



NETWORK ADMINISTRATION

CH5. IMPLEMENTING GPOs



Content

- Introducing Group Policy
- Implementing and administering GPOs
- Group Policy scope and Group Policy processing
- Troubleshooting the application of GPOs
- Implementing administrative templates
- Configuring Folder Redirection, Software Installation, and Scripts
- Configuring Group Policy preferences



Introducing Group Policy

- What is configuration management?
- Overview of Group Policy tools and consoles
- Demonstration: Exploring Group Policy tools and consoles
- Benefits of using Group Policy
- Group Policy Objects
- Overview of GPO scope
- Overview of GPO inheritance
- The Group Policy Client service and client-side extensions
- New features in Group Policy in Windows Server 2016

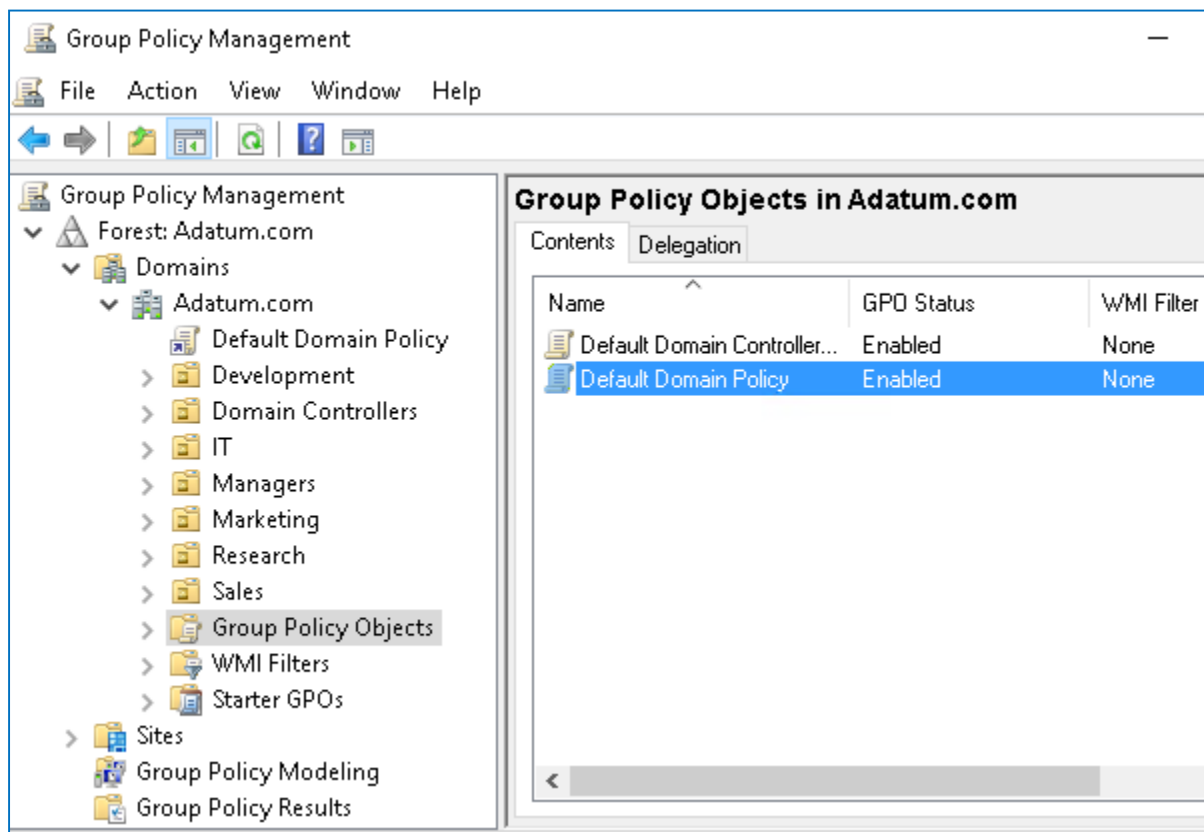


What is configuration management?

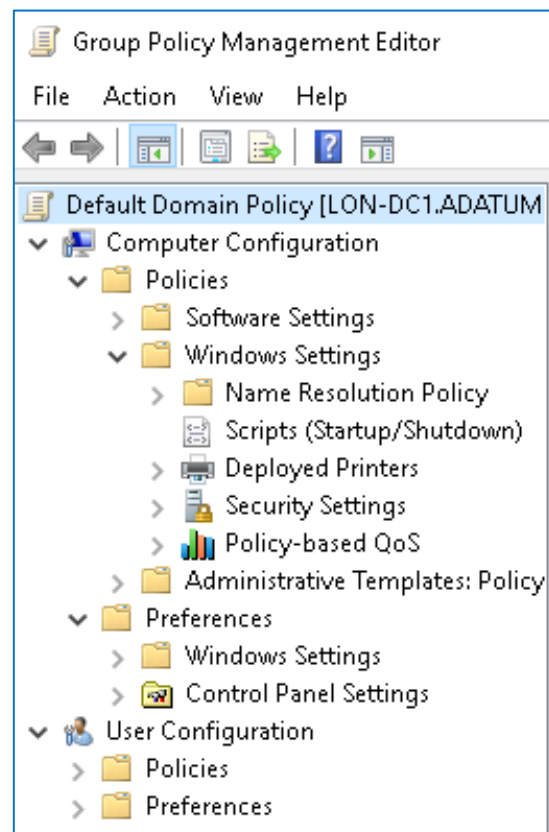
- *Configuration management* is a centralized approach to applying one or more changes to more than one user or computer
- The key elements of configuration management are:
 - Setting
 - Scope
 - Application



Overview of Group Policy tools and consoles



Group Policy Management Console



Group Policy Management Editor

Command-line utilities: **GPUpdate** and **GPResult**



Demonstration: Exploring Group Policy tools and consoles

- *In this demonstration, you will learn how to:*
 - Navigate the GPMC
 - Create a new GPO
 - Configure a setting
 - Perform a Group Policy refresh
 - Examine which GPOs apply to the computer and user



Benefits of using Group Policy

- Group Policy is a very powerful administrative tool
- You can use it to enforce various types of settings to a large number of users and computers
- Typically, you use GPOs to:
 - Apply security settings
 - Manage desktop application settings
 - Deploy application software
 - Manage Folder Redirection
 - Configure network settings



Group Policy Objects

A GPO is:

- A container for one or more policy settings
- Managed with the GPMC
- Stored in the GPOs container
- Edited with Group Policy Management Editor
- Applied to a specific level in the AD DS hierarchy



Overview of GPO scope

- The *scope* of a GPO is the collection of users and computers that will apply the settings in the GPO
- You can use several methods to scope a GPO:
 - Link the GPO to a container, such as an OU
 - Filter by using security settings
 - Filter by using WMI filters
- For Group Policy preferences:
 - You can filter or target the settings that you configure by Group Policy preferences within a GPO based on several criteria



Overview of GPO inheritance

GPOs are processed on a client computer in the following order:

1. Local GPOs
2. Site-level GPOs
3. Domain-level GPOs
4. OU GPOs, including any nested OUs



The Group Policy Client service and client-side extensions

- Group Policy application process:
 1. Group Policy Client retrieves GPOs
 2. Client downloads and caches GPOs
 3. Client-side extensions process the settings
- Policy settings in the **Computer Configuration** node apply at system startup and every 90–120 minutes thereafter
- Policy settings in the **User Configuration** node apply at sign-in and every 90–120 minutes thereafter



New features in Group Policy in Windows Server 2016

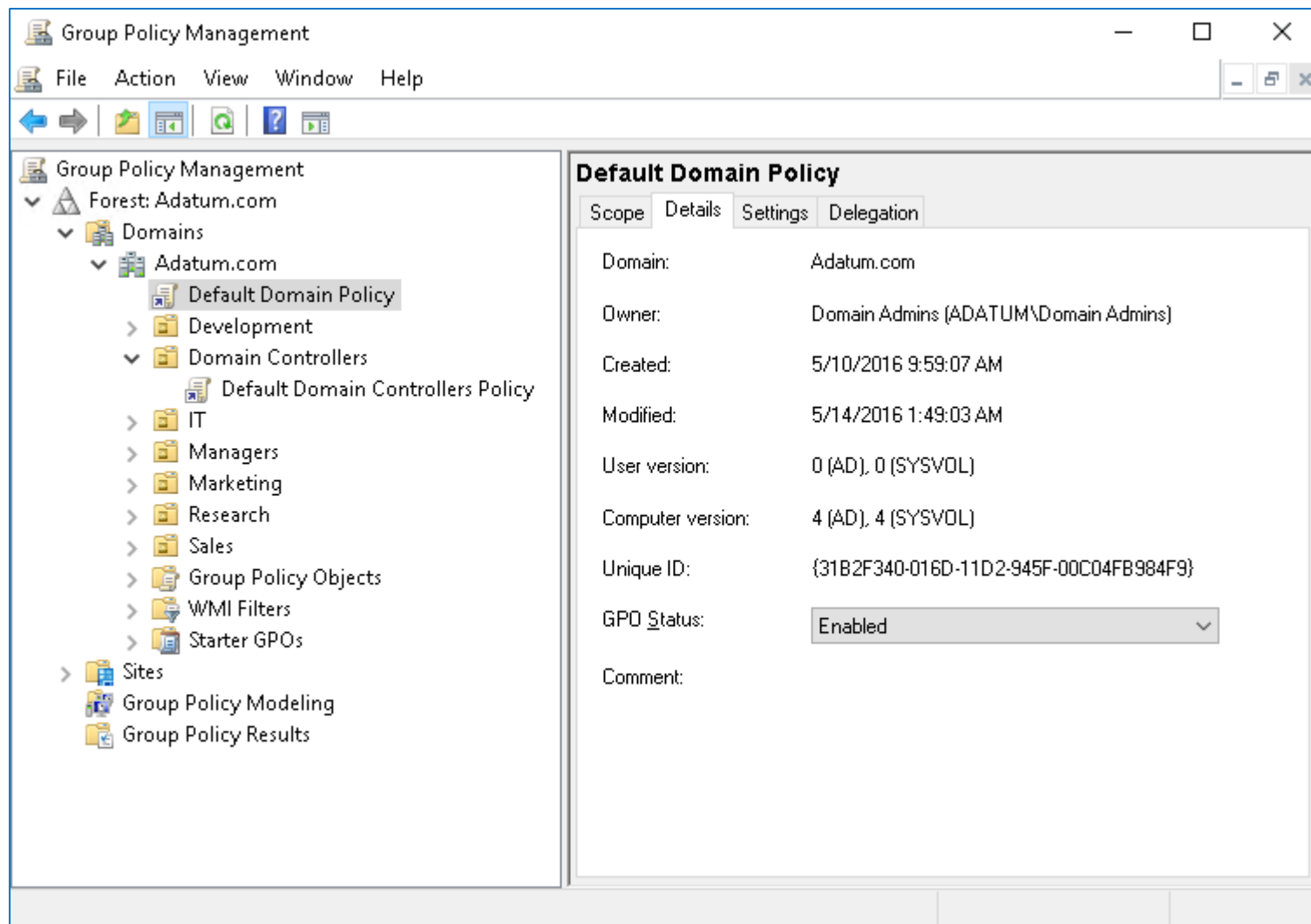
- Windows Server 2016 introduces a few changes and improvements to Group Policy, including:
 - Importing the following types of policy settings on Nano Server:
 - Registry settings
 - Security settings
 - Audit settings
 - Including Windows 10 administrative templates



