

NEC Express5800/R120e-2E Configuration Guide

Standard model



Introduction

This document contains product and configuration information that will enable you to configure your system. The guide will ensure fast and proper configuration of your NEC Express5800 server.

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Technical Specification

Key Features

- High performance with the latest Intel® Xeon® processor E5-2400 v2 product family
- Up to 384 GB of memory capacity, supporting high speed and energy efficient DDR3-1600 memory
- Up to sixteen 2.5-inch hard drives
- High energy efficiency with power capping feature and 80 PLUS® Titanium power supply
- Full manageability by integrated EXPRESSSCOPE Engine 3

Specification

(1/2)

Model		R120e-2E			
Part Number		N8100-2135F, N8100-2136F, N8100-2137F			
Processor	Type	Intel® Xeon® processor E5-2403 v2	Intel® Xeon® processor E5-2407 v2	Intel® Xeon® processor E5-2420 v2	Intel® Xeon® processor E5-2430 v2
	Clock speed	1.80 GHz	2.40 GHz	2.20 GHz	2.50 GHz
	Number of Processors	1 to 2			
	Cache	10 MB	10 MB	15 MB	15 MB
	Cores and Threads	4C-4T	4C-4T	6C-12T	6C-12T
Chipset		Intel® C602 Chipset			
Memory	Type	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1333 ECC Registered Low Power DIMM			
	Standard Capacity	0 GB			
	Maximum Capacity	384 GB (12 x 32 GB)			
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing			
Internal Storage	Standard Capacity	0 GB			
	Maximum Capacity	SAS HDD : 19.2 TB (16 x 1.2 TB) SATA HDD : 16 TB (16 x 1 TB) SAS SSD : 6.4 TB (16 x 400 GB)			
	Disk Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)			
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)			
	Hot Plug	Supported			
	Optical Disk Drive	Optional			
	Optical Drive Bays	1			
	3.5-inch Media Bays	1			
	Disk Drive Bays	16			
Expansion Slots	Standard	Total: 6 slots available 1 PCIe 3.0 x8 (x8 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 2.0 x4 (x8 connector) 1 PCIe 2.0 x1 (x4 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot			
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)			
	Resolution / Color	1280 x 1024 / 16.7M ¹			

Model		R120e-2E			
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)			
Server Management		EXPRESSSCOPE Engine 3			
Redundant Fan		Optional, hot plug			
Redundant Power Supply		Optional, hot plug			
Power Supply		1 to 2 x 450 Watt or 800 Watt 80 PLUS® Platinum certified, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz			
Power Consumption	(Max. Config, Idling)	273 VA / 271 Watt	275 VA / 273 Watt	274VA / 273 Watt	274VA / 272 Watt
	(Max. Config, Operating)	542 VA / 538 Watt	548 VA / 544 Watt	603 VA / 599 Watt	660 VA / 655 Watt
Acoustical Noise (Sound Pressure Level)²	Max. Config, Idling	45.6dB			
	Max. Config, Operating	50.2dB			
Dimensions (W x D x H)		448.4 x 696.3 x 87.4 mm / 17.6 x 27.4 x 3.4 in (2U)			
Weight (Minimum / Maximum)		18 kg / 29 kg, 39.68 lbs. / 63.93 lbs.			
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C ³ / 50° to 104° F ³ , 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%			
Regulatory and Safety		FCC, CE, UL, CB, RCM, BSMI, KC, CCC, RoHS			
Operating Systems		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard ⁴ Microsoft® Windows Server® 2012 Datacenter ⁴ Red Hat Enterprise Linux 5.9 or later (x86) ⁵ Red Hat Enterprise Linux 5.9 or later (EM64T) ⁵ Red Hat Enterprise Linux 6.4 or later (x86) ⁵ Red Hat Enterprise Linux 6.4 or later (x86_64) ⁵ Red Hat Enterprise Linux 7.0 or later ⁵ VMware ESXi 5.0 Update 2 VMware ESXi 5.1 Update 1 VMware ESXi 5.5 VMware ESXi 5.5 Update 1			

¹ Maximum resolution available via EXPRESSSCOPE Engine 3 remote console is 1280 x 1024 / 65K colors.

² Noise emission was measured in accordance with ISO 7779. The actual value may vary by the operating environment.

³ Operable up to 35°C (95°F) when 3 or more BBUs are installed.

⁴ For Windows Server 2012 installation, download the driver kit from the following website and install it after OS installation
<http://www.nec.com/en/global/prod/express/download/>

⁵ For Linux support, contact our sales representative or go to the NEC website at:
<http://www.nec.com/global/prod/express/linux/index.html>

(2/2)

Model		R120e-2E		
Part Number		N8100-2135F, N8100-2136F, N8100-2137F		
Processor	Type	Intel® Xeon® processor E5-2430L v2	Intel® Xeon® processor E5-2440 v2	Intel® Xeon® processor E5-2470 v2
	Clock speed	2.40 GHz	1.90 GHz	2.40 GHz
	Number of Processors	1 to 2		
	Cache	15 MB	20 MB	25 MB
	Cores and Threads	6C-12T	8C-16T	10C-20T
	Chipset	Intel® C602 Chipset		
Memory	Type	DDR3-1600 ECC Unbuffered Low Power DIMM, DDR3-1600 and DDR3-1333 ECC Registered Low Power DIMM		
	Standard Capacity	0 GB		
	Maximum Capacity	384 GB (12 x 32 GB)		
	Memory protection	ECC, x4 SDDC, Memory Mirroring, Memory Lockstep, Memory Sparing		
Internal Storage	Standard Capacity	0 GB		
	Maximum Capacity	SAS HDD : 19.2 TB (16 x 1.2 TB) SATA HDD : 16 TB (16 x 1 TB) SAS SSD : 6.4 TB (16 x 400 GB)		
	Disk Controller	SATA : 3Gb/s and 6Gb/s (Integrated) SAS: 6Gb/s (Optional)		
	RAID	SATA : RAID 0/1/10(Standard), RAID 5/6/50/60 (Optional) SAS : RAID 0/1/5/6/10/50/60 (Optional)		
	Hot Plug	Supported		
	Optical Disk Drive	Optional		
	Optical Drive Bays	1		
	3.5-inch Media Bays	1		
	Disk Drive Bays	16		
	Expansion Slots	Standard	Total: 6 slots available 1 PCIe 3.0 x8 (x8 connector) 2 PCIe 3.0 x4 (x8 connector) 1 PCIe 2.0 x4 (x8 connector) 1 PCIe 2.0 x1 (x4 connector) 1 PCIe 3.0 x8 (x8 connector) dedicated RAID slot	
Video	Controller (VRAM)	Integrated in Server Management Controller (32MB)		
	Resolution / Color	1280 x 1024 / 16.7M ¹		
Interfaces		2 x VGA (15-pin mini D-sub, 1 x front, 1 x rear) 9 x USB2.0 (2 x front, 4 x rear, 3 x internal) 1 to 2 x Serial (9-pin mini D-sub, RS232-C, 1 to 2 x rear) 4 x 1000BASE-T LAN connector (RJ-45, 4 x rear) 1 x Management LAN connector (RJ-45, 1 x rear)		
Server Management		EXPRESSSCOPE Engine 3		
Redundant Fan		Optional, hot plug		
Redundant Power Supply		Optional, hot plug		
Power Supply		1 to 2 x 450 Watt or 800 Watt 80 PLUS® Platinum certified, or 800 Watt 80 PLUS® Titanium certified hot plug PSU 100-240 VAC ± 10% 50 / 60 Hz ± 3 Hz		

Model		R120e-2E		
Power Consumption	Max. Config, Idling	275 VA / 273 Watt	285 VA / 284 Watt	278 VA / 277 Watt
	Max. Config, Operating	587 VA / 583 Watt	653 VA / 649 Watt	714 VA / 709 Watt
Acoustical Noise (Sound Pressure Level) ²	Max. Config, Idling	45.6dB		
	Max. Config, Operating	50.2 dB		
Dimensions (W x D x H)		448.4 x 696.3 x 87.4 mm / 17.6 x 27.4 x 3.4 in (2U)		
Weight (Minimum / Maximum)		18 kg / 29 kg, 39.68 lbs. / 63.93 lbs.		
Temperature, Relative Humidity (non-condensing)		Operating: 10° to 40° C ³ / 50° to 104° F ³ , 20 to 80% Non-Operating: -10° to 55° C / 14° to 131° F, 20 to 80%		
Regulatory and Safety		FCC, CE, UL, CB, RCM, BSMI, KC, CCC, RoHS		
Operating Systems		Microsoft® Windows Server® 2008 Standard Microsoft® Windows Server® 2008 Enterprise Microsoft® Windows Server® 2008 Standard (x64) Microsoft® Windows Server® 2008 Enterprise (x64) Microsoft® Windows Server® 2008 R2 Standard Microsoft® Windows Server® 2008 R2 Enterprise Microsoft® Windows Server® 2012 Standard ⁴ Microsoft® Windows Server® 2012 Datacenter ⁴ Red Hat Enterprise Linux 5.9 or later (x86) ⁵ Red Hat Enterprise Linux 5.9 or later (EM64T) ⁵ Red Hat Enterprise Linux 6.4 or later (x86) ⁵ Red Hat Enterprise Linux 6.4 or later (x86_64) ⁵ Red Hat Enterprise Linux 7.0 or later ⁵ VMware ESXi 5.0 Update 2 VMware ESXi 5.1 Update 1 VMware ESXi 5.5 VMware ESXi 5.5 Update 1		

