

IBM N series Storage Efficiency

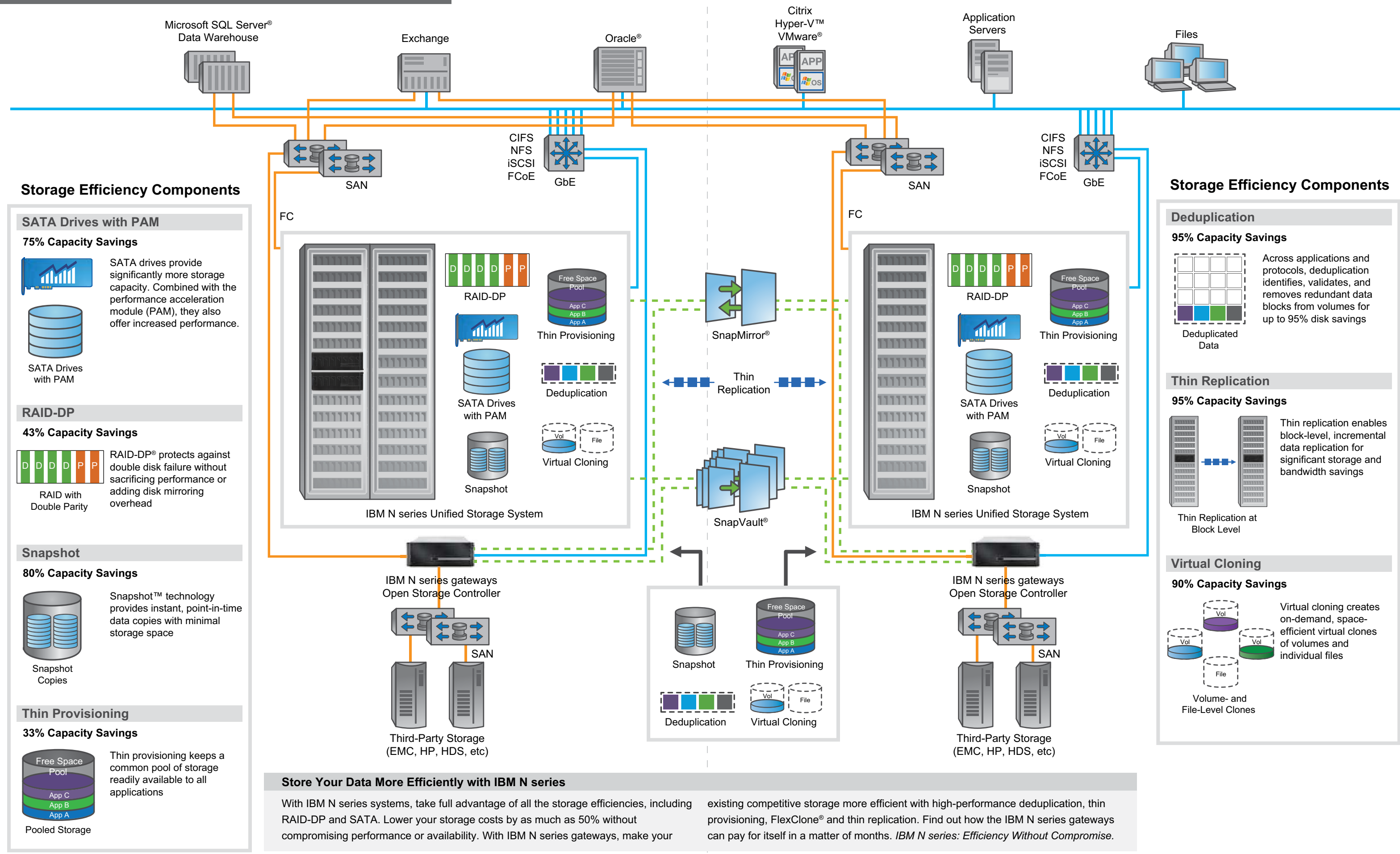
Efficient Storage Solutions for Your Dynamic Infrastructure



FAMILY BROCHURE

IBM System Storage N series

Proven. Adept. Efficient.



