# Technical Support Options

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# Getting Started

## Microsoft® Virtual Server 2005 R2

**Microsoft**®

# Content

CHAPTER 1

# Welcome

Welcome to *Getting Started* for Microsoft® Virtual Server 2005 R2

## Using Getting Started

*Getting Started* is intended to be used with the Setup program so you can easily set up and configure Virtual Server. This guide contains information you need to know before you install Virtual Server, as well as instructions for setting up Virtual Server and creating a simple virtual machine. After you install Virtual Server, comprehensive information on deploying and managing Virtual Server is available, as described in the following section.

This chapter gives an overview of Virtual Server and its features, as well as information about scenarios for which Virtual Server is well suited and scenarios that require usage considerations. Chapter 2 guides you through the process of installing and setting up Virtual Server. Chapter 3 guides you through the process of setting up a virtual machine and installing an operating system. Appendices contain information about troubleshooting setup problems and accessibility options for people with disabilities.

The information in this guide applies to both Virtual Server 2005 R2, Standard Edition, and to Virtual Server 2005 R2, Enterprise Edition, unless otherwise noted.

## Getting More Information

To get more information about Virtual Server, see the following resources:

- *Virtual Server 2005 Release Notes*, located at the root of the Setup CD. Release notes contain the most up-to-date information available when the product was released and generally contain information that could not be included in this guide or the *Administrator's Guide*. We recommend that you review the release notes before installin.g Virtual Server. After you install Virtual Server, you can open *Release Notes* from the Start menu by pointing to **All Programs**, pointing to **Microsoft Virtual Server**, and then clicking **Release Notes**.

- *Virtual Server 2005 Administrator's Guide*, which is installed in the Microsoft Virtual Server program group. The *Administrator's Guide* is organized into the following guides to make it easier for you to find the content you need: Deployment Guide, Operations Guide, and Technical Reference. These guides cover setup, installation, management, support, and troubleshooting information for Virtual Server. You can open the *Administrator's Guide* from the **Start** menu by pointing to **All Programs**, pointing to **Microsoft Virtual Server**, and then clicking **Virtual Server Administrator's Guide.**

- *Virtual Server 2005 Programmer's Guide*, which is installed in the Microsoft Virtual Server program group. The guide contains programming information, sample code, and descriptions of the COM (Component Object Model) interface for Virtual Server. You can open the *Programmer's Guide* from the **Start** menu by pointing to **All Programs,** pointing to **Microsoft Virtual Server ,** and then clicking **Virtual Server Programmer's Guide.**

- *Administration Website Help*, which is Web page–based information that describes how to use the screen to which it is associated. You can view this Help by clicking the question mark (**?**) icon from any page on the Administration Website.

- The Microsoft Virtual Server Web site at:

  http://www.microsoft.com/virtualserver

- The Microsoft Product Support Services Web site at:

  http://support.microsoft.com

- By telephone at (800) MICROSOFT

# Virtual Server Overview

This section describes Virtual Server and the common usage scenarios.

## What Is Virtual Server?

Virtual Server is a server application based on the Microsoft Windows® operating system that enables users to run a broad range of operating systems—including Microsoft Windows Server™ 2003 and Microsoft Windows 2000 Server—simultaneously on a single physical server. Virtual Server is designed to run on industry-standard x86-based servers.

A typical server configuration matches hardware with one operating system and the applications designed for that one operating system. The hardware includes the mouse and keyboard, processor, memory, disk drives and drive controllers, video and network cards, and other physical devices. The operating system runs on and controls the hardware. Applications run on the operating system.

By contrast, the virtual machine technologies built into Virtual Server enable one physical server to run an array of operating systems and related applications. A virtual machine uses software and selected hardware devices to create an emulated operating environment.

# Scenarios

Virtual machine technology implemented by Virtual Server enables enterprises to run multiple operating systems simultaneously on a single physical server. There are three primary deployment scenarios for Virtual Server:

- **Software development and test automation.** The quick creation of new configurations for testing, training, and demonstrations improves developer productivity and test coverage.

- **Application migration.** Migrating applications running on obsolete hardware and operating systems into virtual machines on more resilient hardware running Windows Server 2003 operating systems enables improved application compatibility, manageability, and resource utilization.

- **Departmental and branch office server consolidation.** Consolidating servers running line-of-business applications increases application compatibility and manageability, and resource utilization. Virtual Server allows applications to coexist on the same hardware, thus increasing hardware utilization and manageability while reducing capital costs.

## Usage Considerations

It is possible to run almost any x86-based application on a virtual machine; however, some applications are not as well suited as others for use on a virtual machine. Although you can run Virtual Server on a multiprocessor computer, each virtual machine can use a maximum of one processor. This means that enterprise-class applications designed to use multiprocessor hardware may not provide adequate performance if you run them on a virtual machine. When deciding whether to run an application on a virtual machine, consider the virtual machine's physical counterpart. In other words, would you run this application on a physical computer that has one processor?

The appropriateness of running an enterprise-class application on a virtual machine also depends on anticipated workload and how you intend to use the application. For example, applications such as Microsoft SQL Server™ or Microsoft Exchange Server will run on a virtual machine. However, depending on workload, performance may not meet acceptable levels for your organization. If you need to run such an application for testing or training purposes, the data access demands that affect performance would be very different than if you use the application in a production environment.

## Hints for New Users

New users who are unfamiliar with virtual machine technology often have some basic questions about using virtual machines. Following are hints that help address some of the most common questions. We also strongly suggest that you review the Administrator's Guide, which contains comprehensive information about deploying and using Virtual Server. Each hint provides a reference to a topic in the appropriate section of the *Administrator's Guide*.

■ Certain features of Virtual Server emulate specific hardware for all virtual machines, re-gardless of the hardware that exists on the physical computer. For more information, see "Emulated hardware" in the Deployment Guide.

■ Some types of devices that are attached to the computer on which you install Virtual Server may not be available for use on the virtual machines. For example, you cannot use universal serial bus (USB) smart card readers on virtual machines. For more information, see "Setting up the physical computer" in the Deployment Guide.

■ Virtual machines can use storage on any location that can be accessed by the operating system running on the computer on which you install Virtual Server. For more informa-tion, see "Virtual hard disks" in the Technical Reference.

■ Virtual machines have the same backup and software requirements as do the physical computers in your organization. We recommend that you follow the same policies that exist for your physical computers. For more information, see "Backing up and restoring Virtual Server" and "Applying operating system updates" in the Operations Guide.

■ Virtual Server is designed to enable you to run multiple server operating systems simulta-neously on the same physical computer. The main factor that affects how many operat-ing systems you can run simultaneously is system resources. For more information, see "System Requirements" in the following chapter or in the Deployment Guide.

# Setting Up Virtual Server

This chapter provides information that you should review before you set up Microsoft®
Virtual Server 2005 , as well as instructions on performing the installation.

