

# Hardware Certification List (HCL) for NexentaStor 4.0.x

Certification Team

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## Revision History

12/06/16	<p><b>Update aligned with the NexentaStor 4.0.5 and its support of SED based data at rest encryption</b></p> <p><b>Additions:</b>          Section 2.5: added support for Intel v4 CPUs to Supermicro configurations          Sections 2.5.1, 2.5.2 and 2.6: added note requiring Nexenta Integration SKU to ensure functional chassis management.          Section 2.6: added Note 2 on support of SED devices with NexentaStor 4.0.5          Section 3.1.2: updated drive configurations and added Note 4 on support for SED devices with NexentaStor 4.0.5          Section 3.2.1: updated Note 2 to reflect support for SED devices with NexentaStor 4.0.5          Sections 3.2.2 and 3.2.3: Added Note 6 on support of SED devices with NexentaStor 4.0.5          Section 3.3.1: updated Note 1 to reflect support for SED devices with NexentaStor 4.0.5          Section 4.2 CS Building Blocks: added ATTO Celerity FC-162E and FC-162P HBAs, and Intel X710/XL710 NICs          New Section 7 on data at rest encryption configuration with NexentaStor 4.0.5, SED devices and SafeNet KeySecure from Gemalto.</p> <p><b>Modifications:</b>          Section 2.1.2 Dell RA: Updated column boundary for ND-960-13G to reflect that it is based on 4TB HDDs          Section 2.4 StorMax RA: Updated configuration names, CPU and Memory specifications. Added QLE 2562 FC HBA.</p>
10/12/16	<p><b>Additions:</b>          Section 2.1: Added Hybrid and All-Disk 4x MD1280 and 8xMD1280 Dell Reference Architectures          Section 2.4: Added StorMax RA configurations          Section 3.3.1: Supermicro RA+: Added ES-2643 (v3 and v4) in CPU row          Section 4.1: Certified Solutions: Added the following certified solutions:          - Ericsson HDS 8000          - PogoLinux Q2H-HA          - Toyon NCS3700          Section 4.2: Certified Solutions Building Blocks: Added the new HGST 4U60G1 (4U 60-bay) storage enclosure          Section 6.0: Metro HA Configurations: Added maximum device count information and 2 additional notes.          Appendix A: Supported SSDs:          - Added HGST 1920GB L2ARC SSD          - Added several general purpose(GP), SLOG, and L2ARC Seagate 1200.2 SSDs          Appendix C: Legacy Configurations          - C.10: Certified Solutions: Added Besta SD201</p> <p><b>Modifications:</b>          Section 2.1.1: Fixed column misalignment in CPU row          Section 4.1: Marked Besta SD201 as <b>white on grey</b> (not supported for new deployments)          Section 4.1: Marked the Quanta M4602H as <b>white on grey</b> (not supported for new deployments)</p> <p><b>Deletions:</b>          Section 2.5.1: Supermicro X10 RA: Removed the 20TB configuration</p>
6/27/16	<p><b>Correction</b>          Section 2.3: Dell RA (R730 and R730xd All Flash): Corrected Dell SSD part number to AMOQ (was AM0Q).</p>
6/7/16	<p><b>Additions:</b>          All Dell RA and RA+ configurations: Added the Intel v4 CPUs (Broadwell Xeon Intel chip)</p>

<p>All Supermicro RA+ configurations: Added the Intel v4 CPUs (Broadwell Xeon Intel chip)</p> <p>Section 2.1.1: Dell RA (R730 Hybrid Configurations):</p> <ul style="list-style-type: none"> <li>- Added the 1296TB configuration column which utilizes the MD1280 storage enclosure</li> </ul> <p>Section 2.1.2: Dell RA (R730 All Disk Configurations):</p> <ul style="list-style-type: none"> <li>- Added the 1334TB all-SSD configuration column which utilizes the MD1280 storage enclosure</li> </ul> <p>Section 2.2.1: Dell RA (R730xd): Added the 42TB and the 104TB non-HA RA configurations</p> <p>Section 2.2.2: Dell RA (R730xd) - Expanded: Added the 90TB and 264TB expanded configuration</p> <p>Section 2.3: Added the Dell RA (R730 and R730xd) All Flash section</p> <p>Section 2.4.1: SuperMicro RA (20TB to 216TB Configurations):</p> <ul style="list-style-type: none"> <li>- Controller row, 198TB and 216TB columns, added the part number for the 36-bay enclosure</li> </ul> <p>Section 3.1.3: Added the Cisco and SanDisk Infiniflash IF150 RA+ configuration</p> <p>Section 3.2.1: Added the MD1280 storage enclosure column</p> <p>Section 3.2.3: Added the Dell RA+ (R730 and R730xd All Flash) section with 3.2TB SSDs</p> <p>Section 3.2.4: Added the Dell and SanDisk Infiniflash IF150 RA+ configuration</p> <p>Section 3.3.1: Supermicro RA+ (X10 Based): FC HBA row, added the QLogic 16Gb FC HBA (QLE 2672)</p> <p>Section 3.3.2: Added the Supermicro RA+ (X10 Based) and SanDisk InfiniFlash IF150 RA+ configurations</p> <p>Section 4.1: Certified Solutions: Toyou row, added 7500P</p> <p>Section 4.2: Certified Solutions Building Blocks: FC HBA column, added QLogic 16Gb FC HBA (QLE 2672)</p> <p>Section 5.3: Added new section on NexentaStor with DirectPathIO VSA</p> <p>Appendix A: Supported SSDs:</p> <ul style="list-style-type: none"> <li>- Added Seagate 200GB and 400GB (1200.2) L2ARC SSDs</li> <li>- Added Micron 800GB and 1920GB general purpose data drives</li> <li>- Added SanDisk Optimus Eco (2TB) and Optimus Max(4TB) general purpose data drives</li> <li>- Added Seagate 1.6TB general purpose data drive</li> <li>- Added SanDisk Infiniflash IF150 BSSDs (4TB and 8TB flash modules)</li> </ul> <p>Appendix C: Legacy RA and RA+: Moved the following configurations in this section:</p> <ul style="list-style-type: none"> <li>- Cisco and SanDisk InfiniFlash 1F100 RA+</li> <li>- Dell (13G Based) and SanDisk InfiniFlash IF100 RA+</li> <li>- Supermicro (X10 Based) and SanDisk InfiniFlash IF100 RA+</li> <li>- C.10: Certified Solutions: Q5 Predator and Q5 Beluga</li> </ul> <p><b>Modifications/Corrections:</b></p> <p>Section 2.1: Dell RA (13G Based R730): Split the Dell RA configurations into 2 subsections: Hybrid and Archive</p> <p>Section 2.2.1: Dell RA (R730xd): Replaced Dell part numbers with the latest 13G part numbers</p> <p>Section 2.4.1: Supermicro RA (20TB to 216TB Configurations): Corrected AOC-SAS-9300-8e to AOC-SAS3-9300-8e</p> <p>Section 2.4.2: Supermicro RA (340TB to 5760TB Configurations): Corrected AOC-SAS-9300-8e to AOC-SAS3-9300-8e</p> <p>Section 2.5: Supermicro and HGST All Flash Array RA:</p> <ul style="list-style-type: none"> <li>- Corrected form factor numbers</li> <li>- Corrected AOC-SAS-9300-8e to AOC-SAS3-9300-8e</li> </ul> <p>Section 3.2.2: Dell RA+(13G Based R730xd): Updated the configuration to reflect the latest Dell 13G part numbers</p> <p>Section 3.3.2: Supermicro and SanDisk IF150 RA+: Corrected AOC-SAS-9300-8e to AOC-SAS3-9300-8e</p> <p>Section 4.1: Certified Solutions: Marked Q5 Predator and Beluga <span style="background-color: #e0e0e0;">white on grey</span></p> <p>Section 4.2: Certified Solutions Building Blocks: Sorted FC HBAs by speed</p> <p>Section 6.0: Metro HA Configurations: Modified the topology diagram to better illustrate connectivity</p> <p>Appendix B: All-SSD Tuning Guide: Replaced references to SanDisk IF100 with SanDisk IF150</p> <p><b>Deletions:</b></p> <p>Section 2.4.1: Supermicro RA (20TB to 216TB Configurations): ZIL/ SLOG row, removed HGST part numbers.</p> <p>Section 2.4.2: Supermicro RA (340TB to 5760TB Configurations): ZIL/ SLOG row, removed HGST part numbers.</p>
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## 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 is a targeted variation 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"> <li>• Exact configurations with specific components within each configuration</li> </ul>	<ul style="list-style-type: none"> <li>• Controller Variations               <ul style="list-style-type: none"> <li>○ CPU type</li> <li>○ DRAM quantity</li> <li>○ NIC</li> <li>○ SAS HBA</li> <li>○ FC HBA</li> </ul> </li> <li>• Storage Enclosure Variations               <ul style="list-style-type: none"> <li>○ Enclosure count</li> <li>○ HDD type and count</li> <li>○ SSD type and count</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Controllers and/or Storage Enclosures that are outside of RA+ scope</li> <li>• Open Configurations</li> <li>• Certifications Required</li> </ul>

