

Module 5: Publishing Resources in Active Directory

Contents

Overview	1
Introduction to Publishing Resources	2
Setting Up and Administering Published Printers	3
Implementing Printer Locations	10
Setting Up and Administering Published Shared Folders	17
Comparing Published Objects with Shared Resources	19
Lab A: Publishing Resources in Active Directory	20
Troubleshooting Published Resources	27
Best Practices	28
Review	29



Information in this document, including URL and other Internet Web site references, is subject to change without notice. Unless otherwise noted, the example companies, organizations, products, domain names, e-mail addresses, logos, people, places, and events depicted herein are fictitious, and no association with any real company, organization, product, domain name, e-mail address, logo, person, places or events is intended or should be inferred. Complying with all applicable copyright laws is the responsibility of the user. Without limiting the rights under copyright, no part of this document may be reproduced, stored in or introduced into a retrieval system, or transmitted in any form or by any means (electronic, mechanical, photocopying, recording, or otherwise), or for any purpose, without the express written permission of Microsoft Corporation.

Microsoft may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Microsoft, the furnishing of this document does not give you any license to these patents, trademarks, copyrights, or other intellectual property.

© 2000 Microsoft Corporation. All rights reserved.

Microsoft, Active Directory, BackOffice, FrontPage, IntelliMirror, PowerPoint, Visual Basic, Visual Studio, Win32, Windows, Windows Media, and Windows NT are either registered trademarks or trademarks of Microsoft Corporation in the U.S.A. and/or other countries.

The names of actual companies and products mentioned herein may be the trademarks of their respective owners.

Instructor Notes

Presentation:
45 Minutes

Lab:
15 Minutes

This module provides students with the knowledge and skills to publish resources, including shared folders and printers, in Active Directory® directory service. Publishing resources makes it easier for users to locate resources on a network, and provides secure and selective publication of network resources to users.

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

- Describe the purpose of publishing resources in Active Directory.
- Set up and administer published printers in Active Directory.
- Set up printer locations for published printers.
- Set up and administer published shared folders in Active Directory.
- Differentiate between the object that is published in Active Directory and the actual shared resource.
- Troubleshoot common problems with publishing resources in Active Directory.
- Apply best practices for publishing resources in Active Directory.

In the hands-on lab in this module, students will have the opportunity to publish printers and shared folders in Active Directory. In the first exercise, the students will install and share a new printer. They will also modify the properties of the printer to make it easier for users to search the network for it. In the next exercise, the students will create a shared folder and then attempt to locate the shared folder on the network. They will publish that shared folder in Active Directory, and then attempt to locate the shared folder on the network.

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 2154a_05.ppt

Preparation Tasks

To prepare for this module, you should:

- Read all of the materials for this module.
- Complete the labs.
- Study the review questions and prepare alternative answers to discuss.
- Anticipate questions that students may ask. Write out the questions and provide the answers.
- Read chapter 4, “Network Printing” in the Server Operations Guide book in the Microsoft Windows® 2000 Server Resource Kit.
- Read the white paper, *Integration of Windows 2000 Printing with Active Directory* on the Student Materials compact disc.

Module Strategy

Use the following strategy to present this module:

- **Introduction to Publishing Resources**

In this topic, you will introduce publishing Active Directory resources to make resources easily accessible to users. Explain how Active Directory enables publication of resources.

- **Setting Up and Administering Published Printers**

In this topic, you will introduce setting up and administering published printers. Explain how to control and manage printer publishing in Active Directory. Demonstrate how to publish printers on computers not running Microsoft Windows 2000 in Active Directory. Demonstrate how to administer published printers by performing tasks, such as moving, installing, and changing printer properties.

- **Implementing Printer Locations**

In this topic, you will introduce the purpose of printer locations. Emphasize that the physical location of objects, such as printers, and fax machines is important to a user. Tell the students that before they can enable location tracking, a network must meet some specific requirements. Explain the procedure for enabling location tracking. First explain the steps, and then go into details in each topic. Use the example in the text to explain how to define printer locations. If the students ask about sites and subnets, refer them to Module 11 in this course.

- **Setting Up and Administering Published Shared Folders**

In this topic, you will introduce setting up and administering published shared folders. Tell the students that they can publish a folder in Active Directory after making it sharable. Demonstrate how to publish a shared folder. Demonstrate how to add a description and keywords to the published shared folder. Show students some examples of meaningful descriptive words and keywords.

- **Comparing Published Objects with Shared Resources**

In this topic, you will differentiate between the object that is published in Active Directory and the actual shared resource. Emphasize that the published object and the shared object has its own discretionary access control list (DACL).

- **Lab A: Publishing Resources in Active Directory**

Prepare students for the lab in which they will first install and share a new printer, and then modify the properties of the printer to make it easier for users to search the network for it. In the next exercise, the students will create a shared folder and then attempt to locate the shared folder on the network. Finally they will publish that shared folder in Active Directory, and then attempt to locate the shared folder on the network. After students have completed the lab, ask them if they have any questions concerning the lab.

- Troubleshooting Published Resources

Describe the common problems with publishing resources in Active Directory. Present some of the more common problems that students may encounter when publishing resources in Active Directory, along with suggested strategies for resolving them.

- Best Practices

Present best practices for publishing resources in Active Directory. Emphasize the reason for each best practice.

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.

Important The labs in this module are also dependent on the classroom configuration that is specified in the Customization Information section at the end of the Classroom Setup Guide for Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.

Lab Setup

The labs in this module require that the student computers be configured as domain controllers. To prepare student computers to meet this requirement, perform one of the following actions:

- Complete Module 3, “Creating a Windows 2000 Domain,” in Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.
- Run Autodc.vbs from the C:\Moc\Win2154A\Labfiles\Custom\Autodc folder.
- Run Dcpromo.exe on the student computers by using the following parameters:
 - A domain controller for a new domain.
 - A new domain tree.
 - A new forest of domain trees.
 - Full DNS domain name, which is computerdom.nwtraders.msft (where computer is the assigned computer name).
 - NetBIOS domain name, which is COMPUTERDOM.
 - Default location for the database, log files, and SYSVOL.
 - Permission compatible only with Windows 2000–based servers.
 - Directory Services Restore Mode Administrator Password, which is **password**.

Note Before you use Module 3, “Creating a Windows 2000 Domain,” in Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*, you must successfully complete Module 2, “Implementing DNS to Support Active Directory,” in Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.

Lab Results

There are no configuration changes on student computers 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 publishing resources, including printers and shared folders in Active Directory.

- Introduction to Publishing Resources
- Setting Up and Administering Published Printers
- Implementing Printer Locations
- Setting Up and Administering Published Shared Folders
- Comparing Published Objects with Shared Resources
- Troubleshooting Published Resources
- Best Practices

*****ILLEGAL FOR NON-TRAINER USE*****

One of the key challenges of network administration is providing secure and selective publication of network resources to users. Another challenge is making it easy for employees to find information on the network. Use Microsoft® Windows® 2000 Active Directory® directory service to address these challenges by storing information about network objects, offering rapid information retrieval, and providing security mechanisms that control access to information in Active Directory.

