

Microsoft[®] Windows[®] Compute
Cluster Server 2003
Installation 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.

Information in this document is subject to change without notice.

© 2006 Dell Inc. All rights reserved.

Reproduction in any manner whatsoever without the written permission of Dell Inc. is strictly forbidden.

Trademarks used in this text: *Dell*, the *DELL* logo, *PowerEdge*, *PowerVault*, and *OpenManage* are trademarks of Dell Inc.; *Active Directory*, *Microsoft*, *Windows*, and *Windows Server* are registered trademarks of Microsoft Corporation.

Other trademarks and trade names may be used in this document to refer to either the entities claiming the marks and names or their products. Dell Inc. disclaims any proprietary interest in trademarks and trade names other than its own.

August 2006

Rev. A00

Contents

Setting Up Your Hardware	5
Installing the Operating System With Dell OpenManage Server Assistant	6
Configuring Your Cluster After Installing the Operating System	7
Windows Server 2003 R2 Post-Setup Security Updates	7
Promote System to Domain Controller and Install DNS	8
Install DHCP Server	9
Authorize the DHCP Server	9
Before You Install CCP	10
Preparing a Partition for the RIS Server Images	10
Installing CCP	10
Configuring CCP	11
Networking	11
Remote Installation Service	11
Adding PowerEdge 1950-Specific Drivers to the RIS Image	12

This document provides information about installing Microsoft® Windows® Compute Cluster Server 2003 on your Dell™ PowerEdge™ Cluster. It is intended for experienced IT professionals who need to configure the cluster solution, and for trained service technicians who perform upgrade and maintenance procedures. This document also addresses readers who are new to clustering and covers the following topics:

- Setting up your hardware
- Installing the operating system with Dell OpenManage™ Server Assistant
- Configuring your system after installing the operating system
- Before you install Compute Cluster Pack (CCP)
- CCP Installation
- CCP Configuration

Setting Up Your Hardware

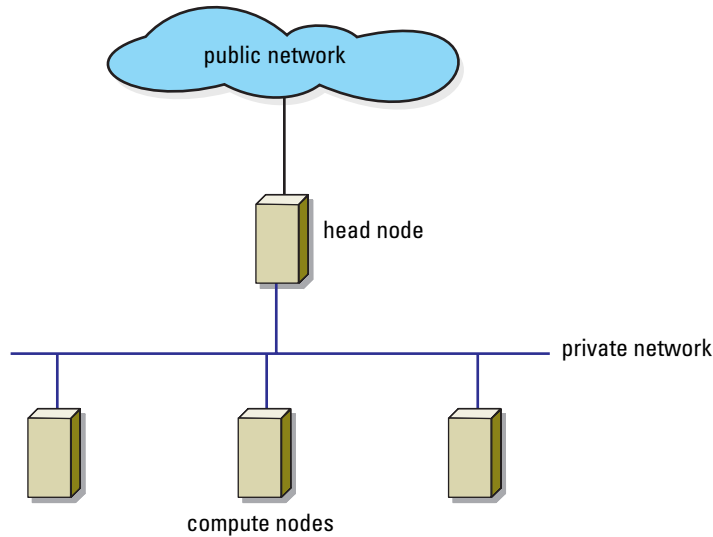
Compute Cluster Server 2003 is supported on PowerEdge 1950 systems and embedded Broadcom network devices (as both the public interface and the cluster interconnect). The supported external storage is Dell PowerVault™ MD1000 attached to a PowerEdge Expandable RAID Controller (PERC) 5/e.

A cluster running Compute Cluster Server 2003 comprises of a single head node and one or more compute nodes. The head node controls the access to the cluster. Figure 1-1 gives an example of the topology through which the head node and the compute nodes are connected in a network. For more information about network configuration using Compute Cluster Server 2003, see the Microsoft Support website at support.microsoft.com.

The recommended configurations for the head node and compute nodes are:

- Head node
 - Disable hyperthreading in BIOS.
 - Disable Pre-boot eXecution Environment (PXE) on both network interfaces.
 - Connect the primary network interface to the cluster switch.
 - Connect the secondary network interface to the public or intranet network.
- Compute nodes
 - Disable hyperthreading in BIOS.
 - Ensure that PXE is enabled on the primary network interface (NIC 1).
 - Ensure that the boot order has the primary network interface before the local hard drive.

