



NEC

**SPC BENCHMARK 1™
EXECUTIVE SUMMARY**

**NEC CORPORATION
NEC STORAGE M700**

SPC-1 V1.13

Submitted for Review: April 26, 2013

Submission Identifier: A00132

EXECUTIVE SUMMARY

Test Sponsor and Contact Information

Test Sponsor and Contact Information	
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Revision Information and Key Dates

Revision Information and Key Dates	
SPC-1 Specification revision number	V1.13
SPC-1 Workload Generator revision number	V2.3.0
Date Results were first used publicly	April 26, 2013
Date the FDR was submitted to the SPC	April 26, 2013
Date the Priced Storage Configuration is available for shipment to customers	Currently Available
Date the TSC completed audit certification	April 24, 2013

Tested Storage Product (TSP) Description

NEC's M700 SAN storage arrays are a great choice for very scalable, mission-critical, high performance, primary or tiered storage. These SAN storage arrays are easy to operate, dependable and efficient.

They are also well-suited for use in virtualized environments by virtue of their great scalability, LUN lock stability, support for VMware APIs and flexibility.

NEC M700 SAN arrays feature host interfaces: 8 Gbps Fibre Channel, 10Gbps/1Gbps iSCSI. Both interfaces can be deployed concurrently.

M700 offers 3.5" and 2.5" drives. 2.5" drives are attractive due to their lower power and space consumption. 3.5" drives by contract offer the best storage density per spindle. M700 simultaneously supports SAS HDD, NearLine SAS HDD, and SSD in the same enclosures, enabling flexible tiered storage architecture.

Summary of Results

SPC-1 Reported Data	
Tested Storage Product (TSP) Name: NEC Storage M700	
Metric	Reported Result
SPC-1 IOPS™	152,478.90
SPC-1 Price-Performance™	\$3.84/SPC-1 IOPS™
Total ASU Capacity	69,166.799 GB
Data Protection Level	Protected 1 (<i>Mirroring</i>)
Total Price	\$586,215.30
Currency Used	U.S. Dollars
Target Country for availability, sales and support	USA

SPC-1 IOPS™ represents the maximum I/O Request Throughput at the 100% load point.

SPC-1 Price-Performance™ is the ratio of **Total Price** to SPC-1 IOPS™.

Total ASU (Application Storage Unit) **Capacity** represents the total storage capacity available to be read and written in the course of executing the SPC-1 benchmark.

A **Data Protection Level** of **Protected 1** using *Mirroring* configures two or more identical copies of user data.

***Protected 1:** The single point of failure of any **storage device** in the configuration will not result in permanent loss of access to or integrity of the SPC-1 Data Repository.*

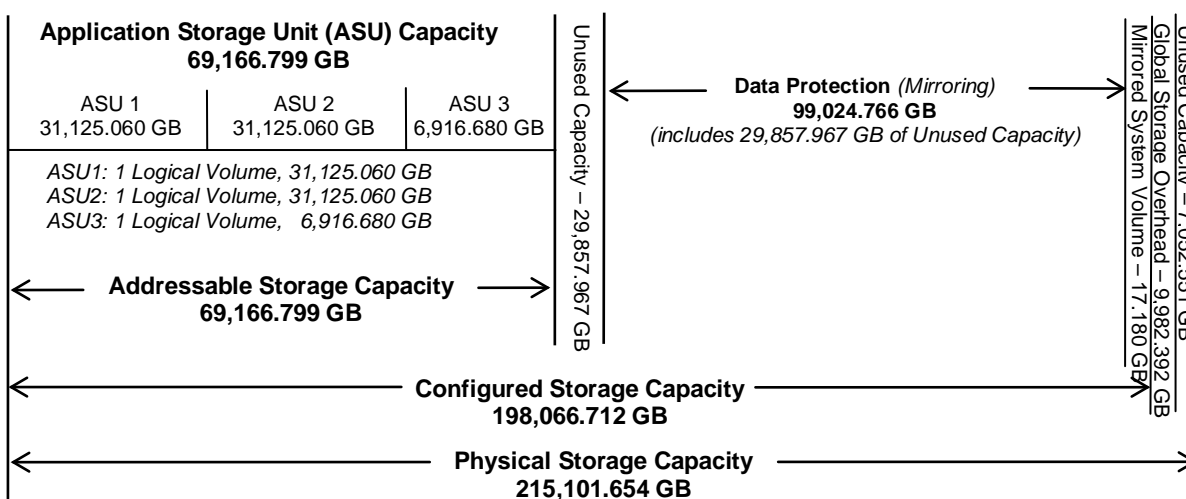
Total Price includes the cost of the Priced Storage Configuration plus three years of hardware maintenance and software support as detailed on page 7.