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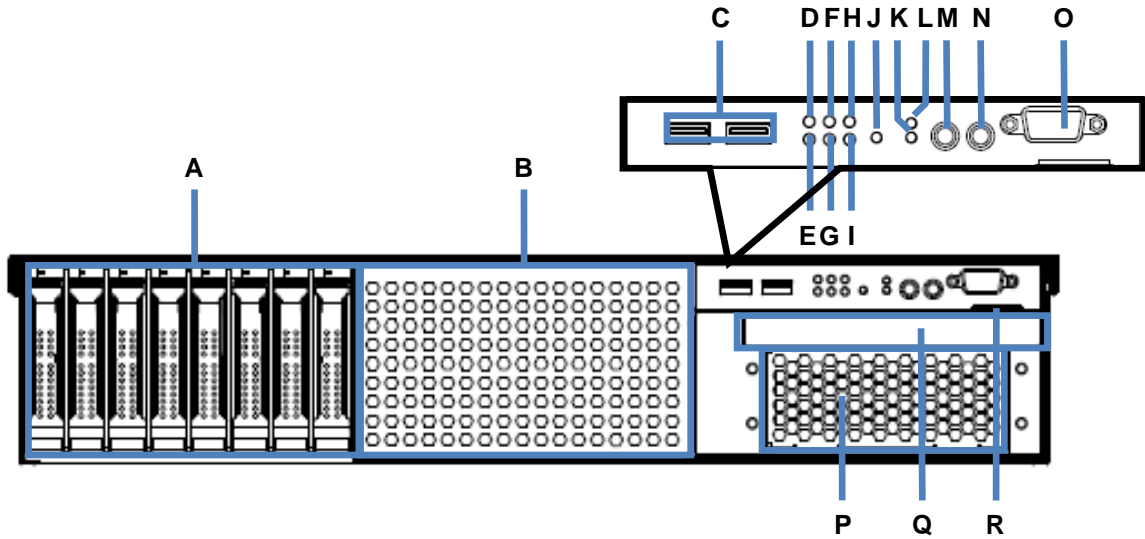
⁴ For Windows Server 2012 installation, download the driver kit from the following website and install it after OS installation
<http://www.nec.com/en/global/prod/express/download/>

⁵ For Linux support, contact our sales representative or go to the NEC website at:
<http://www.nec.com/global/prod/express/linux/index.html>

External Views

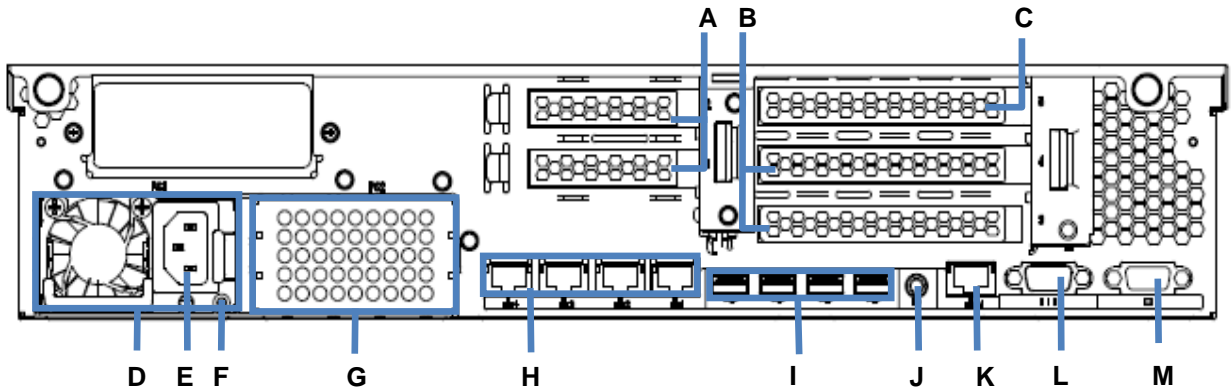
Front and Rear Views

Front View



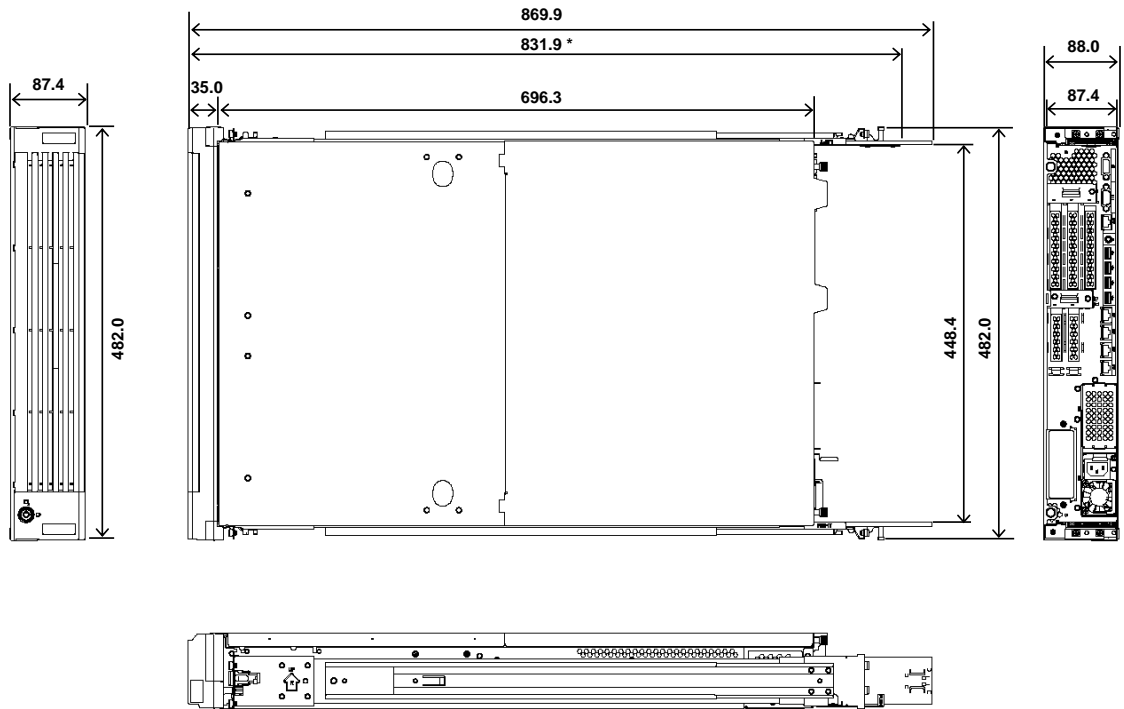
Legend			
A.	2.5-inch Drive Bays	J.	BMC Reset Button
B.	2.5-inch Drive Cage Bay	K.	Dump (NMI) Button
C.	USB Connectors	L.	System Reset Button
D.	Data LAN 1 Activity LED	M.	UID LED Button
E.	Data LAN 2 Activity LED	N.	Power Button / Power LED
F.	Data LAN 3 Activity LED	O.	VGA Connector
G.	Data LAN 4 Activity LED	P.	Media Bay
H.	Hard Drive Activity LED	Q.	Optical Drive Bay
I.	System Status LED	R.	Pull-out Tab

Rear View



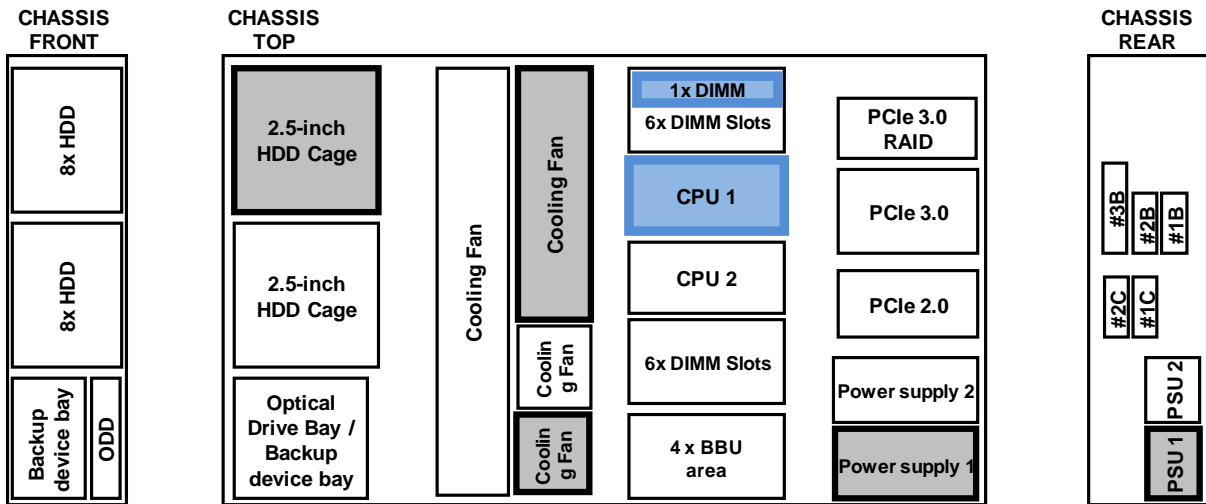
Legend			
A.	PCI Slots (Low-Profile)	H.	Data LAN Connectors
B.	PCI Slots (Low-Profile) (with Full Height bracket)	I.	USB Connectors
C.	PCI Slots (Full Height)	J.	UID Button/LED
D.	Power Supply	K.	Management LAN Connector
E.	AC Inlet	L.	Serial Port Connector
F.	AC Power LED	M.	VGA Connector
G.	Additional Power Supply Slot		

