Enter the default gateway address, and then press Enter.

7. Review the configuration confirmation and record the virtual SP IP address on to the Software Setup Worksheet for reference during subsequent setup procedures with the software Guided Setup.

8. To exit, press Enter.
Setting up the SP and storage system software: Process overview

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

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

[www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)

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

To set up the software for the HPE 3PAR Service Processor and the HPE 3PAR StoreServ 9000 Storage system, complete the following process:

**Prerequisites**

- The cabling is complete.
- With either IPv4 or IPv6 DNS, verify that the network infrastructure of the data center has been configured and that DNS is running.
- The access privileges to the storage system are obtained.
- The network connections are active.
- The SP setup is complete for either a virtual or physical SP.
- The Service Processor (SP) and storage system are connected to the network and the SP is on the same network subnet as the storage system.
- The storage system components are powered on.
- The storage system LEDs indicate the following:
  - Components are powered on.
  - Cables are properly installed.
  - Network connections are active.
  - All cabled SAS ports have green Activity LEDs.
  - All Controller Nodes have solid green Status LEDs.
Procedure

1. Complete Setting up the SP software using HPE 3PAR Guided Setup on page 45.
2. Complete Setting up the storage system software using HPE 3PAR Guided Setup on page 46.
3. Proceed to Installing and setting up the SSMC software: Process overview on page 47.

Setting up the SP software using HPE 3PAR Guided Setup

Procedure

1. Connect to the HPE 3PAR Service Processor (SP) through a browser with the HPE 3PAR SP IP address: https://<sp_ip_address>:8443/.

   ✪ IMPORTANT:
   If you receive a warning from your browser when you enter the HPE 3PAR SP URL, see Browser warning with an SP connection on page 55. Later, you will be able to install appropriate certificates so that you do not see this warning message in the future.

The HPE 3PAR Guided Setup window opens and displays three steps. Notice that you have already completed Step 1, Connect Service Processor. You can now proceed with Step 2, Setup the Service Processor.

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

Under network settings, you have a chance to review and correct any information that you entered in Step 1. If you check IPv6, you will be prompted to enter the IPv6 address, subnet prefix length, and gateway. More network speed, domain, and DNS adjustments to the HPE 3PAR SP network configuration can also be set.

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

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

5. To apply the settings, click Setup.

An HPE 3PAR Guided Setup window displays describing the status and next steps.

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

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

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

6. Click Continue to be taken to the Service Processor Setup page to monitor the initialization of the SP.
7. Follow the setup progress. The full list of initialization steps is displayed on the right side the screen with its status, while the steps that have not yet been completed are listed on the left side of the screen.

8. Once the setup is complete, reboot the HPE 3PAR SP by clicking the Reboot link at the top of the screen. The HPE 3PAR SP Service Console automatically reconnects to the login screen. Allow several minutes for the reboot.

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

Procedure

1. Once the HPE 3PAR Service Processor (SP) has restarted after setting up the HPE 3PAR SP software using the Guided Setup, the HPE 3PAR SP Service Console login page is displayed with a single button and the Guided Setup window open.

2. Click Continue, enter the admin credentials you previously assigned in the Guided Setup, and then click Login.

   Another Guided Setup window will display more information and instructions.

3. If no HPE 3PAR StoreServ Storage system is added to the HPE 3PAR SP Service Console, you will be taken to the Systems page and the Setup StoreServ dialog opens with a Guided Setup window.

4. Click Next in the Guided Setup window.

   Another Guided Setup window will display more information and instructions.

5. To close the Guided Setup window, click Continue.

   You will then be able to fill in the required information for adding an HPE 3PAR StoreServ Storage system. This process includes accepting and caching a security certificate; entering system settings, date, and time settings; HPE 3PAR StoreServ Storage credentials; entering information about the installation site, and adding a system support contact.

6. Follow the instructions on the dialog that opens. You will have the option of adding a new uninitialized HPE 3PAR StoreServ Storage system or one that has already been initialized.

7. Once you have completed filling in the required settings, click Setup.

   A Guided Setup window will display information about the system setup process and how the process can be monitored. You will be able to follow the setup progress on the StoreServ Setup screen, which is similar to the Service Processor Setup screen. Once the setup is complete, a Guided Setup window will explain the next steps to take.

   **TIP:**

   If the Guided Setup remains incomplete due to an error, the checklist displays the error with a link to the section of the setup dialog related to the error condition.
Installing and setting up the SSMC software: Process overview

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

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

www.hpe.com/support/softwaredepot

Prerequisites

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

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

www.hpe.com/info/storage/docs

To filter the table for the HPE 3PAR SSMC documentation, select 3PAR StoreServ Management Console in the Models/Subcategories filter.

- Confirm that the setup requirements in the HPE 3PAR StoreServ Management Console Administrator Guide have been met before installing the HPE 3PAR SSMC.

Procedure

1. Use the HPE 3PAR StoreServ Management Console Administrator Guide for installing the HPE 3PAR StoreServ Management Console (SSMC) software.

2. Use the HPE 3PAR StoreServ Management Console User Guide and the HPE 3PAR SSMC Online Help for setting up and managing your HPE 3PAR StoreServ Storage system.

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

   See the Provisioning Tutorial available from the Help window in the Main Console.
Post-installation tasks

For more information, see the HPE 3PAR Service Processor (SP) documentation (version 5.0 and later) and HPE 3PAR StoreServ Management Console (SSMC) documentation (version 3.1 and later) available at the Hewlett Packard Enterprise Information Library website:

www.hpe.com/info/storage/docs

Configuring the Host and SAN: Process overview

Procedure

- Complete Configuring a host using a host-OS implementation guide on page 48.
- Only for HPE 3PAR Smart SAN, see the HPE 3PAR Smart SAN User Guide available at the Hewlett Packard Enterprise Information Library website: www.hpe.com/info/storage/docs.

Configuring a host using a host-OS implementation guide

Procedure

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

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

www.hpe.com/info/storage/docs

Adding workstations to the public firewall rules

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

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

Procedure

1. Connect and log in to the HPE 3PAR Service Processor (SP).
   a. Browse to the IP address https://<sp_ip_address>:8443/.
   b. Enter the account credentials, and then click Login.

