

Hardware Certification List (HCL) for NexentaStor 4.0.x

Product Management
Certification Team

October 2015

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Revision History

7/10/14	Addition: 3.3: HP RA+: D6000 added to HP+ building blocks. Clarify 2.5" vs. 3.5" HDD support
12/15/14	Additions: 2.1: Dell RA: Added R730 (Dell 13G Server) based RAs 3.1: Dell RA+: Added section for 13G based hardware 4.1: Certified Solutions: Added Adcap Systems and Besta 7.0: Appendix A: Added a table listing certified SSDs
1/22/15	Additions: 3.3: SuperMicro RA+: Added 90-bay JBOD in fourth column 4.1: Certified Solutions: Added a row for Zstor
4/6/15	Additions: Section 2.2: Dell RA (R730xd): Added R730xd (13G based) RA. Section 2.4: Supermicro RA (X10): Added X10 based RA Section 2.6: Fujitsu RA: Added RX300 RA Section 3.3: Supermicro RA+: Added section for X10-based system Section 4.1: Certified Solutions: Added Cirrascale, Maguay, Redapt, SGI, Silicon Mechanics zStax 94 Section 5:0 and 6.0: Added section on Virtual NAS use cases and MetroHA solution, respectively Deletion: Section 2.5: Supermicro RA (X9): Removed NSM-40 column
4/14/15	Additions: Section 3.3: Supermicro RA+(X10): Added SYS6018U controller Section 4.2: Certified Solutions Building Blocks- Storage Enclosure: Added Quanta JB7
7/21/2015	Additions: Section 2.1: Dell RA(13G): Added the 480TB configuration column Section 3.1: Added section on Cisco RA+ standalone and Cisco RA+ with Seagate Section 4.1: Certified Solutions: Added ICC, Pogo Storage, and Toyou rows Section 4.2: Certified Solutions Building Blocks: Added LPe 16002 in FC HBA column
10/19/15	Additions: Section 2.2: Dell RA (13G R730xd): Added H730 in SAS HBA row Section 2.4: Added section on Supermicro (X10) and HGST all flash RA Section 3.1.3: Added section on Cisco RA+ with SanDisk InfiniFlash Section 3.2.2: Added section on Dell (13G R730) with SanDisk InfiniFlash RA+ Section 3.3.1: Supermicro (X10) RA+: Added the new 90-bay SC946ED-R2KJBOD Section 3.3.2: Added section on Supermicro (X10) with SanDisk InfiniFlash RA+ Section 3.3.3: Supermicro RA+ (X9): Added the new 90-bay SC946ED-R2KJBOD replacing 847DE26-RSK02JBOD Section 4.1: Certified Solutions: <ul style="list-style-type: none"> - Added new Aberdeen entries: AberSAN ZXP4, AberSAN Petarack4, AberSANZ23, AberSANZ23, AberSANZ43 - Added Penguin IceBreaker 4836 row Section 4.2: Certified Solutions Building Blocks, Storage Enclosure table: <ul style="list-style-type: none"> - Added Quanta JB9 (4U 60-bay) - Added new Supermicro enclosure (4U 90-bay) - Added note that chassis management for Quanta JB9 FAB5 controller will be available in NexentaStor 4.0.4-FP1

Section 6:0: MetroHA Configurations: Made the Fibre Channel switched fabric requirement more explicit
Appendix A: Supported SSDs: Added general purpose (GP) data drives (HGST, SanDisk, Seagate) for all-flash configs
Appendix B: All-SSD Tuning: Added section with pointers on how to tune all-SSD deployments
Appendix C: Legacy Configurations: Moved Dell 720 (12G RA and RA+) and HP RA configurations in this new section

Modifications:

Section 2.1: Dell RA (13G):

- Specified NIC to be Intel x520 dual port NIC + Intel i350 dual port NIC
- Reduced 10GbE ports from 8 to 4

Section 2.3: Supermicro RA (X10):

- Marked 8GB ZeusRAM SLOG **white on grey**
- Marked 1.2TB SAS 10k 2.5" **white on grey**

Section 2.5: Supermicro RA (X9): Marked 8GB ZeusRAM SLOG **white on grey**

Section 3.1.1: Cisco RA+: Specified Cisco controller as CS240 M4SX (previously listed as C240 M4)

Section 3.2.1: Dell RA+ (13G R730): Controller row, marked R630 **white on grey** as it's no longer available from Dell

Section 3.2.1: Dell RA+ (13G R730): Data HDD row in Building Blocks table:

- MD1400 column, changed upper bound for 3.5" drive to 8TB from 4TB
- MD1420 column, changed upper bound for 7.2k SAS HDD to 2TB from 1TB
- MD1420 column, changed upper bound for 10k SAS HDD to 1.8TB from 1.2TB
- MD3060e column, changed upper bound for 7.2k SAS HDD(3.5") to 8TB from 6TB
- MD3060e column, changed upper bound for 7.2k SAS HDD(2.5") to 1.8TB from 1TB
- MD3060e column, changed upper bound for 10k SAS HDD to 1.8TB from 1.2TB

Section 3.3.1: Supermicro RA+(X10):

- Marked 8GB ZeusRAM SLOG **white on grey**, replaced by HGST UltraStar SSD800MH.B 200GB
- Changed upper bound for SAS HDD to 8TB from 6TB

Appendix A: Supported SSDs:

- ZIL/SLOG: Marked Toshiba PX02SS **white on grey**
- Seagate 1200, HGST UltraStar SSD800MH3, HGST UltraStar SSD1600MR3 now certified for 12Gb SAS enclosures

1.0 Overview

1.1 Introduction

NexentaStor is Nexenta's flagship Software Defined Storage (SDS) platform, allowing thousands of customers all around the world to transform their storage infrastructure, increase flexibility and agility, simplify management, and dramatically reduce costs without compromising on availability, reliability, or functionality.

NexentaStor delivers unified file and block storage services, runs on industry standard hardware, scales from tens of terabytes to petabyte configurations, and includes all data management functionalities. NexentaStor is Software Defined Storage with SMARTS: Security, Manageability, Availability, Reliability, (lower) TCO, and Scalability.

This document is intended for Nexenta Partners and Nexenta customer-facing organizations. The latest version of Nexenta Hardware Certification List (HCL) is posted on Partner Portal. For NexentaConnect utilizing VMware vSphere, please refer to VMware HCL.

1.2 Nexenta Storage Solutions

Partners who are looking to offer NexentaStor storage solutions have the following options:

- Reference Architecture (RA)
- Reference Architecture Plus (RA+)
- Certified Solution (CS)

1.2.1 Reference Architecture (RA)

A Reference Architecture consists of fixed sets of components within RA building blocks. RA building blocks are:

- Controllers: x86 servers with specific CPU, memory, NICs, and HBAs
- Storage enclosures: JBOD with specific HDDs and SSDs
- NexentaStor software

The detailed list of components for each RA configuration is listed in Section 2.0. Nexenta and hardware technology partners (such as Dell, Supermicro, and others) collaborate to pre-certify NexentaStor software releases on each RA solution. In most cases, hardware technology partners offer consolidated SKUs for RA configurations to simplify ordering and selling of NexentaStor solutions. As a result, RAs typically provide the fastest path to market for Nexenta Partners.

1.2.2 Reference Architecture Plus (RA+)

Reference Architecture Plus are targeted variations from RA configurations and provide additional flexibility to Nexenta Partners. That flexibility is limited to modifying specific attributes of RA building blocks. Specifically, RA+ allows variations in CPU, DRAM, NIC, SAS HBA, and FC HBA in controllers and enclosure count, HDDs, SSDs in storage enclosures. Refer to Section 3.0 for more details. While RA+ provide additional flexibility to Nexenta Partners, they also require a lightweight Nexenta certification effort.

1.2.3 Certified Solution (CS)

Any deviations outside the scope of Reference Architecture and Reference Architecture Plus require Nexenta certification. Certification may be a lengthy process depending on the nature of the certification and requires extra efforts from both Partners' and Nexenta's engineering resources. Additional fees are required for certification. Unless CS is necessary, it is recommended that RA is the first choice of considerations for all deployments.

Note: Certified Solutions are specific to NexentaStor major releases. For example, a Certified Solution for NexentaStor 3.1.x does not automatically carry forward to NexentaStor 4.0.x and will need to get re-certified.

RA	RA+	CS
<ul style="list-style-type: none">Exact configurations with specific components within each configuration	<ul style="list-style-type: none">Controller Variations<ul style="list-style-type: none">CPU typeDRAM quantityNICSAS HBAFC HBAStorage Enclosure Variations<ul style="list-style-type: none">Enclosure countHDD type and countSSD type and count	<ul style="list-style-type: none">Controllers and/or Storage Enclosures that are outside of RA+ scopeOpen ConfigurationsCertifications Required

1.3 Certification

Certification requests (certification request CR form and certification testing requirement CTR form) can be made at <http://www.nexenta.com/hcl>. Both RA+ and CS require certification request. Estimation of completion time is in the following (from the receipt of certification requests):

	RA	RA+	CS
Certification Request	<ul style="list-style-type: none"> No certification or approval necessary 	<ul style="list-style-type: none"> Submit CR and CTR Nexenta SE can pre-approve RA+ 	<ul style="list-style-type: none"> Submit CR and CTR
Certification Process	<ul style="list-style-type: none"> Nexenta certification process (default) 	<ul style="list-style-type: none"> Review RA+ config No certification tests Approval of RA+ 	<ul style="list-style-type: none"> Review CS config Nexenta certification tests Approval of CS
Estimated Completion	n/a	Up to two weeks	Approximately eight weeks
Certification Fees	n/a	n/a	Yes (Contact Sales)

Above estimation completion does not include new driver development and is subject to change at any time. For questions, contact certsolprg@nexenta.com.