Implementing and administering GPOs

- What are domain-based GPOs?
- GPO storage
- What are starter GPOs?
- Common GPO management tasks
- Delegating administration of Group Policy
- Demonstration: Delegating administration of Group Policy

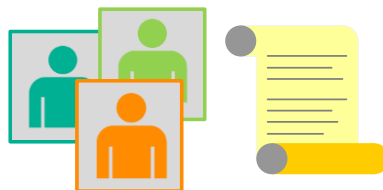
What are domain-based GPOs?





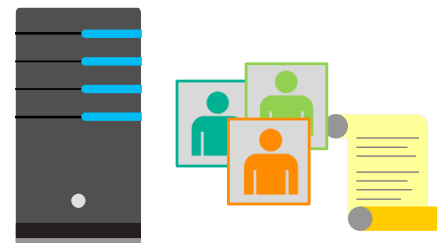
GPO storage

GPO



- Contains Group Policy settings
- Stores content in two locations

Group Policy container



- Stored in AD DS
- Provides version information

Group Policy template



- Stored in shared SYSVOL folder
- Provides Group Policy settings



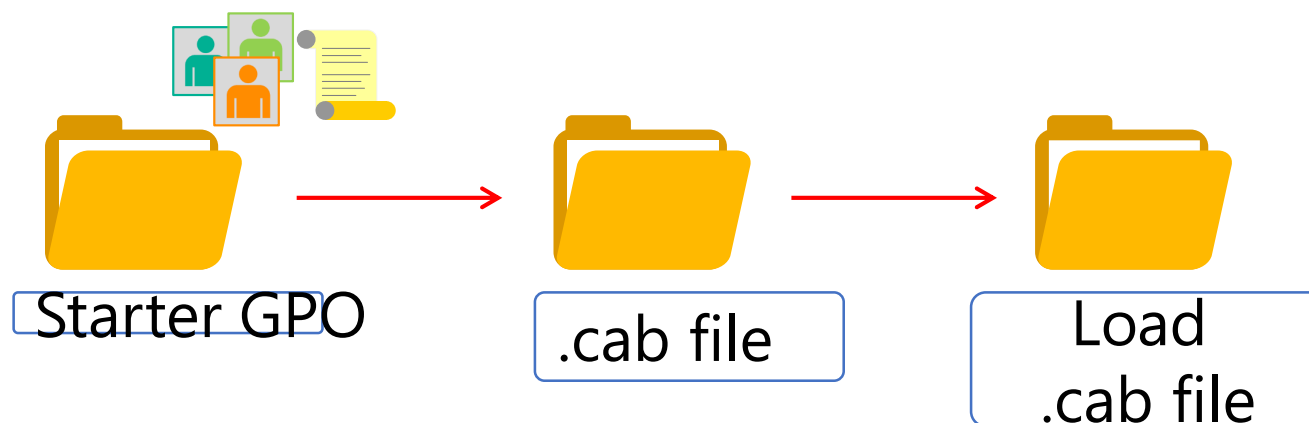
What are starter GPOs?

A starter GPO:

- Stores administrative template settings on which new GPOs will be based
- Can be exported to .cab files
- Can be imported into other areas of an organization

Exported to .cab file

Imported to the GPMC

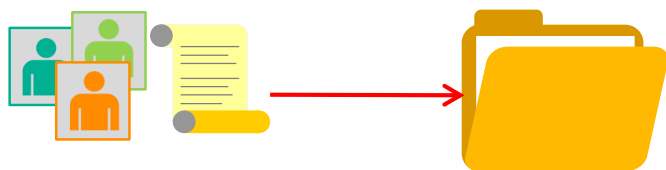




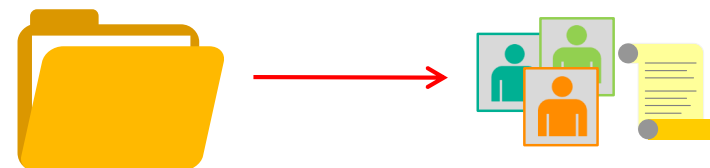
Common GPO management tasks

You can manage GPOs by using GPMC or Windows PowerShell. These are some of the options for managing the state of GPOs:

Back up GPOs



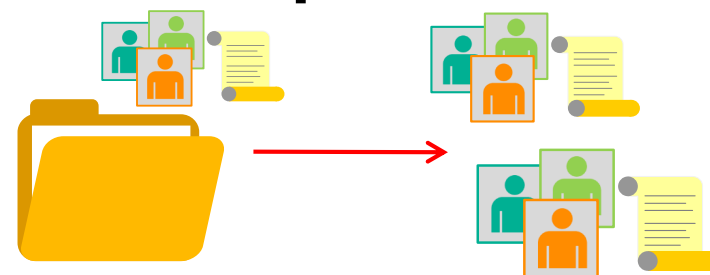
Restore GPOs



Copy GPOs



Import GPOs





Delegating administration of Group Policy

- Delegation of GPO-related tasks allows the administrative workload to be distributed across the enterprise
- You can delegate the following Group Policy tasks independently:
 - Creating GPOs
 - Editing GPOs
 - Managing Group Policy links for a site, domain, or OU
 - Performing Group Policy modeling analysis in a domain or OU
 - Reading Group Policy results data in a domain or OU
 - Creating WMI filters in a domain



Demonstration: Delegating administration of Group Policy

- In this demonstration, you will learn how to:
 - Delegate permissions to create GPOs
 - Delegate permissions to link GPOs
 - Delegate permissions to view Group Policy results



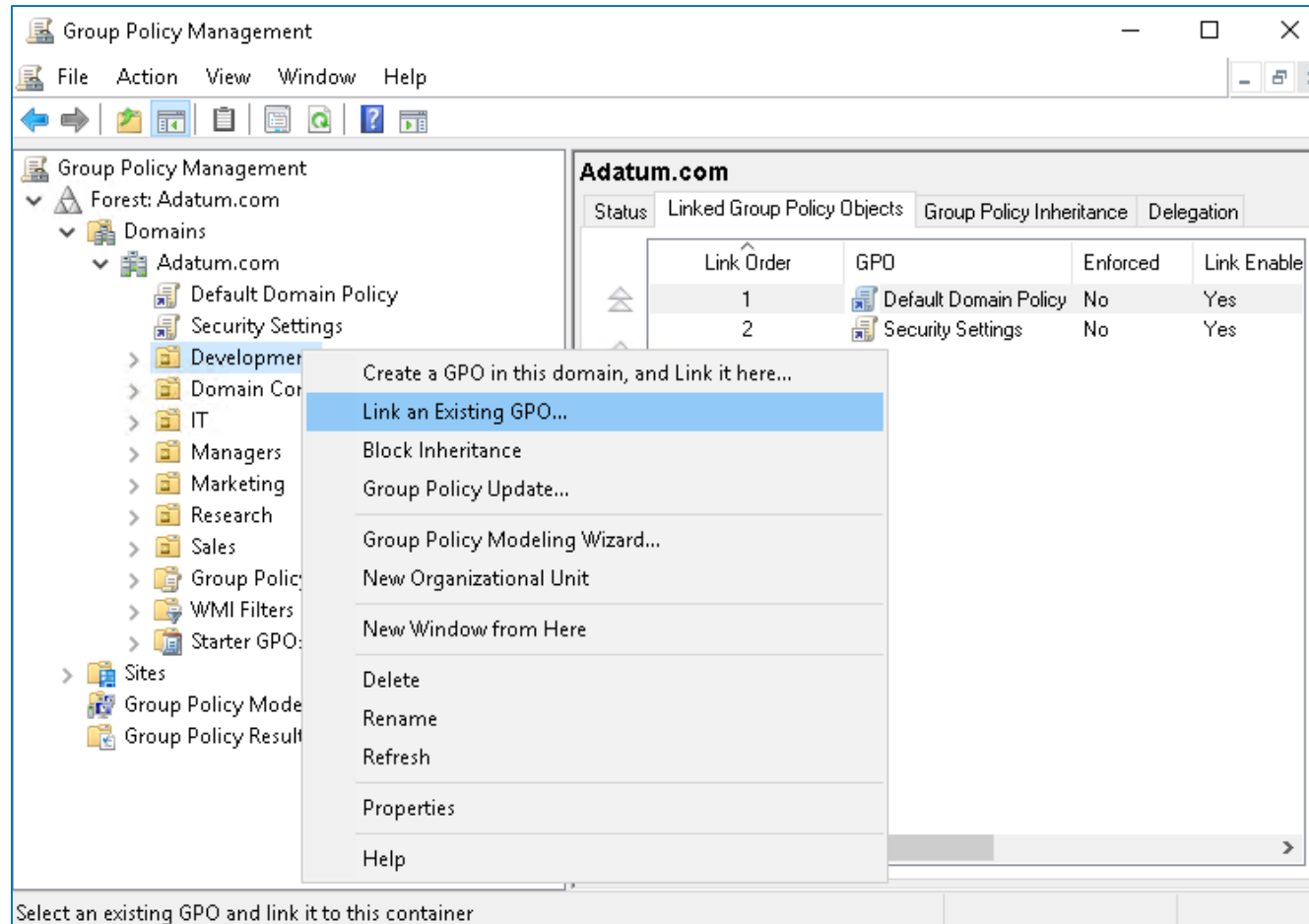
Group Policy scope and Group Policy processing

- What are GPO links?
- Demonstration: Linking GPOs
- Group Policy processing order
- Configuring GPO inheritance and precedence
- Using security filtering to modify Group Policy scope
- What are WMI filters?
- Demonstration: Filtering Group Policy application
- How to enable or disable GPOs and GPO nodes
- Loopback policy processing
- Considerations for slow links and disconnected systems
- Identifying when settings become effective



What are GPO links?

