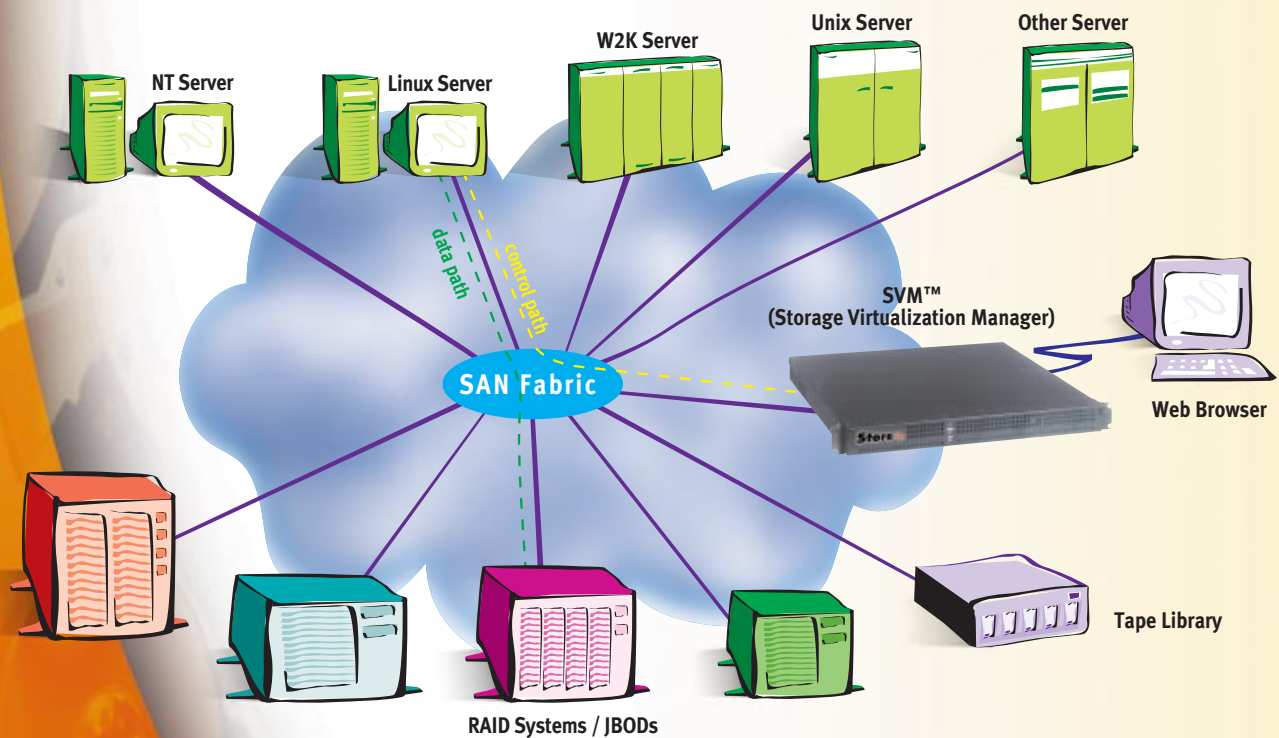


# SVM™ Storage Virtualization Manager

Storage Virtualization is the technology that separates the logical representation of storage from the actual physical storage components. This delivers the true benefits expected from Storage Area Networks (SAN). **With its innovative, "off the data path" architecture, StoreAge's SVM™ appliance provides centrally managed storage pooling and virtual volume allocations for the entire SAN.** SVM enables independent scalability, top performance, and high availability of all SAN resources. It brings substantial improvements to managing enterprise-class storage networks, reducing administration costs and improving utilization of expensive storage resources. SVM also enables the implementation of advanced disaster recovery and back up applications.

**SVM operates in a heterogeneous SAN environment, which can include servers and storage devices from various vendors.** Storage can be flexibly allocated to the servers and value-added storage applications using SVM. Managed via a web-based GUI, storage can be organized into stripe sets, storage pools, and then selectively allocated to one or more servers. The SVM appliance is connected to a Fibre Channel loop or switched fabric, and is capable of monitoring the status of physical devices connected to the SAN. The SVM manages storage off the data path, serving the volume maps to distributed virtualization agents. This design enables full utilization of SAN performance and provides superior scalability and reliability. **SVM is a key enabler for advanced disaster recovery strategies and other enterprise storage applications, implemented above the virtualization layer.**



**StoreAge**  
networking technologies

## Principles of Operation

The SVM provides a central point of storage management across the entire SAN without imposing a performance penalty.

By separating the control path and the handling of metadata from the data path, the SVM provides centrally managed mapping and other SAN functions while maintaining the distributed nature of servers and storage devices. This architecture enables the full bandwidth of the SAN fabric to be utilized. A variety of server platforms are supported through the installation of an SVM Agent. The SVM Agent retrieves the volume information from the SVM appliance and allows the server to communicate directly with the physical storage devices for read/write operations.

SAN monitoring and operation can be performed by administrators via SVM's web-based GUI. This monitoring may be integrated with policy based storage management software on various servers in the SAN via SVM's SAN Application Programming Interface (API) and Command Line Interface (CLI).

## Architecture

- Single or Dual-active stand-alone SVM appliance(s), connected to one or two SAN fabrics.
- Servers are connected to the SAN with industry standard HBAs, using standard, vendor-supplied HBA drivers.
- SVM Agents in each server supporting fail-over and load balancing across multiple HBAs.
- Supports a wide variety of Fibre Channel Disk and Tape storage devices.
- Web-enabled management.

## Key Attributes

### SAN MANAGEMENT

SVM provides a central point of management for all enterprise SAN resources. The Web-enabled, intuitive GUI is accessible through any standard browser.