Figure 1-1. Example of a Topology With Nodes Running Compute Cluster Server 2003



NOTE: If you purchased the head node with preinstalled operating system from Dell, Windows Server® 2003 R2 Enterprise 64-bit Edition is preinstalled on your head node.

Installing the Operating System With Dell OpenManage Server Assistant

NOTE: If you purchased a PowerEdge system with a preinstalled image of Compute Cluster Server 2003, see "Configuring Your Cluster After Installing the Operating System" to complete your operating system configuration.

Dell recommends installing the Windows Server 2003 R2 operating system on the head node using the *Dell PowerEdge Installation and Server Management* CD. This CD prepares the hard drives and completes the installation of the operating system. The Dell OpenManage Server Assistant creates an unattended installation by requesting various system resources such as host name, IP numbers, disk, and redundant array of independent disk (RAID) configurations.

- 1 Boot the system from the *Dell PowerEdge Installation and Server Management* CD.
- 2 Select your language at the first graphical user interface (GUI) screen.
- 3 The **Dell Server Assistant End User License Agreement** appears. Read the agreement, choose **Accept**, and click **Next** if you agree to the terms and conditions.

- 4 In the **Home** window, select **Click here for server setup**.
 - a Set the date, time, and time zone for the server.
 - b Configure the RAID controller. For internal drives, RAID 1 configuration is recommended.
 - c Select the operating system, in this case, **Microsoft Windows Server 2003 x64 Edition**.
 - d Configure the hard drive.

If you plan to use the Remote Install Server (RIS) to install the compute nodes (recommended), then a second hard drive or partition is required. At least 10 GB should be made available on the second hard drive or partition. The recommended partition type is NTFS.

- 5 Configure your network.
 - a The primary network interface (Link A) is recommended for the cluster fabric. To ease installation of compute nodes with RIS, a static IP should be set on this interface along with a matching subnet mask. Ensure that you select a subnet that does not include the secondary network interface (Link B).
 - b Configure the secondary network interface (Link B) as the public device. This interface may be used as either a dynamic or static IP.
- 6 In the **Enter Operating System Information** window, enter information specific to your organization and/or deployment.
- 7 In the **Installation Summary** window, confirm installation selections and options before proceeding to install the operating system.
- 8 Install the operating system.

At this point, the hard drives are prepared and partitioned, and the operating system installation begins. The installer prompts you to insert the operating system CD after it has gathered the system resources.
- 9 When prompted, remove the CD and click **Finish** to reboot the system.

The system completes the installation. Your system may reboot several times during this process.

Configuring Your Cluster After Installing the Operating System

After completing the operating system installation, the system reboots and prompts for the operating system CD for Windows Server 2003 R2 components. If you want to install any additional components, do so before CCP installation.

Windows Server 2003 R2 Post-Setup Security Updates

- 1 After installation of Windows Server 2003 R2, a window appears prompting you to apply existing security updates. If the system is connected to the Internet, download and apply the latest updates at this time.
- 2 If you plan to have the system connected to the Internet at all times, configure the automatic updates at this time as well.

Promote System to Domain Controller and Install DNS



NOTE: If you are using your system running Compute Cluster Server 2003 as a stand-alone device, or if a domain network is already installed, see "Install DHCP Server" for more information.

- 1 Click **Start**→ **Programs**→ **Administrative Tools**→ **Manage Your Server**.
- 2 In the **Manage Your Server Roles** window, click **Add or remove a role** and click **Next**.
The system detects your network settings and connections, and displays the **Configuration Options** window.
- 3 In the **Configuration Options** window, select **Custom Configuration** and click **Next**.
The **Server Role** window appears.
- 4 In the **Server Role** window, select **Domain Controller (Active Directory)** and click **Next**.
- 5 In the **Summary** window, click **Next**.
- 6 In the **Active Directory Installation** window, click **Next** to open the **Operating System Compatibility** wizard.
- 7 In the **Operating System Compatibility** wizard, click **Next** and follow the steps below to set the operating system parameters that are required:
 - a In the **Domain Controller Type** screen, select **Domain controller for a new domain** and click **Next**.
 - b In the **Create New Domain** screen, select **Domain in a new forest** and click **Next**.
 - c In the **Install or Configure DNS** screen, select **No, just install and configure DNS on this computer** and click **Next**.
 - d In the **New Domain Name** screen, enter a DNS name for the new domain (for example, `cluster.com`) and click **Next**.
 - e In the **NetBIOS Domain Name** screen, enter a NetBIOS domain name and click **Next**.
 - f In the **Database and Log Folders** screen, select folders for the database and logs, and click **Next**.
 - g In the **Shared System Volume** screen, select a folder for the Shared System Volume and click **Next**.
 - h In the **Permissions** screen, select the permissions compatibility depending on your environment and click **Next**.
 - i In the **Directory Services Restore Mode Administrator Password** screen, enter a **Directory Services Restore Mode Administrator Password** and click **Next**.
 - j In the **Summary** screen, review the contents and click **Next** if they are correct.
Microsoft Active Directory® installation occurs at this point and the system prompts you to insert the operating system CD. This installation may take several minutes.
- 8 Click **Finish** and then click **Restart Now**.
- 9 After the system reboots, log in and click **Finish**.

