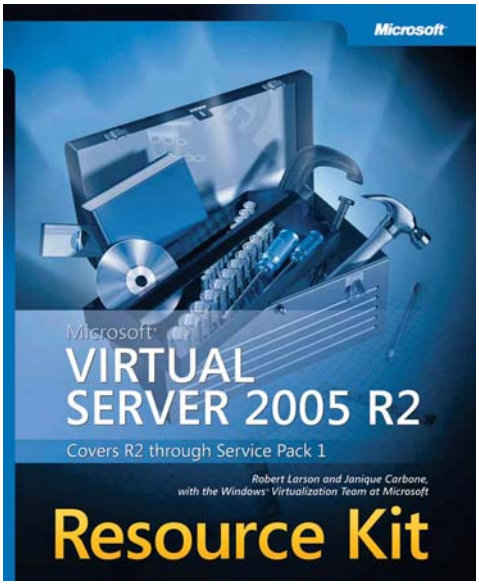

Microsoft® Virtual Server 2005 R2 Resource Kit

Robert Larson and Janique Carbone with the Windows Virtualization team

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Chapter 4

Installing Virtual Server 2005 R2 SP1

In this chapter:

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This chapter provides the information you need to install Microsoft Virtual Server 2005 Release 2 (R2) Service Pack 1 (SP1). It explains the differences in installing Virtual Server 2005 R2 SP1 on Microsoft Windows XP, Windows Vista, and Windows Server 2003. This chapter also covers a series of installation scenarios and shows how to interactively install Virtual Server for these scenarios, as well as how to use the command-line interface to perform the same tasks.

What Are the Prerequisites?

Before installing Virtual Server 2005 R2 SP1, review the requirements and prerequisites and make sure you have installed the required hardware and software to prevent failed installations. This section describes the minimum and recommended hardware and software requirements for installing Virtual Server 2005 R2 SP1. It separates the requirements into physical computer hardware requirements and operating system requirements. These requirements apply to all installation scenarios. Any scenario-specific requirements are discussed in the section that covers that scenario.

Hardware Requirements

The physical computer hardware requirements for Virtual Server 2005 R2 SP1 can vary widely from the minimum to recommended requirements. Table 4-1 lists the requirements for installing Virtual Server 2005 R2 SP1 to obtain a working system.

Important The minimum and recommended disk space and memory requirements listed in Table 4-1 are only for the disk space and memory required to install Virtual Server 2005 R2 SP1. These requirements do not include the disk space you will need for creating and storing virtual machines or the memory that you will need for running virtual machines. Planning and designing a Virtual Server host for different numbers and workloads of virtual machines will be covered in Chapter 15, "Virtualization Project: Planning and Design Phase."

Table 4-1 Virtual Server 2005 R2 SP1 Hardware Requirements

Item	Minimum requirement	Recommended requirement
CPU	1 CPU running at 550 MHz or faster	1 dual-core CPU running at 2 GHz or faster Intel VT or AMD-V enabled processor
RAM	256 MB	512 MB
Disk Space	60 MB	100 MB
Video	800 × 600 pixels or higher resolution monitor	1024 × 768 pixels or higher resolution monitor

Operating System Requirements

Virtual Server 2005 R2 SP1 comes in both 32-bit and 64-bit versions. To install the 32-bit version of Virtual Server 2005 R2 SP1, you must have a 32-bit host operating system installed on an x86-class server. To install the 64-bit version of Virtual Server 2005 R2 SP1, you must have a 64-bit operating system installed on an x64-class server. Virtual Server 2005 R2 SP1 does not support the Intel Itanium 64-bit processor line. Refer to Chapter 1, "Introducing Virtual Server 2005 R2 SP1," for a complete discussion of supported and unsupported hosts.

Supported 32-Bit Host Operating Systems

The following list is a summary of the supported host operating systems that can be used with the 32-bit version of Virtual Server 2005 R2 SP1:

- Microsoft Windows Server 2003 R2, Standard, Enterprise, and Datacenter Editions
- Microsoft Windows Server 2003, Standard, Enterprise, and Datacenter Editions with Service Pack 1 (SP1)
- Microsoft Windows Small Business Server 2003 with SP1 and R2 Editions
- Microsoft Windows XP Professional with Service Pack 2 (SP2)
- Windows Vista Enterprise, Business, and Ultimate Editions

Supported 64-Bit Host Operating Systems

The following list shows all the supported host operating systems that can be used with the 64-bit version of Virtual Server 2005 R2 SP1:

- Microsoft Windows Server 2003 R2, Standard, Enterprise, and Datacenter x64 Editions
- Microsoft Windows Server 2003, Standard, Enterprise, and Datacenter x64 Editions
- Microsoft Windows XP Professional, x64 Edition
- Windows Vista Enterprise, Business, and Ultimate, x64 Edition

Important Microsoft Windows XP and Windows Vista are supported only for nonproduction use as the host operating system.

Active Directory Requirements

Virtual Server 2005 R2 SP1 does not require Active Directory to operate. You can install Virtual Server 2005 R2 SP1 on a server in a workgroup and you will be able to create, modify, run, manage, and operate virtual machines on that host. When the Virtual Server service starts, it verifies whether the host is a member of an Active Directory domain, and if so it attempts to register service principal name (SPN) records with the Active Directory domain it is a member of.

Direct from the Source: Troubleshooting SPNs

To register SPNs, the user or group requires the Validated Write To Service Principal Name permission. By default, a user or computer account has this permission on its own Active Directory object. In addition, the Domain Administrators group has this permission on all objects. If you find that you are receiving errors in the Virtual Server event viewer that indicate failure to register SPNs or you just want to verify registered SPNs, you can use Setspn.exe to list or manually register SPNs for a machine running the Virtual Server service. Refer to Chapter 11, "Troubleshooting a Virtual Server Installation," for details on using Setspn to troubleshoot and register SPNs in Active Directory.

Allen Stewart
Program Manager, Windows Server Division

Installing Virtual Server 2005 R2 SP1 on servers that are members of Active Directory domains also allows you to reduce the management and operations of the Virtual Server installation. By joining an Active Directory domain, the security configuration and access control lists (ACLs) can use domain-based groups and users. This functionality allows you to establish a set of groups or specific user accounts that can be centrally managed but used across a pool of Virtual Server hosts in a server farm.

By combining standardized security groups on the Virtual Server hosts with domain global groups, you can establish a standard security configuration across the servers in the farm. If you try to maintain standardized security on each Virtual Server host that is not joined to an Active Directory domain, you will be required to create duplicate local user accounts, track and maintain separate passwords across the hosts, or establish poor practices such as synchronizing the passwords across the hosts.

Note Refer to Chapter 6, "Security in Depth," for a more in-depth discussion on the security features of Virtual Server 2005 R2 SP1 and how to best use them.

To take advantage of some features of Virtual Server 2005 R2 SP1, the host is required to be a member of an Active Directory domain. The Virtual Server service can then publish its binding information in Active Directory as a service connection point (SCP) object. This arrangement allows customers and independent software vendors (ISVs) to write scripts or applications to easily locate all instances of the Virtual Server service within an Active Directory forest.

What Are the Installation Scenarios?

During Virtual Server 2005 R2 SP1 installation, you select components that define how the Virtual Server operates and how it will be managed, choose optional tools to assist in managing the system, and determine how the security of the Virtual Server service is configured. Table 4-2 lists the available components.

Table 4-2 Virtual Server 2005 R2 SP1 Components

Component	Description
Virtual Server service	The Virtual Server service is a required component on any server where you want to define, create, and operate virtual machines.
Virtual Server Administration Website	The Virtual Server administrative interface is browser-based and therefore requires a Web server to host the Administration Website. The Administration Website can reside on the local server or on a separate server. The choice of where the Administration Website resides affects the security configuration of the Virtual Server service.
Virtual Server documentation and developer resources	The Virtual Server documentation and Component Object Model (COM) application programming interface (API) is required on any machine where you want to create, test, and run scripts or applications that will manage one or more Virtual Server hosts. This tool is typically installed with the Virtual Server service and on any development workstations where applications or scripts are being developed for Virtual Server.

Table 4-2 Virtual Server 2005 R2 SP1 Components

Component	Description
VHD Mount tool	The VHD Mount tool is required on any machine where you want to perform offline access to a virtual hard drive. This tool is typically installed with the Virtual Server service and consists of a client tool and a storage bus driver.
Virtual Machine Remote Control (VMRC) Windows client	The VMRC Windows client is required on any machine where you want to remotely manage virtual machines. This tool is typically installed with the Virtual Server service and independently on administrative workstations.

Virtual Server 2005 R2 SP1 comes in a self-extracting executable that contains a Microsoft Installer (MSI) package. As with most MSI packages, you have the option of performing a complete install or performing a custom install. Performing a complete install installs all available components on the local server. Selecting a custom install allows you to select components individually for local installation.

Note Virtual Machine Network Services (VMNS) and the Volume Shadow Copy Service (VSS) writer are also installed when you install the Virtual Server service. Virtual Machine Network Services provides the virtual network interface and handles all packet receipt and delivery with the virtual machines. The VSS writer provides a VSS-compliant backup interface for backup applications. You can see all installed VSS writers by using the *vssadmin list writers* command.

Table 4-3 provides a breakdown of the typical installation scenarios and a description of what is installed.

