

## S2A9900 StorageScaler™ System

Every day, S2A users are changing our world. These are leaders in research, design, computer modeling, government, entertainment and business whose environments all have one thing in common – they demand more from their storage.

Traditional system architectures inherently create bottlenecks & scalability problems, preventing the next leap forward.

Through relentless innovation, S2A turns long-standing disk system limitations into mere myths, enabling new possibilities for you to lead.



# Revolutionary Approach

Think outside the *traditional storage box*™ . . .

### Read and Write at the Same Speed

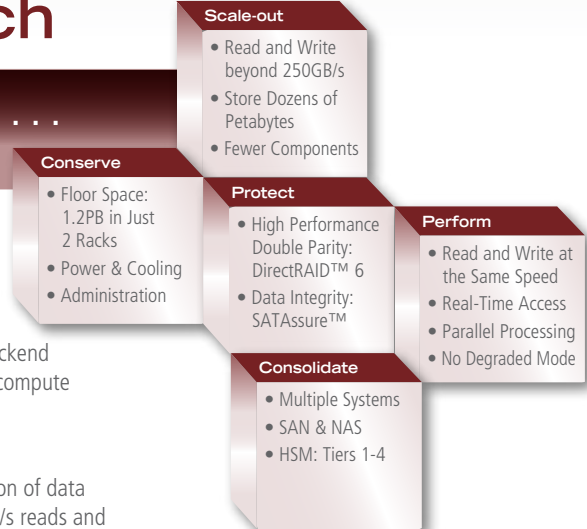
Revolutionary in its ability to read and write at the same speed, the traditional RAID 5 50% write performance penalty has been eliminated.

### Real-Time Quality of Service

Parallel processing, distributed cache, and the largest quantity of host-side and backend disk channels remove contention from the S2A. Deployed in the most demanding compute environments, S2A eliminates the storage bottleneck.

### RAID 6 – Without Compromise

The DirectRAID™ 6 engine delivers the virtues of rock-solid double-parity protection of data without any of the typical performance hits. Achieve full system bandwidth of 6GB/s reads and writes, while taking advantage of high performance SAS or large-capacity SATA drives without sacrificing data protection or performance in any way.



## Only S2A's revolutionary design breaks through common storage limitations.

**Traditional Storage Limitations**

- Slow Writes: 400-800MB/s
- Slow Reads: 1-1.5GB/s
- Low Density
- 200-500 Drive Limit per System
- Slow Performance from RAID 6
- Low Confidence in SATA
- Slow Access When Drives Fail
- Slow Performance During Rebuilds
- Vulnerable to Data Corruption

**S2A Advantages**

- Write at 6GB/s
- Read at 6GB/s
- 1.2PB in Just 2 Racks
- 1,200 Drives per System
- DirectRAID 6 with No Penalty
- High RAS Enterprise-Class SATA
- No Impact from Drive Errors/Failures
- No Degraded Mode
- SATAssure™ Finds & Corrects Corruption in Real-Time

Compare Approaches to Scale-out Capacity and Performance:

**Traditional Storage**

Additional Systems	Additional Components	Additional Requirements
	More Switches	More Power
	More RAID Controllers	More Cooling
	More Drive Enclosures	More Administration
	More Software	More Complexity

VS.

**S2A9900**

**Lower TCO. Store More, Manage Less Increase Speed, Reduce Systems**

- Minimize Floor Space
- Reduce Power & Cooling
- S2A SleepMode™
- Eliminate Multiple Systems & Components
- Tiers 1 & 2-n on a Single System
- Read & Write at 6GB/s
- Real-Time Access, No Latency
- Eliminate Degraded Mode

To Manage 1.2PB & 1,200 Drives . . . **4 Traditional Systems Required**  
 To Sustain 6GB/s Reads . . . **4 Traditional Systems Required**  
 To Sustain 6GB/s Writes . . . **8 Traditional Systems Required**

OR **1 S2A9900 StorageScaler System**

S2A Technology

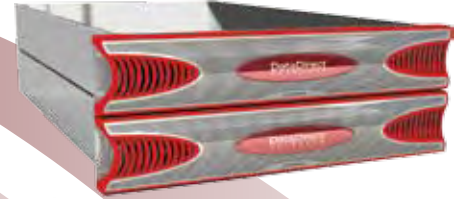
# The New Storage System Benchmark



## Performance

Read and write at 6GB/s.