Currency Used is formal name for the currency used in calculating the **Total Price** and **SPC-1 Price-Performance™**. That currency may be the local currency of the **Target Country** or the currency of a difference country (*non-local currency*).

The **Target Country** is the country in which the Priced Storage Configuration is available for sale and in which the required hardware maintenance and software support is provided either directly from the Test Sponsor or indirectly via a third-party supplier.

Storage Capacities, Relationships, and Utilization

The following diagram and table document the various storage capacities, used in this benchmark, and their relationships, as well as the storage utilization values required to be reported.



SPC-1 Storage Capacity Utilization	
Application Utilization	32.16%
Protected Application Utilization	64.31%
Unused Storage Ratio	31.04%

Application Utilization: Total ASU Capacity (69,166.799 GB) divided by Physical Storage Capacity (215,101.654 GB)

Protected Application Utilization: Total ASU Capacity (69,166.799 GB) plus total Data Protection Capacity (99,024.766 GB) minus unused Data Protection Capacity (29,857.967 GB) divided by Physical Storage Capacity (215,101.654 GB)

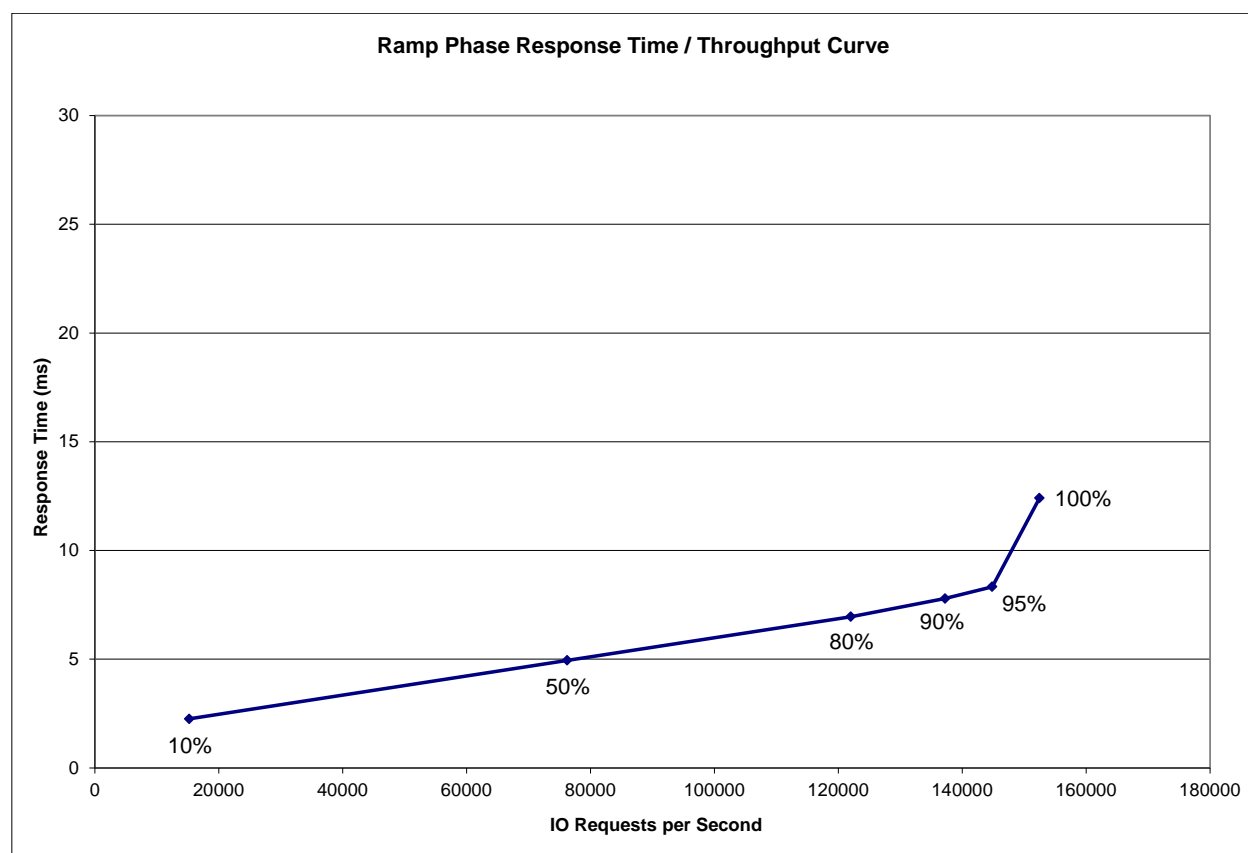
Unused Storage Ratio: Total Unused Capacity (66,768.484 GB) divided by Physical Storage Capacity (215,101.654 GB) and may not exceed 45%.

