MARATHON

The Application Availability Experts™

everRun® MX Hardware Guide

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Introduction

This document identifies the key considerations for sizing and purchasing servers to run Marathon Technologies everRun MX software. After reviewing this document, you should have a good understanding of how to select and size server hardware.

Hardware configurations are driven by two considerations:

- Is the hardware supported?
- How much is required to run the application(s)?

When purchasing hardware there are several key considerations:

- Confirm the server hardware is supported by everRun.
- How many virtual machines do I plan to run?
- What are the operational requirements of each application, i.e.: memory or RAM, network connectivity and disk footprint?

A virtual machine may run one application or workload, such as Exchange or SQL Server. Or a virtual machine may run multiple applications or workloads, such as DNS, Domain Controller and DHCP. The allocation of applications to virtual machines is based on the performance requirements of the application(s). If you are unsure of the performance requirements of your applications contact the application vendor or Marathon.

Please note: This document is intended as a guide only. To properly determine the size and type of servers to run everRun, you must understand your specific application load and performance requirements. For assistance with the sizing process, please don't hesitate to contact Marathon for additional guidance.

How much hardware is required?

To estimate the amount of hardware required:

1. Add up the total number of virtual machines
2. Estimate the number of CPUs* for each virtual machine
3. Estimate the amount of memory required for each virtual machine
4. Estimate the amount of hard drive space required for each virtual machine
5. Estimate the number of NICs required for the virtual machines
6. Allocate memory for the hypervisor and everRun Availability Manager(s)
7. Allocate CPUs for the hypervisor and everRun Available Manager(s)

*Note: Intel Processors have the ability to support a combination of physical (cores) and logical (hyper-threading) cores to increase the number of CPU's presented by the hardware. Both of these characteristics combined are identified in Operating Systems and software as CPU's, although the underlying architecture could be one, the other, or both.

What hardware is important

This document is focused on system configurations and components that are important to run everRun MX. The best approach is to select a server model that is compatible with everRun MX. Then confirm the CPU, RAID controller and Network Interface Cards (NICs) are compatible.

Server model

Just because a server model is on the HCL (Hardware Compatibility List) does not mean all of its components will work with everRun MX. Due to the ability to customize systems it is possible to purchase a server that is on the HCL that will not run everRun MX.

The four components that need to be confirmed are:

1. System model
2. CPU
3. RAID controller
4. Network Interface Card (NIC)

Tower vs. Rack vs. Blade

The physical type of server is usually not an issue. There is no cost difference today (for the most part) between tower and rack servers. Blade servers are different. Most tower and rack servers today ship with four Ethernet NICs standard, blade servers tend to have only two. And the ability to support, at least the minimum number of NICs is critical to the successful use of everRun MX. The minimum number of NICs is four. The suggested amount is five for a smaller server and eight for a larger server. Before buying a blade server confirm it can support the number of NICs required for your applications.

1st Select a server model that is on the HCL.

A current list of supported server models is listed at the end of this document. This list is updated frequently. Check the Marathon Partner Portal website for the latest version.

2nd Select a CPU

Matching CPUs or processors (type and clock speed) are required. A two-processor configuration with four cores per processor is the required minimum. More cores will support more virtual machines and faster clock speeds will improve performance. See the Configuration Table on page six for a list of supported processors.

What is Hyper-Threading

Intel processors have the ability to support both physical cores and logical (Hyper-Thread) cores to increase the number of CPU's presented by the hardware. Physical and logical cores are identified by the Operating Systems and software as CPU's. Multi-threaded applications can benefit from Hyper-Threading.

How does it affect the number of CPUs?

When Hyper-Threading is enabled (in the system BIOS) the number of CPUs that are available for use doubles. For example a dual socket quad core server with Hyper-Threading turned off will show there are eight CPUs. If Hyper-Threading is turned on, it will show there are sixteen CPUs. EverRun MX can be used on systems with Hyper-Threading turned on or off.