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



## 2.0 Reference Architectures

### 2.1 Dell RA (13G Based R730)

#### 2.1.1 Dell RA (R730 Hybrid Configurations)

Dell RA	ND-44-13G	ND-88-13G	ND-176-13G	ND-224-13G	ND-456-13G	ND-1296-13G	ND-2640-13G
Raw Capacity	44TB	88TB	176TB	224TB	456TB	1296TB	2640TB
Data Drive #	44	44	88	112	228	162	330
Form Factor (tot. system)	8U	12U	20U	12U	20U	14U	24U
Memory (tot. system)	192GB			512GB			
Read Cache	Up to 800GB		Up to 1.6TB			Up to 800GB	
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-1296-13G	ND-2640-13G
Controller	2x <a href="#">R730</a> PN: 210-AEZO						
CPU	E5-2609 v3 1.9GHz, 6-core, 2-socket E5-2609 v4 1.7GHz, 8-core, 2-socket			E5-2643 v3 3.4GHz, 6-core, 2-socket E5-2643 v4 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 Dell SAS 6Gb HBA PN: 406-BBDN	4x Dell SAS 6Gb HBA PN: 406-BBDN	2x Dell SAS 6Gb HBA PN: 406-BBDN	4x Dell 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 <a href="#">MD1420</a> (24-bay) PN: 210-AEWI	4x <a href="#">MD1400</a> (12-bay) PN: 210-AFDZ	8x <a href="#">MD1400</a> (12-bay) PN: 210-AFDZ	2x <a href="#">MD3060e</a> (60-bay) PN: 210-ACIS	4x <a href="#">MD3060e</a> (60-bay) PN: 210-ACIS	2x <a href="#">MD1280</a> (84-bay) PN: 210-AIDE	4x <a href="#">MD1280</a> (84-bay) PN: 210-AIDE
Data HDD	1TB SAS 7.2k 2.5"	2TB SAS 7.2k 3.5"				8TB SAS 7.2K 12Gb 3.5"	
Data Drive #	44	44	88	112	228	162	330
L2ARC	0 – 2x Dell 400GB 12Gb 2.5" PN: 400-AEIR		0 – 4x Dell 400GB MU 12Gb 2.5" PN: 400-AEIT			2x Dell 400GB 12Gb 2.5" PN: 400-ANDY	
ZIL/SLOG	2x Dell 400GB SSDR PN: 400-AHFS	2x Dell 400GB SSDR PN: 400-AJUD	4x Dell 400GB SSDR PN: 400-AJUD	4x Dell 400GB SSDR PN: 400-AMXM	8x Dell 400GB SSDR PN: 400-AMXM	4x Dell 400GB 12Gb 2.5" PN: 400-AMZL	

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

**Note 2:** BIOS for R730 system with the v3 CPU should be 1.0.4 and above. BIOS for R730 system with v4 CPU is 2.0.2 or later.

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

**Note 4:** Contact Dell for detailed wiring diagrams for these configurations

**Note 5:** Chassis management for the MD1280 enclosure will be available in an upcoming NexentaStor 4.0 release

**Note 6:** PCIe based SSDs are not supported. ZeusRAM ZIL/SLOG is supported for existing but not new deployments

### 2.1.2 Dell RA (R730 All-HDD Configurations)

Dell RA	ND-480-13G	ND-960-13G	ND-1344-13G	ND-1920-13G	ND-2688-13G	ND-5376-13G
Raw Capacity	480TB	960TB	1344TB	1920TB	2688TB	5376TB
Data Drive #	120	240	168	480	336	672
Form Factor (tot. system)	12U	20U	14U	36U	24U	44U
Memory (tot. system)	512GB					
Read Cache	n/a					
10GbE port	4					
Software	NexentaStor 4.0.x					

Dell RA	ND-480-13G	ND-960-13G	ND-1344-13G	ND-1920-13G	ND-2688-13G	ND-5376-13G
Controller	2x <a href="#">R730</a> PN: 210-AEZO					
CPU	E5-2643 v3 3.4GHz, 6-core, 2-socket E5-2643 v4 3.4GHz, 6-core, 2-socket					
DRAM	256GB (16x 16GB)					
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")					
SAS HBA	2x Dell SAS 6Gb HBA PN: 406-BBDN	4x Dell SAS 6Gb HBA PN: 406-BBDN	2x Dell SAS 6Gb HBA PN: 406-BBDN	4x Dell SAS 6Gb HBA PN: 406-BBDN		
	H730 (for internal SysPool drives only)					
NIC	1x Network Daughter Card - Intel x520 dual port NIC + Intel i350 dual port NIC					
Storage Enclosure	2x <a href="#">MD3060e</a> (60-bay) PN: 210-ACIS	4x <a href="#">MD3060e</a> (60-bay) PN: 210-ACIS	2x <a href="#">MD1280</a> (84-bay) PN: 210-AIDE	8x <a href="#">MD3060e</a> (60-bay) PN: 210-ACIS	4x <a href="#">MD1280</a> (84-bay) PN: 210-AIDE	8x <a href="#">MD1280</a> (84-bay) PN: 210-AIDE
Data HDD	4TB SAS 7.2k 3.5"		8TB SAS 12Gb 3.5" PN: 400-AJZJ	4TB SAS 7.2k 3.5"	8TB SAS 12Gb 3.5" PN: 400-AJZJ	
Data Drive #	120	240	168	480	336	672
L2ARC	n/a					
ZIL/SLOG	n/a					

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

**Note 2:** BIOS for R730 system with the v3 CPU should be 1.0.4 and above. BIOS for R730 system with v4 CPU is 2.0.2 or later

**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:** Chassis management for the MD1280 enclosure will be available in an upcoming NexentaStor 4.0 release

## 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.

### 2.2.1 Dell RA (R730xd)

Dell RA	NDxd-42-13G (Non-HA with 2.5" Drives)	NDx-104-13G (Non-HA with 3.5" Drives)
Raw Capacity	42TB	104TB
Data Drive #	21	13
Form Factor	2U	
Memory	128GB (8x16GB)	
Read Cache	Up to 400GB	
Built-in Ethernet	2x 10GbE	
Software	NexentaStor 4.0.x	

Dell RA	NDxd-42-13G (Non-HA with 2.5" Drives)	NDx-104-13G (Non-HA with 3.5" Drives)
Controller	1x <a href="#">R730xd</a> PN: 210-AHXR	
CPU	E5-2609 v3 1.9GHz, 6-core, 2-socket E5-2609 v4 1.7GHz, 8-core, 2-socket	
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)	
NIC	X540 10GbE RJ45 X520 10GbE SFP+ I350	
Data HDD	2TB SAS 7.2k 3.5"	8TB SAS 7.2k 3.5"
Data Drive #	21	13
L2ARC	1x Dell 400GB MU 12Gb 2.5" PN: 400-AEIT	
ZIL/SLOG	2x Dell 400GB W1 12Gb 2.5" PN: 400-AEQB	

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

**Note 2:** BIOS for R730xd system with v3 CPU is 1.1.4 or later. For systems with the v4 CPU, BIOS version is 2.0.2 or later.

**Note 3:** The R730xd configurations require updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto:support@nexenta.com) for details.

## 2.2.2 Dell RA (R730xd) - Expanded

Dell RA	NDxde-90-13G (Non-HA with 2.5" Drives)	NDxde-296-13G (Non-HA with 3.5" Drives)
Raw Capacity	90TB	Up to 296TB
Data Drive #	45	37
Form Factor	4U	
Memory	128GB (8x16GB)	
Read Cache	Up to 400GB	
Built-in Ethernet	2x 10GbE	
Software	NexentaStor 4.0.x	

Dell RA	NDxde-90-13G (Non-HA with 2.5" Drives)	NDxde-296-13G (Non-HA with 3.5" Drives)
Controller	1x <a href="#">R730xd</a> PN: 210-AHXR	
CPU	E5-2609 v3 1.9GHz, 6-core, 2-socket E5-2609 v4 1.7GHz, 8-core, 2-socket	
DRAM	128GB(8x16GB)	
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")	
SAS HBA	H730 (For SysPool and R730xd data drives, H730 data drives must be in pass through mode only) Dell SAS 12Gb HBA PN: 405-AAEB <sup>4</sup>	
NIC	X540 10GbE RJ45 X520 10GbE SFP+ I350	
Storage Enclosure	1x <a href="#">MD1420</a> PN: 210- AEWI	1x <a href="#">MD1400</a> PN: 210-AFDZ
Data HDD	2TB SAS 7.2k 3.5"	8TB SAS 7.2k 3.5"
Data Drive #	45	37
L2ARC	1x Dell 400GB 12Gb 2.5" PN: 400-ANDY	
ZIL/SLOG	2x Dell 400GB 12Gb 2.5" PN: 400-AMZL	

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

**Note 2:** BIOS for R730xd system with v3 CPU is 1.1.4 or later. For systems with the v4 CPU, BIOS version is 2.0.2 or later.

**Note 3:** The R730xd configurations require updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto:support@nexenta.com) for details.

**Note 4:** This is for external connectivity only. The low profile option (Dell SAS 12Gb HBA PN: 405-AAFB) can be used if there are no more full height slots available.

