

VMware<sup>®</sup> ESX Server<sup>™</sup> 2.5.2 Software for  
Dell<sup>™</sup> PowerEdge<sup>™</sup> Servers

# Deployment Guide

# Notes, Notices, and Cautions



**NOTE:** A NOTE indicates important information that helps you make better use of your computer.



**NOTICE:** A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.



**CAUTION:** A CAUTION indicates a potential for property damage, personal injury, or death.

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# Introduction

This document is a companion guide to the VMware® ESX Server™ 2.5.2 *Installation Guide* and provides additional information for supporting Dell™ PowerEdge™ servers. The following topics are covered:

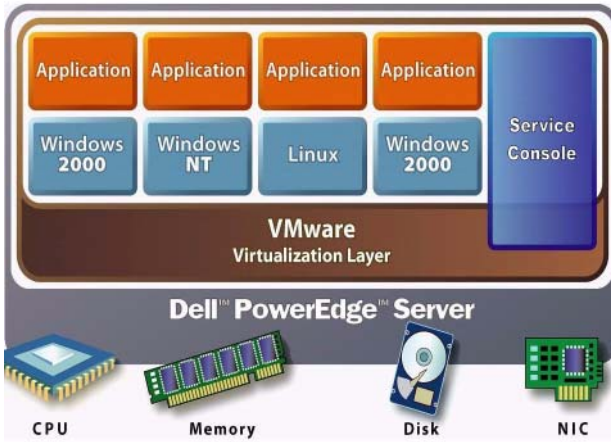
- **Background** – provides a brief overview of ESX Server and VirtualCenter products and technologies.
- **What’s New** – provides additional supported hardware and updated software in this release.
- **Understanding Dell Configurations** – provides a list of qualified and supported ESX Server configurations, as well as recommended VirtualCenter configurations.
- **Current Hardware and Software Qualification List** – provides references to Dell, EMC®, and VMware qualified configurations.
- **Installation of ESX Server 2.5.2 Software** – provides additional planning tips for before and after installation steps.
- **SAN Environment Setup with ESX Server Software** – provides a brief overview of SAN components and instructions for setting up a SAN environment.
- **Dell OpenManage™ Software in a VMware ESX Server Environment** – provides a brief overview of Dell OpenManage software and its installation steps on ESX Server software.
- **Guest Operating Systems** – provides tuning tips for Microsoft® Windows® and Linux® Virtual Machines.
- **Additional Resources** – provides references to additional documentation.

# Background

VMware ESX Server software provides for the rapid creation of multiple virtual machines on a single physical server. Each of these virtual machines run in a resource-isolated, secure environment and can include a Windows, Linux, or Novell® NetWare® operating system with their associated applications. The ESX Server software has a virtualization layer that allocates virtualized Dell hardware resources to virtual machines and

a Service Console. The Service Console provides a management interface for the VMware virtualization layer. **Figure 1-1** shows the ESX Server architecture.

**Figure 1-1. VMware ESX Server Architecture**



VMware VirtualCenter is a management application that monitors and manages virtual machines distributed across ESX Server installations, as well as the ESX Server systems themselves.

When VirtualCenter-managed ESX Server farms have a common Storage Area Network (SAN), they can take advantage of VMotion™ technology. This technology allows for the “hot” migration of a running virtual machine. A live, stateful application, with its operating system, can be moved from one ESX Server system to another. This migration is transparent to the end users, who are not aware that it is taking place. VMotion technology provides dynamic scaling and performance, and zero-downtime maintenance. If a physical server needs servicing, it can be vacated; that is, all running virtual machines are moved to other ESX Server systems without affecting users. The vacant system can be shutdown, repaired, then placed back into service at which time virtual machines can be migrated back to it – all without impacting a

virtual machine's availability to end users. Similarly, a virtual machine can be moved to a system with more physical resources to improve the virtual machine's performance without affecting its operation.

Dell configurations of ESX Server software and VirtualCenter allow users to:

- Implement server consolidation
- Deliver high availability and guaranteed service levels
- Streamline testing and deployment
- Scale hardware and software infrastructure
- Upgrade to current and standard hardware, independent of software upgrades

This document is a companion guide to the *VMware ESX Server 2.5.2 Installation Guide* and provides information specific to Dell servers and Dell recommended configurations. For the latest version of this document, see the "Resource Center" at [www.dell.com/vmware](http://www.dell.com/vmware). For more information about ESX Server software and VirtualCenter, see the following documents, which are distributed with the software and are available on the VMware website at [www.vmware.com/support/pubs/](http://www.vmware.com/support/pubs/):

- *ESX Server 2.5.2 Installation Guide*
- *ESX Server 2.5.2 Administration Guide*
- *Guest Operating System Installation Guide*
- *VMware Scripting API User's Manual*
- *VMware VirtualCenter 1.3.1 User's Manual*

## What's New?

This release is an updated build of ESX Server 2.5.2 to add additional support for Dell hardware.

