

IBM SAN Volume Controller

Leverage software-defined storage capability for new and existing storage

Highlights

- Enhance storage functions, economics and flexibility
- Complement on-premises storage of all types with hybrid cloud capability
- Use encryption to help improve data security
- Leverage sophisticated data reduction technologies for efficiency
- Move data among storage systems without disruptions
- Optimize tiered storage automatically with IBM Easy Tier
- Implement multi-site configurations for high availability and data mobility

Data is the new currency of business, the most critical asset of the modern organization. It's no surprise that this data is growing. In fact, Enterprise Strategy Group reports that costs, data growth, management and running out of space were among the top five storage challenges in 2017.¹

As a result, 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 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, and 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 rapid insight and support more customer interaction. The right infrastructure allows clients to share information, secure transactions and drive *real-time* insights.

Building an effective infrastructure starts with software-defined storage, which frees data from 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.

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.

An industry-leading storage solution, SVC has been delivering availability, reliability, flexibility and efficiency for more than 13 years. Its innovative capabilities, built with IBM Spectrum Virtualize, also provide the foundation for the IBM Storwize family, IBM FlashSystem V9000 and VersaStack integrated solutions.

Enhancing storage function

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



IBM SAN Volume Controller Model SV1 Engines

SVC helps make new and existing storage more effective and includes many functions traditionally deployed separately in storage systems. SVC standardizes functions across storage systems for greater flexibility and lower costs.

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

Hybrid cloud

In a recent survey, more than 75 percent of companies said that to achieve their storage goals, they plan to increase spending on cloud services.² The challenge for these organizations is how to take advantage of hybrid cloud technology without the expense of replacing current storage with cloud-capable storage systems. IBM Spectrum Virtualize in SVC and the cloud enables use of cloud storage for disaster recovery from any of more than 440 supported storage systems, dramatically speeding the ability to deploy hybrid-cloud configurations while slashing the potential cost. IBM Spectrum Virtualize for Public Cloud enables new opportunities to migrate data between on-premises and public cloud storage as well as use of public cloud for disaster recovery. Together with IBM Spectrum Copy Data Management software, cloud storage may be used for data copies as well.

Data reduction for enhanced efficiency

New data reduction pools help transform the economics of data storage. When applied to new or existing storage, they can significantly increase 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. Capabilities include:

- Block deduplication that works across all the storage in a data reduction pool to minimize the number of identical blocks
- New compression technology that provides consistent performance across application workload patterns
- New SCSI UNMAP support that de-allocates physical storage when operating systems delete logical storage constructs such as files in a file system

Improved application availability

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

Should an SVC engine fail, a new “hot spare” capability enables the system to rapidly switch to a standby engine, restoring full redundancy and performance in seconds.

The IBM HyperSwap function supports storage and servers in two data centers. In this configuration, the solution enables servers at both data centers to access data concurrently with automated switch-over in case of failure. When combined with server data mobility functions such as VMware vMotion or IBM 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.

IBM has shipped more than 159,000 systems running IBM Spectrum Virtualize, including more than 62,000 SVC engines. These dependable systems are delivering more than five nines of availability while managing more than 8.2 exabytes of data.⁴

Innovative flash storage support

SVC supports up to twenty 12-Gbps SAS expansion enclosures per pair of SVC data engines, for up to 736 flash or disk drives. These enclosures provide low-cost storage capacity to complement external storage. SVC also supports IBM FlashSystem devices, other dedicated flash storage and flash drives within storage systems. The distributed RAID technology in SVC helps improve rebuild times and performance in drives within expansion enclosures by using all drives for data and spare capacity, rather than reserving some drives as spares.

Tiered storage

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.⁵

Easy Tier can use any supported flash storage to benefit any other storage. This approach delivers greater benefits from flash storage than tiering systems that are limited to just a single disk system.

Flexible replication

With many conventional storage 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.

IBM Spectrum Protect Snapshot is designed to perform near-instant, application-aware snapshot backups using SVC IBM FlashCopy local replication, but with minimal impact to IBM Db2, Oracle, SAP, VMware, Microsoft SQL Server or Microsoft Exchange databases.

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 storage (including cloud with IBM Spectrum Virtualize software). Support for VMware vCenter Site Recovery Manager helps speed disaster recovery.

Simplified management

IBM Spectrum Virtualize software delivers a modern user 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. Plug-ins to support Microsoft System Center Operations Manager and VMware vCenter help enable more efficient, consolidated management in these environments. The new interface is consistent with other members of the IBM Spectrum Storage family, to simplify tasks for administrators and help reduce the risk of error.