## System Requirements

The minimum requirements that your system should meet will vary depending on the
number and type of operating systems and applications you plan to install on the virtual
machines. For example, to run multiple virtual machines simultaneously, the physical
computer must have at least enough memory to cover the requirements of the host operating
system and each guest operating system. The host operating system runs on the physical
computer. Each virtual machine runs a guest operating system. You should refer to the
system requirements to ensure that your system resources will support your deployment.

## Physical Computer and Host Operating System Requirements

Following are the minimum system requirements for the physical computer and the host
operating system:

- An x86-based computer with a 550 megahertz (MHz) or faster (1 gigahertz [GHz] recom-
  mended) processor with L2 cache, such as processors from any of the following families:

  - Intel—Xeon or Pentium families
  - AMD—AMD64 or Athlon families

You can run Virtual Server on servers with multiple processors. Virtual Server 2005,
Standard Edition can run on servers with a maximum of four processors. Virtual Server
2005, Enterprise Edition can run on servers with more than four processors. The maximum
number of processors for Virtual Server 2005, Enterprise Edition is determined by the host
operating system.

- CD-ROM or DVD drive

- Super VGA (800 × 600) or higher resolution monitor recommended

**Important**

The World Wide Web Service component of Internet Information Services (IIS) is required on the computer running the Administration Website.

- Host operating system: the 32-bit version of any of the following operating systems:

    - Microsoft Windows Server™ 2003, Standard Edition
    - Microsoft Windows Server 2003, Enterprise Edition
    - Microsoft Windows Server 2003, Datacenter Edition
    - Microsoft Windows® Small Business Server 2003
    - Microsoft Windows XP Professional

**Important**

You should use Microsoft Windows XP Professional as a host operating system only in anon-production environment.

For disk space and memory requirements, refer to the following table to determine the minimum required by the host operating system. These requirements are general guidelines only. You should consult the product documentation provided with each operating system for specific requirements.

| Host operating system | Minimum RAM | Minimum disk space |
|---|---|---|
| Windows Small Business Server 2003, Standard Edition | 256 MB | 4 GB |
| Windows Small Business Server 2003, Premium Edition | 512 MB | 4 GB |
| Windows Server 2003, Standard Edition | 256 MB | 2 GB |
| Windows Server 2003, Enterprise Edition | 256 MB | 2 GB |
| Windows Server 2003, Datacenter Edition | 512 MB | 2 GB |

The disk space in the previous table is only a starting point in determining how much disk space you will need. It is essential that you allow for the additional space that will be required by all guest operating systems that you plan to deploy. Not only do you need enough disk space for the host operating system and each guest operating system, you must also take into account the extra space needed for each virtual machine's paging file, all dynamically expanding virtual hard disks, and the space needed to save the contents of each virtual machine's RAM when putting the virtual machine into a saved state. For more information, see "Best practices" in the Operations Guide.

> **Note**
>
> You should enable Physical Address Extension (PAE) X86 on your host operating system if it is appropriate to do so. PAE X86 allows the host operating system to access more than 4 gigabytes (GB) of physical memory. You should not, however, enable PAE X86 on the virtual machines. Virtual machines can only access up to 3.6 GB of memory each; thus this technology is not necessary.

# Guest Operating System Requirements

Virtual Server supports the following guest operating systems:

- Any 32-bit version of the Microsoft Windows Server 2003 operating systems, except Datacenter Edition

- Any Microsoft Windows 2000 Server operating system, except Datacenter Edition

- Microsoft Windows NT® Server 4.0 with Service Pack 6a (SP6a)

You should refer to the product documentation included with each operating system to determine the minimum system requirements for the guest operating system. Be aware that the minimum required disk space you need is the sum of the required disk space of each guest operating system and the host operating system, in addition to disk space for any applications to be installed on the operating systems.

If you plan to run more than one guest operating system simultaneously, you need to add the RAM requirements for all of those operating systems in addition to the RAM required by the host operating system. Additionally, Virtual Server can require up to an additional 32 MB of RAM per virtual machine. To enhance performance, consider increasing the amount of memory beyond the minimum requirements described here and in the product documentation. Note that memory allocated to virtual machines is not available for paging by the host operating system.

Virtual Server can support up to a maximum of 64 virtual machines. The practical limit of how many virtual machines you can run simultaneously depends on system resources, the amount of memory assigned to each virtual machine, and the total memory available on the physical computer.

> **Note**
>
> Virtual Server supports up to 3.6 gigabytes (GB) of RAM per virtual machine.

## Calculating requirements: a sample configuration

This example illustrates how to calculate the memory and storage required by the host operating system and guest operating systems you want to run. Assume that you want to run the following operating systems simultaneously on three virtual machines:

- Host operating system for the physical computer: Windows Server 2003, Standard Edition

■  Guest operating system for virtual machine 1: Windows NT Server 4.0 with SP6a

■  Guest operating system for virtual machine 2: Windows NT Server 4.0 with SP6a

■  Guest operating system for virtual machine 3: Windows 2000 Server

To calculate the minimum disk space required by all the operating systems, add them as shown in the following table

| Operating system | Disk space | Memory (including overhead for virtual machines) |
|---|---|---|
| Host operating system for the phy sical compute | 2 GB | 256 MB |
| Guest operating system for virtual machine 1 | 500 MB | 64 MB + 32 MB = 96 MB |
| Guest operating system for virtual machine 2 | 500 MB | 64 MB + 32 MB = 96 MB |
| Guest operating system for virtual machine 3 | 1 GB | 128 MB + 32 MB = 160 MB |
| **Minimum total required** | **4 GB** | **608 MB** |

**Note**

Just as in a physical computer, adding memory to a virtual machine will improve performance.

# Before You Begin

This section provides information that we recommend you review before installing Virtual Server. It includes information about security considerations, compatibility with Microsoft Virtual PC 2004, and describes your options for setting up Virtual Server.

## Security Considerations

This section provides some of the security information for Virtual Server that may be helpful for you to review before you install Virtual Server. For more comprehensive security information, see the *Administrator's Guide*.

**Important**

After installing Virtual Server, we strongly recommend that you review "Securing Virtual Server" and "Best practices" in the Virtual Server Deployment Guide, as well as the topics under "Security considerations for Virtual Server" in the Technical Reference. The Deployment Guide and Technical Reference are part of the *Administrator's Guide*.

Virtual Server has the following default configuration:

- The Virtual Machine Remote Control (VMRC) server is disabled.

- The VMRC server uses port 5900.

- Virtual Server uses Integrated Windows authentication.

- Only local administrators can access the Administration Website, configure Virtual Server, and create and configure virtual machines and virtual networks; other users must be granted the appropriate permissions manually. The Administration Website is a browser-based tool for configuring and managing Virtual Server and its associated virtual machines and virtual networks.

