XCubeDAS
XD5300

QSAN™

◯ Feature Highlights:

- 12Gb/s SAS technology
- 10x 12Gb/s SAS wide ports
- 480Gb/s bandwidth and 24,000MB/s throughput
- Dual active controller with high availability
- Multiple paths
- Full range product selections
- Support for 12Gb/s SAS, NL SAS, SSDs, and 6Gb/s SAS, NL SAS, SATA, SSDs
- Pay-as-you-grow scalable expansion

- Versatile topologies, zoning, and runtime configuration
- High reliability
- Cable-less design
- Powerful CubeView DAS central management software (CMS)
- Complete HBA and RAID cards support
- Green technology

Next Generation DAS System

QSAN XCubeDAS XD5300 DAS systems are designed with the latest 12Gb/s SAS expander, and built for host server easy capacity expanding, application demanding high throughput, high availability, non-stop services, and flexible storage planning with limited budgets.

12Gb/s SAS Performance with 6Gb/s HDD / SSD Drive Infrastructure
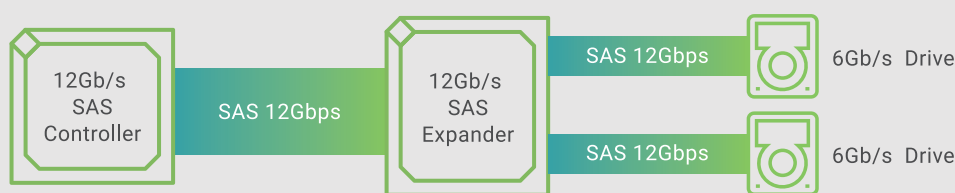
12Gb/s SAS Host or Storage Controller*

Bandwidth Aggregation per drive

Doubles the bandwidth over rate matching

6Gb/s SAS Drive Infrastructure*

58% increase in IOPS versus 6Gb/s host

65% increase in B/W versus 6Gb/s host

12Gb/s SAS Controller — SAS 12Gbps — 12Gb/s SAS Expander — SAS 12Gbps — 6Gb/s Drive / SAS 12Gbps — 6Gb/s Drive

12Gb/s SAS expander aggregates bandwidth with 6Gb/s SAS hard drives

The XD5300 DAS Series Applications

QSAN XCubeDAS XD5300 series is fully compatible with all major 12Gb/s SAS host bus adaptors, RAID cards, servers, and operating systems, including Windows Server 2008/2012, Storage Spaces, RHEL/SuSE/Linux, Solaris, VMware, Citrix, and Hyper-V. The XD5300 series accomplished complete tests and met the requirements of VMware, Citrix, and Hyper-V virtualization environment storage expansion. With the native ability of 12Gb/s SAS and QSAN's performance optimization, the XD5300 series is both efficient and smooth for high-definition media editing, high performance computing applications, massive data archiving/backup, performance-demanding applications, real time clustering, expansion to VMware Virtual SAN (VSAN Software Defined Storage), and online expansion to public or private cloud storage servers.

XCubeDAS XD5300 Series Compatibility

Software-Defined Storage (SDS): Microsoft Windows Storage Spaces and VMware VSAN

As the software-defined storage trends continue, both major virtualization operating systems – Microsoft and VMware pay high attention to SDS and provide integration interfaces for the storage partners. QSAN XD5300 DAS systems integrate both Microsoft and VMware interfaces for users' various environments and applications.

Microsoft Windows Storage Spaces, Windows 8 and Windows Server 2012 built-in feature, enables IT managers to virtualize storage by grouping disks into pools, and creating volumes called Storage Spaces from the available capacity in the storage pools.
VMware Virtual SAN (VSAN) is VMware's SDS solution for hyper-converged infrastructure. VSAN is embedded in the hypervisor and delivers shared storage for vSphere virtual machines. The total system leverages commodity servers, networks, disks, DAS systems, and etc.

