Chapter 8

Understanding Group Policies

THE FOLLOWING AZ-800 EXAM OBJECTIVES ARE COVERED IN THIS CHAPTER:

✓ **Manage Windows Server by using domain-based Group Policies**

- Implement Group Policy in AD DS
- Implement Group Policy Preferences in AD DS
- Implement Group Policy in Azure AD DS

For many years, making changes to computer or user environments was a time-consuming process. If you wanted to install a service pack or a piece of software, unless you had a third-party utility you had to use the *sneakernet* (that is, you had to walk from one computer to another with a disk containing the software).

Installing any type of software or companywide security change was one of the biggest challenges faced by system administrators. It was difficult enough just to deploy and manage workstations throughout the environment. Combine this with the fact that users were generally able to make system configuration changes to their own machines; it quickly became a management nightmare!

For example, consider the case of users who change system settings. Relatively minor changes, such as modifying TCP/IP or desktop settings, could cause hours of support headaches. Now multiply these (or other common) problems by hundreds (or even thousands) of end users. Clearly, system administrators needed to have a secure way to limit the options available to users of client operating systems.

How do you prevent problems such as these from occurring in a Windows Server 2022 environment? Fortunately, there's a readily available solution delivered with the base operating system that's easy to implement. Two of the most important system administration features in Windows Server 2022 and Active Directory are *Group Policy* and *security policy*. By using *Group Policy objects (GPOs)*, administrators can quickly and easily define restrictions on common actions and then apply them at the site, domain, or organizational unit (OU) level. In this chapter, you will see how group and security policies work.

Introducing Group Policy

One of the strengths of Windows-based operating systems is their flexibility. End users and system administrators can configure many different options to suit the network environment and their personal tastes. However, this flexibility comes at a price—generally, end users on a network should not change many of these options. For example, TCP/IP configuration and security policies should remain consistent for all client computers. In fact, end users don't need to be able to change these types of settings in the first place because many of them do not understand the purpose of these settings.

Windows Server 2022 *Group Policies* are designed to provide system administrators with the ability to customize end-user settings and to place restrictions on the types of actions that users can perform. Group Policies can be easily created by system administrators and then later applied to one or more users or computers within the environment. Although they ultimately do affect Registry settings, it is much easier to configure and apply settings through the use of Group Policy than it is to make changes to the Registry manually. To make management easy, Microsoft has set up Windows Server 2022 so that Group Policy settings are all managed from within the Microsoft Management Console (MMC) in the Group Policy Management Console (GPMC).

Group Policies have several potential uses. I'll cover the use of Group Policies for software deployment, and I'll also focus on the technical background of Group Policies and how they apply to general configuration management.

Let's begin by looking at how Group Policies function.

Understanding Group Policy Settings

Group Policy settings are based on *Group Policy administrative templates*. These templates provide a list of user-friendly configuration options and specify the system settings to which they apply. For example, an option for a user or computer that reads Require A Specific Desktop Wallpaper Setting would map to a key in the Registry that maintains this value. When the option is set, the appropriate change is made in the Registry of the affected users and computers.

By default, Windows Server 2022 comes with several administrative template files that you can use to manage common settings. Additionally, system administrators and application developers can create their own administrative template files to set options for specific functionality.

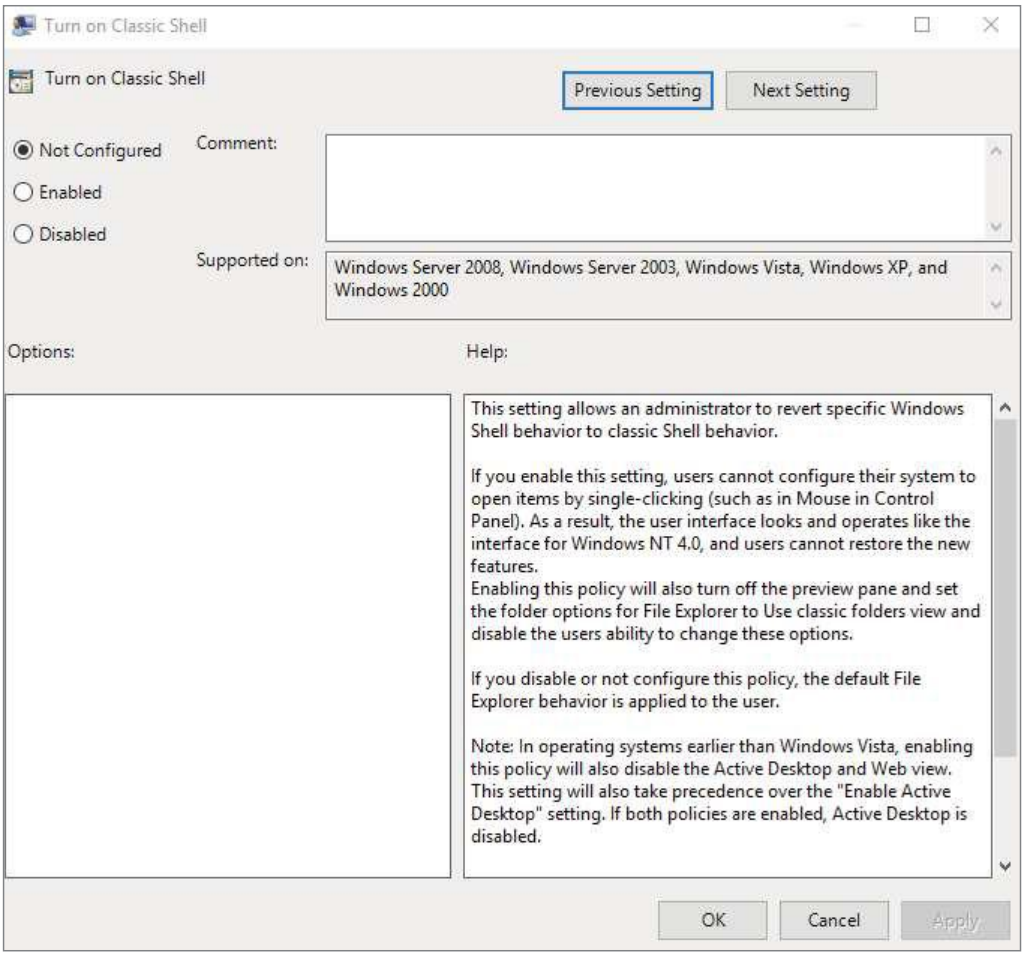
Most Group Policy items have three different settings options (see Figure 8.1):

Enabled Specifies that a setting for this GPO has been configured. Some settings require values or options to be set.

Disabled Specifies that this option is disabled for client computers. Note that disabling an option *is* a setting. That is, it specifies that the system administrator wants to disallow certain functionality.

Not Configured Specifies that these settings have been neither enabled nor disabled. Not Configured is the default option for most settings. It simply states that this group policy will not specify an option and that other policy settings may take precedence.

FIGURE 8.1 Group Policy configuration settings



The specific options available (and their effects) will depend on the setting. Often, you will need additional information. For example, when setting the Account Lockout policy, you must specify how many bad login attempts may be made before the account is locked out. With this in mind, let's look at the types of user and computer settings that can be managed.

Group Policy settings can apply to two types of Active Directory objects: User objects and Computer objects. Because both users and computers can be placed into groups and organized within OUs, this type of configuration simplifies the management of hundreds, or even thousands, of computers.

The main options you can configure within user and computer Group Policies are as follows:

Software Settings The *Software Settings* options apply to specific applications and software that might be installed on the computer. You can use these settings to make new applications available to end users and to control the default configuration for these applications.

Windows Settings The *Windows Settings* options allow you to customize the behavior of the Windows operating system. The specific options that are available here are divided into two types: user and computer. User-specific settings let you configure your Internet browser (including the default home page and other settings). Computer settings include security options, such as Account Policy and Event Log options.

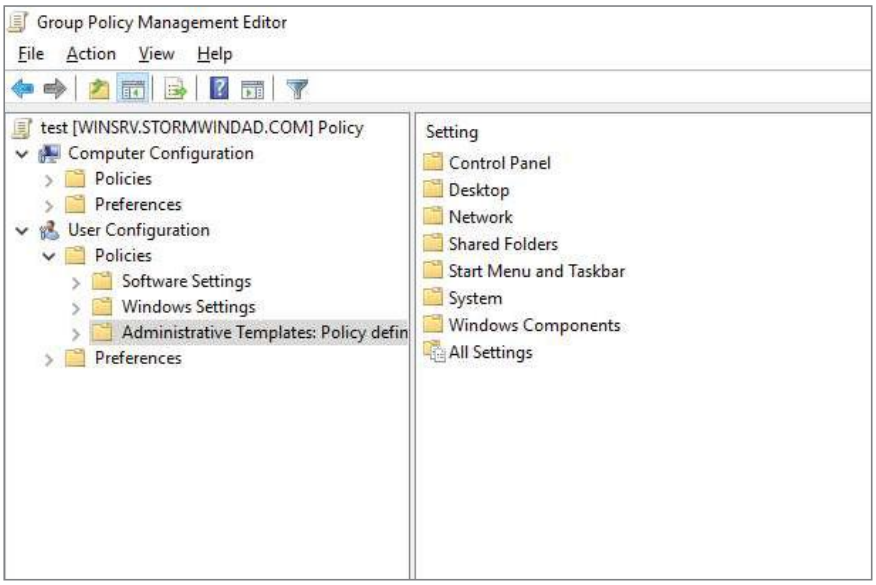
Administrative Templates *Administrative templates* are used to configure user and computer settings further. In addition to the default options available, you can create your own administrative templates with custom options.

Group Policy Preferences The Windows Server 2022 operating system includes *Group Policy preferences (GPPs)*, which give you more than 20 Group Policy extensions. These extensions, in turn, give you a vast range of configurable settings within a Group Policy Object. Included in the Group Policy preference extensions are settings for folder options, mapped drives, printers, the Registry, local users and groups, scheduled tasks, services, and the Start Menu.

