



# IBM SAN Volume Controller

*Improving storage infrastructure flexibility and data economics with IBM Spectrum Virtualize software*

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## Highlights

- Enhance storage functions, economics and flexibility with sophisticated virtualization
  - Leverage hardware-accelerated data compression for efficiency and performance
  - Use encryption to help improve security for data on existing storage systems
  - Move data among virtualized storage systems without disruptions
  - Optimize tiered storage—including flash storage—automatically with IBM® Easy Tier®
  - Improve network utilization for remote mirroring and help reduce costs
  - Implement multi-site configurations for high availability and data mobility
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Data is the new currency of business, the most critical asset of the modern organization. In fact, enterprises that can gain business insights from their data are twice as likely to outperform their competitors; yet 72 percent of them have not started or are only planning big-data activities.<sup>1</sup> In addition, organizations often spend too much money and time managing where their data is stored. The average firm purchases 24 percent more storage every year,<sup>2</sup> but uses less than half of the capacity it already has.<sup>3</sup>

The simple fact is that *infrastructure matters*. The right infrastructure allows organizations to shift spending and invest in projects that improve business results. The infrastructure must ensure the most value from data at the least cost with the least effort and the greatest flexibility.

Organizations need:

- *Increased performance* to enable faster analytics and speed time to insights
- *Data reduction* that helps lower energy costs and frees up capital expense budgets
- *Reduced complexity* to drive down operational expenses and allow workers to focus on strategic priorities
- *High resiliency* to help meet service level agreements with confidence and secure data against threats

In the era of cloud, big data and analytics, mobile and social computing, organizations need to meet ever-changing demands for storage while also improving data economics. IT must deliver more services faster and more efficiently, enable real-time insight and support more customer interaction. The right infrastructure allows clients to share information, secure transactions and drive real-time insights.



Built with IBM Spectrum Virtualize™ software—part of the IBM Spectrum Storage™ family—IBM SAN Volume Controller (SVC) helps organizations achieve better data economics by supporting these new workloads that are critical to their success. SVC systems can handle the massive volumes of data from mobile and social applications, enable rapid and flexible cloud services deployments, and deliver the performance and scalability needed to gain insights from the latest analytics technologies.

Building an effective infrastructure starts with software-defined storage, which frees data from the physical storage and provides better access to applications. IBM Spectrum Storage software helps make an infrastructure simple, cost-effective, easy to manage, and more responsive to changing business needs.

There are many ways to benefit from IBM Spectrum Storage. One approach starts with data virtualization provided by IBM Spectrum Virtualize, which provides a software layer that helps simplify storage management. Among other benefits, data virtualization simplifies deployment of new applications and new storage tiers, eases movement of data among tiers, and enables consistent, easy-to-use optimization technologies across multiple storage tiers.

An industry-leading storage virtualization system, SVC has been delivering availability, reliability, flexibility and efficiency for more than 10 years. Its innovative data virtualization capabilities built with IBM Spectrum Virtualize also provide the foundation for the IBM Storwize® family and IBM FlashSystem™ V9000.

IBM Spectrum Virtualize software in SVC provides the latest storage technologies for unlocking the business value of stored data, including virtualization and IBM Real-time Compression™. SVC is designed to deliver unprecedented levels of efficiency, ease of use and dependability for organizations of all sizes.



## Data virtualization

SVC includes IBM Spectrum Virtualize data virtualization technology to help insulate applications from physical storage. This enables applications to run without disruption, even when changes are made to the storage infrastructure.

Virtualizing storage with SVC helps make new and existing storage more effective. SVC includes many functions traditionally deployed separately in disk systems. By including these in a virtualization system, SVC standardizes functions across virtualized storage for greater flexibility and lower costs.

IBM Spectrum Virtualize functions in SVC benefit all virtualized storage. For example, Easy Tier and Real-time Compression help improve performance and increase effective capacity; encryption helps improve data security, while high-performance thin provisioning helps automate provisioning. These benefits can help extend the useful life of existing storage assets, reducing costs. And since these functions are integrated into SVC, they can operate smoothly together, reducing management effort.