3rd Select RAID controller

The HCL includes information on RAID controllers. Confirm the RAID controller is on the list. Write back cache enabled RAID controllers are critical to improve performance. Most RAID controllers will not allow write back cache to be enabled unless there is an optional backup battery present. Make sure the RAID controller has a battery to enable this feature.

4th Select the NIC cards

The Hardware compatibility list also includes information on NICs. It is better to purchase 2 dual port NIC cards than one quad port NIC for availability. Marathon everRun MX software requires a minimum of four network ports.

Hardware Guide Sizing Spreadsheet Example

The everRun Hardware Guide Sizing Spreadsheet calculates hardware requirements. It can be found on the Marathon Partner Portal. In the following example the server will run three virtual machines. The Historian and File Server and Terminal Server virtual machines are using the same Network port while the SCADA system has a dedicated Network Port. This is NOT a requirement. All three virtual machines could use the same Network port or each could have its own.

Server Name: Sample Server Setup					
Application Resources Requirements					
Virtual Machine Number	**Application Name**	**CPUs (cores)**	**RAM (GB)**	**Hard Drive (GB)**	**Network ports**
VM #1	App #1 *SCADA*	1	3	100	1
	App #2				
	App #3				
	Virtual Machine #1 Subtotal	1	3	100	1
VM #2	App #1 *Historian*	2	5	200	1
	App #2				
	App #3				
	Virtual Machine #2 Subtotal	2	6	200	1
VM #3	App #1 *File and Terminal Server*	1	3	300	
	App #2				
	App #3				
	Virtual Machine #3 Subtotal	1	3	300	0
VM #4	App #1				
	App #2				
	App #3				
	Virtual Machine #4 Subtotal	0	0	0	0
Marathon Infrastructure (automatically calculated)					
		CPUs (cores)	**RAM (GB)**	**Hard Drive (GB)**	**Network ports**
Availability Manager Base		1	1	50	3

Availability Manager RAM requirement (# of Virtual Machines * .5 GB RAM)		1.5		
Availability Manager CPU requirement (1 per Virtual Machine)	3			
TOTAL SERVER REQUIREMENTS				
	CPUs (cores)*	**RAM (GB)**	**Hard Drive (GB)**	**Network ports**
	8	**12**	**650**	**5**

At least one Virtual Machine application network port is required. If additional Virtual Machines are going to use the same network port do not add them to the total.

* When Hyper-Threading is enabled the number of CPUs that are available for use doubles. For example a dual socket quad core server with Hyper-Threading turned off will show there are eight CPUs. If Hyper-Threading is turned on, it will show there are sixteen CPUs.

Configuration Requirements

Server Hardware Requirements	
Servers	Two to four 64-bit Xeon Intel® Virtualization Technology (VT-x) based servers.
Processors	One or more x64 CPUs, 1.5 GHz minimum, 2 GHz or faster multicore CPU recommended. For VMs running Windows, the processors must be virtualization-capable Intel models with one or more (up to 32) CPUs. A second computer with identical processors is required for use as a redundant server for everRun PVMs. The CPUs for every XenServer host computer must have hardware support for virtualization enabled in the BIOS. Level-3 Protection: Intel server-class VT-enabled processors If configuring a Level 3 protected VM with more than 1 Vcpu (FT-SMP) : • Intel 55xx (Nehalem) 2.26 GHz or better required or • Intel 75xx (Nehalem) 2.4 GHz or better required or • Intel 56xx (Westmere) 2.4 GHz or better required If configuring Level 3 protected VMs with 1 Vcpu (FT-Uni): • Intel VT 54xx series (Harpertown) required or • Intel VT 74xx series (Dunnington) required or • Intel VT 52xx (Wolfdale) Any of the processors listed under FT-SMP above or those listed below for everRun VM and 2G below may also be used with 1 Vcpu. In all cases, hyperthreading may be enabled or disabled, but the setting should be the same on all hosts.
Memory	4 GB or more is recommended. For best performance with L3 SMP 1333 MHz Dual-Ranked DIMMs configured for three-way interleaving are recommended (3, 6, 9, etc. DIMMs per server), or configured as needed to achieve three-way interleaving.