Detailed information for the various storage capacities and utilizations is available on pages 25-26 in the Full Disclosure Report.

Response Time – Throughput Curve

The Response Time-Throughput Curve illustrates the Average Response Time (milliseconds) and I/O Request Throughput at 100%, 95%, 90%, 80%, 50%, and 10% of the workload level used to generate the SPC-1 IOPS™ metric.

The Average Response Time measured at the any of the above load points cannot exceed 30 milliseconds or the benchmark measurement is invalid.



Response Time – Throughput Data

	10% Load	50% Load	80% Load	90% Load	95% Load	100% Load
I/O Request Throughput	15,246.10	76,248.14	122,017.26	137,238.82	144,845.98	152,478.90
Average Response Time (ms):						
All ASUs	2.25	4.95	6.95	7.79	8.33	12.41
ASU-1	2.99	6.29	8.63	9.54	10.07	13.63
ASU-2	2.91	7.80	11.19	12.46	13.19	17.20
ASU-3	0.41	0.85	1.54	2.03	2.52	7.73
Reads	4.93	11.00	15.00	16.38	17.04	19.67
Writes	0.51	1.00	1.71	2.19	2.66	7.68

Differences between the Tested Storage Configuration (TSC) and Priced Storage Configuration

There were no differences between the TSC and Priced Storage Configuration.