- Firewall and antivirus software running on the host operating system will not protect guest operating systems. To obtain this protection, you must install firewall and antivirus software directly on the guest operating systems.

- The two Virtual Server services run under security accounts that have low privileges: The Virtual Server service (Vssrvc.exe) runs under the Network Service account, which has limited access to the local computer and authenticated access (as the computer account) to network resources. The Virtual Machine Helper service (Vmh.exe) runs under the Local Service account. This account has limited access to the local computer and anonymous access to network resources.

- Only local administrators can configure Virtual Server or create and configure virtual machines. You can give other users the ability to create and configure virtual machines by changing file system security settings. Use care in giving such permissions to other users.

- Virtual machines run under the account of the user who started the virtual machine, unless you specify a different user account under which to run virtual machines and assign the user account to each virtual machine. Make sure that you specify a user account that has a low level of privileges. For information about the minimum permissions required for this account, see "Modifying general virtual machine properties" in the Operations Guide.

**Important**

Virtual Server is not a replacement for Terminal Services. VMRC does not operate in the same manner as Terminal Services or Remote Desktop because multiple users can use VMRC to connect to the same virtual machine, and each user can access the guest operating system without the knowledge of the other users. This is by design for training and lab scenarios where one user wants to demonstrate a task to other users who are connected to the same remote session. If you want exclusive access to a virtual machine, then you should connect to it by using Terminal Services or Remote Desktop rather than VMRC.

## Using Virtual Server and Virtual PC 2004

It is possible to use Virtual Server and Microsoft Virtual PC 2004 together. However, because of the differences between the two products, there are several points to consider:

**Sound cards:** Virtual Server does not include an emulated sound card in its virtual machines, while Virtual PC does. If you will be using a virtual machine on both Virtual Server and Virtual PC, you should disable the emulated sound card in Virtual PC. This will prevent the sound card's Plug and Play capability from causing errors on the virtual machine that you created with Virtual Server.

**SCSI support:** Virtual Server provides SCSI support while Virtual PC does not. If you create a virtual machine with virtual SCSI disks on Virtual Server, the SCSI disks will be ignored if you move the virtual machine to Virtual PC. This can lead to negative consequences in many situations, for example if the virtual machine page file is on the SCSI disk or if you are trying to use a SCSI disk as the startup disk. If you plan to regularly move virtual hard disks between machines created with Virtual PC and Virtual Server, we recommend that you attach the virtual hard disks only to a virtual IDE bus in Virtual Server.

**Configuration files:** The virtual machine configuration (.vmc) files are typically compatible between Virtual Server and Virtual PC. However, if a virtual machine is in a saved state, do not move the .vmc file between Virtual Server and Virtual PC. The saved-state files (.vsv files) are incompatible between the two products.

**CD-ROM drives:** Although Virtual Server allows for virtual machines with multiple CD-ROM drives, virtual machines created with Virtual PC only support one CD-ROM drive. If you are moving virtual machines between the two products, you should configure only a single CD-ROM drive on the virtual machine and attach it to secondary channel 0, which is the default setting.

# Setting Up and Installing Virtual Server

Setting up Virtual Server consists of the following steps:

- **Install IIS.** You must install the World Wide Web Service component of Internet Information Services (IIS) so you can use the Administration Website to manage Virtual Server. For more information about installing IIS, see the documentation for IIS.

- **Install Virtual Server.** There are two general configuration options for installing Virtual Server. You can use a single physical computer for both the Virtual Server service and the Website components, or you can use multiple computers, separating the Virtual Server service from the Website components. For instructions, see "Installing Virtual Server on one computer" and "Installing Virtual Server on multiple computers" later in this chapter.

## About Constrained Delegation

If you plan to store all of your resource files, such as virtual hard disk (.vhd) files and International Organization for Standardization (ISO) image (.iso) files, on the computer running the Virtual Server service (Vssrvc.exe), you do not need to take additional configuration steps to begin using Virtual Server. If you store your resource files on a different computer, however, you must take additional steps to allow users to access the resource files, as follows:

■ **The Administration Website (VSWebApp.exe) is installed on a different computer than the Virtual Server service**. In this case, to allow users to access files on a remote computer, you must configure constrained delegation on the domain controller, as described earlier in this chapter. This allows the credentials of the user who is logged on to the Administration Website to be passed to the computer that is storing the resource files, so that the user can access the files. In this scenario, you must use Integrated Windows authentication. Delegation does not work with Basic authentication.

■ **The Administration Website (VSWebApp.exe) and the Virtual Server service (Vssrvc.exe) are installed on the same computer.** In this case, to allow users to access files on a remote computer, install a software update. For information about getting the software update, see article 829011, "You Are Prompted for Your User Credentials When You Request a CGI Script" in the Microsoft Knowledge Base at:

http://support.microsoft.com/default.aspx?scid=kb;en-us;829011

Alternatively, you can enable Basic authentication for the Administration Website. By default, Virtual Server uses Integrated Windows authentication. This is the preferred method of authentication, and typically you should not make changes to this setting. Certain risks are involved with using Basic authentication. For more information about configuring authentication, see the documentation for IIS.

In addition, to use Virtual Server Manager search paths, you must also either configure constrained delegation or enable Basic authentication. For more information, see "Configuring Virtual Server Manager search paths" in the Operations Guide.

> ◆ **Important**
>
> If you enable Basic authentication, we strongly recommend that you also implement Secure Sockets Layer (SSL) security for the Administration Website. This is because with Basic authentication, passwords are transmitted in plaintext. You configure SSL for the Administration Website from within IIS. For instructions, see the documentation for IIS.

To view a graphic that illustrates how delegation works when the Virtual Server service, the Administration Website, and the resources files are all located on different servers, see "Configuring constrained delegation" in the Deployment Guide.

The remainder of this section gives instructions on configuring constrained delegation for Virtual Server.

> ✎ **Note**
>
> Constrained delegation is not supported when using Windows XP Professional as your host operating system. In this case, you cannot access files on a remote resource, so you should store files locally.

## Step 1: Verify prerequisites

Before you begin configuring constrained delegation, make sure that you have performed the following tasks:

■ Complete the installation of Virtual Server, as described in "Installing Virtual Server on one computer" and "Installing Virtual Server on multiple computers" later in this chapter.

◆ **Important**

For constrained delegation to work, you must perform a custom installation and select the installation option to run the Administration Website as the Local System account. If you do not, you will have to uninstall and reinstall Virtual Server before you can configure constrained delegation.

■ Verify that the domain controller is configured for a Windows Server 2003 native domain. If necessary, raise the functional level of the domain from Windows 2000 (the default) to Windows Server 2003. For instructions, see "To raise the domain functional level" in Help and Support Center for Windows Server 2003.

