Microsoft® Windows®
Compute Cluster Server 2003 SP1

Installation Guide

Notes and Notices

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.

Contents

This document provides information about installing Microsoft® Windows® Compute Cluster Server 2003 Service Pack 1 (SP1) 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 Windows Server® 2003 Compute Cluster Edition with Service Pack 2 operating system using Dell OpenManage™ Server Assistant
- Configuring your cluster after installing the operating system
- Before you install Microsoft Compute Cluster Pack (CCP) Service Pack 1 (SP1)
- Installing CCP SP1
- Configuring CCP SP1

Setting Up Your Hardware

A cluster running Windows Compute Cluster Server 2003 comprises 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 card (i.e. 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
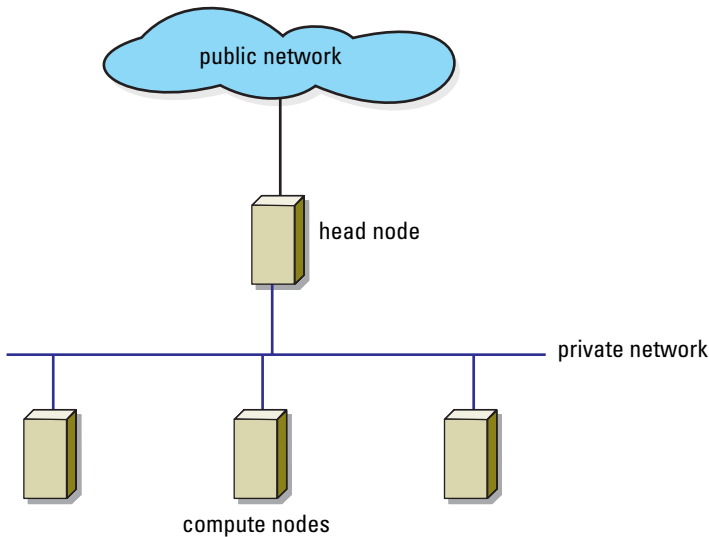
Microsoft Windows Compute Cluster Server 2003 SP1, which consists of Windows Server 2003 Compute Cluster Edition With SP2 as the operating system and Microsoft Compute Cluster Pack Service Pack 1 (SP1) as the cluster package is supported on the following Intel®-based systems and network devices:

- PowerEdge 1950 and 2950 systems as the head node and PowerEdge 1950, 1955, and M600 systems as compute nodes.

- Embedded Broadcom® network devices as both the public interface and the cluster interconnect.

- Dell PowerVault™ MD1000 attached to Dell PowerEdge RAID Controller (PERC) Adapter or PowerVault MD3000 attached to Serial-Attached SCSI (SAS) 5/E Adapter on the head node.

Microsoft Windows Compute Cluster Server 2003 SP1 is supported on the following AMD™-based systems and network devices:

- PowerEdge 2970 systems as the head node and PowerEdge SC1435 and M605 systems as compute nodes.
- Embedded Broadcom network devices as both the public interface and the cluster interconnect.
- Dell PowerVault MD1000 attached to PowerEdge RAID Controller (PERC) Adapter or Dell PowerVault MD3000 attached to SAS 5/E Adapter on the head node.

Installing the Windows Server 2003 Compute Cluster Edition With Service Pack 2 Operating System Using Dell OpenManage Server Assistant

It is recommended that you install the Windows Server 2003 Compute Cluster Edition With SP2 operating system on the head node using the *Dell PowerEdge System Build and Update Utility* media. This media prepares the hard drives and completes the installation of the operating system. After booting the server with the media, the Dell OpenManage Server Assistant starts, which creates an unattended installation by requesting information on system resources such as host name, IP address, disk, and redundant array of independent disk (RAID) configurations.

1 Boot the head node from the *Dell PowerEdge System Build and Update Utility* media.

2 Select **Dell Systems Build and Update Utility** at the first screen.

3 Select your language at the first graphical user interface (GUI) screen.

4 The **Dell Server Assistant End User License Agreement** appears. Read the agreement, choose **Accept**, if you agree to the terms and conditions.