2. Open the HPE 3PAR Service Console (SC) main menu by clicking 3PAR StoreServ Service Console in the upper-left corner.

3. From the main menu, select Service Processor.

4. On the Service Processor page, select Actions > Edit SP configuration.

5. From the Service Processor Firewall section of the Service Processor Settings dialog, click the Add button under Rules.
6. To add the workstations, enter the IP address or range of at least one management workstation, and click the Add button. (Or, click the Add + button to continue adding addresses.)

7. Verify the addresses in the Service Processor Settings dialog.

8. If not already disabled, disable Permissive mode.

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

9. Click OK at the bottom of the Service Processor Settings dialog.

10. The Service Processor setup page will show the process of reconfiguring the SP.

---

**Validating 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. The Remote Support connection is set during the software HPE 3PAR Guided Setup. If needed, Remote Support connectivity can be tested using the HPE 3PAR Service Console interface from the HPE 3PAR Service Processor (SP), which might need to be checked after making any network changes.

For more information about Remote Support connectivity, see the *Remote Connectivity for HPE StoreServ Storage* document: [h20195.www2.hpe.com/v2/getpdf.aspx/4AA5-3528ENW.pdf](h20195.www2.hpe.com/v2/getpdf.aspx/4AA5-3528ENW.pdf)

**Service Console Health pane**

From the HPE 3PAR SC, the health of the Transfer status to Hewlett Packard Enterprise is shown for the storage system in the Health pane of the Overview page.

**Service Console Test SP connectivity action**

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

After a connectivity test has been started, the HPE 3PAR SC shows the process as a task in a notifications box displayed in the detail pane. To see the results of the test, click the notification box, and then click the Details link. This notification pane shows the progress of the test and when the test has completed.

For more information about the HPE 3PAR SC, select the Help feature in console or see the *HPE 3PAR Service Processor Software User Guide* at the Hewlett Packard Enterprise Information Library website: [www.hpe.com/info/storage/docs](www.hpe.com/info/storage/docs)

**Testing SP connectivity using the HPE 3PAR SC**

**Procedure**

1. Connect and log in to the HPE 3PAR Service Processor (SP).
a. Browse to the IP address https://<sp_ip_address>:8443/.
b. Enter the account credentials, and then click Login.

2. Open the HPE 3PAR Service Console (SC) main menu by clicking 3PAR StoreServ Service Console in the upper-left corner.
3. From the main menu, select Service Processor.
4. Select Actions > Test SP connectivity.
5. Switch to Activity view to monitor the test progress.
6. When the test has finished, click the Details link to see the test results. When the SP has connectivity, all tests state ...test passed.

<table>
<thead>
<tr>
<th>Date/Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016-08-29 11:14:01 PDT</td>
<td>Created</td>
</tr>
<tr>
<td>2016-08-29 11:14:01 PDT</td>
<td>Start user operation</td>
</tr>
<tr>
<td>2016-08-29 11:14:04 PDT</td>
<td>SP localhost test passed.</td>
</tr>
<tr>
<td>2016-08-29 11:14:07 PDT</td>
<td>SP public interface test passed.</td>
</tr>
<tr>
<td>2016-08-29 11:14:10 PDT</td>
<td>SP gateway test passed.</td>
</tr>
<tr>
<td>2016-08-29 11:14:10 PDT</td>
<td>Proxy Server connectivity test skipped: proxy server not configured.</td>
</tr>
<tr>
<td>2016-08-29 11:14:12 PDT</td>
<td>Collection Server test passed.</td>
</tr>
<tr>
<td>2016-08-29 11:14:13 PDT</td>
<td>Completed</td>
</tr>
</tbody>
</table>

Accessing InfoSight and registering a storage system: Process overview

For using HPE InfoSight with your HPE 3PAR StoreServ 9000 Storage system, complete the following process:

Procedure

1. Review About HPE InfoSight on page 50
2. If you need to create an account, complete Creating an account to access InfoSight on page 51
3. Complete Registering a storage system with InfoSight using the SSMC on page 51

About HPE InfoSight

Overview

HPE InfoSight is a web portal that can be used with your HPE 3PAR StoreServ 9000 Storage system for planning, managing, monitoring, and troubleshooting.

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

The SFRM functionality has been embedded in HPE InfoSight.

Use HPE InfoSight to perform the following tasks and more:
• Monitor your environment
• Plan for efficient use of your infrastructure
• Troubleshoot performance issues

HPE InfoSight web portal: infosight.hpe.com

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

Registration of a storage system with InfoSight
The registration process validates your ownership of the HPE 3PAR StoreServ 9000 Storage system and makes the system data available to you and other users that you authorize.

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

Registration token for a System Group
Each System Group has a unique HPE InfoSight registration token provided from the Register Systems page. This token is used to register the HPE 3PAR StoreServ 9000 Storage system to a specific System Group by adding the token to the software for the HPE 3PAR StoreServ 9000 Storage system.

HPE Passport account to access HPE InfoSight
To access the HPE InfoSight web portal, you must use an HPE Passport account.

IMPORTANT:
If you created an HPE Passport account to access HPE StoreFront Remote (SFRM), this account is supported with HPE InfoSight.

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

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

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

Registering a storage system with InfoSight using the SSMC
This procedure is for registering an HPE 3PAR StoreServ 9000 Storage system with HPE InfoSight using the HPE 3PAR StoreServ Management Console (SSMC).
IMPORTANT:
To gain access to the HPE InfoSight web portal, Hewlett Packard Enterprise recommends the Google Chrome browser.