⚠ **WARNING**

If you have or will have any domain controllers running Windows NT 4.0 and earlier or Windows 2000, then do not raise the domain functional level to Windows Server 2003. Once the domain functional level is set to Windows Server 2003, it cannot be changed back to Windows 2000 mixed or Windows 2000 native.

## Step 2: Allow the Web server to delegate a user's credentials to the Virtual Server service

Follow these instructions to allow the Web server to delegate the credentials of the logged-on user to the computer running the Virtual Server service:

1. On the domain controller, open **Active Directory Users and Computers**.

2. In the console tree, under *DomainName*, click **Computers**.

3. Right-click the Web server, and then click **Properties**.

4. On the **Delegation** tab, click **Trust this computer for delegation to specified services only**.

5. Click **Use any authentication protocol**.

6. Click **Add**, and then click **Users and Computers**.

7. Type the name of the computer running the Virtual Server service, and then click **OK**.

8. From the list of available services, hold down the CTRL key while clicking **cifs** and **vss-rvc**, and then click **OK**.

9. Repeat as necessary for additional computers running the Virtual Server service.

## Step 3: Allow the Virtual Server service to delegate a user's credentials to another computer

Follow these instructions to allow Virtual Server to delegate the credentials of the logged-on user to another computer. This allows users to access resource files stored on a computer other than the one running the Virtual Server service.

1. On the domain controller, open **Active Directory Users and Computers**.

2. In the console tree, under *DomainName*, click **Computers**.

3. Right-click the computer running the Virtual Server service, and then click **Properties**.

4. On the **Delegation** tab, click **Trust this computer for delegation to specified services only**.

5. Click **Use any authentication protocol**.

6. Click **Add**, and then click **Users and Computers**.

7. Type the name of the computer running the Virtual Server service, and then click **OK**.

8. From the list of available services, select **cifs**, and then click **OK**.

# Installing Virtual Server on One Computer

When you install Virtual Server on one computer, you install all components on one physical computer. However, before you install Virtual Server, you should consider whether you want to use remote or local storage for files you will use with Virtual Server, such as images or virtual hard disks. To enable Virtual Server for remote access to resources, you must configure Virtual Server for delegation as described in "About Constrained Delegation" earlier in this chapter.

## ▷ To install Virtual Server on a single computer

> **Important**
>
> To use the Administration Website, before you begin this procedure, you must install the World Wide Web Service component of Internet Information Services (IIS) on the computer on which you intend to install the Administration Website.
>
> Before installing Virtual Server, you must review the conceptual information in "About Constrained Delegation" earlier in this chapter. Once you configure the Administration Website to run as either the authenticated user or the Local System account, you can only change this option by reinstalling Virtual Server.

1. Start Microsoft Virtual Server 2005 Setup (Setup Wizard) from the Virtual Server 2005 CD-ROM. If you start the Setup Wizard manually, be sure to use **Setup.exe**.

2. Proceed through the wizard until you reach the **Setup Type** page.

3. On the **Setup Type** page, select **Complete**, which installs Virtual Server using the default configuration, and then click **Next**.

4. On the **Configure Components** page, either accept the default **Website port** value of 1024, or type a new value for the port.

5. Next, either accept the default setting, **Configure the Administration Website** to always run as the authenticated user, or select **Configure the Administration Website to always run as the Local System account**. If you plan to access resource files on a remote computer, you must select **Configure the Administration Website to always run as the Local System account** and enable delegation as described in "About Constrained Delegation" earlier in this chapter.

6. Click **Next**, and then click **Install** to begin the installation.

7. Once the installation is complete, the **Setup Complete** page appears. Click **Finish** to close the page and exit the Setup Wizard.

## Installing Virtual Server on Multiple Computers

> **Important**
>
> To use the Administration Website, before you begin this procedure, you must install the World Wide Web Service component of Internet Information Services (IIS) on the computer on which you intend to install the Administration Website.
>
> Before installing Virtual Server, you must review the conceptual information in "About Constrained Delegation" earlier in this chapter. Once you configure the Administration Website to run as either the authenticated user or the Local System account, you can only change this option by reinstalling Virtual Server.

When you install Virtual Server on multiple computers, you install the Virtual Server service on one computer, and install the Administration Website components on a separate computer on which the World Wide Web Service component of Internet Information Services (IIS) has been installed. Following are instructions for completing a multiple-computer installation of Virtual Server. For information about installing IIS, see the documentation for IIS.

▷ **To install the Virtual Server service**

1. On the computer on which you intend to install the Virtual Server service, start the Setup Wizard from the Virtual Server 2005 CD-ROM. If you start the Setup Wizard manually, be sure to use **Setup.exe**.

2. Proceed through the wizard until you reach the **Setup Type** page.

3. On the **Setup Type** page, select **Custom**, and then click **Next**.

4. Click **Virtual Server Web Application**, select **This feature will not be available**, and then click **Next**.

5. Click **Install** to begin the installation.

6. Once the installation is complete, the **Setup Complete** page appears. Click **Finish** to close the page and exit the Setup Wizard.

▷ **To install the Administration Website**

1. On the computer on which you intend to install the Administration Website for Virtual Server, start the Setup Wizard from the Virtual Server CD-ROM. If you start the Setup Wizard manually, be sure to use **Setup.ex**e.

2. Proceed through the wizard until you reach the **Setup Type** page.

3. On the **Setup Type** page, select **Custom**, and then click **Next**.

4. Click **Virtual Server Service**, select **This feature will not be available**, and then click **Next**.

5. On the **Configure Components** page, either accept the default **Website port** value of 1024, or type a new value for the port.

6. Select **Configure the Administration Website to always run as the Local System account.** Selecting this option also requires you to enable delegation as described in "About Constrained Delegation" earlier in this chapter.

7. Click **Nex**t, and then click **Install** to begin the installation.

8. Once the installation is complete, the **Setup Complete** page appears. Click **Finish** to close the page and exit the Setup Wizard.

# Interacting with Virtual Server and Virtual Machines

Virtual Server provides the following tools for interacting with Virtual Server and virtual machines:

- **Administration Website**. The Administration Website is a browser-based tool for configuring and managing Virtual Server and its associated virtual machines and virtual networks. For information about opening the Administration Website, see the following procedure, "To open the Administration Website."

- **Virtual Machine Remote Control (VMRC) client**. VMRC connects to an instance of Virtual Server and provides access to its virtual machines. Through VMRC, you can use a virtual machine as if you were using it through the Administration Website. However, the VMRC client does not provide the administrative capabilities available in the Administration Website, such as creating a new virtual machine or changing a virtual machine configuration. For information about configuring and using the VMRC client, see the *Administrator's Guide*.

Virtual Server also provides a full-featured Component Object Model (COM) scripting model so that you can use scripts to control every aspect of Virtual Server functionality. Because the scripting model is based on COM technology, you are not limited to using a specific scripting language, but can choose among development languages such as Microsoft Visual Basic® .NET development system, C, C++, and C#. Furthermore, you can configure scripts to run when certain events occur within Virtual Server. This extensive scripting support provides ease of customization and automation. For more information about scripting and the Virtual Server object model, see the *Virtual Server 2005 Programmer's Guide*.

