



# Windows<sup>®</sup> HPC Server 2008

## Windows HPC Server 2008: System Management Overview

*Microsoft Corporation*

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### **Abstract**

Windows<sup>®</sup> HPC Server 2008 brings the power of high performance computing (HPC) to mainstream while enhancing end users' and cluster administrators' productivity. The new management and deployment interface, with its template-based deployment capabilities, helps simplify deployment of the operating system and applications to both large and small compute clusters and works to increase cluster administrator productivity. Features described in this overview include the Network Configuration Wizard, which simplifies network and topology setup and configuration. Also, using Windows Deployment Services in Windows Server<sup>®</sup> 2008 provides fully integrated node deployment and provisioning, and helps to ensure that large clusters can be easily and quickly deployed. Cluster monitoring and troubleshooting is directly integrated into the Administration Console, along with reporting of system health and node performance.

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## Introduction

Windows® HPC Server 2008 is the next version of the Microsoft® high performance computing (HPC) platform. Built on Windows Server® 2008 64-bit technology, Windows HPC Server 2008 (HPCS) can efficiently scale to thousands of processing cores while providing enterprise-class tools for a highly productive HPC environment. HPCS includes a new, integrated management console that integrates the new network configuration wizard, template-based provisioning based on the Windows Server 2008 Windows Deployment Services technology, a new scheduler, cluster health monitoring at a glance along with built-in diagnostics, and a faster Microsoft® Message Passing Interface (MS-MPI) that includes new NetworkDirect support.

Microsoft's high performance computing vision is to enable customers to achieve the scalability and performance levels of the most efficient clusters in the Top500 benchmark while making it dramatically more productive to deploy, utilize and integrate the advanced HPC clusters within their environment. #

Windows HPC Server 2008 integrates with other Microsoft products to help increase productivity and improve the overall end-user and administrator experience. This includes collaboration through Microsoft® Office SharePoint® Server and the Windows Workflow Foundation, and improved management and efficiency by integrating with Microsoft® System Center solutions. Through integration with Windows Communication Foundation, Windows HPC Server 2008 allows developers working with Service-Oriented Architecture (SOA) applications to harness the power of parallel computing offered by HPC solutions.

This paper discusses the new management interface and the enhancements in deployment methods and technologies that are included in the new management user interface (UI), which include:

- Setup and configuration of the head node
- Deployment of compute nodes
- Management of nodes
- Cluster and node diagnostics
- Node and cluster health and performance charts and reports

Job management features are covered in the “Windows HPC Server 2008 Job Scheduler” white paper.

## High Availability

HPCS includes support for an important new optional feature—high availability clustering of the head node. Windows HPC Server 2008 supports the built-in Failover Clustering feature of Windows Server 2008 Enterprise and the failover clustering of SQL Server® 2005 to provide high availability of the head node, and to automatically fail over the Job Scheduler without interrupting running jobs. This configuration requires that the head node and failover node both be running Windows Server 2008 Enterprise and SQL Server 2005 Standard.

## Head Node Setup and Configuration

The initial configuration of any Windows HPC Server 2008 cluster starts with installing and configuring the head node. The head node acts as the management, scheduling, and controlling node for the rest of the cluster. The minimum hardware requirements for the head node are:

- 512 MB of RAM (2 GB or more recommended)
- 8-GB hard disk drive space (80 GB recommended)
- x64 processor
- One network interface card (NIC) for the enterprise network. For automated deployment and management, an additional NIC for a private network is required. A third NIC, dedicated to the application network over Message Passing Interface (MPI) or high-speed traffic, is optional.

The minimum software requirements for the head node are:

- Windows Server 2008, x64 versions, Standard, Enterprise, or Windows Server 2008 HPC Edition operating systems
- Microsoft® .NET Framework 3.0
- Microsoft® SQL Server® 2005 (If not present, will install Microsoft® SQL Server® 2005 Express Edition.)

The installation of Microsoft® HPC Pack 2008 enables and automatically configures the following roles and features on the Windows Server 2008 head node:

- Windows Deployment Services (Transport Server Role Service only)
- Dynamic Host Configuration Protocol (DHCP)
- Network Policy and Access (Routing and Remote Access Role Service only)
- Windows PowerShell™

### Configuring the Head Node—To Do List

The head node in an HPCS cluster acts as both the management and deployment node. Simplifying and automating cluster deployment, including large clusters, are important goals of Windows HPC Server 2008. The addition of deployment *templates*, with a Create Template Wizard in the To Do list, and the new Template Editor, give administrators the ability to deploy clusters easily, with confirmation that they are making the right decisions during the process, while being able to easily track the status of deployment using the Operations view of Node Management.

After the setup of the head node is completed, start the Administration Console, shown in Figure 1, to complete the configuration of the cluster. The Administration Console uses the familiar Microsoft System Center user interface. This UI provides improved navigation and filtering abilities to support large clusters, and uses a Navigation Pane (first introduced in Microsoft® Office Outlook® 2003) to quickly change the context and view. A single click shifts the user from Configuration to Reporting (or to any of the other views shown on the navigation buttons on the lower left in Figure 1.) The Administration Console also has pivot views that let the user quickly switch to a different view while maintaining the current context.

The first page in the Administration Console is the To Do List, shown in Figure 1. The To Do List guides the administrator through the steps for setting up the cluster. As each of the initial steps are completed, a green check is inserted next to the step and the next required step is activated. After the initial required configuration is

complete, the optional steps can be completed as appropriate to your environment. The administrator can return to the To Do List by clicking the Configurations button in the Navigation pane. The To Do List contains all the actions the administrator performs to set up the cluster.

The basic steps in the To Do list for a new HPC cluster are:

- Configure the network.
- Provide domain credentials for node installation.
- Specify the naming convention for compute nodes.
- Create the default node template.
- Create an operating system image for compute nodes.

