



Highlights

- Delivers sophisticated enterprise-class storage function for midsize businesses
 - Supports your growing business requirements while controlling costs
 - Provides up to 200% performance improvement with automatic migration to high-performing SSDs
 - Thin provisioning allows you to purchase only the disk capacity you need
 - Enables near-continuous availability of applications through dynamic migration
 - Supports faster and more efficient data copies for online backup, testing or data mining
 - Offers flexible server and storage management
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IBM Storwize V7000 Midrange Disk System

The most powerful and easy-to-use innovative midrange disk system in the storage marketplace

In storage management today, breaking the cycle of increased complexity and explosive data growth can be a big challenge. The old ways of buying and managing storage have become less effective. Due to resource constraints—both physical storage resources and human resources—IT organizations must act quickly to optimize and simplify their infrastructure. Unchecked complexity and growth will only become bigger problems over time.

Small and midsize organizations may also suffer from a range of challenges:

- Disruptive migrations
- Difficulty deploying tiered storage
- Inability to share storage among servers
- Reduced productivity and increased cost caused by isolated server and storage management tools
- Inability to use virtualized storage, like virtual servers, as a tool for optimizing expenditures, resources and capabilities

To stand up to these challenges and allow businesses to respond to a rapidly changing marketplace, IBM® Storwize® V7000 is a virtualized storage system to complement virtualized server environments that provides unmatched performance, availability, advanced functions, and highly scalable capacity never seen before in midrange disk systems.





Storwize V7000 is a powerful midrange disk system that has been designed to be easy to use and enable rapid deployment without additional resources. Storwize V7000 is virtual storage that offers greater efficiency and flexibility through built-in solid state drive (SSD) optimization and thin provisioning technologies. Storwize V7000 advanced functions also enable non-disruptive migration of data from existing storage, simplifying implementation and minimizing disruption to users. Storwize V7000 also enables you to virtualize and reuse existing disk systems, supporting a greater potential return on investment (ROI).

Managing the information infrastructure

The need to increase storage efficiency has led many IT organizations to turn to consolidation, virtualization and automated tiering to reduce capital and operational expenses. IBM offers solutions today that can become part of your highly efficient, highly capable, next-generation information infrastructure, whether your storage environment supports a small or midsize organization or a large, complex data center.

Consolidation

Optimizing resources through consolidation can reduce costs and improve productivity. Consolidation can also lead to more efficient maintenance and management of your information

infrastructure. By enabling you to scale storage efficiently, consolidation can deliver the capacity you need within the budget you have for the performance you want.

Virtualization

Virtualizing your storage infrastructure can optimize your expenditures, resources and capabilities. It allows you to more easily scale system capacity and performance to meet your growing information infrastructure needs, reduce the complexity of management and reduce the risk to your business of system failure. In server environments, virtualization technologies are often used to improve server utilization, reduce complexity, speed provisioning, consolidate application migration and provide improved flexibility in disaster recovery plans. Storage virtualization is designed to provide similar advantages for your storage environment. Combining storage and server virtualization can build a more powerful virtualized infrastructure for your business and provide greater benefits than either virtualization solution deployed alone.

New support for VMware vStorage APIs enables Storwize V7000 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.

Tiering

Tiering optimizes storage by enabling data to be located in a way that can improve system performance, reduce costs and simplify information management. Tiering can enhance performance and reduce operating expenses by automating data movement. And tiering allows you to scale storage performance based upon your business needs. Using IBM System Storage® Easy Tier™ technology, you can deploy SSDs confidently, effectively and economically by automatically and dynamically moving only the appropriate data to the SSDs in the system,



based on ongoing performance monitoring. Such effective storage tiering enables users to enjoy the performance benefits of SSDs without requiring administrators to create and manage storage tier policies—and without the excessive costs associated with placing too much of the wrong data on these relatively expensive drives. With a wide range of disk drives and SSDs, Storwize V7000 provides the ability to optimize a tiered storage configuration to meet diverse application requirements.

