IBM Storwize V5000

Designed to drive innovation and greater flexibility

Highlights

- Customise your storage system with flexible software and hardware options

- Optimise performance with flash storage and automated tiering

- Store up to five times more data on your existing storage with IBM® compression technology[1]

- Consolidate and provide IBM Storwize V5000 capabilities to existing storage infrastructures

- Enhance productivity with a fresh, new, intuitive and simplified graphical user interface (GUI).

The enterprise data storage marketplace is changing at a rapid pace. Organisations of all sizes are experiencing new business and IT operational challenges. Businesses now need greater data collaboration, agility and cost efficiency to stay ahead of the competition. Today, data is more important than ever for making highly informed decisions in real time. Security teams need data to recognise and prevent fraud before it happens. Call centres need data to help accelerate customer service. Most important, top executives need data to develop strategic insights for battling the competition.

With the rise of new applications that demand the integration of big-data analytics, mobility and social platforms, organisations require additional storage capacity, performance, advanced functionality and flexibility. 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.

To enter the new era of business, organisations need robust storage solutions such as Storwize V5000 to provide comprehensive storage services, extraordinary scale and simplified management with all-flash or hybrid-flash options – all designed to support key business initiatives.

Three Storwize V5000 hybrid models – IBM Storwize V5030, IBM Storwize V5020 and IBM Storwize V5010 – provide the flexibility to start small and keep growing while leveraging existing storage investments. Plus, to enable organisations with midsized workloads to achieve advanced performance, IBM Storwize V5030F provides an all-flash solution at an affordable price.

Utilising IBM Spectrum Virtualize software at its core, Storwize V5000 is designed to optimise performance, providing virtualisation capabilities and greater flexibility. It includes built-in functions such as IBM Real-time Compression and IBM Easy Tier technology to deliver extraordinary levels of efficiency and high performance. Available in different models, Storwize V5000 delivers enterprise capabilities at entry-level pricing to help handle business-critical applications while controlling costs for growing organisations.

Multiply your possibilities. Storwize V5000 models provide the flexibility to start small and keep growing, while leveraging existing storage investments.

IBM Storwize also helps organisations achieve better data economics to support the traditional and new mobile, social and analytics workloads that are critical for success. The shift to cloud computing requires a fundamental shift in how organisations consume and support IT.

Storwize V5000 is intended to deliver more of what you need from storage with greater flexibility – while using fewer resources. Using innovative IBM technology, a single Storwize V5000 system can scale up to 760 drives per system (and up to 1,520 drives with two-way clustered systems).

Encompassing Storwize family functions

Storwize V5000 leverages proven Storwize family functions, management and interoperability features.

Enhance storage function

Built with IBM Spectrum Virtualize software, Storwize V5000 enables applications to run without disruption, even when changes are made to the storage infrastructure.

Available in the larger model, Storwize V5030 also extends capabilities to other storage systems. When virtualised, data in a storage system becomes part of the Storwize solution and it can be managed in the same way as internal drives. Data in external systems inherits all the Storwize functional richness and ease-of-use features, including advanced replication, high-performance thin provisioning, encryption, Real-time Compression and Easy Tier.

Heterogeneous data services help improve administrator productivity and boost storage utilisation while also enhancing and extending the value of existing storage investments.

IBM Spectrum Virtualize software in the three Storwize V5000 models provides advanced storage functions that enable VMware vSphere Virtual Volumes (VVOL) and support the latest capabilities in key operating environments including Microsoft Hyper-V, VMware vSphere, IBM PowerVM and OpenStack.

Transform the economics of data with Real-time Compression

Real-time Compression in Storwize V5030 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.[2] 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 the drive, meaning that no space is wasted storing uncompressed data awaiting post-processing. When combined with external data virtualisation, Real-time Compression can significantly enhance the usable capacity of existing storage systems, extending their useful life even further.

Improve storage access with Easy Tier

Easy Tier provides automatic migration of frequently accessed data to high-performing flash storage, enhancing usage efficiencies. Operating at a fine-grained granularity, the optional Easy Tier function automatically repositions different data types to the appropriate class of drives based on input/output (I/O) patterns and drive characteristics, requiring no administrative interaction.

Protect your most valuable asset – your data

To help protect sensitive data from unauthorised users, Storwize V5030 and Storwize V5020 give IT teams the full power of storage encryption. In addition to placing encryption inside hardware arrays – which protects only against a subset of data security risks – IBM Spectrum Virtualize software includes encryption capabilities in its management layer. This enables organisations to add encryption across their existing heterogeneous storage arrays, while leveraging a single point of control for encryption throughout the storage layer.

Storwize V5000 offers an optional IBM FlashCopy function designed to create an almost-instant copy of active data, which can be used for backup purposes or for parallel-processing activities.