Table 4-3 Installation Scenarios

Scenario	Description
Upgrade	Upgrade all components from Virtual Server 2005 R2 to Virtual Server 2005 R2 SP1.
Single Server Installation	Install all components on the same server. Resources can be local or remote.
Central Administration Website Installation	Install all components except for the Administration Web Service on the Virtual Server host machine. The Administration Website is installed on a central server that is providing administrative services for one or more Virtual Server hosts. Resources can be local or remote to the Virtual Server host machines.
Documentation and Developer Resources Only	Install only the documentation and developer resources on the local machine to allow development of applications that make use of the Virtual Server COM API.
VMRC Only	Install only the VMRC client utility on the local machine to allow remote access to Virtual Server host machines.
VHD Mount Only	Install only the VHD Mount utility on the local machine to allow offline read/write modification of a .vhd file.

Configuring Constrained Delegation

When you select a complete install, you are installing all the components of Virtual Server: the Virtual Server service, documentation and development tools, VHD Mount utility, and Virtual Server Administration Website. If you will be accessing all of your resources—such as virtual hard disks, virtual floppy disks, and ISO images—from the local machine, there are no additional setup steps.

If you decide to install the Administration Website on a separate computer or need to access resources that are stored on a separate computer from the Virtual Server service, you have a security delegation requirement and additional configuration, called constrained delegation, is required in most cases.

Constrained delegation is the ability to specify that a computer or service account can perform Kerberos delegation to a limited set of services. This ability allows the user credentials to be passed from the Administration Website to the Virtual Server service or the server hosting the resources files, such as virtual hard disk (.vhd) files and ISO image (.iso) files, so that the user can access the files. In this scenario, you are required to use Integrated Windows authentication. Delegation does not work with Basic authentication.

Important Constrained delegation is supported only in Windows Server 2003 Active Directory domains in Windows Server 2003 domain functional level. This means that if your domain functional level is Windows 2000 mixed mode or Windows 2000 native, you must raise the domain functional level to Windows Server 2003 native level to configure constrained delegation. In order to raise the domain functional level to Windows Server 2003, you can only have Windows Server 2003 domain controllers; therefore, you must replace, upgrade, or remove any Windows NT 4.0 or Windows 2000 domain controllers that currently exist in the domain.

Constrained delegation is not supported when using Windows XP Professional or Windows Vista as the host operating system. If you install Virtual Server on a Windows XP or Windows Vista system, you will not be able to access resources on remote file servers.

Constrained delegation is configured from the Active Directory Users and Computers Microsoft Management Console (MMC) snap-in. When you configure constrained delegation, you need to know the machine that you want to delegate from and the server and services that you want to delegate to.

Important In a constrained delegation configuration, when a Kerberos token is passed from a source to a target configured for delegation, it maintains the original user requesting the action intact for complete auditing of user accounts.

In the scenario where you have the Administration Website on a computer separate from the Virtual Server service and the resources are local to the Virtual Server host, you need to dele-

gate from the Web server to the Virtual Server and select the Virtual Server service (VSSRVC) and Common Internet File System (CIFS) services for delegation. Figure 4-1 shows this scenario that uses delegation to one or more Virtual Server hosts.

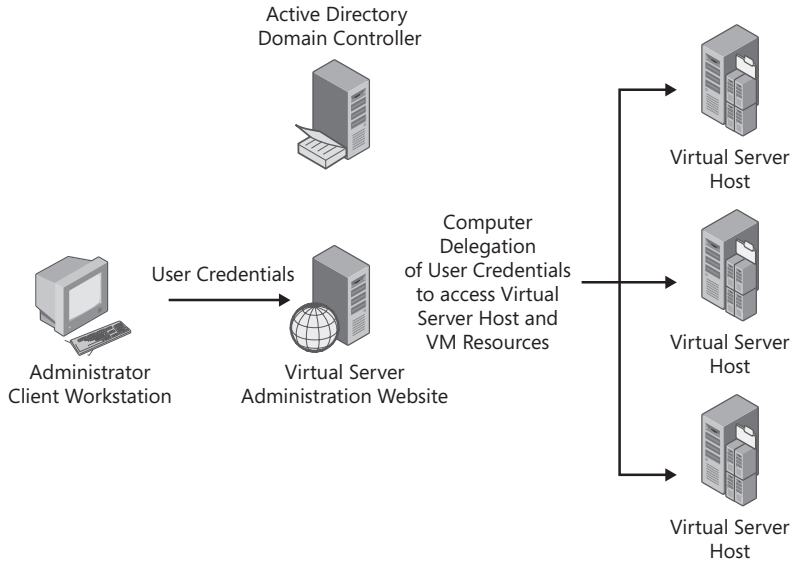

Figure 4-1 Delegation from an Administration Web server to a Virtual Server with local resources

If the virtual machine resource files are stored on a remote file server, you also need to delegate from the Virtual Server to the file server and select the CIFS service for delegation. Figure 4-2 shows this scenario that uses delegation to one or more file servers.

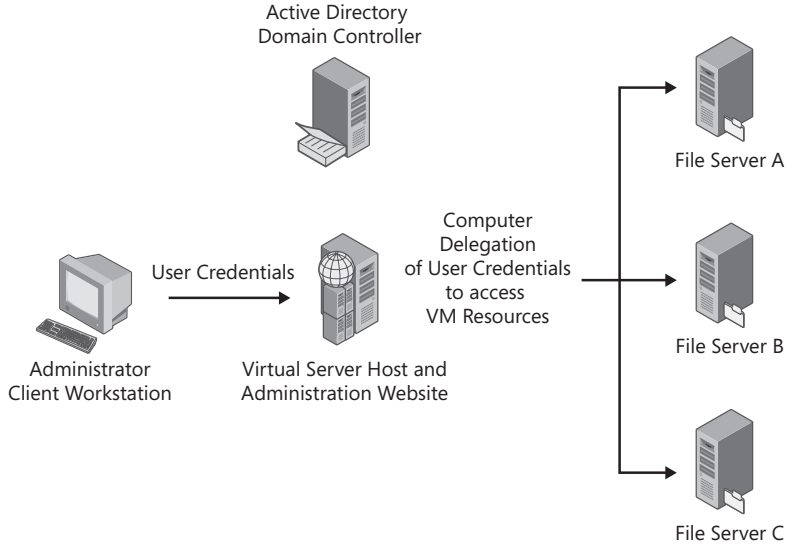

Figure 4-2 Delegation from Virtual Server to file server with remote resources

If the Virtual Server Website is installed centrally and the VM resource files are stored on remote file servers, you need to configure the following two separate delegations, as shown in Figure 4-3:

1. Delegate from the Administration Website to the Virtual Server hosts.
2. Configure a separate delegation from the Virtual Server host to the file servers, and select the CIFS service for delegation.

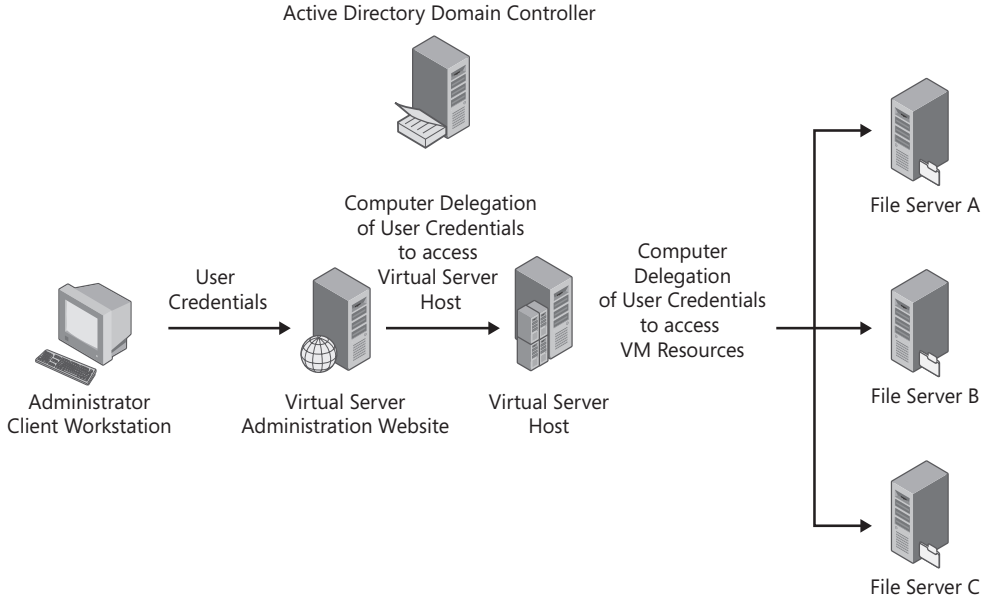

Figure 4-3 Delegation from Web server to Virtual Server and Virtual Server to file server

A constrained delegation configuration can get complicated. Keep detailed documentation on the computer delegations that you have set up and the services that were delegated. You will need this information to troubleshoot access issues and to manage the access in the event that a server is being retired or virtualized.

More Info For detailed steps for configuring constrained delegation, refer to Chapter 17, "Managing a Virtual Server Infrastructure."

Installing Microsoft Internet Information Services 6.0

Installing Internet Information Services (IIS) 6.0 requires slightly different procedures depending on the operating system. This section provides the procedures for installing IIS 6.0 on Windows XP, Windows Vista, and Windows Server 2003. This section is a reference for the three installation scenarios, and you should select the correct operating system procedure based on the operating system on which you are installing Virtual Server.

Windows XP

Installing IIS 6.0 on Windows XP is a simple process because this version of IIS has no configuration options to select from during install. IIS 6.0 on Windows XP supports only a single Web site and therefore will listen only on a single port. As with most Web servers, the default port is port 80.

Important Set the port for the default Web site before you install Virtual Server. Virtual Server will not allow you to change the port during installation. If you want to change the port of the Administration Website to something other than the default port 80 and you did not do so before you installed Virtual Server, you will have to uninstall Virtual Server, change the default port of the Administration Website using the IIS administrative console, and then reinstall Virtual Server.