2.0 Reference Architectures

2.1 Dell RA (13G Based R730)

Dell RA	ND-44-13G	ND-88-13G	ND-176-13G	ND-224-13G	ND-456-13G	ND-480-13G	ND-960-13G	ND-1920-13G
Raw Capacity	44TB	88TB	176TB	224TB	456TB	480TB	960TB	1920TB
Data Drive #	44	44	88	112	228	120	240	480
Form Factor (tot. system)	8U	12U	20U	12U	20U	12U	20U	36U
Memory (tot. system)	192GB			512GB				
Read Cache	Up to 800GB		Up to 1.6TB			n/a		
10GbE port	4							
Software	NexentaStor 4.0.x							

Dell RA	ND-44-13G	ND-88-13G	ND-176-13G	ND-224-13G	ND-456-13G	ND-480-13G	ND-960-13G	ND-1920-13G
Controller	2x R730 PN: 210-AEZO							
CPU	E5-2609 v3 1.9GHz, 6-core, 2-socket			E5-2643 v3 3.4GHz, 6-core, 2-socket				
DRAM	96GB (12x 8GB)			256GB (16x 16GB)				
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")							
SAS HBA	2x Dell SAS 12Gb HBA PN:405-AAEB	4x Dell SAS 12Gb HBA PN: 405-AAEB		2x LSI SAS 6Gb HBA PN: 406-BBDN	4x LSI SAS 6Gb HBA PN: 406-BBDN	4x LSI SAS 6Gb HBA PN: 406-BBDN	4x LSI SAS 6Gb HBA PN: 406-BBDN	4x LSI SAS 6Gb HBA PN: 406-BBDN
NIC	H730 (for internal SysPool drives only) 1x Network Daughter Card - Intel x520 dual port NIC + Intel i350 dual port NIC							
Storage Enclosure	2x MD1420 (24-bay) PN: 210-AEWI	4x MD1400 (12-bay) PN: 210-AFDZ	8x MD1400 (12-bay) PN: 210-AFDZ	2x MD3060e (60-bay) PN: 210-ACIS	4x MD3060e (60-bay) PN: 210-ACIS	2x MD3060e (60-bay) PN: 210-ACIS	4x MD3060e (60-bay) PN: 210-ACIS	8x MD3060e (60-bay) PN: 210-ACIS
Data HDD	1TB SAS 7.2k 2.5"	2TB SAS 7.2k 3.5"				4TB SAS 7.2k 3.5"		
Data Drive #	44	44	88	112	228	120	240	480
L2ARC	0 – 2x Dell 400GB SSD, SAS, MU, MLC, 12G, 2.5 up to 800GB PN: 400-AEIR		0 – 4x Dell 400GB SSD, SAS, MU, MLC, 12G, 2.5 up to 1.6TB PN: 400-AEIT			n/a		
ZIL/SLOG	2x Dell 200GB SSD PN: 400-AEQD	2x Dell 8GB ZeusRAM PN: 400-AIRN	4x Dell 8GB ZeusRAM PN: 400-AIRN	4x Dell 8GB ZeusRAM PN: 400-AEHV	8x Dell 8GB ZeusRAM PN: 400-AEHV	n/a		

Note 1: For Dell deployments, use Nexenta-specific platform SKUs in DellStar or Gii ordering system

Note 2: BIOS for R730 system should be 1.0.4 and above

Note 3: 10GbE port count takes into account the 2 ports on the server Network Daughter Card

Note 4: PCIe based SSDs are not supported

Note 5: Contact Dell for detailed wiring diagrams for these configurations

2.2 Dell RA (13G Based R730xd)

Reference Architectures with Dell R730xd servers and NexentaStor 4.0.x provide single node (non-HA) configurations combining controller and storage in a single 2U chassis.

Dell RA	ND-24xd-13G (Non-HA) 24x 2.5" Drives	ND-12xd-13G (Non-HA) 12x 3.5" Drives
Raw Capacity	Up to 43.2TB	Up to 72TB
Max # of Data Devices	Up to 24	Up to 12
Form Factor (total system)	2U	
Software	NexentaStor 4.0.x	
Controller	1x R730xd	
CPU	All CPUs supported by Dell	
DRAM	128GB(8x16GB)	
Boot Drive	2TB (2x 1TB SAS 7.2k 2.5")	
SAS HBA	H730 (For SysPool and data drives; data drives must be in pass through mode only)	
Built-in Ethernet	2x 10GbE	
NIC (Optional)	X540 10GbE RJ45 X520 10GbE SFP+ I350	
FC HBA	Emulex LPe 12000, LPe 12002 QLogic QLE 2560, QLE 2562	
Storage	24x 2.5" Data + 2x 2.5" Boot devices	12x 3.5" Data + 2x 2.5" Boot devices
Data HDD or SSD	See Dell AVL list for 2.5" and 3.5" devices – Note that PCIe devices are not supported ⁵	
Data Drive #	Up to 24	Up to 12
L2ARC	Up to 1x 400GB SSD device PN: 400-AEIT	
ZIL/SLOG	Up to 1x 200GB SSD device PN: 400-AEQD	

Note 1: For Dell deployments, please use Nexenta-specific platform SKUs in DellStar or Gii ordering system.

Note 2: BIOS for R730xd system is 1.1.4

Note 3: The R730xd configurations require updated LSI drivers that must be installed separately. Contact support@nexenta.com for details.

Note 4: All-SSD configurations are supported on the R730xd platform. There is no need for separate ZIL or L2ARC devices on all-SSD configurations.

2.3 Supermicro RA (X10 Based)

Supermicro RA	NSM-20-X10	NSM-54-X10	NSM-82-X10	NSM-166-X10	NSM-340-X10	NSM-508-X10	NSM-1408-X10
SMC Nexenta SKU	SRS-NSM020-SN0B-01	SRS-NSM054-HA2B-01	SRS-NSM082-HA1B-01	SRS-NSM166-HA2B-01	SRS-NSM340-HA4B-01	SRS-NSM508-HA6B-01	SRS-NS1408-HA8B-01
Raw Capacity	20TB	54TB	82TB	166TB	340TB	508TB	1408TB
Data Drive #	10	45	41	83	170	254	352
Form Factor (total system)	2U	8U	8U	12U	20U	28U	36U
Memory (total system)	96GB	192GB		512GB			
Read Cache	n/a	400GB		800GB			n/a
10GbE port	2	4		8			
Software	NexentaStor 4.0.x						

Supermicro RA	NSM-20-X10	NSM-54-X10	NSM-82-X10	NSM-166-X10	NSM-340-X10	NSM-508-X10	NSM-1408-X10
Controller	1x SYS-6028U-NEX1	2x SYS-6028U-NEX1			2x SYS-6028U-NEX2		
CPU	E5-2609 v3 1.9GHz, 6-core, 2-socket				E5-2643 v3 3.4GHz, 6-core, 2-socket		
DRAM	96GB (12x 8GB)				256GB (16x 16GB)		
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5)						
SAS HBA	2x AOC-S3008L-L8e	1x AOC-SAS-9300-8e		2x AOC-SAS-9300-8e	2x AOC-SAS-9300-16e	3x AOC-SAS-9300-16e	4x AOC-SAS-9300-16e
NIC	1x AOC-STGN-i2S			2x AOC-STGN-i2S			
Data HDD	10x 2TB 7.2k SAS	n/a					
Storage Enclosure	n/a	2x 216BE2C-R741JBOD (24-bay)	1x 847E2C-R1K28JBOD (44-bay)	2x 847E2C-R1K28JBOD (44-bay)	4x 847E2C-R1K28JBOD (44-bay)	6x 847E2C-R1K28JBOD (44-bay)	8x 847E2C-R1K28JBOD (44-bay)
Data HDD	n/a	1.2TB SAS 10k 2.5" 2TB SAS 7.2k 2.5"	2TB SAS 7.2k 3.5"				4TB SAS 7.2k 3.5"
Data Drive #	10	45	41	83	170	254	352
L2ARC	n/a	400GB MLC (1x 400GB)			800GB MLC (2x 400GB)		n/a
ZIL/SLOG	n/a	2x 400GB SSD	2x ZeusRAM UltraStar SSD800MH.B 200GB	4x ZeusRAM UltraStar SSD800MH.B 200GB		8x ZeusRAM UltraStar SSD800MH.B 200GB	n/a

Note 1: Motherboard BIOS for the SMC X10 RA is 1.01

Note 2: White on grey items are supported but not preferred for new deployments.