Native Infiniband 4X DDR and Fibre Channel 8Gbps.

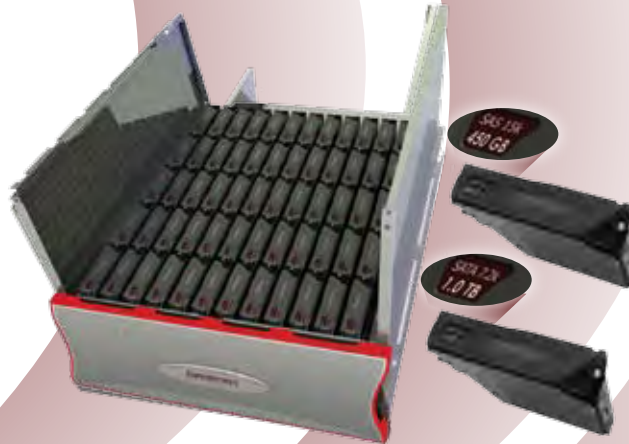


## Say Goodbye to Degraded Mode

S2A performance is always delivered at full speed, regardless of check, error, or failure conditions. Unlike traditional storage systems, you'll never suffer a decrease in performance or accessibility of your data.

## Capacity

- Single System: Up to 1.2 Petabytes
- Scales Beyond: Hundreds of Petabytes
- Intermix SAS & SATA in Same Enclosure
- Manage up to 1,200 Drives
- 1.2PB in Just Two Racks



## SAS and SATA Intermixing

Consolidate multiple tiers of storage within the same system, combining high performance SAS and economical SATA drives. Migrate between tiers utilizing internal system bandwidth without creating host latency or degrading system performance.

## Innovation

### Power Down and Save

S2A SleepMode allows drives to spin down after a user defined inactivity period to save additional power and cooling – especially beneficial with the S2A capacity allocated for archive use. S2A provides a bigger building block to scale-out or consolidate multiple traditional systems; saving floor space, reducing storage network components/complexity and lowering power/cooling requirements.

### SATAssure™ Plus

Revolutionary SATAssure technology delivers enterprise-class data protection and reliability using large capacity, inexpensive SATA disk drives. SATAssure operates on all read operations, ensuring data integrity and automatically corrects problems in real-time – all without the performance or capacity penalty found in traditional storage systems. Reduce drive RMAs with a new ability to power-cycle individual drives.

# Scale Beyond Limits

## Scale Capacity:

- From hundreds of terabytes to multiple petabytes

## Scale Performance:

- From 6GB/s to 250+GB/s

The S2A9900 allows new levels of capacity and performance scaling within a single system.

### Limitless Capacity Scaling

Eclipsing all other storage systems by several multiples, a single S2A system manages the largest quantity of drives, allowing for petascale deployments, massive consolidation or headroom for tomorrow's growth. New, intelligent drive packaging provides the densest footprint available, saving valuable floor space.

### Infinite Performance Scaling

A single S2A system can sustain 6GB/s on both read and write operations, while multiple system configurations are proven to scale beyond 250GB/s.

# Consolidate Everything

## Consolidate and Simplify:

- Multiple Systems
- Storage Islands
- NAS and SAN
- Network Components

## The Power to Reduce:

- Administration
- Floor Space
- Components
- Power Consumption

### More Capacity, Fewer Systems . . .

#### Maximum Capacity Redefined

- Manage an astounding 1,200 drives, providing up to 1.2 petabytes in two standard racks

#### Innovation Delivered

- Houses 60 drives in just 4U
- Allows intermixing of SAS and SATA drives for single-system storage tiering

### More Performance, Fewer Systems . . .

#### Performance Redefined

- Provides the highest throughput bandwidth available today at a blazing 6GB/s for reads and writes

#### Low Latency, No Contention

- Eight parallel access host ports allow you to configure FC4, FC8, and Infiniband 4x DDR for low latency requirements

#### Quality of Service Redefined

- No penalty for write operations – they occur just as fast as reads
- Implementing RAID 6, with its double parity protection, a best practice for safely deploying SATA, compromises performance on all other systems but the S2A
- Real-time data integrity checking occurs with no performance penalty or capacity reduction

# Gain Universal Access

## Single, Common Pool of Storage:

- DAS, NAS, SAN
- Tiers 1, 2-n

## Full-Speed Access:

- No contention or latency
- Sustain performance during events

### A Single, Common Storage Pool

- S2A's open architecture supports all popular file systems for DAS, NAS, SAN, and combined usage.
- Utilize a single system for high performance tier 1 & tier 2 applications as well as archive and backup.

