



**Microsoft Windows Server 2003  
Compute Cluster Edition  
Installation Guide**

*For IBM Cluster 1350*

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## Introduction

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This document describes how to install IBM ServerGuide and Microsoft® Windows® Server 2003 Compute Cluster Edition on the IBM Cluster 1350 platform.

### Windows Server 2003 Compute Cluster Edition system requirements

<b>CPU Requirements</b>	64-bit architecture computer Intel Pentium, or Xeon family with Intel Extended Memory 64 Technology (EM64T) processor architecture, or AMD Opteron family, AMD Athlon family, or compatible processor(s).
<b>Minimum RAM</b>	512 MB
<b>Multiprocessor Support</b>	Windows Compute Cluster Server 2003 supports up to four processors per server.
<b>Minimum Disk Space for Setup</b>	4 GB
<b>Disk Volumes</b>	For a head node, if the base Compute Cluster Pack deployment method is used, the Windows Compute Cluster Server 2003 installation process requires a minimum of two volumes: one for the system partition, and one for Windows Deployment Service (RIS). Only a single volume is required if using external imaging techniques. Compute nodes only require one volume. RAID 0,1,5 may be used as appropriate, although they are not required.
<b>Network Interface Card</b>	All nodes require at least one Network Interface Card (NIC). If a private network is planned, the head node requires a minimum of two NICs to create a public and private network, depending on the network topology selected. Each node may require more NICs as appropriate in case of public network access or in support of an MPI-based network.

## Software requirements

The Windows 2003 Computer Cluster Pack must be installed on a supported operating system. The supported operating systems are identical for both the head and compute nodes. They include:

- Windows Server 2003 Standard x64 Edition
- Windows Server 2003 Enterprise x64 Edition
- Windows Server 2003 R2 Standard x64 Edition
- Windows Server 2003 R2 Enterprise x64 Edition

It is highly recommend that you install Windows Server 2003 SP2 (Service Pack 2) for all configurations. This document is based on Windows Server 2003 R2 Standard SP2 and Compute Cluster Pack SP1 (Service Pack 1).

The remote administration and job scheduling components are automatically installed on the head node of the compute cluster, but they can also be installed on a remote workstation to simplify administration and scheduling.

The supported operating systems for the remote administration and job scheduling components are:

- Windows Server 2003 with Service Pack 2 (SP2).
- Windows XP Professional with Service Pack 2 (SP2)
- Windows XP Professional x64 Edition

## **Architecture and planning for a Windows Compute Cluster**

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A Windows Compute Cluster deployment typically involves the following types of servers:

- **The CCS Head node.** The Head Node provides user interface and management services to the cluster. Management services include Job scheduling, Job and resource management, Node management, and node deployment through Microsoft Remote Installation Services (RIS).
- **CCS Compute nodes.** The compute nodes provide computational resources to the cluster.
- **Management/infrastructure node.** Management and Infrastructure nodes provide Windows infrastructure services to the cluster, such as DNS, DHCP, Active Directory, and storage services. Management and infrastructure nodes are optional, if already present in the existing environment.

~~For recommended IBM System X CCS configurations please refer to the best practice guides found here:~~

~~<http://www-03.ibm.com/systems/clusters/hardware/1350/index.html>~~

## Best Practices for cluster hardware configuration

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### Compute Node hardware recommendations

The hardware recommendations for Compute Nodes are as follows:

- Intel-based Compute Nodes should have a minimum of four identical DIMMS populated for optimal performance.
- AMD-based Compute Nodes should have an identical DIMM configuration for each CPU socket.
- Cache Prefetch should be enabled on Compute Nodes.
- Adjacent Sector Prefetch is application dependent.

To access these BIOS settings on IBM System X servers, press **F1** after booting the server, then select **Advanced Options** and **Processor Settings**

Confirm that BIOS and firmware versions are identical across Compute nodes. UpdateXpress is recommended for this, or other management tools such as Altiris or xCAT.

