Datasheet

NetApp All Flash FAS

Performance without compromise

Key Benefits

- Accelerate applications with the fastest unified scale-out all-flash array of up to 7M IOPS at submillisecond latency and over 360PB effective capacity.
- Transform your data center economics with best-in-class flash density: a complete flash system of 1PB in a 4U compact enclosure.
- Reduce power use by 11 times and rack space by 19 times and cut support costs by 67%.
- Unify data management for both SAN and NAS environments, from flash to disk to cloud.
- Provision storage system and serve data within 10 minutes.
- Reduce SSD storage by 5 to 10 times on average with inline data reduction technologies.
- Remove network bottlenecks with high-speed connectivity of 32Gb FC and 40Gb Ethernet.
- Safeguard your data with the best-in-class integrated data protection suite

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 all-flash storage delivers to critical workloads. Now, as enterprises extend flash across more solutions, it is critical to deliver enterprise-grade data management capabilities for a shared environment. However, many all-flash array solutions in the market today lack robust data management, integrated 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, AFF 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 and enables an easy and risk-free transition to flash for your data center.

Designed specifically for flash, the AFF A series all-flash systems deliver industry-leading performance, capacity density, scalability, security and network connectivity in dense form factors. With the addition of a new entry-level system, the new AFF A series family extends enterprise-grade flash to mid-size businesses and to fit any budget. At up to 7M IOPS per cluster with submillisecond latency, they are the fastest all-flash arrays built on a true unified scale-out architecture. The AFF A series allows customers to complete twice the work at half the latency as compared with the previous generation of AFF systems.[1] As the industry's first all-flash arrays to provide both 40 Gigabit Ethernet (40GbE) and 32Gb Fibre Channel connectivity, AFF A series systems eliminate the bandwidth bottlenecks that are increasingly moved to network from storage as flash gets faster and faster.

NetApp has been leading the all-flash storage innovations with the latest SSD technologies. As the first all-flash array to support 15TB SSDs, AFF systems, with the introduction of the A series, also become the first to use MSW SSDs, which further increase the usable capacity of SSDs significantly.

NetApp®

1. Based on performance comparison with a typical Oracle database at less than 1ms latency.

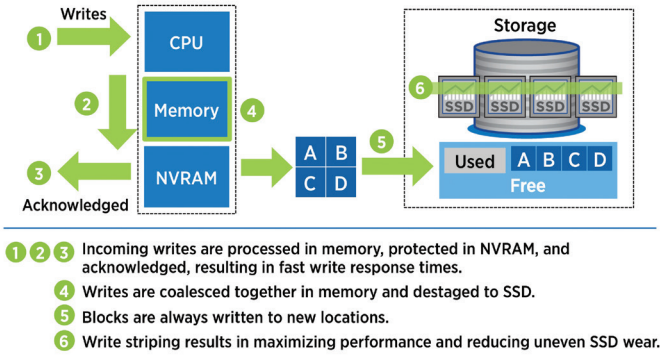

Figure 1) The flash-suited write architecture reduces latency and increases the longevity of SSDs.

With AFF systems, you can:

- **Accelerate the speed of business while increasing operational efficiency:**
  - Built on the flash-optimized NetApp WAFL® (Write Anywhere File Layout) system, ONTAP FlashEssentials enables consistent high performance to meet the demands of a multitude of workloads in a shared environment.
  - Consolidate all your workloads on the AFF systems, which deliver up to 600,000 IOPS at 1ms latency.
  - You can manage a massively scalable NAS container of up to 20PB and 400 billion files with a single namespace using FlexGroup volumes, while maintaining consistent high performance and resiliency.
- **Simplify IT operations while transforming data center economics:**
  - You can reduce power consumption by up to 11 times and rack space by up to 19 times and slash support and performance-tuning costs to a third compared with hybrid systems.
  - You can get flash at the cost of HDDs, thanks to NetApp data reduction technologies, enhanced with new inline data compaction.