### Supported New Hardware

- Dual-Core Intel® Xeon® processor
- Intel PRO/1000 P Dual Port PCI Express network card

## Supported New Software

ESX Server 2.5.2 (previous release supported by Dell was ESX Server 2.5.1). This is a cumulative release that includes ESX Server 2.5.2 Patch 1, Patch 2, and Patch 3.

## Understanding Dell Configurations

For this release, Dell has qualified a base server configuration for use with ESX Server 2.5.2 software. A single server can be used in a "stand-alone" mode, or one or more servers can be connected to a shared SAN through a fibre channel switch.



**NOTE:** A fibre channel switch is required for SAN connectivity. Direct attached fibre channel is not supported in this release.

VMotion technology is available when two or more servers share a common SAN. VirtualCenter may be used to manage servers in any of these configurations, and is required to initiate VMotion events.

The following tables list Dell's recommended configurations. **Table 1-1** shows the common baseline configuration. For standalone configurations, add the contents of **Table 1-2** to that of **Table 1-1**. For SAN-attached configurations, add the contents of **Table 1-3** to that of **Table 1-1**.

**Table 1-4** provides the recommended VirtualCenter server configuration.

**Table 1-1. Base ESX Server System Hardware Configuration**

Device Class	Configuration	Configuration	Configuration	Configuration
Server	PowerEdge 6850	PowerEdge 2850	PowerEdge 1850	PowerEdge 1855
Processor	Four Single/Dual-Core Intel Xeon Processors	Two Single/Dual-Core Intel Xeon Processors	Two Single/Dual-Core Intel Xeon Processors	Two Single/Dual-Core Intel Xeon Processors
RAM	16 GB (recommended)	8 GB (recommended)	8 GB (recommended)	8 GB (recommended)

**Table 1-1. Base ESX Server System Hardware Configuration (continued)**

Device Class	Configuration	Configuration	Configuration	Configuration
Server	PowerEdge 6850	PowerEdge 2850	PowerEdge 1850	PowerEdge 1855
RAID Controller	PowerEdge Expandable RAID Controller 4e/Di (Dual Channel Integrated)	PowerEdge Expandable RAID Controller 4e/Di (Dual Channel Integrated)	PowerEdge Expandable RAID Controller 4e/Si (Single Channel Integrated)	PowerEdge Expandable RAID Controller 4/im (Integrated Mirroring)
Networking	Two Integrated Network Ports Peripheral NIC	Two Integrated Network Ports Peripheral NIC	Two Integrated Network Ports Peripheral NIC	Two Integrated Network Ports <b>NOTE:</b> You have the option to use the Intel Dual Port Gigabit Ethernet daughter card.



**NOTE:** Demand Based Switching (DBS) is not supported with ESX Server software. This feature must be disabled in the BIOS settings for processors that support it.

**Table 1-2. Additional Supported Devices for a Stand-Alone ESX Server System Configuration**

Device Class	Configuration	Configuration	Configuration	Configuration
Server	PE 6850	PE 2850	PE 1850	PE 1855
Storage	Five internal physical disks (15K RPM at RAID 5 is recommended)	Six internal physical disks (15K RPM at RAID 5 is recommended)	Two internal physical disks (15K RPM at RAID 1 is recommended)	Two internal physical disks (15K RPM at RAID 1 is recommended)

**Table 1-3. Additional Supported Devices for a SAN-attached ESX Server System**

Device Class	Configuration
Host Bus Adapter (HBA)	One fibre channel HBA or Two fibre channel HBAs for HBA failover configurations  For higher availability on a PowerEdge 1850, the Qlogic QLA 2342 (dual port HBA card) is recommended.
Storage	Two internal physical disks (15K RPM at RAID 1 is recommended)



**NOTE:** Arbitrated loop or direct attached SAN configurations are not supported. A fibre channel switch is required.

**Table 1-4. Recommended VirtualCenter Server Configuration**

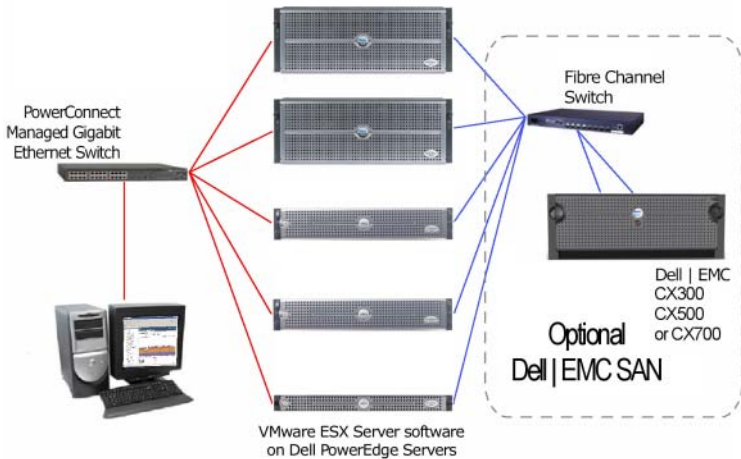
Resource Class	Recommendation
Server	PowerEdge server
Memory	2 GB RAM
RAID Controller	Integrated RAID controller enabled
Storage	Internal or external physical disks at RAID 1, RAID 5, or RAID 10
Network	Two integrated network ports
Operating System	Microsoft Windows Server™ 2003



**NOTE:** For recommended configurations for systems no longer listed in this document, see the *VMware Software Compatibility Matrix for Dell servers and Dell/EMC storage* available at [www.dell.com/vmware](http://www.dell.com/vmware) under "Resource Center".

