



Highlights

- Sophisticated enterprise-class storage function that is easy to use for midsized businesses
 - Integrated IBM System Storage® Easy Tier™ function provides up to 300 percent performance improvement with automatic migration to high-performing solid state drives (SSD)
 - Thin provisioning allows you to purchase only the disk capacity you need
 - Dynamic migration provides continuous availability of applications while migrating critical data
 - Faster and more efficient data copies for online backup, testing or data mining with IBM FlashCopy®
 - IBM Systems Director provides flexible server and storage management capabilities
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IBM Storwize V7000 Midrange Disk System

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 also may suffer from a range of challenges:

- Inability to share storage among servers
- Reduced productivity and increased cost due to isolated storage
- Difficulty deploying tiered storage
- Disruptive migrations
- Inability to use virtualized storage 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 provides unmatched performance, availability, advanced functions, and highly scalable capacity never seen before in midrange disk systems. IBM 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 offers IBM storage virtualization, SSD optimization and “thin provisioning” technologies built in to improve storage utilization and to enable the system to be reconfigured to meet changing needs quickly and easily. Storwize V7000 advanced functions also enable non-disruptive migration of data from existing





storage, simplifying implementation and minimizing disruption to users. IBM Storwize V7000 also allows 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 also can 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 often are 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.

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 the Easy Tier technology, you can deploy solid state drives (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.

Introducing IBM Storwize V7000

IBM 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 IBM System Storage Easy Tier

Easy Tier provides automatic migration of frequently accessed data to high performing solid state drives, enhancing utilization efficiencies. Operating at a fine-grained “sub-LUN” granularity, the Easy Tier function automatically repositions pieces of the data to the appropriate class of drives based on IO 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 and divided into two tiers within the managed disk group, typically SSD and HDD, though other divisions and definitions are permitted.

- The busiest sub-LUN data elements are identified and automatically relocated to high-performance SSDs.
- Remaining data elements 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 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.

An example of thin provisioning might include a scenario where no user is requesting more than 10 GB of data and where the average of effectively used data is below 6 GB per user. In such a case, the storage administrator could decide to allocate 10 GB of virtual capacity for each user as thin provisioned volumes—while in the back-end storage, the real capacity per user amounts to only 6 GB. If, for example, there are 100 users, the virtual capacity would be 1 TB, but only 600 GB of real capacity is available in the storage subsystem. This is a valid approach when the administrator knows from previous observations that not all users will request the whole amount of physical capacity at the same time. Some will request only 4 GB or less, and some might request the whole 10 GB. But the assumption remains that, on average, users request no more than 6 GB of real capacity. It remains the responsibility of the storage administrator to monitor the allocation of real capacity to avoid any out-of-storage condition, with alerts and monitoring from the storage system when capacity thresholds are reached.

Avoiding disruptions with dynamic migration

IBM 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 IBM 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

IBM Storwize V7000 includes a very rich 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.

IBM Storwize V7000 supports incremental FlashCopy operations, which improve 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.

When combined with IBM Storwize V7000 thin provisioning, you can create copies using only a fraction of the amount of storage needed for a full physical copy. This feature, called Space Efficient FlashCopy, is designed to help improve overall storage utilization.

The Reverse FlashCopy function helps enable FlashCopy targets to become restore points for a source volume without breaking the FlashCopy relationship and without having to wait for the original copy operation to complete. This new capability will help enable disk backup copies to be used to recover almost instantly from corrupted data, speeding application recovery.

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 24×7 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. But as the amount of data that needs protecting continues to grow exponentially and the need also increases to keep downtime associated with backup to an absolute minimum, IT processes can reach a breaking point. Tivoli Storage FlashCopy Manager can help minimize the impact caused by backups by coordinating with IBM Storwize V7000 FlashCopy backups and restores. It can improve backup and recovery times from hours to a few minutes—and improve productivity by simplifying management and automating routine storage administration tasks.

The Metro Mirror and Global Mirror functions operate between IBM 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.

