

Designed as reliable, powerful, scalable modular storage systems—with exceptional value—for data center and business applications.



IBM System Storage N5000 Modular Disk Storage Systems



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. Across industries, enterprises of all types and sizes face similar data storage challenges. They need intelligent data and storage management capabilities to manage growth with limited administration resources. They must consolidate storage and improve resource utilization for many applications across multiple server and storage platforms. When they deploy storage and data management systems to address their needs, they must reduce both acquisition and management costs.

Highlights

- **Reliable**—Designed to address the needs of business- and mission-critical applications through high data availability and system-level redundancy features
- **Fast**—Supports high throughput and fast response times for database, e-mail, and technical applications
- **Versatile**—Single, integrated architecture designed to support concurrent block I/O and file serving over Ethernet and Fibre Channel SAN infrastructures
- **Flexible**—Fibre Channel and SATA disk drive capabilities allow for deployment in multiple solution environments including data compliant retention, near-line storage, disk-to-disk backup scenarios and high-performance, mission-critical I/O intensive operations

The solution: IBM System Storage N5000 series

The IBM System Storage® N5000 series offers additional choice to organizations facing the challenges of enterprise data management. The IBM System Storage N5000 series is designed to deliver high-end enterprise storage and data management value with midrange affordability. Built-in enterprise serviceability and manageability features support your efforts to increase reliability, simplify and unify storage infrastructure and maintenance, and deliver exceptional economy.

Designed to support high availability, reliability and scalability with exceptional economy

The N5000 series 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 N5000 series solution is designed to address the entire spectrum of data availability challenges while offering value in price/performance and scalability. By relying on SATA storage, the N5000 series can help you achieve data availability that competes with that of Fibre Channel storage—at a much lower cost. The N5000 series offers a foundation architecture designed to

help you address midrange storage requirements and help you scale to support storage grids as enterprise requirements evolve.

Addressing TCO and ROI concerns through simplified, unified storage

An IBM System Storage N series system is designed to provide integrated block- and file-level data access, allowing concurrent operation in IP SAN (iSCSI), FC SAN, NFS and CIFS environments. Other storage vendors may require the operation of multiple systems to provide this functionality. FlexVol™ and FlexClone™ technologies are designed to offer flexibility in storage management and help you optimize the use of storage resources. These technologies accomplish this through use of a simplified, unified infrastructure that facilitates management and maintenance operations. N5000 series systems are designed to avoid costly downtime, both planned and unplanned, and improve your access to mission-critical data, thereby helping you gain a competitive advantage.

N5000 series near-line storage capabilities

The N5000 series is well suited for near-line storage configurations. An N5000 system populated with Fibre Channel disk drives backs up to another N5000 system populated with



SATA disk drives. This configuration 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 may achieve near-primary storage performance at near-tape storage costs. A disk-based, secondary storage device for enterprise applications, N5000 series 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.

N5000 series capabilities can support your efforts to enhance existing operations by acting as a large data cache or by replacing tape backup devices altogether. Combined with SnapVault®, the N5000 series 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. In addition, with a low cost of acquisition and better performance than tape, the system offers an economical, high-capacity, remote storage device for multi-site replication.

Backing up directly to an N5000 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.

N5000 series data retention capabilities

The N5000 offers multiple capabilities in the area of data retention. It can serve as a high performance device used to store mission-critical production data or as a single purpose device utilizing SATA disk drive technology running SnapLock® software. The N5000 with SnapLock software is designed to deliver high-performance and high-security data permanence to disk-based near-line 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 is available in two versions:

- **SnapLock Compliance:** *Designed to help organizations address strict records-retention regulations such as SEC Rule 17a-4 (broker-dealers), HIPAA (healthcare), Sarbanes-Oxley (public companies), 21CFR Part 11 (life sciences), and DOD 5015.2 (government).*
- **SnapLock Enterprise:** *Designed to help organizations adhere to rigorous organizational best practices through functionality similar to that of SnapLock Compliance. However, it provides administrators with the ability to delete entire SnapLock Enterprise volumes. This can help avoid a SnapLock Enterprise user or administrator deleting or modifying individual SnapLock Enterprise WORM records or undermining SnapLock Compliance WORM volumes.*

Support for data retention through WORM and security capabilities

SnapLock offers capabilities to help you address regulatory and best-practices records retention requirements by supporting the creation of non-rewritable, non-erasable WORM 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 WORM data securely and automatically between multiple N5000 systems using SnapMirror software. The WORM-to-WORM replication of data at remote

sites can help your organization address regulatory concerns or best practices, resulting in a highly robust WORM data protection solution.

