

# IBM® STORWIZE® V7000

## Transforming Data Storage Economics



### ADVANCED FEATURES AND FLEXIBILITY

Data is the new currency of business, the most critical asset of the modern organization. In fact, enterprises that can gain business insights from their data are twice as likely to outperform their competitors; yet, 72 percent of them have not started or are only planning big-data activities<sup>1</sup>. In addition, organizations often spend too much money and time managing where their data is stored. The average firm purchases 24 percent more storage every year<sup>2</sup>, but uses less than half of the capacity it already has<sup>3</sup>.

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.

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

The IBM® Storwize® family helps organizations achieve better data economics by supporting these new workloads that are critical to their success. Storwize family 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.

IBM Storwize V7000 is a virtualized, enterprise-class storage system that provides the foundation for implementing an effective storage infrastructure and transforming the economics of data storage. Designed to complement virtual server environments, this modular storage system delivers the flexibility and responsiveness required for changing business needs.

In fact, Storwize V7000 provides the latest storage technologies for unlocking the business value of stored data, including virtualization and IBM Real-time Compression™. In addition, the systems include a powerful new hardware platform that can support the massive volumes of data created by today's demanding cloud and analytics applications. They are designed to deliver outstanding efficiency, ease of use and dependability for organizations of all sizes.

### DATA VIRTUALIZATION

The Storwize V7000 uses data virtualization technology to help insulate applications from physical storage. This enables applications to run without disruption, even when changes are made to the storage infrastructure.

Storwize V7000 also extends data virtualization to other disk systems. When virtualized, data in a disk system becomes part of the Storwize system, and it can be managed in the same way as internal drives. Data in external disk systems inherits all the Storwize functional richness and ease-of-use features, including advanced replication, high-performance thin provisioning, Real-time Compression and IBM Easy Tier®. Virtualizing external storage helps improve administrator productivity and boost storage utilization while also enhancing and extending the value of existing storage investments.

Moving data is one of the most common causes of planned downtime. Data virtualization enables moving data from existing storage into the new system or between arrays, while maintaining access to the data. This function might 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.

Data virtualization can improve efficiency and business value. Non-disruptive 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. Users who have deployed Storwize V7000 report a 29 percent improvement in application availability<sup>4</sup>.

## REAL-TIME COMPRESSION

IBM® Real-time Compression 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<sup>5</sup>. 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 disk, meaning that no space is wasted storing uncompressed data awaiting post-processing.

The benefits of using Real-time Compression together with other efficiency technologies are very significant and include reduced acquisition cost (because less hardware is required), reduced rack space, and lower power and cooling costs throughout the lifetime of the system.

What's more, Real-time Compression with hardware acceleration transforms the economics of data storage. For example, Real-time Compression can reduce the acquisition cost of storage by as much as half<sup>6</sup>. When combined with external data virtualization, Real-time Compression can significantly enhance the usable capacity of existing storage systems, extending their useful life even further.

## HIGH-PERFORMANCE AND SCALABLE

The IBM® Storwize® V7000 is built on a hardware platform designed to deliver both high performance and dramatically improved data economics. A control enclosure contains dual redundant controllers, each with an 8-core 1.9 GHz Intel Xeon processor with 32 GB or 64 GB of cache. Each controller contains a hardware compression accelerator based on Intel® QuickAssist technology with an available second accelerator. Flexible host interface options include 16 Gbps and 8 Gbps Fibre Channel, 1 Gbps iSCSI, and 10 Gbps iSCSI or Fibre Channel over Ethernet. This powerful platform delivers up to twice as much throughput as previous systems<sup>9</sup>.

Each control enclosure supports up to 20 expansion enclosures attached using high-performance 12 Gbps SAS for maximum expansion of 504 drives or approximately 2 PB of capacity. Control enclosures support up to 24 2.5-inch drives and two models of expansion enclosure support up to 24 2.5-inch or 12 3.5-inch drives.

Clustered systems provide scale-out growth in performance and capacity with up to four control enclosures and associated expansion enclosures operating as a single storage system with 64 processor cores, up to 512 GB of cache, supporting up to 1,056 drives and about 8 PB of capacity, more than double the scalability of previous systems.

## EFFICIENCY

The Storwize V7000 is designed to deliver extraordinary levels of efficiency, helping to revolutionize data economics and drive down costs for cloud, analytics, virtual server and other enterprise-class deployments. It also delivers the performance needed for these demanding environments, so organizations no longer have to choose between performance and efficiency.