Install DHCP Server

If you are using RIS, you must install and configure a DHCP server. The DHCP server is required for network installation of compute nodes. To install and configure the DHCP server:

- 1** Click **Start**→ **Programs**→ **Administrative Tools**→ **Manage Your Server**.
- 2** In the **Manage Your Server Roles** window, click **Add or remove a role** and click **Next**.
- 3** Select **DHCP server** and click **Next**.
- 4** In the **Summary** window, click **Next**.
The installer runs and you may be prompted to insert the operating system CD.
- 5** In the **New Scope** wizard, click **Next**. Complete the following steps to set the scope parameters and to activate the scope:
 - a** In the **Scope Name** screen, select a name and description for the scope and click **Next**.
 - b** In the **IP Address Range** screen, enter a scope on the same subnet as your primary network interface (NIC 1) that is large enough to cover all of the compute nodes and click **Next**.
 - c** In the **Add Exclusions** screen, enter any exclusion ranges or IP addresses as required and click **Next**.
 - d** In the **Lease Duration** screen, enter a lease duration and click **Next**.
 - e** In the **Configure DHCP Options** screen, select **Configure additional DHCP options** and click **Next**.
 - f** In the **Router (Default Gateway)** screen, configure a router if required and click **Next**.
 - g** In the **Domain Name and DNS Servers** screen, configure a domain name and DNS server and click **Next**.
 - h** In the **WINS Server** screen, configure a WINS server if required and click **Next**.
 - i** In the **Activate Scope** screen, select **To activate the scope now** and click **Next**.
 - j** Click **Finish** to exit the wizard.
- 6** Click **Finish** again.

Authorize the DHCP Server

- 1** Click **Start**→ **Programs**→ **Administrative Tools**→ **Manage Your Server**.
- 2** In the **DHCP Server** entry, click **Manage this DHCP server**.
- 3** In the **DHCP Control** window, right-click the server name and select **Authorize**.
- 4** Close the **DHCP Server** window.

Before You Install CCP

Before you begin installation of CCP, download and install the following Quick Fix Executables (QFEs) from Microsoft:

- ICS QFE from <http://go.microsoft.com/fwlink/?linkid=55166>
- RIS QFE from <http://go.microsoft.com/fwlink/?linkid=55167>
- MMC 3.0 x64 version from <http://go.microsoft.com/fwlink/?linkid=62400>

Ensure that you reboot the system after installing these updates.

Preparing a Partition for the RIS Server Images

- 1 Click **Start**→ **My Computer** (right-click)→ **Manage**.
- 2 Select **Disk Management**.
- 3 Right-click the unallocated disk space (either additional space on the primary disk or another disk) and select **New Partition**.
- 4 When the **New Partition** wizard appears, click **Next** and perform the following steps:
 - a In the **Select Partition Type** screen, select **Primary Partition** and click **Next**.
 - b In the **Select Partition Size** screen, select the partition size and click **Next**.
 - c In the **Assign Drive Letter or Path** screen, assign a drive letter to the partition and click **Next**.
 - d Format the partition with the NTFS file system and name the partition (optional). Click **Next**.
 - e Allow the partition to finish formatting. When the formatting is completed, close the **Computer Management** screen.

