



# Windows® HPC Server 2008

## Windows HPC Server 2008 Getting Started Guide

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Published: August 2008

### **Abstract**

This guide provides basic conceptual information and general procedures for installing a high performance computing cluster using Windows® HPC Server 2008. You can use this guide as a reference when you deploy and configure the head node in your HPC cluster, add compute nodes to the cluster, and verify that your cluster deployment has been successful.

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# Getting Started Guide for Windows HPC Server 2008

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This guide provides basic conceptual information and general procedures for installing a high performance computing cluster using Windows® HPC Server 2008.

For detailed deployment information and step-by-step procedures, see the Windows HPC Server 2008 Deployment Guide (<http://go.microsoft.com/fwlink/?LinkID=117921>). Also, to properly plan for your cluster deployment, it is strongly recommended that you first review the Windows HPC Server 2008 Design Guide (<http://go.microsoft.com/fwlink/?LinkID=124376>).



## Note

You can configure your HPC cluster for high availability by installing the head node in the context of a failover cluster. If the server that is acting as the head node fails, the other server in the failover cluster automatically begins acting as the head node (through a process known as failover). For more information about running an HPC cluster with failover clustering, see <http://go.microsoft.com/fwlink/?LinkID=123894>.

## Checklist: Deploy an HPC Cluster (Overview)

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The following checklist describes the overall process of deploying a Windows HPC Server 2008 cluster. Each task in the checklist is linked to the section in this document that describes the steps to perform the task.

Task	Description
<a href="#">Step 1: Prepare for Your Deployment</a>	Before you start deploying your HPC cluster, review the list of prerequisites and initial considerations.
<a href="#">Step 2: Deploy the Head Node</a>	Deploy the head node by installing Windows Server 2008 and HPC Pack 2008.
<a href="#">Step 3: Configure the Head Node</a>	Configure the head node by following the steps in the configuration to-do list.
<a href="#">Step 4: Add Compute Nodes to the Cluster</a>	Add nodes to the cluster by deploying them from bare metal, by importing an XML file, or by manually configuring them.
<a href="#">Step 5: Run Diagnostic Tests on the Cluster</a>	Run diagnostic tests to verify that the deployment of the cluster was successful.

# Step 1: Prepare for Your Deployment

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The first step in the deployment of your HPC cluster is to make important decisions, such as deciding how you will be adding nodes to your cluster, and choosing a network topology for your cluster. The following checklist describes the steps involved in preparing for your deployment.

## Checklist: Prepare for your deployment

Task	Description
<a href="#">1.1. Review initial considerations and system requirements</a>	Review the list of initial considerations and system requirements to ensure that you have all the necessary hardware and software components to deploy an HPC cluster.
<a href="#">1.2. Decide how to add compute nodes to your cluster</a>	Decide if you will be adding compute nodes to your cluster from bare metal, from preconfigured nodes, or from an XML file.
<a href="#">1.3. Choose the Active Directory domain for your cluster</a>	Choose the Active Directory® domain to which you will join the head node and compute nodes of your HPC cluster.
<a href="#">1.4. Choose a user account for installation and diagnostics</a>	Choose an existing domain account with enough privileges to perform installation and diagnostics tasks.
<a href="#">1.5. Choose a network topology for your cluster</a>	Choose how the nodes in your cluster will be connected, and how the cluster will be connected to your enterprise network.
<a href="#">1.6. Prepare for multicast (optional)</a>	If you will be deploying nodes from bare metal and want to multicast the operating system image that you will be using during deployment, configure your network switches appropriately.
<a href="#">1.7. Prepare for the integration of scripted power control tools (optional)</a>	If you want to use your own power controls tools to start, shut down, and reboot compute nodes remotely, obtain and test all the necessary components of your power control tools.

# 1.1. Review initial considerations and system requirements

The following sections list some initial considerations that you need to review, as well as hardware and software requirements for Windows HPC Server 2008.

## Initial considerations

Review the following initial considerations before you deploy your HPC cluster.

