
Module 13: Deploying Windows 2000 Professional by Using RIS

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Instructor Notes

Presentation:
45 Minutes

Lab:
30 Minutes

This module provides students with the knowledge and skills necessary to automate the deployment of Microsoft® Windows® 2000 Professional by using Remote Installation Services (RIS), the basis of Windows 2000 Remote OS Installation.

At the end of this module, students will be able to:

- Describe the purpose and benefits of RIS.
- Install and configure a RIS server by using the Remote Installation Services Setup wizard.
- Modify RIS configurations, including changing default options for client names and account locations, installation options, and diagnostic utilities.
- Deploy CD-based RIS images.
- Create Remote Installation Preparation (RIPrep) images.
- Compare CD-based images and RIPrep images.
- Provide solutions to potential RIS problems.

Materials and Preparation

This section provides you with the required materials and preparation tasks that are needed to teach this module.

Required Materials

To teach this module, you need the following materials:

- Microsoft® PowerPoint® file 2153a_13.ppt.
- The lab simulation “Remote Installation Services,” in the **Lab Simulations** folder on the Web page on the Student Materials compact disc.

Preparation Tasks

To prepare for this module, you should:

- Read all of the materials for this module.
- Complete the simulation.
- Read the following white papers under **Additional Reading** on the Web page on the Student Materials compact disc:
 - *Remote Operating System Installation Overview*
 - *Remote Operating System Installation*
- Read the *Step-by-step Guide to Remote OS Installation* at <http://www.microsoft.com/windows2000/library/technologies/management/default.asp>.
- Search for and read the “Remote Installation Services” topic in Windows 2000 Server Help.
- Review the document *Microsoft Windows 2000 Guide to Unattended Setup* on the Web page on the Student Materials compact disc.

Module Strategy

Use the following strategy to present this module:

- **RIS Overview**

This topic provides a brief introduction to RIS. Explain RIS and the primary components of the remote installation process. Do not describe the differences between CD-based images and RIPrep images, however, because these will be described later in the module.

- **Installing and Configuring RIS**

This topic provides information about RIS requirements, how to install and start RIS, and how to configure RIS security settings. Describe the network and hardware requirements for installing and using RIS. Explain that RIS is one of the optional components that can be installed during the installation of Windows 2000 or added later through Add/Remove Programs. Describe the RIS Setup wizard options and briefly define the CD-based image. Explain why it is necessary to authorize the RIS server and grant user accounts the right to create computer accounts.

- **Configuring Remote Installation Options**

This topic discusses the various options for deploying images that students must consider before bringing a RIS server online. Describe the configuration options for creating a computer naming format and for specifying the computer account location for RIS client computers. Explain the purpose of prestaging client computers, the four installation options that students can configure to appear when users start a remote installation, and how to configure maintenance and troubleshooting utilities.

- **Deploying Images by Using RIS**

This topic describes the steps that are necessary to deploy images by using RIS. Explain the reasons for modifying the answer file for a CD-based image, and how to accomplish it. Demonstrate how to associate answer files with images and how to restrict images to designated users. Explain how to create a RIS Startup disk for client computers with network adapters that do not support a Pre-Boot Execution Environment (PXE), and then explain how to perform remote installation on a client computer.

- **Creating an RIPrep Image**

This topic describes how to deploy Windows 2000 Professional by using an RIPrep image. Describe the advantages of using RIPrep images. Explain the process of setting up a source computer, emphasizing the testing phase. Explain the importance of modifying the default user profile. Describe how to create an image by using the Remote Installation Preparation wizard.

- **Comparing CD-Based Images and RIPrep Images**

This topic compares CD-based images with RIPrep images. Contrast the advantages and disadvantages of each type of disk image. Discuss the situations in which each image type would be ideal.

- **Identifying Solutions to RIS Problems**

Describe possible solutions to common problems that may occur when setting up a RIS server.

Customization Information

This section identifies the lab setup requirements for a module and the configuration changes that occur on student computers during the labs. This information is provided to assist you in replicating or customizing Microsoft Official Curriculum (MOC) courseware.

This module includes only computer-based interactive lab exercises. As a result, there are no lab setup requirements or configuration changes that affect replication or customization.

Overview

Topic Objective

To provide an overview of the module topics and objectives.

Lead-in

In this module, you will learn about setting up and configuring Remote Installation Services to remotely install Windows 2000 Professional.

- RIS Overview
- Installing and Configuring RIS
- Configuring Remote Installation Options
- Deploying Images by Using RIS
- Creating an RIPrep Image
- Comparing CD-Based Images and RIPrep Images
- Identifying Solutions to RIS Problems

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Remote Installation Services (RIS) is the basis of the Microsoft® Windows® 2000 Remote OS Installation feature. RIS makes it easy to deploy Windows 2000 Professional throughout an organization without the need to physically visit each client computer.

The combination of RIS with other Microsoft IntelliMirror® management technologies—User Data Management, Software Installation and Maintenance, and User Settings Management—provides companies with the benefit of better disaster recovery through easier operating system and application management.

At the end of this module, you will be able to:

- Describe the purpose and benefits of RIS.
- Install and configure a RIS server by using the Remote Installation Services Setup wizard.
- Modify RIS configurations, including changing default options for client names and account locations, installation options, and diagnostic utilities.
- Deploy CD-based RIS images.
- Create Remote Installation Preparation (RIPrep) images.
- Compare CD-based images and RIPrep images.
- Provide solutions to potential RIS problems.

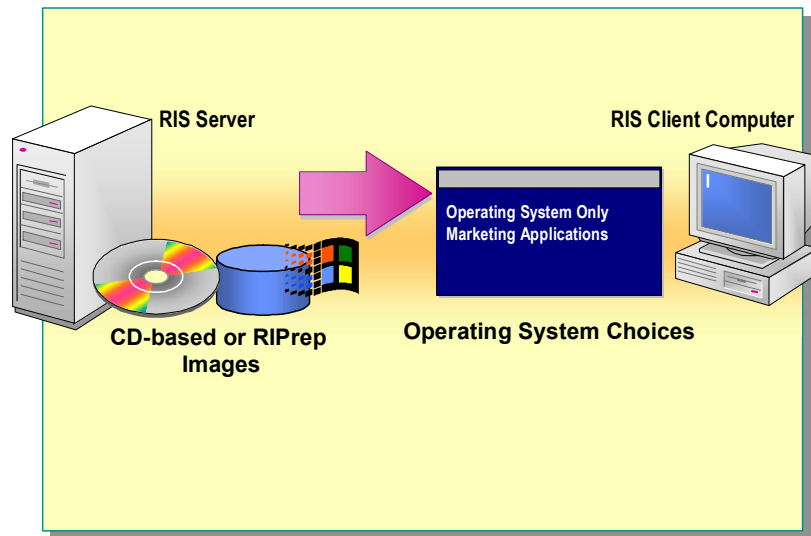
RIS Overview

Topic Objective

To illustrate basic RIS concepts.

Lead-in

RIS provides a mechanism for computers to connect to a server during the startup or boot sequence and install Windows 2000 Professional.



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RIS enables client computers to connect to a server during the initial startup phase and remotely install Windows 2000 Professional. Unlike a standard network installation performed by running Winnt.exe, a remote installation does not require users to know where the installation source files are stored or what information to supply during the Setup program. The remote installation process includes three primary components:

- *RIS servers.* These servers host RIS and distribute Windows 2000 Professional to client computers that are enabled for remote startup. RIS servers can be either domain controllers or member servers in a Windows 2000 domain.
- *RIS client computers.* Upon startup, RIS client computers can connect to a RIS server to install Windows 2000 Professional remotely or run diagnostic and maintenance utilities.
- *Images.* These represent the operating system configurations that can be installed on client computers. RIS supports two types of images: CD-based images and RIPrep images.

Key Points

RIS can be used to deploy workstation operating systems, but can also be used to replace computers quickly and easily.

You can use RIS to quickly and easily install Windows 2000 Professional on a replacement computer. When a user experiences computer problems, you can give the user a computer with an unformatted hard disk as a permanent or temporary replacement. When the user turns on the computer, he or she can use RIS to install the required operating system with the correct configuration, and then use IntelliMirror technologies to install all of the required applications and gain access to personal settings and documents.

Note RIS only supports the remote installation of Windows 2000 Professional. In addition, RIS does not support images that are created by third-party imaging utilities.

◆ Installing and Configuring RIS

Topic Objective

To list the topics that are related to installing and configuring RIS.

Lead-in

You must be familiar with RIS requirements before installing and configuring RIS.

- Identifying RIS Requirements
- Installing and Starting RIS
- Configuring RIS Security Settings

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RIS requires that certain network services be installed and configured to ensure a successful RIS installation. You must also ensure that the server meets certain disk space requirements, and that clients meet specific hardware requirements, before installing RIS.