| VM | VM | VM | VM | VM |

vSphere + Virtual SAN

server 1 server 2 server 3 server 4   · · ·   server N

SSD/Hard Disks
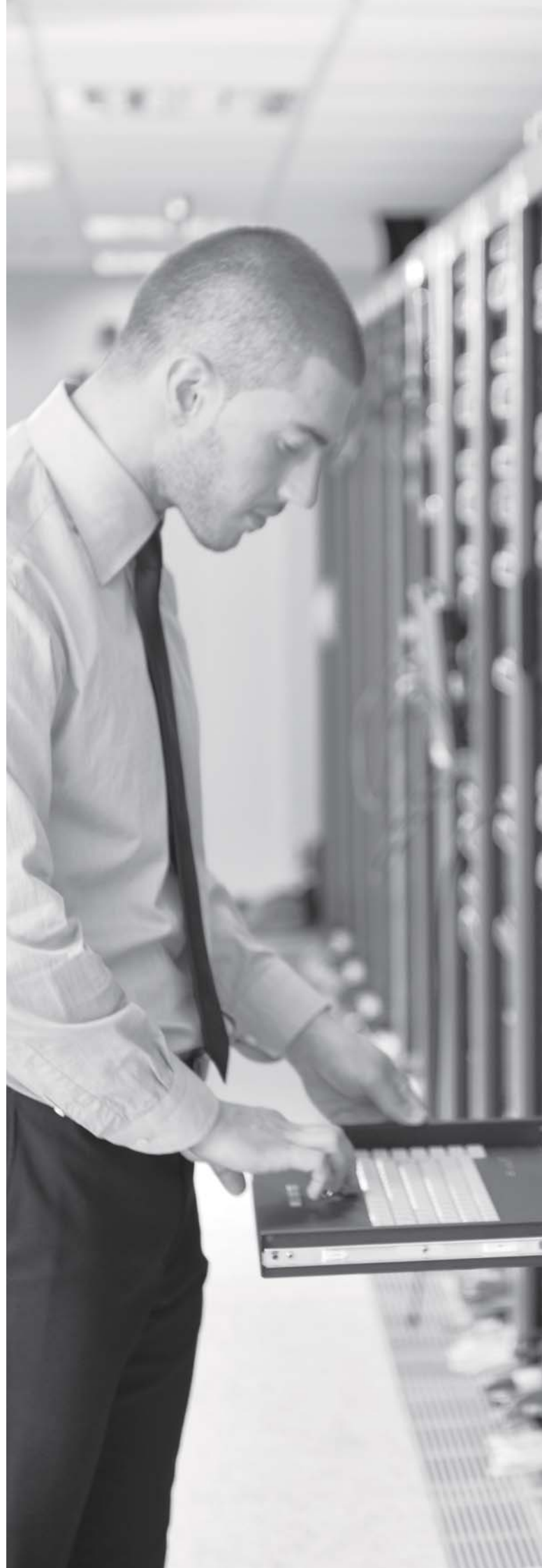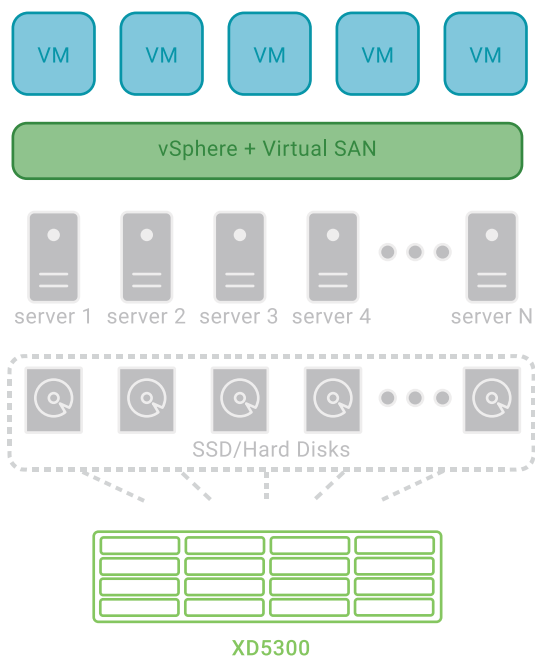
XD5300

High Performance and High Throughput

The XD5300 solutions set a new storage standard for direct-attached storage. The series provides a smart and elastic runtime configuration of the 10x 12Gb/s SAS wide ports with three topologies support, and allows IT managers fully utilizing the 480Gb/s data bandwidth per system for various applications.