Besides providing easier management, Group Policy preferences give you the ability to deploy settings for client computers without restricting the users from changing the settings. This gives you the flexibility needed to decide which settings to enforce and which not to enforce.

Figure 8.2 shows some of the options you can configure with Group Policy.

FIGURE 8.2 Group Policy options



ADMX Central Store Another consideration in GPO settings is whether to set up an *ADMX Central Store*. GPO administrative template files are saved as ADMX (with the file extension `.admx`) files and AMXL (with the file extension `.amxl`) for the supported languages. To get the most benefit out of using administrative templates, you should create an ADMX Central Store.

You create the Central Store in the `SYSVOL` folder on a domain controller. The Central Store is a repository for all your administrative templates, and the Group Policy tools check it. The Group Policy tools then use any ADMX files that they find in the Central Store. These files then replicate to all domain controllers in the domain.

If you want your clients to be able to edit domain-based GPOs by using the ADMX files that are stored in the ADMX Central Store, you must be using Windows 7 or above and Server 2008 or above.

Security Template *Security templates* are used to configure security settings through a GPO. Some of the security settings that can be configured are settings for account policies, local policies, event logs, restricted groups, system services, and the Registry.

Starter GPOs *Starter Group Policy Objects* give you the ability to store a collection of administrative template policy settings in a single object. You can then import and export starter GPOs to distribute the GPOs easily to other environments. When a GPO is created from a starter GPO, as with any template, the new GPO receives the settings and values that were defined from the administrative template policy in the starter GPO.

Group Policy settings do not take effect immediately. You must run the `gpupdate` command at the command prompt or wait for the regular update cycle in order for the policy changes to take effect.

The Security Settings Section of the GPO

One of the most important sections of a GPO is the Security Settings section. The Security Settings section, under the Windows Settings section, allows you to secure many aspects of the computer and user policies. The following are some of the configurable options for the Security Settings section:

Computer Section Only of the GPO

- Account Policies
- Local Policies
- Event Policies
- Restricted Groups
- System Services

- Registry
- File System
- Wired Network
- Windows Firewall With Advanced Security
- Network List Manager Policies
- Wireless Networks
- Network Access Protection
- Application Control Policies
- IP Security Policies
- Advanced Audit Policy Configuration

Computer and User Sections of the GPO

- Public Key Policies
- Software Restriction Policy

Restricted Groups

The *Restricted Groups* settings allow you to control group membership by using a GPO. The group membership I am referring to is the normal Active Directory groups (domain local, global, and universal). The settings offer two configurable properties: Members and Members Of.

The users on the Members list do not belong to the restricted group. The users on the Members Of list do belong to the restricted group. When you configure a Restricted Group policy, members of the restricted group that are not on the Members list are removed. Users who are on the Members list who are not currently a member of the restricted group are added.

Software Restriction Policy

Software restriction policies allow you to identify software and to control its ability to run on the user's local computer, organizational unit, domain, or site. This prevents users from installing unauthorized software. Software Restriction Policy is discussed in greater detail later in this chapter in the section "Implementing Software Deployment."

Client-Side Extensions

In Windows Server, Group Policies are designed using both server-side and client-side extensions (CSEs). The server-side elements include a user interface for creating each Group Policy Object (GPO). When a Windows client system logs into the Active Directory network, the client-side extensions (normally a series of DLL files) receive their GPOs and the GPOs make changes to the Windows client systems.

Within GPOs, there are computer policies that exist for each CSE. The policies normally include a maximum of three options: Allow Processing Across A Slow Network Connection, Do Not Apply During Periodic Background Processing, and Process Even If The Group Policy Objects Have Not Changed.

Group Policy Objects

So far, I have discussed what Group Policies are designed to do. Now it's time to drill down to determine exactly how you can set up and configure them.

To make them easier to manage, Group Policies may be placed in *Group Policy Objects (GPOs)*. GPOs act as containers for the settings made within Group Policy files, which simplifies the management of settings. For example, as a system administrator, you might have different policies for users and computers in different departments. Based on these requirements, you could create a GPO for members of the Sales department and another for members of the Engineering department. Then you could apply the GPOs to the OU for each department. Another important concept you need to understand is that Group Policy settings are hierarchical—that is, you can apply Group Policy settings at four different levels. These levels determine the GPO processing priority.

Local Every Windows operating system computer has one Group Policy object that is stored locally. This GPO functions for both the computer and user Group Policy processing.

Sites At the highest level, you can configure GPOs to apply to entire sites within an Active Directory environment. These settings apply to all of the domains and servers that are part of a site. Group Policy settings managed at the site level may apply to more than one domain within the same forest. Therefore, they are useful when you want to make settings that apply to all of the domains within an Active Directory tree or forest.

Domains Domains are the third level to which you can assign GPOs. GPO settings placed at the domain level will apply to all of the User and Computer objects within the domain. Usually, you make master settings at the domain level.

Organizational Units The most granular level of settings for GPOs is the OU level. By configuring Group Policy options for OUs, you can take advantage of the hierarchical structure of Active Directory. If the OU structure is planned well, you will find it easy to make logical GPO assignments for various business units at the OU level.

Based on the business need and the organization of the Active Directory environment, you might decide to set up Group Policy settings at any of these four levels. Because the settings are cumulative by default, a User object might receive policy settings from the site level, from the domain level, and from the OUs in which it is contained.

You can also apply Group Policy settings to the local computer (in which case Active Directory is not used at all), but this limits the manageability of the Group Policy settings.

Group Policy Inheritance

In most cases, Group Policy settings are cumulative. For example, a GPO at the domain level might specify that all users within the domain must change their password every 60 days, and a GPO at the OU level might specify the default desktop background for all users and computers within that OU. In this case, both settings apply, so users within the OU are forced to change their password every 60 days and have the default Desktop setting.

What happens if there's a conflict in the settings? For example, suppose you create a scenario where a GPO at the site level specifies that users are to use red wallpaper and another GPO at the OU level specifies that they must use green wallpaper. The users at the OU layer would have green wallpaper by default. Although hypothetical, this raises an important point about *inheritance*. By default, the settings at the most specific level (in this case, the OU that contains the User object) override those at more general levels. As a friend of mine from Microsoft always says, "Last one to apply wins."

Although the default behavior is for settings to be cumulative and inherited, you can modify this behavior. You can set two main options at the various levels to which GPOs might apply.

Block Policy Inheritance The *Block Policy Inheritance* option specifies that Group Policy settings for an object are not inherited from its parents. You might use this, for example, when a child OU requires completely different settings from a parent OU. Note, however, that you should manage blocking policy inheritance carefully because this option allows other system administrators to override the settings made at higher levels.

Force Policy Inheritance The *Enforced option* (sometimes referred as *No Override*) can be placed on a parent object, and it ensures that all lower-level objects inherit these settings. In some cases, you want to ensure that Group Policy inheritance is not blocked at other levels. For example, suppose it is corporate policy that all network accounts are locked out after five incorrect password attempts. In this case, you would not want lower-level system administrators to override the option with other settings.

You generally use this option when they want to enforce a specific setting globally. For example, if a password expiration policy should apply to all users and computers within a domain, a GPO with the *Force Policy Inheritance* option enabled could be created at the domain level.

You must consider one final case: If a conflict exists between the computer and user settings, the user settings take effect. If, for instance, a system administrator applies a default desktop setting for the Computer policy and a different default desktop setting for the User policy, the one they specify in the User policy takes effect. This is because the user settings are more specific, and they allow system administrators to make changes for individual users regardless of the computer they're using.

Planning a Group Policy Strategy

Through the use of Group Policy settings, you can control many different aspects of your network environment. As you'll see throughout this chapter, you can use GPOs to configure user settings and computer configurations. Windows Server 2022 includes many different administrative tools for performing these tasks. However, it's important to keep in mind that, as with many aspects of using Active Directory, a successful Group Policy strategy involves planning.

Because there are thousands of possible Group Policy settings and many different ways to implement them, you should start by determining the business and technical needs of your organization. For example, you should first group your users based on their work functions. You might find, for example, that users in remote branch offices require particular network configuration options. In that case, you might implement Group Policy settings best at the site level. In another instance, you might find that certain departments have varying requirements for disk quota settings. In this case, it would probably make the most sense to apply GPOs to the appropriate department OUs within the domain.

The overall goal should be to reduce complexity (e.g., by reducing the overall number of GPOs and GPO links) while still meeting the needs of your users. By taking into account the various needs of your users and the parts of your organization, you can often determine a logical and efficient method of creating and applying GPOs. Although it's rare that you'll come across a right or wrong method of implementing Group Policy settings, you will usually encounter some that are either better or worse than others.

By implementing a logical and consistent set of policies, you'll also be well prepared to troubleshoot any problems that might come up or to adapt to your organization's changing requirements. Later in this chapter, you'll learn about some specific methods for determining effective Group Policy settings before you apply them.

Implementing Group Policy

Now that I've covered the basic layout and structure of group policies and how they work, let's look at how you can implement them in an Active Directory environment. In the following sections, you'll start by creating GPOs. Then you'll apply these GPOs to specific Active Directory objects, and you'll take a look at how to use administrative templates.

Creating GPOs

In older versions of server like, Windows Server 2000 and Windows Server 2003, you could create GPOs from many different locations. For example, you could use Active Directory Users and Computers to create GPOs on your OUs along with other GPO tools. In Windows

Server 2022, things are simpler. You can create GPOs for OUs in only one location: the Group Policy Management Console (GPMC). You have your choice of three applications for setting up policies on your Windows Server 2022 computers.

Local Computer Policy Tool This administrative tool allows you to quickly access the Group Policy settings that are available for the local computer. These options apply to the local machine and to users who access it. You must be a member of the local Administrators group to access and make changes to these settings.

Administrators may need the ability to work on multiple local group policy objects (MLGPOs) at the same time. To do this, you would complete the following steps. (You can't configure MLGPOs on domain controllers.)

