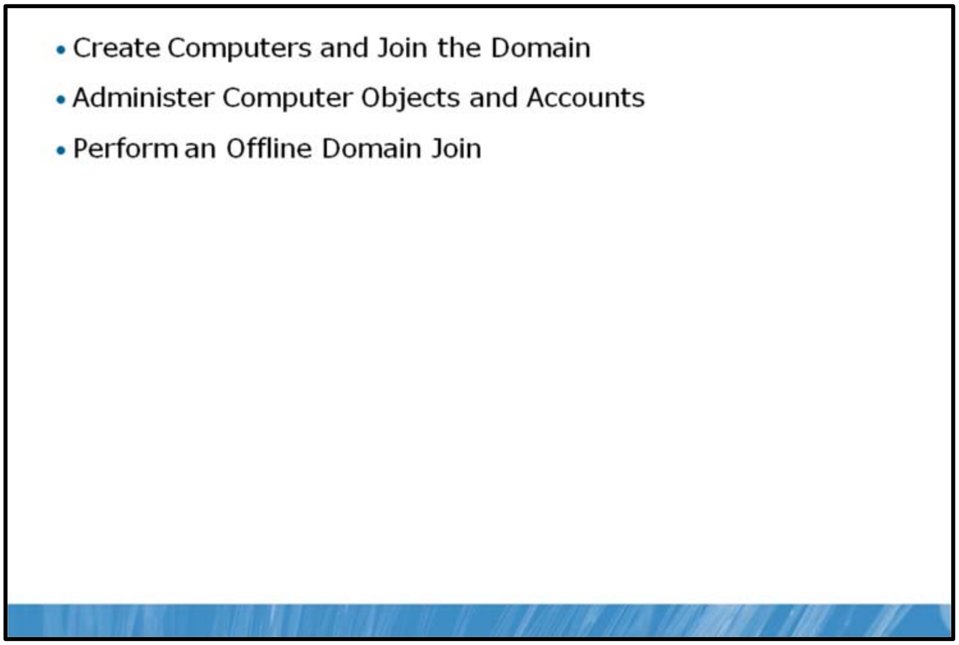
Module 5

Managing Computer Accounts

Contents:

Module Overview



- Create Computers and Join the Domain
- Administer Computer Objects and Accounts
- Perform an Offline Domain Join

Computers in a domain are security principals, like users. They have an account with a logon name and password that Windows® changes automatically every 30 days or so. They authenticate with the domain. They can belong to groups, have access to resources, and be configured by Group Policy. In addition, like users, computers sometimes lose track of their passwords, require a reset, or have accounts that need to be disabled or enabled.

Managing computers—both the objects in Active Directory® and the physical devices—is one of the day-to-day tasks of most IT professionals. New systems are added to your organization, computers are taken offline for repairs, machines are exchanged between users or roles, and older equipment is retired or upgraded, leading to an access of replacement systems. Each of these activities requires managing the identity of the computer represented by its object, or account, and Active Directory.

Unfortunately, most enterprises do not invest the same kind of care and process in the creation and management of computer accounts as they do for user accounts, even though both are security principals. In this module, you will learn how to create computer objects, which include attributes that are required for the objects to be accounts. You will learn how to support computer accounts through their life cycle, including configuring, troubleshooting, repairing, and de-provisioning computer objects. You will also deepen your understanding of the process through which a computer joins a domain, so that you can identify and avoid potential points of failure. In the third lesson of this module, you will be introduced to a new feature of Windows Server® 2008 R2 Active Directory, called Offline Domain Join. This feature enables administrators to join computers to a domain even if the computers do not have a connection to the corporate network.

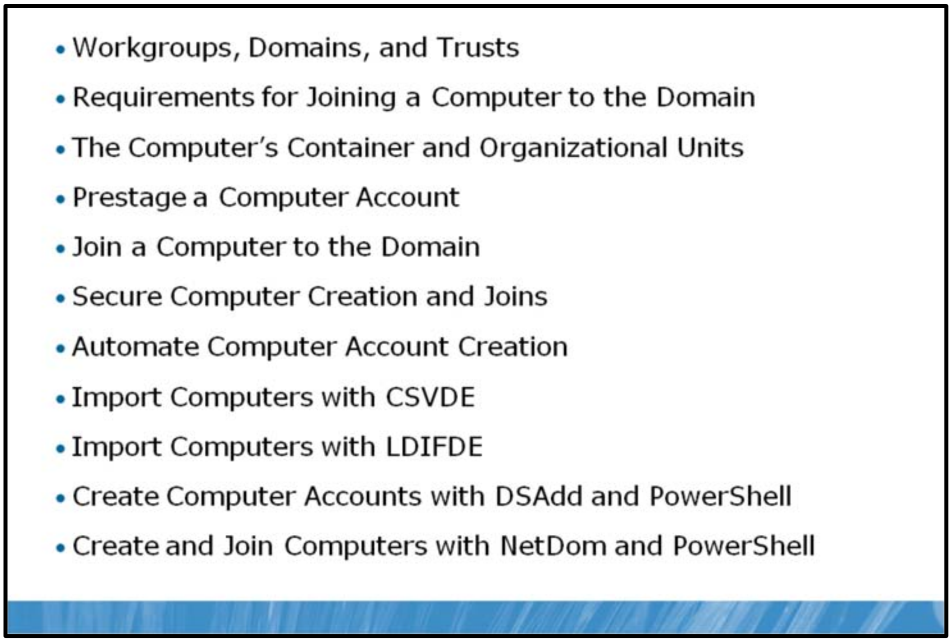
Objectives

After completing this module, you will be able to:

- Create computer accounts and join them to a domain.

- Administer computer objects and accounts by using the Windows Interface and command-line tools.
- Describe and perform the Offline Domain Join process.

Lesson 1
Create Computers and Join the Domain



- Workgroups, Domains, and Trusts
- Requirements for Joining a Computer to the Domain
- The Computer's Container and Organizational Units
- Prestage a Computer Account
- Join a Computer to the Domain
- Secure Computer Creation and Joins
- Automate Computer Account Creation
- Import Computers with CSVDE
- Import Computers with LDIFDE
- Create Computer Accounts with DSAdd and PowerShell
- Create and Join Computers with NetDom and PowerShell

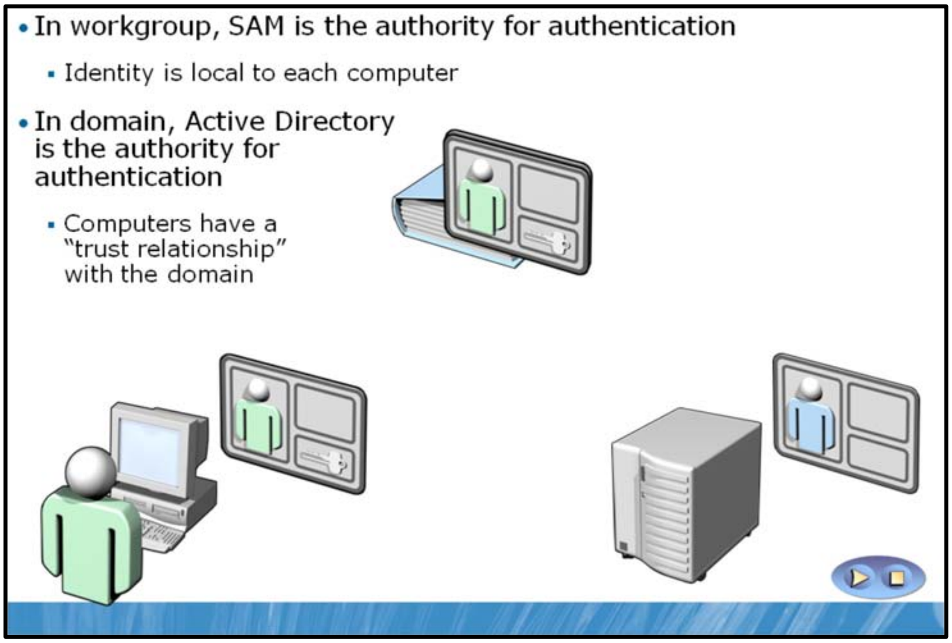
The default configuration of Windows Server 2008—and of all other versions of Windows server and client operating systems—is that the computer belongs to a workgroup. Before you can log on to a computer with a domain account, that computer must belong to the domain. To join the domain, the computer must have an account in the domain, which, like a user account, includes a logon name (the sAMAccountName attribute), a password, and a security identifier (SID) that uniquely represents the computer as a security principal in the domain. Those credentials allow the computer to authenticate against the domain and to create a secure relationship that then allows users to log on to the system with domain accounts. In this lesson, you will learn the steps to prepare the domain for a new computer account, and you will explore the process through which a computer joins the domain.

Objectives

After completing this lesson, you will be able to:

- Understand the relationship between a domain member and the domain, in terms of identity and access.
- Identify the requirements for joining a computer to the domain.
- Prestage a computer account.
- Join a computer to the domain.
- Redirect the default computer container.
- Prevent nonadministrative users from creating computers and joining the domain.
- Use command-line tools to import, create, and join computers.

Workgroups, Domains, and Trusts

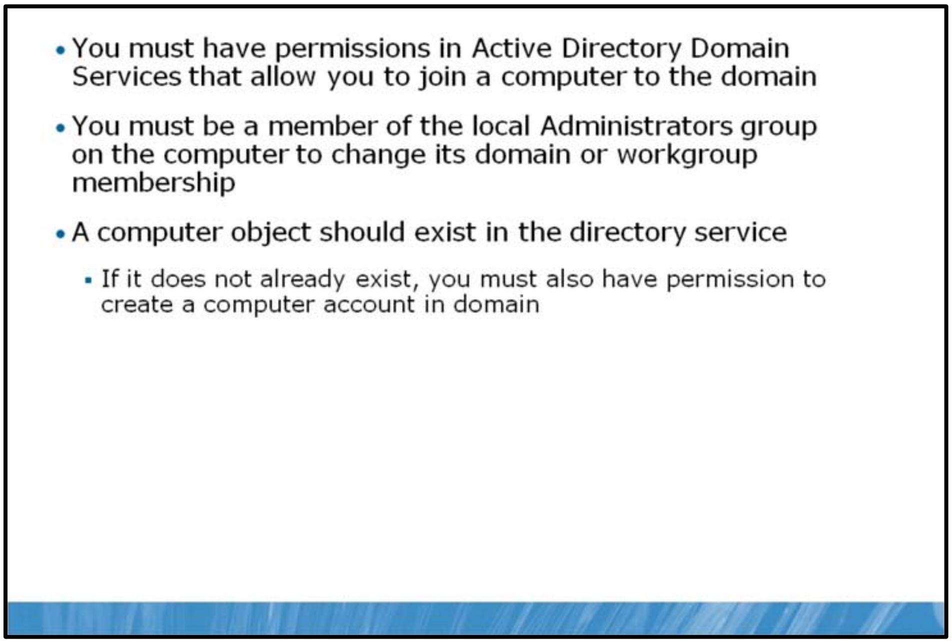


- In workgroup, SAM is the authority for authentication
  - Identity is local to each computer
- In domain, Active Directory is the authority for authentication
  - Computers have a "trust relationship" with the domain

In a workgroup, each system maintains an identity store of user and group accounts against which users can be authenticated and access can begin. The local identity store on each computer is called the Security Accounts Manager (SAM) database. If a user logs on to a workgroup machine, the system authenticates the user against its local SAM database. If a user connects to another system to access a shared folder, the user is reauthenticated against the identity store of the remote system and will probably be prompted to enter a new set of credentials for the remote system. From a security perspective, a workgroup computer is, for all intents and purposes, a stand-alone system.

When a computer joins a domain, it delegates the task of authenticating users to the domain. Although the computer continues to maintain its SAM database to support local user and group accounts, user accounts will typically be created in the central domain directory. When a user logs on to the computer with a domain account, the user is authenticated by a domain controller, rather than by the SAM. In other words, the computer now trusts another authority to validate a user's identity. Trust relationships are generally discussed in the context of two domains, as you will learn in another module**,** but there is also a trust between each domain member computer and its domain that is established when the computer joins the domain. Because all domain member computers trust the domain, they also trust each account that is authenticated by that domain. This allows users with an account in Active Directory to access resources on various servers with only one set of credentials.

Requirements for Joining a Computer to the Domain



- You must have permissions in Active Directory Domain Services that allow you to join a computer to the domain
- You must be a member of the local Administrators group on the computer to change its domain or workgroup membership
- A computer object should exist in the directory service
  - If it does not already exist, you must also have permission to create a computer account in domain

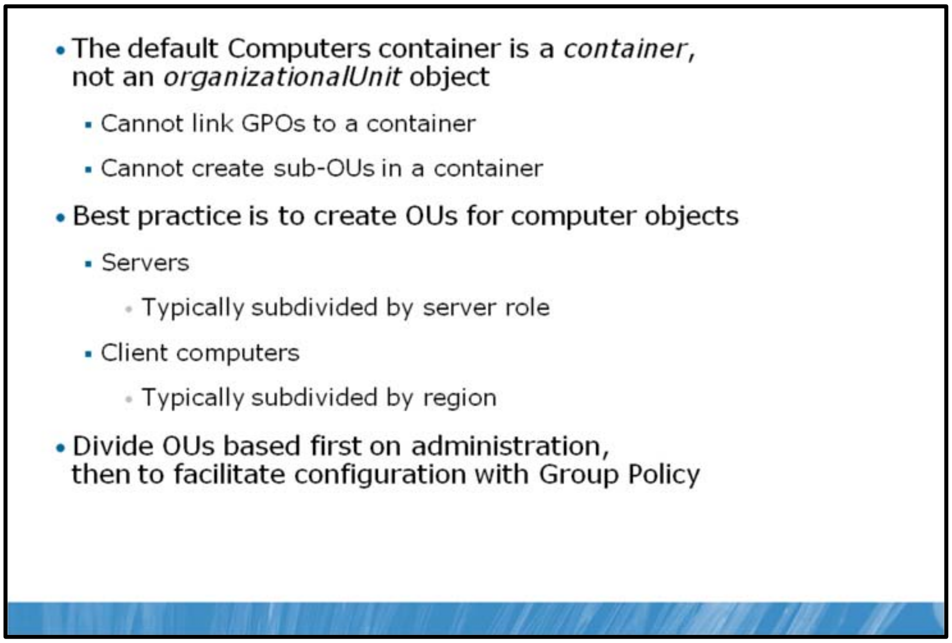
Three conditions are required for you to join a computer to an Active Directory domain:

- A computer object should be created in the directory service.
- You must have appropriate permissions to the computer object. The permissions allow you to join a computer with the same name as the object to the domain.
- You must be a member of the local Administrators group on the computer to change its domain or workgroup membership.

The remainder of this lesson examines each of these requirements.

Note It is not mandatory to create a computer object in the directory service, but it is highly recommended. However, many administrators join computers to a domain without first creating a computer object. When you do this, Windows attempts to join the domain to an existing object. When Windows does not find the object, it fails back and creates a computer object in the default computer container. The step of creating a computer object, either by an administrator before the join or by Windows during the join, is necessary before the computer can join the domain. It is still a requirement. It uses a different set of permissions in Active Directory (your permission to create a computer object) than the join itself, and if you do not happen to have permissions to create computer objects in the default computer container, the join will fail. The bottom line is that it is a requirement for the computer object to exist prior to the join, but Windows helps meet that requirement automatically.

The Computers Container and Organizational Units



- The default Computers container is a *container*, not an *organizationalUnit* object
  - Cannot link GPOs to a container
  - Cannot create sub-OUs in a container
- Best practice is to create OUs for computer objects
  - Servers
    - Typically subdivided by server role
  - Client computers
    - Typically subdivided by region
- Divide OUs based first on administration, then to facilitate configuration with Group Policy

Before you create a computer object in the directory service, you must have a place to put it.

The Default Computers Container

When you create a domain, the Computers container is created by default (CN=Computers). This container is not an organizational unit (OU); it is an object of the **Container** class. There are subtle but important differences between a container and an OU. You cannot create an OU within a container, so you cannot subdivide the Computers OU; and you cannot link a Group Policy object to a container. Therefore, we highly recommend that you create custom OUs to host computer objects, instead of using the Computers container.

