Designed as reliable, powerful, scalable modular storage systems offering a unified storage architecture—with exceptional value—for large-enterprise data center applications and consolidations

IBM System Storage N7000 series Modular Disk Storage Systems

Highlights

- ***Scalable—Designed for non-disruptive expansion to more than 1.1 petabytes (1.1 PB, or 1100 TB) storage capacity***
- ***Versatile—Single, integrated architecture designed to support concurrent block I/O and file serving over Ethernet and Fibre Channel SAN infrastructures***
- ***Efficient consolidation—Intended to provide storage for multiple applications in a single system with FlexShare™ to ensure that critical workloads get priority service***
- ***Application availability—N7000 systems with Data ONTAP® enable application-level recovery in minutes, not hours, upon failure or user error***
- ***Performance—Delivers high, consistent performance for mission-critical applications***

The challenge: Managing data for business advantage

In an increasingly demanding and competitive business landscape, effective data management is essential to the success of the enterprise. Data availability from any location gives employees, partners and customers the up-to-the-minute information they need to work productively, make timely decisions and meet business goals. Information technology professionals facing these challenges are under pressure to deliver more capacity and at higher levels of service. Yet critical resources—staffing, budget, power, cooling and floor space—are often constrained.

These demands call for enterprise-class storage systems with the flexibility to support changing IT requirements, accommodate continuous data growth, satisfy application-level service requirements and unify SAN and NAS infrastructures with the expectation of reducing overall costs.

The solution: IBM System Storage N7000 series

The IBM System Storage™ N7000 series systems are intended to help IT organizations tackle the challenge of effective data management using virtualization technology and a unified storage architecture. The N7000 series is designed to deliver high-end enterprise storage and data management value with midrange affordability. Built-in enterprise serviceability and manageability features help support your efforts to increase reliability, simplify and unify storage infrastructure and maintenance, and deliver exceptional economy.

The N7000 series, like all N series systems, provides powerful virtualization and thin-provisioning capabilities designed to maximize storage utilization and staff productivity while minimizing the use of power, cooling and floor space. Staff productivity can be enhanced by an integrated suite of application-aware manageability software that can provide policy-based automation to otherwise manual tasks.

The IBM N7000 series is designed to provide remarkable versatility by unifying FC SAN, iSCSI SAN, NAS, primary, nearline and regulatory compliance data retention and archival storage in a single integrated architecture. N series systems are designed for easy installation, configuration, management and expansion. The combination of versatility and simplicity of N series systems is intended to help IT professionals respond quickly to changing business needs.

The N7000 series combines the benefits of a unified storage architecture suite of application-aware software with massive scalability, which is intended to provide an ideal platform for large-scale data center applications and storage consolidations.

Designed to support scalability, versatility, flexibility, reliability and availability with outstanding value

Scalability. The N7000 series is designed to meet the massive storage scalability and I/O scalability needs that are critical in large data center environments. The N7900 system can be configured with 1.176 PB of raw storage capacity using up to 1,176 disk drives. The N7700 system can support 840 TB of capacity using as many as 840 disk drives.

Both the N7900 and the N7700 systems offer high-bandwidth controller designs, which can be in an active-active configuration. Each system offers sixteen 4-Gbps Fibre Channel (FC) ports and twelve Gigabit Ethernet (GbE) ports standard with the system's ten PCI-e and six PCI-x expansion slots that can accommodate quad-port 4-Gbps FC adapter cards and ten GbE adapter cards. For additional connectivity, the N7000 series can expand to a maximum of 56 Fibre Channel ports and 52 Ethernet ports.

Versatility. The unified storage architecture of the N7000 series can help eliminate the need to manage separate NAS and SAN storage by providing concurrent support for block and file protocols via Ethernet and Fibre Channel interfaces. With support for Fibre Channel and SATA hard drives, the N7000 product line also has the flexibility to be used for primary and secondary tiered storage.

