HP StoreVirtual Storage VSA Installation and Configuration Guide

Abstract

This guide provides information about installing and configuring the HP StoreVirtual VSA for VMware vSphere and the HP StoreVirtual VSA for Microsoft Hyper-V. Included are network configuration best practices to ensure the best performance for the SAN using the VSAs. The intended audience is system administrators responsible for managing HP StoreVirtual Storage using VSAs.

Acknowledgements

Microsoft®, Windows®, Windows® XP, and Windows NT® are U.S. registered trademarks of Microsoft Corporation.

Revision History

Revision History

Revision 1	September 2010
First edition	
Revision 2	November 2010
Updated with changes for the SAN/iQ software 9.0 release.	
Revision 3	September 2011
Updated with changes for the SAN/iQ software 9.5 release, including new installer for VSA for ESX Server.	
Revision 4	December 2011
Updated with changes for the installer for VSA to ESX Server, for the SAN/iQ software 9.5 release.	
Revision 5	November 2012
Updated for the SAN/iQ software 10.0 release. Updated memory requirements, removed Jumbo Frames and 10 Gb/s has being not supported with virtual NICs, increased virtual CPU prerequisite for VSA for Hyper-V installation from one to two.	
Revision 6	March 2013
Updated with new product branding for the LeftHand OS software 10.5 release.	

Contents

1 Planning for the VSA

Careful planning of the virtual network configuration, the VSA configuration, and the configuration of the clusters and volumes for data storage ensures that you can take full advantage of the features and benefits of the HP StoreVirtual Storage.

Planning the virtual network configuration

Before you install the VSA on the network, plan the virtual network configuration, including the following areas:

- Design and configuration of the virtual switches and network adapters.
- VSA directories, host names and IP addresses.
- Virtual network configuration, including the subnet and the virtual IP addresses for iSCSI access.

For more detailed information, see "Designing a virtual SAN " (page 20).

Planning the clustered storage configuration

When you install the HP StoreVirtual Centralized Management Console, you should plan and configure the storage system features, such as email alert notification, before you configure the data storage.

2 Installing the HP StoreVirtual VSA for VMware vSphere

The VSA is pre-formatted for use with HP StoreVirtual VSA for VMware vSphere. If you are using an evaluation copy, and you want to continue using the VSA after the trial period has ended, you must purchase a license key. After you apply the license key, your configuration can be used as is in a production environment, or reconfigured if necessary.

Supported versions of VMware

VMware vSphere 5; ESXi Server version 5.x for LeftHand OS 9.0 or later

NOTE: If you are running LeftHand OS version 9.0, VMware vSphere 4 and ESX/ESXi Server 4.x are also supported.

Prerequisites

- Available drive space of up to 10 TB for ESX Server. HP recommends installing ESX Server on top of a redundant RAID configuration. Do not use RAID 0.
- 4 GB memory available for running the HP StoreVirtual VSA for VMware vSphere installer.
- Applicable memory reserved based on total disk capacity (Table 1 (page 6)).

Table 1 Reserve physical memory for VSA for vSphere disks

Total capacity of all installed disks	Requires at least this much memory
5 GB to 500 GB	3 GB
500 GB to 5 TB	4 GB
5 TB to 10 TB	5 GB

- Microsoft .Net 2.0 or later on the installer client.
- vCenter and ESX servers properly licensed before connecting to them using the HP StoreVirtual VSA for VMware vSphere installer.
- A Gigabit Ethernet or internal network environment, including the following:
  - A host name for the VSA for vSphere
  - A network configuration plan, including reserved IP addresses, subnet mask, and gateway for the VSA, or use DHCP (requires statically assigned IP addresses)

Installing the HP StoreVirtual VSA for VMware vSphere

Install the VSA for vSphere using any of the following methods:

- Download the VSA for vSphere from either of these HP websites:
      http://www.hp.com/go/tryvsa

  or
      www.hp.com/go/StoreVirtualDownloads

- Install the VSA for vSphere from the HP StoreVirtual VSA and Failover Manager DVD.

The installer for the VSA for vSphere includes a wizard that guides you through configuring the virtual machine on the network, configuring virtual or physical hard drives, and powering on the VSA. The installer checks for the current CMC, and then installs it, if it is not on the system.

NOTE: If a prior version CMC is installed on a management computer on the network, the VSA for vSphere installer updates the CMC to the current version in the same location. The user-specified location entered in the installer wizard is ignored.

NOTE: You cannot run concurrent installations of VSA with the same VSA name on one ESX server.

After the installation is complete, open the CMC and find the VSAs as storage systems in the CMC. You can then set up the clustered storage for the SAN, as described in "Getting started with HP StoreVirtual Storage" (page 14).

Table 2 Configuring the VSA for vSphere using the installer wizard

Installer step	Definition
Host Setup	ESX Server or vCenter Server that will host the VSA. Enter either the IP address or host name of the server.
Select Host	Lists ESX hosts managed by the vCenter Server or ESX Server, and lists health status and configuration details for the host. Select the specific host on the server that was entered in the first step.
Type	Virtual Storage Appliance (VSA) is the storage system. See the *HP StoreVirtual Storage User Guide* for information about installing the Failover Manager (FOM).
Datastore	List of datastores available on the server. Select the desired datastore to host the virtual appliance files.

Network	Network settings include the following information:
	
	• DNS name for the VSA. Name for the VSA must be 80 characters or less. Valid characters include a-z (case insensitive), 0–9, and –.
	
	• NIC to configure. Available NICs are eth0 and eth1. The VSA can support up to two NICs.
	
	   ○ IP address
	      Reserved IP address is recommended. Enter the IP address, subnet mask, and gateway.
	      DHCP is available (requires statically assigned IP addresses).
	
	   ○ The network interface designated for the virtual machines. Select the appropriate interface from the list.
	
	• The NIC designated as the preferred interface for LeftHand OS. Select eth0 or eth1.

Virtual Machine	Information for creating the virtual machine, including the following: • Name for the virtual machine in ESX Server or vCenter Server • Type of data drives, virtual or raw
VMDK or Raw Disk	One of two windows opens, depending on which type of drives were selected in the Virtual Machine window. Virtual or raw drive requirements • Maximum of 5 drives • Minimum size: 5 GB • Maximum size: 2047 GB Virtual hard drives window Select up to 5 virtual hard drives and designate the size. Raw Disk window Select up to five raw disks that you have prepared, and which are available. These drives must have no partitions or volumes on them, or the installer will not list them. **IMPORTANT:** The raw disk can be greater than 2 TB in VMware. However, the total amount of configured storage on the VSA cannot exceed 10 TB or virtual RAID configuration will fail.