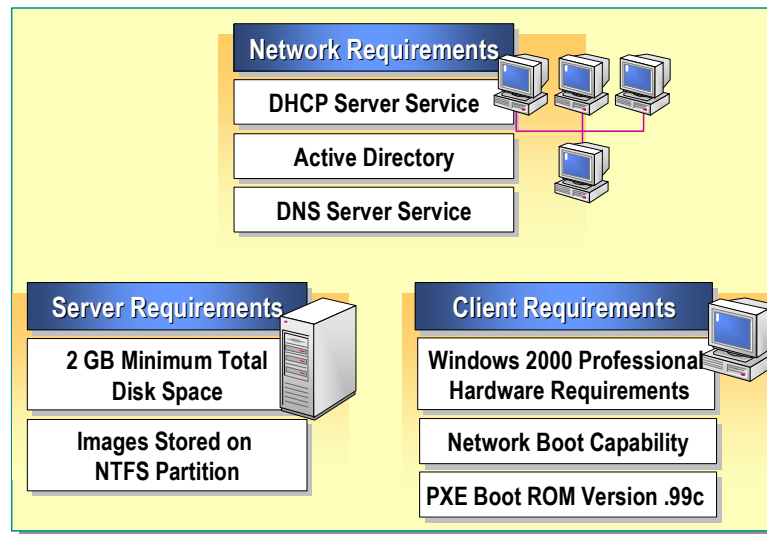
Identifying RIS Requirements

Topic Objective

To list the network, server, and client requirements for RIS.

Lead-in

RIS requires that certain services be running on the network. In addition, the server on which RIS will be installed must meet certain disk space requirements, and client computers must meet specific hardware requirements and boot capabilities.



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Certain services must be available on your network before RIS can be installed. In addition, the server on which RIS will be installed must meet certain disk space requirements, and client computers must meet specific hardware requirements and capabilities. It is important that these requirements be met to ensure successful RIS installation and operation.

Network Requirements

RIS requires that several services be running on the network. These services can run on the same computer as RIS, or they can be installed on other computers located on the network. RIS requires the following Windows 2000 services:

- *DHCP Server service.* Uses the Dynamic Host Configuration Protocol (DHCP) to assign Internet Protocol (IP) addresses to client computers.
- *Active Directory™ directory service.* Locates client computer accounts and RIS servers and manages RIS configuration settings and client installation options.
- *DNS Server service.* Locates the Active Directory directory service. The DNS Server service must be configured to support SRV (service) resource records.

Server Requirements

A RIS server requires 2 gigabytes (GB) of disk space for the Windows 2000 Professional installation source files and the RIS support files. The hard disk must have at least two partitions (for a basic disk) or two volumes (for a dynamic disk). One partition or volume is used for the operating system and the other is used for images. The image partition or volume must be formatted with the NTFS file system.

RIS images cannot be installed on either the system or the boot partition. If the server uses a small system partition or volume and a larger boot partition or volume, a third NTFS partition or volume is required to support RIS images.

Important Place the image files on a partition or volume on a separate hard disk or disk array. This increases performance when copying image files.

Client Requirements

Client computers that will receive remote installations must meet the hardware requirements for Windows 2000 Professional. In addition, the client computers must be able to boot from the network adapter, and the network adapter must support Pre-Boot Execution Environment (PXE) boot ROM version .99c or later.

Installing and Starting RIS

Topic Objective

To list the information required by, and the tasks accomplished by, the Remote Installation Services Setup wizard.

Lead-in

Install RIS by using Add/Remove Programs in Control Panel, and then start RIS by using the Remote Installation Services Setup wizard.

Provide the Setup Wizard with:

- Folder location for images and supporting files
- Initial client support settings
- Location of source files
- Initial image folder name
- Friendly description and Help text

The Setup Wizard Will:

- Create a RIS folder structure
- Copy supporting RIS files to the server
- Create a CD-based image of Windows 2000 Professional
- Start the services required for RIS

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To install RIS, open Add/Remove Programs in Control Panel, and then click **Add/Remove Windows Components**. Select the **Remote Installation Services** check box, and then click **Next**. The Windows Components wizard will guide you through the remainder of the installation process.

Important Place the RIS servers in the same subnet as the client computers that they will serve. This will provide better setup performance and limit the amount of RIS-related network traffic that travels across slow network connections.

Running the Remote Installation Services Setup Wizard

After you install RIS, run the Remote Installation Services Setup wizard to create the initial CD-based image and configure and start RIS.

To start the Remote Installation Services Setup wizard:

1. Click **Start**, and then click **Run**.
2. In the **Open** box, type **risetup** and then click **OK**.

Delivery Tips

Demonstrate how to run the Remote Installation Services Setup wizard.

Describe the options that are required to set up RIS. Describe what happens during the setup process.

3. Follow the on-screen instructions in the Remote Installation Services Setup wizard. When prompted, supply the information provided in the following table.

When prompted for	Do this
Remote Installation Folder Location	Specify the NTFS partition and folder on the RIS server where you want to install the supporting files and the first CD-based image. The location that you supply cannot be on a Distributed file system (Dfs) shared folder or a volume that is configured for encryption by using the Encrypting File System (EFS).
Initial Settings	Specify how the RIS server will respond to client computers. You can set the server so that it: • Does not respond to any client requests by clearing the Respond to client computers requesting service check box. This is the default setting. • Responds to all client requests by selecting the Respond to client computers requesting service check box. • Responds only to requests from clients that have prestaged computer accounts by selecting both the Respond to client computers requesting service and Do not respond to unknown client computers check boxes.
Installation Source Files Location	Specify the location of the Windows 2000 Professional source files that RIS uses to create the initial CD-based image. These files can be copied from either a compact disc or a shared folder on the network. You must create an initial CD-based image before you can start RIS, even if you plan to provide only RIPrep images to users.
Windows Installation Image Folder Name	Specify the name of the folder, within the RIS installation folder on the RIS server, in which the initial CD-based image will be created.
Friendly Description and Help Text	Specify the description and explanatory text for the initial CD-based image. This information will appear when the user logs on to the RIS server and selects this image from the list that appears in the Client Installation wizard.

Note Before running the Remote Installation Services Setup wizard, ensure that the latest service packs, hot fixes and security updates are applied to the server, or ensure that the installation files from a network source contain the latest service packs, hot fixes, and security updates.

Completing Post-Installation Tasks

After the Remote Installation Services Setup wizard is finished, Windows 2000 automatically:

- Creates the RIS folder structure.
- Copies the supporting files to the server.
- Creates the initial CD-based image of Windows 2000 Professional and the default answer file.
- Starts the required services on the RIS server.

Key Point

Do not activate client support until the server is completely configured.

Important Do not activate client support until you are ready to use it. By default, client support is disabled when you run the Remote Installation Services Setup wizard. It is recommended that you leave this option disabled until you have fully configured the server and have set up all of the required images and answer files.

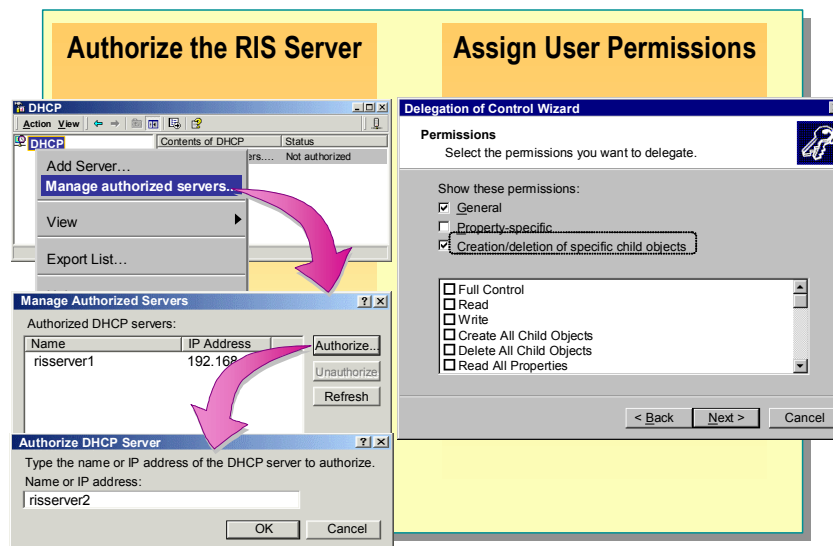
Configuring RIS Security Settings

Topic Objective

To illustrate the user interface for configuring RIS security.

Lead-in

After RIS is running, configure RIS security by authorizing the RIS server in Active Directory and assigning user permissions to create computer accounts.