Traditional approaches to compression relegate its use to only less active and less performance-sensitive data, which limits the benefits and usability of compressed data. In today's business environment, limiting how and when data can be used could be a costly error. IBM Real-time Compression with hardware acceleration enables the Storwize V7000 to deliver higher performance for compressed data than traditional systems offer for uncompressed data<sup>6</sup>.

In addition, automated storage tiering with IBM® EasyTier® can help improve performance at a lower cost by enabling more efficient use of flash storage or multiple types 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<sup>7</sup>.

When combined with external storage virtualization, Real-time Compression, and Easy Tier can help organizations manage internal and external tiers of storage, including IBM® FlashSystem™. Using these techniques with existing storage can significantly improve performance for data on these systems, improving service levels and extending asset life.

When replicating block data for business continuity, Storwize V7000 can use IP network connections for simplicity and lower cost. Integrated Bridgeworks SANrockIT technology helps improve network utilization up to three times compared with traditional approaches<sup>8</sup>, which can help reduce networking costs as well as accelerate replication cycles.

## DEPENDABILITY

The Storwize V7000 is part of the proven IBM Storwize family, with more than 55,000 enclosures and 1.9 Exabytes of capacity deployed in organizations worldwide. A new hardware platform and unique compression accelerators using Intel QuickAssist technology deliver the power and flexibility required to support demanding cloud, analytics and virtual server environments.

The unrelenting tide of data breaches continues to fuel an increasing interest in IBM self-encrypting storage, which automatically secures all information on a disk drive or tape cartridge when physically removed from a storage system. If a drive gets lost or stolen, data encryption renders data inaccessible. Storwize V7000 encryption also provides cryptographic erasure, a simple, cost-effective method for cleansing sensitive data from systems that are being retired or repurposed.

With their virtualized storage design and tight affinity with IBM PowerVM®, OpenStack and VMware, Storwize V7000 is an ideal complement for virtualized servers that are at the heart of cloud deployments.

The Storwize V7000 supports both scaling up (by adding additional enclosures and drives) and scaling out (by clustering) for configuration growth. This flexibility simplifies planning for future requirements and enables organizations to purchase only as much storage and controller capability as needed. For additional investment protection, clusters can include both existing Storwize V7000 systems as well as new Storwize V7000 systems.

## EASE OF USE

The Storwize V7000 is designed to be easy-to-use from the very start. For example, an intuitive management interface enables administrators to easily manage data. In fact, a comparative study found that tasks are almost half as time-consuming as managing a competitor's system.<sup>9</sup>

IBM Tivoli® Storage Productivity Center can also provide organizations with a storage area network (SAN)-wide view of storage health, long-term performance analytics and capacity statistics for the Storwize V7000 and the surrounding storage infrastructure.

What's more, IBM storage technologies—including Real-time Compression, Easy Tier, and IP replication with Bridgeworks SANrockIT technology—operate automatically and require little or no customization.

SANrockIT uses artificial intelligence technology to automatically optimize network use without any manual intervention. Because it's integrated into Storwize V7000, there are no separate appliances to manage. Plus, SANrockIT is not sensitive to data type, so it can deliver consistent benefits even as workloads change.

Storwize V7000 also includes storage pool balancing that operates automatically to distribute data across arrays in a pool—including external virtualized storage—to deliver balanced array performance and help eliminate the need for manual tuning.

## WHY LENOVO ENTERPRISE STORAGE

Lenovo is the leading provider of x86 systems for the data center. The portfolio includes rack, tower, blade, dense and converged systems, and supports enterprise class performance, reliability and security. Lenovo also offers a full range of networking, storage, software and solutions, and comprehensive services supporting business needs throughout the IT lifecycle.

### FEATURE

### BENEFIT

IBM Systems Director	Provides integrated management for physical and virtual server infrastructures, including monitoring and repairing for higher availability and operational efficiency
IBM Flex System Manager	With IBM PureFlex Systems, provides management integration of physical and virtual compute, storage and networking resources from a single vantage point
Distributed RAID	Improves data protection and availability with significantly smaller rebuild time
Dynamic Migration	Provides efficiency and business value in a non-disruptive migration function

