HP 3PAR StoreServ 7000 Storage SmartStart 1.2 Software User's Guide

Abstract

This document provides the information needed to use HP 3PAR SmartStart to install and configure HP 3PAR StoreServ 7000 Storage systems.

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Acknowledgements

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2. Learn more about how HP 3PAR storage systems work. **NOTE:** If you are not familiar with HP 3PAR storage systems, HP highly recommends that you read this short introduction.	"Understanding Storage" (page 40)
3. Set up the Service Processor and the HP 3PAR StoreServ 7000 Storage system.	"Setting Up the Service Processor" (page 13) "Setting Up the HP 3PAR StoreServ Storage System" (page 17)
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Welcome

Welcome to HP 3PAR SmartStart for HP 3PAR StoreServ 7000 Storage systems.

SmartStart helps you configure:

- HP 3PAR StoreServ 7200 Storage system
- HP 3PAR StoreServ 7400 Storage system
- HP 3PAR StoreServ 7450 Storage system

NOTE: If you are setting up multiple HP 3PAR StoreServ 7000 Storage systems, be sure to set up each storage system completely before starting to set up the next storage system.

SmartStart can take up to one minute to open.

Navigating SmartStart

Use the links in the SmartStart navigation pane to access each configuration step in the order presented.

Each configuration step displays in the information pane the substeps or options necessary to complete that step of the configuration.

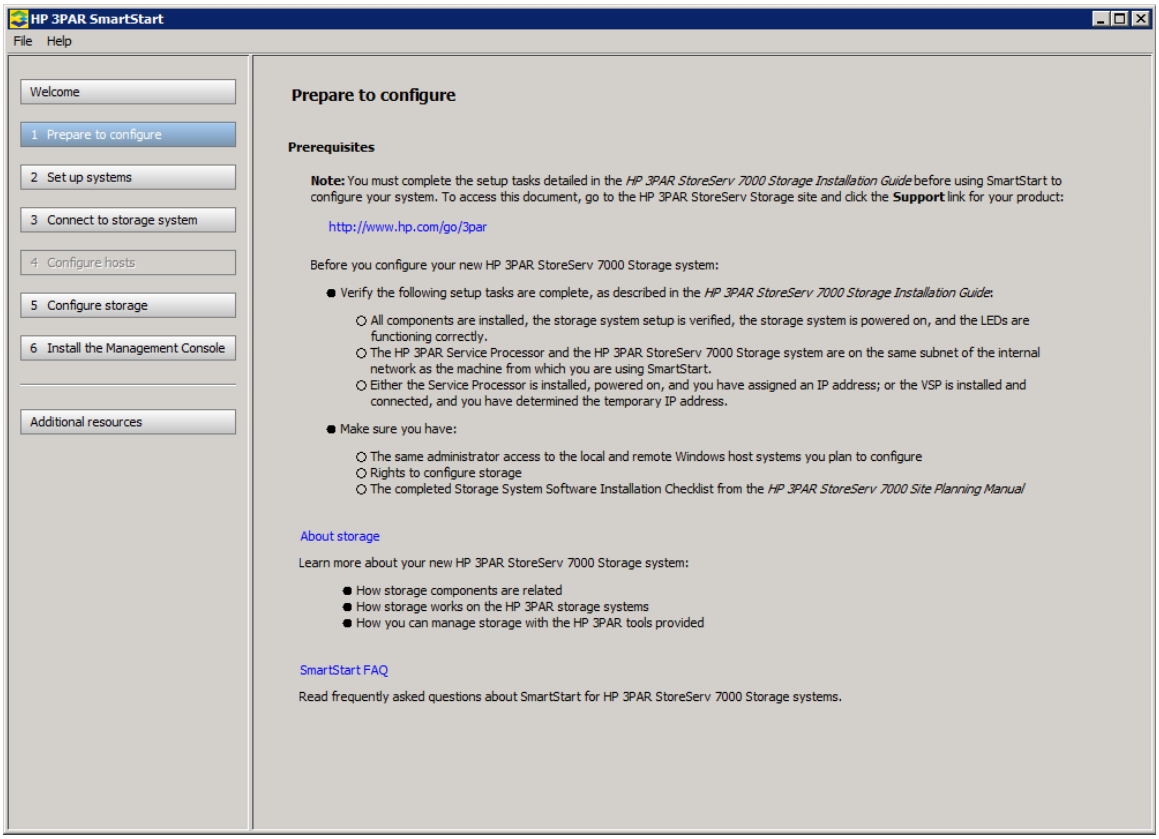
NOTE: SmartStart might at times display a progress bar for up to 10 minutes while completing operations. The progress bar dialog box does not allow you to cancel the operation because doing so can lead to unpredictable results and interrupt normal functionality.

Accessing Online Help

To view online help, do one of the following:

- Press **F1**.
- Select **Help→Online Help**.

1 Prepare to Configure



Prerequisites

IMPORTANT: Before using SmartStart to configure your system, you must complete the setup tasks detailed in the *HP 3PAR StoreServ 7000 Storage Installation Guide*.

To access the *HP 3PAR StoreServ 7000 Storage Installation Guide*, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

A DHCP network is no longer required to set up a virtual Service Processor (VSP). For more information about how to manually set the VSP IP address when DHCP is not available, see the *HP 3PAR StoreServ 7000 Storage Installation Guide*.

NOTE: The Service Processor and StoreServ storage system must be on the same subnet.

Before you configure your new HP 3PAR StoreServ 7000 Storage system:

- Verify that the following setup tasks are complete, as described in the *HP 3PAR StoreServ 7000 Storage Installation Guide*:
  - All components are installed.
  - If you are using a VSP, the system time is set to the correct time of day on the ESXi host.

- The HP 3PAR storage system setup is verified, the storage system is powered on, and the LEDs are functioning correctly.
- Either the physical Service Processor is installed and powered on and you have assigned it an IP address, or the virtual Service Processor is installed and connected and you have determined the temporary IP address.

- Make sure you have the following:
  - Administrative access to the Windows host systems you are configuring

    If you are planning to configure a remote host system (a machine other than the machine into which you inserted the SmartStart media), you must be able to use the same ID and password to gain administrator access to both the system running SmartStart (the local host) and the remote host.
  - Rights to configure storage

    To configure storage, your user account on the HP 3PAR storage system must either be assigned a Super user or Edit role or be granted the following rights:
    - host_create
    - vv_create
    - vlun_create
  - The necessary Service Processor and HP 3PAR storage system information for initialization and configuration

    For more information, see your completed Storage System Software Installation Checklist from the *HP 3PAR StoreServ 7000 Site Planning Manual*.
    - **Service Processor information**
      - The Service Processor IP address, subnet mask, and gateway IP address

        For more information about determining the temporary IP address and assigning the permanent IP address, see the *HP 3PAR StoreServ 7000 Storage Installation Guide*.
      - Host name to assign
      - DNS settings (if applicable)
      - Proxy server settings (if applicable)
      - New password to assign to the user account for the two Storage System Setup wizards (**setupusr**)
      - New password to assign to the user account for the Service Processor (**3parcust**)

        NOTE: Passwords for the **setupusr** and **3parcust** user accounts must be between 7 and 32 characters in length and can consist of alphanumeric characters and the following special characters: period (.), plus sign (+), dash (-), equals sign (=), and forward slash (/).
    - **HP 3PAR StoreServ Storage system information**
      - Storage system serial number

        This seven-digit number is located on the back of your HP 3PAR StoreServ Storage system next to the power switch for the node enclosure power cooling module (PCM1). It begins with "16" (for example, 1624635). For more information, see "Locating the Serial Number" (page 17).
      - Storage system name

- IP address (IPv4 only)
- Subnet mask
- Gateway IP address
- New password to assign to the user account for the storage system (**3paradm**)

NOTE: Passwords for the **3paradm** user account are between six and eight characters in length and can include all printable characters.

CAUTION: Do not run more than one instance of SmartStart on the same host system. Running multiple instances of SmartStart can cause resource conflicts and operating errors.

About Storage

Before you begin to use SmartStart to install and set up your HP 3PAR StoreServ 7000 Storage system, see the following section to learn more about how storage works on your new HP 3PAR storage system:

"Understanding Storage" (page 40)

FAQ

1. What is HP 3PAR SmartStart?

   HP 3PAR SmartStart is an installation wizard for your HP 3PAR StoreServ 7000 Storage systems. SmartStart enables you to:

   - Initialize the HP 3PAR Service Processor
   - Initialize the HP 3PAR StoreServ 7000 Storage system
   - Configure FC and iSCSI host connections
   - Configure and begin data storage
   - Install the HP 3PAR Management Console, which you can use to manage storage and create new storage after installation is complete

2. Can I use HP 3PAR SmartStart with Windows?

   Yes. You can use HP 3PAR SmartStart with Windows Server 2008 R2 and Windows Server 2012.

3. Can I use HP 3PAR SmartStart with servers running other operating systems?

   Not in this release. Refer to the *HP 3PAR StoreServ 7000 Storage Installation Guide*.

4. Can I use HP 3PAR SmartStart to configure other HP 3PAR StoreServ Storage systems?

   Not in this release.

5. Can I use HP 3PAR SmartStart with Windows Server 2008 R2 and Windows Server 2012 servers connected by Fibre Channel?

   Yes. You can use HP 3PAR SmartStart to set up Fibre Channel connections.

6. Can I use HP 3PAR SmartStart with Windows Server 2008 R2 and Windows Server 2012 servers connected by iSCSI?

   Yes. You can use HP 3PAR SmartStart to set up iSCSI connections.

7. Do I need to configure the hosts by inserting the SmartStart media into each and every one of the Windows Server 2008 R2 or Windows Server 2012 hosts?

   No. You can insert the SmartStart media into a Windows Server 2008 R2 or Windows Server 2012 server and use SmartStart to remotely configure other Windows Server 2008 R2 or Windows Server 2012 servers as hosts.

8. Where can I find help and support for HP 3PAR SmartStart?

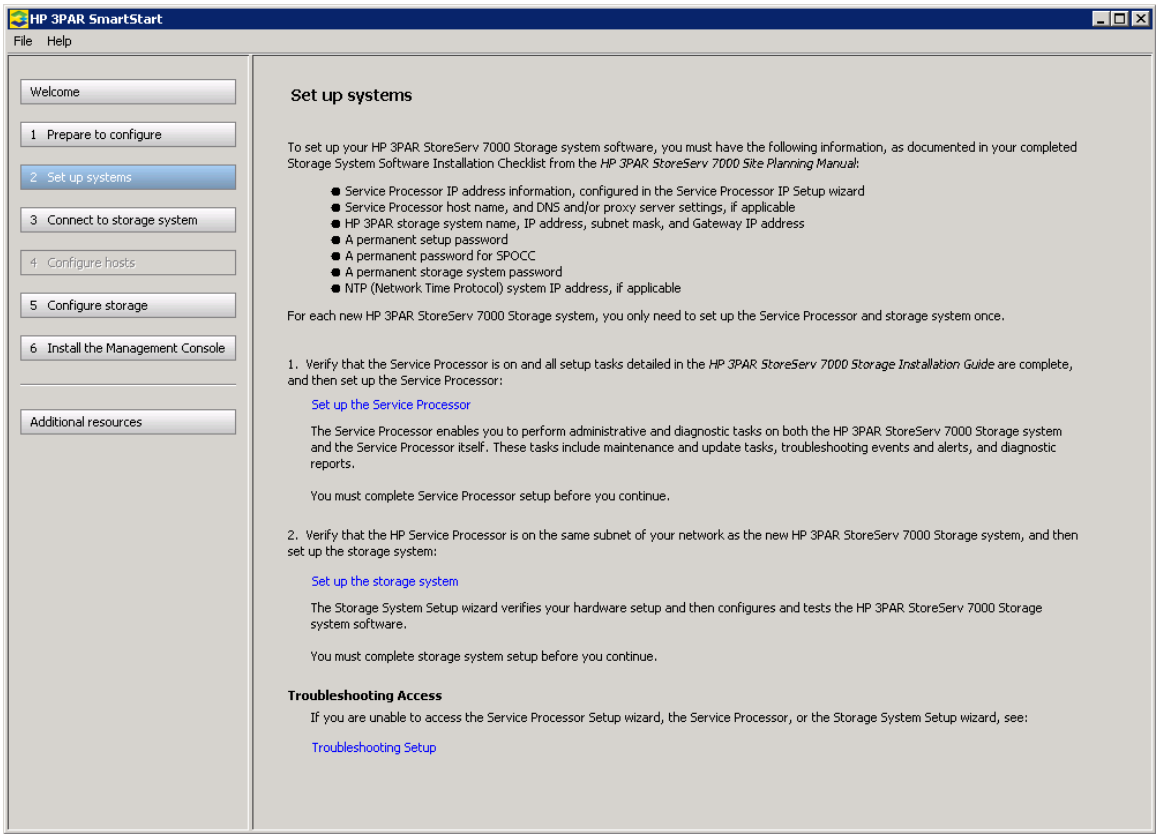
HP 3PAR SmartStart includes online help. To access online help, do one of the following:

- Press **F1**.
- Select **Help** > **Online Help**.

You can also find storage-related information at:

http://www.hp.com/storage

2 Setting Up the Service Processor



Use SmartStart wizard step 2, *Set up systems*, to set up the Service Processor and the HP 3PAR StoreServ Storage system. You need to set up the Service Processor and the storage system only once for each new HP 3PAR storage system.

NOTE: After you have completed Service Processor setup, the Service Processor Setup wizard does not allow you to re-enter the wizard. To modify Service Processor settings, use Service Processor Onsite Customer Care (SPOCC).

You must set up the Service Processor before you can set up the HP 3PAR StoreServ Storage system. The Service Processor enables you to perform administrative and diagnostic tasks.

To set up and configure the Service Processor:

1. Verify that the Service Processor is on.
2. Click the **Set up the Service Processor** link in SmartStart wizard step 2, *Set up systems*.

Accessing the Service Processor Setup Wizard

1. In the **IP Address** field, do one of the following:
   - If you are setting up a virtual Service Processor (VSP), enter the temporary IP address for this VSP.
   - If you are setting up a physical Service Processor, enter the permanent IP address you assigned in the Service Processor IP Setup wizard.

For more information about determining the temporary IP address or assigning the Service Processor IP address, see the *HP 3PAR StoreServ 7000 Storage Installation Guide*.

2. In the **User name** field, enter `setupusr`.

   You do not need to enter a password for setupusr to access this wizard for the first time.

3. Click **OK**.

Troubleshooting Access

If you cannot access the Service Processor Setup wizard, collect the relevant log files and contact HP support. For more information, see "Troubleshooting System Setup" (page 20).