### REDUCED TCO

Central point of management, efficient usage of storage resources, ability to purchase the most cost effective storage device when needed, reduced load on storage administrator personnel - all contribute to a significant reduction in Total Cost of Ownership of the enterprise storage system.

### SAN SCALABILITY

The Asymmetric design of SVM enables virtually limitless independent growth in terms of number of servers, storage capacity, I/O performance and bandwidth.

### HIGH PERFORMANCE

With SVM, data is transferred between servers and storage resources. Striping across RAID arrays further increases total storage performance, and is especially effective in providing cost effective video solutions.

### HIGH AVAILABILITY

Complete redundancy is supported by the SVM. Modifications to system configuration (e.g. add or delete servers or storage resources; create or reallocate volumes) are done on the fly without system re-boot. SVM Agent on each server supports multiple paths with automatic fail-over.

### STORAGE APPLICATIONS

The SVM provides a platform for advanced enterprise recovery, back up and other SAN-aware storage applications.

### SAN SECURITY

Only Volumes that are explicitly allocated to servers are accessible by them. SVM can automatically configure zoning of SAN switches, preventing unauthorized access from servers not running the SVM Agent.

### POLICY BASED INFRASTRUCTURE-READY

SVM enables 3<sup>rd</sup> party applications to automate storage pooling, volume management and backup procedures using the SVM SAN API and CLI.

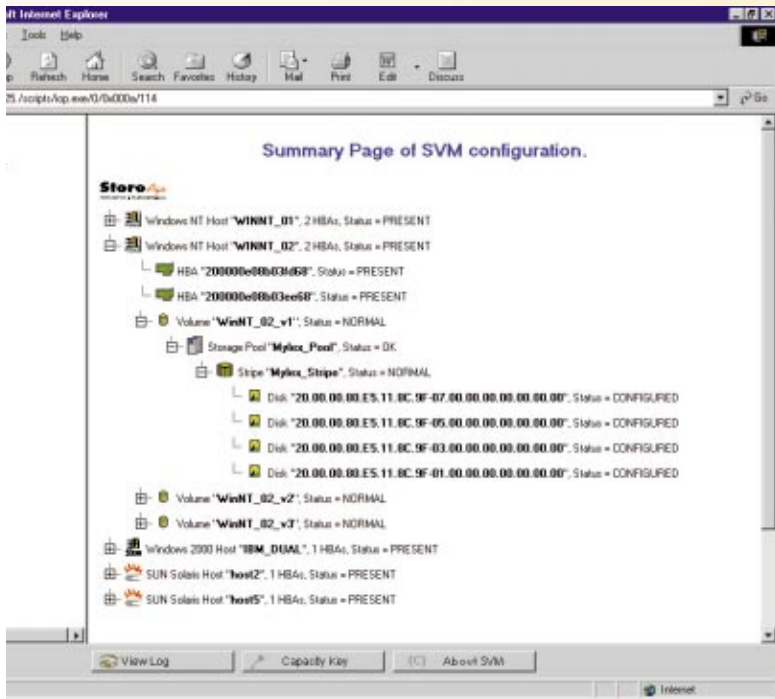




## Features

### STORAGE POOLING

SVM enables the allocation of virtual volumes from any SAN storage device to any server. Volumes can be expanded over various mixed breed storage devices. The utilization of storage resources can be maximized with storage pooling. The creation of several pools according to site-defined Quality of Service (QoS) criteria allows uniform allocation of storage with necessary characteristics to application needs.



### STRIPING

Striping a volume over several devices can substantially increase performance, especially with large stripe sizes - a megabyte or more - which match application I/O sizes.

### VIRTUAL VOLUME MANAGEMENT

Volumes are created from storage pools and stripe sets. Each volume can be allocated to one or more servers and is not accessible to all others.

When a volume needs to be expanded, more capacity can be added "on the fly" from one of the storage pools. Creating, expanding or deleting a volume do not require server reboot.

### CENTRAL STORAGE MANAGEMENT

The SVM provides a central point for managing all storage devices connected to the SAN.

### SEAMLESS INTEGRATION INTO EXISTING SAN

The SVM can be integrated into an existing SAN. It will not affect user's data and the administrator can select which of the physical devices will be managed via the SVM, gradually migrating legacy SANs to a fully virtualized environment, without copying the data.

### BOOTING FROM THE SAN

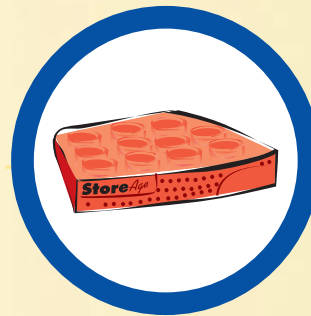
The SVM enables servers to boot from virtual volumes presented by the SVM.

### SCRIPTING and API

SVM provides SAN API and CLI, while enabling administrators to automate procedures. Users can write scripts for 3<sup>rd</sup> party applications while accessing SVM functionality via its API.

### INTEROPERABILITY AND SHARING

Volumes can be allocated to multiple servers, enabling storage sharing for cluster management software, SAN file systems and shared database managers. Volumes can be reassigned from server to server, without copying.



## **SVM** Appliance

19" Rack Mountable, 1U Appliance  
Two Fibre Channel DB9 Ports, with  
5 meter copper cables supplied  
Mouse, Keyboard & Monitor ports  
(Headless operation possible)  
10/100BaseT LAN port

## **S**erver Platforms Supported

Microsoft Windows NT 4.0  
Microsoft Windows 2000  
Sun Solaris  
Linux  
HPUX  
AIX  
Novell  
Other - Consult your StoreAge representative

**StoreAge**  
networking technologies

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**The Virtualization**