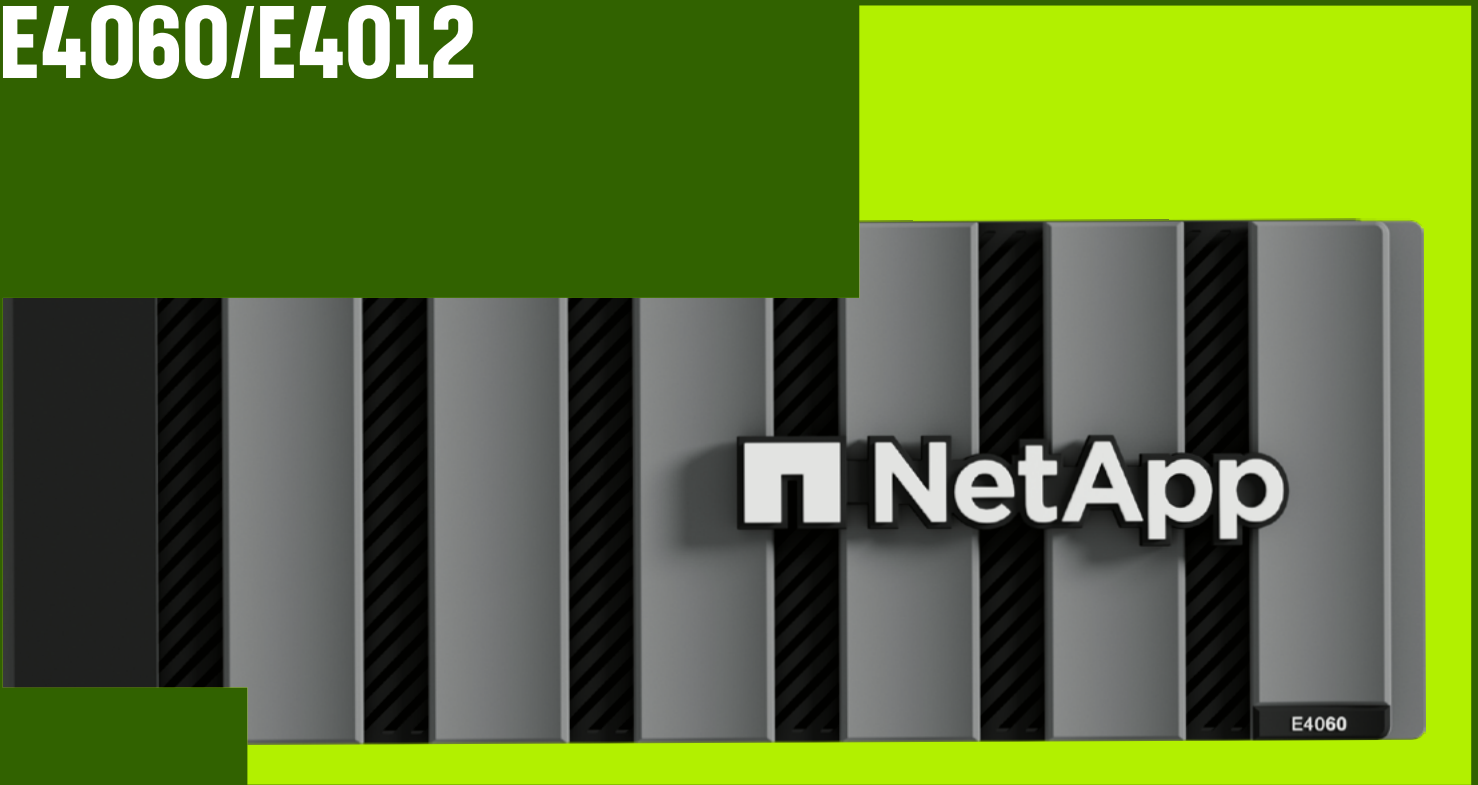


NETAPP E4060/E4012



Gain affordable performance with our cost-effective hybrid flash arrays

The NetApp E4060 and E4012 systems are hybrid flash storage systems with a low acquisition cost and even lower cost of ownership. With the E4060 and E4012, you can streamline your IT infrastructure and drive down costs. Pay-as-you-grow flexibility makes the E4060 and E4012 excellent solutions for companies of all sizes that are facing rapid, unpredictable growth.

