High-performance disk storage for business-critical enterprise workloads

IBM TotalStorage DS8000 series

Highlights

- ***Designed to deliver robust, flexible and cost-effective disk storage for mission-critical workloads***
- ***Built for outstanding performance and offers IBM's first implementation of storage system logical partitions (LPARs) using IBM® Virtualization Engine™ technology***
- ***Created to help provide exceptional system availability to support continuous operations***
- ***Able to scale up to 192TB of physical capacity and support storage sharing for a wide variety of servers***
- ***Designed to facilitate asset protection with model-to-model field upgrades and a standard 4-year warranty***
- ***Designed to offer centralized and simplified management***

Virtualized, resilient, high-performance storage for medium to large enterprises

The IBM TotalStorage® DS8000 series offers high-performance, high-capacity storage systems that are designed to deliver a generation-skipping leap in performance, scalability, resiliency and total value. Created specifically for the mission-critical workloads of medium and large enterprises, the DS8000 series can help consolidate system storage, simplify storage management and support system availability to meet the needs of businesses operating in an on demand world.

The DS8000 series is designed to provide exceptional performance while adding virtualization capabilities that can help customers allocate system resources more effectively and better control application quality of service. The DS8000 series also offers powerful data backup, remote mirroring and recovery functions that can help protect data from unforeseen events. In addition, it is designed to support non-disruptive microcode changes. These

functions are designed to help maintain data availability, which can benefit businesses in markets where information must be accessible around the clock, every day of the year.

Virtualized to simplify

Virtualization can offer dramatic opportunities for clients to help reduce total cost of ownership (TCO) of their storage systems. Introducing a new level of virtualization with innovative storage system logical partitioning (LPAR), the DS8000 series delivers the first use of the POWER5™ processor IBM Virtualization Engine logical partitioning capability. This storage system LPAR technology is designed to enable the creation of two completely separate storage subsystems which can run the same or different versions of the microcode. The subsystems can be used for production, test or other unique storage environments, and they operate within a single physical enclosure. Each storage partition can be established to support the specific performance requirements of a different, heterogeneous workload, and the DS8000 series system hardware-based partitioning implementation helps to isolate and protect the LPARs. These storage system LPAR capabilities are designed to help simplify systems by maximizing management efficiency, cost effectiveness and flexibility.

Impressive performance

The DS8000 series is designed to deliver a new standard in high performance, helping businesses to process, store and retrieve data more quickly. Its innovative design incorporates a high-bandwidth and fault-tolerant internal Fiber Channel interconnect, Fiber Channel disk technology, and a patented highly efficient new caching technology. The DS8000 series includes top-notch front-end performance with single port performance of up to 200MB/second with up to four ports per host adapter. The DS8000 series also boasts leading back-end performance, designed to deliver greater total storage system sequential bandwidth than other enterprise disk storage platforms. The DS8000 series uses 64-bit IBM POWER5 microprocessors in dual 2-way (for the DS8100) or dual 4-way (for the DS8300) processor complexes to help reduce cycle times and accelerate response times, giving users fast access to vital information. The DS8000 series is designed to offer outstanding performance scalability—scaling up nearly linearly in disk, cache, and fabric infrastructure, with processor "wayness" (2-way, 4-way, etc.).

Cache efficiency can help to greatly improve I/O performance and reduce the overall cache requirements. DS8000 series systems can be equipped with up to 256GB of cache to help support high-capacity workloads. The DS8000 series new caching technology is designed to dynamically and adaptively self-tune to continually optimize for the current workload. It can help the system deliver an unimpeded flow of data and high levels of throughput—bringing information to businesses and their customers smoothly and rapidly.

The DS8000 series also incorporates features designed to extend the performance of IBM @server® zSeries® servers. Parallel Access Volumes (PAVs), priority I/O queuing and Multiple Allegiance capabilities help the DS8000 series process data efficiently, dramatically improving performance and enabling better use of large volumes. Using PAVs and Multiple Allegiance, the DS8000 series is designed to allow up to 256 active processes per volume. To facilitate rapid data transfer between the storage enclosure and the server, the DS8000 series can also support up to 128 2Gb Fibre Channel/FICON® ports or up to 64 ESCON® ports.

