

*Designed as reliable, powerful, scalable modular storage systems offering a unified storage architecture—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.

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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 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—Unified Storage Architecture**

The IBM System Storage™ N5000 series offers additional choice to organizations facing the challenges of enterprise data management. The N5000 series is designed to deliver high-end enterprise storage and data management value with midrange affordability.

These enterprise storage systems deliver a unified storage architecture with versatility to simultaneously meet diverse needs—SAN and NAS, primary and secondary storage—while providing high levels of availability. N5000 systems handle complex requirements in a way that actually simplifies the storage infrastructure and improves productivity.

The N5000 line of offerings is fully compatible with all IBM N series systems, which meet a range of storage needs, from small remote office and departmental applications through the largest enterprise applications and consolidations.

The N5000 products offer 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 outstanding value**

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.

**Performance**—The N5000 series delivers excellent performance, whether the storage need is for SAN-based business applications, technical



applications or home directories. With large cache memory configurations, expandable high-performance I/O, FC SAN support, 4 Gbps disk drive support and 10 Gbps Ethernet, the N5000 systems deliver exceptional midrange system performance.

Complementing high-performance hardware capabilities, FlexVol®, a feature of the Data ONTAP® operating system, eliminates performance bottlenecks for spindle-bound applications by striping data across a larger set of disk drives.

**Availability**—Achieve superior application availability with N5000 systems via Snapshot™ copies, storage resiliency features and disaster recovery options. Low-overhead Snapshot technology enables file or application-level recovery in minutes, not hours, after human error or an application failure. A comprehensive set of storage resiliency features, including RAID-DP™ (the N series high-performance implementation of RAID 6) ensures that N5000 storage systems are always up and running. And N series offers a suite of disaster recovery products for protection against catastrophic events.

**Outstanding Value**—The N5000 systems offer outstanding value by reducing costs in all aspects of storage ownership. The superior protection of RAID-DP gives IBM N series the unique ability to leverage large, low-cost SATA disk drives for production applications. FlexVol and FlexClone®, features of Data ONTAP, maximize storage utilization and provide unmatched management simplicity that dramatically reduces administrative costs.

**Addressing TCO and ROI concerns through a unified storage architecture**

An IBM System Storage N series system with its versatile and industry leading unified storage architecture 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 more expensive 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.

IBM N series systems using NearStore® software can leverage 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 of secondary storage. A-SIS deduplication helps remove this inefficiency.

#### **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

<b>Operating system</b>	Data ONTAP 7.1 or later (N5300 and N5600 models require Data ONTAP 7.2.1 or later)
<b>Standard software features</b>	Integrated automatic RAID manager, Snapshot, Fast Boot, telnet, e-mail alerts, NIS, DNS, SNMP, FilerView®, NDMP, SecureAdmin, FlexVol, AutoSupport
<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), iSCSI Protocol, FlexClone, MultiStore®, Clustered Failover (CFO), SnapMirror, SnapRestore®, SnapVault, LockVault™ Compliance, LockVault Enterprise, SnapLock Compliance, SnapLock Enterprise, SyncMirror, SnapValidator®, SnapDrive® for Windows®, SnapDrive for UNIX®, SnapDrive for AIX®, SnapDrive for HPUX, SnapDrive for Linux®, AIX multipathing, Single Mailbox Recovery for Exchange, SnapManager® for Exchange, SnapManager for SQL Server, SnapManager for Oracle, SnapManager for SAP, MetroCluster, Operations Manager, Disk Sanitization, NearStore, Advanced Single Instance Storage (A-SIS), SAN Bundle, Protection Manager™
<b>Hardware features</b>	Four full-duplex 10/100/1000 Base-T Ethernet ports onboard, Four Fibre Channel (FC) ports onboard, built-in LVD SCSI Port (on N5200 and N5500 only), diagnostic LED/LCD, Compact Flash Dual redundant hot-plug integrated cooling fans and auto-ranging power supplies, 19" rack-mount enclosure
<b>Default/min./max. RAID group sizes</b>	RAID-4 (single-parity)—FC-Data/Parity: 7+1 (13+1); SATA-Data/Parity: 7+1 (7+1) RAID 6 (RAID-DP:dual-parity)—FC-Data/Parity: 14+2 (26+2); SATA-Data/Parity: 12+2 (14+2)
<b>Disk storage expansion units supported</b>	EXN4000—4 Gbps Fibre Channel Disk Storage Expansion Unit EXN1000—Serial Advanced Technology Attachment (SATA) Disk Storage Expansion Unit Support for Legacy Expansion Unit EXN2000 FC Storage Expansion Unit
<b>Disk drive capacities supported</b>	EXN4000—4 Gbps 15K RPM FC disk drives (144 GB, 300 GB); 2 Gbps 10K RPM FC disk drives (144 GB, 300 GB) EXN1000—3 Gbps 7200 RPM SATA disk drives (250 GB, 500 GB, 750 GB) Disks Supported for Legacy EXNx000 Configurations FC—36 GB, 72 GB, 144 GB, 300 GB disks SATA—250 GB, 320 GB, 500 GB, 750 GB disks