Storage provisioning can take hours on other storage systems but with N series system's thin provisioning capabilities provided by FlexVol®, volumes can be expanded and contracted automatically without IT staff intervention or disruption to applications.

Another feature of the N series Data ONTAP operating system, FlexClone®, enables the nearly instant creation of clones without requiring incremental storage. FlexClone can dramatically accelerate test and development cycles for IT projects.

Efficient consolidation. The N7000 series is designed to consolidate and serve data for a wide variety of workloads, including mission-critical business applications, technical applications, databases, e-mail, home directories, digital media, backup and recovery, regulatory compliant data retention and archival. IBM N series systems support Windows®, UNIX®, including AIX®, Solaris™ and HP-UX, and Linux® host operating systems as well as VMware for server virtualization.

IT organizations can be challenged with poor response times during peak hours of operations after consolidating storage systems with dissimilar data workloads on to a single platform. To help address this challenge, N series offers FlexShare quality-of-service software, which is intended to enable storage administrators to set and dynamically adjust workload priorities. FlexShare can help ensure that important applications get fast response times.

Application availability. N7000 systems combine a variety of features to meet the need for continuous availability. Complementing the high-availability hardware design is the proven reliability of the Data ONTAP operating system and RAID-DP™ (N series implementation of RAID-6), which uniquely provides double-level RAID data protection to help ensure that data is not lost in the event of multiple disk drive failures. In addition, RAID-DP has negligible performance impact. The N7000 also supports simple yet powerful synchronous, semi-synchronous and asynchronous mirroring that can be deployed in one-to-one, one-to-many and many-to-one mirroring configurations.

The N7000 can serve as the foundation for a comprehensive data management solution consisting of hardware, software and services. With an appliance architecture and built-in backup and recovery software, an N7000 solution is designed to address the entire spectrum of data availability challenges while offering value in price/performance and scalability.

Ultimately what matters is application-level availability, and this is where N series systems excel. Snapshot™, a standard feature of Data ONTAP, makes it possible to instantly revert to a previous version of data upon failure or user error. N series Snapshot copies are unique in that they can be created frequently during production, because they use only a small amount of incremental storage and have virtually no impact on performance. Host-based SnapManager® software integrates Snapshot management with applications, designed to ensure consistent backup images and application-level recovery in minutes.

Performance. High performance and massive storage capacity are characteristics that make the N7000 systems ideal for large-scale applications and storage consolidation. An N7000 system is designed to complete jobs quickly and handle a large number of users via a powerful, high-bandwidth architecture with scalability to 1,176 disk drives capable of delivering up to 1.176 PB of raw storage capacity. With large cache memory configurations, expandable high-performance I/O, 4-Gbps FC SAN support, 4-Gbps disk drive support and support for 10-Gbps Ethernet, the N7000 delivers exceptional enterprise-class system performance.

N7000 near-line storage capabilities

The N7000 is well suited for near-line storage configurations. An N7000 system populated with Fibre Channel disk drives that backs up to another N series system populated with SATA disk drives offers disk-to-disk backup capabilities that are designed to help you fill the price/performance gap between fast but costly primary storage and less-costly but slow archival (tape and optical) storage. Utilizing SATA disk drive technology, you could achieve near-primary storage performance at near-tape storage costs. A disk-based, secondary storage device for enterprise

applications, N7000 disk-to-disk environments are designed to complement and dramatically improve existing tape backup, archiving and data protection schemes. They do so by inserting economical and simple-to-use disk-based storage between application storage and tape libraries in a three-tier storage architecture.

This arrangement is designed to provide economical storage and rapid disk-based access to reference data to help address business and regulatory requirements. It can serve as a key component in an information lifecycle management process by storing less-critical data on a device whose cost and performance stand between primary and tape storage.

