

Vendor System	Dell Compellent	Dell EqualLogic PS	EMC VNX	EMC CLARiiON CX4	Fujitsu Eternus DX440	HDS AMS
Basics						
Models	SC8000	PS6000E (7.2 SATA) PS6500E (7.2 SATA) PS6000X (10K SAS) PS6000XV (15K SAS) PS6000S (SSD) PS6000XVS (SSD+SAS)	VNX5100, VNX5300, VNX5500, VNX5700, VNX7500	CX4 model 120 CX4 Model 240 CX4 model 480 CX4 model 960	DX400 - model 410 DX400 - model 440	AMS 2100 AMS 2300 AMS 2500 AMS 2500DC
Number of Controllers	1, 2	6000E: 1 - 24 6000 : 2 - 24	2 (Storage Processors)	2	2	2
Drive number - Max by Model	FC Drives: 1,232 SAS Drives: 960	PS6000 : 16*12 = 192 PS6500 : 48*12 = 576	5100: 4 - 75 5300: 4 - 125 5500: 4 - 250 5700: 4 - 500 7500: 4 - 1000	120: 5 - 120 240: 5 - 240 480: 5 - 480 960: 5 - 960	410: 8 - 210 440: 8 - 420	2100: 4-159 2300: 4-240 2500: 4-480 2500DC: 4-480
Max physical capacity (Raw)	FC Drives: 739 TB SAS Drives: 960 TB	6000E: 2 - 192 TB 6500E: 24 - 576 TB 6000X: 6.4 - 76.8 TB 6000XV: 4.8 - 86.4 TB 6000S: 0.6 - 9.6 TB	5100: 225 TB 5300: 375 TB 5500: 750 TB 5700: 1,500 TB 7500: 3,000 TB	120: 235 TB 240: 459 TB 480: 939 TB 960: 1,910 TB	410: 414 TB 440: 834 TB	2100: 477 TB 2300: 720 TB 2500: 1,440 TB 2500DC: 480 TB
Drives Currently Available						
SSD Max Drives / max capacity	480 / 96 TB	6000S: 16 / 1.6 TB 600XVS: 8 / 0.8 TB	--	--	--	2100: 30 2300: 60 2500 / 2500DC: 60 / 30
SSD	200, 400 GB	50, 100 GB	100 GB, 200 GB	CX4-480/960: 200, 400 GB	200, 400 GB	200 GB SAS
FC / SAS 15k	300, 600 GB 3.5" 146 GB 2.5"	6000XV: 500, 450, 600 GB	3.5": 300, 600 GB	300, 450, 600 GB	300, 450, 600 GB	300, 600 GB

Vendor System	Dell Compellent	Dell EqualLogic PS	EMC VNX	EMC CLARiiON CX4	Fujitsu Eternus DX440	HDS AMS
FC / SAS 10k	450, 600 GB 3.5" 450, 600, 900 GB 2.5"	6000X: 450, 600 GB	3.5": 300, 600 GB 2.5": 300, 600, 900 GB	400 GB	--	300, 600 GB
FATA, NL-SAS, SATA 7.2k	NL-SAS 1, 2, 3 TB 3.5" 1 TB 2.5"	6000E, 6010E: 250, 500 GB, 1 TB, 2 TB	3.5": 1, 2, 3 TB NL-SAS	NL-SAS 1TB, 2 TB	500 GB, 1, 2 TB	1 TB, 2 TB SATA II
Drive intermix (per drive encl)	Yes	No	Yes	Yes	Yes	Yes
RAID Configurations						
RAID Levels	0, 5, 6 (data initially written to RAID 10)	5, 6, 50, 10	0, 1, 3, 5, 6, 10	0, 1, 3, 5, 6, 10	0, 1, 5, 6, 10	0, 1, 5, 6, 10
RAID Intermix	Yes	No	Yes	Yes	Yes	Yes
Max drives per RAID group	Yes	48	16	16	32	30
Global hot spare	Configurable	Yes	Yes	Yes	Yes	Yes
Redundant hot swap	Yes	Yes	Yes	Yes	Yes	Yes
Cache						
Data Cache Max - per node	4 GB	PS6000: 4 GB / cntrlr PS6000: 4 - 64 GB	System Cache & Flash Cache (SSDs)	120: 1.2 GB 240: 2.5 GB 480: 9.0 GB 960: 21.5 GB	410: 8 GB 440: 32 GB	2100: 4-8 GB 2300: 8-16 GB 2500: 16-32 GB 2500DC: 32 GB
Increment	Not Applicable	2 or 4 w/ controller	Not Applicable	Not Applicable	400: N/A 600: 8 GB	Not specified
Dynamic Cache Partitioning	No	No	No	No	No	Yes
System Cache - per node	16 - 64 GB	No Spec	5100: 8 GB 5300: 16 GB 5500: 24 GB 5700: 36 GB 7500: 48 GB	120: 6 GB 240: 8 GB 480: 16 GB 960: 32 GB	No Spec	2100: 4-8 GB 2300: 8-16 GB 2500: 16-32 GB 2500DC: 32 GB
Cache binding option	No	No	No	No	No	Yes
Performance						