Network Ports	Minimum configuration is four network ports. Recommended configuration of the network interface cards (NICs) : • One 100 Mbps or greater NIC for the production network. Multiple production networks are supported up to a maximum of four per PVM. • One 1 Gbps for the NICs, switches, and uplinks for the management network. • Two 1 Gbps NICs for Availability Link networks (one for each A-Link). An additional 1 Gbps NIC is recommended for NIC bonding of the management network. If available, two 10 Gbps network adapters can be used in place of the two 1 Gbps Availability Link NICs.
Disk Drives	RAID controller configured with multiple drives and write-back cache enabled is recommended. Minimum of 72 GB of total disk space per host. Recommended configuration is RAID 1 for XenServer and everRun MX. RAID 5 or better for virtual machine and protected virtual machine storage Take into consideration the IOPS (Input/Output Operations per Second) for all applications sharing a given disk configuration. Allocate enough RAID sets and spindles, and select higher performance drives (i.e. SAS 15K 6Gb) to alleviate the disks from being a major performance bottleneck.
CD-ROM	1 CD-ROM (IDE, SCSI, or USB)

Virtual Machine Requirements	
CPUs	One to four vCPUs. Although more than four vCPUs can be deployed, Marathon expects that four vCPUs will provide the best scalability. Maximum of eight per PVM.
Memory	1 GB to 24 GB
Virtual NICs	Maximum of 8 virtual NICs (total of 8 VDIs per PVM) Any combination Virtual NICS and Virtual Disks not to exceed eight total devices.
Virtual Disks	Maximum of 8 virtual disks (total of 8 VDIs per PVM) Any combination Virtual NICS and Virtual Disks not to exceed eight total devices.
Storage	2 TB per protected disk
Supported Operating Systems	Microsoft® Windows® Server 2003 – Standard or Enterprise Edition SP2 32-bit or 64-bit Microsoft® Windows® Server 2008 32-bit, 64-bit, R1 and 64-bit R2 Microsoft® Windows® Small Business Server (SBS) 2003 & 2008

Management Client Requirements
Management Console: Windows XP, Server 2003, Vista, or Windows 7, 1 GB RAM
everRun Availability Center: Internet Explorer or Firefox, with Flash enabled

Sample configurations

Single application or virtual machine

The following example is for a server that will run one virtual machine. The virtual machine will run one application.

1. The total number of virtual machines is one.
2. To support the performance requirements of the application allocate 4 CPUs to it. Total CPUs required 4.
3. The application is running in a 32bit virtual machine, it will get 4GB of memory. Total memory 4GB.
4. The application is approximately 50 GB and is not expected to grow in size. Total disk requirement 50GB
5. One NIC is used by the application. Total production NIC requirement, one.
6. The everRun Availability Manager adds 512MB of RAM for each protected virtual machine and the hypervisor requires 1GB of memory to run. 4GB of virtual machine + 512MB of everRun Availability Manager + 1GB of RAM for the hypervisor. Total memory requirement 5.5GB.
7. The virtual machine uses 4 CPUs, the hypervisor uses one CPU and the everRun Availability Manager uses one CPU. 4 CPUs for the virtual machine + I CPU for the hypervisor + 1 CPU for the Availability Manager. Total CPUs required: 6 CPUs

Sample single application or virtual machine configuration

2U rack mounted server
2x Intel Xeon L5520 2.26Ghz quad core CPUs
6GB Memory (3Xmxb) 1333Mhz Dual Ranked RDIMMs
SAS RAID controller with battery backup (to enable write back cache)
3x 146GB 15k rpm SAS hard drives
4x 1GB Ethernet ports on the server motherboard
1 dual port 1GB NIC (total of 6 Ethernet ports)

The hard drives should be setup in a RAID 5 array for best performance.