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You must configure security settings to enable RIS to function properly before you can install Windows 2000 Professional by using RIS. A RIS server must be authorized within Active Directory before it can begin responding to client requests. In addition, users must have the right to create computer accounts in Active Directory to be able to install an image by using RIS.

Delivery Tip

Demonstrate the necessary steps and describe the dialog box options that are required to authorize a RIS server within Active Directory.

Authorizing the RIS Server

You must authorize RIS servers in Active Directory. This prevents users from setting up an additional RIS server and installing unauthorized images on client computers, and then joining those computers to a domain.

You authorize the RIS server as you would authorize a DHCP server in the DHCP console. To authorize a RIS server in Active Directory:

1. Open DHCP from the **Administrative Tools** menu.
2. In the console tree, right-click **DHCP**, and then click **Manage authorized servers**.
3. In the **Manage Authorized Servers** dialog box, click **Authorize**. When prompted, type the name or IP address of the RIS server to be authorized, and then click **OK**.

When authorization is complete, the arrow on the server icon in the DHCP console changes from red to green.

Important To authorize a DHCP or RIS server, a user must be a member of the Enterprise Admins group, which exists in the root domain of the forest.

Delivery Tip

Demonstrate the necessary steps for assigning user permissions, and describe the options that must be configured in the Delegation of Control wizard.

Assigning User Permissions

You can assign users the permissions to create computer accounts anywhere in the domain or in a specified organizational unit (OU).

To assign users the permissions to create computer accounts in Active Directory:

1. Open Active Directory Users and Computers.
2. In the console tree, right-click the domain or OU in which you want to allow users to create computer accounts, and then click **Delegate Control**.
3. In the Delegation of Control wizard, click **Next**.
4. On the **Users or Groups** page, click **Add**.
5. In the **Select Users, Computers, or Groups** dialog box, click the name of the user or group that you want to add, click **Add**, click **OK**, and then click **Next**.
6. On the **Tasks to Delegate** page, click **Create a custom task to delegate**, and then click **Next**.
7. On the **Active Directory Object Type** page, under **Delegate control of**, verify that **This folder, existing objects in this folder, and creation of new objects in this folder** is selected, and then click **Next**.
8. On the **Permissions** page, under **Show these permissions**, select the **Creation/deletion of specific child objects** check box.
9. Under **Permissions**, select the **Create Computer Objects** check box, and then click **Next**.
10. On the **Completing the Delegation of Control Wizard** page, verify the delegation of control settings, and then click **Finish**.

Important By default, each user account has the right to create up to 10 computer accounts in Active Directory. You must only give users permissions to create user accounts if you removed the default right, or if a user must create more than 10 computer accounts.

◆ Configuring Remote Installation Options

Topic Objective

To list the topics that are related to configuring remote installation options.

Lead-in

RIS configurations can be modified to control how RIS operates.

- **Configuring Client Computer Names and Locations**
- **Prestaging Client Computers**
- **Configuring Client Installation Options**
- **Configuring Maintenance and Troubleshooting Utilities**

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After you install and start RIS, you can configure how the RIS server responds to client requests for service. You can customize how RIS operates by specifying a client computer naming format and the Active Directory location in which client computer accounts are created. Additional RIS configurations include prestaging client computer accounts, and specifying which installation options and third-party diagnostic utilities are available to users.

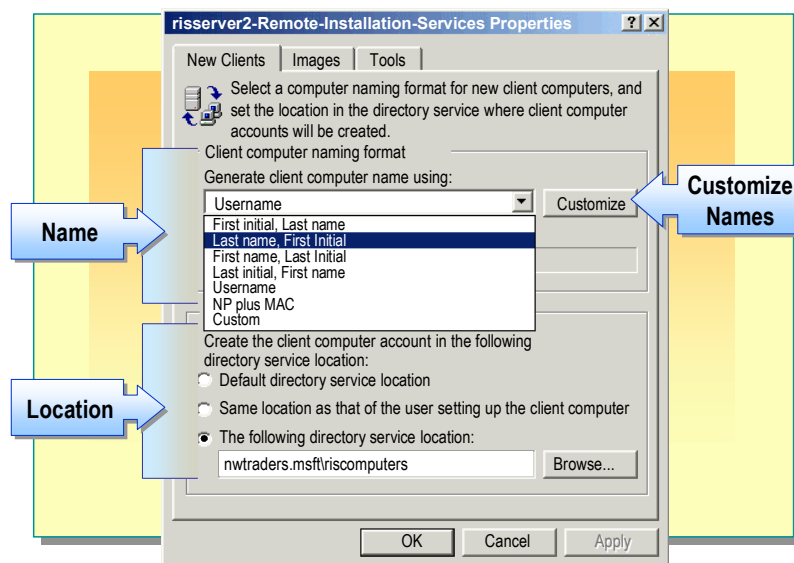
Configuring Client Computer Names and Locations

Topic Objective

To illustrate the user interface for creating a computer naming format and a computer account location for RIS clients.

Lead-in

You can configure a client computer naming convention and specify the Active Directory location where new computer accounts will be created.



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Delivery Tip

Describe the configuration options for creating a computer naming format and for specifying the computer account location for RIS clients.

You can specify a standard naming convention and a computer account location for all client computers that are supported by a designated RIS server.

Client Computer Naming Format

The client computer naming format option provides a standard naming convention for computer accounts that RIS creates.

To configure client names:

1. In Active Directory Users and Computers, right-click the RIS server, and then click **Properties**.
2. In the **Properties** dialog box for the server, click the **Remote Install** tab, and then click **Advanced Settings**.
3. In the **Remote-Installation-Services Properties** dialog box for the server, click the **New Clients** tab, and click one of the predefined naming formats (for example, **First initial, Last name**) or click **Customize** to create a custom naming format.

By default, RIS names computers after the user name of the user performing the remote installation. You can include any alphanumeric text as part of a custom naming format. You can also select from the following variables that are associated with user and computer properties stored in Active Directory. Any name that exceeds 64 characters is truncated.

Variable	Value used in computer name
<i>%Username</i>	User logon name
<i>%First</i>	User first name
<i>%Last</i>	User last name
<i>%#</i>	Incremental number
<i>%MAC</i>	MAC address of the network adapter

Client Computer Account Location

The client computer account location allows you to specify the Active Directory location where new computer accounts will be created. The following table describes the options available for setting computer account locations.

Option	Description
Default directory service location	Creates new computer accounts in the Computers container
Same location as that of the user setting up the computer	Creates new computer accounts in the same OU as the user account of the person who is performing the remote installation
The following directory service location	Creates new computer accounts in the OU that you specify

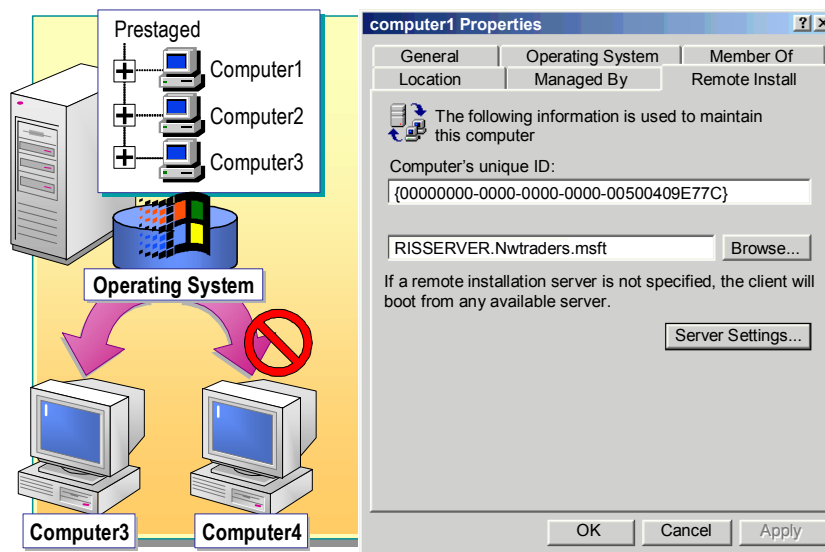
Prestaging Client Computers

Topic Objective

To illustrate the concept of prestaging and how to prestage client computers.

Lead-in

You can prestage client computer accounts to ensure that RIS servers service only authorized computers on the network.



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Delivery Tips

Explain the purpose of prestaging client computers, noting that it is not a required step.

Explain how to obtain a GUID and how to prestage client computers.

Prestaging a client computer involves preconfiguring a computer account for the client computer and assigning it to a designated RIS server. If you assign a client computer to a RIS server, only the designated server responds to service requests from that client computer.