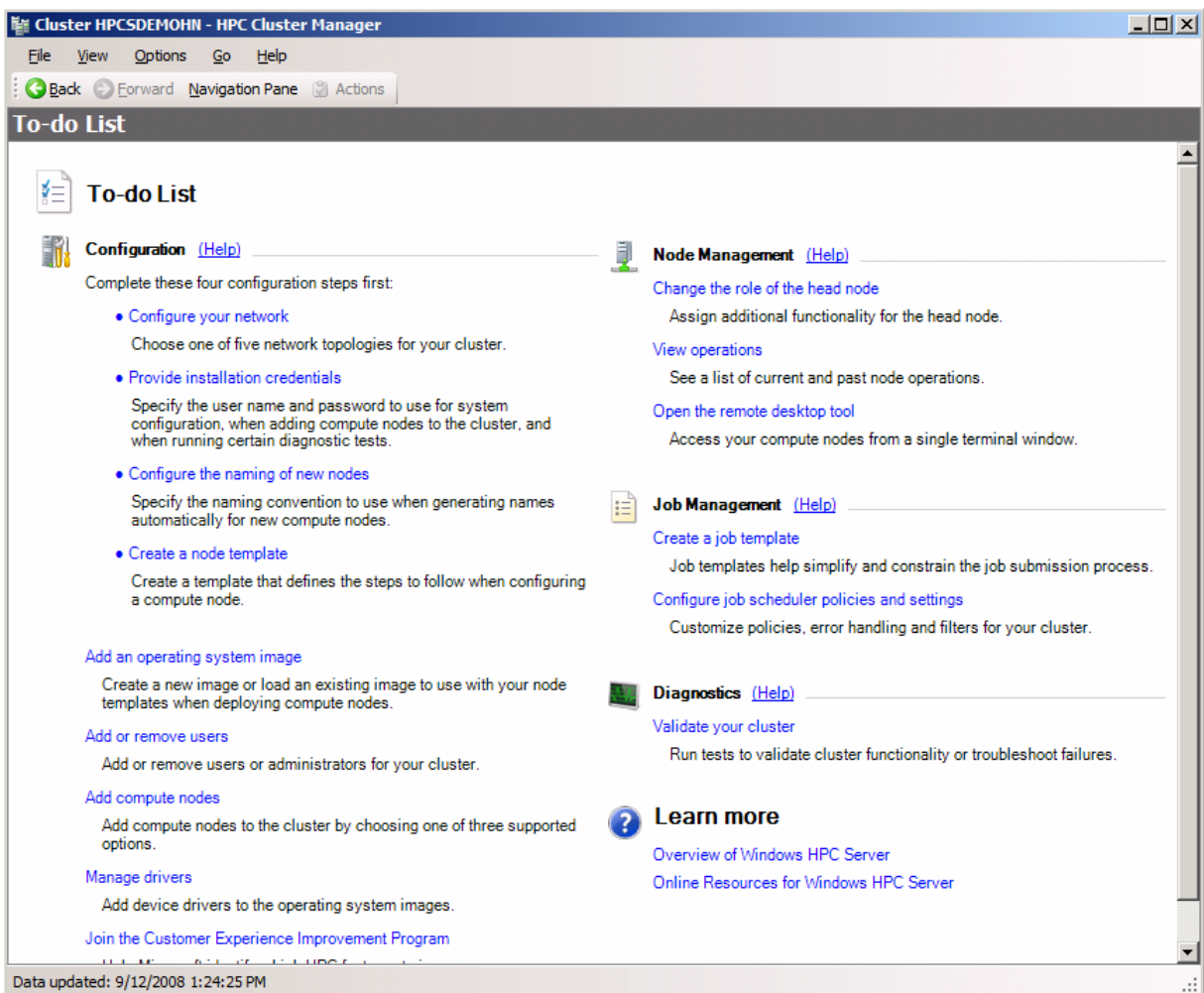


Figure 1 The Windows HPC Server 2008 Administration Console

The To Do List itemizes these tasks, and a check mark indicates successful completion. The following sections discuss each of these steps. After completing the initial deployment tasks, the administrator can add additional drivers to the operating system image, create users and groups if necessary, and create one or more job profiles to define how jobs are scheduled and resources allocated for jobs.

## Network Configuration Wizard

The new Network Configuration Wizard automates the task of setting up the enterprise, private, and application networks for a Windows HPC Server 2008 cluster. Windows HPC Server 2008 supports five different network configurations with from one to three NICs on compute nodes, and one to three NICs on the head node, as shown in Figure 2. Although the five topologies are identical to those used in WCCS, the Network Configuration Wizard detects the cluster hardware setup and guides the administrator through the configuration of the network based on the detected setup.

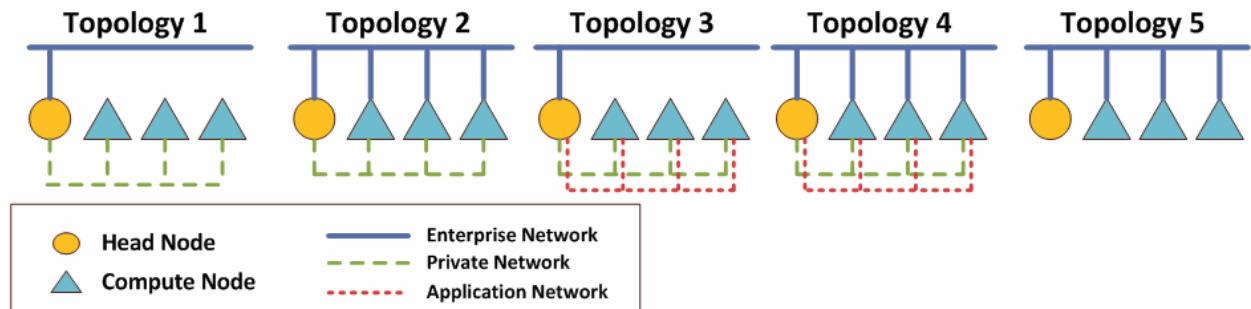


Figure 2 Network Topology Scenarios

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**Important:** A configuration with only a single NIC on the head node connected to a public network does not support any of the automated node deployment features of Windows HPC Server 2008.

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Using the new Network Configuration Wizard, the administrator can define the network topology that will be used in the Windows HPC Server 2008 cluster. The wizard guides the administrator through the configuration, and then automatically configures the correct settings. The wizard:

- Logically binds each head node network interface to a public, private, or MPI network.
- Configures network services appropriately, including DHCP.
- Enables or disables the firewall for each public, private or MPI network.

When compute nodes are added to the cluster, their network configuration will be derived from the network configuration performed on the head node through the Network Configuration Wizard.

## Configuring Node Provisioning

After completing the network configuration, the process of configuring node deployment can begin. The administrator follows the next steps listed in the To Do List.

The next step in the To Do List is to provide the credentials that will be used to deploy nodes in the cluster. These credentials should be a domain account that has the right to join computers to the domain and is a local administrator for the compute nodes, since it is also used for running diagnostics tests on the nodes. Next, define a naming convention for the nodes in the cluster to simplify automated deployment.