## N series Specifications

	N5200	N5200
<b>IBM machine types – models</b>	2864-A10	2864-A20
<b>Storage configuration</b>	Single storage controller	Dual (active/active) storage controllers
<b>Processors</b>		
Processors type	Intel 2.8 GHz Xeon	Intel 2.8 GHz Xeon
Number of processors	1	2
<b>Memory</b>		
Random access memory	2 GB	4 GB
Nonvolatile memory	512 MB	1 GB
<b>Integrated I/O</b>		
Onboard 10/100/1000 Ethernet ports	4	8
Onboard Fibre Channel ports (configurable as storage-attached initiator or host-attached target)	4 (2 Gbps)	8 (2 Gbps)
<b>Storage Expandability</b>		
Maximum number of Fibre Channel loops	4	8
Maximum number of disk drives for filer models (A10 and A20 models)	168	168
Maximum number of storage expansion units per FC loop	6	6
Maximum number of disk drives per Fibre Channel loop	84	84
Maximum raw storage capacity	84 TB	84 TB
Max. logical volume size	16 TB	16 TB
<b>Expandability</b>		
Maximum number FC Ports	16	32
Maximum number of Ethernet Ports	12	24
Maximum number of LUNs	1024	1024
<b>I/O expandability</b>		
Expansion slots	<ul style="list-style-type: none"> <li>• 3 (PCI-X)</li> </ul>	<ul style="list-style-type: none"> <li>• 6 (PCI-X)</li> </ul>
Optional Fibre Channel Adapters (Disk expansion, SnapMirror, and FCP Host Ports)	<ul style="list-style-type: none"> <li>• Dual-port 2 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter</li> <li>• Quad-port 4 Gbps FCP HBA—Disk (for EXN4000)</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port 2 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter Quad-port 4 Gbps FCP HBA—Disk (for EXN4000)</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>
Optional adapters (networking)	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• One-port 10 GbE TOE NIC</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• One-port 10 GbE TOE NIC</li> </ul>
Optional adapters (High Availability)		<ul style="list-style-type: none"> <li>• Dual-port MetroCluster VI HBA</li> </ul>

## N series Specifications

	N5300	N5300
<b>IBM machine types – models</b>	2869-A10	2869-A20
<b>Storage configuration</b>	Single controller	Dual (active/active) storage controllers
<b>Processors</b>		
Processors type	AMD 1.8 GHz Single-core 64-bit Opteron	AMD 1.8 GHz Single-core 64-bit Opteron
Number of processors	2	4
<b>Memory</b>		
Random access memory	4 GB	8 GB
Nonvolatile memory	512 MB	1 GB
<b>Integrated I/O</b>		
Onboard 10/100/1000 Ethernet ports	4	8
Onboard Fibre Channel ports (configurable as storage-attached initiator or host-attached target)	4 ports (1, 2 or 4Gbps auto-sensing)	8 ports (1, 2 or 4Gbps auto-sensing)
<b>Storage Expandability</b>		
Maximum number of Fibre Channel loops	4	8
Maximum number of disk drives for filer models (A10 and A20 models)	252	252
Maximum number of storage expansion units per FC loop	6	6
Maximum number of disk drives per Fibre Channel loop	84	84
Maximum raw storage capacity	126 TB	126 TB
Max. logical volume size	16 TB	16 TB
<b>Expandability</b>		
Maximum number of FC Ports	16	32
Maximum number of Ethernet Ports	16	32
Maximum number of LUNs	2048	2048
<b>I/O expandability</b>		
Expansion slots	<ul style="list-style-type: none"> <li>• 3 (PCI-E)</li> </ul>	<ul style="list-style-type: none"> <li>• 6 (PCI-E)</li> </ul>
Optional FCP Adapters (Disk expansion, Tape, SnapMirror, and FCP Host Ports)	<ul style="list-style-type: none"> <li>• Dual-port 4 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter</li> <li>• Dual-port 4 Gbps FC HBA—Tape</li> <li>• Quad-port 4 Gbps FC HBA for Disk</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port 4 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter</li> <li>• Dual-port 4 Gbps FC HBA—Tape</li> <li>• Quad-port 4 Gbps FC HBA for Disk</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>
Optional Ethernet adapters (networking)	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• Quad-port GbE TOE NIC (copper)</li> <li>• Quad-port GbE NIC (copper)</li> <li>• Dual-port 10 Gbps NIC Fibre</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• Quad-port GbE TOE NIC (copper)</li> <li>• Quad-port GbE NIC (copper)</li> <li>• Dual-port 10 Gbps NIC Fibre</li> </ul>
Optional adapters (High Availability)	<ul style="list-style-type: none"> <li>• Dual-port MetroCluster VI FC HBA</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port MetroCluster VI FC HBA</li> </ul>