### Compatibility with previous versions

The following list describes compatibility between Windows HPC Server 2008 and Windows Compute Cluster Server 2003:

- Windows HPC Server 2008 provides application programming interface (API)-level compatibility for applications integrated with Windows Compute Cluster Server 2003. These applications might, however, require changes to run on Windows Server® 2008. If you encounter problems running your application on Windows Server 2008, you should consult your software vendor.
- Windows HPC Server 2008 supports job submission from Windows Compute Cluster Server 2003 clients, including jobs submitted through the use of the command-line tools, the Compute Cluster Job Manager, and the COM APIs.
- The Windows HPC Server 2008 client tools, including the cluster administration console (HPC Cluster Manager), the job scheduling console (HPC Job Manager), the command-line tools, and the APIs cannot be used to manage or submit jobs to a Windows Compute Cluster Server 2003 cluster.
- Clusters that have both Windows Compute Cluster Server 2003 nodes and Windows HPC Server 2008 nodes are not supported.
- A side-by-side installation of Windows HPC Server 2008 and Windows Compute Cluster Server 2003 on the same computer is not supported. This includes the Windows HPC Server 2008 client utilities.
- The upgrade of a Windows Compute Cluster Server 2003 head node to a Windows HPC Server 2008 head node is not supported.

### Server roles added during installation

The installation of HPC Pack 2008 adds the following server roles to the head node:

- DHCP Server, to provide IP addresses and related information for compute nodes.
- Windows Deployment Services, to deploy compute nodes remotely.
- File Services, to manage shared folders.
- Network Policy and Access Services, which enables Routing and Remote Access so that network address translation (NAT) services can be provided to the cluster nodes.

## Hardware requirements

Hardware requirements for Windows HPC Server 2008 are very similar to those for the 64-bit editions of Windows Server 2008.



### Note

For more information about installing Windows Server 2008, including system requirements, see <http://go.microsoft.com/fwlink/?LinkID=119578>.

### Processor (x64-based):

- Minimum: 1.4 GHz
- Recommended: 2 GHz or faster

### RAM:

- Minimum: 512 MB
- Recommended: 2 GB or more

### Available disk space:

- Minimum: 50 GB
- Recommended: 80 GB or more

### Drive:

- DVD-ROM drive

### Network adapters:

- The number of network adapters on the head node and on the compute nodes depends on the network topology that you choose for your cluster. For more information about the different HPC cluster network topologies, see <http://go.microsoft.com/fwlink/?LinkID=124377>.

## Software requirements

The following list outlines the software requirements for the head node and the compute nodes in a Windows HPC Server 2008 cluster:

- Windows Server 2008 HPC Edition, or another 64-bit edition of Windows Server 2008
- Microsoft HPC Pack 2008

To enable users to submit jobs to your HPC cluster, you can install the utilities included with Microsoft HPC Pack 2008 on client computers. Those client computers must be running any of the following operating systems:

- Windows XP Professional with Service Pack 3 or later (x86- or x64-based)
- Windows Vista® Enterprise, Windows Vista Business, Windows Vista Home, and Windows Vista Ultimate
- Windows Server 2003 Standard Edition or Windows Server 2003 Enterprise Edition with Service Pack 2 or later (x86- or x64-based)
- Windows Server 2003, Compute Cluster Edition

- Windows Server 2003 R2 Standard Edition or Windows Server 2003 R2 Enterprise Edition (x86- or x64-based)

## 1.2. Decide how to add compute nodes to your cluster

There are three ways to add compute nodes to your cluster:

- **From bare metal.** The operating system and all the necessary HPC cluster components are automatically installed on each compute node as it is added to the cluster. No manual installation of the operating system or other software is required.
- **Add preconfigured compute nodes.** The compute nodes are already running Windows Server 2008 HPC Edition, or another 64-bit edition of Windows Server 2008, and Microsoft HPC Pack 2008 is manually installed on each node.
- **Import a node XML file.** An XML file that contains a list of all the nodes that will be deployed is used. This XML file can be used to add nodes from bare metal or from preconfigured nodes. For more information about node XML files, see <http://go.microsoft.com/fwlink/?LinkId=124145>.