After you have linked a GPO, the users or computers in that container are within the scope of the GPO, including computers and users in child OUs



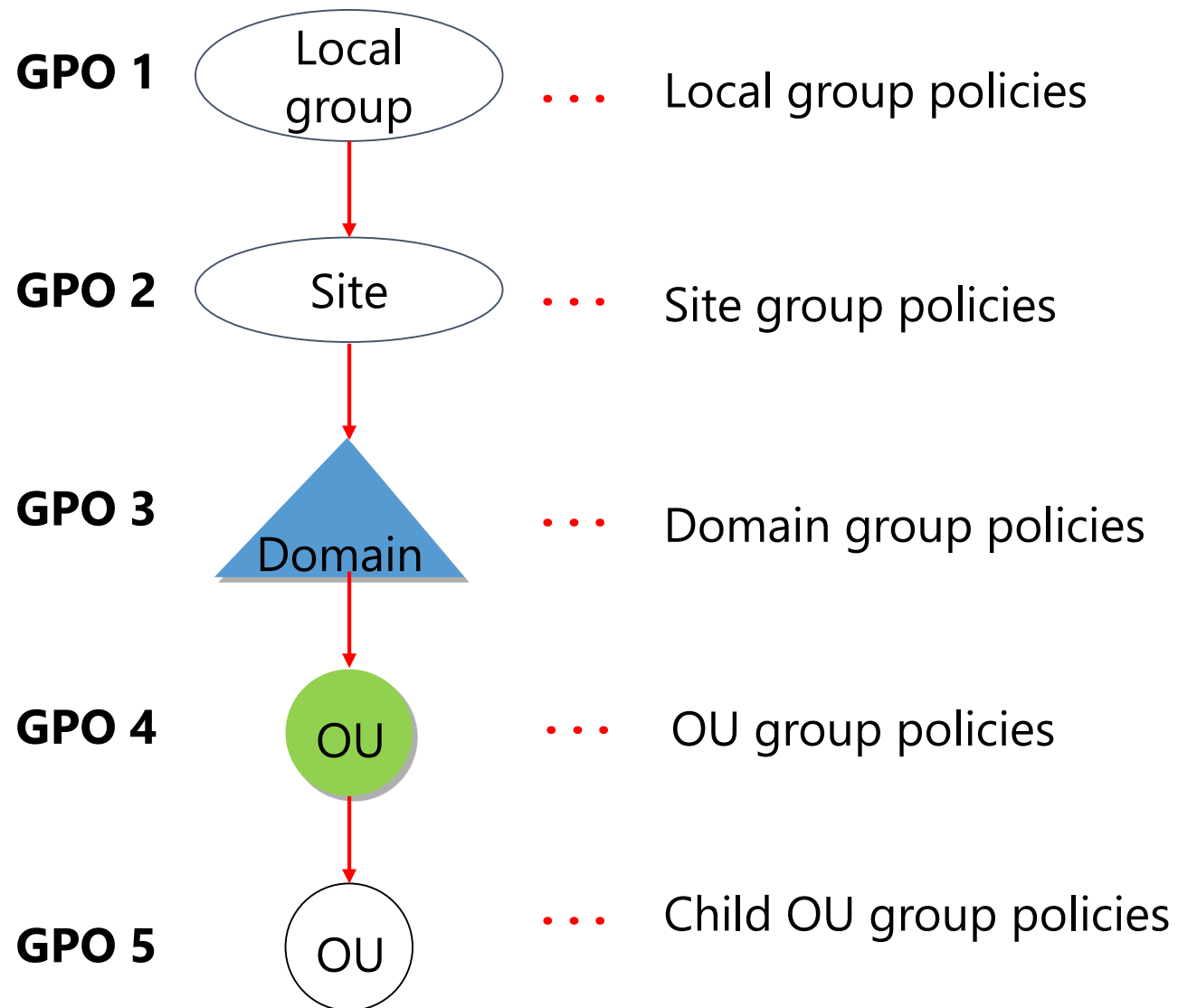


Demonstration: Linking GPOs

In this demonstration, you will learn how to:

- Create and edit two GPOs
- Link the GPOs to different locations
- Disable a GPO link
- Delete a GPO link

Group Policy processing order





Configuring GPO inheritance and precedence

- The application of GPOs linked to each container results in a cumulative effect called *policy inheritance*:
 - Default precedence: Local → Site → Domain → OU → Child OU... (LSDOU)
 - Visible on the **Group Policy Inheritance** tab
- Link order (attribute of GPO link):
 - Lower number → Higher on list → Precedence
- Block Inheritance (attribute of OU):
 - Blocks the processing of GPOs from a higher level
- Enforced (attribute of GPO link):
 - Enforced GPOs override Block Inheritance
 - Enforced GPO settings win over conflicting settings in lower GPOs



Using security filtering to modify Group Policy scope

- Apply Group Policy permission:
 - GPO has an ACL (**Delegation** tab → **Advanced**)
 - Members of the Authenticated Users group have Allow Apply Group Policy permissions by default
- To scope only to users in selected global groups:
 - Remove the Authenticated Users group
 - Add appropriate global groups: Must be global groups (GPOs do not scope to domain local)
- To scope to users except for those in selected groups:
 - On the **Delegation** tab, click **Advanced**
 - Add appropriate global groups
 - Deny the Apply Group Policy permission



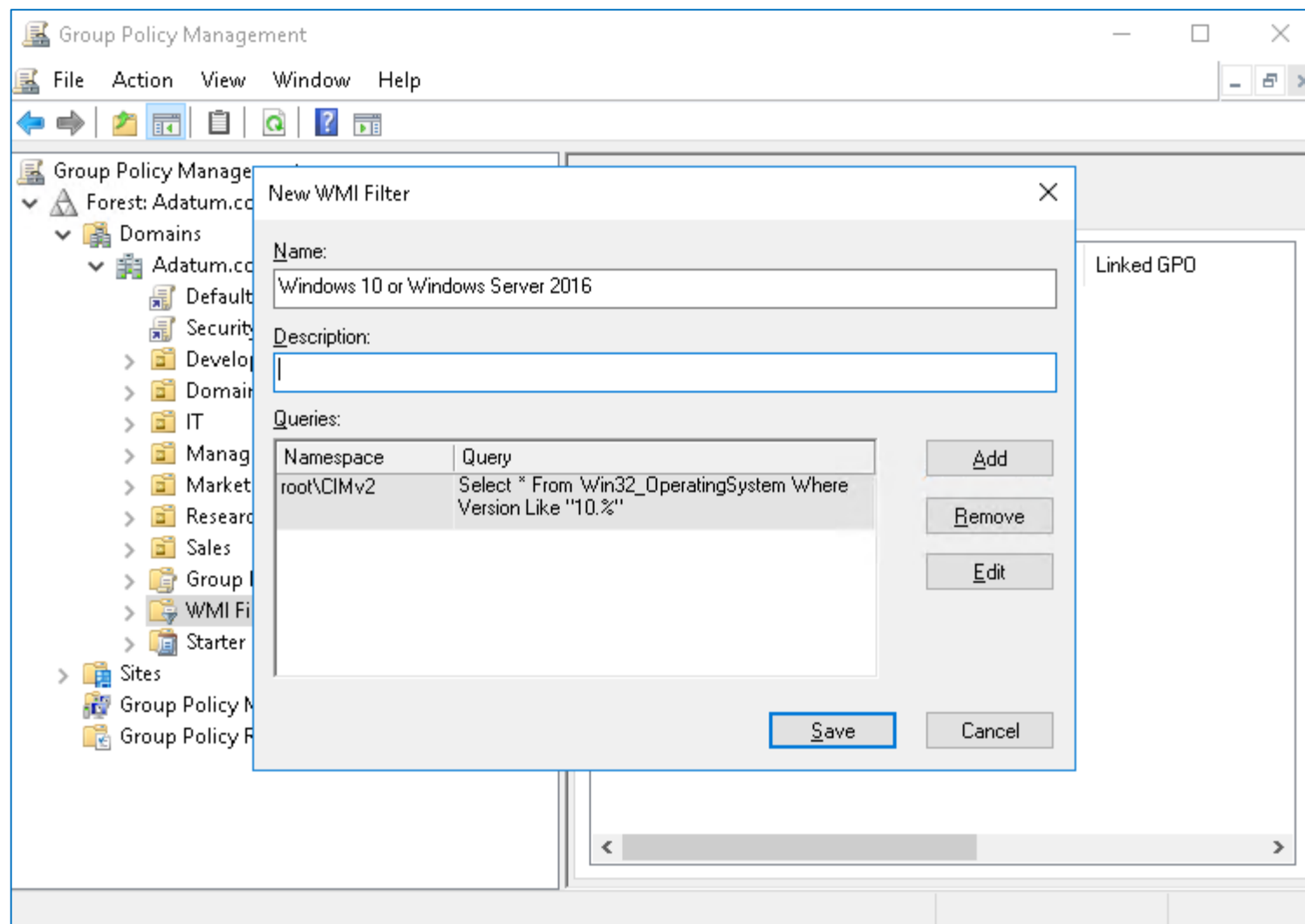
What are WMI filters?

- WMI queries can filter GPOs based on system characteristics, including:
 - RAM
 - Processor speed
 - Disk capacity
 - IP address
 - Operating system version
- WMI queries are written by using WQL, for example
`select * from Win32_OperatingSystem where Version like "10.%"`
- WMI filters can be expensive in terms of Group Policy processing performance





What are WMI filters?