Introducing Storwize V7000

Storwize V7000 is a powerful storage system that combines hardware and software components to provide a single point of control to help support improved storage efficiency. By enabling virtualization, consolidation and tiering in midsize organizations, it is designed to improve application availability and resource utilization. The system offers easy-to-use, efficient and cost-effective management capabilities for both new and existing storage resources in your IT infrastructure.

Enhancing access with Easy Tier

Easy Tier provides automatic migration of frequently accessed data to high performing SSDs, enhancing utilization efficiencies. Operating at a fine-grained granularity, the Easy Tier function automatically repositions pieces of the data to the appropriate class of drives based on I/O patterns and drive characteristics with no further administrative interaction. Easy

Tier also includes the ability to manually and non-disruptively relocate full logical volumes, providing additional flexibility and control for organizations looking to more effectively align system performance with their application needs.

Easy Tier makes it easy and economical to deploy SSDs in your environment. A hybrid pool of storage capacity is created containing two tiers: SSD and hard disk drive (HDD).

- The busiest portions of volumes are identified and automatically relocated to high-performance SSDs.
- Remaining data can take advantage of higher capacity, price-optimized drives for the best customer value.

Volumes in an SSD or HDD managed disk group are monitored and can be managed automatically or manually by moving hot extents to SSD and cold extents to HDD.

Using thin provisioning to optimize efficiency

Using thin provisioning, applications can grow dynamically, while consuming only the space they are actually using. Designed to keep business overhead low, thin provisioning optimizes efficiency by allocating disk storage space in a flexible manner among multiple users, based on the minimum space required by each user at any given time. This reduces use of storage hardware but also can save electrical energy use, lower heat generation and reduce hardware space requirements.

For example, a database might be planned to grow to 100TB but is only 10TB today. Using thin provisioning, a storage administrator can allocate 100TB of virtual capacity to meet expected future requirements while consuming only 10TB of physical capacity. As the database grows, Storwize V7000 allocates additional physical capacity as required. This approach minimizes the amount of physical capacity consumed and helps enable a more efficient approach to storage purchases while also minimizing future configuration changes as the database grows.

Avoiding disruptions with dynamic migration

Storwize V7000 uses virtualization technology to help insulate host applications from physical storage changes. This ability can help enable applications to continue to run without disruption while you make changes to your storage infrastructure. Your applications keep running so you can stay open for business.

Moving data is one of the most common causes of planned downtime. Storwize V7000 includes a dynamic data migration function that is designed to move data from existing storage into the new system or between arrays in a Storwize V7000 system, 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.

Using the Storwize V7000 dynamic migration capabilities can provide efficiency and business value. Dynamic migration can speed time-to-value from weeks or months to days, minimize downtime for migration, 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.

Protecting data with replication services

Storwize V7000 includes a very rich IBM FlashCopy® function that is designed to create an almost instant copy of active data, which can be used for backup purposes or for parallel processing activities. Up to 256 copies of each volume may be created.

When combined with Storwize V7000 thin provisioning, you can create copies using only a fraction of the amount of storage needed for a full physical copy. This type of copy, called a “snapshot,” is designed to help improve overall storage utilization and reduce the amount of capacity required for copies.

Storwize V7000 supports incremental FlashCopy operations, which improves efficiency by copying only the portions of the source or target volume that have been updated since the FlashCopy function was last used, and also “copies of copies” where one copy is itself further copied. These abilities could be used to help maintain and update a test environment based on production data.

IBM Tivoli® Storage FlashCopy Manager is designed for today’s business world, where application servers are operational 24 hours a day—yet data must remain fully protected. If you have a 24x7 environment, you can’t afford to lose any data; you also can’t afford to stop critical systems for hours so you can protect the data adequately. FlashCopy Manager exploits the Storwize V7000 snapshot capabilities to provide high speed, low impact applications, integrated backup and restore functionality. Automated policy based management of multiple snapshot backup versions together with a simple and guided installation and configuration process provide an easy-to-use and quick-to-deploy data protection solution that enables the most stringent database recovery time requirements to be met. FlashCopy Manager can help deliver the highest levels of protection for mission critical IBM DB2®, SAP, Oracle, Microsoft® Exchange and Microsoft SQL Server applications via integrated application-aware snapshot backup and restore capabilities. And custom application support offers the ability to extend FlashCopy Manager capabilities to any application on IBM AIX®, Linux®, and Solaris.