After defining the install credentials and cluster naming convention, the next task in the To Do List, shown in Figure 3, is the creation of a node template for adding nodes to the cluster. For bare metal deployments, the administrator is guided through the steps of creating or selecting a Windows Imaging (WIM) format image.

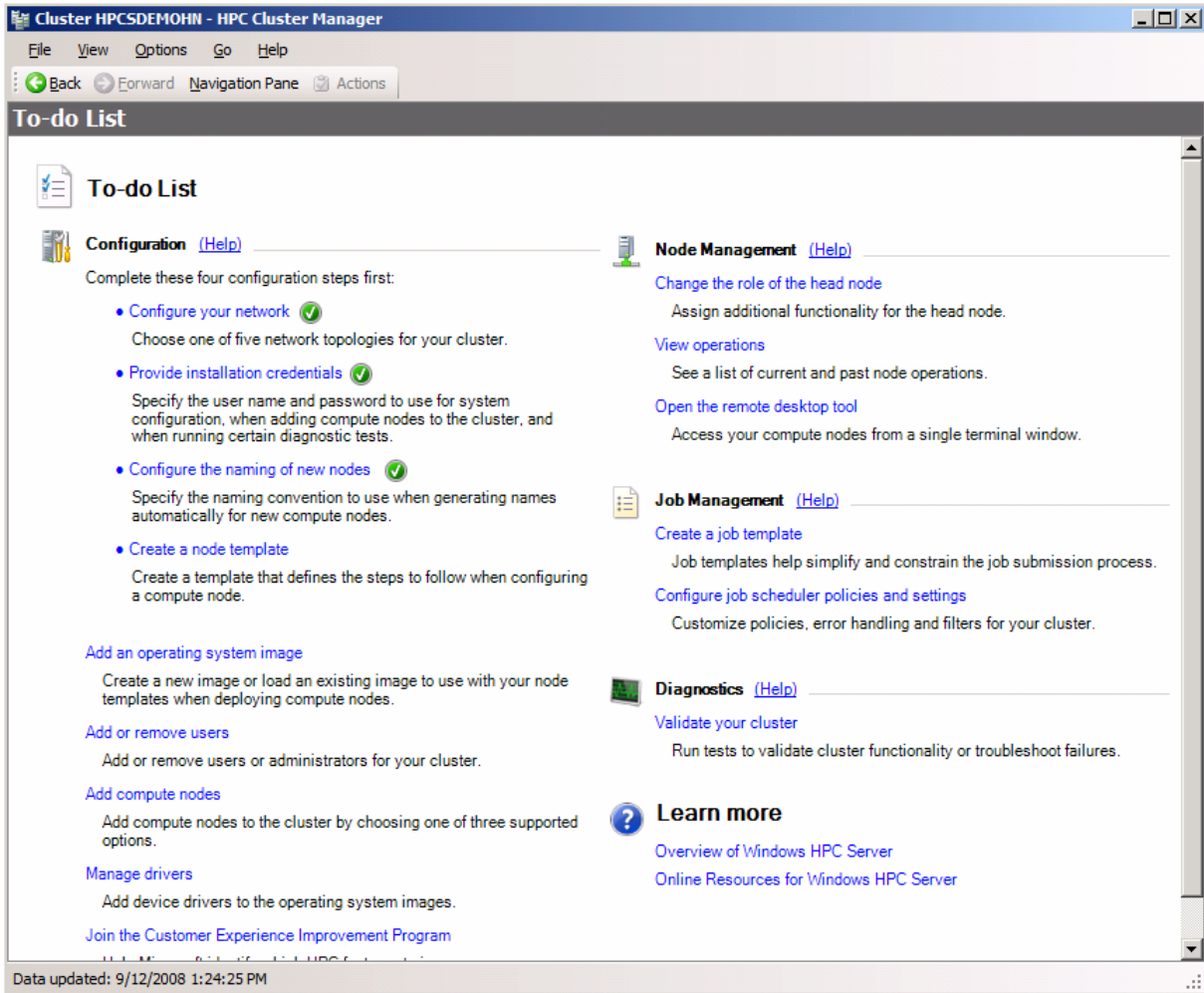
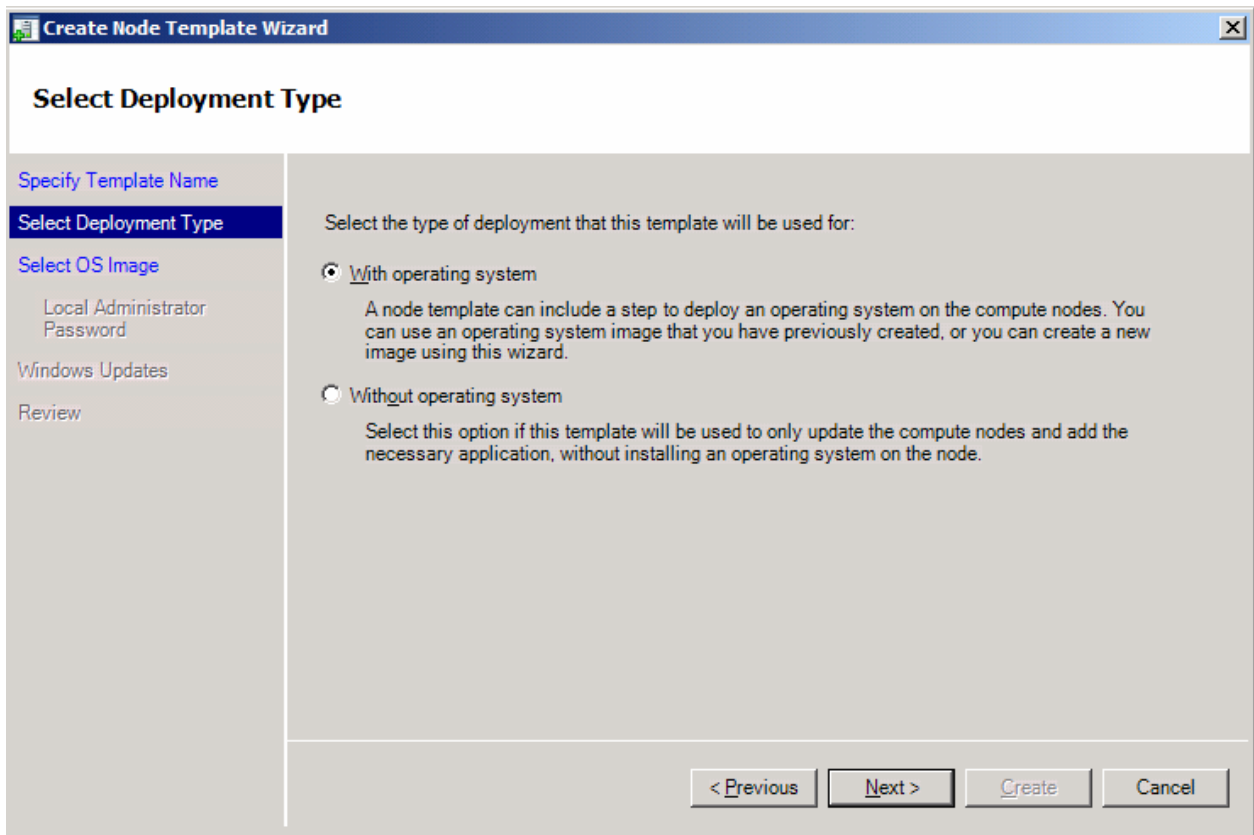


