



# Installation Guide for VMware

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Hitachi, Ltd.

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# Preface

This preface includes the following information:

- [Intended audience](#)
- [Document revision level](#)
- [Document organization](#)
- [Document conventions](#)
- [Getting help](#)
- [Comments](#)

## Intended audience

This document is intended for the personnel who are involved in planning, managing, and performing the tasks to prepare your site for Compute Blade installation and to install the same.

This document covers the necessary procedure on Installation and Setup required for Compute Blade 2000, 320 and 500.

This document assumes the following:

- The reader has a background in hardware installation of computer systems.
- The reader is familiar with the location where the Compute Blade will be installed, including knowledge of physical characteristics, power systems and specifications, and environmental specifications.

## Document revision level

Revision	Date	Description
000	January 2012	New Release
001	April 2012	ESXi 5.0 Installation and Setup Prerequisites Add information of BS500 in the following items. <ul style="list-style-type: none"><li>- System BIOS version</li><li>- Hitachi Customized ESXi 5.0 Installer</li></ul> Update drivers and utilities Add description about lpfc820 driver in ESXi 5.0 Update1 Patches to ESXi Notes on updating patch  ESX 4 Installation and Setup Prerequisites Add notes when enabling NUMA. Modify description about error message when mounting 1TB memories
002	-	N/A
003	June 2012	Add description about the followings. <ul style="list-style-type: none"><li>- Hitachi Custom Image version 01-01</li><li>- Command options when applying ESXi patch</li></ul>
004	July 2012	Change the documentation title from 'VMware Setup Guide' to 'Installation Guide for VMware'

Revision	Date	Description
005	Oct 2012	Add description about the followings. 1-1 ESXi 5.x Installation and Setup 1-2 Related Documentation 1-4 System BIOS version 1-5 Hitachi Customized ESXi 5.x Installer 1-6 FC adapters and FC switch versions 1-6 Boot from SAN 1-7 Minimum system Requirements 1-7 Connecting iSCSI array when using Emulex CNA 1-9 Disable NetQueue when using Broadcom 5718/5719 NICs 1-11 Update drivers and utilities 1-11 Modify ESXi setting to avoid PSOD when installing Intel Xeon E5-2600 processor series. 1-11 vMotion CPU Compatibility 2-1 ESX 4 Installation and Setup 2-3 LSI MegaRAID SAS (megaraid_sas)" 2-7 FC adapters and FC switch versions 2-7 Boot from SAN 2-9 Notes on enabling NUMA mode

## Document organization

The table below provides an overview of the contents and organization of this document. Click the chapter title in the left column to go to that chapter. The first page of each chapter provides links to the sections in that chapter.

Chapter	Description
<a href="#">Chapter 1, ESXi 5.x Installation and Setup</a>	This chapter describes how to install and setup VMware ESXi 5.x on Hitachi Compute Blade.
<a href="#">Chapter 2, ESX 4 Installation and Setup</a>	This chapter describes how to install and setup VMware ESX 4.0 and ESX 4.1 on Hitachi Compute Blade.

## Document conventions

This term “Compute Blade” refers to all the models of the Compute Blade, unless otherwise noted.

This document uses the following typographic conventions:

Convention	Description
<b>Bold</b>	Indicates text on a window, other than the window title, including menus, menu options, fields, and labels. Example: Click <b>OK</b> .
<i>Italic</i>	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: <i>copy source-file target-file</i> <b>Note:</b> Angled brackets (< >) are also used to indicate variables.
screen/code	Indicates text that is displayed on screen or entered by the user. Example: # <code>pairdisplay -g oradb</code>
< > angled brackets	Indicates a variable, which is a placeholder for actual text provided by the user or system. Example: # <code>pairdisplay -g &lt;group&gt;</code> <b>Note:</b> Italic font is also used to indicate variables.
[ ] square brackets	Indicates optional values. Example: [ a   b ] indicates that you can choose a, b, or nothing.
{ } braces	Indicates required or expected values. Example: { a   b } indicates that you must choose either a or b.
vertical bar	Indicates that you have a choice between two or more options or arguments. Examples: [ a   b ] indicates that you can choose a, b, or nothing. { a   b } indicates that you must choose either a or b.
<u>underline</u>	Indicates the default value. Example: [ <u>a</u>   b ]

This document uses the following icons to draw attention to information:

Icon	Meaning	Description
 <b>WARNING</b>	WARNING	Indicates the presence of a potential risk that might cause death or severe injury.
 <b>CAUTION</b>	CAUTION	Indicates the presence of a potential risk that might cause relatively mild or moderate injury.
<b>NOTICE</b>	NOTICE	Indicates the presence of a potential risk that might cause severe damage to the equipment or damage to surrounding properties.
 <b>Note</b>	Note	Indicates notes not directly related to injury or severe damage to the equipment.
 <b>Tip</b>	Tip	Indicates advice on how to make the best use of the equipment.

