



SPC BENCHMARK 1™

EXECUTIVE SUMMARY

NETAPP, INC. NETAPP® AFF A800

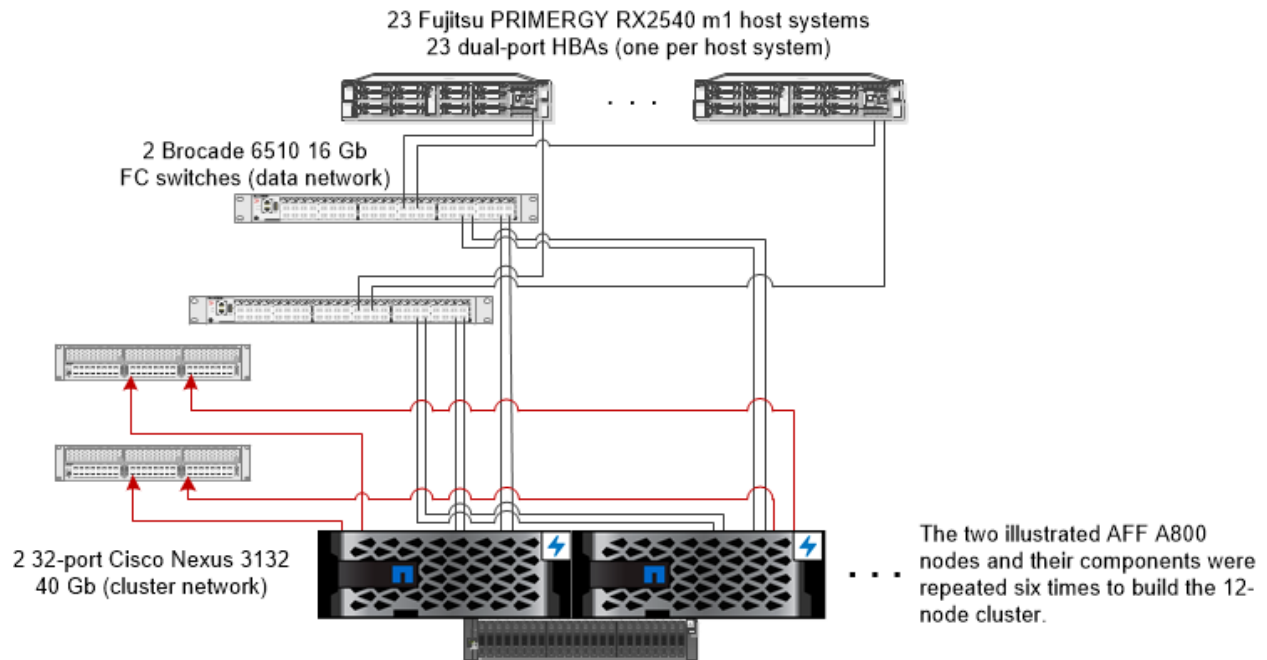
SPC-1 IOPS™	2,401,171
SPC-1 Price-Performance™	\$1,154.53/SPC-1 KIOPS™
SPC-1 IOPS™ Response Time	0.590 ms
SPC-1 Overall Response Time	0.351 ms
SPC-1 ASU Capacity	182,674 GB
SPC-1 Space Effectiveness Ratio	1.76
SPC-1 ASU Price	\$15.18/GB
SPC-1 Total System Price	\$2,772,201.07
Data Protection Level	Protected 2 (NetApp RAID DP®)
Physical Storage Capacity	276,535 GB
Pricing Currency / Target Country	U.S. Dollars / USA

SPC-1 v3.6.0

SUBMISSION IDENTIFIER: A32007

SUBMITTED FOR REVIEW: JULY 5, 2018

Benchmark Configuration Diagram



NetApp AFF A800 storage system 6 HA controller pairs (12 storage nodes total)

This cluster includes:

- 1 TB memory/cache per HA pair
- 24 x 1.9 TB internal NVMe SSDs per HA pair (144 total)
- 2 QLogic 2672 16 Gb HBA Initiators per server (23 total)
- 2 Emulex LPe32004 32 Gb HBA Targets per HA pair (12 total)
- 2 Cisco Nexus 3132 40 Gb 32-port switches (cluster network)
- 2 Brocade 6510 16 Gb FC 48-port switches (data network)

Tested Storage Product Description

As an end-to-end NVMe-based all-flash array, the AFF A800 system delivers industry-leading performance, density, scalability, security, and network connectivity in a 4U chassis. By combining low-latency NVMe solid-state drives (SSDs) with NVMe over Fibre Channel (NVMe/FC) host connectivity, the AFF A800 delivers extremely low latency and massive throughput in a scaled-out cluster configuration. This all-flash array is built on a unified scale-out architecture extending enterprise-grade flash to the most demanding workloads such as AI and deep learning.

Priced Storage Configuration Components

23 x QLogic 2672 dual-port, 16 Gb host bus adapter (HBA)
NetApp AFF A800 6 HA Controller Pairs (12 nodes total), each pair with: 1 TB cache (6 TB total) 8 x 32 Gbps FC ports (48 ports total) Internal NVMe drive connections (no cards, no cables) 144 x 1.92 TB NVMe SSDs (12 per node, 24 per HA pair)
2 x Brocade 6510 16 Gb FC Switches (Data Network) 2 x Cisco Nexus 3132 32-Port 40Gb (Cluster Network)

Storage Configuration Pricing

Part No.	Description	Source	Qty	Unit Price	Ext. Price	Disc.	Disc. Price
Hardware & Software							
AFF-A800-100-	AFF A800,HA,CTL,AC PS,100G,-C	1	6	250,120.00	1,500,720.00	50%	750,360.00
X4001A-12-C	Drive Pack,12X1.9TB,NVMe,SSD,-C	1	12	44,460.00	533,520.00	50%	266,760.00
SW-FLASH-02-C	ONTAP,Per-0.1TB,Flash-C (BASE BNDL: OS + Protocols)	1	2,736	1,095.00	2,995,920.00	50%	1,497,960.00
X-6510-48-16G	Switch,Brocade 6510 48-Pt FF Ent 16G SWL SFPs	1	2	17,179.00	34,358.00	50%	17,179.00
X190001	Switch, Cisco Nexus 3132Q-X, 32 QSFP+ ports, low	1	2	13,000.00	26,000.00	50%	13,000.00
X66100-1	Cable,Direct Attach CU SFP+,40Gb,1m	1	2	50.00	100.00	50%	50.00
FXE10-10M2y	Cable,Cntrlr-Switch,2m,Pair,LC/LC,Op	2	48	33.56	1,610.88	0%	1,610.88
FXE10-10M10y	Cable,Host-Switch,10m,Pair,LC/LC,Op	2	46	43.88	2,018.48	0%	2,018.48
Qlogic 2672	HBA Initiator,Qlogic 16Gig 2port	3	23	989.99	22,769.77	0%	22,769.77
X1135A-C	HBA Target,Emulex LPe32004,4-port FCP Target-Init	1	12	6,790.00	81,480.00	50%	40,740.00
X66100-5	Cable,Direct Attach CU SFP+,40Gb,5m	1	24	75.00	1,800.00	50%	900.00
X8712C-EN-R6-	PDU, 1-Phase, 24 Outlet, 30A, NEMA, -C, R6	1	2	115.80	231.60	50%	115.80
X870E-EN-R6-C	Cab,Lighted,Empty,No PDU,No Rails,EN,-C	1	1	1,947.71	1,947.71	50%	973.86
X8778-R6-C	Mounting Bracket, Tie-Down, 32X0, -C, R6	1	12	21.38	256.56	50%	128.28
Hardware & Software Subtotal							2,614,566.07
Support & Maintenance							
CS-O2-4HR- VA	SupportEdge Premium 4hr Onsite,VA	1	6	52,545.00	315,270.00	50%	157,635.00
Support & Maintenance Subtotal							157,635.00
SPC-1 Total System Price							2,772,201.07
SPC-1 IOPS™							2,401,171
SPC-1 Price-Performance™ (\$/SPC-1 KIOPS™)							1,154.53
SPC-1 ASU Capacity (GB)							182,674
SPC-1 ASU Price (\$/GB)							15.18

Pricing Details: The following key lists the price sources used above.