Information on xCAT (IBM eXtreme Cluster Administration Toolkit) can be found here:

<http://www.xcat.org>

UpdateXpress can be found at:

<https://www-304.ibm.com/jct01004c/systems/support/>

Altiris management of IBM System X server documentation can be found at:

<http://www.redbooks.ibm.com/abstracts/sg247303.html?Open>

## Network hardware recommendations

The choice of MPI network will vary widely, depending upon the applications being used and the size of the cluster.

IBM has validated the following MPI networks for use with Microsoft Compute Cluster Server:

- **Gigabit Ethernet.** Gigabit Ethernet is the standard choice for smaller networks, or embarrassingly parallel applications. All IBM System X servers feature two onboard Broadcom Gigabit Ethernet NICs.



## **Installing IBM ServerGuide for the CCE head node**

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ServerGuide reduces the complexity of server deployment by using an Install Wizard. The Install Wizard automatically detects your server model and any installed hardware adapters.

The Install Wizard then guides you through the installation and configuration of the NOS (network operating system). The most recent version of ServerGuide is shipped with each IBM System X Server.

## Initial setup

To begin the installation, insert the Serverguide CD into the CDROM drive, power on the server, and boot the server from the Serverguide CD.

1. Select the appropriate **language**, **keyboard type** and **country**, and then click **Next**.
2. Read and accept the license agreement. Click **Next**.
3. Select Windows Server 2003 Standard x64 Edition R2, and then click Next.
4. Set the Date and Time. Click Next.
5. The **Server Configuration Tasks** screen will summarize a checklist of installation and configuration tasks. Click **Next**.
6. At the **Clear hard disk drives** screen, select **Skip this task** *only if* the hard disk(s) are already formatted to your specifications. Otherwise, select **Clear all Hard Disks** to delete all hard disk partitions.
7. At the **Create and Format NOS** screen, read the **Attention** message, and then click **Next** to clear the hard disk.

*Note that a reboot may be required if RAID is being configured.*

8. At the **Create and Format Partition** screen, select the desired partition size. Click **Next**.

**Important Note:** Make sure you leave at least 10,000mb (10GB) of free disk space for the installation and creation of the Head Node. In addition, if you plan to use remote WDS (Windows Deployment Server) to install compute nodes (which is the recommended method), a second hard drive or partition is required. At least 4GB of space should be available on the second hard disk or partition.

9. At the **Select File System Type** screen, select **NTFS** and then click **Next**. After all specified partitions are created, click **Next** to continue.
10. Confirm that all settings are correct in the **View Summary Report**, and then click **Next**.

## Installing network device drivers and the network operating system

This section describes the general configuration of the network and network adapter options. **Make sure you have your Product ID key available for this portion of the installation.**

1. At the **General Setup** screen type a **name, computer name**, and a valid **Product ID** key. Also type the name for the Administrator account and password for the Head Node.
2. Set the computer to join a **Workgroup** if it will be a stand alone cluster. If you are joining the computer to an existing domain, type the username and password for an account with the appropriate permissions. Click **Next** to continue.
3. At the **Network Adapter Configuration** screen, select **Specify Settings for the Network Adapters** and then click **Next**.
4. On the **Network Protocol Selection** screen for the first adapter, leave all fields blank (the default) and then click **Next**.
5. At the **TCP/IP Address Selection** screen, type the following information:  
**IP Address:** 192.168.0.1  
**Subnet Mask:** 255.0.0.0  
  
Leave the **Gateway, Primary** and **Alternate DNS** fields blank, and then click **Next**.
6. At the **TCP/IP Address Selection** screen for the second network adapter, leave all TCP/IP settings at their default (DHCP) values.
7. At the Microsoft License Mode Selection screen, select Per Seat and then click Next.
8. Select the appropriate **Time Zone** and **Language** settings, and then click **Next**.