## Getting help

When you contact <contact information>, please provide as much information about the problem as possible, including:

- The circumstances surrounding the error or the failure
- The exact content of any error message displayed on the host system Compute Blade
- The service information messages, including reference codes and severity levels, displayed and/or logged at the Compute Blade

The <sales partner> support staffs are available 24 hours a day, seven days a week. For technical support, visit the portal site at <portal site URL>. For contact information, visit <sales partner's homepage URL>.

## Comments

Please send us your comments on this document, if any, by e-mail to: <e-mail address>. Make sure that the e-mail includes the document title and number, revision, and section(s) and paragraph(s) whenever possible.

***Thank you!*** (All comments become the property of Hitachi.)



# ESXi 5.x Installation and Setup

This chapter describes how to install and setup VMware ESXi 5.x on Hitachi Compute Blade.

- [General Information](#)
- [Prerequisites](#)
- [Installing](#)
- [Settings after installation](#)

# General Information

## Related documentation

The following web site provides the documents how to install, configure and operate VMware ESXi 5.x.

Please see these documents before installation.

<http://www.vmware.com/support/pubs/vsphere-esxi-vcenter-server-pubs.html>

Please also see the following Guides if needed.

Guest Operating System Installation Guide

<http://partnerweb.vmware.com/GOSIG/home.html>

VMware Product Interoperability Matrix

[http://partnerweb.vmware.com/comp\\_guide2/sim/interop\\_matrix.php](http://partnerweb.vmware.com/comp_guide2/sim/interop_matrix.php)

Configuration Maximums

ESXi 5.0:

<http://www.vmware.com/pdf/vsphere5/r50/vsphere-50-configuration-maximums.pdf>

ESXi 5.1:

<http://www.vmware.com/pdf/vsphere5/r51/vsphere-51-configuration-maximums.pdf>

For a complete list of known issues in the ESXi 5.x release, please see the vSphere 5.x Release Notes.

VMware vSphere® 5.0 Release Notes:

<https://www.vmware.com/support/vsphere5/doc/vsphere-esx-vcenter-server-50-release-notes.html>

VMware vSphere® 5.1 Release Notes:

<https://www.vmware.com/support/vsphere5/doc/vsphere-esx-vcenter-server-51-release-notes.html>

Also the VMware Knowledge Base provides various solutions and troubleshooting guide.

VMware Knowledge Base

<http://kb.vmware.com/>

## **Hardware Compatibility**

Hitachi Compute Blade servers are certified for each ESXi version by VMware. For detailed information about ESXi Server hardware compatibility of Hitachi Compute Blade servers, search the VMware Compatibility Guide with 'Hitachi' as 'Partner Name'.

VMware Compatibility Guide

<http://www.vmware.com/go/hcl>

## Prerequisites

### System BIOS version

When you install ESXi 5.x to Hitachi Compute Blade, please set the System BIOS version according to the following tables.

**Table 1-1 BIOS version (Compute Blade Model)**

Compute Blade Model		System BIOS version
Compute Blade 2000	AX55A1 Model (Xeon 5500 series)	01-64 or later
	AX55A2 Model (Xeon 5500/5600 series)	03-50 or later
	AX57A1 Model (Xeon 7500 series)	03-24 or later
	AX57A2 Model (Xeon E7-8800 series)	07-05 or later
	AX55S3/R3 Model (Xeon E5-2600 series)	09-24 or later
Compute Blade 320	AX51A2 Model (Xeon 5100/5300 series)	F46 or later
	AX51A3 Model (Xeon 5200/5400 series)	G15 or later
	AX51E3 Model (Xeon 5300/5400 series)	G15 or later
	AX51A4/S4/H4/P4/R4 Model (Xeon 5500 series)	F13 or later
	AX51A5/S5/H5/P5/R5 Model (Xeon 5500/5600 series)	G18 or later
Compute Blade 500	AGC0A1/AGC0B1 (Xeon E5-2600 series)	EP0110 or later
	AGB0A1 (Xeon E5-2400 series)	EN0107 or later
	AGD0A1/AGD0B1 (Xeon E5-4600 series)	EP4S0104 or later

For the server models which are not listed in the table above, you do not require to update the System BIOS from the factory default.

## Hitachi Customized ESXi 5.x Installer

When you install ESXi 5.x to Hitachi Compute Blade, please use **VMware ESXi 5.x Installable Hitachi Custom ISO Image** which includes drivers necessary to install Hitachi Compute Blade servers.

You can download appropriate **VMware ESXi 5.x Installable Hitachi Custom ISO Image** at the **Drivers and Tools - OEM Customized Installer CDs** section of the [VMware Download Center](#).

**Table 1-2 Hitachi Custom Image Version**

Hitachi Custom Image version	ESXi base version	Compute Blade Model		
		Compute Blade 2000	Compute Blade 320	Compute Blade 500
<del>01-00</del> (*1) ESXi-5.0.0-01-01	ESXi 5.0.0 build 469512	AX55A1 AX55A2 AX57A1 AX57A2	AX51A2 AX51A3 AX51E3 AX51*4 AX51*5	N/A
ESXi-5.0.0-Update1-02-00	ESXi 5.0.0 U1 build 623860	AX55A1 AX55A2 AX57A1 AX57A2 AX55S3 AX55R3	AX51A2 AX51A3 AX51E3 AX51*4 AX51*5	AGC0A1 AGC0B1 AGB0A1 AGD0A1 AGD0B1
ESXi-5.1.0-01-00	ESXi 5.1.0 build 799733	AX55A1 AX55A2 AX57A1 AX57A2 AX55S3 AX55R3	AX51A2 AX51A3 AX51E3 AX51*4 AX51*5	AGC0A1 AGC0B1 AGB0A1 AGD0A1 AGD0B1

(\*1) The version 01-00 of Hitachi Custom Image contains a defect which prevent from users to apply patch with specifying 'update' options.