5 In the **Home** window, select **Server OS Installation**.

   a Set the date, time, and time zone for the server.

   b Select the operating system, in this case, **Microsoft Windows Server 2003 Service Pack 2 x64 Edition**.

   c Configure the RAID controller, if present. For internal drives, RAID 1 configuration is recommended.

d Configure the file system type and hard drive partition size.

> ![NOTE icon] **NOTE:** If you plan to use Windows Deployment Services (WDS) (earlier named Remote Installation Services (RIS) in Windows Server 2003 versions prior to SP2), you require a second hard drive or partition to install the compute nodes (recommended). The second hard drive or partition must have at least 10 GB. The recommended partition type is NTFS.

6 Configure your network.

    a The primary network interface (Link A) is recommended for the cluster fabric. To ease installation of compute nodes with WDS/RIS, you must set a static IP 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 configured as either a dynamic or static IP.

7 In the **Enter Operating System Information** window, enter information specific to your organization and/or deployment.

8 In the **Installation Summary** window, confirm installation selections and options before proceeding to install the operating system.

9 Install the operating system.

At this point, the hard drives are prepared and partitioned, and the operating system installation wizard copies the required files for installation. When prompted, insert the *Dell OpenManage Server Administrator* media (*Systems Management Console* media) and then insert the operating system media.

10 When prompted, remove the media and click **Finish** to reboot the system.

The system completes the installation. Your system may reboot several times during this process. The installer may prompt if any additional information is needed for the installation.

Configuring Your Cluster After Installing the Operating System

After completing the operating system installation, the system reboots. At this stage, you must change the administrator password, which is blank by default.

Windows Server 2003 Compute Cluster Edition With SP2 Post-Setup Security Updates

1 After the installation of Windows Server 2003 Compute Cluster Edition With SP2, 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 a domain network is already installed, skip the following steps, and see "Install DHCP Server" on page 10 for more information on setting up the DHCP server.

1 Click **Start→ All 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 of Selections** 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 media. This installation may take several minutes.

8   Click **Finish→ Restart Now**.

9   After the system reboots, log in and click **Finish in the Configure Your Server Wizard.**

Install DHCP Server

If you are going to use WDS for compute node installation, 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→ All 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 of Selections** window, click **Next**.

The installer runs and you may be prompted to insert the operating system media.

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 enter 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 card (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 (enter the cluster head node IP if it functions as the router for the cluster) and click **Next**.

g In the **Domain Name and DNS Servers** screen, configure a domain name and DNS server (enter the cluster head node IP if it functions as the DNS server for the cluster) and click **Next**.

h In the **WINS Server** screen, configure a WINS server if required (enter the cluster head node IP if it functions as the WINS server for the cluster) and click **Next**.

i In the **Activate Scope** screen, select **Yes, I want 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**→ **All 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 Microsoft Compute Cluster Pack (CCP) Service Pack 1 (SP1)

A separate partition is required for the WDS server images which is used for the compute node installation. If an external storage is used for keeping the compute node images, install and configure any unconfigured external storage devices at this time. If a partition for the WDS server images was not created during the operating system installation, perform the following:

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 SP1

To install CCP:

1 Insert the CCP CD, run **setup.exe**, and click **Next**.

2 The **End User License Agreement** window appears. Read the agreement, choose **I Accept**, and click **Next** if you agree to the terms and conditions.

3 In the **Select Installation Type** screen, determine if the head node must also function as a compute node and select the **Create a new compute cluster with this server as the head node** option.

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 (MSDE 2000).

6 Click **Install** to install Microsoft .NET Framework 2.0.

7 Click **Install** to install CCP. The whole installation process may take a few minutes to complete.

8 Click **Finish**.

Configuring CCP SP1

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 of the **To Do** list:

1 Click **Configure Cluster Network Topology Wizard** and click **Next**.

2 From the drop-down menu, select the **Network Topology** (for example, compute nodes isolated on a private network) 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:** This option disables the cluster compute node Internet connectivity.

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**.