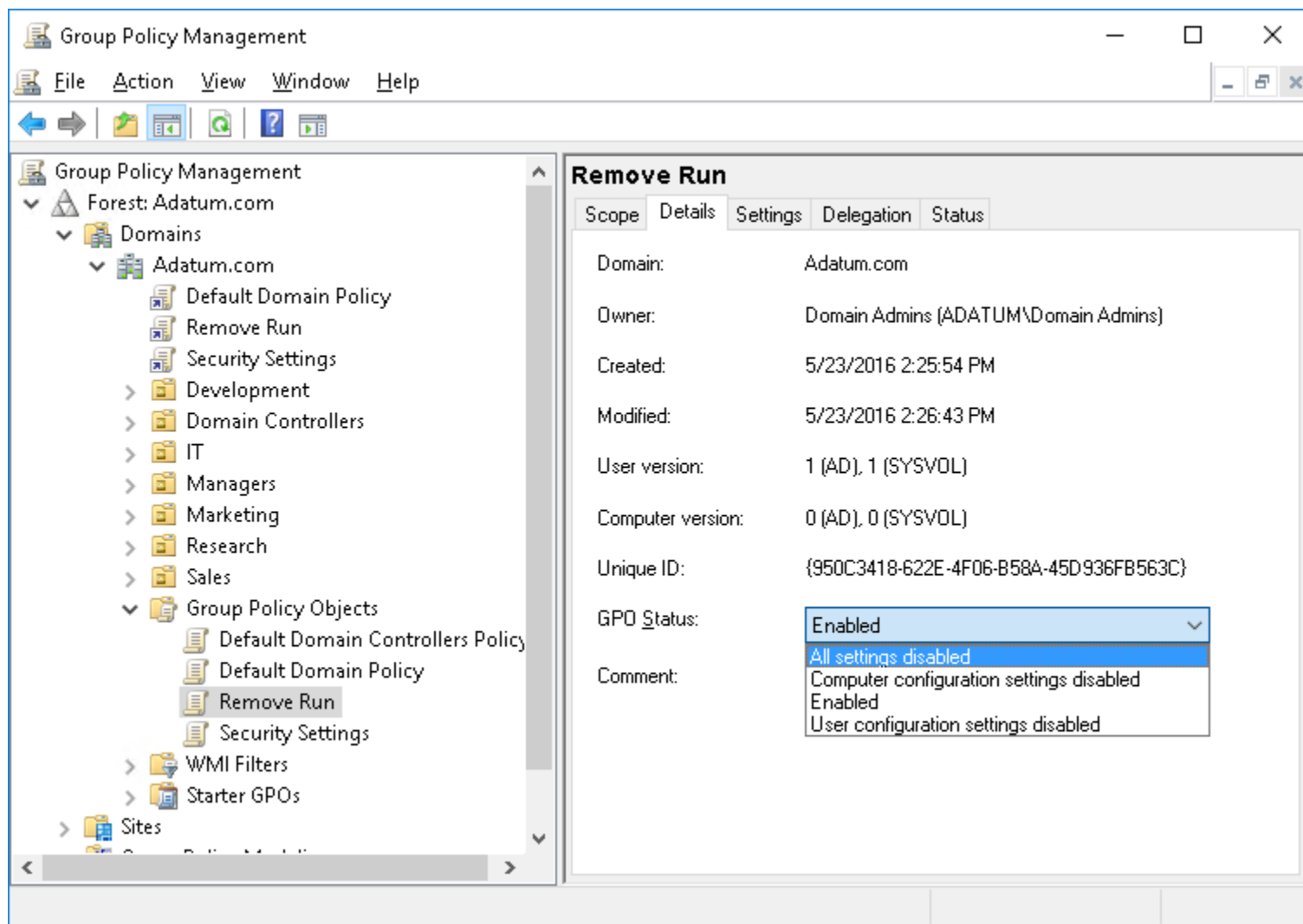
Demonstration: Filtering Group Policy application

In this demonstration, you will learn how to:

- Create a new GPO, and link it to the **IT** OU
- Filter Group Policy application by using security group filtering
- Filter Group Policy application by using WMI filtering



How to enable or disable GPOs and GPO nodes



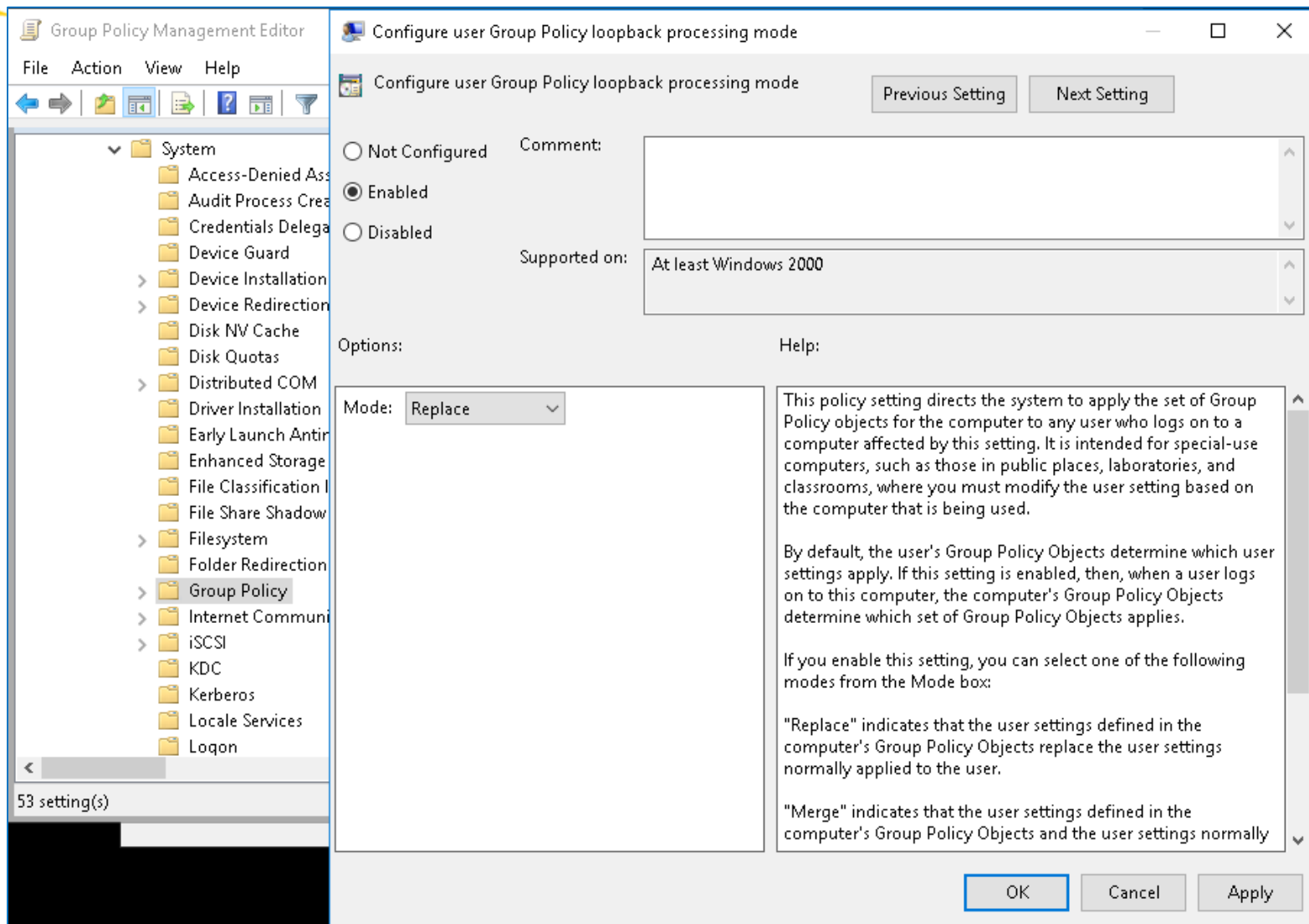


Loopback policy processing

- Provides the ability to apply user Group Policy settings based on the computer to which the user is signing in
- Replace mode:
 - Only the list of GPOs based on the computer object is used
- Merge mode:
 - The list of the GPOs based on the computer have higher precedence than the list of GPOs based on the user
- Useful in closely managed environments and special-use computers, such as:
 - Terminal servers, public-use computers, and classrooms



Loopback policy processing





Considerations for slow links and disconnected systems

- Slow link detection:
 - By default, connection speeds below 500 kbps
 - The following CSEs apply by default:
 - Security Settings
 - Administrative Templates
- Disconnected computers:
 - Cache Group Policy so that settings still apply
 - Perform Group Policy refresh when reconnecting with the domain network if a background refresh has been missed



Identifying when settings become effective

- GPO replication must occur
- Group changes must replicate
- Group Policy refresh must occur
- User must sign out and sign in or the computer must restart
- You must perform a manual refresh
- Most CSEs do not reapply unchanged GPO settings



Troubleshooting the application of GPOs

- Refreshing GPOs
- What is RSoP?
- Generating RSoP reports
- Demonstration: Performing a what-if analysis with Group Policy Modeling Wizard
- Examining Group Policy event logs
- Detecting Group Policy health issues



Refreshing GPOs

- When you apply GPOs, remember that:
 - Computer settings apply at startup
 - User settings apply at sign-in
 - Policies refresh at regular, configurable intervals
 - Security settings refresh at least every 16 hours
 - Policies refresh manually by using:
 - The **gpupdate** command-line utility
 - The Windows PowerShell cmdlet **Invoke-gpupdate**
- With the Remote Group Policy Refresh feature, you can refresh policies remotely



What is RSoP?

RSoP is the net effect of GPOs applied to a user or computer

Group Policy Management

The screenshot displays the Group Policy Management console window. The left pane shows the tree structure: Group Policy Management > Forest: Adatum.com > Group Policy Results > Alan on LON-CL1. The right pane shows the 'Summary' tab for 'Alan on LON-CL1'. The main content area is titled 'Group Policy Results' and shows 'ADATUM\alan on ADATUM\LON-CL1' with data collected on 11/12/2013 1:30:59 AM. Below this, there are expandable sections for 'Computer Details', 'General', 'Component Status', 'Settings', 'Policies', 'Windows Settings', 'Security Settings', 'Account Policies/ Password Policy', 'Account Policies/ Account Lockout Policy', and 'Local Policies/ Security Options'. The 'Component Status' section is expanded, showing a table of component results.

Component Name	Status	Time Taken	Last Process Time	Event Log
Group Policy	Success	484 Millisecond(s)	11/12/2013 1:29:45 AM	View Log
Infrastructure				
Registry	Success	437 Millisecond(s)	11/6/2013 2:52:48 AM	View Log
Security	Success	8 Second(s) 313 Millisecond(s)	11/6/2013 2:52:56 AM	View Log





What is RSoP?