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

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

For more information about the HPE 3PAR Service Processor (SP) software settings, see the HPE 3PAR Service Processor Software 5.0.x User Guide available at the Hewlett Packard Enterprise Information Library website:
www.hpe.com/info/storage/docs

Procedure
1. Connect to the HPE InfoSight web portal: infosight.hpe.com
2. Log in using the credentials for your HPE Passport account.
3. Select Register Systems from the settings menu (gear icon).
4. From the Register Systems page, select an previously created System Group or create a System Group, and then click I Accept to agree you are registering one or more systems that you own or administer.
   To create a System Group, select the Create New Group option from the drop-down menu.
5. Copy the generated registration token to your clipboard by clicking the clipboard button located to the left of the field containing the token.
   This token is text beginning with StoreFrontRemoteAccess and will be pasted into a Token field in the HPE 3PAR SSMC Main Console interface.
6. From the server on which the HPE 3PAR SSMC software is installed, access the Main Console:
   a. Browse to https://<IP address or FQDN>:8443.
      TIP: The default port number is 8443. Another port might have been assigned during installation of the software.
      The login screen opens.
   b. Enter a user name and password, make sure the check box for Administrator Console is clear, and then click Login.
      The Dashboard screen is displayed.
7. From the HPE 3PAR SSMC Main Console dashboard, complete the following steps:
a. From the main menu under **Storage Systems**, click **Systems**.
b. Select the HPE 3PAR StoreServ 9000 Storage system from the list pane view.
c. From the detail pane view for that system, hover over the **General** detail area, and then click the edit icon (�建) that appears near the panel name.
d. Scroll down to the **Descriptors** section, and then paste the token in the **Comments** field.

With this token added, the next time the HPE 3PAR StoreServ 9000 Storage system calls home, StoreFront Remote will see the HPE 3PAR StoreServ 9000 Storage system and associate it with the corresponding group. This process can take 24–48 hours.

**Enhancing 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 website:

[www.hpe.com/info/storage/docs](http://www.hpe.com/info/storage/docs)
Troubleshooting

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 website or the Hewlett Packard Enterprise Support Center website:

www.hpe.com/info/storage/docs

www.hpe.com/support/hpesc

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

Checking the storage system health from the SP 5.x SC interface

Procedure

1. Connect and log in to the HPE 3PAR Service Processor (SP).
   a. Browse to the IP address https://<sp_ip_address>:8443/.
   b. Enter the account credentials, and then click Login.

2. Open the HPE 3PAR Service Console (SC) main menu by clicking 3PAR StoreServ Service Console in the upper-left corner.

3. From the main menu, select Systems.

4. Select Actions > Check health.

Identifying Drive Enclosure (cage) numbering in the software

Symptom

During the software installation of the storage system, the expansion Drive Enclosure (cage) identification numbers are assigned based on a port scan and might not reflect the order of their physical location within the rack.

Identification numbers are assigned during the software installation to the Drive Enclosures based on a scan of the DP1 port first and then the DP2 port on a given Controller Node pair.

Example:

With a two Controller Node storage system that includes three Drive Enclosures cabled to the Controller Node Enclosure through ports DP1 and DP2, the identification numbers are assigned in the order 0, 2, 3, 1. These numbers appear in the cage ID LED screen (on the enclosure front).

This method of assigning the cage ID numbers based on port connections is the expected behavior and cannot be changed. However, you can add a description in the software to describe the physical location of the enclosure within the rack.
Action

Identification of a Drive Enclosure in the rack:

1. Connect and log in to the HPE 3PAR Service Processor (SP).
   a. Browse to the IP address https://<sp_ip_address>:8443/.
   b. Enter the account credentials, and then click Login.
2. Open the HPE 3PAR Service Console (SC) main menu by clicking 3PAR StoreServ Service Console in the upper-left corner.
3. On the main menu, select Drive Enclosures, select one of the Drive Enclosures from the list, and then select Actions > Locate.
4. With locate active, check the front of the storage system and locate the Drive Enclosure that has the Module Fault LED lit solid amber on the left Ear Cap (bezel) and also has all of the drives in the enclosure with their Fault LEDs flashing amber. At the rear of the storage system on the identified Drive Enclosure, the UID led will be flashing blue.
5. Make a note of the physical location of this Drive Enclosure in the rack.

Add a description in the software to describe the physical location of the Drive Enclosures in the rack:

6. On the HPE 3PAR SC main menu, select Drive Enclosures, select the Drive Enclosures from the list, and then select Actions > Edit.
7. Follow the instructions on the dialog that opens. For example, you can enter the description of the physical location of the expansion Drive Enclosure as Rack <xx> Rack-Unit <yy>.

Troubleshooting issues with the Service Processor

Browser warning with an SP 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
Click Continue to this website (not recommended).
Solution 2

Cause
Warning message in Google Chrome browser.

Action

1. Click the Advanced link.

2. Click Proceed to <sp_ip_address> (unsafe).
Solution 3

Cause
Warning message in Mozilla Firefox browser.

Action

1. Click Advanced.

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

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

**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**

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.
To prepare for the software HPE 3PAR Guided Setup process that includes configuring the Service Processor (SP), configuring the HPE 3PAR StoreServ 9000 Storage, and installing the HPE 3PAR StoreServ Management Console (SSMC) software, complete this worksheet.

**IMPORTANT:**
The HPE 3PAR Guided Setup feature is available for the initial installation. For another installation after the initial installation (for example, due to a relocation of the storage system), contact your Hewlett Packard Enterprise support representative. Record user names and passwords only in a secure location.

### Service Processor (SP) information:

<table>
<thead>
<tr>
<th>Name</th>
<th>IPv4 (required): address, subnet mask, gateway, network speed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>IPv6 (optional): address, subnet prefix length, gateway</td>
</tr>
<tr>
<td>DNS server (optional)</td>
<td>Record DNS server addresses.</td>
</tr>
<tr>
<td>NTP server (optional)</td>
<td>Record network time server addresses.</td>
</tr>
<tr>
<td>Administrator account password(^1)</td>
<td>(Preset user name is admin.)</td>
</tr>
<tr>
<td>HPE Partner account password(^1)</td>
<td>(Preset user name is hpepartner.)</td>
</tr>
<tr>
<td>Remote Support proxy (optional)</td>
<td>Record proxy name, IP address, and port.</td>
</tr>
<tr>
<td>Send email notifications of alerts (optional)</td>
<td>Record mail host name, IP address, domain, and email addresses.</td>
</tr>
</tbody>
</table>