Configuring Service Processor Networking

If you are setting up a new Service Processor, generate the Service Processor ID (SP ID). To do this:

1. Enter the seven-digit HP 3PAR StoreServ Storage system serial number in the **StoreServ Serial Number** field.

   NOTE: The serial number is located on the back of the storage system next to the power switch for the node enclosure power cooling module (PCM1). The serial number on HP 3PAR StoreServ 7000 Storage systems begins with "16" (for example, 1612345).

2. Click **Generate SP ID**. The SP ID is automatically generated.

If you are replacing a Service Processor, use the following procedure to generate the SP ID:

1. Click to select the **Replacing a previous Service Processor (SP)** check box, and then enter the following information in the appropriate fields:
   - Previous SP ID
   - StoreServ Storage system IP address
   - Login name
   - Password
2. Click **Generate SP ID**.

The resulting SP ID will be a 12–digit string that consists of SP000 ("SP" followed by three zeros) followed by the storage system serial number. For example, if the storage system serial number is 1612345, the SP ID will be SP0001612345.

IMPORTANT: To generate the SP ID, the storage system must be connected and available on the same subnet that the SP is on. This is because the storage system serial number that you enter is verified by the Service Processor Setup Wizard by connecting to the factory-set IP address of the storage system that has that serial number.

To complete the SP Networking step, enter the relevant information in your completed Storage System Software Installation Checklist from the *HP 3PAR StoreServ 7000 Site Planning Manual*.

Configuring Remote Support

Remote Support enables HP to proactively provide you the best possible support for your HP 3PAR StoreServ Storage system, including:

- Timely remote service
- Remote online software updates
- Accelerated troubleshooting and issue resolution

Remote Support securely sends diagnostic information such as system health statistics, configuration data, performance data, and system events to HP 3PAR Central. These diagnostics are required

for HP to perform fault detection and analysis on your HP 3PAR StoreServ Storage system that help maximize your storage availability.

All remote communications are encrypted and transferred securely to HP 3PAR Central, and no customer application data is ever transferred. No other business information is collected, and the data is managed according to the HP Data Privacy policy. For more information, see:

http://www8.hp.com/us/en/privacy/privacy.html

To configure Remote Support:

1. Enter proxy server settings, if applicable.
2. To mask identifying information in all Service Processor log files, select the **Make contents of Service Processor log files anonymous** check box in the **Advanced** group box.

   When you anonymize log files, the Remote Support process replaces object names in log files (such as "TopSecretVirtualVolume") with meaningless sequential labels (such as "VV*nnn*").
3. Click **Next** to continue the Service Processor configuration. This wizard will enable Remote Support upon completion.

Configuring System Support Information

To enable you to receive Remote Support for your storage system, you must provide the following system support information:

- Company name
- Technical contact name
- Telephone number
- FAX number (optional)
- E-mail address
- Mailing address of the installation site
- Order type

Configuring Your Time Zone

To configure the time zone, select your continental region (Africa, America, Antarctica, Arctic, Asia, Atlantic, Australia, Europe, India, Pacific) and the city or country closest to you from the drop-down lists.

NOTE: The time zones used in this wizard are based on the time zones listed in the tz database, also known as the zoneinfo database or IANA Time Zone Database.

Changing Passwords

- Enter a new, secure password for the setupusr user account.

  You will use the setupusr user account and your new password to access the Storage System Setup wizard and set up your HP 3PAR StoreServ Storage system. The setupusr account is used only for the initial system setup to access the SP from the setup wizards.
- Enter a new, secure password for the 3parcust user account, which you will use for Service Processor Onsite Customer Care (SPOCC).

NOTE: Passwords for the setupusr and 3parcust user accounts must be between 7 and 32 characters in length and consist of alphanumeric characters and the following special characters: period (.), plus sign (+), dash (-), equals sign (=), and forward slash (/).

NOTE: To reset a password for the Service Processor, log in to SPOCC. If you have lost all Service Processor passwords and cannot log in to SPOCC, you must reimage the Service Processor.

Troubleshooting

Troubleshooting the Connection to the Service Processor

If the **Check Your Connection** dialog box appears during the setup process in Service Processor Setup wizard step 7, *Apply Settings*, the Service Processor Setup wizard might be unable to connect to the Service Processor.

Verify the following:

- Your browser is still connected to the network.
- The Service Processor is powered on.
- The Service Processor is connected to the network.

When the Service Processor Setup wizard reconnects to the Service Processor, the **Check Your Connection** dialog box automatically disappears and the setup process automatically resumes.

Troubleshooting Duplicate IP Address Issues

If the wizard cannot configure the permanent IP address you entered because it is already in use:

1. Click **Stop** to stop the *Apply Settings* process and return to the Service Processor Setup wizard.
2. Click **Prev** until you reach step 2, *SP Networking*.
3. Determine an available IPv4 address to use for the Service Processor, and then enter that IP address in the **IP Address** field.
4. Click **Next** until you return to step 7, *Apply Settings*. (You do not need to re-enter any other Service Processor settings.)

   The wizard will automatically begin to apply the settings again.

Troubleshooting "Page Not Found" IP Address Issues

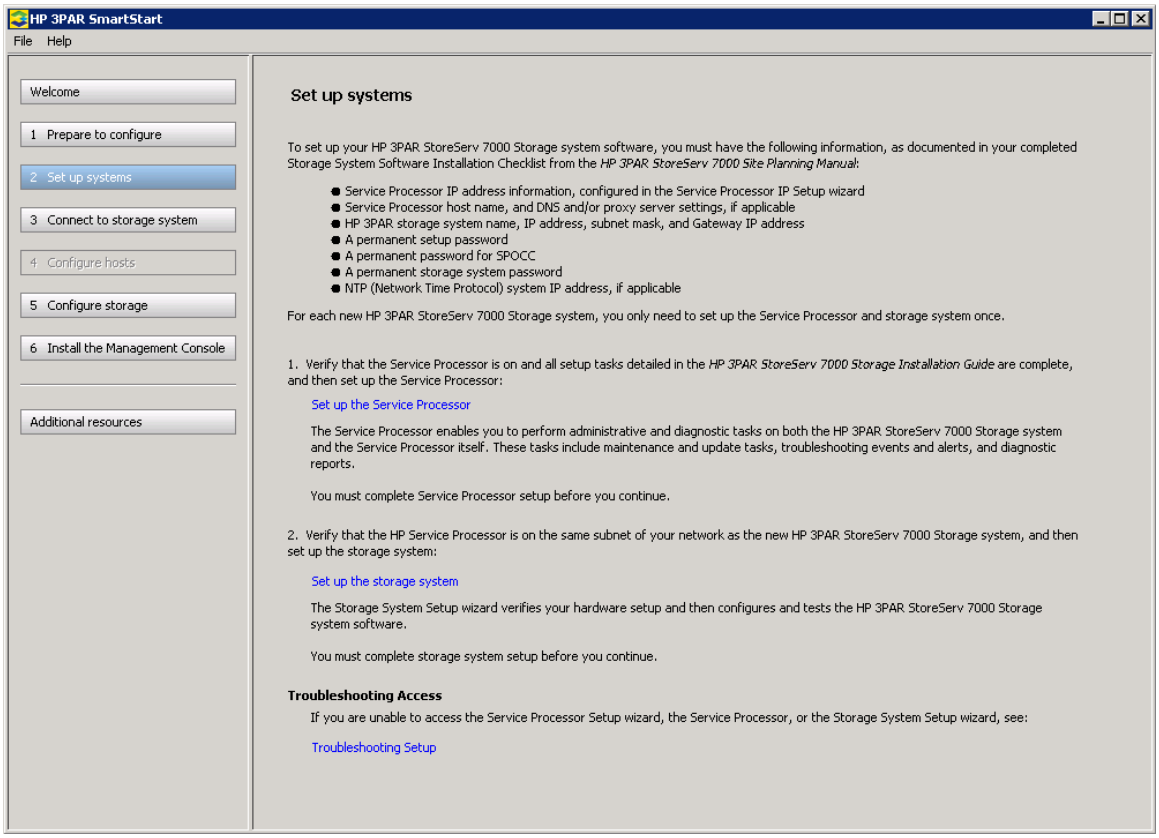
If the Service Processor displays a Page Not Found error message or similar message, the permanent Service Processor IP address you entered is not a valid address. You must set up the Service Processor again.

- If you are using a physical Service Processor:
  1. Return to the Set IP Address wizard and set up a new, valid IP address. For more information, see the *HP 3PAR StoreServ 7000 Storage Installation Guide*.

     To access the *HP 3PAR StoreServ 7000 Storage Installation Guide*, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

     http://www.hp.com/go/3par
  2. Use the new permanent IP address to restart the Service Processor Setup wizard. For more information, see "Setting Up the Service Processor" (page 13).
  3. Proceed through the Service Processor Setup wizard, re-entering your Service Processor settings. (The Service Processor ID is already set; you do not need to reset the ID.)
- If you are using a virtual Service Processor:
  1. Use the temporary SP IP address to restart the Service Processor Setup wizard. For more information, see "Setting Up the Service Processor" (page 13).
  2. Proceed through the Service Processor Setup wizard, re-entering your Service Processor settings. (The Service Processor ID is already set; you do not need to reset the ID.)

3 Setting Up the HP 3PAR StoreServ Storage System



Before you can configure the HP 3PAR StoreServ Storage system, you must initialize it. The Storage System Setup wizard verifies your HP 3PAR storage system configuration, initializes the storage system, and runs initialization tests on the storage system.

To set up and configure the HP 3PAR storage system:

1. Verify that the Service Processor is on the same subnet of the network as the HP 3PAR StoreServ 7000 Storage system you are setting up.
2. Click the **Set up the Storage System** link in SmartStart wizard step 2, *Set up systems*.
3. Enter the permanent Service Processor IP address. For more information about Service Processor IP addresses, see the *HP 3PAR StoreServ 7000 Storage Installation Guide*.
4. Enter the user name **`setupusr`**.
5. Enter the password for setupusr that you created in the Service Processor Setup wizard.

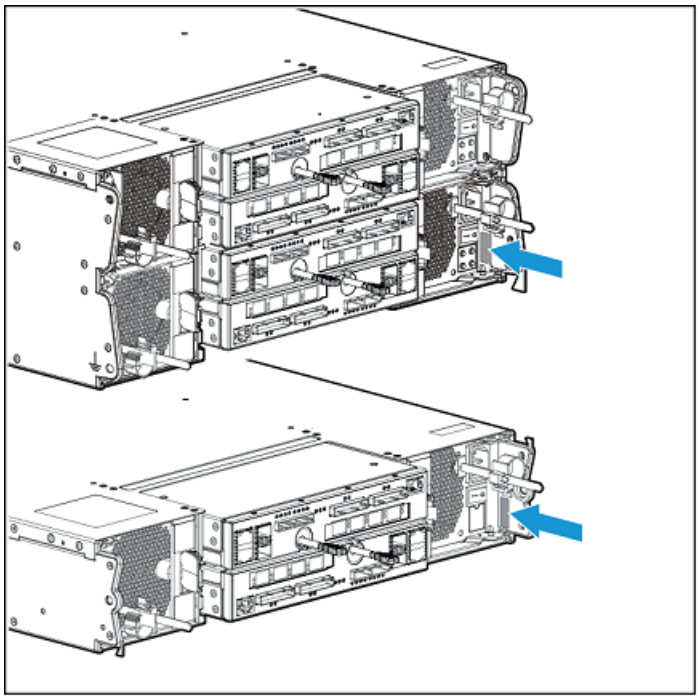
Troubleshooting Access

If you cannot access the Storage System Setup wizard, collect the relevant log files and contact HP support. For more information, see "Troubleshooting System Setup" (page 20).

Locating the Serial Number

The serial number on your HP 3PAR StoreServ Storage system is the seven-digit number located on the back of the storage system next to the power switch for the node enclosure power cooling module (PCM1). It begins with "16" (for example, 1612345).

Figure 1 StoreServ Serial Number



Configuring Networking

Enter the name and IP address information for your new HP 3PAR StoreServ Storage system.

For more information, see your completed Storage System Software Installation Checklist from the *HP 3PAR StoreServ 7000 Site Planning Manual*.

Configuring Your Time Zone

You can do the following:

- Copy the time zone settings from the Service Processor to the HP 3PAR StoreServ Storage system.
- Enter a specific date and time.
- Use the date and time settings on your NTP server, if applicable.
- Select your continental region (Africa, America, Antarctica, Arctic, Asia, Atlantic, Australia, Europe, India, Pacific) and the city or country closest to you from the drop-down lists.

Changing the HP 3PAR StoreServ Storage System Password

Enter a new, secure password for the 3paradm user account.

You will use this user account and password to access your new HP 3PAR StoreServ Storage system.

NOTE: Passwords for the 3paradm user account can include all printable characters and must be between 6-8 characters in length.

Monitoring Setup Progress

The **Setup system volumes** operation in the *Progress* step can continue for up to 40 minutes before the wizard displays a progress indicator. Do not attempt to cancel out of the wizard during the *Progress* step.

Continuing SmartStart Setup

After the Storage System Setup wizard initializes the HP 3PAR StoreServ Storage system, do the following:

1. Click **Finish** in the *Setup Progress and Results* step to exit the Storage System Setup wizard.

   NOTE: The wizard continues to run tests in the background after you have exited the Storage System Setup wizard. If these tests discover any issues, the HP 3PAR Management Console will display details in the Alert tab that is relevant to the issue.

   - To install the Management Console, go to SmartStart wizard step 6, *Install the Management Console*.
   - For more information about alerts, start the Management Console and open the *HP 3PAR Management Console Online Help*.

2. Set up Local Notification. For more information, see "Setting Up Local Notification" (page 19).
3. Validate Remote Support setup. For more information, see "Validating Remote Support" (page 19).
4. Continue to SmartStart wizard step 3, *Connect to the storage system*.

Troubleshooting: Adding the Storage System to the Service Processor

If the wizard cannot successfully add your HP 3PAR StoreServ 7000 Storage system to the Service Processor, use the "Add New InServ" option in the **SPmaint** module in SPOCC to add the storage system.

For more information, see the *HP 3PAR Service Processor Onsite Customer Care (SPOCC) User's Guide*. To access this document, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

Setting Up Local Notification

Local Notification configures your HP 3PAR StoreServ Storage system to email you alerts as issues occur (for example, if a CPG becomes low on space, a disk drive fails, and so on). To set up Local Notification:

1. Enter your Service Processor network address.
2. Click **Setup**.
3. Click **Enable Local Notification**.

   NOTE: A mail host must also be configured in order to completely enable Local Notification.

For more information about Local Notification setup, see the *HP 3PAR Service Processor Onsite Customer Care (SPOCC) Online Help*. For more information about alerts, see the *HP 3PAR Management Console Online Help*.

Validating Remote Support

Remote Support validation is done as a part of the Service Processor setup. If you need to re-run the Remote Support validation, you can use the SPmaint module in HP 3PAR Service Processor Onsite Customer Care (SPOCC).