Storage Efficiency Components

SATA Drives with PAM
75% Capacity Savings

SATA drives provide significantly more storage capacity. Combined with the performance acceleration module (PAM), they also offer increased performance.

RAID-DP
43% Capacity Savings

RAID-DP® protects against double disk failure without sacrificing performance or adding disk mirroring overhead

Snapshot
80% Capacity Savings

Snapshot™ technology provides instant, point-in-time data copies with minimal storage space

Thin Provisioning
33% Capacity Savings

Thin provisioning keeps a common pool of storage readily available to all applications

Storage Efficiency Components

Deduplication
95% Capacity Savings

Across applications and protocols, deduplication identifies, validates, and removes redundant data blocks from volumes for up to 95% disk savings

Thin Replication
95% Capacity Savings

Thin replication enables block-level, incremental data replication for significant storage and bandwidth savings

Virtual Cloning
90% Capacity Savings

Virtual cloning creates on-demand, space-efficient virtual clones of volumes and individual files

Store Your Data More Efficiently with IBM N series

With IBM N series systems, take full advantage of all the storage efficiencies, including RAID-DP and SATA. Lower your storage costs by as much as 50% without compromising performance or availability. With IBM N series gateways, make your existing competitive storage more efficient with high-performance deduplication, thin provisioning, FlexClone® and thin replication. Find out how the IBM N series gateways can pay for itself in a matter of months. *IBM N series: Efficiency Without Compromise.*



THE CHALLENGE

Managing growth and change

In today's rapidly changing business climate, your enterprise demands cost-effective, flexible data storage solutions that can handle the unpredictable and explosive growth of storage in your heterogeneous environment. As your business expands, you need your data to work for you. You're looking for efficiency. You want data management that's able to grow with you as your storage needs explode. It's got to be flexible enough to adapt to and protect your diverse business environment. You want a storage system that allows you to effectively manage your resources, something simple—and something you can afford.

THE SOLUTION

Implement our scalable and flexible IBM System Storage N series

With tens of thousands of IBM System Storage N series systems successfully deployed in business-critical environments, N series storage solutions help you manage data in your enterprise environment with a scalable and flexible operating system we call Data ONTAP®.

IBM System Storage and Data ONTAP provides:

- More efficient use of your storage resources
- High system availability to meet internal/external service level agreements
- Reduced storage management complexity and associated storage IT costs
- A single, scalable platform that can simultaneously support NAS, iSCSI, and FC SAN deployment
- Integrated application manageability for SAP, Exchange, SharePoint, Oracle, and more

Reduce costs and buy less storage

Now you can store more data in less disk space because we integrated data deduplication and thin provisioning into Data ONTAP. FlexVol® technology ensures that you use your storage systems at maximum efficiency, thus reducing the hardware investment to a minimum. Not only do you reduce the amount of physical storage, but you also see significant savings in power, cooling, and data center real estate costs, like Alamance Regional Medical Center (see customer profile).

Protect your existing storage infrastructure/investment:

By consolidating your existing third party storage systems behind one umbrella N series Gateway, you can and take advantage of N series features and repurpose your legacy storage platforms.

N series Gateways supports a broad range of storage arrays, including:

- IBM Enterprise Storage Server (ESS)
- IBM XIV
- IBM DS 4000 Midrange Storage
- HP StorageWorks
- HDS USP
- HDS Lightning
- HDS Thunder
- HDS SANRISE
- EMC Symmetrix
- EMC Clariion
- Fujitsu ETERNUS
- 3PAR InServ

Ensure business continuance and compliance

Disruptions to information access and noncompliance with records retention regulations are simply not options in today's business environments. N series offers innovative, disaster-tolerant data protection and recovery features such



IBM N series in Action

Customer:
Alamance Regional Medical Center

Challenge: Cutting costs related to data storage and improving storage utilization in a virtualized environment

Solution: Deploying IBM N series storage solution to take the place of an expensive, overpowered storage infrastructure

