

# Veritas Storage Foundation™ Manager Getting Started Guide

for Storage Foundation—AIX, HP-UX,  
Linux, Solaris, Windows

2.0



# Storage Foundation Manager Getting Started Guide

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For information about Symantec's Maintenance Programs, you can visit our Web site at the following URL:

[www.symantec.com/techsupp/](http://www.symantec.com/techsupp/)

## Contacting Technical Support

Customers with a current maintenance agreement may access Technical Support information at the following URL:

[www.symantec.com/techsupp/](http://www.symantec.com/techsupp/)

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When you contact Technical Support, please have the following information available:

- Product release level
- Hardware information
- Available memory, disk space, and NIC information
- Operating system

- Version and patch level
- Network topology
- Router, gateway, and IP address information
- Problem description:
  - Error messages and log files
  - Troubleshooting that was performed before contacting Symantec
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## Licensing and registration

If your Symantec product requires registration or a license key, access our technical support Web page at the following URL:

[www.symantec.com/techsupp/](http://www.symantec.com/techsupp/)

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## Maintenance agreement resources

If you want to contact Symantec regarding an existing maintenance agreement, please contact the maintenance agreement administration team for your region as follows:

Asia-Pacific and Japan [customercare\\_apac@symantec.com](mailto:customercare_apac@symantec.com)

Europe, Middle-East, and Africa [semea@symantec.com](mailto:semea@symantec.com)

North America and Latin America [supportolutions@symantec.com](mailto:supportsolutions@symantec.com)

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Select your country or language from the site index.

# Getting started with SF Manager

This document includes the following topics:

- [About SF Manager](#)
- [Planning tips for SF Manager installation, configuration, and deployment](#)
- [SF Manager operating system platforms](#)
- [SF Manager Console Web browser support](#)
- [SF Manager installation overview](#)
- [Storage Foundation Manager on the Web](#)
- [Getting help](#)
- [Using the product documentation](#)
- [Commenting on product documentation](#)

## About SF Manager

Storage Foundation Manager by Symantec (SF Manager) gives you a single, centralized management console for the Veritas Storage Foundation (SF) products. You can use it to monitor, visualize, and manage storage resources and generate reports about them. SF Manager lets you to centrally manage diverse datacenter environments.

## Increasing efficiency and productivity through storage virtualization

The Veritas Storage Foundation products add value to your enterprise by providing storage virtualization—the process of taking multiple physical storage devices and combining them into logical (virtual) storage devices that are allocated to applications and users at will.

Storage virtualization provides a layer of abstraction between applications and the storage they use. This virtualization makes it possible for physical storage in one or more arrays to appear to the application as if it were a single file system on a host. This kind of virtual representation, known as a data container, can take several forms; disk groups and volumes are two of the most common forms.

With storage virtualization you manage data containers rather than individual blocks of storage. This enables you to enjoy the benefits of enterprise-wide server and storage administration.

Storage virtualization affords the following additional benefits:

- **Reduced costs:** applications have flexibility in terms of the storage they can use. While you store mission-critical data on your best and most reliable (and most expensive) storage arrays, you can store other data that is used by the same applications on less expensive media.
- **Better alignment with business needs:** storage tiering (or quality of storage service, QoS) makes it possible for you to provision and use the least expensive storage tier that meets application requirements.
- **Reduced risk:** you realize better availability and reliability by isolating applications from storage technology decisions.

## Veritas Storage Foundation: a complete solution for online storage management

The Veritas Storage Foundation products combine the industry-leading Veritas Volume Manager, Veritas File System, and other licensed products to provide a complete solution for online storage management. The products include utilities for discovering storage resources throughout the enterprise and for monitoring and managing those resources.

With Veritas Storage Foundation products, you can:

- Group physical disks into logical volumes to improve disk utilization and eliminate storage-related downtime
- Move data between different operating systems and storage arrays
- Balance I/O across multiple paths to improve performance
- Replicate data to remote sites for higher availability

- Move unimportant or outdated files to less expensive storage without changing the way users or applications access the files

## SF Manager: tying it all together

SF Manager ties together the various features in the Storage Foundation products in a centralized, standardized way, so your data center can run more efficiently.

Not only can the SF Manager operator visualize an individual host and the storage behind it; he or she can also see all instances of Storage Foundation that are running in the data center, across multiple operating system platforms. In this way the operator can understand and manage everything that is happening throughout the entire data center.

See [“Centralized management and monitoring”](#) on page 9.

### Centralized management and monitoring

In many data centers, the effective management of storage requires a number of different people performing different operations in different locations. For example, a host administrator is tasked with ensuring the efficient use of volumes and file systems, while a storage administrator monitors and provisions the corresponding array storage. An application administrator oversees the applications and databases that consume the storage.