### Microsoft component selection

1. Select the default options, and then click **Next**.
2. Click **Windows Installation**, and click then **Next**.
3. Insert the Windows Server 2003 Compute Cluster Edition CD into the CDROM drive.
4. Read and Accept the License Agreement, and then click **Next**.

## **Installing Windows Server 2003 Compute Cluster Edition**

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After completing the installation of the operating system, the server will reboot. After the server reboots, it will prompt you for the operating system CD for Windows Server 2003 components.

If you wish to add or remove any additional operating system components, do so before installing the Compute Cluster Pack.

### **Installing Windows Server 2003 security updates**

After installing Windows Server 2003, a dialog box will prompt you to install and apply security updates. If the server is connected to the Internet, download and apply the latest security updates now.

If the server will be connected to the Internet at all times, configure the **Automatic Updates** to download and install the updates at a time of your choosing. .

### **Configuring the domain controller and DNS**

The head node **MUST** be joined to an Active Directory Domain before configuring the domain controller and DNS settings.

If this is a stand-alone cluster, the compute cluster server must be promoted to a Domain Controller, and DNS must be installed for it to function properly.

## Installing and configuring Compute Cluster Pack (CCP)

The Microsoft Compute Cluster Pack (CCP) is a combination of software utilities and cluster management infrastructure that makes up Windows Compute Cluster Server 2003.

### CCP Pre-installation tasks

Before you install the Compute Cluster Pack and create a head node, be sure that the following prerequisites have been met:

- The prospective head node must already have Windows Server 2003, Compute Cluster Edition or a supported operating system installed. IBM recommends Windows Server 2003 x64 Standard or Enterprise R2 edition for most clusters. Note that R2 is mandatory if Unix compatibility and interoperability are needed.
- The computer must be connected to at least one network, depending on your choice of cluster networking topology, and you must be a local administrator on that computer.
- The prospective head node must be a member of an Active Directory domain (recommended) or must be a domain controller for the cluster domain.

## Configuring Active Directory, DNS, and DHCP

This section briefly covers the basic installation and configuration of Microsoft Active Directory, DNS, and DHCP. DHCP is required to allow compute nodes to boot from the network prior to a WDS-based installation of Compute Cluster Server.

In the typical cluster topology, the Compute Cluster head node will provide all network services for the compute nodes.

Note that external Active Directory, DNS, and DHCP can also be used on the public network. In that scenario, DHCP will still need to be provided to the private network, and a proxy server will need to be setup to allow the compute nodes to authenticate to Active Directory.

More detail on different network scenarios can be found here:

<http://technet2.microsoft.com/windowsserver/en/library/2a4807d9-92d1-4183-8e3b-4ff20aeebce21033.mspx?mfr=true>

*Note: 1350 clusters will typically use MS topology #3.*

### Active Directory and DNS configuration

1. Click **Start** ® **Manage Your Server**.
2. Click **Add or Remove a Role**.
3. Select **Typical Configuration**.
4. Enter an Active Directory domain name (such as E1350CLUSTER.local).
5. Select a NETBIOS domain or leave it at the default (which should be a part of your Active Directory domain).
6. Review the summary. Click **Next** and then click **OK**.
7. Select your external network interface from the list, and then click **Next**.
8. Review your changes, and then click **Finish**.
9. Insert the Windows 2003 R2 Disc 1 CD and click **OK**. The system will reboot.
10. Log in to the domain. Click **Next**, and then click **Finish**.