1. Begin the installer one of the following ways:

   - Insert the HP StoreVirtual Management Software DVD in the DVD drive.

   - Double-click the executable that you downloaded to start the installation.

2. Click **Install VSA for VMware vSphere** to begin the wizard.

3. In the Meta Launcher command line window that opens, enter **1** to run the installer CLI, or enter **2** to run the installer GUI. Both versions require the same information and perform the same installation.

   - If you selected the GUI installation in the Meta Launcher CLI window, the GUI installer window opens again and you click **Install VSA for VMware for vSphere** again to begin the wizard.

4. If necessary, enter the login credentials to allow the installer to configure the VSA for vSphere on the vSphere server, and click **Yes**.

5. Accept the terms of the License Agreement again.

6. Work through the wizard to configure the parameters of the virtual machine on the network, including the hard drives. See Table 2 (page 7).

   NOTE: Run the wizard again to configure another VSA for vSphere using the same parameters as appropriate.

7. Finish the installation, reviewing the configuration summary, and click **Deploy**.

   When the installer is finished, the VSA for vSphere is ready to be used in the HP StoreVirtual Storage.

8. Next, use the Find function in the CMC to discover the VSA for vSphere, and then add it to a management group.

Installing the VSA OVF version

Import the VSA for vSphere OVF version as a virtual appliance through the Virtual Infrastructure Client. Download the .ovf files from the website:
>   http://www.hp.com/go/StoreVirtualDownloads

When you import the VSA for vSphere you must perform the following tasks:

- Configure the data disk(s).

- Power on the VSA for vSphere and set the IP address and host name of the VSA for vSphere.

Configuring a data disk

When you configure the data disk, use Table 3 (page 8) to determine the proper size for the disk. The maximum disk size on the ESX Server is limited by the block size used to format the datastore.

Table 3 Relationship of disk size to datastore block size

Block Size	Max VMDK
VMFS5 only	
1 MB (default)	up to 2 TB
VMFS3 only	
1 MB	256 GB
2 MB	512 GB

Table 3 Relationship of disk size to datastore block size *(continued)*

Block Size	Max VMDK
4 MB	1024 GB
8 MB	2048 GB

To configure the data disk:
1. In the VI Client, navigate to the Inventory Panel.
2. Click **Add** at the bottom of the Hardware tab.
3. Select **Hard Disk** as the type of device to add and click **Next**.
4. Select **Create a new virtual disk** and click **Next**.
5. In the Disk Capacity section, designate a capacity that is suitable for the amount of storage available on your ESX Server.
6. In the Location section, select **Store with Virtual Machine**, and click **Next**.
7. For the first disk, select the Virtual Device Node to be SCSI1:0 from the list. For additional disks, assign SCSI 1:1 through 1:4, in sequential order.

△ **CAUTION:** Selecting anything other than SCSI 1:0 for the first disk causes RAID to be unconfigurable later.

8. Select **Mode**→**Independent**→**Persistent** and click **Next**.
9. Review the device configuration and click **Finish**.

Powering on the VSA for vSphere and setting IP address and hostname

1. In the inventory panel, select the new VSA for vSphere and power it on.
2. Select the Console tab and wait for the VSA for vSphere to boot.
3. When the VSA for vSphere finishes booting, enter **Start** and press **Enter** to log in to the Configuration Interface.
4. On the Configuration Interface main menu, press **Tab** to select **Network TCP/IP Settings** and press **Enter**.
5. On the Available Network Devices window, press **Tab** to select the applicable network interface and press **Enter**.
6. On the Network Settings window, press **Tab** to select the **Hostname** box and enter a host name for the VSA. Use backspace to erase an entry if necessary.

    This host name displays in the CMC only. It does not change the name of the original .vmx file or the name of the virtual machine in the VMware interface.

7. Press **Tab** to select the method for setting the IP address.

    If you are entering a static IP address, note that Gateway is a required field. If you do not have a gateway, enter 0.0.0.0.

8. Press **Tab** to select **OK** and press **Enter**.
9. Press **Enter** again to confirm the action.
10. After the settings are configured, press **Enter** to confirm the IP address change.
11. On the Available Network Devices window, press **Tab** to select **Back** and press **Enter**.
12. On the Configuration Interface, press **Tab** to select **Log Out** and press **Enter**.

Finishing up with VI Client

1. In the VI Client Information Panel, select the **Summary** tab.
2. In the General section on the Summary tab, verify that the IP address and host name are correct, and that VMware Tools are running.

NOTE: If VMware Tools show `out of date` or `Unmanaged`, then they are running correctly. These statuses are not a problem, because the tools are available and running. VMware tools are updated with each LeftHand OS software upgrade.

3. Optional: If you want the name of the VSA for vSphere to match the host name in the CMC, in the inventory panel, right-click the VSA for vSphere and select **Rename** and enter the host name.

3 Installing the HP StoreVirtual VSA for Microsoft Hyper-V

The HP StoreVirtual VSA for Microsoft Hyper-V is pre-formatted for use with Microsoft® Windows® Server Hyper-V™. Install the VSA for Hyper-V on a Windows server configured with redundant RAID. If you are using an evaluation copy and want to continue using the VSA for Hyper-V after the trial period has ended, you must purchase a license key. After you apply the license key, your configuration can be used as is in a production environment, or reconfigured if necessary.

Supported versions of Microsoft Windows Server

All operating systems listed are 64–bit. HP StoreVirtual VSA for Microsoft Hyper-V is supported on 64–bit systems only.

- Windows Server 2012
- Microsoft Hyper-V Server 2008 R2
- Windows Server 2008 R2 Standard
- Windows Server 2008 R2 Enterprise
- Windows Server 2008 R2 Datacenter
- Windows Server 2008 R2 Server Core
- Windows Server 2008 SP2, except for Core, which is not supported

Prerequisites

- Available drive space of up to 10 TB for Hyper-V Server. HP recommends installing Hyper-V Server on top of a redundant RAID configuration. Do not use RAID 0.
- Applicable memory reserved based on total disk capacity (Table 4 (page 11)).

Table 4 Memory requirements for VSA for Hyper-V disks

Total capacity of all installed disks	Requires at least this much memory
5 GB to 500 GB	3 GB
500 GB to 5 TB	4 GB
5 TB to 10 TB	5 GB

- A Gigabit Ethernet or internal network environment, including the following:
  - A host name for the VSA for Hyper-V.
  - A network configuration plan, including reserved IP addresses, subnet mask, and gateway for the VSA for Hyper-V, or use DHCP (requires statically assigned IP addresses).
- Two virtual CPUs with at least 2000 MHz reserved.
- Define the install paths for the Hyper-V virtual machine and the virtual hard disks.
- Ensure the following hotfixes are applied before beginning the installation: KB 979711, KB 975530, KB 981836.
- If using physical disks for the VSA for Hyper-V:
  - Ensure that the disks are completely clean of any partitions or any other remnants prior to running the VSA for Hyper-V installer
  - Ensure that the disks are connected, but offline in Windows Disk Manager before starting the installer

Best practices

HP recommends installing Hyper-V Server on top of a redundant RAID configuration with a RAID controller that has battery-backed cache enabled. Do not use RAID 0.