Hitachi strongly recommends to install ESXi 5.0 update 1 or later using Hitachi Custom Image version 02-00 or later for fresh installation. However, if you need to install ESXi 5.0, please use the version 01-01 of Hitachi Custom Image which is available on VMware Download Center.

## FC adapters and FC switch versions

When you use N-Port ID Virtualization (NPIV) feature, you have to connect the storage through the FC adapters and the switches which support the NPIV feature.

The following table shows the firmware version of the FC adapters and the switches which support NPIV feature.

## FC Adapters

**Table 1-3 FC adapters and the firmware versions**

Fibre Channel Board			Firmware Version
Hitachi FIVE FIVE-EX	CB2000 FIVE-EX	GV-CC2N8G2N1/GV-CC2N8G2N1EX	30-04-39 or later
		GV-CC2N8G1N1/GV-CC2N8G1N1EX	30-04-39 or later
		GV-CC2D8G2N1/GV-CC2D8G2N1EX	30-04-39 or later
		GV-CC2D8G1N1/GV-CC2D8G1N1EX	30-04-39 or later
		GV-CC2M8G2N1/GV-CC2M8G2N1EX	30-04-39 or later
		GV-CC2M8G1N1/GV-CC2M8G1N1EX	30-04-39 or later
	CB2000 FIVE	GV-CC2M4G1N1/GG-CC2M4G1N1EX	26-08-10 or later
		GV-CC2N4G1N1/GV-CC2N4G1N1BX	26-08-10 or later
	CB320 FIVE-EX	GG-CC9P8G2N1/GG-CC9P8G2N1EX	30-04-39 or later
	CB320 FIVE	GG-CC9MZFC1/GG-CC9MZFC1EX	23-07-76 or later
		GG-CC9M4G1N1/GG-CC9M4G1N1EX	23-07-76 or later
		GG-CC9P4G1N1/GG-CC9P4G1N1EX	26-08-10 or later
	CB500 FIVE-EX	GG-CC3M8G2N1/GG-CC3M8G2N1EX	39-04-5A or later
		GG-CC3M8G2N2/GG-CC3M8G2N2EX	39-04-5A or later

## FC switches

The Fabric OS version should be v5.3.2a or later.

## Boot from SAN

If you install ESXi to boot from SAN, you have to follow the configuration rules and select the appropriate settings to the Server chassis, the Fibre Channel adapters, the SAN storage systems and the Fibre Channel switches.

Please consult the reseller from which you purchased the product for details about updates for the SAN environment configuration.

Focusing on installing ESXi 5.x to boot from SAN, please set the followings;

- Create the boot disk on LU0 when installing ESXi. In this case, the boot disk means the disk which stores the boot loader of ESXi. The System BIOS identifies this disk as ID x'80' by INT 13H.
- On compute Blade 320, the following settings are required.  
AX51A5: 'SAS Option ROM' should be 'Disabled' on the System BIOS.  
AX51R5: 'Boot Disabled' should be set on RAID BIOS and 'SAS Option ROM' should remain unchanged ('Enabled').

- On compute Blade 2000, 'SAS Option ROM' should be 'Disabled' on the System BIOS.

Please also see [vSphere Storage](#) for how to configure your host before installation.

## NIC teaming

Please follow the configuration rules when you configure NIC teaming. Please see [vSphere Networking](#) for details.

## Minimum system Requirements

ESXi requires a minimum of 2GB of physical RAM. However, in some cases, installing ESXi with just 2GB of memory may fail because the system is using some memory and less than 2GB is available for ESXi.

For system requirements of ESXi, please see [vSphere Installation and Setup](#) and the following article on VMware KB for details.

### **Minimum system requirements for installing ESX/ESXi**

(KB 1003661)

## Connecting iSCSI array when using Emulex CNA

You must set up your iSCSI adapters and storage before ESXi can work with a SAN. Please see [vSphere Storage](#) for details.

Please also see the following document for specifically focusing on Emulex CNA adapter.

### **Boot for NIC, iSCSI, and FCoE Protocols User Manual**

[http://www-dl.emulex.com/support/hardware/documentation/nif/12-03/oc\\_boot\\_manual.pdf](http://www-dl.emulex.com/support/hardware/documentation/nif/12-03/oc_boot_manual.pdf)

## Installing

### Installing

When installing ESXi, you can use ESXi CD/DVD or you can specify ISO image directly when connecting a server using Remote Console.

