A high-performance disk storage solution for systems across the enterprise

IBM Enterprise Storage Server, Models F10 and F20

Highlights

Provides superior storage sharing for UNIX**, Windows NT**, Windows** 2000, Novell NetWare**, AS/400*, and S/390* servers

Provides high performance with two powerful four-way RISC SMP processors, large cache, and serial disk attachment

Features industry-standard, state-of-the-art copy services—including FlashCopy*, Peer-to-Peer Remote Copy, and Extended Remote Copy—for rapid backup and disaster recovery

Uses redundant hardware and RAID 5 disk arrays to provide high availability for mission-critical business applications

Provides fast data transfer rates with attached hosts via Fibre Channel, UltraSCSI, ESCON*, and FICON interfaces

Increases administrative productivity by centralizing operations management and providing users with a single interface via a Web browser

Enables enterprises with multiple heterogeneous hosts to scale up to 11 TB while maintaining excellent performance

Shared storage for all major types of servers

The IBM Enterprise Storage Server* is a second-generation Seascape* disk storage system that provides industry-leading availability, performance, manageability, and scalability. Virtually all types of servers can concurrently attach to the Enterprise Storage Server—including S/390, Windows NT, Windows 2000, Novell NetWare, AS/400, and many types of UNIX servers. As a result, the Enterprise Storage Server is ideal for organizations with growing e-business operations that are being handled by multiple heterogeneous servers.

Enterprise-strength storage for distributed systems

With more business-critical information processing being performed on distributed systems (running several different operating systems), the IBM Enterprise Storage Server addresses the need to protect and manage distributed data with the same level of performance previously reserved for the mainframe environment. The IBM Enterprise Storage Server does more than simply enable shared storage across enterprise platforms—it can improve the performance, availability, scalability, and manageability of enterprise-wide storage resources through a variety of powerful functions:

- *FlashCopy* provides fast data duplication capability. This option helps eliminate the need to stop applications for extended periods of time in order to perform backups and restores.

IBM Enterprise Storage Server

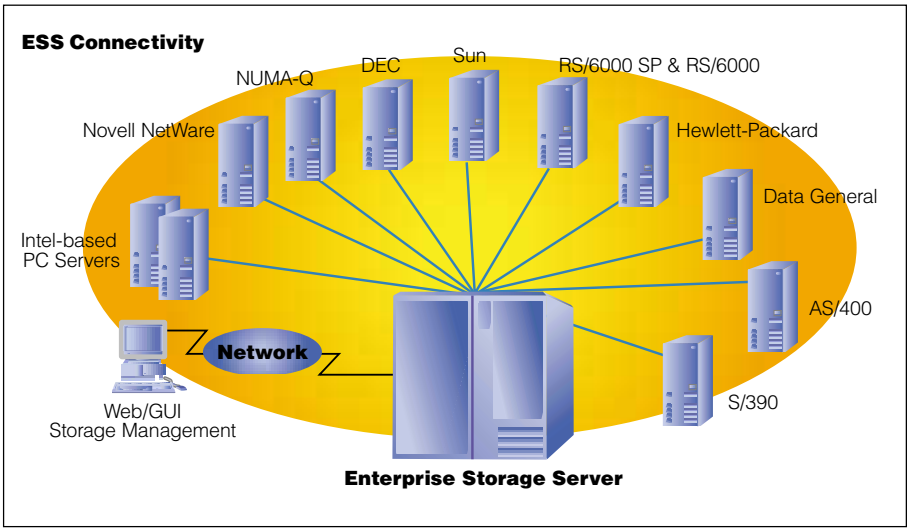
- *Peer-to-Peer Remote Copy* maintains a synchronous copy (always up-to-date with the primary copy) of data in a remote location. This backup copy of data can be used to quickly recover from a failure in the primary system without losing any transactions—an optional capability that can literally keep your e-business applications running.

- *Extended Remote Copy (XRC)* provides a copy of OS/390* data at a remote location (which can be connected using telecommunications lines at unlimited distances) to be used in case the primary storage system fails. The Enterprise Storage Server enhances XRC with full support for unplanned outages. In the event of a telecommunications link failure, this optional function enables the secondary

remote copy to be resynchronized quickly—without requiring duplication of all data from the primary location—for full disaster recovery protection.