2.4 Supermicro and HGST All Flash Array RA (X10 Based)

Supermicro RA All Flash Array	NSH-AFA-19	NSH-AFA-38	NSH-AFA-76	NSH-AFA-115
SMC All-Flash SKU	SRS-NSM019-HGST-01-NS017	SRS-NSM038-HGST-01-NS017	SRS-NSM076-HGST-01-NS017	SRS-NSM115-HGST-01-NS017
Raw Capacity	19TB	38TB	76TB	115TB
Data Drive #	24	24	48	72
Form Factor (total system)	4U	8U	6U	12U
Memory (total system)	512GB			
10GbE port	8			
Software	NexentaStor 4.0.4 and later			

Supermicro RA All Flash Array	NSH-AFA-19	NSH-AFA-38	NSH-AFA-76	NSH-AFA-115
Controller	2x SYS-6028U-NEX2			
CPU	E5-2643 v3 3.4GHz, 6-core, 2-socket			
DRAM	256GB (16x 16GB)			
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5)			
SAS HBA	1x AOC-SAS-9300-8e		2x AOC-SAS-9300-8e	3x AOC-SAS-9300-8e
NIC	2x AOC-STGN-i2S			
Data HDD	n/a			
Storage Enclosure	1x 216BE2C-R741JBOD (24-bay)		2x 216BE2C-R741JBOD (24-bay)	3x 216BE2C-R741JBOD (24-bay)
Data SSD	HGST SSD800MH.B HGST SSD800MR (800GB)		HGST SSD1600MM HGST SSD1600MR (1.6TB)	
Data Drive #	24	24	48	72
L2ARC	n/a			
ZIL/SLOG	n/a			

Note 1: Motherboard BIOS for the SMC X10 RA is 1.01

2.5 SuperMicro RA (X9 Based)

SuperMicro RA	NSM-20	NSM-54	NSM-84	NSM-170	NSM-348	NSM-520	NSM-1440
Raw Capacity	20TB	54TB	84TB	170TB	348TB	520TB	1440TB
Data Drive #	10	27	42	85	174	260	360
Form Factor (total system)	2U	8U	8U	12U	20U	28U	36U
Memory (total system)	96GB	192GB			512GB		
Read Cache	n/a	400GB		800GB			n/a
10GbE port	2	4		8			
Software	NexentaStor 4.0.x						

Supermicro RA	NSM-20	NSM-54	NSM-84	NSM-170	NSM-348	NSM-520	NSM-1440
Controller	1x SSG-6027R-NEX1	2x SSG-6027R-NEX1			2x SSG-6027R-NEX2		
CPU	E5-2609 v2 2.5GHz, 4-core, 2 socket				E5-2643 v2 3.5GHz, 6-core, 2-socket		
DRAM	96GB (12x 8GB)				256GB (16x 16GB)		
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5)						
SAS HBA	n/a	1x LSI 9207-8e		2x LSI 9207-8e	2x LSI 9206-16e	3x LSI 9206-16e	4x LSI 9206-16e
NIC	1x X520 10GbE DA/SFP+			2x X520 10GbE DA/SFP+			
Data HDD	10x 2TB SAS 7.2k 2.5"	n/a					
Storage Enclosure	n/a	2x 216E26-R1200LPB (24-bay) 1x 847E26-RJBOD1 (45-bay)	1x 847E26-RJBOD1 (45-bay)	2x 847E26-RJBOD1 (45-bay)	4x 847E26-RJBOD1 (45-bay)	6x 847E26-RJBOD1 (45-bay)	8x 847E26-RJBOD1 (45-bay)
Data HDD	n/a	1.2TB SAS 10k 2.5" 2TB SAS 7.2k 2.5"	2TB SAS 7.2k 3.5"				4TB SAS 7.2k 3.5"
Data Drive #	n/a	27	42	85	174	260	360
L2ARC	n/a	400GB MLC (1x 400GB)			800GB MLC (2x 400GB)		n/a
ZIL/SLOG	n/a	2x 400GB MLC 2x 200 GB UltraStar SSD (see Appendix A)	2x ZeusRAM UltraStar SSD800MH.B 200GB	4x ZeusRAM 4x UltraStar SSD800MH.B 200GB		8x ZeusRAM 8x UltraStar SSD800MH.B 200GB	n/a

Note 1: White on grey items are supported but not preferred for new deployments.

2.6 Fujitsu RA

Fujitsu RA	NF-90	NF-135
Raw Capacity	90TB	135TB
Data Drive #	90	135
Form Factor (total system)	12U	16U
Memory (total system)	192GB	
Read Cache	Up to 400GB	
10GbE port	4	
Software	NexentaStor 4.0.x	

Fujitsu RA	NF-90	NF-135
Controller	2x RX300 S8	
CPU	Xeon E5-2620 v2 2.10GHz, 4-core, 2-socket	
DRAM	96GB (12x 8GB)	
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")	
SAS HBA	2x LSI-9207-8e	3x LSI-9207-8e
NIC	1x X520 10GbE DA/SFP+	
Storage Enclosure	4x JX40	6x JX40
Data HDD	1TB SAS 7.2k 2.5"	
Data Drive #	90	135
L2ARC	1x Up to 400GB SSD	
ZIL/SLOG	4x 200GB SSD	6x 200GB SSD

Note 1: BIOS for Fujitsu RX300 is 1.7.0

Note 2: Any HDD in a NexentaStor 4.0.x system must have idle state functionality disabled before being added to the configuration

3.0 Reference Architecture Plus

3.1 Cisco RA+

- Controllers and storage enclosures pairing is restricted within the following building blocks only. For example, C240 can be paired with any storage enclosures in the Seagate list, but not across different RA partners building blocks.
- Variations in the following are permitted:
 - Controller: CPU type, DRAM capacity, type and count for SAS HBA, NIC and FC HBA
 - Storage enclosure: HDD type and count, SSD type and count

3.1.1 Cisco RA+ Standalone

Single node (non-HA) storage appliance based on a single Cisco C240 M4SX running NexentaStor 4.0.x in a 2U chassis.

Cisco RA+	NC-24 (Non-HA) 24x 2.5" Drives
Raw Capacity	Up to 38.4TB (24x 1.6TB)
Max # of Data Devices	Up to 24
Form Factor (total system)	2U
Software	NexentaStor 4.0.4 and later
Controller	1x Cisco C240 M4SX
CPU	2x Xeon(R) E5-2680 v3 2.5GHz
DRAM	128GB (8x 16GB)
Boot Drive	2x 480GB internal SSD
SAS HBA	n/a
Built-in Ethernet	Intel i350 dual-port on the motherboard
NIC	X540 10GbE RJ45 X520 10GbE SFP+
FC HBA	Emulex LPe 12002, LPe 16002-MC QLogic QLE 2562
Storage	24x 2.5" Data + internal Boot devices
Data HDD or SSD	See Cisco supported devices here . Note that PCIe devices are not supported.
Data Drive #	Up to 24
L2ARC	Up to 1x 400GB High Endurance SSD device
ZIL/SLOG	Up to 1x 200GB High Endurance SSD device

Note 1: No chassis management provided.

Note 2: BIOS version for Cisco C240 M4SX is C240M4.2.0.6a.0.051220151501

Note 3: The Cisco configuration requires updated LSI drivers that must be installed separately. Contact support@nexenta.com for details.

3.1.2 Cisco and Seagate RA+

Cisco and Seagate RA+ Building Blocks				
	NCS-1x84	NCS-2x84	NCS-3x84	NCS-4x84
Data Drive #	84	168	252	336
Form Factor (HA system)	9U	14U	19U	24U
Software	NexentaStor 4.0.4 and later			
Controller	1x or 2x C240 M4SX			
CPU	2x Xeon(R) E5-2680 v3 2.5GHz			
DRAM	256GB (16x 16GB)			
Boot Drive	2x 480GB internal SSD			
SAS HBA (external)	1x Cisco 9300-8e 12Gb SAS	2x Cisco 9300-8e 12Gb SAS	3x Cisco 9300-8e 12Gb SAS	4x Cisco 9300-8e 12Gb SAS
NIC	Intel X520 10GbE Dual Port SFP+ Intel X540 10GbE Dual Port Base T			
FC HBA	Emulex LPe 12002, LPe 16002-MC QLogic QLE 2562			
Storage Enclosure	1x Seagate SP-2584	2x Seagate SP-2584	3x Seagate SP-2584	4x Seagate SP-2584
Data HDD	Seagate 2TB NL SAS 7.2 PN: ST2000NM0034 Seagate 4TB NL SAS 7.2 PN: ST4000NM0134 Seagate 6TB NL SAS 7.2 PN: ST6000NM0134			
L2ARC	Seagate 1200 SSD 400GB			
ZIL /SLOG	Seagate 1200 HE SSD 200GB			

Note 1: BIOS version for Cisco C240 M4SX is C240M4.2.0.6a.0.051220151501

Note 2: This configuration requires updated LSI drivers that must be installed separately. Contact support@nexenta.com for details.