Please use the appropriate **VMware ESXi 5.x Installable Hitachi Custom ISO Image**

For installation procedure of ESXi, please see [vSphere Installation and Setup](#).for details.

## Settings after installation

### Management LAN Port on Compute Blade 2000

On all Compute Blade 2000 servers, Intel® 82567LF-2 Gigabit Network Connection is a management LAN port. Do not use this network adapter on ESXi.

The network adapter is identified as vmnic<number> on ESXi and Intel® 82567LF-2 Gigabit Network Connection is assigned as the smallest number.

After installing ESXi on Compute Blade, please select another network adapter.

Please see [vSphere Installation and Setup](#) for how to choose the network adapter after installation.

### Hardware NMI facilities to troubleshoot unresponsive host

When a hardware failure happens, the hardware generates interrupt called Non-Maskable Interrupt (NMI) which cannot be ignored by the processor.

If the CPU receives NMI, the system should be stopped because subsequent system processing in such case may cause unexpected behavior of the system.

On ESXi 5.x, the VMkernel always handles the NMI by halting with a purple diagnostic screen by default. No additional configuration is needed on ESXi 5.x.

For details how to configure ESX, please see the following article on VMware KB for details.

**Using hardware NMI facilities to troubleshoot unresponsive hosts**  
(KB1014767)

### Time Zone

The ESXi 5.x identifies the server hardware clock as UCT time zone. Please adjust time from vSphere Client.

### Disable NetQueue when using Broadcom 5718/5719 NICs

Disabling NetQueue for 1Gb NICs, such as Broadcom 5718 and 5719 is highly recommended. Please see the following article on VMware KB for details.

**Broadcom 5719/5720 NICs using tg3 driver becomes unresponsive and stops traffic in vSphere**

(KB 2035701)

### Patches to ESXi

Please apply patches if needed. You can download the latest patches to ESXi from the following web site.

<http://downloads.vmware.com/go/selfsupport-download>

You can also get patches automatically if you configure to use vSphere Update Manager.

Note that basically ESXi patches can not be removed once they applied to ESXi.

Therefore, please read Release Notes carefully whether you apply the patch.

If the released patch triggers another problem, the new patch will be released to fix the problem.

### **Notes on updating patch**

If you install ESXi using Hitachi Custom Image, apply patch with specifying 'esxcli software profile update' command.

Hitachi Custom Image contains several newer versions of inbox drivers, for example, tg3, lpfc820 and be2net to support new devices and an outbox driver such as hfcldd.

Applying the patch with specifying 'software profile install' option forces ESXi to install VIBs present in the depot image profile, and remove any other VIBs install on the target server. Therefore, if you use the devices which inbox drivers do not cover and are also supported only by the outbox driver, the devices will not be identified after reboot.

The 'software profile update' option updates existing VIBS with the corresponding VIBs from the specified profile, but does not affect other VIBs installed on the target server.

If you installed ESXi using the version 01-00 of "Hitachi Custom Image for ESXi 5.0.0 GA Install CD (File Name: VMware-ESXi-5.0.0-469512-hitachi-0100.iso) downloaded from the VMware Downloaded Center, please apply an ESXi patch using the option, 'software vib install'. The esxcli command fails when specifying 'software profile update' option.

However, if you updated the drivers from inbox to newer version of outbox asynchronous drivers, it may be downgraded by applying patch using this option. In this case, you need to re-install outbox asynchronous drivers every time you applying patch. To avoid this maintenance inconvenience, Hitachi recommends that you re-install ESXi using the Hitachi Custom Image version 01-01, or 02-00 or later when updating ESXi.

For details how to upgrade ESXi, please refer to ESXi and vCenter Server product documentations including **vSphere Upgrade**.

## Update drivers and utilities

Please update drivers of adapters if needed. Drivers are required to reboot the ESXi after installation.

The latest drivers are available on VMware download center at the **Drivers & Tools–Driver CDs** section of the [VMware Download Center](#).

For the latest utilities for adapters, please download them from the third party's website respectively. Some tools may require to reboot the ESXi after installation.

### Emulex Fibre Channel Adapter driver (lpfc820)

When you use Emulex Fibre Channel Adapter in ESXi 5.0 Update 1 or later, please update lpfc820 driver to async outbox driver, version 8.2.2.126.50.

If you install ESXi 5.x using **VMware ESXi 5.0.0 Update 1 Installable Hitachi Custom ISO Image and VMware ESXi 5.1.0 Installable Hitachi Custom ISO Image**, the driver of this version has already been preinstalled in Custom ISO image. You do not install the driver after installation.

## Modify ESXi setting to avoid PSOD when installing Intel Xeon E5-2600 processor series.

When you use the server installing Intel Xeon E5-2600 series, PSOD may occur when the CPU usage of the virtual machine is low.

Please set 'Cpu.PcpuMigrateIdlePcpus' of your ESXi to '0' (disabled) using vSphere client, vSphere web client or vSphere CLI.

This setting applies immediately and reboot is not required. And this setting is maintained across reboots.

## vMotion CPU Compatibility

To migrate a virtual machine with vMotion successfully, BIOS versions of the source and the target host should be the same and the processors should be within CPU compatibility group. However, even if your hosts meet these requirements, vMotion may fail depending on BIOS settings (AES/AVX and XSAV) of the hosts.

