Datasheet

NetApp All-Flash FAS

High performance, low latency, and rich data management for business-critical applications

The Challenge

As corporations continue to drive faster time to market and higher customer satisfaction, they need new ways to deliver greater speed and responsiveness from key business operations. IT leaders are focused on adding new components to their IT infrastructure that offer consistent, low-latency delivery of data to and from critical workloads. However, this often requires sacrificing core needs such as robust data management, data protection, proven uptime, and deep application integration.

The Solution

NetApp all-flash FAS addresses these enterprise requirements with high performance and low latency as well as reliability and superior data management. It delivers a powerful combination that's critical for organizations that need to accelerate workloads without compromising on the way they deploy, manage, and protect data across their environment.

Powered by NetApp® Data ONTAP®, all-flash FAS is the leader in advanced data management for high-speed workloads. It's especially valuable for VDI power users that require consistent low-latency performance. In addition, all-flash FAS configurations can be deployed as a node in a cluster with hybrid FAS systems, giving you the flexibility to transparently adjust where an application lives—all-flash or hybrid flash—based on changing business needs.

These capabilities enable all-flash FAS to improve the speed of business as well as the overall efficiency, reliability, and flexibility of IT operations. This benefit for the company, and for IT, translates to a better overall experience for both you and your customers.

Built on Flash-Optimized Data ONTAP

NetApp has spent more than 20 years refining Data ONTAP to deliver maximum performance from underlying storage devices—including solid-state drives (SSDs). Key features to optimize SSD performance and endurance include:

- **Multicore utilization**. Unlike other architectures that have difficulty using available cores equally and fully, with Data ONTAP, workloads are spread evenly across all cores in each controller for maximum IOPS per core.

- **Optimized writes**. Incoming writes are logged in NVRAM; are acknowledged immediately; and are de-staged to SSD later, after being coalesced. This process speeds up write response time and reduces SSD wear. The NetApp WAFL® (Write Anywhere File Layout) file system minimizes overwrites to existing blocks, limiting write amplification that can hamper flash performance and life span.

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- **Optimized reads**. The read-ahead and scheduling algorithm prioritizes latency-sensitive reads over throughput-sensitive writes.

- **Comprehensive error detection and correction**. Error detection and correction techniques provide superior reliability, such as in-memory and on-disk block-level checksums, SSD-level bad-block management, and correction of misdirected reads and writes.

To keep latency low, NetApp leverages the SSD management and monitoring tools built into every SSD controller to maximize SSD life without putting extra overhead on Data ONTAP. With all the SSD optimization that is in place, NetApp confidently provides a five-year warranty with no write limits or other wear restrictions.

Accelerate Applications with a High-Performance Platform

All-flash FAS delivers a fast response time for critical applications that demand low latency. The systems optimize I/O and maximize application throughput while running industry-leading data management functions, featuring:

- Advanced multiprocessor Intel® chipsets with a higher number of cores
- Increased NVRAM for persistent write cache
- An I/O-tuned PCIe Gen3 architecture

All-flash FAS configurations use high-performance SSDs, which are available in a broad set of capacity points, enabling customization to meet specific cost and density needs. If additional IOPS are required, all-flash FAS configurations can scale out in a cluster of up to 24 nodes, providing millions of IOPS at low latency and supporting nearly 5PB of SSD capacity.

Increase ROI with Leading Storage Efficiency

NetApp has been known for its superior storage efficiency technologies, such as deduplication, compression, thin provisioning, and space-efficient Snapshot™ copies. All these technologies apply to all-flash FAS systems and further reduce your cost per effective gigabyte of storage, which lowers your total cost of ownership:

- Performance-efficient inline compression, deduplication, and other data reduction technologies can provide 5x to 10x or higher space savings, depending on workloads and use cases.
- Advanced drive partitioning with SSDs further increases the usable capacity for data, helping your investment on SSDs get superior returns.
- Space-efficient cloning capabilities allow almost instantaneous creation of data copies that you can use for business intelligence or to accelerate product development.

Simplify Operations with Superior Data Management

In a data-driven business, you need the ability to leverage data for a competitive advantage and to assign resources dynamically for more effective operations. All-flash FAS benefits from NetApp's years of experience in building the company's leading data management capabilities:

- Management of your infrastructure is simplified with tight, superior integration with popular virtualization and leading backup applications.
- Role-based access control and workflow automation tools simplify provisioning and data protection so you can assign resources more quickly.
- Enterprise QoS helps you better monitor and assign performance, so your high-performance workloads get the resources they need to meet SLOs.
- Automated tools enable quick setup and simplified management.

Enterprise Reliability: Proven Availability and Nondisruptive Operations

Built on years of Data ONTAP deployment experience and FAS engineering refinement, all-flash FAS meets even the most demanding availability requirements. These systems are designed to deliver 99.999% or greater availability through a comprehensive approach to system resiliency that includes an alternate control path, persistent NVRAM write logs, and advanced data protection.

NetApp Integrated Data Protection delivers long-distance disaster recovery (NetApp SnapMirror® technology), disk-to-disk backup (NetApp SnapVault® software), and leading integration with backup applications for easier management. The support of NetApp Storage Encryption SSDs makes fully encrypted all-flash FAS a reality and helps secure your data.

To eliminate downtime and allow IT upgrades anytime, all-flash FAS supports nondisruptively adding or replacing storage components. Scaling, software and firmware updates, and load balancing can happen without planned downtime.