Note 3: In order to support the highest levels of performance, resilience and redundancy for a NexentaStor deployment, SAS cabling from the head nodes to the JBOD should track the following rules of thumb:

- Unless otherwise specified, all JBODs should be direct connected to SAS HBAs, no intermediate SAS switches, no chaining of JBODs
- Cabling for HA configurations should be connected to be redundant across HBAs, JBODs and JBOD controllers/expanders
- Cabling for HA configurations should be consistent with the ports used on each node from the HBA to the ports on the JBOD controller/expander

3.1.3 Cisco and SanDisk InfiniFlash RA+

Cisco and SanDisk RA+ Building Blocks				
	NCIF-1x-IF100	NCIF-2x-IF100	NCIF-3x-IF100	NCIF-4x-IF100
Raw Capacity	Up to 512TB	Up to 1024TB	Up to 1536TB	Up to 2048TB
Total Device #	64	128	192	256
Form Factor (HA system)	7U	10U	13U	16U
Software	NexentaStor 4.0.4 and later			
Controller	1x or 2x C240 M4SX			
CPU	2x Xeon(R) E5-2680 v3 2.5GHz			
DRAM	256GB (16x 16GB)			
Boot Drive	2x 480GB internal SSD			
SAS HBA (external)	1x Cisco 9300-8e 12Gb SAS	2x Cisco 9300-8e 12Gb SAS	3x Cisco 9300-8e 12Gb SAS	4x Cisco 9300-8e 12Gb SAS
NIC	Intel X520 10GbE Dual Port SFP+ Intel X540 10GbE Dual Port Base T			
FC HBA	Emulex LPe 12002, LPe 16002-MC QLogic QLE 2562			
Storage Enclosure	1x InfiniFlash IF100	2x InfiniFlash IF100	3x InfiniFlash IF100	4x InfiniFlash IF100
Flash Device	8TB Flash Module			
L2ARC	n/a			
ZIL /SLOG	n/a			

Note 1: BIOS version for Cisco C240 M4SX is C240M4.2.0.6a.0.051220151501

Note 2: This configuration requires updated LSI drivers that must be installed separately. Contact support@nexenta.com for details.

Note 3: SanDisk InfiniFlash firmware version is T015 or later

Note 4: In order to support the highest levels of performance, resilience and redundancy for a NexentaStor deployment, SAS cabling from the head nodes to the JBOD should track the following rules of thumb:

- Unless otherwise specified, all JBODs should be direct connected to SAS HBAs, no intermediate SAS switches, no chaining of JBODs
- Cabling for HA configurations should be connected to be redundant across HBAs, JBODs and JBOD controllers/expanders
- Cabling for HA configurations should be consistent with the ports used on each node from the HBA to the ports on the JBOD controller/expander

Note 5: Nexenta requires a minimum of 128TB of raw flash for NexentaStor and SanDisk IF-100 configurations deployed in production environments. 64TB IF-100 systems may only be used in Test/Dev type environments with lower performance requirements.

3.2 Dell RA+

- Controllers and storage enclosures pairing is restricted within RA building blocks only. For example, R730 can be paired with any storage enclosures in the following list, but not across different RA partners building blocks, e.g. Supermicro.
- Variations in the following are permitted:
 - Controller: CPU type, DRAM capacity, type and count for SAS HBA, NIC and FC HBA
 - Storage enclosure: HDD type and count, SSD type and count, storage enclosure type and count
- All Dell-qualified HDD and SSD manufacturers are supported as data HDD and data SSD respectively.

3.2.1 Dell RA+ (13G Based R730)

Dell RA+ Building Blocks - Controller	
Software	NexentaStor 4.0.x
Controller	R730 (PN: 210-AEZO) or R630
CPU	All CPUs on Dell-supported list
DRAM	96GB to 256GB per controller
Boot Drive	2x 1TB SAS 7.2k 2.5" (mirrored)
SAS HBA	Dell SAS 12Gb HBA PN: 405-AAEB LSI SAS 6Gb HBA PN: 406-BBDN LSI 9206-16e H730 (for internal SysPool drives only)
NIC	X520 10GbE DA/SFP+ X540 10GbE RJ45 I350
FC HBA	Emulex LPe 12000, LPe 12002 QLogic QLE 2560, QLE 2562

Dell RA+ Building Blocks – Storage Enclosure			
Storage Enclosure	MD1400 PN: 210-AFDZ	MD1420 PN: 210-AEWI	MD3060e PN: 210-ACIS
Data HDD	All SAS HDD on Dell-qualified list 7.2k SAS HDD ≤ 8TB 3.5" 10k SAS HDD ≤ 1.2TB 2.5" 15k SAS HDD ≤ 300GB 2.5"	All SAS HDD on Dell-qualified list 7.2K SAS HDD ≤ 2TB 2.5" 10k SAS HDD ≤ 1.8TB 2.5" 15k SAS HDD ≤ 600GB 2.5"	All SAS HDD on Dell-qualified list 7.2k SAS HDD ≤ 8TB 3.5" 7.2K SAS HDD ≤ 1.8TB 2.5" 10k SAS HDD ≤ 1.8TB 2.5" 15k SAS HDD ≤ 300GB 2.5"
L2ARC	400GB MLC 2.5" PN: 400-AEIT		
ZIL /SLOG	Dell ZeusRAM 8GB 3.5" PN: 400-AIRN	Dell 200GB SSD 2.5" PN: 400-AEQD	Dell ZeusRAM 8GB 3.5" PN: 400-AEHV
Data SSD	All SAS SSD on Dell-qualified list		

Note 1: Up to 8x MD3060e supported.

Note 2: There is no Self-encrypting Drives (SED) support in NexentaStor at this time. SED drives certification can be waived with the following assumptions:

- Same hardware and firmware as non-SED (that was certified by Nexenta)
- Self-encrypting feature turned off

Note 3: [White on grey items](#) are supported but not preferred for new deployments

Note 4: Please contact Dell for detailed wiring diagrams of these configurations

Note 5: PCIe based SSDs are not supported

3.2.2 Dell (13G Based) and SanDisk InfiniFlash RA+

The following SanDisk Infiniflash based reference architectures deliver full featured, all flash configurations that can pack up to 2PB of raw capacity in as little as 16U and 3,000W of power.

Dell and SanDisk RA+ Building Blocks				
	NDS-1x-IF100	NDS-2x-IF100	NDS-3x-IF100	NDS-4x-IF100
Raw Capacity	Up to 512TB	Up to 1024TB	Up to 1536TB	Up to 2048TB
Total Device #	64	128	192	256
Form Factor (HA system)	7U	10U	13U	16U
Software	NexentaStor 4.0.x			
Controller	1x or 2x R730 PN: 210-AEZO			
CPU	E5-2643v3, 3.4GHz, 6-core, 2-socket			
DRAM	256GB per controller			
Boot Drive	2x 1TB SAS 7.2k 2.5" mirrored			
SAS HBA	1x Dell SAS 12Gb HBA	2x Dell SAS 12Gb HBA	3x Dell SAS 12Gb HBA	4x Dell SAS 12Gb HBA
NIC	H730 (for internal SysPool drives only)			
FC HBA	X520 10GbE DA/SFP+ X540 10GbE RJ45			
Storage Enclosure	1x InfiniFlash IF100	2x InfiniFlash IF100	3x InfiniFlash IF100	4x InfiniFlash IF100
Flash Device	8TB Flash Module			
L2ARC	n/a			
ZIL /SLOG	n/a			

Note 1: BIOS for R730 system should be 1.0.4 and above

Note 2: SanDisk InfiniFlash firmware version is T015 or later

Note 3: In order to support the highest levels of performance, resiliency and redundancy for a NexentaStor deployment, SAS cabling from the head nodes to the JBOD should track the following rules of thumb:

- Unless otherwise specified, all JBODs should be direct connected to SAS HBAs, no intermediate SAS switches, no chaining of JBODs
- Cabling for HA configs should be connected to be redundant across HBAs, JBODs and JBOD controllers/expanders
- Cabling for HA configs should be consistent with the ports used on each node from the HBA to the ports on the JBOD controller/expander

Note 4: Nexenta requires a minimum of 128TB of raw flash for NexentaStor and SanDisk IF-100 configurations deployed in production environments. 64TB IF-100 systems may only be used in Test/Dev type environments with lower performance requirements.

3.3 Supermicro RA+

- Controllers and storage enclosures pairing is restricted within RA building blocks only. For example, SYS6028U-TR4+ can be paired with any storage enclosures in the following list, but not across different RA partners building blocks, e.g. Dell.
- Variations in the following are permitted:
 - Controller: CPU type, DRAM capacity, SAS HBA type and count, NIC type and count, FC HBA type and count.
 - Storage enclosure: HDD type and count, SSD type and count, storage enclosure type and count.
 - All HDD and SSD manufacturers qualified by Supermicro are supported as data HDD and data SSD respectively.

