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# Module 10: Creating and Managing Trees and Forests

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## Instructor Notes

**Presentation:**  
**90 Minutes**

This module provides students with knowledge and skills to create and manage trees and forests in a Microsoft® Windows® 2000 network, and to administer forest-wide resources.

**Labs:**  
**90 Minutes**

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

- Identify the purpose of trees and forests in Windows 2000.
- Create and manage trees and forests in Windows 2000.
- Use trust relationships in trees and forests.
- Use the global catalog to log on to a Windows 2000 network.
- Implement the most effective group strategies to gain access to resources across trees and forests.
- Troubleshoot common problems that can occur when creating and managing trees and forests in Windows 2000.
- Apply best practices to creating and managing trees and forests in Active Directory® directory service.

In the hands-on labs in this module, students will have the opportunity to create and manage trees and forests in Windows 2000. In the first lab, students will create child domains in an existing forest, remove an existing forest, and then examine and verify trusts between domains. In the second lab, students will add groups in Active Directory based on a group strategy, change domain modes, and then verify access to resources by using the group strategy.

## 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\_10.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 11, “Authentication” in the Distributed Systems book in the Microsoft Windows 2000 Server Resource Kit.
- Read chapter 9 “Designing the Active Directory Structure” in the Deployment Planning Guide book in the Microsoft Windows 2000 Server Resource Kit.
- Read the white paper, *Windows 2000 Kerberos Authentication* on the Student Materials compact disc.
- Read the white paper, *Secure Networking Using Windows 2000 Distributed Security Services* on the Student Materials compact disc.

## Module Strategy

Use the following strategy to present this module:

- **Introduction to Trees and Forests**

In this topic, you will introduce trees, forests, and child domains. Emphasize that domain trees and forests provide the flexibility of using both contiguous and noncontiguous naming conventions. Explain the need for multiple domains in Active Directory.

- **Creating Trees and Forests**

In this topic, you will introduce how to create trees and forests. Demonstrate how to create a new child domain, a new tree, and a new forest by using the Active Directory Installation wizard. Do not spend much time on this topic because students have already created a new forest in Module 3 when they installed Active Directory. If you want to explain the options that are displayed when creating a new forest by using the Active Directory Installation wizard, use the simulation to create the first domain used in Module 3.

- **Trust Relationships in Trees and Forests**

In this topic, you will introduce trust relationships in trees and forests. Explain transitive trusts in Windows 2000. Describe how trusts work in Windows 2000. Emphasize the role of the Kerberos version 5 protocol in user authentication. Present the concept of shortcut trusts. Explain and then demonstrate how to create nontransitive trusts in Windows 2000. Illustrate how to verify and revoke the nontransitive trust paths that were created.

- **Lab A: Creating Domain Trees and Establishing Trusts**

Prepare students for the lab in which they will create and manage trees and forests in Windows 2000. In this first lab, students will create child domains in an existing forest, remove an existing forest, and then examine and verify trusts between domains. After students have completed the lab, ask them if they have any questions concerning the lab.

- **The Global Catalog**

In this topic, you will introduce the global catalog. Ask students what they know about the global catalog because they have already covered the basics in Module 1. Describe the global catalog in relation to domain logon requests. Emphasize that the global catalog server provides universal group membership information for your account to the domain controller that processes the user logon information, and authenticates the user principal name.

- **Strategies for Using Groups in Trees and Forests**

In this topic, you will introduce security groups in Active Directory. Review universal groups with students. Present the strategies for using groups in trees and forests. Describe the nesting strategy for using universal groups. Conduct a class discussion on using groups in trees and forest. Use the example given in the class discussion to show how to use groups in a multiple-domain environment. Let the student present a solution, and then discuss the solution as a class.

- Lab B: Using Groups in a Forest

Prepare students for the lab in which they will create and nest domain local, global, and universal security groups, and add global groups from other domains into universal groups. Next, they will switch the domain mode from mixed mode to native mode. They will also verify access to resources by using a group strategy that includes global, universal, and domain local groups. Finally students will view the logged on user's access token, and observe the effects of group nesting. After students have completed the lab, ask them if they have any questions concerning the lab.

- Troubleshooting Creating and Managing Trees and Forests

In this topic, you will introduce troubleshooting options for resolving problems that may occur when creating and managing trees and forests in Windows 2000. Present some of the more common problems that the students may encounter when creating and managing trees and forests, along with suggested strategies for resolving them.

- Best Practices

Present best practices for creating and managing trees and forests in Windows 2000. Emphasize the reason for each best practice.

## Customization Information

This section identifies the lab setup requirements for the 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.

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**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*.

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### Lab Setup

The following list describes the setup requirements for the labs in this module.

#### Setup Requirement 1

The labs in this module require that the student computers be configured as Domain Name System (DNS) servers. To prepare student computers to meet this requirement, perform one of the following actions:

- Complete Module 2, “Implementing DNS to Support Active Directory,” in Course 2154, *Implementing and Administering Microsoft Windows 2000 Directory Services*.
- Run Dnssuf.vbs from the C:\Moc\Win2154A\Labfiles\Custom\Autodns folder.
- Install DNS on the student computers. Configure a forward and reverse lookup zone. Configure both zones to allow updates.

#### Setup Requirement 2

The labs in this module require each student computer to be configured as a domain controller in its own forest. To prepare student computers to meet this requirement, perform one of the following actions:

- Complete the labs in 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**.

### Setup Requirement 3

The labs in this module use the following files that were installed on the student computer during the classroom setup. These files are located under the folder *C:\Moc\Win2154a\Labfiles*:

- Lrights.bat
- Ntrights.exe
- Mytoken.exe

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**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*.

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### Lab Results

Performing the labs in this module introduces the following configuration changes:

- The domain model was changed from each domain controller being a domain in its own forest to child domains of *nwtraders.msft* with two domain controllers for each domain. All Active Directory objects from previous labs are removed.
- Windows 2000 support tools are installed.
- The Log on Locally user right has been granted to the users local group.
- The domains are in native mode.

# Overview

**Topic Objective**

To provide an overview of the module topics and objectives.

**Lead-in**

In this module, you will learn about creating and managing trees and forests in a Windows 2000 network, and administering forest-wide resources.

- Introduction to Trees and Forests
- Creating Trees and Forests
- Trust Relationships in Trees and Forests
- The Global Catalog
- Strategies for Using Groups in Trees and Forests
- Troubleshooting Creating and Managing Trees and Forests
- Best Practices

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Creating a single domain in Active Directory® directory service is the one of the most efficient and easy ways to administer the Active Directory infrastructure. However, when implementing the Active Directory infrastructure, you may want to consider additional domains if your organization requires additional functionalities. Some examples of these additional functionalities are security settings, such as account and password Group Policy settings, which must be applied at the domain level so that distinct security settings apply to the users in each domain. Multiple domains also allow you to decentralize administration to retain complete administrative control of the domain controllers in their domain. Another benefit of multiple domains is that they enable you to reduce replication traffic so that the only data replicated between domains are the changes to the global catalog server, configuration information, and schema.

Depending on your requirements, you can create additional domains, called *child domains*, in the same domain tree. Alternatively, you can create a *forest*. A forest consists of multiple domain trees. All domains that have a common root domain are said to form a *contiguous namespace*. The domain trees in a forest do not form a contiguous namespace.

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

- Identify the purpose of trees and forests in Microsoft® Windows® 2000.
- Create and manage trees and forests in Windows 2000.
- Use trust relationships in trees and forests.
- Use the global catalog to log on to a Windows 2000 network.
- Implement the most effective group strategies to gain access to resources across trees and forests.
- Troubleshoot common problems that can occur when creating and managing trees and forests in Windows 2000.
- Apply best practices to creating and managing trees and forests in Active Directory.

## ◆ Introduction to Trees and Forests

**Topic Objective**

To introduce the topics related to implementing trees and forests.

**Lead-in**

Domain trees and forests provide you with the flexibility of using both contiguous and noncontiguous naming conventions.

- What Is a Tree?
- What Is a Forest?
- What Is the Forest Root Domain?
- Characteristics of Multiple Domains

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By using both domain trees and forests, you can use both contiguous and noncontiguous naming conventions. Trees and forests are useful for organizations with independent divisions that must each maintain its own Domain Name System (DNS) names.

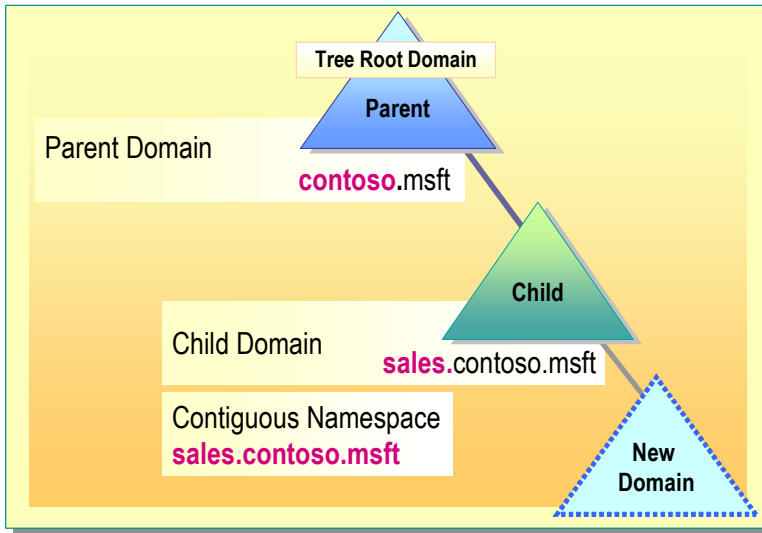
## What Is a Tree?

### Topic Objective

To identify the purpose of a tree in Windows 2000.

### Lead-in

Multiple domains sharing a contiguous namespace form a tree.



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Use the new domain in the slide to test students on the child-parent relationship and the DNS domain name.

### Key Points

A tree is a hierarchical arrangement of Windows 2000 domains that share a contiguous namespace.

Any new domain added to a tree is called a child domain.

The domain above the child domain is called the parent domain.

A contiguous namespace is a hierarchical arrangement of the child and parent domain names separated by a period.

A *tree* is a hierarchical arrangement of Windows 2000 domains that share a *contiguous namespace*. A tree consists of one or more domains. A domain must exist in a tree.

When you add a new domain to a tree, the new domain is called a *child* domain. The name of the domain above the child domain is called a *parent* domain. The name of the child domain is a combination of the child domain name and the parent domain name separated by a period, to form its *DNS name*. This DNS name forms a contiguous namespace hierarchy. The top-level domain in a domain tree is sometimes called the *tree root domain*.

For example, a child domain named sales that has a parent domain named contoso.msft would form a fully qualified DNS domain name of sales.contoso.msft. Any new domain added to sales.contoso.msft becomes its child domain.

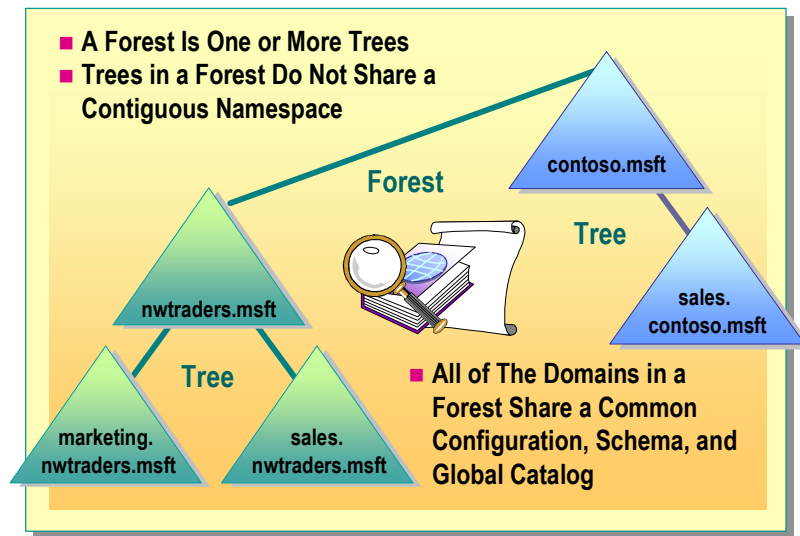
## What Is a Forest?

**Topic Objective**

To identify the purpose of a forest in Windows 2000.

**Lead-in**

Multiple trees having a noncontiguous namespace form a forest.



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A *forest* is a collection of one or more trees. Trees in a forest do not share a contiguous namespace. The domains in a forest share a common configuration, schema, and global catalog.

For example, Contoso, Ltd. creates a separate organization called Northwind Traders. Contoso, Ltd. decides to create a new Active Directory domain name for Northwind Traders, called nwtraders.msft. As shown in the slide, the two organizations do not share a common namespace; however, by adding the new Active Directory domain as a new tree in an existing forest, the two organizations are able to share resources and administrative functions.

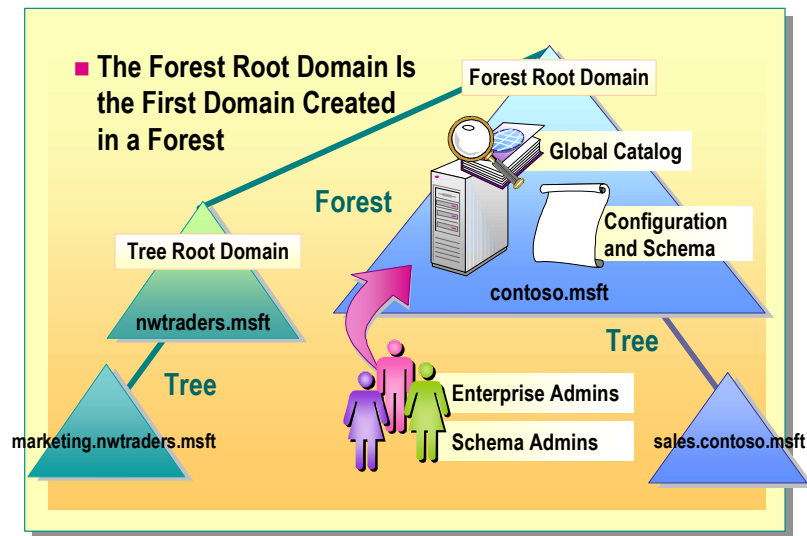
## What Is the Forest Root Domain?

