

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



## IBM System Storage N7000 Modular Disk Storage System



### **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.

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### Highlights

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- **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 retention, near-line storage, disk-to-disk backup scenarios and high-performance, mission-critical I/O intensive operations

**The solution: IBM System Storage N7000 series**

The IBM System Storage™ N7000 series offers additional choice to organizations facing the challenges of enterprise data management. The IBM System Storage 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.

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

The N7000 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 N7000 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 N7000 series can help you achieve data availability that competes with that

of Fibre Channel storage—at a much lower cost. The N7000 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. N7000 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.



**N7000 series near-line storage capabilities**

The N7000 series is well suited for near-line storage configurations. An N7000 system populated with Fibre Channel disk drives that backs up to another N7000 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 may achieve near-primary storage performance at near-tape storage costs. A disk-based, secondary storage device for enterprise

applications, N7000 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.

N7000 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

N7000 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 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.

#### **N7000 series data retention capabilities**

The N7000 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 N7000 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 but 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 N7000 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 N7000 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 N7000 series at a glance

<b>Operating system</b>	Data ONTAP 7.2
<b>Standard software features</b>	Integrated automatic RAID manager, Snapshot™, Fast Boot, telnet, e-mail alerts, NIS, DNS, SNMP, FilerView®, NDMP, SecureAdmin, FlexVol, AutoSupport, FlexShare™, SSH
<b>Network protocol support</b>	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
<b>SAN protocol support</b>	iSCSI; Fibre Channel Protocol (FCP) fabric-attached and direct-attached configurations
<b>Optional licensed functions</b>	NFS, CIFS, HTTP, Fibre Channel Protocol (FCP), FlexClone, MultiStore®, Clustered Failover (CFO), SnapMirror, SnapRestore®, SnapVault, LockVault™ Compliance, LockVault Enterprise, SnapLock Compliance, SnapLock Enterprise, SyncMirror®, SnapValidator™, SnapDrive® for Windows, SnapDrive for UNIX®, Single Mailbox Recovery for Exchange, SnapManager® for Exchange, SnapManager for SQL Server, SnapManager for Oracle, MetroCluster, DataFabric® Manager
<b>Hardware features</b>	Full-duplex 10/100/1000Base-T Ethernet onboard console, diagnostic LED/LCD, Remote Management Card standard, redundant hot-plug cooling fans, redundant hot-plug power supplies, Compact Flash, 19" rack-mount enclosure, optional 220 V 42U 19" system cabinet
<b>Default/min./max. RAID group sizes</b>	RAID4 (single parity) and RAID-DP (double parity) RAID4 support on FC disks are: Default 7 data + 1 parity/Min. 1 data + 1 parity/Max. 13 data + 1 parity; RAID4 support on SATA disks are: Default and Max. 7 data + 1 parity/Min. 1 data + 1 parity; RAID-DP support on FC disks are: Default 14 data + 2 parity/Min. 1 data + 2 parity/Max. 26 data + 2 parity; RAID-DP support SATA disks are: Default 12 data + 2 parity/Min. 1 data + 2 parity/Max. 14 data + 2 parity
<b>Disk storage expansion units supported</b>	EXN2000, (formerly EXP600) – Fibre Channel (FC) Disk Storage Expansion Unit EXN1000 – Serial Advanced Technology Attachment (SATA) Disk Storage Expansion Unit
<b>Disk drive capacities supported</b>	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

	N7600	N7600	N7800	N7800
<b>IBM machine types – models</b>	2866-A10	2866-A20	2867-A10	2867-A20
<b>Storage configuration</b>	Single storage controller	Dual (active/active) storage controllers	Single storage controller	Dual (active/active) storage controllers
<b>Max. raw capacity<sup>a</sup></b>	420TB	420TB	504TB	504TB
<b>Max. number of disk drives</b>	840	840	1008	1008
<b>Storage array disk drive size</b>	1 to 500GB	1 to 500GB	1 to 500GB	1 to 500GB
<b>Volumes (min./max.)</b>	2/200	2/200	2/200	2/200
<b>Max. volume size<sup>a</sup></b>	16TB	16TB	16TB	16TB
<b>ECC memory</b>	16GB	32GB	32GB	64GB
<b>Nonvolatile memory</b>	512MB	1GB	2GB	4GB
<b>Onboard 2Gb Fibre Channel ports (fiber)</b>	8	16	8	16
<b>Onboard be ports (copper)</b>	6	12	6	12