3.3.1 Supermicro RA+ (X10 Based)

SMC RA+ Building Blocks - Controller	
Software	NexentaStor 4.0.x
Controller	SYS6028U-TR4+ (2U) , SYS6018U-TR4+(1U)
CPU	E5-2609v3, 1.9 GHz, 6-core, 2-socket E5-2643v3, 3.4GHz, 6-core, 2-socket
DRAM	96GB to 256GB per controller
Boot Drive	2x 1TB SAS 7.2k 3.5" (mirrored)
SAS HBA	AOC-S3008L-L8e (IT mode; For internal boot drives) AOC-SAS-9300-8e AOC-SAS-9300-16e
NIC	AOC-STGN-i2S AOC-2UR68-i2XT
FC HBA	Emulex LPe 12000, LPe 12002, LPe 12004, LPe 16002 QLogic QLE 2560 and 2562

SMC RA+ Building Blocks – Storage Enclosure			
Storage Enclosure	847E2C-R1K28JBOD	216BE2C-R741JBOD	SC946ED-R2KJBOD⁴
Data HDD	All SAS HDD ≤ 8TB on SMC-qualified list		
L2ARC	400GB MLC 2.5" – See Appendix A for specific options		
ZIL/SLOG	400GB MLC ZeusRAM 3.5" UltraStar SSD800MH.B 200GB – See Appendix A for SSD based alternatives		
Data SSD	All SAS SSD on SMC-qualified list		

Note 1: There is no Self-encrypting Drives (SED) support in NexentaStor at this time. SED drives certification can be waived with the following assumptions:

- Same hardware and firmware as non-SED (that was certified by Nexenta)
- Self-encrypting feature turned off

Note 2: Motherboard BIOS for the SMC X10 RA+ is 1.01

Note 3: [White on grey items](#) are supported but not recommended for new deployments

Note 4: Chassis management for the 90-bay JBOD will be available at a later time.

3.3.2 Supermicro (X10 Based) and SanDisk InfiniFlash RA+

The following SanDisk InfiniFlash based reference architectures deliver full featured, all flash configurations that can pack up to 2PB of raw capacity in as little as 16U and 3,000W of power.

Supermicro and SanDisk RA+ Building Blocks				
	NSS-1x-IF100	NSS-2x-IF100	NSS-3x-IF100	NSS-4x-IF100
Raw Capacity	Up to 512TB	Up to 1024TB	Up to 1536TB	Up to 2048TB
Total Device #	64	128	192	256
Form Factor (HA system)	7U	10U	13U	16U
Software	NexentaStor 4.0.x			
Controller	1x or 2x SYS-6028U-NEX2			
CPU	E5-2643v3, 3.4GHz, 6-core, 2-socket			
DRAM	256GB per controller			
Boot Drive	2x 1TB SAS 7.2k 2.5" mirrored			
SAS HBA	1x AOC-SAS-9300-8e	2x AOC-SAS-9300-8e	3x AOC-SAS-9300-8e	4x AOC-SAS-9300-8e
NIC	1x AOC-STGN-i2S or 1x AOC-2UR68-i2XT		2x AOC-STGN-i2S or 2x AOC-2UR68-i2XT	
FC HBA	Emulex LPe 12002, LPe 12004, LPe 16002 QLogic QLE 2562			
Storage Enclosure	1x InfiniFlash IF100	2x InfiniFlash IF100	3x InfiniFlash IF100	4x InfiniFlash IF100
Flash Device	8TB Flash Module			
L2ARC	n/a			
ZIL /SLOG	n/a			

Note 1: Motherboard BIOS for the SMC X10 RA+ is 1.01

Note 2: SanDisk Infiniflash firmware version is T015 or later

Note 3: In order to support the highest levels of performance, resiliency and redundancy for a NexentaStor deployment, SAS cabling from the head nodes to the JBOD should track the following rules of thumb:

- Unless otherwise specified, all JBODs should be direct connected to SAS HBAs, no intermediate SAS switches, no chaining of JBODs
- Cabling for HA configs should be connected to be redundant across HBAs, JBODs and JBOD controllers/expanders
- Cabling for HA configs should be consistent with the ports used on each node from the HBA to the ports on the JBOD controller/expander

Note 4: Nexenta requires a minimum of 128TB of raw flash for NexentaStor and SanDisk IF-100 configurations deployed in production environments. 64TB IF-100 systems may only be used in Test/Dev type environments with lower performance requirements.

3.3.3 Supermicro RA+ (X9 Based)

- Controllers and storage enclosures pairing is restricted within RA building blocks only. For example, 6027R-E1R12L can be paired with any storage enclosures in the following list, but not across different RA partners building blocks, e.g. Dell.
- Variations in the following are permitted:
 - Controller: CPU type, DRAM capacity, SAS HBA type and count, NIC type and count, FC HBA type and count.
 - Storage enclosure: HDD type and count, SSD type and count, storage enclosure type and count.
 - All HDD and SSD manufacturers qualified by SuperMicro are supported as data HDD and data SSD respectively.

Supermicro RA+ Building Blocks - Controller	
Software	NexentaStor 4.0.x
Controller	SSG-6027R-E1R12L
CPU	E5-2609, 2.4GHz, 4-core, 2-socket E5-2609 v2, 2.5GHz, 4-core, 2-socket E5-2643, 3.3GHz, 4-core, 2-socket E5-2643 v2, 3.5GHz, 6-core, 2-socket
DRAM	64GB to 256 GB per controller
Boot Drive	2x 1TB SAS 7.2k 3.5 (mirrored)
SAS HBA	LSI 9207-8e LSI 9206-16e Internal embedded LSI 2308 (on Motherboard, in IT/JBOD mode, for internal SysPool drives only)
NIC	X520 10GbE DA/SFP+ X540 10GbE RJ45
FC HBA	Emulex LPe 12000, LPe 12002, LPe 12004 QLogic QLE 2462, QLE 2562

SMC RA+ Building Blocks – Storage Enclosure			
Storage Enclosure	847E26-RJBOD1	216E26-R1200LPB	847DE26-R2K02JBOD ⁴ SC946ED-R2KJBOD ⁵
Data HDD	All SAS HDD ≤ 4TB on SMC-qualified list		
L2ARC	400GB MLC 2.5" – See Appendix A for specific options		
ZIL/SLOG	200GB SLC 400GB MLC ZeusRAM 3.5" – See Appendix A for SSD based alternatives		

Note 1: There is no Self-encrypting Drives (SED) support in NexentaStor at this time. SED drives certification can be waived with the following assumptions:

- Same hardware and firmware as non-SED (that was certified by Nexenta)
- Self-encrypting feature turned off

Note 2: Motherboard BIOS is 3.0

Note 3: [White on grey items](#) are supported but not preferred for new deployments. Enclosure 216E26 is no longer available.

Note 4: Deploying 90-bay JBOD will require professional services

Note 5: Chassis management for the 90-bay JBOD will be available in an upcoming Fix Pack.

4.0 Certified Solutions

4.1 Certified Solutions with NexentaStor 4.0.x

The following is a list of Nexenta partners' solutions that are certified with NexentaStor Release 4.0.x.

Partner Name	Partner Solutions
Aberdeen	<ul style="list-style-type: none"> • AberSAN Z22 • AberSAN Z32 • AberSAN Z42 • AberSAN ZXP2 • AberSAN ZXP3 • AberSAN ZXP4 • AberSAN Petarack2 • AberSAN Petarack3 • AberSAN Petarack4 • AberSANZ23 • AberSANZ33 • AberSANZ43
Adcap Systems	<ul style="list-style-type: none"> • Adcap SwiftStor C7000 series
AIC	<ul style="list-style-type: none"> • SB402-CP2 4U Storage Server + JX3000-4603S JBOD
Besta	<ul style="list-style-type: none"> • Besta SD201
Cirrascale	<ul style="list-style-type: none"> • SB1460
ICC	<ul style="list-style-type: none"> • Quanta S810-X52LR
Maguay	<ul style="list-style-type: none"> • Impex PowerStor-NXT
Penguin	<ul style="list-style-type: none"> • IceBreaker 4836
Pogo Storage	<ul style="list-style-type: none"> • StorageDirector ZXR • EX424JS
Q5	<ul style="list-style-type: none"> • Predator • Beluga
Redapt	<ul style="list-style-type: none"> • SC280
SGI	<ul style="list-style-type: none"> • Single node (non-HA) SGI ISS3112-RP2 + SGI MIS 1.5 JBOD
Silicon Mechanics	<ul style="list-style-type: none"> • Silicon Mechanics zStax 104 4U • Silicon Mechanics zStax 104 3U • Silicon Mechanics zStax 64 • Silicon Mechanics zStax 94
Toyou	<ul style="list-style-type: none"> • 820A • 770A
Zstor	<ul style="list-style-type: none"> • Q-3560 • Q-HA356

4.2 Certified Solutions Building Blocks

The following is a list of Certified Solutions building blocks that are certified with NexentaStor 4.0.x.

Certified Solutions building blocks serve as an indication or record of the hardware that went through certification and are for reference only.