480Gb/s Bandwidth

The XD5300 series is fully tested with various configurations and the maximum non cache-hit throughput of the XD5300 system is up to 24,000MB/s. The optimized 12Gb/s SAS storage system combined with QSAN's best efficient firmware, well-deployed

hardware layout, guaranteed full channel bandwidth to each 12Gb/s SAS port, and central management software, enables XCubeDAS XD5300 to deliver a 24,000MB/s throughput and end-to-end 4 millions IOPS offering 24,000 MB/s throughput, 480Gb/s data bandwidth, 10x runtime configurable 12Gb/s SAS wide ports, and multiple enclosure options, this series is ideal for video editing, high performance computing (HPC), cloud storage, streaming, broadcasting, virtualization, and datacenters.

24,000MB/s Throughput

Dual Active Controller and High Availability Design

The XCubeDAS XD5300 DAS systems offer fully redundant components for all major functions, including dual controllers, power supplies, fan modules, host ports, and expansion ports. Besides hot swappable components, The XD5300 is able to upgrade firmware without any system down time and balancing IO loading through multiple paths and dual controllers.

Server1   Server2
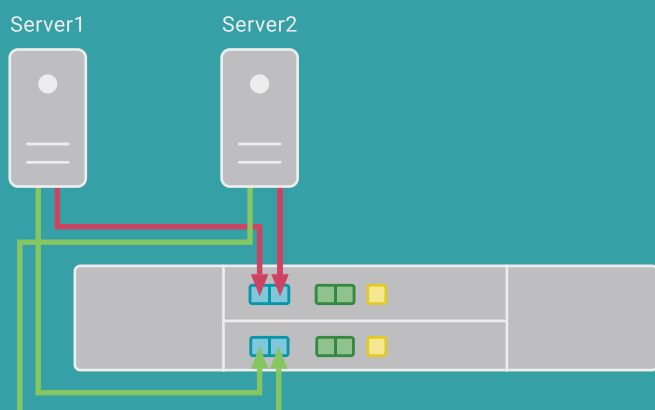
Hardware redundant modules include:

▮ Controllers

▮ Power supplies

▮ Fan modules

▮ Hard drive trays

Firmware high availability includes:

▮ Non-disruptive firmware upgrade

▮ Multiple paths

▮ Automatic failover

Multiple Paths

To provide a fault-tolerance and load-balancing storage system, all data paths in the system from hard drives, backplanes, expander physical links, and front-end ports to servers have to be both hardware redundant and in well defined firmware redundancy protection. The XCubeDAS XD5300 series is built with fully redundancy paths and protection to every data IO and compatible with Microsoft Windows MPIO, Clustering, and Linux Multipathing. The multipath software layers in the operating systems can leverage the redundant paths to provide performance-enhancing, e.g., load-balancing, round-robin, failover, and dynamic reconfiguration.

Full Range and Highly Flexible Solution

The XD5300 also offers various enclosure options, including small form factor 2U 26 bays, large form factor 2U 12 bays, 3U 16 bays, and 4U 24 bays. The XD5300 2U26 system is the worldwide highest density solution in small form factor and high availability (HA) dual controller model – 26 bays in 2U enclosure. This series provides single controller* configuration. The IT administrators on a tight budget can start to deploy the storage system with single controller configuration and upgrade to dual controllers later. QSAN is partner with all major hard drive vendors and fully support the latest hard drives, including 12Gb/s SAS, NL SAS, SSD, 6Gb/s SAS, NL SAS, SATA**, and SSDs. Without any hard drive bundle, IT administrators can choose the best applicable hard drives.

* Some of the features are not supported in the single controller configuration, including high availability, multiple paths, and etc.
** 3.5 inch 6Gb/s SATA hard drive is only supported in single controller configuration. 2.5 inch 6Gb/s SATA drive can be installed in both single controller configuration and dual controller configuration with MUX board.
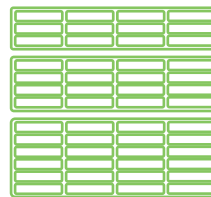
XD5312 | 2U 12 Bays
XD5316 | 3U 16 Bays
XD5324 | 4U 24 Bays
Large form factors
2U, 3U, and 4U

XD5326 | 2U 26 Bays
Small form factor 26
Bays in 2U

Pay-as-You-Grow Scalable Expansion

The XD5300 series support up to 450* hard drives per system. The total raw capacity is up to 3.6PB with 8TB drive installed. Users can always start a minimal deployment and don't worry about the budget and future expansion requirements.