Unlike other storage systems that add file or virtualization layers in the I/O data path, E4060 and E4012 hybrid arrays are purpose-built to optimize performance for mixed workloads. The E4060 and E4012 improve IOPS and throughput to help you extract value from your data and take action faster. The intuitive, on-box graphical interface simplifies configuration and maintenance while providing storage capabilities to deliver consistent performance, data integrity, reliability, and security.

Affordable Performance

The E4060 and E4012 storage systems balance price and performance. These systems deliver over 900K sustained IOPS and support a broad range of high-speed host interfaces, including 32Gb Fibre Channel (FC), 25Gb iSCSI, and it's 12Gb SAS-ready, to protect investment in storage networks.

The SSD cache feature provides intelligent analytics-based caching capabilities for read-intensive workloads. Hot data is cached by using higher-performance, lower-latency SSDs in the drive shelves, with the full dataset being stored on HDDs. You don't need to set up complicated policies to define the trigger for data movement between tiers. You can simply set it and forget it. The SSD cache is expandable to up to 8TB per storage system.

Ease of use

The E4060 and E4012 have a modular design and simple management tools that make it easy to scale without adding management complexity. The on-box, browser-based SANtricity System Manager GUI enables you to streamline deployment and start working with your data in under 10 minutes.

You can use SANtricity System Manager to walk through workload-appropriate provisioning, or you can provision workloads on your own. NetApp Dynamic Disk Pools (DDP) technology dramatically simplifies RAID management by distributing data, parity, and spare capacity across a pool of drives, with intelligent defaults, minimal decision making, and no stranded capacity after deletions. A single E4060 or E4012 system can support both DDP and traditional RAID volumes if your workloads require it.

Advanced Data Protection

NetApp SANtricity DDP technology enables storage administrators to simplify RAID management, improve data protection, and maintain predictable performance under all conditions. DDP technology evenly distributes data, protection information, and spare capacity across the entire pool of drives, simplifying setup and maximizing use. This innovative technology minimizes the performance impact of a drive failure and can return the system to optimal condition up to 8x faster than traditional RAID. With shorter rebuild times and patented technology to prioritize reconstruction, DDP capabilities significantly reduce exposure to multiple disk failures, offering a level of data protection that simply can't be achieved with traditional RAID.

With SANtricity software, all management tasks can be performed while the storage remains online with complete read/write data access. Storage administrators can make configuration changes, conduct maintenance, or expand the storage capacity without disrupting I/O to attached hosts. SANtricity software online capabilities include:

- Dynamic Disk Pool allows for easy capacity increases and decreases.
- Dynamic volume expansion enables administrators to increase the capacity of an existing volume.
- Dynamic segment size migration enables administrators to change the segment size of a given volume.
- Dynamic RAID-level migration changes the RAID level of a RAID group on the existing drives without requiring the relocation of data. Supported RAID levels are 0, 1, 5, 6, and 10.
- All firmware updates (controller, drive, IOM) are nondisruptive, with no interruption to data access.

KEY BENEFITS

Affordable Performance

Leverage flash in an affordable hybrid system for a wide range of mixed workloads.

Worry-Free Reliability

The NetApp E4060 and E4012 are entry-level products with enterprise-level redundancy, automated management, and field-proven availability.

Proven Simplicity

A modern, on-box, browser-based GUI enables you to get access to your data in under 10 minutes, with simple, flexible administration.

To protect against data loss and downtime events, both locally and over long distances, the E4060 and E4012 offer integrated data protection features including:

- NetApp Snapshot™ technology. Create and restore point-in-time copies of datasets in less than a second to protect against accidental data loss on the local array.
- Volume copy. Create a complete physical copy (clone) of a volume for applications that require a full point-in-time copy of production data.
- Asynchronous mirroring. Volume replication over FC or IP long distance to a remote site keeps your business operations running no matter what happens.
- Synchronous mirroring. Continuous volume replication is enabled over FC at campus distances.

With the E4060 and E4012 arrays, you can easily replicate data to another E4060, E4012, or other NetApp E-Series system. With this capability, you can create a high-speed, low-latency recovery system that runs at the same speed as your production operations. This flexibility in design allows you to choose the profile of performance and cost to meet your business requirements.

High Availability and Enterprise Reliability

The E4060 and E4012 are based on a field-proven architecture that delivers high reliability and 99.9999% availability when NetApp best practices are followed. The E4060 and E4012 offer a secure, reliable foundation for your valuable data.