Using Enhanced vMotion Compatibility (EVC) eliminates many vMotion CPU compatibility problems.

For details, please see the following article.

**vMotion CPU Compatibility Requirements for Intel Processors (KB 1991)**  
**Enhanced vMotion Compatibility (EVC) processor support (KB 1003212)**



# ESX 4 Installation and Setup

This chapter describes how to install and setup VMware ESX 4.0 and ESX 4.1 on Hitachi Compute Blade.

- [General Information](#)
- [Prerequisites](#)
- [Installing](#)
- [Setting after Installation](#)
- [Notes](#)

## General Information

### Related documentation

The following web sites provide the documents how to install, configure and operate VMware ESX 4.0 and 4.1 including Release Notes.

Please see these documents before installation.

#### VMware vSphere 4 Documentation (ESX 4.1)

[http://www.vmware.com/support/pubs/vs\\_pages/vsp\\_pubs\\_esx41\\_vc41.html](http://www.vmware.com/support/pubs/vs_pages/vsp_pubs_esx41_vc41.html)

#### VMware vSphere 4 Documentation (ESX 4.0)

[http://www.vmware.com/support/pubs/vs\\_pages/vsp\\_pubs\\_esx40\\_vc40.html](http://www.vmware.com/support/pubs/vs_pages/vsp_pubs_esx40_vc40.html)

Also the VMware Knowledge Base provides various solutions and troubleshooting guide.

VMware Knowledge Base

<http://kb.vmware.com/selfservice/microsites/microsite.do>

### Hardware Compatibility

Hitachi Compute Blade servers are certified for each ESX version by VMware. For detailed information about ESX Server hardware compatibility of Hitachi Compute Blade servers, search the VMware Compatibility Guide with 'Hitachi' as 'Partner Name'.

VMware Compatibility Guide

<http://www.vmware.com/go/hcl>

## Prerequisites

### System BIOS version

When you install ESX to Hitachi Compute Blade, the System BIOS version of each model should be set according to the following tables.

**Table 2-1 System BIOS version**

Compute Blade Model		System BIOS version
Compute Blade 2000	AX55A1 Model (Xeon 5500 series)	01-37 or later
Compute Blade 320	AX51A4/S4/H4/P4/R4 Model (Xeon 5500 series)	F9 or later

For the server models which are not listed in the table above, you do not require to update the System BIOS from the factory default.

If you use VMware Fault Tolerance (FT), please set the System BIOS version according to the following tables.

**Table 2-2 System BIOS version (When using VMware FT feature)**

Compute Blade Model		System BIOS version
Compute Blade 2000	AX55A1 Model (Xeon 5500 series)	03-23
	AX55A2 Model (Xeon 5500 series or Xeon 5600 series)	03-23
Compute Blade 320	AX51P4 Model (Xeon 5500 series)	F12
	AX51P5 Model (Xeon 5500 series or Xeon 5600 series)	G7

### System BIOS settings

#### APIC Mode

If you use 4-Blade SMP configuration on Compute Blade 2000 AX57A2 model, please change **APIC mode** to **xAPIC**.

### ESX Installer

When installing ESX to Hitachi Compute Blade, please download the ESX Installer from [VMware Download Center](#).

### Necessary drivers for installation.

You can download the necessary drivers at the **Related Drivers and Tools-Driver CDs** section of the VMware Download Center.

vSphere 4.1 (ESX 4.1)

[http://downloads.vmware.com/d/info/datacenter\\_cloud\\_infrastructure/vmware\\_vsphere/4\\_1](http://downloads.vmware.com/d/info/datacenter_cloud_infrastructure/vmware_vsphere/4_1)

vSphere 4.0 (ESX 4.0)

[http://downloads.vmware.com/d/info/datacenter\\_cloud\\_infrastructure/vmware\\_vsphere/4\\_0](http://downloads.vmware.com/d/info/datacenter_cloud_infrastructure/vmware_vsphere/4_0)

### Hitachi Fibre Channel adapter driver (hfcldd)

When you install ESX to boot from SAN using Hitachi Fibre Channel Adapter, you need Driver CD for Hitachi hfcldd driver.

Please download Driver CD for the latest **VMware ESX/ESXi 4.X Driver CD for Hitachi hfcldd Driver**.

### Intel Gigabit Ethernet driver (igb)

You need Driver CD for Intel Gigabit Ethernet Controller only if your configuration meets the following conditions.

- Install ESX 4.0 Update 0 or Update 1. (You do not need to embed this igb driver when you install ESX 4.0 update 2 or later, or ESX 4.1)
- Your Compute Blade is listed on the following table.

Please download Driver CD for **VMware ESX/ESXi 4.0 Driver CD for Intel 82575 and 82576 Gigabit Ethernet Controller**.

