



NetApp®



## Datasheet

# NetApp E5400 Storage System

The performance-efficient midrange storage array for a variety of application-driven environments

### KEY BENEFITS

#### Performance Efficiency

The NetApp® E5400 brings together high bandwidth, IOPS performance, and leading density to create a storage system perfectly suited for midrange data-intensive solutions. Combine this with intelligent cache tiering using SSD Cache, and the result is optimal performance efficiency.

#### Modular Flexibility

Three distinct disk drive/controller shelves, multiple drive types, and a complete selection of interfaces allow custom configurations optimized to meet performance and capacity requirements. Use SSD drives for performance or hybrid arrays of both SSD and rotating drives for hybrid or tiered environments.

#### SANtricity Features to Enable Worry-Free Technology

With SANtricity® and innovative Dynamic Disk Pools (DDP), the E5400 greatly simplifies storage and data management, protection, and utilization while removing the complexity of configuring RAID groups and hot spares.

### The Challenge

Midrange environments require storage systems that can scale for the needs of the business. Organizations of all sizes must be productive, responsive, and competitive in today's unrelenting environments. While keeping service-level agreements and increasing data demands in mind, organizations are looking for a better way to improve operational efficiency, reduce their data center footprint, and maintain high availability, all while keeping it simple and within their limited budget.

### The Solution

The NetApp E5400 is a performance-efficient storage system that meets demanding performance and capacity requirements without sacrificing simplicity and efficiency. Designed to address a broad range of solution requirements, the E5400 is equally adept at supporting high-IOPS mixed workloads and databases, high-performance file systems, and bandwidth-intensive streaming applications. And its fully redundant I/O paths, advanced protection features, and extensive diagnostic capabilities deliver the highest levels of availability, integrity, and security.

Combine these E5400 high-availability features with SANtricity DDP and thin-provisioning technology, and the result

is a simple-to-deploy, simple-to-manage storage solution.

### Dynamic Disk Pools = Effortless Data Protection Configuration

Patent-pending DDP greatly simplifies traditional RAID management by distributing data parity information and spare capacity across a pool of drives, also enabling easier future capacity expansion and greater protection.

The number of drives in Dynamic Disk Pools is dynamic. This enables the dynamic rebalancing of data during changes in the number of drives, whether adding drives or in the case of drive failure. Unlike a traditional RAID volume group's rigid configuration with a specific number of drives, Dynamic Disk Pools can optimize from a minimum of 11 to the maximum supported by the E5400 system. By dynamically changing the number of physical drives in the pool, DDP improves data protection through dynamically rebalancing across the remaining (or additional) drives more quickly than traditional RAID while maintaining greater performance. This reduces exposure windows from days to minutes.

The four key tenets of DDP technology are:

- Elimination of complex RAID management

# Designed to address a broad range of solution requirements, the E5400 is equally adept at supporting high-IOPS mixed workloads and databases, high-performance file systems, and bandwidth-intensive streaming applications.

- No idle spares to manage
- No reconfiguring of RAID when expanding
- Significantly reduced performance impact following failure of a drive or drives when compared to traditional RAID

### **Thin Provisioning: Improve Storage Efficiency by Up to 33%**

Thin provisioning eliminates overprovisioning of storage by automatically allocating storage internally, only as it is actually used, while reporting full allocations to hosts, significantly lowering storage use and future storage purchases.

The result is reduced storage TCO (capex and opex) by reducing initial acquisition capacity and improving utilization.

The key tenets of thin provisioning are:

- No more guessing how much storage an application really needs
- Elimination of initial storage purchases based on inflated estimate usages
- Elimination of error-prone emergency out-of-space activities
- Significantly improved storage utilization rates, up to 33%
- Easy one-time single-click management at volume creation
- Autogrow to take care of usage expansion up to the maximum

### **Balanced Performance**

The E5400 storage system continues the NetApp E-Series longstanding heritage of balanced performance designed to support any workload. High-performance file systems and data-intensive bandwidth applications benefit from the E5400's ability to sustain high read and write throughput, while database-driven transactional applications benefit from its high IOPS and low latency. Regardless of the application workload, the E5400 is designed to support maximum performance efficiency.

