

# multiMirror™

SVM™ Application

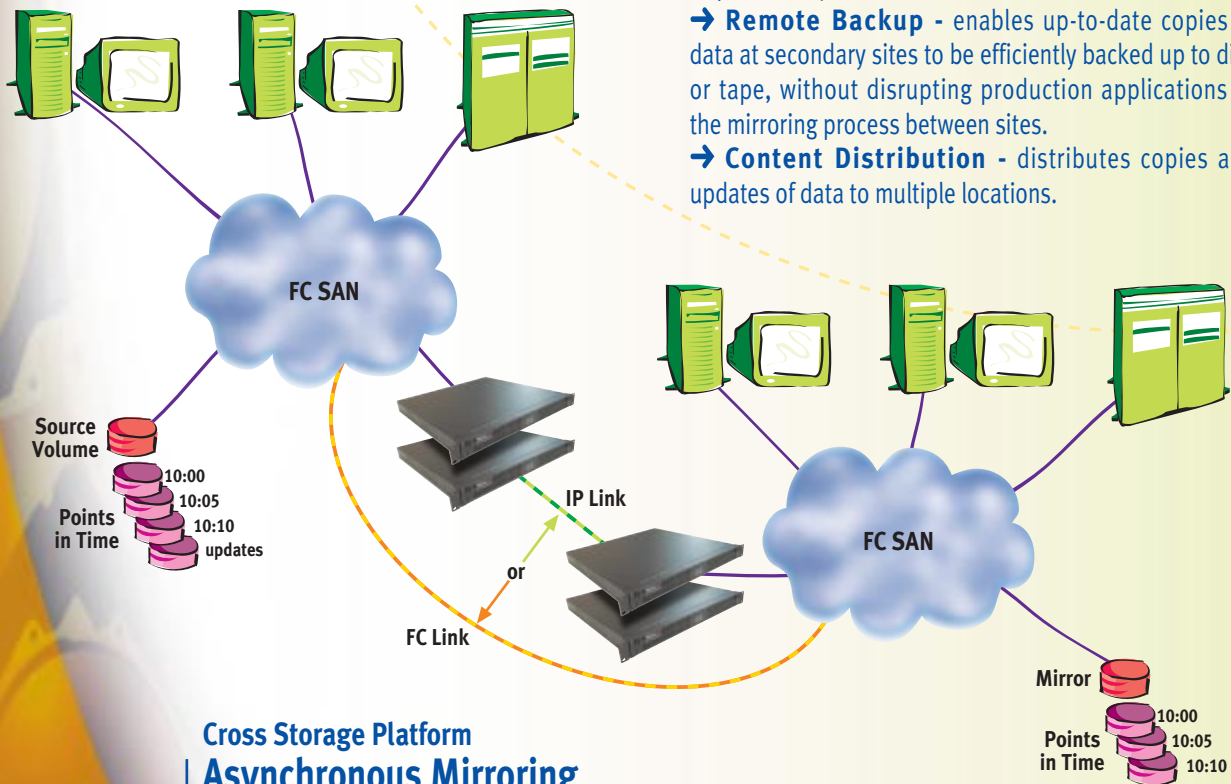
## LOCAL AND REMOTE ANY-TO-ANY DATA MIRRORING FOR DISASTER RECOVERY AND REMOTE BACKUP

StoreAge's **multiMirror** is an enterprise-class disaster recovery and data movement facility implemented in conjunction with StoreAge's SVM™ (Storage Virtualization Manager). Designed as a vendor-independent solution, **multiMirror** continuously mirrors data independently of the operating systems or storage subsystems in use. **This "any-to-any" data mirroring capability ties together storage devices from different vendors into an extremely cost-effective disaster recovery solution, providing vital business continuity capabilities that minimize the impact of both planned and unplanned system downtime while ensuring 24x7 access to your data.** And, by supporting both distributed synchronous and network-based asynchronous mirroring, **multiMirror** allows different modes of mirroring based on different application and business requirements. As a vendor-independent solution, **multiMirror** is compatible

with a broad range of storage subsystems used in virtually all SAN environments, offering exceptional deployment flexibility and a lower TCO compared to alternate approaches. **multiMirror** safeguards critical data by continuously mirroring transactions at a primary site to storage devices at any secondary location. In the event of a system interruption, **multiMirror** enables rapid failover between sites, minimizing application downtime and the associated costs of lost data access. With **multiMirror**, the recovery time following a disaster or failure is compressed to minutes rather than hours or days.