Certified Solutions Building Blocks – Controller						
Controller	CPU	DRAM	Boot Drive	SAS HBA	NIC	FC HBA
Supermicro X9DRH-ITF	E5-2603, 1.8GHz, 4-core, 2-socket	96GB, 256GB	1TB, 2TB SAS 7.2k 3.5	LSI 9200-8e	X520 10GbE DA/SFP+	Emulex LPe 12000
X9DR3-LN4+	E5-2620 v2, 2.1GHz, 6-core, 2-socket			LSI 9205-8e		LPe 12002
X9DR3-LN4+	E5-2620 v2, 2.1GHz, 6-core, 2-socket			LSI 9206-16e	X540 10GbE RJ45	LPe 12004
X9DRW-3LN4F+	E5-2630 v2, 2.6GHz, 6-core, 2-socket			LSI 9207-8e		LPe 16002
X9DRW-3TF+	E5-2630 v2, 2.6GHz, 6-core, 2-socket			LSI 9207-8i		QLogic 4Gb
X9DRD-7LN4F	E5-2690, 2.9GHz, 8-core, 2-socket			LSI-9211-8i	AOC-STGN-i2S	QLE 2460
X10DRU-i+	E5-2690, 2.9GHz, 8-core, 2-socket			LSI-9300-8i		QLE 2462
Cisco C240-M3 ¹	E5-2643, 3.3GHz, 4-core, 2-socket			LSI-9300-8e		QLogic 8Gb
				LSI-9300-16e	AOC-2UR68-i2XT	QLE 2560
				AOC-SAS-9300-8e		QLE 2562
				AOC-SAS-9300-16e		

Note 1: This is a custom configuration by the reseller that uses standard LSI-9207-8i and LSI-9207-8e SAS HBAs to replace the default LSI-9266-8i/9271-8i RAID HBAs.

Note 2: See respective partner AVL for supported drive list.

Certified Solutions Building Blocks – Storage Enclosure
AIC XJ3000-4603S (4U 60-bay)
Dell SC280 (5U 84-bay)
Quanta JB7 (M4240H 4U 24-bay)
Quanta JB9 ³ (M4600H 4U 60-bay)
Quanta JB9 (M4602H 4U 60-bay)
Seagate OneStor SP-2584 (5U 84-bay)
Supermicro 837E26-RJBOD1 (3U 28-bay)
Supermicro 847E2C-R1K28JBOD (4U 44-bay)
Supermicro 216BE2C-R741JBOD (2U 24-bay)
Supermicro SC946ED-R2KJBOD (4U 90-bay)
Xyratex HB-2435-E6EBD (2U 24-bay)
Xyratex UD-8435 (5U 84-bay)
Xyratex OneStor SP-2584 (5U 84-bay)

Note 3: Chassis management for Quanta JB9 Fab5 controller available starting in NexentaStor 4.0.4-FP1.

5.0 NexentaStor as a VMware Storage Virtual Appliance (SVA)

5.1 NexentaStor as a VMware Storage Virtual Appliance (SVA)

NexentaStor can be deployed as a Storage Virtual Appliance (SVA) on VMware ESXi. This is particularly interesting to support Software-Defined Multi-Tenant Virtual NAS use cases where each tenant gets a dedicated Virtual NAS SVA. In this scenario, the NexentaStor SVA consumes vmdks on a VMware Datastore. Data protection is handled by the underlying SAN storage, and NexentaStor can be leveraged to provide NFS and SMB file services.

This solution can be leveraged to eliminate the management complexity of Multi-Tenant NAS services on legacy appliances: instead of trying to pack multiple-tenants within the same hardware appliance, one can deploy on NexentaStor SVA per tenant, relying on VMware to provide resource management. This use case is depicted below:

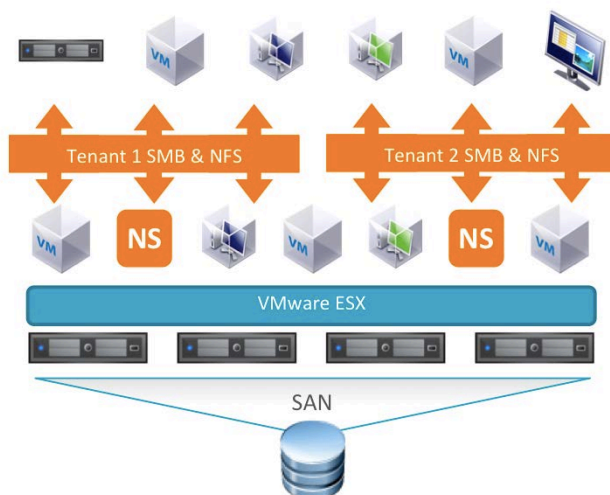


Figure 5-1 – Two NexentaStor SVAs deployed on VMware ESX, providing NAS Services to 2 separate tenants

In this use case, the NexentaStor SVA consumes vmdks and relies on VMware HA for high-availability.

Nexenta supports the following deployment model:

- 1) NexentaStor 4.0.x on VMware ESXi 5.0 or later
- 2) Solaris 11 x64 Virtual Machine with a minimum of 2 vCPUs and 16GB of DRAM
- 3) Make sure you install the open-vm-tools on the NexentaStor SVA. Run:


```
# apt-get install open-vm-tools
```

 from bash as root, to get the supported version from Nexenta's public repositories. Then restart the Virtual Machine to activate the drivers.
- 4) Single instance SVA consumes vmdks for syspool and data devices. Assuming that the underlying storage array supporting the ESX Datastore is responsible for data protection, the simplest configuration is for NexentaStor to simply stripe across data vmdks.
- 5) More advanced RAIDz configurations are supported. The actual benefit of deploying more advanced RAIDz is a function on the data protection provided by the underlying SAN storage.

In the model above, each NexentaStor SVA is deployed in a single node configuration and high-availability is delivered by VMware HA.

It is also possible to deploy NexentaStor with the High-Availability plugin across 2 SVAs when utilizing shared disks via RDM across these SVA. This configuration is more complex and requires the use of host limitations on the NexentaStor appliance. The head nodes must be pinned to hypervisors and heads must reside on separate hypervisors. If you're considering deploying the HA-Plugin across SVAs, please contact Nexenta Customer Services.

Note: The default e1000 and VMxnet3 drivers are supported and included in NexentaStor for network interface controllers. LSI Logic Parallel driver needs to be used to create VMDKs or pass-through RDM can be used with supported HBAs.

5.2 NexentaStor in XenServer Virtual Machines

Similar configurations are supported on XenServer 5.5 and later.

6.0 MetroHA Configurations

For Disaster Recovery requirements, NexentaStor supports periodic asynchronous long distance replication, allowing application data to be replicated between different sites over IP. For business critical applications that cannot afford any data loss in the event of a disaster, NexentaStor can be deployed in a MetroHA configuration.

NexentaStor MetroHA delivers continuous availability and disaster recovery for business critical applications. The solution can be deployed between sites connected via a stretched SAN on the same campus or in the same metro area, over distances up to 30 miles / 50 km. The solution relies on a stretched HA cluster of NexentaStor head nodes (one per site) connected via Fibre Channel to backend storage in each site. NexentaStor synchronously mirrors all data between sites to ensure zero data loss in the event of a site failure. This software-based solution builds on proven hardware from ATTO Technology to deliver simple and cost effective zero RPO disaster recovery.

Requirements

- 2 sites connected via a stretched SAN over distances not exceeding 30 miles / 50 km
- Fibre Channel switched fabric between the NexentaStor heads and ATTO FibreBridges
- NexentaStor 4.0.4 or later
- 2x ATTO FibreBridge 6500
- 4-way mirrors **are required**
 - No hot spares allowed
- Components must be tested by both Nexenta and ATTO Technology
 - Dell 13G – R730 with MD14xx or MD3060e, or
 - SMC X10 – SYS6028U-TR4+ with 216BE2C-R741JBOD (24 bay) or 847E2C-R1K28JBOD (44 bay)

High Level Topology

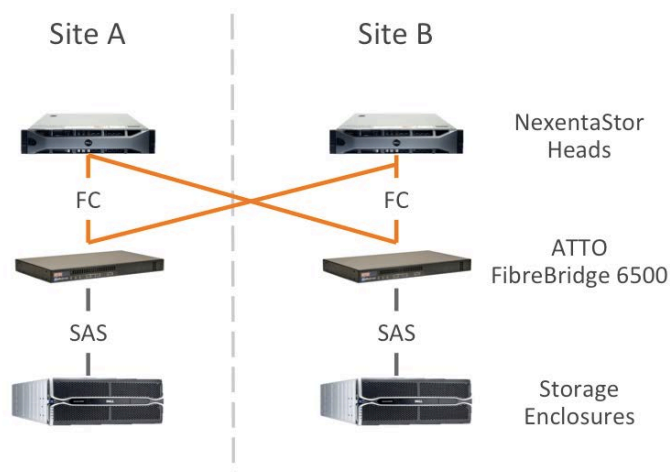


Figure 6-1 – Typical NexentaStor MetroHA Deployment with 2x ATTO FibreBridge 6500
(FC switched fabric required between NexentaStor heads and ATTO FibreBridges)

7.0 About Nexenta

Nexenta is the global leader in Open Source-driven Software-Defined Storage (OpenSDS) with 6,000+ customers, 1,000+ partners, 30+ patents, and more than 1,000 petabytes of storage under management. Nexenta uniquely integrates software-only “Open Source” collaboration with commodity hardware-centric “Software-Defined Storage” innovation. Nexenta OpenSDS solutions are 100% software-based; and 100% hardware-, protocol-, and app-agnostic providing organizations with Total Freedom protecting them against punitive vendor lock-in. Nexenta provides organizations with the “true” benefits of Software-Defined Everything-centric Cloud Computing – from data centers to end users; from the infrastructure to apps. Nexenta OpenSDS enables everyday apps from rich media-driven Social Living to Mobility; from the Internet of Things to Big Data; from Open-Stack and CloudStack to Do-It-Yourself Cloud deployments – for all types of Clouds – Private, Public, and Hybrid. Founded around an “Open Source” platform and industry-disrupting vision, Nexenta delivers its award- and patent-winning software-only unified storage management solutions with a global partner network, including Cisco, Citrix, Dell, HP, Quanta, SanDisk, Seagate, Supermicro, VMware, Western Digital, Wipro, and many others.