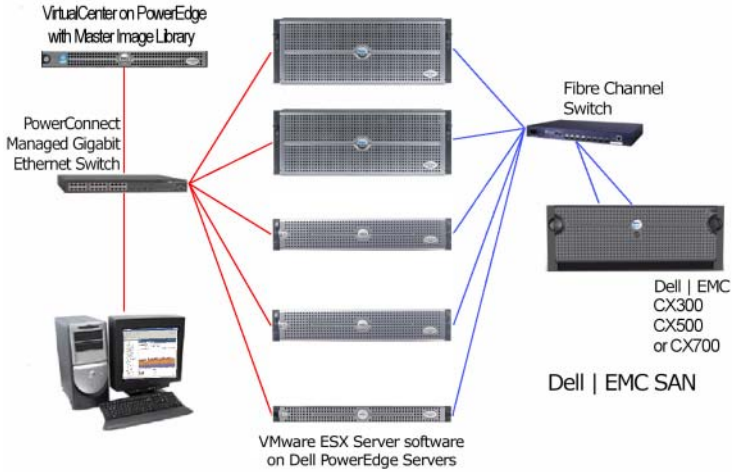
Figure 1-2 shows the Dell qualified base server configuration when not using VirtualCenter.

**Figure 1-2. Non-VirtualCenter Configuration, One or More PowerEdge Servers with Optional SAN**

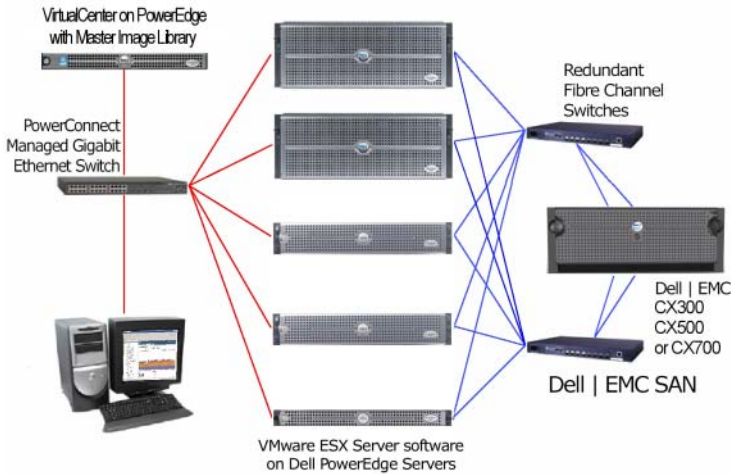


Dell's qualified ESX Server and PowerEdge server configuration with VirtualCenter is: ESX Server 2.5.2 software on each PowerEdge server with a single VirtualCenter 1.3.1 on any suitable Dell PowerEdge server managing all ESX Server installations in a farm. For additional performance or VMware VMotion features, Dell | EMC CX300, CX500, or CX700 storage accessed via a fibre channel switch is required. **Figure 1-3** shows the configuration when using VirtualCenter and **Figure 1-4** shows the configuration when implementing HBA failover. **Figure 1-5** shows the stand-alone configuration on PowerEdge blade servers, **Figure 1-6** shows the SAN configuration with fibre-channel pass-through modules, **Figure 1-7** shows the SAN configuration with fibre-channel switches, and **Figure 1-8** shows the SAN configuration with external fibre-channel switches.

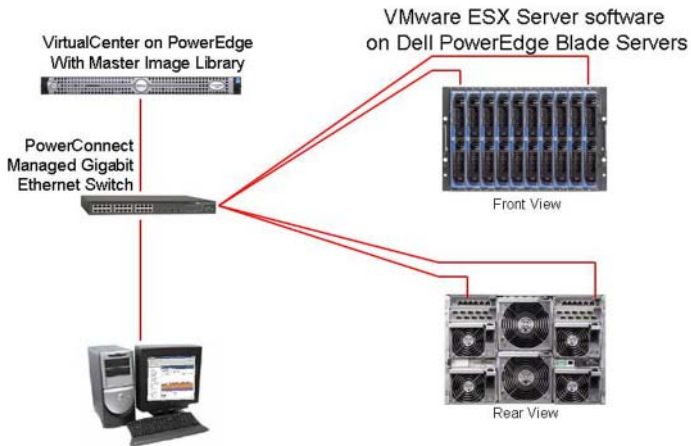
**Figure 1-3. VirtualCenter Configuration with SAN for VMotion**



