Windows PowerShell Automations PowerPack

Beta Version

Windows PowerShell Automations PowerPack version 101

Table of Contents

Chapter 1

Introduction to Windows PowerShell Automations Automation

Overview

This manual describes how to use the automation policies, automation actions, and custom action types found in the *Windows PowerShell Automations* PowerPack.

TIP: This PowerPack requires a subscription to one of the following solutions:

- *Datacenter Automation Pack* PowerPack
- 2020 Pricing Advanced and Premium Packages
- 2020 Pricing Standard Package (does not include support for creating your own automation actions using the custom action type)

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This chapter covers the following topics:

What is the Windows PowerShell Automations PowerPack?

The *Windows PowerShell Automations* PowerPack includes:

- A custom action type for running PowerShell commands on remote devices
- A set of automation actions that run diagnostic commands on Windows systems via PowerShell
- A set of automation policies that tie events from monitoring PowerPacks to the automation actions

The Windows PowerShell Automations actions are executed on the SL1 All-In-One Appliance or Data Collector.

In addition to using the standard content, you can use the content in the *Windows PowerShell Automations*PowerPack to:

- Create your own automation policies that include the pre-defined actions that run different sets of diagnostic commands.
- Use the supplied "Execute Remote PowerShell Request" custom action type to configure your own automation action by supplying a set of commands to be executed via PowerShell.

Installing the Windows PowerShell AutomationsPowerPack

Before completing the steps in this manual, you must import and install the latest version of the *Windows PowerShell Automations*PowerPack.

IMPORTANT: You must install the Datacenter Utilities PowerPack before using the *Windows PowerShell Automations* PowerPack.

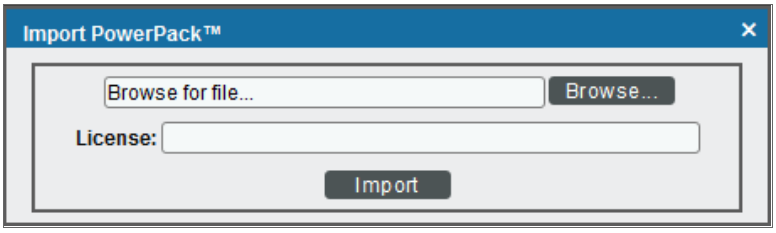
NOTE: The *Windows PowerShell Automations*PowerPack requires SL1 version 8.10.0 or later. For details on upgrading SL1, see the appropriate SL1 Release Notes.

TIP: By default, installing a new version of a PowerPack overwrites all content from a previous version of that PowerPack that has already been installed on the target system. You can use the ***Enable Selective PowerPack Field Protection*** setting in the **Behavior Settings** page (System > Settings > Behavior) to prevent new PowerPacks from overwriting local changes for some commonly customized fields. (For more information, see the ***System Administration*** manual.)

To download and install a PowerPack:

1. Download the PowerPack from the ScienceLogic Customer Portal.
2. Go to the **PowerPack Manager** page (System > Manage > PowerPacks).
3. In the **PowerPack Manager** page, click the **[Actions]** button, then select *Import PowerPack*.

4. The **Import PowerPack** dialog box appears:



5. Click the **[Browse]** button and navigate to the PowerPack file.
6. When the **PowerPack Installer** modal page appears, click the **[Install]** button to install the PowerPack.

> **NOTE:** If you exit the **PowerPack Installer** modal without installing the imported PowerPack, the imported PowerPack will not appear in the **PowerPack Manager** page. However, the imported PowerPack will appear in the **Imported PowerPacks** modal. This page appears when you click the **[Actions]** menu and select *Install PowerPack*.