### 2.3 Dell RA (R730 and R730xd All Flash)

Dell RA	NDxd-AF-77-13G (Non-HA)	NDxd-AF-154-13G (Non-HA)	ND-AF-307-13G (HA)
Raw Capacity	77 TB	154TB	Up to 307TB
Data Drive #	24	48	Up to 96
Form Factor	2U	4U	Up to 12U
Memory (total)	256GB		512GB
Built-in Ethernet	2x 10GbE		
Software	NexentaStor 4.0.x		

Dell RA	NDxd-AF-77-13G (Non-HA)	NDxd-AF-154-13G (Non-HA)	ND-AF-307-13G (HA)
Controller	1x <a href="#">R730xd</a> PN: 210-AHXR	1x <a href="#">R730xd</a> PN: 210-AHXR	2x <a href="#">R730</a> PN: 210-AEZO
CPU	E5-2643 v4, 3.4GHz, 6-core, 2-socket		
DRAM	256GB		
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")		
SAS HBA	H730 (For SysPool and R730xd data drives, H730 data drives must be in pass through mode only) Dell SAS 12Gb HBA PN: 405-AAEB <sup>5</sup>		2x Dell SAS 12Gb HBA PN: 405-AAEB
NIC	X540 10GbE RJ45 X520 10GbE SFP+ I350		1x Network Daughter Card - Intel x520 dual port NIC + Intel i350 dual port NIC
Storage Enclosure	NA	1x <a href="#">MD1420</a> (24-bay) PN: 210-AEWI	1x to 4x <a href="#">MD1420</a> (24-bay) PN: 210-AEWI
SSD	3.2TB SSD MU 12Gb 2.5" PN: AMOQ <sup>6</sup>		
Data Drive #	24	48	Up to 96
L2ARC	n/a		
ZIL/SLOG	n/a		

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

**Note 2:** BIOS for R730xd and R730 systems with the v4 CPU is 2.0.2 or later.

**Note 3:** The R730xd configurations require updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto: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.

**Note 5:** This is for external connectivity only. The low profile option (Dell SAS 12Gb HBA PN: 405-AAFB) can be used if the full height slots run out.

**Note 6:** 1.6TB SSD MU 12Gb 2.5" also available with Dell PN: 400-ALXO

## 2.4 StorMax RA

Reference Architectures with the StorMax NX224 controller provide configurations that combine 2 storage controller high-availability and storage in a single chassis.

StorMax RA	NX225	NX250
Raw Capacity	44TB	92TB
Device Slots	24	
Form Factor (total system)	2U	
Memory (total system)	512GB	
10GbE Ports	4x SFP+	
Software	NexentaStor 4.0.4 and up	

StorMax RA	NX225	NX250
Controller	NX224	
CPU	E5-2650 v4 2.2GHz, 12-core, 2-socket	E5-2643 v4 3.4GHz, 6-core, 2-socket
DRAM	256GB (16x 16GB)	
Boot Drive	Intel DC S3510 240GB SATA 2.5 SSD	
SAS HBA	Built-in LSI 3008	
NIC	2x Intel 82599-ES 10GbE SFP+ OCP mezzanine cards	
FC HBA (Optional)	QLogic QLE 2562	
Storage Enclosure	n/a	
Data HDD or SSD	22x 2TB HDD	24x 3.84TB SSD
L2ARC	n/a	
ZIL/SLOG	2x 100GB SAS SSD	n/a

**Note 1:** Tested motherboard BIOS version 1.00 for StorMax NX224.

**Note 2:** There is no need for separate ZIL or L2ARC devices in all-SSD configurations.

**Note 3:** Chassis management for StorMax is available in NexentaStor 4.0.5.

## 2.5 Supermicro RA (X10 Based)

### 2.5.1 Supermicro X10 RA (54TB to 216TB Configurations)

Supermicro RA	NSM-54-X10	NSM-82-X10	NSM-166-X10	NSM-198S-X10	NSM-216A-X10
SMC Nexenta SKU	SRS-NSM054-HA2B-01	SRS-NSM082-HA1B-01	SRS-NSM166-HA2B-01	SRS-NSM198S-SNOB-01	SRS-NSM216A-SNOB-01
Raw Capacity	54TB	82TB	166TB	198TB	216TB
Data Drive #	45	41	83	33	36
Form Factor (total system)	8U	8U	12U	4U	4U
Memory (total system)	192GB			128GB	
Read Cache	400GB		800GB	400GB	N/A
10GbE port	4		8	2	
Software	NexentaStor 4.0.x				

Supermicro RA	NSM-54-X10	NSM-82-X10	NSM-166-X10	NSM-198S-X10	NSM-216A-X10
Controller	2x <a href="#">SYS-6028U-NEX1</a> (Intel v3) 2x <a href="#">SYS-6028U-NEX3</a> (Intel v4)			1x SYS-6048R-NEX1 <sup>2</sup>	
CPU	E5-2609 v3 1.9GHz, 6-core, 2-socket E5-2620 v4 2.1GHz, 8-core, 2-socket				
DRAM	96GB (12x 8GB)				128GB (16x 8GB)
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")				2TB (2x 1TB SAS 7.2k 2.5") P/N HDD-2A1000-ST1000NX0333
SAS HBA	1x AOC-SAS3-9300-8e		2x AOC-SAS3-9300-8e	2x AOC-S3008L-L8e	
NIC	1x AOC-STGN-i2S		2x AOC-STGN-i2S		1x AOC-STG-i2T
Storage Enclosure	2x <a href="#">216BE2C-R741JBOD</a> (24-bay)	1x <a href="#">847E2C-R1K28JBOD</a> (44-bay)	2x <a href="#">847E2C-R1K28JBOD</a> (44-bay)	n/a	n/a
Data HDD	1.2TB SAS 10k 2.5"	2TB SAS 7.2k 3.5"		33x 6TB 7.2k SAS	36x 6TB 7.2k SAS
Data Drive #	45	41	83	33	36
L2ARC	400GB MLC (1x 400GB)				n/a
ZIL/SLOG	2x 400GB SSD (25DWPD)	2x 200GB SSD (25DWPD)	4x 200GB SSD (25DWPD)	2x 200GB SSD (25DWPD)	n/a

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

**Note 2:** SYS-6048R-NEX1 is the 36-bay enclosure from Supermicro that is similar to [6048R-E1CR36L](#) but with 2 SAS expanders. This configuration requires OEM integration

**Note 3:** ZeusRAM ZIL/SLOG is supported for existing but not new deployments.

**Note 4:** To ensure systems are configured to work with NexentaStor chassis management, they must be ordered with the Nexenta Integration SKU "SRS-INTSRV-10SN-SM-01".

## 2.5.2 Supermicro X10 RA (340TB to 5760TB Configurations)

Supermicro RA	NSM-340-X10	NSM-508-X10	NSM-1408-X10	NSM-5760-X10
SMC Nexenta SKU	SRS-NSM340-HA4B-01	SRS-NSM-508-HA6B-01	SRS-NS1408-HA8B-01	SRS-NS5760-HA10B-01
Raw Capacity	340TB	508TB	1408TB	5760TB
Data Drive #	170	254	352	720
Form Factor (total system)	20U	28U	36U	36U
Memory (total system)	512GB			
Read Cache	800GB	n/a		
10GbE port	8			
Software	NexentaStor 4.0.x			

Supermicro RA	NSM-340-X10	NSM-508-X10	NSM-1408-X10	NSM-5760-X10
Controller	2x <a href="#">SYS-6028U-NEX2</a> (Intel v3) 2x <a href="#">SYS-6028U-NEX4</a> (Intel v4)			
CPU	E5-2643 v3 3.4GHz, 6-core, 2-socket E5-2643 v4 3.4GHz, 6-core, 2-socket			
DRAM	256GB (16x 16GB)			
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")			
SAS HBA	2x AOC-SAS3-9300-16e	3x AOC-SAS3-9300-16e	4x AOC-SAS3-9300-16e	
NIC	2x AOC-STGN-i2S			
Data HDD	n/a			
Storage Enclosure	4x <a href="#">847E2C-R1K28JBOD</a> (44-bay)	6x <a href="#">847E2C-R1K28JBOD</a> (44-bay)	8x <a href="#">847E2C-R1K28JBOD</a> (44-bay)	8x <a href="#">SC946ED-R2KJBOD</a> (90-bay)
Data HDD	2TB SAS 7.2k 3.5"		4TB SAS 7.2k 3.5"	8TB SAS 7.2k 3.5"
Data Drive #	170	254	352	720
L2ARC	800GB MLC (2x 400GB)	800GB MLC (2x 400GB)	n/a	n/a
ZIL/SLOG	4x 200GB SSD (25DWPD)	8x 200GB SSD (25DWPD)	n/a	n/a

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

**Note 2:** ZeusRAM ZIL/SLOG is supported for existing but not new deployments.

**Note 3:** To ensure systems are configured to work with NexentaStor chassis management, they must be ordered with the Nexenta Integration SKU "SRS-INTSRV-10SN-SM-01".