1. Log in to SPOCC (`https://<SP IP>`) using the 3parcust user account.
2. Click **SPmaint→Network Configuration→Test 3PAR Secure Service Collector Server**.
3. Verify that SPOCC displays **Connectivity test to HP 3PAR Secure Service Collector Server successful**.
4. Verify that the Service Processor is transferring files successfully:

a. Click **Home** to return to the SPOCC home page.

   The **Transfer Status** entry indicates the overall status of SP file transfer.

b. To access the SP File Transfer Monitor, click **Transfer Status**.

c. Verify that SP file transfer is successful:

   - The **Last transfer status** entry should include information about the last SP transfer, including the date and time and a status of **OK**.
   - The **Number of files on transfer queue** and **retry queue** values should be 0 (zero), which indicates the SP is currently able to pass files to the transport layer.
   - The **Service Processor upload queue** and **SSAgent upload queue** items show the number of files in the queue and should display the date, time, and file name of the most recent file to start uploading.

     If this queue becomes long, the Service Processor is encountering transfer issues. To remedy the situation, contact HP support. For more information, see "Troubleshooting System Setup" (page 20).

   The SP File Transfer Monitor refreshes every 15 seconds.

For more information, see the *HP 3PAR Service Processor Onsite Customer Care (SPOCC) User's Guide*.

For more information about Remote Support, see "Configuring Remote Support" (page 14).

Troubleshooting System Setup

If you cannot access the Service Processor Setup wizard, the Service Processor, or the Storage System Setup wizard:

1. Collect the SmartStart log files.
2. Collect the Service Processor log files.
3. Contact HP support and request support for your StoreServ 7000 Storage product.

Collecting SmartStart Log Files

To collect the SmartStart log files for HP support, zip all the files in the following folder:

```
C:\Users\<username>\SmartStart\log
```

NOTE: You can continue to access the SmartStart log files in the `Users` folder after you have removed SmartStart from your system.

Collecting Service Processor Log Files

To collect the Service Processor log files for HP support:

1. Connect to Service Processor Onsite Customer Care (SPOCC). To do this, enter the SP IP address in a browser.
2. From the navigation pane, click **Files**.
3. Click the folder icons for **files** > **syslog** > **apilogs**.
4. In the **Action** column, click **Download** for each log file:

File name	Description
SPSETLOG.log	Service Processor setup log
ARSETLOG.system_serial_number.log	HP 3PAR StoreServ Storage system setup log
errorLog.log	General errors

5. Zip the downloaded log files.

Contacting HP Support about System Setup

For worldwide technical support information, see the HP support website:

http://www.hp.com/support

Before contacting HP about accessing the Service Processor Setup wizard or the Storage System Setup wizard, collect the following information:

- SmartStart log files
- Service Processor log files
- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

When you contact HP, specify that you are requesting support for your StoreServ 7000 Storage product.

Verifying the HP 3PAR OS on the Service Processor

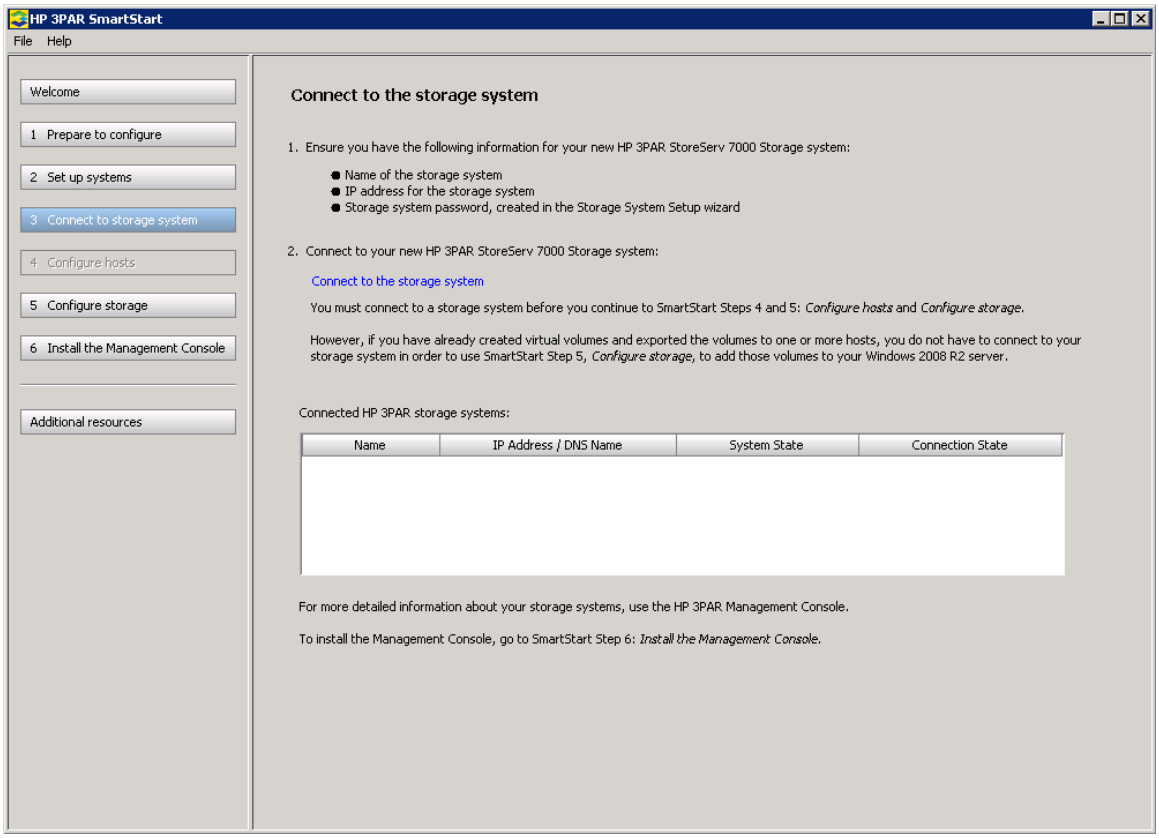
To check the version of the HP 3PAR OS that is installed on your Service Processor, use the **SPmaint** module in SPOCC to display the SP version.

1. Log in to SPOCC (`https://<SP IP>`) using the 3parcust account.
2. Click **SPmaint→SP Control/Status**.
3. Click **Display SP Version**.
4. Click **Finish** to exit the Service Processor Setup wizard.
5. Return to the SmartStart wizard.

For more information, see the *HP 3PAR Service Processor Onsite Customer Care (SPOCC) User's Guide*. To access this document, go to the HP 3PAR StoreServ Storage site, and then click the **Support** link for your product:

http://www.hp.com/go/3par

4 Connect to the HP 3PAR StoreServ 7000 Storage System

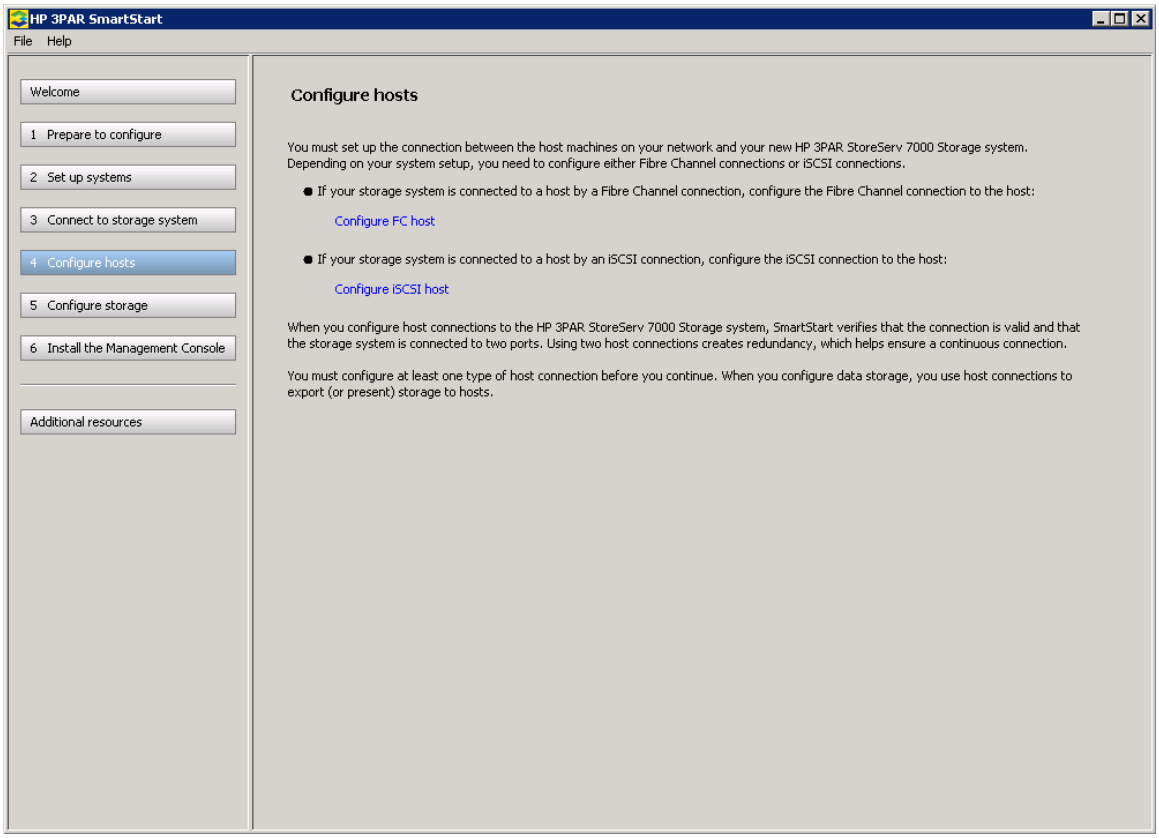


1. Click the **Connect to the storage system** link.
2. In the **IP Address or Name** field, do one of the following:
   - If this is the first time you are connecting to the HP 3PAR storage system, enter the name or IP address of the HP 3PAR StoreServ 7000 Storage system.
   - If you have already connected to the HP 3PAR storage system one or more times, select the storage system from the list.
3. Enter the user name and password.

   To access your new HP 3PAR StoreServ 7000 Storage system for the first time, enter **`3paradm`** and the new password for 3paradm that you created in the Storage System Setup wizard.

△ **CAUTION:** You must configure hosts and storage for only one HP 3PAR storage system at a time. Configuring multiple storage systems can lead to inconsistencies and operating errors.

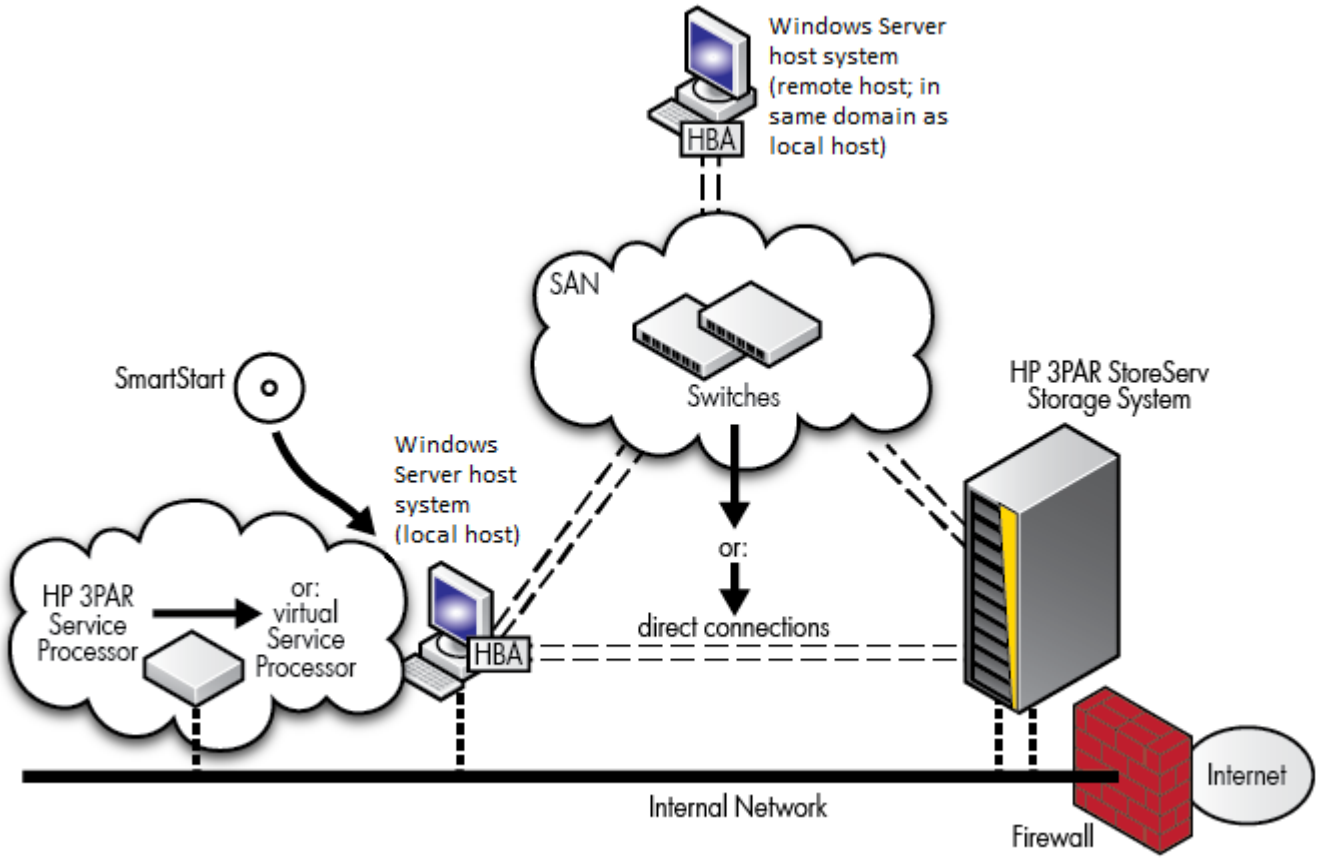
5 Configure the Hosts



To export (or present) virtual volumes to hosts—which enables the host system to write data to and read data from the HP 3PAR StoreServ Storage system—you must configure either Fibre Channel host connections or iSCSI host connections. For more information about exporting volumes, see “Exporting Virtual Volumes” (page 50).

Fibre Channel Connections

You can set up Fibre Channel using direct connections or via switches in a SAN.



To ensure that your HP 3PAR StoreServ Storage system remains available if a path fails, connect the host system to the HP 3PAR storage system using multiple paths.