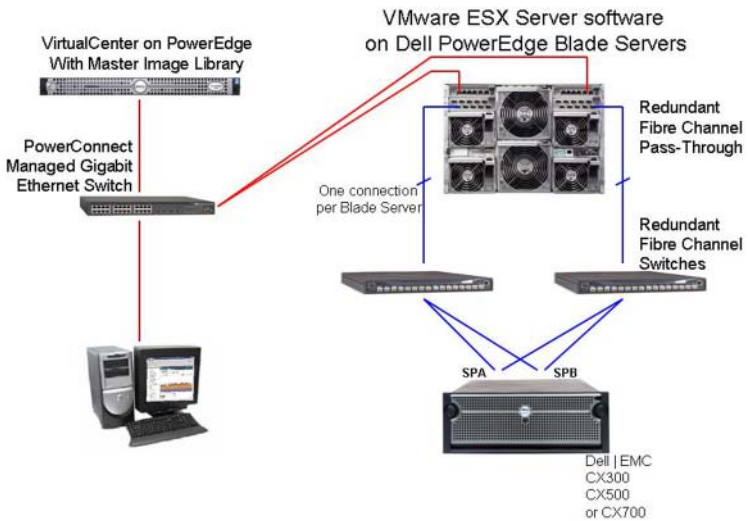
**Figure 1-4. VirtualCenter Configuration with SAN for VMotion (with HBA Failover in a Dual Fabric Environment)**



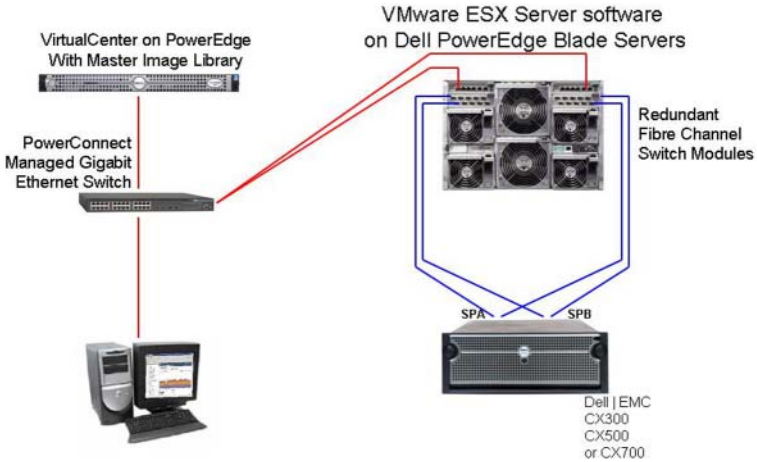
**Figure 1-5. VMware ESX Server Software - Stand-Alone Configuration on PowerEdge Blade Servers**



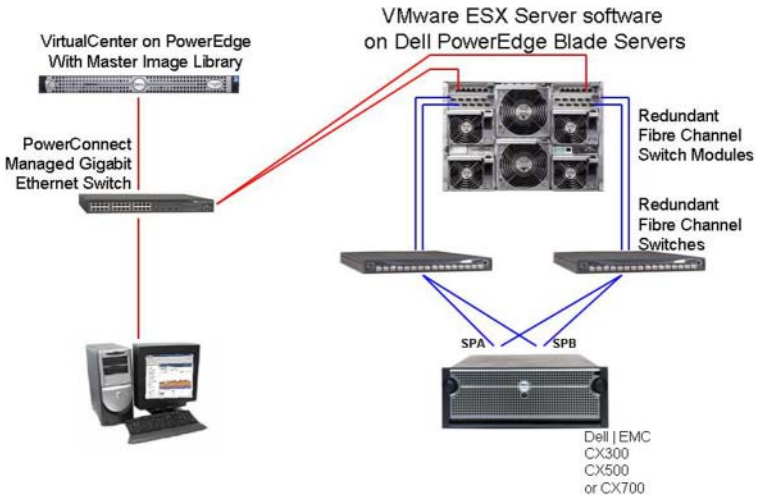
**Figure 1-6. VMware ESX Server Software - SAN Configuration on PowerEdge Blade Servers with Fibre Channel Pass-Through Modules**



**Figure 1-7. VMware ESX Server Software - SAN Configuration on PowerEdge Blade Servers with Fibre Channel Switch Modules**



**Figure 1-8. VMware ESX Server Software - SAN Configuration on PowerEdge Blade Servers with Fibre Channel Switch Modules with External Fibre Channel Switches**



**NOTE:** A minimum of two Inter Switch Links (ISLs) between two directly communicating switches is recommended.


# Current Hardware and Software Qualification List

For more information on the latest Dell qualified configurations of ESX Server software and VirtualCenter, see [www.dell.com/vmware](http://www.dell.com/vmware).

