



Installing Microsoft Windows Compute Cluster Server 2003 on HP ProLiant servers using the Microsoft Remote Installation Service

integration note, 3rd edition



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Abstract

This integration note provides instructions for installing Microsoft® Windows® Compute Cluster Server (CCS) 2003 acquired through a Microsoft Volume Licensing program on specified HP ProLiant servers using Microsoft Remote Installation Services (RIS).

If you purchased Windows CCS 2003 directly from HP, then follow the instructions provided in the HP Factory-Installed Operating System Software for Microsoft Windows Compute Cluster Server 2003 User Guide that is included with the server.

Installation requirements

This section identifies prerequisites and server requirements for installing Windows CCS 2003 on ProLiant servers.

Prerequisites

For operating system requirements, refer to the *Windows Compute Cluster Server 2003 Getting Started Guide*, which is located on the Microsoft Compute Cluster Pack CD.

IMPORTANT:

Windows CCS 2003 installations using RIS are only supported in certain network topologies. Refer to the *Windows Compute Cluster Server 2003 Getting Started Guide* for details.

NOTE:

Domain administrator privileges are required to install the Compute Cluster Pack.

For detailed technical information, including additional prerequisites, refer to the Windows Compute Cluster Server 2003 Technical Library in the Microsoft TechCenter at <http://technet2.microsoft.com/WindowsServer/en/Library>.

Server requirements

Windows CCS 2003 requires 64-bit capable servers. Servers that are supported with Microsoft Windows Server 2003 Release 2, 64-bit Edition are also supported with Windows CCS 2003. For a list of ProLiant servers that are supported with Windows Server 2003 R2 64-bit Edition, see the ProLiant Server Support Matrix for Windows at <http://h10018.www1.hp.com/wwsolutions/windows/index-all.html>.

Although supported ProLiant servers are shipped with the minimum firmware and driver versions required for Windows CCS 2003, HP recommends updating firmware and drivers to the latest versions before installing the operating system. Windows Server 2003 64-bit Edition firmware and driver should be used with Windows CCS 2003.

ProLiant ROM and driver updates are available as follows:

- System ROM family code and version: <http://h18007.www1.hp.com/support/files/server/us/romhowto.html>
- ROMPaq downloads: <http://h18023.www1.hp.com/support/files/server/us/romtabl.html>
- Drivers: www.hp.com/go/support

Installation overview

This section outlines the procedures to follow when using RIS to install Windows CCS 2003 obtained through a Microsoft Volume Licensing program on ProLiant servers. The RIS installation procedures referenced in this document complement the standard RIS installation procedures for Windows CCS 2003. The standard RIS installation instructions are available in the "Installing Remote Installation Service" section of the Installing Compute Cluster instructions on the Microsoft TechCenter website (<http://go.microsoft.com/fwlink/?LinkId=64198>).

To complete a Windows CCS 2003 installation using RIS that is fully supported by HP, complete all of the phases and steps listed below. Before beginning the installation, read the instructions for all phases completely.

A Windows CCS 2003 installation using RIS consists of the following installation phases:

- Install server hardware, racks, and cabling
- Install Windows Server 2003, Compute Cluster Edition on the head node
- Install and configure Microsoft Compute Cluster Pack on the head node
- Configure RIS on the head node
- Install Windows CCS 2003 on the compute nodes using RIS
- Update other drivers manually

NOTE:

The instructions provided in this Integration Note are for Windows CCS 2003 using Windows Service Pack 1 and Compute Cluster Pack version 1. It does not include instructions for Windows Service Pack 2 or Windows Deployment Services.

Pre-installation tasks

To prepare for installation, ensure that the following conditions are met:

1. Ensure that the network topology (switches and cabling) supports RIS and Windows CCS 2003 (see the *Windows Compute Cluster Server 2003 Getting Started Guide* on the Compute Cluster Pack CD).
2. Install all supported server hardware (including memory, CPUs, disks, and controllers) properly.
3. Connect all power connections and verify functionality.

