

IBM System Storage SAN Volume Controller



Highlights

- *Designed to combine storage capacity from multiple disk systems into a reservoir of capacity that can be managed more efficiently*
- *Designed to support improved application availability by insulating host applications from changes to the physical storage infrastructure*
- *Designed to help increase storage utilization by providing host applications with more flexible access to capacity*
- *Designed to enable a tiered storage environment in which the cost of storage can be better matched to the value of data*
- *Designed to help improve storage administrator productivity by enabling management of heterogeneous storage systems using a common interface*
- *Designed to support advanced copy services from higher- to lower-cost devices and across storage systems from multiple vendors*
- *Even more affordable for mid-sized businesses*

Building a more flexible and responsive IT infrastructure

In IT today, the only constant is change. Achieving best business results from a complex enterprise-class IT infrastructure means more than simply deploying new solutions; it means redefining IT as a versatile instrument of business strategy, which can change in parallel with changing demands.

Toward that end, many businesses have pursued strategies such as consolidation to reduce the number of servers or storage systems required to support IT services, and virtualization to unchain those services from specific implementations and redeliver them in a more flexible form.

Consolidation and virtualization can help you achieve a simpler, more scalable, more cost-efficient IT infrastructure that aligns more flexibly with your business goals.

Originating at IBM about 40 years ago, virtualization has taken on new life in a number of contexts: virtual servers to virtual storage, optimized networks, workstations in virtualized environments, and application virtualization. The potential benefits are far reaching, ranging from increased utilization and business flexibility, improved productivity, to lower total costs of computing and improved reliability. Depending on the starting point and the type and extent of the virtualization implemented, clients can achieve some or many of these benefits quickly.

The IBM System Storage™ SAN Volume Controller (SVC) is a storage virtualization system that enables a single point of control for storage resources to help support improved business application availability and greater resource utilization. The objective is to manage storage resources in your IT infrastructure and to make sure they're used to the advantage of your business—and do it quickly, efficiently, in real time, while avoiding administrative cost.

A simpler storage infrastructure

SAN Volume Controller is designed to pool storage volumes from IBM and non-IBM storage systems into a reservoir of capacity for centralized



Figure 1. SVC is designed to virtually consolidate capacity from different storage systems, help provide common copy functions and enable data movement without server disruption, while supporting management of diverse storage from a single point.

management. SAN Volume Controller is designed to hide the boundaries among disk systems, which helps you to focus on managing storage as a resource to meet business requirements and not as a set of boxes. SAN Volume Controller helps you to set business process goals based on all the storage resources at your disposal rather than allowing the storage resources to limit what your business can accomplish.

Increase utilization

SAN Volume Controller is designed to help increase the amount of storage capacity that is available to host applications. By pooling the capacity from multiple disk systems within the storage area network (SAN), it helps

enable storage administrators to reach beyond traditional “islands” of SAN storage and deploy storage in ways that can help best meet the needs of host applications.

Reduce storage use and automate on demand provisioning

SAN Volume Controller has a new Space-Efficient Virtual Disks (SEV) function that is designed to use physical storage capacity only when data is written to virtual disks instead of dedicating physical capacity to the entire defined virtual capacity. This capability is also referred to as “thin provisioning.” This new ability can be used to help reclaim even more allocated but unused space from databases and file systems. The SEV function helps you define virtual capacity to meet anticipated

future growth requirements without using physical storage until it is actually needed. With its Space-Efficient Virtual Disks function, SVC is designed to automatically provision storage on demand as your business grows.

Scalability and performance

SAN Volume Controller combines hardware and software into an integrated, modular solution that is highly scalable. An "I/O Group" is formed by combining a redundant pair of "storage engines" based on IBM System x™ server technology. Each engine includes a four-port 4 Gbps-capable host bus adapter (HBA), designed to allow the SAN Volume Controller to connect and operate at up to 4 Gbps SAN fabric speed. Each I/O Group contains 16 GB of cache memory. Highly available I/O Groups are the basic configuration element of a SAN Volume Controller cluster, as shown in Figure 1. Adding I/O Groups to the cluster is designed to increase cluster performance and bandwidth.

An entry-level SAN Volume Controller configuration contains a single I/O Group, can scale out to support four I/O Groups, and can scale up to

support 1024 host servers and up to 8192 virtual disks. This configuration flexibility means that SAN Volume Controller configurations can start small with an attractive price to suit smaller environments or pilot projects and then can grow with your business to manage very large storage environments (up to eight petabytes).

Improve productivity

SAN Volume Controller provides an easy-to-use graphical interface for central management. With this single interface, administrators can perform configuration, management and service tasks in a consistent manner over multiple storage systems even from different vendors. SAN Volume Controller is designed to allow administrators to map disk storage volumes to virtual pooled volumes to help them use their storage more efficiently. SAN Volume Controller users have as much as doubled the productivity of storage administration, helping enable their storage to grow with their businesses while reducing the need for additional manual management.