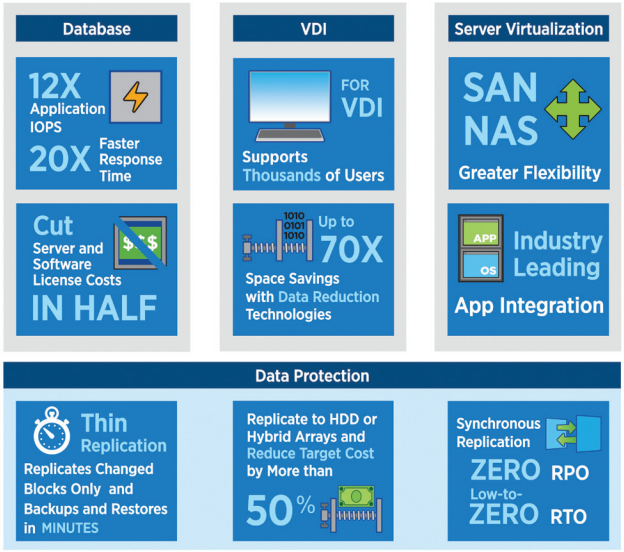

Figure 2) With rich data management capabilities, NetApp AFF enables business cost savings.

  - Support all your backup and disaster recovery needs with a complete suite of integrated data protection and replication features.
  - Secure your data and simplify key management on any type of drive with NetApp Volume Encryption (NVE), software-based at-rest data encryption, and onboard key manager.
- **Deploy flash everywhere with maximum flexibility while retaining control and security of your data:**
  - You can move data and applications where they run best: on an AFF system, on commodity hardware with software-defined storage, or in the cloud.
  - AFF offers the broadest application ecosystem integration for enterprise applications, VDI, database, and server virtualization.
  - Integrate flash into your infrastructure nondisruptively, eliminating silos, and scale out as your requirements grow.

All-Flash Performance Powered by ONTAP FlashEssentials

FlashEssentials is what's boosting the performance and efficiency of AFF. It encapsulates flash innovations and optimization technologies based on the flash-suited WAFL file system in ONTAP software, 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
- 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 inline data compaction, that reduce the SSD storage required and total spending on flash systems

Transform Data Center Economics While Simplifying Operations

With industry-leading performance and density, AFF 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.

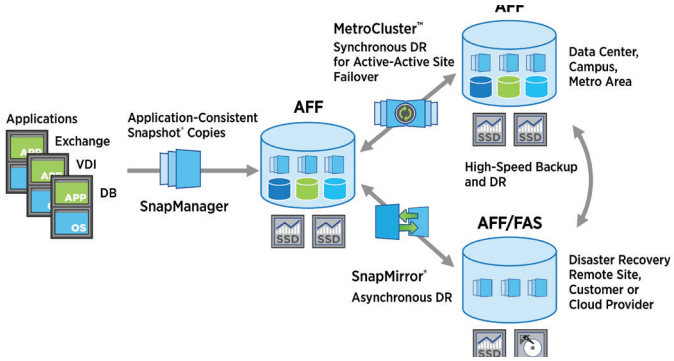

Figure 3) NetApp provides a full suite of integrated data protection and disaster recovery software.

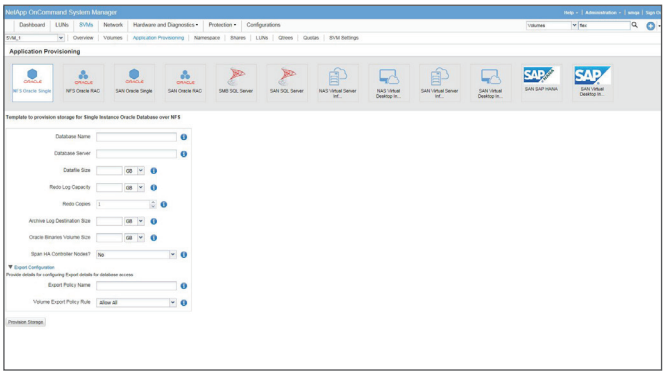

Figure 4) OnCommand System Manager makes setup and management of AFF quick and easy.

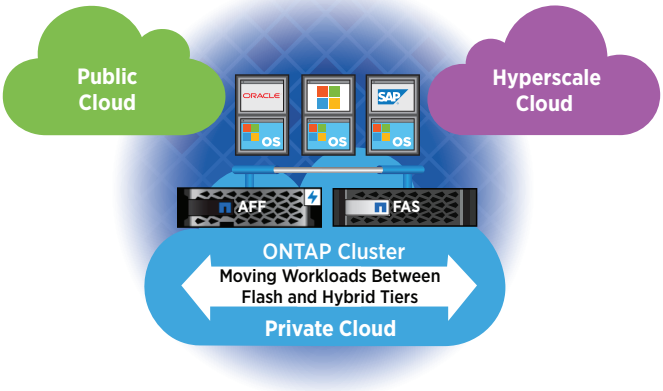

Figure 5) AFF is data fabric ready. You can easily move data between tiers and different clouds.