Dimensions (mm)



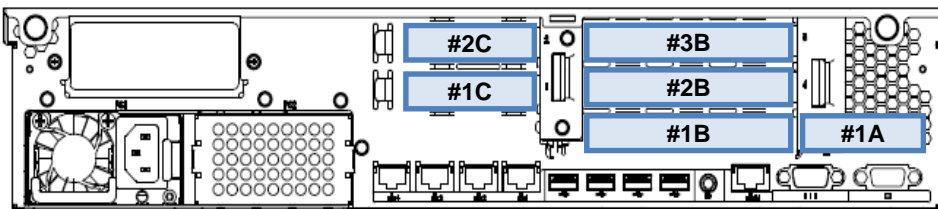
* Without back side parts of slide rail (cable arm cannot be attached)

Configuration Diagram



Legend: Mandatory components Standard components

Expansion Slot



Legend	
#1A	PCIe 3.0 x8, x8 connector, for a dedicated RAID controller
#1B	PCIe 3.0 x4, x8 connector, Low-profile with full-height bracket, up to 197 mm length
#2B	PCIe 3.0 x4, x8 connector, Low-profile with full-height bracket, up to 197 mm length
#3B	PCIe 3.0 x8, x8 connector, Full-height bracket, up to 177 mm length
#1C	PCIe 2.0 x1, x4 connector, Low-profile, up to 177 mm length
#2C	PCIe 2.0 x4, x8 connector, Low-profile, up to 177 mm length

Server Configuration

1 Base Models

Product Name / Description	Part Number
NEC Express5800/R120e-2E Server no processor, no RAM, no HDD, no ODD Including: 8 x 2.5-inch drive cage, 1 x 450 Watt 80 PLUS Platinum power supply, EXPRESSBUILDER DVD	N8100-2135F
NEC Express5800/R120e-2E Server no processor, no RAM, no HDD, no ODD Including: 8 x 2.5-inch drive cage, 1 x 800 Watt 80 PLUS Platinum power supply, EXPRESSBUILDER DVD	N8100-2136F
NEC Express5800/R120e-2E Server no processor, no RAM, no HDD, no ODD Including: 8 x 2.5-inch drive cage, 1 x 800 Watt 80 PLUS Titanium power supply, EXPRESSBUILDER DVD	N8100-2137F

NOTE:

- The base model must be ordered with a processor kit and a memory kit.

2 Processors and Heat Sink

Available sockets: 2

Category	Product Name / Description	Part Number
Processors 1 Processor Required	Xeon E5-2403 v2 Processor Kit Intel® Xeon® Processor E5-2403 v2 (1.80 GHz, 4C/4T, 10 MB)	N8101-730F
	Xeon E5-2407 v2 Processor Kit Intel® Xeon® Processor E5-2407 v2 (2.40 GHz, 4C/4T, 10 MB)	N8101-731F
	Xeon E5-2420 v2 Processor Kit Intel® Xeon® Processor E5-2420 v2 (2.20 GHz, 6C/12T, 15 MB)	N8101-732F
	Xeon E5-2430 v2 Processor Kit Intel® Xeon® Processor E5-2430 v2 (2.50 GHz, 6C/12T, 15 MB)	N8101-733F
	Xeon E5-2430L v2 Processor Kit Intel® Xeon® Processor E5-2430L v2 (2.40 GHz, 6C/12T, 15 MB)	N8101-734F
	Xeon E5-2440 v2 Processor Kit Intel® Xeon® Processor E5-2440 v2 (1.90 GHz, 8C/16T, 20 MB)	N8101-735F
	Xeon E5-2470 v2 Processor Kit Intel® Xeon® Processor E5-2470 v2 (2.40 GHz, 10C/20T, 25 MB)	N8101-736F
	Heat Sink	1st Processor Heat Sink For 1 st Processor
2nd Processor Heat Sink For 2 nd Processor, including cooling fan kit	N8101-575F	

NOTE:

- Minimum one processor kit from above must be installed.
- The processors must be the same to configure dual processor system.
- Do not disable Hyper-Threading technology when using processors with a small number of cores and the system requires a lot of IO resources, in order to avoid performance down.

The maximum number of logical processors supported by OS

See the table below for the maximum number of logical processors that you can actually use on your system.

Number of Logical Processors Supported by Operating Systems		Maximum Available Number of Logical Processors
Microsoft Windows Server 2008 Standard Microsoft Windows Server 2008 Enterprise	32 ¹	32
Microsoft Windows Server 2008 Standard (x64) Microsoft Windows Server 2008 Enterprise (x64)	64 ¹	40
Microsoft Windows Server 2008 R2 Standard (x64) Microsoft Windows Server 2008 R2 Enterprise (x64)	256 ¹	40
Microsoft Windows Server 2012 Standard Microsoft Windows Server 2012 Datacenter Microsoft Windows Server 2012 R2 Standard Microsoft Windows Server 2012 R2 Datacenter	640 ¹	40
Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	32	32
Red Hat Enterprise Linux 5 (EM64T) Red Hat Enterprise Linux 6 (x86_64) Red Hat Enterprise Linux 7	160	40
VMware ESXi 5.0 / 5.1	160	40
VMware ESXi 5.5	320	40

¹ The maximum numbers of logical processors when using Hyper-V are below:
 - Windows Server 2008 : 24 logical processors
 - Windows Server 2008 R2 : 64 logical processors
 - Windows Server 2012 : 320 logical processors
 - Windows Server 2012 R2 : 320 logical processors

3 Memory

3.1 Memory Configuration

Refer to the section in accordance with your memory configuration:

- Independent Channel: Refer to [3.1.1](#)
- Memory Sparing Configuration: Refer to [3.1.2](#)
- Memory Mirroring / Memory Lockstep Configuration: Refer to [3.1.3](#)

Memory Configuration Feature Comparison

See the table below for feature comparisons of memory configurations supported.

	Independent Channel	Memory Sparing	Memory Lockstep	Memory Mirroring
Performance	Best	Better	Better	Good
Data Protection	No	Multiple single bit error protection	No	Multiple single bit and multi bit error protection
Redundancy	No	Partly	No	Fully
Data Correction	ECC, x4 SDDC	ECC, x4 SDDC	ECC, x8 SDDC	ECC, x4 SDDC
Available Memory	Full physical memory	3/4 physical memory	Full physical memory	Half physical memory

Available Memory Channels	3	3	2	2
Notes	-	All DIMMs in the system must be identical.	Paired DIMMs must be identical.	Paired DIMMs must be identical.

3.1.1 Independent Channel Configuration

Available slots: 6 per processor

Category	Product Name / Description	Part Number
Unbuffered DIMM (UDIMM)	4GB DDR3-1600 UNB Memory Kit 1 x 4GB Unbuffered ECC DIMM, DDR3L-1600(PC3L-12800) NOTE: - The x4 SDDC is not supported.	N8102-570F
Registered DIMM (RDIMM)	4GB DDR3-1600 REG Memory Kit 1 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800) NOTE: - The x4 SDDC is not supported.	N8102-572F
	8GB DDR3-1600 REG Memory Kit 1 x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-573F
	16GB DDR3-1600 REG Memory Kit 1 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-574F
	32GB DDR3-1333 REG Memory Kit 1 x 32GB Registered ECC DIMM, DDR3L-1333(PC3L-10600)	N8102-575F

NOTE:

- Minimum one memory kit per processor must be installed.
- It is recommended to install memory kits in multiples of three for triple-channel symmetric memory configurations to increase memory transfer speed.
- When two processors are installed, balance the DIMMs across the two processors.
- Mix configurations of UDIMM/RDIMM are not supported.
- At least 5 GB of memory is required for VMware ESXi 5.5.

3.1.2 Memory Sparing Configuration

Available slots: 6 per processor

Product Name / Description	Part Number
32GB DDR3-1600 REG Memory Kit 2 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-581

NOTE:

- Minimum one memory kit per processor must be installed.
- The configured memories must be identical.
- The logical memory capacity becomes three-fourths of physical capacity.

3.1.3 Memory Mirroring / Memory Lockstep Configuration

Available slots: 4 per processor

Product Name / Description	Part Number
8GB DDR3-1600 REG Memory Kit 2 x 4GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-577
16GB DDR3-1600 REG Memory Kit 2 x 8GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)	N8102-578

32GB DDR3-1600 REG Memory Kit

N8102-579

2 x 16GB Registered ECC DIMM, DDR3L-1600(PC3L-12800)

NOTE:

- Minimum one memory kit per processor must be installed.
- The logical memory capacity becomes a half of physical capacity on memory mirroring configuration.
- At least 5 GB of memory is required for VMware ESXi 5.5.

Maximum Memory Speed

See the table below for the actual maximum memory transfer speed in Independent Channel / Memory Sparing Configuration.

DDR3 memory speed depends on the type of DIMMs, the native memory bus speed of the memory controller and memory configuration. All memory buses operate at the clock frequency of the DIMM with the lowest frequency.