Windows Deployment Services

Windows Deployment Services (WDS) allows automated deployment of compute nodes. WDS is used for installing the operating system and the compute cluster package on the compute nodes. When the compute nodes are installed, WDS also adds them to the domain.

It is recommended that you install the operating system on the compute nodes using WDS because installing the operating system, adding nodes to the domain, and installing the CCP takes lesser time when done using WDS as compared to when they are done manually. WDS replaces the Remote Installation Services (RIS) that was used for deployment in the previous Compute Cluster releases.

> ✎ **NOTE:** The Compute Cluster Administrator refers to WDS as RIS since it is not updated after the Remote Installation Services was replaced by the Windows Deployment Services. In the rest of the document, WDS is referred to as RIS as these operations are performed through the Compute Cluster Administrator.

To complete the tasks in the RIS section of the **To Do** list:

1 Click **Install RIS (wizard)** and click **Next**.

2 In the **Install RIS** screen, click **Finish**.

If you have not inserted the operating system media already, you are prompted to insert the operating system media now.

3 In the **RIS Configuration Succeeded** screen, click **Close**.

4 To add a new image, click **Manage Images (wizard)** and click **Next**.

   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 must be on the partition that was previously prepared for WDS/RIS.

   d Select the drive or path that contains the Microsoft Windows Compute Cluster Server 2003 SP2 media 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 Enter a name and description for the image and click **Next**.

   g Review the settings and click **Finish**.

   The image is now copied from the operating system media and installed. The whole process may take a few minutes to complete.

   h When the image is ready, click **Done**.

   i In the **Add Image Succeeded** screen, click **Close**.

5 To add the product key for the image created, click **Manage Images (wizard)** and click **Next**.

   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 on my OEM-provided Windows media** option.

   d Click **Search** and select the drive with the Microsoft Windows Compute Cluster Server 2003 SP2 media. Click **OK**.

   A message indicating that the key was found appears beside the search button.

   e Click **Next** and then click **Finish**.

6 In the **Update Image Succeeded** screen, click **Close**.

Adding PowerEdge-Specific Drivers to the RIS Image

To complete the configuration of Compute Cluster Server 2003 on PowerEdge systems, you must install additional drivers. Download the drivers applicable to your cluster from the Dell Support website at **support.dell.com** depending on the compute node hardware configuration. The drivers that must be downloaded are listed below (select Windows Server 2003 x64 as the operating system).

- Network Driver for Broadcom NetXtreme II Family of Adapters, required.
- SAS Non-RAID Controllers Driver, Dell SAS Integrated, required if the compute nodes have a SAS adapter.
- SAS RAID devices driver, Dell PERC Integrated, required if the compute nodes have a PERC adapter.

To integrate the afore-mentioned 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 Windows Explorer.

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 is **D:\RemoteInstall\Setup\English\Images\WINDOWS**, where **D:** is the RIS image partition.

3 Create a directory named **OEM** and create two subdirectories in this directory and name them as **textmode** and **$1**. In the $1 directory, create a subdirectory named **drivers**. Under the **drivers** subdirectory, create a subdirectory named **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_105_35_W2K364_AXX.exe**) and extract its contents to **C:\Broadcom\W2K364**, where **C:** is the system boot directory.

5 Copy the files in the **NX2_RIS_Drivers** directory (**C:\Broadcom\W2K364\NX2_RIS_Drivers**) to **D:\RemoteInstall\Setup\English\Images\WINDOWS\$OEM$\$1\drivers\nic**.

6 Run the **setup.exe** program with a command line option of **-a**. Click **Start→ Run,** and type
`C:\Broadcom\W2K364\Driver_Management_Apps_Install`
`er\setup.exe -a`.

This command extracts the additional plug and play (PNP) device drivers required by the system and stores them in a compressed format.

7 When prompted for the **Network Location**, type `C:\Broadcom`. After installation, select **Install**.

8 Copy all the files from the following locations:

C:\Broadcom\Program Files 64\Broadcom\BDrv5706\DIAG

C:\Broadcom\Program Files 64\Broadcom\BDrv5706\VBD

C:\Broadcom\Program Files 64\Broadcom\BDrv5706\Win2K3

C:\Broadcom\Program Files 64\Broadcom\BDRVINST

to the following NIC directory:

D:\RemoteInstall\Setup\English\Images\WINDOWS\$OEM$\$1\drivers\nic

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**.