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

- Describe the purpose of publishing resources in Active Directory.
- Set up and administer published printers in Active Directory.
- Set up printer locations for published printers.
- Set up and administer published shared folders in Active Directory.
- Differentiate between the object that is published in Active Directory and the actual shared resource.
- Troubleshoot common problems with publishing resources in Active Directory.
- Apply best practices for publishing resources in Active Directory.

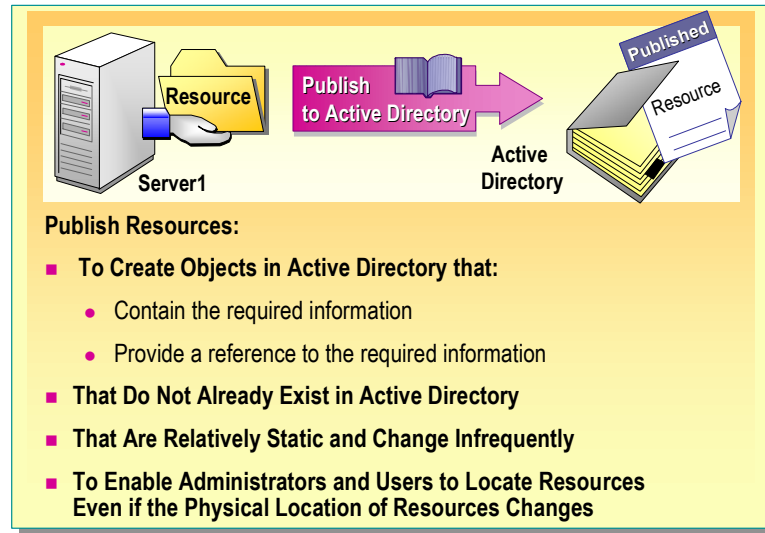
Introduction to Publishing Resources

Topic Objective

To identify the purpose of publishing resources in Active Directory.

Lead-in

To enable you to locate resources centrally, you publish resources in Active Directory by adding Active Directory objects that point to the location of the resource.



*****ILLEGAL FOR NON-TRAINER USE*****

Key Points

Resources should be published in Active Directory if access to these resources is important to users.

Publishing resources for users enables users to easily locate resources on the network.

Publishing means creating objects in Active Directory that either directly contain the information that you want to make available, or provide a reference to that information. For example, a user object contains useful information about a user, such as the user's telephone numbers and e-mail addresses. Alternatively, a shared folder object contains a reference to a shared folder, which resides on a computer in the network. Resources should be published in Active Directory when the information contained in them is useful to a user or when it needs to be highly accessible.

You do not need to publish resources that already exist in Active Directory, such as user accounts. However, you need to publish resources that do not exist in Active Directory. Examples of two resources that do not exist in Active Directory are printers on a computer that is not running Windows 2000 and shared folders.

The main characteristic of information published in Active Directory is that it is relatively static and changes infrequently. Not publishing highly volatile information, such as network adapter statistics, prevents extensive replication traffic across a network. Telephone numbers and e-mail addresses are examples of relatively static information that is suitable for publishing.

Publishing resources in Active Directory enables you to locate resources even if the physical location of the resources changes. For example, as long as you update the reference to the physical location, all shortcuts pointing to an Active Directory object that represents a published shared folder will continue to work after the shared folder has been moved to another computer. No user action is required to continue gaining access to the shared folder.

◆ Setting Up and Administering Published Printers

Topic Objective

To introduce the topics related to setting up and administering published printers.

Lead-in

By default, computers running Windows 2000 that belong to a domain publish all shared printers in Active Directory. You publish printers that are on a computer not running Windows 2000.

- Introduction to Printer Publishing
- Managing Printer Publishing
- Publishing Printers on Computers Not Running Windows 2000
- Administering Published Printers

*****ILLEGAL FOR NON-TRAINER USE*****

Every Windows 2000–based print server that is either a member of a domain or a domain controller automatically publishes its printers in Active Directory. The integration between printer and Active Directory makes it possible to automatically publish printers, and to search across a domain for printers at different physical locations.

You can also publish printers on computers not running Windows 2000 by using Active Directory Users and Computers, or by using the Pubprn.vbs script, which is provided in the System32 folder.

Introduction to Printer Publishing

Topic Objective

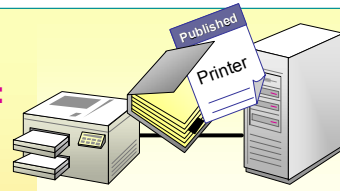
To illustrate the default behavior of Active Directory and printer integration.

Lead-in

The integration between printers and Active Directory makes it possible to publish and search for printers across a domain.

Default Behavior of Printers:

- Any Printer Shared by a Windows 2000-Based Print Server Is Published in Active Directory
- A Printer Is Automatically Removed from Active Directory When a Print Server Is Removed from the Network
- Each Print Server Is Responsible for Its Printers Being Published in Active Directory
- Windows 2000 Automatically Updates the Printer Object's Attributes in Active Directory



*****ILLEGAL FOR NON-TRAINER USE*****

Tell the students that Windows 2000 automatically publishes a printer in Active Directory.

Key Point

Publishing printers means that the print queues are being published. The object in Active Directory is called a *printQueue*.

When you create printers in Windows 2000, the printer and Active Directory integration is configured by default and printers are automatically published in Active Directory. Publishing printers means that the print queues are being published. The object in Active Directory is called a *printQueue*. An administrator needs to administer printers only to change the default behavior. The following summarizes the default behavior of published printers:

- Any printer shared by a print server running Windows 2000 that has an account in an Active Directory domain is published in Active Directory. This means that to publish a printer in Active Directory, an administrator needs to only install and share the printer.
- If a print server is removed from the network, its published printer is automatically removed from Active Directory. This prevents users from trying to connect to a published printer that no longer exists on the network.
- Each print server is responsible for its own printers being published in Active Directory. The domain controllers do not search the network for printers to be published. When a printer is shared, the server that is hosting the shared printer contacts a domain controller to request that the printer be published in Active Directory. There is no centralized printer publishing service.
- When you configure or modify the printer's properties, Windows 2000 automatically updates the published printer object's attributes in Active Directory.

Managing Printer Publishing

Topic Objective

To explain how to control and manage printer publishing in Active Directory.

Lead-in

You can control the automatic publishing of printers in Active Directory.

■ View Printer Objects

- On the **View** Menu, click **Users, Groups, and Computers as containers**

■ Control the Publishing of a Printer

- Select or clear the **List in the Directory** check box
- Configure the **Automatically publish new printers in Active Directory** Group Policy setting

■ Manage Orphaned Printers

- Active Directory removes orphaned printer objects through the orphan pruner process
- Orphan pruner deletes printer objects for non-existent printers at frequent intervals

*****ILLEGAL FOR NON-TRAINER USE*****

Tell the students that to facilitate searching, you should try to populate all of the fields in the **Properties** dialog box of published printers.

Delivery Tip

Demonstrate how to publish printers in Active Directory if you have stopped sharing a printer.

