



DELL EMC SC SERIES HYBRID STORAGE ARRAYS

Cost-effective, predictable performance for mixed-application environments.

Accelerate your workloads, automate your savings

SC Series Hybrid arrays take the guesswork out of storage economics with a modern architecture that optimizes your data center for cost-savings while delivering transformational SSD, HDD or tiered performance.

SC is an integrated portfolio of array models that work together to give companies of all sizes the technology advantage they need to compete in today's volatile markets. From affordable entry solutions offering the lowest effective \$/GB¹, to large arrays providing over 2 million maximum IOPS and 6PB raw capacity², SC has the power to take you from where you are now to where you want to go.

Highlights include:

- **Advanced auto-tiering** – Achieve IOPS goals with the least expensive mix of storage media, even as performance needs evolve. Data Progression and RAID tiering eliminate manual provisioning and help your storage adapt to the unique requirements of each workload.
- **Deduplication & Compression** – Dramatically reduces the raw capacity required to store your data
- **Multi-array Federation** – Gives you freedom to make fast changes without interrupting applications and users
- **World-class deployment & support options** – From intuitive customer-installable solutions, to expert onsite and remote professional services, SC Series has what it takes to ensure your installation goes right the first time.

Respond to changing requirements

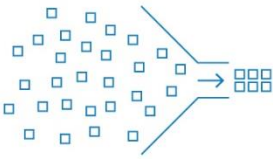
Self-optimizing SC arrays auto-tune your environment for day-to-day *and* long-term success, helping you stay agile in an unpredictable future. Based on real-time usage monitoring and application performance demands, patented SC Data Progression continually adjusts multiple drive tiers and RAID levels for maximum efficiency.

By default, all new data is written to the fastest Tier 1 drives at RAID 10 speeds, then converted to economical RAID 5/6 (on the same drives) for subsequent reads. As data ages, it's moved to less expensive storage until it becomes more active again. Data is precisely where it's needed, when it's needed – the perfect combination of high IOPs and cost savings.



0-100% Flash architecture

Target specific price/ performance ratios with any mix of SSDs and HDDs – then modify the mix as your needs change. Add more flash to boost performance, or “cheap and deep” spinning disk as cold data volumes grow. Hot data will always be written to your fastest drives at the fastest RAID levels.



Intelligent Data Reduction

SC Series Deduplication and Compression are applied dynamically at a sub-LUN level to reduce capacity needs while cranking up performance throughout the data lifecycle. Never stuck in a single mode for any given data set, SC data reduction works with Data Progression to consistently drive down expenditures on SSDs, HDDs or both.



Easy Multi-Array Systems




When you’re ready, the innovative SCOS (SC Operating System) software makes multi-array expansion and management a breeze, automating time-consuming, error-prone tasks such as server/LUN mapping. Rebalance or consolidate workloads with minimal effort – and zero interruption to services.

FEDERATE the combined performance and capacity of up to 10 arrays

Thanks to a built-in “storage hypervisor” capability, multiple heterogeneous SC Series models can be grouped in federated clusters under unified management. Need to move a volume to another array? Included Live Migrate makes it click-simple, keeping workloads online and preserving snapshot and replication relationships throughout the move. Volume Advisor offers ongoing load balancing guidance, suggesting the best initial data locations, then alerting you with optimization recommendations over time.

Always available storage

SC Series Live Volume also keeps workloads running during *unexpected* outages and disasters with non-disruptive auto-failover between synchronized volumes on local and remote arrays. This service guards vital business operations 24/7, helps you achieve “Zero RTO/RPO” goals,³ and even auto-repairs your high-availability environment when a downed array comes back online.

SC Series gives you freedom to create AND react to change		
<p>Online Data Migration</p>  <p>Live Migrate</p>	<p>Easy Load Balancing</p>  <p>Volume Advisor</p>	<p>Seamless Disaster Recovery</p>  <p>Live Volume</p>

Rich feature set protects your investment

Despite remarkably low entry and lifecycle costs, SC Series offers a comprehensive range of advanced features and integrations to ensure your array continues to add value, even as the business grows and matures.