Unsupported configurations

- Running VSA for Hyper-Vs on top of existing HP StoreVirtual Storage is not recommended.

- The hot adding or removal of virtual hard disks and pass-through disks is not supported. See the *Microsoft Linux Integration Services User Guide*.

- In a VSA for Hyper-V configuration, only disk 1 can be used if you are using physical disk pass-thru on any Dell server. However, multiple VHDs can be used.

For additional information about unsupported configurations and best practices, see the *HP StoreVirtual Storage User Guide*.

Installing the HP StoreVirtual VSA for Microsoft Hyper-V

Install the HP StoreVirtual VSA for Microsoft Hyper-V using any of the following methods:

- Download the HP StoreVirtual VSA for Microsoft Hyper-V from either of these HP websites:
  http://www.hp.com/go/tryvsa

  or
  www.hp.com/go/StoreVirtualDownloads

- Install the HP StoreVirtual VSA for Microsoft Hyper-V from the HP StoreVirtual VSA and Failover Manager DVD.

The installer for the VSA for Hyper-V includes a wizard that guides you through configuring the virtual machine on the network, configuring virtual or physical hard drives, and powering on the VSA for Hyper-V. After finishing the installation, install the CMC and find the VSA for Hyper-Vs as storage systems in the CMC. You can then set up the clustered storage for the SAN, as described in "Getting started with HP StoreVirtual Storage" (page 14).

NOTE: One or more Microsoft hotfixes may be required on your system before you can install the VSA for Hyper-V. If this is the case, before the installer actually begins, a window opens that notifies you of the required hotfixes and provides links to the appropriate site to download the hotfix.

Table 5 Configuring the VSA for Hyper-V using the installer wizard

Installer Step	Definition
Hotfix required	Lists one or more Microsoft hotfixes that must be installed before installing the VSA for Hyper-V.
Type	VSA for Hyper-V Server is the storage system
Destination	Locations for the virtual machine and the virtual disks.
Network	Includes the following network information: • Host name for the VSA for Hyper-V. • IP address. Reserved IP address is recommended. DHCP is available (requires statically assigned IP addresses). • The network interface designated for the virtual machines. The VSA for Hyper-V can support up to two NICs.

Table 5 Configuring the VSA for Hyper-V using the installer wizard *(continued)*

Installer Step	Definition
Virtual machine	Information for creating the virtual machine, including the following: • Name for the virtual machine in Hyper-V • Type of hard drives, virtual or physical • Check box to power on the VSA for Hyper-V after it is installed
Hard drives, either virtual or physical	One of two windows opens, depending on which type of drives were selected in the Virtual machine window. Virtual or physical drive requirements • Maximum of 5 drives • Minimum size: 5 GB • Maximum size: 2040 GB Virtual hard drives window Select up to 5 virtual hard drives and designate the size. Physical Drives window Select up to five physical drives that you have prepared, and which are offline. These drives must have no partitions or volumes on them, or the installer will not list them. **IMPORTANT:** Total amount of configured storage on the VSA for Hyper-V cannot exceed 10 TB or virtual RAID will fail.

1. Begin the installer one of the following ways:

   • Unzip the files if you downloaded a .zip file, and then double-click the executable to start the installation.

   • Double-click the downloaded executable to start the installation.

   • Insert the DVD in the DVD drive (either the physical HP StoreVirtual VSA and Failover Manager DVD you received or the DVD you created after downloading the DVD .iso image from the web).

2. Accept the terms of the License Agreement.

3. Configure the parameters of the virtual machine on the network, including the hard drives. See Table 5 (page 12).

   NOTE: You can run the wizard again to configure another VSA for Hyper-V using the same parameters as appropriate.

4. Finish the installation, reviewing the configuration summary.

   When the installer is finished, the VSA for Hyper-V is ready to be used in HP StoreVirtual Storage.

5. Next, install the CMC, described in "Getting started with HP StoreVirtual Storage" (page 14). Then follow the steps in "Installing the CMC" (page 14).

   The installer may take a few minutes to complete, depending upon the underlying hardware.

Troubleshooting

Table 6 Troubleshooting the VSA for Hyper-V installation

Problem	Solution
While installing the VSA for Hyper-V, you do not see the physical disks you prepared.	1. Close the installer. 2. Verify that the disks are offline. 3. Start the installer again.

4 Getting started with HP StoreVirtual Storage

Installing the CMC

Install the CMC on the computer or virtual machine that you use to administer the HP StoreVirtual Storage. You administer the entire network of VSAs from this CMC. To obtain the CMC, download the CMC installer from the following website:

http://www.hp.com/go/StoreVirtualDownloads

Prerequisite

For the CMC installation, 63 MB disk space and 64 MB RAM during runtime.

Installing the CMC in Microsoft Windows

1. Start the CMC installer.
2. Follow the steps in the installation wizard.
3. When the installation completes, HP is added as a separate Program Group and a shortcut icon is added to the Microsoft Windows desktop.

To start the CMC:

- Double-click the icon on your desktop, or

- From the Start menu, select **All Programs→HP →HP StoreVirtual→HP StoreVirtual Centralized Management Console**.

Installing the CMC in Linux

You must be running the X Window System to install the application.
1. Click the CMC installer.
2. Follow the steps in the installation wizard.
3. When the installation completes, HP is added as a separate Program Group.

To start the CMC:

From the directory into which you installed the files, run the script `./Console`.

Getting started with the CMC

The CMC is configured to find all systems on the subnet on which it is installed. The first time you open the CMC, it automatically finds all the storage systems and they appear in the Navigation pane.

To control which systems appear in the CMC, change the configuration using the following steps.
1. Open the CMC.

2. Click **Find Systems** on the Getting Started Launch Pad.
   In the Find Systems window, use these features to control the list of systems:

   • Clear Auto Discover by Broadcast to prevent the entire subnet of systems from appearing in the navigation pane.

   • Add individual IP addresses of systems that you want to appear in the navigation pane.