The following is a list of details to take into consideration when choosing how to add nodes to your HPC cluster:

- When deploying nodes from bare metal, Windows HPC Server 2008 automatically generates computer names for your compute nodes. During the configuration process, you will be required to specify the naming convention to use when automatically generating computer names for the new nodes.
- Compute nodes are assigned their computer name in the order that they are deployed.
- If you want to add compute nodes from bare metal and assign computer names in a different way, you can use a node XML file. For more information about node XML files, see <http://go.microsoft.com/fwlink/?LinkId=124145>.
- If you want to add preconfigured nodes to your cluster, you will need to install Windows Server 2008 HPC Edition, or another 64-bit edition of Windows Server 2008 on each node (if not already installed), as well as Microsoft HPC Pack 2008.

## 1.3. Choose the Active Directory domain for your cluster

The head node and the compute nodes in your HPC cluster must be members of an Active Directory domain. Before deploying your cluster, you must choose the Active Directory domain that you will use for your HPC cluster.

If you do not have an Active Directory domain to which you can join your cluster, or if you prefer not to join an existing domain, you can install the Active Directory Domain Services role on the head node and then configure a domain controller on that node. For more information about

installing the Active Directory Domain Services role on a computer that is running Windows Server 2008, see <http://go.microsoft.com/fwlink/?LinkID=119580>.

 **Caution**

If you choose to install and configure an Active Directory domain controller on the head node, consult with your network administrator about the correct way to isolate the new Active Directory domain from the enterprise network, or how to join the new domain to an existing Active Directory forest.

## 1.4. Choose a user account for installation and diagnostics

During the configuration process of your HPC cluster, you must provide credentials for a domain user account that will be used for installation and diagnostics. You must choose an existing account or create a new account, before starting your cluster deployment.

The following is a list of details to take into consideration when choosing the user account:

- The user account that you choose must be a domain account with enough privileges to create Active Directory computer accounts for the compute nodes. Alternatively, you can create the computer accounts manually or ask your domain administrator to create them for you.
- If part of your deployment requires access to resources on the enterprise network, the user account must have the necessary permissions to access those resources—for example, installation files that are available on a network server.
- If you want to restart nodes remotely from the cluster administration console (HPC Cluster Manager), the account must be a member of the local Administrators group on the head node. This requirement is only necessary if you do not have scripted power control tools that you can use to remotely restart the compute nodes.

## 1.5. Choose a network topology for your cluster

Windows HPC Server 2008 supports five cluster topologies. These topologies are distinguished by how the compute nodes in the cluster are connected to each other and to the enterprise network. The five supported cluster topologies are:

- Topology 1: Compute Nodes Isolated on a Private Network
- Topology 2: All Nodes on Enterprise and Private Networks
- Topology 3: Compute Nodes Isolated on Private and Application Networks
- Topology 4: All Nodes on Enterprise, Private, and Application Networks
- Topology 5: All Nodes on an Enterprise Network

For more information about each network topology, see <http://go.microsoft.com/fwlink/?LinkId=124377>.

When you are choosing a network topology, you must take into consideration your existing network infrastructure:

- Decide which network in the topology that you have chosen will serve as the enterprise network, the private network, and the application network.
- Do not have the network adapter that is connected to the enterprise network on the head node in automatic configuration (that is, the IP address for that adapter does not start with: 169.254). That adapter must have a valid IP address, dynamically or manually assigned (static).
- If you choose a topology that includes a private network, and you are planning to add nodes to your cluster from bare metal:
  - Ensure that there are no Pre-Boot Execution Environment (PXE) servers on the private network.
  - If you want to use an existing DHCP server for your private network, ensure that it is configured to recognize the head node as the PXE server in the network.
- If you want to enable DHCP server on your head node for the private or application networks and there are other DHCP servers connected to those networks, you must disable those DHCP servers.
- If you have an existing Domain Name System (DNS) server connected to the same network as the compute nodes, no action is necessary, but the compute nodes will be automatically deregistered from that DNS server.
- Contact your system administrator to determine if Internet Protocol security (IPsec) is enforced on your domain through Group Policy. If IPsec is enforced on your domain through Group Policy, you may experience issues during deployment. A workaround is to make your head node an IPsec boundary server so that compute nodes can communicate with the head node during PXE boot.