Demonstrate how to view printer objects by enabling objects as containers in Active Directory Users and Computers.

Key Points

A computer running Windows 2000 that belongs to a domain automatically publishes all shared printers in Active Directory.

On a computer that is not running Windows 2000, you must manually publish a printer.

When you install and share a printer on a computer running Windows 2000, and that computer belongs to a domain, Windows 2000 automatically publishes the printer in Active Directory.

Viewing Printer Objects in Active Directory

When you publish a printer, the printer object is placed in the print server's computer object in Active Directory. You can view printer objects in Active Directory. To view printer objects, you enable the option in Active Directory Users and Computers to view objects as containers.

To view printer objects in Active Directory Users and Computers, perform the following step:

- On the **View** menu, click **Users, Groups, and Computers as containers**, and then in the console tree, select the computer on which you installed the printer. The published printer appears in the details pane.

Controlling Printer Publishing

Sometimes you may not want to automatically publish printers in Active Directory to prevent users from viewing or using these printers. An example of a printer that you would not want to automatically publish would be the printer that the Payroll department uses to print paychecks. You can control the automatic publishing of a printer by using the **List in the directory** check box on the printer's **Sharing** tab. The **List in the Directory** check box is selected by default; therefore, the printers that are added using the Add Printer wizard are automatically published.

You can use Group Policy to control the default behavior of published printers. You configure the Automatically publish new printers in Active Directory Group Policy setting under Computer Configuration\Administrative Templates\Printers in Group Policy to disable or enable automatic publishing of printers.

If you do not want a shared printer to be published, you must clear the **List in the Directory** check box after installing the printer; that is, if you chose to share the printer while you were installing it. If the **List in the directory** check box for an already published printer is cleared, the printer will be unpublished.

Managing Orphaned Printers

When you delete a printer from a print server, the corresponding Active Directory object is removed. However, there are situations in which the printer is not deleted but is no longer available, such as when the print server is rebuilt or turned off. In these situations, Active Directory needs to remove these orphaned printer objects. Active Directory removes these orphaned printer objects through a process called the *orphan pruner*, which runs on each domain controller.

At frequent intervals, the orphan pruner verifies all of the printer objects in Active Directory to see if the corresponding printer still exists on the specified print server. If the orphan pruner cannot locate a printer (the orphan pruner checks three times in a row, each time at an eight hour interval), it assumes that the printer is no longer valid and deletes the printer object.

Note For more information about Group Policy, see Module 7, "Implementing Group Policy," in Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.

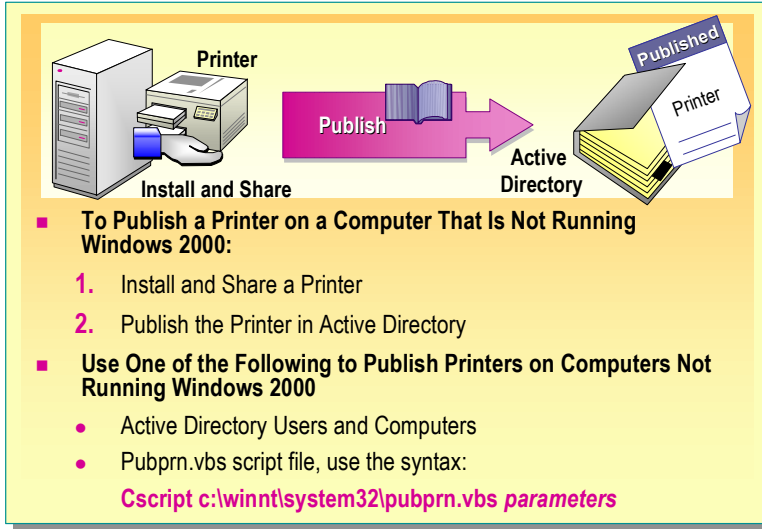
Publishing Printers on Computers Not Running Windows 2000

Topic Objective

To illustrate how to use Active Directory to publish printers on computers not running Windows 2000.

Lead-in

You need to manually publish a printer on a computer that is not running Windows 2000.



*****ILLEGAL FOR NON-TRAINER USE*****

If students do not know the difference between a printer (the device that does the actual printing) and a logical printer (its software interface on the print server) refer them to Module 10, Course 2152, *Implementing Microsoft Windows 2000 Professional and Server*.

Key Points

A printer on a computer that is not running Windows 2000 is not automatically published in Active Directory.

You can publish the printers on a computer not running Windows 2000 by using either Active Directory Users and Computers or the Pubprn.vbs script.

Printers that are added to Windows 2000 and shared are automatically published in Active Directory. If you install and share a printer on a computer that is not running Windows 2000, the printer is not automatically published in Active Directory. However, after creating and sharing these printers, you can publish these shared printers in Active Directory by using either Active Directory Users and Computers or the Pubprn.vbs script. You can publish any printer that is accessible through a universal naming convention (UNC) path name.

Using Active Directory Users and Computers to Publish Printers

To publish a printer by using Active Directory Users and Computers, perform the following steps:

1. In Active Directory Users and Computers, right-click the OU where you want to publish the printer.
2. Point to **New**, and then click **Printer**.
3. Type the UNC name of the printer that you want to publish in Active Directory.

The UNC path is the complete Windows 2000 name of a network resource that conforms to the \\servername\sharename syntax.

Using the Pubprn.vbs Script File to Publish Printers

Windows 2000 includes a script, called Pubprn.vbs that you can use to publish printers on computers not running Windows 2000. Depending on the command-line options you use, this Pubprn.vbs script publishes either all of the printers installed on a print server or just a single printer that you specify.

To run the Pubprn.vbs script, perform the following step:

- At the command prompt, type
Cscript %systemroot%\system32\pubprn.vbs <parameters>

The following examples use the Pubprn.vbs script file to publish all printers or a specific printer:

- To publish all installed printers on a server in the Sales OU in the contoso.msft domain, at the command prompt, type
pubprn.vbs server "LDAP://OU=Sales, DC=contoso, DC=msft"
- To publish a specific printer named Printer on a server in the Accounting OU in the contoso.msft domain, at the command prompt, type
pubprn.vbs \\server\Printer LDAP://OU=Accounting, DC=contoso, DC=msft"

In the above examples, *server* is a server running earlier versions of Windows and Microsoft Windows NT®, and LDAP://OU=...,DC=..." is the path in Active Directory of the target container that will hold the published printer.

Note For more information about adding and sharing printers in Windows 2000, see Module 10, "Configuring Printing," in Course 2152, *Implementing Microsoft Windows 2000 Professional and Server*.

