IBM System Storage SAN Volume Controller

Simplified and centralized management for your storage infrastructure

Highlights

- Enhance storage capabilities with sophisticated virtualization, management and functionality
- Move data among virtualized storage systems without disruptions
- Store up to five times[1] as much active data in the same physical disk space using IBM® Real-time Compression™
- Simplify storage infrastructure with support for Fibre Channel over Ethernet (FCoE) protocol
- Optimize flash storage deployments automatically with IBM System Storage® Easy Tier®
- Allow for nondisruptive scalability from the smallest configuration to the largest
- Implement stretched configurations for high availability and data mobility between data centers

Are your storage requirements growing too fast? Are the costs of managing this growth taking more and more of your IT budget? Would you like to make a better use of existing storage without adding more complexity to the infrastructure? IBM System Storage SAN Volume Controller can help solve these problems and get you on the road toward a more flexible, responsive and efficient storage environment. SAN Volume Controller is designed to deliver the benefits of storage virtualization in environments from large enterprises to small businesses and midmarket companies.

The world is becoming smarter every day. What's making it smarter?

Today's businesses are facing explosive data growth every day. Every moment or action is a transaction, which creates data that is stored, copied, analyzed, classified and audited. Therefore, IT infrastructure has a new challenge: Store more with limited or less resources. This challenge means growing capacity without complexity while controlling capital and operational expenses and improving the efficiency of your storage environment.

Toward that end, many businesses have pursued strategies such as consolidation, tiering and virtualization to optimize their resources, simplify the environment and scale to support information growth.

These strategies help to get the most from your storage resources, and achieve a simpler, more scalable and cost-efficient IT infrastructure that aligns more flexibly with your business goals.

Originating at IBM some 40 years ago, virtualization has taken on new life in a variety 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, business flexibility and improved productivity to lower total costs of computing and improved reliability. Depending on the starting point, type and extent of the virtualization implemented, clients can quickly achieve many of these benefits.

Storage and server virtualization are complementary technologies that help enable you to build a completely virtualized infrastructure. When used together, server and storage virtualization are intended to enable you to derive greater benefit from each technology than if you deployed them alone.

A member of the IBM Storwize® family, SAN Volume Controller 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 and in real time, while avoiding increases in administrative costs.

Enhance storage

Virtualizing storage with SAN Volume Controller helps make new and existing storage more effective. SAN Volume Controller includes many functions traditionally deployed

separately in disk systems. By including these in a virtualization system, SAN Volume Controller standardizes functions across virtualized storage for greater flexibility and potentially lower costs.

SAN Volume Controller functions benefit all virtualized storage. For example, Easy Tier and Real-time Compression help improve performance and effective capacity whereas high-performance thin provisioning helps automate provisioning. These benefits can help extend the useful life of existing storage assets, reducing costs.

Integrating these functions into SAN Volume Controller also means that they are designed to operate seamlessly together, reducing management effort.

Improve efficiency

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 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.

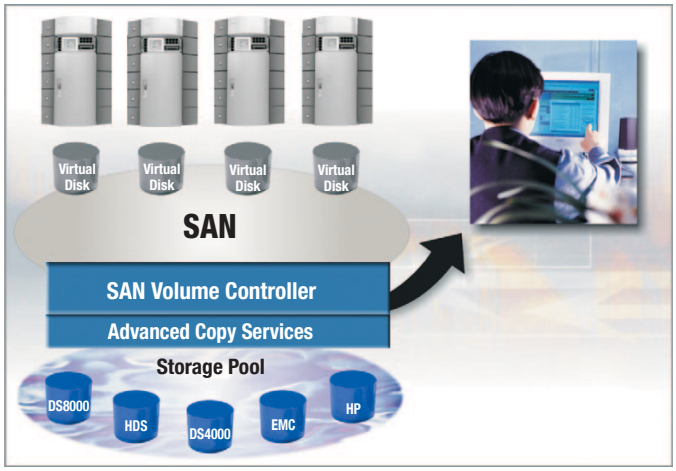
In addition, SAN Volume Controller combines together a variety of IBM technologies including high-performance thin provisioning, automated tiering, storage virtualization, Real-time Compression, clustering, replication, multi-protocol support and a next-generation graphical user interface (GUI). Together, these technologies are designed to enable SAN Volume Controller to deliver extraordinary levels of storage efficiency.