## 1.6. Prepare for multicast (optional)

If you will be deploying nodes from bare metal and want to multicast the operating system image that you will be using during deployment, we recommend that you prepare for multicast by:

- Enabling Internet Group Management Protocol (IGMP) snooping on your network switches, if this feature is available. This will help to reduce multicast traffic.
- Disabling Spanning Tree Protocol (STP) on your network switches, if this feature is enabled.



### **Note**

For more information about these settings, contact your network administrator or your networking hardware vendor.

## 1.7. Prepare for the integration of scripted power control tools (optional)

The cluster administration console (HPC Cluster Manager) includes actions to start, shut down, and reboot compute nodes remotely. These actions are linked to a script file (CcpPower.bat) that performs these power control operations using operating system commands. You can replace the default operating system commands in that script file with your own power control scripts, like Intelligent Platform Management Interface (IPMI) scripts provided by your vendor of cluster solutions.

In preparation for this integration, you must obtain all the necessary scripts, dynamically linked library (DLL) files, and all other components of your power control tools. After you have obtained all the necessary components, test them independently and ensure that they work as intended on the computers that you will be deploying as compute nodes in your cluster.

For information about modifying CcpPower.bat to integrate your own scripted power control tools, see <http://go.microsoft.com/fwlink/?LinkId=124378>.

## Step 2: Deploy the Head Node

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The next step in the deployment of your HPC cluster is to deploy the head node. The following checklist describes the steps involved in deploying the head node.

### Checklist: Deploy the head node

Task	Description
<a href="#">2.1. Install Windows Server 2008 on the head node computer</a>	Install Windows Server 2008 HPC Edition, or another 64-bit edition of Windows Server 2008 on the computer that will act as the head node.
<a href="#">2.2. Join the head node computer to a domain</a>	Join the computer that will act as the head node to a Microsoft Active Directory Domain.
<a href="#">2.3. Install Microsoft HPC Pack 2008 on the head node computer</a>	Install Microsoft HPC Pack 2008 on the computer that will act as the head node, using the installation media or from a network location.

## 2.1. Install Windows Server 2008 on the head node computer

To deploy the head node of your HPC cluster, you must start by installing Windows Server 2008 HPC Edition, or another 64-bit edition of Windows Server 2008 on the computer that will act as the head node. For more information about installing Windows Server 2008, including system requirements, see <http://go.microsoft.com/fwlink/?LinkID=119578>.



### Important

We strongly recommend that you perform a clean installation of Windows Server 2008 before installing Microsoft HPC Pack 2008. If you want to install Microsoft HPC Pack 2008 on an existing installation of Windows Server 2008, remove all server roles first and then follow the procedures in this guide.



### Note

It is recommended that you obtain the latest device drivers for your head node computer from the Web site of your hardware vendors.

## 2.2. Join the head node computer to a domain

As described in the [Step 1: Prepare for Your Deployment](#) section, the head node must be a member of an Active Directory domain. After you have installed Windows Server 2008 on the head node, manually join the head node to an existing Active Directory domain.

## 2.3. Install Microsoft HPC Pack 2008 on the head node computer

After Windows Server 2008 is installed on the head node computer, and the head node is joined to an Active Directory domain, you can install Microsoft® HPC Pack 2008 on the head node.



