Datasheet

NetApp All Flash FAS

Performance without compromise

Key Benefits

- Transform your data center economics with flash—reduce both power use and rack space by 11 times and cut support costs by 67% compared with an HDD-based data center.

- Manage data with unified software for both SAN and NAS environments, from flash to disk to cloud.

- Provision storage and serve data within 10 minutes.

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

- Safeguard your data with the best-in-class integrated data protection suite that is included in the system.

- Scale out nondisruptively to 24 nodes, 367PB of effective capacity, and 4 million IOPS.

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

- Get flash for the price of disk with NetApp All Flash FAS systems that start as low as $25,000.[1]

The Challenge

As businesses strive for 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. As flash goes mainstream and more types of workloads run on all-flash storage, it is also critical for a solution to deliver enterprise-grade data management capabilities for a shared environment. However, many all-flash array solutions lack robust data management, effective data protection, seamless scalability, and deep application integration.

The Solution

NetApp All Flash FAS (AFF) systems address enterprise storage requirements with high performance, superior flexibility, and best-in-class data management. Built on ONTAP data management software, All Flash FAS systems speed up your business without compromising on the efficiency, reliability, or flexibility of your IT operations. As an enterprise-grade all-flash array, it accelerates, manages, and protects your business-critical data, now and in the future, enabling an easy and smooth transition to flash for your datacenter. With AFF systems, you can:

- **Accelerate the speed of business:**
  – Built on the flash-optimized NetApp WAFL® (Write Anywhere File Layout) system, ONTAP FlashEssentials enables consistent submillisecond latency and up to 4 million input/output operations per second (IOPS). It can meet the demands of a multitude of workloads in a shared environment.
  – The All Flash FAS system delivers 4 to 12 times higher IOPS and 20 times faster responses for databases than traditional HDD systems do.
  – The All Flash FAS system improves productivity and customer satisfaction and opens up new business opportunities enabled by the lightening-fast speed.
- **Simplify IT operations while transforming data center economics:**
  – Compared with traditional HDD systems, with All Flash FAS, you can reduce power consumption and rack space by up to 11 times and slash support costs to a third by eliminating performance tuning.
  – You can get flash at the cost of HDDs thanks to NetApp data reduction technologies, enhanced with new inline data compaction.
  – As the industry's leading all-flash storage that supports both synchronous and asynchronous replication, All Flash FAS can support all your backup and recovery needs with a complete suite of integrated data protection.
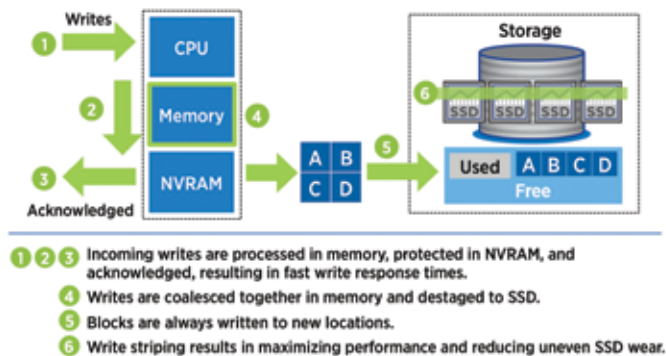
NetApp®

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

- **Future-proof your investment with maximum 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 the premises or in the cloud.
  – All Flash FAS offers the broadest application ecosystem integration for VDI, database, and server virtualization.
  – With no more silos, you can nondisruptively integrate flash into your infrastructure and scale out as your requirements grow.

All-Flash Performance Powered by ONTAP FlashEssentials

FlashEssentials is what's behind the performance and efficiency of All Flash FAS. It encapsulates flash innovations and optimization technologies in ONTAP software. And with the latest ONTAP 9 release, performance can be further increased by up to 60%. ONTAP is well known as leading data management software in the industry, but what is not widely known is that, with its WAFL system, it is natively suited for flash media. FlashEssentials encompasses the technologies that optimize flash performance and media endurance, including:

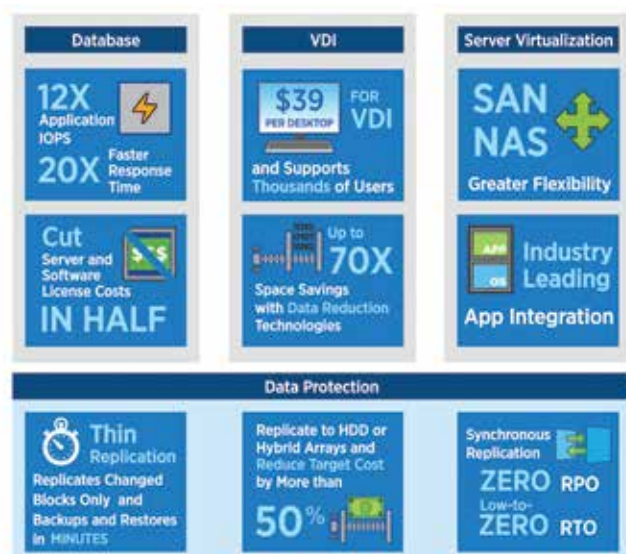- Coalesced writes to free blocks, maximizing performance and the longevity of flash media

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

- 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
- Enhanced built-in quality of service (QoS) that safeguards SLAs in multiworkload and multitenant environments
- Inline data reduction technologies, including inline compression, inline deduplication, and the newly introduced inline data compaction, reduce the SSD storage required and total spending on flash systems.

Transform Data Center Economics While Simplifying Operations

All Flash FAS systems can change your data center economics dramatically by reducing power consumption and rack space to a fraction of what a traditional HDD-based data center needs. They also significantly simplify storage management and cut support costs by eliminating performance tuning.

All Flash FAS is not only excellent for performance-demanding applications such as database, VDI, and server virtualization, but also a great choice for shared environments with a variety of workloads commonly found in a datacenter.

- **Database.** All Flash FAS reduces server and licensing costs by up to 50% by driving up server CPU utilization.
- **VDI**. At just $39/desktop and up to 70:1 data reduction, All Flash FAS costs less than the competition.
- **Server virtualization.** All Flash FAS delivers superior support for your server virtualization environment with unified SAN and NAS support and leading application ecosystem integration.

All Flash FAS 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
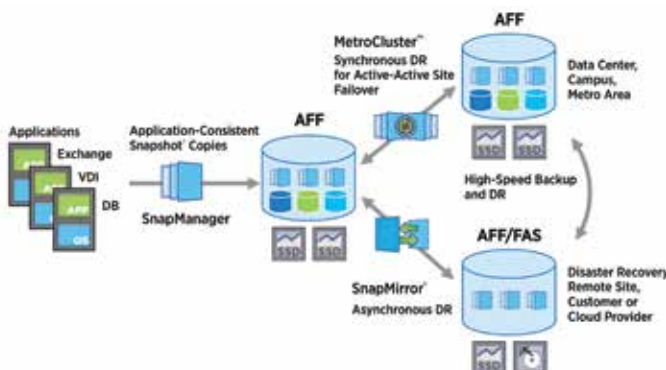

Figure 3) NetApp provides a full suite of integrated data protection and disaster recovery software.

Figure 4) OnCommand System Manager makes setup and management of All Flash FAS quick and easy.

Figure 5) All Flash FAS is data fabric ready—you can easily move data between tiers and different clouds.

- Support for at-rest data encryption and onboard key manager to help secure your data with simplified key management
- NetApp SnapMirror® replication software that replicates to any type of FAS/AFF system—all-flash, hybrid, or HDD, and on the premises or in the cloud—reducing overall system costs

All Flash FAS systems are built with innovative inline data reduction technologies including inline adaptive compression, inline deduplication, and the new inline data compaction introduced in the latest ONTAP 9 release. These technologies provide space savings of 5 to 10 times, on average, for a typical use case. When these capabilities are combined with the space-efficient NetApp Snapshot and FlexClone technologies, a data reduction ratio as high as 933:1 has been observed[2].

Additional details about the data reduction technologies include:

- The new inline data compaction technology uses an innovative approach to place multiple logical data blocks from the same volume into a single 4KB block. This process occurs after inline compression and inline deduplication and just before writing to media. It provides substantial space savings in addition to inline compression for database workloads that have relatively small I/O sizes. For databases with I/O sizes of less than 2KB or 1KB, you can save 2 to 4 times the space, respectively, that inline compression by itself could achieve. A combined space savings as high as 67:1 by using inline data compaction and inline compression together has been observed.
- The inline compression has a near-zero performance impact. Incompressible data detection eliminates wasted cycles.
- The enhanced inline deduplication in ONTAP 9 software further increases space savings to up to 70:1 for VDI workloads. It is particularly effective for volume update operations such as VDI OS patches.
- Advanced SSD partitioning with the latest ONTAP 9 release further increases usable capacity by almost 20%.