Figure 3 - The ToDo List

The Windows HPC Server 2008 Create Node Template Wizard, shown in Figure 4, provides an easy way to create and update deployment templates. A Node Template contains the list of tasks that are required to install a compute node. The Create Node Template Wizard guides the administrator through the process, defining the image selection or creation if doing a bare metal deployment and other provisioning tasks. Management Services uses the generated template in conjunction with Windows Deployment Services in Windows Server 2008 to automatically deploy the compute nodes in the cluster.



**Figure 4 - The Create Node Template**

The use of Node Templates can help the administrator to consistently and quickly deploy nodes across the cluster. Node Templates can include applications and drivers as well as the base operating system, helping to ensure that a consistent and predictable image is deployed to each node, and that nodes are online and available quickly, with minimal administrator intervention. Node Templates also support heterogeneous clusters, allowing the administrator to provision different images to different nodes where required.

### Updating

HPCS includes integrated support for updating compute nodes, either through Windows Updates or the Windows Server Update Service (WSUS). By using Node Templates, and assigning specific templates to Node Groups, the cluster administrator can:

- Control when a node is updated
- Control which nodes are updated
- View the update status of nodes at a glance

Windows HPC Server 2008 uses Node Templates to implement updating, with a specific updating task. The administrator can configure nodes to only get Critical updates or All updates, and can configure Windows Server Update Services on the head node for additional fine grained control of updates.

When an update is initiated by the administrator to a node, the node goes into a “draining” state—jobs that are currently running or assigned to the node continue to run until they complete, and then the node status changes to Offline. After it is offline, the node is updated and restarted as required. When all assigned updates have been successfully installed, the node returns to an Online status. If there are update failures, the node remains offline.

## Windows Deployment Services

Windows Deployment Services is the automated deployment mechanism in Windows Server 2008. In Windows HPC Server 2008, the management services employ Windows Deployment Services to orchestrate the deployment of the compute nodes according to the tasks defined in the Node Template.

The Transport Server components of the Windows Deployment Services are enabled on the head node. This includes a Pre-Boot Execution Environment (PXE) server and a Trivial File Transfer Protocol (TFTP) server to enable the network booting of compute nodes and the installation of the Windows® Preinstallation Environment (Windows PE) operating system.

After the compute nodes PXE boot, they contact the Windows Deployment Services server on the head node, which installs a Windows PE client on the compute node(s). The client component of Windows Deployment Services uses Windows PE as the initial operating system on the compute node. This, then, coordinates with Windows Deployment Services on the head node to automatically install the appropriate operating system image for the compute node as defined by the Node Template.

### Template and Image Management

As described above, Windows HPC Server 2008 includes a Template Generator that guides the administrator through creation of a Node Template for deploying compute nodes. In addition, the administrator can use the Node Template Editor, shown in Figure 5, to modify the Node Templates.

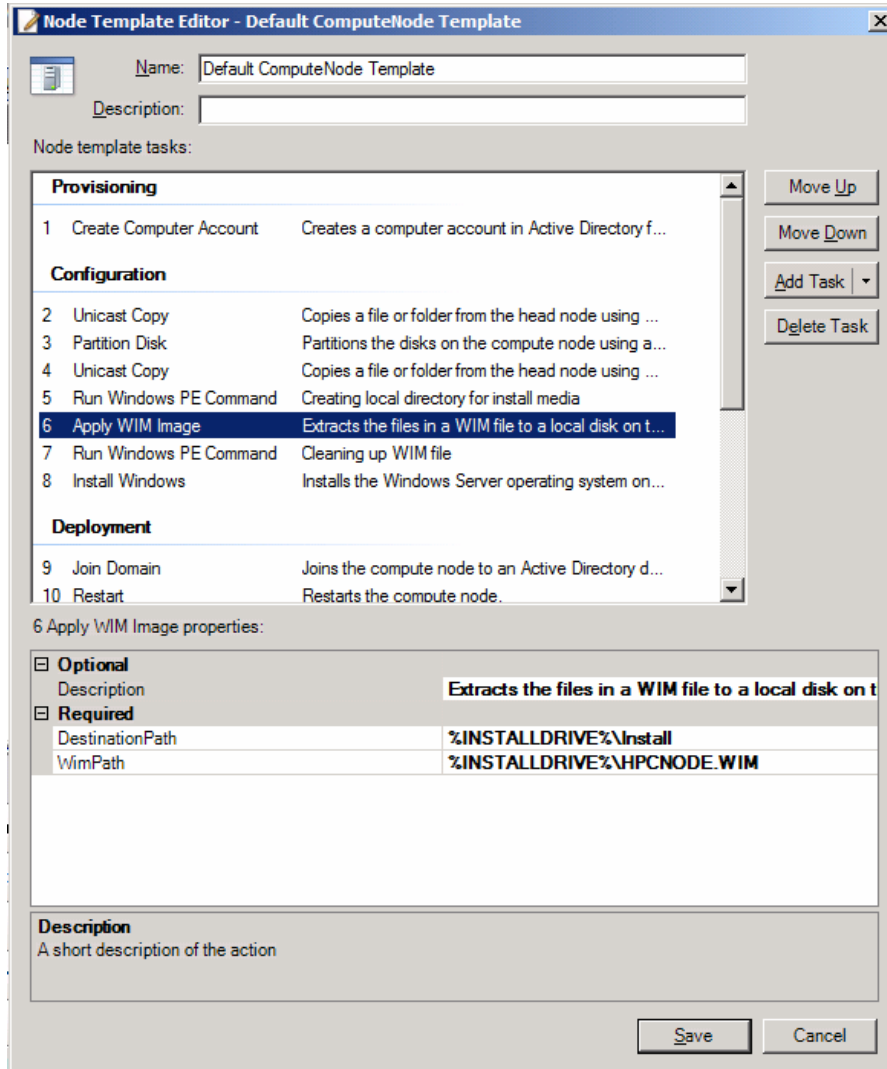


Figure 5 - The Node Template Editor

The Node Template Editor allows the administrator to add tasks to a Node Template to install drivers (including network drivers) that the node needs but that are not part of the base operating system image. The administrator can also add tasks to the Node Templates to deploy applications to the compute nodes. Windows HPC Server 2008 management services maintain a repository of operating system images and Node Templates. The administrator can access these repositories using the Images and Template operations on the left pane of the Configuration Navigation Pane.

