Abstract

This guide helps you get started with Microsoft® Hyper-V™ Server 2008 R2 by providing information about its features, hardware requirements, and how to set up and manage it.

For more information about Hyper-V Server 2008 R2, see the Microsoft Hyper-V Server Web site (http://go.microsoft.com/fwlink/?LinkId=129170). This document is also available in an online format (http://go.microsoft.com/fwlink/?LinkId=158005).
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Microsoft Hyper-V Server 2008 R2 Getting Started Guide

Microsoft® Hyper-V™ Server 2008 R2 is the next generation of Microsoft Hyper-V Server 2008, which is a hypervisor-based product that was first released in September 2008. Hyper-V Server provides a simplified, reliable, and optimized virtualization solution, which enables improved server utilization and reduced costs. Because Hyper-V Server is a dedicated stand-alone product that contains only the Windows® hypervisor, a Windows Server® driver model, and virtualization components, it provides a small footprint and minimal overhead. It can easily fit into customers’ existing IT environments, leveraging their existing provisioning, management, support tools, processes, and skills.

New Features

Hyper-V Server 2008 R2 contains the same virtualization feature set as the Hyper-V role in Windows Server 2008 R2. Some of the features included in Hyper-V Server 2008 R2 are:

- **Live migration**: Hyper-V Server 2008 R2 includes support for live migration. Live migration enables customers to move running virtual machines from one host to another without service interruptions.

- **Failover clustering**: Hyper-V Server 2008 R2 includes host clustering technology to enable support for unplanned downtime. With live migration and failover clustering, customers receive high availability and dynamic migration capabilities for planned and unplanned downtimes.

- **Processor and memory support**: Hyper-V Server 2008 R2 supports up to 8-socket physical systems and provides support for up to 64 cores. In addition, Hyper-V Server 2008 R2 supports up to 1 TB of RAM on a physical system.

- **Updated Server Configuration tool**: The Server Configuration tool is designed to simplify the most common configuration tasks. It helps you configure the initial settings without having to type command-line strings. In Hyper-V Server 2008, this utility is called Hyper-V Configuration Utility (HVConfig). In Hyper-V Server 2008 R2, this tool is called the Server Configuration tool (SConfig.cmd). It is included in Hyper-V Server 2008 R2 and in the Server Core installation option of Windows Server 2008 R2. Two configuration options are available only when you run the Server Configuration tool on a server running Hyper-V Server 2008 R2:
  - An option to have the Server Configuration tool start automatically every time you log on to a computer running Hyper-V Server with the Administrator account
  - An option to configure failover clustering
For a detailed feature and support comparison between Hyper-V Server 2008, Hyper-V Server 2008 R2, and Windows Server 2008 R2, see the Virtualization Platform Comparison section.

## Virtualization Platform Comparison

The following table provides an overview comparison of the features and support in the following products:
- Hyper-V Server 2008
- Hyper-V Server 2008 R2
- Windows Server 2008 R2 (Enterprise and Datacenter editions)

<table>
<thead>
<tr>
<th>Capabilities</th>
<th>Hyper-V Server 2008</th>
<th>Hyper-V Server 2008 R2</th>
<th>Windows Server 2008 R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>x64-based processor architecture only</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Hypervisor-based</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Product type</td>
<td>Stand-alone product</td>
<td>Stand-alone product</td>
<td>Operating system</td>
</tr>
<tr>
<td>Number of sockets (licensing)</td>
<td>Up to 4</td>
<td>Up to 8</td>
<td>Up to 8 (Enterprise)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Up to 64 (Datacenter)</td>
</tr>
<tr>
<td>Number of cores supported by the hypervisor</td>
<td>24 (with Service Pack 2 or KB956710 (<a href="http://go.microsoft.com/fwlink/?LinkId=157983">http://go.microsoft.com/fwlink/?LinkId=157983</a>))</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Memory</td>
<td>Up to 32 GB</td>
<td>Up to 1 TB</td>
<td>Up to 1 TB</td>
</tr>
<tr>
<td>Virtual machine migration</td>
<td>None</td>
<td>Quick and live migration</td>
<td>Quick and live migration (Enterprise and Datacenter)</td>
</tr>
<tr>
<td>Maximum number of cluster nodes</td>
<td>Not applicable</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Capabilities</td>
<td>Hyper-V Server 2008</td>
<td>Hyper-V Server 2008 R2</td>
<td>Windows Server 2008 R2</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Administrative UI</td>
<td>Command line, text-based configuration tool, and remote GUI management (with Remote Server Administration Tools or a Full installation of Windows Server 2008 R2)</td>
<td>Command line, text-based configuration tool, and remote GUI management (with Remote Server Administration Tools or a Full installation of Windows Server 2008 R2)</td>
<td>Command line, text-based configuration tool, remote management, and local GUI (Hyper-V Manager MMC)</td>
</tr>
<tr>
<td>Management</td>
<td>Existing management tools</td>
<td>Existing management tools</td>
<td>Existing management tools</td>
</tr>
<tr>
<td>Manageable by System Center Virtual Machine Manager</td>
<td>Yes (Virtual Machine Manager 2008 and Virtual Machine Manager 2008 R2)</td>
<td>Yes (Virtual Machine Manager 2008 R2)</td>
<td>Yes (Virtual Machine Manager 2008 R2)</td>
</tr>
<tr>
<td>Virtualization rights for Windows Server guest virtual machines</td>
<td>0</td>
<td>0</td>
<td>4 virtual machines (Enterprise) Unlimited virtual machines (Datacenter)</td>
</tr>
<tr>
<td>Number of running virtual machine guests</td>
<td>As many as physical resources allow, up to 192</td>
<td>As many as physical resources allow, up to 384</td>
<td>As many as physical resources allow, up to 384</td>
</tr>
<tr>
<td>Maximum number of virtual processors</td>
<td>8 times the number of logical processors</td>
<td>8 times the number of logical processors</td>
<td>8 times the number of logical processors</td>
</tr>
</tbody>
</table>