- *Custom volumes* enable volumes of various sizes to be defined for S/390 servers, enabling administrators to configure systems for optimal performance.

- *Storage partitioning* uses storage devices more efficiently by providing each server access to its own pool of storage capacity. Storage pools can be shared among multiple servers.



The IBM Enterprise Storage Server provides superior storage sharing for a range of servers.

High availability to safeguard data access

Support for 24x7 operations is built into the IBM Enterprise Storage Server. RAID 5 disk arrays help provide data protection while remote copy technologies allow fast data backup and disaster recovery. The IBM Enterprise Storage Server is a high-performance RAID 5 storage server featuring dual active processing clusters with fail-over switching, hot spares, hot-swappable disk drives, and nonvolatile fast write cache, and redundant power and cooling.

The IBM Enterprise Storage Server also contains integrated functions to help prevent storage server downtime by constantly monitoring system functions. If a potential problem is detected, the IBM Enterprise Storage Server automatically "calls home" to report the problem. A technician can be dispatched to make repairs, often before the problem is noticed by data center staff. Maintenance—including licensed internal code revisions—can typically be performed without interrupting operations.

Built-in flexibility

The IBM Enterprise Storage Server is a general-purpose disk system, providing outstanding flexibility with many options (IBM offers several predefined configurations to simplify ordering). The system consists of disk drives attached to a storage server via high-speed serial interfaces. A variety of host attachment options (UltraSCSI, ESCON, FICON, and Fibre Channel) enable the system to be optimized for the specific requirements of each computing environment.

Scalability for fast-growing environments

The IBM Enterprise Storage Server is especially designed for e-business and other applications with unpredictable growth requirements. It provides unprecedented scalability (up to 11 TB) while maintaining excellent performance. Disk drives for the IBM Enterprise Storage Server are provided as integrated packages of eight disk drives (known as eight-packs). Three disk drive capacities are available: 9 GB, 18 GB, and 36 GB. The server's base frame can hold a maximum of 16 eight-packs which, when used with 36 GB disks, yields a total capacity of nearly 3.4 TB. An add-on expansion enclosure is the same size as the base frame and can contain twice as many eight-packs—up to 256 hard disk drives—to deliver a maximum capacity of more than 11.2 TB.

Built-in investment protection

The IBM Enterprise Storage Server helps protect existing investments in IBM storage devices. For example, disk capacity from IBM Versatile Storage Server* frames and IBM 7133 Serial Disk System drawers (Models 020 and D40) can be attached to the IBM Enterprise Storage Server. Furthermore, first-generation (Models E10 and E20) Enterprise Storage Servers may be upgraded to the F-models, yielding up to 100% improvement in throughput. This upgrade protects customers' investments in ESS technology and enhances the scalability of installed Enterprise Storage Servers.

Performance enhancements for S/390 servers

Building on the capabilities of the IBM Versatile Storage Server and the RAMAC* Virtual Array family, the IBM Enterprise Storage Server improves function and performance for S/390 servers:

- *Multiple Allegiance:* This feature enables different operating systems to perform multiple, concurrent I/Os to the same logical volume—reducing queuing and significantly increasing performance. By enabling the Enterprise Storage Server to process more I/Os in parallel, Multiple Allegiance and optional Parallel Access Volumes can dramatically improve performance and enable more effective use of larger volumes. The result is simplified storage management at a reduced cost.

