Datasheet

NetApp All Flash FAS

Performance without compromise

Key Benefits

- Accelerate databases with 4 to 12 times higher IOPS and 20 times faster response, powered by NetApp® Data ONTAP® FlashEssentials.

- Consolidate servers and reduce database license costs by 50%.

- Reduce SSD storage by 5 to 10 times on average with data reduction technologies.

- Scale out to 24 nodes in a cluster and move data between flash and HDD tiers nondisruptively.

- Safeguard your data with an integrated data protection suite included in the system that starts as low as $25,000.[1]

- Set up and configure the system within 15 minutes with SAN-optimized configurations.

- Protect your investment with flexible deployment options, including connection to the cloud.

- Provide industry-leading VDI performance at $39/desktop.

The Challenge

As businesses strive to achieve faster time to market and greater customer satisfaction, they must improve the speed and responsiveness from key business operations. IT leaders recognize the benefits of all-flash storage for delivering consistent, low-latency I/O to critical workloads. However, many of today's all-flash array solutions lack robust data management, effective data protection, seamless scalability, and deep application integration.

The Solution

NetApp All Flash FAS (AFF) addresses enterprise storage requirements with high performance, combined with superior flexibility and best-in-class data management. Built on the clustered Data ONTAP storage operating system, All Flash FAS speeds up your business without compromising on efficiency, reliability, or the flexibility of your IT operations. As a true enterprise-class all-flash array, it accelerates, manages, and protects your business-critical data, now and in the future. With AFF systems, you can:

- **Accelerate the speed of business:**
  - The storage OS employs the NetApp WAFL® (Write Anywhere File Layout) system, which is natively suitable for flash media.
  - FlashEssentials enables consistent submillisecond latency and up to 4 million IOPS.
  - The AFF system delivers 4 to 12 times higher IOPS and 20 times faster response for databases than traditional HDD systems.
- **Reduce costs while simplifying operations:**
  - High performance enables server consolidation and can reduce database license costs by 50%.
  - As the industry's only unified all-flash storage that supports synchronous replication, AFF can support all your backup and recovery needs with a complete suite of integrated data protection
  - Data reduction technologies can deliver 5 to 10 times space savings on average and up to 933 times space savings in certain cases.[2]
- **Future-proof your investment with deployment flexibility:**
  - The All Flash FAS system is ready for the data fabric; you can move data between the performance tier and the capacity tier, on premises or in the cloud.
  - AFF offers a broad set of application ecosystem integration for VDI, database, and server virtualization.
  - With no more silos, you can nondisruptively scale out and move workloads between flash and HDD within a cluster.

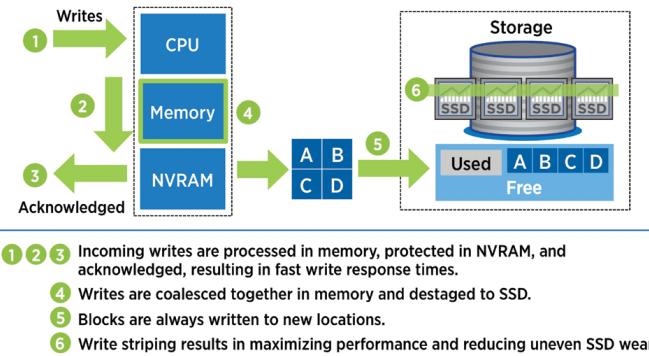1. Based on current promotion.
2. Based on customer deployment data.

Incoming writes are processed in memory, protected in NVRAM, and acknowledged, resulting in fast write response times.

Writes are coalesced together in memory and destaged to SSD.

Blocks are always written to new locations.

Write striping results in maximizing performance and reducing uneven SSD wear.

Figure 1) The flash-suited write architecture reduces latency and increases the longevity of SSDs.