Figure 1 Editing Find Systems to control the systems displayed
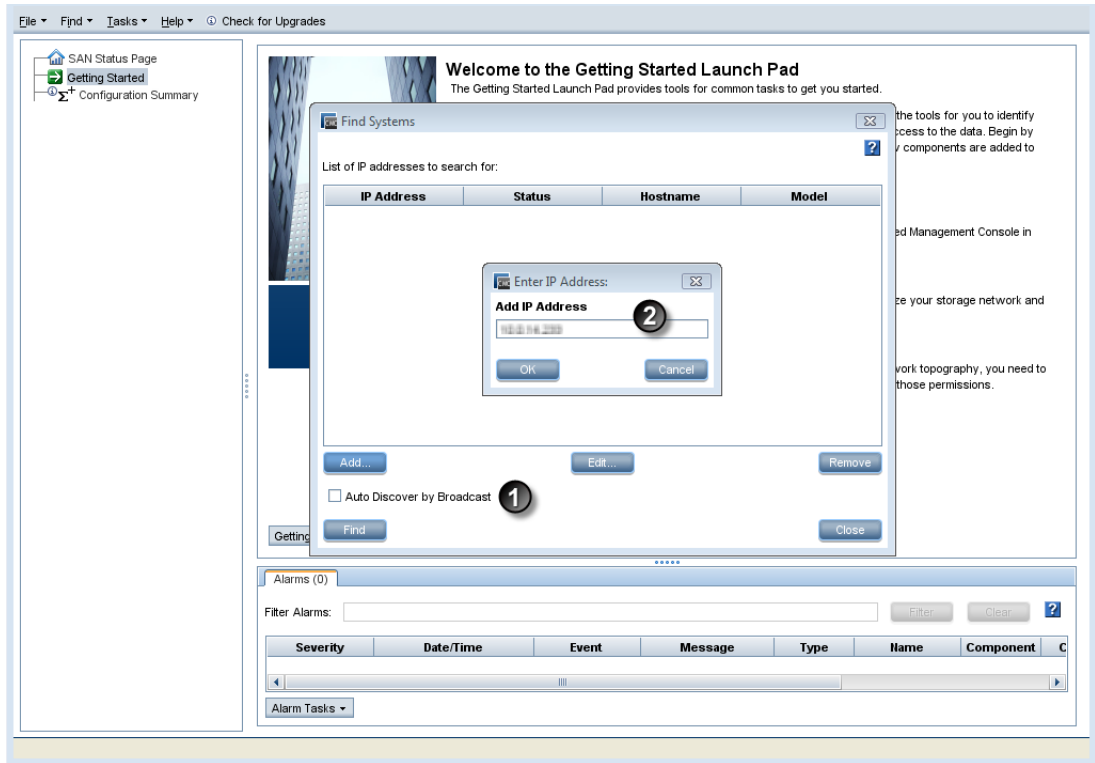
1. Clear Auto Discover by Broadcast

2. Add IP addresses for specific systems

Verify the hardware configuration

Ensure the hardware configuration is correct before adding the VSA to a management group. Select the VSA in the navigation window to expand the hardware configuration categories. Verify that virtual RAID is configured. Verify that the Network settings are correct.

Virtual NICs

Figure 2 Configuring the hardware
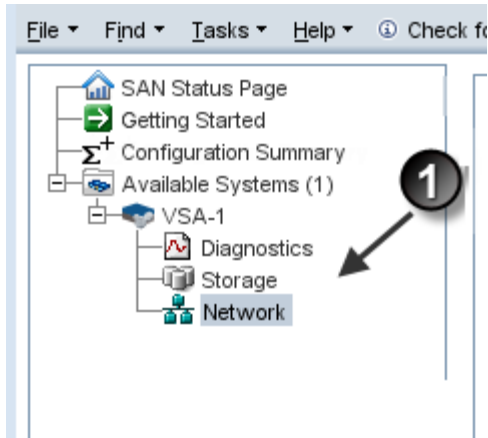
1. Configure RAID and the network from these categories

Configuring RAID

Configure RAID after powering on the VSA. If you power off the VSA and add disks, you must re-configure RAID when you power on the VSA.

RAID and the VSA for Hyper-V Server

If you create the VSA for Hyper-V Server with one disk, RAID will be automatically configured. If you create the VSA for Hyper-V Server with more than one disk, you must manually add the remaining disks to RAID using the CMC.

1. Select the system in the Available Systems pool.
2. Navigate to the Storage category.
3. Use either of the following methods to add the remaining disks to RAID.

   - On the RAID Setup tab, click **RAID Setup Tasks** and select **Reconfigure RAID**.

   - On the Disk Setup tab, click **Disk Setup Tasks** and select **Add Disks to RAID**.

Figure 3 Adding additional disks to RAID in the VSA for Hyper-V Server
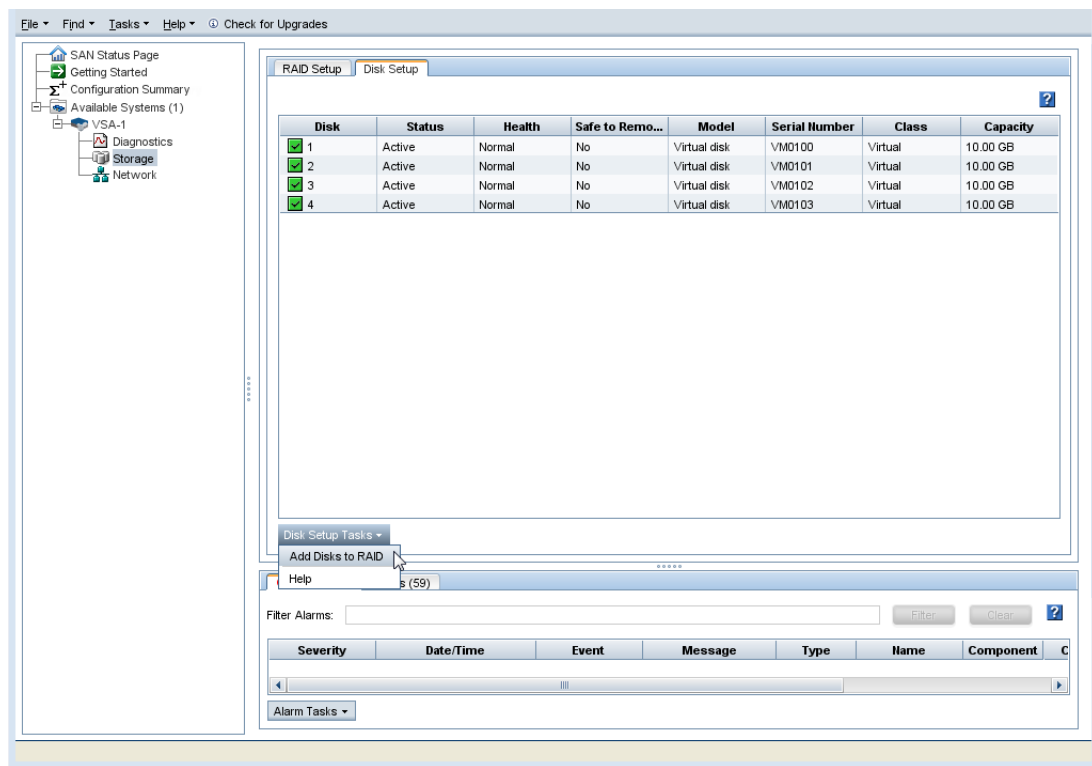
RAID and the VSA for vSphere Server