Processor Type	Populated DIMMs	# of DIMMs per processor	Memory Power Setting	DIMM Speed
E5-2403 v2	UDIMM: 4GB	Up to 3 DIMMs	-	1333 MHz
E5-2407 v2		4 or more DIMMs	-	1066 MHz
	RDIMM: 4 GB, 8 GB,16 GB	-	-	1333 MHz
	RDIMM: 32 GB	-	-	800 MHz
E5-2420 v2	UDIMM: 4GB	Up to 3 DIMMs	-	1333 MHz
E5-2430 v2		4 or more DIMMs	-	1066 MHz
E5-2430L v2	RDIMM: 2 GB, 4 GB, 8 GB,16 GB	-	Low (1.35V)	1333 MHz
E5-2440 v2		-	Normal (1.5V)	1600 MHz
E5-2470 v2	RDIMM: 32 GB	-	-	800 MHz

Maximum Available Memory

See the table below for the maximum memory size that you can actually use on your system.

The maximum available memory is less than the maximum physical memory supported by your system because some chipsets require PCI resource space of about 750MB. PCI resource requirements vary depending on the type and the number of PCI cards you are using.

Maximum Memory Size Supported by OS		Maximum Available Memory
Microsoft Windows Server 2008 Standard	4 GB	4 GB (HW-DEP enabled) App. 2 GB (HW-DEP disabled)
Microsoft Windows Server 2008 Standard (x64) ¹ Microsoft Windows Server 2008 R2 Standard ¹	32 GB	32 GB
Microsoft Windows Server 2008 Enterprise	64 GB	64 GB
Microsoft Windows Server 2008 Enterprise (x64) ¹	1 TB	384 GB
Microsoft Windows Server 2008 R2 Enterprise ¹	2 TB	384 GB
Microsoft Windows Server 2012 Standard ¹ Microsoft Windows Server 2012 Datacenter ¹ Microsoft Windows Server 2012 R2 Standard ¹ Microsoft Windows Server 2012 R2 Datacenter ¹	4 TB	384 GB
Red Hat Enterprise Linux 5 Red Hat Enterprise Linux 6	16 GB	16 GB
Red Hat Enterprise Linux 5 (EM64T)	1 TB	384 GB
Red Hat Enterprise Linux 6 (x86_64) Red Hat Enterprise Linux 7	3 TB	384 GB
VMware ESXi 5.0, 5.1 ²	2 TB	384 GB

VMware ESXi 5.5 ²	4 TB	384 GB
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- ¹ The maximum available memory size of Hyper-V systems are below:
- Windows Server 2008 Standard (x64) and Windows Server 2008 R2 Standard : 32 GB
 - Windows Server 2008 Enterprise (x64) and Windows Server 2008 R2 Enterprise : 1TB
 - Windows Server 2012, Windows Server 2012 R2 : 4 TB

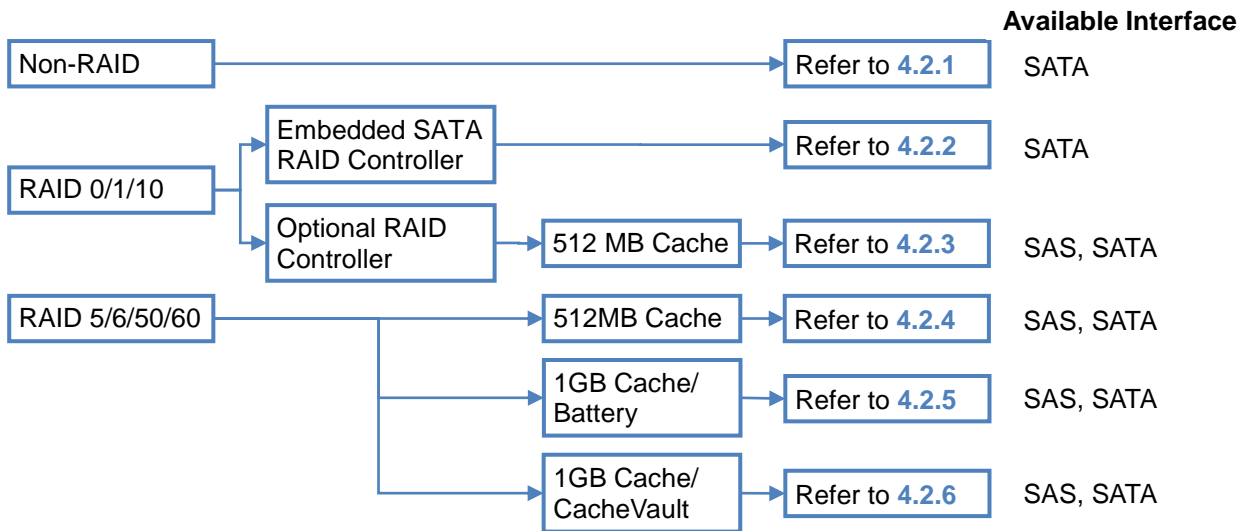
² Up to 1 TB of the main memory is available to each virtual machine.

4 Internal Hard Disk Drives

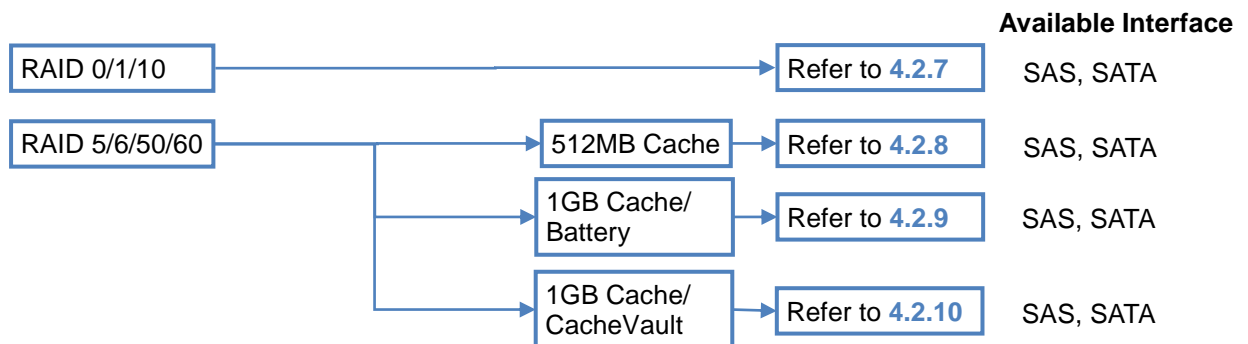
4.1 RAID Configuration

Refer to the section in accordance with your disk form factor and RAID configuration.

Up to eight 2.5-inch Drives



Up to sixteen 2.5-inch Drives



NOTE:

- Up to four hard drives can be installed in the Embedded SATA configuration.
- Hot plug insertion/removal are not supported in the Embedded SATA configuration.
- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a drive cage.
- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

4.2 Internal Drive Configuration

4.2.1 Up to four Drives with Embedded SATA Controller

Category	Product Name / Description	Part Number
Storage Controller	Embedded SATA Controller 2 x 6Gb/s SATA, 2 x 3Gb/s SATA	(Standard)
Cable	Internal SATA Cable 1 x mini-SAS to 1 x mini-SAS	(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch Hot-plug hard drive bays	(Standard)
Drive 4 slots available	SATA HDD 250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE:

- Hot plug insertion/removal is not supported with the Embedded SATA non-RAID controller.
- The maximum transfer speed for Slot 2 and Slot 3 is 3 Gb/s.

4.2.2 Up to four Drives with Embedded SATA RAID 0/1 Controller

Category	Product Name / Description	Part Number
Storage Controller	Embedded SATA Controller 2 x 6Gb/s SATA, 2 x 3Gb/s SATA, RAID 0/1/10 capable	(Standard)
Cable	Internal SATA Cable 1 x mini-SAS to 1 x mini-SAS	(Standard)
Drive Cage	2.5-inch HDD Cage 8 x 2.5-inch Hot-plug hard drive bays	(Standard)
Drive 4 slots available	SATA HDD 250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

NOTE:

- Embedded SATA RAID controller is supported only on limited OS. For more details, please see [OS Support Matrix for PCI Cards and Embedded Controller](#).
- All hard drives within a RAID array should be of the same capacity.
- The maximum transfer speed for Slot 2 and Slot 3 is 3 Gb/s.

4.2.3 Up to eight Drives with RAID 0/1 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (512MB, RAID 0/1) LSI MegaRAID SAS 9272-8i RAID 0/1/10, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-172
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)

Drive Cage		2.5-inch Drive Cage	(Standard)
		8 x 2.5-inch hot plug drive bays	
Drive 8 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD	N8150-301B
		1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		450GB 10K Hot Plug 2.5-inch SAS HDD	N8150-322B
		1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		600GB 10K Hot Plug 2.5-inch SAS HDD	N8150-304B
		1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		900GB 10K Hot Plug 2.5-inch SAS HDD	N8150-332B
		1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		1.2TB 10K Hot Plug 2.5-inch SAS HDD	N8150-408B
		1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		146.5GB 15K Hot Plug 2.5-inch SAS HDD	N8150-303B
		1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
		300GB 15K Hot Plug 2.5-inch SAS HDD	N8150-331B
		1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
450GB 15K Hot Plug 2.5-inch SAS HDD	N8150-442		
1x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm			
600GB 15K Hot Plug 2.5-inch SAS HDD	N8150-443		
1x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm			
SATA HDD	250GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-356	
	1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm		
	500GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-357	
		1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
1TB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-358		
		1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
SAS SSD	200GB Hot Plug 2.5-inch SAS SSD	N8150-711	
	1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s		
	400GB Hot Plug 2.5-inch SAS SSD	N8150-712	
		1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a Drive Cage.

