

Veritas Storage Foundation™ by Symantec

Heterogeneous online storage management

Overview

Veritas Storage Foundation provides a complete solution for heterogeneous online storage management. Based on the industry-leading Veritas Volume Manager and Veritas File System, it provides a standard set of integrated tools to centrally manage explosive data growth, maximize storage hardware investments, provide data protection, and adapt to changing business requirements. Unlike point solutions, Storage Foundation enables IT organizations to manage their storage infrastructure with one tool. With advanced features such as centralized storage management, online configuration and administration, Dynamic Storage Tiering, Dynamic Multi-pathing, data migration, and local and remote replication, Storage Foundation enables organizations to reduce operational costs and capital expenditures across the data center.

Highlights

- **Increased storage utilization**—Maximize storage capacity across heterogeneous operating systems and storage hardware
- **I/O path availability and performance**—Efficiently spread I/O across multiple paths for maximum performance, path failure protection, and fast failover
- **Dynamic Storage Tiering**—Dynamically move files to different tiers of storage to rapidly respond to changing business needs
- **Centralized storage management**—Manage multiple hosts from a central interface to improve operational

efficiencies across a heterogeneous infrastructure

- **Seamless data migration**—Free data from technology changes with simple server migrations across different operating systems
- **Thin Provisioning**—Simplify the management and provisioning of storage, while increasing storage utilization, lowering costs and improving operational efficiencies
- **Local and remote data protection**—Protect data across any environment with point-in-time copies and data replication
- **Multi-vendor hardware infrastructure**—Reduce capital expenditures with broad support for heterogeneous operating systems and storage hardware

Increased storage utilization

Veritas Storage Foundation enables administrators to improve storage utilization and capacity management across heterogeneous operating systems and storage hardware. Storage volumes and file systems can be dynamically grown or capacity reclaimed, and storage can be dynamically provisioned to new applications without any modifications required by the end user. Storage Foundation automates daily and repetitive storage tasks and performs them online, including RAID reconfiguration, defragmentation, file system resizing, and volume resizing.

Storage Foundation enables storage virtualization

across a heterogeneous storage infrastructure whether there are multiple volumes within a single server or volumes that span and are visible to multiple servers. This improves storage utilization and sets the stage to seamlessly move data between different operating systems and storage arrays and spread I/O across multiple paths to improve performance.

I/O path availability and performance

With the Dynamic Multi-pathing (DMP) feature, storage I/O performance and availability are enhanced across heterogeneous server and storage infrastructures. DMP has intelligent algorithms to load-balance storage I/Os across multiple host bus adapters (HBAs) for faster throughput, and increases the application's availability by rerouting I/Os to an available data path in the event of a path failure. Additionally, multi-host DMP management for firmware upgrades and path management can be centrally managed with Storage Foundation Manager. The improved loadbalancing and management capabilities enhance an administrator's productivity and reduce application downtime.

Dynamic Storage Tiering

With the Dynamic Storage Tiering capabilities of Storage Foundation, unimportant or out-of-date files can be moved to less expensive storage devices without changing the way users or applications access those files. Policies can be created that will move files based on date created, last time accessed, owner, size, or name. These files will be dynamically moved without

having to take the application offline. Because the Veritas File System can span multiple volumes, application/database information can be dynamically migrated across multiple volumes/tiers of storage hardware without changing the way the application and database access the information (the file system remains unchanged). This move is completely transparent to the users and applications that own the files—they don't need to know the files have moved. As data is moved to different storage tiers (leveraging declining disk prices and new technologies—e.g., SATA), the policies are centrally managed and dynamic, and support a heterogeneous server and storage infrastructure that requires no application, database, or backup/recovery policy modifications.