You use prestaging primarily for security purposes. When used with the **Do not respond to unknown clients** client support option, prestaging prevents unknown RIS client computers from obtaining images, thereby preventing users from joining unauthorized computers to the domain.

Prestaging enables you to balance the load between RIS servers. You can ensure that a single server does not respond to a disproportionate number of installation requests by directing specific client computers to receive images from designated RIS servers.

Locating a GUID

Before you can prestage a client computer, you must know the globally unique identifier (GUID) of the computer. The manufacturer provides the GUID as part of the PXE specification. The information is generally located on a label on the side of the computer case, on a label within the computer case, or in the basic input/output system (BIOS) of the client computer.

For computers starting from a RIS Startup disk, the GUID is the media access control (MAC) address of the network adapter, with enough leading zeros added to ensure that the GUID is 32 characters in length.

For example: {921FB974-ED42-11BE-BACD-00AA0057B223}

Prestaging a Client Computer with a Known GUID

After you determine the GUID of a client computer, you can prestage the client computer.

To prestage a client computer with a known GUID:

1. In Active Directory Users and Computers, right-click the OU in which you want to create the computer account, point to **New**, and then click **Computer**.
2. In the **Create New Object – (Computer)** dialog box, type a name for the computer and a pre-Windows 2000 name for the computer, and then click **Next**.
3. Select the **This is a managed computer** check box, type the GUID of the computer without the dashes or brackets, and then click **Next**.
4. Under **Specify the remote installation server to support this client**, click **The following remote installation server**, and then type the fully qualified domain name (FQDN) of the designated RIS server—for example, london.nwtraders.msft.
5. Click **Next**, and then click **Finish**.

Prestaging a Client Computer with an Unknown GUID

If you do not know the GUID of a computer, you can prestage the computer by logging on to the RIS server.

To prestage a client computer with an unknown GUID:

1. Start the RIS client computer by using a network service startup, and then log on to the RIS server.
2. When prompted, use the arrow keys to select a setup option, and then press ENTER.
3. When prompted, use the arrow keys to select an image, and then press ENTER.
4. At the **Warning** screen, press ENTER.

The GUID appears on the screen. The computer account is now prestaged. If you want to assign the client computer to a designed RIS server, you can do so in the **Properties** dialog box of the RIS client computer.

5. Turn off the computer to prevent it from receiving an image.

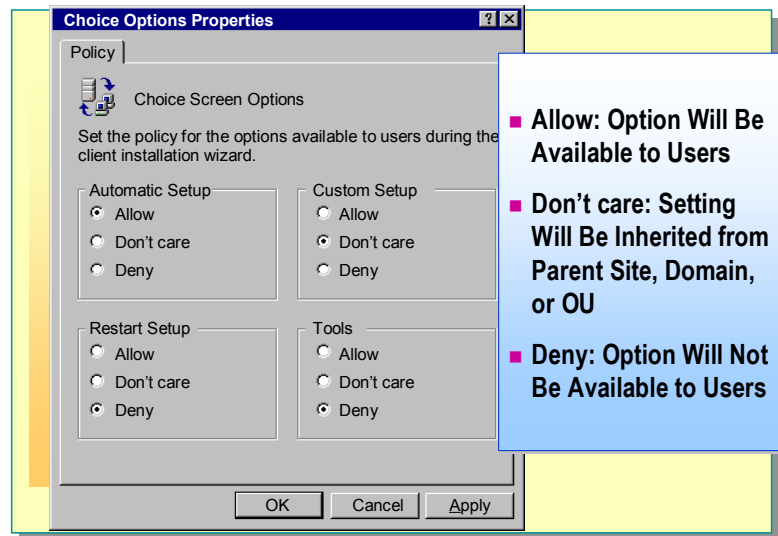
Configuring Client Installation Options

Topic Objective

To illustrate the user interface for customizing client installation options in RIS.

Lead-in

You customize the installation options that are presented to users in the Client Installation wizard.



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You can use Group Policy to configure the installation options that are presented to users in the Client Installation wizard. *Group Policy* is a collection of user-environment settings used to define configurations for groups of users and computers. You can create one Group Policy object (GPO) at the domain level to provide users with a minimal set of installation options, and you can create another GPO for users within a specific OU to provide the users with additional options. If Group Policy settings conflict, the GPO created at the OU level overrides the GPO created at the domain level.

Note For more information on Group Policy, see course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.

Delivery Tip

Describe the procedure for configuring client installation options.

To configure client installation options:

1. In Active Directory Users and Computers, right-click the name of the site, domain, or OU where you want to apply the policy, and then click **Properties**.
2. In the **Properties** dialog box, click the **Group Policy** tab, create a new GPO or click an existing GPO, and then click **Edit**.
3. In the **Group Policy** console, double-click **User Configuration**, double-click **Windows Settings**, and then click **Remote Installation Services**.
4. In the details pane, double-click **Choice Options**, select the appropriate client installation options, and then click **OK**.

Delivery Tip

Explain the four installation options that students configure in RIS that appear when users start a remote installation.

The following table describes the client installation options.

Option	Description
Automatic setup	Installs Windows 2000 Professional by using the computer naming convention and computer account location predetermined for this RIS server.
Custom setup	Allows the user to override the automatic computer name assignment and computer account location. This option is useful if technical support personnel need to set up computers for other users.
Restart Setup	Allows you to restart a failed installation of Windows 2000 Professional from the beginning without requiring you to re-enter information previously entered in the Client Installation wizard.
Tools	Provides access to third-party maintenance and troubleshooting utilities. These options are typically intended for technical support personnel who need to perform maintenance or troubleshooting tasks.

Delivery Tip

Explain the three settings that are available for each installation option.

The following table describes the options that you configure for each client installation option.

Option	Description
Allow	Makes the option available within the Client Installation wizard. Use this option if you want to offer the installation option to users for whom the policy applies.
Don't Care	Has no effect on whether the option is available in the Client Installation wizard. Instead, the policy settings for this option are inherited from a parent site, domain, or OU.
Deny	Prevents the option from being available within the Client Installation wizard. Use this option if you do not want the installation option to be available to users for whom the policy applies.

Note By default, only **Automatic Setup** is enabled when you install RIS. To provide users with access to any of the other options, you must specifically enable those options.

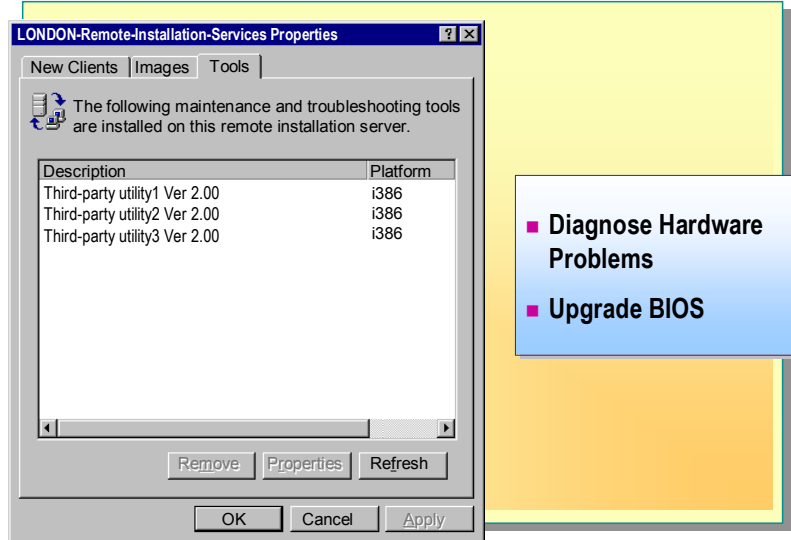
Configuring Maintenance and Troubleshooting Utilities

Topic Objective

To illustrate the user interface for configuring RIS maintenance and troubleshooting utilities.

Lead-in

You can configure maintenance and troubleshooting utilities that are provided by independent software vendors and original equipment manufacturers.



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Delivery Tip

Explain how to install RIS maintenance and troubleshooting utilities.

You can give users the option to use maintenance and troubleshooting utilities provided by independent software vendors (ISVs) and original equipment manufacturers (OEMs). These utilities can be used to troubleshoot hardware-related problems, and provide an easy way to update client computer systems. For example, a vendor may provide a way to upgrade a computer's BIOS by using the remote installation process.

Installing Maintenance and Troubleshooting Utilities

Maintenance and troubleshooting utilities are installed by using an external Setup program provided by the ISV or OEM. The Setup program copies the required files to the RIS server. In addition, it creates an answer file and copies it to the RIS server. When you open the **Remote-Installation-Services Properties** dialog box, the RIS server examines the answer file and displays the installed utilities on the **Tools** tab.