**Table 2-3 Compute Blade Models require an outbox igb driver**

Compute Blade Model	
Compute Blade 2000	AX55A1 Model
	AX55A2 Model
	AX57A1 Model
	AX57E1 Model
Compute Blade 320	AX51A4/S4/H4/P4/R4 Model
	AX51A5/S5/H5/P5/R5 Model

Also, if you use Intel 1Gb 4port LAN board, you need the appropriate version of igb driver. Please download Driver CD for **VMware ESX/ESXi 4.x Driver CD for Intel 82576, 82580 and I350 Gigabit Ethernet Controller** (Driver version should be 3.0.18 or later).

### Intel 10 Gigabit Ethernet driver (ixgbe)

You need to Driver CD for Intel 10 Gigabit Ethernet Controller when you install ESX only if your configuration meets the following conditions.

- When you use Intel 10 Gigabit Server Adapter X520 Series.
- Your Compute Blade is listed on the following table.

**Table 2-4 Compute Blade Models require an outbox ixgbe driver**

Compute Blade Model	
Compute Blade 2000	AX55A2 Model
	AX57A1 Model
Compute Blade 320	AX51P5 Model

Please download Driver CD for **VMware ESX/ESXi 4.x Driver CD for Intel 82598 and 82599 10 Gigabit Ethernet Controllers** (Driver version should be 2.0.84.9 or later).

### Emulex Fibre Channel Adapter driver (lpfc820)

You need Driver CD for Emulex Fibre Channel Adapter only if your configuration meets the following conditions.

- Install ESX 4.0
- Your Compute Blade is listed on the following table.

**Table 2-5 Compute Blade Models require an outbox lpfc820 driver**

Compute Blade Model	
Compute Blade 2000	AX55A1 Model
	AX55A2 Model
	AX57A1 Model
	AX57E1 Model

Please download Driver CD for **VMware ESX/ESXi 4.0 Driver CD for Emulex lpfx820** (Driver version should be 8.2.0.71.17 or later).

### Broadcom 1 Gigabit Ethernet driver (tg3)

You need Driver CD for Broadcom Gigabit Ethernet Adapter if you use Compute Blade servers, mezzanine cards and adapters listed on the following table.

**Table 2-6 Mezzanine cards and adapter requires an outbox tg3 driver**

Compute Blade Model		
Compute Blade 2000	AX55R3 Model (On board NIC)	
	AX55S3 Model (On board NIC)	
Compute Blade 500	SAS/LAN	RAID w/ 1Gb 4p LAN mezzanine
		RAID w/ 1Gb 8p LAN mezzanine
	LAN	1Gb 4p LAN mezzanine
		1Gb 8p LAN mezzanine

Please download Driver CD for **VMware ESX/ESXi 4.x Driver CD for Broadcom NetXtreme I Gigabit Ethernet Driver** (Driver version should be 3.120h.v40.1 or later).

### Emulex 10 Gigabit Ethernet driver (be2net)

You need Driver CD for Broadcom Gigabit Ethernet Adapter if you use Compute Blade servers, mezzanine cards and adapters listed on the following table.

**Table 2-6 Mezzanine cards and adapters require an outbox be2net driver**

Compute Blade Model		
Compute Blade 2000	LAN	10Gb LAN mezzanine
	CNA	10Gb CNA adapter
		10Gb CNA mezzanine
Compute Blade 500	LAN	10Gb 4p LAN mezzanine
	CNA	10Gb 4p CNA mezzanine
	AGC0B1 Model (On board NIC)	

Please download Driver CD for **VMware ESX 4.0/4.1 Driver CD for Emulex OneConnect OCe10102 10GbE Adapter (Network Function)** (Driver version should be 4.1.334.0 or later).

### LSI MegaRAID SAS (megaraid\_sas)

When you use the following Compute Blade servers, mezzanine cards and adapters, please use megaraid\_sas driver, version 00.00.05.37. This driver fixes the issue of potential PSOD when Abort command is issued to internal RAID under high I/O load.

**Table 2-7 Mezzanine cards and adapters require megaraid\_sas driver**

Compute Blade Model			
Compute Blade 2000	SAS	SAS1078	LSI SAS internal RAID board
		SAS2108	LSI SAS internal RAID board
		SAS2208	AX55R3 model (On board RAID)
Compute Blade 320	SAS	SAS1078	AX51H4/ AX51H5 Model
		SAS2108	AX51H5 Model
		SAS2008	AX51R4/ AX51R5 Model
Compute Blade 500	SAS	SAS2008	RAID mezzanine card
		SAS2208	LSI SAS RAID card

Please download Driver CD for **VMware ESX/ESXi 4.x Driver CD for LSI MegaRAID SAS Controllers** (Driver version should be 00.00.05.37).

## FC adapters and FC switch versions

When you use N-Port ID Virtualization (NPIV) feature, you have to connect the storage through the FC adapters and the switches which support the NPIV feature. The following table shows the firmware version of the FC adapters and the switches which support NPIV feature.

### FC Adapters

Please see the section, **FC adapters and FC switch versions** on Chapter 1, **ESXi 5.x Installation and Setup**.

### FC switches

The Fabric OS version should be v5.3.2a or later.