Installation procedure

Install Windows Server 2003, Compute Cluster Edition on the head node

Complete the following steps to install Windows Server 2003, Compute Cluster Edition on the head node, the server that provides management and job scheduling services to the compute cluster. For detailed instructions on standard installations of Windows Server 2003, Compute Cluster Edition, see the "Installing Compute Cluster Edition" section under Compute Cluster Server: Deployment at <http://technet2.microsoft.com/WindowsServer/en/Library>.

1. Connect a keyboard, monitor, and mouse directly to the head node, and power on the server.
2. If prompted, press the **F8** key to configure the disk subsystem.
3. Run the Setup Utility and configure the BIOS settings as follows:

NOTE:

Start the Setup Utility by pressing a function key (usually F9 or F10) during startup.

- a. Set the date and time.
 - b. For Intel-based servers that have an option for Hyper-Threading, disable Hyper-Threading as follows:
 - For ProLiant DL 300 series, DL 500 series, or BladeSystem servers, select **Advanced Options > Hyper-Threading**.
 - For ProLiant DL100 Series servers, select **Advanced > Advanced Processor Options > Hyper-Threading**.
 - c. Configure any other required BIOS settings.
4. Insert the Windows Server 2003, Compute Cluster Edition CD and reboot the server. If prompted, boot from the CD and start Windows Setup.
 5. Create a second partition that is at least 2 GB in size to be used for the RIS images. The RIS partition is only required on the head node, not on compute nodes. This can be a separate partition on the same disk as the boot disk, or it can be on separate physical drives. Create and format the second partition using the Windows disk management tools after the Windows installation has completed.
 6. Perform a standard CD installation. You will need to provide configuration information such as name and organization, computer name, licensing mode, local administrator password, and date and time. For instructions on standard RIS installations, refer to the "Installing Remote Installation Service" section of the Installing Computer Cluster instructions on the Microsoft TechCenter website (<http://go.microsoft.com/fwlink/?LinkID=64198>).

NOTE:

Configuration details may vary depending on your configuration. Certain settings may not apply to your environment.

7. At the Network Settings prompt, select **Custom** to configure TCP/IP on all network interfaces. If you do not see the network settings prompt, please contact your local IT administrator to verify the network is configured correctly within your enterprise.
8. When a prompt displays asking you to join a workgroup or domain, perform either of the following tasks:

NOTE:

If the prompt does not display, select **Control Panel>System> Computer Name> Change** to join a domain or select a workgroup for your configuration as described below.

- If you are connected to a network with an existing Active Directory domain controller, join the domain. Supply a domain administrative user name and password to join the domain.
 - or-
 - If your head node will act as the domain controller, configure a workgroup name instead of joining a domain. Change this when you convert the head node to a domain controller at a later time.
9. After the operating system installation is complete, log in as administrator. Do not run any of the Post-Setup Security Updates or add or change any roles in the Manage Your Server utility at this time.
 10. For ProLiant DL 300 series servers, DL 500 series servers, and BladeSystem servers only, the server prompts you to run the ProLiant Support Pack from the HP SmartStart CD that came with the server. Insert the SmartStart CD and click the Software tab, select Install ProLiant Support Pack, and follow the on-screen instructions.
 11. For ProLiant DL 100 series servers only, insert the HP ProLiant Software Support CD and update any necessary drivers, particularly if you have any network card drivers that are not on the Microsoft media. Select drivers for Windows Server 2003 64-bit.
 12. If you are not prompted to configure your network settings or if you cannot communicate with a domain controller when attempting to join a domain, the network card driver in your server is not on the Software Support CD. To determine whether your network card driver is loaded, complete the following steps:
 - a. Right-click My Computer and select **Properties > System > Hardware > Device Manager**.
 - b. Add the network card driver when prompted. Drivers are included on the SmartStart CD or Software Support CD that came with your server, or you can download the latest drivers from the HP website. Be sure to configure the network addresses to match your cluster topology.
 13. If the Found New Hardware wizard appears during the operating system installation, click **Cancel**. Do not attempt to proceed with the installation of drivers until after the second login when the operating system is fully installed.