Integrating management with IBM Systems Director

This solution provides an integrated approach to IBM Server and Storage Management that is designed to help IT organizations address major concerns associated with managing both physical and virtual server infrastructures—including

monitoring and repairing for higher availability, operational efficiency and infrastructure planning. A single System Administrator can manage and operate IBM Servers (System x®, System p® and BladeCenter®) along with networking infrastructure and IBM Storage (including IBM Storwize V7000) from a single management screen.

High-performing SSD support

For applications that demand high disk speed and quick access to data, IBM provides support for solid state drives in 300 GB 2.5" 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 virtualization allows you to bring external Fibre Channel controller disk capacity into a pool of IBM Storwize V7000 storage with software value and performance capabilities. This enables the extended life of existing storage devices that no longer are useful for primary storage but can be redeployed as secondary storage, for example, as FlashCopy targets or as archived data, while still under the management and storage efficiency features of IBM Storwize V7000.

IBM Storwize V7000 system description

The IBM 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, enabling the system to scale up to 240 drives. Other components and characteristics of the system include:

- **Internal storage capacity**—Up to 24 TB of physical storage using twelve 2 TB near-line SAS disk drive modules or up to 14.4 TB of physical storage 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**—16 GB cache memory (8 GB per internal RAID controller) as a base feature—designed to improve performance and availability
- **Ports**—Eight 8 Gbps FC host ports (four 8 Gbps Fibre Channel ports per RAID controller) and four 1 Gbps iSCSI host ports (two 1 Gbps iSCSI host ports per RAID controller), with an RJ-45 connector for each port

IBM Storwize V7000 control and expansion enclosures are each available in two models—one with twelve 3.5" disk drive bays or one with 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 SATA 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.

Electrical power: control and expansion enclosures

- 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

IBM Systems and Technology
Data Sheet

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.

Host interface	SAN-attached 8 Gbps Fiber Channel (FC) host connectivity and 1 Gbps iSCSI host connectivity
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 Nearline SAS disk 2.5-inch disk drives: <ul style="list-style-type: none"> • 300 GB 2.5" 10k SAS disk • 450 GB 2.5" 10k SAS disk • 600 GB 2.5" 10k SAS disk • 300 GB 2.5" E-MLC (enterprise-grade multilevel cell) SSD
RAID levels	RAID 0, 1, 5, 6, and 10
Maximum drives supported	240

IBM Systems and Technology
Data Sheet

Fans and power supplies	Fully redundant, hot swappable
Rack support	Standard 19 inch
Management software	IBM Storwize V7000 Software
Cache per controller/cache total	8 GB/16 GB
Advanced features included with each system	IBM System Storage Easy Tier, IBM FlashCopy, Thin Provisioning
Additional available advanced features	Remote Mirroring, External Virtualization, IBM FlashCopy Manager, TPC Midrange Edition, Tivoli Storage Manager FastBack™, IBM Systems Director
Warranty	Hardware: Standard is 3-year 9 × 5 next business day Hardware: Upgrade option to 24 × 7 × 4 or 24 × 7 × 2 Software: One year
Replication services	FlashCopy, FlashCopy Manager, Metro Mirror (Synchronous), Global Mirror (Asynchronous)
Dimensions	12-bay enclosures 2076-112 and 2076-212 Width: 483 mm (19.0 in) Depth: 630 mm (24.8 in) Height: 87.9 mm (3.46 in) 24-bay enclosures 2076-124 and 2076-224 Width: 483 mm (19.0 in) Depth: 630 mm (24.8 in) Height: 87.9 mm (3.46 in)
Weight	12-bay enclosures: – 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: – 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 Center at: http://www.ibm.com/systems/support/storage/config/ssic/

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 an 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 IBM storage solutions, including IBM 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 IBM Storwize V7000, please contact your IBM marketing representative or IBM Business Partner, or visit the following website: ibm.com/storage/storwizev7000

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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Route 100
Somers, NY 10589
U.S.A.

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