

Veritas Storage Foundation™ from Symantec

Heterogeneous online storage management

Overview

Veritas Storage Foundation™ from Symantec provides a complete solution for heterogeneous online storage management. Based on the industry-leading Veritas™ Volume Manager from Symantec and Veritas™ File System from Symantec, 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 in a centralized consistent fashion. 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**—Seamlessly and transparently migrate data among storage tiers – Fibre Channel, SATA, Solid State, other – based on its business value
- **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
- **Database storage management**—Simplify manageability while achieving high availability and superior performance for DB2®, Oracle®, Sybase® and MySQL® databases
- **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

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 a heterogeneous server and storage infrastructure. 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 can be centrally managed with Veritas™ Storage Foundation Manager from Symantec¹. The improved load balancing and management capabilities enhance 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

1. Available at no cost. See the Storage Foundation Manager data sheet.
2. Previously available in Veritas Storage Foundation for Databases, this functionality is now available in Veritas Storage Foundation 5.1. For additional details, see the database storage management solutions guide.

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. In addition, pre-defined policies can also be used to move data based on partition name, log files or database files².

Because the 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 across hard disk drives and solid state drives³, 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.

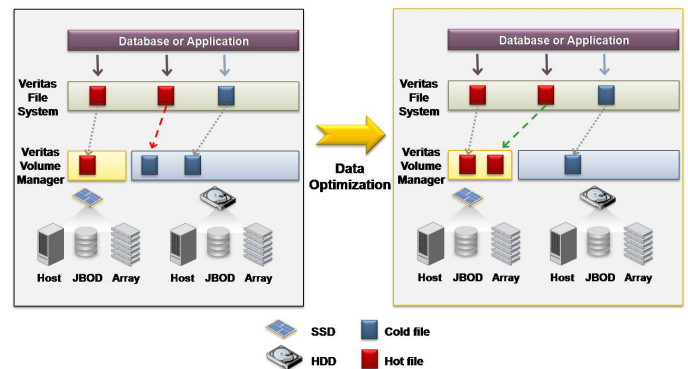


Figure 1. Dynamic Storage Tiering offers automated and transparent optimization of data placement on tiers of storage across hard disk drives and solid state drives.

3. New functionality available in Veritas Storage Foundation 5.1.

Centralized storage management

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

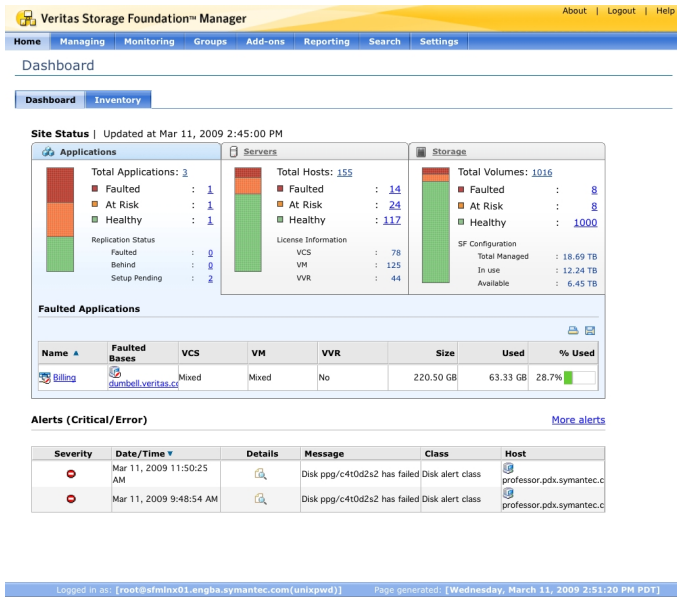


Figure 2. Veritas Storage Foundation Manager provides centralized application, server and storage management capabilities across a heterogeneous infrastructure.

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, 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.