CAUTION:

Do not attempt to install the drivers during the operating system installation. Doing so might cause the server to automatically reboot before the driver installation has completed. This action could result in the incorrect installation of a device.

14. If you see the message "Digital signature is not found" during operating system installation when drivers are about to be installed, click **Yes** to accept the drivers and continue the installation. If you are prompted to reboot the server, click **No**. After the operating system installation is complete, download digitally signed drivers from the HP website (www.hp.com/support/files).

CAUTION:

The server requires a reboot at the end of the installation. Do not power down the server at any time during the installation process. Any power interruption during the installation process could prevent proper completion of the installation and prevent the operating system from restarting.

15. If necessary, reboot the node and log in.

If your head node will also act as your Active Directory domain controller, run DCPROMO.EXE from a command prompt to make the head node a domain controller for the cluster.

Install and configure Microsoft Compute Cluster Pack on the head node

Use the following basic steps to install Compute Cluster Pack on the head node. For instructions on installing the Compute Cluster Pack, see the “Installing Compute Cluster Pack on a Head Node” section in Compute Cluster Server: Deployment at <http://technet2.microsoft.com/WindowsServer/en/Library>.

1. Download and apply the required Microsoft Hot Fixes, and make sure that the head node is a member of a domain.
2. After the reboot, log in as a user with domain Administrator privileges.
3. If your compute nodes are not directly connected to your public network, install and configure Internet Connection Sharing (NAT/ICS) on the head node.
4. Insert the Microsoft Compute Cluster Pack CD and run Setup.exe on the head node to start the cluster software installation.
5. Select **Create a new compute cluster with this server as the head node**. You can also choose to use the head node as a compute node.

IMPORTANT:

If you do not choose to use the head node as a compute node, the only way to configure this later is to remove and reinstall the cluster software on the head node.

6. Select **Install** to install each of the required components. If the components labeled Download required are not already installed, you will need to download these and install them prior to continuing. These are the required Microsoft Hot Fixes.
7. When the Microsoft Compute Cluster Pack installation is complete, the Cluster Deployment Tasks To-Do List appears. Select the **Configure Cluster Network Topology** wizard in the Networking section.
8. Select the network topology that you have configured for your cluster. Make sure that this topology supports RIS installations.

NOTE:

You can use the Compute Cluster Administrator to change the network topology configuration. Reinstallation is not required.

9. If the head node is also a domain controller and the compute nodes are not on a public network, disable the Windows Firewall using the wizard in the Networking section of the Compute Cluster Administrator To-Do List.

Configure RIS on the head node

To complete the RIS installation, follow the procedures found in the "Installing Remote Installation Services" section of the Microsoft documentation (<http://go.microsoft.com/fwlink/?LinkID=64198>) and then complete the following steps:

1. From the To-Do List page of the Compute Cluster Administrator, click **Install RIS** in the Remote Installation Services (RIS) area.
2. Follow the prompts to install RIS.
3. Continue the RIS installation procedures in the "Adding a RIS Image" section of the Microsoft documentation (<http://go.microsoft.com/fwlink/?LinkID=64198>). Follow the prompts to run the Add a New Image wizard.
4. Continue the RIS installation procedures in the "Configuring a RIS Image" section of the Microsoft documentation (<http://go.microsoft.com/fwlink/?LinkID=64198>). Select **Manage Images > Modify image configuration** and add your license key.
5. If the network drivers for a ProLiant server is not on the Windows Server 2003, Compute Cluster Edition CD, add the server network card drivers into the RIS image. To do so, identify which ProLiant servers you will install with RIS, and then locate the appropriate network driver for each. The drivers can be found on the SmartStart or Support CD that was included with your server. The latest server drivers are also available for download from the HP website (www.hp.com/go/support).