Combined with SnapVault®, the N7000 disk-to-disk backup environments are designed to serve as a robust and fully integrated appliance that makes backing up and restoring data rapid and reliable. Backing up directly to an N7000 system in a near-line storage configuration and then to tape can help your organization enhance data protection management, improve primary storage and tape library performance, and reduce backup resource requirements and costs. Two N series systems operating in a disk-to-disk backup scenario are designed to be faster and to consume less application-server CPU processing power than direct backup to tape. SnapVault software can be used to help reduce network bandwidth consumption by supporting incremental block transfers to backup data across a LAN or WAN. SnapMirror® software, which replicates data at high speeds over a LAN or a WAN, is designed to provide high data availability and fast recovery for mission-critical applications.

IBM N series systems using NearStore® software can use the Advanced Single Instance Storage (A-SIS) software feature for better storage utilization. A-SIS software enables N series systems to deduplicate stored data at the block level in order to conserve physical disk space when making disk-to-disk copies of primary data. Traditionally when copies of volumes are created, every duplicate data string is also copied, resulting in an inefficient use for secondary storage. A-SIS deduplication helps eliminate this inefficiency.

Support for data retention through non-erasable, non-rewriteable security capabilities

The N7000 offers multiple capabilities in the area of data retention. It can serve as a high-performance device for storing mission-critical production data and as a data-retention system by running SnapLock® software. The N7000 with SnapLock software is designed to deliver high-performance and high-security data permanence to disk-based nearline and primary N series storage. An optional feature of the proven Data ONTAP operating system, SnapLock software supports the accuracy, integrity and security of data. It helps prevent the alteration of business records and allows data to be rapidly accessible online for long periods of time.

SnapLock offers capabilities to help you address regulatory and best-practices records retention requirements by supporting the creation of non-rewritable, non-erasable volumes on IBM N series systems. This functionality is designed to prevent critical files from being altered or deleted until a specified retention date.

SnapLock is also designed to replicate non-erasable, non-rewriteable data securely and automatically between multiple N series systems using SnapMirror software. The non-erasable, non-rewriteable to non-erasable, non-rewriteable replication of data at remote sites can help your organization address regulatory concerns or best practices, resulting in a highly robust compliant data protection solution. Non-erasable, non-rewriteable data can also be backed up to tape for an additional level of data protection.

Software

Operating system	Data ONTAP	
Operating systems supported	Windows 2000, Windows Server® 2003, Windows XP, Linux, Sun Solaris, IBM AIX, HP-UX, Mac OS, VMware ESX	
Software features	**Standard**	**Licensed**
	Integrated RAID manager, including RAID-DP Snapshot Fast Boot NIS DNS FilerView® FlexVol FlexShare Disk Sanitization SecureAdmin™ Network Data Management Protocol (NDMP)	CIFS NFS HTTP FTP iSCSI FCP FlexCache™ FlexClone FlexScale MultiStore® Clustered Failover SnapMirror SyncMirror® SnapRestore® Single Mailbox Recovery SnapVault SnapMover® NearStore Advanced Single Instance Storage SnapValidator® SnapLock MetroCluster **Manageability Software** Application Suite SnapManager for Microsoft® Exchange SnapManager for Microsoft SQL Server® SnapManager for Microsoft Office SharePoint® SnapManager for Oracle SnapManager for SAP SnapManager for Virtual Infrastructure Server Suite SnapDrive® Virtual File Manager™— Enterprise Edition Virtual File Manager—Migration Edition Storage Suite Protection Manager Provisioning Manager File Storage Resource Manager Operations Manager