WORM data can also be backed up to tape for an additional level of data protection.

To help you address the security and confidentiality of data, the N5000 system as well as other N series systems

support an advanced set of security features, including authentication (Kerberos, Active Directory, NTLM, NIS, LDAP), access controls (CIFS ACLs, NFS Permissions), server- or network-based access restrictions, transmission encryption (SecureAdmin™ software option), and audit logs (CIFS logging).

IBM System Storage N5000 series at a glance

Operating system	Data ONTAP 7.1
Standard software features	Integrated automatic RAID manager, Snapshot, Fast Boot, telnet, e-mail alerts, NIS, DNS, SNMP, FilerView®, NDMP, SecureAdmin, FlexVol™, AutoSupport
Network protocol support	NFS V2/V3/V4 over UDP or TCP, PCNFSD V1/V2 for (PC) NFS client authentication, Microsoft® CIFS, VLD, FTP, HTTP 1.0, HTTP 1.1 Virtual Hosts
SAN protocol support	iSCSI; Fibre Channel Protocol (FCP) fabric-attached and direct-attached configurations
Optional licensed functions	NFS, CIFS, HTTP, Fibre Channel Protocol (FCP), FlexClone, MultiStore®, Clustered Failover (CFO), SnapMirror, SnapRestore®, SnapVault, LockVault™, SnapLock Compliance, SnapLock Enterprise, SyncMirror®, SnapValidator™, SnapDrive® for Windows, SnapDrive for UNIX®, Single Mailbox Recovery, SnapManager® for Exchange, SnapManager for SQL, SnapManager for Oracle, MetroCluster, DataFabric® Manager
Hardware features	Four full-duplex 10/100/1000 Base-T Ethernet ports onboard, Four 2 Gbps Fibre Channel ports onboard, built-in LVD SCSI Port, diagnostic LED/LCD, Compact Flash Dual redundant hot-plug integrated cooling fans and auto-ranging power supplies, 19" rack-mount enclosure
Default/min./max. RAID group sizes	RAID-4 (single-parity) – FC-Data/Parity: 7+1 (13+1); SATADData/Parity: 7+1 (7+1) RAID-DP (dual-parity) – FC-Data/Parity: 14+2 (26+2); SATADData/Parity: 12+2 (14+2)
Disk storage expansion units supported	EXN2000, (formerly EXP600) – Fibre Channel (FC) Disk Storage Expansion Unit EXN1000 – Serial Advanced Technology Attachment (SATA) Disk Storage Expansion Unit
Disk drive capacities supported	EXN2000 – 10K RPM FC disk drives (72GB, 144GB, 300GB), 15K RPM FC disk drives (72GB, 144GB) EXN1000 – 7200 RPM SATA disk drives (250GB, 320GB, 500GB)

Specifications

	N5200	N5200	N5500	N5500
IBM machine types – models	2864-A10	2864-A20	2865-A10	2865-A20
Storage configuration	Single storage controller	Dual (active/active) storage controllers	Single storage controller	Dual (active/active) storage controllers
ECC memory	2GB	4GB	4GB	8GB
Nonvolatile memory	512MB	1GB	512MB	1GB
Integrated I/O				
Onboard 10/100/1000 Ethernet ports	4	8	4	8
Onboard 2 Gbps Fibre Channel ports (configurable as storage-attached initiator or host-attached target)	4	8	4	8
Max. number of Fibre Channel loops	4	8	4	8
Max. number of disk drives	168	168	336	336
Max. number of drives per Fibre Channel loop	84	84	84	84
Max. volume size	17.6TB	17.6TB	17.6TB	17.6TB

I/O expandability

	N5200-A10 Single storage controller	N5200-A20 Dual storage controller active/active configuration	N5500-A10 Single storage controller	N5500-A20 Dual storage controller active/active configuration
PCI-X expansion slots	3	6	3	6
Maximum number of optional adapters	3	6	3	6
— Dual-port FC HBA for disk (only for A20 models)				
— Dual-port GbE iSCSI TOE (copper)				
— Dual-port GbE iSCSI TOE (fibre)				
— Single dual-channel SCSI LVD for tape				
— Dual-port MetroCluster HBA				
— Dual-port 4 Gbps FC HBA				
— Dual-port GbE (copper)				