Two virtual machines

The following example is for a server that will run two virtual machines. The first virtual machine will run one application, SQL Server and the other virtual machine will run two, Terminal Server and Domain Controller.

1. The total number of virtual machines is two, a SQL Server virtual machine, and a Terminal Server and Domain Controller (TS/DC) virtual machine.
2. To support the performance requirements of SQL Server allocate 4 CPUs to it. 1 CPU will be allocated to the TS/DC virtual machine. Total CPUs required 5.
3. The SQL Server is running in a 64bit virtual machine, it will get 6GB of memory, the TS/DC is running a 32 bit virtual machine, and it will get 2 GB of RAM. Total memory 8GB.
4. The SQL Server database is approximately 50 GB and is estimated to grow at 1% per year. The TS/DC virtual machine is approximately 25 GB and is not expected to grow in size. Total disk requirement 75GB

5. To provide flexibility each virtual machine will be assigned its own NIC. Total virtual machine NICs required: two.
6. The everRun Availability Manager adds 512MB of RAM for each protected virtual machine and the hypervisor requires one GB of memory to run. 8GB of virtual machine + 1GB of everRun Availability Manager (2x 512MB) + 1GB of RAM for the hypervisor. Total memory requirement 10GB.
7. The virtual machines use 5 CPUs, the hypervisor uses 1 CPU and each everRun Availability Manager uses 1CPU. 5 CPUs for virtual machines + 2 CPUs for the Availability Manager + 1 CPU for the hypervisor. Total CPUs required: Eight.

Sample two virtual machine configuration

2U rack mounted server
2x Intel Xeon X5660 2.8Ghz quad core CPUs
12GB Memory (6x2GB) 1333Mhz Dual Ranked RDIMMs
SAS RAID controller with battery backup (to enable write back cache)
5x 146GB 15k rpm SAS hard drives
4x 1GB Ethernet ports on the server motherboard
1 dual port 1GB NIC (total of 6 Ethernet ports)

The hard drives will be setup in two RAID arrays, the one RAID array for the hypervisor and a RAID 5 array for the virtual machines.

Sample large machine configuration

Here is a sample configuration for a server to run 4 or more virtual machines

2U rack mounted server
2x Intel Xeon X5680 3.33Ghz six core CPUs
48GB Memory (6x8GB) 1333Mhz Dual Ranked RDIMMs
SAS RAID controller with battery backup (to enable write back cache)
6x 146GB 15k rpm SAS hard drives
4x 1GB Ethernet ports on the server motherboard
2x dual port 1GB NIC (total of 8 Ethernet ports)

The hard drives are setup in two RAID arrays, the first RAID 1 array is for the hypervisor and the other is a RAID 5 array for the virtual machines.

Notes

For additional questions about hardware requirements for everRun MX contact Marathon. We'll help you decide on a system configuration. We can provide an expert analysis of your organization's configuration requirements.

EverRun MX Hardware Compatibility List

This list is effective Oct 7th 2010. For the latest version visit www.marathontechnologies.com