Group Policy Modeling Wizard

Group Policy Modeling Wizard

User and Computer Selection

You can view simulated policy settings for a selected user (or a container with user information) and computer (or a container with computer information).

Example container name: CN=Users,DC=Adatum,DC=com
Example user or computer: ADATUM\Administrator

Simulate policy settings for the following:

User information

☒ Container: OU=IT,DC=Adatum,DC=com

☐ User:

Computer information

☐ Container:

☒ Computer: ADATUM\LON-CL1

☐ Skip to the final page of this wizard without collecting additional data

< Back **Next >** Cancel





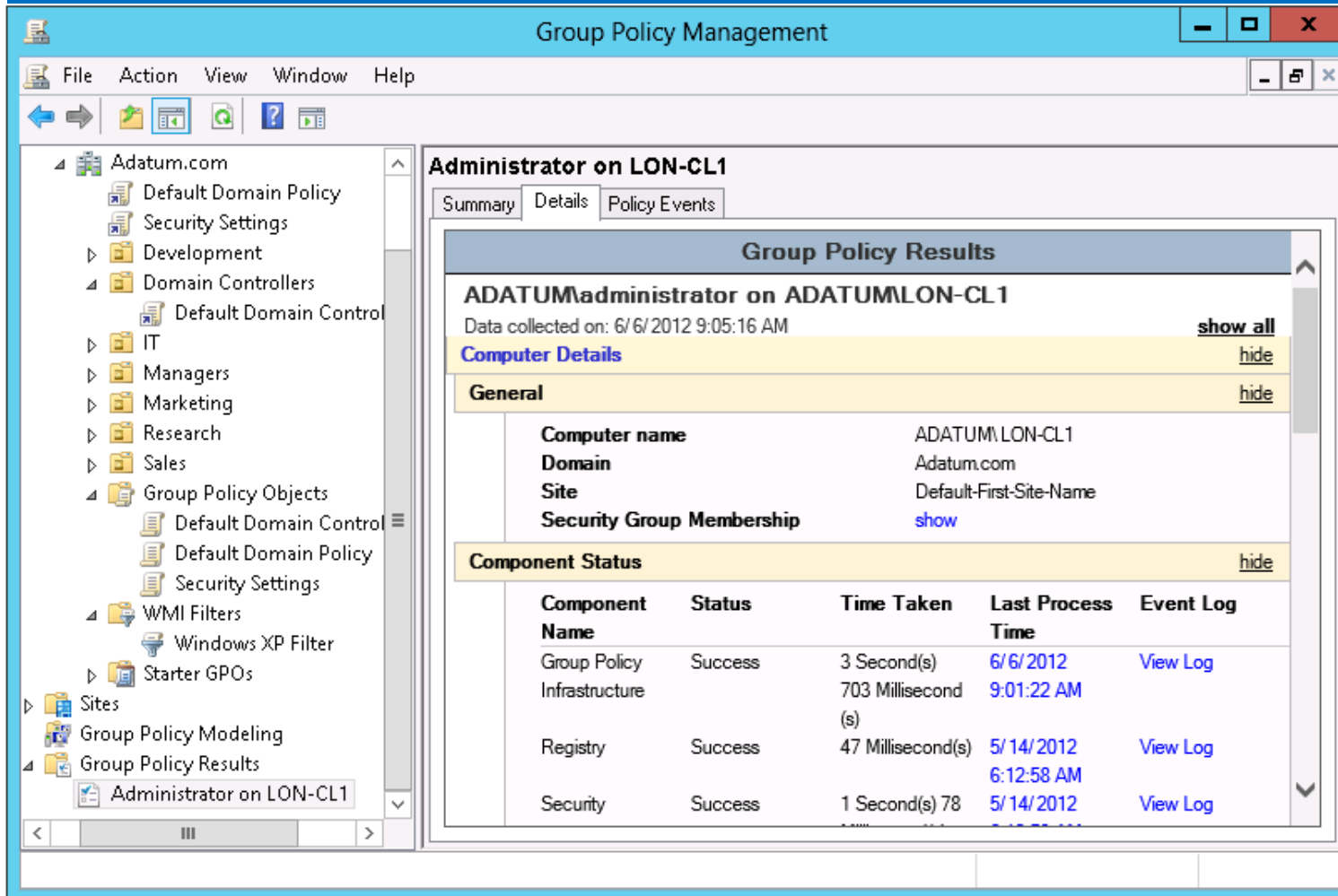
Generating RSoP reports

- RSoP reports show the actual settings being applied to the user and computer
- Might show the time taken to apply Group Policy
- You can generate RSoP reports by using:
 - **Group Policy Results Wizard**
 - **GPRResults**
 - **Get-GPResultantSetOfPolicy**
- Target computer must be online
- Remote WMI must be enabled



Generating RSOP reports

Group Policy Results Wizard



The screenshot shows the Group Policy Management console. The left pane displays a tree view of Group Policy Objects (GPOs) under 'Adatum.com'. The right pane shows the 'Group Policy Results' for the 'Administrator on LON-CL1' GPO. The 'Summary' tab is selected, displaying the following information:

Group Policy Results
ADATUM\administrator on ADATUM\LON-CL1
 Data collected on: 6/6/2012 9:05:16 AM [show all](#)

Computer Details [hide](#)

General [hide](#)

Computer name	ADATUM\LON-CL1
Domain	Adatum.com
Site	Default-First-Site-Name
Security Group Membership	show

Component Status [hide](#)

Component Name	Status	Time Taken	Last Process Time	Event Log
Group Policy Infrastructure	Success	3 Second(s) 703 Millisecond(s)	6/6/2012 9:01:22 AM	View Log
Registry	Success	47 Millisecond(s)	5/14/2012 6:12:58 AM	View Log
Security	Success	1 Second(s) 78	5/14/2012	View Log



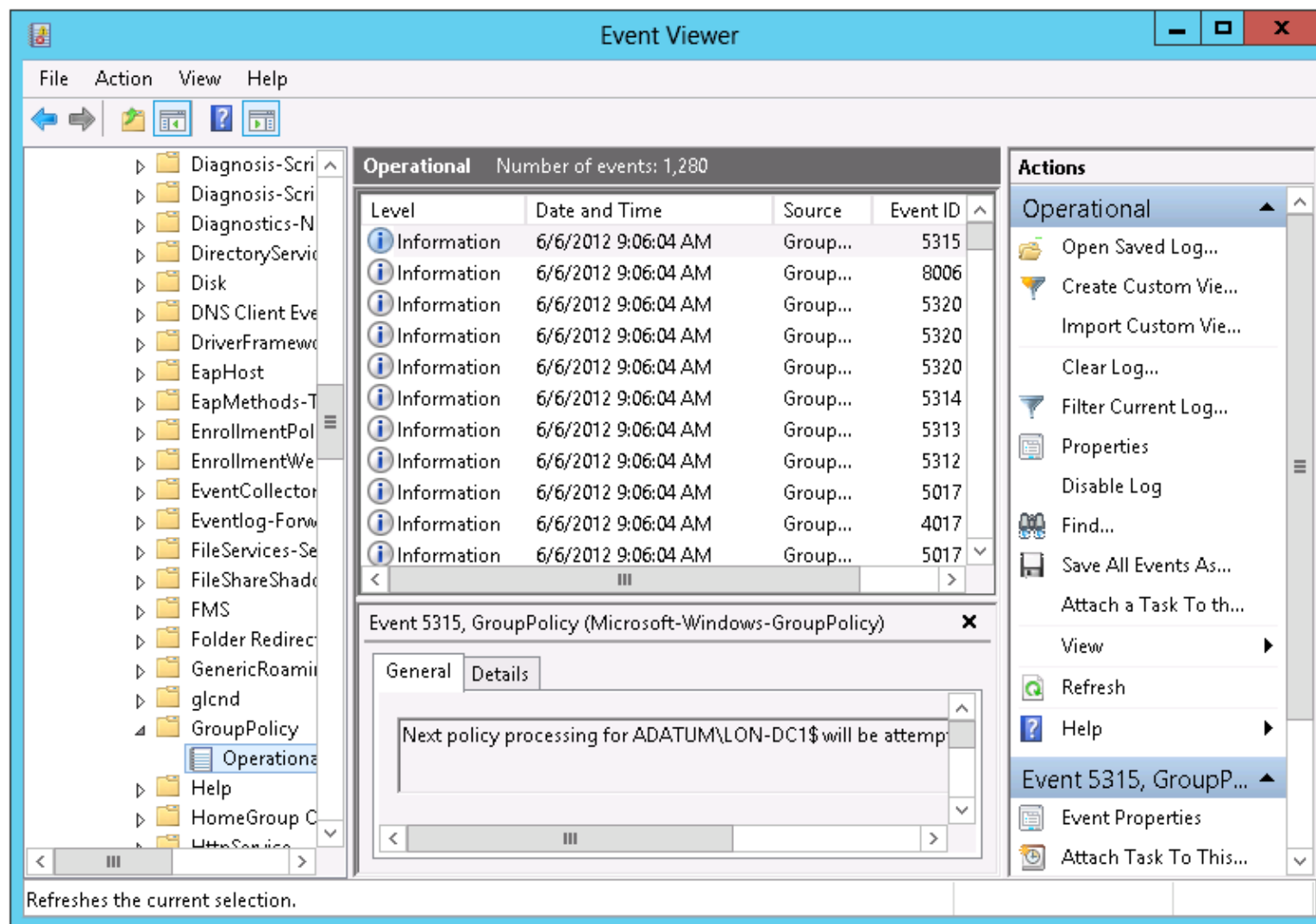


Demonstration: Performing a what-if analysis with Group Policy Modeling Wizard

In this demonstration, you will learn how to:

- Use **GPRResult.exe** to create a report
- Use **Group Policy Reporting Wizard** to create a report
- Use **Group Policy Modeling Wizard** to create a report

Examining Group Policy event logs



Event Viewer

File Action View Help

Operational Number of events: 1,280

Level	Date and Time	Source	Event ID
Information	6/6/2012 9:06:04 AM	Group...	5315
Information	6/6/2012 9:06:04 AM	Group...	8006
Information	6/6/2012 9:06:04 AM	Group...	5320
Information	6/6/2012 9:06:04 AM	Group...	5320
Information	6/6/2012 9:06:04 AM	Group...	5320
Information	6/6/2012 9:06:04 AM	Group...	5314
Information	6/6/2012 9:06:04 AM	Group...	5313
Information	6/6/2012 9:06:04 AM	Group...	5312
Information	6/6/2012 9:06:04 AM	Group...	5017
Information	6/6/2012 9:06:04 AM	Group...	4017
Information	6/6/2012 9:06:04 AM	Group...	5017