## 2.6 Supermicro and HGST All Flash RA (X10 Based)

Supermicro RA All Flash Array	NSH-AF-19	NSH-AF-38	NSH-AF-76	NSH-AF-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)	6U	6U	8U	10U
Memory (total system)	512GB			
10GbE port	8			
Software	NexentaStor 4.0.x			

Supermicro RA All Flash Array	NSH-AF-19	NSH-AF-38	NSH-AF-76	NSH-AF-115
Controller	2x <a href="#">SYS-6028U-NEX2</a> (Intel v3) 2x <a href="#">SYS-6028U-NEX4</a> (Intel v4)			
CPU	E5-2643 v3 3.4GHz, 6-core, 2-socket E5-2643 v4 3.4GHz, 6-core, 2-socket			
DRAM	256GB (16x 16GB)			
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")			
SAS HBA	1x AOC-SAS3-9300-8e		2x AOC-SAS3-9300-8e	3x AOC-SAS3-9300-8e
NIC	2x AOC-STGN-i2S			
Data HDD	n/a			
Storage Enclosure	1x <a href="#">216BE2C-R741JBOD</a> (24-bay)		2x <a href="#">216BE2C-R741JBOD</a> (24-bay)	3x <a href="#">216BE2C-R741JBOD</a> (24-bay)
Data SSD	<a href="#">HGST SSD800MH.B</a> <a href="#">HGST SSD800MH</a> (800GB)		<a href="#">HGST SSD1600MM</a> <a href="#">HGST SSD1600MR</a> (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.

**Note 2:** NexentaStor 4.0.5 supports data at rest encryption with "TCG Enterprise" Self-Encrypting Drives used as SLOG, L2ARC and Data devices.

**Note 3:** To ensure systems are configured to work with NexentaStor chassis management, they must be ordered with the Nexenta Integration SKU "SRS-INTSRV-10SN-SM-01".

## 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 <a href="#">C240 M4SX</a>
CPU	2x Xeon(R) E5-2680 v3 2.5GHz or E5-2640 v4 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 <a href="#">here</a> . 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 or later

**Note 3:** The Cisco configuration requires updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto: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 <a href="#">C240 M4SX</a>			
CPU	2x Xeon(R) E5-2680 v3 2.5GHz or E5-2640 v4 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 <a href="#">Seagate SP-2584</a>	2x <a href="#">Seagate SP-2584</a>	3x <a href="#">Seagate SP-2584</a>	4x <a href="#">Seagate SP-2584</a>
Data HDD	3.5" 7.2k SAS HDD – 2TB 3.5" 7.2k SAS HDD – 4TB 3.5" 7.2k SAS HDD – 6TB 3.5" 7.2k SAS HDD – 8TB 3.5" 7.2k SAS HDD – 10TB			
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 or later.

**Note 2:** This configuration requires updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto: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.

**Note 4:** NexentaStor 4.0.5 supports data at rest encryption with “TCG Enterprise” Self-Encrypting Drives used as SLOG, L2ARC and Data devices.

### 3.1.3 Cisco and SanDisk InfiniFlash IF150 RA+

Cisco and SanDisk RA+ Building Blocks				
	NCIF-1x-IF150	NCIF-2x-IF150	NCIF-3x-IF150	NCIF-4x-IF150
Raw Capacity	Up to 512TB <sup>6</sup>	Up to 1024TB <sup>6</sup>	Up to 1536TB <sup>6</sup>	Up to 2048TB <sup>6</sup>
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 <a href="#">C240 M4SX</a>			
CPU	2x Xeon(R) E5-2680 v3 2.5GHz or E5-2640 v4 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 <a href="#">InfiniFlash IF150</a>	2x <a href="#">InfiniFlash IF150</a>	3x <a href="#">InfiniFlash IF150</a>	4x <a href="#">InfiniFlash IF150</a>
Flash Device	4TB or 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 or later

**Note 2:** This configuration requires updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto:support@nexenta.com) for details.

**Note 3:** SanDisk InfiniFlash IF150 SAS controller firmware version is A017 or later. See supported general purpose BSSDs in Appendix A.

**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 rule of thumb:

- Unless otherwise specified, all JBODs should be direct connected to SAS HBAs, no intermediate SAS switches, and no chaining of JBODs

**Note 5:** Nexenta requires a minimum of 128TB of raw flash for NexentaStor and SanDisk IF150 configurations deployed in production environments.

**Note 6:** Reflects capacity when using 8TB flash modules. Capacity reduced to half with 4TB flash modules.

### 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	<a href="#">R730</a> (PN: 210-AEZO)		
CPU	All CPUs on Dell-supported list		
DRAM	96GB to 256GB per controller		
Boot Drive	2x 1TB SAS 7.2k 3.5" (mirrored)		
SAS HBA	Dell SAS 12Gb HBA PN: 405-AAEB	Dell SAS 6Gb HBA PN: 406-BBDN	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	<a href="#">MD1400</a> PN: 210-AFDZ	<a href="#">MD1420</a> PN: 210-AEWI	<a href="#">MD3060e</a> PN: 210-ACIS	<a href="#">MD1280</a> PN: 210-AIDE
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 ≤ 10TB 3.5" 7.2K SAS HDD ≤ 1.8TB 2.5" 10k SAS HDD ≤ 1.8TB 2.5" 15k SAS HDD ≤ 300GB 2.5"	3.5" 7.2K SAS HDD – 2TB 3.5" 7.2K SAS HDD – 4TB 3.5" 7.2K SAS HDD – 6TB 3.5" 7.2K SAS HDD – 8TB 3.5" 7.2K SAS HDD – 10TB
L2ARC	Dell 400GB MU SSD			
ZIL /SLOG	Dell 400GB WI SSD			
Data SSD	All SAS SSD on Dell-qualified list			

**Note 1:** Up to 8x MD3060e supported.

**Note 2:** NexentaStor 4.0.5 supports data at rest encryption with "TCG Enterprise" Self-Encrypting Drives used as SLOG, L2ARC and Data devices.

**Note 3:** Please contact Dell for detailed wiring diagrams of these configurations.

**Note 4:** PCIe based SSDs are not supported.

**Note 5:** Chassis management for the MD1280 enclosure will be available in an upcoming NexentaStor 4.0 release

**Note 6:** ZeusRAM ZIL/SLOG is supported for existing but not new deployments.

### 3.2.2 Dell RA+ (13G Based R730xd)

Dell RA+ Building Blocks – Controller	
Software	NexentaStor 4.0.x
Controller	1x <a href="#">R730xd</a> PN: 210-AHXR
CPU	All CPUs on Dell-supported list but recommends E5-2643 v4, 3.4GHz, 6-core, 2-socket
DRAM	128GB to 256GB
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5")
SAS HBA	Dell SAS 12Gb HBA PN: 405-AAEB Dell SAS 12Gb HBA PN: 406-AAFB (low profile) H730 (for internal SysPool drives only) H730 (for Syspool and data drives; data drives must be in pass through mode only)
NIC	X520 10GbE SFP+ X540 10GbE RJ45
FC HBA	Emulex LPe 12000, LPe 12002 QLogic QLE 2560, QLE 2562

Dell RA+ Building Blocks – Storage Enclosure		
Storage Enclosure	<a href="#">MD1400</a> <sup>4</sup> PN: 210-AFDZ	<a href="#">MD1420</a> <sup>5</sup> PN: 210-AEWI
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"
L2ARC	Dell 400GB MU 12Gb 2.5"	
ZIL /SLOG	Dell 400GB WI 12Gb 2.5"	
Data SSD	All SAS SSD on Dell-qualified list	

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

**Note 2:** BIOS for R730xd system with the v3 CPU is 1.1.4 or later. For systems with the v4 CPU, BIOS version is 2.0.2 or later.

**Note 3:** The R730xd configurations require updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto:support@nexenta.com) for details.

**Note 4:** Only available for the 3.5" R730xd configuration.

**Note 5:** Only available for the 2.5" R730xd configuration.

**Note 6:** NexentaStor 4.0.5 supports data at rest encryption with "TCG Enterprise" Self-Encrypting Drives used as SLOG, L2ARC and Data devices.

### 3.2.3 Dell RA+ (13G Based R730 and R730xd All Flash)

Dell RA+ Building Blocks - Controller			
Software	NexentaStor 4.0.x		
Controller	<table border="1"> <tr> <td><a href="#">R730</a> (PN: 210-AEZO)</td> <td>1x <a href="#">R730xd</a> (non-HA) PN: 210-AHXR</td> </tr> </table>	<a href="#">R730</a> (PN: 210-AEZO)	1x <a href="#">R730xd</a> (non-HA) PN: 210-AHXR
<a href="#">R730</a> (PN: 210-AEZO)	1x <a href="#">R730xd</a> (non-HA) PN: 210-AHXR		
CPU	All CPUs on Dell-supported list but recommends E5-2643 v4, 3.4GHz, 6-core, 2-socket		
DRAM	96GB to 256GB per controller		
Boot Drive	2TB (2x 1TB SAS 7.2k 3.5") The only HDD in this All-Flash configuration.		
SAS HBA	Dell SAS 12Gb HBA PN: 405-AAEB Dell SAS 12Gb HBA PN: 406-AAFB (low profile) H730 (for internal SysPool drives only) H730 (for Syspool and data drives; data drives must be in pass through mode only)		
NIC	<table border="1"> <tr> <td>X520 10GbE SFP+ X540 10GbE RJ45 I350</td> <td>X520 10GbE SFP+ X540 10GbE RJ45</td> </tr> </table>	X520 10GbE SFP+ X540 10GbE RJ45 I350	X520 10GbE SFP+ X540 10GbE RJ45
X520 10GbE SFP+ X540 10GbE RJ45 I350	X520 10GbE SFP+ X540 10GbE RJ45		
FC HBA	Emulex LPe 12000, LPe 12002 QLogic QLE 2560, QLE 2562		

Dell RA+ Building Blocks – Storage Enclosure			
Storage Enclosure	<table border="1"> <tr> <td>1x to 4x <a href="#">MD1420</a><sup>5</sup> PN: 210-AEWI</td> <td>0 to 1x <a href="#">MD1420</a><sup>5</sup> PN: 210-AEWI</td> </tr> </table>	1x to 4x <a href="#">MD1420</a> <sup>5</sup> PN: 210-AEWI	0 to 1x <a href="#">MD1420</a> <sup>5</sup> PN: 210-AEWI
1x to 4x <a href="#">MD1420</a> <sup>5</sup> PN: 210-AEWI	0 to 1x <a href="#">MD1420</a> <sup>5</sup> PN: 210-AEWI		
SSD	All SAS SSD on Dell-qualified list		
L2ARC	na		
ZIL /SLOG	na		

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

**Note 2:** For R730 and R730xd systems with the v4 CPU, BIOS version is 2.0.2 or later.

**Note 3:** The R730xd configurations require updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto:support@nexenta.com) for details.

