

IBM Storwize V7000

Maximizing storage efficiency and performance with end-to-end NVMe

Highlights

- Accelerate business applications with NVMe and IBM FlashCore technologies
- Maximize value with a wide range of heterogeneous data services
- Transform data economics with sophisticated data reduction technologies
- Utilize encryption to enhance security for data across all systems
- Leverage AI to optimize configurations and streamline issue resolution
- Multiply the power of on-premises storage with hybrid cloud capabilities
- Scale capacity quickly and easily with high-density enclosures

To enter the new era of business, organizations need robust and agile storage solutions that can help them deliver more services faster and more efficiently, enable real-time insight and support more customer interaction. They need a storage infrastructure that can help them deploy their key business initiatives and let them capitalize on business opportunities.

Built with IBM Spectrum Virtualize software—part of the IBM Spectrum Storage family— IBM Storwize V7000 helps organizations cost-effectively support the workloads and applications that are critical to their success with feature-rich, enterprise-grade storage solutions. Storwize systems can handle massive volumes of data, enable rapid and flexible cloud services deployments, and deliver the performance needed to gain insights from the latest analytics technologies with all-flash or hybrid-flash solutions.

IBM Storwize V7000 provides the foundation for implementing a cost-efficient storage infrastructure that also delivers extraordinary functionality and performance. Designed with IBM FlashCore technology and end-to-end NVMe, Storwize V7000 accelerates business-critical applications and real-time analytics.

IBM Spectrum Virtualize software in Storwize V7000 provides comprehensive data services across all managed systems, including encryption, automated tiering and data reduction pools. In addition, the solution includes a powerful new platform that enables efficient, cost-effective hybrid cloud storage solutions.

High-performance, scalable storage

Storwize V7000 is designed to deliver flexible, affordable scaling and performance. It is now NVMe-optimized, with support for NVMe over Fabrics for the highest end-to-end storage performance. NVMe flash drives accelerate workloads and lower storage latency to accelerate application performance and business productivity.

Storwize V7000 systems leverage the advantages of IBM FlashCore-enhanced 3D TLC storage media that provides greater flash density and storage capacity than multi-level cell (MLC) solutions. Along with the move to 3D TLC flash, purpose-engineered FlashCore Modules (FCM) utilize powerful inline, hardware-accelerated data compression technology that provides consistent, high-performance data compression across the full range of workloads. The FCMs are designed to support FIPS 140-2 Level 1 encryption with IBM Security Key Lifecycle Manager centralized key management and full hot-swap capabilities.

You can choose FCMs in multiple capacities or you can opt for industry-standard NVMe-enabled flash drives, with the capability to support both drive types simultaneously within the array. This means that using the always-on inline high-performance data compression in the FCMs or Data Reduction Pool technology with the industry-standard drives, effective capacities can range up to two petabytes in a single 2U enclosure, with the ability to cluster, scale out or scale up capacity and performance to many petabytes and millions of input/output operations per second (IOPS).

The control enclosure contains dual redundant controllers, each with two 8-core 1.7 GHz Skylake processors with 128 GB and options to go up to 1.1 TB of cache. Flexible host interface options include 10 Gbps iSCSI, 16 Gbps Fibre Channel with FC-NVMe support and 25 Gbps Ethernet with iSCSI, iWARP and RoCE support. Control enclosures support three models of expansion enclosures with 24 2.5-inch, 12 3.5-inch, and high-density enclosure with up to 92 3.5-inch or 2.5-inch drives. Each Storwize V7000 control enclosure supports up to twenty expansion enclosures or eight high-density enclosures attached using high-performance 12 Gbps SAS for a maximum capacity of 760 drives.

Clustered systems provide easy scale-out growth in performance and capacity with up to four controllers and associated expansion enclosures operating as a single storage system with 128 processor cores, up to 4.6 TB of cache, 3,040 drives and 32 PB of total capacity.

Enhanced storage functionality

Storwize V7000 uses IBM Spectrum Virtualize technology to provide a wide range of market-leading data services and ensure that applications run without disruption, even when changes are made to the storage infrastructure.