For more information, visit www.nexenta.com, [Twitter](#), [Facebook](#), [LinkedIn](#) and [YouTube](#). Also, download the newly published [Nexenta Special Edition Software Defined Data Centers \(SDDC\) for Dummies](#) eBook.

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Date: October 2015

Appendix A - Supported SSDs

The following table lists SSDs that have been specifically tested by Nexenta and identifies recommended use cases for each. In general, SSDs with higher write endurance and lower sequential write latency should be used for ZIL/SLOG. SSDs with higher capacity and lower cost / performance profiles should be used for L2ARC.

This information is provided to help select devices as part of Certified Solutions or RA+ configurations that provide flexibility for SSD selection. Note that SSDs used as part of any RA+ configuration must also be supported by the enclosure vendor. For example, an SSD used in a Supermicro RA+ configuration should be listed in this Appendix and on Supermicro's list of qualified devices.

Nexenta Use Case	Manufacturer	Model	Interface	Capacity as Sold	Form Factor	Part Number	Min. Firmware
ZIL/SLOG	HGST	ZeusRAM	6G SAS	8GB	3.5"	Z4RZF3D-8UCS	C025
ZIL/SLOG	HGST/STEC	S842Z	6G SAS	32GB	2.5"	S842Z32M2	E4R3
ZIL/SLOG	HGST	s842	6G SAS	200GB	2.5"	S842E200M2 / OT00169	E4R3
ZIL/SLOG	HGST	s842	6G SAS	400GB	2.5"	S842E400M2 / OT00177	E4R3
ZIL/SLOG	HGST	UltraStar SSD800MH ³	12G SAS	200GB	2.5"	HUSMH8020ASS200	A210
ZIL/SLOG	HGST	UltraStar SSD800MH ³	12G SAS	400GB	2.5"	HUSMH8040ASS200	A210
ZIL/SLOG	HGST	UltraStar SSD800MH ³	12G SAS	800GB	2.5"	HUSMH8080ASS200	A210
ZIL/SLOG	HGST	UltraStar SSD800MH.B ³	12G SAS	100GB	2.5"	HUSMH8010BSS200	A45C
ZIL/SLOG	HGST	UltraStar SSD800MH.B ³	12G SAS	200GB	2.5"	HUSMH8020BSS200	A45C
ZIL/SLOG	HGST	UltraStar SSD800MH.B ³	12G SAS	400GB	2.5"	HUSMH8040BSS200	A45C
ZIL/SLOG	HGST	UltraStar SSD800MH.B ³	12G SAS	800GB	2.5"	HUSMH8080BSS200	A45C
ZIL/SLOG	SanDisk	Optimus.2 Extreme	6G SAS	100GB	2.5"	SDLKOE9W100G5CA1	F6C2
ZIL/SLOG	SanDisk	Lightning	6G SAS	100GB	2.5"	LB206S	P329
ZIL/SLOG	SanDisk	Optimus.2 Extreme	6G SAS	200GB	2.5"	SDLKOD9W200G5CA1	F6C2
ZIL/SLOG	SanDisk	Optimus.2 Extreme	6G SAS	400GB	2.5"	SDLKOC9W400G5CA1	F6C2
ZIL/SLOG	SanDisk	Optimus.2 Extreme	6G SAS	800GB	2.5"	SDLLOC9W800G5CA1	F6C2
ZIL/SLOG	Seagate	1200 ³	12G SAS	100GB	2.5"	ST100FM0103	0004
ZIL/SLOG	Seagate	1200 ³	12G SAS	200GB	2.5"	ST200FM0103	0004
ZIL/SLOG	Seagate	1200 ³	12G SAS	400GB	2.5"	ST400FM0103	0004
ZIL/SLOG	Seagate	1200 ³	12G SAS	100GB	2.5"	ST100FM0093	0004
ZIL/SLOG	Seagate	1200 ³	12G SAS	200GB	2.5"	ST200FM0093	0004

Nexenta Use Case	Manufacturer	Model	Interface	Capacity as Sold	Form Factor	Part Number	Min. Firmware
ZIL/SLOG	Seagate	1200 ³	12G SAS	400GB	2.5"	ST400FM0093	0004
ZIL/SLOG	Toshiba	PX02SS	12G SAS ¹	200GB	2.5"	PX02SSF020	A4AC
L2ARC	HGST	UltraStar SSD1600MR ³	12G SAS ¹	250GB	2.5"	HUSMR1625ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR ³	12G SAS ¹	400GB	2.5"	HUSMR1640ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR ³	12G SAS ¹	500GB	2.5"	HUSMR1650ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR ³	12G SAS ¹	800GB	2.5"	HUSMR1680ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR ³	12G SAS ¹	1000GB	2.5"	HUSMR1610ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR ³	12G SAS ¹	1600GB	2.5"	HUSMR1616ASS200 ²	A100
L2ARC	SanDisk	Optimus.2 Ultra	6G SAS	150GB	2.5"	SDLKOEKW150G5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Ascend	6G SAS	200GB	2.5"	SDLKOEKM200G5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Ultra	6G SAS	300GB	2.5"	SDLKODGW300G5CA1	F6C2
L2ARC	Sandisk	Optimus.1 Ascend	6G SAS	400GB	2.5"	SDLKAD6M400G5CA1	KZ40
L2ARC	SanDisk	Optimus.2 Ascend	6G SAS	400GB	2.5"	SDLKODDM400G5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Eco	6G SAS	400GB	2.5"	SDLKOD6R400G5CA1	K0A0
L2ARC	SanDisk	Optimus.2 Ultra	6G SAS	600GB	2.5"	SDLKOCGW600G5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Ascend	6G SAS	800GB	2.5"	SDLKOCM800G5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Eco	6G SAS	800GB	2.5"	SDLKOC6R800G5CA1	K0A0
L2ARC	SanDisk	Optimus.2 Ultra	6G SAS	1.2TB	2.5"	SDLLOCW012T5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Ascend	6G SAS	1.6TB	2.5"	SDLLOCM016T5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Eco	6G SAS	1.6TB	2.5"	SDLLOC6R016T5CA1	K0A0
L2ARC	SanDisk	Optimus.2 Eco	6G SAS	2TB	2.5"	SDLLOC6R020T5CA1	K0A0
L2ARC	Seagate	1200 ³	12G SAS	200GB	2.5"	ST200FM0053	0004
L2ARC	Seagate	1200 ³	12G SAS	400GB	2.5"	ST400FM0053	0004
L2ARC	Seagate	1200 ³	12G SAS	800GB	2.5"	ST800FM0043	0004
L2ARC	Seagate	1200 ³	12G SAS	200GB	2.5"	ST200FM0073	0004 ²
L2ARC	Seagate	1200 ³	12G SAS	400GB	2.5"	ST400FM0073	0004 ²
L2ARC	Seagate	1200 ³	12G SAS	800GB	2.5"	ST800FM0053	0004 ²

Nexenta Use Case	Manufacturer	Model	Interface	Capacity as Sold	Form Factor	Part Number	Min. Firmware
GP Data Drives ⁵	HGST	UltraStar SSD800MH.B	12G SAS	800GB	2.5"	HUSMM1680ASS204	A45C
GP Data Drives ⁵	HGST	UltraStar SSD1600MR	12G SAS	1.6TB	2.5"	HUSMR1616ASS200 ²	A100
GP Data Drives ⁵	SanDisk	InfiniFlash BSSD	6G SAS	8TB	Proprietary	SDIFC10-0720801	593L
GP Data Drives ⁵	Seagate	1200 ³	12G SAS	100GB to 800GB	2.5"	See SLOG and L2ARC sections above for PNs and firmware info	

Note 1: 12Gb SAS devices are currently only certified within 6Gb SAS enclosures. Full 12Gb SAS support is pending.

Note 2: SED functionality is not supported by NexentaStor

Note 3: Tested and supported by Nexenta and Supermicro since January 2015

Note 4: **White on grey items** are supported but not recommended. These SSDs have been EOL'ed by the respective vendor.

Note 5: We strongly encourage our customers to fully understand the workloads that they will place on the SSDs they choose for general purpose data drives due to the nature of the SSDs themselves. Choosing the wrong SSD for your workload can cause reduced performance and/or reduced longevity of the SSDs in the deployed solution. SSDs have a finite number of program erase cycles and each is rated for a specific number of FDWD (full drive writes per day). Please work with your Nexenta SE and HW vendor sales representative to select the correct SSD type for your intended deployment.

Appendix B - All-SSD Tuning Guide

When deploying NexentaStor 4.0.4 on all flash arrays, we recommend you work with Nexenta to ensure the following system level tunings are applied. These changes improve overall system performance and reliability.

Tuning Devices with Larger Queue Depths

You may increase the vdev queues if you know the devices' queue depths.