Before using SmartStart to configure Fibre Channel connections, do one of the following:

- If you are connecting the host and HP 3PAR StoreServ Storage systems directly, verify that the appropriate cabling is in place between the host system and the HP 3PAR storage system.
- If you are using a SAN:
  - Verify that the appropriate cabling is in place between the host system and the fabric and between the HP 3PAR storage system and the fabric.
  - Verify that the fabric zones comply with the zoning guidelines in the *HP 3PAR Windows Server 2012 and Windows Server 2008 Implementation Guide* (see *Setting Up and Zoning the Fabric*).

    To access this document, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

    http://www.hp.com/go/3par

NOTE: SmartStart will configure the port mode depending on the type of connectivity that you configured.

Configuring Fibre Channel Connections

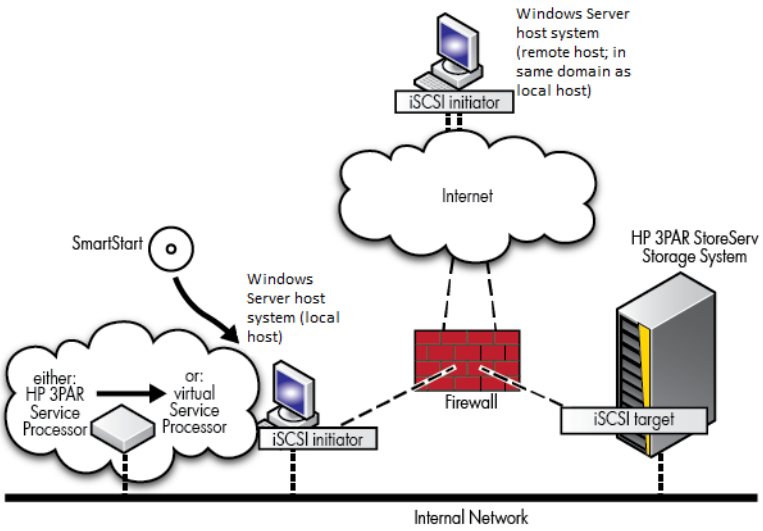
To access the Fibre Channel Host Configuration wizard and configure Fibre Channel connections, click the **Configure FC host** link in the SmartStart wizard.

For more information, see "Configure the Fibre Channel Host" (page 25).

iSCSI Connections

To set up iSCSI connections:

- Verify that your network supports 10-GB iSCSI connections.
- Connect the host system to the HP 3PAR StoreServ Storage system using multiple paths to ensure that your HP 3PAR storage system remains available if a path fails.



Configuring iSCSI Connections

To access the iSCSI Host Configuration wizard and configure iSCSI connections, click the **Configure iSCSI host** link in the SmartStart wizard.

For more information, see "Configure the iSCSI Host" (page 28).

Configure the Fibre Channel Host

Introduction to Configuring the Fibre Channel Host

To set up Fibre Channel connections, ensure that the host system and HP 3PAR StoreServ 7000 Storage system have two Fibre Channel connections. You can configure the Fibre Channel host if you have only one connection, but if that connection stops functioning, the host will not be able to access (read from or write data to) the HP 3PAR StoreServ Storage system.

For more information about setting up Fibre Channel connections, see the *HP 3PAR Windows Implementation Guide*. To access this document, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

△ **CAUTION:** The Fibre Channel Host Configuration wizard might require a reboot of the host system. If the host system cannot be rebooted at this time, use the Fibre Channel Host Configuration wizard to configure your Fibre Channel connections when a possible reboot is more convenient.

Configuring Local and Remote Connections

You can use SmartStart to do the following:

- Connect the local host (the Windows Server 2008 R2 or Windows Server 2012 server into which you inserted the SmartStart media) to the HP 3PAR StoreServ Storage system
- Connect a remote host (any Windows Server 2008 R2 or Windows Server 2012 server other than the Windows Server 2008 R2 or Windows Server 2012 server into which you inserted the SmartStart media) to the HP 3PAR storage system

  To connect to and configure a remote host system:

  - You must be able to use the same ID and password to gain administrator access to both the local host and the remote host. If you cannot use the same login credentials, you must insert the SmartStart media into the remote host and configure the machine as a local host.
  - If you have set up domains on your local host system and plan to configure a remote host system, that remote host must be in the same domain as the local host.

Connect to the Fibre Channel Host System

1. In the **Host address** field, do one of the following:
   - If you are configuring the machine into which you inserted the SmartStart media, enter `localhost`.
   - If you are configuring any host other than the machine that is running SmartStart, enter that host IP address or DNS name.
2. Click **Connect**.
3. Click **Next**.

Validate the Fibre Channel HBA Setup on the Host

1. Click **Validate**.

   SmartStart automatically detects and lists the HBAs that are installed on the host system.
2. Verify that at least two of the listed HBAs are supported by your HP 3PAR StoreServ Storage system.

   To verify your system's HBAs, go to the Single Point of Connectivity Knowledge for HP Storage Products (SPOCK) and navigate to the list of HBAs supported by your host system:

   http://www.hp.com/storage/spock

   Use your HP Passport account to log onto SPOCK. If you do not have an HP Passport account, you can register for a free account on SPOCK.
3. Click **Next**.

Validate the Fibre Channel Connection

1. Select the HP 3PAR StoreServ Storage system for which you want to validate the Fibre Channel connection.
2. Click **Validate**.

   If SmartStart cannot find a Fibre Channel connection, or can only find one Fibre Channel connection, SmartStart enables you to configure ports on the HP 3PAR storage system.

Even if you can configure and validate only one Fibre Channel connection, you can still configure the Fibre Channel host.

△ **CAUTION:** If you are using only one supported Fibre Channel connection and that connection fails, the host will not be able to access (read from or write data to) the HP 3PAR storage system.

The redundancy of two Fibre Channel connections, each connected to a different HP 3PAR StoreServ Storage system node, creates connection stability and allows for future rolling upgrades to the HP 3PAR storage system.

NOTE: To configure more than two Fibre Channel connections, use the HP 3PAR Management Console. To install the Management Console, go to SmartStart wizard step 6, *Install the Management Console*.

3. Click **Next**.

Configure Multipath I/O (MPIO)

Multipath I/O (MPIO) helps ensure the stability of the connection between the host and HP 3PAR StoreServ Storage systems. To configure MPIO:

1. Click **Configure**.
2. If the wizard displays the **Reboot when finished** check box, click to select it. In order to complete this MPIO configuration, the wizard will reboot the host system at the end of the iSCSI host configuration process.

   NOTE: If the MPIO device ID is already configured on the host system, the wizard does not display the **Reboot when finished** check box.

3. Click **Next**.

Troubleshooting Task Completion

If SmartStart displays the **Failed to validate whether the current Windows task is complete** message, click **Configure** again.

If the problem persists, contact HP support. For more information, see "Support and Other Resources" (page 57).

Install and Start Host Explorer

Host Explorer helps you discover and manage host system paths. Installation is optional. If you do not install Host Explorer, you must manually manage host paths. For more information, see "The Host Explorer Software Agent" (page 44).

NOTE: Host Explorer is not available for Windows Server 2012 systems at this time.

To install HP 3PAR Host Explorer:

1. Click **Install**.
2. Click **Next**.

Summary: Fibre Channel Host Configuration

1. Review your Fibre Channel setup.
2. Click **Finish**.
   - If you are connected to the local host and you rebooted the host system, the local host reboots.

     After the local host has finished rebooting, launch SmartStart and continue setup.
   - If you are connected to the remote host and you rebooted the host system, the remote host reboots. After the remote host reboots, continue setup.

Configure the iSCSI Host

Introduction to Configuring the iSCSI Host

To set up iSCSI connections, ensure that you have the following information, which is necessary to set up the iSCSI connections between the host system and HP 3PAR StoreServ 7000 Storage system:

- Host system IP address or name
- iSCSI port information
- Maximum transmission unit (MTU) size:
  - If you are using default frames, use an MTU of 1500.
  - If you have configured jumbo frames, use an MTU of 9000.

Configuring Local and Remote Connections

You can use SmartStart to do the following:

- Connect the local host (the Windows Server 2008 R2 or Windows Server 2012 server into which you inserted the SmartStart media) to the HP 3PAR StoreServ Storage system.
- Connect a remote host (any Windows Server 2008 R2 or Windows Server 2012 server other than the Windows Server 2008 R2 or Windows Server 2012 server into which you inserted the SmartStart media) to the HP 3PAR storage system.

  To connect to and configure a remote host system:

  - You must be able to use the same ID and password to gain administrator access to both the local host and the remote host. If you cannot use the same login, you must insert the SmartStart media into the remote host and configure the machine as a local host.
  - If you have set up domains on your local host system and plan to configure a remote host system, that remote host must be in the same domain as the local host.

Connect to the iSCSI Host System

1. In the **Host address** field, do one of the following:
   - If you are configuring the machine into which you inserted the SmartStart media, enter `localhost`.
   - If you are configuring any host other than the machine that is running SmartStart, enter that host IP address or DNS name.
2. Click **Connect**.
3. Click **Next**.

Configure Multipath I/O (MPIO)

Multipath I/O (MPIO) helps ensure the stability of the connection between the host and HP 3PAR StoreServ Storage systems. To configure MPIO:

1. Click **Configure**.
2. If the wizard displays the **Reboot when finished** check box, select it. In order to complete this MPIO configuration, the wizard will reboot the host system at the end of the iSCSI host configuration process.

   NOTE: If the MPIO device ID is already configured on the host system, the wizard does not display the **Reboot when finished** check box.

3. Click **Next**.

Troubleshooting Task Completion

If SmartStart displays the **Failed to validate whether the current Windows task is complete** message, click **Configure** again.

If the problem persists, contact HP support. For more information, see "Support and Other Resources" (page 57).

Start the iSCSI Initiator

NOTE: SmartStart supports only the Microsoft iSCSI initiator.

1. Click **Start**.
2. Click **Next**.

Configure the iSCSI Port

1. From the **System** list in the **General** group box, select the HP 3PAR StoreServ 7000 Storage system on which you want to configure an iSCSI port.
2. From the **Port** list, select the port to configure.

   NOTE: HP 3PAR storage system ports are designated by the following format:

   `node:slot:port`

   The wizard displays the connected device type and the connected device. For example:

   Connected Device Type: **Host**
   Connected Device: **Storage7200–DataCenter2**

3. In the **IP Settings** group box, select whether to obtain the address automatically or enter it manually.

   To enter the IP address manually, enter the IP address, subnet mask address, and gateway address of the target iSCSI port on your HP 3PAR StoreServ 7000 Storage system.

4. From the **MTU** list, select the MTU size. The MTU size limits the size of data packets transmitted over the connection to ensure an appropriate load and steady flow.
   - If you are using default frames, use an MTU of 1500.
   - If you have configured jumbo frames, use an MTU of 9000.
5. Click **Next**.

   The system configures the port. When the state of the port is **Ready**, the wizard displays the next step (*Configure the iSCSI target*).

Configure the iSCSI Target

1. Select the IP address of the iSCSI initiator on the host system.
2. Click **Configure**.
3. Click **Next**.

Troubleshooting the iSCSI Connection

If the iSCSI initiator on the host system cannot connect to the HP 3PAR StoreServ Storage system, verify your configuration:

1. Verify your IP settings:
   - IP address
   - Subnet mask
   - Gateway
2. Check your iSCSI connection. To do this, ping the HP 3PAR StoreServ Storage system from the host.

Troubleshooting Task Completion

If SmartStart displays the **Failed to validate whether the current Windows task is complete** message, click **Configure** again.

If the problem persists, contact HP support. For more information, see "Support and Other Resources" (page 57).

Install and Start Host Explorer

Host Explorer helps you discover and manage host system paths. Installation is optional. If you do not install Host Explorer, you must manually manage host paths. For more information, see "The Host Explorer Software Agent" (page 44).

To install HP 3PAR Host Explorer:

1. Click **Install**.
2. Click **Next**.

Summary: iSCSI Host Configuration

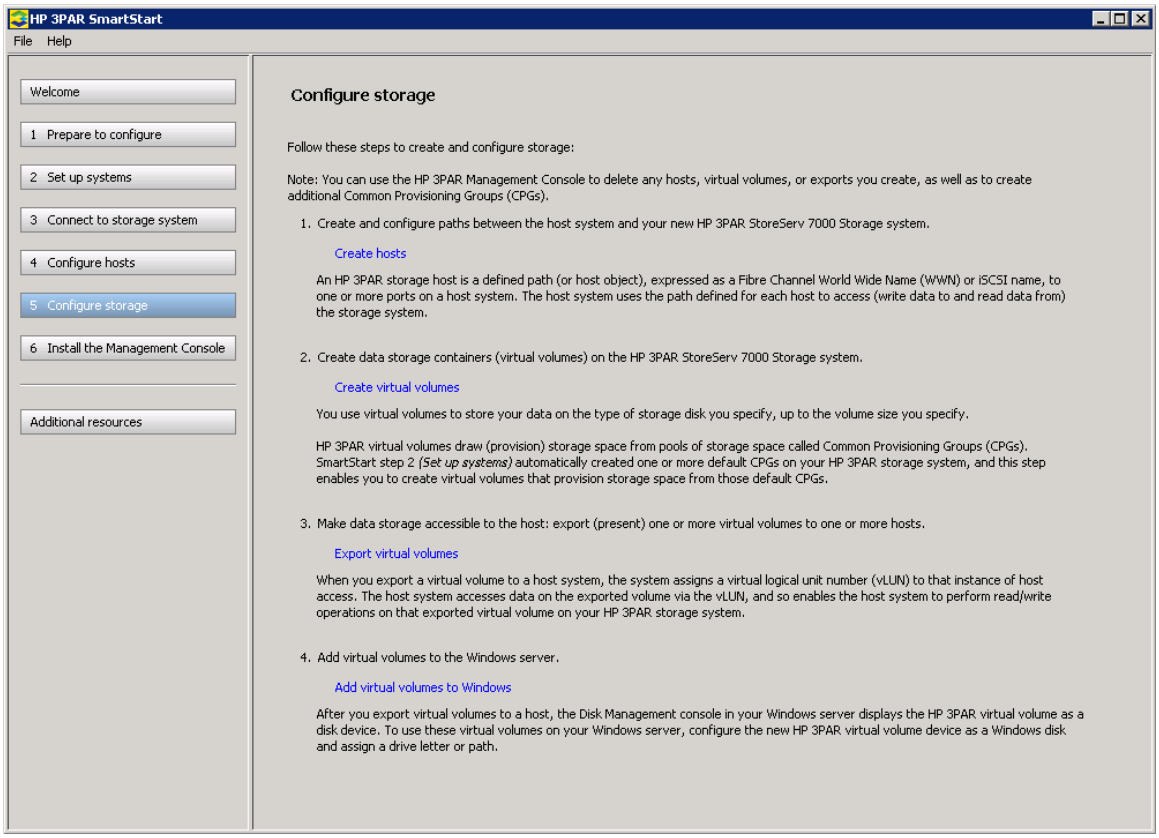
1. Review your iSCSI setup.
2. Click **Finish**.