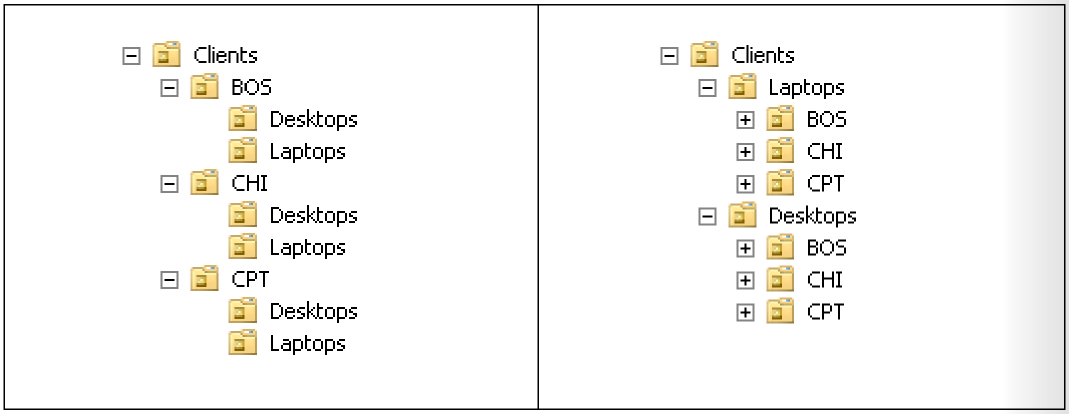
OUs for Computers

Most organizations create at least two OUs for computer objects: one to host computer accounts for client computers—desktops, laptops, and other user systems—and another for servers. These two OUs are in addition to the Domain Controllers OU created by default during the installation of Active Directory. In each of these OUs, computer objects are created. There is no technical difference between a computer object in a client's OU and a computer object in a server's or domain controller's OU: computer objects are computer objects. However, separate OUs are typically created to provide unique scopes of management, so that you can delegate management of client objects to one team and management of server objects to another.

Your administrative model might necessitate further dividing your client and server OUs. Many organizations create sub-OUs beneath a server OU to collect and manage specific types of servers—for example, an OU for file and print servers and an OU for database servers. By doing so, the team of administrators for each type of server can be delegated permissions to manage computer objects in the appropriate OU. Similarly, geographically distributed organizations with local desktop support teams often divide a parent OU for clients into sub-OUs for each site. This approach enables each site's support team to create computer objects in the site for client computers, and join computers to the domain using those computer objects. This is an example only. What is most important is that your OU structure reflects your administrative model so that your OUs provide single points of management for the delegation of administration.

Additionally, separate OUs allow you to create different baseline configurations using different Group Policy objects (GPOs) linked to the client and the server OUs. Group Policy, discussed in detail in another module, allows you to specify configuration for collections of computers by linking GPOs that contain configuration instructions to OUs. It is common for organizations to separate clients into desktop and laptop OUs. GPOs specifying desktop or laptop configuration can then be linked to appropriate OUs.

If your organization has decentralized, site-based administration and wants to manage unique configurations for desktops and laptops, you face a design dilemma. Should you divide your clients OU based on administration and then subdivide desktops and laptops, or should you divide your clients OU into desktop and laptop OUs, and then subdivide based on administration? The options are illustrated as follows.



Because the primary design driver for Active Directory OUs is the efficient delegation of administration through the inheritance of access control lists (ACLs) on OUs, the design on the left would be recommended.

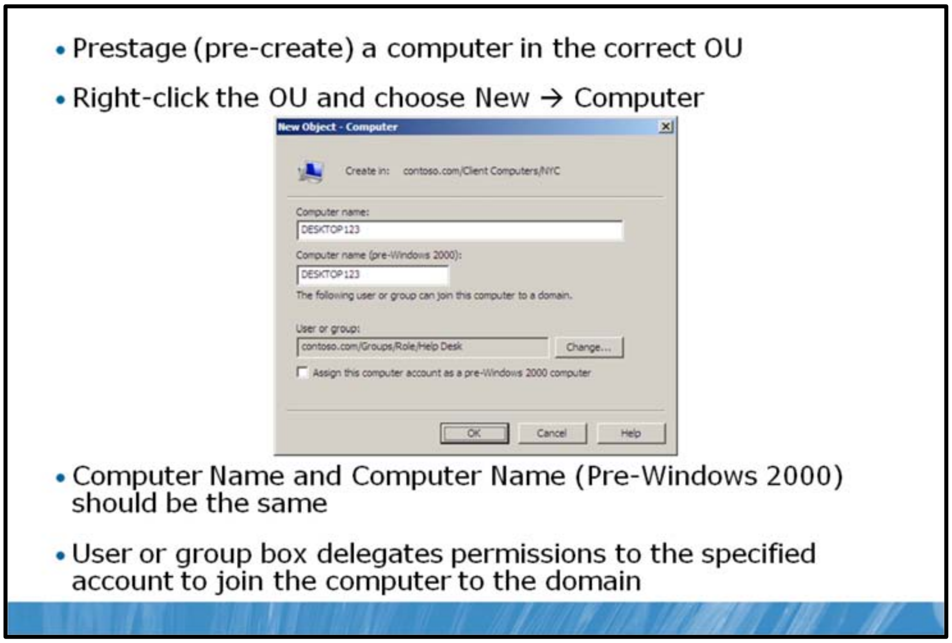
Delegating Permission to Create Computers

By default, the Enterprise Admins, Domain Admins, Administrators, and Account Operators groups have permission to create computer objects in any new OU. However, as discussed in the module about groups, we recommend that you tightly restrict membership in the first three groups, and that you do not add administrators to the Account Operators group.

Instead, you should delegate the permission to create computer objects to appropriate administrators or support personnel. The permission required to create a computer object is Create Computer Objects. This permission, assigned to a group for an OU, allows members of the group to create computer objects in that OU. For example, you might allow your desktop support team to create computer objects in the clients OU, and allow your file server administrators to create computer objects in the file servers OU.

The permissions required to perform computer management tasks are listed in the topic, "Secure Computer Creation and Joins." Module 8 details the process of delegation.

Prestage a Computer Account



- Prestage (pre-create) a computer in the correct OU
- Right-click the OU and choose New → Computer

New Object - Computer

Create in: contoso.com/Client Computers/NYC

Computer name: DESKTOP123

Computer name (pre-Windows 2000): DESKTOP123

The following user or group can join this computer to a domain.

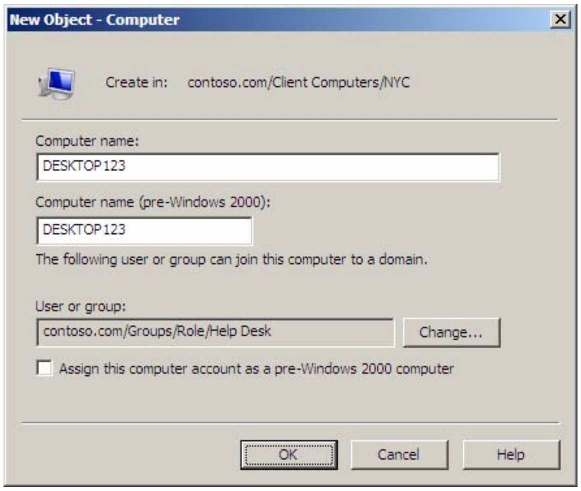
User or group: contoso.com/Groups/Role/Help Desk

□ Assign this computer account as a pre-Windows 2000 computer

- Computer Name and Computer Name (Pre-Windows 2000) should be the same
- User or group box delegates permissions to the specified account to join the computer to the domain

You can and should create a computer account in the correct OU before joining the computer to the domain. This process of creating a computer account in advance is called *prestaging* a computer.

After you have been given permission to create computer objects, you can do so by right-clicking the OU and choosing Computer from the **New** menu. The **New Object – Computer** dialog box, shown below, appears:



New Object - Computer

Create in: contoso.com/Client Computers/NYC

Computer name: DESKTOP123

Computer name (pre-Windows 2000): DESKTOP123

The following user or group can join this computer to a domain.

User or group: contoso.com/Groups/Role/Help Desk

□ Assign this computer account as a pre-Windows 2000 computer

Enter the computer name, following the naming convention of your enterprise, and select the user or group that will be allowed to join the computer to the domain with this account. The two computer names—Computer Name and Computer Name (Pre-Windows 2000)—should be the same: There is very rarely, if ever, a justification for configuring them separately.

Note The permissions that are applied to the user or group you select in the wizard are more than necessary simply to join a computer to the domain. The selected user or group is also given the ability to modify the computer object in other ways. For guidance regarding a least privilege approach to delegating permission to join a computer to the domain, see Windows Administration Resource Kit: Productivity Solutions for IT Professionals by Dan Holme (Microsoft® Press, 2008).

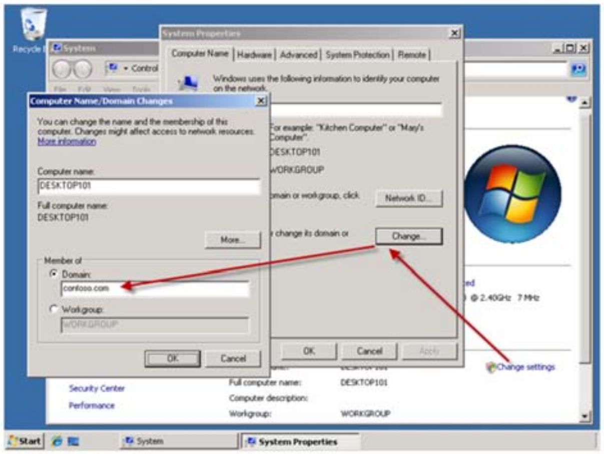
The process you complete to create a computer account before joining the computer to the domain is called *prestaging* the account.

There are two major advantages of prestaging a computer:

- The account is in the correct OU and is therefore delegated according to the security policy defined by the access control list (ACL) of the OU.
- The computer is within the scope of GPOs linked to the OU, before the computer joins the domain.

Join a Computer to the Domain

- The System Properties dialog box or window


Computer Name/Domain Changes

You can change the name and the membership of this computer. Changes might affect access to network resources. More information

Computer name: DESKTOP101

Full computer name: DESKTOP101

Member of

● Domain: contoso.com

○ Workgroup: WORKGROUP

System Properties

Windows uses the following information to identify your computer on the network.

For example: "Kitchen Computer" or "Mary's Computer".

DESKTOP101

WORKGROUP

Full computer name: DESKTOP101

Computer description:

Workgroup: WORKGROUP

- Prompts for domain credentials
- Requires restart

By prestaging the computer object, you fulfill the first two requirements for joining a computer to a domain: the computer object exists, and you have specified who has permissions to join a computer with the same name to the domain. Now, a local administrator of the computer can change the computer's domain membership and enter the specified domain credentials to successfully complete the process.

To join a computer to the domain, perform the following steps:

1. Log on to the computer with credentials that belong to the local Administrators group on the computer.

   Only local administrators can alter the domain or workgroup membership of a computer.

2. Open the System Properties dialog box by using one of the following methods:

In Windows XP, Windows Server 2003:

- Open the **System properties** dialog box by doing one of the following:
  - Right-click **My Computer**, and then click **Properties**.
  - Press **Windows Logo+Pause**.

In Windows Vista®, Windows 7, Windows Server 2008, and Windows Server 2008 R2:

a. Open the **System properties** dialog box by doing one of the following:

   - Right-click **Computer**, and then click **Properties**.
   - Press **Windows Logo+Pause**.

b. In the **Computer name, domain, and workgroup settings** section, click **Change Settings**.

c. If prompted by **User Account Control**, click **Continue** or enter administrative credentials as appropriate.

3. Click the **Computer Name** tab.
4. Click **Change**.
5. Under **Member Of**, click **Domain**.
6. Type the name of the domain you want to join.

Note Use the full DNS name of the domain. Not only is this more accurate and more likely to succeed, but if it does not succeed, it indicates that there could be a problem with DNS name resolution that should be rectified before joining the machine to the domain.

7. Click **OK**.
8. Windows prompts for the credentials of your user account in the domain.

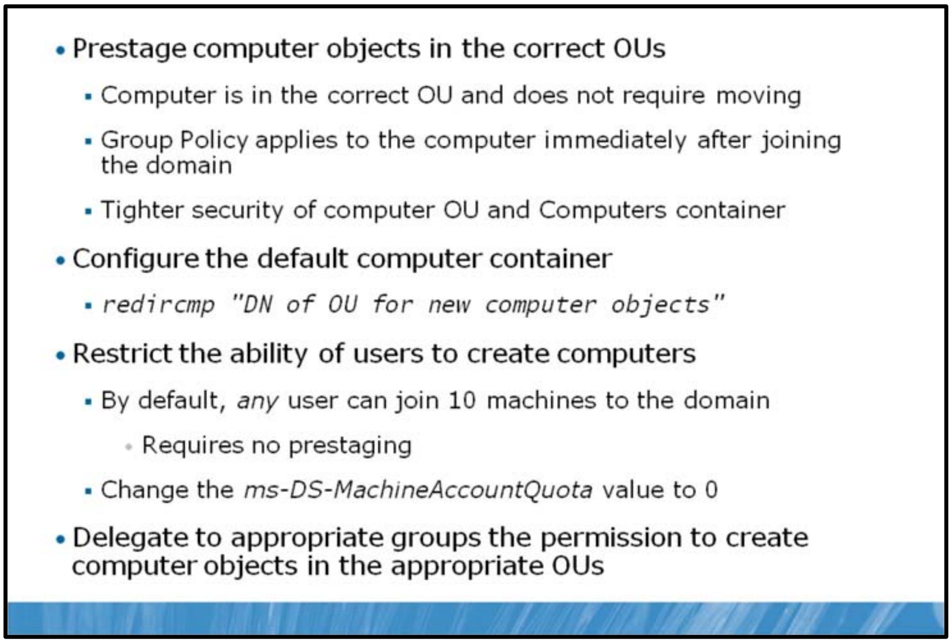
   The domain checks to see if a computer object already exists with the name of the computer. One of the following three things happens:

   - If the object exists and a computer with that name has already joined the domain, an error is returned, and you cannot join the computer to the domain.
   - If the object exists and it is prestaged—a computer with the same name has not joined the domain—the domain confirms that the domain credentials you entered have permission to join the domain using that account. These permissions were discussed in the section, "Prestaging a Computer Account."
   - If the computer account is not prestaged, Windows checks to see if you have permissions to create a new computer object in the default computer container. If you do have permissions to create a new computer object in the default computer container, the object is created with the name of the computer. This method of joining a domain is supported for backwards compatibility, but is not recommended. We recommend that you prestage the account as indicated earlier, and as detailed in the next section, "Secure Computer Creation and Joins."

The computer then joins the domain by assuming the identity of its Active Directory object. It configures its SID to match the domain computer account's SID and sets an initial password with the domain. The computer then performs other tasks related to joining the domain. It adds the Domain Admins group to the local Administrators group and the Domain Users group to the local Users group.

9. You are prompted to restart the computer. Click **OK** to close this message box.
10. Click **Close** (in Windows Vista) or **OK** (in Windows XP) to close the **System Properties** dialog box.
11. You are prompted again to restart the computer, after which the system is fully a member of the domain, and you can log on by using domain credentials.

Secure Computer Creation and Joins



- Prestage computer objects in the correct OUs
  - Computer is in the correct OU and does not require moving
  - Group Policy applies to the computer immediately after joining the domain
  - Tighter security of computer OU and Computers container
- Configure the default computer container
  - *redircmp "DN of OU for new computer objects"*
- Restrict the ability of users to create computers
  - By default, *any* user can join 10 machines to the domain
    - Requires no prestaging
  - Change the *ms-DS-MachineAccountQuota* value to 0
- Delegate to appropriate groups the permission to create computer objects in the appropriate OUs

Creating computer accounts and joining computers to a domain are security-sensitive operations. Therefore, it is very important that these steps are as secure as possible.

Prestage Computer Objects

The best practice is to prestage a computer account prior to joining the machine to the domain. However, Windows allows you to join a computer to a domain without following this best practice. You can log on to a workgroup computer as a local administrator and change the computer membership to the domain. On demand, Windows creates a computer object in the default computer container, gives you permission to join a computer to that object, and then proceeds to join the system to the domain.

There are three problems with this Windows process:

- First, the computer account created automatically by Windows is placed in the default computer container, which is not where the computer object belongs in most enterprises.
- Second, you must move the computer from the default computer container into the correct OU, which is an extra step that is often forgotten.
- Third, any domain user can also do this—no domain-level administrative permissions are required. Any user can join any computer to the domain if you don't manage and secure the process. Because a computer object is a security principal, and because the creator of a computer object owns the object and can change its attributes, this exposes a potential security vulnerability. The next sections detail these disadvantages.

Configuring the Default Computer Container

When you join a computer to the domain and the computer object does not already exist in Active Directory, Windows automatically creates a computer account in the default computer container, which is called, Computers (CN=Computers,DC=domain) by default. The problem with this relates to the discussion of OU design earlier in the lesson. If you have implemented the best practices described there, you have delegated permissions to administer computer objects in specific OUs for clients and servers. Additionally, you might have linked GPOs to those OUs to manage the configuration of these computer objects. If a new computer object is created outside of those OUs, in the default computer container, the permissions and configuration it inherits from its parent container will be different than what it should have received. You will then need to remember to move the computer from the default container to the correct OU after joining the domain.

There are two recommended steps to reduce the likelihood of this problem. First, you should attempt to always prestage computer accounts. If an account is prestaged for a computer in the correct OU, when the computer joins the domain, it will use the existing account and will be subject to the correct delegation and configuration.

Second, to reduce the impact of systems being joined to the domain without a prestaged account, you should change the default computer container so that it is not the Computers container itself, but instead is an OU that is subject to appropriate delegation and configuration. For example, if you have an OU called New Clients, you can instruct Windows to use that OU as the default computer container, so that if computers are joined to the domain without prestaged accounts, the objects are created in the New Clients OU.