Best Practices Standardize the port you use for Virtual Server Administration Websites. The default port for Windows Server 2003 installations is 1024. You should standardize on this port or select another standard and then use this port across all installations of IIS (Windows XP, Windows Vista, and Windows Server 2003).

To install IIS on Windows XP, follow these steps:

1. From the Start menu, select Control Panel.
2. Click Add Or Remove Programs and then click Add/Remove Windows Components to open the Windows Components Wizard, as shown in Figure 4-4.

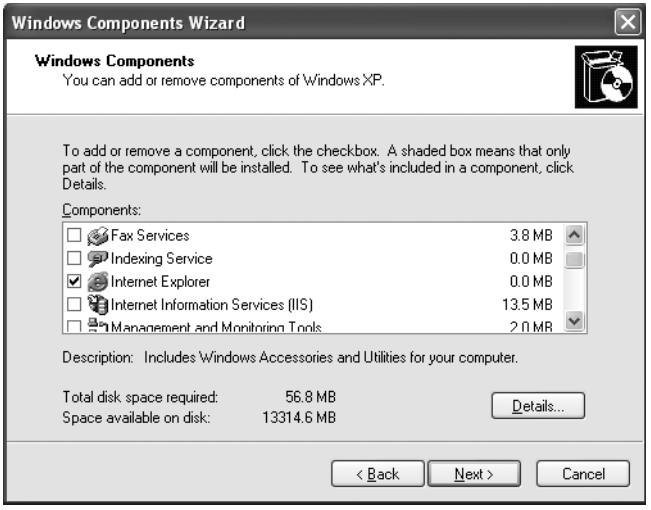

Figure 4-4 Windows Components Wizard

3. Select the Internet Information Services (IIS) check box to enable IIS for installation.
4. Click Next and the installation begins.
5. You might be prompted for the Windows XP or Windows XP service pack CD-ROM. Insert the CD-ROM in the CD-ROM drive and click OK.
6. When IIS installation is complete, click Finish.

Windows Vista

IIS installation on Windows Vista is an easy process, but selecting all the required components to support Virtual Server 2005 R2 SP1 Administration Website operation is not. Although you could take the simple approach and install all features under IIS, that would open your machine with new attack surfaces and is not a good security practice. The Virtual Server development team received feedback during beta testing that installing Virtual Server on Windows Vista was too error prone. To address this issue, the development team added the ability for the Virtual Server installation process to automatically configure the required IIS options. Although this configuration is done automatically, the steps to verify the IIS configuration are provided below.

Note If User Access Control is enabled, you will have to approve the launch of the Control Panel application because it requires administrative rights.

To verify that only the required features of IIS to support Virtual Server are installed on a Windows Vista machine, complete the following steps:

1. Log on to the Windows Vista machine with an account that has administrative rights.
2. Click the Vista Start button.
3. Select Control Panel to open the Control Panel page shown in Figure 4-5.

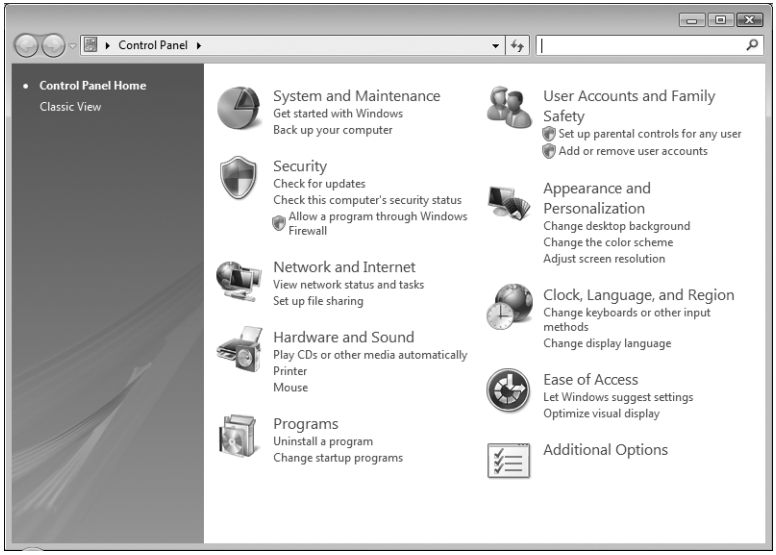

Figure 4-5 Control Panel

4. Click Programs to open the Programs page shown in Figure 4-6.

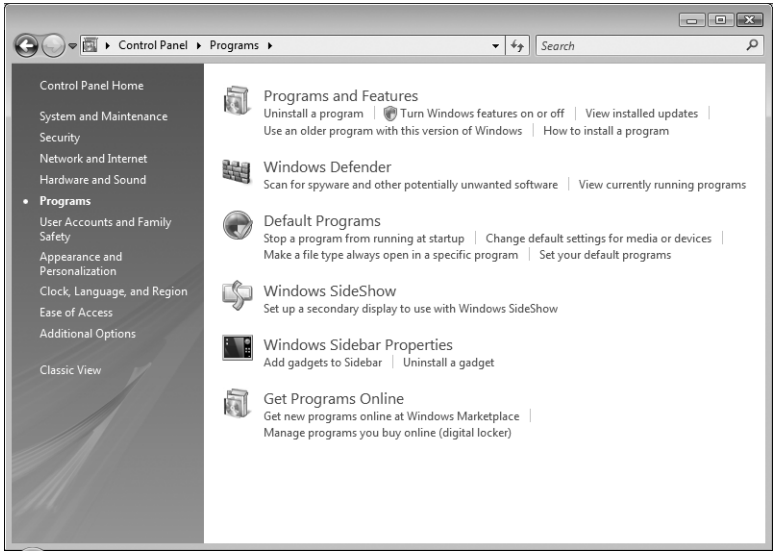

Figure 4-6 Selecting Programs from Control Panel

5. Under the Programs And Features option, click Turn Windows Features On Or Off to open the Windows Features dialog box shown in Figure 4-7.

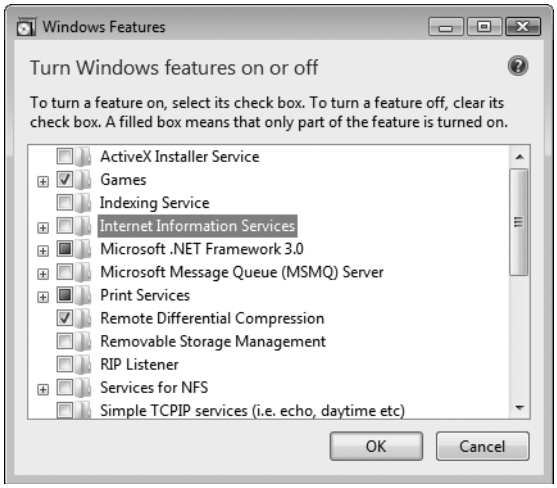

Figure 4-7 Windows Features dialog box

6. Expand the Internet Information Services node.
7. Expand the Web Management Tools node.
8. Verify that IIS Management Console is enabled.
9. Expand the IIS 6 Management Compatibility node.
10. Verify that IIS Metabase And IIS 6 Configuration Compatibility options are enabled.
11. Expand the World Wide Web Services node.
12. Expand the Application Development Features node.
13. Verify that CGI is enabled.
14. Expand the Common HTTP Features node.
15. Verify that the following options are enabled:
    - ❑ Default Document
    - ❑ Directory Browsing
    - ❑ HTTP Errors
    - ❑ Static Content
16. Expand the Health and Diagnostics node.
17. Verify that the following options are enabled:
    - ❑ HTTP Logging
    - ❑ Resource Monitor
18. Expand the Performance Features node.

19. Verify that the Static Content Compression algorithm is enabled.
20. Expand the Security node.
21. Verify that the Enable Windows Authentication feature is enabled.
22. Press OK to accept the IIS configuration settings.

On the Companion Media You will find a batch file on the companion media to automate the installation of Internet Information Services (IIS) on Windows Vista using the pkgmgr tool. The batch file is called Installiis.bat and is in the \Chapter Materials\Scripts directory.

Windows Server 2003

Installing IIS on Windows Server 2003 can be accomplished in two ways. The first way is similar to the Windows XP installation process and involves the use of the Add/Remove Windows Components option. Windows Server 2003 introduced a new interface for tasks like this through the Configure Your Server Wizard. This is a wizard approach for selecting server roles, and it greatly reduces the number of steps that it takes to install a role for a computer. Since the default options are the correct security options for Windows Server 2003, you can use the Configure Your Server Wizard approach.

To install IIS 6.0 on Windows Server 2003, complete the following steps:

1. From the Start menu, select Programs, Administrative Tools, and click Configure Your Server Wizard.
2. When the wizard starts, click Next.
3. On the Preliminary Steps page, click Next to open the Server Role page, which is shown in Figure 4-8. This page enumerates all network devices and connections that will be used during server configuration.