## N series Specifications

	N5500	N5500
<b>IBM machine types – models</b>	2865-A10	2865-A20
<b>Storage configuration</b>	Single storage controller	Dual (active/active) storage controllers
<b>Processors</b>		
Processors type	Intel 2.8 GHz Xeon	Intel 2.8 GHz Xeon
Number of processors	2	4
<b>Memory</b>		
Random access memory	4 GB	8 GB
Nonvolatile memory	512 MB	1 GB
<b>Integrated I/O</b>		
Onboard 10/100/1000 Ethernet ports	4	8
Onboard Fibre Channel ports (configurable as storage-attached initiator or host-attached target)	4 (2 Gbps)	8 (2 Gbps)
<b>Storage Expandability</b>		
Maximum number of Fibre Channel loops	4	8
Maximum number of disk drives for filer models (A10 and A20 models)	336	336
Maximum number of storage expansion units per FC loop	6	6
Maximum number of disk drives per Fibre Channel loop	84	84
Maximum raw storage capacity	168 TB	168 TB
Max. logical volume size	16 TB	16 TB
<b>Expandability</b>		
Maximum number FCP ports	16	32
Maximum number of Ethernet ports	12	24
Maximum number of LUNs	1024	1024
<b>I/O expandability</b>		
Expansion slots	<ul style="list-style-type: none"> <li>• 3 (PCI-X)</li> </ul>	<ul style="list-style-type: none"> <li>• 6 (PCI-X)</li> </ul>
Optional Adapters (Disk expansion, Tape, SnapMirror, and FCP Host Ports)	<ul style="list-style-type: none"> <li>• Dual-port 2 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter</li> <li>• Quad-port 4 Gbps FCP HBA—Disk (for EXN4000)</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port 2 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter</li> <li>• Quad-port 4 Gbps FCP HBA—Disk (for EXN4000)</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>
Optional adapters (networking)	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• One-port 10 GbE TOE NIC</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• One-port 10 GbE TOE NIC</li> </ul>
Optional adapters (High Availability)		<ul style="list-style-type: none"> <li>• Dual-port MetroCluster VI HBA</li> </ul>