Vendor System	Dell Compellent	Dell EqualLogic PS	EMC VNX	EMC CLARiiON CX4	Fujitsu Eternus DX440	HDS AMS
Total bandwidth (GB/sec)	No Spec	No Spec	No Spec	No Spec	No Spec	No Spec Backend - 9.6 GB/s
Max IOPS	No Spec	No Spec	No Spec	120: ? 240: 275,000 480: 400,000 960: 550,000	No Spec	2100/2300: 400,000 2500/2500DC: 900,000
SPC-1	No	No	No	No	model <u>440</u> : 97,498	2100: 31,499 2300: 42,503 2500: 89,492
SPC-2	No	No	No	No	model <u>500</u> : 1,986	No
LUN's						
Max LUN's / System	No Spec	6000: 1024	5100: 512 5300: 2,048 5500: 4,096 5700: 4,096 7500: 8,192	120: 1,024 240: 2,048 480: 4,096 960: 8,192	4,096	2100: 2,048 2300/2500/2500DC : 4,096
Max LUN size	10 PB	2 TB / node 15 TB / system	2 TB	2 TB	32 TB concatenated	60 TB
Wide Striping	Yes	Yes	Yes	Yes	Yes	Yes
Host Connectivity						
Max Fibre Channel Ports	16 @ 8 Gb/s	Not Available	5100: 8 @ 8 Gb 5300, 5500: 16 @ 8 Gb 5700: 24 @ 8 Gb 7500: 32 @ 8 Gb	120: 12 @ 8 Gb 240: 12 @ 8 Gp 480: 16 @ 8 Gb 960: 24 @ 8 Gb	410: 8 @ 8 Gb 440: 16 @ 8 Gb	2100: 4 2300: 16 2500: 16 2500DC: 16 4, 8 Gb/s

Vendor System	Dell Compellent	Dell EqualLogic PS	EMC VNX	EMC CLARiiON CX4	Fujitsu Eternus DX440	HDS AMS
Max iSCSI Ports	10 @ 1Gb/s 10 @ 10Gb/s	6000: 4/controller @ 1 Gb	5300: 8 @ 1 Gb or 4@10 Gb 5500: 16 @ 1 Gb or 8@10 Gb 5700: 16 @ 1 Gb or 12@10 Gb 7500: 16 @ 1 Gb or 12@10 Gb	120: 8 @ 1 Gb or 4@1 + 4@10 Gb 240: 12 @ 1 Gb or 8@1 + 4@10 Gb 480: 12 @ 1 Gb or 4@1 + 8@10 Gb 960: 16 @ 1 Gb or 8@1 + 8@10 Gb	410: 4 @ 1 Gb 440: 8 @ 1 Gb	2100: 4 2300: 4 2500: 8 2500DC: 8 1 or 10Gb/s
Max SAS	N/A		N/A			No
Max FCoE	10 @ 10Gb/s	No	5300: 4 5500: 8 5700: 12 7500: 16	Future - 2010	No	No
NAS Capability	Yes - FS8600	No	Yes	No	No	No - external
Back-end Connectivity						
Max back-end interfaces	16 FC, 10 SAS	No Spec	6 GB/s SAS 5100, 5300 2: 5500: 6 5700: 4 7500: 4 or 8	120: 2 @ 4 Gb 240: 4 @ 4 Gb 480: 8 @ 4 Gb 960: 16 @ 4 Gb	400: 8 @ 4 Gb 600: 16 @ 4 Gb	2100: 8 2300: 16 2500 / 2500DC: 32
Controller to disk enclosure interface	4 or 8 Gb/s FC, 6 Gb/s SAS	Internal SAS	6 Gb/s SAS	4 Gb/s FC	4 Gb/s FC	3 Gb/s SAS
Supported Operating Systems						
AIX	Yes	Yes	Yes	Yes	Yes	Yes
Apple Mac OS	Yes	Yes	--	--	--	Yes
HP-UX	Yes	Yes	Yes	Yes	Yes	Yes
NetWare	Yes	Yes	--	--	--	Yes