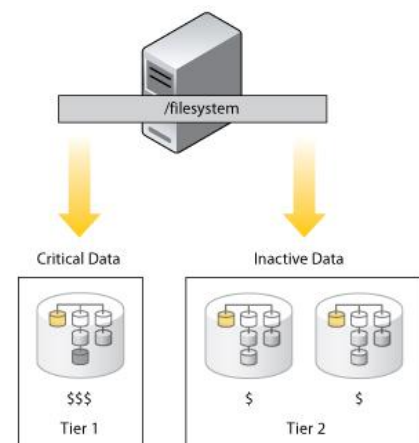


Figure 1. Move unimportant or out-of-date files to less expensive storage devices with Dynamic Storage Tiering.

Centralized storage management

With Storage Foundation Manager, organizations can choose industry leading functionality across server

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platforms and centrally manage their application, server, and storage environments. This leads to faster application deployment times, higher service levels, reduces the risk of human error, and provides comprehensive visibility throughout the environment.

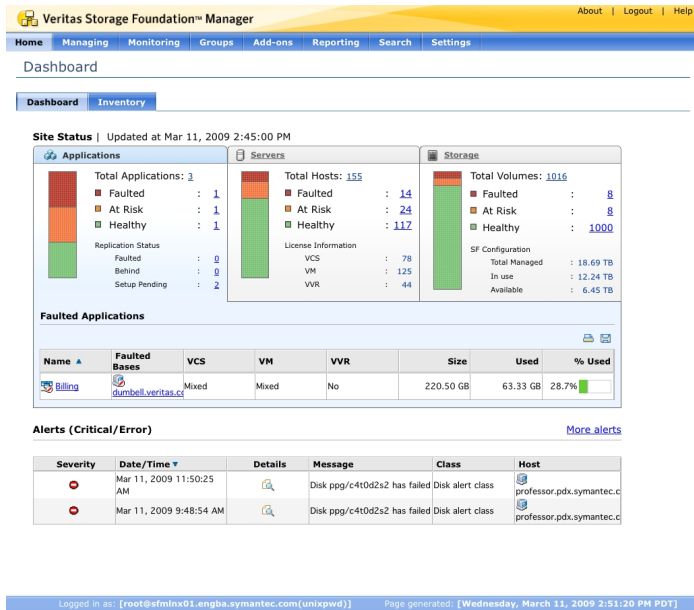


Figure 2. Veritas Storage Foundation Manager provides centralized application, server and storage management capabilities across a heterogeneous infrastructure.

Administrators can quickly and easily create new application, server, and storage environments to support a heterogeneous data center infrastructure. As applications are upgraded or migrated to new hardware, administrators can centrally manage host migrations, and do a pre-migration check to verify that the server and storage connections are correctly set up before the migration begins. Moreover, it enables simultaneous management of DMP on multiple hosts ensuring

applications aren't impacted during maintenance and reducing the chance of human error during migrations. Storage Foundation Manager enables administrators to identify and visualize potential problems with applications and storage resources by correlating health and status information across multiple applications, servers, storage, and replication resources. This increased visibility enables rapid problem resolution that typically spans multiple organizational structures.

Seamless data migration

In addition to providing the same storage management tool for all operating systems, Veritas Storage Foundation can actually make the same set of data accessible to all major operating systems. Administrators no longer need to use NFS or tape to move data between operating systems.

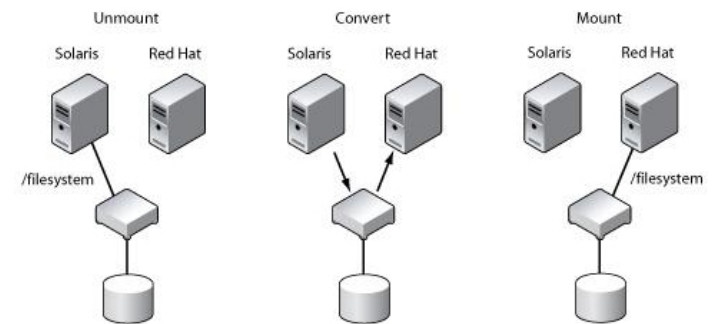


Figure 3. Deport data from one operating system and import it on another in minutes, without creating a copy of the data or moving the data using Portable Data Containers.