## N series Specifications

	N5600	N5600
<b>IBM machine types – models</b>	2868-A10	2868-A20
<b>Storage configuration</b>	Single storage controller	Dual (active/active) storage controllers
<b>Processors</b>		
Processors type	AMD 1.8 GHz Dual-core 64-bit Opteron	AMD 1.8 GHz Dual-core 64-bit Opteron
Number of processors	2	4
<b>Memory</b>		
Random access memory	8 GB	16 GB
Nonvolatile memory	512 MB	1 GB
<b>Integrated I/O</b>		
Onboard 10/100/1000 Ethernet ports	4	8
Onboard Fibre Channel ports (configurable as storage-attached initiator or host-attached target)	4 ports (1, 2 or 4 Gbps auto-sensing)	8 ports (1, 2 or 4 Gbps auto-sensing)
<b>Storage Expandability</b>		
Maximum number of Fibre Channel loops	5	10
Maximum number of disk drives for filer models (A10 and A20 models)	420	504
Maximum number of storage expansion units per FC loop	6	6
Maximum number of disk drives per Fibre Channel loop	84	84
Maximum raw storage capacity	252 TB	252 TB
Max. logical volume size	16 TB	16 TB
<b>Expandability</b>		
Maximum number of FCP Ports	16	32
Maximum number of Ethernet ports	16	32
Maximum number of LUNs	2048	2048
<b>I/O expandability</b>		
Expansion slots	<ul style="list-style-type: none"> <li>• 3 (PCI-E)</li> </ul>	<ul style="list-style-type: none"> <li>• 6 (PCI-E)</li> </ul>
Optional Fibre Channel Adapters (Disk expansion, Tape, SnapMirror, and FCP Host Ports)	<ul style="list-style-type: none"> <li>• Dual-port 4 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter</li> <li>• Dual-port 4 Gbps FC HBA for tape attachment</li> <li>• Quad-port 4 Gbps FC HBA for Disk</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port 4 Gbps FC HBA for disk attachment</li> <li>• Dual-port 4 Gbps FCP Target adapter</li> <li>• Dual-port 4 Gbps FC HBA for tape attachment</li> <li>• Quad-port 4 Gbps FC HBA for Disk</li> <li>• Dual-port FC HBA for SnapMirror over Fibre Channel</li> </ul>
Optional adapters (networking)	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• Dual-port 10 Gbps NIC Fibre</li> <li>• Quad-port GbE TOE NIC (copper)</li> <li>• Quad-port GbE NIC (copper)</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port Gigabit Ethernet (GbE) adapter (copper)</li> <li>• Dual-port GbE adapter (fibre)</li> <li>• Dual-port GbE iSCSI Target adapter (copper)</li> <li>• Dual-port GbE iSCSI Target adapter (fibre)</li> <li>• Dual-port 10 Gbps NIC Fibre</li> <li>• Quad-port GbE TOE NIC (copper)</li> <li>• Quad-port GbE NIC (copper)</li> </ul>
Optional adapters (High Availability)	<ul style="list-style-type: none"> <li>• Dual-port MetroCluster VI FC HBA</li> </ul>	<ul style="list-style-type: none"> <li>• Dual-port MetroCluster VI FC HBA</li> </ul>

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**Environmental specifications (N5200, N5300, N5500 and N5600)**

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	Dual storage controller Active/active configuration (2864-A20 , 2865-A20, 2868-A20, 2869-A20)	Single storage controller (2864-A10, 2865-A10, 2868-A10, 2869-A10)
<b>AC power/max. current</b>	88 to 246/19 to 6.4A	88 to 246 VAC/9.5 to 3.2A
<b>Thermal rating</b>	1706 Btu/hr	853 Btu/hr
<b>Weight (max.)</b>	68 kg (150 lb)	34 kg (75 lb)
<b>Height</b>	26 cm (10.6") 6U EIA	13 cm (5.12") 3U EIA
<b>Width</b>	44.9 cm (17.7")	
<b>Depth</b>	61 cm (24") without cable management tray 76.2 cm (30") with cable management tray	
<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>Non-operating temperature range</b>	-40°C to 65°C (-40°F to 149°F)	
<b>Non-operating relative humidity</b>	5% to 95% relative humidity non-condensing	
<b>Recommended operating temperature relative humidity range</b>	40% to 55% non-condensing	
<b>Operating acoustic noise</b>	56.4 dBA @ 1m at 23°C, 5.64 bels @ 23°C	
<b>Min. cabinet clearances</b>	25.4 cm (10") in front, 30.5 cm (12") in rear	
<b>Min. service clearances</b>	76.2 cm (30") in front, 76.2 cm (30") in rear	
<b>Maximum altitude</b>	3050 m (10,000 ft.)	

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## Storage Expansion Unit specifications (EXN1000, EXN2000 and EXN4000)

<b>Disk storage expansion units</b>	EXN4000 4 Gbps FC disk storage expansion unit (2863-004) EXN1000 SATA disk storage expansion unit (2861-001) Each with 14 low-profile slots for fibre channel or SATA disk drives Legacy Expansion Unit Support EXN2000 FC Storage Expansion Unit with 14 low-profile slots for fibre channel or SATA disk drives
<b>Disk drive storage shelf interface</b>	Fibre Channel-Arbitrated Loop (FC-AL)
<b>Disk shelf interface</b>	Electronically switched hub (ESH2 and ESH4) 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; 50/60Hz
<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 EXN4000—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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N5000 series tape drive support (refer to interoperability matrix on external Web site)

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## N5000 series supported backup methods

<b>Disk-based backup</b>	SnapVault, SnapMirror, NDMP interface
<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)



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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