Windows HPC Server 2008 uses WIM images for deployment, and has the ability to create those WIM images from Windows Server 2008 installation media, including the ability to inject drivers into that image. For more advanced imaging capabilities, the administrator can use the Windows Automated Installation Kit (Windows AIK) for Windows Server 2008 to create and use custom images beyond those directly supported by Windows HPC Server 2008. The Windows Automated Installation Kit can be downloaded at <http://go.microsoft.com/fwlink/?LinkId=79385>.

## Deploying Compute Nodes

The new Add Node Wizard, accessible either from the To Do List or from Add Node on the Action menu, guides the administrator through the process of deploying compute nodes in the cluster, including generating the node template for the nodes. After generating the node template, the user needs to turn on the compute nodes and connect them to the private network for automated deployment. For deployments that include adding an operating system image, the BIOS on the compute nodes must be set to allow booting from the network automatically. After the compute nodes start, they contact the Windows Deployment Services on the head node. These compute nodes will show in the Node Management pane with a status of Unknown, as shown in Figure 6.

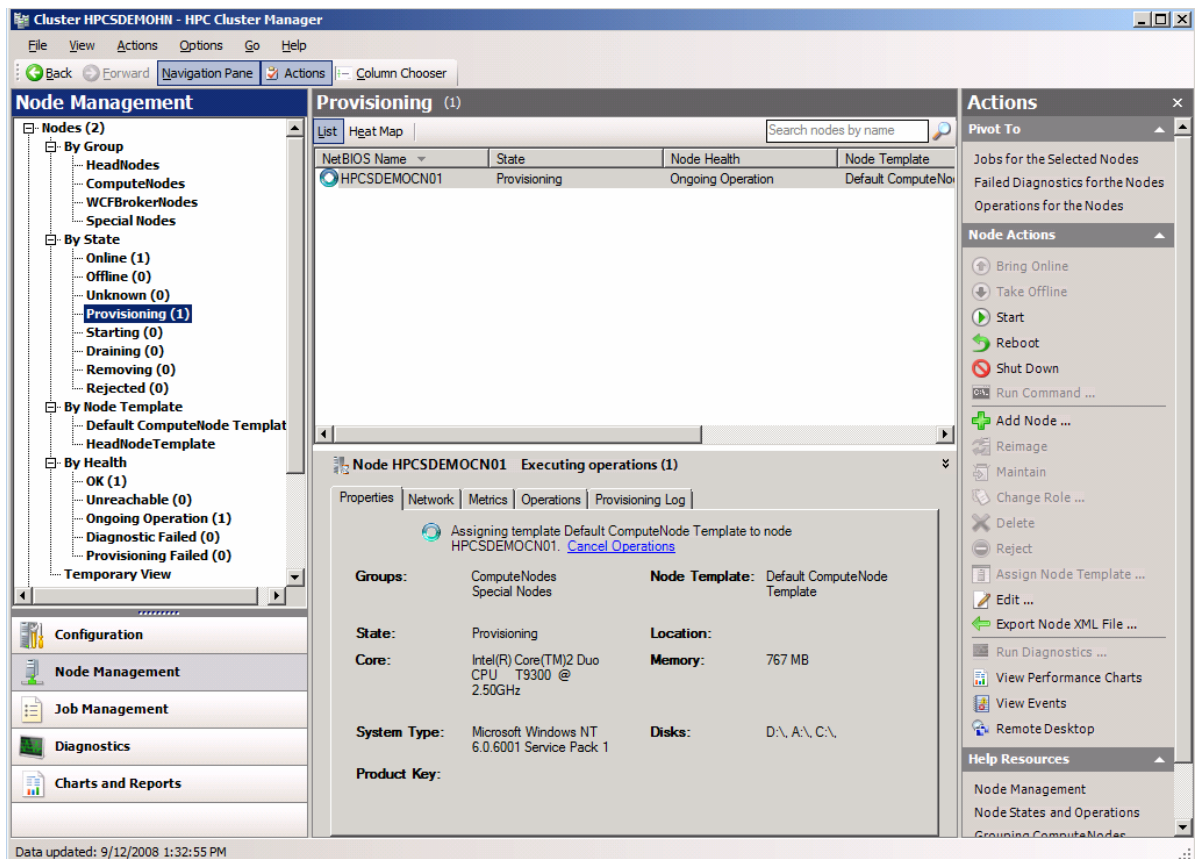


Figure 6 - Adding nodes to a cluster

Before an image is deployed to the Unknown node, the administrator must assign a template to the node, either by right-clicking a node and selecting Assign NodeTemplate, or by selecting the node(s) and clicking Assign Node Template from the Action menu. After a template is assigned, the node is provisioned according to the template. The administrator can view the status of the deployment as it progresses by navigating to the Operations tab. When provisioning is complete, the node status changes to Offline. Before nodes can accept jobs, they need to be brought online.

## License Management

Windows HPC Server 2008 supports images with Volume Licensing, OEM, or retail evaluation licensing. For Volume Licensing, either a Multiple Activation Key (MAK), or Key Management Service (KMS) activation is supported, and the KMS service can be installed on the head node. Note that KMS requires a minimum of 25 nodes. For smaller clusters where KMS activation is not an option, MAK is the preferred solution. If compute nodes have no direct access to the Internet, then the head node can perform MAK proxy activation on behalf of the compute nodes.

The Product Identification (PID) for each compute node is a property of that node. For nodes that use Volume Licensing, the same PID may be shared by multiple nodes. The PID is assigned to the node during initial node discovery, and can be prepopulated to Administration Console using the XML file that prepopulates node names, based on BIOS GUIDS. This has been extended to support MAC addresses as well.

#### Other Administrative Tasks

Administrators can perform other tasks using the Configuration Navigation Pane, including adding users and creating job templates. For more information on job templates, see the “Windows HPC Server 2008 Job Scheduler” white paper.