**multiMirror** delivers several key business advantages to any organization with SAN infrastructures, including:

- **Any-to-Any Synchronous and Asynchronous Data Mirroring** - continuously mirrors data between storage devices from different vendors regardless of the operating systems or storage subsystems in use.
- **Disaster Recovery** - permits rapid failover and fallback between sites in the event of planned or unplanned system downtime.
- **Remote Backup** - enables up-to-date copies of data at secondary sites to be efficiently backed up to disk or tape, without disrupting production applications or the mirroring process between sites.
- **Content Distribution** - distributes copies and updates of data to multiple locations.



Cross Storage Platform  
Asynchronous Mirroring

**StoreAge**  
networking technologies

## Principles of Operation

**multiMirror** creates and continuously maintains one or more physical copies of data volumes at one or more locations.

Two types of mirroring are supported:

**1. One-to-One Mirroring**, where volumes at a primary site are mirrored to a secondary location (either local or remote).

**2. One-to-Many Mirroring**, where volumes at a primary site are mirrored to multiple secondary locations (either local or remote).

In this manner, several copies of the same source data can co-exist at the same site or across multiple locations. Each mirroring process may be configured to work in either synchronous or asynchronous mode, and each process progresses independently according to the network's Quality of Service level.

In addition, Point-in-Time (PiT) Read/Write copies of mirrored volumes may be instantly created using StoreAge's **multiView™** and **multiCopy™** applications. This allows PiT copies of mirrored volumes at any location to be used in activities such as zero-impact backup, data warehouse updates and application testing, all without interrupting normal mirroring activities. Plus, data in the PiT copies may be changed (added, edited and deleted) without affecting the contents of either the source volumes or the mirrored volumes.

## Key Benefits

### Data Protection

Using its Consistency Group mechanism, **multiMirror** allows groups of volumes to be mirrored in either synchronous or asynchronous mode, ensuring data consistency and integrity in a wide variety of application environments.

For additional data protection, StoreAge's **multiView** instant Point-in-Time snapshot image utility may be used at both the primary and secondary locations to enable rapid online recovery and zero-impact backup. In case of data corruption due to viruses or other issues, **multiView** PiT images allows data to be rapidly recovered from either disk or tape, minimizing application downtime and enhancing business continuity.

### Data Integrity Across Multiple Locations

**multiMirror** includes sophisticated data integrity technology which ensures that a usable, I/O-consistent copy of data is maintained at each location. This is especially important during a disaster,

when unplanned system disruptions can result in corrupted data being copied from one site to another. To ensure data integrity across the entire network, **multiMirror** creates a continuous stream of non-disruptive PiT copies that allow administrators to rollback transactions at each location to the last known consistent state. This not only enables rapid recovery from a disaster or failure, but also ensures that information can survive a rolling disaster across multiple sites.

### Scalability

**multiMirror**'s network-based architecture mirrors data regardless of the operating systems and storage devices in use, while enabling exceptional scalability to meet future data protection requirements. **multiMirror** can maintain an unlimited number of mirror copies for each volume or group of volumes, and supports the use of third-party data movers to extend or accelerate data movement between geographically dispersed locations. This allows **multiMirror** to mirror data anywhere - within the same location, across a campus or across the globe - while incrementally scaling the processing power needed to meet or exceed Service Level Agreements.

### Reduced TCO

With its hardware-independent architecture, **multiMirror** breaks the "vendor lock-in" of traditional mirroring approaches by allowing data on one brand of storage device to be mirrored to a storage device of any other brand. In addition, **multiMirror** centrally manages the mirroring process across the entire SAN environment, allowing administrators to use a single tool to manage all their mirroring requirements. This centrally managed, any-to-any mirroring capability lets each organization select the storage devices that best meet their price/performance requirements at each location, thereby significantly lowering the total cost of ownership. In addition, **multiMirror**'s integrated FC/IP routing eliminates the need for third-party routers, providing an extremely cost-effective Disaster Recovery solution for large enterprise and mid-size organizations with storage networks.