Enabling Access to Maintenance and Troubleshooting Utilities

Users can access third-party utilities by initiating a network service startup and then selecting the **Maintenance and Troubleshooting** option. However, these utilities are only available to users if you have used Group Policy to enable users to access them. You can also modify the NTFS permissions on the individual answer files to restrict access to any given utility. For example, you can ensure that a BIOS update utility is available only to users who have that particular BIOS by assigning the Read permission on the answer file for that utility only to those users.

◆ Deploying Images by Using RIS

Topic Objective

To list the topics that are related to deploying images by using RIS.

Lead-in

You use an answer file to automate the setup process when performing a remote installation.

- **Modifying the Installation of a CD-Based Image**
- **Associating an Answer File with an Image**
- **Restricting Images**
- **Creating a RIS Startup Disk**
- **Installing an Image on a RIS Client Computer**

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The process for deploying images involves some or all of the following procedures. The steps you will need to take to actually deploy images depends on the types of images you are using, whether you would like to restrict images to designated groups, and the hardware that is available for the client computers. Deploying images may or may not involve modifying the installation of a CD-based image, associating an answer file with an image, restricting images to designated users, creating a RIS Startup disk for non-PXE network adapters, and installing an image on a RIS client computer.

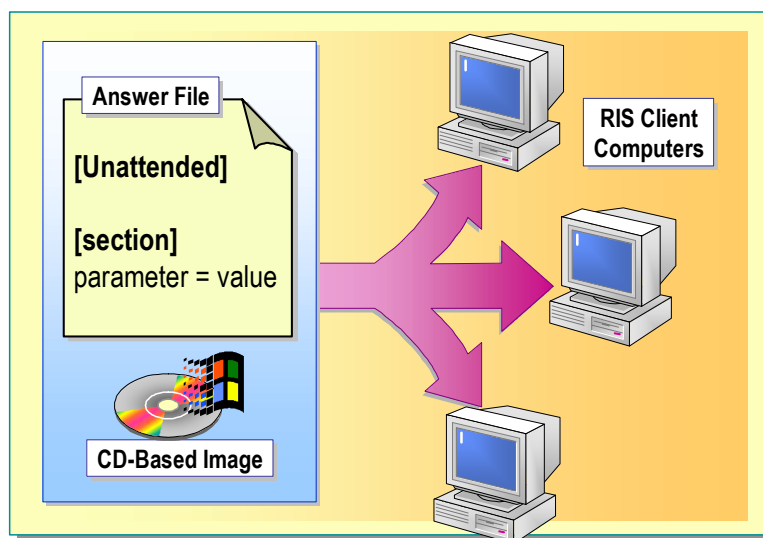
Modifying the Installation of a CD-Based Image

Topic Objective

To illustrate the use of an answer file to automate the installation of Windows 2000 Professional.

Lead-in

You use an answer file to automate the setup process when performing a remote installation.



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Key Point

RIS uses the values found in the answer file to configure the operating system installation.

A CD-based image is an image of the operating system and its default settings. CD-based images are useful for deploying a basic Windows 2000 Professional installation that requires minimal configuration settings.

When you install RIS, a CD-based image and a standard answer file (called Ristndrd.sif) are created for you. After the CD-based image is created, you can configure the setup information file or .sif file, or you can create an additional answer file by using Setup Manager.

Note Setup Manager files are located on the Windows 2000 Server compact disc. To locate the files, open Windows Explorer and expand the CD-ROM drive. Expand the Support folder, and then click **Tools**. In the right pane, double-click **deploy.cab**, and copy the Setupmgr.exe and Setupmgx.dll files to an existing folder or a new folder on your hard disk. You can also copy the files Deptool.chm and Unattend.doc, which contain documentation for Setup Manager. To start Setup Manager, open the folder to which you copied the files and double-click **setupmgr.exe**.

Answer File

An answer file is a text file that contains the information that the user would usually have to supply during setup. It uses the same format as the unattend.txt files used for unattended installations in Windows 2000.

Note For more information about unattend.txt files, see the document *Microsoft Windows 2000 Guide to Unattended Setup*, under **Additional Reading** on the Web page on the Student Materials compact disc.

Configuring an Answer File

By using an answer file, you can:

- Deploy a partial or fully unattended setup of Windows 2000 Professional. You do this by configuring an answer file so that the image is installed with little or no user intervention.
- Deploy an image to a group of computers that require custom settings. For example, you can configure an answer file that sets the display resolution to 800x600 or sets regional settings such as the time zone.

Important The answer file supports a [RemoteInstall] section that contains the repartition parameter. If this value is not specified or set to **Yes**, a RIS installation deletes all partitions on the client computer and partitions and formats the hard drive with one NTFS partition. If this value is set to **No**, RIS uses the default parameters in the client answer file. The RIS formatting process does not affect partitions created for OEM power management.

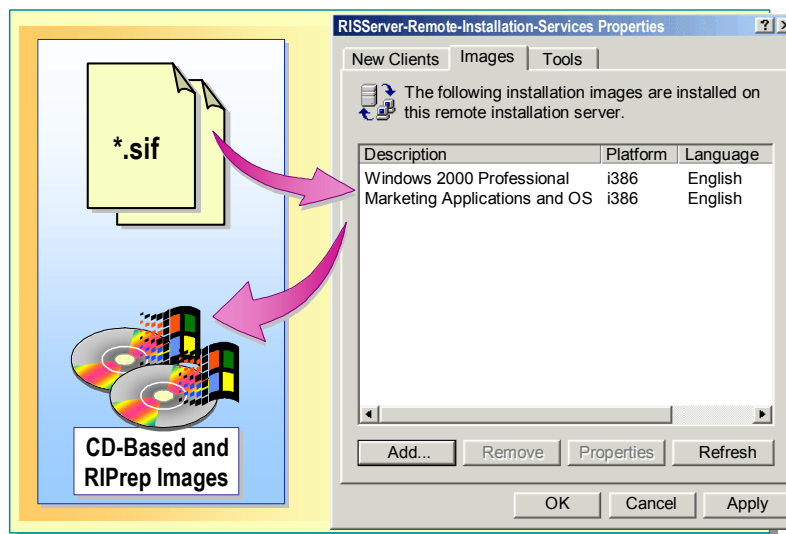
Associating an Answer File with an Image

Topic Objective

To illustrate how to associate an answer file with an image.

Lead-in

After you create an answer file, you must associate it with an existing image.



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After you create an answer file, you must associate it with an existing image. You can associate multiple answer files with a single image. This is useful if you want to add a new configuration of an image to the RIS server without having to recopy all of the files for the image.

Delivery Tip

Demonstrate the procedure for associating an answer file with an image.

To associate an answer file with an image:

1. In Active Directory Users and Computers, right-click the RIS server, and then click **Properties**.
2. In the **Properties** dialog box for the server, click the **Remote Install** tab, and then click **Advanced Settings**.
3. In the **Remote-Installation-Services Properties** dialog box for the server, click the **Images** tab, and then click **Add**.
4. In the Add wizard, on the **New Answer File or Installation Image** page, click **Associate a new answer file to an existing image**, and then click **Next**.
5. On the **Unattended Setup Answer File Source** page, select the location of the answer file by clicking one of the options in the following table, and then click **Next**.

Click this option	To
Windows image sample files	Select from the sample image files that are installed with RIS.
Another remote installation server	Copy an answer file from another RIS server.
An alternate location	Specify a local or universal naming convention (UNC) path to an answer file.

6. Follow the on-screen instructions to finish associating the answer file with an existing image.

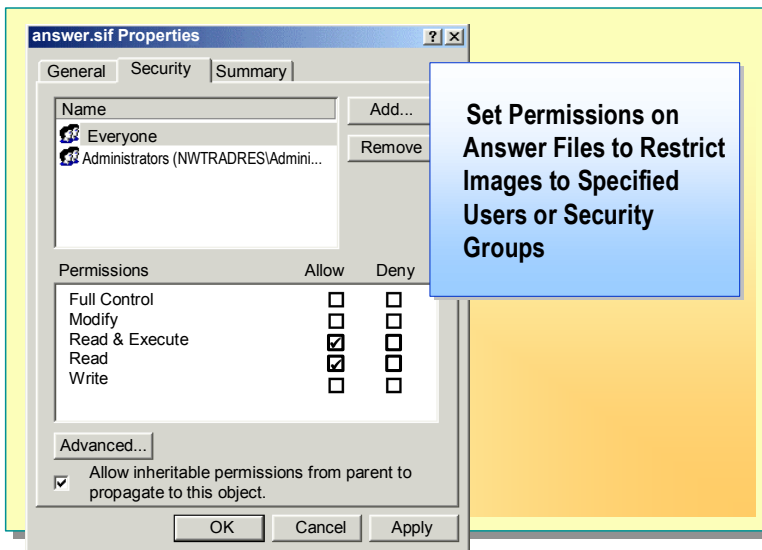
Restricting Images

Topic Objective

To illustrate the user interface for restricting images to selected users.