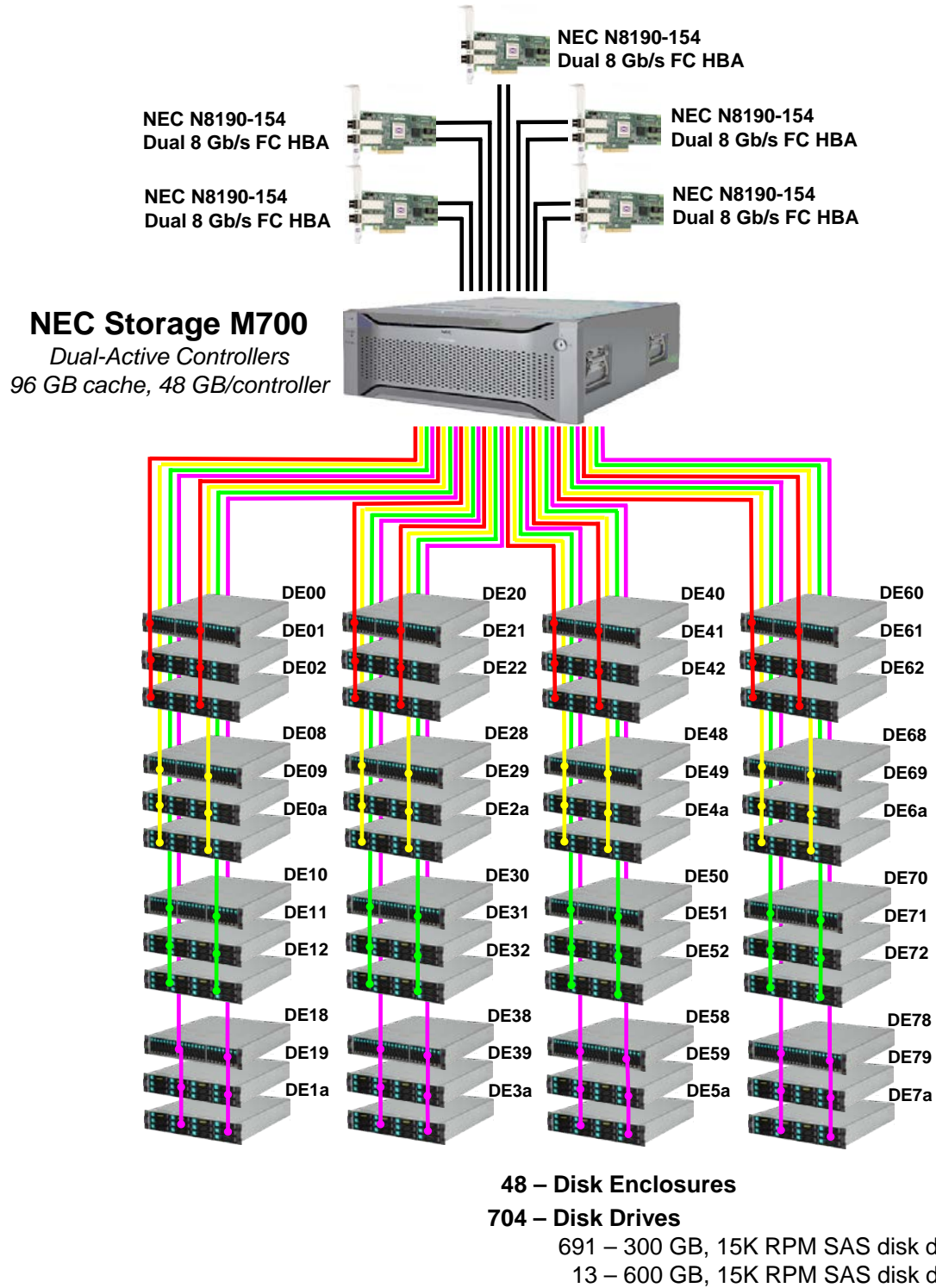
Priced Storage Configuration Pricing

PART#	Product Name	Qty	Unit List Price	Extended LP	Discount	Discounted Price
NF5371-SB00E	M700 Disk Array Unit (includes 1 x NF5371-SD01WE (Disk Port Expansion), 8 x NF9120-SJ73 (Mini SAS Conversion cable(1m)))	1	\$108,096.00	\$108,096.00	20.0%	\$86,476.80
NF5371-SF02WE	M700 Host Port Expansion(2X8Gb FC 4-Port)	4	\$4,686.00	\$18,744.00	20.0%	\$14,995.20
NF5371-SD01WE	M700 Disk Port Expansion (SAS 8Port)	3	\$3,564.00	\$10,692.00	20.0%	\$8,553.60
NF5371-SC03E	M700 Standard Cache Memory(96GB)	1	\$5,321.00	\$5,321.00	20.0%	\$4,256.80
NF5321-SM775E	SAS Disk Drive(2.5", 15krpm/300GB, 6Gbps)	384	\$395.00	\$151,680.00	20.0%	\$121,344.00
NF5321-SE71E	Disk Enclosure(2.5", 6Gbps)	16	\$3,383.00	\$54,128.00	20.0%	\$43,302.40
NF5321-SM725E	SAS Disk Drive(3.5", 15krpm/300GB, 6Gbps)	307	\$440.00	\$135,080.00	20.0%	\$108,064.00
NF5321-SM728E	SAS Disk Drive(3.5", 15krpm/600GB, 6Gbps)	13	\$540.00	\$7,020.00	20.0%	\$5,616.00
NF5321-SE70E	Disk Enclosure(3.5", 6Gbps)	32	\$3,288.00	\$105,216.00	20.0%	\$84,172.80
NF9120-SJ73	Mini SAS conversion cable(3m)	12	\$636.00	\$7,632.00	20.0%	\$6,105.60
N8190-154	8Gbps Dual Port Fibre Channel HBA	5	\$1,355.00	\$6,775.00	10.0%	\$6,097.50
FC cable	FC cable	10	\$100.00	\$1,000.00	10.0%	\$900.00
Power Cord	Power Cord (10 ft.)	100	\$18.20	\$1,820.00	10.0%	\$1,638.00
Power Strips	Power Strips (8 outlets)	13	\$78.00	\$1,014.00	10.0%	\$912.60
RACK	Rack 42U	3	\$1,799.00	\$5,397.00	10.0%	\$4,857.30
UF5M01-700600AM	SW, STORAGE BASEPRODUCT M700	1	\$0.00	\$0.00	20.0%	\$0.00
UF5206-0060W0AM	SW, PATH MANAGER FOR WINDOWS, M700	1	\$1,123.00	\$1,123.00	20.0%	\$898.40
Q24-DN000000013775	3Years Upgraded Platinum Warranty for M700 Disk Array Unit	1	\$14,417.00	\$14,417.00	15.0%	\$12,254.45
Q24-DN000000013782	3Years Upgraded Platinum Warranty for M700 Host Port(8Gb FC 8Port)	4	\$1,640.00	\$6,560.00	15.0%	\$5,576.00
Q24-DN000000013803	3Years Upgraded Platinum Warranty for M700 Disk Port (SAS 8Port)	3	\$1,247.00	\$3,741.00	15.0%	\$3,179.85
Q24-DN000000013856	3Years Upgraded Platinum Warranty for M700 Standard Cache Memory(96GB)	1	\$1,862.00	\$1,862.00	15.0%	\$1,582.70
Q24-DN000000008386	3YR Upgraded to Platinum Warranty M100 HDD 2.5" 15K 300GB 6Gbps	16	\$300.00	\$4,800.00	15.0%	\$4,080.00
Q24-DN000000006695	3YR Upgraded to Platinum Warranty M100 DiskExp2.5"6Gbps	16	\$846.00	\$13,536.00	15.0%	\$11,505.60
Q24-DN000000006752	3YR Upgraded to Platinum Warranty M100 HDD 3.5" 15K 300GB 6Gbps	31	\$300.00	\$9,300.00	15.0%	\$7,905.00
Q24-DN000000006754	3YR Upgraded to Platinum Warranty M100 HDD 3.5" 15K 600GB 6Gbps	2	\$300.00	\$600.00	15.0%	\$510.00
Q24-DN000000006694	3YR Upgraded to Platinum Warranty M100 DiskExp3.5"6Gbps	32	\$822.00	\$26,304.00	15.0%	\$22,358.40
Q24-DN000000061141	3 Years Upgraded Platinum Warranty for Mini SAS conversion cable (1m x 2)	4	\$171.00	\$684.00	15.0%	\$581.40
Q24-DN000000061148	3 Years Upgraded Platinum Warranty for Mini SAS conversion cable (3m x 2)	6	\$222.00	\$1,332.00	15.0%	\$1,132.20
Q24-DN000000013974	3 Years Upgraded Platinum SW Maintenance for M700 Storage Base SW	1	\$20,071.00	\$20,071.00	15.0%	\$17,060.35
Q24-DN000000061692	3 Years Upgraded Platinum SW Maintenance for M-series PathManager_Windows	1	\$351.00	\$351.00	15.0%	\$298.35
Total				\$724,296.00		\$586,215.30