Environmental specifications

	Dual storage controller Active/active configuration (2864-A20 and 2865-A20)	Single storage controller (2864-A10 and 2865-A10)
AC power / max. current	88 to 246/19 to 6.4A	88 to 246VAC/9.5 to 3.2A
Thermal rating	1706 Btu/hr	853 Btu/hr
Weight (max.)	68 kg (150 lb)	34 kg (75 lb)
Height	26 cm (10.6") 6U EIA	13 cm (5.12") 3U EIA
Width	44.9 cm (17.7")	
Depth	61 cm (24") without cable management tray 76.2 cm (30") with cable management tray	
Operating temperature maximum range	10°C to 40°C (50°F to 104°F)	
Recommended operating temperature range	20°C to 25°C (68°F to 77°F)	
Non-operating temperature range	-40°C to 65°C (-40°F to 149°F)	
Non-operating relative humidity	5% to 95% relative humidity non-condensing	
Recommended operating temperature relative humidity range	40% to 55% non-condensing	
Operating acoustic noise	56.4 dBA @ 1m at 23°C, 5.64 bels @ 23°C	
Min. cabinet clearances	25.4 cm (10") in front, 30.5 cm (12") in rear	
Min. service clearances	76.2 cm (30") in front, 76.2 cm (30") in rear	
Maximum altitude	3050 m (10,000 ft.)	

Storage Expansion Unit specifications

Disk storage expansion units	EXN1000 SATA disk storage expansion unit (MTM 2861-001) EXN2000 FC disk storage expansion unit (MTM 2863-001) Each with 14 low-profile slots for fiber channel and SATA disk drives
Disk drive storage shelf interface	PCI-X-based Fibre Channel-Arbitrated Loop (FC-AL)
Disk shelf interface	Electronically switched hub (ESH2) modules
Power supply/cooling fans	Dual, redundant, hot-pluggable, integrated power supply/fan assemblies (220V/110V)
AC power/max. current	100 to 120 VAC/4.4A; 200 to 240 VAC/2.3A 100 to 120 VAC/7A; 200-240 VAC/3.5A; 50/60Hz
Operating temperature maximum range	10°C to 40°C (50°F to 104°F)
Recommended operating temperature range	20°C to 25°C (68°F to 77°F)
Operating relative humidity range	10% to 95% relative humidity, non-condensing 10% to 95%
Recommended operating relative humidity range	40% to 55% non-condensing
Non-operating temperature range	-40°C to 65°C (-40°F to 149°F)
Non-operating relative humidity range	10% to 95% relative humidity, non-condensing
Thermal rating	1,215 Btu/hr (fully loaded disk storage expansion unit)
Operating acoustic noise	56.4 dBA @ 1m at 23°C, 5.64 bels @ 23°C
Dimensions (height/width/depth)	3U EIA (5.25", 13.3 cm)/19" IEC rack-compliant (17.6", 44.7 cm)/20" (50.85 cm)
Weight	EXN1000 – 35.8 kg (78.8 lbs) fully loaded with disk drives, 23 kg (50.6 lbs) empty EXN2000 – 35 kg (77 lbs) fully loaded with disk drives, 23 kg (50.6 lbs) empty

Regulations

Filer safety	EN 60950:2002, CE, CSA 60950 and NRTL (UL) CB (all national deviations), EN60825-1:1994, IRAM, GOST-R
Disk shelf safety	UL/C-UL; CE
Emissions	FCC Class A, EN 55022:1998, EN 61000-3-2, EN 61000-3-3, CE, BSMI, AS/NZ 3548, VCCI
Immunity	EN 55024:1998

N5000 series tape drive support (refer to interoperability matrix on external web site)

N5000 series supported backup methods

Disk-based backup	SnapVault, SnapMirror, NDMP interface
Host-based backup	NDMP/NFS/CIFS/iSCSI
GbE-attached tape support	ibm.com /storage/nas, refer to System Storage N series interoperability matrix
Direct-attached tape support	ibm.com /storage/nas, refer to System Storage N series interoperability matrix
SAN-attached tape support	ibm.com /storage/nas, refer to System Storage N series interoperability matrix
iSCSI initiator, IP fabric and host attached support	ibm.com /storage/nas, refer to System Storage N series interoperability matrix

For more information

Contact your IBM representative or
IBM Business Partner or visit:

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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. Some numbers given for storage capacities give capacity in native mode followed by capacity using data compression technology.

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