For Dell | EMC qualified storage configurations of ESX Server software and VirtualCenter, see EMC Support Matrix (ESM) at [www.emc.com/horizontal/interoperability](http://www.emc.com/horizontal/interoperability).

For additional, non-qualified Dell configurations, see VMware's system, IO, and SAN compatibility guides located at [www.vmware.com/support/pubs](http://www.vmware.com/support/pubs).

## Installation of ESX Server 2.5.2 Software

 **NOTE:** ESX Server 2.5.2 software is only supported with VirtualCenter 1.3.1. If you are using VirtualCenter to manage your ESX Server systems, you *must* upgrade your VirtualCenter installation to VirtualCenter 1.3.1 *before* you upgrade your ESX Server software to version 2.5.2.

This section describes the important guidelines for the installation of ESX Server 2.5.2 software on Dell servers. For step by step installation instructions and requirements of the ESX Server 2.5.2 software, see the *ESX Server 2.5.2 Installation Guide* from VMware. This document comes with the installation CD and can also be found at: [www.vmware.com/support/pubs](http://www.vmware.com/support/pubs).

### Before Installation

#### Planning

Planning is an important phase in the installation of the ESX Server software. A well planned installation will require fewer reconfigurations and less tuning in the future. Gather the following information prior to installation:

- Determine the number of virtual machines that will run on the ESX Server installation and their corresponding workloads.
- Size the resource requirements for the virtual machines, such as CPU requirements, amount of memory, number of NICs, and so on. For more information on sizing, see the sizing guidelines at [www.dell.com/vmware](http://www.dell.com/vmware) under "Resource Center".

- Size the resource requirements for the Service Console.
- Identify resource sensitive virtual machines and dedicate the required resources to those virtual machines (for example, dedicating a NIC to a file server).
- Gather the required network information, such as IP address, IP network mask, and IP gateway address.
- Determine the most appropriate local disk partitioning scheme. (See "Recommended Local Disk Partitioning.")

### **Configuring Boot from SAN**

ESX Server 2.5.2 supports Boot from SAN. For more information regarding configuring ESX to Boot from SAN, see the *VMware ESX Server SAN Configuration Guide* version 2.5.2 at [www.vmware.com/support/pubs](http://www.vmware.com/support/pubs).

### **VirtualCenter**

If you are using VirtualCenter to manage your ESX Server systems, be sure to upgrade it to VirtualCenter 1.3.1 before upgrading any of the ESX Server systems to version 2.5.2.

### **RAID Configuration**

Before installing the ESX Server software, make sure that the physical disks have the required RAID configurations. Use the highest RAID level available, given the number of local physical disks. For two physical disks, use RAID 1. For more than two physical disks, use RAID 5 for improved performance. RAID 0 is not recommended since it does not provide data redundancy.

### **Service Console Configuration**

Resource settings for Service Console can be configured at the 'Device Allocation' stage during the installation or while using the Management User Interface (MUI) after the installation. The amount of memory for the Service Console depends on the number of virtual machines that are planned to run on the ESX Server system. It is recommended that more memory (around 128 MB in addition to the planned size) be allocated to

the Service Console if Dell OpenManage software is installed. The amount of memory dedicated to the Service Console can be changed at any time, but requires a reboot of the ESX Server system.

## Recommended Local Disk Partitioning

The following table lists the recommended local disk partitioning for the ESX Server system. When installing the ESX Server system, choose the **Manual Partitioning** option and use **Table 1-5** to create the local disk partitions.

**Table 1-5. Suggested Disk Partitioning within VMware ESX Server**

Mount Point	Type	Recommended Size	Notes
/boot	ext3	50 MB	Holds the boot kernel image.
swap	swap	1 GB	This is the swap partition for the Service Console only and NOT the swap file for the ESX Server software.
/	ext3	10 GB	Holds the Service Console and ESX Server kernel.
/vmimages	ext3	10 GB+	Holds both ISO image files and Template Exported Virtual Disk images.
/home	ext3	2 GB	Holds the individual Virtual Machine configuration files.
(none)	vmkcore	102 MB	Holds the core dump file for the VMkernel.
(none)	vmfs2	Remaining	Holds the disk files for the virtual machines.



**NOTE:** The /vmimages partition can hold ISO9660 images of CDs as well as Template Exported Virtual Disks. This space can also be used as temporary or transient storage to assist in relocating Virtual Disk images. For example, the Virtual Disks can be moved to this partition, and then copied to the destination machine or storage area. This space can also be used to make temporary backup copies of Virtual Disks.

## After Installation

After installing the ESX Server software, execute the following additional steps using the Management User Interface (MUI):

- Create and activate a **swap** file for the VMkernel. The swap file helps in over-provisioning of the memory to the virtual machines and results in better resource management.
- Give a name to the local VMFS partition. This will improve usability and also preserve access to the local virtual machine disk files, even if one or more peripheral devices are added or removed.
- Create one or more virtual switches. Bind the available physical outbound adapters to these switches if the virtual machines in the server require an uplink.