If you have trouble configuring RAID now, you may have made a mistake when configuring a virtual disk earlier. On the ESX Server, verify that the VSA has at least one virtual disk. The first virtual disk must be configured on SCSI 1:0. Additional disks must be configured sequentially on SCSI 1:1 through 1:4. VSAs use SCSI 0:0 and 0:1 for operating system disks, and use the disk configured for SCSI 1:0 for SAN data storage. If no SCSI disk is configured for SCSI 1:0, RAID cannot be configured on the appliance.

NOTE: If you want to clone the VSA for vSphere Server, do it now. You must only clone a VSA while it is in the Available Systems pool.

Creating the iSCSI SAN

Use the Management Groups, Clusters, and Volumes wizard to create your storage pool. For information about using the wizards, see the *HP StoreVirtual Storage User Guide* or the HP StoreVirtual Storage Online Help.

Best Practice Summary

Use the Best Practice Summary on the SAN Status Page in the CMC to review your SAN configuration and to ensure you are following best practices for the disk RAID and Network RAID configurations, as well as network configurations and the overall SAN configuration. The Best Practice Summary provides an easy-to-use reference about best practices that can increase the reliability and performance of your SAN configurations. Move the mouse over a best practice item to see an explanation of the best practice.

1. Navigate to the SAN Status Page in the CMC.
2. Log in to the management group to verify the Best Practices for that management group.

Troubleshooting

Table 7 Troubleshooting installation—HP StoreVirtual VSA for VMware vSphere

Problem	Solution
You want to reinstall the VSA	1. Close your CMC session. 2. In the VI Client, power off the VSA. 3. Right-click and select **Delete from Disk**. 4. Copy fresh files into the virtual machine folder from the downloaded .zip file or distribution media. 5. Open VMware and begin again.
You cannot find the VSA with the CMC, and cannot recall its IP address.	Open the Configuration Interface. Navigate to the Network Settings window to verify the IP address.
You cannot configure RAID.	Verify that the VSA has a virtual disk configured on SCSI 1:0. VSAs use SCSI 0:0 and 0:1 for operating system disks. They use the disk configured for SCSI 1:0 for SAN data storage. If no SCSI disk is configured for SCSI 1:0 then RAID cannot be configured on the appliance.
In Windows	
If the Installation wizard freezes, reset the Hardware Acceleration in Windows.	1. Open the **Windows Display Settings→Advanced settings→Troubleshoot** tab. 2. Move the Hardware Acceleration slider to one notch above None. 3. Click **OK**, and then **OK** again to leave the Properties dialog. 4. Restart the Installation wizard.
In Linux	
If the installer does not start automatically	Run CMC_Installer.bin again.
In VI Client	
You do not have the cursor or the keyboard available.	If your cursor is missing, you are in console mode. Press **Ctrl-Alt** to regain the cursor. If your keyboard is missing, move the mouse to the console window and click once.
You want to see your VSA, but the window is black.	• You are in the console view of the guest window. Change to the Summary view. • Your console window has timed out. Click in the window with the mouse and then press **Backspace**.

Table 8 Troubleshooting installation—HP StoreVirtual VSA for Microsoft Hyper-V

Problem	Solution
You want to reinstall the VSA	Using the Hyper-V Manager: 1. Close your CMC session. 2. In the Hyper-V Manager, power off the VSA. 3. Right-click and select **Delete from Disk**. 4. Optional: Delete the .vhd files to recover the disk space. 5. Rerun the .exe file and reinstall the VSA. 6. Open the Hyper-V Manager and begin again.
You cannot find the VSA with the CMC, and cannot recall its IP address.	Open the Configuration Interface. Navigate to the Network Settings window to verify the IP address.

Documentation available

For detailed instructions about using the CMC and the VSA, see the following resources. You can find these documents on the HP StoreVirtual Management Software DVD and on the Manuals page of the HP Business Support Center website:

http://www.hp.com/support/StoreVirtualManuals

- HP StoreVirtual Storage Online Help

    All User Guide content is contained in the HP StoreVirtual Storage Online Help, available from the menu bar under **Help**→**Help Topics**. Context sensitive help is available by clicking the question mark on any window ( ).

- HP StoreVirtual Storage User Guide

    The *HP StoreVirtual Storage User Guide* provides detailed instructions for using the LeftHand OS software to create, access and manage the clustered data storage.

- HP StoreVirtual Storage Remote Copy User Guide

    The *HP StoreVirtual Storage Remote Copy User Guide* provides instructions for using the Remote Copy capabilities of the LeftHand OS software.

- HP StoreVirtual Storage Multi-Site Configuration Guide

    The *HP StoreVirtual Storage Multi-Site Configuration Guide* provides instructions for configuring and using the HP StoreVirtual Multi-Site SAN.

5 Designing a virtual SAN

The VSA enables full featured use of the LeftHand OS software in a virtualized environment. When deployed correctly, HP LeftHand SANs are scalable, highly available, and fully redundant.

Figure 4 Example of a virtual SAN using the VSA

Designing your virtual SAN

The design of your virtual SAN affects both its performance and its reliability for production use. Use the concepts and practices in this manual when installing and managing your virtual SAN to ensure optimal performance and reliability.

Configuration requirements

The following configuration requirements are prerequisites for HP to support your virtual SAN for production use.

- A qualified server running VMware ESX Server. Qualified servers are listed in VMware ESX Server systems compatibility guide, which can be found at http://www.vmware.com/resources/compatibility/search.php.

- A qualified server running Microsoft Hyper-V Server. To verify the server is listed and qualified for Hyper-V Server, go to http://windowsservercatalog.com/results.aspx?&bCatID=1283&cpID=0&avc=11&ava=0&OR=1&PGS=25, and then search for "Hyper-V" as an additional qualification. See supported Windows versions.

- Reserved memory based on total disk capacity, as listed in Table 9 (page 20).