Hyper-V Server 2008 and Hyper-V Server 2008 R2 also provide the following support:
• **Storage**
  Direct-attached storage: You can use Serial Advanced Technology Attachment (SATA), external Serial Advanced Technology Attachment (eSATA), Parallel Advanced Technology Attachment (PATA), Serial Attached SCSI (SAS), SCSI, and Firewire.
  Storage area networks (SANs): You can use Internet SCSI (iSCSI), Fibre Channel, and SAS technologies.

• **Guest operating system support**
  See article 954958 in the Microsoft Knowledge Base (http://go.microsoft.com/fwlink/?LinkId=157981).

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**Setting Up Microsoft Hyper-V Server 2008 R2**

The following sections describe the steps to install and set up Hyper-V Server 2008 R2:

- Review Prerequisites for Installation
- Install Hyper-V Server 2008 R2
- Manage Hardware and Drivers
- Configure Hyper-V Server 2008 R2 for Remote Management
- Manage Hyper-V Server 2008 R2 Remotely
- Configure Virtual Networks
- Configure and Manage Failover Clustering

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**Review Prerequisites for Installation**

Hyper-V virtualization technology requires specific hardware. You can identify systems that support x64-based architecture and Hyper-V by searching the Windows Server catalog for Hyper-V as an additional qualification (http://go.microsoft.com/fwlink/?LinkId=111228).

Hyper-V Server 2008 R2 has hardware requirements that are similar to the Hyper-V role in Windows Server 2008 R2.

**Processor**

- Minimum: An x64-based processor with hardware-assisted virtualization. This is available in processors that include a virtualization option—specifically, processors with Intel Virtualization Technology (Intel VT) or AMD Virtualization (AMD-V) technology.
• Hardware-enforced Data Execution Prevention (DEP) must be available and enabled. Specifically, you must enable the Intel XD ("execute disable") bit or the AMD NX ("no execute") bit.

**Memory**
- Minimum: 1 GB RAM; recommended: 2+ GB RAM
- Maximum: 1 TB

**Network adapters**
- Minimum: 1
- Recommended: 2 or more

**Additional considerations**
- The settings for hardware-assisted virtualization and hardware-enforced DEP are available in the BIOS. However, the names of the settings may differ from the names identified previously.
  - For more information about whether a specific processor model supports Hyper-V, check with the manufacturer of the computer.
- If you modify the settings for hardware-assisted virtualization or hardware-enforced DEP, you may need to turn off the power to the computer and then turn it back on. Restarting the computer may not apply the changes to the settings.

**Install Hyper-V Server 2008 R2**

Follow the steps below to install and set the initial configuration of Microsoft Hyper-V Server 2008 R2.

1. Start the computer from the installation media.
2. In the Setup Wizard, click the language you want to use during the installation.
3. In the next screen, select the language to be installed, along with the time and currency formats and the keyboard layout, and then click Next.
4. Click Install Now, and then accept the license terms.
5. In the next screen, specify the location where you want Hyper-V Server 2008 R2 to be installed, and then click Next.
6. As the installation proceeds, the computer will restart several times. When the installation
is complete, you will have the opportunity to set up the Administrator account. Click OK.