Designed to have no single point of failure, E4060 and E4012 have fully redundant I/O paths with automated failover and extensive diagnostic capabilities that alert on and actively help resolve failures. SANtricity Data Assurance (based on the T10 PI industry standard) validates data integrity and protects against silent data corruption.

One of the most critical aspects of an enterprise solution is the ability to detect and resolve issues. In this area, the E4060 and E4012 all-flash arrays offer significant depth of capabilities, including:

- Extensive capturing of diagnostic data provides comprehensive fault isolation and simplifies analysis of unanticipated events.
- Background monitoring proactively scans media and tracks drive health against defined thresholds.
- Integrated Recovery Guru diagnoses problems and provides the applicable procedure to use for recovery.
- With DDP technology and RAID 6, a drive rebuild continues even when an unreadable sector or second failure is encountered.
- NetApp Active IQ® telemetry is built into the E4060 and E4012, so you can take advantage of Active IQ hybrid cloud services to optimize your environment.

Secure Data, Secure Management

NetApp SANtricity drive encryption* combines local key management with drive-level encryption for comprehensive security for data at rest with no impact to performance. Because all drives eventually leave the data center through redeployment, retirement, or service, it's reassuring to know that your sensitive data isn't leaving with them. Customers can choose to manage the drive authentication keys natively for a simple lowest-cost solution or use a KMIP-compliant external key manager for centralized administration.

Management access to the E4060 and E4012 is protected with role-based access control, LDAP/Active Directory

integration, and digital certificate management. The security administrator manages user privileges and password requirements. The exportable audit log gives visibility into management actions taken on the array. All management communication is over HTTPS. In addition, SAML support is available to optionally enable multifactor authentication for further protection against threats.

ENERGY STAR Certification

All E-Series systems use "85% PLUS" power supplies, exceeding the EPA ENERGY STAR requirement of 80% efficiency. See the latest EPA ENERGY STAR-certified E-Series configurations.

ASHRAE Compliance

All E-Series systems meet the certification requirements of ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers), a global society that advances human well-being through sustainable technology built for the environment:

- E4060 and E4012 are ASHRAE A2 compliant
- DE460C and DE212C are ASHRAE A3 compliant

Get more business value with services

Whether you're planning your next-generation data center, need specialized know-how for a major storage deployment, or want to optimize the operational efficiency of your existing infrastructure, [NetApp Professional Services](#) and [NetApp Certified Partners](#) can help.

* Hardware and software for at-rest data encryption are not available in certain countries, including Russia, Belarus, Kazakhstan, and other Eurasian Customs Union countries

Technical specs

	E4060 (DE460C)	E4012 (DE212C)	E5760 (DE406C)	E5724 (DE224C)
Form factor	4U/60 drives (both 2.5" and 3.5")	2U/12 drives (both 2.5" and 3.5")	4U/60 drives (both 2.5" and 3.5")	2U/24 drives (2.5")
Maximum raw capacity	1.3PB (using 60 × 22TB NL-SAS HDDs) 6.6PB with expansion shelves (total of 300 × 22TB NL-SAS drives)	264TB (using 12 × 22TB NL-SAS HDDs) 2.1PB with expansion shelves (total of 96 × 22TB NL-SAS HDDs)	1PB (using 60 × 18TB NL-SAS HDDs) 8.6PB with expansion shelves (total of 480 × 18TB NL-SAS drives)	286.2TB (6 × 1.8 TB + 18 × 15.3TB SSDs) 345.6TB (total of 192 × 1.8TB SAS HDDs)
Maximum drives	300 HDDs (limit of 5 shelves total) 120 SSDs total	96 HDDs (limit of 8 shelves total) 96 SSDs (limit of 8 shelves total)	480 HDDs total 120 SSDs total	192 HDDs (limit of 8 shelves total) 120 SSDs total
System memory	32GB		32GB/128GB	
Drives supported	NL-SAS 4TB, 10TB 22TB, 10TB FIPS SSD 1.9TB (Please see Hardware Universe for current list of supported drives)	NL-SAS 4TB, 10TB, 22TB, 10TB FIPS SSD 1.9TB (Please see Hardware Universe for current list of supported drives)	NL-SAS 4TB, 8TB, 12TB, 18TB 10TB FIPS SAS 1.2TB, 1.8TB 1.8TB FIPS SSD 800GB, 1.6TB 1.6TB FIPS	SAS 1.2TB, 1.8TB 1.8TB FIPS SSD 800GB, 1.6TB, 3.8TB, 7.6TB, 15.3TB 1.6TB FIPS, 3.8TB FDE 15.3TB FDE