## Real-time Compression

IBM Real-time Compression is designed to enable storing up to five times as much data in the same physical disk space by compressing data as much as 80 percent.<sup>4</sup> 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.

What's more, Real-time Compression with hardware acceleration transforms the economics of data storage. When applied to new or existing virtualized storage, it can significantly increase the usable capacity while maintaining application performance. This can help eliminate or drastically reduce costs for storage acquisition, rack space, power, and cooling, and can extend the useful life of existing storage assets.

## Extraordinary efficiency

IBM Spectrum Virtualize software in SVC combines a variety of IBM technologies including high-performance thin provisioning, automated tiering, data virtualization, Real-time Compression, clustering, replication, multi-protocol support and a next-generation graphical user interface (GUI). It also includes leading third-party technologies, such as Bridgewater SANrockIT network optimization. Together, these technologies are designed to deliver extraordinary levels of storage efficiency.

## Improved application availability

Moving data is one of the most common causes of planned downtime. IBM Spectrum Virtualize data virtualization with SVC enables moving data from one storage system to another or between arrays, while maintaining access to the data. This

function might be used when replacing older storage with newer storage, as part of load-balancing work or when moving data in a tiered storage infrastructure from disk drives to flash.

## Innovative flash storage support

SVC supports up to 48 flash drives per pair of SVC Data Engines for up to 153.6 TB of raw flash storage capacity per input/output (I/O) group or 614.4 TB of raw flash capacity per system. SVC also supports virtualized IBM FlashSystem devices, other dedicated flash storage, and flash drives within storage systems. In addition, the Distributed RAID technology in SVC helps improve performance with flash drives by using all drives for data and spare capacity rather than reserving some drives as spares.

## Tiered storage

Deploying tiered storage is an important strategy for controlling storage costs. Using this strategy, organizations consider the performance and cost-effectiveness of different types of storage to right-size the storage to meet business needs. Until now, however, management and functional differences among different types of storage—even from the same vendor—have made implementing tiered storage operationally complex, limiting deployments.

Automated storage tiering with Easy Tier can help improve performance at a lower cost by enabling more efficient use of flash storage or multiple tiers of disk drives. Easy Tier automatically identifies more active data and moves that data to faster storage such as flash. This helps organizations use flash storage for the data that will benefit the most—helping deliver the maximum benefit, even from small amounts of flash storage capacity. In fact, Easy Tier can deliver up to three times performance improvement with only five percent flash storage capacity.<sup>5</sup>

Easy Tier can use any supported flash storage to benefit any virtualized storage. This approach delivers greater benefits from flash storage than tiering systems that are limited to just a single disk system. Because Easy Tier is so tightly integrated, functions such as data movement, replication, encryption, Real-time Compression and management may all be used with flash in the same way as for other storage.

IBM Spectrum Virtualize software in SVC 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 control across all tiers of storage, and helps move critical data between tiers—including flash storage—without disrupting applications.

### Flexible replication

With many conventional disk systems, 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 IBM Spectrum Virtualize software in SVC 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 IBM 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 Spectrum Protect™ Snapshot—part of IBM Spectrum Control™ and IBM Spectrum Protect—is designed to perform near-instant application-aware snapshot backups using SVC FlashCopy local replication, but with minimal impact to IBM DB2®, Oracle, SAP, VMware, Microsoft SQL Server or Microsoft Exchange.

SVC also supports remote mirroring to enable organizations to create copies of data at remote locations for disaster recovery. Replication can occur between any systems built with IBM Spectrum Virtualize and can include any supported virtualized storage. Remote mirroring works with Fibre Channel, Fibre Channel over Ethernet (FCoE), and IP (Ethernet) networking between sites, and supports VMware vCenter Site Recovery Manager to help speed disaster recovery.