### Simplified and Streamlined

- The intelligent design of the S2A eliminates many traditional network storage components and eases deployment. Reduce switching infrastructure, failover software, virtualization appliances and all of the management costs and additional points of failure associated with managing multiple items.

### Always Available at Full-Speed

- Unique in that every host can access every disk, all data is available all of the time – with no waiting and at full-speed.

# S2A Solutions

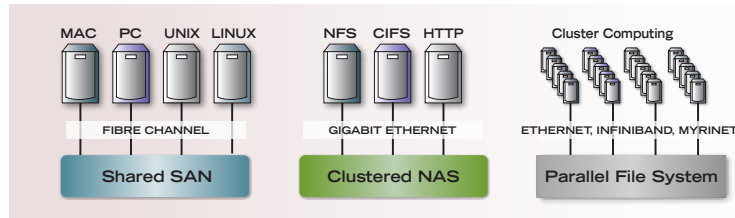
Open architecture and infinite scalability make S2A the ideal storage platform.

Available S2A Turn-key Solutions:

- S2A HPC Storage Solution
- S2A NAS Storage Solution
- S2A Shared SAN File Solution

Simplified and flexible, configuring S2A storage is easy . . .

1. Select your network:



2. Select your drives:

Drive Type	RPM	Capacity
SAS	10K	400GB
	15K	300GB, 450GB
SATA	7.2K	500GB, 750GB, 1TB

## Ideal Fits

<b>All Industries</b>	<ul style="list-style-type: none"> <li>• Rapid Backup/Restore</li> <li>• Tape Replacement</li> <li>• Creating Online Archives</li> </ul>	<b>Government</b>	<ul style="list-style-type: none"> <li>• Intelligence Archives</li> <li>• Digital Record Archives</li> <li>• Homeland Security</li> <li>• Intelligence &amp; Photographic Analysis</li> <li>• Satellite Telemetry &amp; Embedded Systems</li> <li>• Climate Modeling &amp; Space Exploration</li> </ul>
<b>Design &amp; Simulation</b>	<ul style="list-style-type: none"> <li>• Online Archiving of Model &amp; Result Files</li> <li>• Computer Automated Design (CAD)</li> <li>• Computer Automated Engineering (CAE)</li> <li>• Computational Fluid Dynamics (CFD)</li> <li>• Electronic Design Automation (EDA)</li> <li>• Finite Element Analysis (FEA)</li> </ul>	<b>HPC</b>	<ul style="list-style-type: none"> <li>• Cost-Effective High Speed Scratch Storage</li> <li>• Space and Power Efficient Online Archives</li> <li>• Scalable Performance Beyond 100GB/s</li> <li>• Open-systems CPU, OS and File System Support</li> <li>• Rapid Checkpoint Operations</li> <li>• Fast Scratch Storage</li> <li>• Native Infiniband Connectivity</li> </ul>
<b>Digital Media</b>	<ul style="list-style-type: none"> <li>• Massive Online Media Archives, MAM</li> <li>• Broadcast, Post-production, DI</li> <li>• Serve Multiple SD, HD, 2K, 4K Streams</li> </ul>	<b>Internet Services</b>	<ul style="list-style-type: none"> <li>• Online Video, Audio &amp; Image Serving</li> <li>• Address Rapid Data Growth Challenges</li> <li>• Media Archives</li> </ul>
<b>Energy</b>	<ul style="list-style-type: none"> <li>• 3D &amp; 4D Seismic Analysis</li> <li>• Reservoir Simulation</li> <li>• Combustion &amp; Emissions Simulation</li> <li>• Advanced Imaging and Visualization</li> <li>• Online Storage of Raw Data &amp; Results</li> </ul>		
<b>Finance</b>	<ul style="list-style-type: none"> <li>• Compliance Mandated Online Archive</li> <li>• Monte Carlo Simulation</li> <li>• Capital Market Analysis</li> <li>• Low-latency Trading Support</li> </ul>		