Storwize V7000 also extends data services to heterogeneous storage systems. When virtualized, data in a storage system becomes part of the Storwize solution, and it can be managed in the same way as internal drives. External systems inherit all the Storwize functional richness and ease-of-use features, including advanced replication, high-performance thin provisioning, encryption, compression, deduplication and IBM Easy Tier that improve administrator productivity and boost storage utilization while also enhancing and extending the value of existing storage investments.

Storwize V7000 can accelerate efficiency and business value. Nondisruptive data migration shortens time-to-value from weeks or months to days, minimizes downtime for migration, eliminates the cost of add-on migration tools, and helps eliminate penalties and additional maintenance charges for lease extensions. The result can be real cost savings to your business.



IBM Storwize V7000

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.¹ 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 Storwize V7000 enables the use of cloud storage for disaster recovery, dramatically speeds deployment of hybrid cloud configurations and helps slash storage costs. IBM Spectrum Virtualize for Public Cloud enables new opportunities to migrate data between on-premises and public cloud storage, while allowing use of public cloud resources for disaster recovery. By leveraging IBM Spectrum Copy Data Management software, cloud storage may be used for data copies as well.

Data reduction for enhanced efficiency

Data reduction pools (DRP) help transform the economics of data storage. When applied to new or existing storage, they can significantly increase usable capacity while maintaining consistent 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. DRP capabilities include:

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

Tiered storage

Automated storage tiering with Easy Tier can help improve performance and lower costs 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 leverage flash storage for the data that can benefit the most. In fact, Easy Tier can deliver up to three times performance improvement with only five percent flash storage capacity.²

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

Advanced replication

IBM Spectrum Virtualize in Storwize V7000 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 is designed to perform near-instant application-aware snapshot backups using FlashCopy local replication, but with minimal impact to IBM Db2, Oracle, SAP, VMware, Microsoft SQL Server or Microsoft Exchange databases.

IBM Spectrum Virtualize three-site replication capability runs data copies at both metro and global distances to offer a variety of recovery point and time options.

Storwize V7000 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.

For IP replication, IBM Spectrum Virtualize uses innovative Bridgeworks WANrockIT technology to optimize the use of network bandwidth and can compress data being transmitted to help reduce networking costs and improve remote replica currency.

High availability

Moving data is one of the most common causes of planned downtime. The IBM Spectrum Virtualize technology within Storwize V7000 enables data moving 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.

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.

Simplified management

Storwize V7000 with IBM Spectrum Virtualize software, is designed for ease of use from the very start. The systems utilize 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 interface is consistent with other members of the IBM Spectrum Storage family, to simplify tasks for administrators and help reduce the risk of error.

AI-powered storage visibility, insight, and control

IBM Storage Insights and Storage Insights Pro provide critical system analysis and optimization capabilities that enhance your Storwize experience, such as:

- 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.

Easier server virtualization and containerization

IBM Spectrum Virtualize in Storwize V7000 complements server virtualization with technologies such as PowerVM, Microsoft Hyper-V, VMware vSphere, Kubernetes and Docker.

Similar to provisioning virtualized servers, provisioning capacity with Storwize V7000 is achieved with software and with thin provisioning, and is designed to become an almost entirely automated function. Without Storwize V7000, server provisioning could be slowed by the need to provision storage.

Containers are an open-source technology that wraps applications with everything needed 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, Storwize V7000 enables any supported storage to be used as persistent storage in Docker and Kubernetes container environments, improving flexibility, simplifying deployment and lowering costs while offering you the confidence of deploying stateful containers using highly available storage with enterprise capabilities.

¹“Voice of the Enterprise: Storage,” 451 Research, 2016.

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

² IBM lab measurements – August 2010.