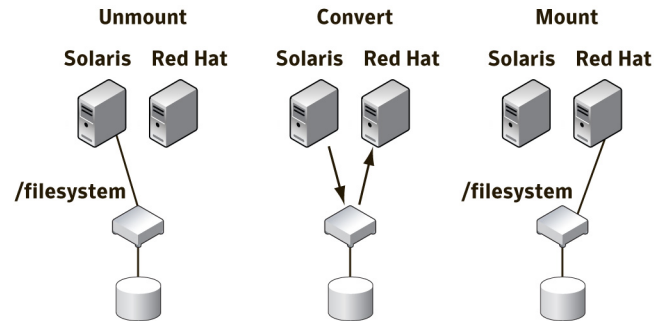


Figure 3. Deport data from one operating system and import it on another in minutes, without creating a copy of the data or moving the data using Portable Data Containers.

With the Portable Data Containers feature of 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. 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 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.

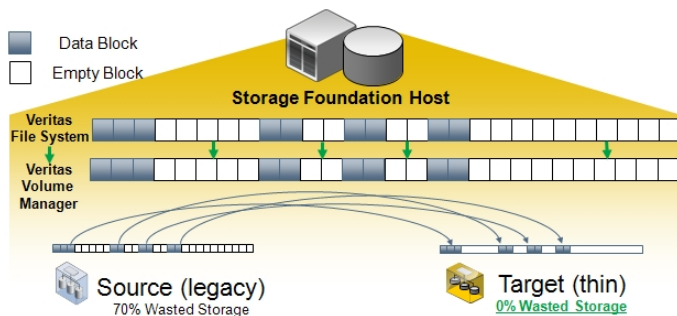


Figure 4. With SmartMove™, mirroring is enhanced with the host file system knowledge. Tight integration makes the volume manager aware of the free blocks that don't need to be copied; only the useful data is copied.

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, Storage Foundation offers the Thin

Reclamation API. The Thin Reclamation API enables automated, granular, online reclamation of allocated but unused thin storage. 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.

Database storage management²

Storage Foundation gives administrators the flexibility to manage database volumes and files using the web-based interface of Storage Foundation Manager or through a command-line interface. Also, Storage Foundation automates many of the manual database storage management tasks, such as RAID reconfiguration, volume and file system resizing, and snapshots, thereby reducing administrative workload as well as human and operational errors.

The major concern in any database environment is maintaining superior performance and meeting performance SLAs. Storage Foundation improves the overall performance of database environments through the use of Quick I/O (QIO), Concurrent I/O (CIO), Oracle Disk Manager (ODM) and Cached Oracle Disk Manager (CODM) database accelerators⁴. The net benefit is database performance equal to raw disk partitions, but with the manageability benefits of a file system.

Local and remote data protection

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 either be full or space-optimized volume snapshots or database clones, which can quickly be re-synched. This allows users to perform resource-intensive processes such as backups, testing, decision support, and reporting off-host.

For mission-critical applications that require remote recovery sites, Veritas™ Volume Replicator from 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 offers File System and Volume Manager capabilities with no limitations and includes database accelerators
- **Storage Foundation Enterprise**—Intended for enterprise environments, Storage Foundation Enterprise offers full functionality, including FlashSnap, storage checkpoints and Dynamic Storage Tiering

Other product highlights

- **Simpler, leaner and more resilient**³—Zero boot install and upgrade, rolling upgrades, smaller host footprint and keyless feature enablement
- **Online administration**—Limits the amount of time disks need to be offline for maintenance by performing volume and file system resizing, domain reconfiguration, backup and off-host processing while the data remains online and available
- **Storage checkpoints**—Instantly creates database² and disk backups of files or file systems that require no additional disk space
- **Automated performance tuning**—Automatically tunes each write for optimal performance
- **Hot relocation**—Automatically migrates data from

failing disks to healthy disks

- **RAID support**—Supports all levels of RAID for maximum availability and performance

Optimized for your environment

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 from Symantec. This version combines the storage availability and manageability of Storage Foundation with the server and application availability of Veritas Cluster Server
- **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 features to support Oracle RAC environments
- **Veritas Storage Foundation for Sybase® ASE CE**—All the features of Storage Foundation Cluster File System with additional features to support Sybase ASE CE environments
- **Veritas Storage Foundation for Windows®**—Provides easy-to-use online storage management specifically designed for mission-critical, enterprise Windows® environments

Supported operating systems

- Sun Solaris
- HP-UX®

- IBM® AIX®
- Red Hat® Linux
- SUSE® Linux
- Oracle® Enterprise Linux
- Microsoft Windows®

More information

Visit our website

<http://enterprise.symantec.com>

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