With the Portable Data Container feature of Veritas Storage Foundation, administrators can deport data from one operating system and import it on another in minutes, without ever creating a copy of the data or

moving the data. Storage Foundation quickly and automatically converts the data for the new platform whether it is a UNIX or Linux platform.

Thin Provisioning

Thin provisioning is a hardware feature that enables storage capacity to be over allocated to applications and physical capacity to be consumed only as applications write data. Veritas File System is the industry's only cross-platform file system that is thin-friendly, enabling administrators to optimize thin provisioned storage and maximize storage utilization. With Thin Provisioning capabilities of Veritas Storage Foundation, such as Thin Friendliness, SmartMove™ and the Thin Reclamation API, organizations can get thin and stay thin across all operating systems - Unix, Linux and Windows and any storage array.

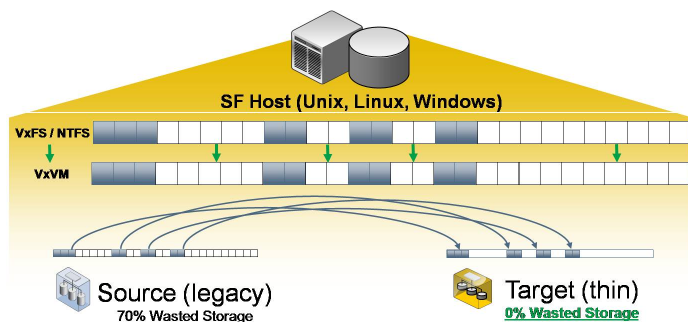


Figure 4. With SmartMove™, mirroring is enhanced with the host file system knowledge. Tight integration makes the volume manager aware of the free blocks that don't need to be copied; only the useful data is copied.

SmartMove™ provides the capability to perform efficient host-based data migration for Unix, Linux, and Windows platforms across heterogeneous storage arrays. It also enables the migration from thick (traditional) storage to

thin storage and the automatic reclamation of unused space, while keeping applications online.

To stay thin over time, Veritas Storage Foundation offers the Thin Reclamation API. The Thin Reclamation API enables automated, granular, online reclamation of allocated but unused thin storage. Veritas Storage Foundation uniquely leverages the server knowledge of actual storage usage, and the capabilities of thin reclamation compliant storage arrays to reclaim allocated but unused storage making thin storage reclamation fully automated and transparent to the server configuration and the applications.

Local and remote data protection

Veritas Storage Foundation provides data protection with copy service options that address both local and remote replication needs. With the FlashSnap™ feature, administrators can create point-in-time copies with minimal impact to applications and users. Point-in-time copies can be accessed from the same server or easily be imported to another host, enabling users to leverage storage hardware economics by taking advantage of the heterogeneous, tiered storage support offered by Storage Foundation. These copies can be either full-volume or space-optimized snapshots that can be quickly resynched with delta-block comparisons. This allows users to perform resourceintensive processes such as backups, testing, decision support, and reporting off-host.

For mission-critical applications that require remote recovery sites, the Veritas Volume Replicator Option by

Symantec enables efficient replication of data over IP networks. This gives organizations an extremely flexible, high-performance alternative to traditional array-based replication architectures. Organizations can combine virtually any storage devices on any major operating system, providing a consistent, easy-to-manage high availability/disaster recovery solution throughout the data center.

Multi-vendor hardware infrastructure

Storage Foundation provides comprehensive platform support for a heterogeneous server and storage infrastructure with no hardware, database, or application agenda. This provides enterprises with the freedom to choose industry-leading functionality across platforms without getting locked into proprietary solutions.

Sized for your needs

Choose the feature set that is appropriate for you:

- **Storage Foundation Basic**—Intended for smaller systems, Storage Foundation Basic is available at no cost and provides the same robust features of Storage Foundation Standard, but is designed for system workloads that do not exceed four volumes and/or four file systems, and/or two processors/sockets in a single physical system.
- **Storage Foundation Standard**—Intended for medium size systems and all workloads, Storage Foundation Standard includes all features, except FlashSnap and Dynamic Storage Tiering.
- **Storage Foundation Enterprise**—Intended for

enterprise environments, Storage Foundation Enterprise offers full functionality, including FlashSnap and Dynamic Storage Tiering.