\(^1\) The password can be 8-32 characters in length and must contain at least one uppercase letter and one lowercase letter, one digit, and one nonalphanumeric character.
### HPE 3PAR StoreServ 9000 Storage information:

<table>
<thead>
<tr>
<th>HPE 3PAR StoreServ Storage Serial number(^1)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>IPv4 (required): address, subnet mask, gateway, network speed</td>
<td></td>
</tr>
<tr>
<td>IPv6 (optional): address, subnet prefix length, gateway</td>
<td></td>
</tr>
<tr>
<td>DNS server (optional)</td>
<td></td>
</tr>
<tr>
<td>Record DNS server addresses.</td>
<td></td>
</tr>
<tr>
<td>NTP server (optional)</td>
<td></td>
</tr>
<tr>
<td>Record network time server addresses.</td>
<td></td>
</tr>
<tr>
<td>Administrator account password(^2)</td>
<td></td>
</tr>
<tr>
<td>(Preset user name is \texttt{3paradm}.)</td>
<td></td>
</tr>
</tbody>
</table>

### HPE 3PAR StoreServ 9000 Storage—Installation site information:

| Company name |  |
| Address |  |

### HPE 3PAR StoreServ 9000 Storage—Support contact information:

| First and last name |  |
| Company name |  |
| Email |  |
| Phone |  |
| Fax (optional) |  |

\(^1\) See the HPE 3PAR StoreServ 9000 Storage documentation to locate the serial number.

\(^2\) The password is restricted to 31 characters in length and can contain alphanumeric characters and the following special characters: plus (+), dash (-), underscore (_), asterisk (*), and “at” symbol (@).

### HPE 3PAR StoreServ Management Console (SSMC) information:

| Administrator account user name\(^1\) |  |
| Administrator account password\(^2\) |  |

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

\(^2\) The password can be 8-32 characters in length and must contain at least one uppercase character, one lowercase character, one digit, and one non-alphanumeric character.
Component identification

NOTE:

• The illustrations of components are examples only and might not accurately represent the configuration of your HPE 3PAR StoreServ 9000 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.

Adapters—Host and SAS Adapters

Up to seven HPE 3PAR StoreServ 9000 Storage Adapters are supported in the Controller Node.

• **SAS Adapter:** The SAS Adapters provide for Drive Enclosure connectivity and are installed in slots 1-2 and optional slot 0.
  ◦ SAS Four-Port 12 Gb Adapter (8-12 ports/node)

• **Host Adapter:** The Host Adapters provide for the host connectivity and are installed in slots 3-6 and optional slot 0.
  **Host Adapter options:**
  ◦ Host Four-Port 16 Gb FC Adapter (0-20 ports/node)
  ◦ Host Two-Port 10 Gb iSCSI Adapter (0-10 ports/node)
  ◦ Host Two-Port 10 GbE NIC Adapter (0-4 ports/node): The Ethernet ports on this Host Adapter can be configured for HPE 3PAR File Persona.
Controller Node

The HPE 3PAR StoreServ 9000 Storage Controller Node (Node) is a component of the storage system and is installed in the Controller Node Enclosure. The Controller Node caches and manages data in a system and provides the hosts with a coherent, virtualized view of the system. The Controller Nodes are located in the rear of the Controller Node Enclosure.

The HPE 3PAR StoreServ 9000 Storage provides four Controller Node compartments (8U) and supports two or four Controller Nodes.

The Controller Nodes are installed in the rear of the Controller Node Enclosure. The numbering sequence of the Controller Nodes begins with zero (0) and increments in ascending order from bottom to top.
Controller Node numbering

Figure 18: HPE 3PAR StoreServ 9000 Storage Controller Node numbering, Controller Node Enclosure rear view

<table>
<thead>
<tr>
<th>System</th>
<th>Number of Controller Nodes</th>
<th>Loading order</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPE 3PAR StoreServ 9450 Storage</td>
<td>2</td>
<td>0, 1</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0, 1, 2, 3</td>
</tr>
</tbody>
</table>

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

**Figure 19: HPE 3PAR StoreServ 9000 Storage Controller Node power switch and onboard ports, Controller Node Enclosure rear view**

**Backup Battery Unit**

The HPE 3PAR StoreServ 9000 Storage includes one HPE 3PAR StoreServ 9000 Storage Backup Battery Units (BBU) per Controller Node with a maximum of four per system.

Depending on the HPE 3PAR StoreServ 9000 Storage Controller Node configuration, the Controller Node Enclosure may include two or four BBUs. The BBUs supply enough power to write the cache memory to the Controller Node drives during a power failure.
BBU numbering

![Figure 20: HPE 3PAR StoreServ 9000 Storage Backup Battery Unit numbering, Controller Node Enclosure front view](image)

**Drive Enclosure**

The HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure supports up to 24 small form factor (SFF) SAS drives.

1. Left Ear Cap
2. SFF drive bays
3. Right Ear Cap

![Figure 21: HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure front view](image)

**SFF drive bay numbering, Drive Enclosure front view**

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

**NOTE:**

The Drive Enclosure contains 25 SFF drive bays (slots); however, do not use the upper-right bay (slot 24).
Figure 22: HPE 3PAR StoreServ 9000 Storage SFF drive bay numbering, Drive Enclosure front view

SFF Drive Enclosure rear view details

1. Pullout tab with serial number
2. Fan Module 0
3. I/O Module 1
4. I/O Module ejector handle
5. I/O Module 0
6. SAS data ports
7. Fan Module 1
8. System-locate UID/push button
9. System status LED
10. Power Supply Unit 1
11. Power Supply Unit 0

Figure 23: HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure rear view details

Drives

- **HPE 3PAR StoreServ 9000 Storage Drive type**: The HPE 3PAR StoreServ 9450 Storage all flash array (AFA) supports Solid State Drives (SSDs) only.
- **HPE 3PAR StoreServ 9000 Storage Drive size**: 2.5 inch small form factor (SFF) SSD
- **Maximum HPE 3PAR StoreServ 9000 Storage Drives supported**: 24 SFF SSDs per Drive Enclosure
Fan Module—Controller Node Enclosure

The HPE 3PAR StoreServ 9000 Storage Fan Modules provide proper cooling for a Controller Node in a Controller Node Enclosure.