AFF not only is excellent for performance-demanding applications such as Oracle, Microsoft SQL Server, and MongoDB databases, VDI, and server virtualization, but also is a great choice for shared environments with a variety of workloads commonly found in a data center.

AFF comes with a full suite of acclaimed NetApp Integrated Data Protection software. Key capabilities and benefits include:

- Native space efficiency with cloning and Snapshot® copies to reduce storage costs and to minimize performance impact
- Application-consistent backup and recovery that simplify application management
- Synchronous replication with NetApp MetroCluster™ software, a leading capability in the all-flash array market that delivers zero RPO and near-zero RTO for mission-critical workloads
- Ability to achieve regulatory compliance with SnapLock®, which is enabled with integrated data protection and storage efficiency
- NetApp SnapMirror® replication software, which 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

AFF systems are built with innovative inline data reduction technologies that provide space savings of 5 to 10 times, on average, for a typical use case. The actual space savings of much higher than 10 times have been reported by our customers.

- The inline data compaction technology uses an innovative approach to place multiple logical data blocks from the same volume into a single 4KB block. It provides substantial space savings in addition to inline compression for database workloads that have relatively small I/O sizes. A combined space savings as high as 67:1 by using inline data compaction and inline compression together with an Oracle database has been observed.
- The inline compression has a near-zero performance impact. Incompressible data detection eliminates wasted cycles.
- The enhanced inline deduplication increases space savings by eliminating redundant blocks. It is particularly effective for operations such as VDI OS patches, where it can achieve 70:1 reduction rates.
- As the first all-flash array to support SSDs with MSW technology and combined with advanced SSD partitioning in ONTAP, AFF further increases usable capacity by 42% for the same cost.

NetApp ONTAP and OnCommand® management software provide automated tools to further simplify management of storage operations:

- With SAN- and NAS-optimized preconfigurations and the fast provisioning workflow, it takes less than 10 minutes to set up an AFF system and start serving application data.
- Provision and rebalance workloads with confidence by monitoring clusters and nodes to assure performance headroom availability with OnCommand Performance Manager.
- Automate common storage tasks such as provisioning and data protection with fast, one-click automation and self-service using OnCommand Workflow Automation.
- Import LUNs from storage arrays that are not based on ONTAP software directly into an AFF to seamlessly migrate data from older storage arrays.

Unified Flash Future-Proofs Investments

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

- AFF systems eliminate performance silos in your datacenter. They seamlessly cluster with hybrid FAS systems, enabling workloads to transparently move between high-performance tiers and low-cost capacity tiers.
- Seamlessly adapt as your needs change with the only all-flash array that allows you to intermix different controllers, SSD sizes, and next-generation technologies so your investment is protected.
- AFF is data fabric ready, with proven cloud connectivity. You can easily move data between the cloud and AFF for maximum performance and return on investment.
- Optimize data management for enterprise workload environments with leading application integration into Oracle, Microsoft, VMware, SAP, OpenStack, and much more.

Get More Business Value with Services

NetApp Services and our NetApp certified services partners collaborate with you to enhance your IT capabilities through a full portfolio of services that covers your IT lifecycle. To help you get the most value from your flash technology investment, NetApp offers:

- Assessment services to help evaluate the performance and efficiency of workloads across your heterogeneous environments
- Advisory services to help you determine the best workload candidates to move to flash
- Deploy and optimization services to prepare your environment and deliver continuous operations of your AFF systems

In addition, NetApp Support offerings, such as the NetApp AutoSupport® service tools, proactively manage your AFF systems and quickly resolve issues.

The mobile-friendly AutoSupport Efficiency Calculator enables storage efficiency monitoring and reporting of your flash storage. Learn more at netapp.com/services.