## Node Management

Once the cluster is deployed, the administrator can monitor the system. Click Node Management in the Navigation Pane to open Node Management View in the Administration Console. There are three basic views available in the Node Management center pane: List View, which shows node properties and resources in a standard list format, the Heat Map View shown in Figure 7, which provides an at-a-glance view of the node health metrics in a heat map format, and the Operations view which is particularly useful for tracking the progress of operations on the nodes.

## Monitoring

For a quick overview of the overall health and status of all nodes, or a subset of nodes based on the filtering properties, the user can display the nodes as a metrics heat map.

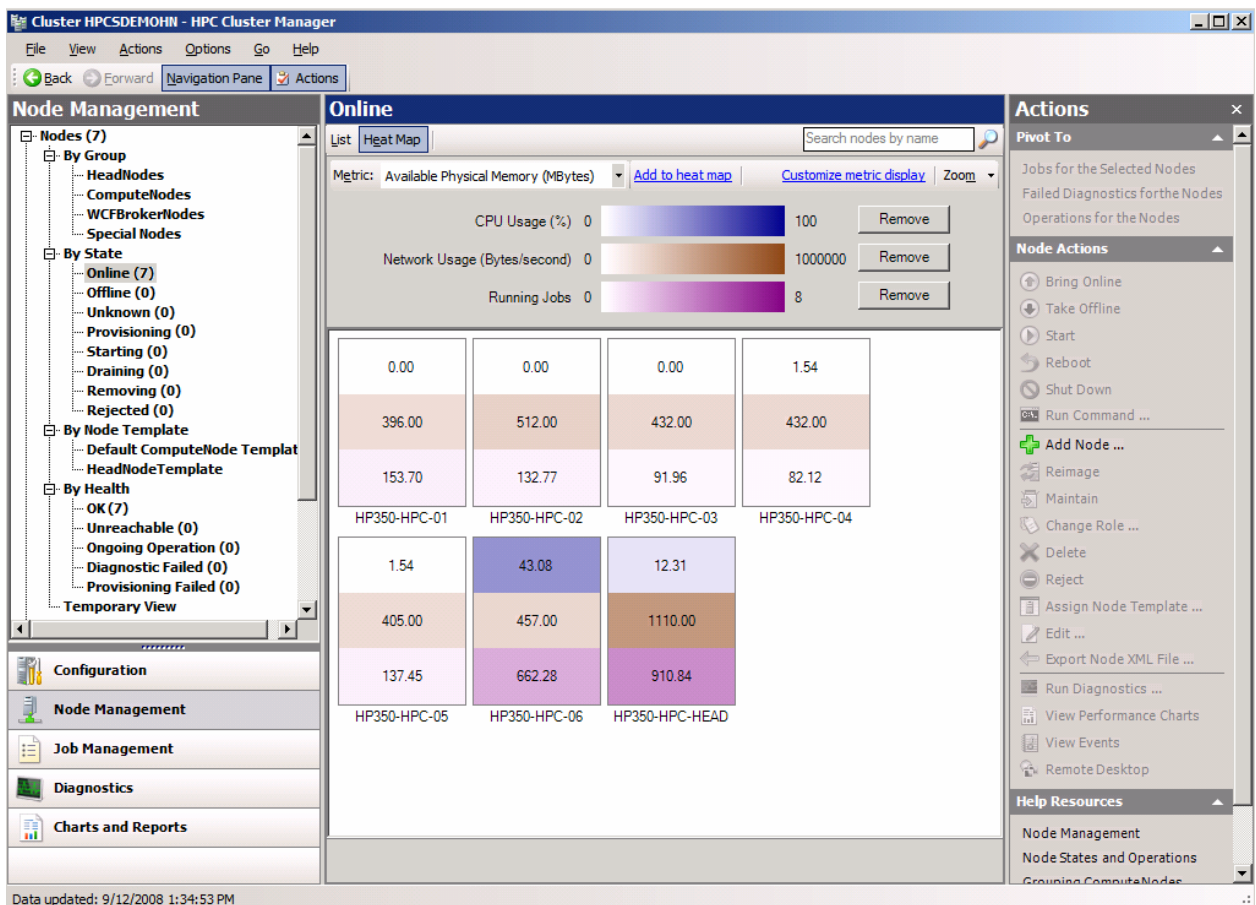


Figure 7 Node state heat map

From Heat Map View, the user can quickly switch to List View, or take action on the node directly. The list of actions available for a selected node or nodes is populated in the Actions pane on the right of the Administration Console, or on the shortcut menu. Double-click a selected node to open a dialog box that shows the details of the node. From the Heat Map view, the user can also quickly see events and charts for the selected nodes.

### **Advanced Monitoring with System Center Operations Manager**

Windows HPC Server 2008 provides basic out-of-the-box monitoring as defined above that allows system administrators to monitor their clusters. Windows HPC Server 2008 will include a custom System Center Operations Manager Management Pack that enables advanced monitoring of Windows HPC Server 2008 clusters within a familiar and extensive System Center enterprise management environment. With System Center Operation Manager, administrators can monitor and aggregate events, provide e-mail alerts, provide for application monitoring, and other services in addition to the built-in Windows HPC Server 2008 cluster monitoring.

### **Grouping and Filtering**

Windows HPC Server 2008 enables the grouping of compute nodes for purposes of both scheduling jobs and for management into Node Groups. Each node group is a collection of compute cluster nodes, and a node can belong to multiple node groups. Cluster administrators can create node groups and assign nodes to one or more node groups. Administrators can apply a management action to all the nodes in a group and users can submit jobs to a particular group of nodes.

Job templates can define a node group so that all jobs using that template will run on a specific node group.

Three default groups are defined by Windows HPC Server 2008 for each cluster you create:

- **Head Nodes** – This group contains the head node.
- **Compute Nodes** – This group contains all the compute nodes that have been added to the cluster.
- **WCF Broker Nodes** – this group contains nodes that are used to dispatch services to compute nodes.

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**Note:** A head node can also be configured as a compute node or broker node.

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### **Operating on Nodes**

The properties of individual nodes are automatically populated into the Node Management Navigation Pane. By default, Node View is repopulated with updated information every 24 hours, or when an event triggers an update.

## Job Management

In Windows HPC Server 2008, the management of jobs is directly integrated into Administration Console. Using the Job Management Navigation button, you can schedule jobs and monitor the status of jobs. The job management functionality is covered in depth in the “Windows HPC Server 2008 Job Scheduler” white paper. Important new features for job management and scheduling include expanded policies, Windows Communications Framework Service Routing for SOA applications, and adaptive and multilevel resource allocation.