All-Flash Performance Powered by Data ONTAP FlashEssentials

FlashEssentials is what's behind the performance and efficiency of AFF. It encapsulates flash innovations and optimization technologies in Data ONTAP. While Data ONTAP is well known as a leading storage OS in the industry, what is not widely known is that, with its WAFL file system, it is natively suited for flash media. FlashEssentials encompasses the technologies that optimize flash performance and media endurance, including:

- Coalesced writes to free blocks, maximizing performance and the longevity of flash media
- A random read I/O processing path that is designed from the ground up for flash
- A highly parallelized processing architecture that promotes consistent low latency
- Built-in QoS that safeguards SLAs in multi-workload and multi-tenant environments
- Inline data reduction and compression innovations that are incorporated from NetApp Mars™ technology, our next-generation all-flash storage OS
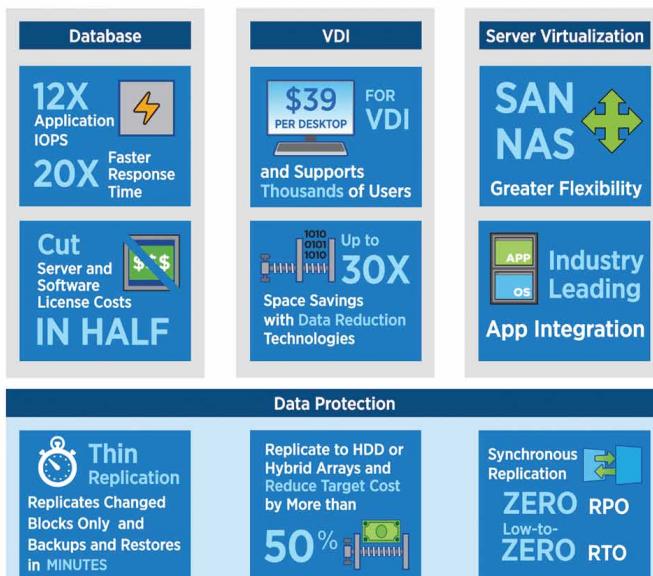

Figure 2) With rich data management capabilities, NetApp All Flash FAS enables business cost savings.

Reduce Server and Software Costs While Simplifying Operations

All Flash FAS systems are ideal for performance-demanding applications such as database, VDI and server virtualization, etc.

- **Database.** AFF reduces server and licensing costs by up to 50% by driving up server CPU utilization.
- **VDI.** At just $39/desktop and up to 30:1 data reduction, AFF costs less than the competition.
- **Server virtualization.** AFF delivers unparalleled support for your server virtualization environment with unified SAN and NAS support and leading application ecosystem integration.

AFF comes with a full suite of acclaimed NetApp Integrated Data Protection software. You get features and capabilities such as NetApp Snapshot® copies, cloning, encryption, and both synchronous and asynchronous replication for backup and disaster recovery. Key capabilities and benefits include:

- Native space efficiency with cloning and Snapshot copies to reduce storage costs
- Snapshot copy creation, cloning, and replication with near-zero performance impact
- Application-consistent Snapshot copies that simplify application management
- Synchronous replication with NetApp MetroCluster™ software, a NetApp exclusive capability in the all-flash array market that delivers zero RPO and low to zero RTO for mission-critical workloads
- Support for at-rest data encryption to help secure your data
- NetApp SnapMirror® replication software that replicates to any type of FAS system—all-flash, hybrid, or HDD, on premises or in the cloud—reducing overall system costs
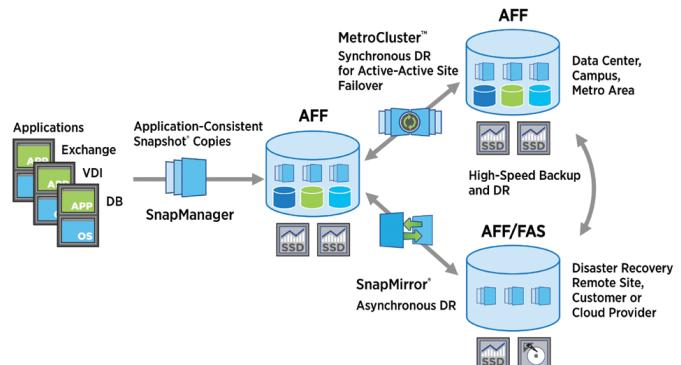

Figure 3) NetApp provides a full suite of integrated data protection and disaster recovery software.