4.2.4 Up to eight Drives with RAID 5/6 Controller with 512 MB Cache

Category	Product Name / Description		Part Number
Storage Controller Required	RAID Controller (512MB, RAID 0/1/5/6) LSI MegaRAID SAS 9272-8i RAID0/1/5/6/10/50/60, 512 MB, Int. 8, PCIe 3.0 x8, 6Gb/s		N8103-173
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i		N8103-153
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets		(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch hot plug drive bays		(Standard)
Drive 8 slots available	SAS HDD	300GB 10K Hot Plug 2.5-inch SAS HDD	N8150-301B
		1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		450GB 10K Hot Plug 2.5-inch SAS HDD	N8150-322B
		1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		600GB 10K Hot Plug 2.5-inch SAS HDD	N8150-304B
		1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
		900GB 10K Hot Plug 2.5-inch SAS HDD	N8150-332B

	1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
	1.2TB 10K Hot Plug 2.5-inch SAS HDD	N8150-408B
	1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
	146.5GB 15K Hot Plug 2.5-inch SAS HDD	N8150-303B
	1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	300GB 15K Hot Plug 2.5-inch SAS HDD	N8150-331B
	1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	450GB 15K Hot Plug 2.5-inch SAS HDD	N8150-442
	1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	600GB 15K Hot Plug 2.5-inch SAS HDD	N8150-443
	1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
SATA HDD	250GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-356
	1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
	500GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-357
	1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
	1TB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-358
	1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
SAS SSD	200GB Hot Plug 2.5-inch SAS SSD	N8150-711
	1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	
	400GB Hot Plug 2.5-inch SAS SSD	N8150-712
	1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a Drive Cage.

4.2.5 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (1GB, RAID 0/1/5/6) LSI MegaRAID SAS 9272-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-174
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
SSD Caching Recommended	MegaRAID CacheCade for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch hot plug drive bays	(Standard)
Drive 8 slots available	SAS HDD 300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
	450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
	600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
	900GB 10K Hot Plug 2.5-inch SAS HDD 1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
	1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
	146.5GB 15K Hot Plug 2.5-inch SAS HDD	N8150-303B

	1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	300GB 15K Hot Plug 2.5-inch SAS HDD	N8150-331B
	1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	450GB 15K Hot Plug 2.5-inch SAS HDD	N8150-442
	1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	600GB 15K Hot Plug 2.5-inch SAS HDD	N8150-443
	1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
SATA HDD	250GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-356
	1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
	500GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-357
	1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
	1TB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-358
	1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	
SAS SSD	200GB Hot Plug 2.5-inch SAS SSD	N8150-711
	1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	
	400GB Hot Plug 2.5-inch SAS SSD	N8150-712
	1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a Drive Cage.

4.2.6 Up to eight Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (1GB, RAID 0/1/5/6) LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-168
SSD Caching Recommended	MegaRAID CacheCade for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch hot plug drive bays	(Standard)
Drive 8 slots available	SAS HDD 300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
	450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
	600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
	900GB 10K Hot Plug 2.5-inch SAS HDD 1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
	1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
	146.5GB 15K Hot Plug 2.5-inch SAS HDD 1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
	300GB 15K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
	450GB 15K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
	600GB 15K Hot Plug 2.5-inch SAS HDD	N8150-443

	1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
SATA HDD	250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
SAS SSD	200GB Hot Plug 2.5-inch SAS SSD 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
	400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a Drive Cage.

4.2.7 Up to sixteen Drives with RAID 0/1 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (512MB, RAID 0/1) LSI MegaRAID SAS 9272-8i RAID 0/1/10, 512MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-172
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required	2.5-Inch Drive Cage 8 x 2.5-inch hot plug drive bays Including SAS expander card and 4 x SAS cable	N8154-46
Drive 16 slots available	SAS HDD	
	300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
	450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
	600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
	900GB 10K Hot Plug 2.5-inch SAS HDD 1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
	1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
	146.5GB 15K Hot Plug 2.5-inch SAS HDD 1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
	300GB 15K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
	450GB 15K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
	600GB 15K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD	
	250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358

SAS SSD	200GB Hot Plug 2.5-inch SAS SSD 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
	400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a Drive Cage.

4.2.8 Up to sixteen Drives with RAID 5/6 Controller with 512 MB Cache

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (512MB, RAID 0/1/5/6) LSI MegaRAID SAS 9272-8i RAID0/1/5/6/10/50/60, 512MB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-173
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required	2.5-Inch Drive Cage 8 x 2.5-inch hot plug drive bays Including SAS expander card and 4 x SAS cable	N8154-46
Drive 16 slots available	SAS HDD 300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
	450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
	600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
	900GB 10K Hot Plug 2.5-inch SAS HDD 1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
	1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
	146.5GB 15K Hot Plug 2.5-inch SAS HDD 1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
	300GB 15K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
	450GB 15K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
	600GB 15K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD 250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD 200GB Hot Plug 2.5-inch SAS SSD 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
	400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.

- Up to two kinds of drives can be mixed in a Drive Cage.

4.2.9 Up to sixteen Drives with RAID 5/6 Controller with 1 GB Cache/Battery

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (1GB, RAID 0/1/5/6) LSI MegaRAID SAS 9272-8i RAID 0/1/5/6/10/50/60, 1 GB, Int. 8, PCIe 3.0 x8, 6Gb/s	N8103-174
RAID BBU Recommended	RAID Battery Backup Unit for LSI MegaRAID SAS 9267-8i/9272-8i	N8103-153
SSD Caching Recommended	MegaRAID CacheCade for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required	2.5-Inch Drive Cage 8 x 2.5-inch hot plug drive bays Including SAS expander card and 4 x SAS cable	N8154-46
Drive 16 slots available	SAS HDD	
	300GB 10K Hot Plug 2.5-inch SAS HDD	N8150-301B
	1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
	450GB 10K Hot Plug 2.5-inch SAS HDD	N8150-322B
	1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
	600GB 10K Hot Plug 2.5-inch SAS HDD	N8150-304B
	1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
	900GB 10K Hot Plug 2.5-inch SAS HDD	N8150-332B
	1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
	1.2TB 10K Hot Plug 2.5-inch SAS HDD	N8150-408B
	1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	
	146.5GB 15K Hot Plug 2.5-inch SAS HDD	N8150-303B
	1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	300GB 15K Hot Plug 2.5-inch SAS HDD	N8150-331B
	1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	
	450GB 15K Hot Plug 2.5-inch SAS HDD	N8150-442
1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm		
600GB 15K Hot Plug 2.5-inch SAS HDD	N8150-443	
1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm		
SATA HDD		
250GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-356	
1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm		
500GB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-357	
1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm		
1TB 7.2K Hot Plug 2.5-inch SATA HDD	N8150-358	
1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm		
SAS SSD		
200GB Hot Plug 2.5-inch SAS SSD	N8150-711	
1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s		
400GB Hot Plug 2.5-inch SAS SSD	N8150-712	
1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s		

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a Drive Cage.

4.2.10 Up to sixteen Drives with RAID 5/6 Controller with 1 GB Cache/CacheVault

Category	Product Name / Description	Part Number
Storage Controller Required	RAID Controller (1GB, RAID 0/1/5/6) LSI MegaRAID SAS 9270CV-8i (with CV) RAID0/1/5/6/10/50/60, 1GB Cache, Int. 8ports, PCIe 3.0(x8), 6Gb/s, flash cache protection modules included	N8103-168
SSD Caching Recommended	MegaRAID CacheCade for LSI MegaRAID SAS NOTE: - SSD used for cache is required - The SSD capacity which can be used as read cache is up to 512 GB.	N8103-156
Cable	Internal SAS/SATA Cable 1 x mini-SAS to 1 x mini-SAS, 2 sets	(Standard)
Drive Cage	2.5-inch Drive Cage 8 x 2.5-inch hot plug drive bays	(Standard)
Optional Drive Cage Required	2.5-Inch Drive Cage 8 x 2.5-inch hot plug drive bays Including SAS expander card and 4 x SAS cable	N8154-46
Drive 16 slots available	SAS HDD 300GB 10K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-301B
	450GB 10K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-322B
	600GB 10K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-304B
	900GB 10K Hot Plug 2.5-inch SAS HDD 1 x 900 GB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-332B
	1.2TB 10K Hot Plug 2.5-inch SAS HDD 1 x 1.2TB SAS HDD, 2.5-inch, 6Gb/s, 10,000 rpm	N8150-408B
	146.5GB 15K Hot Plug 2.5-inch SAS HDD 1 x 146.5 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-303B
	300GB 15K Hot Plug 2.5-inch SAS HDD 1 x 300 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-331B
	450GB 15K Hot Plug 2.5-inch SAS HDD 1 x 450 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-442
	600GB 15K Hot Plug 2.5-inch SAS HDD 1 x 600 GB SAS HDD, 2.5-inch, 6Gb/s, 15,000 rpm	N8150-443
	SATA HDD 250GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 250 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-356
	500GB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 500 GB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-357
	1TB 7.2K Hot Plug 2.5-inch SATA HDD 1 x 1 TB SATA HDD, 2.5-inch, 6Gb/s, 7,200 rpm	N8150-358
	SAS SSD 200GB Hot Plug 2.5-inch SAS SSD 1 x 200 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-711
	400GB Hot Plug 2.5-inch SAS SSD 1 x 400 GB SAS SSD, eMLC, 2.5-inch, 6Gb/s	N8150-712

NOTE:

- All drives within a RAID array should be of the same type, capacity and rotation speed.
- Up to two kinds of drives can be mixed in a Drive Cage.