Gain storage visibility, insight and control

As the resource on which your business depends, data is paramount. Your storage systems take on even greater importance. IBM Storage Insights and IBM Storage Insights Pro provide critical capabilities that enhance your experience throughout that data's lifetime:

- A single dashboard so you can see the status of all your IBM block storage at a glance
- Trend information about capacity and performance so you can make better and more informed decisions
- Storage health information that helps you bring your configuration in line with best practices
- When support is needed, the ability to easily open a ticket, upload log information, and view open tickets

- Detailed configuration data available to IBM specialists to help close tickets quickly

Delivered as a service from IBM Cloud at no charge, Storage Insights is quick and easy to set up and requires no ongoing software maintenance. IBM Storage Insights Pro is an upgrade that provides more detailed information and additional capabilities.

Complement server virtualization and containerization

IBM Spectrum Virtualize in SVC complements server virtualization with technologies such as PowerVM, Microsoft Hyper-V, VMware vSphere, Kubernetes and Docker.

Similar to virtualized servers, 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.

Containers are an open-source technology that lets software be packaged with everything it needs to run the same in any environment. Containers offer the versatility of virtual machines, but at a much smaller footprint and cost. As a result, containerization is a key enabling technology for flexibly delivering workloads to private and public cloud and DevOps. With IBM Spectrum Connect software, SVC enables any supported storage to be used as persistent storage in container environments, improving flexibility, simplifying deployment and helping to lower costs while offering clients the confidence of deploying stateful containers using highly available storage with enterprise capabilities.

Many organizations run mixed environments with a variety of virtualized and non-virtualized servers and expect to do so for years to come. SVC offers an external storage virtualization function to provide consistent services for all attached servers, 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 SVC data engine has two 8-core Intel E5-2667v4 3.2GHz processors with 64 to 256 GB of system memory in increments of 64 GB. Up to two compression accelerators based on Intel QuickAssist technology are available. Flexible host interface options support three built-in 10 Gbps Ethernet ports (iSCSI) and up to sixteen 16 Gbps FC ports (FC or FC-NVMe), up to four 10 Gbps Ethernet (iSCSI/FCoE) ports, or up to eight 25 Gbps Ethernet (iSCSI, iWARP, RoCE) 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, 2 TB of system memory, 128 Fibre Channel ports, and up to 2,944 drives, which can support a total of 32 PB of storage capacity.

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 robust storage capabilities, high-availability architecture and compatibility with PowerVM, Hyper-V, VMware, OpenStack, Kubernetes and Docker, SVC complements virtualized servers that are at the heart of cloud deployments.

¹ Mark Peters, "ESG Brief: 2017 Storage Trends: Challenges and Spending," August 2017.

<http://www.esg-global.com/research/esg-brief-2017-storage-trends-challenges-and-spending>

² "Voice of the Enterprise: Storage," 451 Research, 2016.

<https://451research.com/customer-insight-voice-of-the-enterprise-overview>.

³ IBM lab measurements – August 2017.

⁴ Based on IBM internal measurements – April 2018.

⁵ IBM lab measurements – August 2010.

IBM SAN Volume Controller at a glance

Shared SMP processor configuration per engine	Two Intel Xeon E5-2667v4 3.2GHz 8-core processors
Processor memory per engine	64 to 256 GB (in increments of 64 GB)
Host adapter interfaces per engine	<ul style="list-style-type: none"> • Up to sixteen 16-Gbps Fibre Channel ports (FC or FC-NVMe) • Up to four 10-Gbps optical (SFP+) Ethernet ports for iSCSI/Fibre Channel over Ethernet (FCoE)/replication • Three 10-Gbps copper (RJ45) Ethernet ports for management and/or iSCSI • Up to eight 25-Gbps Ethernet (iSCSI, iWARP, RoCE) ports
Integrated drive support	Up to twenty 12-Gb SAS expansion enclosures; up to 736 drives (flash, SAS and nearline-SAS options) per pair of SVC data engines; up to 2,944 drives per clustered system
Maximum storage capacity	Up to 32 PB usable capacity
Internal drive size	<ul style="list-style-type: none"> • Flash drives: 200 GB, 400 GB, 800 GB, 1.6 TB, 1.92 TB, 3.2 TB, 3.84 TB, 7.68 TB, 15.36 TB • SFF HDD: 300 GB, 600 GB, 900 GB 15K SAS; 900 GB, 1.2 TB, 1.8 TB, 2.4 TB 10K SAS; 2 TB 7.2K nearline-SAS • LFF HDD: 4 TB, 6 TB, 8 TB, 10 TB, 12 TB 7.2K nearline-SAS
RAID levels for internal drives	0, 1, 5, 6 and 10, distributed
Storage and server attachment	Fibre Channel, FC-NVMe, FCoE and iSCSI
Storage system support	More than 440 flash, hybrid and disk storage systems from IBM and other vendors

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For more information

To learn more about IBM SAN Volume Controller, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/us-en/marketplace/san-volume-controller

For the complete and latest support information, visit:

ibm.com/storage/support/2145

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