With SF Manager, all these tasks can be performed at a central point: the SF Manager Console. Using the Console, one administrator can easily gather information, monitor and allocate resources, and perform operations on hosts, databases, applications, and storage resources throughout the data center. Thus the disparate roles and tasks of host administrator, storage administrator, and application administrator converge in the SF Manager Console.

The central administrator can also generate status and inventory reports and distribute the reports to others who need the information.

This centralized operation and reporting is platform-agnostic and vendor-agnostic. Information can be collected, and operations performed, across a variety of operating systems and on storage arrays from multiple hardware vendors.

The SF Manager Console, running as a thin client, is accessed through an ordinary Web browser. The Console also provides an entry point to the individual Storage Foundation products and the many storage features they provide.

### Discovery, monitoring, and management

SF Manager includes discovery and administration of Storage Foundation hosts.

System administrators can monitor resources of managed hosts in SF Manager, select one, and actively manage its attributes in an associated Storage Foundation product—seamlessly within the same browser window. For example, system administrators would want to recover faulted disks that are listed in SF Manager. Administrators can select the faulted disk in SF Manager, click an Administer link that drills into that disk's details, manage the recovery of that disk in Veritas Volume Manager, and exit back to SF Manager.

## Planning tips for SF Manager installation, configuration, and deployment

When planning your SF Manager installation, you must consider several factors. You must decide where to install the software for Management Server and for the managed hosts. You must set up authentication to ensure security and control access among the hosts in the data center. You must also ensure that resources are properly configured for discovery and management.

Review a complete set of planning considerations.

See the *Veritas Storage Foundation Manager Installation Guide*.

## SF Manager operating system platforms

You can install the product's Management Server on the following operating systems:

- Red Hat Linux
- Suse
- Solaris

The product's managed host code runs on the following operating systems:

- AIX
- HP-UX
- Red Hat Linux
- SUSE Linux
- Solaris
- Windows

Before you install SF Manager, learn more about the versions of these operating systems that the product supports.

See the *Veritas Storage Foundation Manager Release Notes*.

## SF Manager Console Web browser support

You can access the SF Manager Console using the following Web browsers:

- Mozilla Firefox 2.0 or later
- Microsoft Internet Explorer 6.0 or later

Review the specific browser versions that are supported and additional requirements.

See the *Veritas Storage Foundation Manager Release Notes*.

## SF Manager installation overview

The topics in this section describe how to prepare for and carry out your first installation of SF Manager.

See the *Veritas Storage Foundation Manager Installation Guide* for further details about the installation process.

## Choosing SF Manager installation options

You have several options for deploying SF Manager.

If you choose to implement centralized management, then a typical full installation consists of a single Management Server, multiple managed hosts, and any number of Web consoles. We recommend this form of management because of the advantages you gain from being able to perform management operations on multiple hosts across the data center.

If you choose to implement traditional, single-host management, then you need to install the Java-based Veritas Enterprise Administrator (Enterprise Administrator). You can manage both SF 5.0 or 4.x hosts with the Java-based Enterprise Administrator console.

The following are typical deployment scenarios:

- Centralized management of both SF 5.0 and 4.x hosts
- Centralized management of SF 5.0 hosts only
- Single-host (standalone) management of both SF 5.0 and 4.x hosts (Java-based Console only)
- Single-host (standalone) management of SF 5.0 hosts only (Java-based Console only)

Review information about each deployment option.

See the *Veritas Storage Foundation Manager Installation Guide*.

## Downloading Storage Foundation Manager packages

SF Manager is a free license add-on to Veritas Storage Foundation. You can download SF Manager packages from the following URL:

<http://www.symantec.com/sfm>

## Connecting to SF Manager

You can use any supported Web browser to connect to SF Manager.

### To connect to SF Manager

- 1 On a client system that has a network connection to the host, open a Web browser.

Your browser must be configured to accept cookies. If you are using pop-up blockers, either disable them or configure them to accept pop-ups from the host.

- 2 In the browser's address field, type the following URL and press Enter:

`https://hostname:14161/sfm`

where *hostname* is the host name, fully-qualified host name, or IP address of the Management Server.

Example: `https://myhost.example.com:14161/sfm`

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**Note:** For Internet Explorer 7.0 on Windows Server 2008, or Firefox 3.0, if the Web page does not get displayed, you have to set up the browser. See [“Setting up Internet Explorer 7.0 and Firefox 3.0 for SF Manager”](#) on page 13.

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- 3 In the **username** and **password** fields, type credentials for a valid operating system network domain account.

The Authentication Service automatically recognizes users in the domain—for example, unixpwd or NT—on which the Authentication Broker host is a member.

- 4 Click **Login**.

The Console appears.