Configuring Multiple iSCSI Ports

To configure another iSCSI port:

1. Go to SmartStart wizard step 4, *Configure hosts*.
2. Click **Configure iSCSI hosts**.
3. In steps 1 through 4 of the iSCSI Host Configuration wizard, configure the same iSCSI host system.
4. At iSCSI Host Configuration wizard step 5, *Configure the iSCSI port*, select an additional port and configure it.
5. In the final steps of the iSCSI Host Configuration wizard, complete the iSCSI configuration for this host.

6 Configure Storage



The steps in SmartStart wizard step 5, *Configure storage*, guide you through creating basic storage on your HP 3PAR StoreServ 7000 Storage system.

NOTE: You can use the HP 3PAR Management Console to delete any hosts, virtual volumes, or exports you create using SmartStart. To do this, install and use the HP 3PAR Management Console (see SmartStart wizard step 6, *Install the Management Console*).

To create basic storage, you create hosts, create virtual volumes, export the virtual volumes, and configure the virtual volumes on a host system. These operations are described in the following list:

1. **Create hosts**. Hosts are defined paths between the host system and the HP 3PAR StoreServ Storage system. For more information, see "Hosts" (page 44).
2. **Create virtual volumes**. Virtual volumes are the storage containers for data. For more information, see "Virtual Volumes" (page 47).

Virtual Volumes and CPGs

When you create virtual volumes, you will assign common provisioning groups (CPGs) to those volumes. CPGs are pools of storage space. CPGs allocate storage space to virtual volumes, and volumes use this space to store data.

Default CPGs

The setup process automatically creates default CPGs on your HP 3PAR StoreServ 7000 Storage system. The CPGs that are created depend on your HP 3PAR storage system's drive types, number of drive cages, and RAID types, as described in the following table.

Drive Type	RAID Type	Default CPG Created
Fast Class	1	FC_r1
Fast Class	6	FC_r6
Nearline	1	NL_r1
Nearline	6	NL_r6
Solid State	1	SSD_r1
Solid State	5	SSD_r5
Solid State	6	SSD_r6

Using Default CPGs

- To use SmartStart to create basic storage, assign the default CPG to the virtual volumes you create.
- To create a new CPG, install and use the HP 3PAR Management Console (see SmartStart wizard step 6, *Install the Management Console*).

3. **Export virtual volumes**. When you export (present) virtual volumes to a host, you make the volumes accessible to the host. The host system can then perform read/write operations on the exported virtual volumes on your HP 3PAR storage system.
4. **Configure virtual volumes**. In addition to creating storage, you must configure the exported virtual volumes on your Windows Server 2008 R2 or Windows Server 2012 host system so the host system can use these volumes. The Add Virtual Volumes to Windows wizard, accessed from SmartStart wizard step 5, *Configure storage*, guides you through configuring virtual volumes on a Windows Server 2008 R2 or Windows Server 2012 host system.

For more information about creating storage or to set up advanced storage parameters, use the HP 3PAR Management Console. To install the Management Console, go to SmartStart wizard step 6, *Install the Management Console*.

Create Hosts

Welcome to the Create Host Wizard

The **Welcome** screen describes the settings and properties you can assign to a host.

NOTE: If you click to select the **Click here to skip this step in the future** check box and later want to reinstate the Welcome screen, delete the following file:

```
C:\Users\<username>\SmartStart\preferences\preferences.xml
```

Host Settings

1. In the **General** group box:
   a. **System** - Select the system to create the new host.
   b. **Domain** - Select the domain in which to create the new host. Select **<none>** if not applicable.
   c. **Name** - Enter the host name. Names are case-sensitive.
   d. **Set Name** - Select the host set in which to create the new host. Select **<none>** if not applicable.
   e. **Host OS** - Select the operating system running on the host.
   f. **Persona** - The host persona is visible and disabled. When you select **Host OS**, the corresponding persona is selected for the user, and the Operating System descriptor field is automatically populated with the host OS.
      - 1 = Generic (Unit Attention Report LUNs, Enable SES device)
      - 2 = Generic-ALUA (Unit Attention Report LUNs, Report Target Port Groups, Enable SES device)
      - 6 = Generic-legacy
      - 7 = HPUX-legacy (Volume Set Addressing)
      - 8 = AIX-legacy (Normal Auto Contingent Allegiance)
      - 9 = Egenera (Soft Inquiry Data)
      - 10 = ONTAP–legacy (Soft Inquiry Data)
      - 11 = VMware (Enable Sub-LUN Addressing, Asymmetric Logical Unit Access)
2. (Optional) In the **Descriptors** group box, enter the description information as desired in the **Location**, **IP Address**, **Operating System, Model**, **Contact**, and **Comments** fields.
3. Click **Next** or **Finish** to close the wizard and create the host with the information that you entered.

Fibre Channel Settings

1. To assign available WWNs:
   a. Select one or more WWNs from the **Available WWNs** list. This list displays WWNs for all physically connected host paths not already assigned to hosts.
   b. Click the left arrow to add the selected WWNs to the **Assigned WWNs** list.
2. To assign new WWNs, enter the WWNs for the host in the **New WWN** field, and then click **Assign**.
3. Click **Next** or **Finish** to close the wizard and create the host with the information entered.

iSCSI Settings

1. In the **iSCSI Host Paths** group box:
   a. Select one or more iSCSI names from the **Available iSCSI Names** list. This list displays iSCSI names for all physically connected host paths not already assigned to hosts.
   b. Click the left arrow to add the selected iSCSI names to the **Assigned iSCSI Names** list.
   c. To assign new iSCSI names, enter the iSCSI names in the **New iSCSI Name** field, and then click **Assign**.
2. In the **CHAP** group box:
   a. Click to select the **Initiator CHAP** check box. The **CHAP Name** field displays the host name.
   b. Enter a secret/password in the **CHAP Secret** field for Initiator CHAP.

      If the secret/password is hexadecimal, click to select the **Hex** check box.

c. If required, click the **Target CHAP** check box. The **CHAP Name** field displays the system name.
d. Enter a secret/password in the **CHAP Secret** field for Target CHAP.

NOTE: Rules for the **CHAP** group box in the following step are as follows:

- When the **Initiator CHAP** check box is selected, CHAP Name is initialized with the host name (default).
- The **Target CHAP** check box is enabled when the **Initiator CHAP** check box is selected.
- The **CHAP Secret** field is required if a CHAP Name is entered.
- **Target CHAP** is optional.
- **Target CHAP** can be populated only if **Initiator CHAP** is populated.

3. Click **Next** to view summary information, or click **Finish** to close the wizard and configure the host with the information gathered.

Summary

Review the summary information, and then click **Finish**.

Create Virtual Volumes

Welcome to the Create Virtual Volumes Wizard

The **Welcome** screen describes the settings and properties you can assign to a virtual volume.

NOTE: If you click to select the **Click here to skip this step in the future** check box and later want to reinstate the Welcome screen, delete the following file:

`C:\Users\<username>\SmartStart\preferences\preferences.xml`

Configure Virtual Volume

1. In the **General** group box:
   a. **System** - Select the system where the volume will be created.
   b. **Domain** - Select the domain in which the volume will reside. Select **<none>** if not applicable.
   c. **Name** - Enter a name for the new volume. Names are case-sensitive.
   d. **ID** - Enter an ID for the new volume if you click to clear the **auto** box (this option is shown only if **Show advanced options** is selected).
   e. **Use Template** - Select the volume template to apply to the new volume. If this is not required, select **<none>**.
   f. **Comments** - Enter any notes about the volume.

2. In the **Allocation** group box:
   a. Select how the volume will be provisioned. Selecting **Thinly Provisioned** results in the creation of a Thinly Provisioned Virtual Volume (TPVV). Selecting **Fully Provisioned** results in the creation of a base volume.

      NOTE: To create TPVVs, the HP 3PAR Thin Provisioning Software license is required.

   b. **Size** - Enter the size of the volume. Change the **Size** list value to MB or TB as applicable. The default is GB.

      NOTE: The minimum permitted volume size is 256 MB and the maximum is 16 TB. The minimum chunklet size for a V-Class system is 1 GB. If 256 MB virtual volumes are created, the remaining space of the volume will be unused.

   c. Configure CPG as appropriate for your situation.
      - If you selected **Thinly Provisioned**:
        a. **User CPG** - Select a user CPG from the **CPG** list.
        b. **Copy CPG** - Select a copy CPG or **<none>**.
        c. In the **Allocation Warning** and **Allocation Limit** fields for **User CPG** and **Copy CPG**, enter the appropriate information. If you do not want these options used, click to clear the **Enabled** check box. (The **Allocation Limit** field appears only if **Show advanced options** is checked.)
      - If you selected **Fully Provisioned**:
        a. **User CPG** - Select a user CPG from the **CPG** list.
        b. **Copy CPG** - Select a copy CPG or **<none>** from the **CPG** list.
        c. In the **Allocation Warning** and **Allocation Limit** fields for **Copy CPG**, enter the appropriate information. If you do not want these options used, click to clear the **Enabled** check box. (The **Allocation Limit** field appears only if **Show advanced options** is checked.)
3. In the **Grouping** group box:
   a. **Number of Volume(s)** - Enter the number of volumes to create. (If you enter 2 or higher, you have the option of selecting **Attempt to share LDs**.)
   b. **Set Name** - Select a virtual volume set name or, if not required, select **<none>**.
4. If you want to export the volumes after creation, click to select **Export Volume(s) after creation**. Otherwise, click **Next** to configure the virtual volumes policies and geometry (if **Show advanced options** is selected) or click **Finish**.
5. In the **Grouping** group box:
   a. **Count** - Enter the number of volumes to create.
   b. **Set Name** - Select a virtual volume set name or, if not required, select **<none>**.
6. Click **Next** to configure **Copy Space Settings**, or click **Finish**.

Policies and Geometry

This page is displayed only if **Show advanced options** was selected on the Configure Virtual Volume page.

1. In the **Policies** group box, enable any of the following, as needed:
   - **Allow stale snapshots**
   - **Restrict export to one host**
   - **Enable zero detect** (default)
   - **Retention Time** — If you enable this, enter a value in the corresponding field, and then select either days or hours.
   - **Expiration Time** — If you enable this, enter a value in the corresponding field, and then select either days or hours.
2. In the **Geometry** group box:
   a. Enter the number of sectors per track or accept the default value.
   b. Enter the number of heads per cylinder or accept the default value.
3. Click **Next** to view summary information, or click **Finish**.

Summary

Review the summary information, and then click **Finish**.

Export Virtual Volumes

Welcome to the Export Virtual Volumes Wizard

The **Welcome** screen describes the virtual volume export possibilities.

NOTE: If you click to select the **Click here to skip this step in the future** check box and later want to reinstate the Welcome screen, delete this file:

`C:\Users\<username>\SmartStart\preferences\preferences.xml`

Export

1. In the **General** group box:
   a. **System** - Select a system from the list.
   b. **Domain** - Select a domain from the list. If not applicable, select **<none>**.
2. In the **Virtual Volume** group box:
   a. Select either **Virtual Volume** or **Virtual Volume Set**.
   b. From the virtual volume or virtual volume set list, select the volumes to export.

3. In the **Export To** group box:
   a. Select either **Host (Host Sees)** or **Host Set (Host in Set)**.
   b. From the host or host set list, select the hosts that you want to export the virtual volumes to.

CAUTION:

- If you make any changes in the advanced options and then click to clear the **Show advanced options** check box, a warning dialog is displayed to warn you that the selected advanced options will be lost.

  If you click **Yes**, Basic mode is reinstated, and all advanced options are set back to default. If port (Port Present) or Host and Port (Matched Set) was selected, that setting is changed back to the default **Host (Host Sees)**.

  If you click **No**, Advanced mode is retained.

- If you select the **Override lower priority templates** check box and then click **Finish**, a warning dialog is displayed. This operation can result in data loss.

4. Click **Next** to go to the Summary page, or click **Finish** to complete the wizard.

Summary

Review the summary information, and then click **Finish**.

Add Virtual Volumes to Windows

Introduction to Adding Virtual Volumes to Windows

To use virtual volumes on a Windows Server 2008 R2 or Windows Server 2012 host system, you must first configure the volumes as Windows disks.

The following rules apply when configuring virtual volumes on your Windows Server 2008 R2 or Windows Server 2012 server:

- You do not have to be connected to the HP 3PAR StoreServ Storage system to add volumes to Windows.
- To use SmartStart to format volumes as Windows disks, you must use Microsoft NTFS.
- If you have started a new SmartStart session, you must be able to supply the IP address or name of the Windows Server 2008 R2 or Windows Server 2012 host system.
- You can either assign the virtual volumes to an available drive or mount an empty NTFS folder.

Connect to the Host

1. In the **Host address** field, do one of the following:
   - If you are configuring the machine into which you inserted the SmartStart media, enter `localhost`.
   - If you are configuring any host other than the machine running SmartStart, enter that host's IP address or DNS name.
2. Click **Connect**.
3. Click **Next**.

Add Virtual Volumes to Windows

1. Select the virtual volume that you want to configure as a Windows disk. The virtual volume is displayed as a virtual volume device.
   - If the volume is less than 2 TB, SmartStart initializes the Windows disk as Master Boot Record (MBR).
   - If the volume is greater than 2 TB, SmartStart initializes the Windows disk as a Globally Unique Identifier Partition Table (GPT).
2. In the **Disk label for this virtual volume** field, enter the Windows disk name to assign to this virtual volume.

   The disk label enables you to identify this virtual volume on the Windows server.

   NOTE: Do not use special characters in the disk label. Certain special characters, such as an apostrophe (') or quotation mark (“), can prevent the wizard from adding the virtual volume to Windows successfully.
3. Select a drive to assign to the virtual volume, or select an empty NTFS folder to mount.

   To mount a volume to an empty folder on a remote system, enter the drive and a folder name that references the remote system (for example, `C:\<remote_folder>`). The network path is not supported.

   NOTE: Verify that the folder you mount is empty. If the folder does not exist, is not empty, or is read-only, the folder might not mount successfully.
4. Click **Next**.

   NOTE: Adding virtual volumes to Windows might take up to 10 minutes.

Troubleshooting Task Completion

If SmartStart displays the **Failed to validate whether the current Windows task is complete** message, try the task again by using one of the following methods:

- Click the **Prev** button, and then click **Next**.
- Cancel and then restart the wizard.

If the problem persists, contact HP support. For more information, see “Support and Other Resources” (page 57).