HPE 3PAR StoreServ 9450 Storage includes three Fan Module compartments per Controller Node and holds a maximum of 12 Fan Modules.

The numbering sequence of the Fan Modules is the same for all Controller Nodes.

Fan Module—Drive Enclosure

Figure 24: HPE 3PAR StoreServ 9000 Storage Fan Module numbering, Controller Node Enclosure front view

Figure 25: HPE 3PAR StoreServ 9000 Storage Fan Module numbering, Drive Enclosure rear view
I/O Module

Figure 26: HPE 3PAR StoreServ 9000 Storage I/O Module numbering, Drive Enclosure rear view

Power Supply Unit—Controller Node Enclosure

There are two HPE 3PAR StoreServ 9000 Storage Power Supply Units (PSUs) for each Controller Node. The following illustration displays the numbering sequence of the PSUs.

Figure 27: HPE 3PAR StoreServ 9000 Storage Power Supply Units numbering, Controller Node Enclosure rear view
Power Distribution Units

For a storage system that is factory integrated in an HPE Rack, the Power Distribution Units (PDUs) are preinstalled with circuit breakers. The cabling is accessible from the rack rear. PDUs can be single-phase or three-phase and regionally specific.

- With the storage system installed in a 42U 1,075 mm HPE Rack, horizontal-modular PDUs are used and up to 12 Drive Enclosures are supported in the base rack.
- With the storage system installed in a 42U 1,200 mm HPE Rack, vertical PDUs are used and up to 16 Drive Enclosures are supported in the base rack.

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

Service Processor

The HPE physical Service Processor (SP) is an optional component that can be used instead of a virtual Service Processor. This physical SP for use with the HPE 3PAR StoreServ 9000 Storage has redundant power supplies (RPS).
Standardized placement of HPE 3PAR StoreServ 9000 Storage components in a 1,075 mm HPE Rack

1. Physical Service Processor (SP)
2. Power Distribution Units (PDUs)
3. Controller Node Enclosure
4. Backup Battery Units (BBUs)
5. Fan Modules
6. Drive Enclosures
7. Leveling Bolt

NOTE:
A virtual SP can be used with the storage system instead of a physical SP.
Standardized placement of HPE 3PAR StoreServ 9000 Storage components in a 1,200 mm HPE Rack

1. Physical Service Processor (SP)
2. Controller Node Enclosure
3. Backup Battery Units (BBUs)
4. Fan Modules
5. Drive Enclosures
6. Leveling Bolt

NOTE:

- A virtual SP can be used with the storage system instead of a physical SP.
- With the 1,200 mm HPE Rack, the Power Distribution Units (PDUs) are mounted vertically at the rack rear along the right edge.

Figure 30: 1,200 mm HPE Rack front view
Component LEDs

The storage system components have LEDs to indicate whether the hardware is functioning properly and to help identify errors. The LEDs help diagnose basic hardware problems. The Drive Enclosures and many of the components have blue LEDs for physically identifying and locating the components in the rack.

Adapter—Two-port 10 Gb iSCSI Host Adapter LEDs

Figure 31: HPE 3PAR StoreServ 9000 Storage Two-port 10 Gb iSCSI Host Adapter LEDs

Table 3: HPE 3PAR StoreServ 9000 Storage Two-port 10 Gb iSCSI Host Adapter LEDs

<table>
<thead>
<tr>
<th>Ethernet LED</th>
<th>Activity LED</th>
<th>Link LED</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off</td>
<td>Off</td>
<td>Off</td>
<td>Power off</td>
</tr>
<tr>
<td>Green solid</td>
<td>Off</td>
<td>Off</td>
<td>Power on; no link</td>
</tr>
</tbody>
</table>

Table Continued
<table>
<thead>
<tr>
<th>Ethernet LED</th>
<th>Activity LED</th>
<th>Link LED</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green solid</td>
<td>Green solid</td>
<td>Green solid</td>
<td>Power on; 10 Gb/s link established; no activity</td>
</tr>
<tr>
<td>Green solid</td>
<td>Green flashing</td>
<td>Green solid</td>
<td>Power on; 10 Gb/s link established; receive/transmit activity</td>
</tr>
<tr>
<td>Green solid</td>
<td>Off</td>
<td>Amber solid</td>
<td>Firmware fault</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Indicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>🚨</td>
<td>Fault</td>
<td>Amber Solid</td>
<td>Fault</td>
</tr>
<tr>
<td>🥐</td>
<td>Status</td>
<td>Green Solid</td>
<td>Normal operation; no fault</td>
</tr>
<tr>
<td>UID</td>
<td>UID/Service</td>
<td>Blue Solid</td>
<td>Locate active; safe to remove</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue Flashing</td>
<td>Locate active; do not remove component</td>
</tr>
</tbody>
</table>

Adapter—Two-port 10 GbE NIC Host Adapter LEDs

Figure 32: HPE 3PAR StoreServ 9000 Storage two-port 10 GbE NIC Host Adapter LEDs
### HPE 3PAR StoreServ 9000 Storage two-port 10 GbE NIC Host Adapter LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Link/Status</td>
<td>Green solid</td>
<td>Normal/connected; link up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green flashing</td>
<td>Link down or not connected</td>
</tr>
<tr>
<td>2</td>
<td>Port/Speed</td>
<td>Amber flashing</td>
<td>Connected at high speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Not connected - port failed or power not applied</td>
</tr>
<tr>
<td>3</td>
<td>Fault</td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
<tr>
<td>4</td>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation; no fault</td>
</tr>
<tr>
<td>5</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active and/or safe to remove</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue flashing</td>
<td>Locate active; do not remove component</td>
</tr>
</tbody>
</table>

### Adapter—Four-port 16 Gb FC Host Adapter LEDs

![Four-port 16 Gb FC Host Adapter LEDs Diagram](image)