Vendor	Dell	Dell	EMC	EMC	Fujitsu	HDS
System	Compellent	EqualLogic PS	VNX	CLARiiON CX4	Eternus DX440	AMS
Open VMS	No	--	--	--	--	Yes
OS/400 - System i	No	No	No	No	No	No
RHEL	Yes	Yes	Yes	Yes	Yes	Yes
SuSE	Yes	Yes	Yes	Yes	Yes	Yes
Sun Solaris	Yes	Yes	Yes	Yes	Yes	Yes
TRU64	Yes	--	--	--	--	Yes
Vmware ESX/ESXi	Yes	Yes	Yes	Yes	Yes	Yes
Windows Server 2000	Yes	Yes	Yes	Yes	--	Yes
Windows Server 2003	Yes	Yes	Yes	Yes	Yes	Yes
Windows Server 2008	Yes	Yes	Yes	Yes	Yes	Yes
Oracle 10G, 11G						
Xen	Yes	Yes	--	--	--	--
Physical						
Min / Max Controller Size (U)	(1 or 2) x 3U = 3 or 6U	Controller enclosure merged with disk controller	5100,5300,5500: 3U 5700,7500: 2U	120, 240, 480: 2U 960: 4U	2 controllers are contained in 4U	2 x 4U = 8U
Disk Chassis Size (U)	3U and 2U	6500E: 4 U, all other are 3 U	25 2.5" drives - 2U 15 3.5" drives - 3U 60 2.5" drives - 4U	3	3	3U or 4U for high density option
Disk Density per enclosure	12, 24	6500E: 48; all others are 16	25 / 15 / 60	15	15	15 or Up to 48 in High Density Drawer
Controller enclosure may hold disks	2 for boot	Yes	Yes - 5100, 5300,	No	No	Yes
Multi-Path I/O SW						
Windows	Yes	Yes	Yes	Yes	Yes	Yes
Linux	Yes	Yes	Yes	Yes	Yes	Yes
Solaris	Yes	Yes	Yes	Yes	Yes	Yes
AIX	Yes		Yes	Yes	Yes	Yes
HP-UX	Yes		Yes	Yes	Yes	Yes
Vmware	Yes	Yes	Yes	Yes	Yes	Yes
Host Integration						
Active/Active Controller pairs	Yes	Yes	Yes	Yes	Yes	Yes
FC - Symmetric LUN Access	No	Yes	No	No	Yes	Yes

Vendor	Dell	Dell	EMC	EMC	Fujitsu	HDS
System	Compellent	EqualLogic PS	VNX	CLARiiON CX4	Eternus DX440	AMS
FC - ALUA - Asymmetric LUN Access	No		Yes	Yes		n/a
Clustering of A/A pairs	Yes	Yes	No	No	Yes	No
Microsoft VSS provider	Yes	Yes	Yes	Yes	Yes	Yes
Microsoft VDS interface	Yes	Yes	Yes	Yes	Yes	Yes
Storage Management						
Element Mgr.	Enterprise Manager	PS Group Manager	Unisphere	Unisphere	ETERNUSmgr	Storage Navigator
CLI	Yes	Yes	Yes	Yes		Yes
SMI-S	No	No	Yes	Yes	Yes	Yes
Data Protection						
Point In Time Snapshots (PIT)	Pointers to data	Copy on write	Copy on Write	Copy on Write	Copy on write	Copy on write
Max # PIT Copies per array	"unlimited"	10,000	5100, 5300 = 512 5500 = 512 5700 = 1024 7500 = 2048	CX4-120 = 512 CX4-240 = 512 CX4-480 = 1024 CX4-960 = 2048	varies by model, max. 16384	Space limited only
Max # PIT copies per LUN	"unlimited"	512	8	8		32
Local Replication (within array)						
# Local Clones	via "Replay" snapshots		5100, 5300 = 256 5500 = 512 5700 = 1024 7500 = 2048	CX4-120 = 256 CX4-240 = 512 CX4-480 = 1024 CX4-960 = 2048	varies by model, max. 16,384	16,384
Resync Clone	n/a	No	Yes	Yes	Yes	Yes
Read / Write Clones	Yes	Yes	Yes	Yes	Yes	Yes
Remote Replication (array to array)						
Replication Connectivity	FC or iSCSI	IP	FC, IP	FC, IP	FC or IP	FC, IP
Synchronous Replication	No	Yes	Yes	Yes	Yes	Yes
Async Replication	from snapshots	Yes	Yes	Yes	Yes	based on snapshots
Write Order Consistency	implicit	Yes	Yes	Yes	Yes	implicit
Consistency Groups	Yes	Yes	100	100	Yes	Yes
Bandwidth Throttle	No	No	Yes - limited	Yes - limited	Yes	No
Delta Replication	implicit	Yes	Yes	Yes	Yes	implicit
WAN Acceleration	No	Yes	Yes	Yes	Yes	No
In-flight Encryption	No	No	No	No	Yes	No
Multi-hop (cascade)	No	No	No	No	No	No
3 Way replication	No	No	Yes with restrictions	Yes with restrictions	No	No