The redircmp.exe command is used to redirect the default computer container with the following syntax.

```
redircmp "DN of OU for new computer objects"
```

Now, if a computer joins the domain without a prestaged computer account, Windows creates the computer object in the specified organizational unit. On this OU, you can apply some baseline GPO settings that affect all computers in the domain.

Note The same concepts apply to the creation of user accounts. By default, if a user account is created by using a legacy practice that does not specify the OU for the account, the object is created in the default user container (CN=Users,DC=domain, by default). The redirusr.exe command can be used to redirect the default container to an actual OU that is delegated and configured appropriately. Redirusr, like redircmp, takes a single option: the distinguished name (DN) of the OU that will become the default user container.

Restricting the Ability of Users to Create Computers

When a computer account is prestaged, the permissions on the account determine who is allowed to join that computer to the domain. When an account is not prestaged, Windows will, by default, allow any authenticated user to create a computer object in the default computer container. In fact, Windows will allow any authenticated user to create 10 computer objects in the default computer container. The creator of a computer object, by default, has permission to join that computer to the domain. It is through this mechanism that any authenticated user can join 10 computers to the domain without any explicit permission to do so.

The 10-computer quota is configured by the ms-DS-MachineAccountQuota attribute of the domain. It allows any authenticated user to join a machine to the domain, no questions asked. This is problematic from a security perspective because computers are security principals, and the creator of a security principal has permission to manage that computer's properties. In a way, the quota is like allowing any domain user to create 10 user accounts, without any controls.

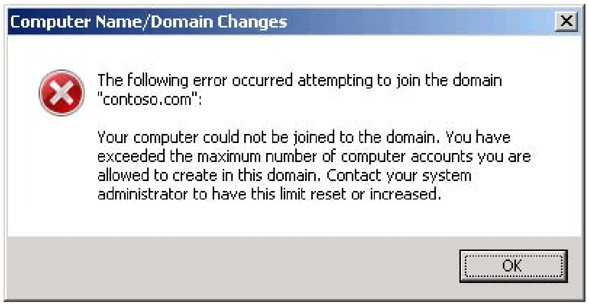
We highly recommend that you close this loophole, so that nonadministrative users cannot join machines to the domain. To change the ms-DS-MachineAccountQuota attribute, perform the following steps:

1. Open the ADSI Edit MMC console from the **Administrative Tools** folder.
2. Right-click **ADSI Edit**, and then click **Connect To**.
3. In the **Connection Point** section, click **Select A Well Known Naming Context**, and then select **Default Naming Context** from the drop-down list.
4. Click **OK**.
5. In the console tree, expand **Default Naming Context**.
6. Right-click the domain folder**—**"dc=contoso,dc=com", for example—and then click **Properties**.
7. Click **ms-DS-MachineAccountQuota,** and then click **Edit**.
8. Type **0**.
9. Click **OK**.

The Authenticated Users group is also assigned the user right to add workstations to the domain, but you do not have to modify this right if you have changed the default value of the ms-DS-MachineAccountQuota attribute.

After you have changed the ms-DS-MachineAccountQuota attribute to 0, you can be assured that the only users who can join computers to the domain are those who have been specifically delegated permission to join prestaged computer objects or to create new computer objects.

After you've eliminated this loophole, you must ensure you have given appropriate administrators explicit permission to create computer objects in the correct OUs, as described in the "Delegating Permission to Create Computers" section, otherwise the following error message will appear.



The following error occurred attempting to join the domain "contoso.com":

Your computer could not be joined to the domain. You have exceeded the maximum number of computer accounts you are allowed to create in this domain. Contact your system administrator to have this limit reset or increased.

Delegating Computer Management

The fourth task to improve the security of computer accounts is to delegate computer management tasks at the OU level. Delegation is discussed in Module 8. The following dsacls commands can be used to delegate computer management tasks:

- Create a computer.

```
dsacls "DN of OU" /I:T /G "DOMAIN\group":CC;computer
```

- Delete a computer.

```
dsacls "DN of OU" /I:T /G "DOMAIN\group":DC;computer
```

- Join a computer to the domain.

```
dsacls "DN of OU" /I:S /G "DOMAIN\group":
          "Validated write to DNS host name";computer

dsacls "DN of OU" /I:S /G "DOMAIN\group":
          "Validated write to service principal name";computer

dsacls "DN of OU" /I:S /G "DOMAIN\group":
          CA;Reset Password;computer

dsacls "DN of OU" /I:S /G "DOMAIN\group":
          WP;Account Restrictions;computer
```

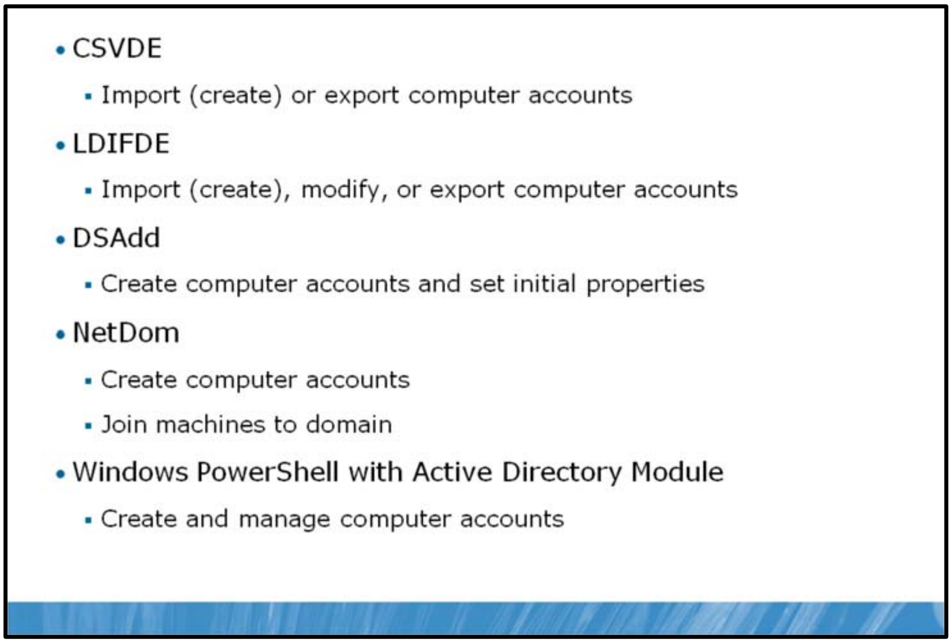
The preceding four commands should be entered at the command prompt with no space after the colon.

- Move a computer.

  Requires permissions to delete computers in the source OU and create computers in the destination OU. Even though a move does not actually delete or create the account, this is the permission that is used by the Access Check.

  Question: What two factors determine whether you can join a computer account to the domain?

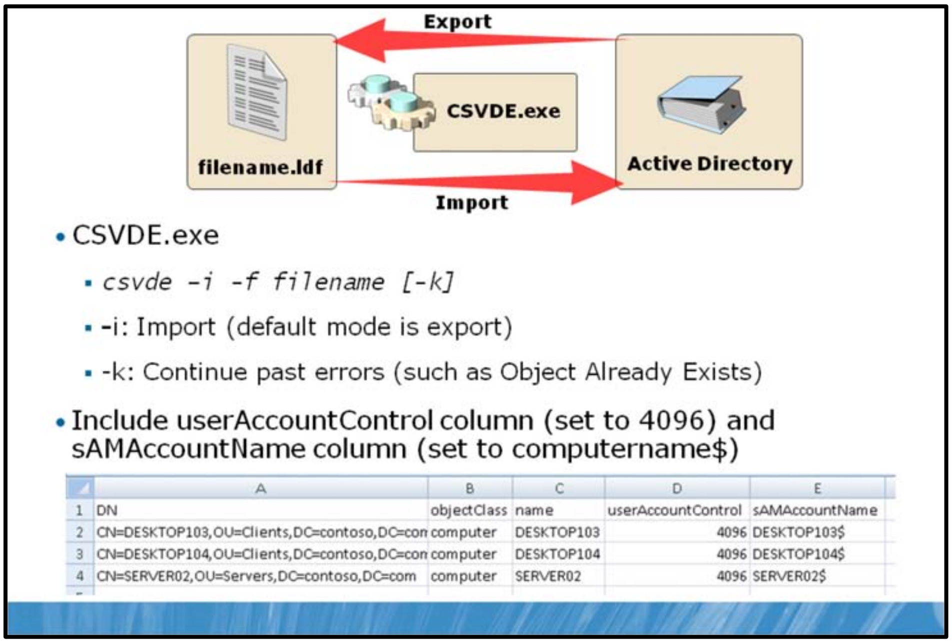
Automate Computer Account Creation



- CSVDE
  - Import (create) or export computer accounts
- LDIFDE
  - Import (create), modify, or export computer accounts
- DSAdd
  - Create computer accounts and set initial properties
- NetDom
  - Create computer accounts
  - Join machines to domain
- Windows PowerShell with Active Directory Module
  - Create and manage computer accounts

The steps you have learned for creating a computer account become burdensome if you are tasked with creating dozens or even hundreds of computer accounts at the same time. Commands such as Comma Separated Value Directory Exchange (CSVDE), Lightweight Directory Access Protocol (LDAP) Data Interchange Format Directory Exchange (LDIFDE), and DSAdd can import and automate the creation of computer objects. Scripts can also allow you to provision computer objects, that is, to perform business logic such as the enforcement of computer naming conventions. Also, if you are using Windows Server 2008 R2, you can use Windows PowerShell with Active Directory Module to automate the creation of computer accounts.

Import Computers with CSVDE



- CSVDE.exe
  - *csvde -i -f filename [-k]*
  - -i: Import (default mode is export)
  - -k: Continue past errors (such as Object Already Exists)
- Include userAccountControl column (set to 4096) and sAMAccountName column (set to computername$)

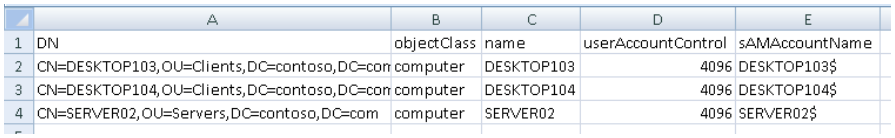
	A	B	C	D	E
1	DN	objectClass	name	userAccountControl	sAMAccountName
2	CN=DESKTOP103,OU=Clients,DC=contoso,DC=con	computer	DESKTOP103	4096	DESKTOP103$
3	CN=DESKTOP104,OU=Clients,DC=contoso,DC=con	computer	DESKTOP104	4096	DESKTOP104$
4	CN=SERVER02,OU=Servers,DC=contoso,DC=com	computer	SERVER02	4096	SERVER02$

CSVDE is a command-line tool that imports or exports Active Directory objects from or to a comma-delimited text file (also known as a comma-separated value text file, or .csv file). The basic syntax of the CSVDE command is.

```
csvde [-i] [-f "Filename"] [-k]
```

The -i option specifies import mode—without it, the default mode of CSVDE is export. The -f option identifies the file name to import from or export to. The -k option is useful during import operations, because it instructs CSVDE to ignore errors, including “object already exists,” “constraint violation,” and “attribute or value already exists.”

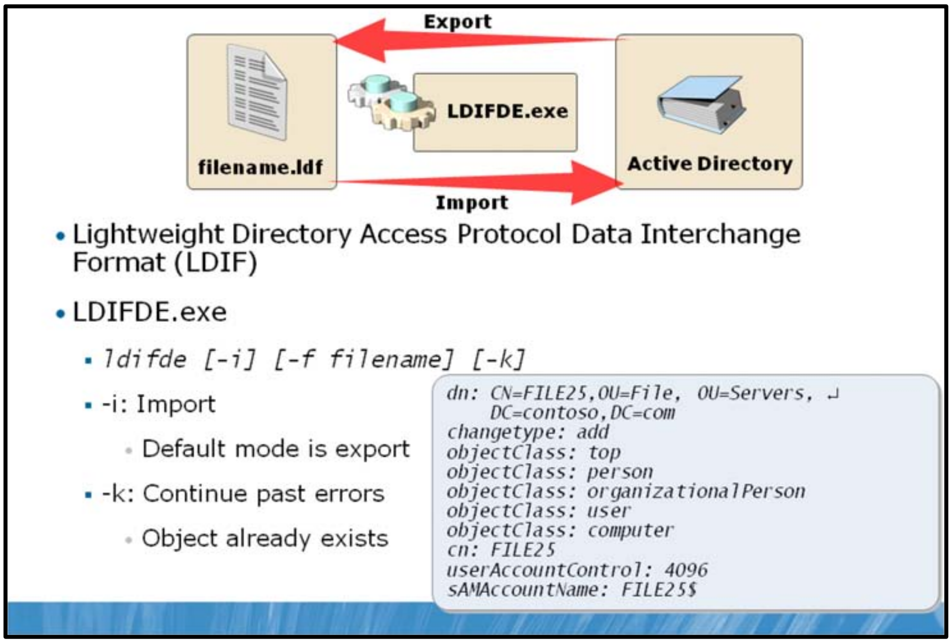
Comma-delimited files can be created, modified, and opened with tools as familiar as Notepad and Microsoft Office Excel®. The first line of the file defines the attributes by their LDAP attribute names. Each object follows, one per line, and must contain exactly the attributes listed on the first line. A sample file is shown in Excel as follows.



	A	B	C	D	E
1	DN	objectClass	name	userAccountControl	sAMAccountName
2	CN=DESKTOP103,OU=Clients,DC=contoso,DC=con	computer	DESKTOP103	4096	DESKTOP103$
3	CN=DESKTOP104,OU=Clients,DC=contoso,DC=con	computer	DESKTOP104	4096	DESKTOP104$
4	CN=SERVER02,OU=Servers,DC=contoso,DC=com	computer	SERVER02	4096	SERVER02$

When importing computers, be sure to include the userAccountControl attribute, and set it to 4096. This attribute ensures that the computer will be able to join the account. Also include the pre-Windows 2000 logon name of the computer, the sAMAccountName attribute, which is the name of the computer followed by a dollar sign ($), as shown in the preceding sample.

Import Computers with LDIFDE



- Lightweight Directory Access Protocol Data Interchange Format (LDIF)
- LDIFDE.exe
  - `ldifde [-i] [-f filename] [-k]`
  - -i: Import
    - Default mode is export
  - -k: Continue past errors
    - Object already exists

```
dn: CN=FILE25,OU=File, OU=Servers, ↵
    DC=contoso,DC=com
changetype: add
objectClass: top
objectClass: person
objectClass: organizationalPerson
objectClass: user
objectClass: computer
cn: FILE25
userAccountControl: 4096
sAMAccountName: FILE25$
```

LDIFDE.exe imports data from files in the LDAP Data Interchange Format (LDIF) format. LDIF files are text files within which operations are specified by a block of lines separated by a blank line. Each operation begins with the DN attribute of the object that is the target of the operation. The next line, changeType, specifies the type of operation: add, modify, or delete.

The following listing is an LDIF file that will create a computer account in the Servers OU.

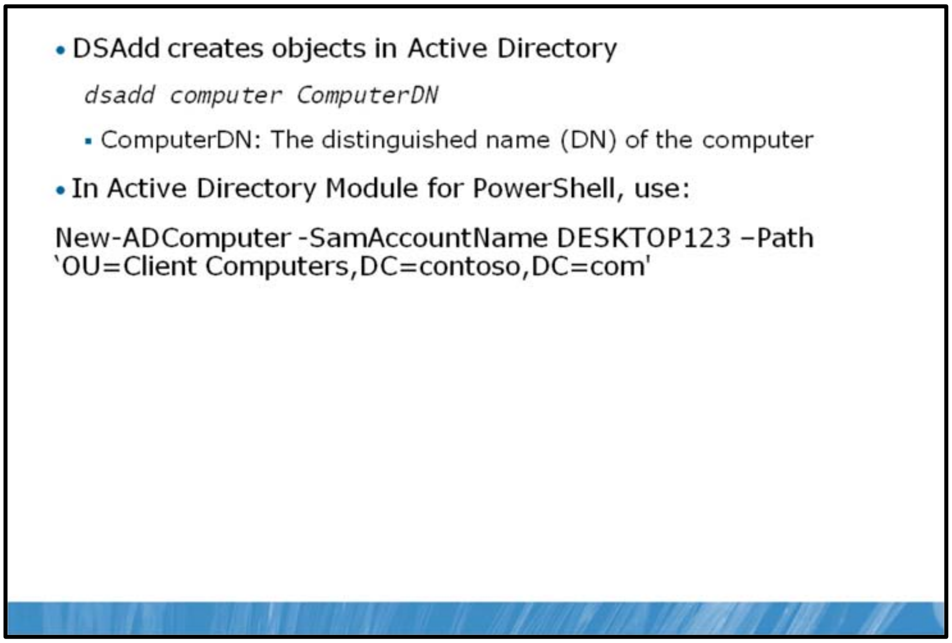
```
dn: CN=FILE25,OU=File,OU=Servers,DC=contoso,DC=com

changetype: add

objectClass: top

objectClass: person

objectClass: organizationalPerson

objectClass: user

objectClass: computer

cn: FILE25

userAccountControl: 4096

sAMAccountName: FILE25$
```

The basic syntax of the LDIFDE command is similar to that of the CSVDE command.

ldifde [-i] [-f "*Filename*"] [-k]

By default, LDIFDE is in export mode. The -i option specifies the import mode. You must specify **-f** to identify the file you are using for import or export. LDIFDE will stop when it encounters errors, unless you specify the -k option, in which case, LDIFDE continues processing.