	E4060 (DE460C)	E4012 (DE212C)	E5760 (DE406C)	E5724 (DE224C)
Host I/O ports	Base I/O Ports			
	4 ports 25Gb iSCSI (optical)		4 ports 16Gb FC or 4 ports 10Gb iSCSI (optical)	
	Optional Add-On I/O Ports			
	8 ports 32Gb FC 8 ports 10Gb iSCSI (copper) 8 ports 12Gb SAS (NOTE: SAS card not available at release)		8 ports 32Gb FC 8 ports 10Gb iSCSI (copper) 8 ports 25Gb iSCSI (optical) 8 ports 12Gb SAS 4 ports 100Gb InfiniBand (iSER or SRP) 4 ports 100Gb NVMe over InfiniBand 4 ports 100Gb NVMe over RoCE (Ethernet)	
Supported HICs	12Gb SAS, 10Gb iSCSI RJ-45 or 32Gb FC		NVMe/IB, NVMe/FC, NVMe/RoCE, SRP/IB, iSER/IB, FC, iSCSI, SAS	
System management	SANtricity System Manager (web-based, on-box)			
High-availability features	• Dual active controller with automated I/O path failover • Automatic load balancing and path connectivity monitoring • Dynamic Disk Pools technology and traditional RAID levels 0, 1, 5, 6, and 10 • Redundant, hot-swappable storage controllers, disk drives, power supplies, and fans • Automatic rebuild after a drive failure • Mirrored data cache with battery-backed destage to flash • Data Assurance (T10 PI ANSI standard to ensure data integrity) • Proactive drive health monitoring that identifies problems before they create issues • NetApp Active IQ • Online SANtricity OS upgrades and drive firmware upgrades • Online configuration changes • Up to six-nines availability (with appropriate configuration and service plans)			
Host operating systems	• Apple macOS • Microsoft Windows Server • Novell SUSE Linux Enterprise Server • Oracle Enterprise Linux • Red Hat Enterprise Linux • Rocky Linux • VMware ESX		• Apple macOS • CentOS Linux • IBM AIX • Microsoft Windows Server • Novell SUSE Linux Enterprise Server • Oracle Enterprise Linux • Oracle Solaris • Red Hat Enterprise Linux • Ubuntu Linux • VMware ESX	
Included software features	• SANtricity synchronous and asynchronous mirroring • SANtricity volume copy • SANtricity thin provisioning • SANtricity Snapshot • SANtricity SSD cache • SANtricity Cloud Connector			
Security features	• Drive encryption (FDE/FIPS) support² • Native encryption key management • External encryption key management (KMIP-compliant) • Role-based access control and audit log • LDAP support • SAML support to enable Multi-Factor Authentication • Common Criteria certification in progress			
System capabilities	• Dynamic Disk Pools and Traditional RAID coexistence • Dynamic volume expansion • Dynamic capacity expansion for DDP or RAID volume group • Dynamic capacity contraction (DDP only) • Dynamic RAID-level or segment size migration (traditional RAID only) • Embedded system event monitoring • Full Stripe Write Acceleration (FSWA) to accelerate system write performance (for qualifying workloads)			
Open management	• NetApp SANtricity Web Services embedded REST APIs • NetApp PowerShell Toolkit APIs • NetApp SANtricity Secure CLI			
Management enablers	• NetApp SANtricity Performance App for Splunk Enterprise³ • VMware vSphere Storage APIs—Array Integration (VAAI) • Microsoft Windows Offloaded Data Transfer (ODX)			