## Setting up Internet Explorer 7.0 and Firefox 3.0 for SF Manager

If you use Internet Explorer 7.0 on Windows Server 2008, or Firefox 3.0, the web pages for configuring and launching SF Manager are not displayed. You need to set up the browser to display the web pages. For Internet Explorer 7.0 on Windows Server 2008, if the Web pages are not displayed, add each Web site to the **Trusted Sites** list. On Firefox 3.0, if a security exception is displayed, add the exception to the browser to override how Firefox identifies the sites.

### To set up Internet Explorer 7.0 on Windows Server 2008 for SF Manager

- 1 In Internet Explorer, select **Tools > Internet Options**.
- 2 Select the **Security** tab.
- 3 Click Sites to add the following Web sites:
  - **https://hostname:5634/**—URL to configure SF Manager
  - **https://hostname:14161/sfm**—URL to launch SF Managerwhere, *hostname* is the name of the Management Server host.

The Web pages are now displayed.

### To set up Firefox 3 for SF Manager

- 1 On the security exception page that is displayed when you attempt to open an SF Manager Web page, click the **Or you can add an exception** link.
- 2 Click **Add Exception**.
- 3 In the Add Security Exception dialog, verify that the location is one of the following:
  - **https://hostname:5634/**—URL to configure SF Manager
  - **https://hostname:14161/sfm**—URL to launch SF Managerwhere, *hostname* is the name of the Management Server host.
- 4 Click **Get Certificate**.
- 5 Select the **Permanently store this exception** check box.
- 6 Click **Confirm Security Exception**.

The Web page is now displayed.

## Storage Foundation Manager on the Web

For comprehensive, up-to-date information about SF Manager, visit the Symantec Web site:

[www.symantec.com/sfm](http://www.symantec.com/sfm)

## Getting help

If an issue arises while you use the products, refer to the product documentation and online help. If necessary, report it to Symantec.

For technical assistance, visit

[www.symantec.com/enterprise/support/index.jsp](http://www.symantec.com/enterprise/support/index.jsp)

This site provides access to resources such as TechNotes, product alerts, software downloads, hardware and software compatibility lists, and the customer email notification service. Use the Knowledge Base Search feature to access additional product information, including current and past releases of product documentation.

## Using the product documentation

The following guides provide information about Storage Foundation Manager:

- *Veritas Storage Foundation Manager Administrator's Guide*
- *Veritas Storage Foundation Manager Getting Started Guide*
- *Veritas Storage Foundation Manager Installation Guide*

For complete host operating system and system resource specifications, as well as any known limitations or issues in this release, see the *Veritas Storage Foundation Manager Release Notes*.

## Commenting on product documentation

Submit comments about the product documentation to the following email address:

[storage\\_management\\_docs@symantec.com](mailto:storage_management_docs@symantec.com)

Please include the following information with your documentation comments:

- The title and product version of the guide you are commenting on
- The topic (if relevant) you are commenting on
- Your comment
- Your name

# Glossary

<b>Action Agent</b>	A component, residing on the Management Server, that provides end users with the ability to create rules triggered by alerts from the Veritas Provider Access Layer (VxPAL). These rules, or policies, associate certain sets of conditions with storage resources and define actions to be taken when these conditions are detected. The Action Agent is seamlessly integrated with the SF Manager so that users of the Console can monitor, define, and modify policies. Also Rule Manager.
<b>Active/active configuration</b>	A failover configuration where each system runs a service group. If either system fails, the other one takes over and runs both service groups. Also symmetric configuration.
<b>Active/passive configuration</b>	A failover configuration consisting of one service group on a primary system, and one dedicated backup system. Also asymmetric configuration.
<b>addressable storage</b>	Configured storage that has been apportioned into addressable units (LUNs) and is ready to be allocated to hosts. This storage is typically part of RAID groups.
<b>addressable unit</b>	Any storage resource in the network that is ready to be allocated for use by hosts and applications. Also AddrUnit or AU.  See also LUN
<b>agent</b>	A process running on a managed host that collects status information from network resources, such as hardware and virtual storage, and relays that information to the Management Server.  See also explorer  In VCS, a process that starts, stops, and monitors all configured resources of a type, and reports their status to VCS.
<b>Agent</b>	See managed host
<b>Alarm Service</b>	A component (Windows service/UNIX daemon), residing on the Management Server, that retrieves and correlates SNMP and other data and sends alerts to the Action Agent for further processing using defined policies. The Alarm Service has a command-line interface— <code>vxascmd</code> —with which you can connect to the Alarm Service to obtain server and object information and perform various Alarm Service commands and queries.
<b>alert</b>	One of several types of configurable notifications produced when an Action Agent alarm is triggered. An alert is dynamic, resetting itself automatically when a condition monitored by a policy returns to its specified CLEAR state.