Table 9 Memory requirements for VSA disks

Total capacity of all installed disks	Requires at least this much memory
5 GB to 500 GB	3 GB
500 GB to 5 TB	4 GB
5 TB to 10 TB	5 GB

- Two virtual CPUs with at least 2000 MHz reserved.

    NOTE: The Hyper-V installer assigns 1000 MHz by default.

- A connection to a virtual switch or virtual network with at least a Gigabit network connection.

- Virtual disk(s) with 5 GB to 2 TB (2047 GB for ESX, 2040 GB for Hyper-V Server virtual machines) of space per disk located on internal disk storage, or direct attached storage that

is not accessible from more than one physical server. (Note that the LeftHand OS software consumes a small amount of the available space.)

- ◦ For ESX Server, the first virtual disk must be connected to SCSI address 1:0.
- ◦ For Hyper-V Server, the first virtual disk must be connected to the first SCSI Controller.

- All virtual disks for the VSA for vSphere must be configured as independent and persistent to prevent VM snapshots from affecting them.
- Virtual disks for VSA for Hyper-V must be fixed, not dynamic.
- The VMFS datastore or NTFS partition for the VSA must not be shared with any other VMs.
- Two or more VSAs on separate physical servers with Network RAID-10, and a Failover Manager is the minimum configuration for high availability with automatic failover.

  Two or more VSAs on separate physical servers can be clustered with a Virtual Manager for manual failover.

Best practices

Other configuration recommendations are useful to improve the reliability and performance of your virtual SAN. Consider implementing as many of these best practices as possible in your virtual SAN environment.

Each VSA should meet the following conditions, if possible.

- Have a virtual switch or virtual network comprised of dual Gigabit Ethernet or more. Providing network redundancy and greater bandwidth improves both performance and reliability.
- Be configured to start automatically and first, and before any other virtual machines, when the ESX Server on which it resides is started. This ensures that the VSA is brought back online as soon as possible to automatically re-join its cluster. The default installation configuration for the VSA for Hyper-V is set to automatically start if it was running when the server shut down.
- Use redundant RAID for the underlying storage of a VSA in each server to prevent single disk failures from causing VSA system failure. Do not use RAID 0.

  NOTE: See the *HP StoreVirtual Storage User Guide* for detailed information about using RAID for individual server-level data protection.

- For the VSA for Hyper-V, dedicate a unique network adapter for iSCSI traffic.
- For the VSA for vSphere, be located on the same virtual switch as the VMkernel network used for iSCSI traffic. This allows for a portion of iSCSI IO to be served directly from the VSA to the iSCSI initiator without using a physical network.
- For the VSA for vSphere, be on a virtual switch that is separate from the VMkernel network used for VMotion. This prevents VMotion traffic and VSA IO traffic from interfering with each other and affecting performance.

Unsupported configurations

- NIC bonding between the 2 virtual NICs in the VSA is not supported. (NIC bonding is a best practice in the server.)
- The virtual NICs on the VSA for vSphere and VSA for Hyper-V do not support flow control setting modifications or TCP off-load. The physical NICs on the server can be configured with these features.
- Use of VMware snapshots, VMotion, HA, DRS, or Microsoft Live Migration on the VSA itself.
- Use of any ESX Server configuration that VMware does not support.

- Use of any Hyper-V Server configuration that Microsoft does not support.
- Booting physical servers off of a VSA cluster.
- Extending the data virtual disk(s) (ESX Server SCSI 1:x or in Hyper-V, the first SCSI Controller) of the VSA while in a cluster.
- Co-location of a VSA and other virtual machines on the same physical platform without reservations for the VSA CPUs and memory in ESX.
- Co-location of a VSA and other virtual machines on the same VMFS datastore or NTFS partition.

Hardware design for VSA

The hardware platform used for a virtual SAN affects the capacity, performance, and reliability of that virtual SAN. The hardware features listed below affect the VSA configuration.

- CPU
- Memory
- Virtual Switch or Network
- Controllers and Hard Disk Drives
- Network Adapters

CPU

Because the CPUs of the VSA must be reserved, platforms that will host a VSA and other VMs should be built with more processor cores to accommodate the additional VMs. Multi-core processors with at least 2 GHz per core should be used so that two cores with at least 2 GHz can be reserved for the VSA. All additional cores are then available for use with other VMs, thereby avoiding resource contention with the virtual SAN. For example, a platform with two dual core processors could host a VSA and use 3 cores to share for other VMs.

Memory

Similarly the memory of the VSA must be reserved. For platforms that will host a VSA and other VMs, build in additional memory to accommodate the additional VMs. All system memory on the host that is not used by the VSA can be used by other VMs

Virtual switch or network

The virtual switch or network should be entirely dedicated to the VSA and not used for any other traffic.

Controllers and hard drives

The internal disk controller and actual hard disk drives of a platform affect the capacity and IO performance of the VSA. Ideally VSAs should use storage that is hosted by many SAS or SCSI drives. If you are designing a new server that will host VSAs, you should incorporate the following recommendations.

- Use as many hard drives as the platform will allow and prefer faster rotation speeds. The more hard drives and the faster their rotation speed, the more IOPs, and better performance.
- Select controllers with protected write cache and ensure that the write cache is enabled.
- Do not enable disk caching on servers that host VSAs.

Network adapters

The number of network adapters available in a platform affects your options for configuring virtual switches. VSAs that will have a dedicated server platform only need two ethernet (minimum 1 GB)

network adapters. Platforms that will host VSAs and other virtual machines should have four ethernet (minimum 1 GB) network adapters so that two adapters can be dedicated to the VSA and iSCSI traffic.

Virtual network design

The virtual switch or virtual network that is used for VSA should be at least a redundant Gigabit network, if possible. Performance and reliability can be improved even further by using more than two ethernet adapters in the iSCSI and VSA virtual networks or by using 10 GB for increased performance.

Using VSAs with HP StoreVirtual Storage

VSAs and physical platforms can be mixed in management groups. When mixing virtual and physical platforms, and mixing differently configured VSAs, you should take the following requirements and guidelines into consideration.

- Cloning VSAs

   To clone a VSA, you must do so while the VSA is still in the Available Systems pool, before you add it to a management group. Cloning a VSA after it is in a management group is not supported.

   NOTE: Configure the first VSA for RAID and Networking. Then create your clone with the hardware settings already configured.

- Running managers on physical platforms

   When possible, locate all managers in a management group on physical platforms instead of VSAs, and ideally on the fastest platforms in the management group. While VSAs can run managers, physical platforms provide better performance and a lower likelihood that they will be rebooted for administrative reasons.

- Locating VSAs that are running managers on separate physical platforms

   If VSAs are running managers, ensure that those VSAs reside on separate physical platforms. Otherwise, rebooting a single physical platform could cause a loss of quorum in the management group.