* The HBA and RAID cards also specify the maximum number of drive/device support. Avago (LSI) 12Gb/s SAS HBA supports up to 1024 drives/devices, Avago (LSI) 12Gb/s SAS RAID card up to 240 drives/devices, Microsemi Adaptec 12Gb/s HBA up to 256 drives/devices, Microsemi Adaptec 12Gb/s RAID card up to 256 drives/devices, and ATTO 12Gb/s SAS HBA supports up to 2048 drives. The Max Drive number (450) here is the maximum driver number that passes QSAN's internal full test with both Avago (LSI) 12Gb/s SAS HBA and ATTO 12Gb/s SAS HBA.

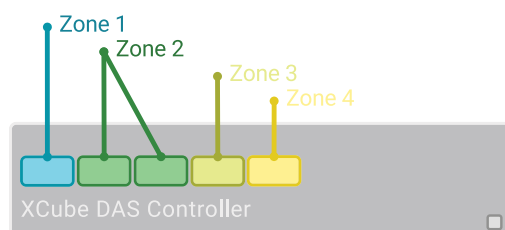# Versatile Topologies: Cascade, Reverse, and Tree

The XD5300 features all 12Gb/s SAS topologies and permutations of all host and expansion port configurations. The XD5300 series supports all 12Gb/s SAS topologies, including Cascade, Reverse, and Tree. The XD5300 series can be deployed freely to fit various connections to the host servers. With up to 10 x 12Gb/s SAS ports support per system, this feature is crucial for users to plan a well-defined resource arrangement to achieve highly utilized performance and capacity of the XD5300 system.

Cascade

Server

XD5300

XD5300

Reverse

Server

XD5300

XD5300

Tree

Server
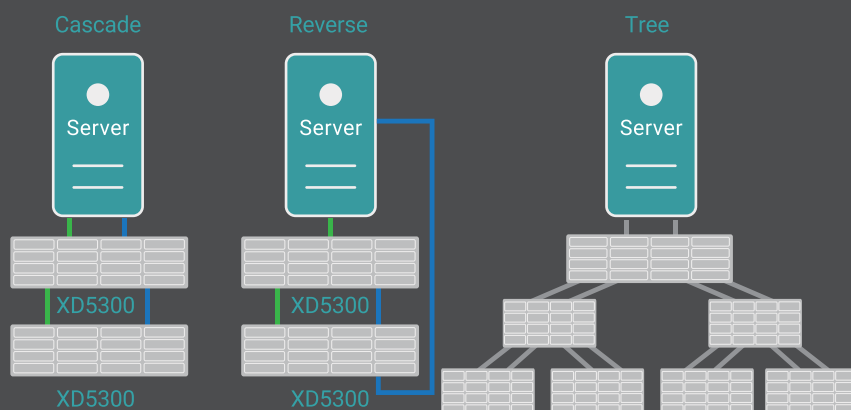
Zoning

User can select specific group of disk slots and define a zone for it. There can be up to 5 zones per system. Each zone can be assigned to at least 1x 12Gb/s SAS port. The zoning feature provides better securi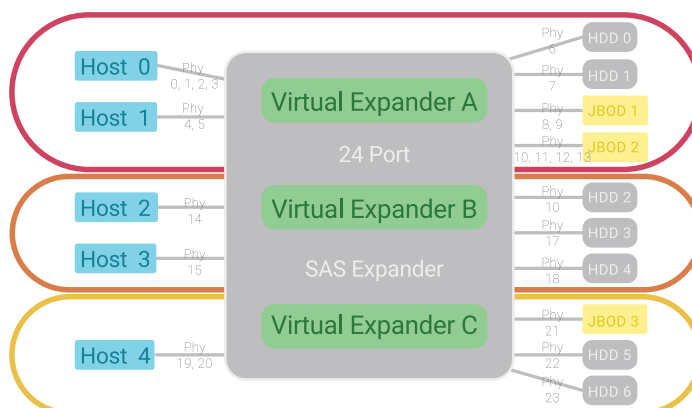ty control even in the direct attached system scenario. Different host servers can connect to the same XD5300 system through different zones and have different access contol schemes for different zones.