For detailed instructions on how to execute the above steps, see the *VMware ESX Server 2.5.2 Installation Guide*.

## Tips for VMotion Configuration

To use the VMotion feature, observe the following important guidelines:

- 1 Configure VMFS volumes in 'public' mode
- 2 VMotion requires the setup of a GigaBit Ethernet migration network between all ESX Servers configured for VMotion.
- 3 Create consistent network labels for each of the vmnics.

More details on VMotion configuration setup can be found at [www.vmware.com/support/pubs](http://www.vmware.com/support/pubs).

For VMotion compatibility across PowerEdge servers, see *VMotion Compatibility with Dell PowerEdge Servers* at [www.dell.com/vmware](http://www.dell.com/vmware) under "Resource Center".

## Installing ESX Server on Dell Blade Servers

For installing ESX on Dell blade servers, see the *Deployment of VMware ESX 2.5.2 Server Software on Dell PowerEdge Blade Servers* guide at [www.dell.com/vmware](http://www.dell.com/vmware) under "Resource Center".

# SAN Environment Setup with ESX Server Software

Advanced features such as VMotion technology require a Storage Area Network (SAN) environment using Dell | EMC CX300, CX500, or CX700 storage devices. This section provides a brief overview of the general concepts of a SAN and the steps needed to set up a SAN environment.

**RAID Group:** A RAID group is a collection of one or more physical disks.

**LUN:** A Logical Unit Number (LUN) is a unique identifier for usable disk space bound in (or carved out of) a RAID group.

**Storage Group:** A storage group is a set of one or more servers and one or more LUNs. A server in a storage group can only access LUNs which are in the same storage group. Storage groups are typically used to implement access control.

In order to create and use storage groups in Navisphere<sup>®</sup>, the Access Logix<sup>™</sup> option must be enabled.



**NOTE:** Access Logix is a software component of Navisphere which must be installed on the storage system.

**Zoning:** Zoning controls access between fibre channel devices. Zoning at the switch can determine the group of servers that can access a particular storage device.

The typical steps involved in setting up a SAN are:

- 1 Install and setup the CX300, CX500, or CX700 storage device.
- 2 Configure zoning at the switch level.
- 3 Create RAID groups.
- 4 Create and bind LUNs.



**NOTE:** When creating the LUNs, select **Auto Assign** to assign the LUN to the storage processor. This is highly recommended for better load balancing.

- 5 Use Naviagent to register the servers (hosts) connected to the SAN.
- 6 Create storage groups and assign ESX Servers and LUNs to each of them.

For detailed information about setting up the storage device, and creating LUNs, RAID groups, and storage groups, and installing Naviagent, see the *EMC Navisphere Manager: Administrator's Guide*. This document comes with the CX-series storage device on a CD.



**NOTE:** EMC PowerPath® is not supported with ESX Server software, nor is it necessary since ESX Server software already includes logic for multipath and failover.

## Tips for Windows Virtual Machines with Disk Images Residing on a SAN (Windows-Only)

In Windows virtual machines with disk images residing on a SAN, modify the Windows registry using the 'regedit' utility as follows:

- 1 Right-click the folder of the registry  
`KEY_LOCAL_MACHINE\System\CurrentControlSet\Services\  
Disk\`
- 2 Add a new DWORD named `TimeoutValue` with a data value of minimum 60 seconds.

For more information, see the "Knowledge Base" article 1014 at [www.vmware.com](http://www.vmware.com).

# Dell OpenManage Software in a VMware ESX Server Environment

## Dell OpenManage Software Overview

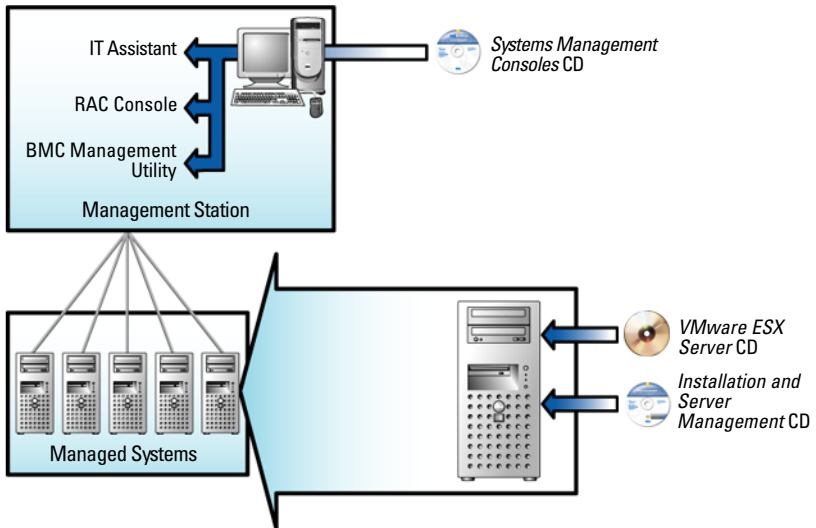
Dell OpenManage systems management software is a suite of application programs for PowerEdge systems. This software allows you to manage your system with proactive monitoring, diagnosis, notification, and remote access. Each system that you plan to manage with Dell OpenManage software products is called a *managed system*. Managed system applications include Server Administrator and Remote Access Controller (RAC) software. Server Administrator provides a comprehensive, one-to-one systems management solution in two ways: from an integrated, web browser-based graphical user interface (GUI) (the Server Administrator home page) and from a command line interface (CLI) through the operating system. (For ESX Server systems, Server