Lead-in

You restrict images by setting security permissions on the answer file.



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All images are available to all users by default. However, you can restrict the images that are available to users by setting NTFS permissions on an answer file. This allows you to determine which images a user can select and download.

Typically, you group users into security groups, and then permit selected security groups access to specific answer files. This allows you to create different menus of images that are customized for specific business units or departments within your organization.

Delivery Tip

Demonstrate the procedure for restricting operating system images.

To restrict operating system images:

1. In Windows Explorer, right-click the answer file that you want to restrict, and then click **Properties**.
2. In the **Properties** dialog box for the answer file, click the **Security** tab, click **Everyone**, and then click **Remove**.

This removes access for all users to this image. If a user runs the Client Installation wizard, he or she does not have access to this image.

3. Click **Add**.
4. In the **Select Users, Computers, or Groups** dialog box, click the security group to whom you want to give access to this image, and then click **Add**.

The default permissions (Read and Read & Execute) are the only permissions that a user needs to use the answer file to install the image.

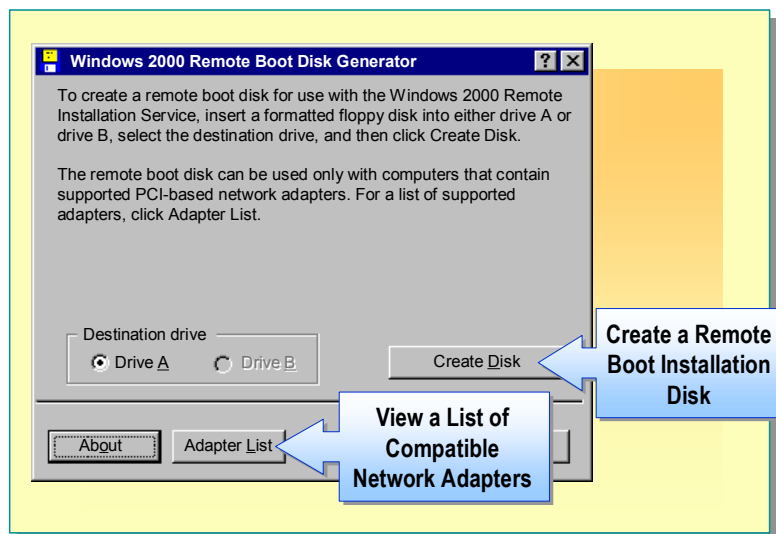
Creating a RIS Startup Disk

Topic Objective

To illustrate the user interface for creating a RIS Startup disk.

Lead-in

If the client computer does not have a network adapter that meets the PXE specification, you may still be able to remotely install Windows 2000 Professional if the RIS Startup disk supports the network adapter.



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For Your Information

For more information about the PXE architecture, refer to Windows 2000 Help and search for PXE architecture.

Before installing the images on client computers, you must verify that the network adapters of the client computers meet the PXE specification. If a client computer does not have a network adapter that meets the PXE specification, you can remotely install Windows 2000 Professional if the RIS Startup disk supports the network adapter.

The RIS Startup disk simulates the PXE startup process for computers with network adapters that do not support PXE. If the computer has a supported network adapter, you can start the computer from the RIS Startup disk and then initiate a RIS session by pressing F12 when prompted.

Key Points

Supported adapters are listed on the Hardware Compatibility List (HCL). However, most Peripheral Component Interconnect (PCI)-based 32-bit adapters will work.

You can use the same RIS Startup disk on any client computer that has one of the supported network adapters installed. You do not need to create a separate Startup disk for each type of network adapter.

Use the Remote Boot Disk Generator utility (rbfg.exe) to create a RIS Startup disk. This utility is automatically installed when you install RIS.

To create a RIS Startup disk:

1. On any computer running Windows 2000, click **Start**, and then click **Run**.
2. In the **Open** box, type \\RIS_server\reminst\admin\i386\rbfg.exe (where RIS_server represents the name of the RIS server), and then click **OK**.
3. When the **Windows 2000 Remote Boot Disk Generator** dialog box appears, insert a blank disk into drive A, and then click **Create Disk**.

Delivery Tip

Describe the procedure for creating a RIS Startup disk.

Note A RIS Startup disk may work with a network adapter that is not on the list of supported network adapters, because PXE compatibility is based on the chipset of the network adapter. You can also test the RIS Startup disk on a computer with an unsupported network adapter to determine whether the network adapter supports remote installation.

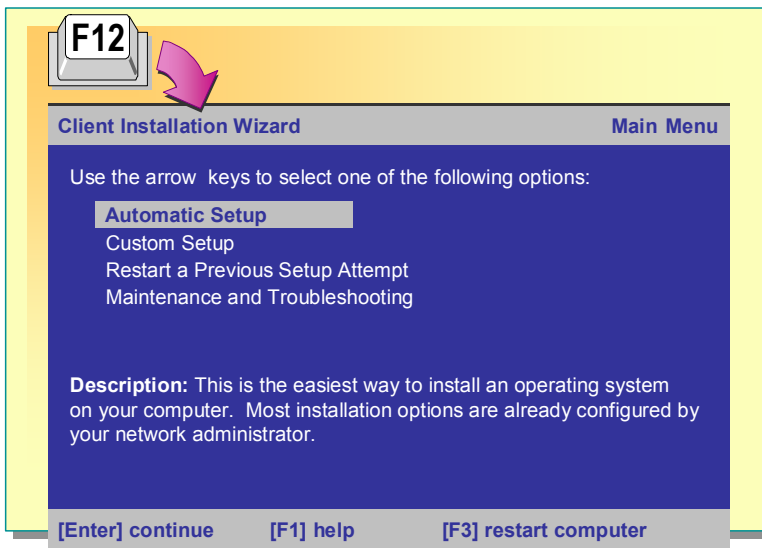
Installing an Image on a RIS Client Computer

Topic Objective

To illustrate the user interface for installing an image on a RIS client computer.

Lead-in

To begin the remote installation process, press F12 when starting a computer.



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Delivery Tip

Point out that the options listed here are determined by the Group Policy choice options discussed earlier in this module.

To perform a remote installation on a client computer, users must request a network service startup by pressing F12 after they turn on their computers, or by starting their computers with the RIS Startup disk. After the client computer establishes a connection with a RIS server, the user is prompted to press F12 again to download and start the Client Installation wizard. The Client Installation wizard prompts the user to log on to a domain, and then provides the user with a list of available installation options. The following table describes the installation options.

Option	Description
Automatic Setup	Users can choose which image to install. If only one image is available, the user is not prompted to press F12.
Custom Setup	Users can override the automatic computer naming process and the default location within Active Directory where client computer accounts will be created. Technical support personnel can use this option to install a client computer for someone else.
Restart a Previous Setup Attempt	Users can restart the operating system installation process. Select this option if the previous installation attempt failed. The option does not start copying files where the previous installation attempt failed; however, the user is not prompted to answer any questions within the Client Installation wizard from the previous setup attempt.
Maintenance and Troubleshooting	Users can gain access to third-party maintenance and troubleshooting utilities.

◆ Creating an RIPrep Image

Topic Objective

To list the topics that are related to using RIPrep images to remotely install Windows 2000 Professional.

Lead-in

Imaging Windows 2000 Professional means creating a replica of a hard disk that can then be installed on other computers in your organization.

- **Setting Up a Source Computer**
- **Modifying the Default User Profile**
- **Creating an Image by Using the Remote Installation Preparation Wizard**

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If you want to deploy applications along with the operating system, or if you want to deploy the operating system by using the fastest method, use Remote Installation Preparation (RIPrep) images instead of CD-based images. Configuring an RIPrep image of Windows 2000 Professional requires a source computer and a RIS server. It is important for you to understand how to set up a source computer, modify the default user profile, and create the image by using the Remote Installation Preparation wizard.