## DHCP configuration

This From the **Manage Your Server Wizard**:

1. Select **DHCP Server**, and then click **Next**.
2. Type a name and description for your private network scope.
3. Enter the IP Address range and subnet mask for your DHCP scope (the set of addresses you want the DHCP server to assign to clients) and then click **Next**
4. Enter the range of IP addresses you wish to have excluded (if any) from your DHCP range, click **next**
5. Enter a lease duration for your DHCP leases.
6. Select **Yes** if you need to configure additional options such as DNS server, default gateway, WINS server, etc. Otherwise select **No** and click **Next**
7. Click **Finish**

For information on joining a domain, or using a head node as a domain controller, please refer to the Microsoft Active Directory Wizard Technical Reference document at the following link: <http://go.microsoft.com/fwlink/?LinkId=52290>

Previous deployments prior to Service Pack 2 will require that the following hotfixes be installed before you begin installation of the Compute Cluster Pack. **These hotfixes are not necessary if deploying with SP2.**

Internet Connection Sharing (ICS) QFE, available at:  
<http://go.microsoft.com/fwlink/?linkid=55166>

High Performance Computing (HPC) update for Remote Installation Services (RIS) QFE, available at  
<http://go.microsoft.com/fwlink/?linkid=55167>

Microsoft Management Console (MMC) 3.0 x64 version available at:  
<http://go.microsoft.com/fwlink/?linkid=62400>

If an Infiniband MPI network is used, the following QFE should also be installed:  
<http://support.microsoft.com/?kbid=910481>

Reboot the server after installing these updates.

## Preparing a partition for the RIS server images

Deploying additional cluster nodes through RIS is highly recommended for small clusters of fewer than 16 nodes. This section describes the procedure for preparing a partition for server images. (If you do not plan to use WDS for cluster node deployment, you may skip these steps.)

1. Right-click **My Computer** and then select **Manage**.
2. Click **Disk Management**.
3. Right-click the unallocated disk space (either additional space on the primary disk or another disk) and select **New Partition**. When the **New Partition Wizard** appears, click **Next** and perform the following steps:
  - a. In the **Select Partition Type** dialog box, select **Primary Partition** and then click **Next**.
  - b. In the **Select Partition Size** dialog box, select the partition size and then click **Next**.
  - c. In the **Assign Drive Letter or Path** dialog box, assign a drive letter to the partition and then click **Next**.
  - d. Format the partition with the NTFS file system. Type a name for the partition, and then click **Next** to format the partition.
4. After the partition has finished formatting, close the **Computer Management** dialog box.



## CCP installation procedure

After you've completed all CCP pre-installation tasks, follow the steps below to install Microsoft CCP. This step is only necessary if you have installed Windows Server 2003 R2 on your management node. If you are using Windows Server Compute Cluster Edition, the following procedure is performed automatically for you.

1. Run **setup.exe** from the CCP installation CD or from the source. Click **Next** to begin the installation.
2. Read and accept the End User License Agreement.
3. In the **Select Installation Type** page, select **Create a new compute cluster with this server as the head node** if the head node will also function as a compute node.
4. In the **Select Installation Location** page, select a destination for the software installation (the default is recommended), and then click **Next**.
5. Click **Install** to install Microsoft SQL Server Desktop Engine.
6. Click **Install** to install Microsoft .NET Framework 2.0.
  - a. Click **Install** to begin Microsoft Compute Cluster Pack.
  - b. Click **Finish** to complete the installation.

# Configuring CCP

After you've installed the CCP on your cluster, a **To Do List** will be displayed. This section describes the steps to complete the CCP configuration through the To Do list.

## Networking

Follow the steps below to complete the Networking tasks in the To Do list:

1. Click **Configure Cluster Network Topology** and then click **Next**.
2. From the drop down menu, select the appropriate Network Topology and then 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 then click **Next**.
5. Select Local Area Connection as the private network adapter, and then click **Next**.
6. Select Disable Internet Connection Sharing and then click Next. Note: Once you select this option, the cluster you are configuring will not have Internet connectivity to the compute nodes.
7. Verify the contents of the Summary dialog box, and then click **Finish**.
8. When the Configuration Succeeded dialog box is displayed, click **Close**.
9. Click **Manage Windows Firewall Settings**, and then click **Next**.
10. In the Configure Firewall dialog box, select Enable Windows Firewall and then click Next. The firewall is enabled on the public network interface, but it is disabled on the private network interface.
11. Review the contents of the Summary dialog box, and then click **Finish**.
12. When the Configuration Succeeded dialog box is displayed, click **Close**.