### Topic Objective

To illustrate the purpose of a forest root domain in Windows 2000.

### Lead-in

The first domain created in a forest is the forest root domain.



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### Key Points

A tree root domain is the first domain in any tree, even if it is also the forest root domain.

The two predefined groups, Enterprise Admins and Schema Admins, exist only in the forest root domain of an Active Directory forest.

The *forest root domain* is the first domain created in a forest. The name of the forest root domain is used to refer to a given forest. The top-level domain of each tree, which is the tree root domain, has a trust relationship to the forest root domain. Therefore, the name of the forest root domain must not change.

The first domain controller in the forest root domain is configured to store the global catalog information. The forest root domain also contains the configuration and schema information for the forest.

The forest root domain contains two predefined forest-wide groups, Enterprise Admins and Schema Admins. These groups exist only in the forest root domain of an Active Directory forest. You add users who perform administrative tasks for the entire forest to these groups. When a domain is switched to native mode from mixed mode, these two predefined global groups automatically change to universal groups. The roles of these groups are the same in mixed mode and native mode, only the group scope changes.

The following table describes these groups and the predefined roles they are given when the forest root domain is created.

| Predefined group name | Description                                                                                                                                                                                                                                                                                                                  |
|-----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enterprise Admins     | It is a universal group if the domain is in native mode, a global group if the domain is in mixed mode. The group is authorized to make changes to the entire forest in Active Directory, such as by adding child domains. By default, the only member of the group is the Administrator account for the forest root domain. |
| Schema Admins         | It is a universal group if the domain is in native mode, a global group if the domain is in mixed mode. The group is authorized to make schema changes in Active Directory. By default, the only member of the group is the Administrator account for the forest root domain.                                                |

**Note** The members of the Domain Admins group in the forest root domain can modify the membership of the Enterprise Admins and Schema Admins groups.

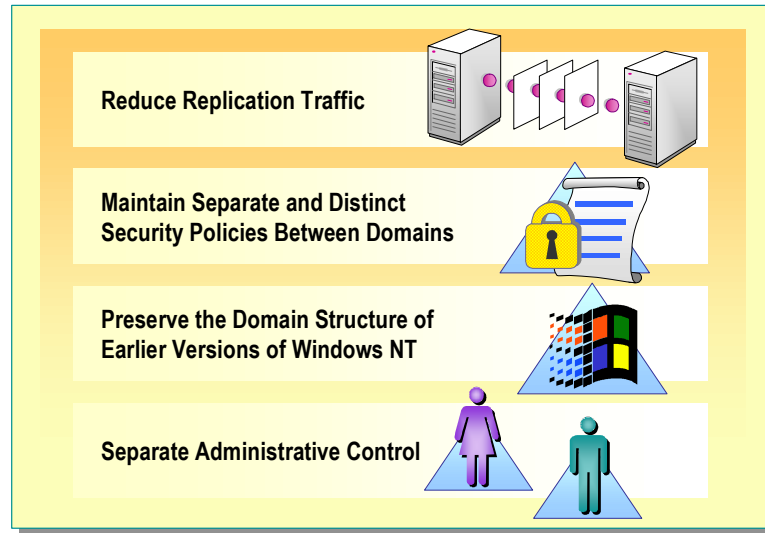
## Characteristics of Multiple Domains

### Topic Objective

To identify the characteristics of multiple domains in Active Directory.

### Lead-in

If you have multiple trees and forests in your organization's Active Directory infrastructure, you can benefit from the functionality provided by multiple domains.



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Consider having multiple domains in your organization because you can use multiple domains in Windows 2000 to:

- **Reduce replication traffic.** Implementing multiple domains, instead of one large single domain, allows you to optimize replication traffic. In multiple domains, only the changes to the global catalog server, configuration information, and schema, are replicated. Not all objects and attributes to all domain controllers in the domain are replicated. For example, if the network uses a slow wide area network (WAN) link, the replication of all objects in the forest uses up unnecessary bandwidth because objects are being replicated to locations where they are rarely used. Creating a separate domain for different locations reduces replication traffic and maintains network performance because replication occurs only in the locations that need the objects.
- **Maintain separate and distinct security settings for different domains.** To be able to apply different domain-level security settings to group of users, you must have multiple domains. For example, you can use a separate domain for administrators and other users if you want to have a more strict password Group Policy, such as a shorter interval of password changes for administrators.
- **Preserve the domain structure of earlier versions of Microsoft Windows NT®.** To avoid or postpone restructuring your existing Windows NT domains, you can upgrade each domain to Windows 2000 while preserving the existing domain structure.
- **Separate administrative control.** The members of the domain administrators group in a domain have complete control over all objects in that domain. If you have a subdivision in your organization that does not allow administrators outside the subdivision control over their objects, place those objects in a separate domain. For example, for legal reasons, it might not be prudent for a subdivision of an organization that works on highly sensitive projects to accept domain supervision from a higher-level Information Technology (IT) group.

## ◆ Creating Trees and Forests

**Topic Objective**

To introduce the topics related to creating trees and forests.

**Lead-in**

You use the Active Directory Installation wizard to create trees and forest.

- Creating a New Child Domain
- Creating a New Tree
- Creating a New Forest

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After you have installed Active Directory and created a single domain, you can use the Active Directory Installation wizard, Dcpromo.exe, to guide you through the process of adding additional domains by creating trees and forests. The information that you must provide when you install Active Directory depends on whether you are creating a child domain in an existing forest or creating a new tree in an existing forest.

## Creating a New Child Domain

### Topic Objective

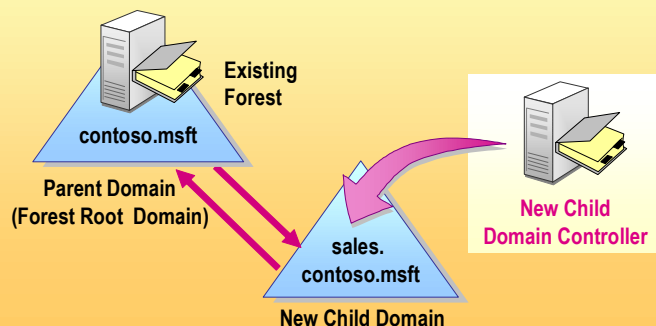
To illustrate how to create a new child domain by using the Active Directory Installation wizard.

### Lead-in

After you establish the root domain, you can create additional domains, called child domains, within the tree.

### The Active Directory Installation Wizard:

- Creates a new domain
- Promotes the computer to a new domain controller
- Establishes a trust relationship with the parent domain



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### Delivery Tip

Demonstrate the steps to create a child domain by using the Active Directory Installation wizard.

After you establish the root domain, you can create additional domains within the tree if your network plan requires multiple domains. You must be a member of the Enterprise Admins group to create a child domain.

Each new domain within the tree will be a child domain of the root domain, or a child domain of another child domain.

For example, you create a domain named sales.contoso.msft, which is a child domain of the root domain, contoso.msft. The next domain that you create within that tree can be a child of constoso.msft or a child of sales.contoso.msft.

To create a child domain, perform the following steps:

1. In the **Run** box, type **dcpromo.exe** and then press ENTER.
2. In the Active Directory Installation wizard, complete the installation by using the information in the following table.

| On this wizard page                | Do this                                                                                                                                           |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Domain Controller Type</b>      | Click <b>Domain controller for a new domain</b> .                                                                                                 |
| <b>Create Tree or Child Domain</b> | Click <b>Create a new child domain in an existing domain tree</b> .                                                                               |
| <b>Network Credentials</b>         | Specify the user name, password, and domain name of a user account in the Enterprise Admins group, which exists in the root domain of the forest. |
| <b>Child Domain Installation</b>   | Specify the DNS name of the parent domain and the name of the new child domain.                                                                   |
| <b>Domain NetBIOS Name</b>         | Specify the NetBIOS name for the new domain.                                                                                                      |
| <b>Database and Log Locations</b>  | Specify locations for the Active Directory database and log files.                                                                                |

*(continued)*

| <b>On this wizard page</b>                                    | <b>Do this</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|---------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Shared System Volume</b>                                   | Specify the location for the shared system volume.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Permissions</b>                                            | Specify whether to set the default permissions on user and group objects to be compatible with computers running earlier versions of Windows, or only with Windows 2000–based servers. Enabling pre-Windows 2000 compatible permissions adds the Everyone group to the Pre-Windows 2000 Compatible Access group. This group has Read access to user and group object attributes that existed in Windows NT 4.0. You should select this option only after considering the impact that weaker permissions have on Active Directory security. |
| <b>Directory Services Restore Mode Administrator Password</b> | Specify a password to use when starting the computer in Directory Services Restore Mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

After you specify the installation information, the Active Directory Installation wizard performs the following tasks:

- Creates a new domain.
- Promotes the computer in the new child domain to a domain controller.
- Establishes trust relationships between the child domain and the parent domain.

## Creating a New Tree

### Topic Objective

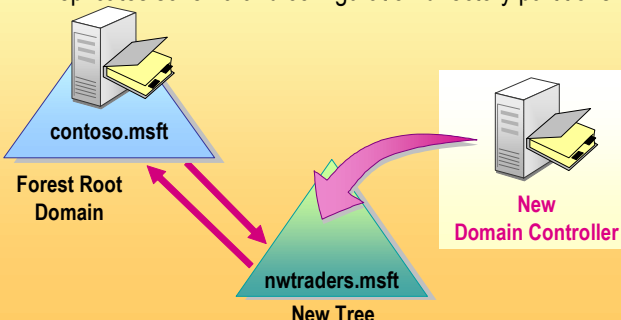
To describe how to create a new tree by using the Active Directory Installation wizard.

### Lead-in

After you establish the root domain, you can add a new tree to the existing forest.

### The Active Directory Installation Wizard:

- Creates the root domain of a new tree
- Promotes the computer to a new domain controller
- Establishes a trust relationship with the forest root domain
- Replicates schema and configuration directory partitions



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### Delivery Tip

Demonstrate the steps to create a new tree by using the Active Directory Installation wizard.

After you establish the root domain, you can add a new tree to the existing forest if your network plan requires multiple trees.

To create a new tree in an existing forest, perform the following steps:

1. In the **Run** box, type **dcpromo.exe** and then press ENTER.
2. In the Active Directory Installation wizard, complete the installation by using the information in the following table.

| On this wizard page         | Do this                                                                                                                                           |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Domain Controller Type      | Click <b>Domain controller for a new domain</b> .                                                                                                 |
| Create Tree or Child Domain | Click <b>Create a new domain tree</b> .                                                                                                           |
| Create or Join Forest       | Click <b>Place this new domain tree in an existing forest</b> .                                                                                   |
| Network Credentials         | Specify the user name, password, and domain name of a user account in the Enterprise Admins group, which exists in the root domain of the forest. |
| New Domain Tree             | Specify the DNS name for the new tree.                                                                                                            |

The remaining options in the Active Directory Installation wizard are identical to the options used for creating the new child domain. After you finish specifying the installation information, the Active Directory Installation wizard performs the following steps:

- Creates the root domain of a new tree.
- Promotes the computer in the new tree to a domain controller.
- Establishes trust relationships to the forest root domain.
- Replicates schema and configuration directory partitions.

## Creating a New Forest

### Topic Objective

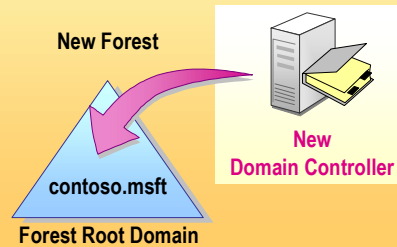
To describe how to create a new forest by using the Active Directory Installation wizard.

### Lead-in

When you create a new forest, the root domains of all domain trees in the forest establish transitive trust relationships with the forest root domain.

### The Active Directory Installation Wizard:

- Creates the root domain of a new forest
- Creates the root domain of a new tree
- Promotes the computer to a new domain controller
- Configures a global catalog server
- Starts with the default schema and configuration directory partitions



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Do not spend much time discussing this topic because students have already created a new forest in Module 3 when they installed Active Directory.

### Delivery Tip

Demonstrate the steps for creating a new forest by using the Active Directory Installation wizard.

When you create a new forest, the root domains of all domain trees in the forest establish transitive trust relationships with the forest root domain. You must be a member of the local administrators group to create a new forest.

To create a new forest, perform the following steps:

1. In the **Run** box, type **dcpromo.exe** and then press ENTER.
2. In the Active Directory Installation wizard, complete the installation by using the information in the following table.

| On this wizard page         | Do this                                            |
|-----------------------------|----------------------------------------------------|
| Domain Controller Type      | Click <b>Domain controller for a new domain</b> .  |
| Create Tree or Child Domain | Click <b>Create a new domain tree</b> .            |
| Create or Join Forest       | Click <b>Create a new forest of domain trees</b> . |

The remaining options in the Active Directory Installation wizard are identical to the options used for creating a new tree.

After you finish specifying the installation information, the Active Directory Installation wizard performs the following steps:

- Creates the root of a new forest.
- Creates the root of a new tree.
- Promotes the computer in the new forest to a domain controller.
- Configures a global catalog server.
- Starts with the default schema and configuration directory partition information.