	E4060 (DE460C)		E4012 (DE212C)		E5760 (DE406C)		E5724 (DE224C)	
System maximums	• Hosts/partitions: 256 • Volumes: 512 • Maximum DDP capacity per system: 12PB • Maximum DDP volume size: 4PB • Maximum RAID volume size: 4PB • Snapshot copies: 512 • Async mirror pairs: 32				• Hosts/partitions: 512 • Volumes: 2,048 • Maximum DDP capacity per system: 12PB • Maximum DDP volume size: 4PB • Maximum RAID volume size: 4PB • Snapshot copies: 2,048 • Async mirror pairs: 128			
Dimensions and weight	E4060 SYSTEM SHELF DE460C DISK SHELF		E4012 SYSTEM SHELF DE212C DISK SHELF		E5760 SYSTEM SHELF DE460C DISK SHELF		E5724 SYSTEM SHELF DE224C DISK SHELF	
Height	6.97" (17.70cm)		3.47" (8.81cm)		6.97" (17.70cm)		3.47" (8.81cm)	
Width	19" (48.26cm)		19" (48.26cm)		19" (48.26cm)		19" (48.26cm)	
Depth	38.25" (97.16cm)		21.1" (53.59cm)		38.25" (97.16cm)		19.27" (48.95cm)	
Weight ⁴	E4060: 226lb (102kg)		E4012: 62lb (28kg)		E5760: 226lb (102kg)		E5724: 55.16lb (25kg)	
	DE460C: 221.014lb (99.46kg)		DE212C: 50.064lb (22.53kg)		DE460C: 221.014lb (99.46kg)		DE224C: 50.064lb (22.53kg)	
Power	E4060 System Shelf		E4012 System Shelf		E5760 System Shelf		E5724 System Shelf	
	Typical	Maximum	Typical	Maximum	Typical	Maximum	Typical	Maximum
kVA	0.587	0.701	0.587	0.701	0.587	0.701	0.587	0.701
Watts	581.79	694.15	581.79	694.15	581.79	694.15	581.79	694.15
BTU	1985.15	2368.54	1985.15	2368.54	1985.15	2368.54	1985.15	2368.54
Power	DE460C Disk Shelf		DE212C Disk Shelf		DE224C Disk Shelf			
	Typical	Maximum	Typical	Maximum	Typical		Maximum	
kVA	1.102	1.501	0.25	0.344	0.313		0.426	
Watts	1090.84	1485.62	248.7	343.7	309.7		422.06	
BTU	3722.1	5069.15	850.55	1175.5	1056.74		1440.13	



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About NetApp

NetApp is the intelligent data infrastructure company combining unified data storage, integrated data services, and CloudOps solutions to turn a world of disruption into opportunity for every customer. NetApp creates silo-free infrastructure, then harnesses observability and AI, to enable the best data management. As the only enterprise-grade storage service natively embedded in the world's biggest clouds, our data storage delivers seamless flexibility and our data services create a data advantage through superior cyber-resilience, governance, and applications agility. Our CloudOps solutions provide continuous optimization of performance and efficiency through observability and AI. No matter the data type, workload or environment, transform your data infrastructure to realize your business possibilities with NetApp. www.netapp.com



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ACCELERATE PERFORMANCE WITH NETAPP EF-SERIES ALL-FLASH ARRAYS



Affordable high-density, all-flash storage systems deliver high performance and capacity for a wide range of specialized block workloads

The challenge

As the amount of data that organizations handle grows exponentially, they are challenged with managing more complex and costly information while balancing limited resources, space, and power. Enterprises of every size are finding that they must evolve and innovate to achieve business success and differentiate themselves from their competitors. They need to process, derive value, and gain insights from unstructured and structured data faster to speed time to market and meet customer demands.

Performance and availability of key business applications are tightly linked to many factors such as time to market, revenue, and customer satisfaction. Therefore, enterprises want solutions that improve the speed and responsiveness of these applications and that support them as their capacity needs grow.

They also require solutions that deliver better business value because the cost-effectiveness of operations has become equally as important as operating without disruptions and delivering consistent performance.

The solution

The NetApp® EF-Series is a family of entry-level and midrange all-flash storage arrays that can accelerate performance and access to your data to help you derive value faster. These systems offer NVMe flash storage and provide high IOPS at ultralow latency, response times under 100 microseconds, and bandwidth up to 44GB/s. They are ideal for specialized block workloads and demanding applications such as media and entertainment, high-performance computing (HPC), and AI (with NVIDIA DGX SuperPOD).