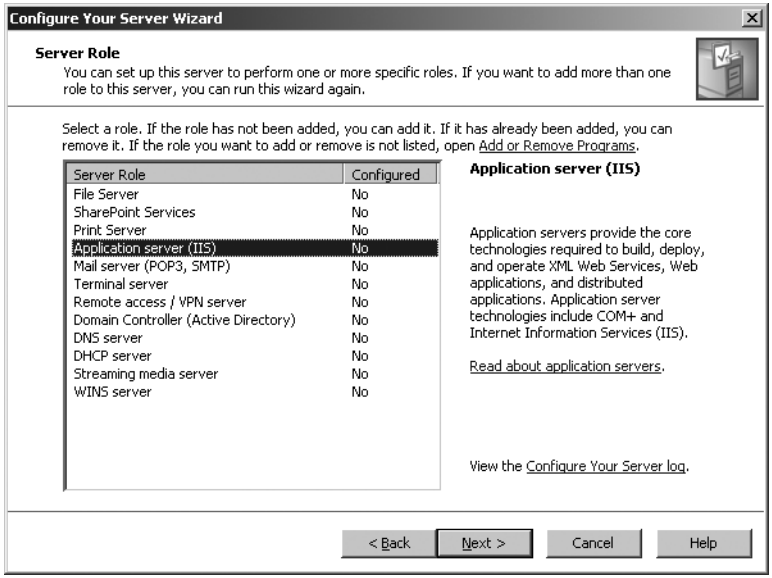

Figure 4-8 Server Role page of the Configure Your Server Wizard

4. Select Application Server and click Next.

   You will be prompted with an option to enable FrontPage Server Extensions and ASP.NET; however, you do not need either for the Virtual Server Administration Website to operate. Click Next.

5. On the Summary Of Selections page, shown in Figure 4-9, review the list of options that will be installed when you proceed, and click Next.

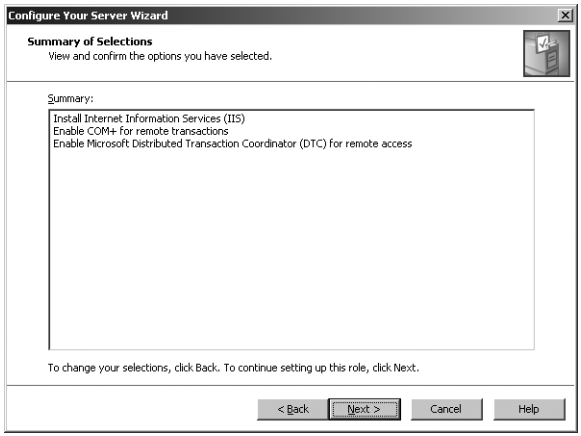

Figure 4-9 Summary Of Selections page of the Configure Your Server Wizard

The wizard scripts the installation based on the selections you made, and it uses that script to install the system in unattended mode. You will be able to see all the steps as the wizard proceeds. When the wizard completes processing, it displays a final page that declares that the machine is now an Application Server.

Installing Virtual Server 2005 R2 SP1

Depending on how Virtual Server will be used, the installation scenario could be an upgrade in place of Virtual Server 2005 R2 or could range from a simple single-server installation to a large multiserver farm of Virtual Server hosts maintained by a central Administration Website. Each installation scenario might require different components of Virtual Server to be installed on different servers, so the installation process supports custom installation and allows you to select any or all components. This section documents the procedures for the most common installation scenarios and important issues to watch out for during installation.

Note Although Virtual Server 2005 R2 SP1 can be installed on 32-bit or 64-bit versions of the supported operating systems, the procedures are the same for either version.

On the Companion Media On the companion media, you will find a directory called \Bonus Materials\Applications\Virtual Server 2005 R2 SP1. Inside that directory, you will find two subdirectories: \x86 and \x64. Each directory contains a single file, Setup.exe, for the associated 32-bit or 64-bit version of Virtual Server 2005 R2 SP1. This is the installation file for Virtual Server 2005 R2 SP1. You can install directly off the companion media, or you can copy the correct file version to the local hard disk and install from there.

Important The Virtual Server 2005 R2 SP1 installation process installs the Virtual Machine Network Services driver. When this driver is installed, it causes the host machine to lose access to the network. Make sure that the installation files are local on the server; otherwise, the installation may fail.

If you are using Remote Desktop to install Virtual Server 2005 R2 SP1 across the network, you will lose your connection while the driver is being installed, but typically it reestablishes the connection quickly. Make sure you use the /console command-line option with Remote Desktop when you establish the connection to the remote server.

Upgrading Virtual Server 2005 R2

Although Virtual Server 2005 R2 SP1 is labeled as a service pack, it is actually a full installation package that can be used to perform a fresh install or upgrade an existing installation of Virtual Server 2005 R2. The uninstall of Virtual Server 2005 R2 and the installation of Virtual Server 2005 R2 SP1 is fully automated in the upgrade process, so you do not have to uninstall Virtual Server 2005 R2 prior to installing Virtual Server 2005 R2 SP1.

Warning Virtual Server 2005 R2 SP1 required changes to the information stored in the save state (.vsv) file. Therefore, Virtual Server 2005 R2 saved states are not compatible with Virtual Server 2005 R2 SP1 save states. You must resume any virtual machines currently in save state and shut down the guest operating system cleanly before attempting the upgrade to Virtual Server 2005 R2 SP1. If not, you will have to discard the saved state before the virtual machine will power on.

To perform an upgrade of Virtual Server 2005 R2 to Virtual Server 2005 R2 Service Pack 1, complete the following steps:

1. Collect the following information before you start the upgrade:
   - ❑ The http port that the Administration Website is currently using
   - ❑ The Service account that the Virtual Server service is running under: Local System or Network Service
2. Open the Virtual Server Administration Website, and shut down all running virtual machines. Any virtual machine that is currently in saved state must be resumed from saved state and shut down.
3. Click the Start button, select Administrative Tools, and click Services.
4. Find the Virtual Server and the Virtual Machine Helper services, right-click each one and select Stop. This will stop both services and allow Virtual Server 2005 R2 SP1 to install.
5. On the companion media, obtain the correct version (32- or 64-bit) of Virtual Server 2005 R2 SP1 and launch Setup.exe to start the installation.
6. The dialog box shown in Figure 4-10 prompts you to verify that you want to upgrade the installed version of Virtual Server. Click Upgrade.

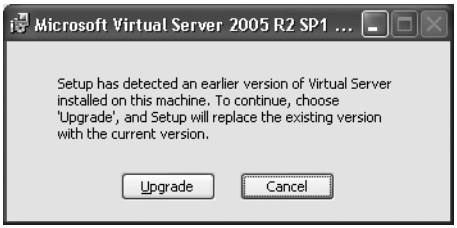

Figure 4-10 Verifying the upgrade

7. Click the Install Virtual Server 2005 R2 SP1 button.
8. Read the license terms, select I Accept The Terms Of This License Agreement if you agree, and click Next.
9. In the Customer Information dialog box, enter your User Name and Organization and click Next. The Product ID should be dimmed and already provided.
10. In the Setup Type dialog box, select the default option of a Complete Install and click Next.
11. Select the port that you want to use for the Virtual Server Administration Website, or use the default of 1024. Select the default option of Configure The Administration Website To Always Run As The Authenticated User, and click Next.

12. Accept the default to Enable Virtual Server extensions in Windows Firewall. This automatically enables firewall exceptions for the Virtual Server Web site and the VMRC protocol in the Windows Firewall. Click Next.
13. You have now selected all the configuration options for Virtual Server 2005 R2 SP1. Click Install to complete the upgrade.

You should see the upgrade proceed, and then you will see an Internet Explorer window that provides a summary of the installation and the links to the new Virtual Server Administration Website.

Single-Server Configuration

Installing Virtual Server on a single server is a typical scenario for environments where there is no security concern for IIS to be installed locally on the server or if there is a desire for each server to have local administrative capabilities. These procedures assume that no previous version of Virtual Server is installed on the server.

To install all Virtual Server components on a single server, complete the following steps:

1. Ensure that the server meets all the requirements for installation.
2. Install IIS using the procedures detailed in the "Installing Microsoft Internet Information Services 6.0" section of this chapter for the operating system version you are installing.
3. On the companion media, obtain the correct version (32- or 64-bit) of Virtual Server 2005 R2 SP1 and launch Setup.exe to start the installation.
4. Click the Install Microsoft Virtual Server 2005 R2 SP1 button as shown in Figure 4-11.

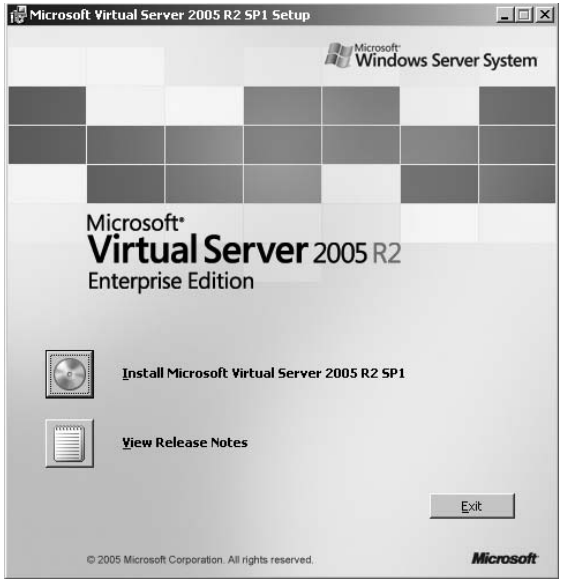

Figure 4-11 Starting the installation

5. Read the license terms, select I Accept The Terms Of This License Agreement if you agree, and click Next.
6. In the Customer Information dialog box, enter your User Name and Organization and click Next. The Product ID should be dimmed and already provided.
7. In the Setup Type dialog box, select the default option of a Complete Install. Click Next.
8. Select the port that you want to use for the Virtual Server Administration Website, or use the default of 1024, as shown in Figure 4-12. Select the default option of Configure The Administration Website To Always Run As The Authenticated User, and click Next.