- **Powerful native management tools** – New Unisphere HTML5 Web UI lets you configure SC quickly with no software installation required. Just point your browser from any mobile device to accomplish most day-to-day tasks. Popular DSM (Dell Storage Manager) client application is still available for advanced management.
- **CloudIQ** – Free cloud-based SaaS (Software as a Service) suite provides predictive analytics, categorized alerts, remediation recommendations and a convenient dashboard to monitor the health of your SC environment.
- **Dynamic Capacity** – Pervasive “thin methods” allocate capacity exclusively on demand.
- **Thin snapshots** – Records changes only, preserved automatically when you move data within a federation.
- **Thin clones** – Create virtually unlimited volume copies for VDI or Test/Dev, without consuming additional space.
- **Replication** – Sync/async, single-hop, multi-hop (chained), 1-to-many mixed topology, deduped for efficiency.
- **Multi-protocol network support** – Flexible FC and iSCSI connections, up to 33,000 MB/s bandwidth per array.⁴
- **SAN and NAS support** – Block and file from same storage pool via optional FS8600 NAS appliance.
- **Native application recovery tools** – Replay Manager ensures reliable application consistent snapshots of Microsoft Volume Shadow Copy (VSS) enabled applications (Exchange, SQL Server and Hyper-V) and VMware virtual machines (VMs). Recover more quickly from farther back in time, with lower risk of human error.
- **Chargeback** – Simplifies budgeting by calculating storage costs for individual applications and departments.
- **Distributed sparing** – 500% faster rebuilds,⁵ eliminates need for dedicated spares, use all drives for I/O
- **Persistent software licensing** – Never pay twice for the same software, minimizes cost of upgrades
- **PS Series (EqualLogic™) integration** – Unified management and cross-platform replication lets you combine two array platforms in a single solution.
- **QoS (Quality of Service), Multi-VLAN tagging, SED Encryption, VVOLS, and more...**

Trusted, enterprise-class solution

And of course SC Series is backed by the #1 market leader in flash, and the #1 leader in storage overall.⁶ Dell EMC products are ubiquitous in data centers around the world -- and *you* get the benefit of all that technology and business expertise!

- **World-class services options** – Choose from a range of comprehensive deployment and support options, including ProSupport, ProDeploy, and new Optimize Services.⁷ Our renowned team can reduce deployment costs, accelerate time to completion, and even monitor your environment to fix problems before they occur.
- **Dell EMC hardware/software support** – SC Hybrid arrays support popular Dell EMC products including PowerPath, ViPR, VPLEX, AppSync, RecoverPoint, Connectrix, Data Domain and more.
- **Broad 3rd-party integration** – Dell EMC has deep relationships with the ecosystem and application leaders that matter to you. VMware, Microsoft, Oracle, OpenStack, IBM, CommVault, VERITAS, Foglight and more.

Dell EMC Future-Proof Storage Loyalty Program

Get an extra level of investment protection with Dell EMC's 4:1 Efficiency, 3-year Satisfaction, "Never Worry" Data Migration, Hardware Investment Protection and All-Inclusive Software offers. The Future-Proof Storage Loyalty Program offers an unmatched set of assurances that your SC Series array will provide lasting value for the lifetime of your applications. Unlike our competitors' programs, this offer is available at no additional cost – either in terms of higher product price or higher maintenance price. Visit DellEMC.com/FutureProof for details.⁸



SC Series array options

The diversified SC portfolio lets you choose performance and capacity to fit your needs today. Since all SC models are supported by the same great OS and management tools, you'll never have to worry about hitting a dead end. Seamless federation and replication among SC models give you multiple ways to evolve beyond the limits of a single array.

Each SC features active/active dual-controller design (2X the bandwidth and CPU performance of active/standby systems), with modern Intel Xeon processors and generous on-board memory. Multi-protocol host/network I/O options (FC, iSCSI, FCoE, SAS) include new 100Gb and 25Gb iSCSI support on SC9000, SC7020 and SC5020 arrays.⁹



SC9000

- 2U controller-only unit (deploy in pairs)
- 1024 drive max expansion
- 6PB raw capacity per array
- Up to 2M max IOPS²



SC7020

- Expandable all-in-one unit
- (30) 2.5" internal drive bays, 3U
- 606 drives, 4PB raw max expansion
- Up to 1.2M max IOPS²



SC5020

- Expandable all-in-one unit
- (30) 2.5" drive bays, 3U
- 222 drives, 2.16PB max expansion
- Up to 1M max IOPS²



SCv3000 Series

- Expandable all-in-one unit
- SCv3020: (30) 2.5" drive bays, 3U
- SCv3000: (16) 3.5" drive bays, 3U
- 222 drives, 1PB raw max per array
- Up to 665,000 max IOPS²

Expansion options

Growing a single array up to its max capacity is simple and non-disruptive, using modular SC Series expansion enclosures. Mix-and-match from multiple formats, including ultra-dense. Both the base arrays and the enclosures support a variety of SSD and HDDs types. See below for expansion options for each array, and separate SC Series Expansion Enclosure Spec Sheet for detailed specifications.