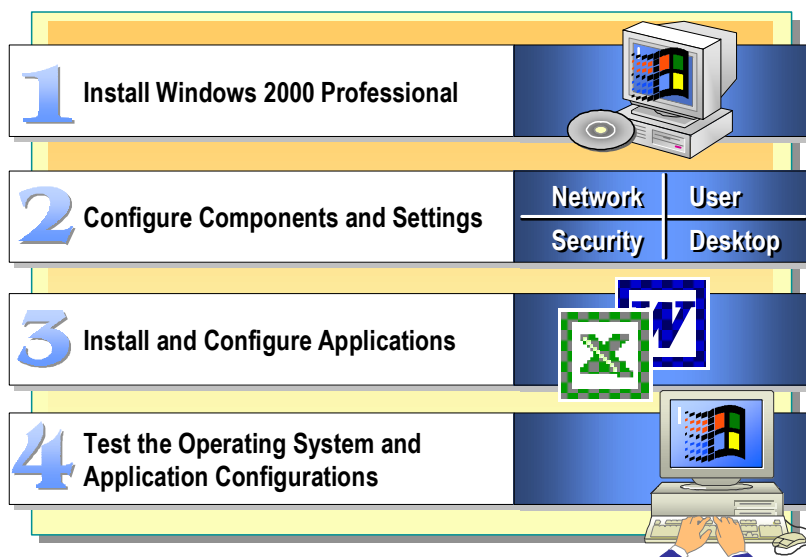
Setting Up a Source Computer

Topic Objective

To list the steps that are necessary to set up a source computer.

Lead-in

You use a source computer to create an image on a RIS server.



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Delivery Tip

Explain the purpose of a source computer and describe how to set up a source computer for imaging.

A *source computer* is a computer that is running Windows 2000 Professional and contains the components, settings, and applications that represent a standard client configuration. Configure a source computer with the exact configuration that you want deployed on other client computers.

When you designate a source computer, remember that the Remote Installation Preparation wizard can be used only to create an image of the contents of a single partition on a RIS server. Before you create and distribute an image, you must set up a source computer.

To set up a source computer:

1. Install Windows 2000 Professional.
2. Configure all components and settings that represent a standard client computer configuration. Always verify that any configuration settings that you make are appropriate for all users and computers that will install the image.
3. Install and configure applications. Install applications only if all users need them. Use Group Policy instead to install applications that are required only by specific individuals.

Tip If you are planning to assign applications to computers, you can save time during installation by deploying the applications to the OU of the source computer before you create the image. Then, after you restart the source computer and create the image, the applications will already be installed.

4. Test the configuration of the operating system and all applications before you create an image. After the image is copied to the RIS server, you cannot alter the configuration. If you need to make any changes, you must create a new image.

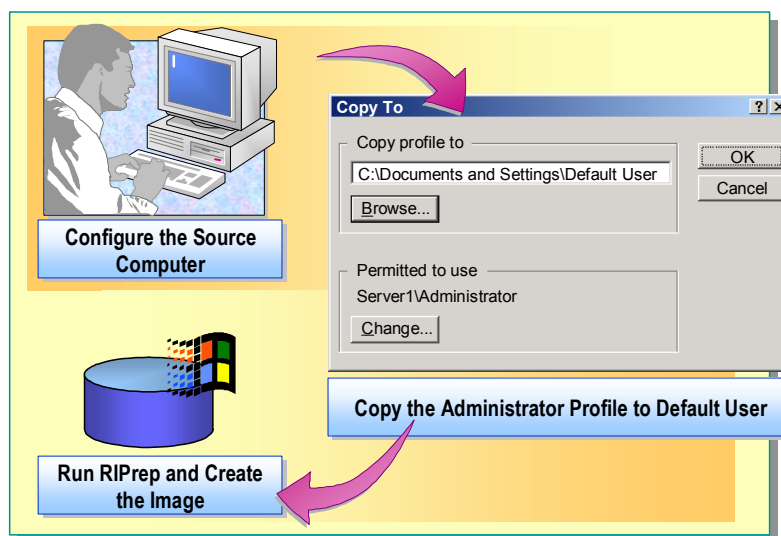
Modifying the Default User Profile

Topic Objective

To illustrate the process of copying the Administrator profile to the Default User profile.

Lead-in

To ensure that configuration changes that you make when creating an RIPrep image are available to all users, you must configure the computer and then copy the Administrator profile to the Default User profile.



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Key Point

You must log on as Administrator to configure a computer and run the Remote Installation Preparation wizard. If you do not copy the Administrator profile to the Default User profile, your configuration changes will affect only users who log on to a computer as Administrator. Everyone else will receive the Default User profile.

When you create an RIPrep image, any changes that you make are recorded in the Administrator profile. As a result, only users who log on as Administrator will receive your customized configuration. Users who log on by using their regular user accounts will receive the Default User profile.

To make your customized settings available to any user who logs on to a computer that has been configured from the RIPrep image, you must copy the Administrator profile to the Default User profile on the source computer before you run the Remote Installation Preparation wizard.

To copy the profile:

1. Make sure that you are logged on to the source computer as Administrator, and that you have completed all computer configuration tasks.
2. Right-click **My Computer**, and then click **Properties**.
3. In the **System Properties** dialog box, click the **User Profiles** tab, click the local Administrator profile from the **Profiles stored on this computer** list, and then click **Copy To**.
4. In the **Copy To** dialog box, in the **Copy profile to** text box, type the path to the Default User folder.
This path is typically C:\Documents and Settings\Default User.
5. Click **Change** to display the **Choose User** dialog box.
6. In the **List Names From** box, click the local computer.
7. In the **Names** box, click **Everyone**, and then click **Add**.
8. Click **OK** twice to close the **Copy to** dialog box.

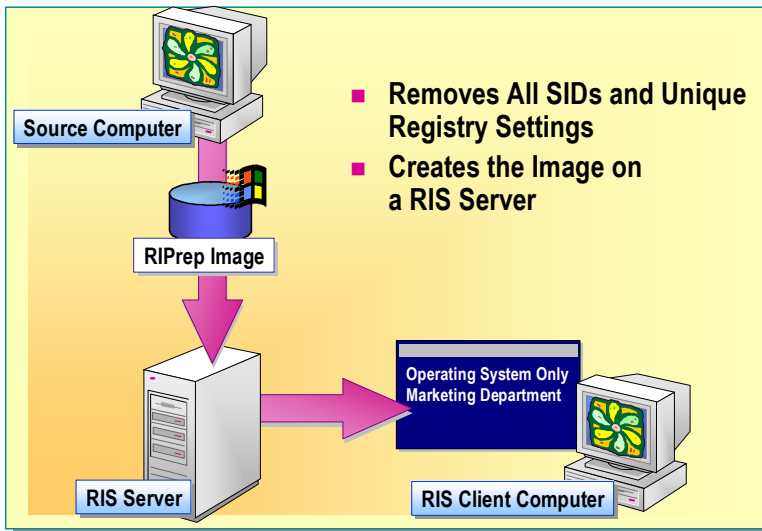
Creating an Image by Using the Remote Installation Preparation Wizard

Topic Objective

To illustrate the purpose of the Remote Installation Preparation wizard.

Lead-in

When you finish configuring the source computer, the next step is to create an image by running the Remote Installation Preparation wizard.



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You use the Remote Installation Preparation wizard to create an image of the source computer on the RIS server. An image that has been created on a RIS server by using the wizard automatically appears as an installation option when the Client Installation wizard runs on a client computer. This happens because the Remote Installation Preparation wizard automatically creates the .sif file and places it in the appropriate folder.

Important Verify that the server still has a CD-based image stored on it before creating an RIPrep image on a RIS server. (A CD-based image is created by default when you first set up a RIS server.) You cannot create an RIPrep image on a RIS server unless that server has an existing CD-based image.

Remote Installation Preparation Wizard

After you finish configuring the source computer, create the image by running the Remote Installation Preparation wizard. The wizard:

- Configures the source computer to a generic state, removing all unique settings such as the unique security identifier (SID) of the computer, computer name, and any registry settings that are unique to that system.
- Creates the RIPrep image on the specified RIS server image partition.
- Creates an answer file and associates it with the newly created RIPrep image.

Creating an RIPrep Image

Delivery Tip

Demonstrate the procedure for creating an RIPrep image.

To create an RIPrep image:

1. On the source computer, click **Start**, and then click **Run**.
2. In the **Open** box, type *RIS_server***reminst\\admin\\i386\\riprep.exe** (where *RIS_server* is the computer name of the RIS server on which you want to create this image), and then click **OK**.
3. Configure the options described in the following table.

Option	Description
Server Name	Provides the name of the RIS server where the image will be stored
Folder Name	Provides the name of the folder that will contain the image
Friendly Description and Help Text	Provides the information used to identify the name and purpose of the image

Important The Remote Installation Preparation wizard creates an image on a single RIS server only. If you want to maintain an image on multiple RIS servers for load balancing or fault tolerance, you need to manually copy that image to each RIS server. Another solution is to use Microsoft Systems Management Server to manage the replication of images to multiple RIS servers.