Moreover, when used in conjunction with StoreAge's **multiView** and **multiCopy** applications, multiple business operations can occur simultaneously (backup, data warehouse updates, application testing, etc.) while production applications remain online, and without interrupting the mirroring processes. This parallel processing capability increases the number of tasks that can be completed each business day.

### Higher Performance

Unlike asynchronous mirroring approaches that can create bottlenecks by queuing each I/O that occurs, **multiMirror** incorporates sophisticated write-gathering intelligence that minimizes the amount of data traffic between sites. Whenever the same sector of data changes multiple times within a short period of time, **multiMirror** need only transmit the last change that occurred, significantly reducing the I/O activity and time needed to update the data at the remote sites. This approach eliminates the out-of-order packet delivery problems associated with I/O queueing, and improves the mirroring performance over connections of any bandwidth.

### Central Mirroring Management and Monitoring

Using SVM's web-based management capability, **multiMirror** provides a uniform methodology for managing mirroring processes across the entire SAN, regardless of the types of storage devices, applications and servers in use. Data on any storage device in the SAN can be mirrored to any other device, allowing centralized management of all mirroring activities.

# Features

## Complete Disaster Recovery Solution

To meet different application uptime and SLA requirements, **multiMirror** mirrors data in both synchronous and asynchronous modes. The synchronous mode, which is often used to mirror data in campus and MAN environments, guarantees the highest degree of data integrity, as mirror copies are completely congruous with the source data. The asynchronous mode, which is often used over longer distances such as WANs, delivers superior data integrity without impacting the performance of production applications at the primary site.

In addition, **multiMirror** can automatically adapt to infrastructure disruptions (transmission link failures, remote site storage device downtime, etc.) by switching between synchronous mode and asynchronous mode. This technique temporarily suspends the mirroring process, but continues to accumulate all data changes until normal service is restored. Then, **multiMirror** resynchronizes the accumulated changes with the remote site, verifies that the data is consistent between sites, and returns to synchronous mode.

## Integrated FC/IP Routing

**multiMirror** leverages the built-in, high performance FC/IP routing capability that is included with each SVM appliance. In addition to driving down the cost of mirroring data over long distances by eliminating the need for third-party routers and other devices, each pair of SVM appliances can mirror up to 9TB of data per day.

## Efficient Workflow

**multiMirror** makes optimum use of network resources by including features that minimize data traffic while maximizing performance over any available bandwidth. For example, write-gathering algorithms identify data that changes multiple times within a short user-defined timeframe and mirrors that data only once, minimizing network traffic and eliminating the processing overhead of ensuring in-order packet delivery of multiple transactions. Another optimization feature is **multiMirror**'s rapid resynchronization capability, which brings source and mirror copies into a data-consistent state without copying an entire volume from scratch.

## One-to-Many Mirroring

**multiMirror** can create and maintain multiple independent mirror copies of the same source volume or group of volumes across

multiple sites, allowing each volume to be mounted by an independent application. The actions of creating, pausing, resuming and mounting these volumes can be centrally managed as a process for one or more applications at each secondary site.

## Defining Priorities Between Mirror Copies

Administrators can flexibly define priorities for the mirroring processes according to specific requirements, optimizing the network load and establishing Quality of Service parameters for each application's data.

## Pause/Resume

Both synchronous and asynchronous mirroring modes may be paused and resumed according to each organization's needs and network load. If a mirroring process is paused, all new transactions at the primary site are accumulated, then efficiently resynchronized with the secondary locations upon resumption of the mirror.

## Application-Aware Solution

**multiMirror** enables administrators to create data-consistent Point-in-Time (PiT) copies of applications such as databases and e-mail systems. This includes temporarily quiescing an application, flushing the buffers, creating a snapshot, then returning the application to normal production mode. The entire process only requires a minute or two, and the PiT copy at the primary site is automatically mirrored to the remote sites, enabling online restores or rollbacks at either site.