Real-time Compression is designed to enable storing up to five times[1] as much data in the same physical disk space by compressing data as much as 80 percent. Unlike other approaches to compression, Real-time Compression is designed to be used with active primary data such as production databases and email systems, which dramatically expands the range of candidate data that can benefit from compression. Real-time Compression operates immediately as data is written to disk, meaning that no space is wasted storing uncompressed data awaiting post-processing.

The benefits of using Real-time Compression together with other efficiency technologies are very significant and include reduced acquisition cost (because less hardware is required), reduced rack space, and lower power and cooling costs throughout the lifetime of the system. Real-time Compression can significantly enhance the usable capacity of your existing storage systems, extending their useful life even further.

By significantly reducing storage requirements with Real-time Compression, you can keep more information online, use the improved efficiency to reduce storage costs or achieve a combination of greater capacity and reduced cost.

Because Real-time Compression can be applied to a much wider range of data—including primary online data—the benefits of compression with SAN Volume Controller can be much greater than with alternative solutions, resulting in much greater savings. Enhancements to SAN Volume Controller nodes support up to three times the performance with Real-time Compression, enabling even larger configurations to experience compression benefits.



IBM System Storage SAN Volume Controller 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.

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 applications continue to run without disruption while you make changes to your storage infrastructure, which can help your business increase its availability to customers.

Moving data is one of the most common causes of planned downtime. SAN Volume Controller includes a dynamic data migration function that is designed to move data from one storage system to another while maintaining access to the data. The data migration function might be used, for example, when replacing older storage with newer storage, as part of load balancing work or when moving data in a tiered storage infrastructure.

Innovative flash storage support

SAN Volume Controller supports internal flash storage with up to four solid-state drives (SSDs) per node delivering up to 3.2 TB of raw flash storage capacity per I/O group or 12.8 TB of raw capacity per system. SAN Volume Controller also supports virtualized flash storage, in the form of IBM FlashSystem™ devices, other dedicated flash storage or SSDs within disk systems.

The SAN Volume Controller Easy Tier function is designed to help improve performance at a lower cost through more efficient use of flash storage. Easy Tier automatically identifies highly active data and moves only that data to flash storage, which targets the use of flash storage to the data that will benefit the most—helping to deliver the maximum benefit, even from small amounts of flash storage capacity. SAN Volume Controller Easy Tier can deliver up to three times performance improvement with only 5 percent flash storage capacity.

Easy Tier can use flash storage, whether deployed in SAN Volume Controller nodes or in virtualized disk systems, to benefit all virtualized storage. This approach delivers greater benefits from flash storage than tiering systems that are limited to just a single disk system.

Because the Easy Tier function is so tightly integrated, functions such as data movement, replication and management all may be used with flash in the same way as for other storage. SAN Volume Controller helps move critical data to and from flash storage as needed without application disruptions.

Combining SAN Volume Controller with FlashSystem storage devices delivers the best of both technologies: extraordinary performance for critical applications with IBM MicroLatency™, coupled with sophisticated functionality. For example, the SAN Volume Controller IBM FlashCopy® function can create "instant" backup snapshots, whereas thin provisioning and Real-time Compression help optimize use of FlashSystem capacity. The high-performance design of SAN Volume Controller enables the full performance of FlashSystem devices while adding valuable capabilities rarely found in dedicated flash storage.

Replication services

With many conventional SAN disk arrays, replication operations are limited to in-box or like-box-to-like-box circumstances. Functions from different vendors can operate in different ways, which makes operations in mixed environments more complex and increases the cost of changing storage types. But SAN Volume Controller is designed to enable administrators to apply a single set of advanced network-based 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 (or "snapshot") of active data that can be used for backup purposes or for parallel processing activities. Up to 256 copies of data may be created.