Some ProLiant servers use a Multi-function NIC, which may not be detected during the RIS installation. Download the RIS driver for your server and add it to the RIS installation.

If this occurs, refer to the following two Microsoft Knowledge Base Articles:

- Microsoft Knowledge Base Article 932449, "A network adapter is not detected when you start a computer by using PXE on an RIS server or on an ADS server that is running Windows Server 2003, Enterprise Edition" at <http://support.microsoft.com/kb/932449/en-us>.
 - Microsoft Knowledge Base Article 246184, "How to Add Third-Party OEM Network Adapters to RIS Installations" at <http://support.microsoft.com/kb/246184/en-us>. However, instead of copying the RIS drivers to the i386 folder, copy it to the amd64 folder.
6. It is also recommended you download the appropriate non-RIS network driver which will be used by the fully installed OS and include these drivers in your RIS image. If the Windows OS install completes, but no network connections are available, the CCS install will not be able to finish. Adding the appropriate non-RIS drivers to your RIS image will resolve this issue.

NOTES:

When deploying a RIPrep image through RIS, you might receive the message "The operating system image you selected does not contain the necessary drivers for your network adapter. Try selecting a different operating system image. If the problem persists, contact your administrator. Setup cannot continue. Press any key to exit." This message indicates that the network card driver for that server cannot be found in the RIS image.

Some newer HP multi-function cards, such as those found on ProLiant c-Class blades, require a special driver when deployed using RIS. For information on how to download the new drivers, refer to

http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?locale=en_US&objectID=c00793390. Use the new drivers to complete the Step 7.

The following Microsoft Knowledge base articles were used as a reference for the instructions:

- For information on adding the driver to the RIS image (<http://support.microsoft.com/kb/932449/en-us>).
- For information on adding the RIS driver to the RIS image (<http://support.microsoft.com/kb/246184/en-us>). Instead of copying the RIS drivers to the i386 folder, copy it to the amd64 folder.

-
7. After RIS is properly configured on the head node, continue the RIS installation procedures in the Modifying a RIS Image section on the Microsoft TechNet website (<http://go.microsoft.com/fwlink/?LinkID=64198>).

You can also add other drivers to the RIS image by following these instructions:

- a. Place the network card driver files in the original image folder created when risetup.exe was executed for the first time. For example: D:\Setup\English\Images\
- b. Place the network card driver files in the amd64 subfolder under the original image folder. For example: D:\Setup\English\Images\\amd64
- c. Create the following directory and place all network card driver files in it:
...\Image Name)\\$oem\$\\$1\Drivers\nic
- d. Edit the ristndrd.sif file located in ...\\amd64\templates to include the following information in the [Unattend] section:

OemPreinstall = yes

OemPnPDriversPath = "Drivers\nic"

DriverSigningPolicy = Ignore

- e. Open a command line and enter the following commands to restart RIS:

```
net stop binlsv
```

```
net start binlsv
```

NOTE:

The following Microsoft Knowledge base articles were used as a reference for the previous instructions:

How to Add OEM Plug and Play Drivers to Windows Installations

(<http://support.microsoft.com/default.aspx?scid=kb;EN-US;254078>)

How to Add Third-Party OEM Network Adapters to RIS Installations

(<http://support.microsoft.com/default.aspx?scid=kb;EN-US;246184>).

Install Windows CCS 2003 on the compute nodes using RIS

After RIS is properly configured on the head node, you will deploy the compute nodes, the servers that provide computational resources. Detailed instructions are located in the "Using Automated Addition to Add Nodes section" of the Microsoft documentation (<http://go.microsoft.com/fwlink/?LinkID=27332>).