Vendor	Dell	Dell	EMC	EMC	Fujitsu	HDS
System	Compellent	EqualLogic PS	VNX	CLARiiON CX4	Eternus DX440	AMS
Multiple Virtual Domains / Tenants						
Role based access	No	No	Yes	Yes	No	No
Sub Administration capabilities	No	No	No	No	No	No
Resource allocation / Domain	No	No	No	No	No	Yes
Other Advanced Features						
Data at rest Encryption	No	No	Yes	Yes	Yes	No
Data Reduction	No	No	Post store compression	No	No	No
Thin Provisioning (see note)	Yes	Yes	Yes	Yes	No	Yes
Disk Spin Down	No	No	Yes	Yes	Yes	Yes
Automated Tiering within box	Yes	Yes	optional, w/FAST	optional, w/FAST	No	No
Frequency of Tiered Movement	Dynamic	N/A	Policy	Policy	N/A	n/a
Level of Tiered Movement	Block	N/A	Sub LUN	Sub LUN	N/A	n/a
Number of Tiers	User defined	N/A	User defined	User defined	N/A	n/a
VMware SRM integration	Yes	Yes	Yes	Yes	Yes	Yes
VMware VAAI						
HW Zero Copy	Yes	No	Yes	Yes	No	Yes
HW Lock Reservation	Yes	No	Yes	Yes	No	Yes
HW Accelerated Copy	Yes	No	Yes	Yes	No	Yes



Vendor	Dell	Dell	EMC	EMC	Fujitsu	HDS
System	Compellent	EqualLogic PS	VNX	CLARiiON CX4	Eternus DX440	AMS
Notes						
			5500F - all flash version			

Vendor	HDS		HP 3PAR	HP Lefthand	HP EVA	IBM
System	HUS - Block Access		F-Class	P4000 G2 SAN	P6000	DS4000
Basics						
Models	HUS 110 130	HUS HUS 150	F200 F400	P4300 MDL Starter P4300 SAS Starter P4500 Virtual SAN P4500 Multi-site SAN P4500 Scalable SAN P4800 BladeSys SAN P4900 SSD SAN	P6300 (P6350) P6500 (P6550)	DS4700 modes 70, 72 DS4800 models, 80, 82A, 84A, 88A
Number of Controllers	2 - Block		F200: 2 F400: 2, 4	2 - 32	2	2
Drive number - Max by Model	110: 4-120 130: 4-264 SFF, 252 LFF 150: 4-960	4-	F200: 16 - 192 F400: 16 - 384	16-256 16-256 24-384 48-384 60-384 70-1120 16-256	P6300: 8 - 250 P6500: 8 - 450	4700: 112 4800: 224
Max physical capacity (Raw)	110: 360 TB 130: 756 TB 150: 2,880 TB		F200: 128 TB F400: 384 TB	256TB 230TB 230TB 768TB 2,240TB 102.4TB	P6300: 750 TB P6500: 1,350 TB	4700: 112 TB 4800: 224 TB
Drives Currently Available						
SSD Max Drives / max capacity	Same as HDD		8 - 64 SSD / 3.2 TB	256 / 102.4TB	25	--
SSD	200, 400 GB SAS		50, 100, 200 GB	400GB MLC SAS	200, 400 GB	
FC / SAS 15k	300 GB		300, 600 GB	P4300: 300, 450GB P4500: 300, 450,600GB P4800: 450,60GB	146, 300 GB	146, 300, 450 GB

Vendor System	HDS HUS - Block Access	HP 3PAR F-Class	HP Lefthand P4000 G2 SAN	HP EVA P6000	IBM DS4000
FC / SAS 10k	300, 600, 900 GB	--		300,450,600, 900 GB	--
FATA, NL-SAS, SATA 7.2k	2, 3 TB NL-SAS	SATA 1, 2 TB	NL-SAS P4300: 1TB P4500: 1, 2TB	SAS: 500GB, 1TB SFF SAS 2, 3TB LFF	750 GB, 1 TB
Drive intermix (per drive encl)	Yes	Yes	Yes	Yes	Yes
RAID Configurations					
RAID Levels	0, 1, 5, 6, 10	0, 1, 5, 6	5, 6, 10	0, 1, 5, 6, 50, 10	0, 1, 3, 5, 6, 10
RAID Intermix	Yes	Yes	No	Yes	Yes
Max drives per RAID group	30	16	Unlimited	Unclear	Unlimited
Global hot spare	Yes	Yes	Yes	Yes	Yes
Redundant hot swap	Yes	Yes	Yes	Yes	Yes
Cache					
Data Cache Max - per node	110: 8 GB 130: 16 GB 150: 32 GB	F200: 12 GB F400: 12 - 24 GB	P4300: 1GB P4500: 2GB P4500 Cap: 2.56GB P4800: 1GB P4900: 2GB	P6300: 2GB P6500: 4GB	4700: 2 - 4 GB 4800: 4 - 16 GB
Increment	Not specified	12 GB	N/A	N/A	4 GB
Dynamic Cache Partitioning	Yes	No	No	No	No
System Cache - per node	110: 8 GB 130: 16 GB 150: 32 GB	F200: 8 GB F400: 8 - 16 GB	P4300: 8GB P4500: 12GB P4500 Cap: 30GB P4800: 48GB P4900: 12GB	No Spec	4700: 256 MB 4800: 1 - 2 GB
Cache binding option	Yes	No	No	No	No
Performance					