Optimized for your environment

Veritas Storage Foundation is available in a number of versions, enabling IT organizations to utilize the version that is right for their operating environment.

- **Veritas Storage Foundation HA**—All the features of Storage Foundation plus Veritas Cluster Server. This version combines the storage availability and manageability of Storage Foundation with the server and application availability of Veritas Cluster Server.
- **Veritas Storage Foundation for Databases**—All the features of Storage Foundation plus special database accelerators and manageability options, providing raw performance with the manageability of a file system. Available as both Standard and Enterprise versions.
- **Veritas Storage Foundation Cluster File System**—All the features of Storage Foundation plus a cluster file system and cluster volume manager for concurrent data access from multiple servers.
- **Veritas Storage Foundation for Oracle® RAC**—All the features of Storage Foundation Cluster File System with additional special features to support the Oracle RAC environments.
- **Veritas Storage Foundation for Windows®**—Provides easy-to-use online storage management specifically designed for mission-critical, enterprise Windows environments.

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Veritas Storage Foundation features

Features	Benefits
Volume Manager and File System	The core of Storage Foundation is the industry-leading Veritas Volume Manager and Veritas File System.
Storage Foundation Manager	Centralizes management across multiple server platforms to provide complete visibility to application, server, and storage resources.
Dynamic Multi-Pathing (DMP)	Balances I/O across all available paths between the server and the storage array to improve performance and availability. With Dynamic Multi-Pathing, common failures from I/O path, HBA, or switch failures can be avoided as administrators can spread I/O across all available paths.
Dynamic Storage Tiering	Allows the administrator to identify and move unimportant or old files to less expensive storage without changing the way users or applications access the files.
Online Administration	Limits the amount of time disks need to be offline for maintenance by performing volume and file system resizing (including shrinking), domain reconfiguration, file system defragmentation, backup, and off-host processing while the data remains online and available.
FlashSnap	Takes instant, full volume, or space-optimized snapshots of data for off-host processing, disk-based recovery, and backup. Only resynchronizes changed blocks for fast resynchronization.
Portable Data Containers	Easily and quickly converts data for use on different operating systems. Makes it easy to migrate to new operating systems.
Storage Checkpoints	Instantly creates disk backups of files or file systems that require no additional disk space. The backup can be easily restored by the user. Useful for maintaining an original copy of a file system while doing development work.
Automated Performance Tuning	Automatically tunes each write for optimal performance. Administrators no longer need to manually tune writes for performance.
Hot Relocation	Automatically migrates data from failing disks to healthy disks.
RAID support	Supports all levels of RAID for maximum availability and performance.
Volume Replicator Option	Provides continuous data replication, enabling rapid and reliable recovery of critical applications at remote recovery sites.
Veritas Cluster Server	The HA (High Availability) version of Storage Foundation includes Veritas Cluster Server, which monitors the status of applications and all its dependent components, automatically moving them to another server in the event of planned or unplanned outages.
Support for all major storage arrays	Lets companies choose the storage hardware that best fits their needs.

Supported operating systems

- Sun™ Solaris™
- HP HP-UX
- IBM® AIX®
- Red Hat® Linux
- SUSE Linux
- Oracle Enterprise Linux
- Microsoft® Windows (See the Veritas Storage Foundation for Windows data sheet)

Note: Please consult <http://www.symantec.com/business/support/compatibility.jsp?language=english&view=comp&pid=15107> for the most current and detailed operating system and storage array support information.

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More information

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<http://enterprise.symantec.com>

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About Symantec

Symantec is a global leader in providing security, storage and systems management solutions to help consumers and organizations secure and manage their information-driven world. Our software and services protect against more risks at more points, more completely and efficiently, enabling confidence wherever information is used or stored.

Symantec World Headquarters

20330 Stevens Creek Blvd.

Cupertino, CA 95014 USA

+1 (408) 517 8000

1 (800) 721 3934

www.symantec.com

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