The Metro Mirror and Global Mirror functions operate between the Storwize V7000 systems at different locations to help create copies of data for use in the event of a catastrophic event at a data center. Metro Mirror is designed to maintain a fully synchronized copy at “metropolitan” distances

(up to 300 km) whereas Global Mirror is designed to operate asynchronously and so helps maintain a copy at much greater distances (up to 8000 km). Both functions are designed to support VMware vCenter Site Recovery Manager to help speed disaster recovery. New ability to use a Remote Mirror source volume as the target for a FlashCopy operation increases flexibility for using FlashCopy in a high availability configuration.

IBM Tivoli Storage Manager FastBack® provides an additional complementary capability to replicate highly-efficient deduplicated snapshots over TCP/IP connections to a remote FastBack Disaster Recovery hub, efficiently storing the disaster recovery DR snapshots on a Storwize V7000. This option helps provide a lower cost approach to delivering effective disaster recovery capability.

Leverage proven ISV solutions

IBM is committed to continuous improvement and seamless application integration to optimize your business results and minimize time-to-value. Our commitment is visible through ongoing work and enduring partnerships with ISVs such as Microsoft, Oracle, SAP, Symantec and VMware.

Combining Storwize V7000 with leading ISV applications can provide increased flexibility and deliver a more robust information infrastructure for your business. Solutions have been qualified for Storwize V7000 for select applications which focus on key solution areas including backup/restore, disaster recovery, clustering, server virtualization, and database and performance optimization. IBM is also committed to certifications with key ISVs aligned with various industries including healthcare, financial services, telecommunications and the public sector.

Integrated management

This solution provides a tiered approach to management designed to meet the diverse needs of different organizations. The Storwize V7000 management interface is designed to give administrators intuitive control of the system. For organizations looking to manage both physical and virtual server infrastructures and the storage they consume—including provisioning and monitoring for higher availability, operational efficiency, and infrastructure planning—Storwize V7000 is integrated with IBM Systems Director Storage Control. A single administrator can manage and operate IBM servers (IBM System x®, IBM Power Systems™ and IBM BladeCenter®) along with networking infrastructure and IBM storage (including Storwize V7000) from a single management screen. For organizations looking to improve the operational efficiency of storage specialists, Tivoli Storage Productivity Center is designed to provide a SAN-wide perspective of storage health, I/O path performance analytics, and capacity utilization for Storwize V7000 and the surrounding storage infrastructure. Plugins to support Storwize V7000 with Microsoft System Center Operations Manager (SCOM) and VMware vCenter help enable more efficient consolidated management in these environments.

A new performance dashboard provides at-a-glance access to key high-level real-time system performance information, which helps monitor and optimize the virtualized environment. Tivoli Productivity Center provides access to—and analysis of—historical performance data.

High-performance SSD support

For applications that demand high disk speed and quick access to data, IBM provides support for SSDs in 300 GB 2.5-inch E-MLC (enterprise-grade multilevel cell) SSDs, or up to 72 TB of physical capacity in a single system enabling scale-out high performance SSD support.

External storage virtualization

External storage virtualization is the ability of the Storwize V7000 system to manage capacity in other disk systems. When Storwize V7000 virtualizes a disk system, its capacity becomes part of the Storwize V7000 system and is managed in the same way as capacity on internal drives within Storwize V7000. Capacity in external disk systems inherits all the functional richness and ease-of-use of the Storwize V7000 system including advanced replication, thin provisioning and Easy Tier. Virtualizing external storage helps improve administrator productivity and boost storage utilization while also enhancing and extending the value of an existing storage asset.