Vendor System	HDS HUS - Block Access	HP 3PAR F-Class	HP Lefthand P4000 G2 SAN	HP EVA P6000	IBM DS4000
Total bandwidth (GB/sec)	Read 8.7 GB/s Write 2.9 GB/s Backend - 19.2 GB/s	F200: 12 GB/s F400: 24 GB/s	P4300: 448MB/s P4500: 448MB/s P4500 Scalable: 1.12GB/s	1.7 GB/s	4700: 1.55 4800: 1.7
Max IOPS	RAID-5 Random Read 68,800 Write 20,300	F200: 46,800 F400: 93,600	P4300: 120,000 P4500: 120,000 P4500 Scalable: 300,000	P6300: 35,000 P6500: 61,000	4700: 120,000 4800: 375,000
SPC-1	N/A	F400: 93,050	No	No	No
SPC-2	No	No	No	No	No
LUN's					
Max LUN's / System	110: 2,048 130/150: 4,096	32,000	1,500	2,047	4700: 1,024 4800: 2,048
Max LUN size	128 TB	16 TB	Not Specified	32TB	2 TB+
Wide Striping	Yes	Yes	Yes	Yes	Yes
Host Connectivity					
Max Fibre Channel Ports	110: 8 @ 8Gb/s 130: 16 @ 8Gb/s 150: 16 @ 8Gb/s	F200: 0 - 12 F400: 0 - 24	--	8 @ 8 Gb/s	4700: 8 @ 8 Gb 4800: 8 @ 8 Gb

Vendor System	HDS HUS - Block Access	HP 3PAR F-Class	HP Lefthand P4000 G2 SAN	HP EVA P6000	IBM DS4000
Max iSCSI Ports	110: 4 130: 8 150: 8 1 or 10Gb/s	F200: 0 - 8 F400: 0 - 16	P4300: 4@1Gb/s opt 4@10Gb/s P4500VSA: 4@1Gb/s opt 4@10Gb/s P4500 Scalable: 4@10Gb/s P4900: 4@10Gb/s 4@1Gb/s	8 @ 1 Gb/s or @ 10 Gb/s 4	Not Available
Max SAS	No		--	N/A	
Max FCoE	No	No	--	4 @ 10 Gb/s	No
NAS Capability	Yes - see NAS matrix	No	No - Requires additional server	No	No
Back-end Connectivity					
Max back-end interfaces	110: 8 130: 16 150: 32	F: 8 @ 4 Gb	4 - SAS @ 6Gb/s	P6300: 8 6 Gb/s lanes : P6500: 16 6 Gb/s lanes	4700: 4 @ 4 Gb 4800: 8 @ 4 Gb
Controller to disk enclosure interface	6 Gb/s SAS	4 Gb/s FC	6Gb/s SAS	6 Gb/s SAS	4 Gb/s FC
Supported Operating Systems					
AIX	Yes	Yes	Yes	Yes	Yes
Apple Mac OS	Yes	--	Yes	Yes	--
HP-UX	Yes	Yes	Yes	Yes	Yes
NetWare	Yes	--	Yes	Yes	Yes

Vendor	HDS	HP 3PAR	HP Lefthand	HP EVA	IBM
System	HUS - Block Access	F-Class	P4000 G2 SAN	P6000	DS4000
Open VMS	Yes	--	--	Yes	No
OS/400 - System i	No	No	--	No	Yes
RHEL	Yes	Yes	Yes	Yes	Yes
SuSE	Yes	Yes	Yes	Yes	Yes
Sun Solaris	Yes	Yes	Yes	Yes	Yes
TRU64	Yes	--	--	--	Yes
Vmware ESX/ESXi	Yes	Yes	Yes	Yes	Yes
Windows Server 2000	Yes	Yes	Yes	Yes	Yes
Windows Server 2003	Yes	Yes	Yes	Yes	Yes
Windows Server 2008	Yes	Yes	Yes	Yes	Yes
Oracle 10G, 11G			Yes	Tes	
Xen	Yes	--	Yes	Yes	--
Physical					
Min / Max Controller Size (U)	110: 2U 2U 130: 150: 3U	F200: 2 x 4U = 8U F400: (2 or 4) x 4U = 8 or 16U	2 x 2U - 4U	2U	2 controllers are contained in 4U
Disk Chassis Size (U)	2U or 4U for high density option	3U	2U - 4U	2U	3
Disk Density per enclosure	15 or Up to 48 in High Density Drawer	16	12, 16, 24	25-Dec	16
Controller enclosure may hold disks	Yes - HUS 110 & 130	No	Yes	No	4700: Yes / 4800: No
Multi-Path I/O SW					
Windows	Yes	Yes	MPIO	MPIO	SDD, MPIO
Linux	Yes	Yes	iSCSI Initiator	Yes	SDD, DMMP
Solaris	Yes	Yes	iSCSI Initiator	Yes	SDD, MPxIO
AIX	Yes	Yes	iSCSI Initiator	Yes	SDD
HP-UX	Yes	Yes	iSCSI Initiator	Yes	SDD, Pvlinks/SecurePath
Vmware	Yes	Yes	Yes	Yes	Yes
Host Integration					
Active/Active Controller pairs	Yes	Yes	N-way	Yes	Yes
FC - Symmetric LUN Access	Yes	Yes	n/a	No	Yes