The NetApp renowned data reduction technologies, including enhanced inline compression and inline zero-block and always-on deduplication, provide 5 to 10 times space savings on average for a typical use case. When these capabilities are combined with space-efficient NetApp Snapshot and FlexClone® technologies, a data reduction ratio as high as 933:1 has been observed.

Figure 4) Simple setup and management of AFF with OnCommand System Manager.

Figure 5) All Flash FAS is data-fabric ready—moving data between tiers and different clouds.

Additional details about the data reduction technologies include:

- The newly enhanced inline compression delivers near-zero performance impact. Incompressible data detection eliminates wasted cycles.
- Always-on deduplication runs continuously in the background and provides additional space savings for use cases such as virtual desktop deployments.
- Inline zero-block deduplication accelerates VM provisioning by 20% to 30%.
- Advanced SSD partitioning increases usable capacity by almost 20%.

NetApp OnCommand® management software provides automated tools to further simplify management of storage operations:

- Setting up and configuring AFF is quick and easy with preconfigured systems for SAN deployments. It takes less than 15 minutes by using OnCommand System Manager.
- OnCommand Workflow Automation automates common storage tasks such as provisioning and data protection. It provides fast, one-click automation and self-service.
- To optimize storage for peak performance and to keep everything running smoothly, OnCommand Performance Manager, an integrated component of OnCommand Unified Manager, automatically monitors and analyzes performance.

Unified Flash Future-Proofs Investments

With All Flash FAS, your investment is protected if your performance and capacity needs change or your cloud strategy evolves in the future:

- All Flash FAS systems eliminate performance silos. They seamlessly integrate with hybrid FAS systems in a clustered Data ONTAP environment, providing a high-performance tier. With nondisruptive operations, workloads can be transparently moved to the storage tier that best meets your requirements.
- Seamless scale-out lets you reach new heights with up to 4 million IOPS and 4.6PB of raw capacity in a single cluster.
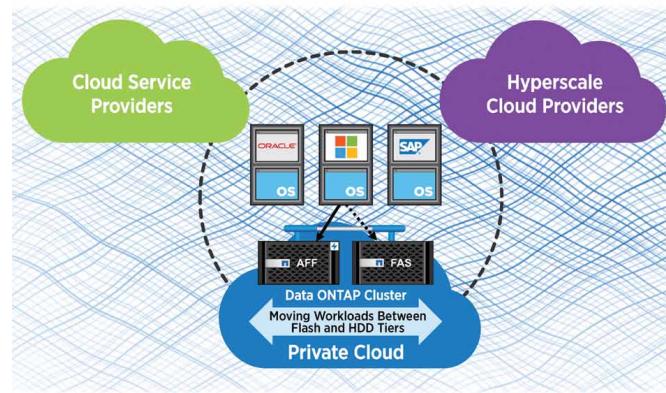
- All Flash FAS is data-fabric ready with proven cloud connectivity. You can easily move data between the cloud and All Flash FAS for maximum performance and ROI.
- Industry-leading ecosystem integration offers a broad set of applications that AFF supports, allowing the flexibility to add or change workloads as needed.

Get More Business Value with Services

Whether you are planning your next-generation storage system, need specialized know-how for a major storage deployment, or want to optimize the operational efficiency of your existing infrastructure, NetApp services and NetApp certified partners have the expertise to help.