**Note 4:** All flash arrays have only SSDs as General Purpose (GP) storage devices, with the exception of the boot drive. See Appendix A for list of GP devices.

**Note 5:** Only available for the 2.5" R730xd configuration.

**Note 6:** NexentaStor 4.0.5 supports data at rest encryption with "TCG Enterprise" Self-Encrypting Drives used as SLOG, L2ARC and Data devices.

### 3.2.4 Dell (13G Based) and SanDisk InfiniFlash IF150 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-IF150	NDS-2x-IF150	NDS-3x-IF150	NDS-4x-IF150
Raw Capacity	Up to 512TB <sup>5</sup>	Up to 1024TB <sup>5</sup>	Up to 1536TB <sup>5</sup>	Up to 2048TB <sup>5</sup>
Total Device #	64	128	192	256
Form Factor (HA system)	7U	10U	13U	16U
Software	NexentaStor 4.0.x			
Controller	1x or 2x <a href="#">R730</a> PN: 210-AEZO			
CPU	E5-2643 v3, 3.4GHz, 6-core, 2-socket E5-2643 v4, 3.4GHz, 6-core, 2-socket			
DRAM	256GB per controller			
Boot Drive	2x 1TB SAS 7.2k 3.5" 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) X520 10GbE DA/SFP+ X540 10GbE RJ45			
FC HBA	Emulex LPe 12002 QLogic QLE 2562			
Storage Enclosure	1x <a href="#">InfiniFlash IF150</a>	2x <a href="#">InfiniFlash IF150</a>	3x <a href="#">InfiniFlash IF150</a>	4x <a href="#">InfiniFlash IF150</a>
Flash Device	4TB or 8TB Flash Module			
L2ARC	n/a			
ZIL /SLOG	n/a			

**Note 1:** BIOS for R730 system with the v3 CPU should be 1.0.4 and above. BIOS for R730 system with v4 CPU is 2.0.2 or later.

**Note 2:** SanDisk InfiniFlash IF150 SAS controller firmware version is A017 or later. See supported general purpose BSSDs in Appendix A.

**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 rule of thumb:

- Unless otherwise specified, all JBODs should be direct connected to SAS HBAs, no intermediate SAS switches, and no chaining of JBODs

**Note 4:** Nexenta requires a minimum of 128TB of raw flash for NexentaStor and SanDisk IF150 configurations deployed in production environments.

**Note 5:** Reflects capacity when using 8TB flash modules. Capacity reduced to half with 4TB flash modules.



### 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	<a href="#">SYS6028U-TR4+ (2U)</a> , <a href="#">SYS6018U-TR4+(1U)</a>
CPU	E5-2609 v3, 1.9 GHz, 6-core, 2-socket E5-2620 v4, 2.1 GHz, 8-core, 2-socket E5-2643 v3, 3.4 GHz, 6-core, 2-socket E5-2643 v4, 3.4 GHz, 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-SAS3-9300-8e AOC-SAS3-9300-16e
NIC	AOC-STGN-i2S AOC-STG-i2T
FC HBA	Emulex LPe 12000, LPe 12002, LPe 12004, LPe 16000, LPe 16002 QLogic QLE 2560, 2562, 2672

SMC RA+ Building Blocks – Storage Enclosure			
Storage Enclosure	<a href="#">847E2C-R1K28JBOD</a> (44 bay)	<a href="#">216BE2C-R741JBOD</a> (24-bay)	<a href="#">SC946ED-R2KJBOD</a> (90-bay)
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 200GB SSD (25DWPDP)– See Appendix A for SSD based alternatives		
Data SSD	All SAS SSD on SMC-qualified list		

**Note 1:** NexentaStor 4.0.5 supports data at rest encryption with “TCG Enterprise” Self-Encrypting Drives used as SLOG, L2ARC and Data devices.

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

**Note 3:** Support for QLE 2672 16GB FC available in NexentaStor 4.0.5 and later.

**Note 4:** ZeusRAM ZIL/SLOG is supported for existing but not new deployments.

**Note 5:** To ensure systems are configured to work with NexentaStor chassis management, they must be ordered with the Nexenta Integration SKU “SRS-INTSRV-10SN-SM-01”.

### 3.3.2 Supermicro (X10 Based) and SanDisk InfiniFlash IF150 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-IF150	NSS-2x-IF150	NSS-3x-IF150	NSS-4x-IF150
Raw Capacity	Up to 512TB <sup>5</sup>	Up to 1024TB <sup>5</sup>	Up to 1536TB <sup>5</sup>	Up to 2048TB <sup>5</sup>
Total Device #	64	128	192	256
Form Factor (HA system)	7U	10U	13U	16U
Software	NexentaStor 4.0.x			
Controller	1x or 2x <a href="#">SYS-6028U-NEX2</a> (Intel v3) 1x or 2x <a href="#">SYS-6028U-NEX4</a> (Intel v4)			
CPU	E5-2643 v3, 3.4GHz, 6-core, 2-socket E5-2643 v4, 3.4GHz, 6-core, 2-socket			
DRAM	256GB per controller			
Boot Drive	2x 1TB SAS 7.2k 3.5" mirrored			
SAS HBA	1x AOC-SAS3-9300-8e	2x AOC-SAS3-9300-8e	3x AOC-SAS3-9300-8e	4x AOC-SAS3-9300-8e
NIC	1x AOC-STGN-i2S or AOC-STG-i2T		2x AOC-STGN-i2S or AOC-STG-i2T	
FC HBA	Emulex LPe 12002, LPe 12004, LPe 16000, LPe 16002 QLogic QLE 2562, 2672 <sup>2</sup>			
Storage Enclosure	1x <a href="#">InfiniFlash IF150</a>	2x <a href="#">InfiniFlash IF150</a>	3x <a href="#">InfiniFlash IF150</a>	4x <a href="#">InfiniFlash IF150</a>
Flash Device	4TB or 8TB Flash Module			
L2ARC	n/a			
ZIL /SLOG	n/a			

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

**Note 2:** Support for QLE 2672 16GB FC available in NexentaStor 4.0.5 and later.

**Note 3:** SanDisk InfiniFlash IF150 SAS controller firmware version is A017 or later. See supported general purpose BSSDs in Appendix A.

**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 rule of thumb:

- Unless otherwise specified, all JBODs should be direct connected to SAS HBAs, no intermediate SAS switches, and no chaining of JBODs

**Note 5:** Nexenta requires a minimum of 128TB of raw flash for NexentaStor and SanDisk IF150 configurations deployed in production environments.

**Note 6:** Reflects capacity when using 8TB flash modules. Capacity reduced to half when using 4TB flash devices.

## 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"> <li>AberSAN Z22</li> <li>AberSAN Z32</li> <li>AberSAN Z42</li> <li>AberSAN ZXP2</li> <li>AberSAN ZXP3</li> <li>AberSAN ZXP4</li> <li>AberSAN Petarack2</li> <li>AberSAN Petarack3</li> <li>AberSAN Petarack4</li> <li>AberSANZ23</li> <li>AberSANZ33</li> <li>AberSANZ43</li> </ul>
Adcap Systems	<ul style="list-style-type: none"> <li>Adcap SwiftStor C7000 series</li> </ul>
AIC	<ul style="list-style-type: none"> <li>SB402-CP2 4U Storage Server + JX3000-4603S JBOD</li> </ul>
Besta	<ul style="list-style-type: none"> <li>Besta SD201</li> </ul>
Cirrascale	<ul style="list-style-type: none"> <li>SB1460</li> </ul>
Ericsson	<ul style="list-style-type: none"> <li>HDS 8000</li> </ul>
ICC	<ul style="list-style-type: none"> <li>Quanta S810-X52LR</li> </ul>
Maguay	<ul style="list-style-type: none"> <li>Impex PowerStor-NXT</li> </ul>
Penguin	<ul style="list-style-type: none"> <li>IceBreaker 4836</li> </ul>
Pogo Storage	<ul style="list-style-type: none"> <li>StorageDirector ZXR</li> <li>EX424JS</li> <li>PogoLinux Q2H-HA</li> </ul>
Q5	<ul style="list-style-type: none"> <li>Predator</li> <li>Beluga</li> </ul>
Redapt	<ul style="list-style-type: none"> <li>SC280</li> </ul>
SGI	<ul style="list-style-type: none"> <li>Single node (non-HA) SGI ISS3112-RP2 + SGI MIS 1.5 JBOD</li> </ul>
Silicon Mechanics	<ul style="list-style-type: none"> <li>Silicon Mechanics zStax 104 4U</li> <li>Silicon Mechanics zStax 104 3U</li> <li>Silicon Mechanics zStax 64</li> <li>Silicon Mechanics zStax 94</li> </ul>
Toyou	<ul style="list-style-type: none"> <li>820A</li> <li>770A</li> <li>7500P</li> <li>NCS3700</li> </ul>
Zstor	<ul style="list-style-type: none"> <li>Q-3560</li> <li>Q-HA356</li> <li>Q-HA120</li> <li>Q-12<sup>3</sup></li> </ul>

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

**Note 2:** Chassis management support for PogoLinux Q2H-HA requires NexentaStor 4.0.5.

**Note 3:** Chassis management support for Zstor requires NexentaStor 4.0.5.

## 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 based on these building blocks are more likely to pass Nexenta Certification Testing.