Vendor	HDS	HP 3PAR	HP Lefthand	HP EVA	IBM
System	HUS - Block Access	F-Class	P4000 G2 SAN	P6000	DS4000
FC - ALUA - Asymmetric LUN Access	n/a	n/a	n/a	Yes	Yes
Clustering of A/A pairs	No	Yes	N-Way	No	No
Microsoft VSS provider	Yes	Yes	Yes	Yes	Yes
Microsoft VDS interface	Yes	No	No	Yes	Yes
Storage Management					
Element Mgr.	Navigator 2	Mgmt Console	Centralized Mgt Console	CommandView EVA	DS Storage Manager
CLI	Yes	Yes	Yes	Yes	Yes
SMI-S	Yes	Yes	No	Yes	Yes
Data Protection					
Point In Time Snapshots (PIT)	Copy on write	Copy on write	Copy on write	Copy on write	Copy on write
Max # PIT Copies per array	100,000	8,000 less # of base virtual volumes	Only limited by capacity	2,048	1,024
Max # PIT copies per LUN	1,024	500 r/o, 256 r/w	Capacity limit	64	16
Local Replication (within array)					
# Local Clones	16,384	8,000 less # of base virtual volumes	Only limited by capacity	2,048	With Volume Copy - up to 511 copies
Resync Clone	Yes	Yes	Yes	Yes	No
Read / Write Clones	Yes	Yes	Yes	Yes	Yes
Remote Replication (array to array)					
Replication Connectivity	FC, IP	IP or FC	IP	FC, IP	FC
Synchronous Replication	Yes	Yes	No	Yes	Yes
Async Replication	based on snapshots	Yes	Yes	Yes	Yes
Write Order Consistency	implicit	Yes	with VSS	Yes	Yes
Consistency Groups	Yes	Yes	with VSS	Yes	Yes
Bandwidth Throttle	No	No	Yes	No	No
Delta Replication	implicit	Yes	Yes	No	only on resync
WAN Acceleration	No	No	No	No	No
In-flight Encryption	No	No	No	No	No
Multi-hop (cascade)	No	No	No	Yes	No
3 Way replication	No	Yes	No	No	No

Vendor	HDS	HP 3PAR	HP Lefthand	HP EVA	IBM
System	HUS - Block Access	F-Class	P4000 G2 SAN	P6000	DS4000
Multiple Virtual Domains / Tenants					
Role based access	No	Yes	No	No	No
Sub Administration capabilities	No	Yes	No	No	No
Resource allocation / Domain	Yes	Yes	No	No	Yes
Other Advanced Features					
Data at rest Encryption	No	No	No	No	Yes
Data Reduction	No	No	No	No	No
Thin Provisioning (see note)	Yes	Yes	Yes	No	No
Disk Spin Down	Yes	No	No	No	No
Automated Tiering within box	No for block	Yes	No	No	No
Frequency of Tiered Movement	n/a	Dynamic	--	--	n/a
Level of Tiered Movement	n/a	Adaptive	--	--	n/a
Number of Tiers	n/a	User defined	--	--	n/a
VMware SRM integration	Yes	Yes	Yes	No	Yes
VMware VAAI					
HW Zero Copy	Yes	Yes	Yes	Yes	No
HW Lock Reservation	Yes	Yes	Yes	Yes	No
HW Accelerated Copy	Yes	Yes	Yes	Yes	No



Vendor	HDS	HP 3PAR	HP Lefthand	HP EVA	IBM
System	HUS - Block Access	F-Class	P4000 G2 SAN	P6000	DS4000
Notes					



Vendor	IBM	IBM	NetApp	NetApp
System	DS5000	V7000	32X0	E5400
Basics				
Models	DS5100 DS5300	V7000	FAS3210 FAS3240 FAS3270	E5400 60/24/12
Number of Controllers	2	2 - 8 (4 node clusters) + 2 File Modules	2 processors - 4/8/8 cores	2
Drive number - Max by Model	3 - 448 / 20 - 480	2 - 240 per node (960 in cluster)	3210: 240 3240: 600 3270: 960	60 Drive: 20-360 24 Drive: 4 - 384 12 Drive: 4 - 192
Max physical capacity (Raw)	268 TB / 960 TB	32 PB	3210: 720 TB 3240: 1,800 TB 3270: 2,880 TB	1,080 TB
Drives Currently Available				
SSD Max Drives / max capacity	20 / 6 TB	240 / 96 TB	96 / 9.6TB	20 / 6 TB
SSD	200, 400 GB	200, 300, 400 GB	100 GB	2.5" 100,200,400 SLC 200, 800 MLC
FC / SAS 15k	300, 450, 600 GB	146, 300 GB 2.5"	FC: 300, 450, 600GB SAS: 300, 450, 600GB	SAS: 300, 450, 600 GB