Summary: Add Virtual Volumes to Windows Wizard

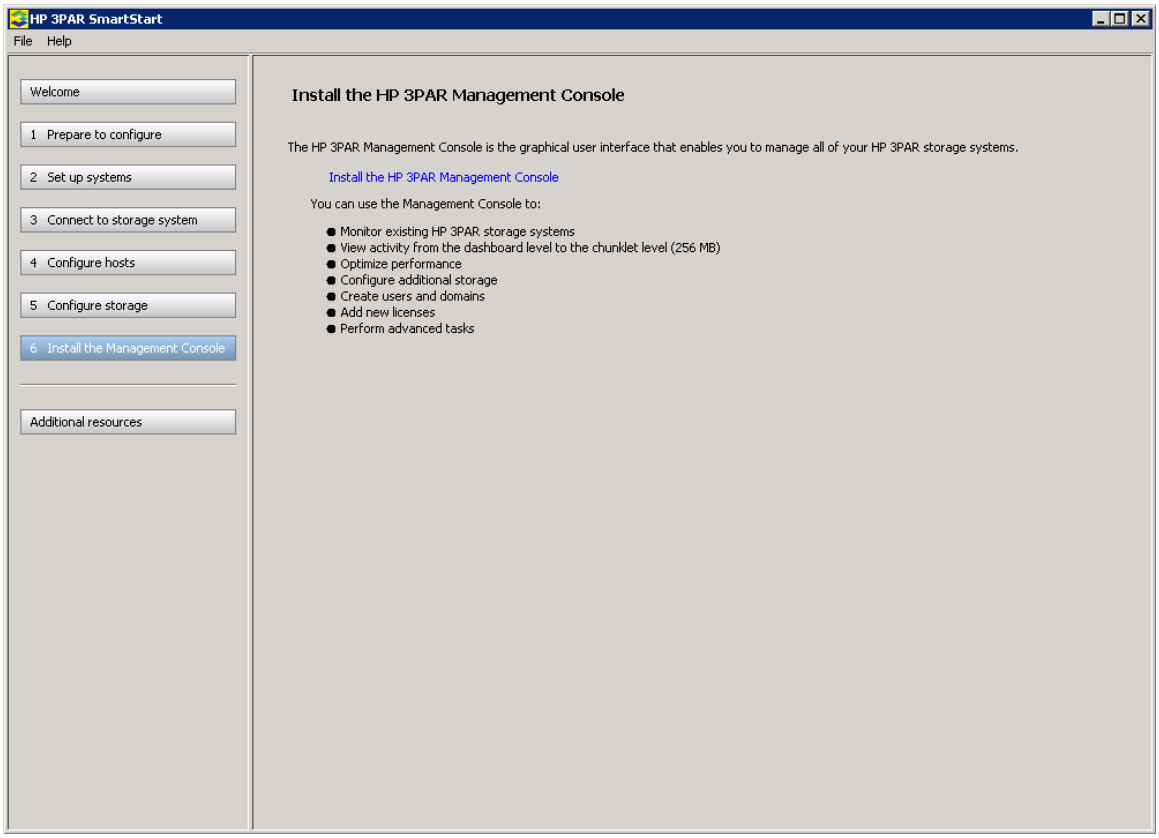
Review your virtual volume disk device setup, and then click **Finish**.

Troubleshooting Task Completion

If SmartStart displays the **Failed to validate whether the current Windows task is complete** message, click **Finish** again.

If the problem persists, contact HP support. For more information, see “Support and Other Resources” (page 57).

7 Install the HP 3PAR Management Console



To manage your HP 3PAR StoreServ Storage systems and access advanced features and functionality, use the HP 3PAR Management Console.

To install the Management Console, click the **Install the HP 3PAR Management Console** link.

Accessing the Management Console

To access the HP 3PAR Management Console do one of the following:

- If you are an administrator, launch the Management Console from the Management Console icon. (The installation adds the HP 3PAR Management Console icon only to administrator desktops.)
- If you are not an administrator, launch the Management Console from the Management Console folder.

For more information about how to use the HP 3PAR Management Console to manage your HP 3PAR storage systems, see the *HP 3PAR Management Console Online Help*.

Part II Understanding Storage

For more information about storage concepts, see the *HP 3PAR StoreServ Storage Concepts Guide*. To access this document, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

For information about supported hardware and software platforms, go to the Single Point of Connectivity Knowledge (SPOCK) website:

http://www.hp.com/storage/spock

For conceptual information about:	**See:**
Data storage components (physical disks, chunklets, logical disks, CPGs, and virtual volumes)	"Storage Software Components" (page 41)
Hosts (WWN or iSCSI paths)	"Hosts" (page 44)
CPGs (pool of storage space)	"Common Provisioning Groups" (page 46)
Virtual volumes (storage containers)	"Virtual Volumes" (page 47)
Exporting virtual volumes (making volumes accessible to hosts)	"Exporting Virtual Volumes" (page 50)
RAID (redundancy for storage stability)	"RAID" (page 51)
User roles and rights (authorizations)	"User Roles and Rights" (page 52)
Managing storage	"Managing Storage" (page 53)

For a list of HP 3PAR documents, see "HP 3PAR documentation" (page 57).

8 Storage Software Components

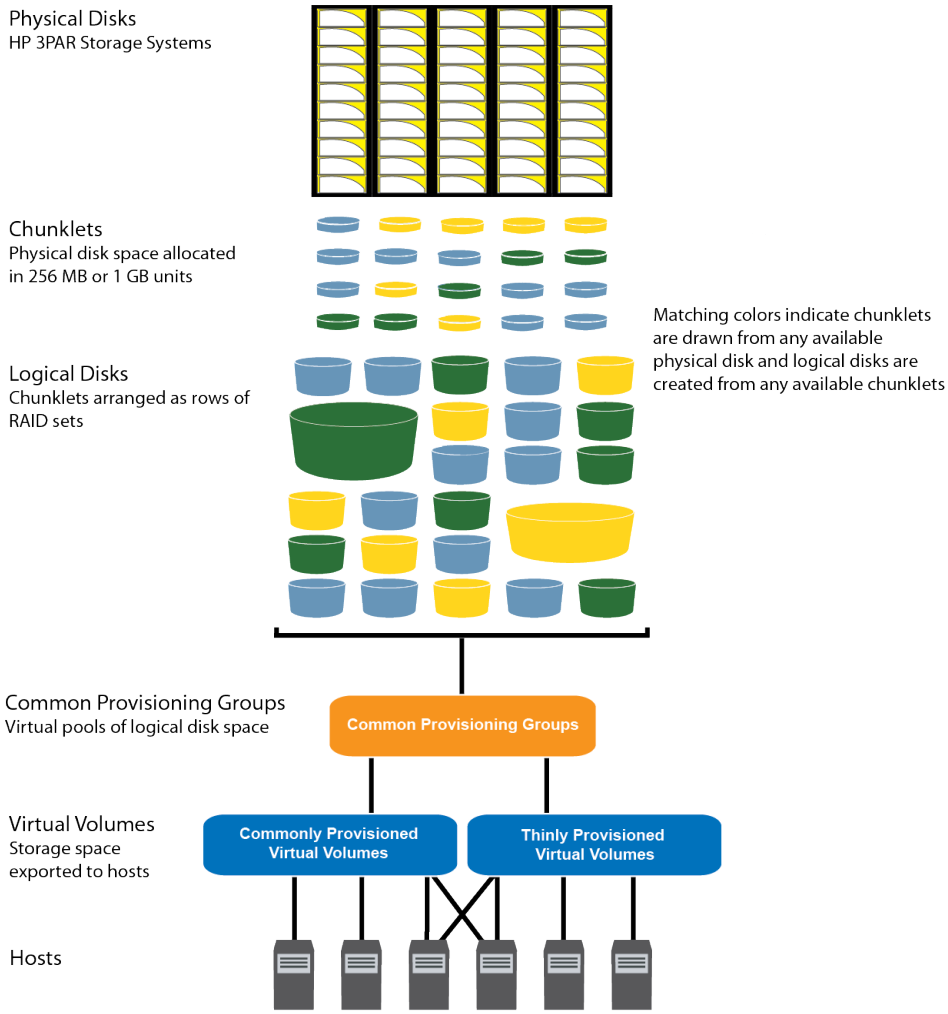
HP 3PAR StoreServ Storage systems include both the hardware components that physically store your data and the software applications that manage your data.

An HP 3PAR storage system is composed of the following logical data layers:

- **Physical disks**
- **Chunklets**—On an HP 3PAR StoreServ 7000 Storage system, chunklets are 1-GB units of disk space
- **Logical disks**—Advanced storage components that add RAID stability
- **CPGs (Common Provisioning Groups)**—Shared pools of storage space
- **Virtual Volumes**—Data containers that are accessible by host systems

The relationship between HP 3PAR storage system data layers is illustrated in Figure 2 (page 41).

Figure 2 HP 3PAR StoreServ Storage System Data Layers



Each layer is created from elements of the layer above, as follows:

- Chunklets are drawn from physical disks.
- Logical disks are created from groups of chunklets.
- Common Provisioning Groups (CPGs) are groups of logical disks.
- Virtual volumes use storage space provided by CPGs.

Physical Disks

A physical disk is a disk drive mounted on a drive magazine located in drive cages (or *drive enclosures*) in an HP 3PAR storage system.

Chunklets

Physical disks are divided into *chunklets*. Each chunklet occupies contiguous space on a physical disk. On HP 3PAR StoreServ 7000 Storage systems, all chunklets are 1 GB. Chunklets are automatically created by the HP 3PAR Operating System, and they are used to create logical disks. A chunklet is assigned to only one logical disk.

RAID and Logical Disks

A *logical disk* is a collection of physical disk chunklets arranged as rows of RAID sets. Each RAID set is made up of chunklets from different physical disks.

Logical disks are pooled together in common provisioning groups (CPGs), which allocate space to virtual volumes. The underlying logical disks are automatically created by the HP 3PAR OS when you create CPGs.

NOTE: Logical disks are an advanced storage component. For more information, see the *HP 3PAR Management Console User Guide* or the *HP 3PAR StoreServ Storage Concepts Guide*. To access these documents, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

Common Provisioning Groups

A *common provisioning group* (CPG) is a shared pool of storage space (specifically, a virtual pool of logical disks) that allocates space to virtual volumes on demand. A CPG allows up to 4,095 virtual volumes to share the CPG's resources. You can create fully provisioned virtual volumes and Thinly Provisioned Virtual Volumes (TPVVs or Thin volumes) that draw space from a CPG's storage pool.

Virtual Volumes

Virtual volumes draw their resources from CPGs. In order to make storage available to hosts, volumes are exported as LUNs to hosts. Virtual volumes are the only data layer that is visible to the hosts.

You can create physical copies or virtual copy snapshots of virtual volumes; both types of copies remain available if the original base volume becomes unavailable.

When you create virtual volumes, you must assign CPGs in order to allocate space to the virtual volumes. Therefore, to create virtual volumes, you must either use the default CPG created during the process of initializing the HP 3PAR StoreServ Storage system or create custom CPGs.

You can create the following types of virtual volumes:

- **Fully provisioned virtual volumes**—Volume size is fixed. No separate license is required to create fully provisioned virtual volumes.
- **Thinly provisioned virtual volumes**—Also known as Thin volumes, these volumes allocate space on demand in small increments. To create Thin volumes, the HP 3PAR Thin Provisioning Software license is required.
- **Physical copies**—A full copy of a volume. No separate license is required to create physical copies.
- **Virtual copies**—A snapshot of a base volume that only records changes to the base volume. To create virtual copies, the HP 3PAR Virtual Copy license is required.

9 Hosts

The HP 3PAR StoreServ Storage system sees a *host* as a set of Fibre Channel World Wide Names (WWNs) or iSCSI names, or in other words, a set of host I/O paths. The host system uses these I/O paths to perform read/write operations on exported virtual volumes on the storage system.

The HP 3PAR storage system automatically detects hosts that are physically connected to ports on the storage system. You can also add new WWNs or iSCSI names for unestablished host paths and assign these WWNs or iSCSI names to a host before hosts are physically connected. These WWNs or iSCSI names do not need to be associated with target ports on the HP 3PAR storage system controller nodes. Therefore, you do not need to manually reconfigure a host path after connecting new hosts.

A virtual volume can be exported (presented or made accessible) to one or more hosts. The host sees the exported virtual volume as a logical unit number (LUN) connected to one or more ports. After the virtual volume is exported to a host, the host can send requests (reads/writes) to the LUN.

To modify system ports and host configurations, use the HP 3PAR Management Console. For more information, see the *HP 3PAR Management Console Online Help*.

NOTE: For recommended practices and detailed configuration information about how to use your host devices with your HP 3PAR storage system, see the relevant *HP 3PAR Implementation Guide*.

Creating and Removing Hosts

You can create, modify, and remove Fibre Channel and iSCSI hosts and their properties.

- When you create a new host, you can either assign WWNs or iSCSI names right away or add those paths later.
- A virtual volume that is exported to a host is exported to all the WWNs or iSCSI names that make up the host.

  To export virtual volumes to specific WWNs or iSCSI names on a host system, you can create separate hosts (host paths) on the host system and assign each WWN or iSCSI name to its own host.
- If you have multiple hosts that require the same administrative procedures, you can group those hosts into a host set and manage them together, as one host.

To manage hosts, use the HP 3PAR Management Console. For more information, see the *HP 3PAR Management Console Online Help*.

Host Personas

Host personas are settings that enable hosts connected to Fibre Channel or iSCSI ports on the HP 3PAR StoreServ Storage system to deviate from the default host behavior. The system automatically assigns a host persona based on your operating system.

For more information about managing host personas, see the *HP 3PAR Management Console Online Help*.

The Host Explorer Software Agent

The HP 3PAR Host Explorer Software agent is a program that runs on a host connected to an HP 3PAR StoreServ Storage system. On Windows, the Host Explorer agent runs as a service.

A separate license is not required to use the HP 3PAR Host Explorer Software agent.

The Host Explorer agent communicates with the HP 3PAR StoreServ Storage system over a Fibre Channel or iSCSI connection and enables the host to send detailed host-configuration information

to the storage system. The information gathered from the Host Explorer agent is visible to uncreated hosts and assists with creating hosts and diagnosing host-connectivity issues.

How Host Explorer Helps You Create Hosts

When you create a host, the system displays the unassigned WWNs or iSCSI names as follows:

- When the Host Explorer agent is running on the attached hosts, the system automatically groups the WWNs or iSCSI names for the host together, which helps you create the host.
- If the Host Explorer agent is not running on the attached hosts, the system cannot determine which host each WWN or iSCSI name belongs to, and you must manually assign each WWN or iSCSI name to a host.