1. Begin deploying the compute nodes from the Node management section of the Compute Cluster Administrator To-Do List. Select **Add Nodes using the Automated Deployment method** and follow the prompts. Detailed instructions are located in the "Using Automated Addition to Add Nodes section" of the Microsoft documentation (<http://go.microsoft.com/fwlink/?LinkID=27332>).
2. Once all of the nodes have been deployed, from the head node, run the Compute Cluster Administrator and select the Node Management screen. All of the compute nodes report a Pending Approval state.
3. Highlight all of the compute nodes and double click **Approve**. The nodes change to a Paused state.
4. Highlight all of the compute nodes and double-click **Resume**. The nodes change to a Ready state.
5. Add administrators and users to your cluster using the User Management wizard in the Compute Cluster Administrator.

Manually update drivers

If you have installed other devices, such as InfiniBand interconnect cards, you may need to manually install the drivers to support these devices. Depending on the driver support provided, the installation method may vary. Refer to the documentation for the device for exact installation procedures.

However, the following are possible solutions:

- Remote Device Installation—Some vendors provide a utility to remotely install devices. Check your vendor documentation to see if this is available.
- Integration into RIS image—It may be possible to integrate the drivers into the RIS image prior to deployment. Refer to the Microsoft Knowledge Base article listed above for suggestions.
- Manual Installation—You may need to login in directly to each compute node (using Remote Desktop) and manually install and configure the drivers.
- Run Command Feature—The Compute Cluster Administrator has a feature called Run Command that allows you to execute a command line executable across all nodes in the cluster.

- Scripts or Batch Files—If specific node names or parameters must be passed using a command line executable, a script or batch file may be used.

Appendix A: Known issues and workarounds

This section provides details about the known issues with installing Windows CCS 2003 on ProLiant servers using RIS.

Table A-1. Known issues on ProLiant servers

Issue	Details
Issue 1	<p>RIS only installs Windows CCS 2003.</p> <p>Description: The RIS process only installs the base operating system and cluster software. It is not possible to use RIS to install other applications.</p> <p>Workaround: The HP ProLiant Essentials Rapid Deployment Pack allows you to deploy a customized image. This allows you to configure one compute node with all of the required software, and then deploy that image to all of the other compute nodes. More information on HP ProLiant Essentials Rapid Deployment Pack can be found at www.hp.com/servers/rdp.</p>
Issue 2	<p>Downloadable driver updates (Smart Components) may not unpack properly with 64-bit Windows.</p> <p>Description: Some compressed driver files may not unpack properly if run on a server running Windows CCS 2003. You may see an error indicating a valid file but for the wrong system architecture.</p> <p>Solution: Copy the compressed file to a system running a 32-bit version of Windows and unpack it, then copy back to the 64-bit server for execution.</p>
Issue 3	<p>Voltaire InfiniBand drivers may not install properly.</p> <p>Description: Voltaire InfiniBand drivers may not install properly if the card has an older version of firmware.</p> <p>Solution: Follow the procedures found in the Voltaire user documentation and update the firmware on each InfiniBand card.</p>
Issue 4	<p>Compute nodes do not join the cluster automatically.</p> <p>Description: RIS installs the operating system successfully, but does not execute the Compute Cluster Pack setup properly.</p> <p>Solution: Change the Windows Firewall setting in the Compute Cluster Administrator using the wizard provided in the Networking section of the To-Do List.</p>

For more information

For additional information, refer to the resources listed below.

Source	Hyperlink
HP and Microsoft Frontline Partnership website	www.hp.com/go/microsoft
Microsoft website	www.microsoft.com
Microsoft Knowledge Base Article 932449, "A network adapter is not detected when you start a computer by using PXE on an RIS server or on an ADS server that is running Windows Server 2003, Enterprise Edition"	http://support.microsoft.com/kb/932449/en-us
Microsoft Knowledge Base Article 246184, "How to Add Third-Party OEM Network Adapters to RIS Installations"	http://support.microsoft.com/kb/246184/en-us

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