1. Open the MMC by typing **MMC** in the Run command box.
2. Click File and then click Add/Remove Snap-in.
3. From the available snap-ins list, choose Group Policy Object Editor and click Add.
4. In the Select Group Policy Object dialog box, click the Browse button.
5. Select the Users tab in the Browse For The Group Policy Object dialog box.
6. Click the user or group for which you want to create or edit a local Group Policy and click OK.
7. Click Finish and then click OK.
8. Configure the multiple policy settings.

Group Policy Management Console You must use the GPMC to manage Group Policy deployment. The GPMC provides a single solution for managing all Group Policy–related tasks, and it is also best suited to handle enterprise-level tasks, such as forest-related work.

The GPMC allows you to manage Group Policy and GPOs all from one easy-to-use console whether their enterprise solution spans multiple domains and sites within one or more forests or is local to one site. The GPMC adds flexibility, manageability, and functionality. Using this console, you can also perform other functions, such as backup and restore, importing, and copying.

`Auditpol.exe` `Auditpol.exe` is a command-line utility that works with Windows 7 or above and Windows Server 2008 and above. You have the ability to display information about policies and also to perform some functions to manipulate audit policies. Table 8.1 shows some of the switches available for `auditpol.exe`.

TABLE 8.1 `Auditpol.exe` switches

Switch	Description
`/?`	This is the `Auditpol.exe` help command.
`/get`	This allows you to display the current audit policy.
`/set`	This allows you to set a policy.
`/list`	This displays selectable policy elements.
`/backup`	This allows you to save the audit policy to a file.
`/restore`	This restores a policy from previous backup.
`/clear`	This clears the audit policy.
`/remove`	This removes all per-user audit policy settings and disables all system audit policy settings.
`/ResourceSACL`	This configures the Global Resource SACL.

You should be careful when making Group Policy settings because certain options might prevent the proper use of systems on your network. Always test Group Policy settings on a small group of users before you deploy them throughout your organization. You'll probably find that some settings need to be changed to be effective.

Exercise 8.1 walks you through the process of installing the Group Policy Management MMC snap-in for editing Group Policy settings and creating a GPO.

Creating a Group Policy Object Using the GPMC

1. Click the Windows button and choose Administrative Tools ➢ Group Policy Management. The Group Policy Management tool opens.
2. Expand the Forest, Domains, *your domain name,* and North America containers. Right-click the Corporate OU and then choose Create A GPO In This Domain, And Link It Here.
3. When the New GPO dialog box appears, type **Warning Box** in the Name field. Click OK.
4. The New GPO will be listed on the right side of the Group Policy Management window. Right-click the GPO and choose Edit.

5. In the Group Policy Management Editor, expand the following: Computer Configuration ➢ Policies ➢ Windows Settings ➢ Security Settings ➢ Local Policies ➢ Security Options. On the right side, scroll down and double-click Interactive Logon: Message Text For Users Attempting To Log On.
6. Select the option Define This Policy Setting In The Template. In the text box, type **Unauthorized use of this machine is prohibited** and then click OK. Close the GPO and return to the GPMC main screen.
7. Under the domain name (in the GPMC), right-click Group Policy Objects and click New.
8. When the New GPO dialog box appears, type **Unlinked Test GPO** in the Name field. Click OK.
9. On the right side, the new GPO will appear. Right-click Unlinked Test GPO and click Edit.
10. Under the User Configuration section, click Policies ➢ Administrative Templates ➢ Desktop. On the right side, double-click Hide And Disable All Items On The Desktop and then click Enabled. Click OK and then close the GPMC.

Note that Group Policy changes may not take effect until the next user logs in (some settings may even require that the machine be rebooted). That is, users who are currently working on the system will not see the effects of the changes until they log off and log in again. GPOs are reapplied every 90 minutes with a 30-minute offset. In other words, users who are logged in will have their policies reapplied every 60 to 120 minutes. Not all settings are reapplied (for example, software settings and password policies).

Linking Existing GPOs to Active Directory

Creating a GPO is the first step in assigning Group Policies. The second step is to link the GPO to a specific Active Directory object. As mentioned earlier in this chapter, GPOs can be linked to sites, domains, and OUs.

Exercise 8.2 walks you through the steps that you must take to assign an existing GPO to an OU within the local domain. In this exercise, you will link the Test Domain Policy GPO to an OU. To complete the steps in this exercise, you must have completed Exercise 8.1.

Linking Existing GPOs to Active Directory

1. Open the Group Policy Management Console.
2. Expand the Forest and Domain containers and right-click the Africa OU.

3. Choose Link An Existing GPO.
4. The Select GPO dialog box appears. Click Unlinked Test GPO and click OK.
5. Close the Group Policy Management Console.

Note that the GPMC tool offers a lot of flexibility in assigning GPOs. You can create new GPOs, add multiple GPOs, edit them directly, change priority settings, remove links, and delete GPOs, all from within this interface. In general, creating new GPOs using the GPMC tool is the quickest and easiest way to create the settings you need.

To test the Group Policy settings, you can simply create a user account within the Africa OU that you used in Exercise 8.2. Then, using another computer that is a member of the same domain, you can log on as the newly created user.

Forcing a GPO to Update

There will be times when you need a GPO to get processed immediately. If you are testing a GPO, you will not want to wait for the GPO to process in its own time or you may not want to have to log off the domain and log back onto the domain just to get the GPO processed.

Windows Server 2022 has changed how GPOs get processed. In a Windows Server 2022 domain, when a user logs onto the domain, the latest version of the Group Policy gets downloaded from the domain controller, and it writes that policy to the local store.

If you have your GPOs set up and running in synchronous mode, then the next time the computer restarts, it will use the most recently downloaded GPO from the local store and not download the GPO from the domain. This is a new feature in Windows Server 2022, and it helps to reduce the time it takes to log onto the domain because the GPO doesn't need to be downloaded each time.

So, now that you understand how GPOs get processed in Windows Server 2022, let's look at a few different ways that you can force a GPO to get processed immediately.

Forcing the GPO from the Server

Windows Server 2022 has an MMC called Group Policy Management Console (GPMC), and by using this MMC, you can remotely refresh an organizational unit (OU) and force the GPO on all users and computers within that OU. The GPMC remote refresh automatically updates all settings, including security settings, which are configured in the GPO that is linked to the OU. In the OU's context menu, you can choose to refresh remotely the OU and the GPOs associated with that OU. When you remotely refresh an OU, the following steps occur:

1. Windows Server 2022 does an Active Directory query, and that query returns a list of all users and computers that belong to the OU.
2. Windows Management Instrumentation (WMI) queries all users and computers that are currently logged into the domain and creates a list that will be used.

3. Using the list that was created in step 2, a remote scheduled task is created, and a `GPUpdate.exe /force` is executed on all of the users and computers that are logged into the domain. The remote scheduled task is then scheduled to execute with a 10-minute random delay to help decrease the load on network traffic.

When you are using the GPMC to force a GPO update, you do not have the ability to change the 10-minute random delay, but if you force the GPO through the use of PowerShell, you have the ability to set the delay.

Another way that you can force a GPO to update immediately is to use Windows PowerShell. By using the PowerShell command `Invoke-GPUpdate` cmdlet, you can not only force the GPO but also set the parameters to be more granular.

Forcing the GPO from the Client

As an administrator, you have the ability also to force a GPO onto a client machine on which you may be working. The `GPUpdate.exe` command allows you to run a GPO on a client machine. The `GPUpdate` command will run on all Windows client machines from Windows Vista to Windows Server 2022. Table 8.2 shows some of the `GPUpdate` switches you can use.

TABLE 8.2 `GPUpdate.exe` switches

Switch	Description
`/target:{Computer | User}`	Updates only the User or Computer policy settings for the computer or user specified.
`/force`	Forces the GPO to reapply all policy settings. By default, only policy settings that have changed are applied.
`/wait:<VALUE>`	Determines the number of seconds that the system will wait after a policy is processed before returning to the command prompt.
`/logoff`	The domain user account will automatically log off the computer after the Group Policy settings are updated.
`/boot`	The computer will automatically restart after the Group Policy settings are applied.
`/sync`	This switch forces the next available foreground policy application to be done synchronously. Foreground policies are applied when the computer boots up and the user logs in.
`/?`	Displays help at the command prompt.

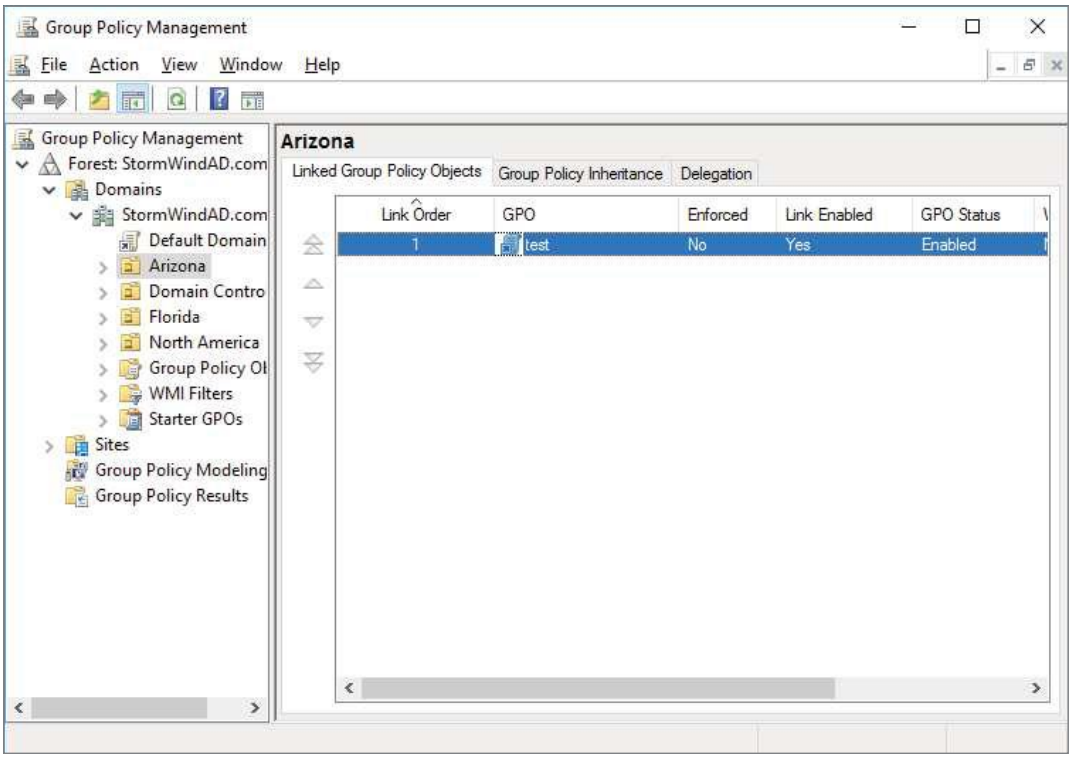
Managing Group Policy

Now that you have implemented GPOs and applied them to sites, domains, and OUs within Active Directory, it's time to look at some ways to manage them. In the following sections, you'll look at how multiple GPOs can interact with one another and ways that you can provide security for GPO management. Using these features is an important part of working with Active Directory, and if you properly plan Group Policy, you can greatly reduce the time the help desk spends troubleshooting common problems.