<b>Alert Manager</b>	See Action Agent
<b>allocated storage</b>	<p>The total amount of addressable storage in LUNs that is designated for use by specific hosts. A LUN is considered allocated when a host operating system has written a device handle for the LUN (in other words, claimed the LUN) or when the array has masked the LUN to a specific target.</p> <p>Contrast with unallocated storage</p>
<b>application</b>	A program or group of programs designed to perform a specific task. Oracle Database and Symantec NetBackup are examples of applications.
<b>big-endian</b>	<p>A technique for multibyte data storage in which the most significant value in each sequence is stored at the lowest (that is, first) storage address.</p> <p>Contrast with little-endian</p>
<b>bridge</b>	<p>A device that connects and passes packets between two segments of a storage network that use the same communications protocol.</p> <p>See also router</p>
<b>capacity</b>	The amount of storage an object can allocate or use.
<b>centralized mode</b>	The condition in which a constituent product or plug-in product [point product] is running on the Management Server, in conjunction with other constituent products. This is the opposite of the situation in which the product runs by itself.
<b>claimed storage</b>	<p>Storage for which at least one host's operating system has created a device handle.</p> <p>Contrast with unclaimed storage</p>
<b>cluster</b>	A set of hosts (each termed a node) that share a set of disks and are connected by a set of redundant heartbeat networks. A cluster can have from one to 32 member systems, or nodes. Also VCS cluster.
<b>cluster communication</b>	Communication between clusters using either of the two core communication protocols defined by Symantec Cluster Server: GAB and LLT. The communication takes place by means of heartbeat signals sent between systems or fast kernel-to-kernel broadcasts.
<b>collector</b>	A measurement representing a specific state or numerical value for objects in the storage network. The Alarm Service uses collectors to monitor and correlate status and performance information, using several different processes. The Alert Manager uses information gathered by collectors to trigger actions such as SMTP mail, Console alerts, commands, and logging.
<b>CommandCentral Storage</b>	A product offering designed to maximize the return on an enterprise's storage technology investment by providing tools with which a storage administrator can make the storage network or SAN operate as effectively as possible.

<b>configured storage</b>	<p>Physical storage that has been formatted and is ready to be apportioned into RAID groups.</p> <p>Contrast with unconfigured storage</p>
<b>connectivity plan</b>	<p>A customizable report with which an operator can see the dependencies between the logical storage resources provided by Veritas Volume Manager and the underlying physical storage, and verify the connections to that storage as visible from various hosts on the network.</p>
<b>deport</b>	<p>To disable all local access to a VxVM-managed disk group or volume, usually in preparation for moving it.</p> <p>Contrast with import</p>
<b>device</b>	<p>A collective term for disks, tapes, disk arrays, tape arrays, and any other objects that store data. Also storage device.</p>
<b>device handle</b>	<p>The name the operating system uses to identify a storage resource (known as an addressable unit or LUN), and the correct means (driver, system call) to access it. Also OS handle.</p>
<b>disaster recovery</b>	<p>The use of a secondary location to recover applications and data after a site failure. Disaster recovery requires heartbeating and replication.</p>
<b>discovery</b>	<p>The process of finding objects on the storage network and adding information about them to a database.</p> <p>See also explorer</p>
<b>disk group</b>	<p>A collection of disks that share a common configuration. A disk group configuration is a set of records containing detailed information on existing Veritas Volume Manager objects (such as disk and volume attributes) and their relationships. Each disk group has an administrator-assigned name and an internally defined unique ID. The root disk group (rootdg) is a special private disk group that always exists.</p>
<b>Domain Controller</b>	<p>A server component that provides an infrastructure and communications layer for object and cache management for many Symantec storage management products. In SF Manager the Domain Controller is installed on the Management Server. Also <code>vxsvc</code>.</p> <p>Contrast with Local Controller</p>
<b>Dynamic Multipathing (DMP)</b>	<p>A feature of Veritas Volume Manager designed to provide greater reliability and performance by using path failover and load balancing for multiported disk arrays connected to host systems through multiple paths. DMP detects the various paths to a disk using a mechanism that is specific to each supported array type. DMP can also differentiate between different enclosures of a supported array type that are connected to the same host system.</p>