Note that whether they are based on building blocks listed below or not, all partner specific Certified Solutions must pass Nexenta Certification Testing before they can be added on the HCL and formally supported.

Certified Solutions Building Blocks – Controller					
Controller	CPU	DRAM	SAS HBA	NIC	FC HBA
Supermicro X9DRH-iTF	E5-2603v2	Up to 256GB	LSI 9200-8e	X520 10GbE DA/SFP+	4Gb: QLE 2460 QLE 2462
X9DRi-LN4+	E5-2620 v2		LSI 9201-16e	X540 10GbE RJ45	
X9DR3-LN4+	E5-2630 v2		LSI 9205-8e		8Gb: LPe 12000
X9DR3-LN4+			LSI 9206-16e	AOC-STGN-i2S	LPe 12002
X9DRW-3LN4F+	E5-2690v3		LSI 9207-8e	AOC-STG-i2T	LPe 12004
X9DRW-3TF+	E5-2640v3		LSI 9207-8i		QLE 2560
X9DRD-7LN4F	E5-2643v3		LSI-9211-8i	Intel X710 10GbE <sup>3</sup>	QLE 2562
X10DRU-i+	E5-2680v3		LSI-9300-8i	Intel XL710 40GbE <sup>3</sup>	
Cisco C240-M3 <sup>1</sup>			LSI-9300-8e		16Gb: LPe 16000
	E5-2620v4		LSI-9300-16e		LPe 16002
	E5-2643v4	AOC-SAS3-9300-8e		QLE 2672 <sup>3</sup>	
		AOC-SAS3-9300-16e		ATTO Celerity FC-162E <sup>3</sup>	
				ATTO Celerity FC-162P <sup>3</sup>	

**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.

**Note 3:** Full support available as of NexentaStor 4.0.5.

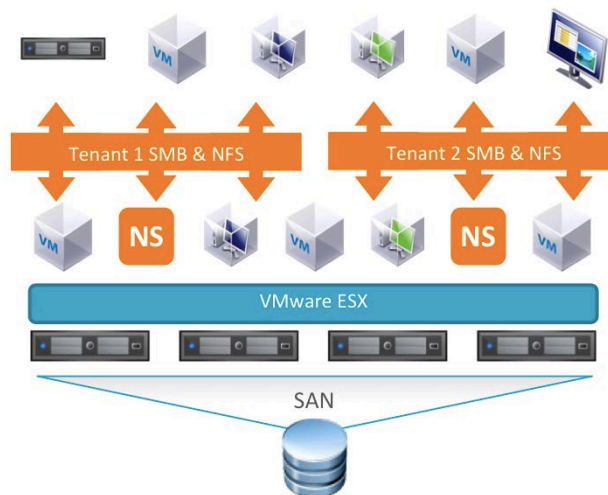
Certified Solutions Building Blocks – Storage Enclosure	Notes
AIC XJ3000-4603S (4U 60-bay)	
Dell SC280 (5U 84-bay)	
HGST 4U60G1 (4U 60-bay)	Chassis management as of NexentaStor 4.0.5
Quanta JB7 (M4240H 4U 24-bay)	
Quanta JB9 (M4600H 4U 60-bay)	
Quanta JB9 (M4602H 4U 60-bay)	12Gb version of the JB9 chassis management is missing.
Seagate OneStor SP-2584 (5U 84-bay)	
Supermicro 216BE2C-R741JBOD (2U 24-bay)	
Supermicro 837E26-RJBOD1 (3U 28-bay)	
Supermicro 847E2C-R1K28JBOD (4U 44-bay)	
Supermicro SC946ED-R2KJBOD (4U 90-bay)	
Xyratex HB-2435-E6EBD (2U 24-bay)	
Xyratex OneStor SP-2584 (5U 84-bay)	

## 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 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.

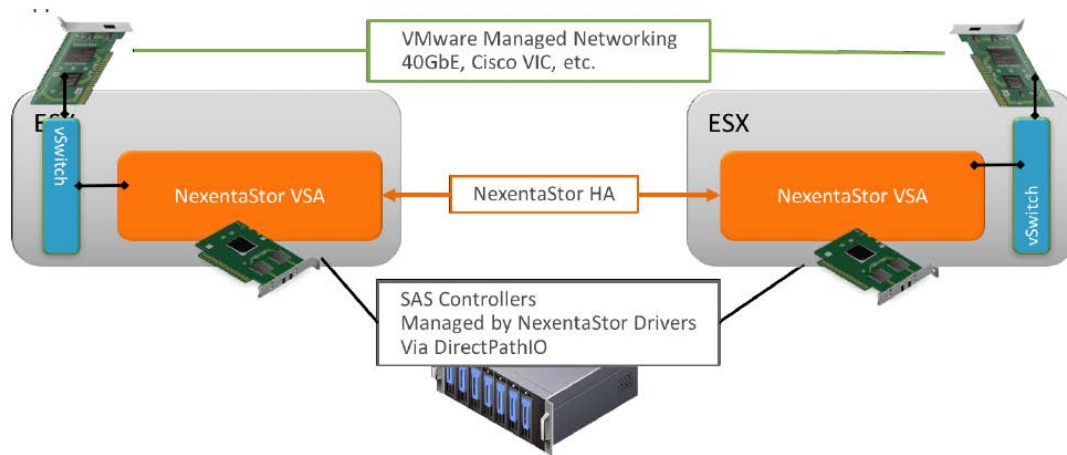
## 5.2 NexentaStor in XenServer Virtual Machines

Similar configurations are supported on XenServer 5.5 and later.

### 5.3 NexentaStor with DirectPathIO VSA

The DirectPathIO VSA configuration allows NexentaStor to run inside VMware Virtual Machines, benefit from VMware virtualization of all front-end network interfaces, and at the same time retain direct access and bare metal management of backend SAS devices. The key benefit is that backend device and chassis management is performed exactly as it would in a NexentaStor bare metal configuration. VMware is only used to virtualize front-end network interfaces.

Target use cases for this configuration are NexentaStor and NexentaStor High-Availability setups on hardware with network interfaces that are not yet natively supported by NexentaStor, such as Cisco Virtual Interface Cards in Cisco C3160 and Cisco C3260 servers, or Intel XL710 40GbE Network Interface Cards.



**Figure 5-2** – Two NexentaStor appliances deployed as virtual storage appliances utilizing VMware networking and DirectPathIO.

For deployment and configuration details, see the DirectPathIO VSA Solution Guide.

## 6.0 Metro HA Configurations

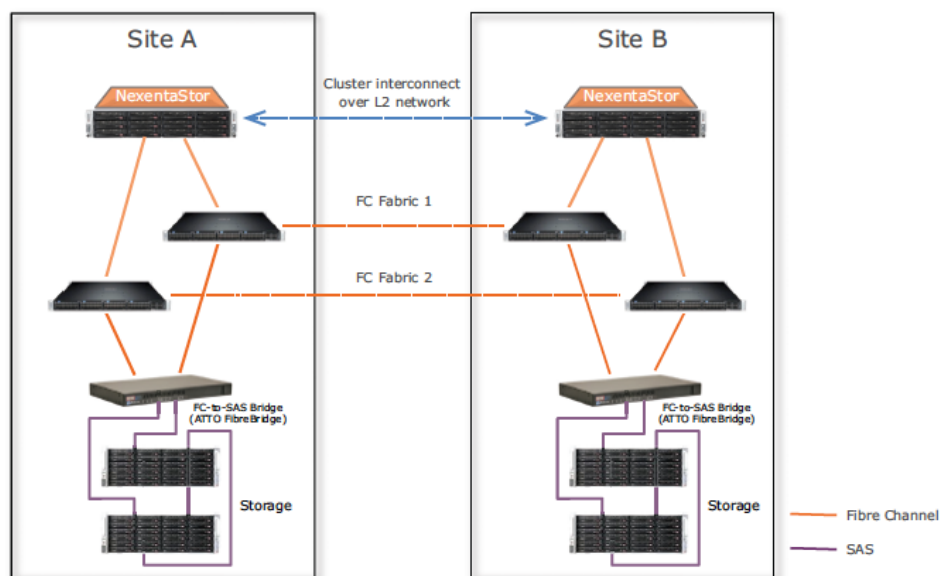
For Disaster Recovery requirements, NexentaStor supports periodic asynchronous long distance replication, allowing application data to be replicated between different sites over IP. For business critical applications that cannot afford any data loss in the event of a disaster, NexentaStor can be deployed in a HA 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 50 miles / 80 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 50 miles / 80 km<sup>2</sup>
- Fibre Channel switched fabric between the NexentaStor heads and ATTO FibreBridges
- NexentaStor 4.0.4-FP2 or later
- 2x or 4x ATTO FibreBridge 6500<sup>3</sup> with firmware version 1.18 or later.
- 4-way mirrors **are required**
  - No hot spares allowed
- Components must be tested by both Nexenta and ATTO Technology
  - Dell 13G – R730 with MD1420 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<sup>1</sup>



## Recommended Scale Limits

There should be at most 2 JBODs behind each FibreBridge switch. All JBODs must have one direct SAS uplink to the bridge and cascade through the other JBOD for the second path.