🡆 **NOTICE:** To avoid possible crash during compute node installation, do not overwrite the existing driver files if prompted.

10 Edit the **ristndrd.sif** file at
D:\RemoteInstall\Setup\English\Images\WINDOWS\amd64\templates

   a Add the following line to the Unattended section

```
OemPnpDriversPath="\Drivers\Nic"
```

   b Save and close the file.

If the compute nodes have a PERC or SAS Adapter, perform the following steps. Otherwise no additional storage drivers are required (for example, if compute nodes have non-RAID SATA disks), go to step 13.

📝 **NOTE:** The procedure described in the following steps is applicable if you are adding one of the storage drivers, either SAS or PERC. If you are installing both SAS and PERC drivers on the same node, the following procedure is not applicable as SAS and PERC drivers contain different **txtsetup.oem** files. For more information, see the Windows Driver kit documentation available on the Microsoft documentation website at **support.microsoft.com**.

11 Extract the downloaded PERC or SAS drivers and copy 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:** From the SCSI section in the **txtsetup.oem** file, copy the text identifier to another file (for example, DELL PERC 5 and PERC 6/CERC 6 RAID Controller Driver [Server 2003 for x64]). Using copy and paste is highly recommended. This text can change between driver revisions.

12 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):

     For PERC drivers:

```
[MassStorageDrivers]

"DELL PERC 5 and PERC 6/CERC 6 RAID Controller
driver (Server 2003 for x64)"="OEM"
```

     For SAS drivers:

```
[MassStorageDrivers]

Dell SAS 5x and SAS 6x Controller Driver
(Windows Server 2003 x64)"="OEM"
```

   b   Add another section labeled **OEMBootFiles** to the **ristndrd.sif** and list the names of all the files from the text mode directory excluding **.txt** files.

       For PERC drivers:

```
[OEMBootFiles]

nodev.inf

oemsetup.inf

percsas.cat

percsas.sys

txtsetup.oem
```

       For SAS drivers:

```
[OEMBootFiles]

lsi_sas.inf

lsi_sas.sys

lsi_sas.tag

s2k3amd64.cat

txtsetup.oem
```

13   Restart the RIS by opening a command prompt and typing `net stop wdsserver` and `net start wdsserver`.

Installing Compute Nodes

In the **Node Management section**, click **Add Nodes (wizard)** and then click **Next**. In the wizard, perform the following procedure:

1   Select **Automated Deployment** and click **Next**.

2   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**.

3   Enter a node series name and click **Next**. This name is used to name the compute nodes when they are installed. The name is followed by a numerical progression of numbers starting with 001.

4 The **End User License Agreement** screen appears. Read the agreement, choose **Accept**, and click **Next** if you agree to the terms and conditions.

5 In the **Start RIS** screen, click **Next**.

6 In the **Image Nodes** screen, click **Start RIS**.

7 When RIS starts, the compute nodes can be booted through PXE. After booting over PXE, the Windows Compute Cluster Edition is installed and configured on the compute node. Following this, CCP is installed and configured. RIS needs to be running during the whole compute node installation process.

8 After all the compute nodes are installed, click **Stop RIS** and then click **Next**.

9 In the **Summary** screen, ensure that all the compute nodes are listed and click **Close**.

10 To open **Compute Cluster Administrator**, click **Start**→ **All Programs**→ **Microsoft Compute Cluster Pack**→ **Compute Cluster Administrator** and then click the **Node Management** tab on the left pane.

11 Select all the compute nodes in the list and click **Approve** located on the right side of the window. The nodes' status must change to **Paused**.

12 Click **Resume**, located on the right side of the window. The nodes' status much change to **Ready**.

The nodes are now ready to accept jobs. You can add permissions to the groups and users using the Active Directory. By default, the group Domain Users, Enterprise Admins, Domain Admins, and the built-in user Administrator are allowed access as regular cluster users.