When deploying NexentaStor on HGST or SanDisk IF-100 All Flash Arrays, add the lines below to the file `/etc/system`:

```
set zfs:zfs_vdev_sync_read_max_active = 30
set zfs:zfs_vdev_sync_write_max_active = 30
set zfs:zfs_vdev_async_read_max_active = 9
set zfs:zfs_vdev_async_write_max_active = 30
```

Generic Pool Tuning

The settings below will improve compression and reduce write inflation by reducing metadata copies and by not modifying access time on a file read. This is done on a per pool basis.

Run the zfs commands below in a bash root shell:

```
zfs set compression=lz4 <InsertPoolNameHere>
zfs set redundant_metadata=most <InsertPoolNameHere>
zfs set atime=off <InsertPoolNameHere>
```

SanDisk IF-100 Recommendations for Pool Configurations

Nexenta recommends that pools configured on SanDisk IF-100 comprise either:

- 1+1 mirrors with record size set to 16KB
- raidz1(4+1) vdevs with record size set to 64KB
- raidz2(8+2) vdevs with record size set to 128KB

Choosing between the options above will be a function of performance, storage efficiency and redundancy requirements. More vdevs with smaller record size will yield better IOPS performance with smaller random IOs. In general:

- 64TB IF-100 with only 8 icechips should be configured with 1+1 mirrors
- larger IF-100 systems should be configured with raidz1(4+1) or raidz2(8+2)

For example, a 256TB IF-100 enclosure could be configured as 6x raidz1(4+1) vdevs, leaving 2 icechips to be used as hot spares, one per pool.

Nexenta requires a minimum of 128TB of raw flash for NexentaStor and SanDisk IF-100 configurations deployed in production environments. 64TB IF-100 systems may only be used in Test/Dev type environments with lower performance requirements.

Appendix C - Legacy RA and RA+

This section includes legacy RA and RA+ configurations that have been superseded by newer generation of hardware architecture. Though these configurations continue to be supported, new deployments should be done with the latest hardware offerings.

C.1 Dell RA (12G Based)

Dell RA	ND-44	ND-88	ND-176	ND-224	ND-456	ND-960
Raw Capacity	44TB	88TB	176TB	224TB	456TB	960TB
Data Drive #	44	44	88	112	228	240
Form Factor (total system)	8U	12U	20U	12U	20U	20U
Memory (total system)	192GB			512GB		
Read Cache	Up to 800GB		Up to 1.6TB			n/a
10GbE port	8					
Software	NexentaStor 4.0.x					
Protocol	NFS v3, v4, CIFS, SMB 2.1, FC, iSCSI					
Client OS	RHEL, Windows, VMware, Hyper-V, OpenStack, CloudStack					

Dell RA	ND-44	ND-88	ND-176	ND-224	ND-456	ND-960
Controller	2x R720					
CPU	E5-2609 v2 2.5GHz, 4-core, 2-socket			E5-2643 v2 3.5GHz, 6-core, 2-socket		
DRAM	96GB (12x 8GB)			256GB (16x 16GB)		
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")					
SAS HBA	2x LSI SAS 6Gb HBA	4x LSI SAS 6Gb HBA				
NIC	1x X520 10GbE DA/SFP+					
Storage Enclosure	2x MD1220 (24-bay)	4x MD1200 (12-bay)	8x MD1200 (12-bay)	2x MD3060e (60-bay)	4x MD3060e (60-bay)	4x MD3060e (60-bay)
Data HDD	1TB SAS 7.2k 2.5"	2TB SAS 7.2k 3.5"				4TB SAS 7.2k 3.5"
Data Drive #	44	44	88	112	228	240
L2ARC	0 – 2x Dell 400GB SSD, SAS, MU, MLC, 12G, 2.5 up to 800GB		0 – 4x Dell 400GB SSD, SAS, MU, MLC, 12G, 2.5 up to 1.6TB			n/a
ZIL/SLOG	2X 200GB SLC 2x Dell 200GB MLC	2x Dell 8GB ZeusRAM	4x Dell 8GB ZeusRAM	4x Dell 8GB ZeusRAM	8x Dell 8GB ZeusRAM	n/a

Note 1: For Dell deployments, please use Nexenta-specific platform SKUs in DellStar or Gii ordering system.

Note 2: BIOS for R720 system is 2.2.3

Note 3: [White on grey items](#) are supported but not preferred for new deployments

Note 4: 10GbE port count takes into account the 2 ports on the server Network Daughter Card

C.2 Dell RA+ (12G Based)

- Controllers and storage enclosures pairing is restricted within RA building blocks only. For example, R720 can be paired with any storage enclosures in the following list, but not across different RA partners building blocks, e.g. SMC.
- Variations in the following are permitted:
 - Controller: CPU type, DRAM capacity, SAS HBA type and count, NIC type and count, FC HBA type and count.
 - Storage enclosure: HDD type and count, SSD type and count, storage enclosure type and count.
- All Dell-qualified HDD and SSD manufacturers are supported as data HDD and data SSD respectively.

Dell RA+ Building Blocks - Controller	
Controller	R620 R720
CPU	All CPUs on Dell-supported list
DRAM	96GB to 256GB per controller
Boot Drive	2x 1TB SAS 7.2k 2.5" (mirrored)
SAS HBA	LSI SAS 6Gb HBA LSI 9206-16e H710 (for internal SysPool drives only)
NIC	X520 10GbE DA/SFP+ X540 10GbE RJ45 I350
FC HBA	Emulex LPe 12000, LPe 12002 QLogic QLE 2462, QLE 2562

Dell RA+ Building Blocks – Storage Enclosure			
Storage Enclosure	MD1200	MD1220	MD3060e
Data HDD	All SAS HDD on Dell-qualified list 7.2k SAS HDD ≤ 4TB 3.5" 10k SAS HDD ≤ 1.2TB 3.5" 15k SAS HDD ≤ 600GB 3.5"	All SAS HDD on Dell-qualified list 10k SAS HDD ≤ 1.2TB 2.5" 15k SAS HDD ≤ 600GB 2.5"	All SAS HDD on Dell-qualified list 7.2k SAS HDD ≤ 6TB 3.5" 7.2K SAS HDD ≤ 1TB 2.5" 10k SAS HDD ≤ 1.2TB 2.5" 15k SAS HDD ≤ 300GB 2.5"
L2ARC		400GB SLC 200GB MLC 2.5" 400GB MLC 2.5"	
ZIL /SLOG	Dell ZeusRAM 8GB 3.5"	200GB SLC 200GB MLC 2.5" 200GB SSD 2.5"	Dell ZeusRAM 8GB 3.5"
Data SSD	All SAS SSD on Dell-qualified list		

Note 1: Up to 8x MD3060e supported.

Note 2: There is no Self-encrypting Drives (SED) support in NexentaStor at this time. SED drives certification can be waived with the following assumptions:

- Same hardware and firmware as non-SED (that was certified by Nexenta)
- Self-encrypting feature turned off

Note 3: White on grey items are supported but not preferred for new deployments

Note 4: Please contact Dell for detailed wiring diagrams of these configurations.

C.3 HP RA+

- Controllers and storage enclosures pairing is restricted within RA building blocks only. For example, DL380e can be paired with any storage enclosures in the following list, but not across different RA partners building blocks, e.g. Dell.
- Variations in the following are permitted:
 - Controller: CPU type, DRAM capacity, SAS HBA type and count, NIC type and count, FC HBA type and count
 - Storage enclosure: HDD type and count, SSD type and count, storage enclosure type and count
- All HP-qualified HDD and SSD manufacturers are supported as data HDD and data SSD, respectively.

HP RA+ Building Blocks - Controller		
Controller	DL380e G8	DL380p G8
CPU	E5-2407, 2.2GHz, 4-core, 2-socket	E5-2643, 3.3GHz, 4-core, 2-socket
DRAM	96GB to 256 GB per controller	96GB to 256GB per controller
Boot Drive	2x 1TB SAS 7.2k 2.5 (mirrored)	
SAS HBA	HP H221 (external) HP H220 (internal)	
NIC	HP 560SFP+	
FC HBA	Emulex LPe 12000, LPe 12002, LPe 12004 QLogic QLE 2462, QLE 2562	

HP RA+ Building Blocks – Storage Enclosure			
Storage Enclosure	D2600	D2700	D6000
Data HDD	All SAS HDD ≤ 4TB on HP-qualified list		
	3.5" HDD	2.5" HDD	3.5" HDD
L2ARC	n/a	200GB MLC 2.5 (741136-B21) 400GB MLC 2.5 (741140-B21) 800GB MLC 2.5 (741144-B21)	n/a
ZIL/SLOG	ZeusRAM 3.5	200GB SLC 2.5 (741148-B21) 400GB SLC 2.5 (741153-B21)	n/a
Data SSD	All SAS SSD on HP-qualified list		

Note 1: There is no Self-encrypting Drives (SED) support in NexentaStor at this time. SED drives certification can be waived with the following assumptions:

- Same hardware as non-SED (that was certified by Nexenta)
- Same firmware as non-SED (that was certified by Nexenta)
- Self-encrypting feature turned off

Note 2: BIOS for HP RA/RA+ is P70

Note 3: D6000 starting with NexentaStor 4.0.3