7. Type a strong password for the Administrator account, confirm it, and then press ENTER.

8. When you see the message **Your password has been changed**, click OK.

**Configure Hyper-V Server 2008 R2**

Hyper-V Server does not contain a graphical user interface. Instead, you configure Hyper-V Server using the Server Configuration tool (Sconfig.cmd). You can use an ordinary command prompt for operations that are not available in the Server Configuration tool. You must be a member of the Administrators group to use the tool.

The Server Configuration tool is also available in Server Core installations of Windows Server 2008 R2, although the options available in the tool are slightly different in that environment. The majority of the options in the Server Configuration tool are documented in the [Server Core Installation Option Getting Started Guide](http://go.microsoft.com/fwlink/?LinkID=134202).

Two options appear only when you run the Server Configuration tool in Hyper-V Server 2008 R2:

- **10) Do not display this menu at login**
- **11) Failover Clustering Feature**

Option 10 simply allows you to control whether or not the Server Configuration tool automatically starts whenever you log on to the computer with an account in the Administrators group.

To enable or disable failover clustering, type **11** and press ENTER. The tool will show the current status of failover clustering.

See the [Command Reference](http://go.microsoft.com/fwlink/?LinkID=132012) for a complete collection of all command-line operations and options.
Because there is no user interface, Hyper-V Server is designed to be managed remotely in the following ways:

- Using Hyper-V Manager from Remote Server Administration Tools (http://go.microsoft.com/fwlink/?LinkID=130862)
- Using the Hyper-V Manager Microsoft Management Console (MMC) snap-in from a server running Windows Server 2008 R2
- Using System Center Virtual Machine Manager R2

### Manage Hardware and Drivers

Follow these procedures to add hardware, obtain a list of drivers, or disable drivers on a server running Hyper-V Server 2008 R2.

#### Adding hardware

▶ **To add hardware**

1. Follow the instructions provided by the hardware vendor for installing the hardware. If the driver is already included in Hyper-V Server 2008 R2, Plug and Play will start and install the driver. If the driver for the hardware is not included, proceed with the following steps.

   ![Note]

   Hyper-V Server 2008 R2 uses the Windows Server driver model. Any drivers that work with Windows Server 2008 R2 will also work with Hyper-V Server 2008 R2.

2. Copy the driver files to a temporary folder on the server running Hyper-V Server 2008 R2.

3. At a command prompt, navigate to the folder where the temporary files are located, and then run the following command, where `driverinf` is the file name of the .inf file for the driver:

   ```
   Pnputil –i –a <driverinf>
   ```

4. If prompted, restart the computer.

▶ **To obtain a list of drivers**

1. At a command prompt, type:

   ```
   Sc query type= driver
   ```

   ![Note]

   You must include the space after the equal sign for the command to complete successfully.
To disable a device driver

1. At a command prompt, type the following, where service_name is the name of the service you obtained in the previous procedure:

   Sc delete <service_name>

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Configure Hyper-V Server 2008 R2 for Remote Management

Before you can manage Hyper-V Server 2008 R2 from a remote computer, you must configure it by following the steps below.

---

To configure Hyper-V Server 2008 R2 for remote management

1. If it is not already running, start the Server Configuration tool by typing Sconfig.cmd in a command prompt and pressing ENTER.

2. If the account you have used to log on to the computer is already in the Domain Administrators group, skip to the next step. If the account you have used to log on to the computer is not in the Domain Administrators group, add the account to the Administrators group by typing 3 and pressing ENTER.

3. Type the domain name and user name and press ENTER. For example, type: domain\domain user.

4. Click OK.

5. In the Server Configuration tool, configure remote management by typing 4 and pressing ENTER.

6. Select any of the following remote management methods. These options are not exclusive—you can enable any or all of them by repeating this step. For remote management, you should enable all of them.

| Allow MMC Remote Management | a. Type 1 to enable MMC Remote Management.  
|                            | b. A message appears that says:  
|                            | “Enabling MMC firewall exceptions and Virtual Disk Service.”  
|                            | c. When the process is complete, the following message appears: |
Enable Windows PowerShell

- Type 2 to enable Windows PowerShell.
- When the process is complete, the following message appears: “You must restart the computer to complete the Windows PowerShell installation. Restart now?” Click Yes.

Allow Server Manager Remote Management

- **Note**
  You must enable Windows PowerShell and restart the computer before you can enable Server Manager Remote Management.
- Type 3 to allow the computer to be managed by using Remote Server Manager.
- When the process is complete, the following message appears: “Remote Server Management enabled.” Click OK.