Storwize V7000 system description

The Storwize V7000 storage system is packaged in 2U rack-mountable enclosures that house up to twenty-four 2.5-inch drives or up to twelve 3.5-inch drives. Control enclosures contain drives, redundant dual-active intelligent RAID controllers and dual power supplies, batteries and cooling components. Expansion enclosures contain drives, switches, power supplies and cooling components. You can attach up to nine expansion enclosures to a control enclosure supporting up to 240 drives. Two control enclosures (each with up to nine expansion enclosures) may be clustered together in a single system for even greater capacity and performance growth potential. Other components and characteristics of the system include:

- Internal storage capacity: Up to 24 TB of physical storage per enclosure using twelve 2 TB near-line SAS disk drive modules or up to 14.4 TB of physical storage per enclosure using twenty-four 2.5-inch 600 GB SAS disk drive modules
- Disk drives: SAS disk drives, near-line SAS disk drives and SSDs. Intermix of these drive types within the IBM Storwize V7000 RAID controller and storage expansion enclosures add flexibility

- Cache memory: Sixteen GB cache memory (8 GB per internal RAID controller) as a base feature—designed to improve performance and availability
- Ports per control enclosure: Eight 8 Gbps Fibre Channel host ports (four 8 Gbps FC ports per RAID controller), four 1 Gbps and optionally four 10 Gbps iSCSI host ports (two 1 Gbps and optionally two 10 Gbps iSCSI host ports per RAID controller)

Storwize V7000 control and expansion enclosures are each available in models that support twelve 3.5" disk drive bays or twenty-four 2.5" disk drive bays. The system supports intermixing 12-bay or 24-bay enclosures in a single system. The expansion enclosures connect to the control enclosure using four SAS 6 Gbps disk expansion ports.

- Control enclosure: Supporting attachment of up to nine expansion enclosures with configurations up to 240 TB physical storage capacities.
- Expansion enclosure: Packaged in a 2U rack-mountable enclosure that houses twenty-four 2.5-inch drive bays or twelve 3.5-inch drive bays and dual power supplies with cooling components. Physical storage capacity of up to 24 TB per storage expansion enclosure using twelve 3.5-inch 2 TB near-line Serial Attached SCSI SAS disk drive modules and up to 14.4 TB per storage expansion enclosure using twenty-four 2.5-inch 600 GB SAS disk drive modules.
- Clustered systems: Two control enclosures (each with up to nine expansion enclosures) may be clustered together in a single system for even greater capacity and performance growth potential. Clustered systems support up to 480 disk drives and up to 480TB capacity.

Electrical power

- 12-bay and 24-bay control enclosures: 120 - 240 V ac, 3.8 - 9.0 A, 50/60 Hz
- 12-bay and 24-bay expansion enclosures: 100 - 240 V ac, 3.2 - 8.0 A, 50/60 Hz

Power and cooling (typical environments)

	Power consumption	Cooling
12-bay control enclosure	380 W	1300 BTU/hr
24-bay control enclosure	410 W	1400 BTU/hr
12-bay expansion enclosure	175 W	600 BTU/hr
24-bay expansion enclosure	205 W	700 BTU/hr

Environment: all systems

- Temperature (operating)
 - 10° to 35° C (50° to 95° F) at 0 to 914 m (0 to 3,000 ft)
 - 10° to 32° C (50° to 90° F) at 914 to 2,133 m (3,000 to 7,000 ft)
- Temperature (powered off):
 - 10° to 43° C (50° to 109° F)
- Temperature (storage):
 - 1° to 60° C (34° to 140° F) at 0 to 2,133 m (0 to 7,000 ft)
- Temperature (shipping):
 - -20° to 60° C (-4° to 140° F) at 0 to 10,668 m (0 to 35,000 ft)
- Relative humidity (operating and powered off): 8 percent to 80 percent

- Relative humidity (storage): 5 percent to 80 percent
- Relative humidity (shipping): 5 percent to 100 percent (including condensation but excluding rain)
- Wet bulb
 - Wet bulb (operating temp): 23° C
 - Wet bulb (powered off temp): 27° C
 - Wet bulb (storage and shipping temp): 29° C
- Noise level: 6.5 decibels LwAd—when operating in a 2146 system rack

Note: The noise emission level stated is the declared (upper limit) sound power level, in decibels, for a random sample of machines. All measurements are made in accordance with ISO 7779 and reported in conformance with ISO 9296.