## Installing and configuring Remote Install Services

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Remote Install Services (RIS)—which can also be referred to as Windows Deployment Services Legacy Mode—can be used in two different modes for Compute Cluster node deployment.

The first and simplest method is very similar to standard RIS-based deployment, and allows you to automate compute node deployment in your cluster environment by automatically installing the operating system and the CCP.

Once the compute nodes are installed, RIS also adds them to the domain. This method is suitable for clusters of up to 16 nodes.

The second, more advanced method is to utilize WDS to deploy a captured, fully configured compute node image. Common scenarios where this might be desirable include:

- Clusters with more than 16 nodes
- Clusters with complex application stacks
- Clusters with mixed server types or architectures.

Both methods of RIS/WDS deployment are discussed below.

It is recommended that you use WDS to install the operating system, install CCP, and then add the newly installed node to the domain. Automated WDS deployment is considerably faster than performing each of these tasks manually.

You can install WDS on the head node using the **To Do List** displayed in the Compute Cluster Administrator.

### WDS system requirements

Before WDS can be installed, ensure that the following prerequisites are met:

- A private network connects the cluster nodes.
- The private network interfaces of the compute nodes are dynamically assigned IP addresses. This is accomplished either by enabling ICS on the head node during the Compute Cluster Pack setup, or by configuring a DHCP server on the private network.

## WDS installation procedure

Follow the steps below to install and configure WDS for your compute cluster environment:

1. From the **To Do List** page of the Compute Cluster Administrator, click **Install WDS (wizard)** from the **Install Windows Deployment Services (WDS)** tile.
2. Note the tasks listed on the **Before You Begin** page, and then click **Next**.
3. On the **Configure WDS** page, click **Install Windows Deployment Services**, and then click **Next**.
4. Insert the operating system CD at the prompt.
5. On the **Update Summary** page, verify that the message **Install Windows Deployment services** is displayed, and then click **Next**.

## Adding a WDS image—Native Installation Method

After WDS is installed, perform the following steps to add a new image for deployment:

1. From the **Windows Deployment Services (WDS)** tile of the **To Do List**, click the **Manage Images** button and then click **Next**.
2. Note the actions available to you on the **Before You Begin** dialog box, and then click **Next**.
3. In the **Choose Action** dialog box, click **Add New Image**, and then click **Finish**.
4. On the **Welcome** dialog box of the **Windows Deployment Services Setup Wizard**, click **Next**.
5. In the **Installation Source Files Location** dialog box, type a name for the folder to which the Windows will be copied. Place each new WDS installation image in its own folder. The destination drive/partition should be the drive/partition that was previously prepared for WDS under [Initial Setup](#). Click **Next**.
6. On the **Windows Installation Image Folder Name** dialog box, type a name for the folder to which the Windows files will be copied. Place each new WDS installation in its own folder.
7. On the **Friendly Description and Help Text** dialog box, type a description of the installation files (for example, "Windows Server 2003 Compute Cluster Edition"). Click **Next**.
8. Review the information you have entered. Click **finish** if you are done, or **Back** if you wish to make changes.

The image will now be copied from the operating system CD. Click **Done** when the copy process has finished. Now that the image has been installed, it must be validated with a license key.