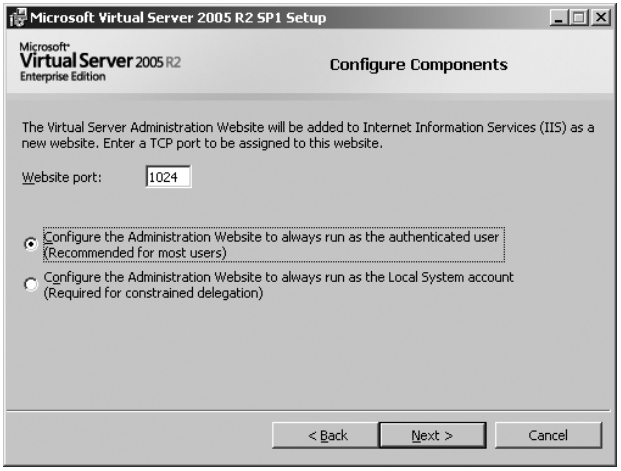

Figure 4-12 Configuring components

9. Verify that the Enable Virtual Server Extensions In Windows Firewall check box is selected as shown in Figure 4-13, and click Next. This automatically enables firewall exceptions for the Virtual Server Web site and the VMRC protocol in the Windows Firewall.

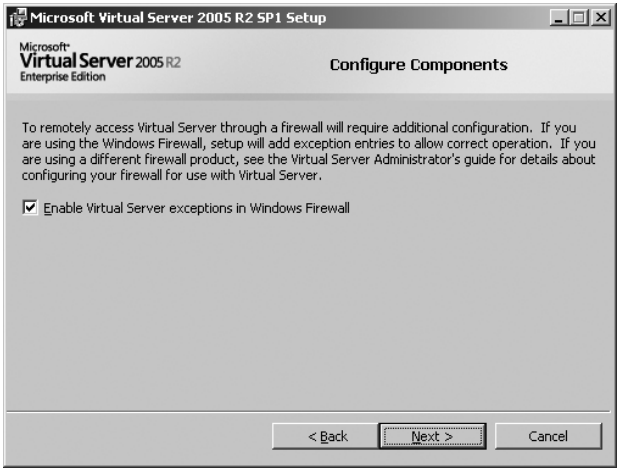

Figure 4-13 Enabling the firewall

10. Click Install to complete the installation.

You should see the installation proceed, and then you will see an Internet Explorer window that provides a summary of the installation and the links to the new Virtual Server Administration Website.

Local Administration Website and Remote Resources

In this scenario, you are installing the Virtual Server host and Website exactly like you would in the Single Server installation scenario. In addition, you must perform the constrained delegation configuration to allow the Virtual Server host to delegate the CIFS service to the file servers where the remote virtual machine resources are stored. The "Configuring Constrained Delegation" section in this chapter covers this scenario. Refer to Figure 4-2 for a diagram that depicts the configuration. The following instructions provide the detailed steps for performing that delegation. Perform these steps after you have installed Virtual Server for a single-server installation.

Note You must perform this step from each Virtual Server host to each file server that will store remote virtual machine files' resources. Therefore, if you have one host and three file servers, you will have to configure the delegation from the Virtual Server host to each file server for the CIFS service.

To allow the Virtual Server service to delegate a user's credentials to a remote file server for the CIFS service, complete the following steps:

1. On the domain controller, open Active Directory Users And Computers.
2. In the console tree, under Domain Name, click Computers, and then click the computer's organizational unit or the organizational unit in which the Virtual Server host is contained.
3. Right-click the Virtual Server host running the Virtual Server service, and then click Properties to open the Virtual Server host's Properties dialog box.
4. On the Delegation tab, select Trust This Computer For Delegation To Specified Services Only.
5. Select Use Any Authentication Protocol, as shown in Figure 4-14.

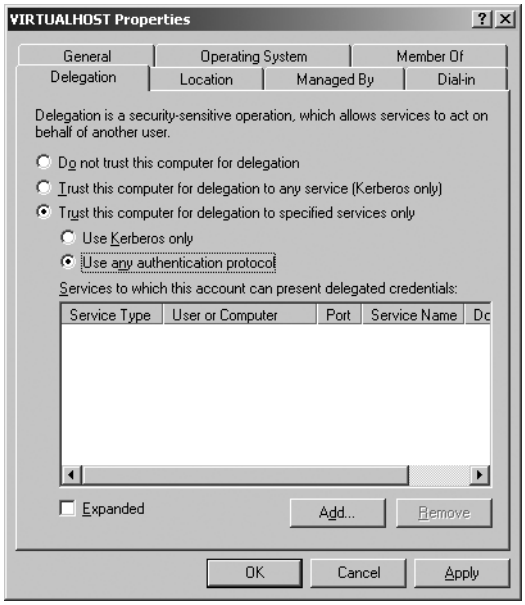

Figure 4-14 Virtual Server host's Properties Delegation tab

6. Click Add to display the Add Services dialog box, and then click the Users And Computers button.

7. Type the name of the computer on which the virtual machine resources are stored, and then click OK.

8. From the list of available services, select CIFS as shown in Figure 4-15, and then click OK. This selects the CIFS service as an approved service to accept delegated user credentials.

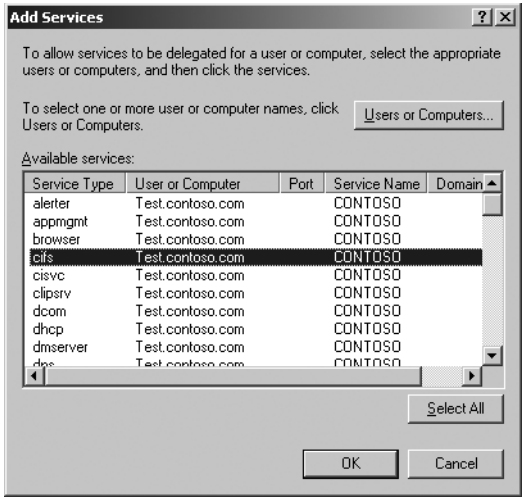

Figure 4-15 Selecting a service for delegation

9. If there is more than one file server that you need to delegate to, repeat steps 6 through 8 for each file server.
10. Click OK, as shown in Figure 4-16, to approve the Virtual Server host's ability to delegate user credentials to the CIFS service on the specified file servers.

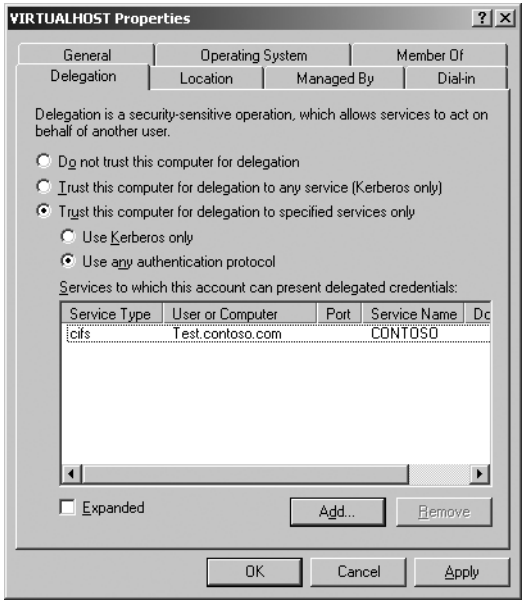

Figure 4-16 Virtual Server Properties Delegation tab

Server Farm with Central Administration Website and Remote Resources

In this scenario, you are installing the Administration Website on a central server to manage all the hosts in a server farm. You'll do this by installing each Virtual Server host with all services but the Administration Website and storing all virtual machine file resources remotely on one or more file servers. This is a typical data center installation scenario that provides a centralized administration point and increases the security of the Virtual Server host machines by reducing the attack surface, because IIS is not required on the host.

In this installation scenario, you must perform two constrained delegation configurations. The first is to allow the central Administration Website to delegate user credentials to the Virtual Server service (VSSRVC) for each host in the server farm. The second is to allow the Virtual Server host to delegate user credentials to the CIFS service running on the file servers on which the remote VM resources are stored. The "Configuring Constrained Delegation" section in this chapter covers this scenario. Refer to Figure 4-3 for a diagram that depicts the configuration. The following instructions provide the detailed steps for performing that delegation.

Installing the Administration Website on a Central Server

To install the Administration Website on a central server, complete the following steps:

1. Ensure that the server meets all the requirements for installation.
2. Install IIS using the procedures detailed in the "Installing Microsoft Internet Information Services 6.0" section of this chapter for the operating system version you are installing.
3. On the companion media, obtain the correct version (32- or 64-bit) of Virtual Server 2005 R2 SP1 and launch Setup.exe to start the installation.
4. Click the Install Microsoft Virtual Server 2005 R2 SP1 button.
5. Read the license terms, select I Accept The Terms Of This License Agreement, and click Next.
6. In the Customer Information dialog box, enter your User Name and Organization and click Next. The Product ID should be dimmed and already provided.
7. In the Setup Type dialog box, shown in Figure 4-17, select the Custom option and click Next.