## ◆ Trust Relationships in Trees and Forests

**Topic Objective**

To introduce the topics related to trust relationships in trees and forests.

**Lead-in**

A relationship is established between multiple domains to enable a domain controller in one domain to authenticate users in another domain.

- Transitive Trusts in Windows 2000
- How Trusts Work
- How Kerberos V5 Works
- Shortcut Trusts in Windows 2000
- Nontransitive Trusts in Windows 2000
- Verifying and Revoking Trusts

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Active Directory provides security across multiple domains through domain trust relationships based on the Kerberos version 5 protocol. A *domain trust* is a relationship established between domains that enables a domain controller in one domain to authenticate users in the other domain. The authentication requests follow a *trust path*.

A series of trust relationships for passing authentication requests between two domains defines a trust path. Trust paths are created automatically when you add domains to a Windows 2000 network. You can also manually create trusts when you want to share resources across domains that are not trusted or when you want to shorten the trust path.

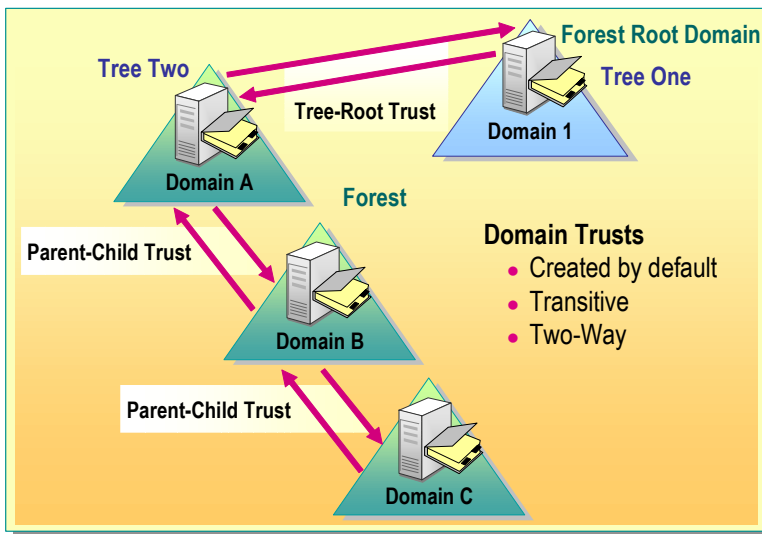
## Transitive Trusts in Windows 2000

### Topic Objective

To illustrate transitive trusts in Windows 2000.

### Lead-in

A trust path is automatically created between the forest root domain and the new domain tree when you create new domains.



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Each time you create a new domain tree in a forest, a trust path is automatically created between the forest root domain and the new domain tree. The trust path allows trust relationships to flow through all domains in the forest.

Authentication requests follow these trust paths, so accounts from any domain in the forest can be authenticated by any other domain in the forest. These trusts are sometimes called *default domain trusts*.

## Types of Domain Trusts

The following are the two types of domain trusts in Windows 2000:

- *Transitive trust.* A transitive trust means that the trust relationship extended to one domain is automatically extended to all other domains that trust that domain. For example, domain A directly trusts domain B. Domain B directly trusts domain C. Because both trusts are transitive, domain A indirectly trusts domain C.
- *Two-way trust.* A two-way trust means that there are two trust paths going in both directions between two domains. For example, domain A trusts domain B in one direction, and domain B trusts domain A in the other direction.

## Types of Transitive Trusts

The advantage of transitive trusts in Windows 2000 domains is that there is complete trust between all domains in an Active Directory forest. Because every child domain has a transitive trust relationship with its parent domain, and every tree root domain has a transitive trust relationship with the forest root domain, all domains in the forest trust each other. The following types of transitive trust relationships can be established with Windows 2000 domains:

- *Tree-root trust.* A tree-root trust relationship is the trust relationship that is established when you add a new tree to a forest. Installing Active Directory automatically creates a trust relationship between the domain that you are creating and the forest root domain that is also the new tree root domain. A tree-root trust relationship has the following restrictions:
  - It can be set up only between the roots of two trees in the same forest.
  - It must be a transitive and two-way trust.
- *Parent-child trust.* A parent-child trust relationship is established when you create a new domain in a tree. Installing Active Directory automatically creates within the namespace hierarchy a trust relationship between the new domain, which is the child domain, and the domain that immediately precedes it, which is the parent domain. The parent-child trust relationship has the following characteristics:
  - It can exist only between two domains in the same tree and namespace.
  - The child domain trusts the parent domain.
  - The parent domain trusts the child domain.
  - The trusts between parent and child domains are transitive.

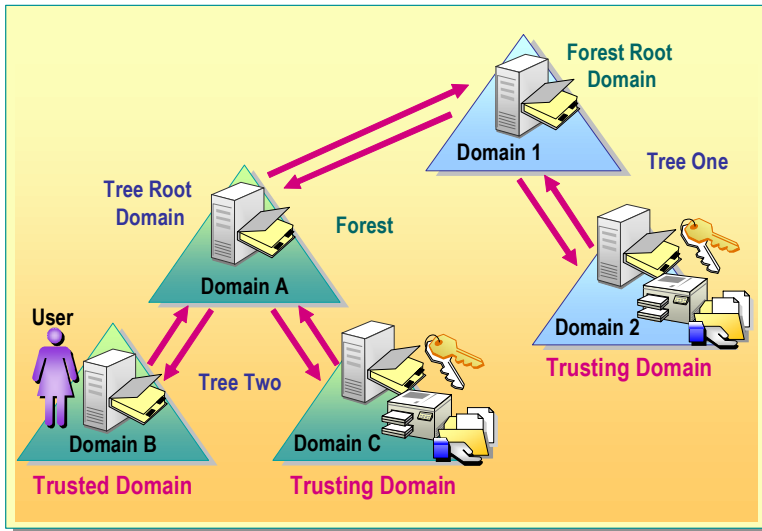
## How Trusts Work

### Topic Objective

To illustrate how trusts work in Windows 2000.

### Lead-in

During user authentication, Kerberos V5 protocol determines whether the trusting domain has a trust relationship with the trusted domain.



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Use the slide for this topic to describe how trusts work. Describe the trust path from domain B to domain C in Tree One to show how trusts work in a single tree.

Then describe the trust path from domain B in Tree One to domain B in Tree Two to show how trusts work in a forest.

### Delivery Tip

Use the Active Directory Domains and Trusts console to show the two-way trust relationship between domains in Tree One and Tree Two.

When a user attempts to gain access to a resource in another domain, the Kerberos V5 protocol must determine whether the *trusting* domain, which is the domain containing the resource to which the user is trying to gain access, has a trust relationship with the *trusted* domain, which is the domain to which the user is logging on. To determine this relationship, the Kerberos V5 security protocol travels the trust path between the domain controller in the trusting domain to the domain controller in the trusted domain.

When a user in the trusted domain attempts to gain access to a resource in another domain, the user's computer first contacts the domain controller in its domain to get authentication to the resource. If the resource is not in the user's domain, the domain controller uses the trust relationship with its parent and refers the user's computer to a domain controller in its parent domain. This attempt for locating a resource continues up the trust hierarchy, possibly to the forest root domain, and down the trust hierarchy until contacting a domain controller in the domain where the resource is located. The path that is taken from domain to domain is the trust path. The path that is taken is the shortest path following the trust hierarchy.

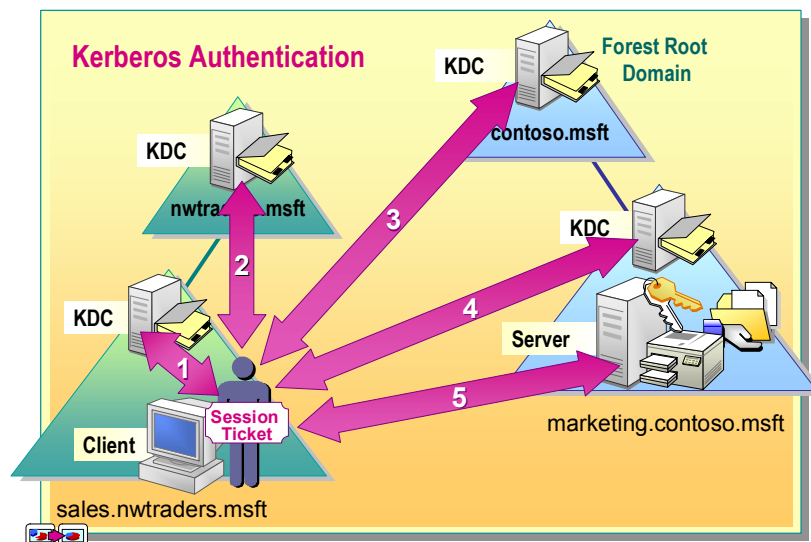
## How Kerberos V5 Works

### Topic Objective

To illustrate how Kerberos V5 authenticates a user to access resources.

### Lead-in

Kerberos V5 verifies both the identity of the user and the integrity of the network services.



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The slide for this topic is animated. Display a new step on the slide as you talk about the example in which the user in sales.nwtraders.msft needs to gain access to resources in marketing.contoso.msft.

The Kerberos V5 protocol is the primary authentication protocol in Windows 2000; it verifies both the identity of the user and the integrity of the network services. The main components of the Kerberos V5 protocol are a client, a server, and a trusted third party to mediate between them. The trusted intermediary in the protocol is known as the *Key Distribution Center* (KDC). In Windows 2000, the domain controller functions as the KDC. The KDC runs on each domain controller as part of Active Directory, which stores all client passwords and other account information.

The Kerberos V5 services are installed on each domain controller, and a Kerberos V5 client is installed on each Windows 2000 workstation and server. A user's initial Kerberos authentication provides the user with a single logon to enterprise resources.

The Kerberos V5 authentication mechanism issues session tickets for accessing network services. These tickets contain encrypted data, including an encrypted key, which confirms the user's identity to the requested service.

When accessing resources across a forest, the client follows the Kerberos V5 protocol trust path. As an example to illustrate the authentication path, consider a tree, contoso.msft, in a forest and its child domain, sales.contoso.msft. The other tree, nwtraders.msft, in the forest consists of the child domain marketing.nwtraders.msft.

Emphasize that for more detailed information on Kerberos, students should see *Windows 2000 Kerberos Authentication* under **Additional Reading** on the Web page on the Student Materials compact disc.

If a user in sales.nwtraders.msft needs to gain access to resources in marketing.contoso.msft. This process assumes that the user has previously authenticated with the network and has a Ticket Granting Ticket (TGT) for the sales.nwtraders.msft domain populated with the user's global and universal group memberships. The following Kerberos V5 authentication process occurs:

1. The user asks for a session ticket for the server in marketing.contoso.msft. The KDC in the sales.nwtraders.msft domain issues a TGT for the nwtraders.msft domain known as a referral ticket.
2. The user presents the KDC in the nwtraders.msft the TGT for that domain and is issued a TGT for the contoso.msft domain.
3. The user presents the KDC in the contoso.msft the TGT for that domain and is issued a TGT for the marketing.contoso.msft domain.
4. The user presents the KDC in the marketing.contoso.msft the TGT for that domain and is issued a ST for the contoso.msft domain. This ST is populated with the domain local group memberships from the marketing.contoso.msft domain.
5. The user presents the server session ticket to the server to gain access to resources on the server in marketing.contoso.msft. The server compares the SIDs include in the session ticket to the ACEs on the requested resource to determine if the user is authorized to access the resource.

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**Important** For more detailed information about the steps in the Kerberos V5 authentication process, see *Windows 2000 Kerberos Authentication* under **Additional Reading** on the Web page on the Student Materials compact disc.

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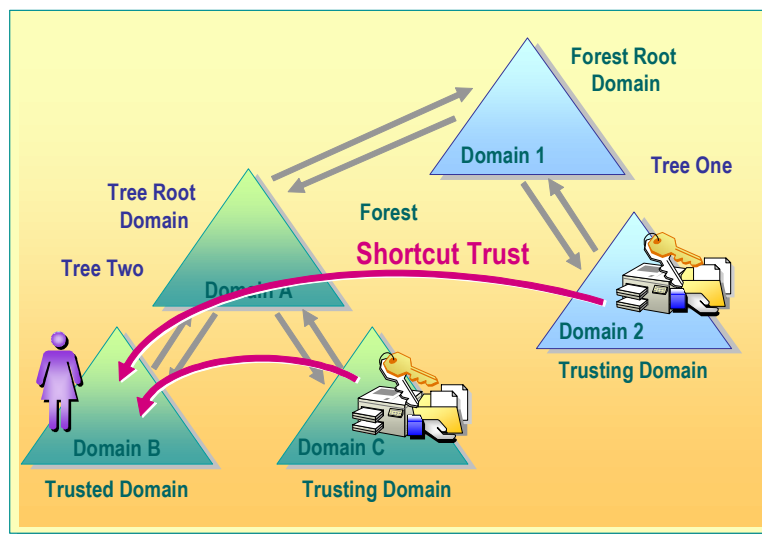
## Shortcut Trusts in Windows 2000

### Topic Objective

To illustrate how shortcut trusts work in Windows 2000.

### Lead-in

You can create shortcut trusts to reduce the trust path by allowing a more direct connection between two domains that otherwise would require the path to travel up the hierarchy.



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Use the slide to describe the shortcut trust path from domain B to domain C in Tree Two to show how shortcut trusts work in a domain tree. Then describe the shortcut trust path from domain B in Tree Two to domain 2 in Tree One to show how they work in a forest.