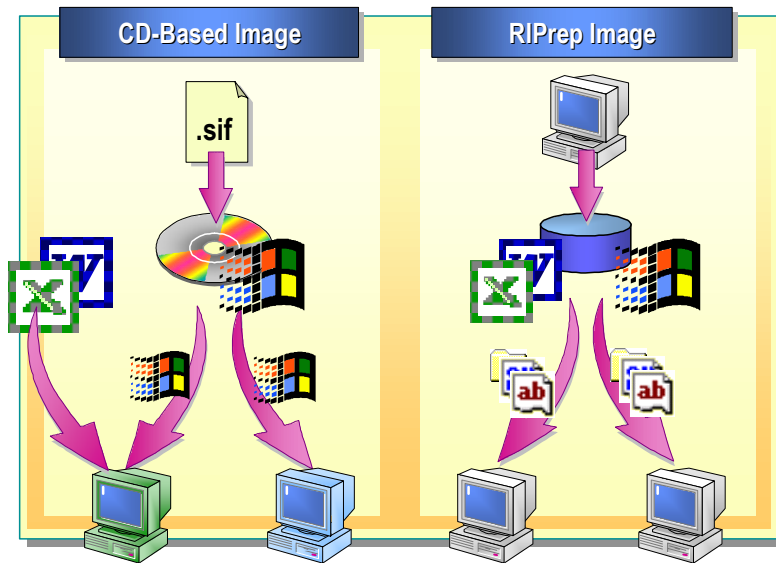
Comparing CD-Based Images and RIPrep Images

Topic Objective

To identify the differences between CD-based and RIPrep images.

Lead-in

To deploy Windows 2000 Professional, you can use either a CD-based image or an RIPrep image.



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You can use a CD-based image or an RIPrep image to deploy Windows 2000 Professional on client computers. The following information compares CD-based images with RIPrep images.

CD-Based Images

CD-based images have the following characteristics:

- When you configure the RIS server, a default image is created automatically.
- A CD-based image can only contain the operating system. You can deploy applications separately by using Group Policy.
- The image is based on the default settings of the operating system. An answer file is required to customize the image.
- The image performs a full over-the-network setup by copying all of the files in the image to a temporary folder on the local hard disk before running the Setup program.
- You can deploy the image to any computer with a supported hardware abstraction layer (HAL).

RIPrep Images

RIPrep images have the following characteristics:

- You must create RIPrep images by using the Remote Installation Preparation wizard.
- The image can contain both the operating system and applications.
- The image is based on a preconfigured source computer. Making additional changes requires you to deploy the image to a client computer, configure the client computer, and then re-create the image.
- An RIPrep image copies only the necessary files and registry keys to the client computer, making it the fastest way to deploy an operating system and applications.
- You can deploy the image to any computer with the same HAL as the source computer.

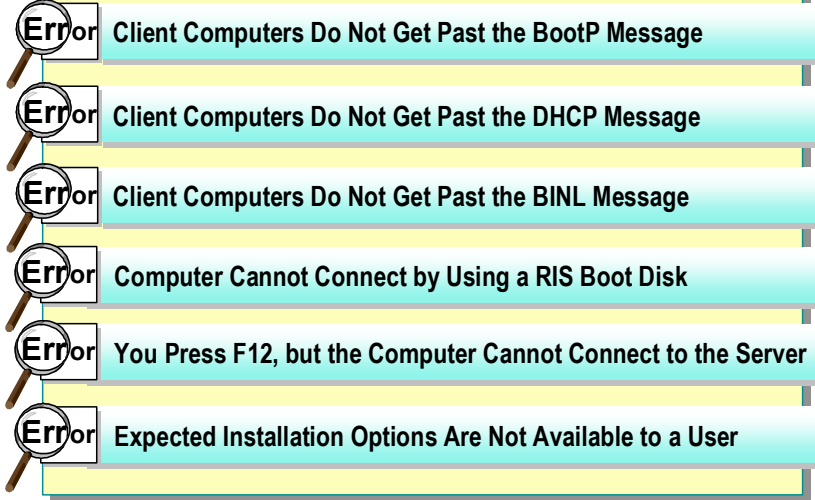
Identifying Solutions to RIS Problems

Topic Objective

To list problems that you may encounter when setting up a RIS server or installing an image on a client computer.

Lead-in

The following problems may occur with RIS servers and client computers.



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Delivery Tip

Describe each problem listed on the slide and the possible solutions.

The following information provides possible solutions for problems that may occur when you set up a RIS server.

BootP Message

If client computers display a BootP message but do not display the DHCP message, determine whether non-RIS clients can obtain an IP address. If they cannot, make sure that the DHCP server is online, authorized, and has a defined and activated IP address scope. Make sure that DHCP packets are being routed.

DHCP Message

If client computers display the DHCP message but do not display the Boot Information Negotiation Layer (BINL) message, verify that the RIS server is online and authorized. In addition, you must ensure that DHCP packets are being routed.

BINL Message

If client computers display the BINL message but cannot connect to the RIS server, restart the Boot Information Negotiation Layer service (BINLSVC) on the RIS server.

RIS Boot Disk

If client computers cannot connect to a RIS server by using the RIS Startup disk, in the Remote Boot Disk Generator utility, click **Adapter List** to verify that the RIS Startup disk supports the client network adapter. To run the Remote Boot Disk Generator utility, click **Start**, click **Run**, type **rbfg.exe** and then press ENTER.

Computer Cannot Connect to the Server

If you press F12 to initiate the remote startup, but the client computer cannot connect to a RIS server, verify that the client PXE ROM is version .99c or later. Start the computer, and check the PXE ROM messages that appear on the screen.

Installation Options Are Not Available

If the expected installation options are not available to a user, check for Group Policy conflicts. Another Group Policy object (GPO) may have taken precedence over the GPO assigned to the installation options.

Lab A: Deploying Windows 2000 Professional by Using Remote Installation Services (Simulation)

Topic Objective

To introduce the RIS simulation.

Lead-in

The RIS simulation will allow you to experience the RIS setup and deployment process in much less time than a hands-on lab.



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Explain the lab objectives.

Objectives

After completing this simulation, you will be able to:

- Install Remote Installation Services (RIS) on a computer running Microsoft Windows 2000 Advanced Server.
- Create a CD-based image of Windows 2000 Professional.
- Pre-stage a RIS Client Computer.
- Create an RIprep image, including a modified profile and Microsoft Word.
- Deploy RIprep images to select groups of users.

Lab Setup

This lab is an interactive exercise. To complete this lab, you need the following:

- A computer running Microsoft Windows 2000, Microsoft Windows NT version 4.0, Microsoft Windows 98, or Microsoft Windows 95.
- A minimum display resolution of 800 x 600 with 256 colors.

Key Points

The lab does not reflect the real-world environment. It is recommended that you always use complex passwords for any administrator accounts, and never create accounts without a password.

Outside of the classroom environment, it is strongly advised that you use the most recent software updates that are necessary. Because this is a classroom environment, we may use software that does not include the latest updates.

Important The lab does not reflect the real-world environment. It is recommended that you always use complex passwords for any administrator accounts, and never create accounts without a password.

Important Outside of the classroom environment, it is strongly advised that you use the most recent software updates that are necessary. Because this is a classroom environment, we may use software that does not include the latest updates.

► To start the lab

1. Insert the Student Materials compact disc into your CD-ROM drive.
2. At the root of the compact disc, double-click **Default.htm**.
3. On the Student Materials Web page, click **Lab Simulations**, and then click **Remote Installation Services**.
4. Read the introduction information, and then click the link to start the simulation.

Estimated time to complete this lab: 30 minutes

Review

Topic Objective

To reinforce module objectives by reviewing key points.

Lead-in

The review questions cover some of the key concepts taught in the module.

- RIS Overview
- Installing and Configuring RIS
- Configuring Remote Installation Options
- Deploying Images by Using RIS
- Creating an RIPrep Image
- Comparing CD-Based Images and RIPrep Images
- Identifying Solutions to RIS Problems

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1. What are the three network services that must be running before RIS can function?

DHCP, DNS, and Active Directory.

2. What types of images does RIS support?

CD-based images and RIPrep images.

3. What are the four primary steps to set up a RIS server?

First, install RIS. Next, configure and start RIS by using the Remote Installation Services Setup wizard (risetup.exe). Then, assign the users who will be performing remote installations permissions to create computer objects. Finally, authorize the RIS server in DHCP and enable the Respond to client requests option.

4. When is it necessary to create a RIS Startup disk for the client computer?

Create a RIS Startup disk when the client computer does not have a network adapter that has a PXE ROM version .99c or later.

5. What can you do to distribute the network load among RIS servers that are servicing simultaneous requests for images?

Prestage all client computers and assign them to designated RIS servers.

6. How can you prevent users from performing remote installations on their own computers?

Give the permissions necessary to perform remote installations only to technical support personnel.