Specifications

SC Hybrid	SCv3000 Series	SC5020	SC7020	SC9000
Chassis Overview				
Rack size	3U	3U	3U	2U
Format	All-in-one unit (dual controllers, internal drive bays, network I/O) Additional capacity via optional expansion enclosures			Controller unit (includes network I/O, no internal drive capacity)
Internal storage capacity	30 x 2.5" drive bays			SCv3000: 16 x 3.5" bays SCv3020: 30 x 2.5" bays
Controllers	Dual hot-swappable per chassis (active/active)			Single controller per chassis, deploy in active/active pairs
Processors	1 per controller Intel® Xeon® E5-2603v4, 1.7GHz, 6 cores	1 per controller Intel® Xeon® E5-2630v3, 2.4GHz, 8 cores	2 per controller Intel® Xeon® E5-2628v3 2.5GHz, 8 cores	2 per controller Intel® Xeon® E5- 2667v3, 3.2GHz, 8 cores
System memory		64GB per controller 128GB per array	128GB per controller 256GB per array	256GB per controller 512GB per array*
Operating system	SCOS 7.2 or higher	SCOS 7.2 or higher	SCOS 7.1 or higher	SCOS 6.7 or higher
Expansion Capacity				
Max raw capacity	1PB	2.16PB	4PB	6PB
Maximum drive count	22	222	606	1024
Supported expansion enclosures	<u>12Gb SAS</u> SCv300: 12 x 3.5" bays SCv320: 24 x 2.5" bays SCv360: 60 x 3.5" bays	<u>12Gb SAS</u> SC400: 12 x 3.5" bays SC420: 24 x 2.5" bays SC460: 60 x 3.5" bays	<u>12Gb SAS</u> SC400: 12 x 3.5" bays SC420: 24 x 2.5" bays SC460: 60 x 3.5" bays <u>6Gb SAS</u> SC200: 12 x 3.5" bays SC220: 24 x 2.5" bays SC280: 84 x 3.5" bays	<u>12Gb SAS</u> SC400: 12 x 3.5" bays SC420: 24 x 2.5" bays SC460: 60 x 3.5" bays <u>6Gb SAS</u> SC200: 12 x 3.5" bays SC220: 24 x 2.5" bays SC280: 84 x 3.5" bays
Storage media support	SAS, NL-SAS (different drive types, transfer rates and rotational speeds can be mixed in same system) SSD: Write-intensive and read-intensive drives HDD: 15K, 10K, 7.2K RPM			
Network and Expansion I/O				
Front-end-network protocols	FC, iSCSI (supports simultaneous multiprotocol)			
Max 32Gb FC ports	NA	8 per array (SFP+)	24 per array (SFP+)	28 per array (SFP+)
Max 16Gb FC ports	8 per array (SFP+)	8 per array (SFP+)	24 per array (SFP+)	40 per array (SFP+)
Max 100Gb iSCSI ports ⁹	NA	8 per array (QSFP28)	16 per array (QSFP28)	8 per array (QSFP28)
Max 25Gb iSCSI ports ⁹	NA	8 per array (SFP28)	16 per array (SFP28)	20 per array (SFP28)
Max 10Gb iSCSI ports	16 per array (SFP+ or BASE-T)	16 per array (SFP+ or BASE-T)	32 per array (SFP+ or BASE-T)	32 per array (SFP+ or BASE-T)
Max 12Gb SAS (front-end)	8 per array	8 per array	NA	NA
Management ports	2 per array (1Gb BASE-T)			

