

*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 series 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 is intended to simplify the storage infrastructure and improve 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, allows applications and users to get more space dynamically and non-disruptively without IT staff intervention. FlexVol can enable more productive use of available storage and help improve performance.

**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. In addition, 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, thin provisioning and FlexClone®, near instantaneous volume cloning, 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.

### **Support for data retention through non-erasable, non-rewriteable security 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 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.

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 non-erasable, non-rewriteable records or undermining SnapLock Compliance non-erasable, non-rewriteable volumes.*

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).

## 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

Integrated RAID manager, including RAID-DP  
Snapshot  
Fast Boot  
NIS  
DNS  
FilerView®  
FlexVol  
FlexShare™  
Disk Sanitization  
SecureAdmin  
Network Data Management Protocol (NDMP)

#### Licensed

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  
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

See [ibm.com/storage/network/n5000/appliance/features.html](http://ibm.com/storage/network/n5000/appliance/features.html) for an overview of the N5000 series software features, functions and benefits

<b>Specifications</b>				
	<b>N5300</b>	<b>N5300</b>	<b>N5600</b>	<b>N5600</b>
	<b>2869-A10</b>	<b>2869-A20</b>	<b>2868-A10</b>	<b>2868-A20</b>
Machine type model				
Controller configuration	Single	Dual (active/active)	Single	Dual (active/active)
Processors speed and type	2.4 GHz AMD Single-core 64-bit Opteron	2.4 GHz AMD Single-core 64-bit Opteron	1.8 GHz AMD Dual-core 64-bit Opteron	1.8 GHz AMD Dual-core 64-bit Opteron
Number of processors	2	4	2	4
Random access memory	4 GB	8 GB	8 GB	16 GB
<b>Standard integrated I/O ports</b>				
Fibre Channel ports (speed)	4 (4-Gbps)	8 (4-Gbps)	4 (4-Gbps)	8 (4-Gbps)
Ethernet ports (speed)	4 (GbE)	8 (GbE)	4 (GbE)	8 (GbE)
<b>Storage scalability</b>				
Maximum raw capacity	336 TB	336 TB	504 TB	504 TB
Maximum number of disk drives	336	336	504	504
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	24	24	36	36
<b>I/O scalability</b>				
PCI-Express (PCI-e) expansion slots	3	6	3	6
PCI-x expansion slots	0	0	0	0
Maximum number FC ports	16	32	16	32
Maximum number of Ethernet ports	16	32	16	32
Maximum number of optional adapters	3	6	3	6
<b>Disk expansion units supported</b>				
	EXN4000—4 Gbps Fibre Channel Disk Storage Expansion Unit			
	EXN1000—SATA Disk Storage Expansion			
	EXN2000—FC Storage Expansion Unit (Legacy)			

<b>Specifications</b>				
	<b>N5200</b>	<b>N5200</b>	<b>N5500</b>	<b>N5500</b>
	<b>2864-A10</b>	<b>2864-A20</b>	<b>2865-A10</b>	<b>2865-A20</b>
Machine type model				
Controller configuration	Single	Dual (active/active)	Single	Dual (active/active)
Processors speed and type	Intel® 2.8 GHz Xeon®	Intel 2.8 GHz Xeon	Intel 2.8 GHz Xeon	Intel 2.8 GHz Xeon
Number of processors	1	2	2	4
Random access memory	2 GB	4 GB	4 GB	8 GB
<b>Standard integrated I/O ports</b>				
Fibre Channel ports (speed)	4 (2-Gbps)	8 (2-Gbps)	4 (2-Gbps)	8 (2-Gbps)
Ethernet ports (speed)	4 (GbE)	8 (GbE)	4 (GbE)	8 (GbE)
<b>Storage scalability</b>				
Maximum raw capacity	84 TB	84 TB	168 TB	168 TB
Maximum number of disk drives	168	168	336	336
Maximum volume size	16 TB	16 TB	16 TB	16 TB
Maximum number of volumes/LUNs	1024	1024	1024	1024
Maximum number of storage enclosures	12	12	24	24
<b>I/O scalability</b>				
PCI-Express (PCI-e) expansion slots	0	0	0	0
PCI-x expansion slots	3	6	3	6
Maximum number FC ports	16	32	16	32
Maximum number of Ethernet ports	12	24	12	24
Maximum number of optional adapters	3	6	3	6
<b>Disk expansion units supported</b>				
	EXN4000—4 Gbps Fibre Channel Disk Storage Expansion Unit			
	EXN1000—SATA Disk Storage Expansion			
	EXN2000—FC Storage Expansion Unit (Legacy)			

## For more information

Contact your IBM representative or IBM Business Partner or visit:

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

For N5000 series modular disk storage system technical specifications and optional adapter cards available, please visit:

[ibm.com/storage/network/n5000/appliance](http://ibm.com/storage/network/n5000/appliance)

For N5000 series interoperability and tape drive support visit:

[ibm.com/systems/storage/network/interophome.html](http://ibm.com/systems/storage/network/interophome.html)

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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Route 100  
Somers, NY 10589

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May 2008  
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TSD01434-USEN-12