Zone 1
Zone 2
Zone 3
Zone 4

XCube DAS Controller

Buy only what you need

Elasticty with Pay-as-you-grow

Host 0 — Phy 0, 1, 2, 3

Host 1 — Phy 4, 5

Virtual Expander A

24 Port

Phy 6 — HDD 0
Phy 7 — HDD 1
Phy 8, 9 — JBOD 1
Phy 10, 11, 12, 13 — JBOD 2

Host 2 — Phy 14

Host 3 — Phy 15

Virtual Expander B

SAS Expander

Phy 16 — HDD 2
Phy 17 — HDD 3
Phy 18 — HDD 4

Virtual Expander C

Host 4 — Phy 19, 20

Phy 21 — JBOD 3
Phy 22 — HDD 5
Phy 23 — HDD 6

Runtime Configuration

The XD5300 controller's host and expansion ports can be configured and changed In/Out during runtime for different applications and environment requirements. The setting is effective immediately without rebooting the system. The 5 In, 4 In / 1 Out, and 3 In / 2 Out configurations displayed below are recommended for better performance utilization.

5x In 12G SAS Ports   Console Port   3x In   2x Out

XCube DAS Controller

4x In   1x Out
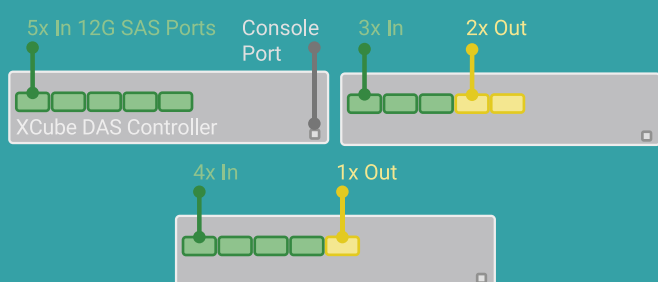
XD5300 Reliability

The XD5300 systems are built with fully redundant and hot swap components. All the duplicating components and overdesigning is to avoid any failure in every system. The system firmware also ensures there is "No Single Point of Failure" with multiple paths, load balancing, and failover functions. The XD5300 overall design is to protect data integrity and stay available for long run. Besides redundant components and robust system firmware, the XD5300 also equips with the following features to be a fully fault-tolerant system.

▌ IO buffering, avoiding IO lost during burst

▌ Error checking and IO retry


480Gb/s
Bandwidth

24,000MB/s
Throughput

Cable-Less Design

All the internal components and modules in the XD5300 systems are built without any cable involved and field replaceable, which reduces the installation and maintenance effort to the minimal. The solid-rock design is to make sure all the data communication and signal quality are secure and stable through the high-speed buses among controllers, backplane, and disks. The whole design can highly reduce the chance of maintenance errors and cable efforts of connector loose during transportation and poor contact after long time of vibration.

Server1   Server2

Controller1
Controller2

XD5300
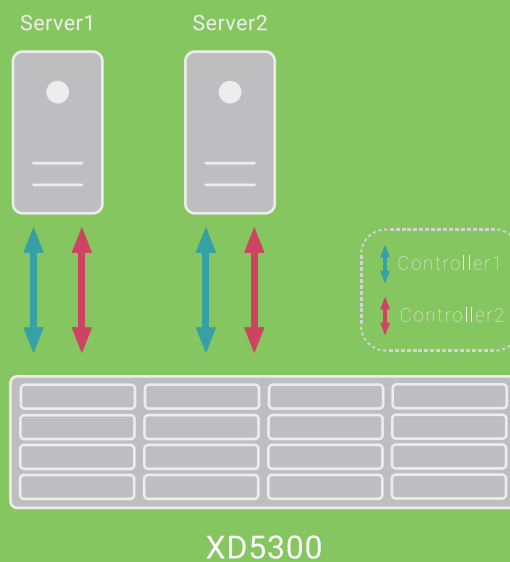
QSAN CubeView Central Management Software

The CubeView CMS can monitor and manage system log, hard drive status, enclosure, zoning function, firmware upgrade, disk firmware batch upgrade*, and history record of system temperature, voltage, and fan speed. The systems also support command line and S.E.S. that allows IT managers completely control of the storage systems and agile configuration of powerful management.
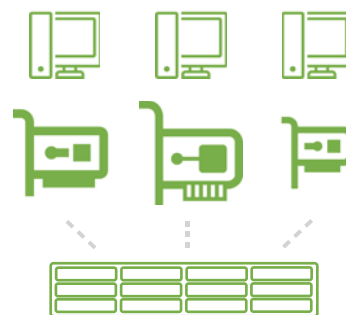
CLI | CubeView

HBA and RAID Card Compatibilities

The XD5300 series provides complete compatibility support of HBA and RAID cards.