All of these performance enhancements deliver tangible results: The DS8000 series systems have as much as six times the throughput of the IBM TotalStorage Enterprise Storage Server® (ESS) Model 800, enabling customers to buy one DS8000 series system where multiple other storage servers may have been needed in the past for similar capacity and throughput.

Exceptional flexibility and scalability

The DS8000 series is well prepared to address the exponential growth of data within an enterprise. With the DS8000 series, many of the boundaries for logical volumes, devices, paths, LUNS, and logical subsystems (LSS) have been pushed way out so old disk storage limitations no longer apply. Additionally, the physical storage capacity of the DS8000 series systems can range from 1.1TB to 192TB of physical capacity, and it has an architecture designed to scale up to a petabyte (one thousand terabytes). It is designed to allow disk capacity to be increased within a frame without system disruption by adding integrated packages of 16 disk drives. Clients can mix and match disk packages in 73GB, 146GB and 300GB sizes to construct a tailored system that meets their specific price, performance and capacity requirements. In addition, IBM RAID-5 and RAID-10 configurations can be intermixed within a single DS8000 series enclosure.

The DS8000 series models are modular systems that are designed to be built upon and upgraded from one model to another in the field, helping clients respond swiftly to changing business requirements. To help accommodate more ongoing workload fluctuations, the DS8000 series employs dynamic provisioning—a feature designed to add or delete volumes on the fly to help meet sudden spikes in demand or to react to other changes. To help further meet the changing storage needs of growing businesses, the DS8000 series can use the IBM Standby Capacity on Demand option, which is designed to allow clients to access extra capacity quickly whenever the need arises. With all these capabilities, the DS8000 series can quickly respond to changing business needs.

Availability

The DS8000 series is designed to meet the needs of on demand environments requiring the highest levels of availability. It has a dual-processor complex implementation and is designed to support concurrent microcode loads, dynamic hardware upgrades, sophisticated Light Path diagnostics and near transparent I/O failover and failback. It also features many redundant, hot-swappable components to help support continuous operations. Furthermore, each system is built to monitor its internal functions. If a potential problem is detected, DS8000 series systems can automatically "call home" to alert service personnel that a potential problem could be developing.

The DS8000 series also offers exceptional advanced functions for data backup, remote mirroring and disaster recovery. These capabilities, which are part of the IBM TotalStorage Resiliency Family, are designed to help maintain access to information even in unexpected circumstances.

IBM TotalStorage FlashCopy

The IBM TotalStorage FlashCopy® feature is a point-in-time copy capability that can be used to help reduce application outages caused by backups and other data copy activities. FlashCopy is designed to enable data to be copied in the background while making both source and copied data available to users almost immediately. In addition to being able to make a full physical copy in the background, FlashCopy has a "no-copy" feature that is designed to reduce internal data movement overhead and can enable a quicker reuse of disk capacity that might otherwise be dedicated to copy operations for an extended period of time. With its copy-on-write capability, the only data copied is that which is about to be changed or overlaid. Copies can be made quickly, after which data can be backed up and capacity reallocated.

Remote mirroring and copy functions

The DS8000 series remote mirroring and copy functions—Global Mirror, Metro Mirror and Global Copy—are designed to create duplicate mirrors and copies of application data at remote sites that are cities—or

continents—away. These capabilities include both synchronous and asynchronous protocols for disaster recovery and backup.

High-speed data transfers help keep data up to date and allow it to be retrieved rapidly. Global Mirror is designed to help maintain data currency at the remote site within a few seconds of the local site, regardless of distance. It includes exceptional capabilities such as self-managed cross-system data consistency groups, which help protect data integrity for large applications across a wide variety of flexible system configurations.

These copying and mirroring capabilities are designed to help give users constant access to critical information during both planned and unplanned local outages. For businesses in on demand fields, that level of data availability and resiliency is essential in sustaining business continuity. To help increase flexibility and investment protection, these functions are compatible and interoperable with those of the IBM TotalStorage DS6000 series and the IBM TotalStorage ESS 800 and 750.

Simplified systems management

The DS8000 series simplifies system deployment by supporting major server platforms, including IBM z/OS®, z/VM®, OS/400®, i5/OS™ and AIX® operating systems, as well as Linux®, HP-UX, Sun SOLARIS, Novell NetWare and Microsoft® Windows® environments, among others. With such broad platform support, the DS8000 series can easily accommodate a comprehensive list of applications.