Unlock the Power of Your Data and Your People

Built on years of flash innovation and experience, NetApp AFF 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

AFF Technical Specifications

	AFF A700s	AFF A700	AFF A300	AFF A200
NAS scale-out	1–24 nodes (12 HA pairs)	1–24 nodes (12 HA pairs)	1–24 nodes (12 HA pairs)	1–8 nodes (4 HA pairs)
Maximum SSD	2,529	5,760	4,608	576
Maximum raw capacity: all flash	39PB/35.2PiB	88.1PB/78.3PiB	70.5PB/62.6PiB	8.8PB/7.8PiB
Effective capacity[a]	155.5PB/138.1PiB	356.3PB/316.4PiB	285.0PB/253.1PiB	34.7PB/30.8PiB
Maximum memory	12288GB	12288GB	3072GB	256GB
SAN scale-out	1–12 nodes (6 HA pairs)	1–12 nodes (6 HA pairs)	1–12 nodes (6 HA pairs)	1–8 nodes (4 HA pairs)
Maximum SSD	1,296	2,880	2,304	576
Maximum raw capacity	19.8PB/17.6PiB	44.1PB/39.1PiB	35.3PB/31.3PiB	8.8PB/7.8PiB
Effective capacity	77.8PB/69.0PiB	178.1PB/159.2PiB	142.5PB/126.6PiB	34.7PB/30.8PiB
Maximum memory	6144GB	6144GB	1536GB	256GB
Cluster interconnect	2 x 40GbE or 4 x 10GbE	2 x 40GbE or 8 x 10GbE	2 x 10GbE	2 x 10GbE
Per HA Pair Specifications (Active-Active Dual Controller)				
	AFF A700s	AFF A700	AFF A300	AFF A200
Maximum SSD	216	480	384	144
Maximum raw capacity: all flash	3.3PB/2.9PiB	7.3PB/6.5PiB	5.9PB/5.2PiB	2.2PB/2.0PiB
Effective capacity	13.0PB/11.5PiB	29.7PB/26.4PiB	23.8PB/21.1PiB	8.8PB/7.8PiB
Controller form factor	4U chassis with two HA controllers and 24 SSD slots	8U chassis with two HA controllers	3U chassis with two HA controllers	2U chassis with two HA controllers and 24 SSD slots
Memory	1024GB	1024GB	256GB	64GB
NVRAM	32GB	64GB	16GB	8GB
PCIe expansion slots	8	20	4	N/A
FC target ports (32Gb autoranging)	8	32	8	N/A
FC target ports (16Gb autoranging)	8	64	24	8
FCoE target ports, UTA2	N/A	64	24	8
40GbE ports	12	32	8	N/A
10GbE ports	24	64	32	8
10GbE Base-T ports (1GbE autoranging)	N/A	64	12	N/A
12Gb/6Gb SAS ports	8	64	24	4
Storage networking supported	FC iSCSI, NFS, pNFS, CIFS/SMB	FC, FCoE, iSCSI, NFS, pNFS, SMB	FC, FCoE, iSCSI, NFS, pNFS, SMB	FC, FCoE, iSCSI, NFS, pNFS, SMB
OS version	ONTAP 9.1 GA or later	ONTAP 9.1 RC1 or later	ONTAP 9.1 RC1 or later	ONTAP 9.1 RC2 or later
Shelves and media	DS224C (2U; 24 drives, 2.5" SFF); DS2246 (2U; 24 drives, 2.5" SFF) See NetApp All Flash FAS Tech Specs page[b] for more details about supported drive types.			
Host/client OSs supported	Windows 2000, Windows Server 2003, Windows Server 2008, Windows Server 2012, Windows Server 2016, 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 http://www.netapp.com/us/products/storage-systems/all-flash-fas/model-a-tech-specs.aspx

AFF A Series Software

Features and software Included with ONTAP software	**Efficiency:** FlexVol®, deduplication, compression, compaction, and thin provisioning **Availability:** MetroCluster and multipath I/O **Data protection:** RAID DP® and Snapshot **Performance:** storage quality of service (QoS) **Management:** OnCommand Workflow Automation, System Manager, Performance Manager, and Unified Manager **Scalable NAS container:** FlexGroup
Flash bundle	• All storage protocols supported (FC, FCoE, iSCSI, NFS, pNFS, SMB) • NetApp **SnapRestore®** software: restore entire Snapshot copies in seconds • NetApp **SnapMirror** software: simple, flexible backup and replication for disaster recovery • NetApp **FlexClone®** technology: instant virtual copies of files, LUNs, and volumes • NetApp **SnapCenter® Standard**: unified, scalable platform and plug-in suite for application-consistent data protection and clone management • NetApp **SnapManager®** software: application-consistent backup and recovery for enterprise applications Go to NetApp.com for information about additional software available from NetApp.