How Host Explorer Helps You Diagnose Host-Connectivity Issues

The Host Explorer agent collects the following information and sends it to the system:

- Host operating system and version
- Fibre Channel and iSCSI HBA details
- Multipath driver and current multipath configuration
- Cluster configuration information

For more information about how to install and use the Host Explorer agent, see the *HP 3PAR Host Explorer User's Guide*. To access this document, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

For a list of supported host operating systems, go to the Single Point of Connectivity Knowledge (SPOCK) website:

http://www.hp.com/storage/spock

10 Common Provisioning Groups

A common provisioning group (CPG) creates a virtual pool of storage space that allows up to 4,095 virtual volumes to share the CPG's resources. When you create virtual volumes (fully provisioned virtual volumes or Thin volumes), the volumes draw storage space from the CPG's storage space pool.

- CPGs dynamically allocate storage space to Thin volumes. Therefore, when a Thin volume is running low on user space, the HP 3PAR StoreServ Storage system automatically assigns more storage capacity to the Thin volume (specifically, the storage system maps new regions—from the logical disks in the CPG associated with the Thin volume—to the Thin volume). Because space is allocated dynamically to Thin volumes, the storage system does not contain large pockets of unused but allocated space.
- CPGs allocate a fixed amount of storage space to fully provisioned virtual volumes upon creation. Therefore, the storage system could contain large pockets of unused but allocated space.

By default, CPGs are configured to automatically grow over time, as required by application writes, when the amount of available space falls below a configured threshold.

Monitoring CPG Growth

CPGs require careful planning and monitoring to prevent them from becoming so large that they set off the HP 3PAR StoreServ Storage system's built-in safety mechanisms. These safety mechanisms prevent a CPG from consuming all free space on the system, but they work properly only on systems that are planned carefully and monitored closely. To restrict a CPG's growth and maximum size, configure the following monitoring aids when you create the CPG:

- Growth increment
- Growth warning
- Growth limit

The maximum number of CPGs per system is 2,048.

To create and manage CPGs, use the HP 3PAR Management Console. For more information, see the *HP 3PAR Management Console Online Help*.

11 Virtual Volumes

Virtual volumes are the only data layer visible to host systems.

- Virtual volumes draw storage space from CPGs.
- Virtual volumes become visible to host systems when you export (present) them to hosts.
- Virtual volumes are exported as LUNs to hosts.
- You can create physical copies or virtual copies (snapshots) of virtual volumes. These copies serve as backups in case the original base volume becomes unavailable.
- If you have multiple volumes that require the same administrative procedures, you can group those volumes into an autonomic group and manage them together, as one volume.

To create and manage virtual volumes, use the HP 3PAR Management Console. For more information, see the *HP 3PAR Management Console Online Help*.

Virtual Volume Types

There are three types of virtual volumes used directly for data storage:

- **Fully provisioned virtual volumes** have a set amount of allocated user space. Fully provisioned virtual volumes require the HP 3PAR StoreServ Storage system to reserve the entire amount of storage space configured for the volumes, whether or not the space is actually used. The size of each fully provisioned virtual volume size is fixed (and not dynamic, like a Thin volume), and the size limit is 16 TB.
- **Thinly Provisioned Virtual Volumes** (TPVVs or Thin volumes) draw space from the associated CPG pools as needed. CPGs allocate space on demand to Thin volumes in small increments for each controller node, but can adjust the size of these increments based on the rate of consumption (allocating more space during periods of high consumption and less space during periods of low consumption). As the volumes that draw space from the CPG require additional storage, the HP 3PAR OS automatically adds more storage space to the CPG until the CPG reaches its growth limit. The Thin volume size limit is 16 TB.

  ### Monitoring Thin Volume Growth

  Thin volumes require careful planning and monitoring to prevent them from becoming so large that they set off the HP 3PAR StoreServ Storage system's built-in safety mechanisms or that writes to the volumes fail. To restrict a Thin volume's growth:

  - Set an allocation warning.
  - Set an allocation limit and ensure that this limit does not exceed the associated CPG's growth limit.
  - Continue to monitor Thin volume growth.

  Creating Thin volumes requires the HP 3PAR Thin Provisioning Software license.
- **Administrative volumes** are created by the system and are for system usage only.

Fully provisioned virtual volumes and Thin volumes have three separate data components:

- *User space* contains the user data. The user space is the area of the volume that corresponds to the regions in the CPG that are available to the host. Thus, the user space is the part of the virtual volume you export to the host as a LUN.
- *Copy space*, also known as *snapshot space*, contains the copy data. The copy space is the area of the volume that corresponds to the regions in the CPG that contain copies of user data that have changed since the previous virtual copy (snapshot) of the volume was created.
- *Administration space*, also known as *admin space,* contains pointers to copies of user data in the copy space. The administration space is the area of the volume that corresponds to regions in the CPG that track changes to the volume that occurred after the previous snapshot was created. Administration space is managed by the system; it cannot be exported and cannot be removed from the system.

You can provision a virtual volume's user space and copy space from the same or from different CPGs. If a virtual volume's user space and copy space are on different CPGs and if the CPG containing the copy space becomes full, the user space still remains available to the host.

To save time, you can create multiple identical virtual volumes at one time.

Physical Copies

A physical copy is a full copy of a volume. A physical copy duplicates all the data from one original *base volume* to another volume called the *destination volume*. The data in a physical copy is static; it is not updated with subsequent changes to the parent volume. Therefore, any changes to either volume causes them to lose synchronization with each other; however, you can resynchronize the volumes. For more information about how to resynchronize a base and destination volume, see the *HP 3PAR Management Console Online Help*.

To reduce the number of management tasks that involve physical copies, you can:

- Create a consistent group of physical copies from a list of virtual volumes.
- Group physical copies into autonomic groups that are managed as one physical copy.

A physical copy can be made only from a base volume that has enough free space to accommodate writes to that volume during the physical copy operation. In addition, the destination volume must meet the following conditions:

- It must have snapshot space associated with it.
- It must have at least as much user space as the volume being copied.
- It must not be exported to a host.

Virtual Copies

A virtual copy is a snapshot of a base volume, which is an original volume that is copied. Unlike a physical copy, which is a duplicate of an entire volume, a virtual copy records only changes to the base volume. This functionality allows an earlier state of the original virtual volume to be re-created by starting with its current state and rolling back all the changes that were made after the virtual copy was created.

To create virtual copies, the HP 3PAR Virtual Copy license is required.

You can make virtual copies of the following items:

- Fully provisioned virtual volumes
- Thin volumes
- Physical copies
- Other virtual copies (snapshots)

Virtual copies are created using *copy-on-write* techniques, which are available only with the HP 3PAR Virtual Copy Software license. Thousands of snapshots of each virtual volume can be created, up to the amount of storage space available. Depending on your system configuration, you can make up to 500 virtual copies of a base volume.

To reduce the number of management tasks around physical copies, you can:

- Create a consistent group of virtual copies from a list of virtual volumes.
- Group virtual copies into autonomic groups that are managed as one virtual copy.

NOTE: Virtual copies are consistent at the virtual volume level, but not at the host filesystem or application level. In other words, virtual copies preserve only the data that was written on the source virtual volume before the virtual copy is created. Virtual copies do not preserve the data that is resident within the application or files ystem buffers and is not flushed to disk before the virtual copy is created.

12 Exporting Virtual Volumes

Virtual volumes are the only data layer you can make visible to hosts. In order to make virtual volumes visible to hosts, you must export (present) the virtual volume to the host.

The export process creates an association between the volume and a LUN. You configure the characteristics of this association when you create the Virtual Volume-LUN pairing (VLUN).

To export virtual volumes, use the HP 3PAR Management Console. For more information, see the *HP 3PAR Management Console Online Help*.

For more information about the maximum number of VLUNs that are supported for each host that has your specific system configuration, see the Single Point of Connectivity Knowledge (SPOCK) website:

http://www.hp.com/storage/spock

VLUN Templates and Active VLUNs

When you create VLUNs, the system produces both VLUN templates that establish export rules, and active VLUNs that the host sees as a LUN or attached disk device expressed as a logical unit number.

A VLUN template is an export rule that sets up an association between a virtual volume and a LUN-host, LUN-port, or LUN-host-port combination that governs how the host can access the virtual volume. A VLUN template can use one of the following export rules:

- A host-sees VLUN template allows only a specified host to see a volume.
- *Host set* allows any host that is a member of the specified host set to see a volume.
- A port-presents VLUN template allows any host on a specified port to see the volume.
- A matched-set VLUN template allows only a specified host on a specified port to see the volume.

When you export volumes, and when the virtual volumes and host paths meet the parameters set in the specified VLUN template, the system creates active VLUNs. The host system uses those active VLUNs to access the virtual volumes in order to perform read/write operations.

13 RAID

RAID is a storage functionality that distributes data in units called chunklets across physical disks in order to create redundancy and therefore increase the stability of your stored data. On the HP 3PAR StoreServ 7000 Storage system, a chunklet is 1 GB.

RAID is one of the parameters of a CPG, the storage pool from which volumes allocate storage space. You can set the RAID type, along with other parameters, when you create a CPG, and you can also modify an existing CPG's RAID.

RAID Types

HP 3PAR storage systems support the following types of RAID:

- **RAID 0**: Data is striped across rows of chunklets on different physical disks.

  RAID 0 improves performance but provides no fault-tolerance.

- **RAID 10 (RAID 1)**: Data is striped across RAID 1 (or mirrored) sets. A RAID 1 set is made up of two or more chunklets that contain the same data. The chunklets in each set are distributed across different physical disks, which could be located in different drive magazines or different drive cages.

  A RAID 1 set can function with the loss of all but one of the chunklets in the set.

- **RAID 50 (RAID 5)**: Data is striped across rows of RAID 5 sets. A RAID 5 set, or parity set, is made up of at least three chunklets. Each RAID 5 set contains a total of two chunklets of space for data and one chunklet of space for parity. The chunklets in each RAID 5 set are distributed across different physical disks, which could be located in different drive magazines or different drive cages.

  A RAID 5 set can function with the loss of any one of the chunklets in the set.

- **RAID Multi-parity (MP) (RAID 6)**: Data is striped across rows of RAID MP sets. A RAID MP set, or *double-parity set*, is made up of at least 8 chunklets. Each RAID MP set contains a total of 6 chunklets of space for data and 2 chunklets of space for parity. The chunklets in each RAID MP set are distributed across different physical disks, which could be located in different drive magazines or different drive cages.

  A RAID MP set can function with the loss of any two of the chunklets in the set.

For more information about the implementation of RAID in HP 3PAR storage systems, see the *HP 3PAR StoreServ Storage Concepts Guide*. To access this document, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

14 User Roles and Rights

To access an HP 3PAR StoreServ Storage system, you must have a user account. Each HP 3PAR OS user is assigned a role, and each role is assigned a set of rights. The roles and rights assigned to the user determine the tasks the user is allowed to perform on a system. To maintain greater control over your system, assign your users a role that has the minimum set of rights that they need to perform their tasks.

Eight roles are defined in the HP 3PAR OS. There are four standard roles and four extended roles.

Table 1 Standard HP 3PAR OS User Roles

User roles	Rights assigned to roles
Browse	Rights are limited to read-only access.
Edit	Rights are granted to most operations, such as creating, editing, and removing virtual volumes and other objects.
Super	Rights are granted to all operations.
Service	Rights are limited to operations required to service the system. Allows limited access to user information and user group resources.

Table 2 Extended HP 3PAR OS User Roles

User roles	Rights assigned to roles
Create	Rights are limited to creating objects, such as virtual volumes, CPGs, hosts, and schedules.
Basic Edit	Rights are similar to the Edit role. For example, the Basic Edit role can create and edit virtual volumes and other objects. However, the rights to remove objects are more restricted for the Basic Edit role than the Edit role.
3PAR AO	Rights are limited to internal use by HP for Adaptive Optimization operations.
3PAR RM	Rights are limited to internal use by HP for Recovery Manager operations.

There is no functional difference between standard and extended roles. The extended roles define sets of rights that are optimized for users with specialized or restricted tasks. For example, assigning a user the Create role allows the user to create virtual volumes and other objects, but does not allow the user to remove virtual volumes.

To view a list of roles and all of the rights assigned to each role, see the *HP 3PAR Command Line Interface Administrator's Manual*. For instructions about performing user-management tasks, see the *HP 3PAR Management Console User Guide*. To access these documents, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

http://www.hp.com/go/3par

15 Managing Storage

To manage your HP 3PAR StoreServ Storage system, use the HP 3PAR Management Console.

- To install the Management Console, go to SmartStart wizard step 6, *Install the Management Console*.
- For more information about using the Management Console, do one of the following:
  - Start the Management Console and open the *HP 3PAR Management Console Online Help*.
  - Download the *HP 3PAR Management Console User's Guide*.

    To access this document, go to the HP 3PAR StoreServ Storage site and click the **Support** link for your product:

    http://www.hp.com/go/3par

Setting Up Alert Emails

To configure your HP 3PAR storage system to email you alerts as issues occur (for example, if a CPG becomes low on space, a disk drive fails, and so on), set up Local Notification.

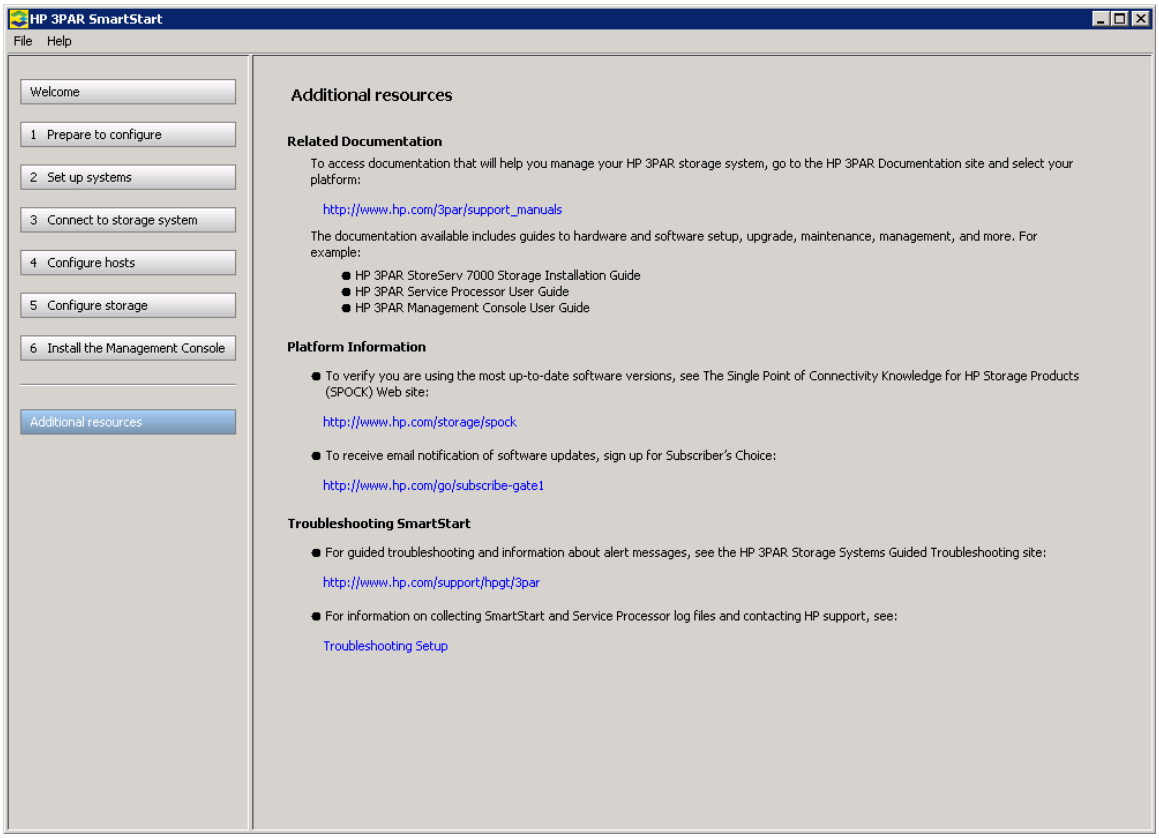
- To set up Local Notification, use the Setup module in SPOCC.