We collaborate with you to enhance your IT capabilities through a full portfolio of services that covers your IT lifecycle. For example, our assessment and advisory services can help evaluate the performance and efficiency of workloads across your heterogeneous environments to help you determine the best workload candidates to move to flash and how to optimize flash technology in your environments—and much more. Support offerings, such as the AutoSupport™ service tools, proactively manage your AFF systems and quickly resolve issues.

Learn more at netapp.com/services.

Unlock the Power of Your Data and Your People

Built on years of flash innovation and experience, NetApp All Flash FAS achieves high I/O at consistent low latency without compromising on core enterprise requirements, such as robust data management, efficient data protection, 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.

www.netapp.com

All Flash FAS Technical Specifications

Scale-Out

	AFF8080 EX	AFF8060	AFF8040	AFF8020
NAS scale-out	1–24 nodes (12 HA pairs)			
Maximum SSDs	2,880	2,880	2,880	2,880
Maximum raw capacity	4.6PB/4.09PiB	4.6PB/4.09PiB	4.6PB/4.09PiB	4.6PB/4.09PiB
Effective capacity[a]	17.9PB/16.7PiB	17.9PB/16.7PiB	17.9PB/16.7PiB	17.9PB/16.7PiB
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/1.33PiB	1.5PB/1.33PiB	1.5PB/1.33PiB	1.5PB/1.33PiB
Effective capacity[a]	6.3PB/5.56PiB	6.3PB/5.56PiB	6.3PB/5.56PiB	6.3PB/5.56PiB
Maximum memory	1024GB	512GB	256GB	192GB
Cluster interconnect	Two, four, or six 10GbE	Two or four 10GbE	Two or four 10GbE	Two 10GbE

Per HA Pair Specifications (Active-Active Dual Controller)

	AFF8080 EX	AFF8060	AFF8040	AFF8020
Maximum SSDs	240	240	240	240
Maximum raw capacity	384TB/349TiB	384TB/349TiB	384TB/349TiB	384TB/349TiB
Effective capacity[a]	1565.3TB/1423TiB	1565.3TB/1423TiB	1565.3TB/1423TiB	1565.3TB/1423TiB
Controller form factor	12U (2 enclosures)	6U	6U	3U
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 8.3 and later			
Shelves and media	See the Shelves and Media page[b] on NetApp.com for the most current information			
Storage protocols supported	FC, FCoE, iSCSI, NFS, pNFS, CIFS/SMB			
Host/client OSs supported	Windows 2000, Windows Server 2003, Windows Server 2008, Windows Server 2012, Windows XP, Linux, Oracle Solaris, AIX, HP-UX, Mac OS, VMware ESX			

a. Effective capacity is based on 5:1 storage efficiency ratios with the maximum number of SSDs installed. The actual ratio can be higher depending on workloads and use cases.
b. See netapp.com/us/products/storage-systems/disk-shelves-and-storage-media/index.aspx.

AFF8000 Series Software Included with the System

Features and software included with the Data ONTAP OS	**Efficiency:** NetApp FlexVol® software, deduplication, compression, and thin provisioning **Availability:** NetApp MetroCluster and multipath I/O **Data protection:** NetApp RAID DP® and Snapshot technology **Performance:** Storage QoS **Management:** OnCommand Workflow Automation, System Manager, Performance Manager, and Unified Manager
Flash bundle included with AFF8000 systems	• All storage protocols supported (FC, FCoE, iSCSI, NFS, pNFS, CIFS/SMB) • NetApp **SnapRestore®** software: Restore entire Snapshot copies in seconds • NetApp **SnapMirror**: Simple, flexible replication for disaster recovery • NetApp **FlexClone**: Instant virtual copies of files, LUNs, and volumes • NetApp **SnapManager®** software: Application-consistent backup and recovery for enterprise applications • NetApp **SnapVault®** software: Simple, flexible replication for backup Go to NetApp.com for information about additional software available from NetApp.