IBM Tivoli® Storage FlashCopy Manager is designed to perform near-instant application-aware snapshot backups using SAN Volume Controller FlashCopy, but with minimal impact to IBM DB2®, Oracle, SAP, Microsoft SQL Server or Microsoft Exchange. FlashCopy Manager also helps reduce backup and recovery times from hours to a few minutes.

The Metro Mirror and Global Mirror functions operate between SAN Volume Controller systems at different locations to help create copies of data for use in the event of a catastrophic event at a data center. For even greater flexibility, Metro Mirror and Global Mirror also support replication between SAN Volume Controller systems and other members of the Storwize family. Metro Mirror is designed to maintain a fully synchronized copy at "metropolitan" distances of up to 300 km, whereas Global Mirror is designed to operate asynchronously and so helps maintain a copy at much greater distances up to 8,000 km. Both functions are designed to support VMware vCenter Site Recovery Manager to help speed disaster recovery.

Enhanced data mobility for high availability

Clients are increasingly deploying virtualized servers using IBM PowerVM®, VMware and other technologies in high availability configurations, including multisite clustered implementations. Such configurations provide attractive options for high availability and load balancing.

To enhance this capability, a SAN Volume Controller system can also be installed in a stretched configuration where a single system supports storage and servers in two data centers. In this configuration, the solution enables servers at both data centers to access data concurrently. When combined with server data mobility functions such as VMware vMotion or PowerVM Live Partition Mobility, this SAN Volume Controller configuration enables nondisruptive storage and virtual machine mobility between the two data centers. Depending on application performance requirements, these data centers can be up to 300 km apart.

These SAN Volume Controller configurations may be combined with Metro Mirror or Global Mirror to support a third data center for applications that require both high availability and disaster recovery in a single solution.

Better 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. Users have as much as doubled the productivity of storage administration, helping their storage grow with their businesses while reducing the need for additional manual management.

The thin provisioning function helps automate provisioning as described above and helps 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

The Storwize family user interface is designed to be easy to use and includes many built-in IBM recommendations to help simplify storage provisioning so new users can get started quickly. At the same time, the interface preserves access to all the functional richness that experienced users have come to expect from SAN Volume Controller.

Because virtualized storage is managed primarily through SAN Volume Controller, in heterogeneous environments, multiple management interfaces are largely eliminated, vastly simplifying management and helping reduce the risk of error.

Plugins to support Microsoft System Center Operations Manager and VMware vCenter help enable more efficient consolidated management in these environments.

Complement server virtualization

Storage virtualization with SAN Volume Controller complements server virtualization with technologies such as PowerVM, Microsoft Hyper-V and VMware vSphere.

Server virtualization helps speed provisioning of new server images because provisioning becomes a software operation rather than one requiring hardware changes. Similarly, provisioning with SAN Volume Controller is achieved with software and with thin provisioning, and is designed to become an almost entirely automated function. Without SAN Volume Controller, server provisioning could be slowed by the need to provision storage.

Functions such as VMware vMotion support application mobility between physical servers. Similarly, SAN Volume Controller is designed to support nondisruptive data migration between storage systems. In addition, this solution helps make storage potentially available to all attached servers, greatly increasingly the flexibility for using VMotion. Without SAN Volume Controller, use of VMotion could be limited by storage being dedicated to specific servers.

Support for VMware vStorage APIs enables SAN Volume Controller to take on some storage-related tasks that were previously performed by VMware, which helps improve efficiency and frees up server resources for other, more mission-critical tasks.

Because SAN Volume Controller appears to servers as a single type of storage, virtual server provisioning is also simplified because only a single driver type is needed in server images, which also simplifies administration of those server images.

