Dell Storage SC9000 Array Controller

Turbocharge your data center with the ultimate in storage performance, efficiency and scalability

Hardware highlights

- Dell 13G server architecture
- Dual 3.2GHz eight-core Intel® processors
- 4x system memory[1], 12G SAS back-end
- 40% more IOPS, 110% more throughput[1]
- Modular hot-swap design
- Easy expansion, up to 100TB/U density
- SAN and/or NAS storage from same pool[2]
- Multiprotocol networks (FC, iSCSI, FCoE)
- 80 PLUS® Platinum-rated power efficiency

Software highlights

- Self-optimizing, virtualized architecture lowers costs, keeps performance high
- RAID tiering and auto-provisioning
- Built-in Live Volume auto-failover and auto-repair
- Multi-array federation, with proactive Volume Advisor
- Compression on SSD or HDD tiers
- 100% host-side data protection in Oracle, Microsoft and VMware environments
- Thin snapshots, replication, provisioning
- FIPS 140-2 encryption and compliance
- Data-in-place upgrades, zero downtime

World-class services

- Award-winning Copilot installation
- Proactive monitoring and support

Optimizing the core of business

Dell's flagship storage controller provides the ideal solution for large-scale systems, high-end workload performance and distributed enterprise environments. Whether you're building a private or hybrid cloud, a big data analytics center or a secure OLTP platform, SC9000 gives you quick, strong return on investment by optimizing, accelerating and protecting the data that's most important to your business goals.

SC9000 builds on the success of the popular SC8000 Series arrays with a fully upgraded, more scalable hardware platform powered by the robust new SCOS 6.7 operating system.

Massively expandable: scale up and out

With non-disruptive, modular expansion to over 3PB raw SAN and/or NAS capacity per array[2], SC9000 can also be linked to other SC Series arrays in larger federated systems under unified management.[3]

Volume movement between arrays is transparent to hosts and does not impact data protection. Volume Advisor proactively monitors clustered arrays for the best data placement based on customizable performance and capacity policies.

Flash and hybrid performance powerhouse

All-flash and hybrid SSD/HDD configurations revolutionize the speed and impact of your mission-critical applications. The ability to combine write- and read-intensive SSDs within the same volume, plus add an ultra-dense HDD tier at any time, gives SC9000 flexibility to target any mixed-workload performance requirement. You can easily evolve from one configuration to another without having to replace drives.

New 12G SAS back-end and enterprise-class front-end network connections provide plenty of throughput headroom for growth, making the advantages of SSD storage practical at any scale. And for additional application acceleration, SC9000 is integrated with Dell's Fluid Cache for SAN solution.[4]

Automated cost-savings and efficiency

Yet even as it cranks up performance, SC9000's intelligent architecture constantly tunes your environment for economy. Patented Data Progression auto-tiering leverages diverse drive types (SLC, MLC, TLC, HDD), using each to its best advantage while optimizing data placement according to actual use. RAID levels are dynamically provisioned, adjusting and rebalancing automatically to help you achieve your most aggressive application objectives with the fewest drives possible.

Thin everything

All volumes are thin provisioned by default — and unlike other solutions, there is no accompanying performance penalty or feature loss. "Thin" methods are fundamental to many key SC Series architectural advantages, including compression (now available on both all-flash and HDD arrays), thin replication, thin snapshots, thin writes and thin clones. Depending on the application, SC Series customers can experience up to a 93% reduction in the amount of capacity they are required to purchase.[5]

Always available storage

Designed for today's non-stop business environments, SC Series' innovative Live Volume feature now offers seamless disaster recovery with transparent auto-failover to synchronized standby volumes on another array. Workloads continue to run during unplanned outages, with zero downtime or administrative intervention.[6]

Better still, when a failed array comes back online, the high-availability environment is efficiently and automatically restored. And the entire solution is native to the array itself — no additional virtualization hardware or software is needed.

Ironclad security

SC9000 protects data from theft, loss or unauthorized access with optional self-encrypting drives (SED), providing failsafe data-at-rest encryption without impacting performance or other advanced capabilities. Dell encryption is FIPS 140-2 certified to meet the most stringent requirements for government data centers, and is also ideal for healthcare, finance or any business with significant intellectual property.

Available in SSD and HDD formats, Dell SEDs automatically lock on power down or removal from the array. Unlike other solutions, SC Series SEDs may be deployed securely in all or just a portion of the array, allowing incremental phase-in of encryption technology in your environment. Leading industry standard external key management services are supported.

Modular, enterprise-grade platform

Redundant, hot-swappable components make SC9000 a resilient, flexible and easy-to-deploy solution. The 2U controller unit functions in active/active pairs for maximum performance and availability. Adding capacity is simple, with five supported expansion enclosure options — including two new models with 12G SAS interconnect.

Each SC9000 controller includes 6 dedicated I/O slots (12 per array) for high-bandwidth expansion and connectivity to Fibre Channel, iSCSI and FCoE SANs, and can simultaneously support file storage via the optional FS8600 NAS appliance.