Create Computer Accounts with DSAdd and PowerShell



- DSAdd creates objects in Active Directory

  dsadd computer ComputerDN

  - ComputerDN: The distinguished name (DN) of the computer
- In Active Directory Module for PowerShell, use:

New-ADComputer -SamAccountName DESKTOP123 –Path 'OU=Client Computers,DC=contoso,DC=com'

The DSAdd command is used to create objects in Active Directory. To create computer objects, simply type the following command.

```
dsadd computer ComputerDN
```

where ComputerDN is the distinguished name (DN) of the computer, such as CN=DESKTOP123,OU=NYC,OU=Client Computers,DC=contoso,DC=com.

If the computer's DN includes a space, surround the entire DN with quotation marks.

The DSAdd Computer command can take the following options after the DN option:

- -samid ComputerName
- -desc Description
- -loc Location

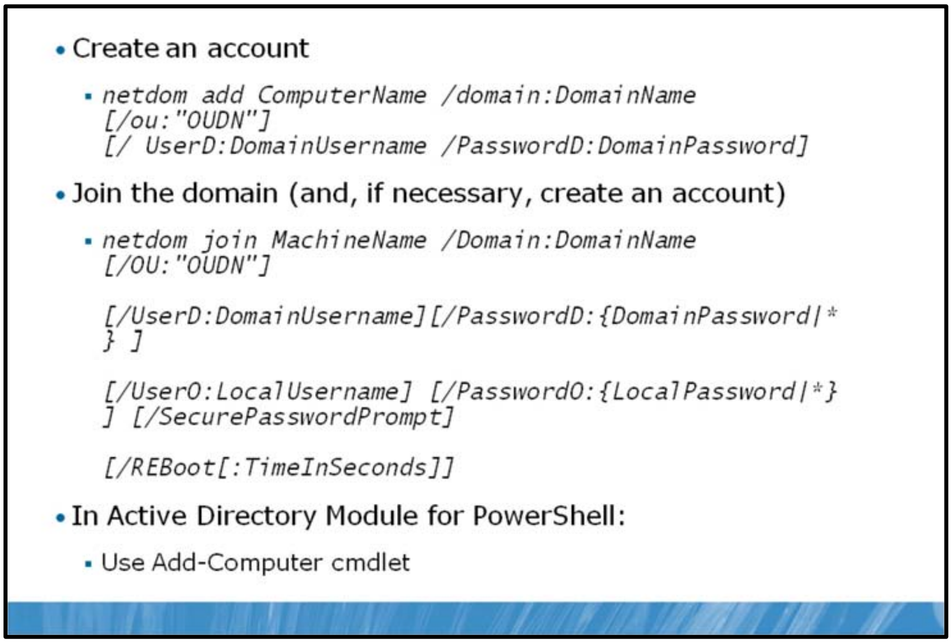
Note Content in the following section is specific to Windows Server 2008 R2.

You can also use the Active Directory module for Windows PowerShell® to create a computer account in AD DS. The following example demonstrates how to create a new computer, DESKTOP123, in the Client Computers OU in the contoso.com domain.

```
New-ADComputer -SamAccountName DESKTOP123 –Path 'OU=Client Computers,DC=contoso,DC=com'
```

For a full explanation of the parameters that you can pass to New-ADComputer, at the Active Directory module command prompt, type **Get-Help New-ADComputer –detailed**, and then press Enter.

Create and Join Computers with NetDom and PowerShell



- Create an account

  -
    ```
    netdom add ComputerName /domain:DomainName
    [/ou:"OUDN"]
    [/ UserD:DomainUsername /PasswordD:DomainPassword]
    ```
- Join the domain (and, if necessary, create an account)

  -
    ```
    netdom join MachineName /Domain:DomainName
    [/OU:"OUDN"]

    [/UserD:DomainUsername][/PasswordD:{DomainPassword|*
    } ]

    [/UserO:LocalUsername] [/PasswordO:{LocalPassword|*}
    ] [/SecurePasswordPrompt]

    [/REBoot[:TimeInSeconds]]
    ```
- In Active Directory Module for PowerShell:
  - Use Add-Computer cmdlet

The NetDom command is also able to perform a variety of domain account and security tasks from the command prompt. You can also use NetDom to create a computer account, by typing the following command.

```
netdom add ComputerName /domain:DomainName [/ou:"OUDN"]
   [/UserD:DomainUsername /PasswordD:DomainPassword]
```

This command creates the computer account for ComputerName in the domain indicated by the /domain option, using the credentials specified by /UserD and /PasswordD. The /ou option causes the object to be created in the OU specified by the organizational unit distinguished name (OUDN) following the option. If no OUDN is supplied, the computer account is created in the default computer container. The user credentials must, of course, have permissions to create computer objects.

Using NetDom.exe

The NetDom.exe command allows you to join a computer to the domain from the command prompt. The basic syntax of the command is as follows.

```
netdom join MachineName /Domain:DomainName [/OU:"OUDN"]
   [/UserD:DomainUsername] [/PasswordD:{DomainPassword|*} ]
   [/UserO:LocalUsername] [/PasswordO:{LocalPassword|*} ]
   [/SecurePasswordPrompt]
   [/REBoot[:TimeInSeconds]]
```

It can be useful to join a machine to a domain from the command prompt. The first reason this is useful is because the join can be included in a script that performs other actions. For example, you could create a batch file that creates the computer account by using NetDom or DSAdd—the latter of which allows you to specify other attributes, including description—and then joins the machine to that account by using NetDom. Second, NetDom.exe can be used to remotely join a machine to the domain. Third, NetDom.exe allows you to specify the OU for the computer object. The command's options are, for the most part, self-explanatory. /UserO and /PasswordO are credentials that are members of the workgroup computer's local Administrators group. Specifying * for the password causes NetDom.exe to prompt for the password at the command prompt. /UserD and /PasswordD are domain credentials with permission to create a computer object, if the account is not prestaged, or to join a computer to a prestaged account. The /reboot option causes the system to reboot after joining the domain. The default timeout is 30 seconds. The /SecurePasswordPrompt option displays a popup for credentials when * is specified for either /PasswordO or /PasswordD.

Note If you want to use NetDom remotely, the Windows Firewall configuration on the computer that will be joined to the domain must allow Network Discovery and Remote Administration.

Using Windows PowerShell

Note Content in the following section is specific to Windows Server 2008 R2.

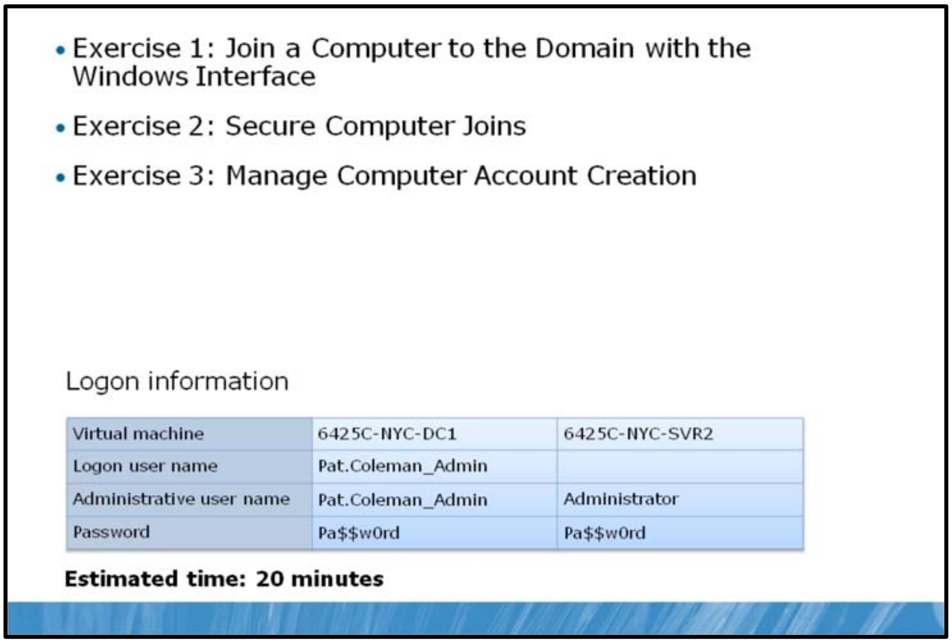
Beside the netdom command, you can also use Windows PowerShell with Active Directory Module to perform a domain join for a local machine. In PowerShell, you should use the Add-Computer cmdlet to perform a domain join.

The following example demonstrates how to add the local computer on which this command is being run, to the contoso.com domain. The local computer is added to the OU in the directory that is specified by the OUPath parameter, using the current logged-on user credentials. You must run this command on the local computer.

```
Add-Computer -DomainOrWorkgroupName Contoso -OUPath OU=Client
Computers,DC=contoso,DC=com
```

For a full explanation of the parameters that you can pass to Add-Computer, at the Active Directory Module command prompt, type **Get-Help Add-Computer –detailed**, and then press Enter.

Lab A: Create Computers and Join the Domain



- Exercise 1: Join a Computer to the Domain with the Windows Interface
- Exercise 2: Secure Computer Joins
- Exercise 3: Manage Computer Account Creation

Logon information

Virtual machine	6425C-NYC-DC1	6425C-NYC-SVR2
Logon user name	Pat.Coleman_Admin	
Administrative user name	Pat.Coleman_Admin	Administrator
Password	Pa$$w0rd	Pa$$w0rd

Estimated time: 20 minutes

Lab Setup

For this lab, you will use the available virtual machine environment. Before you begin the lab, you must complete the following steps:

1. On the host computer, click **Start**, point to **Administrative Tools**, and then click **Hyper-V Manager**.
2. In Hyper-V™ Manager, click **6425C-NYC-DC1** and **6425C-NYC-DC2**, and in the Actions pane, click **Start**.
3. In the Actions pane, click **Connect**. Wait until the virtual machine starts.
4. Log on by using the following credentials:
   - User name: **Pat.Coleman_Admin**
   - Password: **Pa$$w0rd**
   - Domain: **Contoso**
5. Open Windows Explorer on **6425C-NYC-DC1** and then browse to **D:\Labfiles\Lab05a**.
6. Run **Lab05a_Setup.bat** with administrative credentials. Use the account **Pat.Coleman_Admin**, with the password, **Pa$$w0rd**.
7. The lab setup script runs. When it is complete, press any key to continue.
8. Close the Windows Explorer window, **Lab05a**.
9. In Hyper-V™ Manager, click **6425C-NYC-SVR2**, and in the Actions pane, click **Start**.
10. In the Actions pane, click **Connect**. Wait until the virtual machine starts. Do not log on to NYC-SVR2 until directed to do so.

Lab Scenario

You are an administrator for Contoso, Ltd. During a security audit, it was identified that there is no control over the creation of new computer accounts: both clients and servers are being added to the domain with no assurance that process is being followed. In fact, a number of computer accounts were discovered in the Computers container. These computer objects were for active computer accounts, but the computers had not been created in or moved to the correct OUs within the Client Computers or Servers OUs according to standard procedures. You've been tasked with improving the procedures.

Exercise 1: Join a Computer to the Domain with the Windows Interface

In this exercise, you will join a computer to the domain using the Windows interface, and then you will remove the machine from the domain.

The main tasks for this exercise are as follows:

1. Identify and correct a DNS configuration error.
2. Join NYC-SVR2 to the domain.
3. Verify the location of the NYC-SVR2 account.
4. Remove NYC-SVR2 from the domain.
5. Delete the NYC-SVR2 account.

▶ Task 1: Identify and correct a DNS configuration error.

1. Log on to NYC-SVR2 as **Administrator,** with the password, **Pa$$w0rd**.
2. Open **System Properties** by using one of the following methods:
   - Click **Start**, right-click **Computer**, and then click **Properties**.
   - Open **System** from **Control Panel**.
   - Press the Windows logo key and the Pause key.
3. Attempt to join the computer to the domain, **contoso.com**, being sure to use the fully qualified domain name (contoso.com) rather than the NetBIOS name for the domain (contoso).

   Doing so tests that DNS is configured correctly on the client for locating the domain.
4. Change the DNS Server configuration on the client to **10.0.0.10.**

   Question: Why might the join have succeeded if you had used the domain name **contoso,** instead of **contoso.com**? What might go wrong after the domain was successfully joined but with DNS incorrectly configured?

   Answer: The use of the fully qualified name forced the name resolution process to use DNS, and because DNS failed, the domain join failed. The domain name, “contoso”, is a flat domain name that could be resolved through NetBIOS name resolution. Even though the domain join would be successful, the client would likely have problems locating domain controllers in other sites, and locating other resources in the domain. Performing the join with a fully qualified domain name ensures that DNS is functioning before joining the domain.

▶ Task 2: Join NYC-SVR2 to the domain.

1. Join **NYC-SVR2** to the domain. When prompted for domain credentials, enter the user name, **Aaron.Painter,** and the password, **Pa$$w0rd**.
2. Note that **Aaron.Painter** is a standard user in the **contoso.com** domain. He has no special rights or permissions, and yet he is able to join a computer to the domain. He does have to be logged on to the computer with an account that is a member of the computer's Administrators group.
3. Allow the system to restart.

▶ Task 3: Verify the location of the NYC-SVR2 account.

1. On NYC-DC1, run Active Directory Users and Computers as an administrator, with the user name, **Pat.Coleman_Admin,** and the password, **Pa$$w0rd**.
2. Locate the NYC-SVR2 account.

   Question: In which OU or container does the account exist?

   Answer: The Computers container.

▶ Task 4: Remove NYC-SVR2 from the domain.

1. Log on to NYC-SVR2 as **Administrator,** with the password**, Pa$$w0rd**.
2. Change NYC-SVR2**'s** domain/workgroup membership to a workgroup named, **WORKGROUP**.
3. Restart the server.

▶ Task 5: Delete the NYC-SVR2 account.

Question: On NYC-DC1, refresh the view of the Computers container and examine the NYC-SVR2 account. What is its status?

Answer: The status is Disabled.

Question: You were not prompted for domain credentials in Task 4, and yet a change was made to the domain: the computer account was reset and disabled. What credentials were used to do this? What credentials were used to change the workgroup/domain membership of NYC-SVR2?

Answer: This is a tricky question. Domain credentials with appropriate permissions are required to make a change to the domain, such as resetting and disabling a computer account; and credentials that are in the local Administrators group on the client are required to change the computer's workgroup/domain membership.

You were logged on to NYC-SVR2 as the local Administrator, so you were able to change the computer's workgroup/domain membership. Normally, you would have been prompted for domain credentials, but it just so happens that the local Administrator account's user name, Administrator, and password, Pa$$w0rd, are identical to those of the domain Administrator account, which of course has permission to modify objects in the domain. Windows attempts to authenticate you behind the scenes, and only prompts you for domain credentials if that authentication fails. In this case, because of the similarity in credentials, you were actually authenticated as the domain's Administrator.

In a production environment, the domain's Administrator account should have a very long, complex, secure password that is different from the passwords used for Administrator accounts in the domain member computer.

- Delete the NYC-SVR2 computer object.

Result: In this exercise, you became familiar with typical legacy practices used to join computers to a domain.

Exercise 2: Secure Computer Joins

In this exercise, you will implement best practices to secure the joining of machines to the domain.

The main tasks for this exercise are as follows:

1. Redirect the default computer container.
2. Restrict unmanaged domain joins.
3. Validate the effectiveness of ms-DS-MachineAccountQuota.

▶ Task 1: Redirect the default computer container.

1. On NYC-DC1, run a command prompt as an administrator with the user name, **Pat.Coleman_Admin**, and the password, **Pa$$w0rd**.
2. Use the **RedirCmp** command to redirect the default computers container to the **New Computers** OU in the **contoso.com** domain.

▶ Task 2: Restrict unmanaged domain joins.

1. Run the ADSI Edit console as an administrator with the user name, **Pat.Coleman_Admin**, and the password, **Pa$$w0rd**.
2. Connect to the domain and, in the properties of the domain, change the **ms-DS-MachineAccountQuota** to zero (0).

▶ Task 3: Validate the effectiveness of ms-DS-MachineAccountQuota.

- Log on to NYC-SVR2 as **Administrator** and attempt to join **NYC-SVR2** to the **contoso.com** domain just as you did in Exercise 1. When prompted for domain credentials, enter the user name, **Aaron.Painter**, and the password, **Pa$$w0rd**.

  In Exercise 1, Aaron Painter was able to join the domain. Now, he is unable to join the domain.

  Question: What message do you receive when a user is no longer able to create a computer object because of the ms-DS-MachineAccountQuota?

Results: In this exercise, you redirected the container for creating computer accounts to the New Computers OU, and restricted the users from joining computers to the domain without explicit permissions to do so.

Exercise 3: Manage Computer Account Creation

In this exercise, you will implement several best practices for creating computer accounts and joining machines to the domain.