### To install Microsoft HPC Pack 2008 on the head node computer

1. To start the Microsoft HPC Pack 2008 installation wizard on the computer that will act as the head node, run setup.exe from the HPC Pack 2008 installation media or from a network location.
2. On the **Getting Started** page, click **Next**.
3. On the **Microsoft Software License Terms** page, read or print the software license terms in the license agreement, and accept or reject the terms of that agreement. If you accept the terms, click **Next**.
4. On the **Select Installation Type** page, click **Create a new HPC cluster by creating a head node**, and then click **Next**.
5. Continue to follow the steps in the installation wizard.

## Step 3: Configure the Head Node

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After you have deployed the head node of your HPC cluster, you must configure the head node by following the configuration to-do list in HPC Cluster Manager.

### Checklist: Configure the head node

The following checklist includes the items in the configuration to-do list in HPC Cluster Manager that you need to complete in order to configure your head node.

Task	Description
<a href="#">3.1. Configure the HPC cluster network</a>	Configure the cluster network by using the <b>Network Configuration Wizard</b> .
<a href="#">3.2. Provide installation credentials</a>	Specify which credentials to use for system configuration and when adding new nodes to the cluster.
<a href="#">3.3. Configure the naming of new nodes</a>	Specify the naming convention to use when generating names automatically for new compute nodes.
<a href="#">3.4. Create a node template</a>	Create a template that defines the steps to follow when configuring a compute node.
<a href="#">3.5. Add drivers for the operating system images (optional)</a>	If you will be deploying compute nodes from bare metal and those nodes require special device drivers, add drivers for the operating system images that you created for your node template on the previous task.
<a href="#">3.6. Add or remove users (optional)</a>	If you will be giving access to the cluster to other members of your organization, add or remove users or administrators for your cluster.

### 3.1. Configure the HPC cluster network

The HPC cluster network configuration is the first step in the configuration process of your head node. The HPC cluster network is configured by following the **Network Configuration Wizard** in HPC Cluster Manager. When configuring the HPC cluster network, you must choose the network topology that you have selected for your cluster, as described in [Step 1: Prepare for Your Deployment](#).

### **Important**

Before you start configuring the HPC cluster network in HPC Cluster Manager, ensure that the head node and the computers that you will add as compute nodes to the cluster are physically connected according to the network topology that you have chosen for your cluster. Also, ensure that you are able to identify to which network each one of the network adapters in the head node is connected.

### **To configure the HPC cluster network**

1. If HPC Cluster Manager is not already open on the head node, open it. Click **Start**, point to **All Programs**, click **Microsoft HPC Pack**, and then click **HPC Cluster Manager**.
2. In the **To-do List**, click **Configure your network**.
3. Follow the steps in the **Network Configuration Wizard**.

## 3.2. Provide installation credentials

Installation credentials must be provided in order to configure new compute nodes. These credentials will be used when installing the operating system, applications, and when adding nodes to the Active Directory domain. Also, these same credentials will be used when running diagnostic tests on the cluster nodes.

### **To provide installation credentials**

1. In the **To-do List**, click **Provide installation credentials**. The **Installation Credentials** dialog box appears.
2. Type the user name, including the domain (DOMAIN\User), and then the password for the domain user account you will use to deploy compute nodes and to run diagnostic tests.

### **Important**

The account must be a domain account with enough privileges to create Active Directory computer accounts for the compute nodes. Alternatively, you can create the computer accounts manually or ask your domain administrator to create them for you.

### **Important**

If part of your deployment requires access to resources on the enterprise network, the account should have the necessary permissions to access those resources.

### **Important**

If you want to restart nodes remotely from the cluster administration console (HPC Cluster Manager), the account must be added as an HPC cluster administrator on the head node. This requirement is only necessary if you do not

have scripted power control tools that you can use to remotely restart the compute nodes.

3. To save the specified credentials, click **OK**.

### 3.3. Configure the naming of new nodes

If you deploy compute nodes from bare metal, and you are not using a node XML file to import nodes to the cluster, Windows HPC Server 2008 will automatically generate computer names for the new nodes that are being deployed. You need to specify how those names will be generated, by defining a naming series.