Servers

Dell	PowerEdge 1900	Tower
Dell	PowerEdge 1950	Server
Dell	PowerEdge 1950 III	Server
Dell	PowerEdge 2900 III	Server
Dell	PowerEdge 2950	Rack
Dell	PowerEdge 2950 III	Server
Dell	PowerEdge R510	Rack
Dell	PowerEdge R610	Rack
Dell	PowerEdge R710	Rack
Dell	PowerEdge R900	Rack
Dell	PowerEdge T410	Tower
Dell	PowerEdge T610	Tower
Dell	PowerEdge T710	Tower
Fujitsu	Primergy RX200 S5	Rack
Fujitsu	Primergy RX200 S6	Rack
Fujitsu	Primergy RX300 S5	Rack
Fujitsu	Primergy RX300 S6	Rack
Fujitsu	Primergy TX300 S5	Tower
Fujitsu	Primergy TX300 S6	Tower
HP	ProLiant BL280c G6	Blade
HP	ProLiant BL460c	Blade
HP	ProLiant BL460c G5	Blade
HP	ProLiant BL460c G6	Blade
HP	ProLiant BL490c G6	Blade
HP	ProLiant BL680c	Blade
HP	ProLiant BL680c G5	Blade
HP	ProLiant DL160 G6	Server
HP	ProLiant DL160se G6	Server
HP	ProLiant DL180 G6	Server
HP	ProLiant DL180se G6	Server
HP	ProLiant DL360 G5	Server
HP	ProLiant DL360 G6	Server
HP	ProLiant DL370 G6	Tower
HP	ProLiant DL380 G5	Server
HP	ProLiant DL380 G6	Server
HP	ProLiant DL580 G5	Server
HP	ProLiant ML150 G6	Server
HP	ProLiant ML330 G6	Tower
HP	ProLiant ML350 G5	Server
HP	ProLiant ML350 G6	Server
HP	ProLiant ML370 G5	Server

HP	ProLiant ML370 G6	Server
IBM	System x iDataPlex dx360 M2	Rack
IBM	System X3250 M3	Rack
IBM	System x3400	Server
IBM	System x3500	Server
IBM	System x3550	Server
IBM	System x3550 M2	Rack
IBM	System x3550 M3	Rack
IBM	System x3650	Server
IBM	System x3650 M2	Rack
IBM	System x3650 M3	Rack
IBM	x3850 M2	Server
IBM	x3950 M2	Server
LENOVO	R630 G7	Server
LENOVO	RD210	Rack
LENOVO	RD220	Rack

Storage Controllers

3ware Inc	7xxx/8xxx-series PATA/SATA-RAID	PATA/SATA
3ware Inc	9650SE SATA-II RAID	SATA
3ware Inc	9550SX 4-port RAID	SCSI
Adaptec	AAC-RAID (Rocket)	SCSI
Adaptec	AIC-7902(B) U320 w/HostRAID	SCSI
Dell	QME2462 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
Dell	PERC 6/E SAS RAID Controller	SAS
Dell	PERC 6/i Integrated SAS RAID Controller	SAS
Dell	PERC H200	SAS
Dell	SAS 5/E RAID Adapter	SAS
Dell	PERC 5/E RAID Adapter	SCSI
Dell	PERC 6/E RAID Adapter	SCSI
Dell	PowerEdge Expandable RAID controller 5i	SCSI
Emulex Corporation	LightPulse Lpe1105 (Zephyr)	Fibre Channel
Emulex Corporation	LightPulse Lpe12002 (Thor)	Fibre Channel
Emulex Corporation	LP10000 Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
Emulex Corporation	LP10000DC Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
Emulex Corporation	LP10000ExDC Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
Emulex Corporation	LP101 Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
Emulex Corporation	LP1050 Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
Emulex Corporation	LP1050DC Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
Emulex Corporation	LP1050Ex Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
Emulex Corporation	LP11000 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
Emulex Corporation	LP11002 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel

Emulex Corporation	LP1150 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
Emulex Corporation	LPe11000 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
Emulex Corporation	LPe11004 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
Emulex Corporation	LPe1105 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
Emulex Corporation	LPe1150 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
Emulex Corporation	LPe12000 Fibre Channel Host Bus Adapter (8GB)	Fibre Channel
Emulex Corporation	LPe12002 Fibre Channel Host Bus Adapter (8GB)	Fibre Channel
Emulex Corporation	LPe1250 Fibre Channel Host Bus Adapter (8GB)	Fibre Channel
HP	300874-B21 Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
HP	354054-B21 Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
HP	361426-B21 Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
HP	381881-B21 Fibre Channel Host Bus Adapter (2GB)	Fibre Channel
HP	403621-B21 (LPe1105) Emulex PCI-X dual channel Fibre Channel Mezzanine adapter (4 Gb)	Fibre Channel
HP	FC1142 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
HP	FC1143 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
HP	FC1242 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
HP	FC1243 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
HP	FC2142SR Emulex PCI-e single channel Fibre Channel adapter (4 Gb)	Fibre Channel
HP	FC2143 Emulex PCI-X 2.0 single channel Fibre Channel adapter (4 Gb)	Fibre Channel
HP	FC2242SR Emulex PCI-e dual channel Fibre Channel adapter (4 Gb)	Fibre Channel
HP	FC2243 Emulex PCI-X 2.0 dual channel Fibre Channel adapter (4 Gb)	Fibre Channel
HP	QMH2462 Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
HP	StorageWorks 81E PCIe Fibre Channel Host Bus Adapter	Fibre Channel
HP	StorageWorks 81Q PCIe Fibre Channel Host Bus Adapter	Fibre Channel
HP	StorageWorks 82E PCIe Dual Port Fibre Channel Host Bus Adapter	Fibre Channel
HP	StorageWorks 82Q PCIe Dual Port Fibre Channel Host Bus Adapter	Fibre Channel
HP	Smart Array E200 (SAS Controller) RAID	SAS
HP	Smart Array P700m RAID	SAS
HP	E200 RAID	SCSI
HP	E500 RAID	SCSI
HP	Smart Array 6402 RAID	SCSI
HP	Smart Array 6404 RAID	SCSI
HP	Smart Array 642 RAID	SCSI
HP	Smart Array P400 RAID	SCSI
HP	Smart Array P600 RAID	SCSI
HP	Smart Array P800 RAID	SCSI
IBM	BladeCenter Fibre Channel SFF Exp. Card (26K4841) (2GB)	Fibre Channel
IBM	HS20 BladeCenter Fibre Channel Exp. Card (13N2203) (2GB)	Fibre Channel
IBM	QMC2462 Fibre Channel Host Bus Adapter	Fibre Channel

IBM	QMC2462S Fibre Channel Host Bus Adapter (4GB)	Fibre Channel
IBM	QMC4052R - Mezzanine Card	Fibre Channel
LSI Logic/Symbios Logic	8708 MegaRAID SAS	SAS
LSI Logic/Symbios Logic	MegaRAID SAS	SAS
LSI Logic/Symbios Logic	SAS 6/iR RAID Integrated	SAS
LSI Logic/Symbios Logic	1068E 6-port	SCSI
LSI Logic/Symbios Logic	1068E 8-port	SCSI
QLogic Corp.	ISP2432-based 4Gb Fibre Channel to PCI Express HBA	Fibre Channel
QLogic Corp.	QCP2340 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QCP2342 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QEM2462 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA200 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA2340 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA2340L Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA2342 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA2342L Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA2344 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA2460 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA2462 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE210 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE220 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2360 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2362 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2460 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2462 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2464 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2560 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2562 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLE2564 quad port Fibre Channel 8G PCI-Express (8Gb) Host Bus Adapter	Fibre Channel
QLogic Corp.	QME2472 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QME2572 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QMH2562 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QMI2472 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QMI2572 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QMI3572 OEM mezzanine Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QSB2340 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QSB2342 Fibre Channel Host Bus Adapter	Fibre Channel
QLogic Corp.	QLA4050 iSCSI Host Bus Adapter	SCSI
QLogic Corp.	QLA4050c iSCSI Host Bus Adapter	SCSI
QLogic Corp.	QLA4052c iSCSI Host Bus Adapter	SCSI
QLogic Corp.	QLE4060c iSCSI Host Bus Adapter	SCSI
QLogic Corp.	QLE4062c iSCSI Host Bus Adapter	SCSI