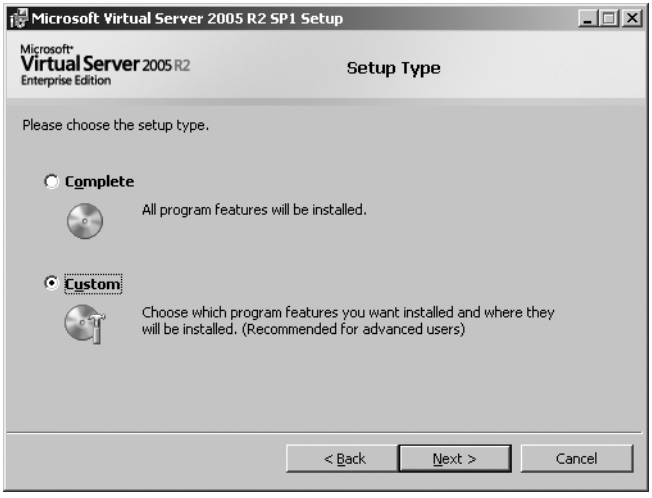

Figure 4-17 Setup Type dialog box

8. In the Custom Setup dialog box, shown in Figure 4-18, click Virtual Server Service, select This Feature Will Not Be Available, and then click Next. You do not want to install the Virtual Server Service.

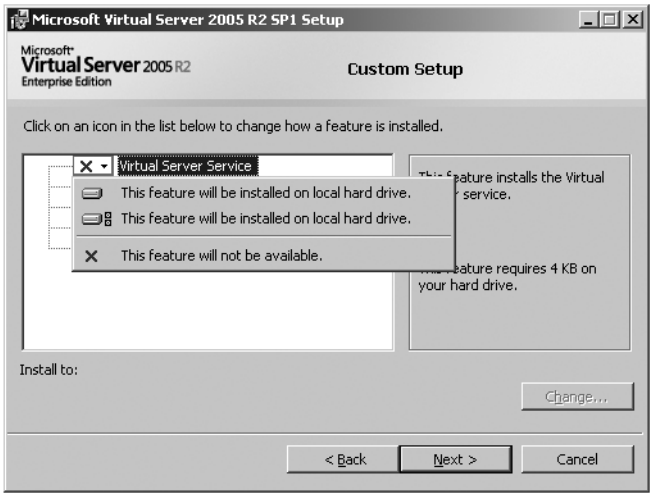

Figure 4-18 Disabling the Virtual Server service in the Custom Setup dialog box

9. In the Configure Components dialog box, shown in Figure 4-19, select the port that you want to use for the Virtual Server Administration Website or use the default of 1024. Select the Configure The Administration Website To Always Run As The Local System Account option, and click Next.

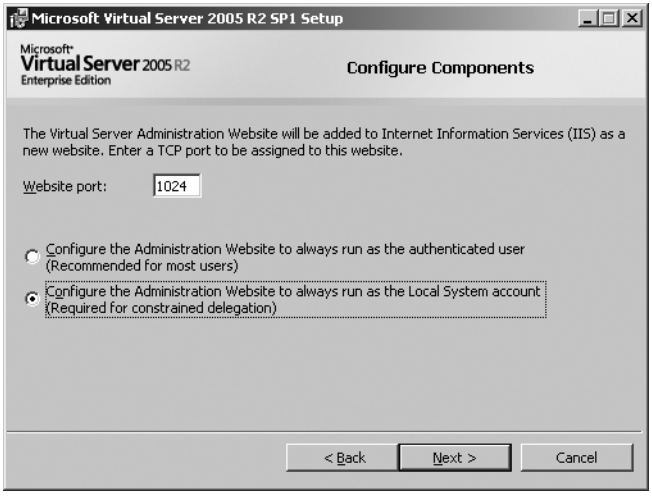

Figure 4-19 Configure Components dialog box

10. Accept the default to Enable Virtual Server Extensions In Windows Firewall, and click Next. This automatically enables firewall exceptions for the Virtual Server Web site and the VMRC protocol in the Windows Firewall.

11. Click Install to complete the installation.

You should see the installation proceed, and then you will see an Internet Explorer window display that provides a summary of the installation and the links to the new Virtual Server Administration Website.

Installing the Virtual Server Host Server with No Local Administration Website

To install the host server without a local Administration Website, complete the following steps:

1. Ensure that the server meets all the requirements for installation.

> **Important** Do not install IIS on this machine; you will not be installing the Virtual Server Administration Website and you do not require IIS.

2. On the companion media, obtain the correct version (32- or 64-bit) of Virtual Server 2005 R2 SP1 and launch Setup.exe to start the installation.
3. Click the Install Microsoft Virtual Server 2005 R2 SP1 button.
4. Read the license terms, select I Accept The Terms Of This License Agreement if you agree, and click Next.
5. In the Customer Information dialog box, enter your User Name and Organization and click Next. The Product ID should be dimmed and already provided.
6. In the Setup Type dialog box, select the Custom Install option and click Next.
7. In the Custom Setup dialog box, shown in Figure 4-20, click Virtual Server Web Application, select This Feature Will Not Be Available, and then click Next.

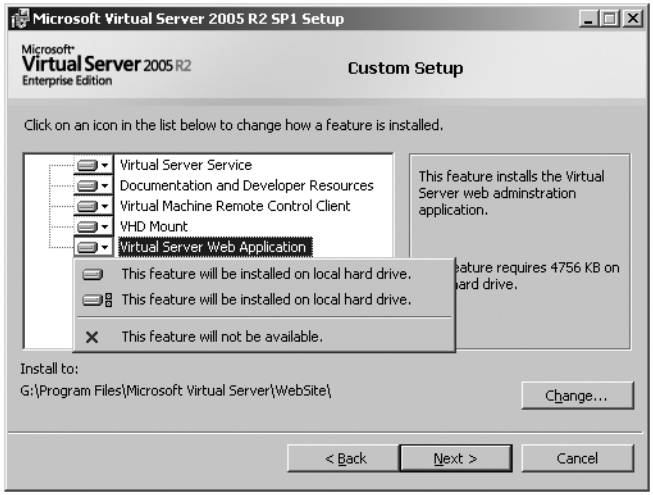

Figure 4-20 Disabling a Virtual Server Web application in the Custom Setup dialog box

> **Note** Because you are not installing the Virtual Server Web Application on this server, you are not prompted to configure the port for the Web server.

8. Accept the default to Enable Virtual Server Extensions In Windows Firewall, and click Next. This automatically enables firewall exceptions for the VMRC protocol in the Windows Firewall.
9. Click Install to complete the installation.

You should see the installation proceed, and then you will see an Internet Explorer window that provides a summary of the installation.

Documentation and Developer Resources Only

In scenarios where you need to perform development for Virtual Server, you might need to install only the development tools and documentation on a development workstation and none of the other services, such as the Virtual Server service or the Administration Website. You must have Virtual Studio or one of the Express development products installed on the development workstation before you install the development tools. Use the following instructions to install only the development tools and documentation.

To install the Virtual Server documentation and developer resources, complete the following steps:

1. On the companion media, obtain the correct version (32- or 64-bit) of Virtual Server 2005 R2 SP1 and launch Setup.exe to start the installation.
2. Click the Install Microsoft Virtual Server 2005 R2 SP1 button.
3. Read the license terms, select I Accept The Terms Of This License Agreement if you agree, and click Next.
4. In the Customer Information dialog box, enter your User Name and Organization, and click Next. The Product ID should be dimmed and already provided.
5. In the Setup Type dialog box, select the Custom Install option and click Next.
6. In the Custom Setup dialog box, shown in Figure 4-21, select each of the listed options except the Documentation And Developer Resources option, and select This Feature Will Not Be Available from the drop-down menu. Once you have disabled all components except Documentation And Developer Resources, click Next.

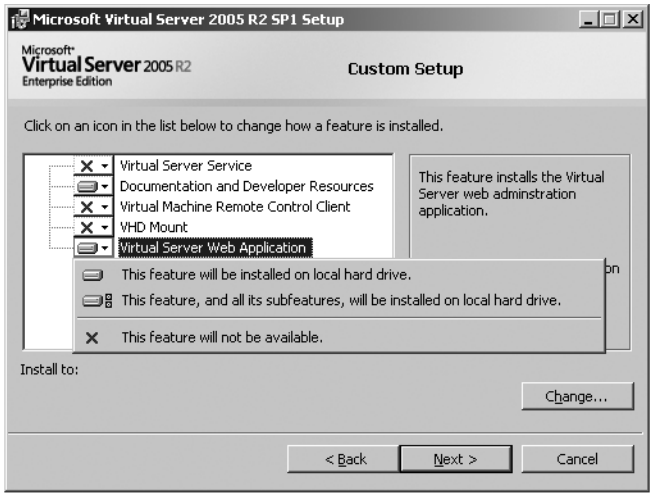

Figure 4-21 Installing Documentation And Developer Resources Only

7. Click Install to complete the installation.

You should see the installation proceed, and then you will see an Internet Explorer window that provides a summary of the installation.

Virtual Machine Remote Control Client Tool Only

In scenarios where you need to perform remote management of virtual machines, you might need to install the Virtual Machine Remote Control (VMRC) Client tool on an administrative workstation and none of the other services, such as the Virtual Server service or the Administration Website.

To install the Virtual Server VMRC tool only, complete the following steps:

1. On the companion media, obtain the correct version (32- or 64-bit) of Virtual Server 2005 R2 SP1 and launch Setup.exe to start the installation.
2. Click the Install Microsoft Virtual Server 2005 R2 SP1 button.
3. Read the license terms, select I Accept The Terms Of This License Agreement if you agree, and click Next.
4. In the Customer Information dialog box, enter your User Name and Organization and click Next. The Product ID should be dimmed and already provided.
5. In the Setup Type dialog box, select the Custom Install option and click Next.
6. In the Custom Setup dialog box, shown in Figure 4-22, select each of the listed options except the Virtual Machine Remote Control Client, and select This Feature Will Not Be Available from the drop-down menu. After you have disabled all components except the VMRC Client, click Next.