The naming series is defined by selecting a root name and the starting number that will accompany that name. The starting number is enclosed in percentage signs (%). For example: ClusterNode%1000%.

When you deploy compute nodes from bare metal, nodes will be named in sequence, as they become available. For example, if you deploy three nodes after specifying the following naming series: ClusterNode-%100%, those nodes will be assigned these names:

- ClusterNode-100
- ClusterNode-101
- ClusterNode-102



#### Important

Compute node names are limited to 15 characters. When specifying the compute node naming series, take into account the number of compute nodes in your deployment and ensure that the series that you specify will not generate names that exceed 15 characters. For example, if your deployment will consist of 1,000 compute nodes, and your starting number is 1, your root name cannot have more than 12 characters; otherwise, your node number 1,000 will need a name that consists of 16 characters.



#### To specify the compute node naming series

1. In the **To-do List**, click **Configure the naming of new nodes**. The **Specify Compute Node Naming Series** dialog box appears.
2. Type the naming series that you want to use. The preview helps you to see an example of how the naming series will be applied to the names of the compute nodes.



#### Note

You cannot specify a compute node naming series that consists only of numbers.

3. To save the compute node naming series that you have specified, click **OK**.

## 3.4. Create a node template

Node templates are new in Windows HPC Server 2008. They define the necessary tasks for configuring and adding compute nodes to your cluster. With a node template, you can deploy an operating system image, add specific drivers and software to compute nodes, or simply add a preconfigured node to your cluster. Because you might have more than one type of compute node, or you may be adding compute nodes to your cluster in different ways, you can create different templates that apply to different nodes or situations.

You can create two types of node templates:

- **With an operating system image.** This type of template includes a step to deploy an operating system on the compute nodes. Use this type of template when adding compute nodes from bare metal.
- **Without an operating system image.** This type of template is used to add preconfigured compute nodes to the cluster, or to update existing nodes.

The type of template that you create for the initial deployment of your HPC cluster depends on how you decided to add compute nodes to your cluster.



### Important

If you will create a node template with an operating system image, you will need the installation media for Windows Server 2008 HPC Edition or another 64-bit edition of Windows Server 2008, or you must have the installation files available on a network location that is accessible from the head node computer.



### To create a node template

1. In the **To-do List**, click **Create a node template**.
2. Follow the steps in the **Create Node Template Wizard**.



### Note

The node templates that you create with the **Create Node Template Wizard** include the most common deployment and configuration tasks. You can add more tasks to the node templates that you create by using the **Node Template Editor**. For more information, on the **Specify Template Name** page of the **Create Node Template Wizard**, click **Understanding Node Templates**.

## 3.5. Add drivers for the operating system images (optional)

If you will be deploying compute nodes from bare metal and those nodes require special device drivers, you will need to add those drivers during the configuration process of your head node. Drivers must be in the .inf format, and must be available to all operating system images in the image store.

### **Note**

It is recommended that you obtain the latest device drivers for your compute nodes from the Web site of your hardware vendors.

### **To add drivers for the operating system images**

1. In the **To-do List**, click **Manage drivers**. The **Manage Drivers** dialog box appears.
2. To add a driver, click **Add**.
3. Type or browse to the location of the setup information file for the driver that you want to add (.inf format), and then click **Open**.
4. Repeat the two previous steps for all the drivers that you want to add.
5. After you are done adding drivers, click **Close**.

## 3.6. Add or remove users (optional)

If you will be giving access to the cluster to other members of your organization, you need to add them as HPC cluster users or HPC cluster administrators. Also, you can remove users or administrators that were added by default during installation.

### **Important**

The **Domain Users** group is added as an HPC cluster user during installation. If you do not want all users in the domain to have access to your cluster, you can remove the **Domain Users** group from the list of HPC cluster users, and add a different domain group specifically created for users of your HPC cluster, or you can add individual domain users.

