

DATASHEET

# NetApp EF-Series All Flash Arrays EF600, EF300, EF570, and EF280

Affordable to extreme performance all-flash storage systems for wide range of mixed enterprise workloads



## The Challenge

Enterprises of every size are finding they must evolve and innovate to gain competitive advantage. Performance and availability of key business applications is tightly linked to time to market, revenue, and customer satisfaction, and they seek solutions to improve the speed and responsiveness of these applications.

At the same time, managing data can be increasingly complex and costly—especially with limited resources, space, and power. Cost-effective operations is as much of an imperative as operating without disruptions and delivering consistent performance. Additionally, organizations want the ability to gain value and insights from their data to differentiate themselves from competitors and accelerate time to market.

## The Solution

The EF-Series is a family of entry-level and mid-range all-flash storage arrays that can accelerate access to your data and help you derive value from it faster. These systems offer both SAS and NVMe flash storage and provide you with affordable to extreme IOPS, response times under 100 microseconds, and bandwidth up to 44GBps, making them ideal for mixed workloads and demanding applications such as analytics and high performance computing (HPC).

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

- NVMe over Fabrics support providing lowest latency and investment protection
- Fibre Channel, iSCSI and InfiniBand support for enhanced interoperability with your existing infrastructure
- Redundant components with automated failover
- Advanced monitoring and diagnostics with proactive repair
- Intuitive storage management with comprehensive tuning functions
- Full-function SANtricity® Web Services embedded REST API

## Key Benefits

### Performance

- Modular and flexible configuration options to support demanding performance and cost requirements
- Industry-leading IOPS and ultra-low latency to maximize application responsiveness
- NVMe delivers 2X the performance of SAS-based all-flash arrays
- Support for multiple high-speed host interfaces in 2U form factor

### Value

- Industry-leading price/performance for both IOPS and bandwidth
- NVMe over Fabrics and SCSI options provide investment protection to meet future demands without forklift upgrades

### Simplicity

- Simple, flexible, online administration
- Browser-based on-box GUI with guided configuration and recovery guru
- SQL Server setup in under 6 minutes
- Embedded REST APIs for easy integration
- Worry-free reliability with over 1 million installations

- SANtricity Snapshot technology, volume copy, remote and asynchronous mirroring for data protection, and Dynamic Disk Pools (DDPs)
- SANtricity® data assurance (T10 PI) for data integrity and protection against silent data corruption

Combined, these capabilities offer the best price/performance, configuration flexibility, and simplicity in a compact package to help you make actionable decisions faster and more securely. The EF-Series helps you protect your storage investment with systems that grow with your business.

### **Powerful and Affordable Performance**

The EF600 and EF570 all-flash arrays are designed specifically for workloads that demand the highest levels of performance. The EF300 and EF280 arrays are designed for mixed workload environments such as big data analytics and databases. The NVMe all-flash arrays deliver double the performance of SAS all-flash arrays, and you can 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 Hadoop, reducing time to actionable data.
- Significantly improve the overall efficiency of your IT operations while meeting performance requirements.
- Rapidly unlock the value of your data to create key insights with all-flash NVMe systems.
- Accelerate databases, real-time analytics, and high-performance computing (HPC) applications at scale with any of the many enterprise file systems we are integrated with, including BeeGFS.

### **Enterprise Value**

The EF-Series offers industry-leading price/performance in an enterprise-grade system. With support for up to 367TB of flash capacity in a single modular 2U building block, the EF-Series allows you to easily meet ever-changing business requirements. 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 management complexity.

The EF-Series runs on the enterprise-proven SANtricity OS software platform. Optimized for flash, SANtricity software allows 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, allowing administrators to make informed decisions about configuration adjustments to further refine performance. For additional performance analysis, solutions for Splunk Enterprise and Grafana are available.

### **High Availability and Enterprise Reliability**

The 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 EF-Series to achieve greater than 99.9999% availability with data integrity and security.

**“By having the flash platform available we’re able to facilitate these critical enterprise apps that are high I/O and generate market insight. Then we can give that information back to the business so they can make informed decisions.”**

– Nick Vine, Hosting and Security Manager, Mirvac

The EF-Series is designed to have no single point of failure through 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) ensures data integrity and protects against silent data corruption. Storage administrators can make configuration changes and conduct maintenance without disrupting application I/O.

One of the most critical aspects of an enterprise solution is the ability to detect and resolve issues. EF-Series helps achieve this through a number of capabilities:

- Extensive capture of diagnostic data that provides comprehensive fault isolation and simplifies analysis of unanticipated events.
- Intelligent management of SSDs to offer wear life reporting and proactive warnings.
- Integrated Recovery Guru diagnoses problems and provides the applicable procedure to use for recovery.
- NetApp DDP and RAID 6 allow drive rebuilds to continue even when an unreadable sector or second failure is encountered.
- NetApp Active IQ® provides proactive dispatch and maintenance.