## Scalability

Scalable, Modular Configuration

- Simple cabling
- Add drives and enclosures online
- Grow incrementally to 1,200 disk drives

## DirectRAID Quality of Service

Maintain Real-Time Performance During:

- Degraded drive behavior
- Loss of up to two drives per parity group
- Loss of up to two full drive enclosures
- Up to 4 concurrent drive rebuilds
- Any drive channel failure
- Drive, check, error or failure conditions

## Robust Data Availability

Full System Fault-Tolerance

- Fully redundant
- Active-Active host port access
- Active-Active failover
- DirectRAID 6 double-disk failure protection

## Optimize Space, Power and Cooling

Low Per-GB/s Power Consumption:  
Highest TB/Sq. Ft.

User Defined Drive Sleep Mode

- 6GB/s in 19U

SATA disk drives

- Half rack (24U): 300TB
- Single rack (44U): 600TB
- Dual rack (84U): 1.2PB

DataDirect Networks is the leading provider of scalable storage systems for performance and capacity drive applications. DataDirect's S2A (Silicon Storage Architecture) enables modern applications such as video streaming, content delivery, modeling and simulation, backup and archiving, cluster and supercomputing, and real-time collaborative workflows, that are driving the explosive demand for storage performance and capacity. DataDirect's S2A technology and solutions solve today's most challenging storage requirements, including providing shared, high-speed access to a common pool of data, minimizing data center footprints and storage costs for massive archives, reducing simulation computational times, and capturing and serving massive amounts of digital content.



# DataDirect Networks S2A9900 Storage System Specifications

## DataDirect S2A9900 Specifications, SAS or SATA Disk Drives

### Standard Software Features

Integrated software features with no external software required for: LUN Mapping and Masking by WWN and/or Port Zoning; PowerLUNs; Real-Time Data Verification; Background Data Scrubbing; LUN in Cache; Place Holder LUNs; Intelligent Stream Detection, Read-Only LUNs, Advanced A/V Modes, DirectMirror LUN Caching, DirectAPI.

### Optional Software Features

Java-Based GUI, System Management Console, and directMonitor supporting SNMP Trap Display Utility, Logging, Remote Administration Utility, Pager and E-Mail Fault Notification Utility and Sleep Mode

### Standard Communication

Ethernet Telnet, Ethernet SNMP, RS-232 Serial, TCP/IP In-Band, Management API

### S2A9900 Couplet Specifications

Sustained Sequential Read & Write		up to 6 GB/s
DirectRAID (Parity) 8+2 (RAID 6)		Yes
Maximum Number of Host Logins	Fibre Channel	4096
	Infiniband	1024
Maximum Number of LUNs		64K
Maximum Capacity per LUN	32-bit LBA Support	2TB (512 Byte Block) to 16TB (4096 Byte Block)
	64-bit LBA Support	96TB (512 Byte Block) to 96TB (4096 Byte Block)
Cache		5GB RAID-Protected
Maximum Disk Drives		1200
Minimum Disk Drives, 8+2		10
Maximum Channel Hot Spares, 8+2		Configurable
Max. Number of Disk Chassis (60 Bay)		20
Min. Number of Disk Chassis		5
Disk-Side SAS Ports		20
Host-Side FC Ports or IB Ports		8
Redundant Hot Plug Cooling Modules		2
Redundant Hot Plug Power Supplies		4

S2A9900 with	SAS Drives 60-Bay Chassis	SATA Drives 60-Bay Chassis
Maximum Raw Capacity** (Includes Parity and Spares)	540TB (450GB drives)	1.2PB (1TB drives)
Maximum Useable Capacity (Excludes Parity and Spares)	432TB (450GB Drives)	960TB (1TB Drives)
Disk Drives Supported	300GB, 400GB & 450GB	500GB, 750GB & 1TB