1. NetApp, Inc.
2. Rexel USA
3. Serverpartdeals.com

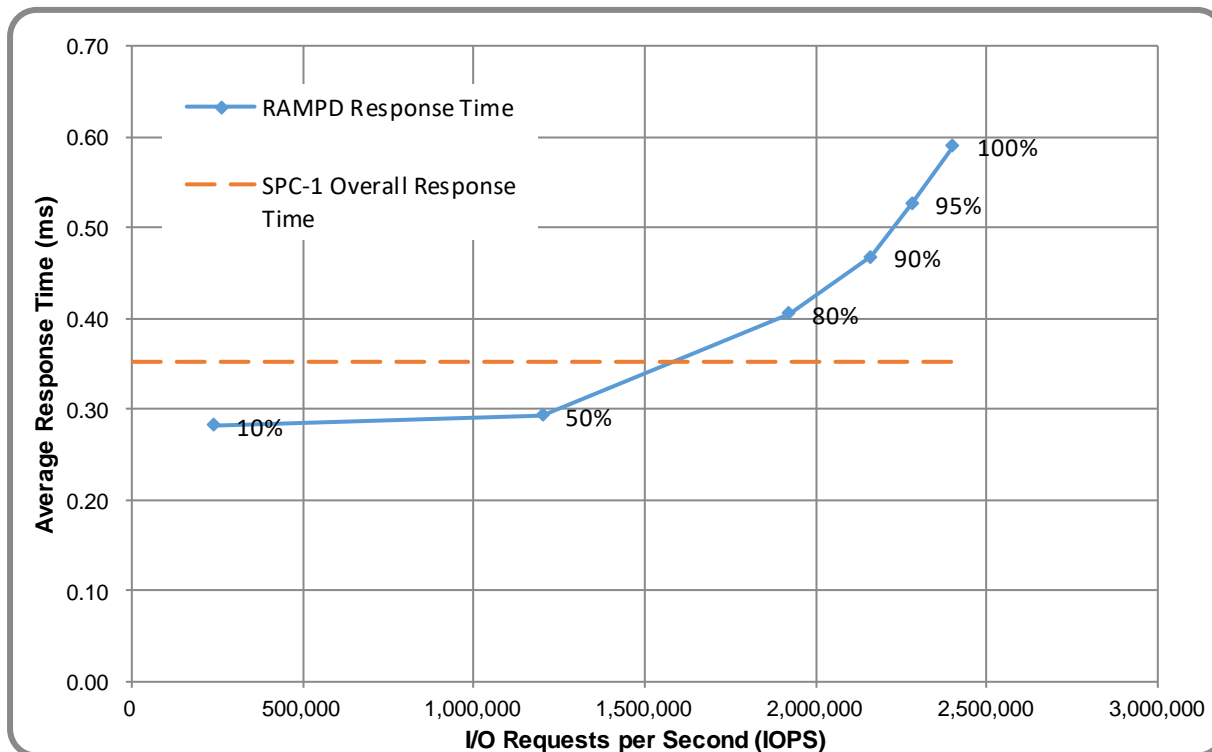
Please see Appendix B for third-party price quotations.

Discount Details: The discounts shown are based on the storage capacity purchased and are generally available.

Warranty: The 3-year maintenance and support included in the above pricing meets or exceeds a 24x7 coverage with a 4-hour response time.

Availability Date: currently available.

Response Time and Throughput Graph



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Revision Information	
SPC Benchmark 1™ Revision	v3.6.0
SPC-1 Workload Generator Revision	v3.0.2-1-g823a
Publication Revision History	Initial Publication