<b>Dynamic Storage Tiering (DST)</b>	<p>A feature with which administrators of multi-volume VxFS file systems can manage the placement of files on individual volumes in a volume set by defining placement policies that control both initial file location and the circumstances under which existing files are relocated. These placement policies cause the files to which they apply to be created and extended on specific subsets of a file system's volume set, known as placement classes. The files are relocated to volumes in other placement classes when they meet specified naming, timing, access rate, and storage capacity-related conditions.</p> <p>See also Veritas File System (VxFS)</p>
<b>event</b>	<p>A notification that indicates when an action, such as an alert or a change in state, has occurred for one or more objects on the storage network.</p>
<b>explorer</b>	<p>A software tool that uses a unique methodology to discover information about a particular kind of resource on the storage network. In an SF Manager configuration, explorers running on both the Management Server and the managed host locate resources and discover information about them.</p> <p>See also discovery</p>
<b>extent</b>	<p>A continuous space on a disk or storage volume that is occupied by or reserved for a particular data set, data space, or file.</p>
<b>fabric</b>	<p>A group of SAN objects connected by a Fibre Channel (FC) switch. A fabric contains at least one FC switch and may also contain zones.</p>
<b>failover</b>	<p>A backup operation that automatically switches to a standby database, server, or network if the primary system fails or is temporarily shut down for servicing.</p>
<b>Fibre Channel</b>	<p>A collective name for the fibre optic technology that is commonly used to set up a storage area network (SAN) or virtual fabric (VSAN). A set of standards capable of transferring data between ports and through network devices at higher speeds and over significantly greater distances than SCSI technology, Fibre Channel supports point-to-point, loop, and fabric topologies.</p>
<b>file change log (FCL)</b>	<p>In Veritas File System, a repository to track changes made to files in a file system. It can also contain information about file accesses (such as opens, reads, and writes) and I/O activity. FCL data is used in file placement policies to evaluate a file's activity level (access history and I/O temperature).</p>
<b>file system</b>	<p>A means of organizing the addressable storage of one or more physical or virtual disks to give users and applications a convenient way of organizing files. File systems appear to users and applications as directories arranged in a hierarchy.</p>
<b>firmware</b>	<p>A set of software instructions set permanently in a device's memory.</p>
<b>GBIC</b>	<p>Gigabit interface converter. A widely used transceiver module for Fibre Channel. A GBIC is modular and hot-swappable and can be either copper or optical.</p>

<b>generic group</b>	<p>A class or collection of switches, hosts, and storage devices. Groups are useful for a number of different purposes such as meeting certain availability and redundancy requirements, or for administrative or tracking purposes.</p> <p>See also group</p>
<b>Global Service Group</b>	<p>A VCS service group that spans across two or more clusters. The ClusterList attribute for this group contains the list of clusters over which the group spans.</p>
<b>group</b>	<p>A class or collection of network objects. Groups are useful for a number of different purposes such as meeting certain availability and redundancy requirements, or for administrative or tracking purposes. The SF Manager supports two different types of groups: custom groups (user-defined collections of objects) and application groups (collections of objects determined by their common dependency on a specific application).</p>
<b>Group Atomic Broadcast (GAB)</b>	<p>A communication mechanism of the VCS engine that manages cluster membership, monitors heartbeat communication, and distributes information throughout the cluster.</p>
<b>HBA</b>	<p>Host bus adapter. An interface between a server or workstation bus and a Fibre Channel network.</p>
<b>heartbeat</b>	<p>A signal sent at regular intervals to indicate that a host and its connections are operating normally.</p>
<b>High Availability (HA)</b>	<p>The concept of configuring the SF Manager to be highly available against system failure on a clustered network using Symantec Cluster Server (VCS).</p>
<b>hub</b>	<p>A common connection point for devices in the storage network. The hub may be unmanaged, IP-managed, or FC-managed. An unmanaged hub is passive in the sense that it serves simply as a conduit for data, moving the data from one storage resource to another. IP-managed and FC-managed hubs are intelligent, containing features an administrator can use to monitor the traffic passing through the hub and configure each port in the hub.</p>
<b>import</b>	<p>To re-enable local access to a VxVM-managed disk group or volume, usually after it has been moved.</p> <p>Contrast with deport</p>
<b>in-band</b>	<p>A type of Fibre Channel management protocol. The most prevalent in-band protocol over Fibre Channel is SCSI Enclosure Services (SES).</p> <p>Contrast with out-of-band</p>
<b>intent</b>	<p>A conceptualization of the purpose of a disk or a volume. Connectivity reports in the SF Manager Console display data on intent satisfaction: a measure of how closely the storage device's actual usage aligns with its intended purpose.</p>