Managing GPOs

One of the benefits of GPOs is that they're modular and can apply to many different objects and levels within Active Directory. This can also be one of the drawbacks of GPOs if they're not managed properly. A common administrative function related to using GPOs is finding all of the Active Directory links for each of these objects. You can do this when you are viewing the Linked Group Policy Objects tab of the site, domain, or OU in the GPMC (shown in Figure 8.3).

FIGURE 8.3 Viewing GPO links to an Active Directory OU



In addition to the common action of delegating permissions on OUs, you can set permissions regarding the modification of GPOs. The best way to accomplish this is to add users to the Group Policy Creator/Owners built-in security group. The members of this group are able to modify security policy.

Windows Management Instrumentation

Windows Management Instrumentation (WMI) scripts are used to gather information or to help GPOs deploy better. The best way to explain this is to give an example. Let's say you wanted to deploy Microsoft Office 2016 to everyone in the company. You would first set up a GPO to deploy the Office package (explained later in the section "Deploying Software Through a GPO").

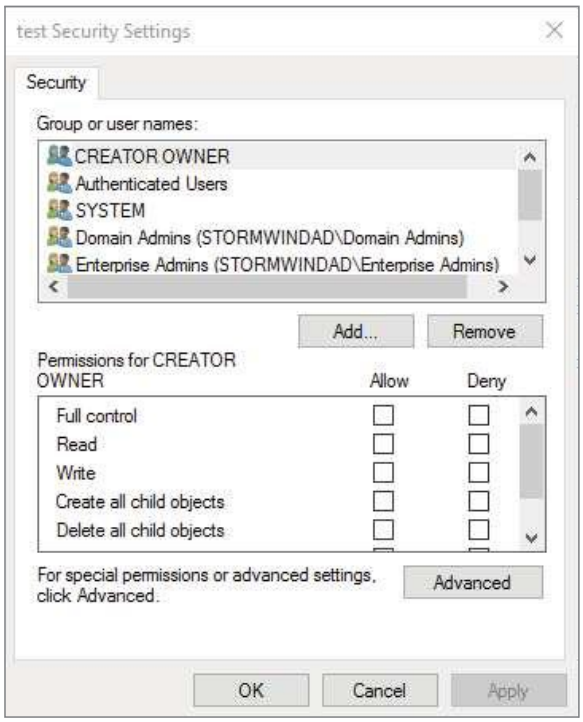
You can then place a WMI script on the GPO stating that only computers with 10 GB of hard disk space actually deploy Office. Now if a computer has 10 GB of free space, the Office GPO would get installed. If the computer does not have the 10 GB of hard disk space, the GPO will not deploy. You can use WMI scripts to check for computer information such as MAC addresses. WMI is a powerful tool because if you know how to write scripts, the possibilities are endless. The following script is a sample of a WMI script that is checking for at least 10 GB of free space on the `C:` partition/volume:

```
Select * from Win32_LogicalDisk where FreeSpace > 10737418240 AND Caption = "C:"
```

Security Filtering of a Group Policy

Another method of securing access to GPOs is to set permissions on the GPOs themselves. You can do this by opening the GPMC, selecting the GPO, and clicking the Advanced button in the Delegation tab. The Unlinked Test GPO Security Settings dialog box appears (see Figure 8.4).

FIGURE 8.4 A GPO's Security Settings dialog box



The following permissions options are available:

- Full Control
- Read
- Write
- Create All Child Objects
- Delete All Child Objects
- Apply Group Policy

You might have to scroll the Permissions window to see the Apply Group Policy item. Of these, the Apply Group Policy setting is particularly important because you use it to filter the scope of the GPO. *Filtering* is the process by which selected security groups are included or excluded from the effects of the GPOs. To specify that the settings should apply to a GPO, you should select the Allow check box for both the Apply Group Policy setting and the Read setting. These settings will be applied only if the security group is also contained within a site, domain, or OU to which the GPO is linked. To disable GPO access for a group, choose Deny for both of these settings. Finally, if you do not want to specify either Allow or Deny, leave both boxes blank. This is effectively the same as having no setting.

In Exercise 8.3, you will filter Group Policy using security groups. To complete the steps in this exercise, you must have completed Exercises 8.1 and 8.2.

Filtering Group Policy Using Security Groups

1. Open the Active Directory Users and Computers administrative tool.
2. Create a new OU called **Group Policy Test**.
3. Create two new global security groups within the Group Policy Test OU and name them **PolicyEnabled** and **PolicyDisabled**.
4. Exit Active Directory Users and Computers and open the GPMC.
5. Right-click the Group Policy Test OU and select Link An Existing GPO.
6. Choose Unlinked Test GPO and click OK.
7. Expand the Group Policy Test OU so that you can see the GPO (Unlinked Test GPO) underneath the OU.
8. Click the Delegation tab and then click the Advanced button in the lower-right corner of the window.
9. Click the Add button and type **PolicyEnabled** in the Enter The Object Names To Select field. Click the Check Names button. Then click OK.
10. Add a group named **PolicyDisabled** in the same way.

11. Highlight the PolicyEnabled group and select Allow for the Read and Apply Group Policy permissions. This ensures that users in the PolicyEnabled group will be affected by this policy.
12. Highlight the PolicyDisabled group and select Deny for the Read and Apply Group Policy permissions. This ensures that users in the PolicyDisabled group will not be affected by this policy.
13. Click OK. You will see a message stating that you are choosing to use the Deny permission and that the Deny permission takes precedence over the Allow entries. Click the Yes button to continue.
14. When you have finished, close the GPMC tool.

Delegating Administrative Control of GPOs

So far, you have learned about how to use Group Policy to manage user and computer settings. What you haven't done yet is to determine who can modify GPOs. It's important to establish the appropriate security on GPOs themselves for two reasons.

- If the security settings aren't set properly, users and system administrators can easily override them. This defeats the purpose of having the GPOs in the first place.
- Having many different system administrators creating and modifying GPOs can become extremely difficult to manage. When problems arise, the hierarchical nature of GPO inheritance can make it difficult to pinpoint the problem.

Fortunately, through the use of delegation, determining security permissions for GPOs is a simple task. Exercise 8.4 walks you through the steps that you must take to grant the appropriate permissions to a user account. Specifically, the process involves delegating the ability to manage Group Policy links on an Active Directory object (such as an OU). To complete this exercise, you must have completed Exercises 8.1 and 8.2.

Delegating Administrative Control of Group Policy

1. Open the Active Directory Users and Computers tool.
2. Expand the local domain and create a user named **Policy Admin** within the Group Policy Test OU.
3. Exit Active Directory Users and Computers and open the GPMC.
4. Click the Group Policy Test OU and select the Delegation tab.
5. Click the Add button. In the field Enter The Object Name To Select, type **Policy Admin** and click the Check Names button.

6. The Add Group Or User dialog box appears. In the Permissions drop-down list, make sure that the item labeled Edit Settings, Delete, Modify Security is chosen. Click OK.
7. At this point you should be looking at the Group Policy Test Delegation window. Click the Advanced button in the lower-right corner.
8. Highlight the Policy Admin account and check the Allow Full Control box. This user now has full control of these OUs and all child OUs and GPOs for these OUs. Click OK.

   If you just want to give this user individual rights, then, in the Properties window (step 8), click the Advanced button and then the Effective Permissions tab. This is where you can also choose a user and give them only the rights that you want them to have.
9. When you have finished, close the GPMC tool.

Understanding Delegation

Although I have talked about delegation throughout the book, it's important to discuss it again in the context of OUs, Group Policy, and Active Directory.

Once configured, Active Directory administrative delegation allows you to delegate tasks (usually administration related) to specific user accounts or groups. What this means is that if you don't manage it all, the user accounts (or groups) you choose will be able to manage their portions of the tree.

It's important to be aware of the benefits of Active Directory Delegation (AD Delegation). *AD Delegation* will help you manage the assignment of administrative control over objects in Active Directory, such as users, groups, computers, printers, domains, and sites. AD Delegation is used to create more administrators, which essentially saves time.

For example, let's say you have a company whose IT department is small and situated in a central location. The central location connects three other smaller remote sites. These sites do not each warrant a full-time IT person, but the manager on staff (for example) at each remote site can become an administrator for their portion of the tree. If that manager administers the user accounts for the staff at the remote site, this reduces the burden on the system administrator of doing trivial administrative work, such as unlocking user accounts or changing passwords, and thus it reduces costs.