IBM Systems and Technology
Data Sheet

Host interface	SAN-attached 8 Gbps Fiber Channel (FC) host connectivity, 1 Gbps iSCSI and optional 10 Gbps iSCSI
User interface	Graphical user interface (GUI)
Supported drives	3.5-inch disk drives: <ul style="list-style-type: none"> • 2 TB 3.5" 7.2k Near-Line SAS disk 2.5-inch disk drives: <ul style="list-style-type: none"> • 146 GB 2.5" 15k SAS disk • 300 GB, 450 GB, 600 GB 2.5" 10k SAS disk 300 GB 2.5" E-MLC (enterprise-grade multilevel cell) solid state drive (SSD)
RAID levels	RAID 0, 1, 5, 6, and 10
Maximum drives supported	240 per control enclosure; 480 per clustered system
Fans and power supplies	Fully redundant, hot swappable
Rack support	Standard 19 inch
Management software	Storwize V7000 software
Cache per controller/control enclosure/clustered system	8 GB/16 GB/32 GB
Advanced features included with each system	System Storage Easy Tier, FlashCopy, thin provisioning
Additional available advanced features	Remote mirroring, external virtualization, IBM® FlashCopy Manager, IBM Tivoli® Storage Productivity Centre Midrange Edition, Tivoli Storage Manager, Tivoli Storage Manager FastBack®, IBM Systems Director
Warranty	Hardware; 3 year limited warranty, Customer Replaceable Units and On-site service, Next Business Day 9x5, service upgrades available Software: Software Maintenance Agreement available
Replication services	FlashCopy, FlashCopy Manager, Metro Mirror (Synchronous), Global Mirror (Asynchronous)
Dimensions	All enclosure types Width: 483 mm (19.0 in) Depth: 630 mm (24.8 in) Height: 87.9 mm (3.46 in)

IBM Systems and Technology
Data Sheet

Weight	12-bay enclosures: <ul style="list-style-type: none">- Drive-ready (without drive modules installed): 17.7 kg (37.6 lb)- Fully configured (12 drive modules installed): 27.2 kg (59.8 lb) 24-bay enclosures: <ul style="list-style-type: none">- Drive-ready (without drive modules installed): 17.7 kg (37.6 lb)- Fully configured (24 drive modules installed): 25.2 kg (55.4 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 System Storage Interoperation Centre.
ISV solutions	For a list of high quality solutions with our partner Independent Software Vendors (ISVs), including access to solution briefs and white papers, refer to the ISV Solutions Resource Library.

Why IBM?

The performance and availability of your storage environment can either enhance or hamper your business processes. That's where IBM comes in. As a market leader in the storage industry, we can help you handle the challenges, whether you are a small to midsize company or a large enterprise.

Innovative technology, open standards, excellent performance, a broad portfolio of proven storage software, hardware and solutions offerings—all backed by IBM with its recognized industry leadership—are just a few of the reasons you should consider storage solutions from IBM, including Storwize V7000.

With IBM, you get some of the best storage products, technologies, services and solutions in the industry without the complexity of dealing with different hardware and software vendors and system integrators.

IBM Maintenance and Technical Support solutions can help you get the most out of your IT investment by reducing support costs, increasing availability and simplifying management with integrated support for your multiproduct, multivendor hardware and software environment.

IBM offers tailored financing solutions to credit-qualified clients that can be customized to address your specific IT needs from great rates to flexible payment plans and loans.

For more information

To learn more about Storwize V7000, please contact your IBM sales representative or IBM Business Partner, or visit the following website: ibm.com/storage/storwizev7000

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

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

Additionally, financing solutions from IBM Global Financing can enable effective cash management, protection from technology obsolescence, improved total cost of ownership and return on investment. Also, our Global Asset Recovery Services help address environmental concerns with new, more energy-efficient solutions. For more information on IBM Global Financing, visit: ibm.com/financing



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