## ▷ To open the Administration Website

1. Open Microsoft Internet Explorer and in the Address field, type
   **http://***FQDN***:1024/VirtualServer/VSWebApp.exe**. If you have changed the port
   number, then replace **1024** with the port number you specified. *FQDN* represents the
   fully qualified domain name of the computer on which the Administration Website is
   installed.

2. When the **User name and Password** prompt appears, type your credentials, and then
   click **OK**.

> **Note**
>
> If you are logged on to the computer on which the Administration Website is installed, you can
> connect using the **Virtual Server Administration Website** link in the **Microsoft Virtual Server** folder.
> You can open this folder by opening the Start menu and then selecting either the **Programs** folder
> or the **All Programs** folder, depending on your Start menu configuration.
>
> If you have multiple instances of Virtual Server, instead of using Virtual Server Manager, you can
> connect directly to a specific instance by adding **?view=1&remoteServer=***remote_Computer_FQDN*
> to the URL listed in the first step of this procedure. That is, by using
> **http://FQDN:1024/VirtualServer/VSWebApp.exe?view=1&remoteServer=***remote_Computer_FQDN.*

# Setting Up a Virtual Machine

After installing Microsoft® Virtual Server 2005, the next step is to create and set up a virtual machine. This chapter provides information and instructions on creating a basic virtual machine.

## Creating a Virtual Machine

Virtual Server uses virtual machines to run the different guest operating systems you want to install, and each guest operating system requires its own virtual machine. So, before you can install and run the guest operating systems, you need to create virtual machines. When you create a virtual machine, it is a "blank" computer that does not include an operating system.

Each virtual machine requires at least one virtual hard disk so that you can install an operating system. Virtual hard disks are stored as .vhd files. You can store a virtual hard disk file on the hard disk of the physical computer or on an external hard disk. For more information about virtual hard disks, see "Creating virtual hard disks" in the Deployment Guide.

The Administration Website provides two ways for you to add virtual machines to Virtual Server:

- **Create a virtual machine.** You use this method to create a new virtual machine. You provide a name for the virtual machine and then you either customize the settings or leave them set to the default. If you accept the default selections, Virtual Server creates a virtual machine with a basic configuration. A basic virtual machine has a name, a dynamically expanding virtual hard disk, and no virtual networking.

- **Add a virtual machine.** You can use this method to add existing virtual machines created with Virtual Server 2005 or Microsoft Virtual PC 2004. To learn about feature differences between Virtual Server 2005 and Virtual PC 2004, we recommend that you review "Using Virtual Server and Virtual PC 2004" in the previous chapter.

Virtual Server provides many features you can use to customize your virtual machines. For example, you can assign multiple virtual hard disks to a virtual machine, using the virtual IDE adapter and optional virtual SCSI adapters. You can assign as many as four virtual network adapters to a virtual machine. You can create private virtual networks for communications between virtual machines and external virtual networks to access the physical computer's network adapter. You also can manage how the physical computer's CPU resources are allocated among virtual machines. For information about these features, see the Operations Guide, which is part of the *Administrator's Guide*.

▷ **To create a virtual machine**

1. Open the Administration Website.

2. In the navigation pane, under **Virtual Machines**, click **Create**.

3. In **Virtual machine name**, type a descriptive name for the virtual machine. If you do not want the virtual machine (.vmc) file to be created in the default configuration folder, specify a fully qualified path to the location where you want to create the virtual machine.

4. In **Virtual machine memory,** type a value in megabytes for the amount of RAM used by the virtual machine.

5. In **Virtual hard disk**, do one of the following:

   ■ Select **Create a new virtual hard dis**k. Next, to set the size of the virtual hard disk, specify a value in **Size**, and then select either **MB** for megabytes or **GB** for gigabytes.

   ■ Select **Use an existing virtual hard disk**. If the virtual hard disk (.vhd) file is located in a directory included in Virtual Server Search Paths, you can select the .vhd file from **Location**. Otherwise, in **File name (.vhd)** type the complete path to the location of the .vhd file.

   ■ Select **Attach a virtual hard disk late**r to create a virtual machine without a virtual hard disk.

6. Under **Virtual network adapter**, in **Connected to**, select a networking option from the drop-down menu.

7. Click **Create**.

# Installing a Guest Operating System

Each virtual machine requires an operating system, which is called the guest operating system. For information about which operating systems are supported for installation on a virtual machine, see "System Requirements" in the previous chapter.

There are some important points to consider when installing a guest operating system:

■ Guest operating system licenses are not included with a Virtual Server license. You must ensure that you are appropriately licensed for all operating systems and applications that you install on a virtual machine.

■ You cannot use the CTRL+ALT+DELETE keyboard shortcut from within the virtual machine. You can instead use the HOST KEY+DELETE shortcut to send CTRL+ALT+DELETE to the guest operating system. By default, the Host key is the right ALT key. Each virtual machine also provides a CTRL+ALT+DELETE action on the virtual machine **Remote Control** menu that you can use to emulate this keyboard shortcut.

■ You must install Virtual Machine Additions in order to improve integration and performance of the guest operating systems and the host operating system. For information about the features provided by Virtual Machine Additions, see "Installing Virtual Machine Additions" later in this chapter.

**Note**

It is possible to use Remote Installation Services (RIS) to perform a network installation of an operating system on a virtual machine. However, Virtual Server does not support starting an operating system directly from the network to perform a network installation. You must use a remote boot disk that includes the appropriate instructions for contacting the network installation point. You use the Rbfg.exe utility provided with RIS to create the remote boot disk. If you have installed RIS, search on "Rbfg.exe" in Help and Support Center for more information about the remote boot floppy disk. RIS is provided with the Microsoft Windows Server™ 2003 operating systems.

You can install a guest operating system from a startup CD or an ISO image (.iso) file. Virtual Server supports ISO 9660 images, the International Organization for Standardization format, of a CD or DVD. The image must use an .iso extension to be available for use in Virtual Server.

You also can start the installation from a startup disk if the CD or image cannot be used to start the virtual machine. Some older operating systems, such as Microsoft Windows NT® Server 4.0, require startup disks to install the operating system. For more information about installing and using Windows NT Server 4.0 as a guest operating system, see "Using Windows NT Server 4.0 as a guest operating system" in the Deployment Guide.

### ▷ To use a startup CD or image file to install an operating system

**Important**

Prior to installing Virtual Machine Additions, the mouse pointer may appear as a dot on screen. The mouse still functions correctly; only the display of the pointer is affected.

1. Open the Administration Website.

2. In the navigation pane, under **Virtual Machines**, point to **Configure** and then click the appropriate virtual machine.