*Shortcut trusts* are one-way transitive trusts that you can use to optimize performance by shortening the trust path for authentication purposes. You manually create one-way shortcut trusts between Windows 2000 domains from the trusting domain to the trusted domain in the same forest. Even though shortcut trusts are one-way, you can also create a two-way relationship by manually creating two one-way trusts in each direction.

Shortcut trusts reduce the trust path by allowing a more direct connection between two domains that otherwise would require the path to travel up the hierarchy, possibly to the forest root domain, before it travels down to the other domain. The most effective use of shortcut trusts is when there is a number of users frequently accessing resources in another domain in the forest and the number of domains in the trust path that the client needs to connect to is numerous.

To illustrate an example of a shortcut trust in the same tree, assume users in domain B often need to gain access to resources in domain C. You can create a direct link from the trusting domain C to the trusted domain B by using a shortcut trust relationship so that domain A can be bypassed in the trust path.

To illustrate an example of a shortcut trust between two trees, assume users in domain B often need to gain access to resources in domain 2. You can create a direct link from the trusting domain 2 to the trusted domain B through a shortcut trust relationship so that data does not have to travel up through the forest root from one domain tree through the other.

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**Note** For more information about how to create and manage shortcut trusts by using Active Directory Domains and Trusts, see the Windows 2000 Help.

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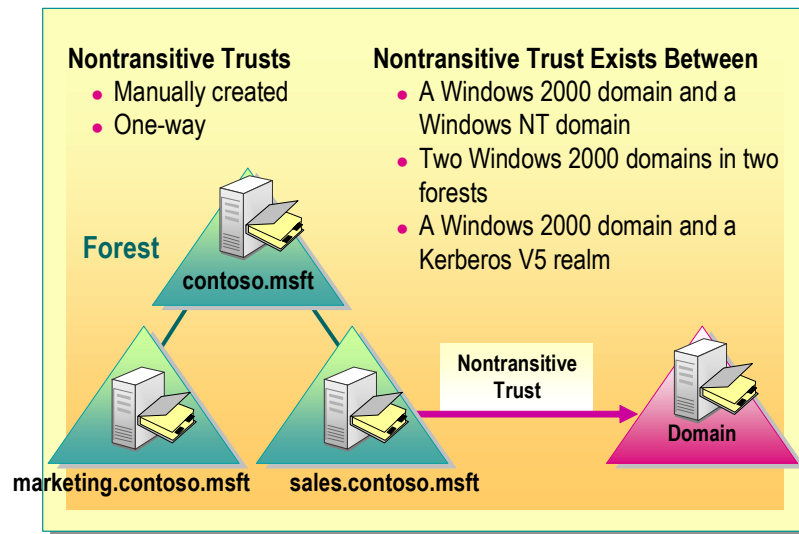
## Nontransitive Trusts in Windows 2000

### Topic Objective

To illustrate the types of nontransitive trusts in Windows 2000.

### Lead-in

You can manually create a nontransitive trust relationship between Windows 2000 domains when a transitive trust relationship is not automatically provided.



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### Delivery Tip

Use the slide to support the student notes.

### Key Points

Nontransitive trusts must be manually created.

Nontransitive trusts are one-way by default.

You can manually create two-way nontransitive trusts.

A *nontransitive trust relationship* can be created between Windows 2000 domains if a transitive trust relationship is not automatically provided.

## What Is a Nontransitive Trust?

You must explicitly create a nontransitive trust. A nontransitive trust is one-way. To create a two-way nontransitive trust, you can manually create two one-way trusts in each direction.

Nontransitive trusts are the trust relationships that are possible between only the following:

- A Windows 2000 domain and a Windows NT domain. If one of these domains is an account domain and the other is a resource domain, the trust relationship is usually created as a one-way trust relationship.
- A Windows 2000 domain in one forest and a Windows 2000 domain in another forest. The relationship between these two domains is often called an *external trust*.
- A Windows 2000 domain and an Kerberos V5 protocol security realm.

**Note** A Kerberos V5 realm is a security boundary similar to a Windows 2000 domain.

## Creating a Nontransitive Trust

To create a nontransitive trust, you must know the domain names to be included in the relationship and have a user account with permission to create trusts in each domain. Each trust is assigned a password that the administrators of both domains in the relationship must know.

To create a nontransitive trust, perform the following steps:

1. In Active Directory Domains and Trusts, in the console tree, right-click the domain that you want to administer, and then click **Properties**.
2. On the **Trusts** tab, depending on which domain you are on, click **either Domains trusted by this domain** or **Domains that trust this domain**, and then click **Add**.
3. Depending on the type of domain, perform one of the following tasks:
  - If the domain to be added is a Windows 2000 domain, type the full DNS name of the domain.
  - If the domain is running an earlier version of Windows, type the domain name.
4. Type the password for this trust, and then confirm the password.
5. Repeat steps 1 through 4 on the domain that forms the other part of the nontransitive trust relationship.

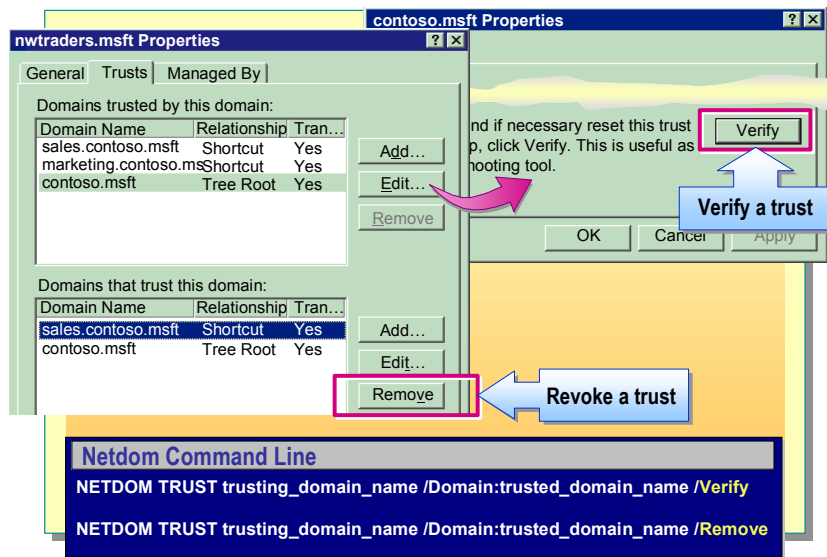
## Verifying and Revoking Trusts

### Topic Objective

To illustrate how to verify and revoke trusts.

### Lead-in

Sometimes you will need to verify and revoke the nontransitive trust paths that you have created.



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### Delivery Tip

Demonstrate the steps to verify and revoke trusts.

If you create nontransitive trusts, you will sometimes need to verify and delete, or revoke, the trust paths you created. You verify a trust to make sure it is working correctly and can validate authentication requests from other domains. You revoke a trust to prevent that authentication path from being used during authentication. You can use Active Directory Domains and Trusts or the **netdom** command to verify and revoke trust paths.

## Verifying Trusts

To verify a trust by using Active Directory Domains and Trusts, perform the following steps:

1. In Active Directory Domains and Trusts, in the console tree, right-click one of the domains involved in the trust that you want to verify, and then click **Properties**.
2. On the **Trusts** tab, depending on which domain you are in, you use **Domains trusted by this domain** or **Domains that trust this domain** to select the trust to be verified.
3. Click the trust, and then click **Edit**.
4. Click **Verify/Reset**.
5. Repeat steps 1 through 4 to verify the trust for the other domain involved in the relationship.

## Revoking Trusts

To revoke a trust by using Active Directory Domains and Trusts, perform the following steps:

1. In Active Directory Domains and Trusts, in the console tree, right-click one of the domains involved in the trust that you want to revoke, and then click **Properties**.
2. On the **Trusts** tab, depending on which domain you are in, use **Domains trusted by this domain** or **Domains that trust this domain** to select the trust to be revoked.
3. Select the trust, and then click **Remove**.
4. Repeat steps 1 through 3 to revoke the trust for the other domain involved in the relationship.

## Verifying and Revoking Trusts Using Netdom

**Netdom** is a command-line utility that you can use to manage Windows 2000 domains and trust relationships from a command prompt window.

Use **netdom** to perform the following tasks:

- View all trust relationships.
- Enumerate direct trust relationships.
- Enumerate all (direct and indirect) trust relationships.

To verify a trust by using **netdom**, perform the following steps:

1. Open a command prompt window.
2. Type  
**NETDOM TRUST trusting\_domain\_name**  
**/Domain:trusted\_domain\_name /Verify** and press ENTER.

To revoke a trust using **netdom**, perform the following steps:

1. Open a command prompt window.
2. Type  
**NETDOM TRUST trusting\_domain\_name**  
**/Domain:trusted\_domain\_name /Remove** and press ENTER.

# Lab A: Creating Domain Trees and Establishing Trusts

## Topic Objective

To introduce the lab.

## Lead-in

In this lab, you will create child domains in an existing forest, remove an existing forest, and then examine and verify trusts between domains.



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Explain the lab objectives.

If you want to save time, you can start exercise 1 and lecture while the Active Directory Installation wizard removes the existing forest.

## Objectives

After completing this lab, you will be able to:

- Create child domains in an existing forest.
- Remove an existing forest.
- Examine and verify trusts between domains.

## Prerequisites

Before working on this lab, you must have knowledge and experience installing and removing Active Directory.

## Lab Setup

To complete this lab, you need the Windows 2000 Advanced Server compact disc for the installation of the support tools during the lab.

## 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.

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**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.

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**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.

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## Student Computer IP Address, Domain, and FQDN Information

During this lab, you will be asked for your Internet Protocol (IP) address, domain, and fully qualified domain name (FQDN). Use this information from the following table to determine what to enter for these values. Your instructor will assign you a student number and provide the number to use in place of the *x* in the IP address.

| Student number | IP address   | Domain (domain) | FQDN                                |
|----------------|--------------|-----------------|-------------------------------------|
| 1              | 192.168.x.1  | namerica1       | vancouver.namerica1.nwtraders.msft  |
| 2              | 192.168.x.2  | namerica1       | denver.namerica1.nwtraders.msft     |
| 3              | 192.168.x.3  | spacific1       | perth.spacific1.nwtraders.msft      |
| 4              | 192.168.x.4  | spacific1       | brisbane.spacific1.nwtraders.msft   |
| 5              | 192.168.x.5  | europa1         | lisbon.europa1.nwtraders.msft       |
| 6              | 192.168.x.6  | europa1         | bonn.europa1.nwtraders.msft         |
| 7              | 192.168.x.7  | samerica1       | lima.samerica1.nwtraders.msft       |
| 8              | 192.168.x.8  | samerica1       | santiago.samerica1.nwtraders.msft   |
| 9              | 192.168.x.9  | asia1           | bangalore.asia1.nwtraders.msft      |
| 10             | 192.168.x.10 | asia1           | singapore.asia1.nwtraders.msft      |
| 11             | 192.168.x.11 | africa1         | casablanca.africa1.nwtraders.msft   |
| 12             | 192.168.x.12 | africa1         | tunis.africa1.nwtraders.msft        |
| 13             | 192.168.x.13 | namerica2       | acapulco.namerica2.nwtraders.msft   |
| 14             | 192.168.x.14 | namerica2       | miami.namerica2.nwtraders.msft      |
| 15             | 192.168.x.15 | spacific2       | auckland.spacific2.nwtraders.msft   |
| 16             | 192.168.x.16 | spacific2       | suva.spacific2.nwtraders.msft       |
| 17             | 192.168.x.17 | europa2         | stockholm.europa2.nwtraders.msft    |
| 18             | 192.168.x.18 | europa2         | moscow.europa2.nwtraders.msft       |
| 19             | 192.168.x.19 | samerica2       | caracas.samerica2.nwtraders.msft    |
| 20             | 192.168.x.20 | samerica2       | montevideo.samerica2.nwtraders.msft |
| 21             | 192.168.x.21 | asia2           | manila.asia2.nwtraders.msft         |
| 22             | 192.168.x.22 | asia2           | tokyo.asia2.nwtraders.msft          |
| 23             | 192.168.x.23 | africa2         | khartoum.africa2.nwtraders.msft     |
| 24             | 192.168.x.24 | africa2         | nairobi.africa2.nwtraders.msft      |

**Estimated time to complete this lab: 60 minutes**

## Exercise 1

### Removing an Existing Forest

#### Scenario

After testing the features in Active Directory and the computer hardware, you will create the Northwind Traders forest. Before creating a new domain, you must remove the existing test forest environment and prepare your network settings for the new domain.

