IBM Storwize V7000 Unified and Storwize V7000

Transforming the economics of data storage

Highlights

- Meet changing business needs with virtualized, enterprise-class, flash-optimized modular storage
- Transform the economics of data storage with hardware-accelerated data compression
- Leverage integrated support for file and block data to consolidate workloads
- Use encryption to help improve security for data on existing storage systems
- Optimize performance with automated storage tiering
- Improve network utilization for remote mirroring with innovative replication technology
- Deploy storage quickly with easy-to-use management tools and built-in support for leading software platforms

In the era of cloud, big data and analytics, 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.

Built with IBM® Spectrum Virtualize™ software—part of the IBM Spectrum Storage™ family—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 Unified and IBM Storwize V7000 are virtualized, enterprise-class hybrid storage systems that provide the foundation for implementing an effective storage infrastructure and transforming the economics of data storage. Designed to complement virtual server environments, these modular storage systems deliver the flexibility and responsiveness required for changing business needs.

In fact, IBM Spectrum Virtualize software in Storwize V7000 Unified and 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 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

Storwize V7000 Unified and Storwize V7000 use IBM Spectrum Virtualize 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 Unified and Storwize V7000 also extend 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, encryption, 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. Nondisruptive 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.[1]

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.[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 disk, meaning that no space is wasted storing uncompressed data awaiting post-processing.

What's more, Real-time Compression with hardware acceleration transforms the economics of data storage. The benefits include reduced acquisition cost (because less hardware is required), reduced rack space, and lower power and cooling costs throughout the lifetime of the system. And, 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, scalable platform

Storwize V7000 Unified and Storwize V7000 are built on a new 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 new platform delivers up to twice as much throughput as previous systems.[3]

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 7.87 PB of total capacity.

Storwize V7000 Unified systems also include dual redundant File Modules with 1 Gbps and 10 Gbps interfaces for network-attached storage (NAS) capability.

Efficiency

IBM Spectrum Virtualize software in Storwize V7000 Unified and 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. The solution 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 Storwize V7000 Unified and Storwize V7000 to deliver higher performance for compressed data than traditional systems offer for uncompressed data, enabling its use for practically all data types.[3]

In addition, automated storage tiering with IBM Easy Tier 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.[4]

Storwize V7000 Unified also features IBM Active File Management (formerly known as IBM Active Cloud Engine®) for automated, policy-based placement and tiering of file data—including flash, disk and tape tiers—for highly efficient, low-cost storage. Active File Management operates both within a single system and across systems at multiple locations, enabling automated placement of data closest to users. New integration with IBM Spectrum Scale™ allows file sharing between Storwize V7000 Unified and IBM Spectrum Scale under one single global name space.

When combined with external storage virtualization, Real-time Compression, Easy Tier and Active File Management 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 Unified and 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,[5] which can help reduce networking costs as well as accelerate replication cycles.

High availability

Clients are increasingly deploying virtualized servers using IBM PowerVM®, VMware and other technologies in high-availability configurations. Such configurations provide attractive options for high availability and load balancing.

The IBM HyperSwap® function enables a single Storwize V7000 system to support servers in two data centers. In this configuration, the solution enables servers at both data centers to access data concurrently. When combined with server data mobility functions such as VMware vMotion or 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.

In addition, Distributed RAID technology helps improve data availability by allowing data to be distributed across more physical drives that are used simultaneously, achieving faster rebuild time. This technology can also deliver increased performance since data can be read from/written to more drives for a given I/O.

Ease of use

Storwize V7000 Unified and Storwize V7000, using IBM Spectrum Virtualize software, are designed to be easy to use from the very start. For example, an intuitive management interface enables administrators to easily manage both block and file data in the same system. In fact, a comparative study found that tasks are almost half as time-consuming as managing a competitor's system.[6]

IBM Spectrum Control™, based on IBM Tivoli® Storage Productivity Center can also provide organizations with an end-to-end view of storage health, long-term performance analytics and capacity statistics for Storwize V7000 Unified, Storwize V7000 and the surrounding storage infrastructure.

What's more, IBM Spectrum Virtualize technologies—including Real-time Compression, Easy Tier, IP replication with Bridgeworks SANrockIT technology and Active File Management—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 Unified and 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 Unified and Storwize V7000 also include 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.

In addition, Storwize V7000 Unified includes integrated support for IBM Spectrum Protect™, based on Tivoli Storage Manager technology to simplify backups; restores; and application-aware, VMware-aware snapshots. It also supports the Network Data Management Protocol (NDMP) for backing up data with third-party applications.

Dependability

Storwize V7000 Unified and Storwize V7000 are part of the proven IBM Storwize family, with more than 225,000 enclosures and 2.4 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.

For example, Storwize V7000 Unified combines both block and file storage into a single, dependable system. As a result, multiple management points can be eliminated, storage tiers—including flash—can be shared across all types of data, and data economics can be improved for a wide range of applications.

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.

IBM Storwize V7000 Unified and Storwize V7000 storage systems at a glance

Maximum drives supported	504 per control enclosure; 1,056 per clustered system
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

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Support for Network File System (NFS) v4 and Server Message Block (SMB) 3.0 protocols, coupled with multi-tenancy support for file workloads, also enables consolidation with even more application types and deployment scenarios.

With their virtualized storage design and tight affinity with IBM PowerVM, OpenStack, Microsoft ODX, VMware vSphere v6 and VMware vSphere Virtual Volumes (VVOL), Storwize V7000 Unified and Storwize V7000 are an ideal complement for virtualized servers that are at the heart of cloud deployments.

Storwize V7000 Unified and Storwize V7000 support 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 Unified and Storwize V7000 systems.

Why IBM?

Innovative technology, open standards, excellent performance, and 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 Unified and Storwize V7000.

For more information

To learn more about IBM Storwize V7000 Unified and Storwize V7000, please contact your IBM 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 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

[6] Edison Group, "Competitive Management Cost Study: IBM Storwize V7000 vs. EMC VNX5500 Storage Systems," April 2012. http://www.lighthousecs.com/_resources/common/userfiles/file/V7000.pdf

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Actual available storage capacity may be reported for both uncompressed and compressed data and will vary and may be less than stated.

[1] Forrester Consulting, "Total Economic Impact Study of IBM Storwize V7000 – April 2012." The paper is available from our website, including on **ibm.com**/systems/storage/disk/storwize_v7000/resources.html

[2] IBM lab measurements – April 2012

[3] IBM lab measurements – April 2014

[4] IBM lab measurements – August 2010

[5] IBM lab measurements – September 2013

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