**Figure 33:** HPE 3PAR StoreServ 9000 Storage four-port 16 Gb FC Host Adapter LEDs
### HPE 3PAR StoreServ 9000 Storage four-port 16 Gb FC Host Adapter LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Link/Status</td>
<td>Green solid</td>
<td>Normal/connected; link up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green flashing</td>
<td>Link down or not connected</td>
</tr>
<tr>
<td>2</td>
<td>Port/Speed</td>
<td>Amber flashing</td>
<td>Connecting at high speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Not connected; port failed or power not applied</td>
</tr>
<tr>
<td>3</td>
<td>Fault</td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
<tr>
<td>4</td>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation; no fault</td>
</tr>
<tr>
<td>5</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active; safe to remove</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue flashing</td>
<td>Locate active; <strong>do not remove component</strong></td>
</tr>
</tbody>
</table>

---

**Adapter—Four-port 12 Gb SAS Adapter LEDs**

![Image of Adapter—Four-port 12 Gb SAS Adapter LEDs]

Figure 34: HPE 3PAR StoreServ 9000 Storage four-port 12 Gb SAS Adapter LEDs
### HPE 3PAR StoreServ 9000 Storage four-port 12 Gb SAS Adapter LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Port speed</td>
<td>Amber solid</td>
<td>Not connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Connected</td>
</tr>
<tr>
<td>2</td>
<td>Link status</td>
<td>Green solid</td>
<td>Normal/connected; link up</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Not connected</td>
</tr>
<tr>
<td>3</td>
<td>Fault</td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
<tr>
<td>4</td>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation; no fault</td>
</tr>
<tr>
<td>5</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active and/or safe to remove</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue flashing</td>
<td>Locate active; <strong>do not remove component</strong></td>
</tr>
</tbody>
</table>

#### Backup Battery Unit LEDs

![Backup Battery Unit LEDs](image)

Figure 35: HPE 3PAR StoreServ 9000 Storage Backup Battery Unit LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>UID</strong>/Service</td>
<td>Blue solid</td>
<td>Locate active and/or safe to remove</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue flashing</td>
<td>Locate active; <strong>do not remove component</strong></td>
</tr>
<tr>
<td>2</td>
<td>Status</td>
<td>Green solid</td>
<td>Battery functioning</td>
</tr>
</tbody>
</table>

Table Continued
### HPE 3PAR StoreServ 9000 Storage Backup Battery Unit LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Fault</td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
<tr>
<td>4</td>
<td>Battery</td>
<td>Green solid</td>
<td>Battery charging</td>
</tr>
</tbody>
</table>

### Controller Node LEDs

**Figure 36: HPE 3PAR StoreServ 9000 Storage Controller Node LEDs**

#### HPE 3PAR StoreServ 9000 Storage Controller Node LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Port/Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fault</td>
<td>Amber solid</td>
<td>Fault; node or component in faulted state</td>
</tr>
<tr>
<td>2</td>
<td>Status</td>
<td>Green solid</td>
<td>Booting; not a cluster member</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green flashing</td>
<td>Normal operation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(1 blink/sec)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active and/or shutdown (halted); not a</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>cluster member; safe to remove.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue flashing</td>
<td>Locate active; <strong>do not remove component</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4, 5, 6</td>
<td>10 Gb Ethernet (RCIP)</td>
<td>Green solid</td>
<td>Normal/connected; link up</td>
</tr>
</tbody>
</table>

*Table Continued*
### HPE 3PAR StoreServ 9000 Storage Controller Node LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Port/Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Green flashing</td>
<td>Link down or not connected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber flashing</td>
<td>Connected at high speed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>Not connected; port failed or power not applied</td>
</tr>
<tr>
<td>7</td>
<td>1 Gb Ethernet MGMT (Management port)</td>
<td>N/A</td>
<td></td>
</tr>
<tr>
<td>8, 9</td>
<td>• Link up speed</td>
<td>Green solid</td>
<td>10 GbE link</td>
</tr>
<tr>
<td></td>
<td>• Activity</td>
<td>Amber solid</td>
<td>100 Mb link</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>No link established</td>
</tr>
<tr>
<td></td>
<td></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>10</td>
<td>Service (Console port)</td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

### Drive Enclosure LEDs

![Drive Enclosure LEDs](image)

**Figure 37: HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure front view LEDs**

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation; no faults detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber solid</td>
<td>Critical fault detected</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber flashing</td>
<td>Noncritical fault detected within the enclosure</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Example: failed or removed Fan Module</td>
</tr>
</tbody>
</table>

*Table Continued*
### HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure front view LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active</td>
</tr>
</tbody>
</table>

**TIP:**
This UID push button activates or deactivates the Blue UID LED on the rear and front of the Drive Enclosure.

### HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure rear view LEDs

<table>
<thead>
<tr>
<th>LED function</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>UID</td>
<td>Blue solid</td>
<td>Location activated</td>
</tr>
</tbody>
</table>

**TIP:**
This UID push button activates or deactivates the Blue UID LED on the rear and front of the Drive Enclosure.

<table>
<thead>
<tr>
<th>Status</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Green solid</td>
<td>Normal operation</td>
</tr>
<tr>
<td></td>
<td>Amber solid</td>
<td>Critical fault</td>
</tr>
<tr>
<td></td>
<td>Amber flashing</td>
<td>Noncritical fault</td>
</tr>
</tbody>
</table>

**Drive LEDs**

**Figure 38: HPE 3PAR StoreServ 9000 Storage SFF Drive Enclosure rear view LEDs**

**Figure 39: HPE 3PAR StoreServ 9000 Storage SFF Drive LEDs**
### HPE 3PAR StoreServ 9000 Storage SFF Drive LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active; safe to remove</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue flashing</td>
<td>Locate active; <strong>do not remove component</strong></td>
</tr>
<tr>
<td>2</td>
<td>Status/Activity</td>
<td>Green solid</td>
<td>Normal operation; drive in <strong>OK</strong> state; admitted by the HPE 3PAR OS</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Green flashing</td>
<td>Drive activity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber solid</td>
<td>• Critical fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Solid amber in conjunction with the blue indicates the drive being admitted or serviced</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Amber flashing</td>
<td>Noncritical fault</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Off</td>
<td>No power</td>
</tr>
</tbody>
</table>