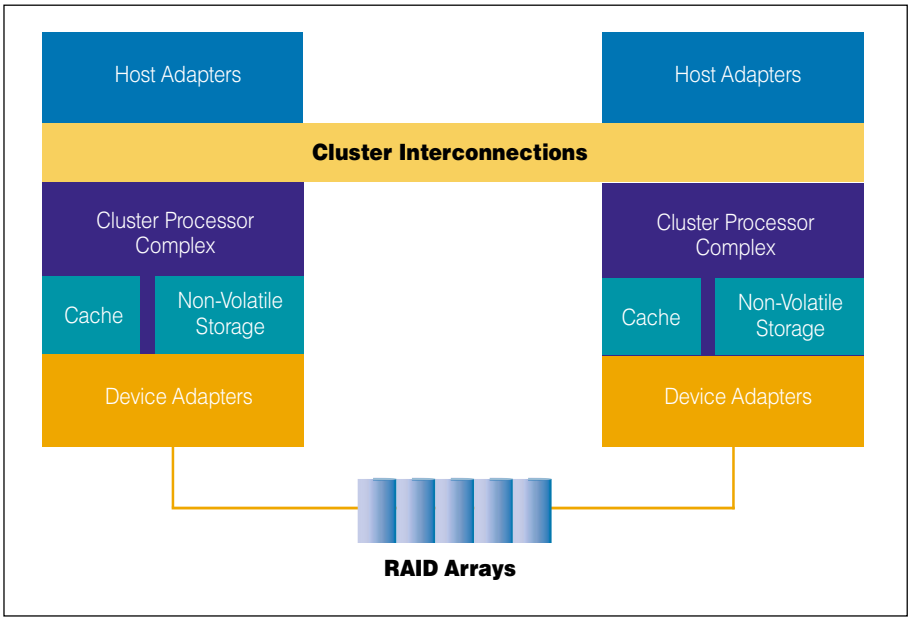
- *Parallel Access Volumes:* Previous S/390 systems allowed only one I/O operation per logical volume at a time. Now, performance is improved by enabling multiple I/Os from any operating system to access the same volume at the same time.

- *Priority I/O Queuing:* The storage server can ensure that important jobs have priority access to storage resources. With Priority I/O Queuing, the Enterprise Storage Server uses information provided

by the OS/390 Workload Manager to manage the sequence in which I/Os are processed—matching I/O priority to your application priorities.

Enterprise-wide storage management to maximize productivity

IBM StorWatch* Enterprise Storage Server Specialist* is an integrated storage management tool that enables storage administrators to centrally monitor and manage IBM Enterprise Storage Servers. Using commonly available browser software, users can access the StorWatch Enterprise Storage Server Specialist tool from work, home, or on the road via a secure network connection. This enables additional control and flexibility in managing storage assets.



The IBM Enterprise Storage Server logical structure provides outstanding flexibility to meet different price/performance requirements.

For more information

For more information, contact your IBM representative or IBM Business Partner or visit www.ibm.com/storage/ess.

IBM Enterprise Storage Server at a glance

Characteristics	***Enterprise Storage Server 2105-F10***	***Enterprise Storage Server 2105-F20***
Disk storage capacity (baseframe)	420 GB to 1.68 TB	420 GB to 11.2 TB
Cache size	8 or 16 GB	8 or 16 GB
Host server attachments	Up to 32 SCSI or ESCON ports, up to 16 Fibre Channel ports, and intermix configurations	Up to 32 SCSI or ESCON ports, up to 16 Fibre Channel ports, and intermix configurations
Physical characteristics		
Dimensions	75.25" H x 54.50" W x 35.75" D (1913 mm x 1383 mm x 909 mm)	75.25" H x 54.50" W x 35.75" D (1913 mm x 1383 mm x 909 mm)
Weight	2160 lb. (980 kg)	2590 lb. (1175 kg)
Operating environment		
Temperature	60 to 90° F (16 to 32° C)	60 to 90° F (16 to 32° C)
Relative humidity	20 to 80%	20 to 80%
Wet bulb maximum	73° F (23° C)	73° F (23° C)
Caloric value	11,000 BTU/hr	16,000 BTU/hr
Power supply	Single phase 50/60 Hz	Three phase 50/60 Hz
Electrical power	3.5 kVA	5.0 kVA
Supported systems[1]		
S/390; AS/400 (9406 models); Data General; DEC; Hewlett-Packard (9000); Intel**-based PC servers; Novell NetWare; RS/6000*; RS/6000 SP; Sun**; NUMA-Q; Compaq		

[1] For more details on supported servers, visit www.ibm.com/storage/ess.

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Produced in the United States
3-00

G225-6832-02