The above pricing includes hardware maintenance and software support for three years, 7 days per week, 24 hours per day. The hardware maintenance and software support provides the following:

- Acknowledgement of new and existing problems with four (4) hours.
- Onsite presence of a qualified maintenance engineer or provision of a customer replaceable part within four (4) hours of the above acknowledgement for any hardware failure that results in an inoperative Priced Storage Configuration that can be remedied by the repair or replacement of a Priced Storage Configuration component.

Priced Storage Configuration Diagram



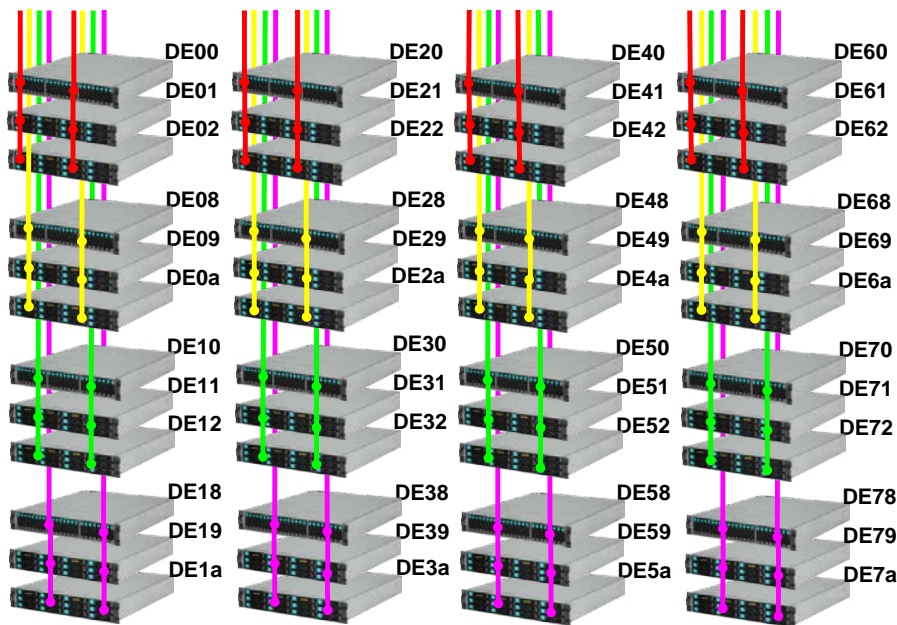
The distribution of disk drives to disk enclosures is documented on page [11](#).