Installing CCP

To install CCP:

- 1 Run **setup.exe** and click **Next**.
- 2 The **End User License Agreement** window appears. Read the agreement, choose **Accept**, and click **Next** if you agree to the terms and conditions.
- 3 In the **Select Installation Type** screen, determine if the head node will also function as a compute node and select the **Create a new compute cluster with this server as the head node**.
- 4 In the **Select Installation Location** screen, select a destination for the software installation (default recommended) and click **Next**.
- 5 Click **Install** to install Microsoft SQL Server 2000 Desktop Engine.
- 6 Click **Install** to install Microsoft .NET Framework 2.0.
- 7 Click **Install** to begin Microsoft Compute Cluster Pack.
- 8 Click **Finish**.

Configuring CCP

After installing CCP on your cluster, a **To Do** list appears. This section describes the steps to follow for completing the CCP configuration through the **To Do** list.

Networking

To complete the tasks in the **Networking** section:

- 1 Click **Configure Cluster Network Topology** and click **Next**.
- 2 From the drop down menu, select the **Network Topology** and click **Next**.
- 3 Select **Compute Nodes Isolated on a Private Network** for this installation.
- 4 Select **Local Area Connection 2** as the public network adapter and click **Next**.
- 5 Select **Local Area Connection** as the private network adapter and click **Next**.
- 6 Select **Disable Internet Connection Sharing** and click **Next**.



NOTE: On selecting this option, this cluster will not have Internet connectivity to the compute nodes.

- 7 In the **Summary** window, verify the contents and click **Finish**.
- 8 In the **Configuration Succeeded** window, click **Close**.
- 9 Click **Manage Windows Firewall Settings** and click **Next**.
- 10 In the **Configure Firewall** window, select **Enable Windows Firewall** and click **Next**. The firewall is enabled on the public network interface but is disabled on the private network interface.
- 11 In the **Summary** window, click **Finish**.
- 12 In the **Configuration Succeeded** window, click **Close**.

Remote Installation Service

RIS allows automated deployment of compute nodes. RIS installs the operating system and the compute cluster package. When the compute nodes are installed, RIS also adds them to the domain.

Dell recommends that you install the operating system using RIS because installing the operating system, adding nodes to the domain, and installing CCP take lesser time when done using RIS as compared to when they are done manually.

- 1 Click **Install RIS (wizard)** and click **Next**.
- 2 In the **Install RIS** screen, click **Finish**.
If you have not inserted the operating system CD already, you will be prompted to insert the CD now.
- 3 In the **Configuration Succeeded** screen, click **Close**.

- 4** Click **Manage Images (wizard)** and click **Next**. Perform the following steps to add a new image.
 - a** Select **Add New Image** and click **Finish**.
 - b** When the wizard starts, click **Next**.
 - c** Select a destination for the remote installation folder and click **Next**. This destination should be on the partition that was previously prepared for RIS.
 - d** Select the drive or path that contains the Compute Cluster Server 2003 operating system CD or image and click **Next**.
 - e** Select a folder name for the image and click **Next**. The default folder name is **WINDOWS** and is appropriate for the first image.
 - f** Select a description for the image and click **Next**.
 - g** Review the settings and click **Finish**.

The image will now be copied from the operating system CD and installed. The installation may take a few minutes to complete.
 - h** When the image is installed, click **Done**.
 - i** In the **Succeeded** screen, click **Close**.
- 5** Click **Manage Images (wizard)** and click **Next**. Perform the following steps to add the product key for the image you have created.
 - a** Select **Modify Image Configuration** and click **Next**.
 - b** Select the image that was just created and click **Next**.
 - c** In the **Product Key** section, select the **Search for product key** option.
 - d** Click **Search** and select the drive with the Compute Cluster Server 2003 media. Click **OK**.

A message indicating that the key was found should appear next to the search button.
 - e** Click **Next** and then click **Finish**.
- 6** In the **Summary** screen, click **Close**.

Adding PowerEdge 1950-Specific Drivers to the RIS Image

To complete the configuration of Compute Cluster Server 2003 on PowerEdge 1950, you must install additional drivers. Download the latest drivers for PERC 5/i, SCSI/RAID, and Broadcom NetExtreme II drivers from the Dell Support website at support.dell.com. Search for **R120962** and download the appropriate drivers for your system.

To integrate these drivers into the RIS image, follow the instructions in this section.

NOTE: Throughout this section, **D:** refers to the RIS image partition and **C:** refers to the system boot directory.