The DS8000 series is also designed to streamline configuration and management capabilities through IBM TotalStorage DS Storage Manager—a high-function, easy-to-use GUI management console that helps clients manage multiple subsystems and controllers, perform logical configuration set up and changes and also administer copy service management functions. It includes both on-line "real-time" configuration management, as well as an off-line function which is designed to allow for the creation and saving of logical configurations, for later use. The DS Storage Manager is designed to be accessed conveniently through a Web browser from any location with network privileges, greatly enhancing management efficiency.

To help enable even more effective and flexible system management the DS8000 series also supports a command line interface (CLI) and an SMI-S compliant application programming interface (API). Moreover, configuration options such as RAID 5 or 10 selection, volume creation/deletion and LUN masking are designed to be under direct user control with no vendor assistance required. Changes are designed to be made dynamically while the DS8000 series remains online.

More storage in less space

The DS8000 series packs more capacity into each enclosure than the previous generation of IBM storage units. The result is a disk system that occupies up to 20 percent less floor space than the ESS 800 while requiring less management and maintenance. The benefit to businesses is a dramatic reduction in acquisition, operation and real estate costs.

Completing the solution

Whatever your requirement, IBM can help to support it with a complete solution that includes the storage hardware, servers, software and support. The DS8000 series offers a leading 4-year warranty with IBM world-class support. Additionally, IBM Global Services can offer comprehensive assistance, including planning and design as well as implementation and migration support services. If a hands-on test drive of IBM storage solutions or access to proof-of-concept and benchmarking platforms is desired, you can visit an IBM briefing center or an IBM TotalStorage Solution Center. Moreover, IBM works with IBM Business Partners and other leading technology companies to deliver the right solutions for your business.

IBM TotalStorage DS8000 series at a glance

Models	DS8100 (921)	DS8300 (922, 9A2)
Processor	POWER5	POWER5
Processor configuration	dual 2-way	dual 4-way
Virtualization Engine (LPAR) capability	Not available	Optional
Processor Memory for Cache and NVS (min/max)	16GB/128GB	32GB/256GB
Host Adapter interfaces	4-port 2Gb Fibre Channel/FICON, 2-port ESCON	4-port 2Gb Fibre Channel/FICON, 2-port ESCON
Host adapters (min/max)	2/16	2/32
Host ports (min/max)	4/64	4/128
Drive interface	FC-AL	FC-AL
Number of disk drives (min/max)	16/384	16/640
Device Adapters	Up to 8 4-port 2Gb/s FC-AL	Up to 16 4-port 2Gb/s FC-AL
Maximum physical storage capacity	115TB	192TB
Disk sizes	73GB (15,000 rpm) 146GB (10,000 rpm) 300GB (10,000 rpm)	73GB (15,000 rpm) 146GB (10,000 rpm) 300GB (10,000 rpm)
RAID levels	5, 10	5, 10
Dimensions (height x width x depth)	193 x 84.7 x 118.3 cms With one expansion frame: 193 x 169.4 x 118.3 cms	193 x 84.7 x 118.3 cms With one expansion frame: 193 x 169.4 x 118.3 cms With two expansion frames: 193 x 254.1 x 118.3 cms
Maximum weight	1189 kg (2620 lbs) Add per expansion frame: 1089 kg (2400lbs)	1307 kg (2880 lbs) Add per expansion frame: 1089 kg (2400 lbs)
Operating environment		
Wet bulb maximum	23°C (73°F)	23°C (73°F)
Relative humidity	20-80%	20-80%
Caloric value BTU/hr	30,000	30,000
Power supply	Three phase 50/60 Hz	Three phase 50/60 Hz
Electrical power kVA	8.7	8.7
Supported systems	For more details on supported servers, visit **ibm.com**/totalstorage/disk	For more details on supported servers, visit **ibm.com**/totalstorage/disk

For more information

For more information about the IBM TotalStorage DS8000 series, contact your IBM representative or an IBM Business Partner, or call 1 800 IBM-CALL within the U.S. You can also visit the IBM Web site at:

ibm.com/totalstorage/ds8000.

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MB, GB and TB equal 1,000,000, 1,000,000,000 and 1,000,000,000,000 bytes, respectively, where referring to storage capacity. Actual storage capacity will vary based upon many factors and may be less than stated.

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