Third-party integrations

As a premiere global solutions provider with a huge install base, Dell has the industry touch-points to ensure support for the applications you need. New Application Protection Manager Suite, for example, provides application-consistent snapshots in Oracle, VMware and Microsoft environments. Microsoft® Azure Site Recovery support enables VM failover between two private clouds, and VMware Metro Stretch Cluster support helps VMs "follow the storage" in the event of an array or site failure.

Numerous VMware® integrations, including a vSphere® plug-in, vCenter™ and VAAI support help you manage storage and virtual machines together – and the Microsoft Windows® PowerShell command set streamlines system management with an intuitive scripting interface. See the SC Series Management spec sheet for more certified, validated platforms.

Investment protection

SC9000 customers can proceed with confidence, knowing they are deploying a truly future-ready solution.

- **SC Series tiering architecture** – Designed to incorporate new technologies faster and with less disruption.
- **Lifetime warranty on flash drives** – Full coverage while the array is under a support agreement, regardless of wear or maximum life rating.
- **No forklift hardware upgrades** – Fully modular architecture, including data-in-place upgrades from SC8000.
- **Simplified, evergreen software licenses** – Never pay twice for the same advanced features.
- **Award-winning Copilot installation and support** – Ensure your deployment goes right the first time, with ongoing proactive services to resolve most issues before they become a problem.

SC9000 technical specifications

Controller platform	
Processors	Dual 3.2GHz 8-core Intel® Xeon® processors per controller
Controllers per array	2 (active/active)
Operating system	Dell Storage Center 6.7 or greater
Max system memory	256GB per controller (512GB total per array)[3]
Expansion capacity	
Min/max drives	6/960 per array, more in federated systems[3]
Max raw capacity (SAN)	3PB per array (SSD or HDD), more in federated systems[3]
Max raw capacity (NAS)	• 3PB per array with optional FS8600 • 4PB in single name space (with FS8600 and multiple SC9000 arrays)
Storage media	SAS and NL-SAS drives; different drive types, transfer rates and rotational speeds can be mixed in same system • SSDs: write-intensive, read-intensive (SLC, MLC and TLC formats) • HDDs: 15K, 10K, 7.2K RPM
Expansion enclosures	Mix and match from the following options • SC420 (24 2.5" drive slots, 12Gb SAS) • SC400 (12 3.5" drive slots, 12Gb SAS) • SC280 (24 2.5" drive slots, 6Gb SAS) • SC220 (24 2.5" drive slots, 6Gb SAS) • SC200 (12 3.5" drive slots, 6Gb SAS)
Network and expansion I/O	
PCIe Gen 3 slots	7 per controller • 4 full-height (cache card consumes one) • 3 low-profile Any slot may be used for either front-end network or back-end expansion capacity connections
Front-end network protocols	FC, iSCSI, FCoE (supports simultaneous multiprotocol)
Max 16Gb FC ports	20 per array (SFP+)
Max 8Gb/4Gb FC ports	40 per array (SFP+)
Max 10Gb iSCSI ports	20 per array (SFP+ optical or copper card, BASE-T)
Max 1Gb iSCSI ports	20 per array (BASE-T)
Max 10Gb FCoE ports	12 per array (SFP+ optical or copper card, BASE-T)
Back-end expansion protocols	12Gb SAS (auto-negotiates to 6Gb)
Max back-end expansion ports	40 per array
Functional	
Array configurations	All-flash, hybrid or HDD arrays
Storage format	Block (SAN) and/or file (NAS) from same pool[2]

Data optimization	
Auto-tiering method	Policy-based migration based on real-time data usage, customizable 512KB-4MB page size
Auto-tiering structure	Up to 3 primary (media-based) tiers total, up to 2 SSD tiers (write- and read-intensive SSDs)
Tiering customizations	Default and user-defined profiles, option to "pin" volumes to any tier
RAID support	RAID 0, 1, 5, 6, RAID 10, and RAID 10 DM (dual mirror); any combination of RAID levels can exist on a single array
RAID tiering	Auto-provisions and dynamically restripes multiple RAID levels on the same tier; no need to pre-allocate RAID groups
Server-side cache	Supports application acceleration via Dell Fluid Cache for SAN integration[6], including unified management and snapshot protection for cache data
Thin provisioning	Active by default on all volumes, operates at full performance across all features
Compression	Selectable option per volume on lowest tier (SSD or HDD)
HDD optimization	FastTrack moves frequently accessed data to outer tracks for quicker response times
Data mobility and migration	
Replication	• Synchronous/Asynchronous via FC or iSCSI • Target/source relationships may be one-to-many or many-to-one • Supports all SC data services on source and target volumes • Change replication types and topologies on demand
Volume mobility	• Host-transparent migration between arrays via Live Volume • Maintains snapshots/replication relationships
Thin import	• Space-efficient, non-disruptive data migration from PS Series (EqualLogic™) arrays
Thin clones	• Clone standalone volumes with zero duplication of data • Clones maintain independent snapshots and replication • Ideal for VDI, test/dev, other applications that require discrete instances of common data • More efficient than dedupe for database copies
Data protection, disaster recovery, security	
Business continuity	• Live Volume bi-directional auto-failover, auto-repair • Continuous operations, disaster recovery, disaster avoidance • Includes third-site (tertiary) replication options • Zero RTO/RPO with customizable site failover SLAs per volume • Does not require identical hardware at each site • VMware Metro Stretch Cluster support • Microsoft Azure Site Recovery support
Thin snapshots	• Records changes only, snapshots auto-migrate to lower-cost storage
Application data protection	• Application Protection Manager Suite restores host-side data from array in Oracle, Microsoft or VMware environments
Data-at-rest encryption	• Self-encrypting drives (SED) in SSD or HDD formats • Full-disk encryption (FDE) based on AES-256 • Drives certified to FIPS 140-2 Level 2 • Key Management Server options available for FIPS 140-2 Level 1, 2 and 3
External key manager support	• Gemalto's SafeNet KeySecure k460, SafeNet KeySecure k250, SafeNet KeySecure k150v • Thales EMS 200