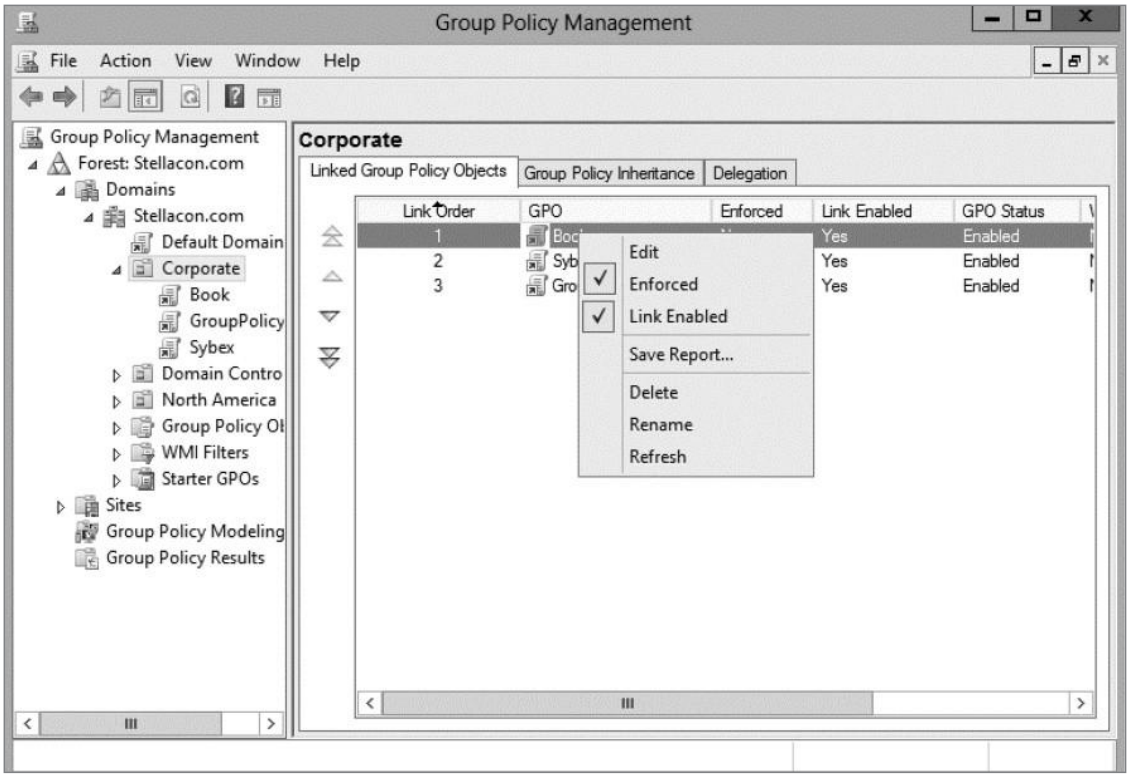
Controlling Inheritance and Filtering Group Policy

Controlling inheritance is an important function when you are managing GPOs. Earlier in this chapter, you learned that, by default, GPO settings flow from higher-level Active Directory objects to lower-level ones. For example, the effective set of Group Policy settings for a user might be based on GPOs assigned at the site level, at the domain level, and in the OU hierarchy. In general, this is probably the behavior you would want.

In some cases, however, you might want to block Group Policy inheritance. You can accomplish this easily by selecting the object to which a GPO has been linked. Right-click the object and choose Block Inheritance. By enabling this option, you are effectively specifying that this object starts with a clean slate; that is, no other Group Policy settings will apply to the contents of this Active Directory site, domain, or OU.

You can also force inheritance. By setting the Enforced option, you can prevent other system administrators from making changes to default policies. You can set the Enforced option by right-clicking the GPO and choosing Enforced (see Figure 8.5).

FIGURE 8.5 Setting the Enforced GPO option



Assigning Script Policies

You might want to make several changes and implement certain settings that would apply while the computer is starting up or the user is logging on. Perhaps the most common operation that logon scripts perform is mapping network drives. Although users can manually map network drives, providing this functionality within login scripts ensures that mappings stay consistent and that users only need to remember the drive letters for their resources.

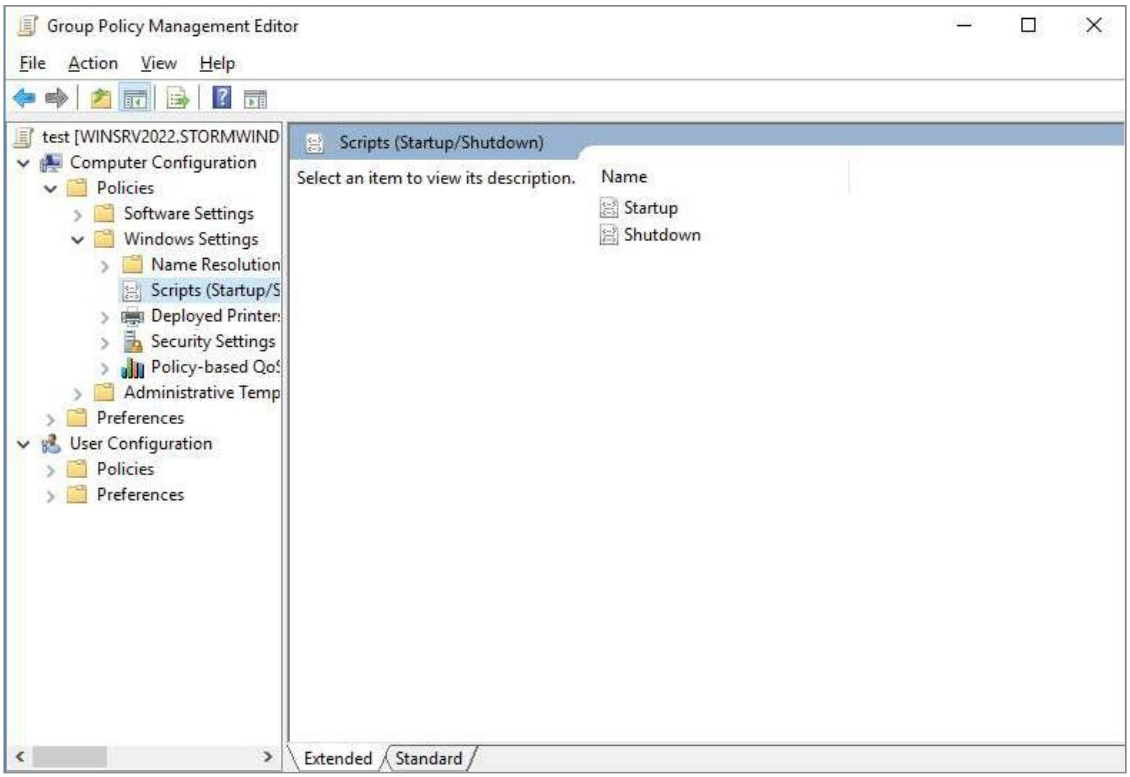
Script policies are specific options that are part of Group Policy settings for users and computers. These settings direct the operating system to the specific files that should be processed during the startup/shutdown or logon/logoff processes. You can create the scripts by using the *Windows Script Host (WSH)* or with standard batch file commands. WSH allows developers and system administrators to create scripts quickly and easily using Visual Basic Scripting Edition (VBScript) or JScript (Microsoft's implementation of JavaScript). Additionally, WSH can be expanded to accommodate other common scripting languages.

To set script policy options, you simply edit the Group Policy settings. As shown in Figure 8.6, there are two main areas for setting script policy settings:

Startup/Shutdown Scripts These settings are located within the Computer Configuration ➢ Windows Settings ➢ Scripts (Startup/Shutdown) object.

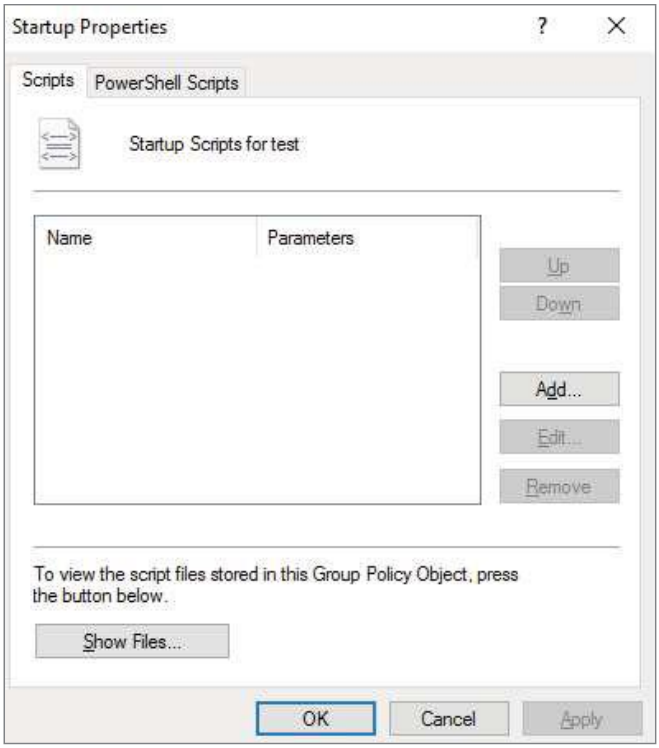
Logon/Logoff Scripts These settings are located within the User Configuration ➢ Windows Settings ➢ Scripts (Logon/Logoff) object.

FIGURE 8.6 Viewing Startup/Shutdown script policy settings



To assign scripts, simply double-click the setting and its Properties dialog box appears. For instance, if you double-click the Startup setting, the Startup Properties dialog box appears (see Figure 8.7). To add a script filename, click the Add button. When you do, you will be asked to provide the name of the script file (such as `MapNetworkDrives.vbs` or `ResetEnvironment.bat`).

FIGURE 8.7 Setting scripting options



Note that you can change the order in which the scripts are run by using the Up and Down buttons. The Show Files button opens the directory folder in which you should store the Logon script files. To ensure that the files are replicated to all domain controllers, you should be sure you place the files within the SYSVOL share.