The main tasks for this exercise are as follows:

1. Prestage a computer account.
2. Join a computer remotely to a prestaged account by using NetDom.

▶ Task 1: Prestage a computer account.

1. On NYC-DC1, run **Active Directory Users and Computers** as an administrator with the user name, **Pat.Coleman_Admin**, and the password, **Pa$$w0rd**.
2. In the **Servers\File** OU, create a new computer object for NYC-SVR2 and give the **AD_Server_Deploy** group permission to join the computer to the domain.

▶ Task 2: Join a computer remotely to a prestaged account by using NetDom.

In this task, you will join **NYC-SVR2** to the domain remotely, using credentials that are in the local **Administrators** group of **NYC-SVR2** and domain credentials that are in the **AD_Server_Deploy** group.

1. Run the command prompt as an administrator, with the user name, **Aaron.Painter_Admin**, and the password, **Pa$$word**.

> **Note** **Aaron.Painter_Admin** is not an administrator. The **Run as an administrator** command allows you to run a process with any credentials, as long as those credentials have sufficient privilege to run the process itself.

2. Type the command, **whoami /groups**, to list the group memberships of the current account (**Aaron.Painter_Admin**). Note that the user is a member of **AD_Server_Deploy** and is not a member of any other administrative group.
3. Using the **NetDom** command, join **NYC-SVR2** to the domain. Use the local Administrator account credentials for **NYC-SVR2** and the domain credentials for **Aaron.Painter_Admin**, who is a member of **AD_Server_Deploy** and therefore has permission to join the computer to the domain. Configure the server to reboot automatically in 5 seconds.

   Type the following command, and then press Enter.

```
netdom join NYC-SVR2 /domain:contoso.com
   /UserO:Administrator /PasswordO:*
   /UserD:CONTOSO\Aaron.Painter_Admin /PasswordD:*
   /REBoot:5
```

> **Note** The NYC-SVR2 firewall exceptions are configured for ports 135, 139, and for Network Discovery (NB-Name-In). These exceptions allow NetDom Join to be used to remotely join NYC-SVR2 to the domain.

4. The server restarts.

5. Log on to NYC-SVR2 as Contoso\Pat.Coleman, with the password of Pa$$w0rd. This confirms that the server has successfully joined the domain.
6. Log off from NYC-SVR2.

Results: After completing this exercise, NYC-SVR2 will be joined to the domain with an account in the Servers\File OU.

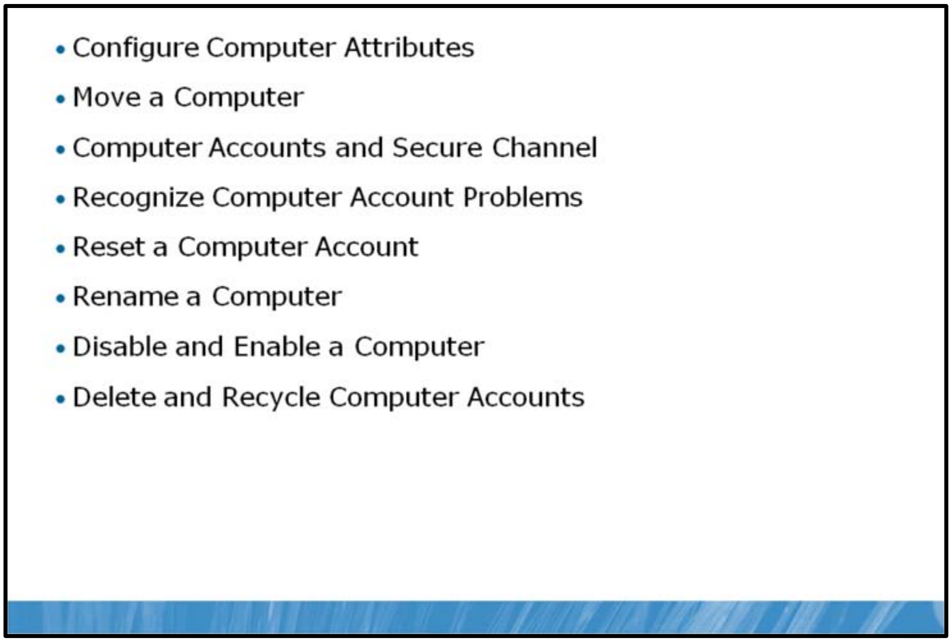
Important Do not shut down the virtual machines after you finish this lab because the settings you have configured here will be used in Lab B.

Lab Review Questions

Question: What did you learn about the pros and cons of various approaches to creating computer accounts in an AD DS domain?

Question: What are the two credentials that are necessary for any computer to join a domain?

Lesson 2
Administer Computer Objects and Accounts



- Configure Computer Attributes
- Move a Computer
- Computer Accounts and Secure Channel
- Recognize Computer Account Problems
- Reset a Computer Account
- Rename a Computer
- Disable and Enable a Computer
- Delete and Recycle Computer Accounts

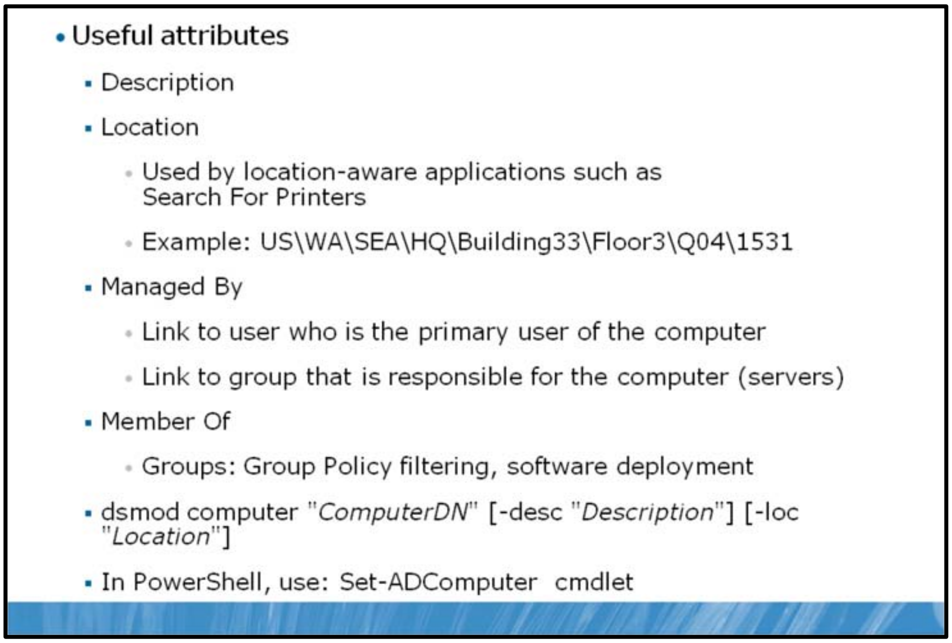
A computer account begins its life cycle when it is created and when the computer joins the domain. Day-to-day administrative tasks include configuring computer properties; moving the computer between OUs; managing the computer itself; and renaming, resetting, disabling, enabling, and eventually deleting the computer object. This lesson looks closely at the computer properties and procedures involved with these tasks, and will equip you to administer computers in a domain.

Objectives

After completing this lesson, you will be able to:

- Configure computer account properties.
- Move a computer between OUs.
- Recognize computer account problems.
- Reset a computer account.
- Rename a computer.
- Disable and enable a computer.

Configure Computer Attributes



- Useful attributes
  - Description
  - Location
    - Used by location-aware applications such as Search For Printers
    - Example: US\WA\SEA\HQ\Building33\Floor3\Q04\1531
  - Managed By
    - Link to user who is the primary user of the computer
    - Link to group that is responsible for the computer (servers)
  - Member Of
    - Groups: Group Policy filtering, software deployment
  - dsmod computer "*ComputerDN*" [-desc "*Description*"] [-loc "*Location*"]
  - In PowerShell, use: Set-ADComputer cmdlet

When you create a computer object by using Active Directory Users and Computers, you are prompted to configure only the most fundamental attributes, including the computer name and the delegation to join the computer to the domain. Computers have several properties that are not visible when you are creating the computer object; you should configure these properties as part of the process of staging the computer account.

Open a computer object's **Properties** dialog box to set its location and description, configure its group memberships and dial-in permissions, and link it to the user object of the user to whom the computer is assigned. The **Operating System** tab is read-only. The information will be blank until a computer has joined the domain using that account, at which time the client publishes the information to its account.

Several object classes in Active Directory support the **managedBy** attribute that is shown on the Managed By tab. This linked attribute creates a cross-reference to a user object. All other properties—the addresses and telephone numbers—are displayed directly from the user object. They are not stored as part of the computer object itself. Some organizations use the Managed By tab to link the computer to the primary user of the computer. Alternatively, you might choose to link the computer to a group that is responsible for the support of a computer. For example, this as an option might be attractive for computer accounts that represent servers.

On the Member Of tab of a computer's **Properties** dialog box, you can add the computer to groups. The ability to manage computers in groups is an important and often underutilized feature of Active Directory. A group to which computers belong can be used to assign resource access permissions to the computer, to filter the application of a GPO, or as a collection for a software management tool, such as Microsoft® System Center Configuration Manager 2007.

As with users and groups, it is possible to select more than one computer object and subsequently manage or modify properties of all selected computers simultaneously.

Configuring Computer Attributes with DSMod

You can use the DSMod command to modify the description and the location attributes of a computer object. It uses the following syntax.

```
dsmod computer "ComputerDN" [-desc "Description"] [-loc "Location"]
```

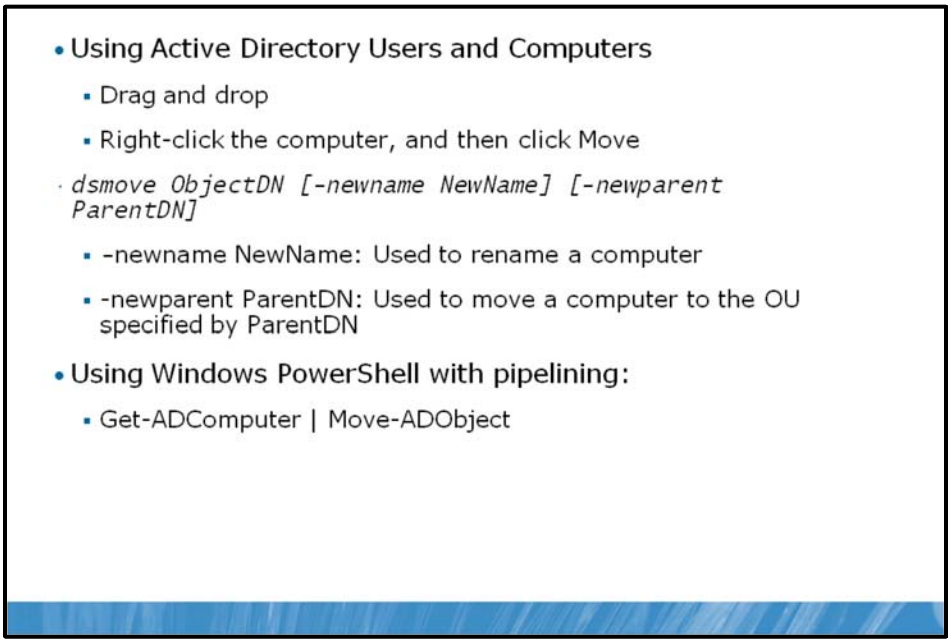
Note Content in the following section is specific to Windows Server 2008 R2.

Attributes of a computer account can also be managed by using Windows PowerShell with Active Directory Module.

The following example demonstrates how to modify the **ManagedBy** attribute of the computer LON-SRV1.

```
Set-ADComputer LON-SRV1 -ManagedBy 'CN=SQL Administrator
01,OU=UserAccounts,OU=Managed,DC=contoso,DC=com'
```

Move a Computer



- Using Active Directory Users and Computers
  - Drag and drop
  - Right-click the computer, and then click Move
- *dsmove ObjectDN [-newname NewName] [-newparent ParentDN]*
  - -newname NewName: Used to rename a computer
  - -newparent ParentDN: Used to move a computer to the OU specified by ParentDN
- Using Windows PowerShell with pipelining:
  - Get-ADComputer | Move-ADObject

Many organizations have multiple OUs for computer objects. Some domains, for example, have computer OUs based on geographic sites, as shown earlier in this module. If you have more than one OU for computers, it is likely that someday you will need to move a computer between OUs.

To move a computer by using the Active Directory Users and Computers snap-in, you can use one of the following options:

- Click the computer and then drag and drop the computer to the desired location.
- Right-click the computer, and then click **Move**.

The **DSMove** command allows you to move a computer object or any other object. The syntax of DSMove is as follows.

```
dsmove ObjectDN [-newname NewName] [-newparent ParentDN]
```

The -newname option allows you to rename an object. The -newparent option allows you to move an object. To move a computer named, DESKTOP153, from the Computers container to the NYC OU, you would type the following command.

```
dsmove "CN=DESKTOP153,CN=Computers,DC=contoso,DC=com" -newparent
"OU=NYC,OU=Client Computers,DC=contoso,DC=com"
```

Using Windows PowerShell

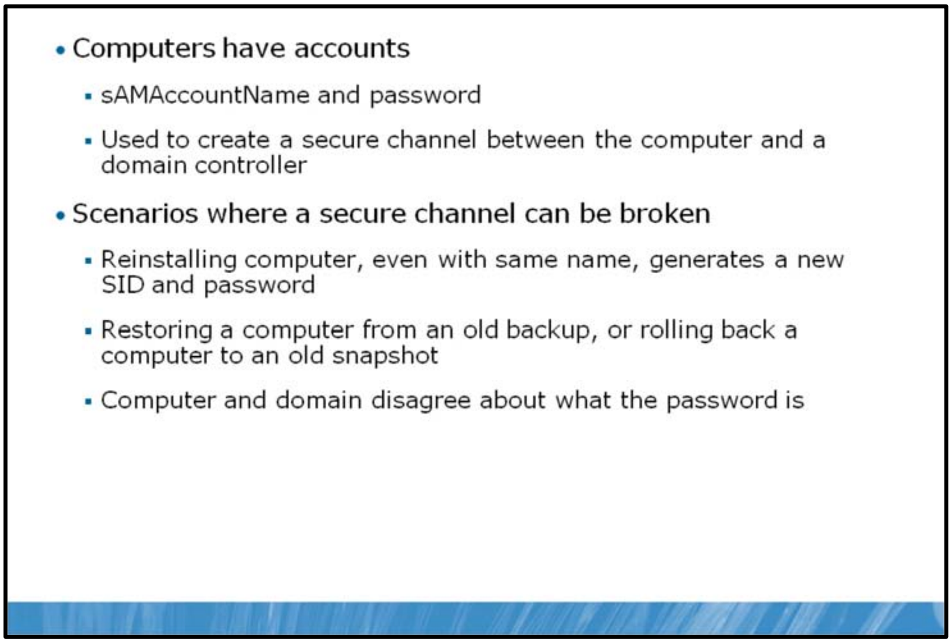
Note Content in the following section is specific to Windows Server 2008 R2.

You can also perform the move process for a computer by using Windows PowerShell with Active Directory Module. This is performed by using pipelined cmdlets, **Get-ADComputer** and **Move-ADObject**.

The following example demonstrates how to move the computer, Workstation1, to the ManagedComputers OU in the contoso.com domain.

```
Get-ADComputer Workstation1 | Move-ADObject -TargetPath
'OU=ManagedComputers,DC=contoso,DC=com'
```

Computer Account and Secure Channel



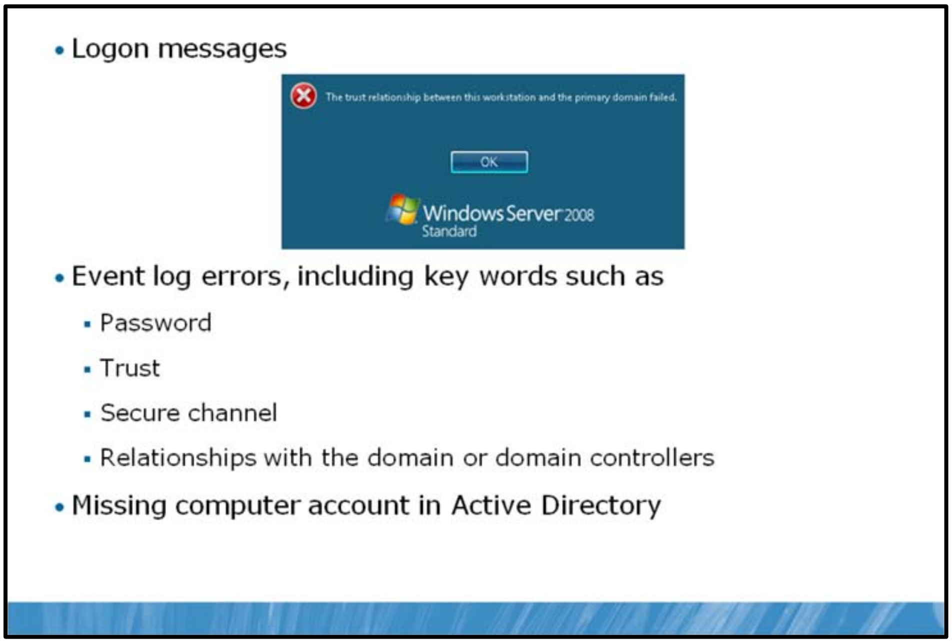
- Computers have accounts
  - sAMAccountName and password
  - Used to create a secure channel between the computer and a domain controller
- Scenarios where a secure channel can be broken
  - Reinstalling computer, even with same name, generates a new SID and password
  - Restoring a computer from an old backup, or rolling back a computer to an old snapshot
  - Computer and domain disagree about what the password is

Every member computer in an Active Directory domain maintains a computer account with a user name (sAMAccountName) and password, just like a user account does. The computer stores its password in the form of a local security authority (LSA) secret and changes its password with the domain every 30 days or so. The NetLogon service uses the credentials to log on to the domain, which establishes the secure channel with a domain controller.