Vendor System	IBM DS5000	IBM V7000	NetApp 32X0	NetApp E5400
FC / SAS 10k	300, 450, 600, 900 GB	300, 450, 600, 900 GB	SAS: 450, 600GB	SAS: 300, 450, 600, 900 GB
FATA, NL-SAS, SATA 7.2k	NL-SAS 1, 2, 3 TB LFF 1 TB SFF	1 TB 2.5", 2 TB 3.5", 3 TB 3.5"	SATA 1, 2, 3 TB	NL-SAS 2, 3 TB
Drive intermix (per drive encl)	Yes	Yes	No	Yes
RAID Configurations				
RAID Levels	0, 1, 3, 5, 6, 10	0, 1, 5, 6, 10	4, 6	0, 1, 3, 5, 6, 10 (RAID 6 with DDP)
RAID Intermix	Yes	Yes	Yes (different groups)	Yes
Max drives per RAID group	Unlimited	Yes	R6=28; R4=14	Unlimited
Global hot spare	Yes	Yes	No	Yes
Redundant hot swap	Yes	Yes	Yes	Yes
Cache				
Data Cache Max - per node	5100: 8 or 16 GB 5300: 8 - 64 GB	8 GB	3210: 512GB 3240: 1TB 3270: 2TB	12, 24 GB / cntlr
Increment	8 GB	Fixed per node	512GB or 1TB (depending on model) * (using Flash Cache)	12 GB
Dynamic Cache Partitioning	No	No	?	No
System Cache - per node	4 GB	N/A	3210: 8GB 3240: 16GB 3270: 32GB	4 GB
Cache binding option	No	No	Yes - included	No
Performance				

Vendor System	IBM DS5000	IBM V7000	NetApp 32X0	NetApp E5400
Total bandwidth (GB/sec)	6.4 GB/s	5.5 GB/s Cache, 3.9 GB/s disk read, 2.9 GB/s disk write	No Spec	6.4 GB/s
Max IOPS	5100: 650,000 5300: 700,000	1M IOPS	No Spec	150,000 disk reads 350,000 SSD reads 800,000 cache reads
SPC-1	DS5300: 62,243	No	No	No
SPC-2	DS5300: 5,634	No	No	No
LUN's				
Max LUN's / System	2,048	8,192	4,096	1,024
Max LUN size	2 TB+	256 TB	50/50/70 TB	64TB
Wide Striping	Yes	Yes	Yes	Yes
Host Connectivity				
Max Fibre Channel Ports	5100: 8 @ 8 Gb 5300: 16 @ 8 Gb	8 @ 8 Gb/s	Onboard: 4@ 4 Gb Plus Expansion: 3210: 8@8Gb/20@4Gb 3240/3270: 24@8Gb/52@4Gb	16 @ 8 Gb also InfiniBand - 4 @ 40GB/s

Vendor System	IBM DS5000	IBM V7000	NetApp 32X0	NetApp E5400
Max iSCSI Ports	8 @ 1 Gb/s @ 10 Gb/s	2 4 at 1Gb/s, 4 @ 10Gb/s	Standard: 4 @ 1 Gb Plus Expansion: 3210: 20@1Gb or 8@10Gb 3240/3270: 48@1Gb or 24@10Gb	8 @ 1 Gb/s 2 @ 10 Gb/s
Max SAS		No		No
Max FCoE	No	4 @ 10Gb/s	3210: 8@10Gb 3240/3270: 24@10Gb	No
NAS Capability	No	Yes (GPFS - refer to SONAS in NAS matrix) - 2 10GigE ports for each file module	Yes - details in NAS Matrix	No
Back-end Connectivity				
Max back-end interfaces	5100: 16 @ 4 Gb 5300: 16 @ 4 Gb	FC: 8 @ 8 Gb/s SAS: 2 @ 6 Gb/s	Fibre Channel 3210: 48 @ 4 Gb 3240/3270: 128 @ 4Gb SAS Onboard: 4 @ 6Gb Plus Expansion: 3210: 16@6Gb 3240/3270: 48@6Gb	2 @ 6 Gb/s SAS
Controller to disk enclosure interface	4 Gb/s FC	SAS-2	4 Gb FC (or 6 Gb SAS)	6 Gb/s SAS
Supported Operating Systems				
AIX	Yes	Yes	Yes	Yes
Apple Mac OS	--	Yes	Yes	--
HP-UX	Yes	Yes	Yes	Yes
NetWare	Yes	Yes	--	Yes