Administrator is installed in the Service Console.) Server Administrator is designed for system administrators to both locally and remotely manage systems on a network. Server Administrator allows system administrators to focus on managing their entire network by providing comprehensive one-on-one systems management. A management station can be used to remotely manage one or more managed systems from a central location. By installing IT Assistant on a management station, you can effectively manage from one to hundreds of remote managed systems.

For more information about Dell OpenManage software, see the *Dell PowerEdge Documentation CD*, which comes with the Dell server and is also available at [www.dell.com/openmanage](http://www.dell.com/openmanage).

**Figure 1-9** illustrates the relationship between a management station and its managed systems. **Figure 1-9** also shows the operating systems and the Dell OpenManage software products that may be installed on the managed systems.

**Figure 1-9. Example of a Management Station and Managed Systems**





**NOTE:** Since it is used to manage physical hardware, Dell OpenManage Server Administrator should only be installed into the ESX Server Service Console. Do not attempt to install Dell OpenManage Server Administrator into the guest operating system of a virtual machine as it is not supported.

## Installing Dell OpenManage Server Administrator and Remote Management

The Dell OpenManage 4.5 server support kit implements native RPM based operating system installation tools to install systems management software on VMware ESX Server software installed on a Dell PowerEdge system.

This document covers the steps for installing Dell OpenManage 4.5 on ESX Server 2.5.2. Dell OpenManage 4.5 is the only supported version of Dell OpenManage software on ESX Server 2.5.2. Dell OpenManage version 4.5.1 and later, released since the release of this document, are not supported on ESX Server 2.5.2. For more information on supported Dell OpenManage software versions and their installation steps, see the "Resource Center" at [www.dell.com/vmware](http://www.dell.com/vmware).

Use the following steps to install Dell OpenManage 4.5 on ESX Server 2.5.2.



**NOTE:** The *VMware ESX Server* CD and *Dell PowerEdge Installation and Server Management* CD (which contains the Dell OpenManage Server Administrator) are required for the installation.



- 1 Log on with administrator privileges (root) to the Service Console.
- 2 Prepare the Service Console for Dell OpenManage software installation using the following command:  

```
# omasetup.sh install
```
- 3 Insert the *VMware ESX Server* CD when prompted to do so.
- 4 After the script completes, insert the *Dell PowerEdge Installation and Server Management* CD to install Dell OpenManage 4.5.
- 5 Mount the CD with the following command:  

```
mount /dev/cdrom/mnt/cdrom
```

- 6 Install Dell OpenManage 4.5 by executing one of the following commands:
  - a If you are installing Dell OpenManage 4.5 on a PowerEdge 1855 system, or on a system that does not have a RAC, use the following command:

```
/mnt/cdrom/srvadmin/linux/supportscripts/  
srvadmin-install.sh -b -w -s
```
  - b For all other configurations, use the following command:

```
/mnt/cdrom/srvadmin/linux/supportscripts/  
srvadmin-install.sh -b -w -r -s
```
-  **NOTICE:** Failure to use the correct command options may result in errors during the Dell OpenManage startup sequence.
-  **NOTE:** ESX Server 2.5.2 does not support Dell OpenManage diagnostics. The above commands omit diagnostics installation.
- 7 If you have installed the IT Assistant management application on your network, configure SNMPD to send trapsink messages to the management console. Edit `/etc/snmp/snmpd.conf` and add the following line to the end of the file:

```
trapsink <Destination_IP_Address> <community  
name>
```
- 8 If you are installing Dell OpenManage 4.5 on a PowerEdge 1855 system, execute the following commands after completing the installation:

```
chkconfig mptctlnode on  
service mptctlnode start
```
- 9 Unmount and eject the CD with the following command:

```
eject
```

For more information on Dell OpenManage software installation and usage, see the "Resource Center" at [www.dell.com/vmware](http://www.dell.com/vmware).

# Guest Operating Systems

## Guest Operating System Installation

For information on how to install Virtual Machines, see the latest *VMware Guest Operating System Installation Guide*.

## Performance Tuning Tips for Guest Operating System

The following tuning tips significantly improve performance over the guest operating system and VMware tools default installations and are highly recommended for Dell qualified configurations.