The table below lists the maximum device counts for the different storage enclosures. For example, two 60-bay MD3060e enclosures in a 2-FibreBridge switch configuration would involve 240 devices (2 enclosures per switch x 2 switches x 60 devices per enclosure).

Storage Enclosure	Two FibreBridge Configuration	Four FibreBridge Configuration
Dell MD3060e (60-bay)	240	480
SMC 847E2C-R1K28JBOD (44-bay)	176	352
Dell MD1420 (24-bay)	96	192
SMC 216BE2C-R741JBOD (24-bay)	96	192

**Note 1:** A Metro HA deployment with 4x ATTO FibreBridge switches is also supported. See the **MetroHA Admin Guide** on nexenta.com for details.

**Note 2:** Configurations beyond 10km stretches may require additional FC switch feature/capacity licenses to be purchased from switch vendors for additional buffer credits.

**Note 3:** The ATTO FibreBridge 6500 uses QSFP (SFF-8436) connectors. ATTO includes cables for connecting the FibreBridge 6500 to external mini-SAS (SFF-8088) ports. If you plan to use the ATTO FibreBridge with 12 Gb SAS enclosures, you must obtain separate SFF-8436-to-mini-SAS HD (SFF-8644) cables. Nexenta does not support fanout cables with the FibreBridge 6500.

## 7.0 Key Management Requirements for Data At Rest Encryption

NexentaStor 4.0.5 supports data at rest encryption on hardware configurations built with “TCG Enterprise” Self-Encrypting Drives for SLOG, L2ARC and Data devices. As noted in previous sections of this document, such configurations can be All-Flash, Hybrid and All-Disk from Cisco, Dell, HGST, Seagate, Supermicro and others.

NexentaStor 4.0.5 requires an external KMIP compliant key management infrastructure to generate, store and protect the Authentication Keys (AK) that are used to unlock SEDs at boot time.

At this time, NexentaStor 4.0.5 has been certified to work with:

- [SafeNet KeySecure from Gemalto](#), physical and virtual editions.

More information on configuring and managing a NexentaStor system for data at rest encryption is available in the ***NexentaStor 4.0.5 Data At Rest Encryption with SED Configuration Guide*** on [nexenta.com](http://nexenta.com).

## 8.0 About Nexenta

Nexenta is the global leader in Open Source-driven Software-Defined Storage (OpenSDS) with 6,000+ customers, 400+ partners, 42 patents, and more than 1,500 petabytes of storage under management. Nexenta uniquely integrates deep software-only “Open Source” collaboration with one of the largest and most vibrant Open Source communities (46,000 members) and a comprehensive vision around a commodity hardware-centric “Software-Defined Storage” innovation enabling ANY app, cloud platform and protocol. Nexenta is **100% Software-based**; and 100% hardware-, protocol-, cloud platform-, and app-agnostic providing organizations with **Total Freedom** protecting them against punitive “vendor-lock-in”, “vendor-bait-n-switch”, and “vendor-rip-n-replace” gimmicks. Nexenta provides enterprises with the “true” benefits of “true” Software-Defined Everything-centric Cloud Computing – from data centers to end users; from the infrastructure to apps. Nexenta enables everyday apps from rich media-driven Social Living to Mobility; from the Internet of Things to Big Data; from OpenStack 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 along with enterprise-scale 24x7 - around the globe - **All Love** - service and support with a global partner network, including Cisco, Citrix, Dell, Docker, HPE, Lenovo, Quanta, SanDisk, Seagate, Supermicro, VMware, Western Digital, Wipro, and many others. Nexenta: **100% Software. Total Freedom. All Love.**

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

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## 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/ 0T00169	E4R3
ZIL/SLOG	HGST	s842	6G SAS	400GB	2.5"	S842E400M2/ 0T00177	E4R3/E505
ZIL/SLOG	HGST	UltraStar SSD800MH <sup>3</sup>	12G SAS	200GB	2.5"	HUSMH8020ASS200	A210
ZIL/SLOG	HGST	UltraStar SSD800MH <sup>3</sup>	12G SAS	400GB	2.5"	HUSMH8040ASS200	A210
ZIL/SLOG	HGST	UltraStar SSD800MH <sup>3</sup>	12G SAS	800GB	2.5"	HUSMH8080ASS200	A210
ZIL/SLOG	HGST	UltraStar SSD800MH.B <sup>3</sup>	12G SAS	100GB	2.5"	HUSMH8010BSS200	A45C
ZIL/SLOG	HGST	UltraStar SSD800MH.B <sup>3</sup>	12G SAS	200GB	2.5"	HUSMH8020BSS200	A45C
ZIL/SLOG	HGST	UltraStar SSD800MH.B <sup>3</sup>	12G SAS	400GB	2.5"	HUSMH8040BSS200	A45C
ZIL/SLOG	HGST	UltraStar SSD800MH.B <sup>3</sup>	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 <sup>3</sup>	12G SAS	100GB	2.5"	ST100FM0103	0004
ZIL/SLOG	Seagate	1200 <sup>3</sup>	12G SAS	200GB	2.5"	ST200FM0103	0004
ZIL/SLOG	Seagate	1200 <sup>3</sup>	12G SAS	400GB	2.5"	ST400FM0103	0004
ZIL/SLOG	Seagate	1200 <sup>3</sup>	12G SAS	100GB	2.5"	ST100FM0093	0004
ZIL/SLOG	Seagate	1200 <sup>3</sup>	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 <sup>3</sup>	12G SAS	400GB	2.5"	ST400FM0093	0004
ZIL/SLOG	Seagate	1200.2	12G SAS	200GB	2.5"	ST200FM0133	0004
ZIL/SLOG	Seagate	1200.2	12G SAS	200GB	2.5"	ST200FM0143	0004
ZIL/SLOG	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0323-25DWPD	B003
ZIL/SLOG	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0333	0004
ZIL/SLOG	Toshiba	PX04SH	12G SAS	400GB	2.5"	PX04SHB040	0104
ZIL/SLOG	Toshiba	PX02SS	12G SAS <sup>1</sup>	200GB	2.5"	PX02SSF020	A4AC
L2ARC	HGST	s842	6G SAS	400GB	2.5"	S842E400M2/OT00177	E4R3/E505
L2ARC	HGST	UltraStar SSD1600MR <sup>3</sup>	12G SAS <sup>1</sup>	250GB	2.5"	HUSMR1625ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR <sup>3</sup>	12G SAS <sup>1</sup>	400GB	2.5"	HUSMR1640ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR <sup>3</sup>	12G SAS <sup>1</sup>	500GB	2.5"	HUSMR1650ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR <sup>3</sup>	12G SAS <sup>1</sup>	800GB	2.5"	HUSMR1680ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR <sup>3</sup>	12G SAS <sup>1</sup>	1000GB	2.5"	HUSMR1610ASS200	A100
L2ARC	HGST	UltraStar SSD1600MR <sup>3</sup>	12G SAS <sup>1</sup>	1600GB	2.5"	HUSMR1616ASS200 <sup>2</sup>	A100
L2ARC	HGST	UltraStar SSD1600MR	12G SAS	1920GB	2.5"	HUSMR1619ASS230	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"	SDLKOCDM800G5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Eco	6G SAS	800GB	2.5"	SDLKOC6R800G5CA1	K0A0