5 Optical Drive

Category	Product Name / Description	Part Number
Internal 1 slot available	Internal Slim DVD-ROM drive Slim DVD-ROM drive	N8151-122
	Internal DVD Super Multi Drive Slim DVD Super Multi drive, not including writing software	N8151-107F
External	External DVD-ROM drive DVD-ROM drive, Bus powered, 1.2 A required	N8160-91

NOTE:

- Up to 1 optical drive can be connected.

6 Internal RDX Drives

6.1 RDX Configuration

Category	Product Name / Description	Part Number
Controller	Internal USB Controller 1 x USB port	(Standard)
Cable	Internal USB cable 1 x Internal USB to 1 x USB device	K410-264(00)
Drive 1 bay available	Internal RDX (USB)	N8151-105

7 PCI Card

Please refer to [Supported PCI Cards and Installable Slots](#) with regard to the position of PCI slot which can mount PCI card supported.

7.1 Network Interface Controller

Category	Product Name / Description	Part Number
Adapter	1GbE 1000BASE-T Adapter Broadcom® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-138
	Dual Port 1000BASE-T Adapter Broadcom® BCM5718 Gigabit Ethernet Controller PCIe 2.0 x1	N8104-132
	Dual Port 1000BASE-T Adapter Intel® 82580 Gigabit Ethernet Controller PCIe 2.0 x4	N8104-145
	Quad Port 1000BASE-T Adapter Broadcom® BCM5719 Gigabit Ethernet Controller PCIe 2.0 x4	N8104-133
	NOTE: - Network cables with RJ-45 plug covers cannot be used. - Up to one adapter only can be installed in a single processor configuration with E5-2403 v2/-2407 v2.	
10GbE	10GBASE Adapter (SFP+/2ch) Broadcom NetXtreme II BCM957711 10G SFP+ Dual Port Network Interface Card PCIe 2.0 x8	N8104-128
	NOTE: - N8104-129 SFP+ Module is required to connect with an optical	

	<p>cable.</p> <ul style="list-style-type: none"> - Up to 2 SFP+ Modules can be installed. - Supports up to two adapters of 10Gb Network Adapter on any supported operating systems, excluding Red Hat Enterprise Linux 6(x86). - Up to one 10Gb Network Adapter on Red Hat Enterprise Linux 6(x86). 	
	<p>10GBASE Adapter (SFP+/2ch)</p> <p>Broadcom NetXtreme II BCM957711 10G SFP+ Dual Port Network Interface Card PCIe 2.0 x8</p> <p>NOTE:</p> <ul style="list-style-type: none"> - Not supported in a configuration with Xeon E5-2403 v2/-2407 v2 - N8104-129 SFP+ Module is required to connect with an optical cable. - Up to 2 SFP+ Modules can be installed. - The latest driver is required for Window Server 2008 and Windows Server 2008 R2. - Supports up to two adapters of 10Gb Network Adapter on any supported operating systems, excluding Red Hat Enterprise Linux 6(x86). - Up to one 10Gb Network Adapter on Red Hat Enterprise Linux 6(x86). 	N8104-149
	<p>Dual Port 10GBASE-T Adapter</p> <p>Intel X540 PCIe 2.0(x8)</p>	N8104-153
SFP+ Module	<p>SFP+ Module (10G-SR)</p> <p>1 x SFP+ Module for N8104-128/-149</p>	N8104-129

NIC Teaming feature – NIC Teaming and bonding features

See the table below for supported network interfaces and OS combinations.

Windows Server 2008 support BASP (Broadcom Advanced Server Program) or Intel PROSet teaming while Windows Server 2012, Windows Server 2012 R2 and Linux support teaming with bonding function supported by OS.

Network Interface	Team	Operating Systems
<p>1GbE NIC</p> <p>Embedded 1GbE NIC and N8104-138/-132/-133</p>	<p>Up to four teams per one system</p> <p>Up to four ports per one team</p>	<p>Windows Server 2008</p> <p>Windows Server 2008 R2</p> <p>Windows Server 2012</p> <p>Windows Server 2012 R2</p> <p>Red Hat Enterprise Linux 5.9 or later</p> <p>Red Hat Enterprise Linux 6.4 or later</p> <p>Red Hat Enterprise Linux 7.0 or later</p>
<p>1GbE NIC</p> <p>N8104-145</p>	<p>Up to four teams per one system</p> <p>Up to four ports per one team</p>	<p>Windows Server 2008</p> <p>Windows Server 2008 R2</p> <p>Windows Server 2012</p>
<p>10GbE NIC</p> <p>N8104-128</p>	<p>Up to two teams per one system</p> <p>Up to two ports per one team</p>	<p>Windows Server 2008</p> <p>Windows Server 2008 R2</p> <p>Windows Server 2012</p> <p>Windows Server 2012 R2</p> <p>Red Hat Enterprise Linux 5.9 or later</p> <p>Red Hat Enterprise Linux 6.4 or later</p> <p>Red Hat Enterprise Linux 7.0 or later</p>
<p>10GbE NIC</p> <p>N8104-149</p>		<p>Windows Server 2008(x86)</p> <p>Windows Server 2008 R2</p> <p>Windows Server 2012</p>

Windows Server 2012 R2
Red Hat Enterprise Linux 6.5 or later

NOTE:

- Teaming feature is not supported on iSCSI interfaces.
- The network interfaces for teaming must be the same.
- When 10GbE and 1GbE NIC teams are mixed, the teams must be up to four per one system.

Using iSCSI

See the table below for supported network interfaces and OS combinations.

Category	Network Interface	Operating Systems
1GbE	Embedded 1GbE NIC	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 6, VMware
	N8104-138	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 6, VMware
	N8104-132	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 6, VMware
	N8104-133	Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 6, VMware
10GbE	N8104-128	Windows Server 2008, Windows Server 2008 R2, Windows Server 2012, Windows Server 2012 R2, Red Hat Enterprise Linux 5, Red Hat Enterprise Linux 6, VMware
	N8104-149	Windows Server 2008 R2 / Windows Server 2012 / Windows Server 2012 R2 / Red Hat Enterprise Linux 6.5 or later / VMware

NOTE:

- NIC Teaming feature is not supported on iSCSI interfaces.

7.2 InfiniBand

Category	Product Name / Description	Part Number
Controller	Single Port InfiniBand Adapter Mellanox ConnectX-3 VPI, MCX353A-FCBT, FDR, PCIe 3.0(x8)	N8104-146
	Dual Port InfiniBand Adapter Mellanox ConnectX-3 VPI, MCX354A-FCBT, FDR, PCIe 3.0(x8)	N8104-147
Cable	InfiniBand Cable 2m/FDR Copper	K410-304(02)
	InfiniBand Cable 3m/FDR Copper	K410-304(03)
Switch	Unit InfiniBand Switch 36 ports/FDR Mellanox MSX6036F-1SFR 36 ports, FDR, One power supply module included, no power cord	NE3707-061
	Power Supply Redundant Power Supply Unit Power supply module for 36 ports InfiniBand switch, no power cord	NE3707-063

NOTE:

- Up to two InfiniBand adapters can be installed into the system and two adapters should be of the same type.
- The InfiniBand adapters and other options are make-to-order products. Please consult our sales representative in regards to production lead time.

7.3 PCIe SSD Adapter

Category	Product Name / Description	Part Number
PCIe SSD	PCIe SSD Adapter 365GB Fusion-io ioDrive2 365GB PCIe 2.0(x4), Low Profile / Full Height	N8118-01

NOTE:

- Server Core is not supported
- Warranty period is the shorter of 3 years (37 months) or until the total bytes of written value (PBW) exceeds 4 PB. Check the PBW periodically with the utility for the PCIe SSD adapter.
- At least 8GB of memory per one PCIe SSD Adapter is required for adequate performance with this product. Refer to the user's guide for details.
- Operating system can not be installed in this product.

7.4 External Storage Controller

7.4.1 RAID Controller

Category	Product Name / Description	Part Number
Controller	RAID Controller (1GB, RAID0/1/5/6) LSI MegaRAID SAS 9286CV-8e RAID0/1/5/6/10/50/60, 1GB, Ext. 8, PCIe 3.0 x8, SAS 6Gb/s, SATA 6Gb/s, flash cache protection modules included	N8103-161

NOTE:

- To configure a large-capacity RAID array, it is recommended to configure in RAID 6 or RAID 60 in order to minimize the risk of becoming multiple hard drives failure during the RAID rebuilding process.
- It is recommended to set RAID array configuration drives less than eight in order to minimize the risk of becoming multiple hard drives failure.