<b>IP address</b>	<p>An identifier for a computer or other device on a TCP/IP network, written as four eight-bit numbers separated by periods. Messages and other data are routed on the network according to their destination IP addresses.</p> <p>See also virtual IP address</p>
<b>jeopardy</b>	<p>The state in which a node is missing one of the two required heartbeat connections. When a node is running with one heartbeat only (in jeopardy), VCS does not restart the applications on a new node. This action of disabling failover is a safety mechanism that prevents data corruption.</p>
<b>legacy managed host</b>	<p>A Storage Foundation version 4.x host that contains a Veritas Provider Access Layer (VxPAL) agent enabling it to be centrally managed by Storage Foundation Manager.</p>
<b>little-endian</b>	<p>A technique for multibyte data storage in which the most significant value in each sequence is stored at the highest (that is, last) storage address. Contrast with big-endian</p>
<b>Local Controller</b>	<p>A server component that provides object and cache management for many Symantec storage management products. In SF Manager the Local Controller can be installed on a Management Server or on a standalone host, where it also functions as a daemon for the Veritas Enterprise Administrator (Enterprise Administrator) Java console to connect to and manage the host. Also <code>vxsvc</code>.</p> <p>Contrast with Domain Controller</p>
<b>logical volume</b>	<p>A simple volume that resides on an extended partition on a basic disk and is limited to the space within the extended partitions. A logical volume can be formatted and assigned a drive letter, and it can be subdivided into logical drives.</p> <p>See also LUN</p>
<b>LUN</b>	<p>Acronym for "logical unit number." A unique and discrete addressable unit or logical volume that may reside inside one or more simple or array storage devices. LUNs are exposed to the outside world through an addressing scheme presented to the host as SCSI LUN numbers. Each LUN has a unique device handle and represents a logical volume.</p>
<b>LUN binding</b>	<p>The creation of access paths between an addressable unit (AddrUnit) within a disk array and a port on the array. AddrUnits are storage volumes built out of the physical disks within the array. Array ports are connected to the SAN fabric and function as SCSI targets behind which the AddrUnits bound to those ports are visible.</p>
<b>LUN masking</b>	<p>The practice of enabling access to a particular addressable unit (AddrUnit) for a host on the storage network. This is done by creating an access control list associated with the LUN (the access path) between that AddrUnit and an array</p>

	<p>port to which it is bound. The access control list for a LUN contains the World Wide Name of each HBA port that is allowed to access that LUN within the array.</p>
<b>managed host</b>	<p>A component that assists the Management Server in discovering all of the resources in the storage network. The managed host is connected to the Management Server and consists of several agents that are also used by the Management Server.</p> <p>See also agent</p>
<b>SF Manager Console</b>	<p>See Storage Foundation Management Console</p>
<b>management explorer (MGEX)</b>	<p>An explorer that uses the Fibre Channel Common Transport (CT) protocol to discover switches in-band over Fibre Channel, obtain switch characteristics, and explore port connectivity.</p>
<b>Management Server</b>	<p>The central component in a Storage Foundation Manager installation. It receives network data from one or more managed hosts and serves as a focal point for various network management operations.</p>
<b>mirroring</b>	<p>A form of storage redundancy in which two or more identical copies of data are maintained on separate volumes. (Each duplicate copy is known as a mirror.) Also RAID Level 1.</p>
<b>multipathing</b>	<p>Multiple physical access paths to a disk connected to a host system. Any software residing on the host (for example, the DMP driver) that hides multiple physical access paths from the user is said to provide multipathing functionality.</p> <p>See also Dynamic Multipathing (DMP)</p>
<b>network partition</b>	<p>The condition that exists after all network connections between any two groups of systems fail simultaneously. When this happens, systems on both sides of the partition can restart applications from the other side resulting in duplicate services, or split-brain. A split brain occurs when two independent systems configured in a cluster assume they have exclusive access to a given resource (usually a file system or volume). The most serious problem caused by a network partition is that it affects the data on shared disks.</p> <p>See jeopardy</p> <p>See seeding</p>
<b>node</b>	<p>An object in a network. In Symantec Cluster Server, node refers specifically to one of any number of hosts in a cluster.</p> <p>See also object</p>
<b>object</b>	<p>A single, unique addressable entity on a storage network. It is possible for objects to be present within objects. For example, while a tape array is an object, each individual tape drive within the array is also an object. A host is an object, and</p>

the HBA inside the host is also an object. Each object has one or more attributes and can be a member of one or more zones.

**object dependency group**

A class or collection of storage objects associated with applications, such as volumes and file systems. Groups are useful for a number of different purposes such as meeting certain availability and redundancy requirements, or for administrative or tracking purposes.

See also [group](#)

**Object Reference or OID (Object ID)**

A key which uniquely identifies an object in the discovery data store. OIDs are represented in XML files as hexadecimal strings with a maximum length of 128 characters.

**out-of-band**

A type of communication protocol other than the Fibre Channel management protocol, such as SNMP or a vendor-specific proprietary protocol.

Contrast with [in-band](#)

**path**

The route through which a host accesses data on a storage medium such as a disk in an array. The path consists of an HBA (host bus adapter) on the host, a SCSI or Fibre Channel connector, and a controller on the disk or disk array.

**physical fabric**

The physical components of a fabric, including all switches and all other SAN objects. You can configure one or more virtual fabrics—each one isolated from the others—based on the hardware components in the physical fabric.

**plex**

In storage media managed by Veritas Volume Manager (VxVM), a collection of one or more subdisks located on one or more physical disks.