### **SANtricity Remote Mirroring: Proven Data Replication and Disaster Recovery Protection**

With NetApp SANtricity Remote Mirroring, customers now have a proven and efficient disaster recovery schema for maintaining access to business-critical data in the event of site outages. Available for both FC and IP networks, SANtricity Remote Mirroring provides highly available data storage across campus, across the state, or around the world and simplifies the management of data replication to meet the application service levels of both virtual and traditional environments.

### **Modular Flexibility**

The E5400 offers multiple form factors and drive technology options to best meet requirements. The ultradense 60-drive disk shelf supports up to 240TB in just 4U and is perfect for environments with vast amounts of data and limited floor space. Its 24-drive shelf combines low power consumption and exceptional performance density with its cost-effective 2.5" drives. And the 12-drive shelf is a great fit for cost-conscious organizations that need to deploy both performance and capacity drives. All three shelves support E5400 controllers or can be used for expansion, enabling optimized configurations that best meet performance, capacity, or cost requirements.

### **Flexible Interface Options**

The E5400 supports a complete set of host or network interfaces designed for either direct server attach or network environments. With multiple ports per interface, the rich connectivity provides ample options and bandwidth for high throughput. The interfaces include SAS, iSCSI, FC, and InfiniBand to connect with and protect investments in storage networks.

### **Maximum Storage Density**

Today's storage must keep up with continuous growth and meet the most demanding capacity requirements. The

## E5400 TECHNICAL SPECIFICATIONS

All data in this table applies to dual-controller configurations.

	<b>E5460 (DE6600)</b>	<b>E5424 (DE5600)</b>	<b>E5412 (DE1600)</b>
Maximum raw capacity	240TB, w/expansion 1.54PB using 4TB drives	28.8TB, w/expansion 1.47PB using 1.2TB and 4TB drives	48TB w/expansion 1.54PB using 4TB drives
Form factor	4U/60 drives	2U/24 drives	2U/12 drives
Maximum disk drives* (maximum 384 drives or 16 total shelves)	360 w/60-drive shelves 384 with other expansion shelves 120 SSDs: 25 SSDs/60-drive shelf	384 drives 120 SSDs	192 w/12-drive shelves 384 with mixed shelves
Drive types supported	2/3/4TB NL-SAS 7.2k FDE and non-FDE 600/900GB, 1.2TB SAS 10k FDE and non-FDE 400GB, 800GB, 1.6TB SSD non-FDE 800GB SSD FDE	600/900GB, 1.2TB SAS 10k FDE and non-FDE 400GB, 800GB, 1.6TB SSD non-FDE 800GB SSD FDE	2/3/4TB NL-SAS 7.2k FDE and non-FDE
System ECC memory	12GB/24GB		
Base ports for host I/O	Eight 8Gb FC		
Additional ports for host I/O	Eight 16Gb FC Four 40Gb InfiniBand Four 10Gb iSCSI Eight 6Gb SAS		
Operating system	SANtricity 11.10		
High-availability features	Dual active controller with automated I/O path failover Supports Dynamic Disk Pools and traditional RAID levels 0, 1, 3, 5, 6, and 10 simultaneously Redundant, hot-swappable storage controllers, disk drives, power supplies, and cooling fans Dynamic Disk Pools dynamic rebalancing for change in drive counts up or down Automatic RAID rebuild following a drive failure Mirrored data cache with battery backup and destage to flash SANtricity proactive drive health monitoring identifies problem drives before they create issues 99.999% availability (with appropriate configuration and service plans)		
Operating system support	Microsoft® Windows Server®, Red Hat Enterprise Linux®, Novell SUSE Linux Enterprise Server, VMware® ESX®, Oracle® Solaris, HP, HP-UX, Apple® Mac® OS®		
Software features	<b>Standard</b> SANtricity Remote Mirroring SANtricity Volume Copy SANtricity Snapshot™ Dynamic Disk Pools Dynamic volume expansion Dynamic capacity expansion Dynamic RAID-level migration Dynamic segment size migration Event monitoring Proactive drive health monitoring Nondisruptive firmware upgrades Media scan with autoparity check and correction SANtricity SSD Cache SANtricity Thin Provisioning Data Assurance (T10P1)	<b>Optional licensed software:</b> SANtricity Disk Encryption	
SANtricity 11.10 maximums	Hosts/partitions: 512 Volumes: 2,048 Snapshot copies: 2,048 Mirrors: 128		

\* All models are capable of reaching 384 disk drives when configured with intermixed drive shelves.