Event 5315, GroupPolicy (Microsoft-Windows-GroupPolicy)

General Details

Next policy processing for ADATUM\LON-DC1\$ will be attempt

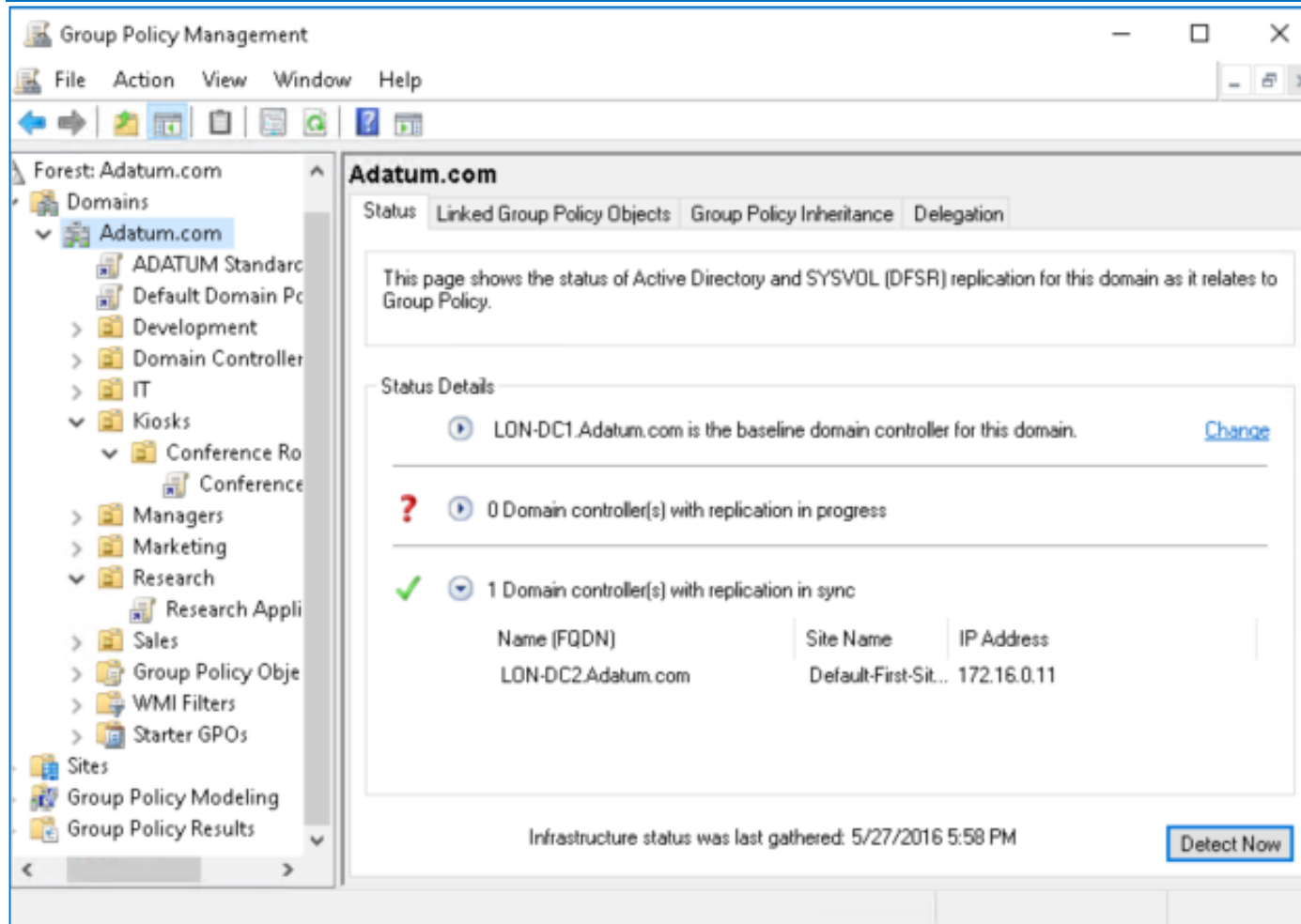
Actions

- Operational
- Open Saved Log...
- Create Custom Vie...
- Import Custom Vie...
- Clear Log...
- Filter Current Log...
- Properties
- Disable Log
- Find...
- Save All Events As...
- Attach a Task To th...
- View
- Refresh
- Help
- Event 5315, GroupP...
- Event Properties
- Attach Task To This...

Refreshes the current selection.

Detecting Group Policy health issues

Group Policy health check in Group Policy Management Console



The screenshot shows the Group Policy Management console for the Adatum.com domain. The left pane displays the domain hierarchy, including Forest: Adatum.com, Domains, and various organizational units like ADATUM Standard, Development, Domain Controller, IT, Kiosks, Conference Rooms, Managers, Marketing, Research, Sales, Group Policy Objects, WMI Filters, and Starter GPOs. The right pane shows the 'Adatum.com' status page with tabs for Status, Linked Group Policy Objects, Group Policy Inheritance, and Delegation. The Status tab is active, displaying a message about Active Directory and SYSVOL (DFS) replication. Below this, the 'Status Details' section shows that LON-DC1.Adatum.com is the baseline domain controller. A red question mark icon indicates that 0 Domain controller(s) have replication in progress. A green checkmark icon indicates that 1 Domain controller(s) have replication in sync. A table lists the domain controller details:

Name (FQDN)	Site Name	IP Address
LON-DC2.Adatum.com	Default-First-Sit...	172.16.0.11

At the bottom, it states 'Infrastructure status was last gathered: 5/27/2016 5:58 PM' and includes a 'Detect Now' button.





Detecting Group Policy health issues

In Group Policy Management Console:

- The **Status** tab displays information that indicates the health of the Group Policy infrastructure:
 - Domain
 - GPO
- Information displayed includes:
 - Domain controllers
 - Permissions on the Group Policy container and the Group Policy template
 - GPO replication
 - GPO versioning
- Domain controllers not reachable or inconsistent with the baseline domain controller are added to the **Domain controller(s) with replication in progress** list





Module Review and Takeaways

- Review Questions
- Common Issues and Troubleshooting Tips



Implementing administrative templates

- What are administrative templates?
- What are .adm and .admx files?
- Overview of the central store
- Discussion: Practical uses of administrative templates
- Demonstration: Configuring settings with administrative templates
- Importing security templates
- Managing administrative templates



What are administrative templates?

- Administrative templates give you the ability to control the environment of the operating system and the user experience:
- Administrative template section for computers:
 - Control Panel
 - Network
 - Printers
 - System
 - Windows-based components
- Administrative template section for users:
 - Control Panel
 - Desktop
 - Network
 - Start menu and taskbar
 - System
 - Windows-based components
- Each of these main sections contain many subfolders to further organize settings



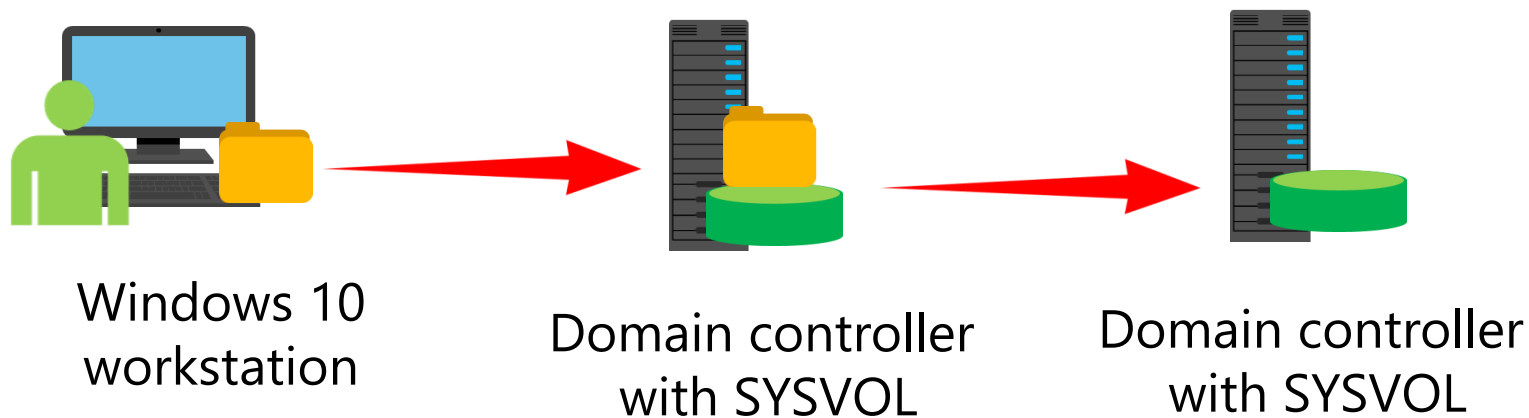
What are .adm and .admx files?

- .adm files:
 - Are copied into every GPO in SYSVOL
 - Are difficult to customize
 - Are not language-neutral
 - Could cause SYSVOL bloat if there are many GPOs
- .admx files:
 - Are language-neutral
 - .adml files provide the localized language
 - Are not stored in the GPO
 - Are extensible through XML

Overview of the central store

The central **store**:

- Is a central repository for .admx and .adml files
 - Is stored in SYSVOL
 - Must be created manually
 - Is detected automatically by Windows Vista, Windows Server 2008, and newer operating systems
- .admx files





Discussion: Practical uses of administrative templates

- How do you provide desktop security currently?
- How much administrative access do users have to their systems?
- Which Group Policy settings will you find useful in your organization?