## Boot from SAN

If you install ESX to boot from SAN, you have to follow the configuration rules and select the appropriate settings to the Server chassis, the Fibre Channel adapters, the SAN storage systems and Fibre Channel switches.

Please consult the reseller from which you purchased the product for details about updates for the SAN environment configuration.

Focusing on installing ESX 4.0 or 4.1 to boot from SAN, please set the followings;

- Create the boot disk on LU0 when installing ESX. In this case, the boot disk means the disk which stores the boot loader of ESX. The System BIOS identifies this disk as ID x'80' by INT 13H.
- On compute Blade 320, the following settings are required.

AX51A5: 'SAS Option ROM' should be 'Disabled' on the System BIOS.

AX51R5: 'Boot Disabled' should be set on RAID BIOS and 'SAS Option ROM' should remain unchanged ('Enabled').

- On compute Blade 2000, 'SAS Option ROM' should be 'Disabled' on the System BIOS.

Please also see **Fibre Channel SAN Configuration Guide** for how to configure your host before installation.

#### **vSphere 4.1 (ESX 4.1)**

[http://www.vmware.com/pdf/vsphere4/r41/vsp\\_41\\_san\\_cfg.pdf](http://www.vmware.com/pdf/vsphere4/r41/vsp_41_san_cfg.pdf)

#### **vSphere 4.0 (ESX 4.0)**

[http://www.vmware.com/pdf/vsphere4/r40/vsp\\_40\\_san\\_cfg.pdf](http://www.vmware.com/pdf/vsphere4/r40/vsp_40_san_cfg.pdf)

## **Notes on enabling NUMA mode**

When the hardware supports Non-Uniform Memory Access (NUMA) and an unequal amount memory is allocated to each NUMA node, ESXi host fails to start or install with the error: The BIOS reports that NUMA node X has no memory.

When you need to enable NUMA, configure your hardware to have an equal amount of memory on each NUMA node.

Please see the following article on VMware KB for details.

ESX host fails to start or install with the error: The BIOS reports that NUMA node X has no memory (KB 1016154)

# Installing

## Installing

When installing ESX, you can use ESX CD/DVD or you can specify ISO image directly when connecting a server using Remote Console.

For installation procedure of ESX, please see **ESX and vCenter Server Installation Guide** details.

### vSphere 4.1 (ESX 4.1)

[http://www.vmware.com/pdf/vsphere4/r41/vsp\\_41\\_esx\\_vc\\_installation\\_guide.pdf](http://www.vmware.com/pdf/vsphere4/r41/vsp_41_esx_vc_installation_guide.pdf)

### vSphere 4.0 (ESX 4.0)

[http://www.vmware.com/pdf/vsphere4/r40/vsp\\_40\\_esx\\_vc\\_installation\\_guide.pdf](http://www.vmware.com/pdf/vsphere4/r40/vsp_40_esx_vc_installation_guide.pdf)

## When using Remote Console Application

### Remote CD/DVD and Remote FD

When you install VMware ESX 4.0 or 4.1 using Remote CD/DVD feature with ISO image, please connect both remote FD and remote CD/DVD before turning on the power of the server

If the remote FD is not connected, ESX installer may fail to switch ISO image and stop installation process. It leads to installation failure eventually.

### Graphical Installation

When you install VMware ESX 4.1 using Remote CD/DVD feature in the graphical mode, ESX installation may fail because the installer fails to identify the appropriate video driver.

Please add the following parameter to Boot options when you choose graphical installation mode during installation. You can modify options by pressing F2 key.

(space)videodriver=vesa

## Bootloader option settings

The reboot after installation may fail when you install ESX 4.0 on Compute Blade 2000 AX57A1 model which mounts over 256GB memories. You have to let Boot loader know the memory size mounted on the system with adding the option to Boot loader.

To add the option to Boot loader, execute the following procedure.

- (1) Select **Advanced Setup** on **Setup Type** screen when installation.
- (2) Uncheck the checkbox of **Configure boot loader automatically**.
- (3) After setting the disk partition, enter the following options as **Kernel Arguments** on **Set Bootloader Options** screen.

```
Vmkopts=memLowReservedMaxMB:512
```

## Management LAN Port on Compute Blade 2000

On Compute Blade 2000 AX55A1, AX55A2 and AX57A1 models, Intel® 82567LF-2 Gigabit Network Connection is a management LAN port. Do not use this network adapter on ESX.

The Intel® 82567LF-2 Gigabit Network Connection is listed the top of the identified network cards. Please select another network adapter.

## Time Zone

The ESX 4.0 identifies the server hardware clock as UCT time zone.

Please set appropriate time at **Date and Time** screen which sets the system time when installation.

Adjusting time at **Date and Time** screen modifies the system time after the subsequent reboot when installation completes.

## Settings after installation

### Hardware NMI facilities to troubleshoot unresponsive host

When a hardware failure happens, the hardware generates interrupt called Non-Maskable Interrupt (NMI) which cannot be ignored by the processor.

If the CPU receives NMI, the system should be stopped because subsequent system processing in such case may cause unexpected behavior of the system.

ON ESX 4.0 and 4.1, the host takes no action by default. You have to configure ESX to halt with a purple diagnostic screen.