## E5400 TECHNICAL SPECIFICATIONS CONT'D

Dimensions and weight	E5460 system shelf DE6600 disk shelf		E5424 system shelf DE5600 disk shelf		E5412 system shelf DE1600 disk shelf	
	Typical	Maximum	Typical	Maximum	Typical	Maximum
Height	7.0" (17.78 cm)		3.47" (8.81 cm)		3.4" (8.64 cm)	
Width	19" (48.26 cm)		19" (48.26 cm)		19" (48.26 cm)	
Depth	32.5" (82.55 cm)		19.6" (49.78 cm)		21.75" (55.25 cm)	
Weight	232 lb (105.2 kg)		57.32 lb (26 kg)		59.52 lb (27 kg)	
	E5460 system shelf		E5424 system shelf		E5412 system shelf	
	Typical	Maximum	Typical	Maximum	Typical	Maximum
KVA	1.025	1.235	0.457	0.607	0.404	0.554
Watts	1015	1222	453	601	400	548
BTU	3463	4171	1545	2051	1364	1871
	DE6600 disk shelf		DE5600 disk shelf		DE1600 disk shelf	
	Typical	Maximum	Typical	Maximum	Typical	Maximum
KVA	0.782	0.992	0.225	0.375	0.172	0.322
Watts	774	982	223	371	170	318
BTU	2641	3350	761	1267	580	1086

E5400 is purpose-built for capacity-intensive environments requiring optimal space utilization and reduced power/cooling requirements. Its ultra-dense 60-drive 4U disk shelf provides industry-leading performance and space efficiency that reduce rack space by up to 60%. And its high-efficiency power supplies and intelligent design can lower power use up to 40% and cooling requirements by up to 39%.

### High Reliability

The E5400 storage system enables not only high-speed data access, but continuous access to the data as well. With over 20 years of storage development behind it, the E5400 is based on a field-proven architecture designed to provide high reliability and 99.999% availability with appropriate configurations and service plans. As part of the E-Series family, the E5400 is covered by NetApp AutoSupport™ for proactive maintenance.

Its redundant components, automated path failover, and online administration keep organizations productive. And

its advanced protection features and extensive diagnostic capabilities deliver high levels of data integrity, including Data Assurance (T10-PI) to protect against silent drive errors.

### Intuitive Management

NetApp SANtricity storage management software offers an appealing combination of robustness and ease of use. Storage administrators appreciate the extensive configuration flexibility, which allows optimal performance tuning and complete control over data placement. With its dynamic capabilities, SANtricity software supports on-the-fly expansion, reconfigurations, and maintenance without interrupting storage system I/O.

### Disk Encryption (Licensed)

SANtricity Full-Disk Encryption combines local key management with drive-level encryption for comprehensive security for data at rest that doesn't sacrifice performance or ease of use. 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.

### Intelligent Cache Tiering with SSD Cache

The SSD Cache feature provides intelligent caching capability to identify the subset of the data that is active and caches that data on higher performance, lower latency SSDs. This caching approach works in real-time, always-on data-driven fashion. Users are not required to set up complicated policies to define the trigger for data movement between tiers. Simply set it and forget it. SSD Cache accelerates data access through the caching use of SSDs located in the drive shelves and is expandable up to 5TB per storage system.

### About NetApp

NetApp creates innovative storage and data management solutions that deliver outstanding cost efficiency and accelerate business breakthroughs. Discover our passion for helping companies around the world go further, faster at [www.netapp.com](http://www.netapp.com).

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