  For more information about Local Notification setup, see the *HP 3PAR Service Processor Onsite Customer Care (SPOCC) Online Help*.
- For more information about alerts, see the *HP 3PAR Management Console Online Help*.

Part III Additional Resources

For information about:	See:
Accessing related HP 3PAR documentation	"Additional Resources" (page 55)
Troubleshooting SmartStart	Troubleshooting SmartStart The HP 3PAR StoreServ Storage Systems Guided Troubleshooting site: http://www.hp.com/support/hpgt/3par
Definitions for HP 3PAR terms	"Glossary" (page 62)

16 Additional Resources



Related Documentation

To access documentation that will help you manage your HP 3PAR StoreServ Storage system, go to the HP 3PAR StoreServ Storage site, and then click the **Support** link for your product:

http://www.hp.com/go/3par

The HP 3PAR Documentation site contains information about:

- Hardware and software installation
- Setup implementation by OS
- Upgrade and maintenance
- Storage concepts
- Administration and management
- Troubleshooting

Troubleshooting SmartStart

To troubleshoot SmartStart:

- See the *HP 3PAR StoreServ 7000 Storage Troubleshooting Guide*. To access this guide, go to the HP 3PAR StoreServ Storage site, and then click the **Support** link for your product:
  http://www.hp.com/go/3par
- Go to the HP 3PAR StoreServ Storage Systems Guided Troubleshooting site:
  http://www.hp.com/support/hpgt/3par

To troubleshoot setting up the Service Processor or the HP 3PAR StoreServ Storage system, see:

"Troubleshooting System Setup" (page 20)

17 Support and Other Resources

Contacting HP

For worldwide technical support information, see the HP support website:

http://www.hp.com/support

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

Specify the type of support you are requesting:

HP 3PAR storage system	Support request
HP 3PAR StoreServ 7200, 7400, and 7450 Storage systems	StoreServ 7000 Storage
HP 3PAR StoreServ 10000 Storage systems HP 3PAR T-Class storage systems HP 3PAR F-Class storage systems	3PAR or 3PAR Storage

HP 3PAR documentation

For information about:	See:
Supported hardware and software platforms	The Single Point of Connectivity Knowledge for HP Storage Products (SPOCK) website: http://www.hp.com/storage/spock
Locating HP 3PAR documents	The HP 3PAR StoreServ Storage site: http://www.hp.com/go/3par To access HP 3PAR documents, click the **Support** link for your product.
HP 3PAR storage system software	
Storage concepts and terminology	*HP 3PAR StoreServ Storage Concepts Guide*
Using the HP 3PAR Management Console (GUI) to configure and administer HP 3PAR storage systems	*HP 3PAR Management Console User's Guide*
Using the HP 3PAR CLI to configure and administer storage systems	*HP 3PAR Command Line Interface Administrator's Manual*
CLI commands	*HP 3PAR Command Line Interface Reference*
Analyzing system performance	*HP 3PAR System Reporter Software User's Guide*
Installing and maintaining the Host Explorer agent in order to manage host configuration and connectivity information	*HP 3PAR Host Explorer User's Guide*
Creating applications compliant with the Common Information Model (CIM) to manage HP 3PAR storage systems	*HP 3PAR CIM API Programming Reference*

For information about:	See:
Migrating data from one HP 3PAR storage system to another	*HP 3PAR-to-3PAR Storage Peer Motion Guide*
Configuring the Secure Service Custodian server in order to monitor and control HP 3PAR storage systems	*HP 3PAR Secure Service Custodian Configuration Utility Reference*
Using the CLI to configure and manage HP 3PAR Remote Copy	*HP 3PAR Remote Copy Software User's Guide*
Updating HP 3PAR operating systems	*HP 3PAR Upgrade Pre-Planning Guide*
Identifying storage system components, troubleshooting information, and detailed alert information	*HP 3PAR F-Class, T-Class, and StoreServ 10000 Storage Troubleshooting Guide*
Installing, configuring, and maintaining the HP 3PAR Policy Server	*HP 3PAR Policy Server Installation and Setup Guide* *HP 3PAR Policy Server Administration Guide*

For information about:	See:
Planning for HP 3PAR storage system setup Hardware specifications, installation considerations, power requirements, networking options, and cabling information for HP 3PAR storage systems	
HP 3PAR 7200, 7400, and 7450 storage systems	*HP 3PAR StoreServ 7000 Storage Site Planning Manual* *HP 3PAR StoreServ 7450 Storage Site Planning Manual*
HP 3PAR 10000 storage systems	*HP 3PAR StoreServ 10000 Storage Physical Planning Manual* *HP 3PAR StoreServ 10000 Storage Third-Party Rack Physical Planning Manual*
Installing and maintaining HP 3PAR 7200, 7400, and 7450 storage systems	
Installing 7200, 7400, and 7450 storage systems and initializing the Service Processor	*HP 3PAR StoreServ 7000 Storage Installation Guide* *HP 3PAR StoreServ 7450 Storage Installation Guide* *HP 3PAR StoreServ 7000 Storage SmartStart Software User's Guide*
Maintaining, servicing, and upgrading 7200, 7400, and 7450 storage systems	*HP 3PAR StoreServ 7000 Storage Service Guide* *HP 3PAR StoreServ 7450 Storage Service Guide*
Troubleshooting 7200, 7400, and 7450 storage systems	*HP 3PAR StoreServ 7000 Storage Troubleshooting Guide* *HP 3PAR StoreServ 7450 Storage Troubleshooting Guide*
Maintaining the Service Processor	*HP 3PAR Service Processor Software User Guide* *HP 3PAR Service Processor Onsite Customer Care (SPOCC) User's Guide*
HP 3PAR host application solutions	
Backing up Oracle databases and using backups for disaster recovery	*HP 3PAR Recovery Manager Software for Oracle User's Guide*
Backing up Exchange databases and using backups for disaster recovery	*HP 3PAR Recovery Manager Software for Microsoft Exchange 2007 and 2010 User's Guide*
Backing up SQL databases and using backups for disaster recovery	*HP 3PAR Recovery Manager Software for Microsoft SQL Server User's Guide*
Backing up VMware databases and using backups for disaster recovery	*HP 3PAR Management Plug-in and Recovery Manager Software for VMware vSphere User's Guide*
Installing and using the HP 3PAR VSS (Volume Shadow Copy Service) Provider software for Microsoft Windows	*HP 3PAR VSS Provider Software for Microsoft Windows User's Guide*
Best practices for setting up the Storage Replication Adapter for VMware vCenter	*HP 3PAR Storage Replication Adapter for VMware vCenter Site Recovery Manager Implementation Guide*
Troubleshooting the Storage Replication Adapter for VMware vCenter Site Recovery Manager	*HP 3PAR Storage Replication Adapter for VMware vCenter Site Recovery Manager Troubleshooting Guide*
Installing and using vSphere Storage APIs for Array Integration (VAAI) plug-in software for VMware vSphere	*HP 3PAR VAAI Plug-in Software for VMware vSphere User's Guide*

Typographic conventions

Table 3 Document conventions

Convention	Element
Bold text	• Keys that you press • Text you typed into a GUI element, such as a text box • GUI elements that you click or select, such as menu items, buttons, and so on
`Monospace text`	• File and directory names • System output • Code • Commands, their arguments, and argument values
`<Monospace text in angle brackets>`	• Code variables • Command variables
`Bold monospace text`	• Commands you enter into a command line interface • System output emphasized for scannability

WARNING! Indicates that failure to follow directions could result in bodily harm or death, or in irreversible damage to data or to the operating system.

CAUTION: Indicates that failure to follow directions could result in damage to equipment or data.

NOTE: Provides additional information.

Required

Indicates that a procedure must be followed as directed in order to achieve a functional and supported implementation based on testing at HP.

HP 3PAR branding information

- The server previously referred to as the "InServ" is now referred to as the "HP 3PAR StoreServ Storage system."
- The operating system previously referred to as the "InForm OS" is now referred to as the "HP 3PAR OS."
- The user interface previously referred to as the "InForm Management Console (IMC)" is now referred to as the "HP 3PAR Management Console."
- All products previously referred to as “3PAR” products are now referred to as "HP 3PAR" products.

18 Documentation feedback

HP is committed to providing documentation that meets your needs. To help us improve the documentation, send any errors, suggestions, or comments to Documentation Feedback (**docsfeedback@hp.com**). Include the document title and part number, version number, or the URL when submitting your feedback.

Glossary

active VLUN	The pairing of a virtual volume and a LUN so the host can access its virtual volume and I/O writes can be saved to the virtual volume. The VLUN parameters determine whether a virtual volume is expressed as an active VLUN. VLUNs that are not active will not communicate with the HP 3PAR StoreServ Storage system.
allocation limit	User-defined threshold that can be set for Thinly-Provisioned Virtual Volumes and fully-provisioned virtual volumes to cap their potential size.
allocation warning	User-defined threshold that can be set for Thinly-Provisioned Virtual Volumes and fully-provisioned virtual volumes to alert users when the volumes reach a certain size.
chunklet	A block of contiguous storage space on a physical disk. On F-Class and T-Class systems, all chunklets are 256 MB. On HP 3PAR 10000 systems, all chunklets are 1 GB.
CPG	Common Provisioning Group (also known as a storage pool or logical disk pool). A set of logical disks from which you can create virtual volumes and virtual copies that are capable of allocating storage on demand.
CPG template	Common Provisioning Group template. A CPG template contains a set of common provisioning group and logical disk parameters that HP 3PAR Management Console users can apply in order to create a new Common Provisioning Group.
created host	A host that is defined on the system but does not necessarily have any physically connected host paths or WWNs assigned to it.
drive cage	A component in a rack or chassis that contains a drive. Drive cages connect to nodes for communication with hosts. Drives may be Fibre Channel or iSCSI.
drive magazine	An electronic circuit board mounted on a mechanical structure that is inserted into a drive bay in a drive cage. A drive magazine holds up to four physical disks.
export	To present a virtual volume to a host. Exporting makes a volume available to a host by creating an association between the volume's name and a LUN (logical unit number) for the specified host and port.
Fast Class	Drive type: either Fibre Channel or Serial Attached SCSI (SAS). With regard to drive types and drive capacities, the abbreviation FC applies to Fast Class. With regard to ports, the abbreviation FC applies to Fibre Channel only.
Fibre Channel adapter	A Fibre Channel PCI host bus adapter (HBA) located in a controller node. The Fibre Channel adapter connects a controller node to a host or to a drive chassis.
fully provisioned virtual volume	A virtual volume (snapshot) with a set amount of user space and for which snapshot administration space and snapshot data space draw resources from a Common Provisioning Group (CPG).
growth increment	The unit of storage space by which the system creates and allocates additional logical disks to a Common Provisioning Group (CPG) when the volumes in that CPG require additional resources. The minimum growth increment varies according to the number of controller nodes in the system (from 8 GB for a two-node system to 32 GB for a eight-node system).
growth limit	An optional setting that enables you to specify the maximum size to which a CPG can grow.
growth warning	An optional setting that enables you to specify the size at which the system alerts you to the amount of CPG growth.
host	A path or set of paths, defined as either WWN or iSCSI names, to one or more ports on a system.
host definition	The name of the host and the list of the paths (WWN or iSCSI) assigned to the host, if any. If you remove all the paths assigned to the host, the host name becomes the host definition.
host-sees VLUN template	A VLUN template that allows a specified host connected to any port to see a virtual volume as a specified LUN (logical unit number).
iSCSI adapter	An iSCSI PCI host bus adapter (HBA) located in a controller node. An iSCSI adapter connects a controller node on an iSCSI port to a host.
iSCSI name	The name of an iSCSI path. You use an iSCSI name to identify that iSCSI path to a host.

LD	Logical disk. A collection of chunklets that reside on different physical disks and that are arranged as rows of RAID sets. When you create a CPG, the system creates and groups logical disks and assigns those logical disks to the CPG.
LUN	Logical Unit Number. A number used to access a virtual volume that has been assigned to a particular host on a particular port.
matched-set VLUN template	A rule that allows a particular host connected to a particular port to see a virtual volume as a specified LUN.
parity	A data redundancy technique used by some RAID levels (in particular RAID 5) to provide data protection on a storage array.
PCM	Power Cooling Module. A hardware component that includes the battery, fan, and power supply.
physical disk	A dual-ported Fibre Channel disk mounted onto a drive magazine.
port-presents VLUN template	A VLUN template that allows any host connected to a particular port to see a virtual volume as a specified LUN.
roles and rights	The roles and rights assigned to a user determine which tasks the user can perform with a system.
Service Processor	A device inserted into a rack or virtual software that enables you to locally and remotely monitor and service systems.
TPVV	Thinly-Provisioned Virtual Volume. A virtual volume that maps to logical disk space associated with a Common Provisioning Group (CPG) and is therefore capable of growing on demand.
user data	For standard base volumes, the data that is written to the user space.
virtual copy	A snapshot created using the copy-on-write technique.
virtual volume	A virtual storage unit created by mapping data from one or more logical disks.
VLUN	Virtual logical unit number. A VLUN is a virtual volume-LUN pairing expressed as either an active VLUN or as a VLUN template.
VLUN template	A rule that sets up the association between the name of the virtual volume and a LUN-host, LUN-port, or LUN-host-port combination. The three types of VLUN templates are host-sees, port-presents, and matched-set.
VSP	Virtual Service Processor.
WWN	World-Wide Name. A unique 64-bit value used to identify Fibre Channel devices on an arbitrated loop. The WWN consists of a prefix issued by the IEEE to uniquely identify the company and a suffix that is issued by the company.