### Fan Module LEDs—Controller Node Enclosure

#### Figure 40: HPE 3PAR StoreServ 9000 Storage Fan Module LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active and/or safe to remove</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Blue flashing</td>
<td>Locate active; <strong>do not remove component</strong></td>
</tr>
</tbody>
</table>

*Table Continued*
### HPE 3PAR StoreServ 9000 Storage Fan Module LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation; no fault</td>
</tr>
<tr>
<td>3</td>
<td>Fault</td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
</tbody>
</table>

### Fan Module LEDs—Drive Enclosure

![Figure 41: HPE 3PAR StoreServ 9000 Storage Fan Module LEDs](image)

#### LED function

<table>
<thead>
<tr>
<th>UID</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locate UID</td>
<td>Blue solid</td>
<td>Locate activate; safe to remove</td>
</tr>
<tr>
<td></td>
<td>Blue flashing</td>
<td>Locate activate; do not remove component</td>
</tr>
<tr>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation</td>
</tr>
<tr>
<td></td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No power</td>
</tr>
</tbody>
</table>
## I/O Module LEDs

**Figure 42: HPE 3PAR StoreServ 9000 Storage I/O Module LEDs**

<table>
<thead>
<tr>
<th>LED function</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health/Fault</td>
<td>Green solid</td>
<td>Normal operation</td>
</tr>
<tr>
<td></td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
<tr>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Location requested; safe to remove</td>
</tr>
<tr>
<td></td>
<td>Blue flashing</td>
<td>Location requested; <strong>do not remove</strong> Indicates maintenance in progress; for example, firmware updating</td>
</tr>
</tbody>
</table>

**Figure 43: HPE 3PAR StoreServ 9000 Storage SAS port LEDs**
<table>
<thead>
<tr>
<th>LED Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Activity</td>
<td>Green solid</td>
<td>• With amber Fault LED off, link at high speed with no activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With solid amber Fault LED, link at low speed with no activity.</td>
</tr>
<tr>
<td></td>
<td>Green flashing</td>
<td>• With amber Fault LED off, link at high speed with activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With solid amber Fault LED, link at low speed with activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With flashing amber Fault LED, locate requested.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>With solid amber Fault LED, no link or no cable connected.</td>
</tr>
<tr>
<td>2 Fault</td>
<td>Amber solid</td>
<td>• With solid green Activity LED, link at low speed with no activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With flashing green Activity LED, link at low speed with activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With green Activity LED off, no link or no cable connected.</td>
</tr>
<tr>
<td></td>
<td>Amber flashing</td>
<td>With flashing green Activity LED, locate requested.</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>• With solid green Activity LED, link at high speed with no activity.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• With flashing green Activity LED, link at high speed with activity.</td>
</tr>
</tbody>
</table>
Power Supply Unit LEDs—Controller Node Enclosure

Figure 44: HPE 3PAR StoreServ 9000 Storage Power Supply Unit LEDs

<table>
<thead>
<tr>
<th>LED function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Status</td>
<td>Green solid</td>
<td>Normal operation</td>
</tr>
<tr>
<td></td>
<td>Amber solid</td>
<td>PSU failed</td>
</tr>
<tr>
<td>2 UID/Service</td>
<td>Blue solid</td>
<td>Locate active and/or safe to remove</td>
</tr>
<tr>
<td></td>
<td>Blue flashing</td>
<td>Locate active; do not remove component</td>
</tr>
</tbody>
</table>

Power Supply Unit LEDs—Drive Enclosure

Figure 45: HPE 3PAR StoreServ 9000 Storage Power Supply Unit LEDs
### HPE 3PAR StoreServ 9000 Storage Power Supply Unit LEDs

<table>
<thead>
<tr>
<th>LED function</th>
<th>Display</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation</td>
</tr>
<tr>
<td></td>
<td>Amber flashing</td>
<td>Non-critical fault</td>
</tr>
<tr>
<td></td>
<td>Amber solid</td>
<td>Critical fault</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>No power</td>
</tr>
</tbody>
</table>

## Service Processor LEDs

![Service Processor LEDs rear panel](image)

Figure 46: Service Processor LEDs rear panel

<table>
<thead>
<tr>
<th>LED/Port function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 UID/Service</td>
<td>Blue solid</td>
<td>Activated</td>
</tr>
<tr>
<td></td>
<td>Blue flashing</td>
<td>Service Processor managed remotely</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Deactivated</td>
</tr>
<tr>
<td>2 NIC link</td>
<td>Green solid</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 solid</td>
<td>Network link</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>
</tbody>
</table>

Table Continued
### Service Processor LEDs rear panel

<table>
<thead>
<tr>
<th>LED/Port function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Power supply</td>
<td>Green solid</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>The physical Service Processor has redundant power supplies (RPS) and the LEDs are the same on both. Off represents one or more of the following conditions:</td>
</tr>
<tr>
<td></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>

### Service Processor LEDs front panel

**Table 4: Service Processor LEDs front panel**

<table>
<thead>
<tr>
<th>LED/Port function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Power on/Standby button</td>
<td>Green solid</td>
<td>Service Processor on</td>
</tr>
<tr>
<td></td>
<td>Green flashing</td>
<td>Performing power-on sequence</td>
</tr>
<tr>
<td></td>
<td>Amber solid</td>
<td>Service Processor in standby, power still on</td>
</tr>
<tr>
<td></td>
<td>Off</td>
<td>Power cord not attached, no power supplies installed, or power failure</td>
</tr>
<tr>
<td>2 Health</td>
<td>Green solid</td>
<td>Service Processor on and health normal</td>
</tr>
<tr>
<td></td>
<td>Amber flashing</td>
<td>Service Processor health degraded</td>
</tr>
<tr>
<td></td>
<td>Red flashing</td>
<td>Service Processor health critical</td>
</tr>
</tbody>
</table>

*Table Continued*
### Service Processor LEDs front panel

<table>
<thead>
<tr>
<th>LED/Port function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Off</td>
<td>Service Processor power off</td>
</tr>
<tr>
<td>3 NIC status</td>
<td>Green solid</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 link/activity</td>
</tr>
<tr>
<td>4 UID/Service</td>
<td>Blue solid</td>
<td>Active</td>
</tr>
<tr>
<td></td>
<td>Blue flashing</td>
<td>Either remote management, firmware upgrade in progress, or iLO manual reboot sequence initiated</td>
</tr>
</tbody>
</table>

### System status LEDs—Controller Node Enclosure

The HPE 3PAR StoreServ 9000 Storage system status LEDs are located at the front, right corner of the Controller Node Enclosure.