**“The EF-Series could handle 10 times the number of concurrent users in 95% less processing time, even while playing large video files.”**

– Bill Kernan, CIO, Western Oregon University

### **Advanced Data Protection**

SANtricity DDP 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 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, and expand storage capacity without disrupting I/O to attached hosts.

SANtricity software online capabilities include:

- Dynamic capacity and volume expansion allow administrators to increase the capacity of an existing DDP, volume group, or volume.
- Dynamic segment size migration allows 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) are nondisruptive, with no interruption to data access.

### **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 is 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 EF-Series is protected with role-based access control and LDAP/Active Directory integration.

### **DevOps Ready**

To enable the automation and agility that are needed in the DevOps-based IT revolution, the EF-Series natively supports a full-function RESTful Web Services API. NetApp is a long-time contributor to the Ansible open-source IT orchestration project. Ansible modules and roles are available for policy-based orchestration and automated configuration management of the EF-Series.

### **Validated Solution Reference Designs**

With tested solution designs for Oracle databases, Microsoft SQL Server, HPC with BeeGFS, and real-time analytics, you can be confident that your critical business applications built on EF-Series systems will continue to work flawlessly so that you can focus on growing your business instead of worrying about your data infrastructure.

### **ASHRAE Compliance**

EF-Series meets 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.

### **About NetApp**

In a world full of generalists, NetApp is a specialist. We're focused on one thing, helping your business get the most out of your data. NetApp brings the enterprise-grade data services you rely on into the cloud, and the simple flexibility of cloud into the data center. Our industry-leading solutions work across diverse customer environments and the world's biggest public clouds.

As a cloud-led, data-centric software company, only NetApp can help build your unique data fabric, simplify and connect your cloud, and securely deliver the right data, services and applications to the right people—anytime, anywhere.

**Table 1) EF-Series Technical Specifications.**

	NVMe Flash			SAS Flash
	EF600	EF300	EF570	EF280
<b>Maximum Raw Capacity</b>	367TB	367TB	1.8PB	1.5PB
<b>Maximum drives<sup>1</sup></b>	24 SSD	24 SSD	120 SSD (expansion)	96 SSD (expansion)
<b>Maximum IOPS<sup>2</sup></b>	2,000,000 IOPS	670,000 IOPS	1,000,000 IOPS	300,000 IOPS
<b>Maximum Read Bandwidth<sup>2</sup></b>	44GBps	20GBps	21GBps	10GBps
<b>Maximum Write Bandwidth<sup>2</sup></b>	13GBps	7GBps	9GBps	4GBps
<b>I/O Interface options</b>	200Gb NVMe/IB, NVMe/RoCE 200Gb iSER/IB 100Gb NVMe/IB, NVMe/RoCE 100Gb iSER/IB, SRP/IB 32 Gb NVMe/FC 32Gb FC 25Gb iSCSI	100Gb NVMe/IB, NVMe/RoCE 100Gb iSER/IB, SRP/IB 32 Gb NVMe/FC 32Gb FC 25Gb iSCSI	100Gb NVMe/IB, NVMe/RoCE 100Gb iSER/IB, SRP/IB 32Gb/16Gb FC 25Gb/10Gb iSCSI 12Gb SAS	32Gb/16Gb FC 12Gb SAS 25Gb/10Gb iSCSI
<b>High-Availability Features</b>	Dual active controller with automated I/O path failover Auto load balancing and path connectivity monitoring Dynamic Disk Pools technology and traditional RAID levels Redundant, hot-swappable storage controllers, disks, PSUs, fans Automatic rebuild after a drive failure Mirrored data cache with battery-backed destage to flash Proactive drive health monitoring Online software/firmware upgrades and maintenance 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)			
<b>Security Features</b>	RBAC with audit log LDAP/LDAPS for user authentication Digital certificate management MFA supported via SAML 2.0 Internal key management supported with SED or FIPS drives External key management (KMIP-compliant) supported with SED or FIPS TLS 1.2 minimum for all management communication			
<b>Optional Features</b>	SANtricity Drive Encryption <sup>3</sup>			
<b>Included Software Features</b>	SANtricity volume copy SANtricity Snapshot <sup>®</sup> copy 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 Resource-provisioned volumes for smart NVMe SSD performance and endurance management		SANtricity volume copy SANtricity Snapshot <sup>®</sup> copy 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 Asynchronous remote mirroring (FC and iSCSI) Synchronous remote mirroring (FC)	

1. The base system can be configured with a minimum of 6 SSDs.

2. Peak system performance

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