\*\*One Gigabyte, or GB, equals one billion bytes when referring to hard drive capacities

### Certifications

UL, CE, CUL, C-Tick, FCC

### FC Host Connectivity

Windows	Emulex, LSI, QLogic
Linux	QLogic
Sun	Emulex, JNI, QLogic
Silicon Graphics IRIX	QLogic
RS/6000	Cambex, Emulex, IBM
Macintosh	ATTO

### IB Host Connectivity

Linux	Cisco, Mellanox
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**Fibre-Channel Fabric Connectivity** Brocade, Cisco, McData, QLogic

**Infiniband Fabric Connectivity** Cisco, Mellanox, SilverStorm, Voltaire

### S2A9900 Couplet Environmental Specifications

Dimensions	Height	7.0" (17.8 cm)*
	Width	19" IEC Rack Compliant (17") (43.2 cm)*
	Depth	31" Including Front Bezel (78.8cm)*
Rack Height		4 EIA Units
AC Power / Maximum		1100W
AC Power / Average		800W
Voltage Range		85 - 264VAC
Operating Environment		10° to 35° C
Non-Operating Environment		-10° to 50° C
Thermal Rating		3760 BTU/280 cfm
Frequency		47/63 Hz
Max Power (P/S Rating)		1100W/5.3A
Average Power		800W/3.84A
Max Cooling (P/S Rating)		3756 BTU/hr
Average Cooling		2730 BTU/hr
Peak Airflow		280 cfm
Weight		90 lbs (41.0 kg)**

\*measurements rounded to nearest inch \*\*weight is approximate

### 28" Rack Cabinet Specifications

		RK4201	RK4501
Dimensions	Height	79.5" (200 cm)*	86" (218 cm)*
	Width	28" (71.1 cm)*	28" (71.1 cm)*
	Depth (excluding doors)	42" (105 cm)*	42" (105 cm)*
Rack Unit Capacity		42 EIA Units	45 EIA Units
AC Power		208/230V	208/230V
L6-30p		4	8
Number of Outlets (internal)		32	64
Weight		325 lbs (148 kg)**	350 lbs (159 kg)**

### Drive Enclosure Specifications

		16-Bay	24-Bay	60-Bay
Dimensions	Height	5.12" (13 cm)*	3.5" (8.9 cm)*	7" (17.8 cm)*
	Width	19.0" (48.3 cm)*	17.7" (45 cm)*	17.56" (44.6 cm)*
	Depth (without bezel)	21.7" (55.1 cm)*	19.3" (49 cm)*	36" (91.4 cm)* (42" (107 cm)* w/bezel and cable management arms)
Rack Height		3U	2U	4U
Voltage Range		100-240 VAC	90-264 VAC	190-264 VAC
Operating Environment		5° to 40° C	5° to 40° C	10° to 35° C
Frequency		48-62 Hz	47-63 Hz	47-63 Hz
Max Power (P/S Rating)		700 W	1060 W	3904 W
Peak Power		520 W	515 W	1922 W
Average Power		440 W	530 W	1750 W
Max Cooling		2390 BTU/h	3617 BTU/h	13324 BTU/h
Peak Cooling		1780 BTU/h	1758 BTU/h	6560 BTU/h
Average Cooling		1500 BTU/h	1809 BTU/h	5973 BTU/h
Peak Airflow		72 cfm	100 cfm	220 cfm
Weight	With Drives	109.6 lbs (27.2 kg)**	54.4 lbs (24.7 kg)**	240 lbs (109 kg)**
	Without Drives	77.6 lbs (35.2 kg)**	40 lbs (18.2 kg)**	120 lbs (54.5 kg)**
Drive Size		3.5" (8.9cm)*	2.5" (6.4cm)*	3.5" (8.9cm)*

\*measurements rounded to nearest inch

\*\*weight is approximate

NOTE: These Specifications are preliminary and subject to change.

**DataDirect**  
NETWORKS  
Performance. Capacity. Innovation.

WWW.DATADIRECTNET.COM

9351 Deering Avenue  
Chatsworth, California 91311  
phone +1.800.TERABYTE (837.2298)  
fax +1.818.700.7601  
sales@datadirectnet.com

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