Should a catastrophic event occur at a data centre (DC), Storwize V5000 supports remote mirroring to create copies of data for use at a second location. Metro Mirror supports synchronous replication at distances up to 300 km (186 miles), whereas Global Mirror supports asynchronous replication at distances up to 8,000 km (4,970 miles). Replication can occur between any Storwize family offerings and can include any supported virtualised storage. With IP networking, Storwize V5000 supports 1 gigabit Ethernet (GbE) and 10 GbE connections and uses innovative Bridgeworks WANrockIT technology to optimise the 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.

In addition, the IBM HyperSwap function enables a single Storwize V5030 system to support servers in two DCs. In this configuration, the solution enables servers at both DCs to access data concurrently. When combined with server data mobility technologies such as VMware vMotion or PowerVM Live Partition Mobility (LPM), this configuration enables non-disruptive storage and virtual machine (VM) mobility between the two DCs.

Storwize V5000 also helps improve data availability with its support for Distributed Redundant Array of Independent Disks (RAID). The system allows data to be distributed across a large number of physical drives that are used simultaneously, achieving faster rebuild time. What's more, Distributed RAID can also deliver increased performance since data can be read from and written to more drives for a given I/O.

Avoid disruptions with dynamic migration

Moving data is one of the most common causes of planned downtime. Storwize V5000 includes a dynamic data-migration function that is designed to move data from existing storage into a new system or between arrays in a Storwize V5000

system, while maintaining user access to 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.

Non-disruptive migration can speed time-to-value from weeks or months to days, minimise downtime for migration, help eliminate the cost of add-on migration tools and may help avoid penalties and additional maintenance charges for lease extensions. The result can be real cost savings to your business.

Take advantage of additional features

In addition, Storwize V5000 includes:

- Innovative management capabilities, to ease storage management
- Dual clustering for Storwize V5030, to enable growth from smaller configurations

- High-density expansion enclosures, which can hold up to 92 drives and 1.4 petabytes (PB) in a 5U form factor
- Support for OpenStack Cinder driver, which helps automate storage provisioning and volume management for organisations by combining the efficiency of Storwize V5000 with the OpenStack Compute cloud platform.

Leveraging proven independent software vendor solutions

IBM is committed to continuous improvement and smooth application integration to optimise business results and minimise time-to-value. Our commitment is evident through our ongoing work and enduring partnerships with independent software vendors (ISVs) such as Microsoft, Oracle, SAP, Symantec and VMware.

IBM Storwize V5000 at a glance

Software	IBM Spectrum Virtualize software for Storwize V5030	IBM Spectrum Virtualize software for Storwize V5020	IBM Spectrum Virtualize software for Storwize V5010
User interface	Web-based graphical user interface (GUI)	Web-based GUI	Web-based GUI
Single or dual controller	Dual	Dual	Dual
Connectivity (standard)	10 gigabit (Gb) Internet small computer system interface (iSCSI) 1 Gb iSCSI	12 Gb SAS 1 Gb iSCSI	1 Gb iSCSI
Connectivity (optional)	16 Gb Fibre Channel (FC) 12 Gb serial attached SCSI (SAS) 10 Gb iSCSI/Fibre Channel over Ethernet (FCoE) 1 Gb iSCSI	16 Gb Fibre Channel 12 Gb SAS 10 Gb iSCSI/FCoE 1 Gb iSCSI	16 Gb Fibre Channel 12 Gb SAS 10 Gb iSCSI/FCoE 1 Gb iSCSI