- Managing the performance impact of mixing platforms in clusters

   Mixing VSAs built from different hardware in the same cluster also yields unpredictable performance. Typically the overall performance of the cluster is close to the aggregate average of the storage systems in the cluster.

   Additionally, you may perceive performance degradation if a faster VSA fails, thereby causing volumes to fail over to a slower VSA. Such performance degradation is normal in a mixed cluster.

- Managing the storage capacity of mixing platforms in clusters

   While clusters can contain storage systems with different capacities, all storage systems in a cluster operate at a capacity equal to that of the smallest-capacity storage system. The additional capacity on the VSA will operate according the same rules for physical storage systems in a cluster; that is, the VSA will operate at a capacity equal to that of the smallest capacity VSA in the cluster. See "Clusters and storage systems" in the *HP StoreVirtual Storage User Guide* for more information.

Adding storage capacity to a VSA

Add storage capacity to a VSA by adding up to 4 additional virtual disks for a total of 5 disks. Ensure that if you add capacity to a VSA in a cluster, you balance the capacity of all the storage

systems in the cluster. See "Using VSAs with HP StoreVirtual Storage" (page 23) for information about storage capacity and platforms in a cluster.

The following steps describe how to add disks after the VSA has been added to a management group and cluster. However, you can add the disks to the VSA when you first configure it, before you use it for clustered storage.

Create additional disks

Create up to 4 additional disks for a VSA.

Requirements

- Minimum disk size—5 GB
- Maximum disk size—2047 GB for ESX, 2040 GB for Hyper-V
- Created sequentially as follows:
    - ESX Server—from SCSI 1:1 through SCSI 1:4. This assumes that the first disk has already been created and assigned to SCSI 1:0.
    - Hyper-V—Add up to four additional disks to SCSI Controller 0, location 1 through 4. This assumes that the first disk has already been created in SCSI Controller 0, location 0.

Creating the disk

1. Power off the VSA.
2. Using either VMware Server, VI Client, or Microsoft virtual machine manager, add from 1 to 4 disks to the VSA.
3. Assign each disk to the next sequential SCSI address or location.
4. Configure the disks as follows:
    - ESX Server disks as independent and persistent
    - Hyper-V disks as fixed size
5. Increase memory based on the total capacity of the VSA, according to the requirements in Table 10 (page 24).

Table 10 Memory requirements for VSA disks

Total capacity of all installed disks	Requires at least this much memory
5 GB to 500 GB	3 GB
500 GB to 5 TB	4 GB
5 TB to 10 TB	5 GB

6. Power on the VSA when you have finished adding disks.

Adding disks to RAID

A new disk appears as Uninitialized in the Disk Setup tab of the Storage configuration category. Add the new disk to RAID, which automatically powers the disk on.

1. In the CMC, navigate to the VSA.
2. Select the Storage configuration category and select the **Disk Setup** tab.
3. Select the disk to add to RAID.

    Disks must be added to RAID sequentially. For example, you cannot add disk 3 to RAID if disk 2 has not been added.

4. Right-click and select **Add Disk to RAID**.

Sample configurations

Some sample configurations and their uses and benefits are described below.

Single system configuration

A single system configuration is useful for implementing a simple iSCSI target that can scale up to a redundant iSCSI SAN of any size. A single system configuration has only the elements listed

IMPORTANT: A single system configuration offers no data protection, failover, or redundancy, and is not recommended.

- One VSA
- A single management group
- A single cluster
- Running a single manager

Figure 5 Single system configuration
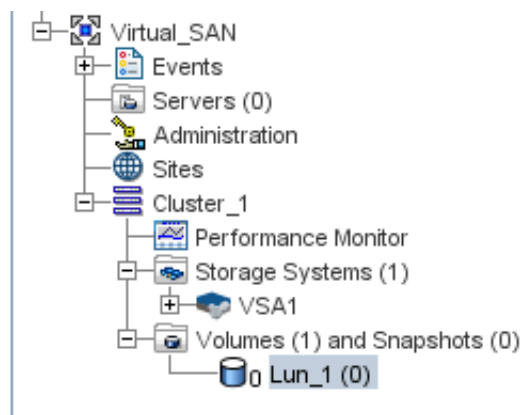
Two-system configuration

A two-system configuration is the smallest possible redundant configuration. Automatic failover between systems requires a failover manager. A two-system configuration includes the elements listed.

- Two VSAs in a single management group
- A single cluster
- Two managers
- A Failover Manager added to the management group

NOTE: For more information, see "Failover Manager Overview" in the *HP StoreVirtual Storage User Guide*, available on the Manuals page of the HP Business Support Center website:

http://www.hp.com/support/StoreVirtualManuals

Figure 6 Two-system configuration

```
Virtual_SAN
├── Events
├── Servers (0)
├── Administration
├── Sites
└── Cluster_1
    ├── Performance Monitor
    ├── Storage Systems (2)
    │   ├── VSA1
    │   └── VSA2
    └── Volumes (1) and Snapshots (0)
        └── Lun_1 (0)
```
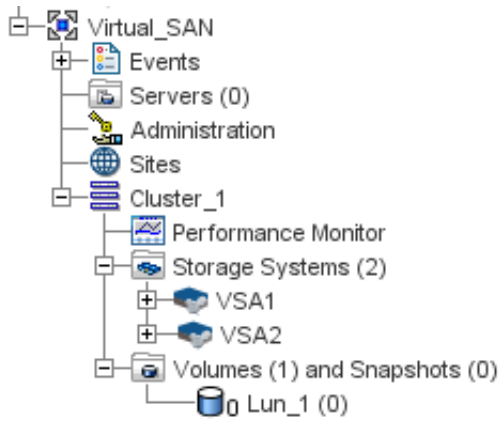
Three-system-plus configuration

All configurations greater than two systems can be redundant, and do not require a Virtual Manager or Failover Manager. A configuration greater than two systems includes the items listed.