Windows, Lunix, Mac, ...

- Avago (LSI) RAID Cards MegaRAID SAS 9380
- Microsemi Adaptec RAID 8885
- Avago (LSI) HBA SAS 9300 and SAS 9207
- Microsemi Adaptec HBA 1000-16e
- ATTO HBA ExpressSAS H12F0 and H1280

Green Technology

The XD5300 firmware is well designed for energy saving. The booting sequence is optimized for every component to avoid any power surge and unnecessary energy waste, especially the hard drive current surge during booting and after blackout reboot. The XD5300 enclosure management procedure monitors and controls system temperature with QSAN optimized cooling mechanism. The 80 PLUS Platinum power supplies offer 94% efficiency at 50% loading and 90% efficiency at 20% loading. In virtue of the reduction of overall power consumption, the advanced cooling, and the energy efficient power supplies, the unnecessary power cost is decreased greatly.

XCubeDAS	XD5312-D XD5312-S	XD5316-D XD5316-S	XD5324-D XD5324-S	XD5326-D XD5326-S
Configurations	Dual Controllers Single Controller	Dual Controllers Single Controller	Dual Controllers Single Controller	Dual Controllers Single Controller
Host Wide Ports Per System	10x 12Gb/s SAS 5x 12Gb/s SAS	10x 12Gb/s SAS 5x 12Gb/s SAS	10x 12Gb/s SAS 5x 12Gb/s SAS	10x 12Gb/s SAS 5x 12Gb/s SAS
Enclosures	LFF 2U12	LFF 3U16	LFF 4U24	SFF 2U26
No. of Hard Drives	12	16	24	26
Hard Drive Interfaces 12Gb/s 6Gb/s	SAS, NL SAS, SSD SAS, NL SAS, SATA*, SSD	SAS, NL SAS, SSD SAS, NL SAS, SATA*, SSD	SAS, NL SAS, SSD SAS, NL SAS, SATA*, SSD	SAS, NL SAS, SSD SAS, NL SAS, SATA*, SSD
Scalability Max Drives Max Capacity	450 3.6PB	450 3.6PB	450 3.6PB	450 3.6PB
Dimension (H x W x D)	88 x 438 x 515 mm	130 x 438 x 515 mm	170 x 438 x 515 mm	88 x 438 x 491 mm
Topologies	Cascade; Reverse; Tree			
Compatibility OS RAID Card / HBA Expansion	Windows Server 2008/2012; Storage Spaces; RHEL/SuSE/Linux; Solaris, VMware, Citrix Avago (LSI) RAID Cards (MegaRAID SAS 9380); Avago (LSI) Host Bus Adapters (SAS 9300 and SAS 9207); Microsemi Adaptec RAID Cards (RAID 8885); Microsemi Adaptec Host Bus Adapters (HBA 1000-16e); ATTO Host Bus Adapters ExpressSAS (H12F0 and H1280) Servers			
Central Management Management	CubeView Central Management Software S.E.S.; CLI; Console; Zoning			
Host & Expansion Port Configuration	Automatic Configuration Recommended Configuration: 5 IN; 4 IN 1 OUT; 3 IN 2 OUT			
Power Supplies	2x 450W 80 PLUS Platinum	2x 770W 80 PLUS Platinum	2x 770W 80 PLUS Platinum	2x 770W 80 PLUS Platinum
Fan Modules	2	2	2	2
Temperature	Operating: 0°C to 40°C; 32°F to 104°F Shipping: -40°C to 70°C; -40°F to 158°F			
Relative Humidity	Operating: 10% to 90% RH @ 40°C (104°F) Non-condensing Non-Operating: Up to 93% RH @ 40°C (104°F) Non-condensing			
Regulatory	CE, FCC, BSMI , CB , KCC			
Warranty	3 Years			

* 3.5 inch 6Gb/s SATA hard drive is only supported in single controller configuration. 2.5 inch 6Gb/s SATA drive can be installed in both single controller configuration and dual controller configuration with MUX board.

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