3. In **Configuration**, click **CD/DVD**, do one of the following, and then click **OK**:

   - Insert the startup CD for the operating system into the CD drive on the physical computer running the Virtual Server service. Next, click **Physical CD/DVD** drive, and if necessary, from the drop-down menu select the corresponding CD or DVD drive letter.

   - Click **Known image files**. If the image file containing a startup CD image is located in the default directory (\Documents and Settings\All Users\Documents\Shared Virtual Machines\), it is available from the drop-down menu. Otherwise, in **Fully qualified path to file**, type the complete directory path to the image file.

4. In **Status**, point to the virtual machine name, and then click **Turn On**.

5. Once the virtual machine is turned on, point to the virtual machine name, and then click **Remote Control**.

6. Once you are connected to the virtual machine, follow the instructions provided by the operating system to complete the installation.

> ⬥ **Important**
>
> Accessing files on a remote computer requires constrained delegation and a software update to the host operating system of the local computer. For more information, see the *Virtual Server 2005 R2 Release Notes*.

▷ **To use a startup disk to install an operating system**

1. In the navigation pane, under **Virtual Machines,** point to **Configure** and then click the appropriate virtual machine.

2. In **Configuration**, click **Floppy drive**, do one of the following, and then click **OK**:

   ■ If you have a startup disk, insert it into the floppy disk drive, click **Physical floppy drive**, and if necessary, from the drop-down menu select the corresponding floppy drive letter.

   ■ If you have an existing virtual system disk located in the default directory (\Documents and Settings\All Users\Documents\Shared Virtual Machines\), it is available from the **Known floppy disks** drop-down menu. Otherwise, in **Fully qualified path to file** type the complete directory path to the virtual floppy disk (.vfd) file.

3. In **Status**, point to the virtual machine name, and then click **Turn On**.

4. Once the virtual machine is turned on, point to the virtual machine name, and then click **Remote Control**.

5. Once you are connected to the virtual machine, follow the instructions provided by the operating system to complete the installation.

# About Virtual Machine Additions

Virtual Server provides features that improve the integration and performance of a virtual machine running a supported Windows operating system. These features are part of Virtual Machine Additions; they are not native to the operating system or to the Virtual Server service. Virtual Machine Additions is not installed by default when you install Virtual Server, although you must install it in order to use a guest operating system effectively.

Virtual Machine Additions will also improve many aspects of your experience when using Virtual Server. For example, if Virtual Machine Additions is installed on the virtual machine, you can move the pointer freely between the virtual machine window and the host operating system when using Virtual Machine Remote Control (VMRC).

> ⬥ **Important**
>
> Virtual Machine Additions is always installed on the guest operating system of the virtual machine. You should never install Virtual Machine Additions on the host operating system.

The following features are included in Virtual Machine Additions:

- Improved performance of the guest operating system

- Integrated use of the mouse

- Optimized video drivers

- Time synchronization

# Installing Virtual Machine Additions

You must install Virtual Machine Additions on all virtual machines running an operating system for which this feature is available. The version of Virtual Machine Additions included with Virtual Server 2005 is the most recent and should be installed on any virtual machine running earlier versions of Virtual Machine Additions.

Virtual Machine Additions is included for the following supported server operating systems:

- Microsoft Windows Server™ 2003 (all versions)

- Microsoft Windows® 2000 Server

- Microsoft Windows NT® Server 4.0 with Service Pack 6a (SP6a)

Virtual Machine Additions is provided as a convenience for the following client operating systems:

- Microsoft Windows XP (all versions)

- Microsoft Windows 2000 Professional

- Microsoft Windows Millennium Edition

- Microsoft Windows 98

- Microsoft Windows 95

**Note**

If you move a virtual machine that was created with Microsoft Virtual PC 2004 to Virtual Server, you must reinstall Virtual Machine Additions, even if it was installed in Virtual PC. This is because the version of Virtual Machine Additions included with Virtual Server has been updated.

▷ **To install Virtual Machine Additions**

1. Open the Administration Website.

2. In the navigation pane, under **Virtual Machines**, point to **Configure** and then click the appropriate virtual machine.

3. In **Status**, point to the virtual machine name, and then click **Turn On**.

4. Once the virtual machine has started, point to the virtual machine name, and then click **Remote Control**.

**5.** Log on to the virtual machine as an administrator or member of the Administrators group.

**6.** Once the guest operating system is loaded, press the **HOST KEY** to release the mouse pointer, and then in the lower-left corner, under **Navigation**, click **Configure** *virtual_machine_name.*

**7.** In **Configuration,** click **Virtual Machine Additions**, click **Install Virtual Machine Additions**, and then click **OK**.

**8.** Under **Status**, point to the virtual machine name, and then click **Remote Control**.

**9.** Click in the **Remote Control** window to return to the guest operating system. The Virtual Machine Additions installation wizard will start. Proceed through the wizard.

**10.** Once the wizard is complete, you will be prompted to restart the virtual machine to complete the installation.

**Note**

If you do not want to use Host time synchronization, you can disable it when the virtual machine is turned off. You can do this either before or after installing Virtual Machine Additions.

If your guest operating system is configured as a domain controller or your guest operating system and host operating system are members of different domains or are operating in different time zones, you should disable Host time synchronization.

## Logging On and Navigating in a Virtual Machine

You use the keyboard and a mouse to control a virtual machine much as you would a physical computer. This section summarizes the differences, as well as features that address those differences.

### Using the keyboard

In general, the keyboard works the same for a virtual machine as it does for a physical computer. Virtual Server provides much of the required keyboard functionality through the use of the Host key and keyboard shortcuts. By default the Host key is the right ALT key. You use the Host key to return control of the mouse to the host operating system if a virtual machine has captured the pointer.

Some keyboard shortcuts such as CTRL+ALT+DELETE do not work within a virtual machine because of the interaction between the host operating system and the guest operating system. You can use **Send CTRL+ALT+DEL** from the Remote Control menu of either the Virtual Machine Remote Control (VMRC) client or Remote View page to use the functionality of the CTRL+ALT+DELETE keyboard shortcut. You can also use HOST KEY+DELETE.

**Note**

Virtual Server includes keyboard shortcuts that you can use to perform common tasks. For a list of the keyboard shortcuts, see Appendix B, "Accessibility for People with Disabilities."

## Using the mouse

The way you use the mouse depends on whether Virtual Machine Additions is installed.

- If Virtual Machine Additions is installed on the virtual machine, you can move the pointer freely between the virtual machine window and the host operating system. This simplifies switching among virtual machines and the host operating system.

- If Virtual Machine Additions is not installed on the virtual machine, the virtual machine must capture the pointer before the mouse can be used within the virtual machine window. The virtual machine captures the pointer when you click the pointer inside the virtual machine window.