QLogic Corp.	QMH4062 iSCSI Host Bus Adapter	SCSI

NICs

Allied Telesis	AT-2973SX	1GB
Allied Telesis	AT-2973T	1GB
Atheros Communications, Inc.	AR5418 802.11a/b/g/n Wireless PCI Express Adapter	
Atheros Communications, Inc.	AR5418 802.11abgn Wireless PCI Express Adapter	
Broadcom Corporation	Embedded NetXtreme II 5708 Gigabit Ethernet NIC	
Broadcom Corporation	NetXtreme 5709 Gb Ethernet NIC	1Gb
Broadcom Corporation	NetXtreme 5722 Single Port Gigabit Ethernet NIC	
Broadcom Corporation	NetXtreme BCM5703X Gigabit Ethernet	
Broadcom Corporation	NetXtreme BCM5704 Gigabit Ethernet	
Broadcom Corporation	NetXtreme BCM5715 Gigabit Ethernet	
Broadcom Corporation	NetXtreme BCM5721 Gigabit Ethernet PCI Express	
Broadcom Corporation	NetXtreme BCM5751 Gigabit Ethernet PCI Express	
Broadcom Corporation	NetXtreme BCM5752 Gigabit Ethernet PCI Express	
Broadcom Corporation	NetXtreme BCM5754 Gigabit Ethernet PCI Express	
Broadcom Corporation	NetXtreme BCM5755 Gigabit Ethernet PCI Express	
Broadcom Corporation	NetXtreme II 5708 1-Port Gb Ethernet NIC	
Broadcom Corporation	NetXtreme II 57710 10 Gigabit Ethernet	10Gb
Broadcom Corporation	NetXtreme II BCM5708 Gigabit Ethernet	
Broadcom Corporation	NetXtreme II BCM5708S Gigabit Ethernet	
Broadcom Corporation	NetXtreme II BCM5709 Gigabit Ethernet	1Gb
Chelsio Communications Inc	N310E	10GB
Chelsio Communications Inc	N310E-CXA	10GB
Chelsio Communications Inc	N310E-SR	10GB
Chelsio Communications Inc	N320E	10GB
Chelsio Communications Inc	N320E-BT	10GB
Chelsio Communications Inc	N320E-CXA	10GB
Chelsio Communications Inc	N320E-G2-CR	10GB
Chelsio Communications Inc	S302E	1GB
Chelsio Communications Inc	S310E-BT	10GB
Chelsio Communications Inc	S310E-CR	10GB
Chelsio Communications Inc	S310E-CXA	10GB
Chelsio Communications Inc	S310E-SR+	10GB
Chelsio Communications Inc	S320E-CR	10GB
Chelsio Communications Inc	S320E-CXA	10GB
Chelsio Communications Inc	S320E-LP-CR	10GB
Chelsio Communications Inc	S320EM-BCH	10GB
Corsair	5722 dual-port NIC	
D-Link	DGE-530T Gigabit Ethernet Adapter (rev 11)	
HP	1/10Gb-F Virtual Connect Ethernet Module	10Gb
HP	NC110T	1Gb
HP	NC112T	1Gb