### FEATURE

### BENEFIT

IBM Easy Tier	Provides automatic migration of frequently accessed data elements across tiers of storage including flash
Clustered systems	Enable growth from the smallest configurations up to systems with 1,056 drives (up to 8 PB capacity)
Thin Provisioning	Supports business applications that need to grow dynamically, while consuming only the space actually used
IBM FlashCopy	Creates a near-instant copy of active data that can be used for backup or for parallel processing activities; supports backup for recovering corrupted data
Flash drives	For applications that demand high disk speed, quick access to data and support for tiered storage environments
IBM Tivoli Storage FlashCopy Manager	Helps minimize the impact of backups, provides near-instant restore, shortens backup and recovery times, simplifies management and automates routine tasks
Metro Mirror and Global Mirror	<ul style="list-style-type: none"> <li>Allows synchronous or asynchronous data replication between any Storwize family systems for maximum flexibility</li> <li>Helps optimize use of network bandwidth with integrated Bridgeworks SANrockIT technology to reduce network costs or speed replication cycles, improving the accuracy of remote data</li> </ul>
IBM Real-time Compression	<ul style="list-style-type: none"> <li>Helps improve efficiency by storing up to five times as much active primary data in the same physical disk space;* by significantly reducing storage requirements, you can keep up to five times more information online, use the improved efficiency to reduce storage costs, or achieve a combination of greater capacity and reduced cost</li> <li>Integrated Comprestimator enables a quicker and easier way to see compression results and is unique in the industry - showing value on live data</li> </ul>
Encryption of External Virtualized Storage	Helps improve data security without purchase of new drives to enable encryption
Replication services	FlashCopy, Tivoli Storage FlashCopy Manager, Metro Mirror (synchronous), Global Mirror (asynchronous),
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.
HyperSwap®	HyperSwap capability in IBM Spectrum Virtualize Software V7.6 delivers high availability and disaster recovery in one solution. HyperSwap reuses capital investments in order to achieve a range of recovery and management options which are transparent to host operations.
Spectrum Virtualize Software V7.6	Supports Microsoft™ Offloaded Data Transfer (ODX), VMware vSphere 6, and the underlying infrastructure for VMware Virtual Volumes (VVols).

## PRODUCT SPECIFICATIONS

Part number	6195C32 - Storwize 7000 2.5" Storage Controller Unit 6195SEF - Storwize V7000 2.5" Storage Expansion Unit 6195LEF - Storwize V7000 3.5" Storage Expansion Unit
Host interface	SAN-attached 8 or 16Gbps Fibre Channel, 1 Gbps iSCSI and optional 10 Gbps iSCSI/FCoE
User interface	Web-based graphical user interface (GUI)
Single/dual controller	Dual controller
Cores per controller/control enclosure/clustered system	8/16/64
Cache per controller/control enclosure/clustered system	32 or 64 GB/64 or 128 GB/up to 512 GB
Drive type	Dual-port, hot-swappable, 6 Gb SAS disk drives
Supported drives	Small form-factor 2.5-inch SAS disk drives: <ul style="list-style-type: none"> <li>• 300 GB and 600 GB at 15k rpm</li> <li>• 600 GB, 900 GB, 1.2 TB, and 1.8 TB 10k rpm</li> <li>• 1 TB and 2 TB at 7.2k rpm Nearline SAS</li> <li>• 200 GB, 400 GB and 800 GB</li> <li>• 1.92 TB, 3.84 TB RI SSDs</li> </ul> Large form-factor 3.5-inch SAS disk drives: <ul style="list-style-type: none"> <li>• 2 TB, 3 TB, 4 TB, 6 TB, 8 TB 7.2k rpm Nearline SAS disk</li> </ul>
Maximum drives supported	504 per control enclosure; 1,056 per clustered system
Warranty	•3 year warranty with optional additional services

RAID levels	RAID 0, 1, 5, 6 and 10: Supports Distributed RAID 5 and 6
Fans and power supplies	Fully redundant, hot-swappable
Rack support	Standard 19-inch
Management software	IBM Storwize V7000 software
Dimensions	Control enclosures <ul style="list-style-type: none"> <li>• Width: 445 mm (17.5 in.)</li> <li>• Depth: 749 mm (29.5 in.)</li> <li>• Height: 85 mm (3.35 in.)</li> </ul> Weight: <ul style="list-style-type: none"> <li>• Without drive modules installed): 31.8 kg (70.1 lb)</li> <li>• 24 drive modules installed): 36.5 kg (80.5 lb)</li> </ul>

## FOR MORE INFORMATION

To learn more about the IBM® Storwize® V7000, contact your Lenovo representative Business Partner or visit [lenovo.com/systems/storage](http://lenovo.com/systems/storage)

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