Computer accounts and the secure relationships between computers and their domain are robust. However, certain scenarios might arise in which a computer is no longer able to authenticate with the domain. Examples of such scenarios include the following:

- After reinstalling the operating system on a workstation, the workstation is unable to authenticate, even though the technician used the same computer name. Because the new installation generated a new SID and because the new computer does not know the computer account password in the domain, it does not belong to the domain and cannot authenticate to the domain.
- A computer is completely restored from backup and is unable to authenticate. It is likely that the computer changed its password with the domain after the backup operation. Computers change their passwords every 30 days, and Active Directory remembers the current and previous password. If the restore operation restored the computer with a significantly outdated password, the computer will not be able to authenticate.
- A computer's LSA secret gets out of synchronization with the password known by the domain. You can think of this as the computer forgetting its password; although it did not forget its password, it just disagrees with the domain over what the password really is. When this happens, the computer cannot authenticate and the secure channel cannot be created.

Recognize Computer Account Problems



- Logon messages

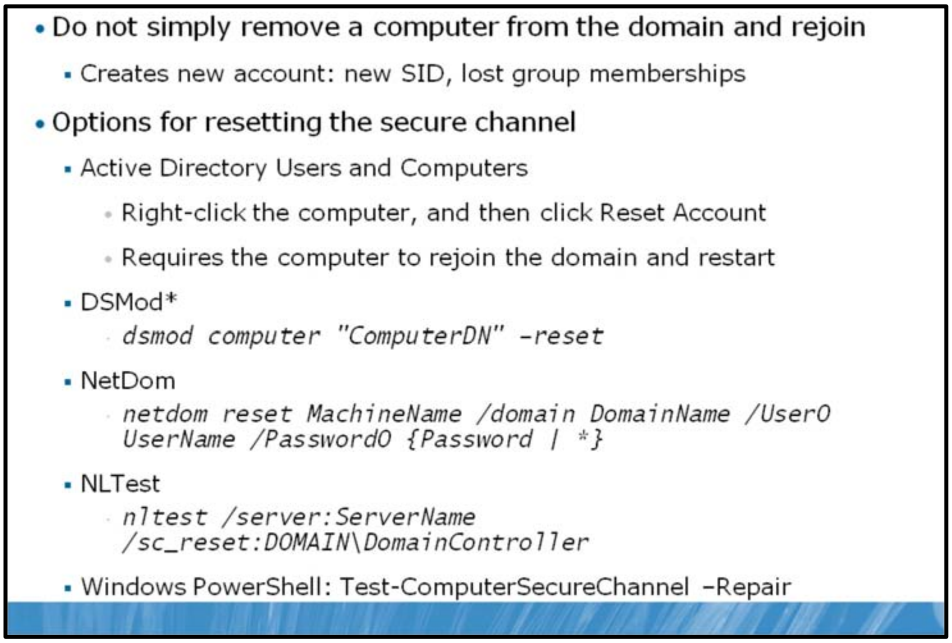
The trust relationship between this workstation and the primary domain failed.

- Event log errors, including key words such as
  - Password
  - Trust
  - Secure channel
  - Relationships with the domain or domain controllers
- Missing computer account in Active Directory

The most common signs of computer account problems are the following:

- Messages at logon indicate that a domain controller cannot be contacted, that the computer account might be missing, that the password on the computer account is incorrect, or that the trust relationship (another way of saying "the secure relationship") between the computer and the domain has been lost. An example is shown here.
- Error messages or events in the event log indicate similar problems or suggest that passwords, trusts, secure channels, or relationships with the domain or a domain controller have failed. One such error is NETLOGON Event ID 3210: Failed To Authenticate, which appears in the computer's event log.
- A computer account is missing in Active Directory.

Reset a Computer Account



- Do not simply remove a computer from the domain and rejoin
  - Creates new account: new SID, lost group memberships
- Options for resetting the secure channel
  - Active Directory Users and Computers
    - Right-click the computer, and then click Reset Account
    - Requires the computer to rejoin the domain and restart
  - DSMod*

    ```
    dsmod computer "ComputerDN" -reset
    ```

  - NetDom

    ```
    netdom reset MachineName /domain DomainName /User0
    UserName /Password0 {Password | *}
    ```

  - NLTest

    ```
    nltest /server:ServerName
    /sc_reset:DOMAIN\DomainController
    ```

  - Windows PowerShell: Test-ComputerSecureChannel -Repair

When the secure channel fails, you must reset the secure channel. Many administrators do so by removing the computer from the domain, putting it in a workgroup, and then rejoining the domain. This is not a good practice because it has the potential to delete the computer account altogether, which loses the computer's SID, and more importantly, its group memberships. When you rejoin the domain, even though the computer has the same name, the account has a new SID, and all the group memberships of the previous computer object must be re-created.

Do not remove a computer from the domain and rejoin it.

If the trust with the domain has been lost, do not remove a computer from the domain and rejoin it. Instead, reset the secure channel.

To reset the secure channel between a domain member and the domain, use the Active Directory Users and Computers snap-in, DSMod.exe, NetDom.exe, or NLTest.exe. If you reset the account, the computer's SID remains the same and it maintains its group memberships.

To reset the secure channel by using the Active Directory Users and Computers snap-in:

1. Right-click a computer, and then click **Reset Account**.
2. Click **Yes** to confirm your choice.
3. Rejoin the computer to the domain, and then restart the computer.

To reset the secure channel by using DSMod:

1. Type the following command.

```
dsmod computer "ComputerDN" –reset.
```

2. Rejoin the computer to the domain, and then restart the computer.

To reset the secure channel by using NetDom:

- Type the following command,

```
netdom reset MachineName /domain DomainName /UserO UserName /PasswordO {Password | *}
```

  where the credentials belong to the local **Administrators** group of the computer.

  This command resets the secure channel by attempting to reset the password on both the computer and the domain, so it does not require rejoining or rebooting.

To reset the secure channel by using NLTest, on the computer that has lost its trust, type the following command.

```
NLTEST /SERVER:SERVERNAME /SC_RESET:DOMAIN\DOMAINCONTROLLER
```

For example, the following command, like NetDom, attempts to reset the secure channel by resetting the password on both the computer and in the domain, so it does not require rejoining or restarting.

```
nltest /server:NYC-SVR2 /sc_reset:CONTOSO\NYC-SVR2
```

Because NLTest and NetDom reset the secure channel without requiring a reboot, you should try those commands first. Only if those are not successful should you use the Reset Account command or DSMod to reset the computer account.

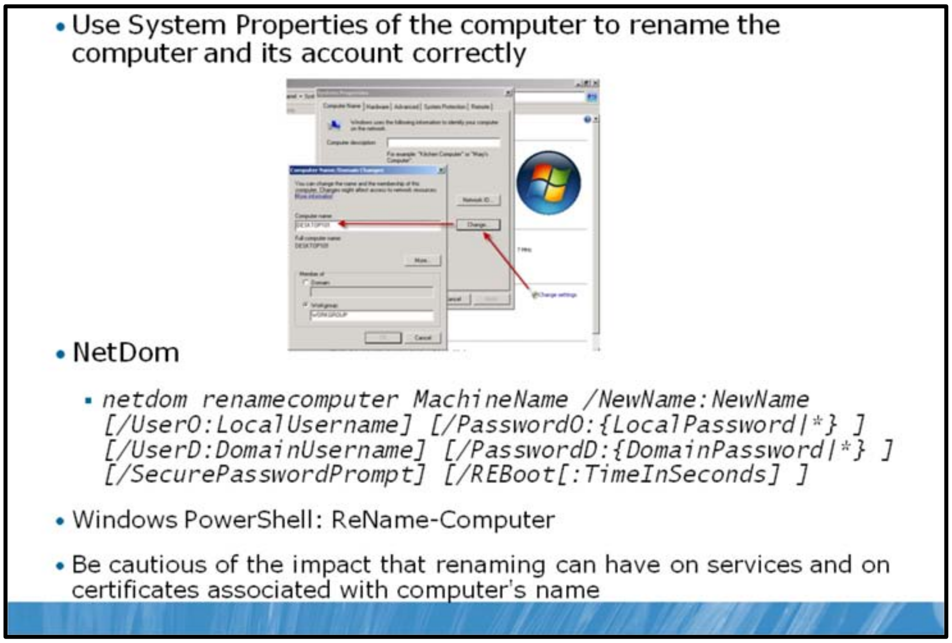
Note Content in the following section is specific to Windows Server 2008 R2.

You can also use Windows PowerShell with Active Directory Module to reset a computer account. The following example demonstrates how to reset the secure channel between the local computer and the domain to which it is joined. You must run this command on the local computer.

```
Test-ComputerSecureChannel –Repair
```

For a full explanation of the parameters that you can pass to Test-ComputerSeureChannel, at the Active Directory Module command prompt, type **Get-Help Test-ComputerSecureChannel –detailed**, and then press Enter.

Rename a Computer



- Use System Properties of the computer to rename the computer and its account correctly
- NetDom
  - *netdom renamecomputer MachineName /NewName:NewName [/UserO:LocalUsername] [/PasswordO:{LocalPassword|*}] [/UserD:DomainUsername] [/PasswordD:{DomainPassword|*}] [/SecurePasswordPrompt] [/REBoot[:TimeInSeconds]]*
- Windows PowerShell: ReName-Computer
- Be cautious of the impact that renaming can have on services and on certificates associated with computer's name

When you rename a computer, you must be careful to do it correctly. Remember that the computer uses its name to authenticate with the domain, so if you rename only the domain object, or only the computer itself, they will be out of synch. You must rename the computer in such a way that both the computer and the domain object are changed.

You can rename a computer correctly by logging on to the computer, either locally or with a remote desktop session.

1. Open **System Properties** from **Control Panel.**
2. In the **Computer name, domain, and workgroup settings** section, click **Change Settings**.
3. If you are prompted by **User Account Control**, click **Continue**.
4. Click the **Computer Name** tab.
5. Click the **Change** button.
6. Type the new name and click **OK** twice to close the dialog boxes.
7. Restart the computer to allow the change to take effect.

From the command prompt, you can use the NetDom command, with the following syntax.

```
netdom renamecomputer MachineName /NewName:NewName
   [/UserO:LocalUsername] [/PasswordO:{LocalPassword|*} ]
   [/UserD:DomainUsername] [/PasswordD:{DomainPassword|*} ]
   [/SecurePasswordPrompt] [/REBoot[:TimeInSeconds]]
```

In addition to specifying the machine to rename (MachineName) and the desired new name (NewName), you must have credentials that are a member of the local Administrators group on the computer and credentials that have permission to rename the domain computer object. By default, NetDom will use the credentials with which the command is run. You can specify credentials by using /UserO and /PasswordO for the credentials in the computer's local Administrators group, and /UserD and /PasswordD for the domain credentials with permission to rename the computer object. Specifying * for the password causes NetDom.exe to prompt for the password at the command prompt. The /SecurePasswordPrompt option displays a popup for credentials when * is specified for either /PasswordO or /PasswordD. After you rename a computer, you must reboot the computer. The /REBoot option causes the system to reboot after 30 seconds, unless otherwise specified by TimeInSeconds.

When you rename a computer, you can adversely affect services running on the computer. For example, Active Directory Certificate Services (AD CS) relies on the server's name. Be certain to consider the impact of renaming a computer before doing so. Do not use these methods to rename a domain controller.

Note The content in the following section is specific to Windows Server 2008 R2.

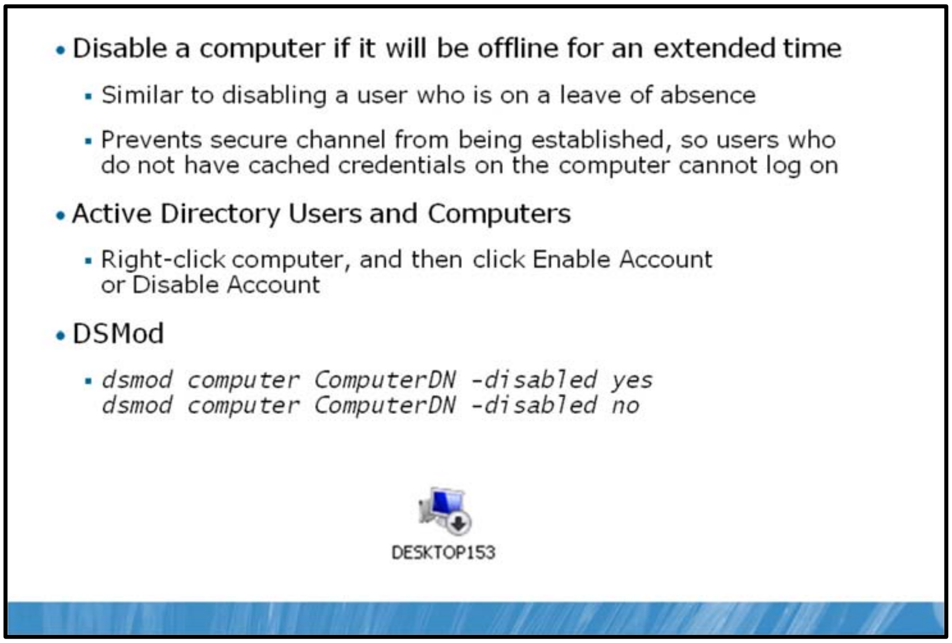
It is also possible to use Windows PowerShell with Active Directory Module to rename a computer. You can use this approach to change the local computer name and to change the Active Directory computer object name. The following example demonstrates how to rename the local domain-joined computer on which the command is being run. This command must be run on the local computer.

```
ReName-Computer -NCN MyComputer
```

The second example shows how to change the name of computer object named, Server1, in the ManagedComputers OU in the contoso.com domain.

```
Rename-ADObject 'CN=fabrikamsrv1,OU=ManagedComputers,DC=Fabrikam,DC=com' –NewName
fabrikamsrv3
```

Disable and Enable a Computer



- Disable a computer if it will be offline for an extended time
  - Similar to disabling a user who is on a leave of absence
  - Prevents secure channel from being established, so users who do not have cached credentials on the computer cannot log on
- Active Directory Users and Computers
  - Right-click computer, and then click Enable Account or Disable Account
- DSMod
  - *dsmod computer ComputerDN -disabled yes*
dsmod computer ComputerDN -disabled no

If a computer is taken offline or is not to be used for an extended period of time, you should consider disabling the account. This recommendation reflects the security principle that an identity store should allow authentication only of the minimum number of accounts required to achieve the goals of an organization. Disabling the account does not modify the computer's SID or group membership, so when the computer is brought back online, the account can be enabled.

To disable a computer in the Active Directory Users and Computers snap-in, right-click the computer, and then click **Disable Account**.

A disabled account appears with a down-arrow icon in the Active Directory Users And Computers snap-in, as shown here:

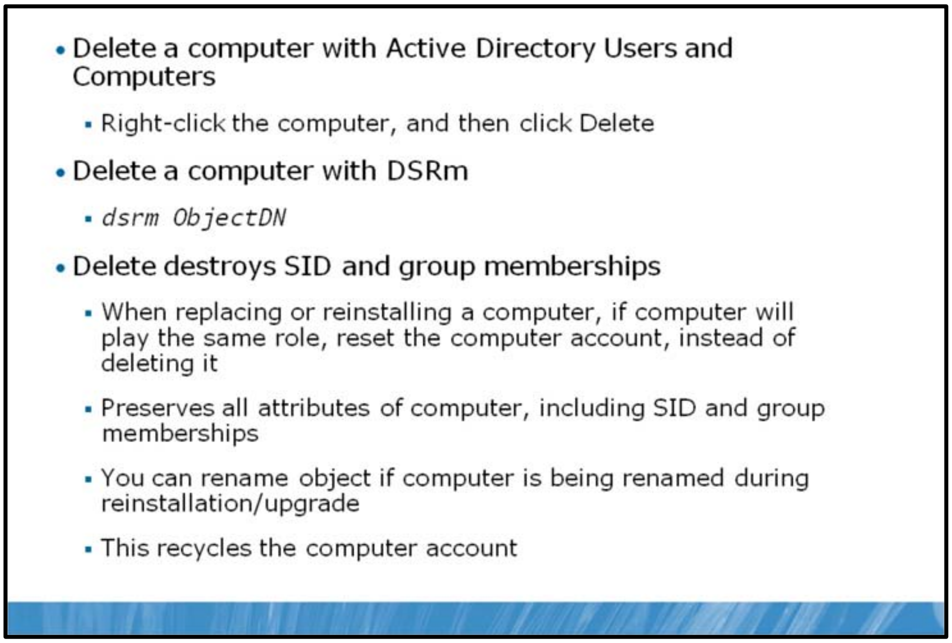
While an account is disabled, the computer cannot create a secure channel with the domain. The result is that users who have not previously logged on to the computer, and who therefore do not have cached credentials on the computer, will be unable to log on until the secure channel is reestablished by enabling the account.