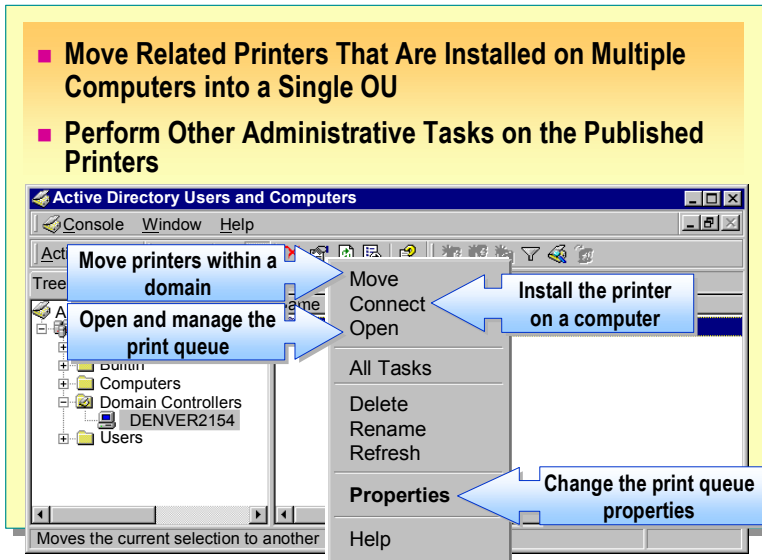
Administering Published Printers

Topic Objective

To illustrate how to administer published printers by performing tasks, such as moving, installing, and changing printer properties.

Lead-in

To effectively manage your network, you can perform different administrative tasks on the published printers.



*****ILLEGAL FOR NON-TRAINER USE*****

Delivery Tip

Demonstrate how to move a single object and multiple objects within a domain.

Demonstrate how to install the printer on a computer, open the print queue, and change the print queue properties.

Administering printers includes some common tasks such as moving printers, connecting to printers on the network, and modifying properties of the print queue objects. After you publish printers in Active Directory, user and organization printing needs may change. This change may require you to configure printer settings so that your printing resources better fit these needs.

To organize published printers, you can move related published printers that are installed on multiple computers into a single OU. By moving printers into a single OU, you can perform similar administrative functions on all of the printers in the OU.

To move printers within a domain, perform the following steps:

1. In Active Directory Users and Computers, select the published printers to be moved.
2. Right-click the printers that you selected, and then click **Move**.
3. In the **Move** dialog box, expand the domain tree, click the OU to which you want to move the selected printers, and then click **OK**.

The following lists the other administrative tasks that you can perform on the published printers in Active Directory Users and Computers:

- To install the printer, right-click the printer object, and then click **Connect**.
- To open the print queue and perform tasks, such as canceling print jobs, reordering printers in the queue, and changing printer properties, right-click the printer object, and then click **Open**.
- To change the print queue properties, right-click printer object, and then click **Properties**. The information on the **General** tab is published with the print queue object and helps users find printers.

◆ Implementing Printer Locations

Topic Objective

To introduce topics related to creating printer locations.

Lead-in

To be able to use certain resources in Active Directory, users must know the physical location of some objects in Active Directory.

- What Are Printer Locations?
- Requirements for Printer Locations
- Defining Location Names
- Configuring Printer Locations

*****ILLEGAL FOR NON-TRAINER USE*****

In a Windows 2000 network, printer locations allow users to locate and connect to print devices that are physically located near the user. When you implement printer locations, the results of an Active Directory search return a list of printers that are located in the same physical location (for example, in the same building or on the same floor) as the client computer that a person is using when searching for printers. Additionally, printer locations make it easy to find printers in any location in which a user is currently located.

What Are Printer Locations?

Topic Objective

To identify the purpose of printer locations.

Lead-in

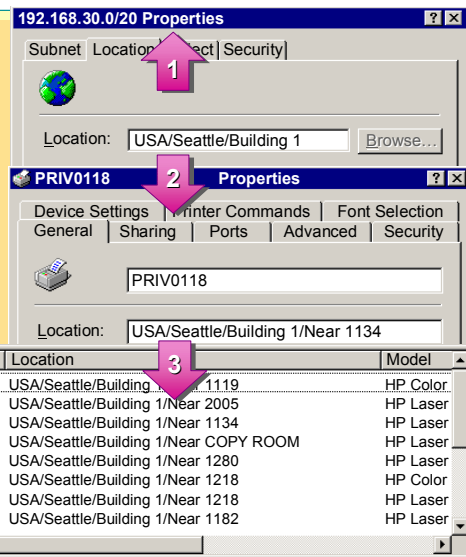
In Active Directory, you can search for printers by their location.

When a User Searches for Printers:

1. Active Directory finds the subnet object that corresponds to the IP subnet in which the user's computer is located

2. Active Directory uses the value in the Location attribute of the subnet object to search for printers with same value

3. Active Directory displays a list of printers whose Location value matches the Location value of the subnet object



*****ILLEGAL FOR NON-TRAINER USE*****

The slide in this topic is animated. There are three slides. Display a new step on the slide as you talk about it.

Do not go into details in this topic while explaining the steps to enable location tracking. These tasks are covered in detail in later topics.

Printer locations allow users to locate and connect to print devices that are in close physical proximity to the user. When you implement printer locations, the results of an Active Directory search return a list of printers that are located in the same physical location (for example, in the same building or on the same floor) as the client computer that a person is using when searching for published printers.

This “find the nearest printer to me” capability is based on the assumption that print devices that are physically located near a user reside on the same Internet Protocol (IP) subnet as the user’s client computer. In Active Directory, an IP subnet is represented by a subnet object, which contains a Location attribute that is used during a search for printers. Active Directory uses the value of this attribute as the text string in a search for printers that also have a Location attribute.

Therefore, when a user searches for a printer when printer locations is implemented, Active Directory:

1. Finds the subnet object that corresponds to the subnet on which the user’s computer is located.
2. Uses the value in the Location attribute for the subnet object as the text string for a search for all published printers that have the same Location attribute value.
3. Returns to the user a list of printers whose Location attribute value matches the one that is defined for the subnet object. The user can then connect to the nearest printer.

Additionally, users can also search for printers in any location, which is useful if they need to find and connect to a printer in a physical location different from the one in which they normally work.

Requirements for Printer Locations

Topic Objective

To identify the requirements necessary to implement printer locations.

Lead-in

Here is a list of requirements that the Windows 2000 network must meet before you can implement printer locations.

- **An Active Directory Network with Two or More IP Subnets**
- **An IP Addressing Scheme That Corresponds to the Physical Topology of the Network**
- **A Subnet Object for Each Site**
 - Represents an IP subnet in Active Directory
 - Contains a location attribute that Active Directory uses to find printers in the same physical location as a client computer
- **Client Computers That Can Search Active Directory**

*****ILLEGAL FOR NON-TRAINER USE*****

Tell students that you will discuss how to implement printer locations in a network with less than two IP subjects in a later topic.

Key Point

The value in the Location attribute is used to locate printers that reside in the same physical location as the user.