Types and Number of Available RAID Controllers when Running with VMware ESXi

See the table below for the types and number of available RAID Controllers when running with VMware ESXi.

The condition depends on interrupt processes managed by the operating system and insufficient interrupt resources may lead to system failure.

Processor Type	Controller Type	Number of available controllers	Total Number of available controllers
E5-2403 v2	N8103-172 RAID Controller (512MB, RAID 0/1)	Up to one controller	Up to three controllers
E5-2407 v2	N8103-173 RAID Controller (512MB, RAID 0/1/5/6)		
E5-2420 v2	N8103-174 RAID Controller (1GB, RAID 0/1/5/6)		
E5-2430 v2	N8103-168 RAID Controller (1GB, RAID 0/1/5/6)		
E5-2430L v2	N8103-161 RAID Controller (1GB, RAID 0/1/5/6)	Up to two controllers	
E5-2440 v2			
E5-2470 v2	N8103-172 RAID Controller (512MB, RAID 0/1)	Up to one controller	Up to two controllers
	N8103-173 RAID Controller (512MB, RAID 0/1/5/6)		
	N8103-174 RAID Controller (1GB, RAID 0/1/5/6)		
	N8103-168 RAID Controller (1GB, RAID 0/1/5/6)		
	N8103-161 RAID Controller (1GB, RAID 0/1/5/6)		

7.4.2 Fibre Channel / SAS Controller

Category	Product Name / Description	Part Number
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Fibre Channel	Fibre Channel Controller (1ch) Emulex LightPulse LPe1250-F8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-153
	Fibre Channel Controller (2ch) Emulex LightPulse LPe12002-M8 Host Bus Adapter 8Gb/s, Optical, PCIe 2.0 x8	N8190-154
	Fibre Channel Controller (1ch) Emulex LightPulse LPe16000B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-157
	Fibre Channel Controller (2ch) Emulex LightPulse LPe16002B-M6 Host Bus Adapter 16Gb/s, Optical, PCIe 3.0 x8	N8190-158A
NOTE: - Not supported in a single processor configuration with Xeon E5-2403 v2/-2407 v2		
SAS	SAS Controller LSI SAS9212-4i4e Host Bus Adapter 6Gb/s SAS, Int. 4(7-pin SATA) / ext. 4(SFF-8088), PCIe 2.0(x8), Low Profile / Full Height	N8103-142
	SAS Controller LSI SAS9300-8e Host Bus Adapter 12Gb/s SAS, ext. 8(SFF-8644 x2), PCIe 3.0 x8	N8103-184

NOTE:

- Up to two 16Gb/s Fiber Channel Controller can be installed.
- Up to three SAS Controller can be installed.

7.5 Serial Port Adapter

Product Name / Description	Part Number
Serial Port Adapter Serial port fixed to PCI bracket	N8117-01A

NOTE:

- Up to one Serial Port Adapter can be installed.

8 Other Add-in Components

8.1 Redundant Power Supply Module

Product Name / Description	Part Number
450W Hot Plug Power Supply 1 x 450 Watt 80 PLUS® Platinum	N8181-86F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Platinum	N8181-87F
800W Hot Plug Power Supply 1 x 800 Watt 80 PLUS® Titanium	N8181-118F

NOTE: 200 VAC input only supported

NOTE:

- The power units must be the same to configure redundancy.
- Use the NEC Power Supply Selector to select appropriate size for power units. For details, please visit the NEC website at:
http://www.nec.com/en/global/prod/express/collateral/tools/PowerSelector_G01.xls

8.2 Redundant Fan Kit

Product Name / Description	Part Number
Redundant Fan Kit 5 hot plug redundant cooling fans for R120e-2E	N8181-99

8.3 Trusted Platform Module Kit

Product Name / Description	Part Number
Trusted Platform Module Kit TPM 1.2 module	N8115-20

NOTE:

- The kit is not available in China.
- The kit is not removable after attachment.
- "TPM Support" in BIOS setup menu must be activated prior to use of this kit.
- To use Windows BitLocker drive encryption, be sure to keep the "recovery password" of BitLocker function. The recovery password is required to restore data for hardware replacement during a system error.

8.4 Internal Flash Memory

Product Name / Description	Part Number
Internal Flash Memory Internal flash memory to enable software and tools in the EXPRESSBUILDER DVD without DVD media	N8115-10

NOTE:

Before use, software and tools must be copied from the EXPRESSBUILDER DVD to the flash memory.

The following operations can be performed with the flash memory:

- Installation of Windows server with express setup
- Installation of Starter Pack—the package of NEC qualified drivers and system setting tools
- Installation of NEC ESM PRO Agent and Universal RAID Utility
- Performance of the Test and Diagnosis Tool

8.5 Flash FDD

Choose the Flash FDD if you need to prepare an alternative device for a floppy drive.

Product Name / Description	Part Number
Flash FDD USB flash emulating USB floppy disk, Native capacity 1.44 MB	N8160-96

NOTE:

- Up to one drive can be connected.

8.6 Front Bezel

Product Name / Description	Part Number
Front Bezel Front bezel for R120e-2E	N8146-48F

9 Add-on Components

9.1 17-inch LCD Console Drawer

Category	Product Name / Description	Part Number
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Drawer w/ KVM	Drawer	17-inch LCD Console Drawer (8port) 17-inch LCD, US 83-keys Keyboard, Optical mouse, 8 port KVM switch, 1U height	N8143-77F
	Cable	Switch Unit Connection Cable Set (USB, 1.8m) 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB, 3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB, 5m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
Drawer w/o KVM	Drawer	17inch LCD Console Unit 1U 17-inch LCD, US 83-keys Keyboard, Optical mouse, 1U height, 4-pin USB B to 4-pin USB A cable 2 m, PS/2 Y-splitter cable 2m, 15-pin mini D-sub VGA cable 2 m	N8143-76F
		17inch LCD Console Drawer (1port) 17-inch LCD, US 103-keys Keyboard with 10-key, Touch pad with 3-button, 1U height, 4-pin USB B to 4-pin USB A cable 1.8 m, Two PS/2 cable 1.8 m, 15-pin mini D-sub VGA cable 1.8 m	N8143-84F
	Keypad	Keyboard Unit (JP) JP 108-keys Keyboard with 10-key for N8143-84F 17inch LCD Console Drawer (1port)	N8143-85
		Keyboard Unit (UK) UK 104-keys Keyboard with 10-key, for N8143-84F 17inch LCD Console Drawer (1port)	N8143-87

NOTE:

- There are two VGA connectors on R120e-2E, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

9.2 KVM Switch

Category		Product Name / Description	Part Number
KVM Switch		Server Switch Unit (8 server) 1U USB 8 port KVM switch	N8191-12F
Cable	KVM	Switch Unit Connection Cable Set (USB,1.8m) 1.8 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(1A)
		Switch Unit Connection Cable Set (USB,3m) 3 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(03)
		Switch Unit Connection Cable Set (USB,3m) 5 m, 1 x 15-pin mini D-sub to 1 x 15-pin mini D-sub / 1 x 4-pin USB A	K410-118(05)
	Cascading	Switch Unit Connection Cable 1.8 m 1.8 m, 1 x 15-pin mini D-sub - 1x 15-pin mini D-Sub / 2x PS/2	K410-119(1A)

NOTE:

- There are two VGA connectors on R120e-2E, one on the front side and one on the rear side. However, the front side only works when both are connected at the same time.

9.3 Cable Management Arm

Product Name / Description	Part Number
Cable Management Arm 2U Kit for R120e-2E	N8143-95

9.4 Server Management License

The server integrates the EXPRESSSCOPE Engine 3 as standard. Refer to [Server Management](#) for the standard management features. For more extensive remote KVM and remote media features, choose the following kit.

Product Name / Description	Part Number
Remote KVM and Media License Kit License for one server. Remote KVM and remote media are enabled regardless of OS status. Remote KVM: <ul style="list-style-type: none"> - Displays a graphics console on the web browser of the remote terminal (PC/server). - Controls keyboard and mouse via the remote terminals' web browser Remote media: <ul style="list-style-type: none"> - Enables the user to use the CD / DVD / FD / Flash memory of the remote terminals (PC/server) as if accessing the local drives. 	N8115-04

NOTE:

- Remote KVM and remote media features are not available for virtual machines.

9.5 Medium and Cartridge

Category	Product Name	Drive supported	Part Number	
RDX	HDD	RDX Cartridge (320GB)	N8151-105	N8153-01
		RDX Cartridge (500GB)	N8151-105	N8153-02
		RDX Cartridge (1TB)	N8151-105	N8153-03
		RDX Cartridge (2TB)	N8151-105	N8153-08
RDX	SSD	RDX Cartridge (SSD/128GB)	N8151-105	N8153-06
		RDX Cartridge (SSD/256GB)	N8151-105	N8153-07

References

Server Management

The EXPRESSSCOPE Engine 3, integrated into the server, provides superior remote control and system management features listed in the table below.