Priced Storage Configuration Components

Priced Storage Configuration:
5 – N8190-154 dual 8 Gb/s FC HBAs
NEC Storage M700 dual controllers – Active-Active 48 GB cache per controller <i>(96 GB total)</i> 2 – FC 2x4-port Host Port Expansion per controller <i>(8 Gbps, 4 Host Port Expansions total)</i> 16 – 8 Gbps front-end connections per controller <i>(32 total, 10 used)</i> 2 – SAS 8 port Disk Port Expansion per controller <i>(6 Gbps, 4 Disk Port Expansions total)</i> 16 – 6 Gbps SAS backend connections per controller <i>(32 total, 32 used)</i>
48 – Disk Enclosures 32 – enclosures, 6 Gbps <i>(3.5" disk drives)</i> 16 – enclosures, 6 Gbps <i>(2.5" disk drives)</i>
704 – 15K RPM SAS disk drives 384 – 2.5" 300 GB disk drives 307 – 3.5" 300 GB disk drives 13 – 3.5" 600 GB disk drives
3 – 42U Racks with 13 Power Strips <i>(8 outlets per strip)</i>

Distribution of Disk Drives to Disk Enclosures

DE00 (2.5"): 24 - 300 GB disk drives	DE20 (2.5"): 24 - 300 GB disk drives	DE40 (2.5"): 24 - 300 GB disk drives	DE60 (2.5"): 24 - 300 GB disk drives
DE01 (3.5"): 12 - 300 GB disk drives	DE21 (3.5"): 12 - 300 GB disk drives	DE41 (3.5"): 12 - 300 GB disk drives	DE61 (3.5"): 12 - 300 GB disk drives
DE02 (3.5"): 8 - 300 GB disk drives	DE22 (3.5"): 8 - 300 GB disk drives	DE42 (3.5"): 8 - 300 GB disk drives	DE62 (3.5"): 8 - 300 GB disk drives
DE08 (2.5"): 24 - 300 GB disk drives	DE28 (2.5"): 24 - 300 GB disk drives	DE48 (2.5"): 24 - 300 GB disk drives	DE68 (2.5"): 24 - 300 GB disk drives
DE09 (3.5"): 12 - 300 GB disk drives	DE29 (3.5"): 12 - 300 GB disk drives	DE49 (3.5"): 12 - 300 GB disk drives	DE69 (3.5"): 12 - 300 GB disk drives
DE0A (3.5"): 8 - 300 GB disk drives	DE2A (3.5"): 8 - 300 GB disk drives	DE4A (3.5"): 8 - 300 GB disk drives	DE6A (3.5"): 8 - 300 GB disk drives
DE10 (2.5"): 24 - 300 GB disk drives	DE30 (2.5"): 24 - 300 GB disk drives	DE50 (2.5"): 24 - 300 GB disk drives	DE70 (2.5"): 24 - 300 GB disk drives
DE11 (3.5"): 12 - 300 GB disk drives	DE31 (3.5"): 12 - 300 GB disk drives	DE51 (3.5"): 12 - 300 GB disk drives	DE71 (3.5"): 12 - 300 GB disk drives
DE12 (3.5"): 8 - 300 GB disk drives	DE32 (3.5"): 8 - 300 GB disk drives	DE52 (3.5"): 8 - 300 GB disk drives	DE72 (3.5"): 3 - 300 GB disk drives 5 - 600 GB disk drives
DE18 (2.5"): 24 - 300 GB disk drives	DE38 (2.5"): 24 - 300 GB disk drives	DE58 (2.5"): 24 - 300 GB disk drives	DE78 (2.5"): 24 - 300 GB disk drives
DE19 (3.5"): 12 - 300 GB disk drives	DE39 (3.5"): 12 - 300 GB disk drives	DE59 (3.5"): 12 - 300 GB disk drives	DE79 (3.5"): 12 - 300 GB disk drives
DE1A (3.5"): 8 - 300 GB disk drives	DE3A (3.5"): 8 - 300 GB disk drives	DE5A (3.5"): 8 - 300 GB disk drives	DE7A (3.5"): 8 - 600 GB disk drives



48 – Disk Enclosures

32 – enclosures (3.5" disk drives)
16 – enclosures (2.5" disk drives)

704 – Disk Drives

691 – 300 GB, 15K RPM SAS disk drives
13 – 600 GB, 15K RPM SAS disk drives