- Three or more systems in a management group
- Multiple clusters with as many VSAs as desired in each cluster
- Running three or five managers, as appropriate

Figure 7 Three-system-plus configuration

```
Virtual_SAN
├── Events
├── Servers (0)
├── Administration
├── Sites
└── Cluster_1
    ├── Performance Monitor
    ├── Storage Systems (3)
    │   ├── VSA1
    │   ├── VSA2
    │   └── VSA3
    └── Volumes (1) and Snapshots (0)
        └── Lun_1 (0)
```
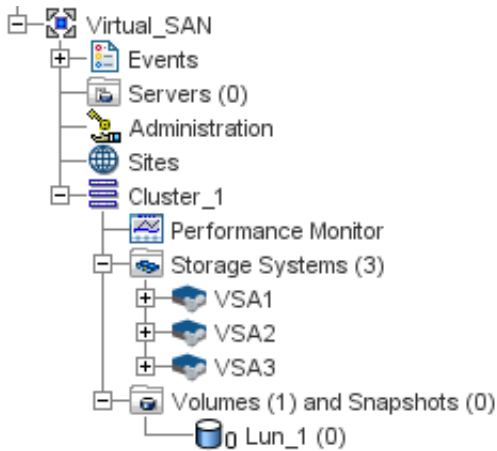
6 Using the VMware VSA laptop demo

The VMware VSA laptop demo is the smallest and most portable version of the LeftHand OS software virtual appliance. Use this demo to create HP StoreVirtual Storage, complete with storage clusters.

NOTE: There is not a separate demo version of the HP StoreVirtual VSA for Microsoft Hyper-V Server.

The VSA can be used for free indefinitely as a single system iSCSI target with snapshots. If a configuration is deleted and recreated, the trial period of licensed features starts again.

To use the VSA fully featured on an ESX Server, purchase a license and follow the instructions in "Installing the HP StoreVirtual VSA for VMware vSphere" (page 6) to set up virtual HP StoreVirtual Storage.

The VSA runs a full-featured version of the LeftHand OS software, and provides the following capabilities:

- Use of the LeftHand OS software without requiring physical storage devices.
- Use of advanced LeftHand OS software features such as Clustering and Virtualization, Managed Snapshots, Remote Copy and Multi-Site SAN during an evaluation period.

The demo is available at www.hp.com/go/tryvsa.

Requirements for the demo

- The demo VSA is supported on 64–bit systems only
- Minimum of 3 GB of RAM
- One virtual CPU with 2GHz reserved
- A dedicated gigabit virtual switch
- 5 GB to 2 TB of disk space per virtual disk, up to 10 TB total per virtual storage appliance
- VMware Player, Workstation, or Server
- IP address, subnet mask, and gateway for the virtual machine

Planning the demo installation

Before you install the VSA, plan the virtual network configuration. Then, when you install the CMC, plan and configure the hardware features before configuring the virtual storage system for data storage.

- Virtual appliance directories, host names and IP addresses. Create a directory for each virtual machine on the hard drive you will use as the storage system.
- Network configuration. Plan the subnet and IP address for the virtual machines as well as for the VIPs required for storage clusters.
- Storage configuration. Install the CMC on a Linux or Microsoft Windows OS. Then use the CMC to find storage systems, create storage, and connect to application servers.

Installing the VSA

When you start the VSA for the first time with a VMware console, you will:

- Unzip to the prepared directory and start the virtual machine.
- Direct the Ethernet port to NAT (default), Host-only, or bridged.
- Set the IP address and host name of the VSA.

You only need to configure each virtual machine once.

1. Copy or download the VSA .zip file.
2. Copy or unzip the VSA files to the virtual machine directory.

    Copy the files to multiple directories for multiple VSAs.

Configuring the VSA with VMware Player, VMware Server, or VMware Workstation

1. Open the VMware console.
2. Click **File→Open** to open the `VSA.vmx` file.
3. Navigate to the location of the unzipped VSA files.
4. Select the `VSA.vmx` file and click **Open**.
5. Edit the VSA settings as required by the VMware console you are using. Select the appropriate network mode:

    - Bridged

    - NAT

    - Host-only

    NOTE: All VSAs on the same platform should use the same networking mode. When running multiple VSAs on a single host, use NAT or Host-only networking mode, and use DHCP to assign IP addresses to the VSAs.

6. Power on the VSA.
7. Use the Configuration Interface to set the IP address and host name as described in "Powering on the VSA for vSphere and setting IP address and hostname" (page 9).

7 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

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

http://www.hp.com/go/e-updates

After registering, you will receive e-mail notification of product enhancements, new driver versions, firmware updates, and other product resources.

Rack stability

Rack stability protects personnel and equipment.

⚠ **WARNING!** To reduce the risk of personal injury or damage to equipment:

- Extend leveling jacks to the floor.
- Ensure that the full weight of the rack rests on the leveling jacks.
- Install stabilizing feet on the rack.
- In multiple-rack installations, fasten racks together securely.
- Extend only one rack component at a time. Racks can become unstable if more than one component is extended.

Customer self repair

HP customer self repair (CSR) programs allow you to repair your HP product. If a CSR part needs replacing, HP ships the part directly to you so that you can install it at your convenience. Some parts do not qualify for CSR. Your HP-authorized service provider will determine whether a repair can be accomplished by CSR.

For more information about CSR, contact your local service provider, or see the CSR website:

http://www.hp.com/go/selfrepair

HP Insight Remote Support Software

HP strongly recommends that you install HP Insight Remote Support software to complete the installation or upgrade of your product and to enable enhanced delivery of your HP Warranty, HP Care Pack Service or HP contractual support agreement. HP Insight Remote Support supplements your monitoring, 24x7 to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will

initiate a fast and accurate resolution, based on your product's service level. Notifications may be sent to your authorized HP Channel Partner for on-site service, if configured and available in your country. The software is available in two variants:

- HP Insight Remote Support Standard: This software supports server and storage devices and is optimized for environments with 1-50 servers. Ideal for customers who can benefit from proactive notification, but do not need proactive service delivery and integration with a management platform.

- HP Insight Remote Support Advanced: This software provides comprehensive remote monitoring and proactive service support for nearly all HP servers, storage, network, and SAN environments, plus selected non-HP servers that have a support obligation with HP. It is integrated with HP Systems Insight Manager. A dedicated server is recommended to host both HP Systems Insight Manager and HP Insight Remote Support Advanced.

Details for both versions are available at: http://www.hp.com/go/insightremotesupport

To download the software, go to Software Depot:

http://www.software.hp.com.

Select **Insight Remote Support** from the menu on the right.

Related information

You can find related documents on the product manuals page
http://www.hp.com/support/StoreVirtualManuals

HP websites

For additional information, see the following HP websites:

- http://www.hp.com
- http://www.hp.com/go/storage
- http://www.hp.com/service_locator
- http://www.hp.com/go/StoreVirtualDownloads
- http://www.hp.com/storage/whitepapers

8 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.

Free Manuals Download Website

http://myh66.com

http://usermanuals.us

http://www.somanuals.com

http://www.4manuals.cc

http://www.manual-lib.com

http://www.404manual.com

http://www.luxmanual.com

http://aubethermostatmanual.com

Golf course search by state

http://golfingnear.com

Email search by domain

http://emailbydomain.com

Auto manuals search

http://auto.somanuals.com

TV manuals search

http://tv.somanuals.com