To enable a computer account, right-click the computer, and then click **Enable Account**.

To disable or enable a computer from the command prompt, use the DSMod command. The syntax used to disable or enable computers is as follows.

```
dsmod computer ComputerDN -disabled yes
dsmod computer ComputerDN -disabled no
```

Delete and Recycle Computer Accounts



- Delete a computer with Active Directory Users and Computers
  - Right-click the computer, and then click Delete
- Delete a computer with DSRm
  - *dsrm ObjectDN*
- Delete destroys SID and group memberships
  - When replacing or reinstalling a computer, if computer will play the same role, reset the computer account, instead of deleting it
  - Preserves all attributes of computer, including SID and group memberships
  - You can rename object if computer is being renamed during reinstallation/upgrade
  - This recycles the computer account

You have learned that each computer account, like each user account, maintains a unique SID, which enables an administrator to grant permissions to computers. Also, like user accounts, computers can belong to groups. Therefore, it is important to understand the effect of deleting a computer account. When a computer account is deleted, its group memberships and SID are lost. If the deletion is accidental, and another computer account is created with the same name, it is nonetheless a new account, with a new SID. Group memberships must be reestablished, and any permission assigned to the deleted computer must be reassigned to the new account. Delete computer objects only when you are certain that you no longer require those security-related attributes of the object.

To delete a computer account by using Active Directory Users and Computers, perform the following steps:

1. Right-click the computer object, and then click **Delete**.

   You are prompted to confirm the deletion, and because deletion is not reversible, the default response to the prompt is **No**.

2. Click **Yes** to delete the object.

The DSRm command allows you to delete a computer object from the command prompt. To delete a computer with DSRm, type the following command.

```
dsrm ObjectDN
```

Where ObjectDN is the distinguished name of the computer, such as “CN=Desktop154, OU=NYC,OU=Client Computers,DC=contoso,DC=com.” Again, you will be prompted to confirm the deletion.

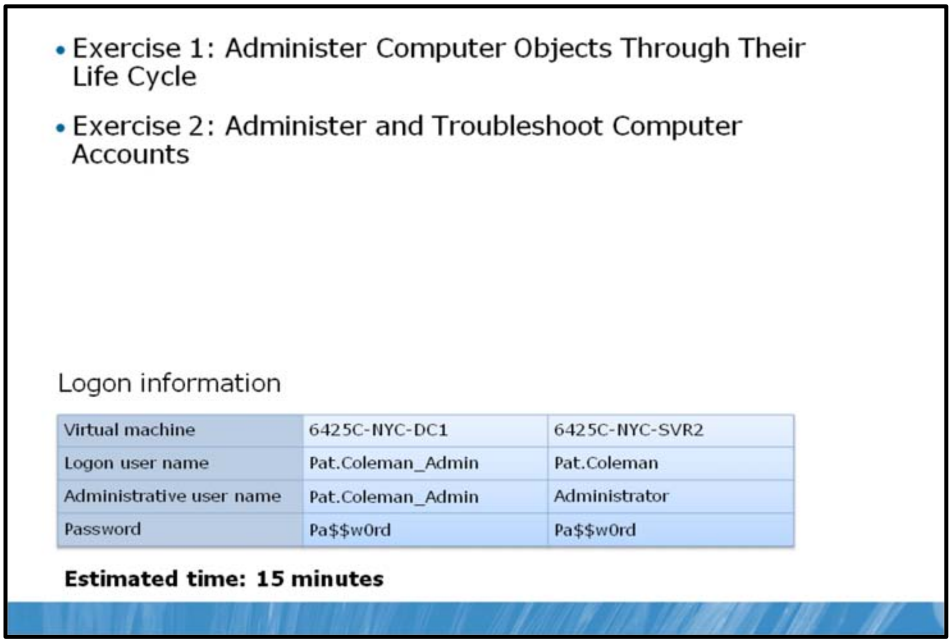
Recycling Computers

If a computer account's group memberships and SID, and the permissions assigned to that SID, are important to the operations of a domain, you do not want to delete that account. So what would you do if a computer was replaced with a new system, with upgraded hardware? That is another scenario in which you would reset a computer account.

Resetting a computer account resets its password, but maintains all of the computer object's properties. With a reset password, the account becomes, in effect, available for use. Any computer can then join the domain using that account, including the upgraded system. In effect, you've recycled the computer account, assigning it to a new piece of hardware. You can even rename the account. The SID and group memberships remain the same.

As you learned earlier in this lesson, the Reset Account command is available in the context menu when you right-click a computer object. The DSMod command can also be used to reset a computer account, when you type dsmod computer "ComputerDN" -reset.

Lab B: Administer Computer Objects and Accounts



- Exercise 1: Administer Computer Objects Through Their Life Cycle
- Exercise 2: Administer and Troubleshoot Computer Accounts

Logon information

Virtual machine	6425C-NYC-DC1	6425C-NYC-SVR2
Logon user name	Pat.Coleman_Admin	Pat.Coleman
Administrative user name	Pat.Coleman_Admin	Administrator
Password	Pa$$w0rd	Pa$$w0rd

Estimated time: 15 minutes

Lab Setup

The virtual machines should already be started and available after completing Lab A. However, if they are not, you should complete steps 1 to 3 and then step through exercises 1 to 3 in Lab A before continuing. You will be unable to successfully complete Lab B unless you have completed Lab A.

1. Start 6425C-NYC-DC1**.**
2. Log on to NYC-DC1 as **Pat.Coleman.admin**, with the password, **Pa$$w0rd**.
3. Start 6425C-NYC-SVR2**.** Do not log on until directed to do so.

Lab Scenario

You are an administrator for Contoso, Ltd. During a security audit, a number of computer accounts were discovered. Those computers no longer exist in the domain. You've been tasked with improving the management of computer accounts, and identifying the best practices for administering the entire life cycle of a computer account.

Exercise 1: Administer Computer Objects Through Their Life Cycle

In this exercise, you will configure common attributes of computer objects, including description and ManagedBy. You will also manage the group membership of computers and move computers between OUs.

The main tasks for this exercise are as follows:

1. Configure computer object attributes.
2. Add computers to software management groups.
3. Move a computer between OUs.
4. Disable, enable, and delete computers.

▶ Task 1: Configure computer object attributes.

1. On NYC-DC1, run **Active Directory Users and Computers** as an administrator, with the user name, **Pat.Coleman_Admin**, and the password, **Pa$$w0rd**.
2. In the **Client Computers\SEA** OU, use the **Managed By** tab of computer objects to assign **LNO8538** to **Linda Mitchell** and **LOT9179** to **Scott Mitchell**.
3. Because Scott and Linda Mitchell will occasionally use each other's computer, use multiselect to change the description of both **LNO8538** and **LOT9179** to **Scott and Linda Mitchell**.

▶ Task 2: Add computers to software management groups.

Microsoft Office Project is required on both Scott's and Linda's computers. Contoso, Ltd. uses security groups as collections for scoping the deployment of software. You will add each of their computers to the group, APP_Project, by using two different methods.

Method 1

1. In the **Client Computers\SEA** OU, right-click **LOT9179**, and then click **Add to a group**.
2. Type **APP_** and press Enter.

   The **Multiple Items Found** dialog box appears.
3. Click **APP_Project**, and then click **OK**.

   A message appears: "The Add to Group operation was successfully completed."
4. Click **OK**.

Method 2

1. In the console tree, expand the **Groups** OU, and then click **Application**.
2. Right-click **APP_Project,** and then click **Properties**.
3. Click the **Members** tab.
4. Click **Add**.
5. Type **LNO8538** and press Enter.

   The **Name Not Found** dialog box appears.

   By default, the **Select Users, Computers, or Groups** interface does not search for computer objects.
6. Click **Object Types**.

7. Select the check box next to **Computers**, and then click **OK**.
8. Click **OK** to close the **Name Not Found** dialog box.

   Both computers can now be seen on the **Members** tab.
9. Click **OK**.

▶ Task 3: Move a computer between OUs.

Scott and Linda are relocating to the Vancouver office. You will move their computers to the new OU by using two different methods.

Method 1

1. In the **Client Computers\SEA** OU, click **LOT9179**.
2. Drag **LOT9179** into the **VAN** OU, visible in the console tree.

   A message appears that reminds you to be careful about moving objects in Active Directory.
3. Click **Yes**.

Method 2

4. Right-click **LNO8538**, and then click **Move**.

   The **Move** dialog box appears.
5. In the console tree, expand **Client Computers**, and then click **VAN**.
6. Click **OK**.

▶ Task 4: Disable, enable, and delete computers.

1. In the **Client Computers\SEA** OU, disable, and then enable the account for **DEP6152**.
2. Delete the account for **DEP6152**.

Result: In this exercise, you added computers to software management groups, moved a computer between OUs, and deleted a computer..

Exercise 2: Administer and Troubleshoot Computer Accounts

In this exercise, you will administer and troubleshoot computer accounts and the secure channel.

The main tasks for this exercise are as follows:

1. Reset a computer account.
2. Experience a secure channel problem.
3. Reset the secure channel.

▶ Task 1: Reset a computer account.

Recently, Scott Mitchell's computer required reinstallation. The naming convention at Contoso, Ltd. is to use the name of a computer object as its asset tag, assigned by the IT inventory team. Because Scott reinstalled his computer on the same piece of hardware, the computer name is the same: LOT9179. He now wants to join the machine to the domain, but there is already an account for LOT9179, and the account is a member of groups that ensure the correct software (including Microsoft Office Project) and configuration are applied to the system. Therefore, it is important that the account not be deleted, so that group memberships can be retained.

- In the **Client Computers\VAN** OU, reset the account for **LOT9179**.

  You could now join Scott's reinstalled computer to the domain.

▶ Task 2: Experience a secure channel problem.

1. Log on to NYC-SVR2 as **Pat.Coleman,** with the password, **Pa$$w0rd**. After the desktop appears, log off.
2. To "break" the secure channel, use Active Directory Users and Computers on NYC-DC1 to reset the account for NYC-SVR2.
3. Attempt to log on to NYC-SVR2 as **Pat.Coleman,** with the password, **Pa$$w0rd**.

▶ Task 3: Reset the secure channel.

To solve a broken trust relationship between a domain member and the domain, you can reset the computer's account, move the computer into a workgroup, and then rejoin the domain.

- Reset the computer account for NYC-SVR2.

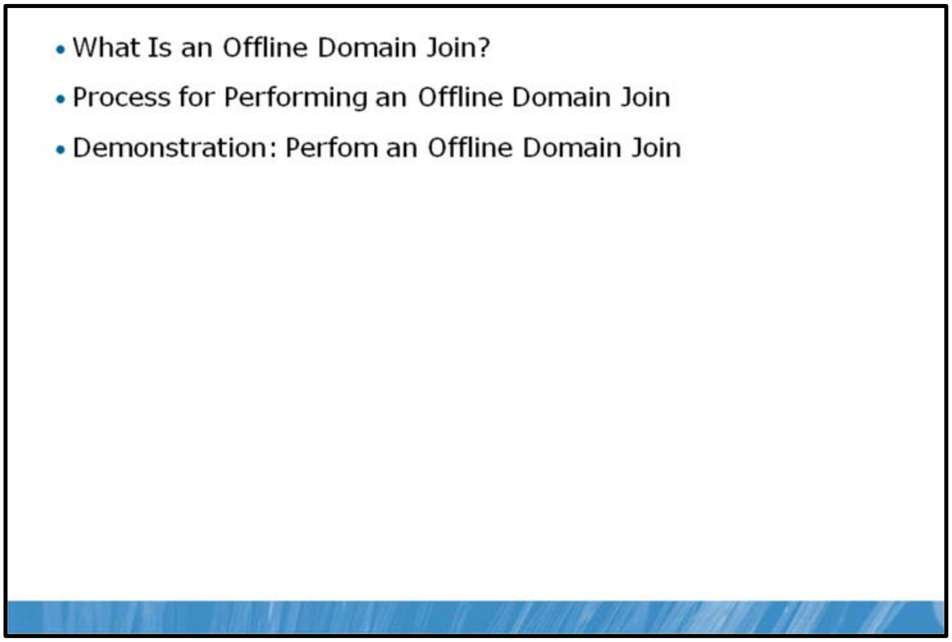
  After resetting the secure channel, you could move NYC-SVR2 into a workgroup, and then rejoin the domain. It will join its reset account, thereby retaining its group memberships. Do not perform that step at this time.

Result: In this exercise, you resolved secure channel issues..

Lab Review Question

Question: What insights did you gain into the issues and procedures regarding computer accounts and administering computer accounts through their life cycle?

Lesson 3
Offline Domain Join



- What Is an Offline Domain Join?
- Process for Performing an Offline Domain Join
- Demonstration: Perfom an Offline Domain Join

Offline Domain Join is a new functionality specific to Windows Server 2008 R2. This functionality enables administrators to join computers to domain without network connectivity. In this lesson you will learn how Offline Domain Join works and how to use it.

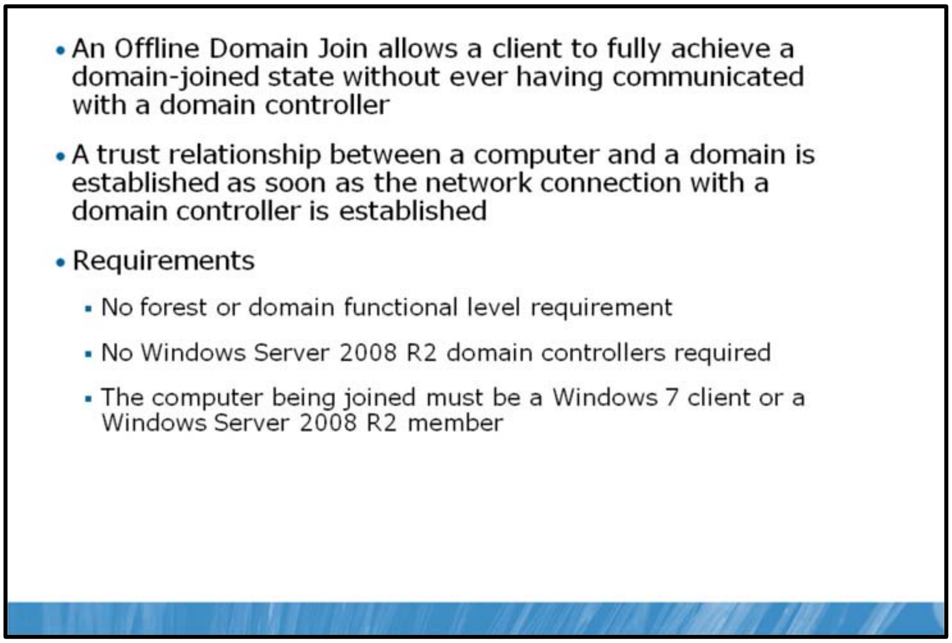
Objectives

After completing this lesson you will be able to:

- Describe Offline Domain Join.
- Describe the process for performing an Offline Domain Join.
- Perform an Offline Domain Join.

Note The content in this lesson is specific to Windows Server 2008 R2.

What Is an Offline Domain Join?



- An Offline Domain Join allows a client to fully achieve a domain-joined state without ever having communicated with a domain controller
- A trust relationship between a computer and a domain is established as soon as the network connection with a domain controller is established
- Requirements
  - No forest or domain functional level requirement
  - No Windows Server 2008 R2 domain controllers required
  - The computer being joined must be a Windows 7 client or a Windows Server 2008 R2 member

In earlier Windows versions, it was mandatory to have a network connection to a domain controller to join a computer to the Active Directory domain. In some scenarios, this can be a limitation. For example, if you need to perform a full provision of computers that are currently not connected to a network, or not located in the same place as domain controllers, you cannot complete the process unless you join the computers to a domain, and restart them once more after network connections are established.

Offline Domain Join is a new functionality in Windows Server 2008 R2 and Windows 7 that allows you to join a computer to domain without actually being connected to the network where the domain controller resides. In fact, all preparation steps are performed on a domain controller and a computer while it is still offline. After it gets connected to a network, a trust relationship with the domain is established without any user intervention. No additional restart is necessary to complete the domain join. This helps reduce the time and effort required to complete a large-scale computer deployment in places such as data centers.

You can also benefit from the Offline Domain Join feature if you are deploying virtual machines. Offline Domain Join makes it possible for you to join the virtual machines to the domain when they initially start following the operating system installation. No additional restart is required to complete the domain join. This can significantly reduce the overall time required for wide-scale virtual machine deployments.