#### Goal

In this exercise, you will use the Active Directory Installation wizard to remove your existing domain and forest so that you can become a domain controller for a child domain. You will configure your network settings in preparation for the new domain.

| Tasks                                                                            | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Remove your existing domain and forest. When prompted, restart your computer. | <ol style="list-style-type: none"> <li>Log on as Administrator in your domain with a password of <b>password</b>.</li> <li>Run <b>dcpromo</b> to start the Active Directory Installation wizard.</li> <li>On the <b>Welcome to the Active Directory Installation Wizard</b> page, click <b>Next</b> to continue, and then click <b>OK</b> to close the message indicating that this domain controller is also a global catalog server.</li> <li>On the <b>Remove Active Directory</b> page, select the <b>This server is the last domain controller in the domain</b> check box, and then click <b>Next</b>.</li> <li>On the <b>Network Credentials</b> page, in the <b>User name</b> box, type <b>Administrator</b>.</li> <li>In the <b>Password</b> box, type <b>password</b> and then click <b>Next</b>.</li> <li>On the <b>Administrator Password</b> page, in the <b>Password</b> and <b>Confirm password</b> boxes, type <b>password</b> and then click <b>Next</b>.</li> <li>On the <b>Summary</b> page, review the summary information, and then click <b>Next</b>.</li> </ol> <p> <i>The wizard takes several minutes to complete the removal of Active Directory from this computer.</i></p> <ol style="list-style-type: none"> <li>On the <b>Completing the Active Directory Installation Wizard</b> page, click <b>Finish</b>, and then click <b>Restart Now</b> to restart your computer.</li> </ol> |
| 2. Remove the DNS subcomponent of Networking Services.                           | <ol style="list-style-type: none"> <li>Log on as Administrator with a password of <b>password</b>.</li> <li>On the desktop, right-click <b>My Network Places</b>, and then click <b>Properties</b>.</li> <li>In the Network and Dial-up Connections window, on the <b>Advanced</b> menu, click <b>Optional Networking Components</b>.</li> <li>On the <b>Windows Components</b> page, under <b>Components</b>, clear the <b>Networking Services</b> check box, and then click <b>Next</b> to complete the removal of the DNS service.</li> </ol> <p> <i>The wizard finishes removing the DNS service.</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Tasks                                                                                                                                                                                                                                   | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>3. Configure the Internet Protocol (TCP/IP) properties of your Local Area Connection to use the instructor computer, London 192.168.x.200 (where <i>x</i> is your assigned classroom network ID), for your preferred DNS server.</p> | <ol style="list-style-type: none"> <li>In the Network and Dial-up Connections window, right-click <b>Local Area Connection</b>, and then click <b>Properties</b>.</li> <li>Click <b>Internet Protocol (TCP/IP)</b>, and then click <b>Properties</b>.</li> <li>In the <b>Preferred DNS Server</b> box, type the IP address of London, which is <b>192.168.x.200</b> (where <i>x</i> is your assigned classroom network ID) and then click <b>OK</b>.</li> <li>In the <b>Local Area Connections Properties</b> dialog box, click <b>OK</b>, and then close the Network and Dial-up Connections window.</li> </ol>                                                                                                                                                                                                                                                                        |
| <p>4. Configure the DNS suffix for your computer. When prompted, restart your computer. The primary DNS suffix is <i>domain.nwtraders.msft</i> (where <i>domain</i> is your assigned domain name).</p>                                  | <ol style="list-style-type: none"> <li>On the desktop, right-click <b>My Computer</b>, and then click <b>Properties</b>.</li> <li>In the <b>System Properties</b> dialog box, on the <b>Network Identification</b> tab, click <b>Properties</b>.</li> <li>In the <b>Identification Changes</b> dialog box, click <b>More</b>.</li> <li>In the <b>DNS Suffix and NetBIOS Computer Name</b> dialog box, in the <b>Primary DNS suffix of this computer</b> box, type <i>domain.nwtraders.msft</i> (where <i>domain</i> is your assigned domain name) and then click <b>OK</b>.</li> <li>In the <b>Identification Changes</b> dialog box, click <b>OK</b>, and then click <b>OK</b> again to restart the computer for the changes to take effect.</li> <li>In the <b>System Properties</b> dialog box, click <b>OK</b>, and then click <b>Yes</b> to restart your computer.</li> </ol>      |
| <p>5. Verify the proper configuration of Host Name, Primary DNS Suffix, and DNS servers according to the configuration table located in the Lab Setup section of this lab.</p>                                                          | <ol style="list-style-type: none"> <li>Log on as Administrator with a password of <b>password</b>.</li> <li>Open a command prompt window.</li> <li>At the command prompt, type <b>ipconfig /all</b> and then press ENTER to view your computer's TCP/IP configuration.</li> <li>Verify that the value of <b>Host Name</b> is your host name. Ensure that this value matches the first label of your FQDN entry, which is listed in the table in the Lab Setup section of this lab.</li> <li>Verify that the value of <b>Primary DNS Suffix</b> is the full domain name of your computer. Ensure that this value matches the last three labels of your FQDN entry listed, which is in the table in the Lab Setup section of this lab.</li> <li>Verify that the value of <b>DNS Servers</b> matches London's IP address: <b>192.168.x.200</b></li> <li>Close all open windows.</li> </ol> |

## Exercise 2

### Creating a Child Domain

#### Scenario

Northwind Traders has designed their forest structure, which consists of a single domain tree with the root DNS name of nwtraders.msft. The corporate office is overseeing the rollout of the domain tree, and has already created the forest root domain nwtraders.msft. You must create the child domain for your region.

#### Goal

In this exercise, you will run the Active Directory Installation wizard to create the child domain for your region.

| Tasks                                                                                                                                                                                                                                                                                                                          | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Important:</b> Perform this entire exercise only on the computer with the lower student number of the pair that is in the same child domain.                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <ol style="list-style-type: none"><li>1. Start the Active Directory Installation wizard to create:<ul style="list-style-type: none"><li>• A new domain controller for a new domain.</li><li>• An existing domain tree.</li><li>• For network credentials, use Administrator, password, and nwtraders.msft.</li></ul></li></ol> | <ol style="list-style-type: none"><li>a. Run <b>depromo</b> to start the Active Directory Installation wizard.</li><li>b. On the <b>Welcome to the Active Directory Installation Wizard</b> page, click <b>Next</b> to continue.</li><li>c. On the <b>Domain Controller Type</b> page, ensure that <b>Domain controller for a new domain</b> is selected, and then click <b>Next</b>.</li><li>d. On the <b>Create Tree or Child Domain</b> page, click <b>Create a new child domain in an existing domain tree</b>, and then click <b>Next</b>.</li><li>e. On the <b>Network Credentials</b> page, type <b>Administrator</b> in the <b>User name</b> box, type <b>password</b> in the <b>Password</b> box, type <b>nwtraders.msft</b> in the <b>Domain</b> box, and then click <b>Next</b>.</li></ol> |

| Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p>2. Complete the Active Directory installation process, providing the following information:</p> <ul style="list-style-type: none"> <li>• Full DNS name of domain.nwtraders.msft.</li> <li>• NetBIOS domain name of domain in uppercase characters.</li> <li>• Default locations for the database, log files, and shared system volume.</li> <li>• Permission compatible only with servers running Windows 2000.</li> <li>• A password of password for the Directory Services Restore Mode Administrator password.</li> <li>• Restart your computer when prompted.</li> </ul> | <ul style="list-style-type: none"> <li>a. On the Child Domain Installation page, click Browse.</li> <li>b. In the <b>Browse for Domain</b> dialog box, click <b>nwtraders.msft</b>, and then click <b>OK</b>.</li> <li>c. On the <b>Child Domain Installation</b> page, in the <b>Child domain</b> box, type <i>domain</i> and then click <b>Next</b>.</li> <li>d. On the <b>NetBIOS Domain Name</b> page, in the <b>Domain NetBIOS name</b> box, ensure that the value is the domain name, and then click <b>Next</b>.</li> <li>e. On the <b>Database and Log Locations</b> page, click <b>Next</b> to accept the default folder locations for both database files and log files.</li> <li>f. On the <b>Shared System Volume</b> page, click <b>Next</b> to accept the default folder location.</li> <li>g. On the <b>Permissions</b> page, click <b>Permissions compatible only with Windows 2000 servers</b>, and then click <b>Next</b>.</li> <li>h. On the <b>Directory Services Restore Mode Administrator Password</b> page, in the <b>Password</b> and <b>Confirm password</b> boxes, type <b>password</b> and then click <b>Next</b>.</li> <li>i. On the <b>Summary</b> page, review the summary information, and then click <b>Next</b>.<br/>  <i>The wizard takes several minutes to complete the installation of Active Directory on this computer.</i> </li> <li>j. On the Completing the Active Directory Installation Wizard page, click <b>Finish</b>, and then click <b>Restart Now</b> to restart your computer.</li> </ul> |
| <p>3. Log on as Administrator in your domain after the domain controller restarts.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>▪ Log on as Administrator in your domain with a password of <b>password</b>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Exercise 3

### Creating a Replica in a Child Domain

#### Scenario

Northwind Traders has designed their forest structure, which consists of a single domain tree with the root DNS name of `nwtraders.msft`. The corporate office is overseeing the rollout of the domain tree, and has already created all of the domains in the forest. Now the corporate office is strictly enforcing the guidelines that all domains should have at least two domain controllers to provide fault tolerance in case of a failure.

#### Goal

In this exercise, you will run the Active Directory Installation wizard to create a replica for the child domain of your region.

| Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                            | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Important:</b> Perform this entire exercise only on the computer with the higher student number of the pair that is in the same child domain, and only after exercise 2 is complete.                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>1.</b> Start the Active Directory Installation wizard to create: <ul style="list-style-type: none"> <li>An additional domain controller for an existing domain.</li> <li>For network credentials, use Administrator, <b>password</b>, and <code>domain.nwtraders.msft</code>.</li> </ul>                                                                                                                                                      | <ol style="list-style-type: none"> <li>Run <b>dcpromo</b> to start the Active Directory Installation wizard.</li> <li>On the <b>Welcome to the Active Directory Installation Wizard</b> page, click <b>Next</b> to continue.</li> <li>On the <b>Domain Controller Type</b> page, click <b>Additional domain controller for an existing domain</b>, and then click <b>Next</b>.</li> <li>On the <b>Network Credentials</b> page, type <b>Administrator</b> in the <b>User name</b> box, type <b>password</b> in the <b>Password</b> box, type <code>domain.nwtraders.msft</code> in the <b>Domain</b> box, and then click <b>Next</b>.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>2.</b> Complete the Active Directory installation process, providing the following information: <ul style="list-style-type: none"> <li>Full DNS name of <code>domain.nwtraders.msft</code>.</li> <li>Default locations for the database, log files, and shared system volume.</li> <li>A password of <b>password</b> for the Directory Services Restore Mode Administrator password.</li> <li>Restart your computer when prompted.</li> </ul> | <ol style="list-style-type: none"> <li>On the Additional Domain Controller page, click <b>Browse</b>.</li> <li>In the <b>Browse for Domain</b> dialog box, expand <code>nwtraders.msft</code>, click <code>domain.nwtraders.msft</code>, and then click <b>OK</b>.</li> <li>On the <b>Additional Domain Controller</b> page, click <b>Next</b>.</li> <li>On the <b>Database and Log Locations</b> page, click <b>Next</b> to accept the default folder locations for both database files and log files.</li> <li>On the <b>Shared System Volume</b> page, click <b>Next</b> to accept the default folder location.</li> <li>On the <b>Directory Services Restore Mode Administrator Password</b> page, in the <b>Password</b> and <b>Confirm password</b> boxes, type <b>password</b> and then click <b>Next</b>.</li> <li>On the <b>Summary</b> page, review the summary information, and then click <b>Next</b>.<br/>  <i>The wizard takes several minutes to complete the installation of Active Directory on this computer.</i> </li> <li>On the <b>Completing the Active Directory Installation Wizard</b> page, click <b>Finish</b>, and then click <b>Restart Now</b> to close the message asking to reboot your computer now.</li> </ol> |
| <b>3.</b> Log on as Administrator in your child domain after the domain controller restarts.                                                                                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Log on as Administrator in your child domain with a password of <b>password</b>.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## Exercise 4

### Examining Trusts in a Forest

#### Scenario

Northwind Traders corporate administrators want to ensure that each region's domain in the nwtraders.msft domain tree is working correctly before moving forward with the second phase of their deployment plan. You must verify that the parent-child trusts between your region's domain and nwtraders.msft are working correctly.

#### Goal

In this exercise, you will verify the operation of the trusts between your region's domain and nwtraders.msft. This verification is necessary for the corporate office to determine that the nwtraders.msft domain tree that has just been created is functional and stable. You will also use the Netdom.exe support tool to verify the parent-child trust relationship.

| Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Test the trust between your child domain and nwtraders.msft, by using the Active Directory Domains and Trusts console.                                                                                                                                                                                                                                                                                                                                | <ol style="list-style-type: none"> <li>Open Active Directory Domains and Trusts from the <b>Administrative Tools</b> menu, expand <b>nwtraders.msft</b>, and then click <i>domain.nwtraders.msft</i>.</li> <li>Right-click <i>domain.nwtraders.msft</i>, and then click <b>Properties</b>.</li> <li>In the <i>domain.nwtraders.msft Properties</i> dialog box, click the <b>Trusts</b> tab.</li> </ol>                                                                                                                                                                               |
| <p> How many parent-child trust relationships does your child domain have?</p> <p><b>There are two parent-child trust relationships (nwtraders.msft) for your child domain. One trust relationship enables nwtraders.msft to trust your child domain. The other trust relationship enables your child domain to trust nwtraders.msft.</b></p> <hr/> <hr/> <hr/> <hr/> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1. (continued)                                                                                                                                                                                                                                                                                                                                                                                                                                           | <ol style="list-style-type: none"> <li>In the <b>Domains trusted by this domain</b> list, click <b>nwtraders.msft</b>, and then click <b>Edit</b> to view the properties of this trust link.</li> <li>In the <b>nwtraders.msft Properties</b> dialog box, click <b>Verify</b>.</li> <li>In the <b>Active Directory</b> dialog box, in the <b>User name</b> box, type <b>Administrator</b><br/>In the <b>Password</b> box, type <b>password</b></li> <li>Click <b>OK</b>, and then click <b>OK</b> again to close the message indicating that the trust has been verified.</li> </ol> |

| Tasks                                                                                                                         | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. <i>(continued)</i>                                                                                                         | <ul style="list-style-type: none"> <li>h. If necessary, click <b>OK</b> to close the message indicating that a secure channel could not be established because there are currently are no logon servers available.</li> <li>i. Click <b>OK</b> to close the <b>nwtraders.msft Properties</b> dialog box, click <b>OK</b> to close the <b>domain.nwtraders.msft Properties</b> dialog box, and then close Active Directory Domains and Trusts.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 2. Install the Windows 2000 Support Tools, if they are not already installed, by using all of the default options.            | <ul style="list-style-type: none"> <li>a. On your Windows 2000 Advanced Server compact disc, in the Support/Tools folder, run <b>Setup</b> to start the Windows 2000 Support Tools Setup wizard.</li> <li>b. On the <b>Welcome to the Windows 2000 Support Tools Setup Wizard</b> page, click <b>Next</b> to continue.</li> <li>c. On the <b>User Information</b> page, type your name in the <b>Name</b> box, type your organization in the <b>Organization</b> box, and then click <b>Next</b>.</li> <li>d. On the <b>Select An Installation Type</b> page, ensure that <b>Typical</b> is selected, and then click <b>Next</b>.</li> <li>e. On the <b>Begin Installation</b> page, click <b>Next</b> to begin the installation of the Windows 2000 Support Tools.<br/><br/>  <i>The wizard takes a short time to complete the installation.</i> </li> <li>f. On the <b>Completing the Windows 2000 Support Tools Setup Wizard</b> page, click <b>Finish</b>.</li> </ul> |
| 3. Verify the trust relationship between your child domain and nwtraders.msft by using the Netdom.exe tool, and then log off. | <ul style="list-style-type: none"> <li>a. Open a command prompt window.</li> <li>b. At the command prompt, type <b>netdom help trust</b> and then press ENTER to view the available options.</li> <li>c. At the command prompt, type <b>netdom trust domain /Domain:nwtraders /UserD:Administrator /PasswordD:password /UserO:Administrator /PasswordO:password /verify</b> and then press ENTER to determine the state of the trust relationship.</li> <li>d. Close all open windows, and then log off.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## ◆ The Global Catalog

**Topic Objective**

To introduce the topics related to the global catalog.