IBM Storwize V5000 at a glance

Cache (per system)	32 GB or 64 GB	16 GB or 32 GB	16 GB
Drives supported	Small form-factor 2.5-inch disk drives: • 300 GB, 600 GB @ 15k rpm • 900 GB, 1.2 terabytes (TB), 1.8 TB @ 10k rpm • 2 TB @ 7.2k rpm SAS nearline Large form-factor 3.5-inch disk drives: • 300 GB, 600 GB, 900 GB @ 15k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 900 GB, 1.2 TB, 1.8 TB @ 10k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 2 TB*, 3 TB*, 4 TB, 6 TB, 8 TB, 10 TB @ 7.2k rpm 2.5-inch flash drives: • 400 GB, 800 GB, 1.6 TB, 1.92 TB, 3.2 TB, 3.84 TB, 7.68 TB and 15.36 TB	Small form-factor 2.5-inch disk drives: • 300 GB, 600 GB @ 15k rpm • 900 GB, 1.2 TB, 1.8 TB @ 10k rpm • 2 TB @ 7.2k rpm SAS nearline Large form-factor 3.5-inch disk drives: • 300 GB, 600 GB, 900 GB @ 15k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 900 GB, 1.2 TB, 1.8 TB @ 10k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 2 TB*, 3 TB*, 4 TB, 6 TB, 8 TB, 10 TB @ 7.2k rpm 2.5-inch flash drives: • 400 GB, 800 GB, 1.6 TB, 1.92 TB, 3.2 TB, 3.84 TB, 7.68 TB and 15.36 TB	Small form-factor 2.5-inch disk drives: • 300 GB, 600 GB @ 15k rpm • 900 GB, 1.2 TB, 1.8 TB @ 10k rpm • 2 TB @ 7.2k rpm SAS nearline Large form-factor 3.5-inch disk drives: • 300 GB, 600 GB, 900 GB @ 15k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 900 GB, 1.2 TB, 1.8 TB @ 10k rpm, SAS (2.5-inch drive in a 3.5-inch drive carrier) • 2 TB*, 3 TB*, 4 TB, 6 TB, 8 TB, 10 TB @ 7.2k rpm 2.5-inch flash drives: • 400 GB, 800 GB, 1.6 TB, 1.92 TB, 3.2 TB, 3.84 TB, 7.68 TB and 15.36 TB
Maximum drives supported	Maximum of 760 drives per system and 1,520 drives in two-way clustered: • Small form-factor enclosure: 24 x 2.5-inch drives • Large form-factor enclosure: 12 x 3.5-inch drives • High-density expansion enclosure: 92 x 3.5-inch drives	Maximum of 392 drives per system: • Small form-factor enclosure: 24 x 2.5-inch drives • Large form-factor enclosure: 12 x 3.5-inch drives • High-density expansion enclosure: 92 x 3.5-inch drives	Maximum of 392 drives per system: • Small form-factor enclosure: 24 x 2.5-inch drives • Large form-factor enclosure: 12 x 3.5-inch drives • High-density expansion enclosure: 92 x 3.5-inch drives
Maximum expansion enclosure capacity	• Standard expansion enclosures: up to 20 standard expansion enclosures per controller • High-density expansion enclosures: up to 8 high-density expansion enclosures per controller	• Standard expansion enclosures: up to 10 standard expansion enclosures per controller • High-density expansion enclosures: up to 4 high-density expansion enclosures per controller	• Standard expansion enclosures: up to 10 standard expansion enclosures per controller • High-density expansion enclosures: up to 4 high-density expansion enclosures per controller
RAID levels	RAID 0, 1, 5, 6, 10, Distributed	RAID 0, 1, 5, 6, 10, Distributed	RAID 0, 1, 5, 6, 10, Distributed

IBM Storwize V5000 at a glance

Fans and power supplies	Fully redundant, hot-swappable	Fully redundant, hot-swappable	Fully redundant, hot-swappable
Rack support	Standard 19-inch	Standard 19-inch	Standard 19-inch
Advanced functions included with each system	• Embedded GUI • Virtualisation of internal storage • Thin provisioning • One-way data migration • Dual-system clustering	• Embedded GUI • Virtualization of internal storage • Thin provisioning • One-way data migration	• Embedded GUI • Virtualization of internal storage • Thin provisioning • One-way data migration
Additional available advanced functions	• Easy Tier • FlashCopy • Remote mirroring • Encryption • Real-time Compression • External virtualisation	• Easy Tier • FlashCopy • Remote mirroring • Encryption	• Easy Tier • FlashCopy • Remote mirroring

Size†	8.7 cm (3.4 in.) H x 48.3 cm (19.0 in.) W x 55.6 cm (21.9 in.) D
	• Approximate weight:
	  – Large form-factor control enclosure:
	    ○ Empty: 18.0 kg (39.6 lb)
	    ○ Fully configured: 28.3 kg (62.2 lb)
	  – Large form-factor expansion enclosure:
	    ○ Empty: 16.4 kg (36.1 lb)
	    ○ Fully configured: 26.7 kg (58.8 lb)
	  – Small form-factor control enclosure:
	    ○ Empty: 19.0 kg (41.8 lb)
	    ○ Fully configured: 27.3 kg (60.0 lb)
	  – Small form-factor expansion enclosure:
	    ○ Empty: 16.7 kg (36.7 lb)
	    ○ Fully configured: 25.0 kg (55.2 lb)
		8.7 cm (3.4 in.) H x 48.3 cm (19.0 in.) W x 55.6 cm (21.9 in.) D
		• Approximate weight:
		  – Large form-factor control enclosure:
		    ○ Empty: 18.0 kg (39.6 lb)
		    ○ Fully configured: 28.3 kg (62.2 lb)
		  – Large form-factor expansion enclosure:
		    ○ Empty: 16.4 kg (36.1 lb)
		    ○ Fully configured: 26.7 kg (58.8 lb)
		  – Small form-factor control enclosure:
		    ○ Empty: 19.0 kg (41.8 lb)
		    ○ Fully configured: 27.3 kg (60.0 lb)
		  – Small form-factor expansion enclosure:
		    ○ Empty: 16.7 kg (36.7 lb)
		    ○ Fully configured: 25.0 kg (55.2 lb)
			8.7 cm (3.4 in.) H x 48.3 cm (19.0 in.) W x 55.6 cm (21.9 in.) D
			• Approximate weight:
			  – Large form-factor control enclosure:
			    ○ Empty: 18.0 kg (39.6 lb)
			    ○ Fully configured: 28.3 kg (62.2 lb)
			  – Large form-factor expansion enclosure:
			    ○ Empty: 16.4 kg (36.1 lb)
			    ○ Fully configured: 26.7 kg (58.8 lb)
			  – Small form-factor control enclosure:
			    ○ Empty: 19.0 kg (41.8 lb)
			    ○ Fully configured: 27.3 kg (60.0 lb)
			  – Small form-factor expansion enclosure:
			    ○ Empty: 16.7 kg (36.7 lb)
			    ○ Fully configured: 25.0 kg (55.2 lb)