### **To add or remove users for the cluster**

1. In the **To-do List**, click **Add or remove users**.
2. To add a user to the cluster:
  - a. In the **Actions** pane, click **Add User**. The **Select Users or Groups** dialog box appears.
  - b. Type the user name of the user that you want to add, and then click **Check Names**. For more information, on the **Select Users or Groups** window, click **examples**.
  - c. Repeat the previous step for all users that you want to add.
  - d. After you are done adding users, click **OK**.
3. To add an administrator to the cluster:
  - a. In the **Actions** pane, click **Add Administrator**. The **Select Users or Groups** dialog box appears.
  - b. Type the user name of the administrator that you want to add, and then click **Check Names**. For more information, on the **Select Users or Groups** window, click **examples**.

- c. Repeat the previous step for all administrators that you want to add.
  - d. After you are done adding administrators, click **OK**.
4. To remove a user or administrator, select it on the **Users** list, and then click **Remove**.

## Step 4: Add Compute Nodes to the Cluster

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Windows HPC Server 2008 simplifies the deploying process of compute nodes by providing automatic node imaging, automatic naming of nodes, and other capabilities to streamline deployment tasks. Also, it provides tools that you can use to monitor the progress of your deployment.

### **Important**

Unlike previous versions of Windows HPC Server 2008, the default in Windows HPC Server 2008 is to respond only to Pre-Boot Execution (PXE) requests that come from existing compute nodes. This default setting is automatically changed when you use the **Add Node Wizard** to add nodes from bare metal. Also, you can manually change this setting in the **Options** menu, under **Deployment Settings**.

After creating a node template, you can use the **Add Node Wizard** to add compute nodes to your HPC cluster. There are three ways by which you can add compute nodes to your cluster:

- Deploy compute nodes from bare metal
- Add compute nodes by importing a node XML file
- Add preconfigured compute nodes

For more information about each of these three node deployment options, see the Windows HPC Server 2008 Deployment Guide (<http://go.microsoft.com/fwlink/?LinkID=117921>).

### **To add compute nodes to your cluster**

1. In the **To-do List**, click **Add compute nodes**.
2. Follow the steps in the **Add Node Wizard**.

### **Note**

Step-by-step procedures for adding compute nodes to your cluster are available in the HPC Cluster Manager Help documentation. To see these procedures, on the **Select Deployment Method** page of the **Add Node Wizard**, click **Adding Nodes to a Cluster**.

## Step 5: Run Diagnostic Tests on the Cluster

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After you have configured your head node and added all compute nodes to the cluster, you should run diagnostic tests to validate cluster functionality and troubleshoot any configuration issues.

### To run diagnostic tests on the cluster

1. In the **To-do List**, click **Validate your cluster** (under **Diagnostics**).
2. On the **Run Diagnostics** dialog box, ensure that the **Run all functional tests** and **All nodes** options are selected, and then click **OK**.
3. To see the progress of the diagnostic tests and the test results, in **Diagnostics**, click **Test Results**.
4. To see detailed information about a test, double-click the test. To expand the information in a section of the test results, click the down arrow for that section.

#### **Note**

For more information about using diagnostic tests to troubleshoot your cluster, see <http://go.microsoft.com/fwlink/?LinkID=122091>.

## Additional Resources

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- Detailed information about designing and deploying an HPC cluster is available online on the Microsoft Web site:
  - Windows HPC Server 2008 Design Guide (<http://go.microsoft.com/fwlink/?LinkId=124376>).
  - Windows HPC Server 2008 Deployment Guide (<http://go.microsoft.com/fwlink/?LinkId=117921>)
- Additional online resources, including step-by-step guides, technical reference documentation and troubleshooting guides are available on the Windows HPC Server 2008 TechCenter (<http://go.microsoft.com/fwlink/?LinkId=119594>).
- HPC Cluster Manager includes comprehensive Help documentation. This documentation is available from the user interface by clicking any of the in-context help links or by pressing F1.