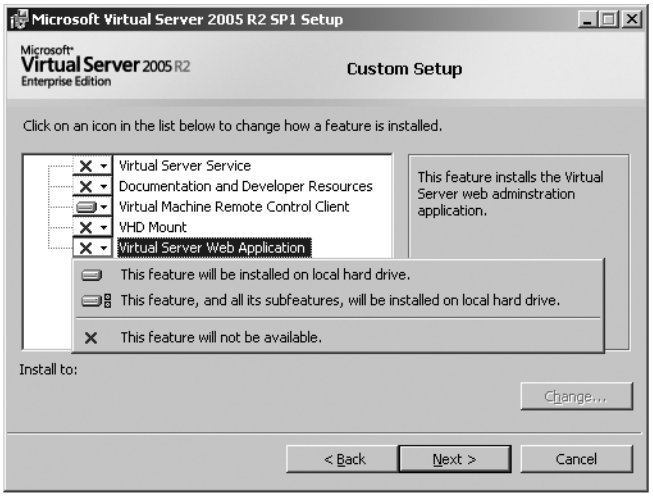

Figure 4-22 Selecting only the VMRC Client for installation

7. Click Install to complete the installation.

You should see the installation proceed, and then you will see an Internet Explorer window that provides a summary of the installation.

At this point, the VMRC client is installed into the C:\Program Files\Microsoft Virtual Server\VMRC Client\ directory. A Start menu program group is also created, and a shortcut to the VMRC client will be created. You should be able to launch the VMRC client utility from the shortcut in the menu.

Note The VMRC Client is a Windows application instead of a Web browser interface. The Windows VMRC Client actually uses the same ActiveX control as the Web browser version; it just has more features because it is a Windows application. For example, the VMRC client will allow you to expand the display to full screen and allow you to switch to other running virtual machines using the host key plus the left or right arrow keys.

VHD Mount Tool Only

In scenarios where you need to perform maintenance of virtual hard drive (.vhd) files or maybe offline modification of sysprep files in a virtual hard drive used as a template for provisioning new virtual machines, you might need to install the VHD Mount tool on an administrative workstation and none of the other services, such as the Virtual Server service or the Administration Website.

To install the Virtual Server VHD Mount tool, complete the following steps:

1. On the companion media, obtain the correct version (32- or 64-bit) of Virtual Server 2005 R2 SP1 and launch Setup.exe to start the installation.
2. Click the Install Microsoft Virtual Server 2005 R2 SP1 button.
3. Read the license terms, select I Accept The Terms Of This License Agreement if you agree, and click Next.
4. In the Customer Information dialog box, enter your User Name and Organization, and click Next. The Product ID should be dimmed and already provided.
5. In the Setup Type dialog box, select the Custom Install option and click Next.
6. In the Custom Setup dialog box, shown in Figure 4-23, select each of the listed options except VHD Mount, and select This Feature Will Not Be Available from the drop-down menu. After you have disabled all components except the VHD Mount tool, click Next.

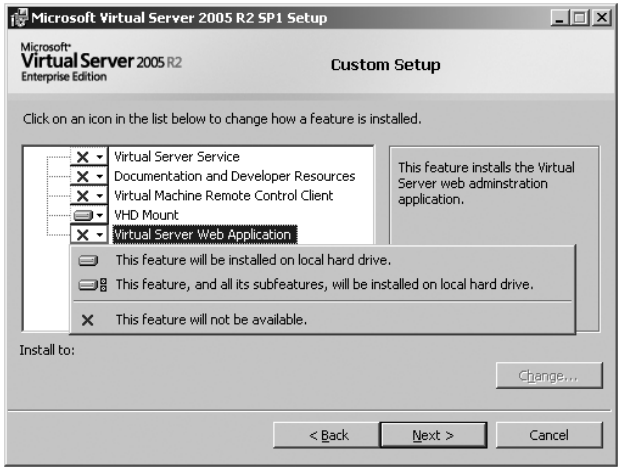

Figure 4-23 Enabling the VHD Mount tool

7. Click Install to complete the installation.

You should see the installation proceed, and then you will see an Internet Explorer window that provides a summary of the installation.

At this point, VHD Mount is installed into the C:\Program Files\Microsoft Virtual Server \VHDMount directory. A Start menu program group is not installed when you install VHD Mount because it is a command-line tool. To use VHD Mount, you must open a command prompt window and run the vhdmount.exe command with the correct command-line options to mount or unmount a .vhd file.

More Info For more information on VHDMount and the command-line options, refer to Chapter 5, "Advanced Features."

Uninstalling Virtual Server 2005 R2 SP1

Uninstalling Virtual Server 2005 R2 SP1 is a straightforward process. When you launch the uninstall process, the Virtual Server 2005 SP1 MSI file executes the predefined uninstall routine. This routine performs the following actions:

- Uninstalls the Virtual Server service
- Uninstalls the Virtual Machine Helper service
- Removes the Virtual Machine Monitor (VMM)
- Removes the Virtual Machine Network Services from all network interface cards that it is bound to
- Removes the Start menu Programs menu group and all shortcuts

If the Virtual Server Administration Website is installed on the local machine, the uninstall process also removes the IIS virtual directory, deletes the Administration Website files, removes any application pool configuration changes, and removes any files related to the Administration Website from the machine. The uninstall process does not remove IIS from the machine—that requires a separate uninstall step. Refer to Help and Support for your operating system version for instructions on how to uninstall IIS.

Any resource files that are stored locally on the machine or on a remote server will not be touched during the uninstall process. This means that you can uninstall Virtual Server 2005 R2 SP1 with no concern for loss of your virtual machines, virtual hard disks, or their configuration files. In addition, the Virtual Server configuration information file Options.xml is not removed from the system, so you can uninstall and reinstall Virtual Server without fear of losing your configuration settings.

The following procedures describe uninstalling Virtual Server 2005 R2 SP1. Instead of presenting one procedure for Windows XP and another procedure for Windows Server 2003 and Windows Vista, the various options are included in the appropriate steps. The Windows XP and Windows Server 2003 selections are presented first, followed by the Windows Vista selections.

To uninstall Virtual Server 2005 R2 SP1, complete the following steps:

1. Click the Start button, select Administrative Tools, and click Services.
2. Find the Virtual Server and the Virtual Machine Helper, right-click each one, and select Stop. This will stop both services and allow Virtual Server 2005 R2 SP1 to install. You cannot uninstall Virtual Server while the services are running.
3. Click the Start button, select Control Panel, click Add/Remove Programs or Uninstall A Program, depending on your operating system.

4. Find the entry for Virtual Server 2005 R2 SP1 in the list, and click either Remove or Uninstall, depending on your operating system. Figure 4-24 shows the dialog box for Windows XP and Windows Server 2003.

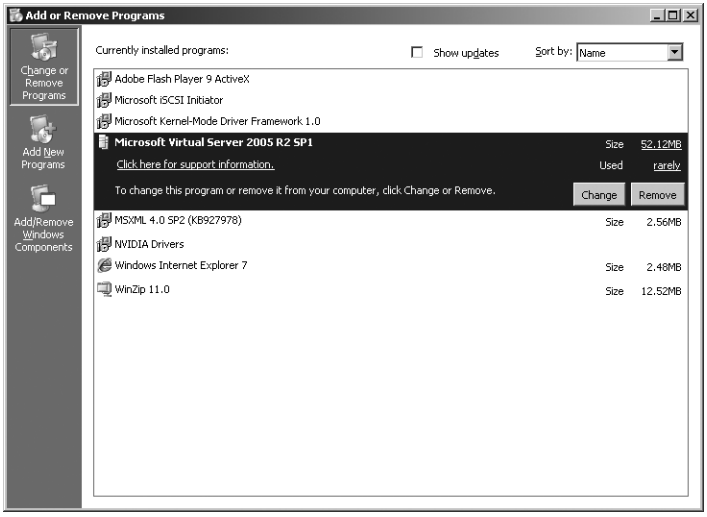

Figure 4-24 Uninstalling a program in Windows Server 2003 or Windows XP

5. Click Yes to confirm that you want to uninstall the Virtual Server 2005 R2 SP1 application and then click OK.

The uninstall process will launch, uninstall all components, and then finish.

Performing a Command-Line Installation

Microsoft Virtual Server 2005 R2 SP1 has a command-line installation interface that you can use to install or uninstall any combination of the installable Virtual Server components. The command-line interface is provided as part of the MSI file that is extracted from the Setup.exe provided by Microsoft. The command-line syntax contains a list of options that allow you to control the level of interface that is presented, from a full user interface to a quiet install with no visible interface. In addition, the command-line options allow you to control parameters such as the port used for the Administration Website and the state of the Virtual Server services.

This section presents the command-line options and explains how to use them to achieve the installation scenarios that were described in this chapter: single-server installation, central Administration Website, Virtual Server service, VMRC Client installation, Documentation and Developer Resources, and VHD Mount.

Command-Line Options

Performing a command-line installation of Virtual Server requires you to execute the command line from the local machine. To execute the command line with all available options, you must extract the Virtual Server 2005 Install.msi file from the Setup.exe file. Extracting the files requires the following syntax:

```
Setup.exe /c /t [drive letter:\path]
```

The meaning of each element in the syntax is as follows:

/c Extracts the contents of the Setup.exe file

/t Indicates the drive letter and path to use to extract the file will follow

drive letter:\path Specifies the drive letter and path in which to store the extracted files

For example, if you want to extract the Virtual Server 2005 Install.msi file to C:\VirtualServerSetupFiles, you would type the following on the command line and execute it.

```
Setup.exe /c /t c:\VirtualServerSetupFiles
```

Once you have extracted the Virtual Server 2005 Install.msi file, you need to understand the command-line options, the supporting parameters that are available to you, and how to use the .MSI file and Msiexec.exe file to achieve an installation from the command line. Table 4-4 lists the specific Msiexec.exe command-line options for Virtual Server 2005 Install.msi.