## Diagnostics

The goal of Windows HPC Server 2008 is to provide a diagnostics platform that allows administrators to execute health and proactive monitoring, troubleshooting, and performance tests from within the Administration Console by clicking the Diagnostics button in the Navigation Pane. Tests will be node-based (events, connectivity), node group-based (DHCP, AD), or service-based (latency). The diagnostics platform of HPCS provides a comprehensive set of tests and diagnostic tools. With HPCS you can:

- Run tests on the entire cluster or a subset of the nodes
- Use the Job Scheduler to coordinate test runs and jobs so they don't interfere
- Archive test run results so that the administrator can track historical cluster status
- Integrate diagnostics tests as a final step in deployment to verify cluster functionality

### Windows HPC Server 2008 Expanded Diagnostics Include:

- **Connectivity Tests**
  - **Domain Connectivity**—checks basic Active Directory® Domain Services (AD DS) connectivity.
  - **DNS Name Resolution**—verifies that nodes are able to resolve the names of other nodes.
  - **Internode Connectivity**—performs ping tests from each node to all other online nodes in the cluster.
  - **Parallel Ring Latency**—performs single ping-pong test for each node in a ring.
- **Services Tests**
  - **Service Errors**—searches event logs for recent service errors.
  - **All Services Running**—verifies that the HPC Pack services are running on the node.
- **Job Submission Test**—runs a simple test job on the node
- **System Configuration Tests**
  - **Application Configuration Report**—Reports on the configured applications installed on node.
  - **Firewall Configuration Report**—lists the firewall rules enabled on the node.
  - **Installed Patches Report**—lists the updates installed on each node.
  - **Network Configuration Report**—shows the network configuration of the node
  - **Pending Patches Report**—lists outstanding updates for the node
  - **Patches Required**—compares updates installed against the list of updates in the node template.
  - **Service Configurations Report**—reports on all the services running on the node.
- **Service-Oriented Applications Tests**
  - **SOA Model Latency**—runs a basic Service-Oriented Application functional test.
  - **SOA Service Configurations Report**—shows all the SOA services running on the node.

A key feature of the Windows HPC Server 2008 is time synchronized event logging. By precisely time-stamping and synchronizing events across the cluster, and rolling those events up to the head node, the ability to troubleshoot jobs across even very large clusters is greatly enhanced.

## Charts and Reports

Windows HPC Server 2008 has the familiar look of SQL Reporting Services. If an existing SQL Server 2005 instance is available, it will be used, or SQL Express will be installed on the head node if required. HPCS includes historical charting of node and cluster performance and health, including:

- Node state
- Job throughput
- Cluster CPU usage
- Cluster network usage
- Cluster disk throughput
- Scheduler nodes
- Scheduler jobs
- Scheduler cores

In addition to these charts, there are standard reports of:

- Node Availability
- Job Resource Usage
- Job throughput
- Job turnaround

## Windows PowerShell

Windows HPC Server 2008 includes full support for Windows PowerShell, with a complete set of cmdlets that give the cluster administrator full management capabilities from the command line. PowerShell cmdlets use a “Verb-Noun” syntax, with all the HPCS cmdlets having nouns preceded by “Hpc”. Table 1 in the Appendix lists the PowerShell cmdlets that are available.

### Using Windows PowerShell

Figure 8 shows a simple example of using Windows PowerShell to provision nodes on a cluster. In the HPC PowerShell window, we first get a list of nodes in state “Unknown”, and then take that list and apply the “Default ComputeNode Template” to them. In the background, on the management console, we can see that the state of the nodes has changed to Provisioning.