		Standard	With Remote KVM and Media License kit
Hardware monitoring	Temperature/voltage/power/standard LAN fan /degeneration (memory/hard drive)	✓	✓
	Hardware configuration information collection	✓	✓
	Hardware event log collection	✓	✓
Boot monitoring	BIOS/POST stall, Booting, OS stall, shutdown	✓ ¹	✓ ¹
Alerting	HW error, Boot error , and OS panic (by SNMP, E-Mail)	✓	✓
Remote KVM (via LAN)	POST/BIOS setup, ROM utility	✓ ²	✓
	Panic screen, Boot screen	✓ ^{2, 3, 4}	✓
	CUI-based screen (OS console)	✓ ^{2, 4}	✓
	GUI-based screen (OS console)	-	✓
	Remote console recording function	-	✓
Remote control (via LAN)	Remote reset/power on-off/ dump	✓	✓
	Remote power capping	✓	✓
	BIOS/BMC FW update	✓	✓
	Remote BIOS setup(partial configuration only)	✓	✓
	OS shutdown	✓ ¹	✓ ¹
	Remote media (CD/DVD/FD/USB)	-	✓
	CLP (Command Line Protocol) (DMTF compliant)	✓	✓
	Remote control via Web browser (multi user login at the same time)	✓	✓
Maintenance	Scheduling (without UPS)	✓ ¹	✓ ¹
	EXPRESSSCOPE® Profile key (Backup/restore BIOS/BMC setup information)	✓	✓
Others	Set automatic IP address via DNS/DHCP	✓	✓
	LDAP/Active Directory verification/user control	✓	✓
	Clock synchronization of main unit and the RTC	✓	✓
	Access log collection	✓	✓
Industry standard	IPMI	2.0	2.0

¹ The feature is not supported on VMware ESXi systems.

² The optional serial port is not available for the feature.

³ Monitoring boot screens is not supported on VMware systems.

⁴ In VMware systems, only the direct console user interface is supported.

OS Support Matrix for PCI Cards and Embedded Controller

Part Number	Product Name	WS 2012 R2	WS 2012	WS 2008R2	WS 2008	WS 2008 x64	RHEL 7	RHEL 6	RHEL 6 x64	RHEL 5	RHEL 5 x64	ESXi 5.5	ESXi 5.1	ESXi 5.0
-	Embedded SATA non-RAID Controller	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
-	Embedded SATA RAID Controller	-	-	✓	✓	✓	-	-	-	-	-	-	-	-
-	Embedded 1GbE NIC	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8103-142	SAS Controller	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓
N8103-184	SAS Controller	✓	✓	-	-	-	-	-	✓	-	-	-	-	-
N8190-153	Fibre Channel Controller	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
N8190-154	Fibre Channel Controller (2ch)	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓
N8190-157	Fibre Channel Controller	✓	✓	✓	-	-	-	-	✓	-	-	✓	-	-
N8190-158	Fibre Channel Controller (2ch)	✓	✓	✓	-	-	-	-	✓	-	-	✓	-	-
N8104-138	1000BASE-T adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-132	Dual Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-145	Dual Port 1000BASE-T Adapter	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-133	Quad Port 1000BASE-T Adapter	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-128	10GBASE adapter (SFP+/2ch)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
N8104-149	10GBASE adapter (SFP+/2ch)	✓	✓	✓	✓	-	✓	✓	✓	-	-	✓	✓	-
N8104-153	Dual Port 10GBASE-T Adapter	✓	✓	-	-	-	✓	-	✓	-	-	-	-	-
N8104-146	Single Port InfiniBand Adapter	✓	✓	-	-	-	-	-	✓	-	-	-	-	-
N8104-147	Dual Port InfiniBand Adapter	✓	✓	-	-	-	-	-	✓	-	-	-	-	-
N8118-01	PCIe SSD Adapter 365GB	✓	✓	-	-	-	-	-	-	-	-	-	-	-

Supported PCI Cards and Installable Slots

Part Number	Product Name	Slots						Note
		#1A	#1B	#2B	#3B	#1C	#2C	
N8103-172	RAID Controller (512 MB, RAID 0/1)	✓	-	-	-	-	-	
N8103-173	RAID Controller (512 MB, RAID 0/1/5/6)	✓	-	-	-	-	-	
N8103-174	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-	-	-	-	
N8103-168	RAID Controller (1 GB,RAID 0/1/5/6)	✓	-	-	-	-	-	
N8103-161	RAID Controller (1 GB,RAID 0/1/5/6)	-	✓	✓	✓	-	✓	Max. 2
N8103-142	SAS Controller	-	✓	✓	✓	-	✓	Max. 3
N8103-184	SAS Controller	-	-	-	✓	-	-	
N8190-153	Fibre Channel Controller	-	✓	✓	✓	-	✓	
N8190-154	Fibre Channel Controller (2ch)	-	✓	✓	✓	-	✓	
N8190-157	Fibre Channel Controller	-	✓	-	✓	-	✓	
N8190-158	Fibre Channel Controller (2ch)	-	✓	-	✓	-	-	
N8104-138	1000BASE-T adapter	-	✓	✓	✓	✓	✓	
N8104-132	Dual Port 1000BASE-T Adapter	-	✓	✓	✓	✓	✓	
N8104-133	Quad Port 1000BASE-T Adapter	-	✓	✓	✓	-	✓	
N8104-145	Dual Port 1000BASE-T Adapter	-	✓	✓	✓	✓	✓	Max. 2
N8104-128	10GBASE adapter (SFP+/2ch)	-	✓	✓	✓	-	✓	
N8104-149	10GBASE adapter (SFP+/2ch)	-	✓	✓	✓	-	✓	Max. 2
N8104-153	Dual Port 10GBASE-T Adapter	-	✓	✓	✓	-	✓	
N8104-146	Single Port InfiniBand Adapter	-	✓	✓	✓	-	-	
N8104-147	Dual Port InfiniBand Adapter	-	-	-	✓	-	-	
N8118-01	PCIe SSD Adapter 365GB	-	✓	-	✓	-	-	
N8117-01A	Serial Port Adapter	-	-	✓	✓	✓	✓	

NOTE:

- The slot #2B is not available when installing N8190-157 Fibre Channel Controller (1ch) or N8190-158 Fibre Channel Controller (2ch) into the slot #1B or slot #3B.

Maximum power consumption

See the table below for the maximum power consumption based on type of power supplies installed. The power consumption was measured in 40 degree Celsius (104 degree Fahrenheit) environment.

Processors		E5-2403 v2	E5-2407 v2	E5-2420 v2	E5-2430 v2	E5-2430L v2	E5-2440 v2	E5-2470 v2
200 VAC input	800 Watt PSU	536 VA /532 Watt	542 VA / 538 Watt	597 VA / 593 Watt	653 VA / 648 Watt	581 VA / 577 Watt	647 VA / 642 Watt	707 VA / 702 Watt
	450 Watt PSU	356 VA /354 Watt	362 VA /360 Watt	418 VA /415 Watt	473 VA /470 Watt	401 VA /398 Watt	361 VA /359 Watt	401 VA /399 Watt
100 VAC input	800 Watt PSU	542 VA /538 Watt	548 VA /544 Watt	603 VA /599 Watt	660 VA /655 Watt	587 VA /583 Watt	653 VA /649 Watt	714 VA /709 Watt
	450 Watt PSU	360 VA /357 Watt	366 VA /363 Watt	422 VA /419 Watt	478 VA /475 Watt	405 VA /402 Watt	365 VA /362 Watt	405 VA /403 Watt

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For hard drive capacity measurements, 1 GB = 1 billion bytes. Actual formatted capacity is less.

Revision History

Revision	Date	Description
4.1	February 18, 2015	Others: Added note to configure with VMware Systems
4.0	January 28, 2015	New products added: SAS Controller / N8103-184 Part number changed: Flash FDD / N8160-96
3.1	November 21, 2014	Others: Supported N8104-153 Dual Port 10GBASE-T Adapter on Windows Server 2012 and Windows Server 2012 R2
3.0	October 16, 2014	New products added: 10GBASE Adapter (SFP+/2ch) / N8104-149 PCIe SSD Adapter 365GB / N8118-01 Part number changed: Fibre Channel Controller (2ch) / N8190-158A Discontinued product deleted: Dual Port 10Gb Converged Network Adapter / N8104-131 RDX Cartridge (1.5TB) / N8153-04 Others: Add Red Hat Linux 7 to the list of operating system supported Update OS support matrix
2.0	July 18, 2014	New products added: 450GB 15K Hot Plug 2.5-inch SAS HDD / N8150-442 600GB 15K Hot Plug 2.5-inch SAS HDD / N8150-443 Dual Port 10GBASE-T Adapter / N8104-153 RDX Cartridge (2TB) / N8153-08 Part number changed: 300GB 10K Hot Plug 2.5-inch SAS HDD / N8150-301B 450GB 10K Hot Plug 2.5-inch SAS HDD / N8150-322B 600GB 10K Hot Plug 2.5-inch SAS HDD / N8150-304B 900GB 10K Hot Plug 2.5-inch SAS HDD / N8150-332B 1.2TB 10K Hot Plug 2.5-inch SAS HDD / N8150-408B 146.5GB 15K Hot Plug 2.5-inch SAS HDD / N8150-303B 300GB 15K Hot Plug 2.5-inch SAS HDD / N8150-331B Discontinued products removed: Internal DAT (USB) / N8151-78A Others: Added configuration limitations for N8190-158 Added the minimum required memory capacity for ESXi5.5 (5GB) Added a note for processors WS2012 R2 is added in the supported OS for iSCSI Added a note for InfiniBand Adapter WS2012 R2 is supported with N8103-142 SAS Controller Added a note for VGA connectors
1.0	January 16, 2014	Initial release