See also [subdisk volume](#)

**policy**

A set of rules, or configuration settings, that are applied across a number of objects in the storage network. You establish policies to help you monitor and manage the network. Each policy associates certain sets of conditions with storage resources and defines actions to be taken when these conditions are detected.

**port**

A connection through which a device is attached to an I/O bus or to the storage network, or the representation of this physical connection to the link hardware.

**provisioning**

The set of activities by which a user allocates storage to hosts and applications, for example creating LUNs in an array, setting up zoning between a host and an array, and giving the server access to the storage.

**RAID**

Redundant Array of Independent Disks. A set of techniques for managing multiple disks for cost, data availability, and performance.

See also [mirroringstriping](#)

**replication**

The synchronization of data between systems where shared storage is not feasible. The systems that are copied may be in local backup clusters or remote failover

sites. The major advantage of replication, when compared to traditional backup methods, is that current data is continuously available.

<b>resource</b>	Any of the individual components that work together to provide services on a network. A resource may be a physical component such as a storage array or a switch, a software component such as Oracle8i or a Web server, or a configuration component such as an IP address or mounted file system.
<b>resource type</b>	A way of classifying resources in a cluster. Each resource is identified by its name and its resource type. Symantec Cluster Server includes a set of predefined resource types for storage, networking, and application services.
<b>router</b>	A device that connects two segments of a storage network and determines the optimal path along which traffic should be forwarded. Also gateway.  See also bridge
<b>Rule Manager</b>	See Action Agent
<b>SAN</b>	Acronym for "storage area network." A network linking servers or workstations to devices, typically over Fibre Channel, a versatile, high-speed transport. The storage area network (SAN) model places storage on its own dedicated network, removing data storage from both the server-to-disk SCSI bus and the main user network. The SAN includes one or more hosts that provide a point of interface with LAN users, as well as (in the case of large SANs) one or more fabric switches and SAN hubs to accommodate a large number of storage devices.
<b>SCSI</b>	Small Computer Systems Interface. A hardware interface that allows for the connection of multiple peripheral devices to a single expansion board that plugs into the computer. The interface is widely used to connect personal computers to peripheral devices such as disk and media drives.
<b>seeding</b>	A technique used to protect a cluster from a preexisting network partition. By default, when a system comes up, it is not seeded. Systems can be seeded automatically or manually. Only systems that have been seeded can run VCS. Systems are seeded automatically only when an unseeded system communicates with a seeded system or when all systems in the cluster are unseeded and able to communicate with each other.  See network partition
<b>service group</b>	A collection of resources working together to provide application services to clients. It typically includes multiple resources, hardware- and software-based, working together to provide a single service.
<b>service group dependency</b>	A mechanism by which two service groups can be linked by a dependency rule, similar to the way resources are linked.
<b>shared storage</b>	Storage devices that are connected to and used by two or more systems.

<b>slot</b>	An opening in a computer or other network device into which a printed circuit board can be inserted, adding capability to the device. Also expansion slot.
<b>SMTP</b>	Simple Mail Transfer Protocol, a commonly used protocol for sending email messages between servers.
<b>SnapMirror</b>	A method of mirroring volumes and qtrees on NetApp unified storage devices. With SnapMirror, a user can schedule or initiate data transfers, request information about transfers, update a mirror, and manage mirrors.  See mirroring
<b>snapshot</b>	A point-in-time image of a volume or file system that can be used as a backup.
<b>SNMP</b>	The Simple Network Management Protocol for Internet network management and communications used to promote interoperability. SNMP depends on cooperating systems that must adhere to a common framework and a common language or protocol.
<b>striping</b>	A layout technique that spreads data across several physical disks by mapping the data to successive media, known as stripes, in a cyclic pattern. Also RAID Level 0.
<b>subdisk</b>	In storage media managed by Veritas Volume Manager (VxVM), a set of contiguous disk blocks used for allocating disk space. A VxVM disk can be divided into one or more subdisks, each one representing a specific portion of the disk. Each portion is mapped to a specific region of a physical disk.  See also plex volume
<b>switch</b>	A network device to which nodes attach and which provides high-speed switching of node connections via link-level addressing.
<b>system</b>	The physical hardware on which data and applications reside, and the connections between them.
<b>tool</b>	A prepackaged workflow shipped with Storage Foundation Manager for performing tasks that otherwise would require multiple operations in multiple locations. Two examples of solutions are migrating disk groups from one host to another and storing, maintaining, and implementing storage tiers by creating and executing file placement policies.
<b>topology</b>	The physical or logical arrangement of resources on the storage network and the connections between them.
<b>UDID</b>	An alternative disk identifier used internally by some components in the Storage Foundation products, for example, Veritas Volume Manager (VxVM) command-line interfaces.  See also VDID