15 minutes





Demonstration: Configuring settings with administrative templates

In this demonstration, you will see how to:

- Configure an Administrative Templates setting
- Filter Administrative Templates policy settings
- Apply comments to policy settings
- Add comments to a GPO
- Create a new GPO by copying an existing GPO
- Create a new GPO by importing settings that were exported from another GPO



Importing security templates

- Security Templates contain settings for:
 - Account policies
 - Local policies
 - Event log
 - Restricted groups
 - System services
 - Registry
 - File system
- More security settings are available in a GPO
- Security templates created in the Security Templates snap-in can be imported into a GPO
- The Security Compliance Manager can export security baselines in a GPO backup format



Managing administrative templates

- Extend the set of administrative templates by:
 1. Creating new templates or downloading available templates
 2. Adding the templates to the central store so the settings become available in all GPOs
 3. Configuring the settings in a GPO
 4. Deploying the GPO
- .admx files are available for both Microsoft and third-party applications
- Import legacy .adm files to the Administrative Templates section of a GPO



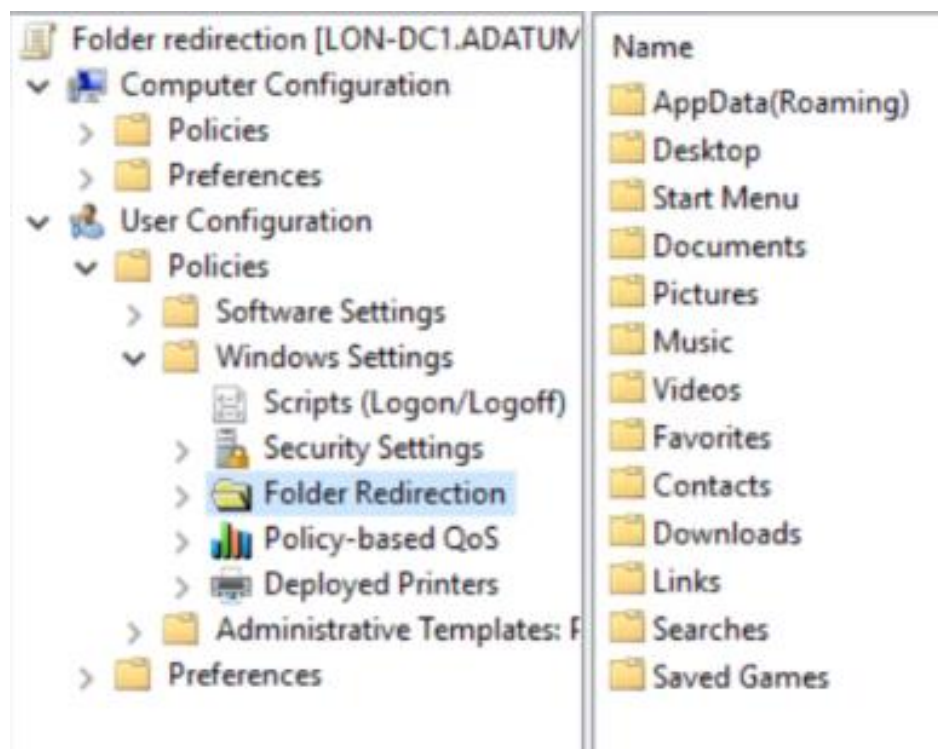
Configuring Folder Redirection, Software Installation, and Scripts

- What is Folder Redirection?
- Settings for configuring Folder Redirection
- Security settings for redirected folders
- Demonstration: Configuring Folder Redirection
- Managing software with Group Policy
- Group Policy settings for applying scripts
- Demonstration: Configuring scripts with GPOs



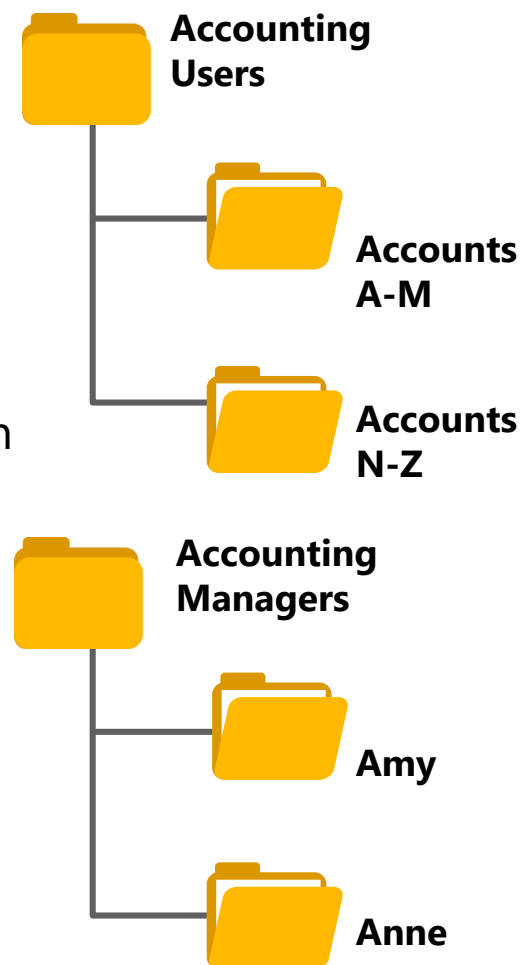
What is Folder Redirection?

- Folder Redirection allows folders to be located on a network server, but appear as if they are located on a local drive
- Folders that can be redirected in Windows Vista and later are:



Settings for configuring Folder Redirection

- Folder Redirection configuration options:
 - Use Basic Folder Redirection when all users save their files to the same location
 - Use Advanced Folder Redirection when the server hosting the folder location is based on group membership
 - Use the Follow the Documents folder to force certain folders to become subfolders of Documents
- Target folder location options:
 - Create a folder for each user under the root path
 - Redirect to the following location
 - Redirect to the local user profile location
 - Redirect to the user's home directory (Documents folder only)





Security settings for redirected folders

NTFS permissions for root folder

Creator/Owner	Full control – subfolders and files only
Administrator	None
Security group of users that save data on the share	List Folder/Read Data, Create Folders/Append Data-This Folder Only
Local System	Full control

Share permissions for root folder

Creator/Owner	Full control – subfolders and files only
Security group of users that save data on the share	Full control

NTFS permissions for each user's redirected folder

Creator/Owner	Full control – subfolders and files only
%Username%	Full control, owner of folder
Administrators	None
Local System	Full control

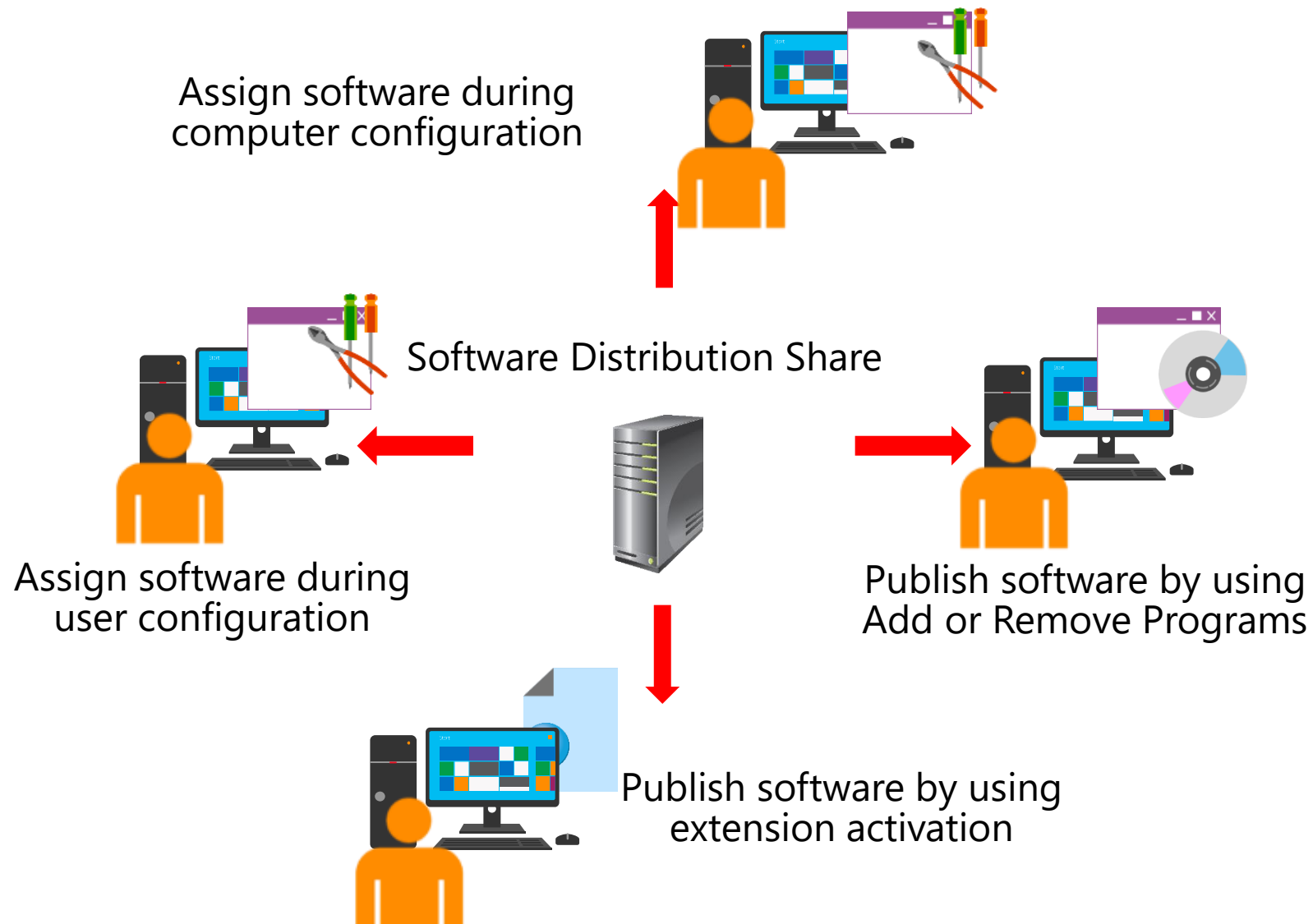


Demonstration: Configuring Folder Redirection

In this demonstration, you will learn how to:

- Create a shared folder for Folder Redirection
- Create a GPO to redirect the Documents folder
- Test Folder Redirection

Managing software with Group Policy





Group Policy settings for applying scripts

- You can use scripts to perform many tasks, such as clearing page files, mapping drives, and clearing temp folders for users
- Scripts languages include VBScript, Jscript, Windows PowerShell, and command/batch files
- You can assign Group Policy script settings to assign:
 - For computers:
 - Startup scripts
 - Shutdown scripts
 - For users:
 - Logon scripts
 - Logoff scripts



Demonstration: Configuring scripts with GPOs

In this demonstration, you will learn how to:

- Create a logon script to display a message
- Create and link a GPO to use the script
- Sign in to a client computer and test the results



Configuring Group Policy preferences

- What are Group Policy preferences?
- Comparing Group Policy preferences and Group Policy settings
- Features of Group Policy preferences
- Item-level targeting options
- Demonstration: Configuring Group Policy preferences



What are Group Policy preferences?