Before you can implement printer locations, your Windows 2000 network must meet the following requirements:

- An Active Directory network configured with at least one site and two or more IP subnets. Because IP subnets are used to identify the physical location of a printer, a network with only one network ID address or one IP subnet would assume that all printers reside in one physical location and therefore would be in close proximity to users.
- An IP addressing scheme that corresponds to the geographical and physical layout of your network. Therefore, computers and printers that reside on the same IP subnet must also reside in approximately the same physical location. If this is not the case with your network, you cannot implement printer locations.
- A subnet object for each site. The subnet object, which represents an IP subnet in Active Directory, contains a Location attribute that is used during a search for printers. The value of this Location attribute is used during a search of Active Directory to locate printers that reside near the physical location of the user's client computer.
- Client computers that can search Active Directory. Users with client computers running Windows 2000 Professional or running previous versions of Windows that are configured with an Active Directory client can take advantage of printer locations when searching for printers.

Note You use Active Directory Sites and Services to create a subnet object. For more information about Windows 2000 sites and subnet objects, see Module 11, "Managing Active Directory Replication," in Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.

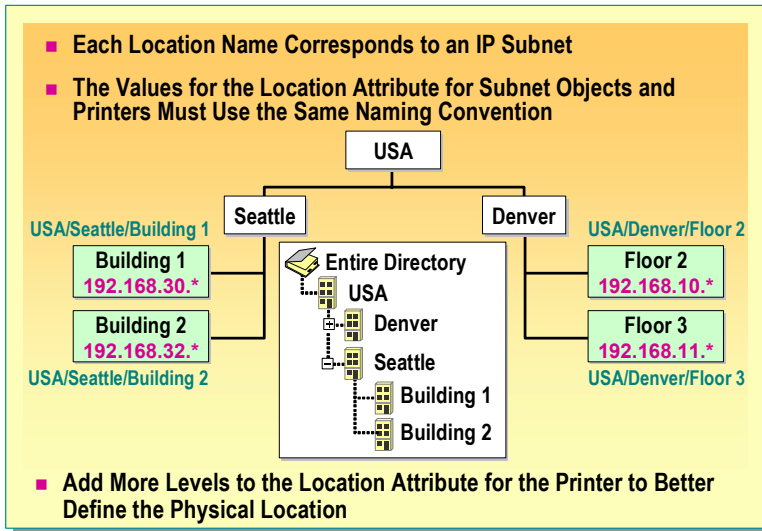
Defining Location Names

Topic Objective

To explain how to define location names for published printers.

Lead-in

Defining rules for creating printer location names ensures accurate search results.



*****ILLEGAL FOR NON-TRAINER USE*****

The graphic on the slide is the example in the text.

Key Point

A location name corresponds to a specific IP subnet.

Use a naming convention to determine the printer location names that will populate the Location attributes for subnet and printer objects.

The key to implementing printer locations is to develop a naming convention for printer locations that corresponds to the physical topology of your network. These printer location names must correspond to an IP subnet. You use this naming convention to determine the values for the Location attributes for both the subnet object and the printer object.

Names for printer locations must use the following format:

Name/name/name/...

The maximum length for each name is 32 characters; the maximum length for a full location name is 260 characters.

To illustrate how to define a naming convention for printer location names, assume that there is an international organization with offices in Seattle and Denver (which can correspond to sites in Windows 2000), and offices in other countries. The IP addressing scheme for the organization closely corresponds to the geographical distribution of the offices, and to characteristics such as buildings and floors. In the Seattle site, each building has its own subnet, whereas each floor in the Denver site has its own subnet. Each of these subnets corresponds to a specific subnet object in Active Directory.

Therefore, the following naming convention could be used for this example:

- The top-level node is the country.
- The next level is the city name.

The levels following the city name provide more structure as needed and vary in depth depending on the complexity of the organization and the amount of detail available in the IP network.

The following table illustrates the location names and corresponding IP subnets for the example shown in the graphic above.

Site	IP Subnet (Name of Subnet Object in Active Directory)	Location Name
Seattle	192.168.30.0/24	USA/Seattle/Building 1
Seattle	192.168.32.0/24	USA/Seattle/Building 2
Denver	192.168.10.0/24	USA/Denver/Floor 2
Denver	192.168.11.0/24	USA/Denver/Floor 3

Note The naming of subnet objects in Active Directory uses the format of *IPaddress/ActiveBits*. Therefore, in example above, for subnet 192.168.10.0 with a net mask of 255.255.255.0, the subnet object name is 192.168.10.0/24.

For the value that populates the Location attribute of the printer, you can add more levels to the location name to help further identify the physical location of the printer. For example, for the Seattle office (where the subnets correspond to buildings) you can add levels that correspond to the floor and office near where the printer is located:

- USA/Seattle/Building 1/Floor 3/Office 3334
- USA/Seattle/Building 1/Floor 4/Office 4404
- USA/Seattle/Building 1/Floor 5/Office 5517

Therefore, when a user in Building 1 in the Seattle site searches for a printer, the detailed location names appear in the results box of a search and help the user locate the closest printer.

Note For more information about developing a naming convention for printer locations, see the topic “Establishing a naming convention for printer locations” in the Windows 2000 Server Help.

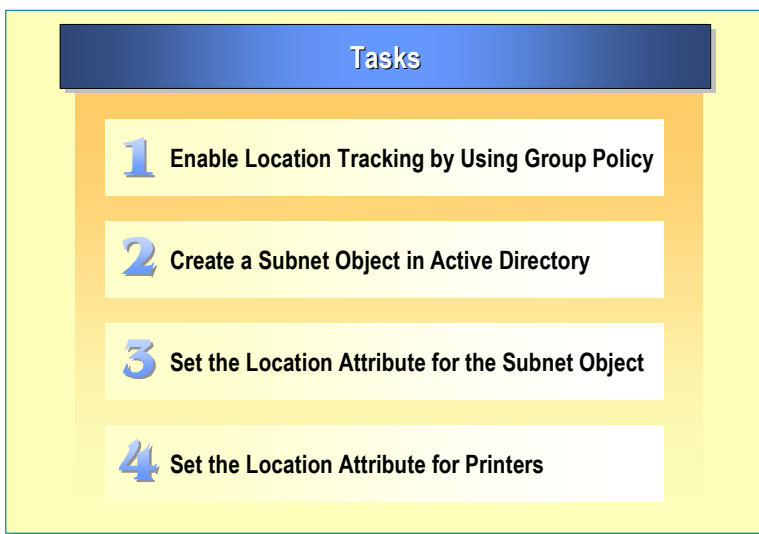
Configuring Printer Locations

Topic Objective

To illustrate how to configure printer locations.

Lead-in

After setting the Location attribute of the sites and subnets, you need to enable printer location.



*****ILLEGAL FOR NON-TRAINER USE*****

Delivery Tip

Demonstrate each task for configuring printer locations. Be sure to emphasize the similarity between the values of the Location attributes for the printer and for the subnet object.

After you have met the requirements for implementing printer locations, and have devised a naming convention, perform the following tasks to configure printer locations:

1. Enable printer location tracking by using Group Policy. Printer location tracking pre-populates the location search field when a user searches Active Directory for a printer. The value used to pre-populate the search field is the *same* value that is specified in the Location attribute of the subnet object that corresponds to the IP subnet in which the user's computer is located.

To enable printer location tracking by using Group Policy, enable the Pre-populate printer search location policy setting, which is located in Computer Configuration\Administrative Templates\Printers.