SC Hybrid	SCv3000 Series	SC5020	SC7020	SC9000
Back-end expansion protocols	12Gb SAS		12Gb SAS (also supports 6Gb expansion)	
Max back-end expansion ports	8	8	24	40
Functional & Performance				
Array configurations	All-flash, all-HDD, or hybrid mix			
Storage format	Native block (SAN), file (NAS) from same pool with optional FS8600			
Max SAN hosts	250	500	500	500
Max initiator ports	500	1000	1000	1000
Max LUN size	500TB	500TB	500TB	500TB
Max number of LUNs	1000	2000	2000	2000
Max number of snapshots	4096	8192	16,384	32,000
Max IOPS ²	665,000	1,025,000	1,200,000	2,220,000
Max IOPS ² (with latency <1ms)	540,000	818,000	1,050,000	2,085,000
Max IOPS ¹⁰ (80% reads, 20% writes)	231,000	330,000	346,000	502,000
Max throughput (reads) ¹¹	19,000 MB/s	19,000 MB/s	29,000 MB/s	33,000 MB/s
Max throughput (writes) ¹²	9,500 MB/s	9,500 MB/s	14,000 MB/s	19,000 MB/s
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)			
RAID tiering	Auto-provisions and dynamically restripes multiple RAID levels on the same tier; eliminates need to pre-allocate RAID groups			
Tiering customizations	User-defined profiles, option to "pin" volumes to any tier or RAID level			
RAID support	RAID 0, 1, 5, 6, RAID 10, and RAID 10 DM (Dual Mirror); any combination of RAID levels can exist in single array			
Thin provisioning	Active by default on all volumes, operates at full performance across all features			
Thin snapshots	Records changes only, snapshots auto-migrate to lower-cost storage			
Intelligent deduplication and compression	Compression only, selectable option per volume	Selectable option per volume "Deduplication + compression" mode "Compression-only" mode		

SC Hybrid	SCv3000 Series	SC5020	SC7020	SC9000
Data Mobility and Migration				
Replication	Heterogeneous arrays (SC Series any-to-any) 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 Supports cross-platform replication with PS Series/EqualLogic arrays (either direction)			
Volume mobility	Live Migrate (included in base product) enables host-transparent data movement among arrays; see also Federation section			
Federated multi-array systems	Live Migrate (included in base product) enables host-transparent movement of volumes among arrays Snapshots maintained/preserved during migration ¹⁴			
Thin Import	Space-efficient, non-disruptive data migration from PS Series (EqualLogic) and MD3 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 ³ Heterogeneous arrays (SC Series any-to-any, except SCv2000) Continuous operations, disaster recovery, disaster avoidance Includes third-site (tertiary) replication options with Live Volume Managed Replication Zero RTO/RPO with customizable site failover SLAs per volume VMware Metro Stretch Cluster, VMware Site Recovery Manager support			
Thin snapshots	Records changes only, snapshots auto-migrate to lower-cost storage			
Replay Manager	Application-consistent snapshots in Microsoft, VMware, Oracle environments			
Data-at-rest encryption	Supports self-encrypting drives (SEDs) Full Disk Encryption (FCE) based on AES-256 Drives certified to FIPS 140-2 Level 2 Key Management Server (KMS) 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	<u>Browser-based (HTML 5)</u> <ul style="list-style-type: none"> • CloudIQ (cloud-based storage monitoring and analytics) • Unisphere for SC (single-array element manager, no software installation required) • Unisphere Central for SC (multi-array management) <u>Client application</u> <ul style="list-style-type: none"> • Dell Storage Manager – Advanced multi-array, multi-site and cross-platform (PS Series) management 			
Federation	Create large multi-array systems under unified management, with seamless workload migration between arrays via included Live Migrate feature. 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, all SC models supported. ¹⁴			
Scripting support	Microsoft PowerShell API RESTful API			

SC Hybrid	SCv3000 Series	SC5020	SC7020	SC9000
Host OS support	Microsoft® Windows Server®, Oracle® Solaris, HP®-UX, Oracle Linux, IBM® AIX®, Novell® NetWare, SLES, Apple, HPTru64, VMware®, Citrix® XenServer®, RedHat®			
Third-party application integration	VMware, Microsoft, IBM, OpenStack, Symantec, CommVault, Foglight, Docker			
Data-in-place upgrades	NA	Transfer drives from SC4020 head unit and any expansions enclosures directly to new SC5020 or SC7020 system. ¹⁴		NA
Coexistence with PS Series arrays	Replication in either direction Day-to-day management from a single interface Thin import: space-efficient, non-disruptive data migration from PS Series arrays			
Certifications	VMware vSphere Metro Storage Cluster, VMware SRM, Veritas Storage Foundations Suite, IBM VIOS Recognized, Oracle Validated Infrastructure (OVI); see Dell Storage Support Matrix for additional certifications and details			
Reporting/alerts	Support assist (phone home), remote diagnostics and performance monitoring, automated alerts, reports and notifications, departmental chargeback			
Workload management	QoS, VVOLs			
Physical				
Rack size	3U		2U (single controller only)	
Height	13.33 cm (5.25 inches)		8.73 cm (3.44 in)	
Width	44.5 cm (17.52 inches)		48.24 cm (18.98 in)	
Depth	78.5 cm (30.9 inches)		75.58 cm (29.75 in)	
Weight at max configuration	24.22 kg (53.4 lb)		19.73 kg (43.5 lb)	
Weight empty	15.15 kg (33.4 lb)		NA	
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			
Power				
Power/wattage	2 hot-swappable 1485W power supplies; 1485W maximum power		2 hot-swappable 1100 80 PLUS® Platinum-certified power supplies, 425W maximum power	
Heat dissipation	5,067 BTU/hr maximum		4,100 BTU/hr maximum	
Voltage	200-240 VAC		200-240 VAC	
Frequency	50/60 Hz		50/60 Hz	
Amperage	1485/1000 – 14A, 1485/240 – 6.2A		12A – 6.5A	
Environmental Operating Conditions				
Operating temperature	50 - 95°F (10 - 35°C)		41 - 104°F (-5 - 40°C)	
Non-operating temperature	-40 - 149°F (-40 - 65°C)		-40 - 149°F (-40 - 65°C)	
Operating humidity ranges (non-condensing)	10% to 80% with 29°C (84.2°F) maximum dew point			
Non-operating humidity (non-condensing)	5% to 95% with 33°C (91°F) maximum dew point			