Understanding the Loopback Policy

There may be times when the user settings of a Group Policy Object should be applied to a computer based on its location instead of the User object. Usually, the user Group Policy processing dictates that the GPOs be applied in order during computer startup based on the

computers located in their organizational unit. User GPOs, on the other hand, are applied in order during logon, regardless of the computer to which they log on.

In some situations, this processing order may not be appropriate. A good example is a kiosk machine. You would not want applications that have been assigned or published to a user to be installed when the user is logged on to the kiosk machine. *Loopback Policy* allows two ways to retrieve the list of GPOs for any user when they are using a specific computer in an OU.

Merge Mode The GPOs for the computer are added to the end of the GPOs for the user. Because of this, the computer's GPOs have higher precedence than the user's GPOs.

Replace Mode In Replace mode, the user's GPOs are not used. Only the GPOs of the Computer object are used.

Managing Network Configuration

Group Policies are also useful in network configuration. Although you can handle network settings at the protocol level using many different methods, such as Dynamic Host Configuration Protocol (DHCP), Group Policy allows you to set which functions and operations are available to users and computers.

Figure 8.8 shows some of the features that are available for managing Group Policy settings. The paths to these settings are as follows:

Computer Network Options These settings are located within the Computer Configuration ➢ Administrative Templates ➢ Network ➢ Network Connections folder.

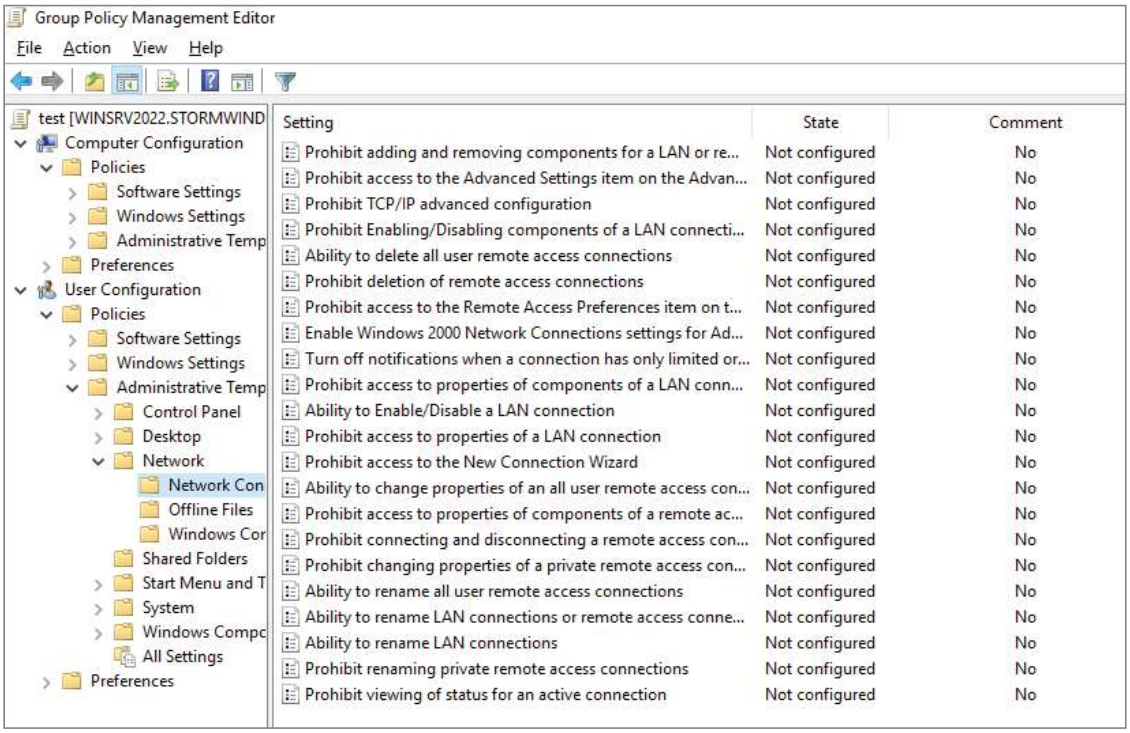
User Network Options These settings are located within User Configuration ➢ Administrative Templates ➢ Network.

Here are some examples of the types of settings available:

- The ability to allow or disallow the modification of network settings.

  In many environments, the improper changing of network configurations and protocol settings is a common cause of help desk calls.
- The ability to allow or disallow the creation of Remote Access Service (RAS) connections.

FIGURE 8.8 Viewing Group Policy User network configuration options



This option is useful, especially in larger networked environments, because the use of modems and other WAN devices can pose a security threat to the network.

- The ability to set offline files and folders options.

  This is especially useful for keeping files synchronized for traveling users, and it is commonly configured for laptops.

Each setting includes detailed instructions in the description area of the GPO Editor window. By using these configuration options, you can maintain consistency for users and computers and avoid many of the most common troubleshooting calls.

Configuring Network Settings

In Windows Server 2022, you can set a lot of user and network settings by using GPOs. Some of the different settings that can be configured are configure printer preferences, defining network drive mappings, configuring power options, setting custom Registry settings, manipulating Control Panel settings, configuring Microsoft Edge settings, settings for file and folder deployment, setting up shortcut deployments, and configuring item-level targeting.

To configure any of these settings, open the Group Policy Management Console and choose the GPO you want to edit. Once you start editing, you can configure any of these network settings.

Automatically Enrolling User and Computer Certificates in Group Policy

You can also use Group Policy to enroll user and computer certificates automatically, making the entire certificate process transparent to your end users. Before proceeding, you should understand what certificates are and why they are an important part of network security.

Think of a digital certificate as a carrying case for a public key. A certificate can contain both a public and a private key and a set of attributes, including the key holder's name and email address. These attributes specify something about the holder: their identity, what they're allowed to do with the certificate, and so on. The attributes and the public key are bound together because the certificate is digitally signed by the entity that issued it. Anyone who wants to verify the certificate's contents can verify the issuer's signature.

Certificates are one part of what security experts call a *public-key infrastructure (PKI)*. A PKI has several different components that you can mix and match to achieve the desired results. Microsoft's PKI implementation offers the following functions:

Certificate Authorities CAs issue certificates, revoke certificates they've issued, and publish certificates for their clients. Big CAs like Thawte and VeriSign do this for millions of users. If you want, you can also set up your own CA for each department or workgroup in your organization. Each CA is responsible for choosing which attributes it will include in a certificate and what mechanism it will use to verify those attributes before it issues the certificate.

Certificate Publishers They make certificates publicly available, inside or outside an organization. This allows widespread availability of the critical material needed to support the entire PKI.

PKI-Savvy Applications These allow you and your users to do useful things with certificates, such as encrypt email or network connections. Ideally, the user shouldn't have to know (or even be aware of) what the application is doing—everything should work seamlessly and automatically. The best-known examples of PKI-savvy applications are web browsers such as Internet Explorer and Firefox and email applications such as Outlook.

Certificate Templates These act like rubber stamps. By specifying a particular template as the model you want to use for a newly issued certificate, you're actually telling the CA which optional attributes to add to the certificate as well as implicitly telling it how to fill some of the mandatory attributes. Templates greatly simplify the process of issuing certificates because they keep you from having to memorize the names of all of the attributes you may potentially want to put in a certificate.

Learn More About PKI

When discussing certificates, it's also important to mention PKI and its definition. The exam doesn't go deeply into PKI, but I recommend you do some extra research on your own because it is an important technology and shouldn't be overlooked. PKI is actually a simple concept with a lot of moving parts. When broken down to its bare essentials, PKI is nothing more than a server and workstations utilizing a software service to add security to your infrastructure. When you use PKI, you are adding a layer of protection. The auto-enrollment Settings policy determines whether users and/or computers are automatically enrolled for the appropriate certificates when necessary. By default, this policy is enabled if a certificate server is installed, but you can make changes to the settings, as shown in Exercise 8.5.

In Exercise 8.5, you will learn how to configure automatic certificate enrollment in Group Policy. You must have first completed the other exercises in this chapter in order to proceed with Exercise 8.5.

Configuring Automatic Certificate Enrollment in Group Policy

1. Open the Group Policy Management Console tool.
2. Right-click the North America OU that you created in the previous exercises in this book.
3. Select Create A GPO In This Domain And Link It Here and name it **Test CA**. Click OK.
4. Right-click the Test CA GPO and choose Edit.
5. Open Computer Configuration ➢ Policies ➢ Windows Settings ➢ Security Settings ➢ Public Key Policies.
6. Double-click Certificate Services Client – Auto-Enrollment in the right pane.
7. The Certificate Services Client – Auto-Enrollment Properties dialog box will appear. For now, don't change anything—just become familiar with the settings in this dialog box. Click OK to close it.

Redirecting Folders

Another set of Group Policy settings that you will learn about are the *folder redirection settings*. Group Policy provides a means for redirecting the `Documents`, `Desktop`, and

`Start Menu` folders, as well as cached application data, to network locations. Folder redirection is particularly useful for the following reasons:

- When they are using roaming user profiles, a user's `Documents` folder is copied to the local machine each time they log on. This requires high bandwidth consumption and time if the `Documents` folder is large. If you redirect the `Documents` folder, it stays in the redirected location, and the user opens and saves files directly to that location.
- Documents are always available no matter where the user logs on.
- Data in the shared location can be backed up during the normal backup cycle without user intervention.
- Data can be redirected to a more robust server-side administered disk that is less prone to physical and user errors.

When you decide to redirect folders, you have two options:

- *Basic* redirection redirects everyone's folders to the same location (but each user gets their own folder within that location).
- *Advanced* redirection redirects folders to different locations based on group membership. For instance, you could configure the Engineers group to redirect their folders to `//Engineering1/Documents/` and the Marketing group to `//Marketing1/Documents/`. Again, individual users still get their own folder within the redirected location.