If you do not enable printer location tracking, users must select the printer location to search.

2. Create a subnet object in Active Directory. If a subnet object does not already exist, use Active Directory Sites and Services to create a subnet object. The format of the subnet name is *IPaddress/ActiveBits*.
3. Set the Location attribute for the subnet object. Use the naming convention that you develop for printer location names as the value of this attribute. To set the Location attribute for the subnet object, perform the following steps:
 - a. In Active Directory Sites and Services, right-click the subnet object, and then click **Properties**.
 - b. Click the **Location** tab, type the location name that corresponds to the subnet object, and then click **OK**.

If you have enabled printer location tracking as the first step, you can also browse for locations rather than typing the entire location string.

4. Set the Location attribute for printers. For each printer located in the physical location that corresponds to the IP subnet, you must add the Location attribute to the printer's properties. Use the same printer location name that you set for the subnet object. To set the Location attribute for printers, perform the following steps:
 - a. In the Printers folder, right-click the printer object, and then click **Properties**.
 - b. On the **General** tab, in the **Location** box, type the printer location name (including any additional levels in the location name to better describe the physical location of the printer), and then click **OK**. You can also browse for the location by clicking **Browse**.

When installing a new printer, you can specify the Location attribute with the Add Printer wizard.

Note For more information about using Group Policy, see Module 8, "Using Group Policy to Manage User Environments," in Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.

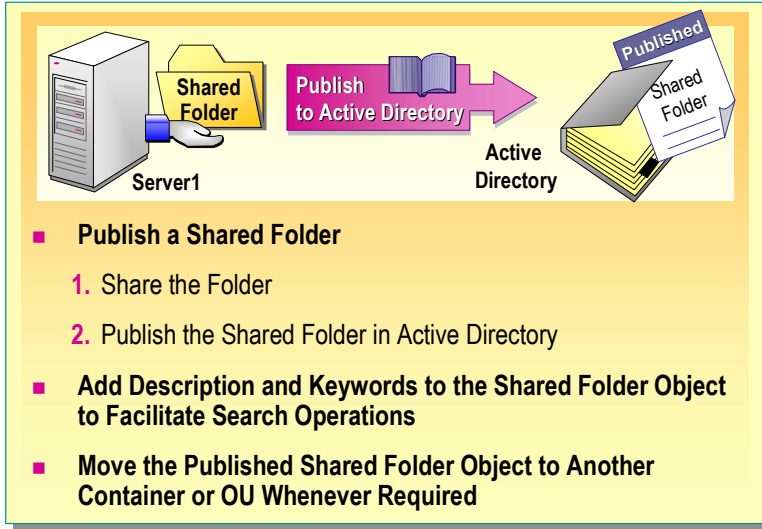
Setting Up and Administering Published Shared Folders

Topic Objective

To illustrate how to set up and administer shared folders in Active Directory.

Lead-in

After sharing a folder on a computer, you can publish the shared folder in Active Directory.



*****ILLEGAL FOR NON-TRAINER USE*****

Delivery Tip

Demonstrate how to publish a shared folder in Active Directory.

Demonstrate how to add a description and keywords to the published shared folder. Show students some examples of meaningful descriptive words and keywords.

Demonstrate how to move shared folders between containers.

Key Point

In Active Directory, you can publish any shared folder that can be accessed by using a UNC name.

In Active Directory, you can publish any shared folder that can be accessed by using a UNC name. A computer running Windows 2000 can use Active Directory to locate the object that represents the shared folder, and then connect to the shared folder. After publishing shared folders, you can define keywords and a description for the shared folders, and if required, move shared folders to related OUs.

Publishing Shared Folders.

You can publish shared folders in Active Directory by using Active Directory Users and Computers. To make a shared folder accessible, you first share the folder, and then publish the shared folder in Active Directory.

To publish a shared folder, perform the following steps:

1. In Active Directory Users and Computers, right-click the OU where you want to publish the shared folder, click **New**, and then click **Shared Folder**.
 - In the **Shared Folder Name** box, type the name of the folder.
2. In the **UNC Path** box, type the UNC that you want to publish in Active Directory.

The UNC path is the complete Windows 2000 name of a network resource that conforms to the \\servername\sharename syntax.

Configuring Search Options for Published Shared Folders

After you have published a shared folder, you can add a description and keywords to the shared folder objects to facilitate searching for it. Descriptions can be used to provide more information about the shared folder, such as its contents. Keywords are a list of words that you can define for the shared folder object, and that you can use to search for the shared folder.

To add a description and keywords to the shared folder objects, perform the following steps:

1. In Active Directory Users and Computers, right-click the shared folder, and then click **Properties**.
2. Type the description for the shared folder in the **Description** box, and then click **Keywords**.
3. Type a keyword that facilitates searching for this folder, click **Add**, and then click **Close**. You can add more than one keyword for a shared folder.

Moving Published Shared Folders

After a shared folder has been published, you can move the published folder to another container or OU. When you perform the move operation, you move the shared folder object (which contains information or references the shared folder) in Active Directory. The physical location of the shared folder does not change.

To move a shared folder, perform the following steps:

1. In Active Directory Users and Computers, right-click the shared folder, and then click **Move**.
2. Select the destination container or OU, and then click **OK**.

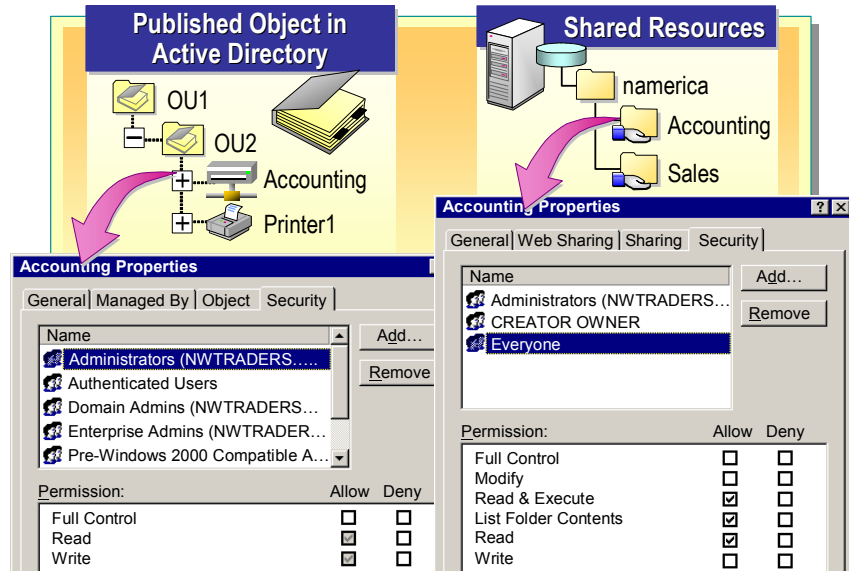
Comparing Published Objects with Shared Resources

Topic Objective

To differentiate between the object that is published in Active Directory and the actual shared resource.

Lead-in

When you publish a printer or shared folder in Active Directory, two distinct objects exist, the shared printer or folder and the published object.



