NetApp®

Datasheet

NetApp Disk Shelves and Storage Media

Flexibility to Optimize Your Storage for a Variety of Needs
Get high performance, density, and capacity with 2.5" SFF (small form factor) SAS drives. Deliver massive capacity with multi-terabyte SATA drives. Harness extreme performance and density with solid state technology. Or combine any of these options to meet your specific needs.

High Availability and Resiliency
Multipath connections and full redundancy continue as standard in our disk shelf design. For added resiliency, we've introduced Alternate Control Path (ACP) connections from disk shelf to storage controller.

Reduce Complexity with Storage That Can Be Used Across Platforms
Common disk shelves and media work across our unified family of storage systems. Data-in-place upgrades allow you to upgrade storage controllers without changing disk shelves or media, so your data is undisturbed.

The Challenge
Provide reliable storage to support applications with varied and changing needs

The problem is that what is right for your set of applications today may not meet tomorrow's requirements. Meeting the performance, capacity, and density needs of varied applications can be a tricky balancing act. What if you find that you require two technologies at completely opposite ends of the performance spectrum?

Acquiring and supporting separate storage that is independently managed and maintained can quickly exhaust your available budget, staff, and resources. The need to effectively manage power and to operate within data center space constraints compounds the problem.

What you need is storage hardware with built-in flexibility to meet needs ranging from highest capacity to extreme performance and everything in between. You also need the ability to optimize for both storage density and performance density. All this should be available to you from a common, unified platform.

The Solution
NetApp's line of disk shelves and storage media provides flexibility, reliability, and cross-platform leverage

NetApp® DS4243 and DS2246 disk shelves offer a range of media, from high-capacity SATA to high-performing, high-density SAS, plus extreme performance options that use solid state technology.

At NetApp, we're proud of our leadership position in SAS technology adoption. When most vendors of network storage are just starting to integrate SAS drives into their product lines, the DS2246 disk shelf marks our third-generation SAS offering. Our extreme performance options include solid state drives (SSDs) for your most demanding applications; or choose NetApp Flash Cache intelligent read caches to reduce average latency and increase I/O throughput for data stored on any disk drive.

Figure 1) The DS4243 disk shelf—maximum capacity and performance.

Figure 2) The DS2246 disk shelf—performance and storage density with 2.5" SFF drives.

Our family of disk shelves delivers the enterprise-class resiliency and availability that you expect while leveraging all of the storage efficiencies of the NetApp Data ONTAP® operating system. Plus, the same drives and shelves work across multiple system platforms with nondisruptive controller upgrades for the utmost in flexibility.

Storage Media to Meet a Variety of Needs

OLTP databases are the lifeblood of nearly every enterprise data center. These highly transactional workloads can benefit from the lowest latency combined with maximum performance density delivered by the consistently high performance of SSDs.

If SSDs aren't in your plan, consider using high-performing 15k RPM SAS drives for the highest performance with hard disk drives. Conversely, archive data at rest on SATA drives for maximum capacity and density at the lowest cost per gigabyte.

File services, popular office productivity applications, and similar workloads do well with the balance of performance

density and storage density associated with 2.5" SFF SAS drives. Applications like messaging and collaboration—where data hot spots are highly unpredictable—can benefit from the automated performance handling of Flash Cache intelligent read caches combined with low-cost-per-gigabyte SATA drives. Add NetApp RAID-DP®, our unique double-parity RAID 6 implementation, and you have a trifecta of performance, cost containment, and reliability. See Table 1, "Media selection guide," to identify the right media and disk shelf options for your applications.

DS4243 disk shelf

The NetApp DS4243 is our most versatile disk shelf; it supports requirements from maximum capacity and storage density to extreme performance and performance density. This disk shelf is 4U high and supports 24 hard disk drives or SSDs. Choose this disk shelf to maximize capacity and optimize cost with massive SATA drives or to achieve best hard disk drive performance with 15k RPM SAS drives. Use the DS4243 with SSDs for consistently low latency and for maximum performance density (IOPS per rack unit).

SELECTION CRITERIA	STORAGE MEDIA	DISK SHELF
• Max capacity • Cost per gigabyte • Max storage density	High-capacity HDDs (SATA, 7.2k RPM, 3.5")	DS4243 (4U, 24 drives)
• Performance density • Storage density	Small form factor HDDs (SAS, 10k RPM, 2.5" SFF)	DS2246 (2U, 24 drives)
• Best performance with hard disk drives	High-performance HDDs (SAS, 15k RPM, 3.5")	DS4243 (4U, 24 drives)
• Lowest latency • Max performance density	Solid state drives (SSDs)	DS4243 (4U, 24 drives)

Table 1) Media selection guide.

Figure 3) NetApp Flash Cache.
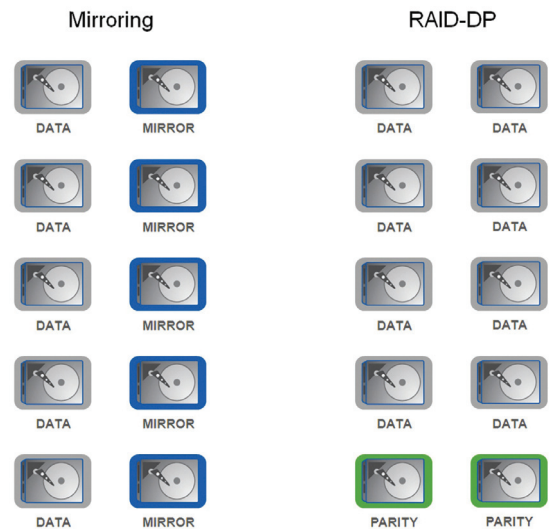
Mirroring

RAID-DP

Figure 4) NetApp RAID-DP with double parity offers superior data protection compared to mirroring and up to 46% better storage efficiency.*

DS2246 disk shelf

NetApp leads among vendors of enterprise network storage in the adoption of SAS and small form factor hard disk drives. The NetApp DS2246 disk shelf holds 24 SAS 2.5" drives in only 2U of rack space, achieving both storage and performance density concurrently. Compared to a 4U-high DS4243 disk shelf with SAS drives of the same capacity, the DS2246 doubles the storage density, can increase performance density by 60%, and can reduce power consumption by 30% to 50%.