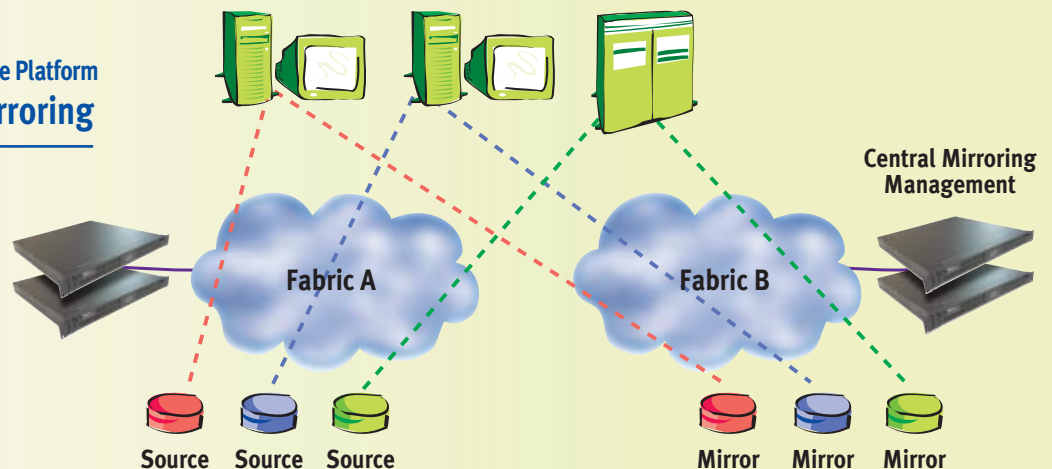
## Enhancing Primary and Remote Site Operations

StoreAge's **multiView** and **multiCopy** instant Point-in-Time copy capabilities enable numerous activities to occur at both the primary and remote sites without interrupting the mirroring processes between sites. These activities - which can include zero-downtime backup, application testing and development, data warehouse updates, online restores from disk and data migration - can occur simultaneously using independent copies of production data, all without interrupting either the production applications or the mirroring processes. The result is a significant increase in the number of tasks that can be completed each business day, and maximizes application uptime by eliminating backup windows and enabling rapid restores of data from disk.

## Supports Application Consistency Groups

Volumes may be logically grouped into Consistency Groups that aggregate all related volumes for an application or system. This ensures that both mirrors and Point-in-Time copies are consistent between all volumes within each Consistency Group.

## Distributed Cross Storage Platform Synchronous Mirroring



## P rerequisite

StoreAge SVM™ (Storage Virtualization Manager), a 1U, rack-mountable Virtualization Appliance and associated host agents, installed in the SAN.

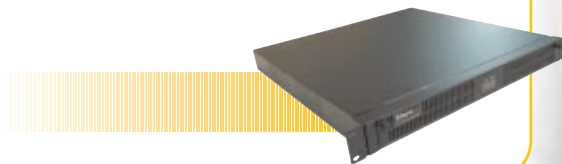
## P latforms Supported

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

## A bout SVM™

SVM (Storage Virtualization Manager) is a SAN appliance that provides virtual volume management in heterogeneous environments. The SVM features storage capacity and storage performance pooling across the entire SAN space. Uniquely designed to virtualize storage off the data path, the SVM does not impose any performance penalty and thus delivers a highly scalable and highly available SAN infrastructure at levels not found with alternative approaches.

The SVM provides centralized management for distributed enterprise storage, significantly reducing the Total Cost of Ownership. It is an ideal platform for SAN-aware Storage Applications such as Remote Mirroring, Snapshot and others and a key enabler for business continuity strategies.



# StoreAge

networking technologies

### StoreAge Networking Technologies Inc.

One Technology Drive  
Building C515, Irvine, CA 92618  
Tel: 949 754 0640 Fax: 949 754 0645

### StoreAge Networking Technologies Ltd.

63 Bar Yehuda Rd.  
Nesher 36651, Israel  
Tel: +972 48203454 Fax: +972 48203464  
email: info@store-age.com

[www.store-age.com](http://www.store-age.com)

The Virtualization Architects