With IP networking, IBM Spectrum Virtualize in SVC uses innovative Bridgeworks SANrockIT technology to optimize use of network bandwidth. As a result, the networking infrastructure may require lower speeds (and thus, lower costs), or users may be able to improve the accuracy of remote data through shorter replication cycles.

### Enhanced data mobility for high availability

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

The IBM HyperSwap® function enables a single SVC system that 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 configuration enables nondisruptive storage and virtual machine mobility between the two data centers, which can be up to 300 km (186 miles) apart.

## Simplified management

IBM Spectrum Virtualize software provides an easy-to-use graphical interface for centralized 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—vastly simplifying management and helping reduce the risk of errors. IT staff can also use built-in monitoring capabilities to securely check the health and performance of the system remotely from a mobile device.

In addition, plug-ins to support Microsoft System Center Operations Manager and VMware vCenter help enable more efficient, consolidated management in these environments.

## Smooth server virtualization

IBM Spectrum Virtualize in SVC 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 SVC is achieved with software and with thin provisioning, and is designed to become an almost entirely automated function. Without SVC, server provisioning could be slowed by the need to provision storage.

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

Support for VMware vStorage APIs (VAAI and VASA) enables SVC 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. IBM Spectrum Virtualize software also provides advanced storage functions that make SVC ready for VMware vSphere Virtual Volumes (VVOL) and supports the latest capabilities in key operating environments including Microsoft ODX and VMware vSphere v6.

Many organizations run mixed environments with a variety of virtualized and non-virtualized servers, and expect to do so for years to come. SVC 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.

## Scalability and performance

SVC combines hardware and software into an integrated, modular solution that is highly scalable. The new SVC Data Engine can have up to two 8-core Intel Xeon E5-2650v2 processors running at 2.6 GHz with 32 GB or 64 GB of cache. One or two compression accelerators based on Intel QuickAssist technology are available. Flexible host interface options support up to sixteen 8 Gbps or 16 Gbps Fibre Channel ports, and four 10 Gbps iSCSI/FCoE ports.

SVC Data Engines are always deployed in high-availability pairs and up to four pairs may be clustered into a single system with up to 128 cores, 512 GB of cache and 128 Fibre Channel ports, which can support up to 192 TB of raw internal storage and a total of 32 PB of virtualized storage capacity.

## 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, high-availability architecture, and tight affinity with PowerVM, Hyper-V, VMware and OpenStack, SVC complements virtualized servers that are at the heart of cloud deployments.

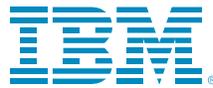
### Why IBM?

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 SAN Volume Controller, please contact your IBM representative or IBM Business Partner, or visit the following website: [ibm.com/storage/svc](http://ibm.com/storage/svc)

For the complete and latest support information, visit: [ibm.com/storage/support/2145](http://ibm.com/storage/support/2145)



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Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.

<sup>1</sup> Michael Schroeck, Rebecca Shockley, Janet Smart, Dolores Romero-Morales and Peter Tufano, “Analytics: The real-world use of big data”, *IBM Institute for Business Value and Saïd Business School at the University of Oxford*, October 2012. [http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=XB&infotype=PM&appname=GBSE\\_GB\\_BT\\_USEN&htmlfid=GBE03519USEN&attachment=GBE03519USEN.PDF](http://www-01.ibm.com/common/ssi/cgi-bin/ssialias?subtype=XB&infotype=PM&appname=GBSE_GB_BT_USEN&htmlfid=GBE03519USEN&attachment=GBE03519USEN.PDF)

<sup>2</sup> TheInfoPro “Wave 17 Storage Study,” *451 Research*, October 2013. <https://451research.com/component/content/article/15/254-theinfo-pro-wave-17-storage-study>

<sup>3</sup> IBM storage infrastructure optimization studies – April 2014

<sup>4</sup> IBM lab measurements – April 2012

<sup>5</sup> IBM lab measurements – August 2010



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