<b>unallocated storage</b>	<p>LUNs that have not yet been allocated. A LUN is considered allocated when a host operating system has written a device handle for the LUN (in other words, claimed the LUN) or when the array has masked the LUN to a specific target.</p> <p>Contrast with allocated storage</p>
<b>unclaimed storage</b>	<p>Storage that has been allocated to hosts whose operating systems have not yet written device handles. This is usually wasted storage.</p> <p>Contrast with claimed storage</p>
<b>unconfigured storage</b>	<p>Physical storage that has yet to be formatted.</p> <p>Contrast with configured storage</p>
<b>unused storage</b>	<p>Storage to which data has not been written.</p> <p>Contrast with used storage</p>
<b>used storage</b>	<p>The portion of storage allocated to a file system or database to which data has been written, expressed as a quantity (such as 10 GB).</p> <p>Contrast with unused storage</p>
<b>Cluster Server</b>	See Veritas Cluster Server (VCS)
<b>VCS</b>	See Veritas Cluster Server (VCS)
<b>VxVM</b>	See Veritas Volume Manager (VxVM)
<b>VDID</b>	A unique disk identifier. See also UDID
<b>VEA</b>	See Veritas Enterprise Administrator (VEA)
<b>Veritas Authentication Service (VAS)</b>	A component of the Veritas Security Services (VxSS) that is used by the Storage Foundation offerings to provide user authentication. VAS is a set of processes and runtime libraries that enables users to log on to multiple Symantec products with one logon.
<b>Veritas Cluster Server (VCS)</b>	An open systems clustering solution designed to eliminate planned and unplanned downtime, simplify server consolidation, and allow the effective management of a wide range of applications in multiplatform environments.
<b>Veritas Cluster Server cluster</b>	A cluster consisting of multiple systems connected in various combinations to shared storage devices. Veritas Cluster Server monitors and controls applications running in the cluster and can restart applications in response to a variety of hardware or software faults. A cluster is defined as all systems with the same cluster identification and connected via a set of redundant heartbeat networks. Clusters can have from one to 32 member systems, or nodes.
<b>Veritas Cluster Server service group</b>	A set of resources working together to provide application services to clients. For example, a Web application service group might consist of: disk groups on which the Web pages to be served are stored; a volume built in the disk group; a file

system using the volume; a database whose table spaces are files and whose rows contain page pointers; the network interface card or cards used to export the Web service; one or more IP addresses associated with the network card(s); the application program and associated code libraries. Veritas Cluster Server performs administrative operations on resources, including starting, stopping, restarting and monitoring at the service group level.

<b>Veritas Enterprise Administrator (VEA)</b>	A Java-based graphical user interface monitoring and managing legacy (Storage Foundation 4.x) hosts in a single-host (standalone) management environment. The Enterprise Administrator interface provides an alternative to the browser-based SF Manager Console.
<b>Veritas File System (VxFS)</b>	A component of the Veritas Storage Foundation product suite that provides high performance and online management capabilities to facilitate the creation and maintenance of file systems. A file system is a collection of directories organized into a structure that enables you to locate and store files.
<b>Veritas Storage Foundation Manager</b>	A single, centralized management application with which administrators and operators can monitor, visualize, and manage their Storage Foundation products and generate reports about storage resources.
<b>Veritas Volume Manager (VxVM)</b>	A Symantec product installed on storage clients that enables management of physical disks as logical devices. VxVM enhances data storage management by controlling space allocation, performance, data availability, device installation, and system monitoring of private and shared systems.
<b>Veritas Volume Replicator (VVR)</b>	A data replication tool designed to contribute to an effective disaster recovery plan. VVR is a feature of Veritas Volume Manager (VxVM).
<b>virtual IP address</b>	A unique IP address associated with a VCS cluster. This address can be used on any system in the cluster, along with other resources in the VCS cluster service group. A virtual IP address is different from a system's base IP address, which corresponds to the system's host name.  See also IP address
<b>virtualization</b>	Representing one or more objects, services, or functions as a single abstract entity so that they can be managed or acted on collectively. An example of virtualization is the creation of a virtual fabric from a switch and associated storage resources as a means of controlling access and increasing scalability in the storage network.
<b>volume</b>	In storage media managed by Veritas Volume Manager, a virtual disk made up of a portion or portions of one or more physical disks and representing an addressable range of disk blocks. A volume appears to applications, databases, and file systems like a physical disk device, but it does not have the physical limitations of a physical disk device. A volume consists of one or more plexes, each holding a copy of the selected data in the volume. Due to its virtual nature, a volume is not restricted to a particular disk or a specific area of a disk.

See also plex subdisk

**VVR**

See Veritas Volume Replicator (VVR)

**World Wide Name  
(WWN)**

A registered, 64-bit, unique identifier that is assigned to nodes and ports.