## Updating a WDS Image with a Valid License Key

1. From the WDS pane of the **To Do List**, click **Manage Images** and then click **Next**.
2. On the **Before You Begin** page, Click **Next**.
3. Select **Modify image configuration**, and then click **Next**.
4. On the **Select Image** page, chose an existing image to modify from the **Select the image to configure** drop-down box. Click **Next**.
5. On the **Modify Image** page, you can change the image description and the image product license key.
6. In the **Product Key** section, if you have a volume license key, enter it now, otherwise select the **Search for product key** option.
7. Click **Search** and select the drive with the Compute Cluster Server 2003 media. Click **OK**.
8. A message indicating that the product key was found should be displayed next to the search button. Click **Next**, and then click **Finish**.
9. Review the contents of the **View Summary** page. Click **Finish** to complete the procedure, or click Previous to go back and alter settings.
10. A **Result** page is displayed and states whether or not the reconfiguration of the WDS image was successful.

## Adding IBM-Specific Drivers to the WDS Image

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To complete the configuration of Compute Cluster Server 2003 on certain System X servers, you must install additional drivers.

### Where to get drivers

The following compute nodes will require additional driver support:

**e326m/x3455:** SATA models require the Broadcom SATA driver, which can be downloaded from the following URL:

[http://www-1.ibm.com/support/docview.wss?rs=0&uid=psg1MIGR-65697&loc=en\\_US](http://www-1.ibm.com/support/docview.wss?rs=0&uid=psg1MIGR-65697&loc=en_US)

**x3550/x3650/x3455/x3655/x3755:** Require the ServeRaid driver, which can be downloaded from the following URL:

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-61865&brandind=5000008>

**HS21/LS21/x3455/x3550/x3650/x3655/x3755:** Require the Broadcom NetXtreme II driver, which can be downloaded from the following URL:

<http://www-304.ibm.com/jct01004c/systems/support/supportsite.wss/docdisplay?Indocid=MIGR-5070766&brandind=5000008>

## Integrating Drivers into the WDS Image

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

**Note:** Throughout this section, **D:\** refers to the WDS image partition and **C:\** refers to the system boot directory.

1. Open Windows Explorer and browse to the image directory on the WDS image partition. (If the defaults were picked during the WDS image creation, the WDS image directory will be `D:\RemoteInstall\Setup\English\Images\WINDOWS`, where `D:\` is the WDS image partition.
2. Create a directory named **\$OEM\$**.
3. Create two subdirectories in the **\$OEM\$** directory and name them as **textmode** and **\$1\drivers\nic**.
4. Run the Broadcom driver package: (`brcm_dd_nic_t288_anyos_i386.exe`) and extract its files to **C:\Broadcom**
5. Copy the files in the **WDS** directory (`C:\Broadcom\W2K3x64\WDS`) to the following directories:

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

**D:\RemoteInstall\Setup\English\Images\WINDOWS\amd64.**

The following steps will copy the additional plug and play (PNP) device drivers required by the system and are store them in a compressed format in the install directory

6. Navigate to the `C:\Broadcom\W2K3x64\b06bdrv`
7. Copy all files therein to the **D:\RemoteInstall\Setup\English\Images\WINDOWS\OEM\$\1\drivers\nic**
8. Navigate to the **C:\Broadcom\W2k3x64\4nd\_w2k3** directory
9. Repeat step 7.



## Driver Installation Guide

Once all the drivers have been extracted to the correct directories, follow the procedure below to install them into your WDS image.

1. 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**.
2. Extract the SCSI\SAS drivers into the **textmode** directory. This may require running an executable installer and then accessing the location to which the files are installed.
3. Copy the text from the **[SCSI]** section from the **txtsetup.oem** file. An example of this might be:

*Adaptec Raid Controller Driver [Windows Server 2003 x64]*

Using copy and paste is highly recommended for this, because the text in the SCSI section of the txtsetup.oem file can change between driver revisions.