*****ILLEGAL FOR NON-TRAINER USE*****

Key Points

When you publish a printer or shared folder in Active Directory, two distinct objects exist, the shared printer or folder and the published object.

A shared resource and the published object that refers to the shared resource both have their own DACLs.

When implementing published folders and published printers, it is important to understand the difference between the object that is published in Active Directory and the actual shared resource, such as a printer or folder.

Understanding this difference assists you when troubleshooting problems that users may have when accessing published resources.

The object that is published in the directory is completely separate from the shared resource that it represents. In other words, when you publish a printer or shared folder in Active Directory, two distinct objects exist, the shared printer or folder and the published object. The published object contains a reference to the location of the shared resource. When a user accesses the published object, Windows 2000 redirects the user to the shared resource.

DACLs for Shared Resources and Published Objects

Because a shared resource and the published object that refers to the shared resource are two different objects, each of these objects has its own discretionary access control list (DACL). Use the DACL on the shared resource to control access to that shared resource. For example, with a shared printer, use the DACL to control who is allowed to print to the printer, and who is allowed to manage print jobs. Use the DACL on the corresponding printQueue object published in Active Directory to control who can view or change the properties of the published object.

A user requires Read permission on the DACL of a published object to view the published object, or to have the object appear in the results list when searching for a published resource. A user may be able to view a published object, which is controlled by the DACL on the published object, but may not be able to access the shared resource, depending on the DACL on the shared resource.

Lab A: Publishing Resources in Active Directory

Topic Objective

To introduce the lab.

Lead-in

In this lab, you will publish printers and shared folders in Active Directory.



*****ILLEGAL FOR NON-TRAINER USE*****

Explain the lab objectives.

Objectives

After completing this lab, you will be able to:

- Publish shared folders in Active Directory.
- Publish shared printers in Active Directory.

Prerequisites

Before working on this lab, you must have:

- The knowledge and skills to create shared folders.
- The knowledge and skills to install and configure printers.

Lab Setup

To complete this lab, you need the following:

- A computer running Windows 2000 Advanced Server configured as a domain controller.

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.

Estimated time to complete this lab: 15 minutes

Exercise 1

Publishing Printers

Scenario

To take full advantage of the benefits provided by Active Directory, you have decided to publish shared printers in Active Directory. This will allow your users to easily locate and access the shared printers.

Goal

In this exercise, you will install and share a new printer. You will then modify the properties of the printer to make it easier for users to search the network for it.

Tasks	Detailed Steps
1. Install and share a new printer by using the following information: - Local printer - Do not automatically detect - Use LPT1 - HP Color LaserJet 4500 - Default printer name - Default share name - No location or comment - Do not print a test page	- Log on as Administrator with a password of password. - Open the Printers folder from the Start/Settings menu. - In the Printers folder, double-click Add Printer. - On the Welcome to the Add Printer Wizard page, click Next. - On the Local or Network Printer page, ensure that Local printer is selected, clear the Automatically detect and install my Plug and Play printer check box, and then click Next. - On the Select the Printer Port page, ensure that LPT1: is selected, and then click Next. - On the Add Printer Wizard page, in the list of Manufacturers, click HP, in the list of Printers, click HP Color LaserJet 4500, and then click Next. - On the Name Your Printer page, click Next to accept the default name. - On the Printer Sharing page, click Next to accept the default name. - On the Location and Comment page, click Next. - On the Print Test Page, click No, and then click Next. - On the Completing the Add Printer Wizard page, click Finish.  <i>Windows 2000 installs the required printer drivers and then adds an icon for your printer to the Printers folder.</i> - Close the Printers folder.
 Is this printer now published in Active Directory? Yes. Unlike shared folders, shared printers are automatically published by default.	

Tasks	Detailed Steps
2. Attempt to locate the printer in Active Directory Users and Computers.	a. Open Active Directory Users and Computers from the Administrative Tools menu.
 Can you see the published printer in Active Directory Users and Computer? Why or why not? No. To view published printers in Active Directory Users and Computers, the View Users, Groups and Computers as containers option must be enabled.	
2. (continued)	b. On the View menu, click Users, Groups, and Computers as containers. c. Expand Domain Controllers, and then click <i>computer</i> (where <i>computer</i> is your assigned computer name).
 What appears in the details pane? An icon representing the published printer.	
2. (continued)	d. Leave Active Directory Users and Computers open.
3. Modify the Location property of the published printer to make it easier to search for. Set the location to Classroom.	a. In the details pane, double-click the published printer. b. In the <i>computer-HP Color LaserJet 4500 Properties</i> dialog box, in the Location box, type Classroom and then click OK. c. On the View menu, click Users, Groups, and Computers as containers. d. Close Active Directory Users and Computers.
4. Attempt to locate the published printer by searching for printers in the Classroom.	a. Open For Printers from the Search menu. b. In the Find Printers dialog box, on the Printers tab, in the Location box, type Classroom and then click Find Now.  Notice that when the search is complete, the published printer appears in the dialog box. c. Close all open windows, and then log off.

Exercise 2

Publishing Shared Folders

Scenario

To take full advantage of the benefits provided by Active Directory, you have decided to publish shared folders in Active Directory. This will allow your users to easily locate and access the shared folders.

Goal

In this exercise, you will create a shared folder and then attempt to locate the shared folder on the network. You will then publish that shared folder in Active Directory, and then attempt to locate the shared folder on the network.

Tasks	Detailed Steps
1. Create and share a folder at the root of Drive C. Name the folder Accounting and use the same name for the share name.	- Log on as Administrator with a password or password. - At the root of Drive C, create a folder named Accounting. - Share the Accounting folder by using the default values.
2. Attempt to locate the shared folder by browsing the network.	On the desktop, double-click My Network Places, double-click Entire Network, click entire contents, double-click Microsoft Windows Network, double-click <i>domain</i> (where <i>domain</i> is your assigned domain name), and then double-click <i>computer</i> (where <i>computer</i> is your assigned computer name).
 Does the Accounting folder appear in the window displaying the shared resources available on your computer? Yes, the Accounting folder appears.	
 Why is this not an efficient way to locate network resources? To access shared folders by browsing the network, users must know the name of the shared folder as well the name of the computer from which the folder is shared and the name of the domain that contains the computer.	