IBM Storwize V5000 at a glance

Operating environment	• Air temperature: – Operating: 10°C – 35°C (50°F – 95°F) at 30.5 m below to 3,000 m above sea level (100 ft below to 9,840 ft above) – Non-operating: -10°C – 50°C (14°F – 125°F) • Relative humidity: – Operating: 20% – 80% – Non-operating: 10% – 90%	• Air temperature: – Operating: 10°C – 35°C (50°F – 95°F) at 30.5 m below to 3,000 m above sea level (100 ft below to 9,840 ft above) – Non-operating: -10°C – 50°C (14°F – 125°F) • Relative humidity: – Operating: 20% – 80% – Non-operating: 10% – 90%	• Air temperature: – Operating: 10°C – 35°C (50°F – 95°F) at 30.5 m below to 3,000 m above sea level (100 ft below to 9,840 ft above) – Non-operating: -10°C – 50°C (14°F – 125°F) • Relative humidity: – Operating: 20% – 80% – Non-operating: 10% – 90%
Warranty	Hardware: • Flexible warranty – One- or three-year warranty with 9 to 5 next-business-day response (dependent upon machine type) – Tier 1 customer-replaceable units and on-site repairs – Warranty service upgrades available • Post-warranty support available • Customer setup (initial installation and field upgrades) Software: • Initial license purchase Software maintenance agreement available	Hardware: • Flexible warranty – One- or three-year warranty with 9 to 5 next-business-day response (dependent upon machine type) – Tier 1 customer-replaceable units and on-site repairs – Warranty service upgrades available • Post-warranty support available • Customer setup (initial installation and field upgrades) Software: • Initial license purchase Software maintenance agreement available	Hardware: • Flexible warranty – One- or three-year warranty with 9 to 5 next-business-day response (dependent upon machine type) – Tier 1 customer-replaceable units and on-site repairs – Warranty service upgrades available • Post-warranty support available • Customer setup (initial installation and field upgrades) Software: • Initial license purchase Software maintenance agreement available
Supported systems	For a list of currently supported servers, operating systems (OS), host bus adapters, clustering applications and SAN switches and directors, refer to the IBM System Storage Interoperation Centre (SSIC) at: **ibm.com**/systems/ support/storage/config/ssic	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 Centre at: **ibm.com**/systems/support/ storage/config/ssic	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 Centre at: **ibm.com**/systems/support/ storage/config/ssic
ISV solutions	For a list of high-quality solutions with IBM partner ISVs, including access to solution briefs and white papers, refer to the ISV Solutions Resource Library	For a list of high-quality solutions with IBM partner ISVs, including access to solution briefs and white papers, refer to the ISV Solutions Resource Library	For a list of high-quality solutions with IBM partner ISVs, including access to solution briefs and white papers, refer to the ISV Solutions Resource Library

Why IBM?

The Storwize family of products from IBM, a recognised leader in the storage industry, is known for providing efficiency and high-performance storage for almost any type of workload. IBM storage offerings customised for small, midsized and large organisations are designed to deliver performance in streamlined packages that are easy to buy, deploy and manage.

Offered in a wide range of storage systems, the Storwize family delivers sophisticated capabilities that help control costs for growing businesses.

For more information

To learn more about IBM Storwize V5000, please contact your IBM representative or IBM Business Partner (BP), or visit:
ibm.com/us-en/marketplace/storage-consolidation

To learn more about IBM Storwize V5030F all-flash, please contact your IBM representative or IBM BP, or visit:
ibm.com/systems/storage/storwize/all-flash

IBM Global Financing can help enable credit-qualified clients to transform their business with affordable options to acquire the latest IT solutions, visit: **ibm.com**/financing

* Available only in Storwize V5000 generation 1.

† To assure installation and serviceability in non-IBM industry-standard racks, review the installation planning information for any product-specific installation requirements.

[1] IBM lab measurements – April 2012.

[2] IBM lab measurements –August 2010.