4. Edit the ristndrd.sif file at **D:\RemoteInstall\Setup\English\Images\WINDOWS\amd64\templates**.
5. Add a section named **[MassStorageDrivers]** and paste the text from the SCSI section described in step 3. The end result should look similar to the example below:

```
[MassStorageDrivers]
"Adaptec SAS/SATA-II RAID Controller (x64 device drivers)"="OEM"
```

6. Add another section to the ristndrd.sif file called **[OEMBootFiles]**. List each file from the **textmode** directory, excluding .txt files. The end result should look similar to the example below:

```
[OEMBootFiles]
nodev.inf
oemsetup.inf
txtsetup.oem
```

7. Add the following line to the **[Unattended]** section of the ristndrd.sif file:

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

8. Save and close the file.

9. Stop WDS Click **Start** ® **Programs** ® **Administrative Tools** ® **Services**. Find the **Windows Deployment Service**, right-click it, and select **Restart**. opening a command prompt and typing: **net stop wdssrvr** Restart WDS by typing the following command at the command prompt:  
**net start wdssrvr**

## Adding Drivers to the Ristndrd.sif file

For the ristndrd.sif file, you need to add the following lines (in addition to adding the [MassStorageDrivers] section described in the “Driver Installation Guide” section.

Edit or add the [OEMBootFiles] section, and list all of the files in the D:\RemoteInstall\Setup\English\Images\WINDOWS\%OEM%\textmode directory, one file on each line. For example:

```
[OEMBootFiles]

txtsetup.oem

arcsas.cat

arcsas.inf

arcsas.sys

raidisk1

adpahci.cat

adpahci.inf

adpahci.sys

satadsk1

lsi_sas.inf

lsi_sas.sys

lsi_sas.tag

lsinodrv.inf

s2k3am64.cat
```

## Installing More than One Driver in a WDS Legacy (RIS) image

In some cases, it may be useful to create a WDS / RIS image with more than one set of storage drivers. The steps for this are outlined below.

1. Extract each individual driver set to its own directory. For example:  
C:\Drivers\- 2. Copy all files for each driver *except* txtsetup.oem to  
D:\RemoteInstall\Setup\English\Images\WINDOWS\%OEM%\textmode
- 3. Create a new txtsetup.oem in  
D:\RemoteInstall\Setup\English\Images\WINDOWS\%OEM%\textmode
- 4. Edit the txtsetup.oem file with a text editor and insert the following sections into this txtsetup.oem:
 

```
[Disks]
[Defaults]
[scsi]
```
- 5. Copy each of these sections from the driver's txtsetup.oem. Paste each section into the corresponding section of the new txtsetup.oem that we created in step 3. Do this for each of the txtsetup.oem files for each driver.
- 6. Under the [Disks] section, make sure each *d<number>* entry has a unique number. For example:
 

```
[Disks]

# arcsas

d1 = "Adaptec SAS/SATA II RAID Windows XP/2003 x64
Device Drivers", \amd64\raidisk1, \

# adpahci

d2 = "Adaptec SATA Driver v1.00 (Windows EM64T/AMD64
for XP/2003)", \satadsk1, \
```
- 7. For each individual txtsetup.oem file, copy the remaining sections completely (including the definitions in brackets) into the integrated driver file, making sure any references to the dX in disks matches for the drivers.

## Adding Nodes with WDS

After WDS has been installed and configured, and the deployment images have been created, follow the steps below to deploy cluster nodes with WDS.

1. In the **Node Management** section, click **Add Nodes** (wizard) and then click **Next** to start the **Add Node Wizard**.
2. Select **Automated Deployment** and then click **Next**.
3. In the **Select Image** dialog box, log in with a username that has permissions to add nodes to a domain. Click **Next**.
4. Enter a node series name. The Node Series Name will be used to name the compute nodes when they are installed. A numerical progression of numbers starting with 001 will be automatically appended to the node series name when nodes are deployed. Click **Next**.
5. Read and accept the End User License Agreement.
6. On the **Start WDS page**, click **Next**.
7. On the **Image Nodes page**, click **Start WDS**.
8. When WDS starts, the compute nodes can be booted through PXE.
9. After all the compute nodes are installed, click **Stop WDS** and then click **Next**.
10. On the Summary page, ensure that all the compute nodes are listed and click **Close**.
11. Click the **Node Management tab**.
12. Select all the compute nodes in the list and click **Approve**.