The new Space-Efficient Virtual Disks function helps automate provisioning as described above and so helps further improve productivity by enabling

administrators to focus on overall storage deployment and utilization, and longer-term strategic requirements, without being distracted by routine everyday storage provisioning.

Simplify management

SAN Volume Controller uses the IBM System Storage Productivity Center (SSPC), an advanced management console that can provide a view of both IBM- and non-IBM storage environments. As a common management console initially supporting IBM System Storage DS8000™ and SVC, SSPC is designed to enable a greater degree of simplification for growing organizations.

Based on IBM TotalStorage® Productivity Center Basic Edition software, SSPC extends the capabilities available through the SVC user interface. SSPC offers the capability to manage a variety of storage devices connected across the storage area network. The rich, user-friendly graphical user interface provides a comprehensive view of the storage topology, from which the administrator can explore the health of the environment at an aggregate or in-depth view. SSPC may optionally be upgraded with

IBM TotalStorage Productivity Center Standard Edition, which enables consolidated management of virtual and physical resources from a single console including SVC, disk systems, tape systems, file servers and SAN fabric.

Improve application availability

Because it hides the physical characteristics of storage from host systems, SAN Volume Controller is designed to help insulate host applications from physical changes to the storage pool. This ability can help enable applications to continue to run without disruption while you make changes to your storage infrastructure, which can help your business increase its availability to its customers.

SAN Volume Controller can help improve application availability by including a dynamic data migration function. This function is designed to move data from one storage system to another while maintaining application access to the data. This ability can help administrators to reallocate and scale storage capacity without disrupting applications, helping to increase the availability of their applications to their customers. The data migration function might be used, for example, when

replacing older storage with newer storage, as part of load balancing work or when implementing a tiered storage infrastructure.

SAN Volume Controller has a new Virtual Disk Mirroring function, which is designed to store two copies of a virtual disk on different storage systems. This new function helps improve application availability in the event of failure or disruptive maintenance to an array or disk system: SVC is designed to automatically use whichever copy remains available.

Link infrastructure performance to business goals

SAN Volume Controller can help businesses to build an infrastructure from existing assets that is simpler to manage, easier to provision and can be changed without impacting application availability. Businesses may be able to use their assets more efficiently. They can allocate and provision storage to applications from a single view and know the effect on their overall capacity situation immediately. And they can

experience improvements to their application availability to enable better quality of service goals. These benefits help businesses manage their costs and capabilities more closely, linking the performance of their infrastructure to their individual business goals.

Tiered storage

Deploying tiered storage is an important strategy for controlling storage cost, where different types of storage with different performance and cost characteristics are used to match different business requirements. Until now, however, management and functional differences among different types of storage—even from the same vendor—have made implementing tiered storage operationally complex and have limited deployments. SAN Volume Controller is designed to make it much easier to implement tiered storage because it helps deliver consistent management and function across all tiers of storage, and helps support movement of data between tiers without disrupting applications. Because SVC also has cache, it can improve the performance of lower tier storage, enabling it to be used more widely in a data center further reducing costs.

Replication services

With many conventional SAN disk arrays, replication operations are limited to in-box or like-box-to-like-box circumstances. But SAN Volume Controller is designed to enable administrators to apply a single set of advanced network-based replication services, such as the IBM System Storage FlashCopy® function, across multiple storage systems from different vendors. This ability can help simplify the storage environment and reduce the total cost of storage.

Network-based SAN Volume Controller replication services can help match the value of data with the cost of storage. For example, whereas production data may be stored on enterprise-class storage, SVC is designed to enable backup copies created with the FlashCopy function to be stored on lower cost storage. Similarly, conventional approaches to business continuity require largely the same storage at production and recovery locations. But SVC is designed to support different storage at each location, which can help to reduce cost when creating disaster recovery strategies.

SAN Volume Controller supports a broad range of replication services that operate in a consistent manner regardless of the type of storage being used.

The FlashCopy function is designed to create an almost “instant” copy of active data, which could be used for backup purposes or for parallel processing activities. Up to 256 copies of data may be created.

SVC supports incremental FlashCopy operations, which copy only the portions of the source or target virtual disk (vdisk) that have been updated since the FlashCopy function was last used, and also “cascaded” operations where the target of one FlashCopy relationship is itself further copied. These abilities could be used, for example, to help maintain and update a test environment based on production data.

Metro Mirror and Global Mirror operate between SVC systems at different locations to help create copies of data for use in the event of a catastrophic event at a data center. Metro Mirror is designed to maintain a fully synchronized copy at “metropolitan” distances (up to 300 km) whereas Global Mirror is designed to operate asynchronously and so helps maintain a copy at much greater distances (up to 8000 km).

Reduce storage used for replication

With SAN Volume Controller the new Space-Efficient Virtual Disks function may be combined with FlashCopy to implement the Space-Efficient FlashCopy (SEFC) function. When copying a virtual disk, the SEFC function is designed to dramatically reduce storage requirements by using additional storage only for the differences between source and target and not for the entire target virtual disk capacity.