For details how to configure ESX, please see the following article on VMware KB for details.

**Using hardware NMI facilities to troubleshoot unresponsive hosts**  
(KB1014767)

### Using Remote CD/DVD or Remote FD feature

When you use Remote CD/DVD or Remote FD feature of Remote Console, you need an additional setting to make ESX identify these as a remote device.

Please change the assignment rule of storage path module according to the following procedure.

(1) Log on to Service Console as root privilege

(2) Execute the following commands.

```
# esxcli nmp satp deleterule --satp=VMW_SATP_DEFAULT_AA -V HITACHI
```

(3) Reboot ESX

### Patches to ESX

Please apply patches if needed. You can download the latest patches to ESX from the following web site.

<http://downloads.vmware.com/go/selfsupport-download>

You can also get patches automatically if you configure to use vSphere Update Manager.

Note that basically ESX patches can not be removed once they applied to ESX. Therefore, please read Release Notes carefully whether you apply the patch.

If the released patch triggers another problem, the new patch will be released to fix the problem.

## Update drivers and utilities

Please update drivers of adapters if needed. Drivers are required to reboot the ESX after installation.

The latest drivers are available on VMware download center at the **Drivers & Tools–Driver CDs** section of the VMware Download Center.

vSphere 4.1 (ESX 4.1)

[http://downloads.vmware.com/d/info/datacenter\\_cloud\\_infrastructure/vmware\\_vsphere/4\\_1](http://downloads.vmware.com/d/info/datacenter_cloud_infrastructure/vmware_vsphere/4_1)

vSphere 4.0 (ESX 4.0)

[http://downloads.vmware.com/d/info/datacenter\\_cloud\\_infrastructure/vmware\\_vsphere/4\\_0](http://downloads.vmware.com/d/info/datacenter_cloud_infrastructure/vmware_vsphere/4_0)

For the latest utilities for adapters, please download them from third party's website respectively. Some tools may require to reboot the ESX after installation.

## Disable NetQueue when using Broadcom 5718/5719 NICs

Disabling NetQueue for 1Gb NICs, such as Broadcom 5718 and 5719 is highly recommended. Please see the following article on VMware KB for details.

**Broadcom 5719/5720 NICs using tg3 driver becomes unresponsive and stops traffic in vSphere** (KB 2035701)

## vMotion CPU Compatibility

To migrate a virtual machine with vMotion successfully, BIOS versions of the source and the target host should be the same and the processors should be within CPU compatibility group. However, even if your hosts meet these requirements, vMotion may fail depending on BIOS settings (AES/AVX and XSAV) of the hosts.

Using Enhanced vMotion Compatibility (EVC) eliminates many vMotion CPU compatibility problems.

For details, please see the following article.

**vMotion CPU Compatibility Requirements for Intel Processors** (KB 1991)

**Enhanced vMotion Compatibility (EVC) processor support** (KB 1003212)

## Notes

### Error message when mounting 1TB memories

When you install ESX on the server with 1TB of memory, around 2GB memory may be remapped above the 1TB limit.

However, ESX can only handle a memory address up to 1TB so around 2GB memories allocated over 1TB address remain unused.

Therefore the following error message appears at the main screen when booting.

This message has no impact on the execution of ESX except around 2GB memories can not be used.

**XXXX MB of memory ignored because the system exceeded the supported host physical page number of XXXXXXXX**

(X means numeric character)

Please see the following article on VMware KB for details.

**ESX console message: XXXX MB of memory ignored because the system exceeded the supported host physical page number**

(KB 1026483)

### Memory mirror mode on Compute Blade 2000

Do not select **Mirror Channel Mode** at the settings of Memory RAS Mode on System BIOS when you use ESX on Compute Blade 2000 AX57A1 model.

If the Mirror Channel Mode is selected, ESX may fail to boot.

The setting is Lockstep Channel Mode by factory default.



# Acronyms and Abbreviations

BSMI	Bureau of Standards, Metrology and Inspection
CD	Compact Disk
CPU	Central Processing Unit
CRU	Customer Replaceable Units
DBS	Deep Brain Stimulation
DCB	Direct Copper Bonding
DIMM	Dual Inline Memory Module
DVD	Digital Versatile/Video Disk
EFI	Extensible Firmware Interface
EIA	Environmental Impact Assessment
FC	Fibre Channel
FCC	Federal Communications Commission
FD	Floppy Disk
FTP	File Transfer Protocol
HDD	Hard Disk Drive
ID	Identity Document
IO	Input/Output
IP	Internet protocol
iSCSI	Internet Small Computer System Interface
KVM	Keyboard, Video and Mouse
LAN	Local Area Network
LED	Light Emitting Diode
OS	Operating System
PC	Personal computer
PCI	Peripheral Component Interconnect
SAN	Storage Area Network
SAS	Serial Attached SCSI
SNMP	Simple Network Management Protocol
SSD	Solid State Drive
SVP	SerVice Processor

USB	Universal Serial Bus
VLAN	Virtual LAN
WEEE	Waste Electrical and Electronic Ezuipment
WWN	World Wide Name



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