**Note:** The following Microsoft TechNet article was used as a reference for these instructions:

<http://technet2.microsoft.com/WindowsServer/en/library/1fd5b3be-ca29-43d0-b5e2-8a65192d5b781033.msp?mfr=true>

## Pre-populating Active Directory with MAC-based GUIDs

In the WDS Legacy deployment scenario, when the compute nodes initially PXE boot, they will be assigned node names in a random fashion. In a typical racked environment, this is usually undesirable.

For smaller clusters, a simple workaround is to power on the systems sequentially, in the order desired, so that names are assigned in the order in which the systems turn on.

In a larger cluster, however, this is impractical. Using the IBM provided solution below, it is possible to utilize the xCAT tab file IBM generates during 1350 Cluster manufacturing, to assign node names properly to the cluster.

1. In a configured xcat environment for the cluster, make sure you've gathered the MAC addresses for all of the nodes, and verify that all nodes are present in `/opt/xcat/etc/mac.tab`.
2. Copy the `mac.tab` file to a directory on the head node of the Windows cluster.
3. Open a command prompt. Change to the directory where the script and the `mac.tab` file are located. Run the `mkcomp.vbs` script (included with this document) as follows:

```
cscript mkcomp.vbs mac.tab <cluster domain> <install server>
```

**For example:**

```
cscript mkcomp.vbs mac.tab e1350.local mn
```

4. This should insert the needed information into Active Directory to ensure that the nodes maintain the name given to them in manufacturing. It will also remove the need to press F12 for the first boot to activate the windows installer.

### Creation of the compute node master image

- Refer to the directions on page 9 (“IBM ServerGuide installation of the Compute Cluster head node”) to install the Compute Cluster edition OS on the first compute node.
- Add any additional required drivers that are not included in Serverguide. This would typically include Infiniband, Myrinet, or 10Gb Ethernet drivers. Refer to the directions for these adapters for details.
- Add the compute node to the Active Directory domain.
- Copy the Compute Cluster Pack SP1 locally to the `c:\ccp` directory with the following command:

```
Xcopy \\headnode\ccpinstallshare\*. * /s c:\ccp\
```

- Install any desired application code or patches

- Run `sysprep -reseal` to prepare the compute node for image capture, and shutdown.

### **Configuring the WDS server**

1. From the Start Menu, select **Admin Tools**, and then select **Wdsmgmt**.
2. In the left pane, expand Windows Deployment Services.
3. Right-click the **Servers** node and then click **Add Server**.
4. The local server is selected by default. Click **OK**.
5. Click **Yes** when the dialog box warning appears to add the server.
6. Expand **Servers**.
7. Right-click the server and select **Configure Server to start the WDS configuration wizard**.
8. Click next on the Welcome screen.
9. Select the default location (D:\remoteinstall) and then click **Next**.
10. If DHCP is installed on the local server, select option 0x60.
11. On the PXE server settings page, select **Respond to All Client Computers**.
12. Click the **Advanced** button, and then select **Auto-add the client computer and mark it as known**. Click **OK**.
13. Click **Finish**

## Post image-based deployment tasks

---

Once the compute nodes are deployed, they must now be added to the compute cluster. This can be done through either manual installation, by running setup from the c:\ccp directory or through the SetupCCP.vbs script, which can be obtained from the following URL:

<http://windowshpc.net/files/17/scripting/entry575.aspx>

The script will push the compute cluster pack installation to all nodes, and add those nodes to the cluster. Be sure to open the setupCCP.vbs file in a text editor, and perform the following steps before running the script:

1. Make the modifications listed to the head node name.
2. Create a text file named *servers.txt* in the same directory, listing each compute node name on a new line.
3. Run the script, using the command `cscript ccpsetup.vbs`



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