To configure folder redirection, follow the steps in Exercise 8.6. You must have completed the other exercises in this chapter to proceed with this exercise.

Configuring Folder Redirection in Group Policy

1. Open the GPMC tool.
2. Open the North America OU and then edit the Test CA GPO.
3. Open User Configuration ➢ Policies ➢ Windows Settings ➢ Folder Redirection ➢ Documents.
4. Right-click Documents, and select Properties.
5. On the Target tab of the Documents Properties dialog box, choose the Basic – Redirect Everyone's Folder To The Same Location selection from the Settings drop-down list.
6. Leave the default option for the Target Folder Location drop-down list and specify a network path in the Root Path field.
7. Click the Settings tab. All of the default settings are self-explanatory and should typically be left at the default setting. Click OK when you have finished.

Folder Redirection Facts

Try not to mix up the concepts of *folder redirection* and *offline folders*, especially in a world with ever-increasing numbers of mobile users. Folder redirection and offline folders are different features.

Windows Server 2022 folder redirection works as follows: The system uses a pointer that moves the folders you want to a location you specify. Users do not see any of this—it is transparent to them. One problem with folder redirection is that it does not work for mobile users (users who will be offline and who will not have access to files they may need).

Offline folders, however, are copies of folders that were local to you. Files are now available locally to you on the system you have with you. They are also located back on the server where they are stored. The next time you log in, the folders are synchronized so that both folders contain the latest data. This is a perfect feature for mobile users, whereas folder redirection provides no benefit for the mobile user.

Managing GPOs with Windows PowerShell Group Policy Cmdlets

As stated earlier in this book, *Windows PowerShell* is a Windows command-line shell and scripting language. Windows PowerShell can also help you automate many of the same tasks that you perform using the Group Policy Management Console.

Windows Server 2022 helps you perform many of the Group Policy tasks by providing dozens of cmdlets. Each of these cmdlets is a simple, single-function command-line tool.

The Windows PowerShell Group Policy cmdlets can help you perform some of the following tasks for domain-based Group Policy objects:

- Maintain, create, remove, back up, and import GPOs
- Create, update, and remove GPO links to Active Directory containers
- Set Active Directory OUs and domain permissions and inheritance flags
- Configure Group Policy Registry settings
- Create and edit starter GPOs

The requirement for Windows PowerShell Group Policy cmdlets is Windows Server 2022 on either a domain controller or a member server that has the GPMC installed. Windows 7 or above also gives you the ability to use Windows PowerShell Group Policy cmdlets if you have Remote Server Administration Tools (RSAT) installed. RSAT includes the GPMC and its cmdlets. PowerShell is also a requirement.

Item-Level Targeting

You have the ability to apply individual preference items only to selected users or computers using a GPO feature called item-level targeting. *Item-level targeting* allows you to select specific items that the GPO will look at and then apply that GPO only to the specific users or computers. You have the ability to include multiple preference items, and you can customize each item for specific users or computers to use.

The target item has a value that belongs to it, and the value can be either true or false. You can get even more granular by using the operation command of `AND` or `OR` while building this GPO, and this will allow you to combine the targeted items with the preceding one. Once all of the conditions are executed, if the final value is false, then the GPO is not applied. If the final value is true, the GPO is applied to the users or computers that were previously determined. You have the ability to item-target the following items:

- Battery Present Targeting
- Computer Name Targeting
- CPU Speed Targeting
- Date Match Targeting
- Disk Space Targeting
- Domain Targeting
- Environment Variable Targeting
- File Match Targeting
- IP Address Range Targeting
- Language Targeting
- LDAP Query Targeting
- MAC Address Range Targeting
- MSI Query Targeting
- Network Connection Targeting
- Operating System Targeting
- Organizational Unit Targeting
- PCMCIA Present Targeting
- Portable Computer Targeting
- Processing Mode Targeting
- RAM Targeting
- Registry Match Targeting
- Security Group Targeting
- Site Targeting
- Terminal Session Targeting
- Time Range Targeting

- User Targeting
- WMI Query Targeting

You can easily set up item-level targeting by following these steps:

1. Open the Group Policy Management Console. Select the GPO that will contain the new preferences by right-clicking the GPO and then choosing Edit.
2. In the console tree under Computer Configuration or User Configuration, expand the Preferences folder and then browse to the preference extension.
3. Double-click the node for the preference extension, right-click the preference item, and click Properties.
4. In the Properties dialog box, select the Common tab.
5. Select Item-Level Targeting and then click Targeting.
6. Click New Item. If you are configuring multiple targeted items, from the Item Option menu choose the logical operation (`AND` or `OR`). Then click OK when finished.
7. Click OK in the Properties dialog box, and you are all set.

Back Up, Restore, Import, Copy, and Migration Tables

One of the biggest advantages of using the Group Policy Management Console is that it is a one-stop shopping utility. You can do everything you need to do for GPOs in one location. The GPMC not only allows you to create and link a GPO but also lets you back up, restore, import, copy, and use migration tables.

Backing Up a GPO

Since this book is about Windows Server 2022 and everything you should do to set up the server properly, then you most likely already understand what backups can do for you.

The reason administrators back up data is in the event of a crash or major error that requires us to reload data to the server. Backups should be done daily on all data that is important to your organization. Backups can be done by using Windows Server 2022's backup utility, or you can purchase third-party software/hardware to back up your data.

I am an IT director, and data recoverability is one of the most critical items that I deal with on a daily basis. I use a third-party hardware device from a company called Unitrends. This is just one of many companies that helps protect an organization's data.

This hardware device does hourly backups for all of my servers. One of the nice features of the Unitrends box is that it backs up onto the hardware device and then sends my data to the cloud automatically for an offsite backup. This way, if I need to recover just one piece of data, I can grab it off the hardware device. But if I have a major issue, such as a fire that destroys the entire server room, I have an offsite backup from which I can retrieve my data.

It's the same for GPOs. You need to make sure you back up your GPOs in the event of an issue that requires you to do a reload. To back up your GPOs manually, you can go into the GPMC MMC and, under Group Policy Objects, you can right-click and choose Backup All or right-click the specific GPO and choose Backup.

Restoring a GPO

There may be times when you have to restore a GPO that was previously backed up. There are normally two reasons why you have to restore a GPO—you accidentally deleted the GPO, or you need to restore the GPO to a previous state. (This normally happens if you make changes and they cause an issue.) Restoring a GPO is simple:

1. Open the Group Policy Management Console.
2. In the console tree, right-click Group Policy Objects and choose Manage Backups.
3. Select the backup you want to restore and click the Restore button.

Importing or Copying GPOs

As an administrator, you may you need to import or copy a GPO from one domain to another domain. You do this so that the second domain has the same settings as the first domain.

You can use the import or copy-to-transfer settings from one GPO to another GPO within the same domain, to a GPO in another domain in the same forest, or to a GPO in a domain in a different forest.

Importing or copying a GPO is an easy process. To do this, complete the following steps:

1. Open the Group Policy Management Console.
2. In the console tree, right-click Group Policy Objects and choose either Import Settings or Copy.

Migration Tables

One issue that we run into when copying or moving a GPO from one system to another is that when some GPOs are built, they are domain specific. Doing so can be a problem when the GPOs are moved to a system in another domain. This is where migration tables can help you out. *Migration tables* tell you how domain-specific settings should be treated when the GPO is moved from the domain in which it was created to another domain.

Migration tables are files that are used to map previous domain information (such as users and groups) to the new domain's object-specific data. Migration tables have mapping entries that map the old data to the new data.

Migration tables store their mapping data in an XML format, and the migration tables have their own file extension, `.migtable`. If you want to create a migration table, you can use the *Migration Table Editor (MTE)*. The MTE is an easy-to-use utility for configuring or just viewing migration tables.

It does not matter if you decide to copy or import a GPO; migration tables apply to any of the settings within the GPO. However, if you copy a GPO instead of move it, you have the option of bringing the Discretionary Access Control List (DACL) option over with the copy.

If you are looking at using migration tables, there are three settings that you can configure:

Do Not Use A Migration Table If you choose this option, the GPO is copied over exactly as is. All security objects and UNC paths are copied over without any modification.

Use A Migration Table If you choose this option, the GPO has all of the options that can be in the migration table mapped.

Use A Migration Table Exclusively If you choose this option, all security principals and UNC path information in the GPO are chosen. If any of this information is not included in the migration table, the operation will fail.

To open the Migration Table Editor, perform the following steps:

1. Open the Group Policy Management Console.
2. In the console tree, right-click Group Policy Objects and choose Open Migration Table Editor.

Resetting the Default GPO

There may be a time when you need to reset the default GPO to its original settings. This is easy to do as long as you understand how to use the DCGPOFix command-line utility. This command-line utility does just what it spells—it fixes the domain controller's GPO. To use this command, use the following syntax:

```
DCGPOFix [/ignoreschema] [/target: {Domain | DC | Both}] [/?]
```

Let's take a look at the switches in the previous command. The `/ignoreschema` switch ignores the current version of the Active Directory schema. The reason you use this switch is because this command works only on the same schema version as the Windows version in which the command was shipped. By using this switch, you don't need to worry about what schema you have on the system.

The next switch is `[/target: {Domain | DC | Both}]`. This switch specifies the GPO you are going to restore. You have the ability to restore the Default Domain Policy GPO, the Default Domain Controllers GPO, or both. The final switch, `/?`, displays the help for this command.

Summary

In this chapter, you examined Active Directory's solution to a common headache for many systems administrators: policy settings. Specifically, I discussed topics that covered Group Policy.

I covered the fundamentals of Group Policy, including its fundamental purpose. You can use Group Policy to enforce granular permissions for users in an Active Directory environment. Group Policies can restrict and modify the actions allowed for users and computers within the Active Directory environment.

Certain Group Policy settings may apply to users, computers, or both. Computer settings affect all users who access the machines to which the policy applies. User settings affect users regardless of the machines to which they log on.