**Lead-in**

The global catalog stores information about objects in all domains.

- The Global Catalog and the Logon Process
- Creating a Global Catalog Server

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Review the concepts of the global catalog and the global catalog server. Tell students that the attributes stored in the global catalog are those that are most frequently used in queries, such as a user's first name, last name, and logon name. Refer students to Module 1 if they are not familiar with the concept of a global catalog.

The *global catalog* contains the information that is necessary to determine the location of any object in Active Directory. The global catalog enables a user to log on to the network by providing universal group membership information and user principal name domain mapping information to a domain controller. Also, the global catalog server enables a user to find Active Directory information in the entire forest, regardless of the location of the information.

The first domain controller that you create in Active Directory is a global catalog server. You can configure additional domain controllers to be global catalog servers to balance the traffic from logon authentication and queries.

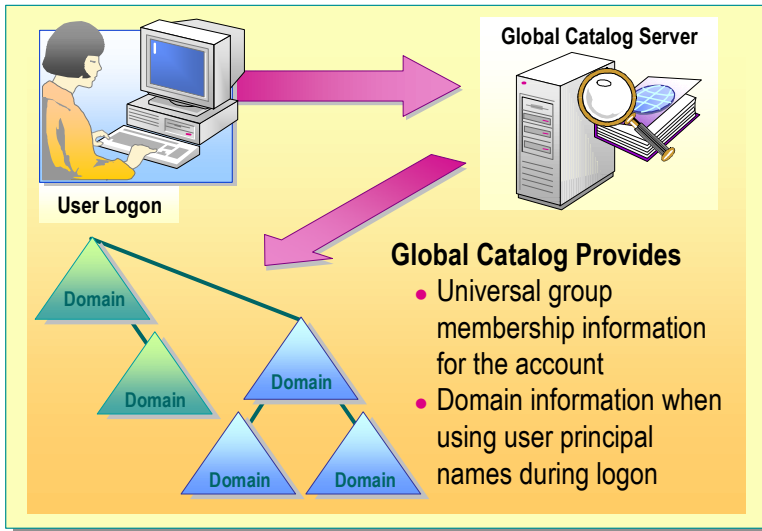
## The Global Catalog and the Logon Process

### Topic Objective

To illustrate the global catalog in relation to domain logon requests.

### Lead-in

When you log on to a domain in native mode, the global catalog server provides universal group membership information for your account to the domain controller that processes the user logon information.



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Remind the students that security-type universal groups are available only in native mode.

### Key Points

Windows 2000 uses cached credentials to log on the user if the global catalog server is not available and the user has logged on to the domain previously.

A global catalog server is also required when a user logs on with a user principal name.

When you log on to a domain in native mode, the global catalog server provides universal group membership information for your account to the domain controller that processes the user logon information, and authenticates the user principal name.

### Global Catalog and Universal Group Membership

When a user logs on to a domain in native mode, the global catalog server provides universal group membership information for the account to the domain controller that processes the user logon information. If a global catalog server is not available when a user initiates the network logon process and the user has logged on to the domain previously, Windows 2000 uses cached credentials to log on the user. If the user has not logged on to the domain previously, the user is able to log on to only the local computer.

During the logon process, an access token, which contains the groups to which the user belongs, is associated with the user. Because universal group membership is centrally stored in the global catalog, global catalog servers are used to identify the universal groups of which a user is a member.

## Global Catalog and Authentication

A global catalog server is also required when a user logs on with a user principal name and the authenticating domain controller does not have direct knowledge of the account.

For example, Suzan Fine's account is in contoso.msft. She uses a computer that is in the domain sales.contoso.msft. She logs on as suzanf@contoso.msft. When the domain controller in sales.contoso.msft is unable to authenticate the user account for Suzan Fine, it must contact a global catalog server to complete the logon process.

Clarify to students that although a global catalog server is not queried during the logon process in a single domain network, a global catalog server is required for other types of directory service queries.

In a single domain network, a global catalog server is not required for the logon process because every domain controller contains the information that is needed to authenticate a user. Although a global catalog server is not queried during the logon process in a single domain network, a global catalog server is required for other types of directory service queries.

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**Note** When the user is a member of the Domain Admins group, the user can log on to the network even when the global catalog server is not available.

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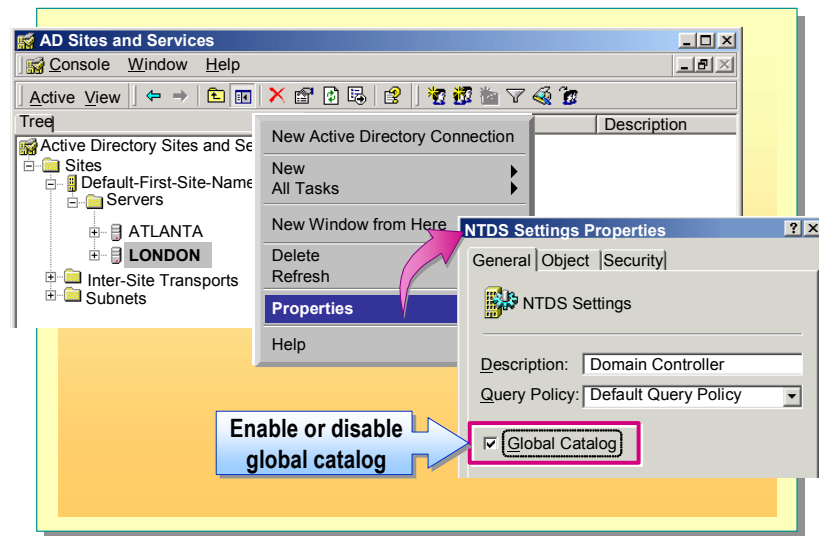
## Creating a Global Catalog Server

### Topic Objective

To illustrate how to enable or disable a global catalog server.

### Lead-in

Although the first domain controller in a forest is automatically designated as a global catalog server, you can authorize any domain controller to be a global catalog server.



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### Delivery Tip

Demonstrate enabling and disabling a global catalog server.

The first domain controller in a forest is automatically designated as a global catalog server. You can authorize any domain controller to be a global catalog server; however, one global catalog server is typically useful in each site.

To enable or disable a global catalog server, perform the following steps:

1. In Active Directory Sites and Services, in the console tree, expand the domain controller that will host or is hosting the global catalog.
2. Right-click **NTDS Settings**, and then click **Properties**.
3. Select or clear the **Global Catalog** check box.

## ◆ Strategies for Using Groups in Trees and Forests

**Topic Objective**

To introduce the topics related to strategies for using groups in trees and forests.

**Lead-in**

You use security groups in Windows 2000 to ensure consistent security permissions across all members of a group.

- **Universal Groups and Replication**
- **Nesting Strategy Using Universal Groups**
- **Class Discussion: Using Groups in Trees and Forests**

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Windows 2000 allows you to organize users and other domain objects into security groups to assign the same security permissions. Assigning security permissions to a group instead of to individual users ensures consistent security permissions across all members of a group. By using security groups to assign permissions, you can ensure that the discretionary access control lists (DACLS) on resources do not change often and are easy to manage and audit.

You can add or remove users from the appropriate security groups as needed. When you create a new user, you can add the user to an existing security group to completely define the user's permissions and access limits. You can add groups to other groups. Changing permissions for the group affects all users and groups within the group.

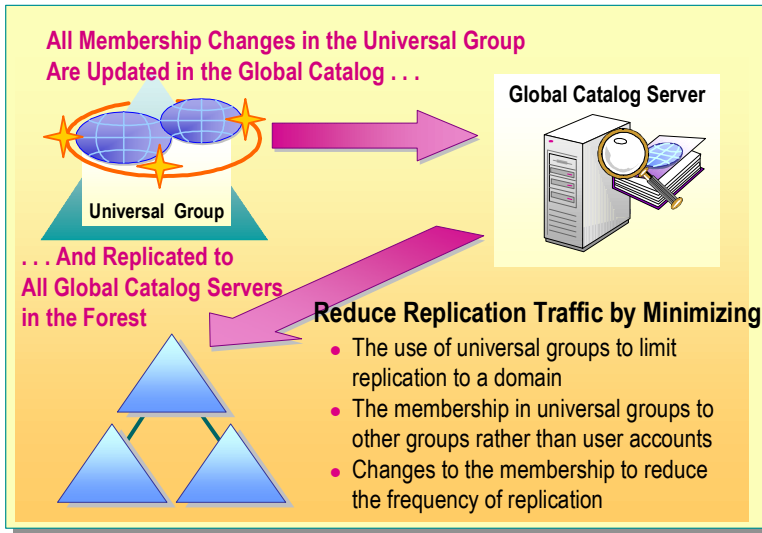
## Universal Groups and Replication

### Topic Objective

To illustrate how to reduce replication traffic by minimizing the use of universal groups.

### Lead-in

Changes to the data stored in the global catalog are replicated to every global catalog in a forest, which increases the replication traffic.



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### Key Points

Reduce replication traffic by minimizing the use of universal groups to contain the replication to a single domain.

Reduce replication traffic by minimizing the membership in universal groups to other groups.

Reduce replication traffic by not changing membership frequently.

A list of universal group memberships is maintained in the global catalog. Global and domain local groups are listed in the global catalog, but their membership is not. Changes to the data stored in the global catalog are replicated to every global catalog in a forest. Whenever one member of a group with universal scope changes, the entire group membership must be replicated to all global catalogs in the domain tree or forest.

By minimizing the use of universal groups, you can limit the replication traffic to a single domain.

Consider minimizing the membership in universal groups to global groups, instead of to user accounts. This allows you to adjust the user accounts that are members of the universal group by adjusting the membership of the groups that are members of the universal group. Because adjusting the membership of the groups does not directly affect the membership of the universal group, no replication traffic is generated.

Reduce the amount of changes made to the membership of a universal group. This reduces the number of times the membership data is replicated to all the global catalog servers. If any change is made to the membership, the entire membership list is replicated.

**Note** An access token can contain up to 1,024 groups. Groups can have up to 5,000 members. The user's primary group membership, such as Domain Users, is not stored in the group membership list.

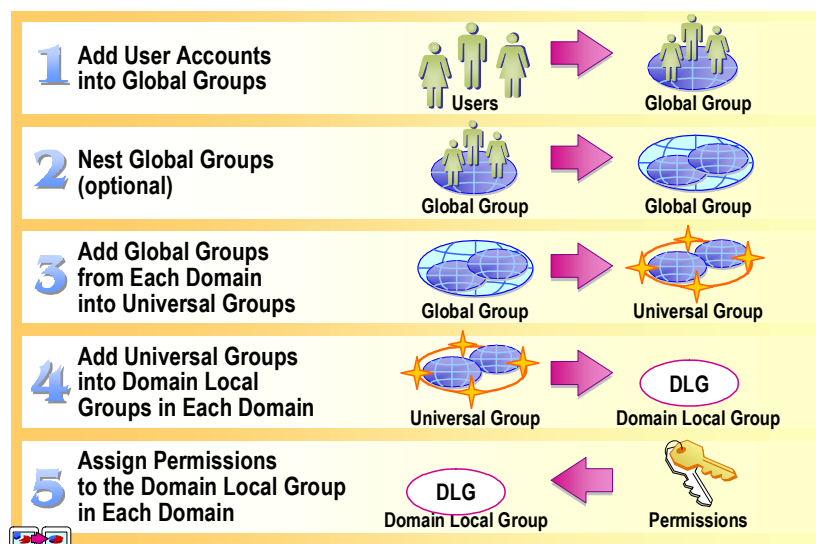
## Nesting Strategy Using Universal Groups

### Topic Objective

To illustrate the nesting strategy for using universal groups.

### Lead-in

You can use universal groups to consolidate groups that span multiple domains.



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The slide for this topic is animated. Display a new step on the slide as you talk about it.

Use universal groups to consolidate groups that span multiple domains.