To perform an Offline Domain Join, you do not have to have domain controllers running on Windows Server 2008 R2, It is also not mandatory to have the domain or forest in the Windows Server 2008 functional mode. The only essential requirement for using this method is that the machine used for provisioning and the machine being provisioned must have Windows 7 or Windows Server 2008 R2.

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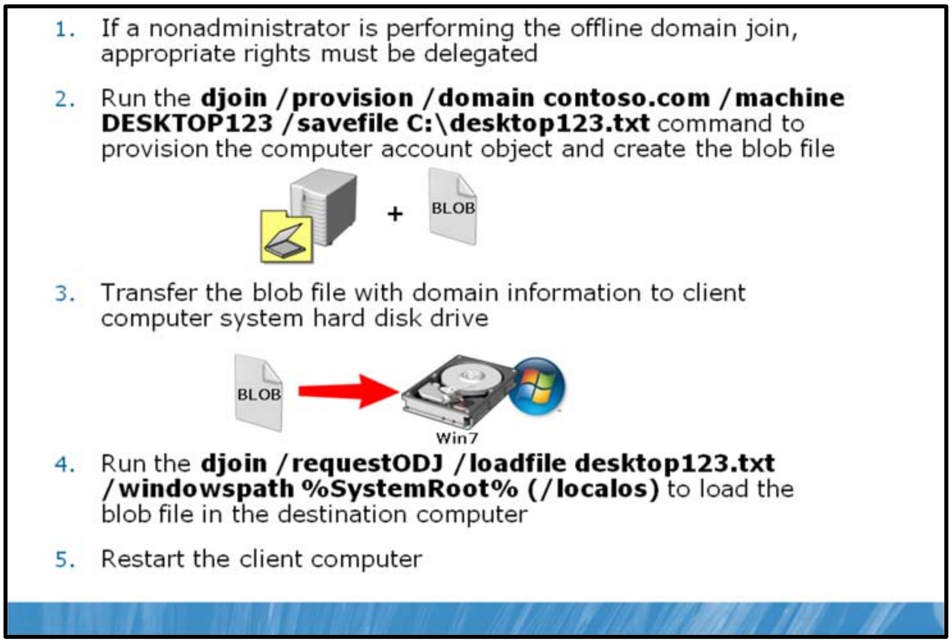
Process for Performing an Offline Domain Join



1. If a nonadministrator is performing the offline domain join, appropriate rights must be delegated
2. Run the **djoin /provision /domain contoso.com /machine DESKTOP123 /savefile C:\desktop123.txt** command to provision the computer account object and create the blob file

+
BLOB

3. Transfer the blob file with domain information to client computer system hard disk drive

BLOB
Win7

4. Run the **djoin /requestODJ /loadfile desktop123.txt /windowspath %SystemRoot% (/localos)** to load the blob file in the destination computer
5. Restart the client computer

To perform an Offline Domain Join, you must use a new command-line utility named, Djoin.exe. This utility is used to both provision computer accounts into AD DS and for inserting domain data into the operating system of the computer that is being joined to the domain by using this method.

Performing an Offline Join by Using Djoin.exe

Djoin.exe performs the following tasks:

- Provisions a new computer account into AD DS. This pre-creates a computer account and sets it up to be connected at a later date.
- Generates a text file (a blob) that contains information that is necessary for an Offline Domain Join. The blob contains the machine account password and other information about the domain, including the domain name, the name of a domain controller, the SID of the domain, and so on
- Inserts the data provided in the blob into the operating system of the computer being joined to the domain

Prerequisites for Performing an Offline Join

The computer on which you run Djoin.exe to provision computer account data into AD DS must be running Windows 7 or Windows Server 2008 R2. The computer that you want to join to the domain must also be running Windows 7 or Windows Server 2008 R2.

It is not mandatory that you perform an Offline Domain Join right after you provision a computer account into AD DS. You can do it at any time later.

To perform an Offline Domain Join, you must have the rights that are necessary to join workstations to the domain and to create computer accounts in the domain. Members of the Domain Admins group have these rights by default. If you are not a member of the Domain Admins group, a member of the Domain Admins group must delegate you the right to join computers to the domain by using Group Policy or by editing an ACL of the container where the computer account will be stored.

Djoin.exe should be run at an elevated command prompt to provision the computer account metadata. When you run the provisioning command, the computer account metadata is created in a .txt file that you specify as part of the command. After you run the provisioning command, you can either run Djoin.exe again to request the computer account metadata and insert it into the Windows directory of the destination computer, or you can save the computer account metadata in the Unattend.xml file and then specify the Unattend.xml file during an unattended operating system installation of the destination computer.

Offline Domain Join Process

The Offline Domain Join process includes the following steps:

1. Run the djoin.exe /provision command to create the computer account metadata for the destination computer (the computer that you want to join to the domain). As part of this command, you must specify the name of the domain that you want the computer to join and the name of the computer, as follows.

```
djoin /provision /domain contoso.com /machine DESKTOP123 /savefile C:\desktop123.txt
```

After performing this step, a computer account named, DESKTOP123, will be provisioned to AD DS, and a blob file named desktop123.txt will be created. Now you have to transfer this file to the computer that is being joined to the domain.

Note The base64-encoded metadata blob that is created by the provisioning command contains very sensitive data. It should be treated just as securely as a plaintext password.

2. Run the djoin.exe /requestODJ command to insert the computer account metadata into the Windows directory of the destination computer, as follows.

```
djoin /requestODJ /loadfile desktop123.txt /windowspath %SystemRoot% /localos
```

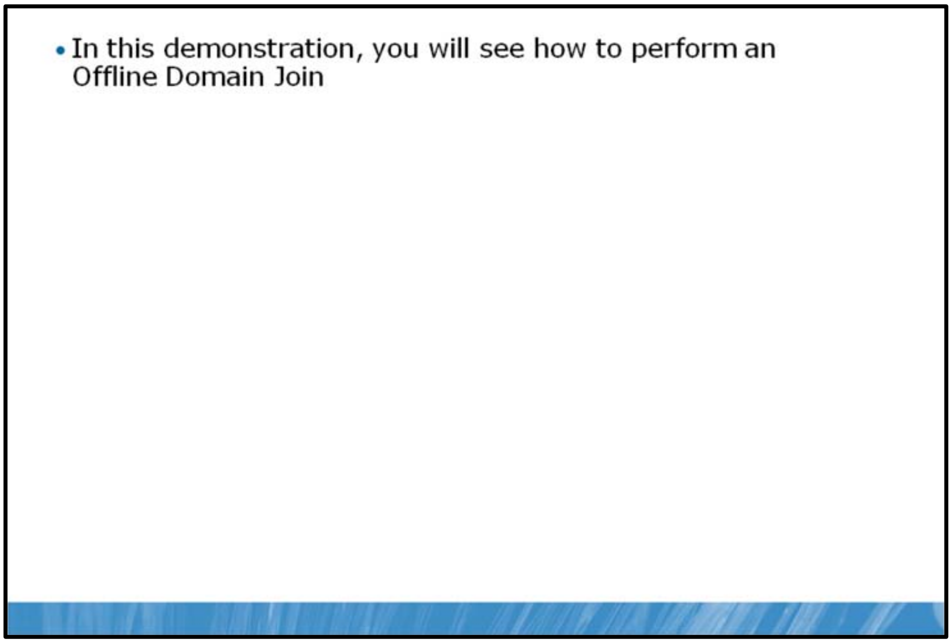
3. When you start the destination computer, either as a virtual machine or after a complete operating system installation, the computer will be joined to the domain that you specify.

The switch /localos from the previous command is used only if you perform a djoin operation on the computer that you are joining to the domain. However, if during the provisioning process, you are mounting system hard drives (virtual or physical) from the computers that you are provisioning, you should not use the /localos switch.

Note Using deployment tools such as Windows System Image Manager, you can perform an unattended domain join during an operating system installation by providing information that is relevant to the domain join in an Unattend.xml file. Using the same Unattend.xml file, you can supply the information that is necessary for the computers that run Windows 7 and Windows Server 2008 R2 to perform an Offline Domain Join.

Question: What is the content of the text file that is created during a djoin provisioning process?

Demonstration: Perform an Offline Domain Join



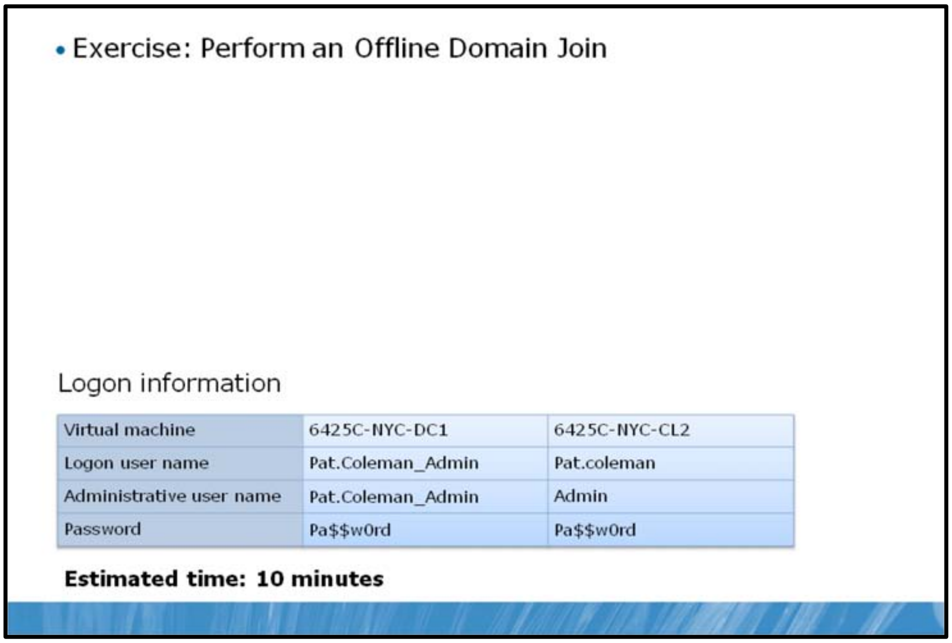
- In this demonstration, you will see how to perform an Offline Domain Join

In this demonstration, your instructor will show you how to perform an Offline Domain Join.

Demonstration Steps

- Provision a new computer account called, NYC-CL2, in the contoso domain by using the djoin utility.

Lab C: Perform an Offline Domain Join



- Exercise: Perform an Offline Domain Join

Logon information

Virtual machine	6425C-NYC-DC1	6425C-NYC-CL2
Logon user name	Pat.Coleman_Admin	Pat.coleman
Administrative user name	Pat.Coleman_Admin	Admin
Password	Pa$$w0rd	Pa$$w0rd

Estimated time: 10 minutes

Lab Setup

For this lab, you will use the available virtual machine environment. Before you begin the lab, you must:

1. On the host computer, click **Start**, point to **Administrative Tools**, and then click **Hyper-V Manager**.
2. Ensure that the **6425C-NYC-DC1** virtual machine is running.
3. Log on to 6425C-NYC-DC1 by using the following credentials:
   - User name: **Pat.Coleman_Admin**
   - Password: **Pa$$w0rd**
   - Domain: **Contoso**
4. Start the **6425C-NYC-CL2** virtual machine. Do not log on to the client machine until directed to do so.

Lab Scenario

You are an administrator for Contoso, Ltd. You must provision a large number of new computers in a short period of time. Not all computers can have network connectivity, so you have decided to leverage the Offline Domain Join functionality. In this lab, you will test this functionality on one virtual machine.

Exercise: Perform an Offline Domain Join

In this exercise, you will perform an Offline Domain Join.

The main tasks for this exercise are as follows:

1. Ensure that the client computer is not joined to the domain.
2. Provision a computer account and perform an Offline Domain Join.

▶ Task 1: Ensure that the client computer is not joined to the domain.

1. Log on to **NYC-CL2** as **Admin,** with the password, **Pa$$w0rd.**
2. Open **System Properties** and ensure that the computer is joined to a workgroup, instead of a domain

▶ Task 2: Provision a computer account and perform an Offline Domain Join

1. On NYC-DC1, open a command prompt using administrative credentials and use djoin.exe to provision a new computer account to AD DS by typing the following command.

```
djoin /provision /domain contoso.com /machine NYC-CL2 /savefile C:\NYC-CL2.txt
```

2. Open Active Directory Users and Computers and verify that the NYC-CL2 machine has been provisioned in the Computers container.
3. On NYC-CL2, create a folder called C:\DJOIN. Use Windows Explorer and browse to \\NYC-DC1\C$.
4. Copy NYC-CL2.txt to the C:\DJOIN folder.
5. Open a Command Prompt using administrative privileges, type the following command, and then press Enter.

```
djoin /requestodj /loadfile C:\DJOIN\NYC-CL2.txt /windowspath %SystemRoot% /localos
```

6. After the command is completed, restart NYC-CL2.
7. Log on as **Contoso\Pat.coleman** and ensure that NYC-CL2 is joined to the contoso.com domain.

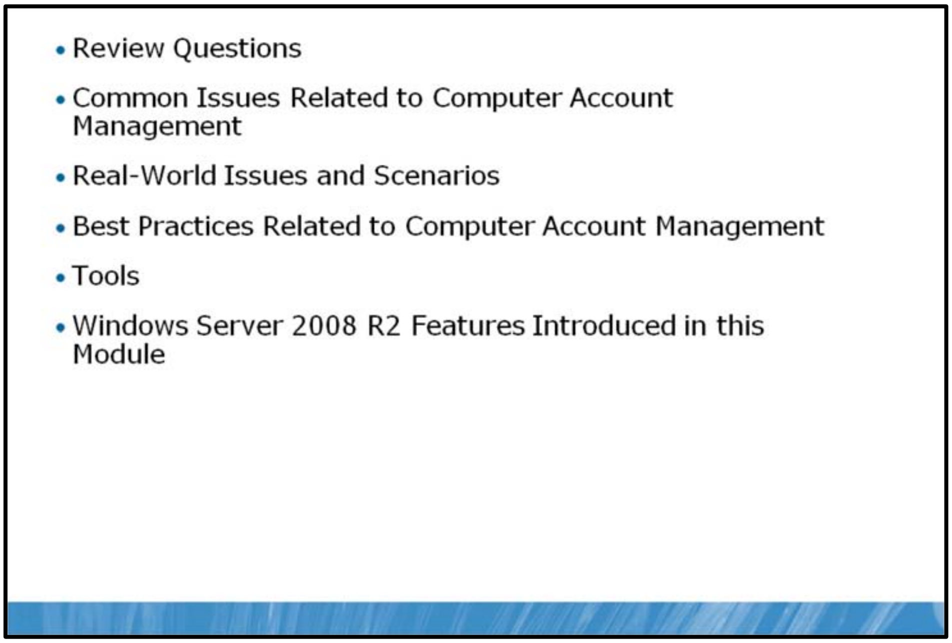
Result: In this exercise, you joined the NYC-CL2 computer to the domain by using Offline Domain Join technology.

▶ To prepare for the next module

When you finish the lab, revert the virtual machines to their initial state. To do this, complete the following steps:

1. On the host computer, start Hyper-V Manager.
2. Right-click **6425C-NYC-DC1** in the **Virtual Machines** list, and then click **Revert**.
3. In the **Revert Virtual Machine** dialog box, click **Revert**.
4. Repeat these steps for **6425C-NYC-SVR2** and **6425C-NYC-CL2**.

Module Review and Takeaways



- Review Questions
- Common Issues Related to Computer Account Management
- Real-World Issues and Scenarios
- Best Practices Related to Computer Account Management
- Tools
- Windows Server 2008 R2 Features Introduced in this Module

Review Questions

1. What is the main difference between the Computers container and an OU?
2. When should you reset a computer account? Why is it better to reset the computer account than to disjoin and rejoin it to the domain?
3. In an Offline Domain Join, what should you do after you provision a new computer account to the domain by using the djoin.exe utility?

Common Issues Related to Computer Account Management

Issue	Troubleshooting tip
The computer cannot be joined to the domain.	
Group Policy is not applied to the computer after it is joined to the domain.	
The Offline Domain Join is not working as expected.	

Real-World Issues and Scenarios

1. You are working as an IT technician in Contoso, Ltd. You are managing the Windows Server based infrastructure. You have to find a method for joining new Windows 7 based computers to a domain during the installation process without intervention of a user or an administrator.

Best Practices Related to Computer Account Management

- Always provision a computer account before joining computers to a domain and place them in appropriate OUs.
- Redirect the default Computer container to another location.
- Reset the computer account, instead of just doing a disjoin and rejoin.
- Integrate the Offline Domain Join functionality with unattended installations.

Tools

Tool	Use for	Where to find it
Windows PowerShell with Active Directory Module	Computer account management	Administrative Tools
CSVDE,LDIFDE	Importing computer accounts in AD DS	Windows Server 2008 command prompt
Djoin.exe	Offline domain join	Windows Server 2008 command prompt

Windows Server 2008 R2 Features Introduced in this Module

Windows Server 2008 R2 feature	Description
Windows PowerShell with Active Directory Module	New administration utility for Active Directory, based on Windows PowerShell
Offline Domain Join	New feature in Windows Server 2008 R2 and Windows 7 that allows you to join machines to domain even when they don't have network connection to domain controller