7. You may need to restart the computer to activate the option.
8. If the computer running Hyper-V Server is in a workgroup, see the Hyper-V Server home page for more information (http://go.microsoft.com/fwlink/?LinkId=158001).

### Manage Hyper-V Server 2008 R2 Remotely

After configuring the computer running Hyper-V Server 2008 R2 for remote management, you can remotely manage Hyper-V Server through any of the following methods:

- Use Hyper-V Manager in a Full installation of Windows Server 2008 R2.
- Use Hyper-V Manager in Windows 7 using Remote Server Administration Tools.
- Use Microsoft System Center Virtual Machine Manager 2008 R2.
Choose the option that is right for you, and then follow the steps that correspond with your choice.

Notes

- The Hyper-V Manager Microsoft Management Console (MMC) snap-in is automatically installed when the Hyper-V role is enabled on Full installations of Windows Server 2008 R2.
- If you will be using a computer with a 32-bit operating system to remotely manage a computer running Hyper-V Server that has failover clustering enabled, you must enable 32-bit support for failover clustering on the computer running Hyper-V Server. You can do this with the following command: dism /online /enable-feature /featurename: FailoverCluster-Core-WOW64

To manage from a Windows Server 2008 R2 computer

1. On the remote computer you will be managing Hyper-V Server from, enable the Hyper-V Manager MMC snap-in: On the Start menu, click Server Manager.
2. Right-click Features, and then click Add Features.
3. Under Remote Server Administration Tools, click Role Administration Tools, click Hyper-V Tools, and then click Next.
4. Click Install.
5. After the computer restarts, click the Start menu, click Administrative Tools, and then click Hyper-V Manager.
6. On the left side of the MMC window, click Hyper-V Manager.
7. From the Actions menu, click Connect to Server, select Another Computer, and then enter the name or IP address of the server that you want to connect to.

To manage from Windows 7

1. On the remote computer you will be managing Hyper-V Server 2008 R2 from, download and install the Hyper-V Manager MMC snap-in from Remote Server Administration Tools (http://go.microsoft.com/fwlink/?LinkId=130862).
2. After the computer restarts, click the Start menu, click Administrative Tools, and then click Hyper-V Manager.
3. On the left side of the MMC window, click Hyper-V Manager.
4. From the Actions menu, click Connect to Server, select Another Computer, and then enter the name or IP address of the server that you want to connect to.
To manage Hyper-V Server remotely from Microsoft System Center Virtual Machine Manager, see the Virtual Machine Manager content (http://go.microsoft.com/fwlink/?LinkID=129168).

**Configure Virtual Networks**

You can configure one or more virtual networks for virtual machines to access network resources. Configure virtual networks as follows.

1. Go to any computer that you have previously set up for remote management of Hyper-V Server.
2. Start the Hyper-V Manager MMC snap-in.
3. From the Actions menu, click Connect to Server, select Another Computer, and then enter the name or IP address of the server that you want to connect to.
4. In the Actions menu, click Virtual Network Manager.
5. Under Create virtual network, select External, and then click Add.
6. Type a name for the new virtual network (such as Corpnet), and then click OK.

**Note**

When you create a virtual network remotely, Hyper-V Server creates the new virtual switch and binds it to the TCP/IP stack of the physical network. If the server running Hyper-V Server is configured with only one physical network adapter, this may result in a loss of network connection. When you create the external virtual switch, ensure that you select the Allow management operating system to share this network adapter check box in Step 5 in this procedure to avoid this situation. A drop of the network connection is normal during the creation of the virtual switch on the physical adapter.

**Configure and Manage Failover Clustering**

You can configure and manage failover clustering and live migration.

1. In the Server Configuration tool (Sconfig.cmd), use option 11 to enable failover clustering.
2. On the remote computer that you will be managing a failover cluster from, download and install Remote Server Administration Tools (http://go.microsoft.com/fwlink/?LinkId=130862).
3. After the computer restarts, click Start, click Administrative Tools, and then click Failover Cluster Manager. You can then use the manager to create and manage failover clusters.
Note

You can mix Hyper-V Server 2008 R2 nodes with nodes running Server Core installations of Windows Server 2008 R2. That is, a cluster can contain nodes of both kinds.

Additional References

- Microsoft Hyper-V Server Web site
  (http://go.microsoft.com/fwlink/?LinkId=129170)
- Microsoft System Center Virtual Machine Manager Web site
  (http://go.microsoft.com/fwlink/?LinkId=129168)