Server virtualization helps increase flexibility and reduce costs for disaster recovery by enabling the use of different physical configurations at production and recovery sites. Common virtual server configurations are used on these different physical infrastructures. Similarly, SAN Volume Controller supports the use of different physical storage configurations at production and recovery sites, yet helps create the same virtual configuration at each site. Without SAN Volume Controller, production and recovery site physical storage configurations would need to be similar, potentially increasing costs.

Many organizations run mixed environments with a variety of virtualized and non-virtualized servers and expect to do so for years to come. SAN Volume Controller provides an external storage virtualization function that operates in a consistent manner and provides consistent services for all attached servers, regardless of whether or not those servers are virtualized. In contrast, server-based storage virtualization techniques differ from server to server and make mixed environments more complex rather than less.

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 with one (optionally, two) Intel Xeon 5600 2.4 GHz six-core processor, 24 GB (optionally, 48 GB) of memory, four (optionally, eight) 8 Gbps Fibre Channel ports, two 1 Gbps iSCSI ports and

optionally, two 10 Gbps iSCSI/FCoE ports. Highly available I/O groups are the basic configuration element of a SAN Volume Controller cluster. 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 4,096 host servers, up to 8,192 volumes and up to 32 PB of virtualized storage capacity. This configuration flexibility means that your SAN Volume Controller implementation can start small with an attractive price to suit smaller environments or pilot projects, and then grow with your business to manage very large storage environments.

Virtualized foundation for cloud deployments

Improving efficiency and delivering a flexible, responsive IT infrastructure are essential requirements for any cloud deployment. Technologies for delivering this infrastructure include virtualization, consolidation and automation.

With its storage virtualization capabilities, integrated support for OpenStack compute clouds, and tight affinity with technologies such as PowerVM and VMware, SAN Volume Controller complements virtualized servers that are at the heart of cloud deployments. The high availability characteristics of SAN Volume Controller, including its ability to move data among storage systems and move volumes between SAN Volume Controller engines without disruption to applications, reinforces this role.

Real-time Compression and thin provisioning help deliver levels of storage utilization higher than ever, lowering infrastructure costs. Finally, automated tiering technologies such as Easy Tier and Tivoli software help make the best use of the storage resources available.

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, thereby limiting deployments.

SAN Volume Controller integrates virtualization, management and storage functions into a single system designed to make it much easier to implement tiered storage. The solution helps deliver consistent management and function across all tiers of storage, and helps support movement of data between tiers without disrupting applications.

Next-generation networking

As organizations evolve towards a dynamic infrastructure, they need new ways to reduce the complexity of their environments. To address this challenge, clients are turning to Converged Enhanced Ethernet (CEE) networks, which help enable them to combine storage, messaging traffic, VoIP, video, and other data on a common data center Ethernet infrastructure.

SAN Volume Controller systems with 10 Gbps Ethernet ports support attachment to next-generation Converged Enhanced Ethernet networks using Fibre Channel over Ethernet. This support enables you to connect SAN Volume Controller to servers and to other SAN Volume Controller systems for clustering or mirroring using Fibre Channel or FCoE interfaces using these networks. The same ports may also be used for iSCSI server connections.

Improve energy efficiency

Many data centers today are focusing on reducing their energy usage to reduce costs and demonstrate concern for the environment. SAN Volume Controller can be a key tool to help you improve the energy efficiency of your data center. This solution can help improve energy efficiency in several ways. For example, IBM Real-time Compression with SAN Volume Controller can help by significantly increasing the effective capacity of storage and reduce requirements for additional storage in the future. This can help reduce the total amount of physical storage required by up to 80 percent, helping reduce energy use. The thin provisioning and snapshot functions are designed to extend this benefit even further.

IBM services

IBM offers services to help speed implementation and improve return on investment. IBM storage specialists are available to conduct storage solution and infrastructure reviews that can help 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 keep your infrastructure up-to-date and running smoothly.

For more information

To learn more about IBM System Storage SAN Volume Controller, please contact your IBM marketing representative or IBM Business Partner, or visit the following website: **ibm.com**/storage/svc

For the complete and latest support information, visit: **ibm.com**/storage/support/2145

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