You learned that you can link Group Policy objects to Active Directory sites, domains, or OUs. This link determines to which objects the policies apply. GPO links can interact through inheritance and filtering to result in an effective set of policies.

The chapter covered inheritance and how GPOs filter down. I showed you how to use the Enforced option on a GPO issued from a parent and how to block a GPO from a child.

You can also use administrative templates to simplify the creation of GPOs. There are some basic default templates that come with Windows Server 2022. In addition, you can delegate control over GPOs in order to distribute administrative responsibilities. Delegation is an important concept because it allows for distributed administration.

You can also deploy software using GPOs. This feature can save time and increase productivity throughout the entire software management life cycle by automating software installation and removal on client computers. The Windows Installer offers a more robust method for managing installation and removal, and applications that support it can take advantage of new Active Directory features. Make sure you are comfortable using the Windows Installer.

You learned about publishing applications via Active Directory and the difference between publishing and assigning applications. You can assign some applications to users and computers so that they are always available. You can also publish them to users so that the user can install them with minimal effort when required.

You also learned how to prepare for software deployment. Before your users can take advantage of automated software installation, you must set up an installation share and provide the appropriate permissions.

The final portion of the chapter covered the Resultant Set of Policy (RSoP) tool, which you can use in logging mode or planning mode to determine exactly which set of policies applies to users, computers, OUs, domains, and sites.

Exam Essentials

Understand the purpose of Group Policy. You use Group Policy to enforce granular permissions for users in an Active Directory environment.

Understand user and computer settings. Certain Group Policy settings may apply to users, computers, or both. Computer settings affect all users that access the machines to which the policy applies. User settings affect users, regardless of which machines they log on to.

Know the interactions between Group Policy Objects and Active Directory. GPOs can be linked to Active Directory objects. This link determines to which objects the policies apply.

Understand filtering and inheritance interactions between GPOs. For ease of administration, GPOs can interact via inheritance and filtering. It is important to understand these interactions when you are implementing and troubleshooting Group Policy.

Know how Group Policy settings can affect script policies and network settings. You can use special sets of GPOs to manage network configuration settings.

Understand how delegation of administration can be used in an Active Directory environment. Delegation is an important concept because it allows for distributed administration.

Know how to use the Resultant Set of Policy (RSoP) tool to troubleshoot and plan Group Policy. Windows Server 2022 includes the RSoP feature, which you can run in logging mode or planning mode to determine exactly which set of policies applies to users, computers, OUs, domains, and sites.

Understand the difference between publishing and assigning applications. Some applications can be assigned to users and computers so that they are always available. Applications can be published to users so that the user may install the application with a minimal amount of effort when it is required.

Know how to configure application settings using Active Directory and Group Policy. Using standard Windows Server 2016 administrative tools, you can create an application policy that meets your requirements. You can use automatic, on-demand installation of applications as well as many other features.

Review Questions

1. The process of assigning permissions to set Group Policy for objects within an OU is known as:
   - **A.** Promotion
   - **B.** Inheritance
   - **C.** Delegation
   - **D.** Filtering

2. Which of the following statements is true regarding the actions that occur when a software package is removed from a GPO that is linked to an OU?
   - **A.** The application will be automatically uninstalled for all users within the OU.
   - **B.** Current application installations will be unaffected by the change.
   - **C.** The system administrator may determine the effect.
   - **D.** The current user may determine the effect.

3. You are the network administrator for your organization. You are working on creating a new GPO for the sales OU. You want the GPO to take effect immediately. Which command would you use?
   - **A.** `GPForce`
   - **B.** `GPUpdate`
   - **C.** `GPResult`
   - **D.** `GPExecute`

4. You are the network administrator for your organization. You are working on creating a new GPO for the Marketing OU. You want the GPO to take effect immediately, and you need to use Windows PowerShell. Which PowerShell cmdlet command would you use?
   - **A.** `Invoke-GPUpdate`
   - **B.** `Invoke-GPForce`
   - **C.** `Invoke-GPResult`
   - **D.** `Invoke-GPExecute`

5. You are the network administrator, and you have decided to set up a GPO with item-level targeting. Which of the following is *not* an option for item-level targeting?
   - **A.** Battery Present Targeting
   - **B.** Computer Name Targeting
   - **C.** CPU Speed Targeting
   - **D.** DVD Present Targeting

6. Your network contains an Active Directory Domain Services (AD DS) domain. You have a Group Policy Object (GPO) named GPO1 that contains Group Policy preferences. You plan to link GPO1 to the domain. You need to ensure that the preferences in GPO1 apply only to domain member servers and *not* to domain controllers or client computers. All the other Group Policy settings in GPO1 must apply to all the computers. The solution must minimize administrative effort. Which type of item level targeting should you use?
   A. Domain
   B. Operating System
   C. Security Group
   D. Environment Variable

7. You work for an organization with a single Windows Server 2022 Active Directory domain. The domain has OUs for Sales, Marketing, Admin, R&D, and Finance. You need the users in the Finance OU only to get Microsoft Office 2016 installed automatically onto their computers. You create a GPO named OfficeApp. What is the next step in getting all of the Finance users Office 2016?
   A. Edit the GPO and assign the Office application to the user's account. Link the GPO to the Finance OU.
   B. Edit the GPO, and assign the Office application to the user's account. Link the GPO to the domain.
   C. Edit the GPO, and assign the Office application to the computer account. Link the GPO to the domain.
   D. Edit the GPO, and assign the Office application to the computer account. Link the GPO to the Finance OU.

8. You are hired as a consultant to the ABC Company. The owner of the company complains that she continues to have desktop wallpaper that she did not choose. When you speak with the IT team, you find out that a former employee created 20 GPOs and they have not been able to figure out which GPO is changing the owner's desktop wallpaper. How can you resolve this issue?
   A. Run the RSoP utility against all forest computer accounts.
   B. Run the RSoP utility against the owner's computer account.
   C. Run the RSoP utility against the owner's user account.
   D. Run the RSoP utility against all domain computer accounts.

9. You are the network administrator for a large organization that has multiple sites and multiple OUs. You have a site named SalesSite that is for the sales building across the street. In the domain, there is an OU for all salespeople called Sales. You set up a GPO for the SalesSite, and you need to be sure that it applies to the Sales OU. The Sales OU GPOs cannot override the SalesSite GPO. What do you do?
   A. On the GPO, disable the Block Child Inheritance setting.
   B. On the GPO, set the Enforce setting.
   C. On the GPO, set the priorities to 1.
   D. On the Sales OU, configure the Inherit Parent Policy settings.

10. You are the administrator for an organization that has multiple locations. You are running Windows Server 2022, and you have only one domain with multiple OUs set up for each location. One of your locations, Boston, is connected to the main location by a 256 Kbps ISDN line. You configure a GPO to assign a sales application to all computers in the entire domain. You have to be sure that Boston users receive the GPO properly. What should you do?
    A. Disable the Slow Link Detection setting in the GPO.
    B. Link the GPO to the Boston OU.
    C. Change the properties of the GPO to publish the application to the Boston OU.
    D. Have the users in Boston run the `GPResult/force` command.

11. You are the network administrator for a large organization that uses Windows Server 2022 domain controllers and DNS servers. All of your client machines currently have the Windows XP operating system. You want to be able to have client computers edit the domain-based GPOs by using the ADMX files that are located in the ADMX Central Store. How do you accomplish this task? (Choose all that apply.)
    A. Upgrade your clients to Windows 8.
    B. Upgrade your clients to Windows 10.
    C. Add the client machines to the ADMX edit utility.
    D. In the ADMX store, choose the box Allow All Client Privileges.

12. You work for an organization with a single Windows Server 2022 Active Directory domain. The domain has OUs for Sales, Marketing, Admin, R&D, and Finance. You need only the users in the Finance OU to get Windows Office 2016 installed automatically onto their computers. You create a GPO named OfficeApp. What is the next step in getting all of the Finance users Office 2016?
    A. Edit the GPO, and assign the Office application to the user's account. Link the GPO to the Finance OU.
    B. Edit the GPO, and assign the Office application to the user's account. Link the GPO to the domain.
    C. Edit the GPO, and assign the Office application to the computer account. Link the GPO to the domain.
    D. Edit the GPO, and assign the Office application to the computer account. Link the GPO to the Finance OU.

13. To disable GPO settings for a specific security group, which of the following permissions should you use?
    A. Deny Write
    B. Allow Write
    C. Enable Apply Group Policy
    D. Deny Apply Group Policy

14. GPOs assigned at which of the following level(s) will override GPO settings at the domain level?
    A. OU
    B. Site
    C. Domain
    D. Both OU and site

15. A system administrator wants to ensure that only the GPOs set at the OU level affect the Group Policy settings for objects within the OU. Which option can they use to do this (assuming that all other GPO settings are the defaults)?
    A. The Enforced option
    B. The Block Policy Inheritance option
    C. The Disable option
    D. The Deny permission

16. A system administrator is planning to implement Group Policy Objects in a new Windows Server 2022 Active Directory environment. In order to meet the needs of the organization, he decides to implement a hierarchical system of Group Policy settings. At which of the following levels is he able to assign Group Policy settings? (Choose all that apply.)
    A. Sites
    B. Domains
    C. Organizational units
    D. Local system

17. Ann is a system administrator for a medium-sized Active Directory environment. She has determined that several new applications that will be deployed throughout the organization use Registry-based settings. She would like to do the following:
    - Control these Registry settings using Group Policy
    - Create a standard set of options for these applications and allow other system administrators to modify them using the standard Active Directory tools

    Which of the following options can she use to meet these requirements? (Choose all that apply.)
    A. Implement the inheritance functionality of GPOs.
    B. Implement delegation of specific objects within Active Directory.
    C. Implement the No Override functionality of GPOs.
    D. Create administrative templates.
    E. Provide administrative templates to the system administrators who are responsible for creating Group Policy for the applications.