SC Hybrid	SCv3000 Series	SC5020	SC7020	SC9000
Inlet type		NEMA 5-15/CS22.2, n°42		
Services, Warranties⁷				
Services	Dell ProSupport with deployment and consulting services. Optional ProSupport Plus is available offering proactive and preventative services to improve performance and stability. Dell Optimize is 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 EMC Live Optics			
Drive warranty	All SSDs are warranted for full lifetime wear-out replacement with valid service agreement. SSD warranty covers all formats: SLC, MLC and TLC			

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.¹⁵ For more information, visit Dell.com/OEM.

Footnotes

1 – Net usable capacity of Dell array with 5 years of support, after 4:1 data reduction, vs. major competitors net of data reduction. Street price analysis is based on a variety of sources including analyst data, price sheets when available, and public information as of January 2017.

2 – Based on internal tests performed in February, 2018 on all-flash configurations. 100% sequential reads with 4K sector transfer size. Actual performance will vary based on configuration, usage and manufacturing variability. See Specifications section for additional Dell EMC performance test results.

3 – Requires optional Live Volume feature

4 – Based on internal tests in February 2018 on all-flash SC9000 configurations running 100% sequential reads. Tests covered 16Kb-2048Kb sector transfer sizes. Actual performance will vary based on model, configuration, usage and manufacturing variability.

5 – Based on internal tests performed by Dell EMC on SCv3000 array with and without distributed sparing mode active. Actual performance will vary based on configuration, usage and manufacturing variability.

6 – Ranking by vendor revenue. IDC Tracker, “Worldwide Quarterly Enterprise Storage Systems Tracker.” 1Q17.

7 – Availability and terms of Dell Services vary by region. Contact your Dell representative or Authorized Partner for details.

8 – Contact your Dell EMC representative or Authorized Partner for details regarding the Future-Proof Storage Loyalty Program. Terms and Conditions apply.

9 – Requires update to SCOS 7.3 for support. Subject to hardware availability (estimated Q218 for 25Gb, Q318 for 100Gb).

10 – Based on internal tests performed in February 2018 on all-flash configurations running OLTP type workloads with 80% reads, 20% writes and 4k sector transfer size. Actual performance will vary based on configuration, usage and manufacturing variability.

11 – Based on internal tests in February 2018 on all-flash configurations running 100% sequential reads. Tests covered 16Kb-2048Kb sector transfer sizes for SC9000, and 256Kb-2048Kb sizes for SCv3000, SC5020 and SC7020. Actual performance will vary based on model, configuration, usage and manufacturing variability.

12 – Based on internal tests in February 2018 on all-flash configurations running 100% sequential writes. Tests covered 64Kb-2048Kb sector transfer size for SC9000 and SC5020, 128Kb-2048Kb for SC7020, and 256Kb-2048Kb for SC7020. Actual performance will vary based on model, configuration, usage and manufacturing variability.

13 – Multiple SC Series arrays may be deployed in federated configurations using the Live Migrate feature included with firmware version 7.1 and above. 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 10 SC9000 arrays can provide a total of over 10,000 drives (up to 60PB raw capacity) with over 5TB of system memory.

14 – Available Q218 for SC5020, Q318 for SC7020. Professional Services assistance required, subject to system eligibility requirements. Contact your Dell EMC representative or Authorized Partner for details.

15 – OEM-ready available on certain models. See your Dell EMC representative for details.