- 1 Open an explorer window.
- 2 Navigate to the image directory on the RIS image partition.
If the defaults were picked during the RIS image creation, the RIS image directory will be **D:\RemoteInstall\Setup\English\Images\WINDOWS**, where **D:** is the RIS image partition.
- 3 Create a directory **\$OEM\$** and two subdirectories in this directory and name them as **textmode** and **\$1\drivers\nic**.

The directory structure should resemble Figure 1-2:

Figure 1-2. OEM Directory Structure



- 4 Run the Broadcom driver package that you downloaded (**Bcom_LAN_NX2_26_W2K364_A01.exe**) and extract its files to **C:\Broadcom\W2K364**, where **C:** is the system boot directory.
- 5 Copy the files in the **RIS_Drivers** directory (**C:\Broadcom\W2K364\RIS_Drivers**) to **D:\RemoteInstall\Setup\English\Images\WINDOWS\\$OEM\$\\$1\drivers\nic** and **D:\RemoteInstall\Setup\English\Images\WINDOWS\amd64**.
- 6 Run the **setup.exe** program with a command line option of **-a**. Click **Start** → **Run**, and type **C:\Broadcom\W2K364\setup.exe -a**.
This command extracts the additional plug and play (PNP) device drivers required by the system and are stores them in a compressed format.
- 7 When prompted for the **Network Location**, type **C:\Broadcom**.
- 8 Copy all the files from the following locations to the NIC directory:
C:\Broadcom\Program Files\Broadcom\Broadcom Driver and Management Applications\NetXtremeII\Win2K3SNP\x64
C:\Broadcom\Program Files\Broadcom\Broadcom Driver and Management Applications\NetXtremeII\vbd\x64

- 9 Copy the .inf and .sys files from the NIC driver directory, D:\RemoteInstall\Setup\English\Images\WINDOWS\\$\OEM\$\\$1\drivers\nic to D:\RemoteInstall\Setup\English\Images\WINDOWS\amd64.
- 10 Extract the PERC 5/i drivers into the **textmode** directory. This may require running an executable installer and then accessing the location at which the files are installed (for example, C:\Dell\PERC5).
 **NOTE:** Copy the text in the **SCSI** section from the file **txtsetup.oem** (for example, DELL PERC 5 RAID Controller Driver [Windows Server 2003 x64]) exactly into another file. Using copy and paste is highly recommended for this. This text can change between driver revisions.
- 11 Edit the **ristndrd.sif** file at D:\RemoteInstall\Setup\English\Images\WINDOWS\amd64\templates.
 - a Add a section **MassStorageDrivers** and add the text from the SCSI section mentioned above (use copy and paste):
[MassStorageDrivers]
"DELL PERC 5 RAID Controller Driver (Windows Server 2003 x64)"="OEM"
 - b Add another section **OEMBootFiles** and list each file from the text mode directory excluding .txt files
[OEMBootFiles]
nodev.inf
oemsetup.inf
percsas.cat
percsas.pdb
percsas.sys
txtsetup.oem
 - c Add the following line to the **Unattended** section
OemPnpDriversPath=" \Drivers\Nic "
 - d Save and close the file.
- 12 Restart the RIS by opening a command prompt and typing `net stop binlsv` and `net start binlsv`.

- 13** In the **Node Management** section, click **Add Nodes (wizard)** and then click **Next**. In the wizard, perform the following procedure:
- a** Select **Automated Deployment** and click **Next**.
 - b** In the **Select Image** screen, enter the administrator (or a user with permission to add nodes to a domain) user name and password, and click **Next**.
 - c** Enter a node series name and click **Next**. This name will be used to name the compute nodes when they are installed. The name is followed by a numerical progression of numbers starting with 001.
 - d** The **End User License Agreement** screen appears. Read the agreement, choose **Accept**, and click **Next** if you agree to the terms and conditions.
 - e** In the **Start RIS** screen, click **Next**.
 - f** In the **Image Nodes** screen, click **Start RIS**.
 - g** When RIS starts, the compute nodes can be booted through PXE.
 - h** After all the compute nodes are installed, click **Stop RIS** and then click **Next**.
 - i** In the **Summary** screen, ensure that all the compute nodes are listed and click **Close**.
 - j** Click the **Node Management** tab.
 - k** Select all the compute nodes in the list and click the **Approve** button located on the right side of the window.
 - l** Click **Resume**, which is also located on the right side of the screen.