**Figure 48: HPE 3PAR StoreServ 9000 Storage system status LEDs, Controller Node Enclosure front view**
### HPE 3PAR StoreServ 9000 Storage system status LEDs

<table>
<thead>
<tr>
<th>LED</th>
<th>Function</th>
<th>Status</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>UID/Service</td>
<td>Blue solid</td>
<td>Locate active</td>
</tr>
<tr>
<td>2</td>
<td>Status</td>
<td>Green solid</td>
<td>Normal operation; no fault</td>
</tr>
<tr>
<td>3</td>
<td>Fault</td>
<td>Amber solid</td>
<td>Fault</td>
</tr>
</tbody>
</table>
Websites

Hewlett Packard Enterprise general websites:
Information Library
   www.hpe.com/info/EIL
Customer Self Repair Services Media Library
   www.hpe.com/support/sml-csr
InfoSight
   infosight.hpe.com
Safety and Compliance
   www.hpe.com/support/Safety-Compliance-EnterpriseProducts
Software Depot
   www.hpe.com/support/softwaredepot
Software License Manager
   enterpriselicense.hpe.com/
Software updates and licensing
   www.hpe.com/downloads/software
Support Center
   www.hpe.com/support/hpesc
SPOCK
   www.hpe.com/storage/spock
White papers and analyst reports
   www.hpe.com/storage/whitepapers

Hewlett Packard Enterprise storage websites:
Data Storage
   www.hpe.com/info/storage
Information Library Storage
   www.hpe.com/info/storage/docs
Support and other resources

Accessing Hewlett Packard Enterprise Support

• For live assistance, go to the Contact Hewlett Packard Enterprise Worldwide website:
  http://www.hpe.com/assistance

• To access documentation and support services, go to the Hewlett Packard Enterprise Support Center website:
  http://www.hpe.com/support/hpesc

Information to collect

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

Accessing updates

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

• To download product updates:
  Hewlett Packard Enterprise Support Center
  www.hpe.com/support/hpesc
  Hewlett Packard Enterprise Support Center: Software downloads
  www.hpe.com/support/downloads
  Software Depot
  www.hpe.com/support/softwaredepot

• To subscribe to eNewsletters and alerts:
  www.hpe.com/support/e-updates

• To view and update your entitlements, and to link your contracts and warranties with your profile, go to the Hewlett Packard Enterprise Support Center More Information on Access to Support Materials page:
IMPORTANT:
Access to some updates might require product entitlement when accessed through the Hewlett Packard Enterprise Support Center. You must have an HPE Passport set up with relevant entitlements.

Customer self repair
Hewlett Packard Enterprise customer self repair (CSR) programs allow you to repair your product. If a CSR part needs to be replaced, it will be shipped directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your Hewlett Packard Enterprise authorized service provider will determine whether a repair can be accomplished by CSR.
For more information about CSR, contact your local service provider or go to the CSR website:
http://www.hpe.com/support/selfrepair

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

Remote support and Proactive Care information
HP Get Connected
www.hpe.com/services/getconnected
HP Proactive Care services
www.hpe.com/services/proactivecare
HP Proactive Care service: Supported products list
www.hpe.com/services/proactivecaresupportedproducts
HP Proactive Care advanced service: Supported products list
www.hpe.com/services/proactivecareadvancedsupportedproducts

Proactive Care customer information
Proactive Care central
www.hpe.com/services/proactivecarecentral
Proactive Care service activation
www.hpe.com/services/proactivecarecentralgetstarted

Warranty information
To view the warranty for your product or to view the Safety and Compliance Information for Server, Storage, Power, Networking, and Rack Products reference document, go to the Enterprise Safety and Compliance website:
www.hpe.com/support/Safety-Compliance-EnterpriseProducts
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:

website

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:

website

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

website

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

website

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Acronyms

1U
one-unit rack space

2U
two-unit rack space

4U
four-unit rack space

AC
alternating current

AFA
all flash array

BBU
Battery Backup Unit

CC
Control Cache (DIMMs)

CDA
confidential disclosure agreement

CLI
command line interface

CNA
converged network adapter

CSI
Customer Self Install

DAR
data at rest

DHCP
dynamic host configuration protocol

DNS
domain name system

ESD
electrostatic discharge

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

FIPS
Federal Information Processing Standard
FRU
  field replaceable unit
GB
  Gigabyte
Gb/s or Gbps
  Gigabits per second
GbE
  Gigabit Ethernet
GUI
  graphical user interface
HBA
  host bus adapter
I/O
  input/output
iLO
  integrated lights out
IOM
  I/O Module
LAN
  local area network
LUN
  logical unit number
NIC
  network interface card
NTP
  network time protocol
OOTB
  out of the box
OVF
  open virtual format
PCIe
  peripheral component interconnect express
PCM
  Power Cooling Module
PDU
  Power Distribution Unit
PSU
Power Supply Unit

RAID
redundant array of independent disks

RPS
redundant power supply

SAN
storage area network

SAS
serial attached SCSI

SC
HPE 3PAR Service Console

SFF
small form factor

SFP
small form-factor pluggable

SFRM
HPE StoreFront Remote

SP
Service Processor

SPS
single power supply

SSA
secure service agent

SSD
solid state drive (drive type)

SSH
Secure Shell

SSMC
HPE 3PAR StoreServ Management Console

TCP
transmission control protocol

TOTP
time-based one-time password

TUI
HPE 3PAR Text-based User Interface
U
  unit of space in a rack

UID
  unit identification

VM
  virtual machine

VV
  virtual volume

W
  watt