Group Policy preferences extensions expand the range of configurable settings within a GPO:

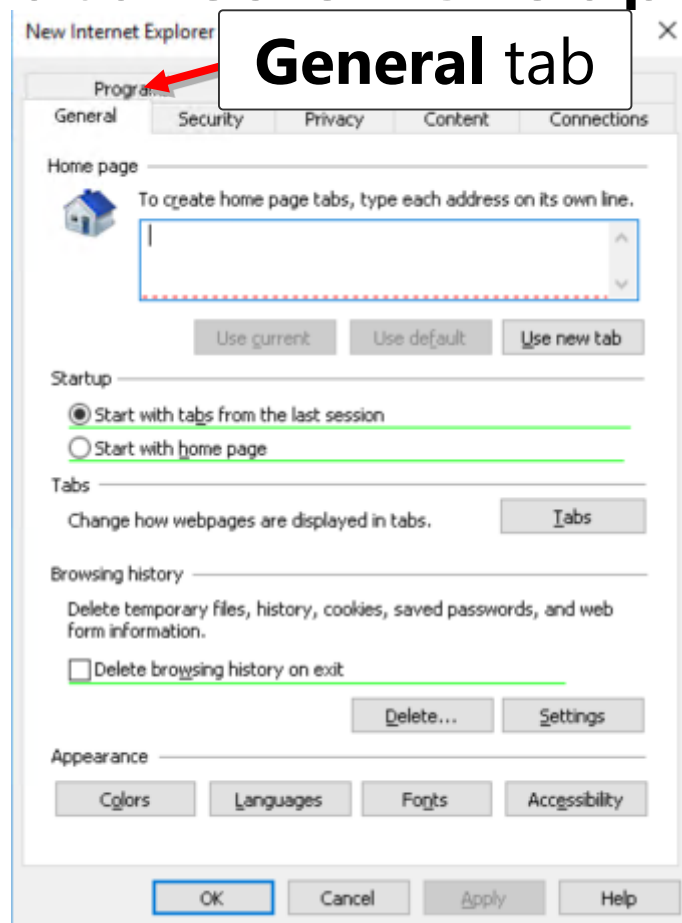
- Enables you to manage settings that were previously not manageable by using Group Policy
- Are supported natively on Windows Server 2008 and newer and Windows Vista SP2 and newer
- Can be created, deleted, replaced, or updated
- Categories include mapped drives, shortcuts, registry changes, power options, schedules tasks, and Internet Explorer settings



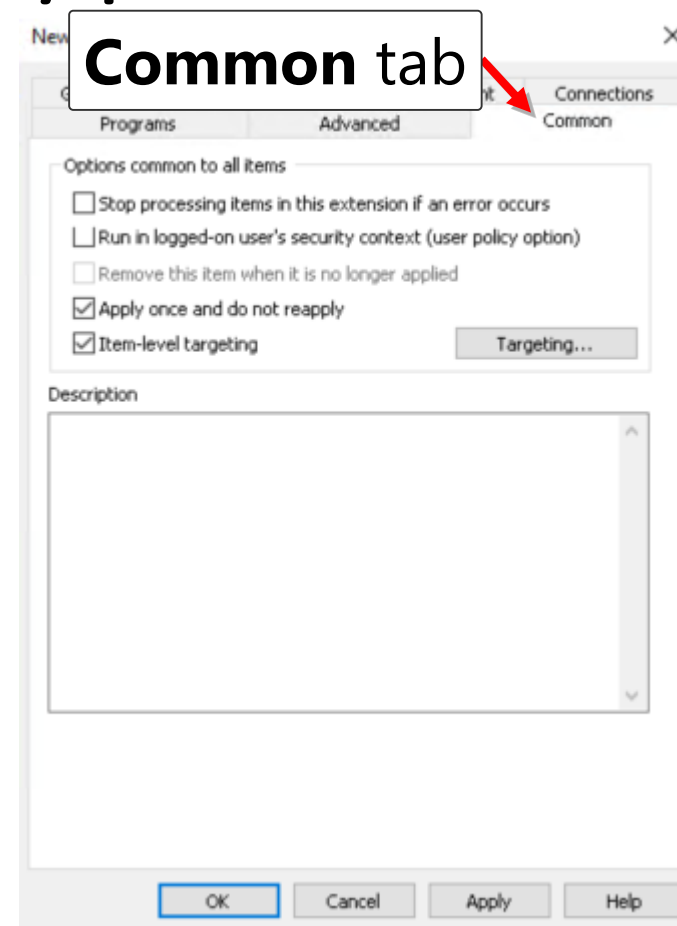
Comparing Group Policy preferences and Group Policy settings

Group Policy settings	Group Policy preferences
Strictly enforce policy settings by writing the settings to areas of the registry that standard users cannot modify	Are written to the normal locations in the registry that the application or operating system feature uses to store the setting
Typically disable the user interface for settings that Group Policy is managing	Do not cause the application or operating system feature to disable the user interface for settings they configure
Refresh policy settings at a regular interval	Refresh preferences by using the same interval as Group Policy settings by default, but can be configured to apply only once

Features of Group Policy preferences



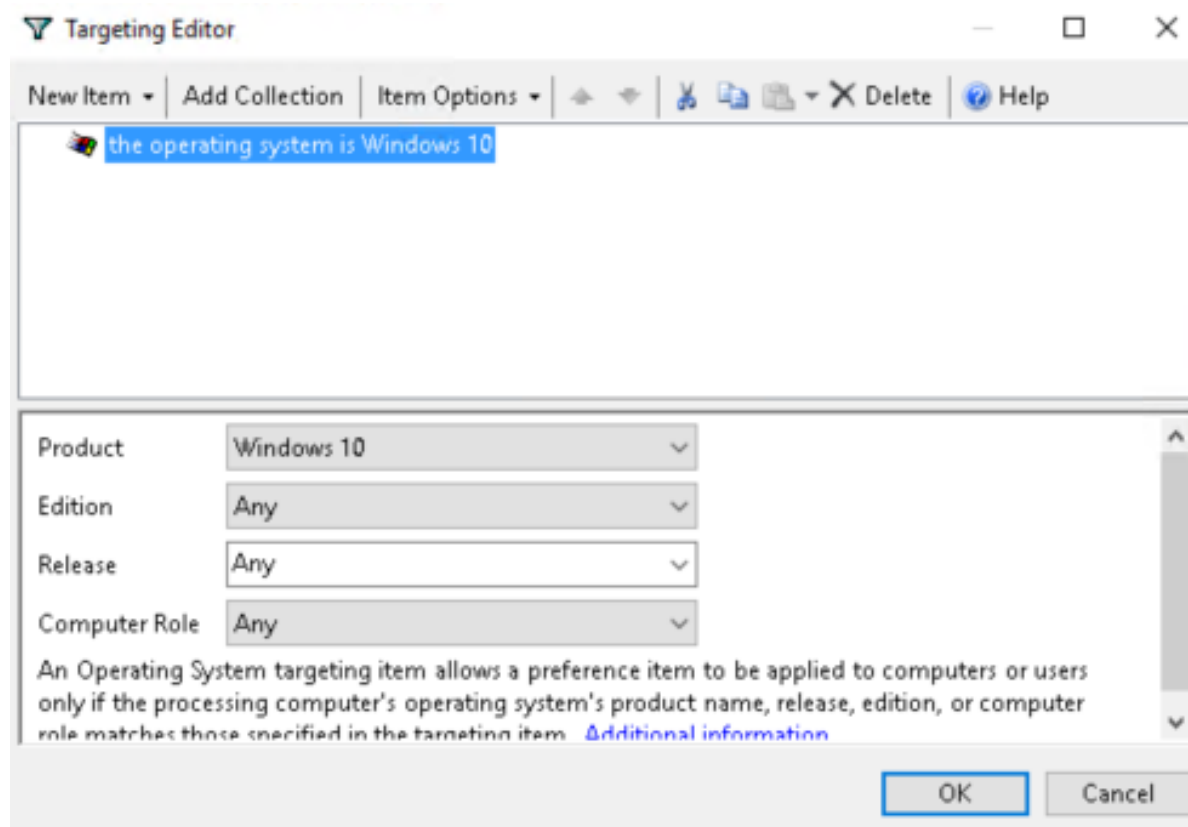
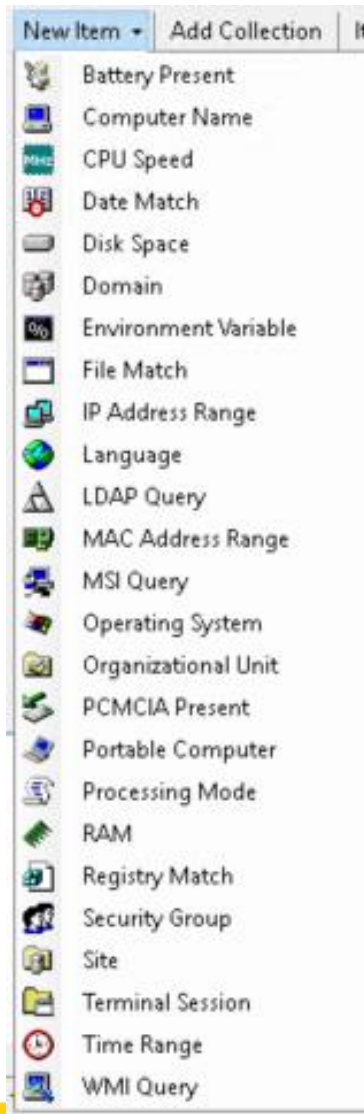
- Configure most settings
- Look out for red dotted-lines
- The setting is not enabled; use F6 to enable it



Configure additional options that control the behavior of a Group Policy preference item



Item-level targeting options





Item-level targeting options

- Restrict drive mappings to an Active Directory security group
- Configure different power plans to portable and desktop computers
- Deploy printers only to computers that meet specific criteria, and to users that are members of a specific group
- Copy Microsoft Office templates based on the language of the operating system installed on the computer



Demonstration: Configuring Group Policy preferences

In this demonstration, you will see how to:

- Create a printer with Group Policy preferences
- Target the preference
- Create a power plan with Group Policy preferences
- Target the preference
- Test the preferences

Q & A