Table 4-4 Msiexec.exe Command-Line Options for Virtual Server 2005 Install.msi

Command-line option	Description
/i	Performs an installation of Virtual Server.
/a	Performs an administrative install of Virtual Server to a network location.
/x	Uninstalls an existing installation of Virtual Server.
/q[n,b,r,f]	Sets the user interface level based on the optional parameters specified. /q or /qn – No interface is provided (and no summary screen either) /qb – Basic user interface provided /qr – Reduced user interface provided /qf – Full user interface provided
/l {logfile}	Specifies where the setup log file is stored and the name of the log file. The *logfile* parameter must be specified as a full path, and environment variables can be used in the path. Examples: /l C:\logfiles\VirtualServerInstall.log /l %TEMP%\VirtualServerInstall.log

Table 4-4 Msiexec.exe Command-Line Options for Virtual Server 2005 Install.msi

Command-line option	Description
MSIFILE	Specifies the name of the MSI file that the Msiexec.exe file will launch. This must provide the full path to the MSI file or must be in the current directory.
ALLUSERS	Determines what users see in the Start menu and in Add Or Remove Programs. If ALLUSERS is not specified, a per-machine installation is performed (default). If ALLUSERS="" , the installer performs a per-user installation for the user that started the installation.
PIDKEY	Obsolete. This option is no longer needed. The PIDKEY is embedded in the installation MSI file and does not need to be specified.
SERVICESTARTUPMANUAL	Specifies whether the Virtual Server services (VSSRVC.EXE and VMH.EXE) are configured to start manually or automatically. 1 = Manual 0 = Automatic For example, to start the services manually: SERVICESTARTUPMANUAL=1
WEBSITEDEFAULTPORT	Specifies the default port that will be used for access to the Administration Website. If you do not specify a value, the default port number 1024 is used. Value = Port number For example: WEBSITEDEFAULTPORT=80
INSTALLDIR	Used in conjunction with the /i parameter to specify the custom directory path where you want Virtual Server to be installed. Not specifying this option will install Virtual Server to the default location C:\Program Files\Microsoft Virtual Server\. Value = the full path to the directory For example: INSTALLDIR=C:\VirtualServer
TARGETDIR	Used in conjunction with the /a parameter to specify the target directory in which you want Virtual Server administration installation to be placed. This option can be specified as a UNC path or a mapped driver letter and path. For example: TARGETDIR=\\SERVERA\Software\VirtualServer TARGETDIR=S:\VirtualServer

Table 4-4 Msiexec.exe Command-Line Options for Virtual Server 2005 Install.msi

Command-line option	Description
ADDLOCAL	Specifies the Virtual Server components that will be installed. One or more components can be specified, separated by commas. ADDLOCAL must be specified with all uppercase letters. **VirtualServer** – Virtual Server services **VMRCClient** – VMRC Client **DevAndDoc** –Documentation and Developer Resources **VSWebApp** – Administration Website **VHDMount** – VHD Mount tool For example, to install only the Administration Website, use the following: ADDLOCAL=VSWebApp To install the Virtual Server services, documentation and developer resources, and VHD Mount tool, use the following: ADDLOCAL=VirtualServer, DevAndDoc, VHDMount
NOSUMMARY	Specifies whether you want to display the summary screen at the end of the installation. Use a value of 1 to indicate the summary should not be displayed. The default is to display the summary. For example: NOSUMMARY=1

Command-Line Syntax

The MSIEXEC full command-line syntax is as follows:

```
msiexec.exe {/i|/a|/x} "msifile" [allusers=value] [servicestartupmanual=value]
[websitedefaultport=value] [{installdir=value|targetdir=value}] [ADDLOCAL=value,value]
[nosummary=value] [/qb | /qn | /qr | /qf] [/l logfile]
```

The following syntax line examples are for different scenarios (install on a local computer, administration installation, and uninstall) in which not all options are required.

Installing on a Local Computer

The following code block is a list of all the options and parameters that are available when performing an installation of Virtual Server 2005 R2 SP1 from the command line on a single server:

```
msiexec.exe /i "msifile" [allusers=value]
[servicestartupmanual=value] [websitedefaultport=value] [{installdir=value}]
[ADDLOCAL=value,value]
[nosummary=value] [/qb | /qn | /qr | /qf] [/l logfile]
```

Performing an Administrative Installation

The following code block is a list of all the options and parameters that are available when performing an administration installation of Virtual Server 2005 R2 SP1 on a remote server:

```
msiexec.exe /a "msifile" targetdir=value [/qb | /qn | /qr | /qf] [/l logfile]
```

Uninstalling an Existing Virtual Server Installation

The code block that follows is a list of all the options and parameters that are available when performing an uninstall of an existing installation of Virtual Server 2005 R2 SP1 on a local server:

```
msiexec.exe /x "msifile" [ADDLOCAL=value,value] [/qb | /qn | /qr | /qf] [/l logfile]
```

Important When you specify any path values in the command line and those paths contain spaces, you must enclose the entire path in quotes (" ").

Command-Line Examples

To perform a full installation of Virtual Server 2005 R2 SP1 on the local machine with no user interface and no logfile, use the following command line. This command line will use the default installation path, select the default Web administration port of 1024, and not provide a summary screen at the end of the installation.

```
msiexec.exe /I "virtual server 2005 install.msi" /qn
```

To change the default port that the Administration Website listens on from 1024 to port 80, you add the WEBSITEDEFAULTPORT=80 parameter to the command line:

```
msiexec.exe /I "virtual server 2005 install.msi" websitedefaultport=80 /qn
```

To perform an Administration install of Virtual Server 2005 R2 SP1 on a server named SERVER1, share named SOFTWARE, in a directory called VS2005R2SP1, with basic user interface (all on one line), use the following command line:

```
msiexec.exe /a "virtual server 2005 install.msi" targetdir=\\Server1\Software\VS2005R2SP1 /qb
```

To uninstall an existing Virtual Server installation with no user interface and a log file created and stored at C:\temp and called VS-UNINSTALL.LOG, use the following command line:

```
Msiexec.exe /X "Virtual Server 2005 Install.msi" /L C:\TEMP\VS-UNINSTALL.LOG /qn
```

Direct from the Source: Why Won't My Uninstall Command Line Work?

The Virtual Server uninstall process does not stop the Virtual Server and Virtual Machine Helper services prior to attempting to uninstall. You can use the NET STOP <*service name*> command for each service before launching an uninstall of the software. If you create a simple batch file with the following lines, uninstall will be successful:

```
Net Stop "Virtual Server"
Net Stop VMH
Msiexec /x "Virtual Server  2005 Install.msi" /qn
```

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Performing the Installation Scenarios Using the Command Line

This section describes how to use the command-line process to perform the same installation scenarios of Virtual Server 2005 R2 SP1: single-server installation, local Administration Website only, Virtual Server services only, Documentation and Developer Resources only, and VHD Mount tool only. You will specify that all of these command-line scenarios specify no user interface.

Single-Server Installation

```
Msiexec.exe /I "Virtual Server 2005 Install.msi" /qn
```

Local Administration Website Only

```
Msiexec.exe /I "Virtual Server 2005 Install.msi" ADDLOCAL=vswebapp /qn
```

Virtual Server Services Only

```
Msiexec.exe /I "Virtual Server 2005 Install.msi" ADDLOCAL=virtualserver /qn
```

Documentation and Developer Resources Only

```
Msiexec.exe /I "Virtual Server 2005 Install.msi" ADDLOCAL=devanddoc /qn
```

VMRC Client Tool Only

```
Msiexec.exe /I "Virtual Server 2005 Install.msi" ADDLOCAL=vmrcclient /qn
```

VHD Mount Tool Only

```
Msiexec.exe /I "Virtual Server 2005 Install.msi" ADDLOCAL=vhdmount /qn
```

Summary

In this chapter, we covered the installation and removal of Virtual Server 2005 R2 SP1, as well as how to upgrade an existing Virtual Server 2005 R2 installation. There are multiple possible installation scenarios based on operating system, desired Virtual Server components, and

component placement on servers. Determining which installation scenario applies to your environment and proactively collecting the required information will reduce installation issues. Distributing the Virtual Server 2005 R2 SP1 components across multiple servers will reduce the security risk of your environment, but that approach requires constrained delegation to be configured. The command-line installation process is the most flexible and easiest to use, and it should be your preferred method of installing or removing Virtual Server 2005 R2 SP1 in your environment.

Additional Resources

The following resources contain additional information and tools related to this chapter:

- Knowledge Base Article 890893, "The SPNs that Virtual Server requires are not registered in Active Directory when you try to install Virtual Server 2005 on a Windows-based domain controller," at *http://support.microsoft.com/kb/890893*
- Knowledge Base Article 322692, "How to raise domain and forest functional levels in Windows Server 2003," at *http://support.microsoft.com/kb/322692*
- Virtual Server 2005 R2 SP1 Administrator's Guide and Release notes available in the Microsoft Virtual Server menu option under the Start Menu
- Knowledge Base Article 314881, "The Command-Line Options for the Microsoft Windows Installer Tool Msiexec.exe," at *http://support.microsoft.com/kb/314881*
- IIS 6.0 Technical Reference in the Windows Server 2003 TechCenter, at *http://www.microsoft.com/technet/prodtechnol/WindowsServer2003/Library/IIS/69a58513-141a-4adb-b6bc-2aaad4ea77b8.mspx*