To consolidate groups that span multiple domains, perform the following steps:

1. In each domain, add user accounts for users with the same job function to global groups.
2. Nest global groups into a single global group to consolidate users. This step is optional, but is very useful if you need to manage large groups of users.
3. Nest the global group or multiple global groups from each domain into one universal group.
4. Add the universal groups to the domain local groups that are created for each resource.
5. Assign to the domain local groups the appropriate permissions for users in the group to gain access to resources.

By using this strategy, any membership changes in the global groups do not affect the membership in the universal groups.

The strategy described on this page uses A-G-G-U-DL-P and applies to the following circumstances:

- File and print permission.
- Active Directory Permissions in the domain name controller.

You can use A-G-U-P strategy for assigning permissions to:

- Configure naming conventions in Active Directory.
- Attribute permissions for attributes published to the global catalog.

## Class Discussion: Using Groups in Trees and Forests

### Topic Objective

To check students' understanding of how to use groups in a forest.

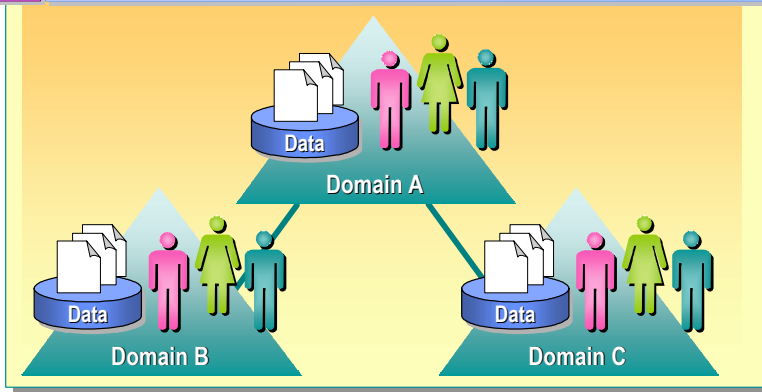
### Lead-in

This example shows how to use groups in a multiple-domain environment. Take a few minutes to think of a solution, and then we will discuss it as a class.



### Accountants Need to Gain Access to the Accounting Data Across the Forest

#### How Do You Set Up Groups?



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### Delivery Tip

There are six slides in the presentation for the first question.

Use the first slide to introduce the scenario and present the first question.

Use the second and the third slides to illustrate the creation of global groups to consolidate users with similar job tasks.

Use the fourth slide to illustrate the addition of the global group from each domain into the universal group.

Use the fifth slide to illustrate the creation of domain local groups that have permissions for the appropriate resources.

Use the sixth slide to illustrate the addition of the universal group into domain local groups.

In this example, Contoso, Ltd. wants to react more quickly to market demands. It has been determined that the accounting data spanning multiple domains in the enterprise needs to be available to all of the accounting staff, which is also located in multiple domains. Contoso, Ltd. wants to create the entire group structure for the Accounting division, which includes the Accounts Payable and Accounts Receivable departments.

1. What would you do to ensure that the managers have the required access and that there is a minimum of administration?
  - a. **Make sure that your network is running in native mode. If not, you must first convert it to a native mode network.**
  - b. **Create three global groups in each domain. One group named “Domain Accountants” will represent all department accountants in each domain. Name the other two groups “Accounts Payable” and “Accounts Receivable” to represent the organizational structure of the accounting department. Add the appropriate users to the Accounts Receivable and Accounts Payable groups. Nest the Accounts Payable and Accounts Receivable global groups into the Accounting Division global group in each domain.**
  - c. **Create a universal group named “All Accountants” to consolidate all of the accounting employees in the forest. Add all global groups from each domain named Domain Accountants to the universal group.**
  - d. **In each domain, create a domain local group called “Accounting Data.” Put the accounting data resource file into this group with Full Control permissions for the domain local group.**
  - e. **Add the universal group into each domain local group so that users can gain access the accounting data.**

**Delivery Tip**

There are three slides in the presentation for the second question.

Use the seventh slide to introduce the scenario and present the second question. This slide illustrates the creation of new global groups in the new domain.

Use the eighth slide to illustrate the creation of a domain local group for the accounting data and to illustrate assigning the appropriate permissions on the resource file.

Use the ninth slide to illustrate the addition of the accounting division global group into the universal group, and the addition of All Accountants group into the new domain local group.

2. Contoso, Ltd. has experienced growth in their business and you must create a new domain. What changes would you make to your group structure to make sure that all accountants in the organization, including those in the new domain, have access to all of the accounting data?
  - a. **Create three new global groups in the new domain. Name them as you did in the other domains and then nest the Accounts Payable and Accounts Receivable global groups into the Accounting Division global group.**
  - b. **Create a domain local group for the accounting data and set the same permissions on the resource file that exist in the other domains.**
  - c. **Add the Accounting Division global group into the universal group All Accountants. Then add the All Accountants group into the new domain local group. Now all of the new accountants can gain access to all of the accounting data in the organization.**

## Lab B: Using Groups in a Forest

### Topic Objective

To introduce the lab.

### Lead-in

In this lab, you will create groups. You will also switch the domain mode from mixed mode to native mode. Finally, you will verify access to resources by using a group strategy that includes global, universal, and domain local groups, view the logged on user's access token, and observe the effects of group nesting.



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Explain the lab objectives.

Remind the students to run the batch file in the lab setup section of this lab before they begin Exercise 1.

### Objectives

After completing this lab, you will be able to:

- Create and nest domain local, global, and universal security groups.
- Add global groups from other domains into universal groups.
- Switch the domain mode from mixed mode to native mode.
- Verify access to resources by using a group strategy that includes global, universal, and domain local groups.
- View the logged on user's access token, and observe the effects of group nesting.

### Prerequisites

Before working on this lab, you must have:

- Knowledge about mixed and native domain modes.
- Knowledge and skills using domain local, global, and universal groups.
- Knowledge about replication latency, and how to manually initiate replication.
- Knowledge about access tokens and how group membership affects them.

### Lab Setup

To complete this lab, you need to do the following:

- Run the batch file C:\Moc\Win2154a\Labfiles\Lrights.bat to set the log on locally user right for the users group.

## Student Computer Information

During this lab, you will be asked for your student number, host name, and domain. Use the information from the following table to determine what to enter for these values. Your instructor will assign you a student number.

| Student number ( <i>n</i> ) | Host name ( <i>servername</i> ) | Domain ( <i>domain</i> ) | FQDN                                |
|-----------------------------|---------------------------------|--------------------------|-------------------------------------|
| 1                           | vancouver                       | namerica1                | vancouver.namerica1.nwtraders.msft  |
| 2                           | denver                          | namerica1                | denver.namerica1.nwtraders.msft     |
| 3                           | perth                           | spacific1                | perth.spacific1.nwtraders.msft      |
| 4                           | brisbane                        | spacific1                | brisbane.spacific1.nwtraders.msft   |
| 5                           | lisbon                          | europa1                  | lisbon.europa1.nwtraders.msft       |
| 6                           | bonn                            | europa1                  | bonn.europa1.nwtraders.msft         |
| 7                           | lima                            | samerica1                | lima.samerica1.nwtraders.msft       |
| 8                           | santiago                        | samerica1                | santiago.samerica1.nwtraders.msft   |
| 9                           | bangalore                       | asia1                    | bangalore.asia1.nwtraders.msft      |
| 10                          | singapore                       | asia1                    | singapore.asia1.nwtraders.msft      |
| 11                          | casablanca                      | africa1                  | casablanca.africa1.nwtraders.msft   |
| 12                          | tunis                           | africa1                  | tunis.africa1.nwtraders.msft        |
| 13                          | acapulco                        | namerica2                | acapulco.namerica2.nwtraders.msft   |
| 14                          | miami                           | namerica2                | miami.namerica2.nwtraders.msft      |
| 15                          | auckland                        | spacific2                | auckland.spacific2.nwtraders.msft   |
| 16                          | suva                            | spacific2                | suva.spacific2.nwtraders.msft       |
| 17                          | stockholm                       | europa2                  | stockholm.europa2.nwtraders.msft    |
| 18                          | moscow                          | europa2                  | moscow.europa2.nwtraders.msft       |
| 19                          | caracas                         | samerica2                | caracas.samerica2.nwtraders.msft    |
| 20                          | montevideo                      | samerica2                | montevideo.samerica2.nwtraders.msft |
| 21                          | manila                          | asia2                    | manila.asia2.nwtraders.msft         |
| 22                          | tokyo                           | asia2                    | tokyo.asia2.nwtraders.msft          |
| 23                          | khartoum                        | africa2                  | khartoum.africa2.nwtraders.msft     |
| 24                          | nairobi                         | africa2                  | nairobi.africa2.nwtraders.msft      |

**Estimated time to complete this lab: 30 minutes**

## Exercise 1

### Implementing Groups Strategy

#### Scenario

Northwind Traders wants to react more quickly to market demands. It has been determined that the accounting data is located in various folders throughout the domains and needs to be available to the entire accounting staff which is located in multiple domains. Northwind Traders wants to create the entire group structure for the Accounting division, which includes the Accounts Payable and Accounts Receivable departments.

#### Goal

In this exercise, you will create three global groups: Accounting, Accounts Payable, and Accounts Receivable. You will add Accounts Payable and Accounts Receivable as members of Accounting. You will create the universal group, All Accounting, and then add the Accounting groups from all domains into this group. This will consolidate all of the accounting employees in the forest into the single universal group. You will create the domain local group, Local Data, and add the universal group as a member. You will assign Read permissions of the accounting data to the Local Data domain local group. To test the group structure, you will create a test user account and add this user account to the Accounts Payable group.

| Tasks                                                                                                                                                                                                                                                                         | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <b>Important:</b> Perform task 1 only on the computer with the lower student number of the pair that is in the same child domain.                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1. Switch <i>domain.nwtraders.msft</i> (where <i>domain</i> is your assigned domain name) to native mode to allow extended group nesting and universal security groups.                                                                                                       | a. Log on as Administrator in your domain with a password of <b>password</b> .<br>b. Open Active Directory Users and Computers from the <b>Administrative Tools</b> menu.<br>c. In the console tree, right-click <i>domain.nwtraders.msft</i> (where <i>domain</i> is your assigned domain name), and then click <b>Properties</b> .<br>d. Click <b>Change Mode</b> , click <b>Yes</b> to close the confirmation dialog box, click <b>OK</b> , and then click <b>OK</b> again to close the message indicating that it may take 15 minutes or more for this information to replicate to all domain controllers. |
|  <b>Important:</b> Perform task 2 only on the computer with the higher student number of the pair that is in the same child domain. Wait until task 1 is completed before starting task 2. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

| Tasks                                                                                                                                                                                                                | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>2. Manually initiate replication from your partner's domain controller to your domain controller to quickly replicate the domain mode change.</p>                                                                 | <ol style="list-style-type: none"> <li>Open Active Directory Sites and Services from the <b>Administrative Tools</b> menu, expand <b>Sites</b>, expand <b>Default-First-Site-Name</b>, expand <b>Servers</b>, expand <i>servername</i> (where <i>servername</i> is the host name of your computer), and then click <b>NTDS Settings</b>.</li> <li>In the details pane, right-click the connection object that is from <i>partnerserver</i> (where <i>partnerserver</i> is the host name of your partner's computer), and then click <b>Replicate Now</b> to initiate the copying of changes from your partner's domain controller to your domain controller.</li> <li>Click <b>OK</b> to close the message indicating that replication has been initiated, and then close Active Directory Sites and Services.</li> </ol> <p> <i>If an error message indicating the RPC service is unavailable, simply wait a moment and then repeat the Replicate Now operation.</i></p> |
| <p> <b>Important:</b> Perform the remaining tasks on both computers.</p>                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>3. Within <i>domain.nwtraders.msft</i>, create the following OU: <i>n_Accounting</i> (where <i>n</i> is your assigned student number).</p>                                                                        | <ol style="list-style-type: none"> <li>Open, or switch to, Active Directory Users and Computers, and then in the console tree, expand <i>domain.nwtraders.msft</i>.</li> <li>Right-click <i>domain.nwtraders.msft</i>, point to <b>New</b>, and then click <b>Organizational Unit</b>.</li> <li>In the <b>New Object – Organizational Unit</b> dialog box, in the <b>Name</b> box, type <i>n_Accounting</i> (where <i>n</i> is your assigned student number), and then click <b>OK</b>.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>4. Within the <i>n_Accounting</i> OU, create the following global security groups:<br/><i>n_Accounts Payable</i><br/><i>n_Accounts Receivable</i>.</p>                                                            | <ol style="list-style-type: none"> <li>Right-click the <i>n_Accounting</i> OU, point to <b>New</b>, and then click <b>Group</b>.</li> <li>In the <b>New Object – Group</b> dialog box, in the <b>Group name</b> box, type <i>n_Accounts Payable</i>.</li> <li>Ensure that <b>Group scope</b> is <b>Global</b> and <b>Group type</b> is <b>Security</b>, and then click <b>OK</b>.</li> <li>Repeat steps a and b, changing step b as required, to create the <i>n_Accounts Receivable</i> global security group.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <p>5. Within the <i>n_Accounting</i> OU, create the <i>n_Domain Accountants</i> global group, and then add the department global groups, <i>n_Accounts Payable</i> and <i>n_Accounts Receivable</i>, as members.</p> | <ol style="list-style-type: none"> <li>Right-click the <i>n_Accounting</i> OU, point to <b>New</b>, and then click <b>Group</b>.</li> <li>In the <b>New Object – Group</b> dialog box, in the <b>Group name</b> box, type <i>n_Domain Accountants</i>.</li> <li>Ensure that <b>Group scope</b> is <b>Global</b> and <b>Group type</b> is <b>Security</b>, and then click <b>OK</b>.</li> <li>Click the <i>n_Accounting</i> OU, in the details pane, right-click the <i>n_Domain Accountants</i> global group, and then click <b>Properties</b>.</li> <li>In the <i>n_Domain Accountants Properties</i> dialog box, click the <b>Members</b> tab, and then click <b>Add</b>.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                     |