Tasks	Detailed Steps
2. (continued)	b. Close all open windows.
3. Publish the Accounting folder in the Domain Controllers OU by using Active Directory Users and Computers.	a. Open Active Directory Users and Computers from the Administrative Tools menu. b. Expand your domain, if necessary, and then in the console tree, click Domain Controllers. c. Right-click Domain Controllers, point to New, and then click Shared Folder. d. In the New Object – Shared Folder dialog box, in the Name box, type Accounting. e. In the Network Path (\\server\share) box, type \\computer\accounting (where <i>computer</i> is your assigned computer name), and then click OK.  Notice that Accounting now appears in the Domain Controllers OU. f. Leave Active Directory Users and Computers open.
4. Modify the following properties of the Accounting object to make it easier to locate: - Description: Accounts Payable. - Keywords: FY00, AP Reports.	a. In the details pane, double-click Accounting. b. In the Accounting Properties dialog box, in the Description box, type Accounts Payable and then click Keywords. c. In the Keywords dialog box, type FY00. d. Click Add, type AP Reports click Add, and then click OK. e. Click OK to close the Accounting Properties dialog box, and then close Active Directory Users and Computers.
5. Attempt to locate the Accounting folder by searching your domain for a shared folder by using the keyword FY00.	a. On the desktop, double-click My Network Places, double-click Entire Network, click entire contents, and then double-click Directory. b. Right-click your domain, and then click Find. c. In the Find Users, Contacts and Groups dialog box, in the Find list, click Shared Folders. d. On the Shared Folders tab, in the Keywords box, type FY00 and then click Find Now.  Notice that when the search is complete, the Accounting folder appears in the dialog box. e. Double-click Accounting.
 What happens? A window appears, displaying the contents of the shared folder.	

Tasks	Detailed Steps
5. <i>(continued)</i>	f. Close all open windows and dialog boxes.
6. Run the Rmpub.vbs script located in the C:\Moc\Win2154A\Labfiles folder. This script removes all of the objects created in this lab.	a. Open the C:\Moc\Win2154A\Labfiles folder. b. Double-click Rmpub.vbs. This batch file removes all of the objects created in this lab. c. Log off.

Troubleshooting Published Resources

Topic Objective

To troubleshoot common problems with publishing resources.

Lead-in

Here are some of the common problems that you may encounter when publishing resources in Active Directory.

 **Error****Cannot Find All Printers with Location Tracking Enabled** **Error****User Cannot Access Published Shared Printers**

*****ILLEGAL FOR NON-TRAINER USE*****

You may encounter problems when publishing resources in Active Directory. Here are some of the common problems that you may encounter and some strategies for resolving them:

- You cannot find all printers with location tracking enabled. If the location string for a printer does not match the naming convention used for the location string on the subnet objects, that printer will not be found when searching for printers based on location. To correct this problem, ensure that the location string on all printers matches the naming convention used for the subnet objects and update the location string for any printers that do not follow the naming convention.
- Users cannot access published shared printers. When a user tries to connect to a published printer, an error message appears indicating that the printer cannot be located. This error message is generated when a published printer becomes orphaned, that is, if the shared printer is no longer available but the orphan pruner process has not yet removed the published printer object from the directory. To resolve this problem, either ensure that the printer is shared and available or manually delete the published printer object from Active Directory.

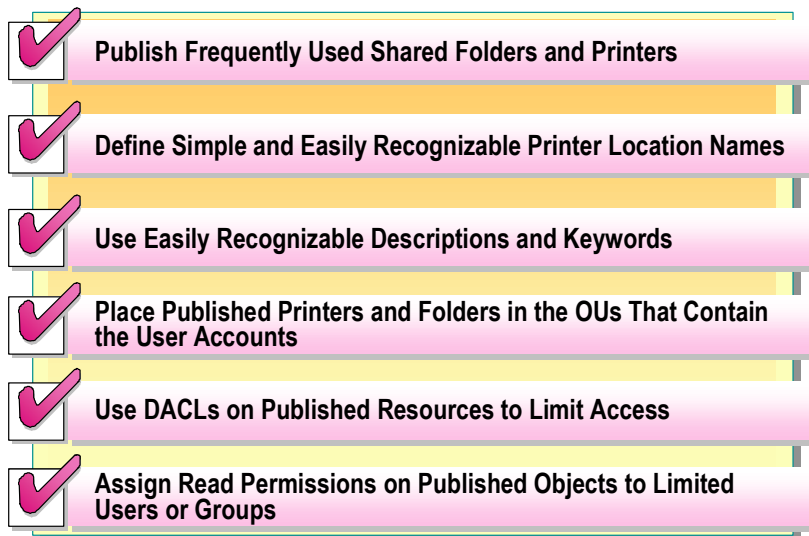
Best Practices

Topic Objective

To identify best practices for publishing resources.

Lead-in

Review this checklist before you publish resources in Active Directory.



*****ILLEGAL FOR NON-TRAINER USE*****

Emphasize the reason for each best practice

The following list provides best practices for publishing resources in Active Directory:

- Publish the frequently used shared folders and printers in Active Directory. Publishing these resources makes it easier to find these resources and to keep track of the folders and printers, even if someone changes the physical location.
- The printer location names are intended to be read by users. Therefore, the names should be simple and correspond to names that users readily recognize. For example, using the postal codes known only to the facilities management group would not be helpful. In addition, avoid using special characters in printer location names. Special characters make printer location names difficult to read.
- When publishing folders, ensure that you use easily recognizable descriptions and keywords. This makes it easier for users to locate published folders when performing a search.
- Place published printers and folders in the OUs that contain the user accounts that will be accessing the published resources on a regular basis. Place published printers and folders in separate OUs eases the management burden.
- Make use of the DACLS on published resources to limit which users or groups can see the published resources. If a user or group does not have at least Read permission on a published resource, that resource will not appear when the user searches for published resources. This makes it easier for users to locate published folders and printers that they should be using.
- Assign Read permissions on the published objects to *only* those users or groups that have been assigned the necessary permissions to access the corresponding shared resource. This helps reduce support calls generated by access denied messages when users attempt to access shared folders and printers that are published in Active Directory.

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.

- Introduction to Publishing Resources
- Setting Up and Administering Published Printers
- Implementing Printer Locations
- Setting Up and Administering Published Shared Folders
- Comparing Published Objects with Shared Resources
- Troubleshooting Published Resources
- Best Practices

*****ILLEGAL FOR NON-TRAINER USE*****

Give students time to read and answer the review questions on their own, and then discuss the answers as a group.

1. You can control the publishing of a printer. Which option allows you to enable and disable the publishing of printers in Active Directory?

Select the List in the directory check box to publish printers and clear this check box to disable publishing of printers.

2. What are the main steps involved in activating the location option in printers?

Define a naming convention for your organization.

Enable location tracking.

Create subnet objects in Active Directory.

Set the Location attribute of the subnets.

Set the location of each printer.

3. You enabled the location tracking feature for all of the printers in your building so that users know where each printer is located. But when location tracking was enabled, the users could find only those printers with a Location attribute that matched the naming convention. They could not find the printers that had locations set to a different naming convention. How will you enable the viewing of all printers?

Update the Location property for all published printers.

4. How do you ensure that all shortcuts pointing to a published shared folder will continue to work after the shared folder has been moved to another computer?

You need to update the shared folder object in Active Directory. The next time users log on, they will connect to the new physical location automatically. The advantage of publishing resources in Active Directory is that you are able to locate resources even if their physical locations change.

5. You have published a large number of printers and shared folders and your users are complaining that the list of objects returned when they perform a search is too large. Additionally, they are complaining that they are receiving access denied error messages when trying to access a number of the shared resources. How would you solve these problems?

Modify the DACLs of the published objects to limit their visibility to only those users and groups who have been assigned permissions to access the shared resources that the published objects represent.