To prevent issues from becoming outages, advanced service analytics constantly monitor the system, so administrators or NetApp service staff are alerted to proactively address issues that might affect operations. All-flash FAS also supports nondisruptive granular LUN movement that is near-instantaneous. Volumes that are almost at full capacity can be quickly remediated, delivering faster resolution of performance and capacity issues.

Enable Performance on Demand
The extra value of all-flash FAS shines when it's used as high-performance nodes combined with hybrid FAS systems in a clustered Data ONTAP environment. This combination delivers native multi-tenancy, QoS, nondisruptive

operations, and easily defined tiers of service. Workloads can be transparently moved to the node that best meets the customer's requirements at different points in time. This kind of data mobility is not only important for enterprises looking for the optimal cost and performance combination, but is also ideal for cloud service providers to optimize their ROI.

All-flash FAS offers additional ways to flexibly adapt to changing workloads and optimize your storage environment:

• You can accelerate more workloads with support for SAN and NAS protocols.
• Proven cloud connectivity lets you easily move data between the cloud and all-flash FAS for maximum performance and ROI.

Get More Business Value with Services
Whether you are planning your next-generation environment, need specialized know-how for a major deployment, or want to get the most from your current storage, NetApp and our certified partners can help.

We collaborate with you to enhance your IT capabilities through a full portfolio of services that covers your IT lifecycle with:

• **Strategy services**—to align IT with your business goals
• **Design services**—to architect your best storage environment

• **Deploy and transition services**— to implement validated architectures and prepare your storage environment
• **Operations services**—to deliver continuous operations while driving operational excellence and efficiency

In addition, NetApp provides in-depth knowledge transfer and education services that give you access to our global technical resources and intellectual property.

Learn more at *netapp.com/services*.

Unlock the Power of Your Data and Your People
Built on years of flash experience, all-flash FAS achieves high I/O at low latency without compromising on core enterprise requirements, such as robust data management, proven reliability, and flexibility to respond to changing needs.

About NetApp
Leading organizations worldwide count on NetApp for software, systems and services to manage and store their data. Customers value our teamwork, expertise and passion for helping them succeed now and into the future.

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All-Flash FAS8000 Technical Specifications

Scale-Out

	FAS8080 EX	FAS8060	FAS8040	FAS8020
NAS scale-out	1–24 nodes (12 HA pairs)			
Maximum SSDs	2,880	2,880	2,880	2,880
Maximum raw capacity	4.6PB	4.6PB	4.6PB	4.6PB
Effective capacity[1]	16.3PB	16.3PB	16.3PB	16.3PB
Maximum memory	3072GB	1536GB	768GB	576GB
SAN scale-out	1–8 nodes (4 HA pairs)			
Maximum SSDs	960	960	960	960
Maximum raw capacity	1.5PB	1.5PB	1.5PB	1.5PB
Effective capacity[1]	5.4PB	5.4PB	5.4PB	5.4PB
Maximum memory	1024GB	512GB	256GB	192GB
Cluster interconnect	2, 4, or 6 10GbE	2 or 4 10GbE	2 or 4 10GbE	2 10GbE

Per HA Pair Specifications (Active-Active Dual Controller)

	FAS8080 EX	FAS8060	FAS8040	FAS8020
Maximum SSDs	240	240	240	240
Maximum raw capacity	384TB	384TB	384TB	384TB
Controller form factor	12U (2 enclosures)	6U	6U	3U
Effective capacity[1]	1388.5TB	1388.5TB	1388.5TB	1388.5TB
ECC memory	256GB	128GB	64GB	48GB
NVRAM	32GB	16GB	16GB	8GB
PCIe expansion slots	24	8	8	4
Onboard I/O: UTA 2 (16Gb FC/FCoE/10GbE)	8	8	8	4
Onboard I/O: GbE	8	8	8	4
Onboard I/O: 10GbE	8	8	8	4
Onboard I/O: 6Gb SAS	8	8	8	4
OS version	Data ONTAP 8.2.2 and later		Data ONTAP 8.2.1 and later	
Shelves and media	See the Shelves and Media page[2] on *NetApp.com* for the most current information			
Storage protocols supported	FC, FCoE, iSCSI, NFS, pNFS, CIFS/SMB, HTTP, FTP			
Host/client operating systems supported	Windows® 2000, Windows Server® 2003, Windows Server 2008, Windows Server 2012, Windows XP, Linux®, Oracle Solaris, AIX, HP-UX, Mac® OS®, VMware® ESX®			

1. Effective capacity is based on 5:1 storage efficiency ratios with the maximum number of SSDs installed. The actual ratio is up to 10:1 and higher, depending on workloads and use cases.
2. *netapp.com/us/products/storage-systems/disk-shelves-and-storage-media/index.aspx*

All-Flash FAS8000 Series Software

Features and software included with Data ONTAP	**Efficiency**: FlexVol®, deduplication, compression, and thin provisioning **Availability**: MetroCluster™ and multipath I/O **Data protection**: RAID-DP® and Snapshot **Performance**: Storage QoS **Management**: OnCommand® Workflow Automation, System Manager, and Unified Manager
Extended value software (optional)	• FlexArray storage virtualization software • OnCommand Balance • Storage protocols (purchase each storage protocol you require) A Premium Bundle is available for purchase with FAS8000 systems that includes: • SnapRestore®: Restore entire Snapshot copies in seconds • SnapMirror: Simple, flexible disaster recovery • FlexClone®: Instant virtual copies of files, LUNs, and volumes • SnapManager® software: Backup/recovery for enterprise applications • SnapVault: Disk-based backup See *NetApp.com* for information on additional software available from NetApp.

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