Specifications

	N7700	N7700	N7900	N7900
Machine type model	**2866-A11**	**2866-A21**	**2867-A11**	**2867-A21**
Controller configuration	Single	Dual (active/active)	Single	Dual (active/active)
Processors speed and type	2.6 GHz AMD™ Opteron™	2.6 GHz AMD Opteron	2.6 GHz AMD dual core Opteron	2.6 GHz AMD dual core Opteron
Number of processors	2	4	4	8
Random access memory	16 GB	32 GB	32 GB	64 GB
Standard integrated I/O ports				
Fibre Channel ports/speed	8 (4-Gbps)	16 (4-Gbps)	8 (4-Gbps)	16 (4-Gbps)
Ethernet ports/speed	6 (1-GbE)	12 (1-GbE)	6 (1-GbE)	12 (1-GbE)
Storage scalability				
Maximum raw capacity[1]	840 TB	840 TB	1176 TB	1176 TB
Maximum number of disk drives	840	840	1176	1176
Maximum volume size	16 TB	16 TB	16 TB	16 TB
Maximum number of volumes/LUNs	2048	2048	2048	2048
Maximum number of storage enclosures	60	60	84	84
Disk expansion units supported	EXN4000—4-Gbps Fibre Channel Disk Storage Expansion Unit EXN1000—SATA Disk Storage Expansion			
I/O scalability				
PCI-Express (PCI-e) expansion slots	5	10	5	10
PCI-x expansion slots	3	6	3	6
Maximum number FC ports	28	56	28	56
Maximum number of Ethernet ports	26	52	26	52

Specifications

	N7600	N7600	N7800	N7800
Machine type model	**2866-A10**	**2866-A20**	**2867-A10**	**2867-A20**
Controller configuration	Single	Dual (active/active)	Single	Dual (active/active)
Processors speed and type	2.6 GHz AMD Opteron	2.6 GHz AMD Opteron	2.6 GHz AMD Opteron	2.6 GHz AMD Opteron
Number of processors	2	4	4	8
Random access memory	16 GB	32 GB	32 GB	64 GB
Standard integrated I/O ports				
Fibre Channel ports/speed	8 (2-Gbps)	16 (2-Gbps)	8 (2-Gbps)	16 (2-Gbps)
Ethernet ports/speed	6 (1-GbE)	12 (1-GbE)	6 (1-GbE)	12 (1-GbE)
Storage scalability				
Maximum raw capacity[1]	840 TB	840 TB	1008 TB	1008 TB
Maximum number of disk drives	840	840	1008	1008
Maximum volume size	16 TB	16 TB	16 TB	16 TB
Maximum number of volumes/LUNs	2048	2048	2048	2048
Maximum number of storage enclosures	60	60	72	72
Disk expansion units supported	EXN4000—4-Gbps Fibre Channel Disk Storage Expansion Unit EXN1000—SATA Disk Storage Expansion			
I/O scalability				
PCI-Express (PCI-e) expansion slots	5	10	5	10
PCI-x expansion slots	3	6	3	6
Maximum number FC ports	28	56	28	56
Maximum number of Ethernet ports	26	52	26	52

For more information

Contact your IBM representative or IBM Business Partner or visit:

ibm.com/systems/storage/network

For technical specifications, optional I/O expandability and software features, functions and benefits of the N7000 series, visit:

ibm.com/systems/storage/network/n7000/appliance

For N7000 series interoperability visit:

ibm.com/systems/storage/network/interophome.html

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MB, GB, TB and PB equal 1,000,000, 1,000,000,000, 1,000,000,000,000 and 1,000,000,000,000,000 bytes, respectively, where referring to storage capacity. Actual storage capacity will vary based upon many factors and may be less than stated. Some numbers given for storage capacities give capacity in native mode followed by capacity using data compression technology.

IBM's customer is responsible for ensuring its own compliance with legal requirements. It is the customer's sole responsibility to obtain advice of competent legal counsel as to the identification and interpretation of any relevant laws and regulatory requirements that may affect the customer's business and any actions the customer may need to take to comply with such laws. IBM does not provide legal advice or represent or warrant that its services or products will ensure that the customer is in compliance with any law.

[1] Max. capacity is derived based on the type, size, and number of the drives. Max. capacity and volume size are calculated using Base10 arithmetic (i.e., 1 TB = 1,000,000,000,000 bytes).

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