Extreme Performance

For extreme performance, use the NetApp DS4243 with solid state drives (SSDs) to achieve consistently low latency with persistent storage, as is often needed for mission-critical databases.

NetApp Flash Cache combined with hard disk drives is a smart alternative to SSDs when your workload is random read intensive and frequently used, or when "hot" data is less predictable, such as for server and desktop virtualization, e-mail, files shares, and home directories. Flash Cache is a controller-resident intelligent caching module

that can reduce average latency and increase I/O throughput for your frequently accessed data.

The bottom line is that unified storage offers the flexibility to use solid state technology in more ways without investing in different platforms and training multiple experts.

Industry-Leading Storage Efficiency

Data ONTAP delivers industry-leading storage efficiency across the NetApp Unified Storage Architecture. Thin provisioning allows you to expand or contract LUNs or volumes instantly. Our single high-efficiency integrated data protection platform uses highly space-efficient NetApp Snapshot® copies that enable more frequent backups and restores in minutes. Our thin replication enables disaster recovery and archiving using minimal storage capacity while reducing the use of network resources. Add to this our deduplication, which offers a significant advantage against ever-increasing storage capacity demands and you can experience a dramatic increase in the efficiency of your storage and lower TCO.

Highly Resilient and Available

NetApp disk shelves are deployed using multipath high-availability with storage controller pairs to improve overall system availability. Our HA features include:

- Full redundancy, including fans and power supplies, is standard in our disk shelf design.
- Alternate Control Path (ACP) provides out-of-band management connections from disk shelf to storage controller.
- RAID-DP, our unique high-performance implementation of double-parity RAID 6, offers superior data protection and better capacity utilization over traditional RAID implementations.

About NetApp

NetApp creates innovative storage and data management solutions that deliver outstanding cost efficiency and accelerate business breakthroughs. Discover our passion for helping companies around the world go further, faster at *www.netapp.com*.

Go further, faster®

NetApp disk shelves and storage media enable you to build a flexible and efficient shared infrastructure today as your foundation for future-ready IT.

SPECIFICATION	DS2246	DS4243
Rack units	2	4
Drives per enclosure	24	24
Drive types and capacities	2.5" SAS 10k RPM 450GB/600GB	3.5" SATA 7.2k RPM 1TB/2TB/3TB; 3.5" SAS 15k RPM, 300GB/450GB/600GB; 3.5" SSD 100GB
Controllers supported	With disk drives: FAS2040, FAS2050, FAS/V3070, FAS/V3100 Series, FAS/V3200 Series, FAS/V6000 Series, FAS/V6200 Series	With disk drives: FAS2040, FAS2050, FAS/V3070, FAS/V3100 Series, FAS/V3200 Series, FAS/V6000 Series, FAS/V6200 Series With SSDs: FAS/V3160, FAS/V3170, FAS/V3240, FAS/V3270, FAS/V6040, FAS/V6080, FAS/V6200 Series
Data ONTAP version required	For FAS2040/2050: 7.3.4 and later, 8.0.1 or later; For other systems: 7.3.3P2 or later, 8.0P1 or later	7.3.3P2 or later, 8.0P1 or later; 100 GB SSDs require 8.0.1 or later; 3TB SATA requires 8.0.2 or later
Shelf architecture and I/O bandwidth	SAS operating at 6Gbps. SAS operates at 3Gbps with FAS2040/2050 systems. Connections require PCIe SAS host bus adapter card or available embedded SAS port	SAS operating at 3Gbps. Connections require PCIe SAS host bus adapter card or available embedded SAS port
Shelf I/O modules	Dual IOM6 modules	Dual IOM3 modules
Power supply/cooling fans	Dual, hot-pluggable, integrated power supply/fan assemblies	Dual (SATA) or quadruple (SAS), redundant, hot-pluggable, integrated power supply/ fan assemblies
Input power voltage V RMS(AC) (auto-ranging)	100-120V or 200-240V	100-120V or 200-240V
Input power frequency	50-60 Hz (AC)	50-60 Hz (AC)
Weight	49 lbs (22.2 kg)	110 lbs (49.9 kg)
Dimensions	Height: 3.4 in. (8.5 cm) Width: 19 in. (48.0 cm) Depth: 19.1 in. (48.4 cm)	Height: 7 in. (17.8 cm) Width: 19 in. (48.3 cm) Depth: 24 in. (61 cm)
Temperature—Operating	50 F to 104 F (10 C to 40 C)	50 F to 104 F (10 C to 40 C)
Relative Humidity—Operating	20% to 80% non-condensing	20% to 80% non-condensing

* Savings of 46% based on a comparison of a NetApp RAID-DP configuration with 26 disk drives for data plus 2 for parity versus a mirrored configuration with 26 drives for data and 26 for the mirror.

Table 2) Technical specifications for disk shelves.

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