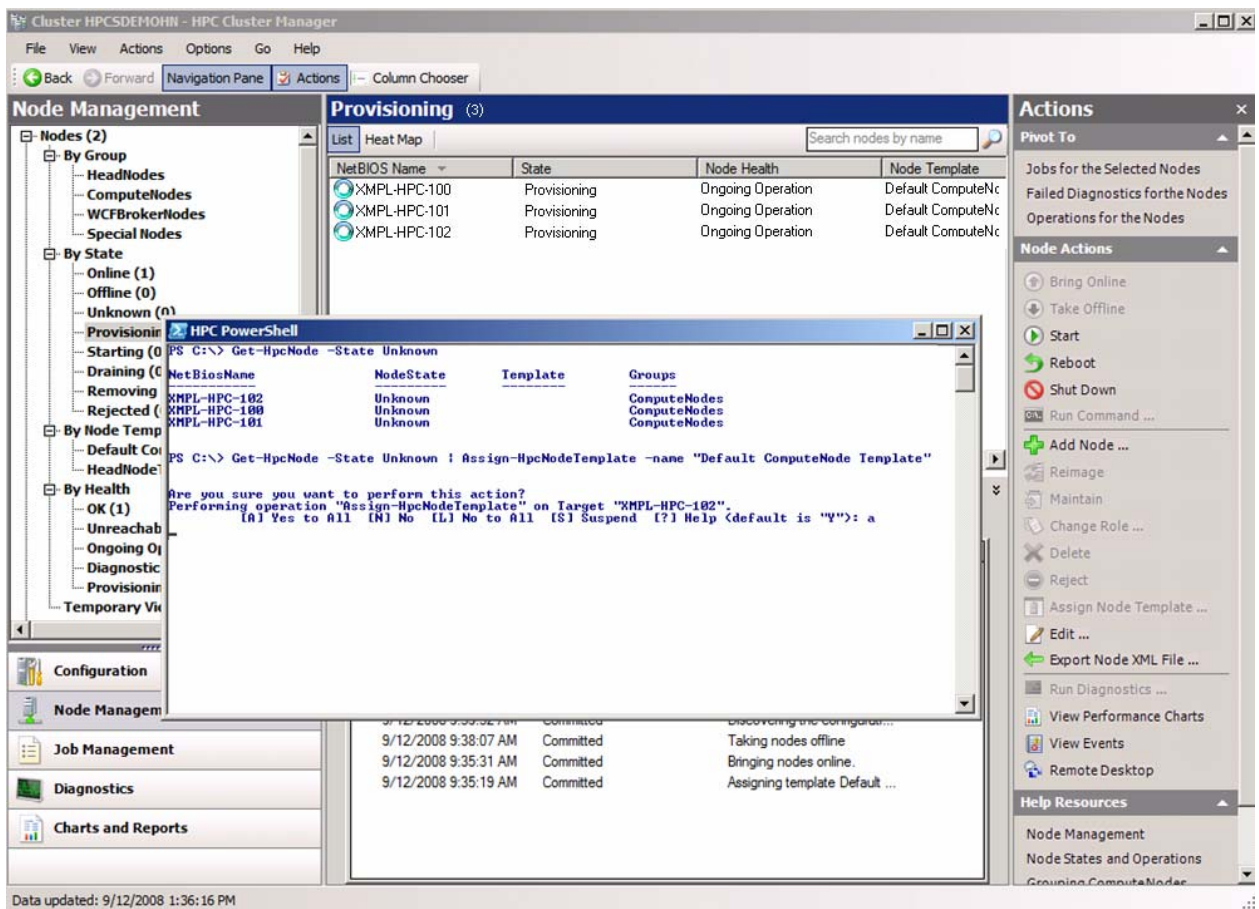


Figure 8 - Using Windows PowerShell to Provision Nodes

## Summary

Windows HPC Server 2008 is the latest version of the Microsoft High Performance Computing (HPC) platform. A key introduction in Windows HPC Server 2008 is the new System Center user interface, which integrates all the management functions of Windows HPC Server 2008 into a single user interface that provides improved navigation and filtering abilities for large clusters, and uses Navigation Pane buttons to quickly change the context and view. The new management and deployment interface, with its template-based deployment capabilities, helps simplify deployment of the operating system and applications to both large and small compute clusters and works to increase cluster administrator productivity. Using the Windows Deployment Services Role in Windows Server 2008 provides fully integrated node deployment and provisioning, and helps to ensure that large clusters can be easily and quickly deployed.

The Job Scheduling, Node Management, Cluster Monitoring, Diagnostics, and Reporting functions are directly integrated into the Administration Console, providing a unified interface to help improve administrator productivity, and to improve cluster utilization.

## Appendix – Powershell Cmdlets

Table 1 - Microsoft HPC Pack 2008 PowerShell Cmdlets

Verb	Noun	ShortDescription
Set	HpcClusterProperty	Set cluster wide properties. Cluster wide properties are job scheduler parameters and environment variables as well as deployment's NamingSeries and install credentials
Get	HpcClusterProperty	Get all cluster wide properties.
Add	HpcDriver	Inject a driver into all images in the cluster.
Get	HpcDriver	Get a list of drivers or a single driver by name.
Remove	HpcDriver	Remove the specified driver.
Remove	HpcGroup	Remove a specified group from associated nodes. Without specifying what group to remove, it removes all groups associated with returned nodes
Set	HpcGroup	Changes a group's name and description
Get	HpcGroup	Get a list of groups or individual group
Add	HpcGroup	Add a list of nodes to a group.
New	HpcGroup	Create a new group with name and description.
Get	HpcImage	Get a list of images or a single image by name.
Add	HpcImage	Load an image WIM file and add image to the image store.
Remove	HpcImage	Remove the specified image.
New	HpcImage	Create a new image and add it to the cluster image store
New	HpcJob	Creates a new job
Get	HpcJob	Gets list of jobs
Export	HpcJob	Persist a job to xml file.
Stop	HpcJob	Cancel a job on the specified cluster.
Submit	HpcJob	Submits or resubmits a job to the specified cluster for execution.
Set	HpcJob	Changes the properties of a job
Set	HpcJobCredential	Set job submission credential
Remove	HpcJobCredential	Remove scheduler credential.
Get	HpcJobTemplate	Gets a job template from the cluster specified with the Scheduler parameter.
Import	HpcJobTemplate	Import a job template XML file
Remove	HpcJobTemplate	Delete a job template.
Copy	HpcJobTemplate	Copies a job template.
Export	HpcJobTemplate	Exports a job template to XML
Set	HpcJobTemplateAcl	Sets the ACL on the specified job template.
Get	HpcJobTemplateAcl	Get the ACL for the specified job template
Get	HpcMember	Get users and administrators from the cluster.
Add	HpcMember	Add either a user or an administrator to the cluster.
Remove	HpcMember	Remove a member from the cluster. This member can either be a user or an administrator
Get	HpcMetric	Get a list of metric used for the heatmap in the Admin Console
Remove	HpcMetric	Remove the specified heatmap metric
Export	HpcMetric	Creates an XML file for the specified metric.
Import	HpcMetric	Imports an XML file to create a new metric or overwrite an existing metric for the heatmap display.
Get	HpcMetricValue	Get current value of specified metric.
Set	HpcNetwork	Set network topology as well as all network interfaces.
Get	HpcNetworkInterface	Get the list of network interface or a particular network interface using a

Verb	Noun	ShortDescription
		name or type.
Get	HpcNetworkTopology	Get the current network topology.
Add	HpcNode	Add a preconfigured node into the cluster.
Get	HpcNode	Get a list of nodes
Start	HpcNode	Powers on a node using an IPMI script
Shutdown	HpcNode	Shuts down a compute node.
Restart	HpcNode	Restart compute node.
Set	HpcNode	Change a compute node's properties including description, data center, rack, chassis and roles.
Remove	HpcNode	Remove a compute node.
Set	HpcNodeState	Set the state of a compute node. Currently available states to set are: online, offline and reject.
Export	HpcNodeTemplate	Creates an XML-based representation of a template and stores it in a file.
Copy	HpcNodeTemplate	clone a template, the copy will be exactly the same as the source template
Import	HpcNodeTemplate	Import a template XML file and creates a new template or overwrites an existing template.
Assign	HpcNodeTemplate	Apply node template is used to apply a node template to a compute node.
New	HpcNodeTemplate	Create a new node template and optionally associate with an image
Remove	HpcNodeTemplate	delete the specified template.
Get	HpcNodeTemplate	Get a list of templates or a specific template.
Export	HpcNodeXML	Exports a list of node to an XML file
Import	HpcNodeXML	Imports a node list from an XML file
Get	HpcOperation	View operation's details.
Stop	HpcOperation	Cancel an operation
Get	HpcOperationLog	Get a list of log of the specified operation.
Set	HpcTask	Set a specified task's properties.
Add	HpcTask	Creates a new task and adds it to the specified job.
Get	HpcTask	Returns a task from the specified scheduler
Invoke	HpcTest	Run a specified test
Get	HpcTest	Get all tests or a specific test by name.
Stop	HpcTestResult	Cancels a running test.
Export	HpcTestResult	Exports a test result to an HTML file
Get	HpcTestResult	Get a list of test results for a given test.