The EF-Series is packed with enterprise-proven capabilities, including:

- NVMe over Fabrics (NVMe-oF) support, providing ultralow latency and investment protection
- Fibre Channel (FC), iSCSI, and InfiniBand (IB) support for enhanced interoperability with your existing SAN infrastructure
- Redundant components with automated failover
- Advanced monitoring and diagnostics with proactive repair
- Intuitive storage management with comprehensive tuning functions
- Full-function NetApp SANtricity® Web Services embedded REST API
- SANtricity Snapshot™ technology, volume copy, mirroring for data protection where supported, and Dynamic Disk Pools (DDP)
- SANtricity data assurance (T10-PI standard) for data integrity and protection against silent data inconsistency

Together, these capabilities offer an outstanding combination of capacity, performance, and price, along with configuration flexibility and simplicity, in a compact package to help you make actionable decisions faster and more securely. The EF-Series helps protect your storage investment with systems that grow with your business needs.

Fast and affordable performance you can rely on

The EF-Series all-flash arrays offer industry-leading price, performance, and capacity in an enterprise-grade system. With support for up to 1.5PBs of flash capacity in a single modular 2U building block, the systems enable you to easily meet ever-changing business requirements. And with lower TCO and a smaller physical footprint, they help achieve more cost-efficient operations.

- The EF600 all-flash array is designed specifically for workloads that demand the highest levels of performance, while the EF300 array is designed for mixed workload environments such as big data analytics and databases. Both arrays are also available with Quad-Level Cell (QLC) drives with the NetApp EF300C and EF600C to meet a wide range of capacity needs. The NetApp EF-Series family provides the combination of speed, performance, and capacity to meet your core block storage needs. Accelerate write IOPS and read/write throughput with an end-to-end NVMe system that is purpose-built for high-performance workloads.
- Achieve better performance for analytics applications such as Splunk and Apache® Hadoop®, reducing time to actionable data.

KEY BENEFITS

Performance

- Modular and flexible configuration options to support demanding performance and cost requirements
- Industry-leading IOPS and ultralow latency to increase application responsiveness
- Support for multiple high-speed host interfaces in 2U form factor

Affordability

- Industry-leading budget and performance for both high IOPS and bandwidth
- NVMe-oF and SCSI options provide investment protection to meet future demands without forklift upgrades
- Worry-free reliability with over 1 million installations

- Significantly improve the overall efficiency of your ITops while meeting performance requirements.
- Speed up databases, real-time analytics, and HPC and AI applications at scale with any of the enterprise parallel file systems that the EF-Series is integrated with, including BeeGFS.

Additionally, the EF300 and EF600 systems support expansion with SAS enclosures, adding a tier of spinning media to complement your ultralow latency NVMe SSDs. With various connectivity, infrastructure, and media options, the EF-Series offers investment protection so that you can meet future demands without forklift upgrades.

Proven simplicity

Modular design and simple management tools make it easy to configure, manage, and scale without adding complexity.

The EF-Series runs on the enterprise-proven NetApp SANtricity OS. Optimized for flash, the SANtricity OS enables you to maximize performance through extensive configuration flexibility and custom performance tuning.

The SANtricity System Manager graphical performance tools provide key information about storage I/O from multiple viewpoints, enabling administrators to make informed decisions about configuration adjustments to further refine performance. For more performance analysis, Splunk Enterprise and Grafana solutions are available.

High availability and enterprise reliability

The NetApp EF-Series was engineered from the start to support applications that are at the heart of a corporation's business. Built to provide enterprise reliability in both the architecture and the software design, the EF-Series leverages expertise based on more than 20 years of development experience and more than 1 million implemented systems. Fully redundant I/O paths, advanced data protection features, and extensive diagnostic capabilities allow the EF-Series to achieve greater than 99.9999% availability with data integrity and security.

Secure data, secure management

NetApp SANtricity drive encryption combines key management with drive-level encryption. This combination creates comprehensive security for data at rest with no impact to performance. Because all drives eventually leave the data center through redeployment, retirement, or service, you can be assured that your sensitive data is not leaving with them. You can choose to manage the drive authentication keys natively for a simple, low-cost solution or use a KMIP-compliant external key manager for centralized administration. Management access to the EF-Series is protected with role-based access control (RBAC) and LDAP/Active Directory integration.

Advanced data protection

SANtricity Dynamic Disk Pools technology enables storage administrators to simplify RAID management, improve data protection, and maintain predictable performance under every condition. DDP technology evenly distributes data, protection information, and spare capacity across the drives, simplifying setup and maximizing use. This innovative technology minimizes the performance impact of a drive failure and can return the system to optimal condition up to 8 times faster than traditional RAID. With shorter rebuild times and exclusive technology to prioritize critical reconstruction, DDP significantly reduces exposure to multiple failures, offering a level of data protection that simply cannot be achieved with traditional RAID.