Hardware: IBM N series N5600 and N5200 storage , IBM Power Systems, System p and System i servers, and four IBM BladeCenter chassis

Software: IBM N series SnapManager for Virtual Infrastructure, IBM N series SnapMirror and SnapRestore, IBM Tivoli Storage Manager, VMware, and Citrix XenApp and XenDesktop

Benefits

- Storage lag time eliminated, boosting user productivity
- 83% reduction in storage requirements from deduplication
- 60 percentage point increase in storage utilization, increasing cost efficiency
- \$140,000 annual cost savings in hardware and software

"It's pretty obvious we'll be cutting a lot of overhead, both related to upfront costs and... ongoing maintenance."

Jerry Moore
Senior Network Administrator, ARMC

Headquartered in Burlington, N.C., Alamance Regional Medical Center (ARMC) is a non-profit

as SnapLock, SnapVault and SnapMirror technologies. Literally tens of thousands of corporate IT departments rely on N series proven SnapMirror disaster recovery solution to ensure business continuance.

Field tests reveal that N series technology with its optional software capabilities delivers 99.999% availability**

healthcare provider serving local communities. It offers clinical, educational, preventative-wellness and other resources, including a 238-bed medical center, to some 200,000 people yearly.

Supporting this is an IT infrastructure recognized by the Healthcare Information and Management Systems Society, which has ranked ARMC as one of the top six hospitals in North Carolina and in the top 3 percent of hospitals across the U.S. in IT development and clinical information systems.

ARMC had virtualized many servers—and has even earnestly begun moving to a thin-client computing model—but was stified in part by an older storage architecture that didn't quite fit with the organization's cutting-edge reputation. Realizing server virtualization was a great first step, ARMC also knew something else was missing, something that could help shrink IT costs even further.

Most of that virtualization is happening using VMware on a series of IBM System x servers, including 3950s and 3850s (the former as production boxes and the latter as disaster-recovery boxes) and four IBM BladeCenter chassis. The organization also hosts a mix of IBM System i, System p and Power Systems servers running IBM i and AIX.

Because of this mix of virtualized and physical servers, ARMC sought a way to consolidate much of its storage. It had been doing this to some extent before deploying the N series, but the organization found its existing solution lacking in some regards and expensive to maintain and scale. ARMC as a whole felt it should cut costs wherever possible, without hampering patient care.

Working closely with IBM business partner Yorel Integrated Solutions, ARMC diagnosed the problem and found a cure in the form of the NetApp-based IBM N series storage solutions.

ARMC began configuring the N series to work within its environment. *To that end, it purchased an N5600 system for production and an N5200 system for its disaster-recovery (DR) environment, which would use the N series-*

Data ONTAP standard features and optional capabilities that contribute to this high level of data availability include:

- SnapMirror
- Snapshot™
- FlexClone®
- Multipath high availability
- Active-active controller failover

proven SnapMirror DR solution.

It then began the migration process, moving its data from old storage devices to its new storage purchases. *ARMC began seeing immediate benefits, including improved performance. Rather than relying on one connection per virtualized-server panel or per IBM AIX OS-based System p and Power Systems server ... it now had multiprotocol connections that allowed simultaneous access to multiple data stores. This quickly addressed the data-return lags the organization had been experiencing.*

Migrating to the N series has also saved money. *ARMC is saving a whopping \$90,000 a year using the N series compared with the previous solution, including the cost of hardware and controlling software. It's also saving a respectable \$50,000 annually by avoiding expensive—and underutilized—new-capacity costs.*

Because the N series has less physical storage, ARMC is also seeing much better utilization, with the primary device running at around 80 percent capacity and the DR device, which also stores archived data, at around 90 percent. This means ARMC is getting much more bang for its storage buck, as the older solution ran at less than 25 percent capacity.

ARMC also began deduplicating its data, which lets data be written to storage only once even if it appears in multiple locations. This can have a dramatic impact on how much storage is used, as in the case of ARMC, which Moore says "had an immediate effect on our data stores. In the past, we had to allocate at least 30 GB to each server. Now, we're running 20-plus Windows servers on a single data store using less than 100 GB total capacity. That's a remarkable difference."