  If a pointer is captured by a virtual machine on which Virtual Machine Additions is not installed, the virtual machine must release it before you can use the mouse on the host operating system or in another virtual machine window. You can use the Host key to return the use of the mouse to the host operating system.

# Troubleshooting

This section contains information to help you troubleshoot problems you may encounter when you set up and begin using Microsoft® Virtual Server 2005 . For information about problems that may occur as you use and manage Virtual Server, see "Troubleshooting" in the Operations Guide.

**When connecting to an instance of Virtual Server using Terminal Services or Remote Desktop Connection, the Virtual Server Administration Website shortcut does not work, or I receive the following message: "The page cannot be displayed."**

Your Microsoft Internet Explorer security settings are preventing the Administration Website's Master Status page from loading. Add the URL of the Administration Website to your Trusted sites or Local intranet Web content zone by taking the following steps:

**1.** Open Internet Explorer and on the **Tools** menu, click **Internet Options**.

**2.** Click the **Security** tab, click **Trusted sites**, and then click **Custom Level**.

**3.** Scroll to the bottom of the list and select **Prompt for user name and password** under **User Authentication**.

**I have installed Virtual Server but cannot get the Administration Website to open. After I enter my security credentials the server displays a blank screen.**

The shortcut cannot load the Administration Website over a Terminal Services connection. When using Remote Desktop Connection, you must start it as a console session. Either start Remote Desktop Connection as a console session or use Internet Explorer to open the Administration Website. To start as a console session, type **mstsc /v:***Your server address***/console**. To use Internet Explorer, type **http://***FQDN***:1024/VirtualServer/VSWebApp.exe**. If you have changed the port number, then replace **1024** with the port number you specified.

**When attempting to enable constrained delegation, the Virtual Server service (Vssrvc.exe) does not appear in the list of available services in the Active Directory® directory service.**

Verify that a service principal name (SPN) has been registered for all computers running the Virtual Server service. Each instance of Virtual Server automatically registers an SPN with the domain controller, although it is a good idea to verify that this has occurred before you begin configuring delegation.

To verify that an SPN has been registered for all computers running the Virtual Server service, you can use Setspn.exe, a free utility from Microsoft. For information about downloading Setspn.exe, see "Windows 2000 Resource Kit Tool: Setspn.exe" on the Microsoft Web site at:

http://www.microsoft.com/downloads/details.aspx?displaylang=en&FamilyID=5FD831FD-AB77-46A3-9CFE-FF01D29E5C46

Setspn.exe lists the SPN that is registered for a given computer. For each computer running the Virtual Server service, you can create a query by using the following syntax:

```
setspn /l domain_name/computer_name
```

If an SPN has been registered for it, this lists the fully qualified domain name and the NetBIOS name of the computer.

### The mouse is not working on my guest operating system or the cursor appears as a small dot on my guest operating system.

Virtual Machine Additions has not been installed on the guest operating system. If Virtual Machine Additions is not installed, the cursor will appear as a small dot and you will not be able to move the cursor outside of the guest operating system unless you use the Host key. Install the current version of Virtual Machine Additions to provide mouse functionality and move the pointer freely between the virtual machine window and the host operating system. For more information, see "Installing Virtual Machine Additions" in the previous chapter.

### I cannot install Virtual Machine Additions.

If the operating system on which you want to install Virtual Machine Additions requires you to log on, you must log on as an administrator or a member of the Administrators group on the guest operating system to run the Virtual Machine Additions Setup program.

### After I install Virtual Machine Additions on a Windows NT Server 4.0 guest operating system, the video does not display correctly and I cannot log on.

Not enough memory was allocated to the virtual machine. Allocate at least 64 MB of RAM to the virtual machine running the Microsoft Windows NT® Server 4.0 operating system. We recommend allocating at least 40 MB of RAM. For more information, see "Using Windows NT Server 4.0 as a guest operating system" in the Operations Guide.

### When connected to a virtual machine by using either Terminal Services or Remote Desktop and the console switch, CDs and DVDs are not displayed in a captured CD or DVD drive in the guest operating system.

If you log on to a virtual machine running a Microsoft Windows Server™ 2003 operating system with the console switch, then you will not receive "Run Automatically" events because you are running in the context of the console. Either release the captured CD or DVD drive on the host operating system and then capture it again or do not use the console switch.

# Accessibility for People with Disabilities

Microsoft is committed to making its products and services easier for everyone to use. The following topics provide information about the features, products, and services that make Microsoft® products, including Virtual Server 2005, more accessible for people with disabilities.

## Accessibility Products and Services from Microsoft

The following sections provide information about the features, products, and services that make Microsoft Windows® operating systems more accessible for people with disabilities:

- Accessibility features of Windows

- Documentation in alternative formats

- Customer service for people with hearing impairments

- For more information

**Note**

The information in this topic may apply only to users who license Microsoft products in the United States. If you obtained this product outside of the United States, you can use the subsidiary information card that came with your software package or visit the Microsoft Accessibility Web site at http://www.microsoft.com/enable/default.aspx for a list of Microsoft support services telephone numbers and addresses. You can contact your subsidiary to find out whether the type of products and services described in this topic are available in your area. Information about accessibility is available in other languages, including Japanese and French.

# Accessibility Features of Windows

The Windows operating system has many built-in accessibility features that are useful for individuals who have difficulty typing or using a mouse, are blind or have low vision, or who are deaf or hard-of-hearing. The features are installed during Setup. For more information about these features, see the documentation for your Windows operating system and on the Microsoft Accessibility Web site at:

http://www.microsoft.com/enable/default.aspx

# Free Step-By-Step Tutorials

Microsoft offers a series of step-by-step tutorials that provide detailed procedures for adjusting the accessibility options and settings on your computer. This information is presented in a side-by-side format so that you can learn how to use the mouse, the keyboard, or a combination of both.

To find step-by-step tutorials for Microsoft products, see the Microsoft Accessibility Web site at:

http://www.microsoft.com/enable/default.aspx

# Assistive Technology Products for Windows

A wide variety of assistive technology products are available to make computers easier to use for people with disabilities. You can search through a catalog of assistive technology products that run on Windows at the Microsoft Accessibility Web site at:

http://www.microsoft.com/enable/default.aspx

If you use assistive technology, be sure to contact your assistive technology vendor before you upgrade your software or hardware to check for possible compatibility issues.

# Documentation in Alternative Formats

If you have difficulty reading or handling printed materials, you can obtain the documentation for many Microsoft products in more accessible formats. You can view an index of accessible product documentation on the Microsoft Accessibility Web site at:

http://www.microsoft.com/enable/default.aspx

In addition, you can obtain additional Microsoft publications from Recording for the Blind & Dyslexic, Inc. (RFB&D). RFB&D distributes these documents to registered, eligible members of their distribution service. For information about the availability of Microsoft product documentation and books from Microsoft Press® books, contact:

**Recording for the Blind & Dyslexic, Inc.**
20 Roszel Road
Princeton, NJ 08540

Telephone number from within the United States: (800) 221-4792

Telephone number from outside the United States and Canada:
(609) 452-0606

Fax: (609) 987-8116

The Recording for the Blind & Dyslexic Web site is located at:

http://www.rfbd.org

**Note**

Web addresses can change, so you might be unable to connect to the Web
site or sites mentioned here.