| Tasks                                                                                                                                                                         | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| 5. <i>(continued)</i>                                                                                                                                                         | <p>f. In the <b>Select Users, Contacts, Computers, or Groups</b> dialog box, in the <b>Name</b> box, scroll to the bottom of the list and click <b><i>n</i>_Accounts Payable</b>, click <b>Add</b>, click <b><i>n</i>_Accounts Receivable</b>, click <b>Add</b>, and then click <b>OK</b>.</p> <p>g. In the <b><i>n</i>_Domain Accountants Properties</b> dialog box, on the <b>Members</b> tab, ensure that <b><i>n</i>_Accounts Payable</b> and <b><i>n</i>_Accounts Receivable</b> are listed, and then click <b>OK</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 6. Within the <b><i>n</i>_Accounting</b> OU, create the <b><i>n</i>_All Accountants</b> universal security group and then add <b><i>n</i>_Domain Accountants</b> as a member. | <p>a. Right-click the <b><i>n</i>_Accounting</b> OU, point to <b>New</b>, and then click <b>Group</b>.</p> <p>b. In the <b>New Object – Group</b> dialog box, in the <b>Group name</b> box, type <b><i>n</i>_All Accountants</b></p> <p>c. Under <b>Group scope</b>, click <b>Universal</b>, ensure <b>Group type</b> is set to <b>Security</b>, and then click <b>OK</b>.</p> <p>d. Click the <b><i>n</i>_Accounting</b> OU, and in the details pane, right-click the <b><i>n</i>_All Accountants</b> universal group, and then click <b>Properties</b>.</p> <p>e. In the <b><i>n</i>_All Accountants Properties</b> dialog box, click the <b>Members</b> tab, and then click <b>Add</b>.</p> <p>f. In the <b>Select Users, Contacts, Computers, or Groups</b> dialog box, in the <b>Name</b> box, scroll to the bottom of the list and click <b><i>n</i>_Domain Accountants</b>, click <b>Add</b>, and then click <b>OK</b>.</p> <p>Note: Typically a universal group contains members from multiple domains. Adding groups from other domains can be performed by selecting the domain in the Look in box, and selecting a group from the list.</p> <p>g. In the <b><i>n</i>_All Accountants Properties</b> dialog box, on the <b>Members</b> tab, ensure that <b><i>n</i>_Domain Accountants</b> is listed, and then click <b>OK</b>.</p> |
| 7. Create the <b><i>n</i>_Local Data</b> domain local security group, and then add <b><i>n</i>_All Accountants</b> as a member.                                               | <p>a. Right-click <b><i>n</i>_Accounting</b>, point to <b>New</b>, and then click <b>Group</b>.</p> <p>b. In the <b>New Object – Group</b> dialog box, in the <b>Group name</b> box, type <b><i>n</i>_Local Data</b></p> <p>c. Ensure that <b>Group scope</b> is set to <b>Domain Local</b> and <b>Group type</b> is set to <b>Security</b>, and then click <b>OK</b>.</p> <p>d. Click the <b><i>n</i>_Accounting</b> OU, in the details pane, right-click the <b><i>n</i>_Local Data</b> domain local group, and then click <b>Properties</b>.</p> <p>e. In the <b><i>n</i>_Local Data Properties</b> dialog box, on the <b>Members</b> tab, click <b>Add</b>.</p> <p>f. In the <b>Select Users, Contacts, Computers, or Groups</b> dialog box, in the <b>Name</b> box, scroll to the bottom of the list and click <b><i>n</i>_All Accountants</b>, click <b>Add</b>, and then click <b>OK</b>.</p> <p>g. In the <b><i>n</i>_Local Data Properties</b> dialog box, on the <b>Members</b> tab, ensure that <b><i>n</i>_All Accountants</b> is listed as members of the <b><i>n</i>_Local Data</b> domain local group, and then click <b>OK</b>.</p>                                                                                                                                                                                           |

| Tasks                                                                                                                                                                                                                                                                                                                                                               | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>8. Create an empty text document C:\Report.txt and give Full Control permissions to only the <i>n_Local Data</i> domain local group.</p>                                                                                                                                                                                                                         | <ol style="list-style-type: none"> <li>In the <b>Run</b> box, type <b>C:\</b> and then click <b>OK</b> to open the C:\ window.</li> <li>In the C:\ window, right-click an area of blank space, point to <b>New</b>, and then click <b>Text Document</b>.</li> <li>Rename the text document to <b>Report.txt</b>.</li> <li>Right-click <b>Report.txt</b>, and then click <b>Properties</b>.</li> <li>In the <b>Report Properties</b> dialog box, on the <b>Security</b> tab, and click <b>Add</b>.</li> <li>In the <b>Select Objects</b> dialog box, in the <b>Name</b> box, scroll to the bottom of the list and click <b>n_Local Data</b>, click <b>Add</b>, and then click <b>OK</b>.</li> <li>In the <b>Report Properties</b> dialog box, in the <b>Permissions</b> box, select the <b>Full Control Allow</b> check box.</li> <li>Clear the <b>Allow inheritable permissions from parent to propagate to this object</b> check box, and then click <b>Remove</b> to close the message asking whether to copy or remove the inherited permissions.</li> <li>Ensure that <b>n_Local Data</b> is the only entry and that it has Full Control permissions, and then click <b>OK</b>.</li> <li>Close the C:\ window.</li> </ol> |
| <p>9. Within the <i>n_Accounting</i> OU, create a user account with the following properties to test the group structure:</p> <ul style="list-style-type: none"> <li>Full name:<br/><i>n_TestAccount</i></li> <li>User logon name:<br/><i>n_TestAccount@nwtraders.msft</i></li> <li>Add this user account to the <i>n_Accounts Payable</i> global group.</li> </ul> | <ol style="list-style-type: none"> <li>In Active Directory Users and Computers, click the <i>n_Accounting</i> OU.</li> <li>Right-click <i>n_Accounting</i>, point to <b>New</b>, and then click <b>User</b>.</li> <li>On the <b>New Object – User</b> page, in the <b>Full name</b> box, type <i>n_TestAccount</i><br/>In the <b>User logon name</b> box, type <i>n_TestAccount</i> and then click <b>Next</b>.</li> <li>Click <b>Next</b>, and then click <b>Finish</b> to complete the wizard by using the defaults.</li> <li>Click the <i>n_Accounting</i> OU, and in the details pane, right-click the user <i>n_TestAccount</i>, and then click <b>Properties</b>.</li> <li>In the <i>n_TestAccount Properties</i> dialog box, on the <b>Member Of</b> tab, click <b>Add</b>.</li> <li>In the <b>Select Groups</b> dialog box, under the <b>Name</b> column, click <i>n_Accounts Payable</i>, click <b>Add</b>, and then click <b>OK</b>.</li> <li>In the <i>n_TestAccount Properties</i> dialog box, ensure the <i>n_Accounts Payable</i> global group is listed, and then click <b>OK</b>.</li> <li>Close Active Directory Users and Computers.</li> </ol>                                                             |
| <p>10. Log off from the domain controller, and then log on as <i>n_TestAccount</i>. Verify that you can gain access to the resource C:\Report.txt, and then delete the document.</p>                                                                                                                                                                                | <ol style="list-style-type: none"> <li>Log off, and then log on as <i>n_TestAccount</i> in your domain without typing a password.</li> <li>Open the file, C:\Report.txt, and then type <b>Some Modifications</b></li> <li>In this document, save and close the document.</li> <li>Delete the document C:\Report.txt.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

| Tasks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Detailed Steps                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p> Were you able to access the resource C:\Report.txt?</p> <p><b>Yes, you were able to access the resource C:\Report.txt with Full Control permissions.</b></p> <hr/> <hr/> <hr/> <hr/>                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>11.</b> Run C:\MOC\Win2154A\Labfiles\Mytoken.exe to determine which groups <i>n_TestAccount</i> has in its access token.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                        | <p>a. Open a command prompt window.</p> <p>b. At the command prompt, type <b>C:\MOC\Win2154A\Labfiles\Mytoken.exe</b> and then press ENTER.</p> <p> <i>The access token information appears. First, the information displays the user information and other general information about the access token. Second, it displays the group information one security identifier (SID) entry per line. Finally, privileges of the user are displayed.</i></p>                                                                               |
| <p> Does the access token for <i>n_TestAccount</i> contain the appropriate nested global groups, the universal group, and the domain local group following the membership path? Can you determine from the output of Mytoken which groups are nested?</p> <p><b>Yes, the nested global, universal and domain local groups are in the access token. No, there is no distinction between nested groups and groups of which the user is directly a member.</b></p> <hr/> <hr/> <hr/> <hr/> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>11.</b> (continued)</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <p>c. Close the command prompt window.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>12.</b> Log off and log on as Administrator, delete the <i>n_Accounting</i> OU, and then log off.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <p>a. Log off, and then log on as Administrator in your domain with a password of <b>password</b>.</p> <p>b. Open Active Directory Users and Computers from the <b>Administrative Tools</b> menu, and then expand <i>domain.nwtraders.msft</i>.</p> <p>c. Right-click the <i>n_Accounting</i> OU, click <b>Delete</b>, click <b>Yes</b> to close the confirmation dialog box, and then click <b>Yes</b> to close the dialog box indicating that all of the objects contained in this object will also be deleted.</p> <p>d. Close Active Directory Users and Computers, close all open windows, and then log off.</p> |

# Troubleshooting Creating and Managing Trees and Forests

**Topic Objective**

To troubleshoot creating and managing trees and forests in Windows 2000.

**Lead-in**

You may encounter problems when creating and managing trees and forests in Windows 2000.



**Shortcut Trust Is Not Being Used**



**Cannot Log On to a Domain**



**Cannot Create Universal Groups in Some Domains**

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You may encounter problems when creating and managing trees and forests in Windows 2000. Here are some of the common problems that you may encounter and some strategies for resolving them:

- Shortcut trust is not being used. The possible cause could be that the trust was created in the wrong direction. Verify that the trusting and trusted domains are correct. If they are not, then delete both halves of the existing shortcut trust and recreate the shortcut trust in the other direction. Verify that the trust is functioning by using the **Verify** button in Active Directory Domains and Trusts or the Netdom.exe utility.
- Cannot log on to a domain. The possible cause could be that a global catalog server could not be located. The global catalog is needed to access universal group information and map user principal names to domains. Ensure that a global catalog server is running and available. Ensure that the network is functioning correctly from the authenticating domain controller and a global catalog server. Ensure that the DNS service is functioning. Also, verify the entries for global catalog servers in DNS to make sure that they are correct. The Global Catalog SRV record exists in the forest root domain only.
- Cannot create universal groups in some domains. The possible cause could be that the domains where you cannot create universal groups may not be in native mode. Verify the domain mode, and if required, change the domain mode from mixed mode to native mode, and then create universal groups.

## Best Practices

### Topic Objective

To apply best practices for creating and managing trees and forests in Windows 2000.

### Lead-in

Review this checklist before you create and manage trees and forests in Windows 2000.



Use the Strategy:



Create Shortcut Trusts Between Frequently Accessed Domains with Long Trust Paths



Place a Global Catalog Server in Each Heavy Traffic Site



Place a DNS Server in Each Site

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Emphasize the reason for each best practice.

Consider the following best practices for creating and managing Windows 2000 trees and forests:

- Use the A→G→G→U→DL←P group strategy. Keep membership in universal groups small, and use memberships that do not change often to reduce network replication traffic. This solution is recommended for file and print permissions and Active Directory permissions in the domain naming context. It is recommended that you use the A→G→U←P group strategy for Configuration naming context in Active Directory and attribute permissions for attributes published to the global catalog.
- Create shortcut trusts when many users from one domain frequently access resources in a domain with long trust paths. Shortcut trusts reduce the latency and network traffic needed to authenticate a user for the resource.
- Place a global catalog server in each site that has many users logging on to reduce network traffic and allow users to log on if the WAN link fails.
- Place a DNS server at each site. A DNS server must exist at each site so that local domain controllers and global catalog servers can be found if a WAN link fails. The DNS server must contain a replica of the forest root domain zone to enable users to find global catalog resource records.

## 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 Trees and Forests
- Creating Trees and Forests
- Trust Relationships in Trees and Forests
- The Global Catalog
- Strategies for Using Groups in Trees and Forests
- Troubleshooting Creating and Managing Trees and Forests
- Best Practices

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

1. What role does the forest root domain play when new trees are created in the forest?

**Trust relationships are established between the tree root and the forest root.**

2. Why would you create shortcut trusts?

**Shortcut trusts are created to reduce the trust path for authentication to resources.**

3. What role does the global catalog play during the logon process?

**A global catalog server is used to determine universal group membership and map user principal names to domains.**

4. What is the benefit of small and relatively static membership for a universal group?

**The benefit is reduced network traffic due to replication of the universal group membership to other global catalog servers. Membership being relatively static reduces the frequency that the updated universal group is replicated. A small membership list reduces the amount of data that is replicated when a change is made because the entire membership list is replicated for any change.**

5. The three domains in your network correspond to different branches of your organization in North America, Asia, and Europe respectively. Accountants in the three domains need to gain access to documents in all three domains. How do you set up the accountants' access to documents in all domains?

**Put the user accounts of accountants in each domain into a global group. Then put the three global groups into one universal group. Create a domain local group to assign access to resources. Add the universal group to the appropriate domain local group.**