Nexenta Use Case	Manufacturer	Model	Interface	Capacity as Sold	Form Factor	Part Number	Min. Firmware
L2ARC	SanDisk	Optimus.2 Ultra	6G SAS	1.2TB	2.5"	SDLLOCGW012T5CA1	F6C2
L2ARC	SanDisk	Optimus.2 Ascend	6G SAS	1.6TB	2.5"	SDLLOCDM016T5CA1	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 <sup>3</sup>	12G SAS	200GB	2.5"	ST200FM0053	0004
L2ARC	Seagate	1200 <sup>3</sup>	12G SAS	400GB	2.5"	ST400FM0053	0004
L2ARC	Seagate	1200 <sup>3</sup>	12G SAS	800GB	2.5"	ST800FM0043	0004
L2ARC	Seagate	1200 <sup>3</sup>	12G SAS	200GB	2.5"	ST200FM0073	0004 <sup>2</sup>
L2ARC	Seagate	1200 <sup>3</sup>	12G SAS	400GB	2.5"	ST400FM0073	0004 <sup>2</sup>
L2ARC	Seagate	1200 <sup>3</sup>	12G SAS	800GB	2.5"	ST800FM0053	0004 <sup>2</sup>
L2ARC	Seagate	1200.2	12G SAS	200GB	2.5"	ST200FM0133	0004
L2ARC	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0303	0004
L2ARC	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0343	0004
GP DD <sup>5</sup>	HGST	UltraStar SSD800MH.B	12G SAS	800GB	2.5"	HUSMM1680ASS204	A45C
GP DD <sup>5</sup>	HGST	UltraStar SSD1600MR	12G SAS	1.6TB	2.5"	HUSMR1616ASS200 <sup>2</sup>	A100
GP DD <sup>5</sup>	Micron	S630DC-1920 <sup>6</sup>	12G SAS	1920GB	2.5"	MTFDJAL1T9MBT	M010
GP DD <sup>5</sup>	Micron	S650DC-800	12G SAS	800GB	2.5"	MTFDJAK800MBS	M013
GP DD <sup>5</sup>	SanDisk	InfiniFlash IF100 BSSD	6G SAS	8TB	Proprietary	SDIFC10-0720801	593L
GP DD <sup>5</sup>	SanDisk	InfiniFlash IF150 BSSD	12G SAS	4TB	Proprietary		62HQ
GP DD <sup>5</sup>	SanDisk	InfiniFlash IF150 BSSD	12G SAS	8TB	Proprietary	SDIFC10-0720801	62EL
GP DD <sup>5</sup>	SanDisk	Optimus Eco <sup>6</sup>	6G SAS	2TB	2.5"	SDLLOCDR020T5CA1	F820
GP DD <sup>5</sup>	SanDisk	Optimus Max <sup>6</sup>	6G SAS	4TB	2.5"	SDLLOCDR038T5CA1	AM70
GP DD <sup>5</sup>	Seagate	1200 <sup>3</sup>	12G SAS	100GB - 800GB	2.5"	See SLOG and L2ARC sections above for PNs and firmware info	
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0303	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0343	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0233	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0243	0004

Nexenta Use Case	Manufacturer	Model	Interface	Capacity as Sold	Form Factor	Part Number	Min. Firmware
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	400GB	2.5"	ST400FM0293	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	480GB	2.5"	ST480FM0003	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	480GB	2.5"	ST480FM0013	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	800GB	2.5"	ST800FM0233	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	800GB	2.5"	ST800FM0243	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	800GB	2.5"	ST800FM0173	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	800GB	2.5"	ST800FM0183	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	800GB	2.5"	ST800FM0213	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	960GB	2.5"	ST960FM0003	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	960GB	2.5"	ST960FM0013	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	1.6TB	2.5"	ST1600FM0073	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	1.6TB	2.5"	ST1600FM0083	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	1.6TB	2.5"	ST1600FM0003	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	1.6TB	2.5"	ST1600FM0013	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	1.6TB	2.5"	ST1600FM0023	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	1.92TB	2.5"	ST1920FM0003	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	1.92TB	2.5"	ST1920FM0023	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	3.2TB	2.5"	ST3200FM0063	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	3.2TB	2.5"	ST3200FM0003	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	3.2TB	2.5"	ST3200FM0023	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	3.2TB	2.5"	ST3200FM0033	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	3.2TB	2.5"	ST3200FM0043	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	3.84TB	2.5"	ST3840FM0003	0004
GP DD <sup>5</sup>	Seagate	1200.2	12G SAS	3.84TB	2.5"	ST3840FM0023	0004

**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:** General Purpose Data Drives (GPDD). 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.

**Note 6:** For capacity-based solutions and not performance-based solutions.



## Appendix B - All-SSD Tuning Guide

When deploying NexentaStor 4.0 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 IF150 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 IF100/ IF150 Recommendations for Pool Configurations

Nexenta recommends that pools configured on SanDisk IF150 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 IF150 with only 8 icechips should be configured with 1+1 mirrors
- larger IF150 systems should be configured with raidz1(4+1) or raidz2(8+2)

For example, a 256TB IF150 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 IF150 configurations deployed in production environments. 64TB IF150 systems may only be used in Test/Dev type environments with lower performance requirements.

**Note 1:** Above settings also apply to SanDisk IF100 deployments.

## 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 Cisco and SanDisk InfiniFlash IF100 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 <a href="#">C240 M4SX</a>			
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 <a href="#">InfiniFlash IF100</a>	2x <a href="#">InfiniFlash IF100</a>	3x <a href="#">InfiniFlash IF100</a>	4x <a href="#">InfiniFlash IF100</a>
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 or later

**Note 2:** This configuration requires updated LSI drivers that must be installed separately. Contact [support@nexenta.com](mailto: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 IF150 configurations deployed in production environments. 64TB IF150 systems may only be used in Test/Dev type environments with lower performance requirements.

**Note 6:** 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.

## C.2 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 <a href="#">R720</a>					
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	H710 (for internal SysPool drives only)					
NIC	1x X520 10GbE DA/SFP+					
Storage Enclosure	2x <a href="#">MD1220</a> (24-bay)	4x <a href="#">MD1200</a> (12-bay)	8x <a href="#">MD1200</a> (12-bay)	2x <a href="#">MD3060e</a> (60-bay)	4x <a href="#">MD3060e</a> (60-bay)	4x <a href="#">MD3060e</a> (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	<a href="#">2x 200GB SLC</a> 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.3 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	<a href="#">R620</a> <a href="#">R720</a>
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 <a href="#">LSI 9206-16e</a> 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	<a href="#">MD1200</a>	<a href="#">MD1220</a>	<a href="#">MD3060e</a>
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		<a href="#">400GB SLC</a> 200GB MLC 2.5" 400GB MLC 2.5"	
ZIL /SLOG	Dell ZeusRAM 8GB 3.5"	<a href="#">200GB SLC</a> 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.4 Dell (13G Based) and SanDisk InfiniFlash IF100 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 <a href="#">R730</a> PN: 210-AEZO			
CPU	E5-2643v3, 3.4GHz, 6-core, 2-socket			
DRAM	256GB per controller			
Boot Drive	2x 1TB SAS 7.2k 3.5" 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 <a href="#">InfiniFlash IF100</a>	2x <a href="#">InfiniFlash IF100</a>	3x <a href="#">InfiniFlash IF100</a>	4x <a href="#">InfiniFlash IF100</a>
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 IF100 configurations deployed in production environments. 64TB IF100 systems may only be used in Test/Dev type environments with lower performance requirements.

**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.

## C.5 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	<a href="#">DL380e G8</a>	<a href="#">DL380p G8</a>
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	<a href="#">D2600</a>	<a href="#">D2700</a>	<a href="#">D6000</a>
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

## C.6 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 <a href="#">SSG-6027R-NEX1</a>	2x <a href="#">SSG-6027R-NEX1</a>			2x <a href="#">SSG-6027R-NEX2</a>		
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
	Internal embedded LSI 2308 (on Motherboard, in IT/JBOD mode, for internal SysPool drives only)						
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 <a href="#">216E26-R1200LPB</a> (24-bay) 1x <a href="#">847E26-RJBOD1</a> (45-bay)	1x <a href="#">847E26-RJBOD1</a> (45-bay)	2x <a href="#">847E26-RJBOD1</a> (45-bay)	4x <a href="#">847E26-RJBOD1</a> (45-bay)	6x <a href="#">847E26-RJBOD1</a> (45-bay)	8x <a href="#">847E26-RJBOD1</a> (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 UltraStar SSD800MH.B 200GB		8x ZeusRAM UltraStar SSD800MH.B 200GB	n/a

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

## C.7 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	<a href="#">SSG-6027R-E1R12L</a>
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	<a href="#">847E26-RJBOD1</a>	<a href="#">216E26-R1200LPB</a>	<a href="#">847DE26-R2K02JBOD</a> <sup>4</sup> <a href="#">SC946ED-R2KJBOD</a> <sup>5</sup>
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.



## C.8 Supermicro (X10 Based) and SanDisk InfiniFlash IF100 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 <a href="#">SYS-6028U-NEX2</a>			
CPU	E5-2643v3, 3.4GHz, 6-core, 2-socket			
DRAM	256GB per controller			
Boot Drive	2x 1TB SAS 7.2k 3.5" mirrored			
SAS HBA	1x AOC-SAS3-9300-8e	2x AOC-SAS3-9300-8e	3x AOC-SAS3-9300-8e	4x AOC-SAS3-9300-8e
NIC	1x AOC-STGN-i2S or AOC-STG-i2T		2x AOC-STGN-i2S or AOC-STG-i2T	
FC HBA	Emulex LPe 12002, LPe 12004, LPe 16000, LPe 16000, LPe 16002 QLogic QLE 2562			
Storage Enclosure	1x <a href="#">InfiniFlash IF100</a>	2x <a href="#">InfiniFlash IF100</a>	3x <a href="#">InfiniFlash IF100</a>	4x <a href="#">InfiniFlash IF100</a>
Flash Device	4TB or 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 IF100 configurations deployed in production environments. 64TB IF100 systems may only be used in Test/Dev type environments with lower performance requirements.

**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.

## C.9 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 <a href="#">RX300 S8</a>	
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 <a href="#">JX40</a>	6x <a href="#">JX40</a>
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

## C.10 Certified Solutions

Partner Name	Partner Solutions
Q5	<ul style="list-style-type: none"> <li>Predator</li> <li>Beluga</li> </ul>
Besta	<ul style="list-style-type: none"> <li>Besta SD201</li> </ul>