Management	
Management interface	Enterprise Manager (multi-array, multi-site)
Federation	Create large multi-array systems under unified management, with seamless workload migration between arrays. Add arrays non-disruptively, efficiently utilizing their combined capacity and performance. Volume Advisor monitors federated arrays to suggest optimal data placement and load balancing. Volume movement does not impact snapshots or replication data protection. Federate like or unlike arrays: SC9000, SC8000, SC4020, S40. See also Business continuity section.
Scripting support	SMI-S, Microsoft PowerShell API
Host OS support	Microsoft Windows Server®, Oracle® Solaris, HP®-UX, Oracle Linux, IBM® AIX®, Novell® NetWare®, SUSE® Enterprise Linux®, Apple®, HPTru64, VMware, Citrix® XenServer®, RedHat®
Third-party application integration	VMware, Oracle, Microsoft, IBM, OpenStack™, Symantec™, CommVault®, Foglight™ — see the SC Series Management spec sheet for details
Certifications	VMware Metro Stretch Clusters, VMware SRM, IBM VIOS Recognized
Reporting/Alerts	Support Assist (phone home), remote diagnostics and performance monitoring, automated alerts, reports and notifications, departmental chargeback
Physical	
Power supplies	Dual, redundant 1100W 80 PLUS® Platinum certified power supplies
Max power	425W
Inlet type	NEMA 5-15/CS22.2, n°42
Chassis	Height: 2U/87.3 mm (3.44 inch) Width: 482.4 mm (18.98 inch) with rack latches; 444 mm (17.08 inch) without rack latches Depth: 755.8 mm (29.75 inch) with bezel Weight: 19.73 kg (43.5 lb)
Rack support	ReadyRails™ II static rails for tool-less mounting in 4-post racks with square or unthreaded round holes or tooled mounting in 4-post threaded-hole racks
Environmental	Temperature Operating: 41º to 104ºF (5º to 40ºC) Non-operating: -40º to 149ºF (-40º to 65ºC) Humidity Operating: 10% to 80% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Services, warranties	
Services	Dell Copilot support with deployment and consulting services. Dell Copilot Optimize available for additional ongoing strategic counsel and guidance from a highly trained system analyst.
Diagnostics engine	Integrated Dell Remote Access Controller (iDRAC)
System sizing	Dell Performance Analysis Collection Kit (DPACK) tool
Drive warranty	All SSDs and HDDs are warrantied for full lifetime wear-out replacement with valid service agreement. SSD warranty covers all formats: SLC, MLC and TLC.

[1] Compared to previous SC8000 controller.

[2] NAS support requires optional Dell Storage FS8600 NAS appliance.

[3] Multiple SC9000 arrays may be deployed in federated configurations using the SC Series Live Volume feature. Transparent, non-disruptive volume movement among arrays is enabled, allowing the combined capacity and cache of the entire federated cluster to be seamlessly utilized for maximum performance and scalability in expanding data centers. For example, a cluster of eight SC9000 arrays can provide a total of 7,680 drives (up to 24PB raw capacity) with over 4TB of system memory.

[4] Dell Fluid Cache for SAN supports the SC9000 on Linux. Review the Dell Fluid Cache for SAN specification sheet for more information.

[5] Source: Dell internal testing, August, 2015. Best case results for Microsoft SQL application data. Customer results may vary depending on application and configuration.

[6] Requires optional Live Volume feature and 6.7-level firmware.

[7] Availability and terms of Dell Services vary by region. For more information, visit Dell.com/ServiceDescriptions.

End-to-end technology solutions

Reduce IT complexity, lower costs and eliminate inefficiencies by making IT and business solutions work harder for you. You can count on Dell for end-to-end solutions to maximize your performance and uptime. A proven leader in Servers, Storage and Networking, Dell Enterprise Solutions and Services deliver innovation at any scale. And if you're looking to preserve cash or increase operational efficiency, Dell Financial Services™ has a wide range of options to make technology acquisition easy and affordable. Contact your Dell Sales Representative for more information.

OEM-ready version available

From bezel to BIOS to packaging, your storage arrays can look and feel as if they were designed and built by you.[7] For more information, visit Dell.com/OEM.

Learn More at Dell.com/SCseries

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