HP	NC150T	1Gb
HP	NC325m	1Gb
HP	NC326m	1Gb
HP	NC360T	1Gb
HP	NC364T	1Gb
HP	NC373F	1Gb
HP	NC373m	1Gb
HP	NC373T	1Gb
HP	NC375i	1GbE
HP	NC375T	1Gb
HP	NC380T	1Gb
HP	NC510C	10Gb
HP	NC510F	10Gb
HP	NC512m	10Gb
HP	NC522m	10Gb
HP	NC522SFP	10Gb
HP	NC524SFP	10Gb
HP	NC532m	10Gb
HP	NC7170	1Gb
HP	NC7771	1Gb
HP	Virtual Connect 1/10Gb	10Gb
HP	Virtual Connect 4Gb	4Gb
HP	Virtual Connect 8Gb 24-port	8Gb
HP	Virtual Connect Flex-10	10Gb
Intel	10 Gigabit AF DA Dual Port Server Adapter	10Gb
Intel	10 Gigabit AT Server Adapter	10Gb
Intel	10 Gigabit CX4 Dual Port Server Adapter	10Gb
Intel	10 Gigabit XF LR Server Adapter	10Gb
Intel	10 Gigabit XF SR Dual Port Server Adapter	10Gb
Intel	10 Gigabit XF SR Server Adapter	10Gb
Intel	80003ES2 Gigabit Ethernet Controller (Copper)	1Gb
Intel	82540EM Gigabit Ethernet Controller	
Intel	82541GI Gigabit Ethernet Controller	
Intel	82541PI Gigabit Ethernet Controller	
Intel	82545GM Gigabit Ethernet Controller	
Intel	82546GB Gigabit Ethernet Controller	
Intel	82557/8/9 [Ethernet Pro 100]	
Intel	82566DC Gigabit Network Connection	
Intel	82566DM-2 Gigabit Network Connection	
Intel	82571EB Gigabit Ethernet Controller	
Intel	82573E Gigabit Ethernet Controller (Copper)	
Intel	82573L Gigabit Ethernet Controller	
Intel	82575EB Gigabit Ethernet Controller	1Gb
Intel	82576EB Gigabit Ethernet Controller	1Gb

Intel	82598EB 10 Gigabit Ethernet Controller	10Gb
Intel	Gigabit EF Dual Port Server Adapter	1Gb
Intel	Gigabit ET Dual Port Server Adapter	1Gb
Intel	Gigabit VT Quad Port Server Adapter	1Gb
Intel	PRO/1000 PF Single Port Server Adapter	
Intel	PRO/1000 PT Dual Port Server Adapter	
Intel	PRO/1000 PT Quad Port Server Adapter	1Gb
Intel	PRO/1000 PT Single Port Server Adapter	
Linksys	NC100 Network Everywhere Fast Ethernet 10/100	
Mellanox Technologies	ConnectX EN MNEH28-XTC	
Mellanox Technologies	ConnectX EN MNEH29-XTC	
Mellanox Technologies	ConnectX EN MNKH18-XSC	
Mellanox Technologies	ConnectX EN MNKH18-XTC	
Mellanox Technologies	ConnectX EN MNKH28-XSC	
Mellanox Technologies	ConnectX EN MNKH28-XTC	
Mellanox Technologies	ConnectX EN MNKH29-XSC	
Mellanox Technologies	ConnectX EN MNKH29-XTC	
Neterion	X3100 Series 10 GbE driver (vxge)	10GbE
Neterion	Xframe E	10GbE
Neterion	Xframe II	10GbE
NetXen Incorporated	NX3-20GCU Intelligent Ethernet Adapter	10Gb
NetXen Incorporated	NX3-20GxR Intelligent Ethernet Adapter	10Gb
NetXen Incorporated	NX3-4GBT Intelligent Ethernet Adapter	Quad Gb
Online USV-Systeme AG	UPS SNMP DW5SNMP20	100Mbit
Online USV-Systeme AG	UPS SNMP DW5SNMP30	100Mbit
Online USV-Systeme AG	UPS SNMP DW7SNMP20	100Mbit
Online USV-Systeme AG	UPS SNMP DW7SNMP30	100Mbit
QLogic Corp.	QLE3044-RJ-CK Intelligent Ethernet Adapter	Quad Gb
QLogic Corp.	QLE3142-CU-CK Intelligent Ethernet Adapter	10Gb
QLogic Corp.	QLE3142-LR Intelligent Ethernet Adapter	10Gb
QLogic Corp.	QLE3142-SR Intelligent Ethernet Adapter	10Gb