IBM Storwize V7000 at a glance

Host interface	SAN or direct-attached, 10 Gbps Ethernet (iSCSI), 16 Gbps Fibre Channel (FC, FC-NVMe) and 25 Gbps Ethernet (iSCSI, iWARP, RoCE), 4-port 32 Gb FC with FC-NVMe
User interface	GUI
Supported drives	2.5-inch NVMe FCMs <ul style="list-style-type: none"> • 4.8 TB, 9.6 TB and 19.2 TB compressing FCMs 2.5-inch NVMe flash drives <ul style="list-style-type: none"> • 800 GB, 1.92 TB, 3.84 TB, 7.68 TB and 15.36 TB
RAID levels	DRAID 5 (CLI-only), 6 and TRAIID 10
Maximum drives supported	760 per control enclosure; 3,040 per clustered system
SAS Expansion enclosures	Model 12F/24F 2U 12 or 24 drive Model 92F 5U 92 drive 2.5-inch flash drives supported: <ul style="list-style-type: none"> • 800 GB, 1.6 TB, 1.92 TB, 3.84 TB, 7.68 TB, 15.36 TB, and 30.72TB 2.5-inch disk drives supported: <ul style="list-style-type: none"> • 600 GB and 900 GB 15k SAS drive • 600 GB, 900 GB, 1.2 TB, 1.8 TB and 2.4 TB 10k SAS disk • 2 TB 7.2k nearline SAS disk 3.5-inch disk drives supported: <ul style="list-style-type: none"> • 4 TB, 6 TB, 8 TB, 10 TB, 12 TB, and 14 TB 7.2k nearline SAS disk
Fans and power supplies	Fully redundant, hot swappable
Rack Support	Standard 19-Inch
Management software	IBM Spectrum Virtualize software
Cores per control enclosure/clustered system	32/128
Cache per control enclosure/clustered system	128 or up to 1,152GB / 512 or up to 4,608 GB
Advanced features included with each system	Virtualization of internal storage, data migration, data reduction pools with thin provisioning, unmap and deduplication
Additional available advanced features	Remote mirroring, Easy Tier, compression, external virtualization, encryption, FlashCopy, IBM Spectrum Control, IBM Spectrum Protect Snapshot
Warranty	Hardware: <ul style="list-style-type: none"> • 3-year limited warranty • Customer-replaceable units • On-site service • Next business day between 9 a.m. and 5 p.m. • Service upgrades available Software: <ul style="list-style-type: none"> • Software maintenance agreement available
Replication services	FlashCopy, IBM Spectrum Protect Snapshot, Metro Mirror (synchronous), Global Mirror (asynchronous)
Dimensions	Control enclosures <ul style="list-style-type: none"> • Width: 483 mm (19.0 in.) • Depth: 850 mm (33.5 in.) • Height: 88 mm (3.5 in.)

Weight	Control enclosures: <ul style="list-style-type: none">Fully configured (24 drive modules installed): 46.6 kg (102.5 lb)
Supported Systems	For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the IBM System Storage Interoperation Center: https://www.ibm.com/systems/support/storage/ssic/interoperability.wss
Independent Software vendors (ISV) solutions	For a list of high-quality solutions with our partner ISVs, including access to solution briefs and white papers, refer to the ISV Solutions Resource Library: https://www.ibm.com/partnerworld/wps/pub/systems/whyibm/programs

Why IBM?

Innovative technology, open standards, excellent performance, and a broad portfolio of proven storage solutions backed by IBM's global presence and leadership—these are just a few of the reasons you should consider deploying IBM Storwize V7000 and [Storwize V7000F](#).

For more information

To learn more about Storwize V7000, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/us-en/marketplace/storage-workload

To learn more about IBM Storwize V7000F all-flash, please contact your IBM representative or IBM Business Partner, or visit: ibm.com/systems/storage/storwize/all-flash

For a list of currently supported servers, operating systems, host bus adapters, clustering applications and SAN switches and directors, refer to the IBM System Storage Interoperation Center at: ibm.com/systems/support/storage/config/ssic

For a list of high-quality solutions with our partner ISVs, including access to solution briefs and white papers, refer to: ibm.com/systems/storage/solutions/isv

© Copyright IBM Corporation 2019.

IBM, the IBM logo, and ibm.com are trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at <https://www.ibm.com/legal/us/en/copytrade.shtml>, and select third party trademarks that might be referenced in this document is available at https://www.ibm.com/legal/us/en/copytrade.shtml#section_4.

This document contains information pertaining to the following IBM products which are trademarks and/or registered trademarks of IBM Corporation:
IBM®, Easy Tier®, FlashCopy®, IBM FlashCore®, IBM FlashSystem®, IBM Spectrum Storage™, IBM Spectrum Virtualize™, HyperSwap®, PowerVM®, Storwize®



Microsoft, Windows, Windows NT, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

All statements regarding IBM's future direction and intent are subject to change or withdrawal without notice, and represent goals and objectives only.