This capability can be used to help reduce storage usage when cloning boot drives for multiple servers, using additional storage only for differences among servers. The SEFC function may also help implement “continuous data protection” strategies, enabling regular copies of data to be made with much less storage required. SEFC is also designed to help deliver “data deduplication,” reducing the storage required when using the FlashCopy function to create backup copies or test environments as described earlier.

Improve energy efficiency

Many data centers today are focusing on reducing their energy usage to reduce costs and out of concern for the environment. SAN Volume Controller

can be a key tool to help you improve the energy efficiency of your data center. It does so in three significant ways:

1. SVC is designed to migrate data from older to newer disk systems without disruption to applications, which helps make it easier and quicker for you to implement more energy efficient storage.
2. SVC is designed to simplify implementation of a tiered storage infrastructure and improve performance of lower tier storage, which helps optimize the mix of storage you deploy and may enable greater use of lower tier storage.
3. SVC can help increase the utilization of storage and reduce requirements for additional storage in the future, which can help reduce the total amount of storage required and so helps reduce energy use. The new Space-Efficient Virtual Disks and Space-Efficient FlashCopy functions are designed to extend this benefit even further.

Designed for mid-sized businesses

SAN Volume Controller Entry Edition delivers the full efficiency, flexibility and simplicity benefits of SVC with new price options to better suit mid-sized businesses. SVC Entry Edition supports storage configurations containing up to 60 disk drives and is designed to grow smoothly with your business; SVC Entry Edition configurations may easily be converted to the full SAN Volume Controller offering for even greater growth potential if required.

Technology for an on demand environment

IBM offers a rich, diverse and integrated array of virtualization solutions, spanning from x86 systems to System z™ mainframes to storage virtualization with SAN Volume Controller and beyond. Furthermore, IBM can work effectively with you to develop key business strategies and processes to capitalize on those solutions' benefits—all while guided by established best practices.

With IBM's help, businesses today can leverage the many engaging opportunities virtualization technologies present in enhancing every aspect of how IT works in the overall organization.

IBM services

IBM offers services to help speed implementation and improve return on investment (ROI). IBM storage specialists are available to conduct storage solution and infrastructure reviews to prepare and speed installation. And IBM Global Services can examine your infrastructure to help determine sizing and performance needs. In addition, you can choose from a range of service and subscription offerings designed to help keep your infrastructure up-to-date and running smoothly.

IBM System Storage SAN Volume Controller supported environments at a glance

The table below provides a summary of SVC supported environments. For the most current, and more detailed, information, please visit ibm.com/systems/storage/software/virtualization/svc/ and click on "Interoperability."

IBM System Storage SAN Volume Controller supported environments at a glance

Storage systems support

Specific models of the following storage systems:

- IBM TotalStorage Enterprise Storage Server®, IBM System Storage DS3000, DS4000™, DS5000, DS6000™, DS8000, N series
- IBM XIV® Storage System
- EMC Symmetrix DMX and 8000-series models
- EMC CLARiiON CX-series models and FC4700
- Hitachi Data Systems Thunder, Lightning, TagmaStore, AMS, WMS, Universal Storage Platform
- Sun StorEdge systems, Sun StorageTek systems, FlexLine 200
- Hewlett Packard MA8000, EMA12000, EMA16000, EVA family, MSA family, XP family
- NetApp FAS
- Bull StoreWay
- Fujitsu Eternus
- NEC iStorage
- Pillar Axiom

Host multipathing software

- IBM System Storage Multipath Subsystem Device Driver (SDD)
- Symantec/Veritas Volume Manager 3.5 MP3, 4.0, 4.1, 4.3, 5.0
- PVLinks for HP-UX
- MPIO for Windows® and IBM AIX®
- MPxIO for Solaris
- Native NetWare multipathing driver
- Native VMware multipathing driver for VMware ESX 2.5 and later
- Native multipathing drivers for OpenVMS, Tru64, SGI Irix
- RDAC multipathing software for certain DS4000 environments

Operating system support

- IBM AIX V4.3.3
- IBM AIX 5L™ V5.1, V5.2, V5.3
- IBM AIX V6.1
- IBM z/VSE V4.2
- IBM PowerVM Virtual I/O Server 1.2, 1.3, 1.4, 1.5
- Microsoft® Windows 2000, 2003 and 2008
- Microsoft Hyper-V
- Novell NetWare V6.5
- Sun Solaris 8, 9, 10
- VMware ESX 2.1, 2.5.2, 2.5.3, 3.0.2, 3.5, 3i
- HP-UX 11.0, 11i V1, V2, V3
- Red Hat Enterprise Linux®, Advanced Server 2.1, 3.0, 4.0, 5.0
- SUSE Linux Enterprise Server 8, 9, 10
- HP Tru64 5.1A, 5.1B
- HP OpenVMS 7.3-2, 8.2, 8.3
- SGI Irix 6.5.28, Altix SLES 9
- IBM N series Gateways
- NetApp V-Series
- ONStor Clustered NAS Gateway

For information on HBAs and clustering support with these operating systems, visit

ibm.com/systems/storage/software/virtualization/svc/ and click on "Interoperability."