Additionally, the company has realized a power savings of about 6 percent. "It's a guesstimate," Moore says, "but we compared UPS (uninterruptable power supply) loads with the older system to the new one, and that's about the number we came up with. Over time, that will add up quite significantly."

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- RAID-DP®
- SyncMirror®

Manage everything with ease and efficiency

Using Operations Manager and System Manager, you can centrally manage and configure multiple systems throughout

Key N series software highlights

	Software/Feature	Function	Benefit
System Manageability	Deduplication	General-purpose deduplication for removal of redundant data objects	Reduces the amount of storage you need to purchase and maintain
	FlexClone	Instantaneously creates file, LUN and volume clones without requiring additional storage	Saves you time in testing and development and increases your storage capacity
	FlexVol	Creates flexibly sized LUNs and volumes across a large pool of disks and one or more RAID groups	Ensures that your storage systems are used at maximum efficiency and reduces your hardware investment
Backup & Recovery	Snapshot	Makes incremental, data-in-place, point-in-time copies of a LUN or volume with minimal performance impact	Enables you to create frequent, space efficient backups with no disruption to data traffic
	SnapRestore®	Rapidly restores single files, directories, or entire LUNs and volumes from any Snapshot backup	Instantaneously recovers your files, databases, and complete volumes from your backup
	SnapVault	Exports Snapshot copies to another IBM system, providing an incremental block-level backup solution	Provides you with cost-effective, long-term backups of disk-based data
	SnapLock	Write-protects structured application data files within a volume to provide WORM disk storage	Provides you with worry-free compliance with records retention regulations
Storage Efficiency	SnapMirror	Enables automatic, incremental data replication between systems: synchronous or asynchronous	Provides you with flexibility and efficiency when mirroring for data distribution and disaster recovery
	SyncMirror	Maintains two online copies of data with RAID-DP protection on each side of the mirror	Protects your system from all types of hardware outages, including triple disk failure
	Operations Manager	Manages multiple IBM systems from a single administrative console	Simplifies your IBM deployment and allows you to consolidate management of multiple IBM systems
Storage Efficiency	Protection Manager	Backup and replication management software for IBM disk-to-disk environments	Lets you automate data protection, ensuring that you have mistake-free backup
	System Manager	Provides setup, provisioning and configuration management of a Data ONTAP storage system	Simplifies out-of-box setup and device management using an intuitive Windows based interface

For more information

www.netapp.com/ibmnsseries

Technical Support

Online Technical Support

For online Technical Support for your IBM N series product, visit the following web site: www.ibm.com/storage/support/nas/

Hardware service and support

You can receive hardware service through IBM Integrated Technology Services. Visit the following web site for support telephone numbers: www.ibm.com/planetwide/

your enterprise. We make it easy: wizards guide you through the most common management and configuration tasks.

IBM Global Technology Services – Delivering a comprehensive, integrated approach to Storage and Data

IBM's broad portfolio of technology services, with IBM's N series and NetApp's industry-leading storage products, provides comprehensive, innovative infrastructure solutions. IBM Global Technology Services (GTS) solutions help improve alignment of IT assets and resources with your current and future business goals, providing end to end IT services that address storage and server infrastructure optimization as well as infrastructure optimization for desktop virtualization projects. With assessment, planning, design, implementation and management services, you can anticipate

benefits such as reduced IT complexity, controlled costs and efficient storage, server and desktop environments.

With IBM GTS services solutions, you gain valuable insight into how you are utilizing existing storage assets, and are provided efficiency recommendations on how and where to institutionalize best practices across your enterprise. Combining IBM and NetApp technologies helps maximize the availability, value, and protection of your information by reducing business risks through secure, efficient and optimized information infrastructure management.