With the SANtricity OS, all management tasks can be performed while the storage remains online with complete read/write data access. Storage administrators can make configuration changes, conduct maintenance, and expand storage capacity without disrupting I/O to attached hosts.

SANtricity OS online capabilities include:

- Dynamic capacity and volume expansion enable administrators to increase the capacity of an existing pool, volume group, or volume.
- Dynamic segment size migration enables administrators to change the segment size of a given volume.



- Dynamic RAID-level migration changes the level of a RAID group on the existing drives without requiring the relocation of data. Supported RAID levels are 0, 1, 5, 6, and 10.
- All software/firmware updates (controller, drive) are nondisruptive, with no interruption to data access.

Administrators can use the SANtricity remote storage feature to perform online import of remote volumes over iSCSI.

DevOps ready

To enable the automation and agility that DevOps-minded teams need, robust support for Ansible is available. EF-Series Ansible collections simplify and streamline adoption by supporting all storage provisioning tasks, including setting up attached host servers. For advanced use cases, all functions available on an EF-Series array are also exposed as embedded REST APIs through SANtricity Web Services. Eliminate risk and accelerate your business with DevOps-ready storage that can be managed as code.

Validated solution reference designs

With tested solution designs for high-transaction databases, AI with NVIDIA DGX SuperPOD, and real-time analytics using Splunk, your demanding business applications with large throughput requirements built on EF-Series systems will consistently deliver high performance. You can focus on growing your business instead of worrying about your data infrastructure.

ASHRAE compliance

All EF-Series systems meet the certification requirements of the American Society of Heating, Refrigerating and Air-Conditioning Engineers, a global society that advances human well-being through sustainable technology for the built environment. All EF-Series models are ASHRAE A4 compliant.

► Get more business value with services

Whether you're planning your next-generation data center, need specialized know-how for a major storage deployment, or want to optimize the operational efficiency of your existing infrastructure, [NetApp Professional Services](#) and [NetApp Certified Partners](#) can help.

Table 1. NetApp EF-Series technical specifications

	EF600	EF600C	EF300	EF300C
Controller chassis form factor¹	2U; 24 internal NVMe SSD slots	2U; 24 internal NVMe SSD slots	2U; 24 internal NVMe SSD slots	2U; 24 internal NVMe SSD slots
SAS Expansion shelves	Hybrid: 4U with 60 slots and 2U with 12 slots; All-flash: 2U with 24 SAS SSD slots	n/a	Hybrid: 4U with 60 slots and 2U with 12 slots; All-flash: 2U with 24 SAS SSD slots	n/a
Controller memory	32GB, 128GB	32GB, 128GB	16GB	16GB
Maximum SSDs (NVMe)	24	24	24	24
Maximum raw capacity in base system	367TB	1.5PB	367TB	1.5PB
Maximum raw capacity with expansion	9.6PB hybrid, or 1.8PB all-SSD	1.5PB	5.7PB hybrid, or 1.8PB all-SSD	1.5PB
Maximum IOPS	Up to 2,000,000	Up to 1,000,000	Up to 670,000	Up to 350,000
Maximum read bandwidth²	44GBps	44GBps	20GBps	20GBps
Maximum write bandwidth²	13GBps	13GBps	9GBps	9GBps
Power consumption	Typical: 979W Maximum: 1128W	Typical: 979W Maximum: 1128W	Typical: 643W Maximum: 870W	Typical: 643W Maximum: 870W
IO connectivity per array	4 ports 200Gb NVMe/IB, NVMe/RoCE 4 ports 200Gb iSER/IB 8 ports 100Gb NVMe/IB, NVMe.RoCE 8 ports 100Gb iSER/IB, SRP/IB 16 ports 32 Gb NVMe/FC 16 ports 32Gb SCSI FC 16 ports 25Gb iSCSI	4 ports 200Gb NVMe/IB, NVMe/RoCE 4 ports 200Gb iSER/IB 8 ports 100Gb NVMe/IB, NVMe.RoCE 8 ports 100Gb iSER/IB, SRP/IB 16 ports 32 Gb NVMe/FC 16 ports 32Gb SCSI FC 16 ports 25Gb iSCSI	4 ports 100Gb NVMe/IB, NVMe/RoCE 4 ports 100Gb iSER/IB, SRP/IB 8 ports 32 Gb NVMe/FC 8 ports 32Gb SCSI FC 8 ports 25Gb iSCSI	4 ports 100Gb NVMe/IB, NVMe/RoCE 4 ports 100Gb iSER/IB, SRP/IB 8 ports 32 Gb NVMe/FC 8 ports 32Gb SCSI FC 8 ports 25Gb iSCSI
Storage networking supported	NVMe/IB, iSER/IB, SRP/IB, NVMe/RoCE, NVMe/FC, FC, iSCSI	NVMe/IB, iSER/IB, SRP/IB, NVMe/RoCE, NVMe/FC, FC, iSCSI	NVMe/IB, iSER/IB, SRP/IB, NVMe/RoCE, NVMe/FC, FC, iSCSI	NVMe/IB, iSER/IB, SRP/IB, NVMe/RoCE, NVMe/FC, FC, iSCSI