Vendor	IBM	IBM	NetApp	NetApp
System	DS5000	V7000	32X0	E5400
Open VMS	No	Yes	--	No
OS/400 - System i	Yes	Yes	No	Yes
RHEL	Yes	Yes	Yes	Yes
SuSE	Yes	Yes	Yes	Yes
Sun Solaris	Yes	Yes	Yes	Yes
TRU64	Yes	No	--	Yes
Vmware ESX/ESXi	Yes	Yes	Yes	Yes
Windows Server 2000	--	Yes	--	--
Windows Server 2003	Yes	Yes	Yes	Yes
Windows Server 2008	Yes	Yes	Yes	Yes
Oracle 10G, 11G				
Xen	--	Yes	--	--
Physical				
Min / Max Controller Size (U)	2 controllers are contained in 4U	2U or 3U - 6U with file modules	1 or 2 controllers are contained in 6U	2 controllers are contained in 4U
Disk Chassis Size (U)	3	2U - 2.5" disk 3U - 3.5" disk	3	3
Disk Density per enclosure	16 - 3.5" 24 - 2.5" 60 - 2.5" or 3.5"	24 - 2.5" 12 - 3.5"	14	16 - 3.5" 24 - 2.5" 60 - 2.5" or 3.5"
Controller enclosure may hold disks	No	Yes	No	Yes
Multi-Path I/O SW				
Windows	SDD, MPIO	SDD, MPIO	Yes	SDD, MPIO
Linux	SDD, DMMP	SDD, DMMP	Yes	SDD, DMMP
Solaris	SDD, MPxIO	SDD, MPxIO	Yes	SDD, MPxIO
AIX	SDD	SDD	Yes	SDD
HP-UX	SDD, Pvlinks/SecurePath	SDD, Pvlinks/SecurePath	Yes	SDD, Pvlinks/SecurePath
Vmware	Yes	Yes	Yes	Yes
Host Integration				
Active/Active Controller pairs	Yes	Yes	Yes	Yes
FC - Symmetric LUN Access	Yes	Yes	Yes	Yes

Vendor	IBM	IBM	NetApp	NetApp
System	DS5000	V7000	32X0	E5400
FC - ALUA - Asymmetric LUN Access	Yes	No	Yes	Yes
Clustering of A/A pairs	No	No	Yes	No
Microsoft VSS provider	Yes	Yes	Yes	Yes
Microsoft VDS interface	Yes	No	Yes	Yes
Storage Management				
Element Mgr.	DS Storage Manager	Web GUI	Multiple	SANtricity
CLI	Yes	Yes	Yes	Yes
SMI-S	Yes	Yes	Yes	Yes
Data Protection				
Point In Time Snapshots (PIT)	Copy on write	Copy on write	Alloc on Write	Copy on write
Max # PIT Copies per array	1,024	1,024 per IOGroup	127,000	2,048
Max # PIT copies per LUN	16	256	255	128
Local Replication (within array)				
# Local Clones	With Volume Copy - up to 511 copies	8,192	(yes)	With Volume Copy - up to 511 copies
Resync Clone	No	Yes	Yes	No
Read / Write Clones	Yes	Yes	Yes	Yes
Remote Replication (array to array)				
Replication Connectivity	FC	FC	FC,IP	FC
Synchronous Replication	Yes	MetroMirror	Yes	Yes
Async Replication	Yes	GlobalMirror	Yes	Yes
Write Order Consistency	Yes	Yes	Yes	Yes
Consistency Groups	Yes	Yes	Yes	Yes
Bandwidth Throttle	No	No	Yes	No
Delta Replication	only on resync	No	Yes	only on resync
WAN Acceleration	No	No	No	No
In-flight Encryption	No	No	No	No
Multi-hop (cascade)	No	Yes	No	No
3 Way replication	No	Yes	No	No



Vendor	IBM	IBM	NetApp	NetApp
System	DS5000	V7000	32X0	E5400
Multiple Virtual Domains / Tenants				
Role based access	No	Yes	Yes	No
Sub Administration capabilities	No	Yes	Yes	No
Resource allocation / Domain	Yes	No	Yes	Yes
Other Advanced Features				
Data at rest Encryption	Yes	No	Yes	Yes
Data Reduction	No	Inline Compression	Post store compression deduplication	No
Thin Provisioning (see note)	No	Yes	Yes	Yes
Disk Spin Down	No	No	No	No
Automated Tiering within box	No	Yes-Easy Tier	No	No
Frequency of Tiered Movement	n/a	Policy	Manual	n/a
Level of Tiered Movement	n/a	Sub-LUN	LUN/Volume	n/a
Number of Tiers	n/a	2	3	n/a
VMware SRM integration	Yes	Yes	Yes	Yes
VMware VAAI				
HW Zero Copy	No	Yes	Yes	Yes
HW Lock Reservation	No	Yes	Yes	Yes
HW Accelerated Copy	No	Yes	Yes	Yes



Vendor	IBM	IBM	NetApp	NetApp
System	DS5000	V7000	32X0	E5400
Notes				