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IBM System Storage N series Product Reference Sheet

IBM MODELS	N3300	N3400	N3600	N6040	N6060	N6070	N7900
NetApp Models	FAS2020	FAS2040	FAS2050	FAS3140	FAS3160	FAS3170	FAS6080
System Storage N series Gateway							
IBM Model Numbers (s-single, c-clustered)	N/A	N/A	N/A	2858-A10(s)* 2858-A20(c)* *w/ feature code 9551	2858-A22(c)* *w/feature code 9551	2858-A21(c)* *w/ feature code 9551	2867-G21(c) *w/ feature code 9551
FC Max	N/A	N/A	N/A	189TB	302TB	378TB	529TB
SATA Max	N/A	N/A	N/A	420TB	672TB	840TB	1176TB

System Storage N series							
IBM Model Numbers (s-single, c-clustered)	2859-A10(s) 2859-A20(c)	2859-A11(s) 2859-A21(c)	2862-A20(c)	2858-A10(s) 2858-A20(c)	2858-A22(c)	2858-A21(c)	2867-A21(c)
Processor/Type	Intel® 2.2 GHz Celeron	Intel® 1.6GHz Dual Core Xeon	Intel® 2.2 GHz Celeron	AMD® 2.4GHz Dual Core Opteron®	AMD® 2.6GHz Dual Core Opteron®	AMD® 2.6GHz Dual Core Opteron®	AMD® 2.6GHz Dual Core Opteron®
Processor/Number ¹	1/2	1/2	1/2	1/2	2/4	2/4	4/8
Memory/RAM ²	1GB	4GB	2GB	4GB	8GB	16GB	32GB
Memory/Nonvolatile ²	128MB	256MB	256MB	512MB	2GB	2GB	2GB
Max. Raw Capacity	68TB	136TB	104TB	420TB	672TB	840TB	1176TB
Max. Disk Drives	68	136	104	420	672	840	1176
Max LUNs	1024	1024	1024	2048	2048	2048	2048

Form Factor	Single Controller		2RU		4RU		6RU		8RU		12RU	
	2RU	2RU	4RU	4RU	6RU	6RU	8RU	8RU	12RU	12RU		
Drive Options	FC	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	
	SATA	500GB 1TB	500GB/ 1TB	500GB/ 1TB	500GB/ 1TB	500GB/ 1TB	500GB/ 1TB	500GB/ 1TB	500GB/ 1TB	500GB/ 1TB		
	SAS	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB	144/300/ 450/600GB		
Onboard/Max. Ports ³	Ethernet, 1Gb	4/4	8/8	4/8	4/36	4/36	4/36	4/36	12/52			
	Ethernet, 10Gb	—	—	—	0/16	0/16	0/16	0/20				
	Fibre Channel, 2Gb	—	—	—	—	—	—	—				
	Fibre Channel, 4Gb	4/4	4/4	4/8	8/40	8/40	8/40	16/56				
PCI-X/PCI-Express Expansion Slots ³	—	—	0/2	8	8	8	16					

EXPANSION SHELVES								
		Max. Disk Drives	Disk Drive Capacities	Disk Drive Type/Size	Interface Modules	Interface Type	Power Supply	Form Factor
EXN1000 (NetApp DS14MK2AT)		14	500GB 7.2K 1TB 7.2K 2TB 7.2K	SATA	2 x AT-FCX	2Gb Fibre Channel	AC	3RU
EXN3000 (NetApp DS4243)		24	500GB 7.2K, 1TB 7.2K, 2TB 7.2K, 300GB 15K, 450GB 15K, 600GB 15K	SATA/SAS	2 x IOM3	12Gb SAS	AC	4RU
EXN4000 (NetApp DS14MK4FC)		14	300GB 10K-15K 450GB 15K 600GB 15K	FC	2 x ESH4	4Gb Fibre Channel	AC	3RU

¹ SAS drives are **only** supported in the primary shelf of the N3300/N3600 series models. SAS expansion shelves will be available at a later date

² Single controller configuration

³ Dual controller specifications

⁴ Onboard FC ports for N3300/N3600 can be used for either target (SAN) and/or initiator (disk) mode

⁵ The second number refers to dual controller specifications

**as reported by IDC's report on 5x9's Availability Study for N series Technology