## Customer Service for People with Hearing Impairments

If you are deaf or hard-of-hearing, complete access to Microsoft product and customer
services is available through a text telephone (TTY/TDD) service:

- For customer service, contact Microsoft Sales Information Center at (800) 892-5234
  between 6:30 A.M. and 5:30 P.M. Pacific Time, Monday through Friday, excluding holi-
  days.

- For technical assistance in the United States, contact Microsoft Product Support Services
  at (800) 892-5234 between 6:00 A.M. and 6:00 P.M. Pacific Time, Monday through
  Friday, excluding holidays. In Canada, dial (905) 568-9641 between 8:00 A.M. and 8:00
  P.M. Eastern Time, Monday through Friday, excluding holidays.

Microsoft Support Services are subject to the prices, terms, and conditions in place at the
time the service is used.

## For More Information

For more information about how accessible technology for computers helps to improve the
lives of people with disabilities, see the Microsoft Accessibility Web site at

http://www.microsoft.com/enable/default.aspx

## Accessibility Features of Virtual Server and the Administrator's Guide

The information in this topic describes accessibility features of Virtual Server 2005, includ-
ing accessibility features of the *Virtual Server 2005 Administrator's Guide*.

# Accessibility Features of Virtual Server

In addition to accessibility features and utilities in Microsoft Windows, there are keyboard shortcuts in Virtual Server that make it more accessible for people with disabilities. By using the keyboard shortcuts in Virtual Server, you can quickly accomplish common tasks. The following table lists the shortcuts.

| Keyboard shortcut | Description |
|---|---|
| HOST KEY+DELETE | Sends CTRL+ALT+DELETE functionality to the virtualmachine operating system. |
| HOST KEY+C | Connects the Remote Control feature or Virtual Machine Remote Control (VMRC) to the VMRC server. |
| HOST KEY+A | Switches the Remote Control or VMRC to the Administrator Display. |
| HOST KEY+ | Displays connection information. |
| HOST KEY+V | Sets the virtual machine so that the guest operating system cannot be manipulated. You can only view the virtual machine window. |
| HOST KEY+H | Displays the control to set the Host key. |
| HOST KEY+ENTER | Switches the virtual machine window to full-screen display. This option is available only when you connect to a virtual machine by using the VMRC client. |
| HOST KEY+LEFT ARROW | Switches to the previous virtual machine. This option is available only when you connect to a virtual machine by using the VMRC client. |
| HOST KEY+RIGHT ARROW | Switches to the next virtual machine. This option is available only when you connect to a virtual machine by using the VMRC client. |

### Note

The information in this topic applies only to users who license Microsoft products in the United States. If you obtained this product outside of the United States, you can use the subsidiary information card that came with your software package or visit the Microsoft Accessibility Web site at http://www.microsoft.com/enable/default.aspx for a list of telephone numbers and addresses for Microsoft support services. You can contact your subsidiary to find out whether the type of products and services described in this topic are available in your area. Information about accessibility is available in other languages, including Japanese and French.

# Accessibility Features of the Administrator's Guide

The *Virtual Server 2005 Administrator's Guide* includes features that make it accessible to a wider range of users, including those who have limited dexterity, low vision, or other disabilities. In addition, the *Administrator's Guide* is available on the Web at the Microsoft Web site at:

http://www.microsoft.com/technet/prodtechnol/virtualserver/default.mspx

# Keyboard Shortcuts for Using the Administrator's Guide Window

By using the keyboard shortcuts listed in the following table from the *Administrator's Guide*, you can quickly accomplish many common tasks.

| To do this | Use this keyboard shortcut |
|---|---|
| Switch the cursor between the *Administrator's Guide* topic pane and the navigation pane (tabs such as **Contents, Search**, and **Index**). | F6 |
| Change between tabs (for example, **Contents**, **Search**, and **Index**) while in the navigation pane. | ALT + Underlined letter of the tab |
| Select the next hidden text or hyperlink. | TAB |
| Select the previous hidden text or hyperlink. | SHIFT+TAB |
| Perform the action for the selected Show All, Hide All, hidden text, or hyperlink. | ENTER |
| Display the **Options** menu to access an *Administrator's Guide* toolbar command. | ALT+O |
| Hide or show the pane containing the **Contents**, **Search**, and **Index** tabs. | ALT+O, and then press T |
| Display the previously viewed topic. | ALT+O, and then press B |
| Display the next topic in a previously displayed sequence of topics. | ALT+O, and then press F |
| Return to the specified home page. | ALT+O, and then press H |
| Stop the *Administrator's Guide* window from opening an *Administrator's Guide* topic (useful if you want to stop a Web page from downloading). | ALT+O, and then press S |
| Open the **Internet Options** dialog box for Microsoft Internet Explorer, where you can change accessibility settings. | ALT+O, and then press I |
| Refresh the topic (useful if you have linked to a Web page). | ALT+O, and then press R |
| Print all topics in a book or a selected topic only. | ALT+O, and then press P |
| Close the *Administrator's Guide* window. | ALT+F4 |

▷ **To change the font in the Administrator's Guide**

1. Open the *Administrator's Guide* window.

2. Click **Options**, and then click **Internet Options**.

3. On the **General** tab, click **Accessibility**. Then select **Ignore colors specified on Web pages**. You also can choose to use the settings specified in your own style sheet.

4. To customize the colors used in the *Administrator's Guide*, on the **General** tab, click **Colors**. Clear the **Use Windows Colors** check box, and then select the font and background colors that you want to use.

> ✎ | **Note**
>
> If you change the background color of the *Administrator's Guide* topics in the *Administrator's Guide* window, the change also affects the background color when you view a Web page in Microsoft Internet Explorer.

▷ **To change the font in the Administrator's Guide**

1. Open the *Administrator's Guide* window.

2. Click **Options**, and then click **Internet Options**.

3. On the **General** tab, click **Accessibility**. To use the same settings as those used in your instance of Microsoft Internet Explorer, select **Ignore font styles specified on Web pages** and **Ignore font sizes specified on Web pages**. You also can choose to use the settings specified in your own style sheet.

4. To customize the font style used in the *Administrator's Guide*, on the **General** tab, click **Fonts**, and then click the font style you want.

> ✎ | **Note**
>
> If you change the font of the *Administrator's Guide* topics in the *Administrator's Guide* window, the change also affects the font when you view a Web page in Internet Explorer.