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

- With SAN- and NAS-optimized pre-configurations and the fast provisioning workflow, it takes less than 10 minutes to set up All Flash FAS systems and start serving application data.
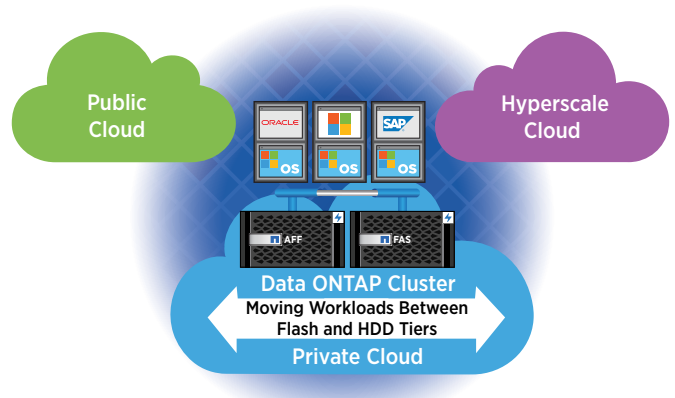
2. Based on customer deployment data.

- OnCommand Performance Manager enables informed workload provisioning and rebalancing by monitoring performance headroom to assure clusters and nodes are not loaded beyond the optimal operating point.
- OnCommand Workflow Automation automates common storage tasks such as provisioning and data protection. It provides fast, one-click automation and self-service.

Unified Flash Future-Proofs Investments

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

- All Flash FAS systems eliminate performance silos. They seamlessly integrate with hybrid FAS systems in an 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 367PB of effective 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 return on investment.
- Industry-leading ecosystem integration offers a broad set of applications that All Flash FAS 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 can 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. This evaluation helps 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 NetApp AutoSupport® service tools, proactively manage your All Flash FAS 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. And it does so 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
NAS scale-out	1–24 nodes (12 HA pairs)		
Maximum SSDs	5,760	5,760	4,608
Maximum raw capacity	88.5PB/78.6PiB	22.1PB/19.7PiB	17.7PB/15.7PiB
Effective capacity[a]	366.6PB/325.6PiB	91.6PB/81.4PiB	73PB/64.8PiB
Maximum memory	3,072GB	1,536GB	768GB
SAN scale-out	1–8 nodes (4 HA pairs)		
Maximum SSDs	1,920	1,920	1,536
Maximum raw capacity	26.2PB/23.3PiB	7.4PB/6.6PiB	5.9PB/5.2PiB
Effective capacity[a]	122.2PB/108.5PiB	30.5PB/27.1PiB	24PB/21.3PiB
Maximum memory	1024GB	512GB	256GB
Cluster interconnect	Two, four, or six 10GbE	Two or four 10GbE	Two or four 10GbE

Per HA Pair Specifications (Active-Active Dual Controller)

	AFF8080 EX	AFF8060	AFF8040
Maximum SSDs	480	480	384
Maximum raw capacity	7.4PB/6.6PiB	1.8PB/1.6PiB	1.5PB/1.3PiB
Effective capacity[a]	30.6PB/27.1PiB	7.6PB/6.8PiB	6.1PB/5.4PiB
Controller form factor	6U; 12U (two 6U enclosures)	6U; 12U (two 6U enclosures)	6U
ECC memory	256GB	128GB	64GB
NVRAM	32GB	16GB	16GB
PCIe expansion slots	6 for 6U single enclosure; 24 for 12U dual enclosure	8 for 6U single enclosure; 24 for 12U dual enclosure	8
Onboard I/O: UTA 2 (16Gb FC/FCoE/10GbE)	8	8	8
Onboard I/O: GbE	8	8	8
Onboard I/O: 10GbE	8	8	8
Onboard I/O: 6Gb SAS	8	8	8
OS version	ONTAP 8.3 or later; ONTAP 8.3.1 or later for AFF8080 EX single-chassis HA and AFF8060 dual-chassis HA.		
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 included with the ONTAP software	**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** software: Simple, flexible replication for disaster recovery • NetApp **FlexClone** technology: 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.