	EF600	EF600C	EF300	EF300C
OS version	SANtricity OS 11.70.5R1 or later	SANtricity OS 11.90R1 or later	SANtricity OS 11.70.5R1 or later	SANtricity OS 11.90R1 or later
Shelves and media	DE212C (2U, 12 drives, 3.5" NL-SAS and 2.5" SAS); DE224C (2U, 24 drives, 2.5" SAS); DE460C (4U, 60 drive, 3.5" NL-SAS and 2.5" SAS)		DE212C (2U, 12 drives, 3.5" NL-SAS and 2.5" SAS); DE224C (2U, 24 drives, 2.5" SAS); DE460C (4U, 60 drive, 3.5" NL-SAS and 2.5" SAS)	
Host/client OS supported	Windows Server, Linux, MacOS, VMware			

¹ The base system can be configured with a minimum of 6 SSDs. See the expansion options later in this Table 1.

² Peak system performance.

Table 2. EF-Series software: SANtricity System Manager (web-based, on-box)

High availability	- Dual active controller with automated I/O path failover - Automatic Load Balancing and path connectivity monitoring - DDP technology and traditional RAID levels - Redundant, hot-swappable storage controllers, disks, power supply units (PSUs), fans - Automatic rebuild after a drive failure - Mirrored data cache with battery-backed destaging to flash - Proactive drive health monitoring - Online upgrades and maintenance for software and firmware - Online configuration, expansion, contraction, and tuning - Data assurance (T10 PI ANSI standard for data integrity) - NetApp Active IQ - Six-nines availability (with appropriate configuration and service plans)
Data management	- Remote storage online volume import (iSCSI) - Dynamic Disk Pools technology and traditional RAID levels 0, 1, 5, 6, and 10 - On-box SANtricity System Manager - On-box SANtricity Web Services API - SANtricity Unified Manager for enterprise management - Smart NVMe SSD performance and endurance management - SANtricity SSD read cache
Data protection	- SANtricity Snapshot copy - SANtricity asynchronous mirroring
Security and compliance	- RBAC with audit log - LDAP/LDAPS for user authentication - Digital certificate management - Multifactor authentication (MFA) supported through SAML 2.0 - Internal key management supported with self-encrypting drive (SED) or FIPS drives - External key management (KMIP-compliant) supported with SED or FIPS drives - Transport Layer Security (TLS) 1.2 minimum for all management communication - SANtricity drive security data at rest encryption¹

¹ Hardware and software for at-rest data encryption are not available in certain countries, including Russia, Belarus, Kazakhstan, and other Eurasian Customs Union countries.



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About NetApp

NetApp is the intelligent data infrastructure company, combining unified data storage, integrated data services, and CloudOps solutions to turn a world of disruption into opportunity for every customer. NetApp creates silo-free infrastructure, harnessing observability and AI to enable the industry's best data management. As the only enterprise-grade storage service natively embedded in the world's biggest clouds, our data storage delivers seamless flexibility. In addition, our data services create a data advantage through superior cyber resilience, governance, and application agility. Our CloudOps solutions provide continuous optimization of performance and efficiency through observability and AI. No matter the data type, workload, or environment, with NetApp you can transform your data infrastructure to realize your business possibilities. www.netapp.com