**NOTE:** The actual results of the tuning tips provided here depend on the configuration and will vary accordingly.

- **Install the latest version of VMware tools to improve video and mouse performance and provide other benefits.**  
On Linux guest operating systems, install the VMware tools on the guest operating system prior to starting the X server. For example, Skip X Configuration in the video card installation during the Linux guest operating system setup.
- **Disable all CPU-intensive screen savers and visual effects.**  
On Windows guest operating systems, reduce or eliminate visual effects like screen savers or heavy desktop graphics when possible. The animation, shadow, styles and other visual effects that newer versions of Windows use when displaying menus and dialogs can be slow and make the virtual machine seem less responsive. To disable these visual effects:
  - a Right-click **My Computer** on the guest operating system desktop.
  - b Choose **Properties**→**Advanced**.
  - c Click **Settings** in the **Performance** section.
  - d Select **Adjust for best performance** and all visual effects will be disabled.
  - e Optionally, deselect undesired features in the **Custom** section of the **Performance Options** dialog.

- **Disconnect the Virtual CD Drive.**  
Disconnect the virtual CD drive if you do not have to use it. Performance is improved when virtual machines are connected to ISO files in the Service Console instead of the CD.
- **Replace vlsance with vmxnet device as the virtual NIC.**  
For virtual machines that do not require boot through Pre-boot Execution Environment (PXE), it is recommended to replace vlsance with vmxnet as the virtual NIC. For the steps to install the vmxnet virtual NIC, see the *ESX Server 2.5 Installation Guide*. This will improve performance when Gigabit Ethernet is used and the virtual machines have high bandwidth requirements.
- **Set a fixed paging file (Windows-only).**  
By default, Windows dynamically changes the size of its paging file as needed, within set parameters. To reduce this expansion and contraction, and resulting physical disk activity, change the paging file to a fixed size:
  - a Right-click **My Computer** on the guest operating system desktop.
  - b Choose **Properties**→**Advanced**.
  - c Click **Settings** in the **Performance** section.
  - d Click the **Advanced** tab.
  - e Click the **Change** button in the **Virtual Memory** section.
  - f Set the **Initial Size** and **Maximum Size** to the same value. The minimum value set must be the size of the allocated memory.
  - g Click **Set** before clicking **OK**.
- **Install the kernel/HAL (UP or SMP) according to the number of processors allocated to the virtual machine.**  
Ensure that guest virtual machines are using the correct kernel or Hardware Abstraction Layer (HAL) when the number of virtual processors allocated to a virtual machine changes from one to more than one.

## Performance Tuning Tips For Applications Installed on Guest Operating Systems

Set workload attribute to "Terminal Services" if using Windows Terminal Service (Windows-only).

Windows Terminal Service (WTS) performance is improved by setting the workload attribute to "Terminal Services." This option can be enabled in the Management User Interface when creating the virtual machine, or by adding the following line in the configuration file of the virtual machine: `workload = "TerminalServices"`



**NOTE:** For more information on tuning tips, see the *Guest Operating System Installation Guide* at [www.vmware.com/support/pubs](http://www.vmware.com/support/pubs).

## Additional Resources

### Product Documentation Resources

- Complete and current documentation for Dell qualified VMware configurations is available at [www.dell.com/vmware](http://www.dell.com/vmware).
- Dell products: [www.dell.com](http://www.dell.com), see servers, then product literature.
- EMC Support Matrix (ESM) at [www.emc.com/horizontal/interoperability](http://www.emc.com/horizontal/interoperability)
- For information about Dell Services and Support product offerings and requirements, see [www.dell.com/vmware](http://www.dell.com/vmware) under the Product and Services tab.
- VMware VirtualCenter 1.3.1
  - Features: [www.vmware.com/products/vmanage/vc\\_features.html](http://www.vmware.com/products/vmanage/vc_features.html)
  - Documents: [www.vmware.com/support/pubs/vc\\_pubs.html](http://www.vmware.com/support/pubs/vc_pubs.html)
  - Troubleshooting: [www.vmware.com/support/vc13/doc/releasenotes\\_vc.html](http://www.vmware.com/support/vc13/doc/releasenotes_vc.html)
- VMware ESX Server 2.5.2
  - Installation guide, administration guide, scripting user's manual, technical resources, and knowledge base: [www.vmware.com/support/pubs/](http://www.vmware.com/support/pubs/)

## **Technical Support Resources**

- Dell-specific VMware information and additional documentation are located at [www.dell.com/vmware/](http://www.dell.com/vmware/)
- VMware support website at [www.vmware.com](http://www.vmware.com)
- Dell hardware support at [www.dell.com/support](http://www.dell.com/support)
- Dell deployment and professional services at [www.dell.com/services](http://www.dell.com/services)

## **Newsgroups**

- VMware Newsgroups at [news.vmware.com](http://news.vmware.com)



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