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**I/O expandability**

	N7600-A10 Single storage controller	N7600-A20 Dual storage controller active/active configuration	N7800-A10 Single storage controller	N7800-A20 Dual storage controller active/active configuration
<b>PCI Express Expansion Slots</b>	5	10	5	10
<b>PCI-X Expansion Slots</b>	3	6	3	6
<b>Maximum number of optional adapters</b>	Not to exceed 8	Not to exceed 16	Not to exceed 8	Not to exceed 16
Quad GbE TOE (copper) adapter	2	4	2	4
Single 10GbE TOE (fibre) adapter	2	4	2	4
Dual GbE (copper or fibre) adapter	5	10	5	10
Dual iSCSI (copper or fiber) host adapter	3	6	3	6
Dual 4Gbps FC Target adapters	4	8	4	8
Single dual-channel SCSI LVD for tape	3	6	3	6
Dual 4Gbps FC HBA for disk	4	8	4	8
Dual 4Gbps FC HBA for tape	3	6	3	6

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## Environmental specifications

	Dual storage controller Active/active configuration (2866-A20 and 2867-A20)	Single storage controller (2866-A10 and 2867-A10)
<b>AC Power/Current (line voltage for standalone systems dependent on local power distribution; system cabinets are 200 to 240 V only)</b>	100 to 240VAC, 22 to 10A (typical) 24A (max.) @ 100VAC 200 to 240VAC, 11 to 5A (typical) 12A (max.) @ 200VAC	100 to 240VAC, 11 to 5A (typical) 12A (max.) @ 100VAC 200 to 240VAC, 5.5A to 2.8A (typical) 6A (max.) @ 200VAC
<b>Thermal rating</b>	6142 BTU/hr.	3071 BTU/hr.
<b>Weight (max.)</b>	242 lb (109.6 kg)	121 lb (54.8 kg)
<b>Height</b>	20.8" (52.8 cm), fits into 12U space	10.3" (26.2 cm), fits into 6U space
<b>Width</b>	19" IEC rack-compliant (17", 44.53 cm)	
<b>Depth</b>	23.5" (59.7 cm), 29.05" (73.8 cm) with cable management bracket	
<b>Operating temperature, altitude, and relative humidity</b>	10°C to 40°C (50°F to 104°F); at <math>\leq 3,000\text{ m}</math> (at <math>\leq 10,000'</math>) elevation; 20% to 80% relative humidity, non-condensing (28° C wet bulb temperature)	
<b>Non-operating temperature and relative humidity</b>	-40° C to 65° C (-40° F to 149° F); 10% to 95% relative humidity, non-condensing, in original container	
<b>Operating acoustic noise</b>	56.5 dBA sound pressure (LpA) @ normal operating conditions (at 22°C and at sea level)	
<b>Min. cabinet clearances</b>	1.85" (4.7 cm) for bezel, 3" (7.6 cm) for cable radius	
<b>Min. service clearances</b>	25" (63.5 cm) from front of cabinet; 40" (76 cm) from rear of cabinet	
<b>Maximum altitude</b>	3050 m (10,000 ft.)	

## Storage Expansion Unit specifications

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

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## Regulations

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

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N7000 series tape drive support (refer to interoperability matrix on external website)

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## N7000 Gateway supported backup methods

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

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## For more information

Contact your IBM representative or  
IBM Business Partner or visit:

[ibm.com/storage/nas/](http://ibm.com/storage/nas/)



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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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<sup>a</sup> 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., 1TB = 1,000,000,000,000 bytes).