Chapter 2

Windows PowerShell Automation Policies

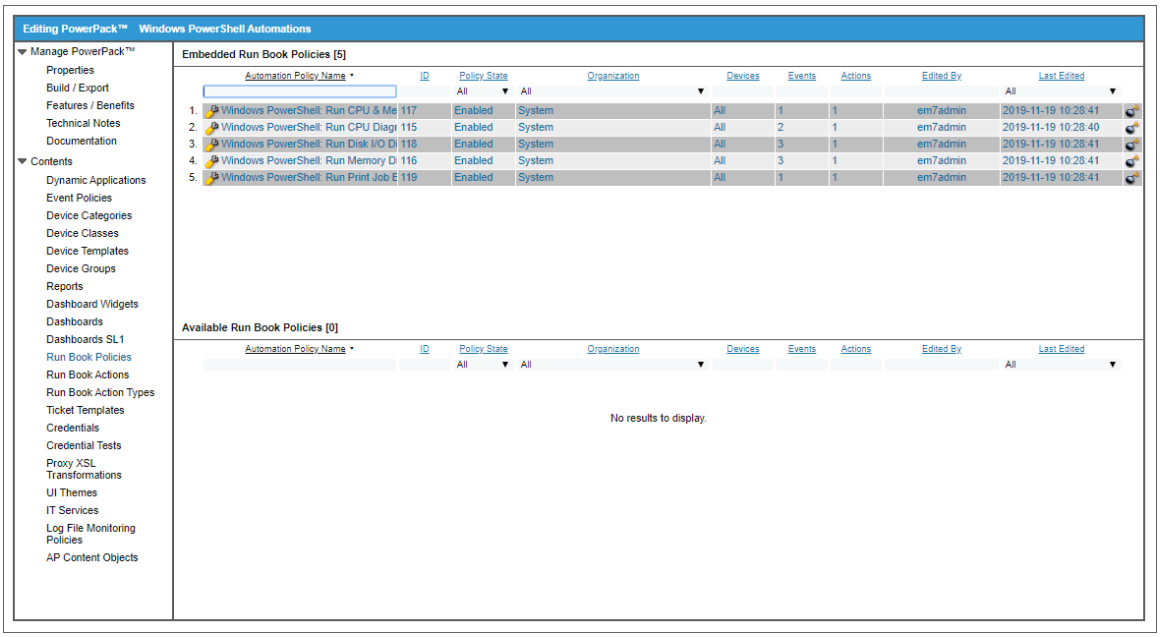
Overview

This chapter describes how to use the automation policies, automation actions, and custom action types found in the *Windows PowerShell Automations* PowerPack.

This chapter covers the following topics:

Standard Automation Policies

The *Windows PowerShell Automations*PowerPack includes five standard automation policies, shown in the following figure. Each policy triggers a single automation action that collects diagnostic data within a PowerShell session, and an action that formats the output as HTML. All of the automation actions use the same custom action type, "Execute Remote PowerShell Request", which is supplied in the PowerPack.



All of the standard automation policies are tied to included ScienceLogic SL1 events generated by the Dynamic Applications from the Windows Server PowerPack.

All of the standard automation policies are configured to trigger immediately when the event occurs. The automation actions are configured to output in raw format. For each executed command, a dictionary is added to the list with the following keys:

- ***command***. The command that was executed.
- ***output***. The HTML output of the command.

Several of the automation actions use the substitution character feature of the "Execute Remote PowerShell Request" custom action type. If an event variable is included in a command (such as "%Y" for the sub-entity name), the custom action type automatically replaces that variable with the value from the triggering event.

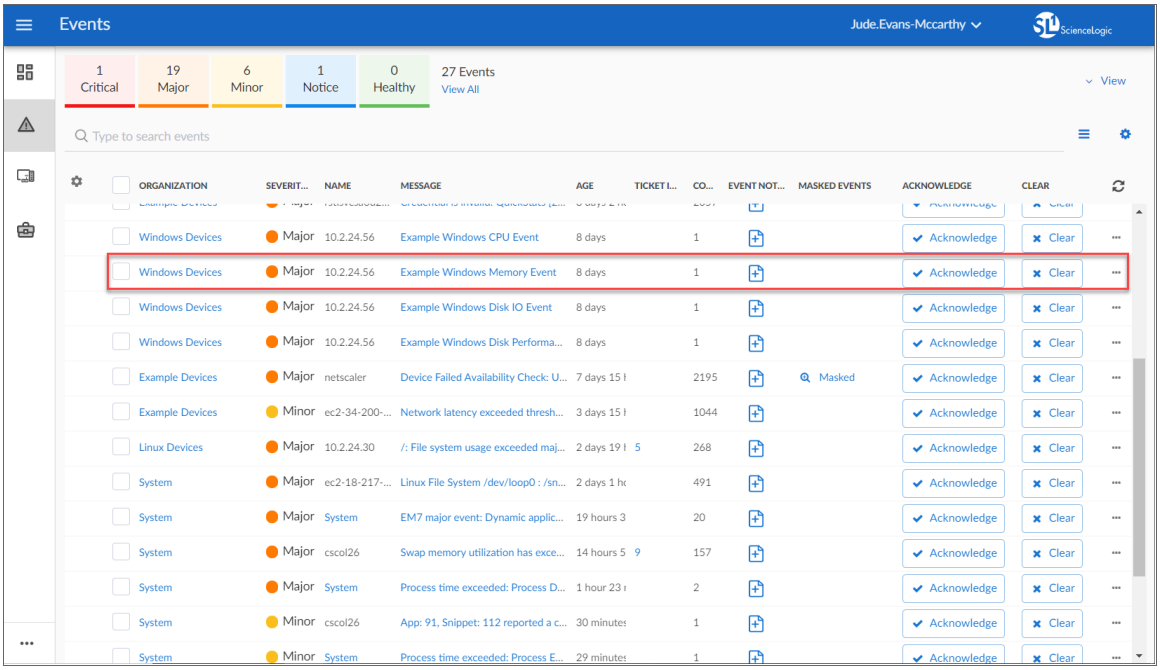
The following table shows the standard automation policies, their aligned events, and the automation action that runs in response to the events.

NOTE: The aligned events are included as part of the *Microsoft Windows Server* PowerPack and are not installed with the SL1 platform. You must install the *Microsoft Windows Server* PowerPack to obtain these events.

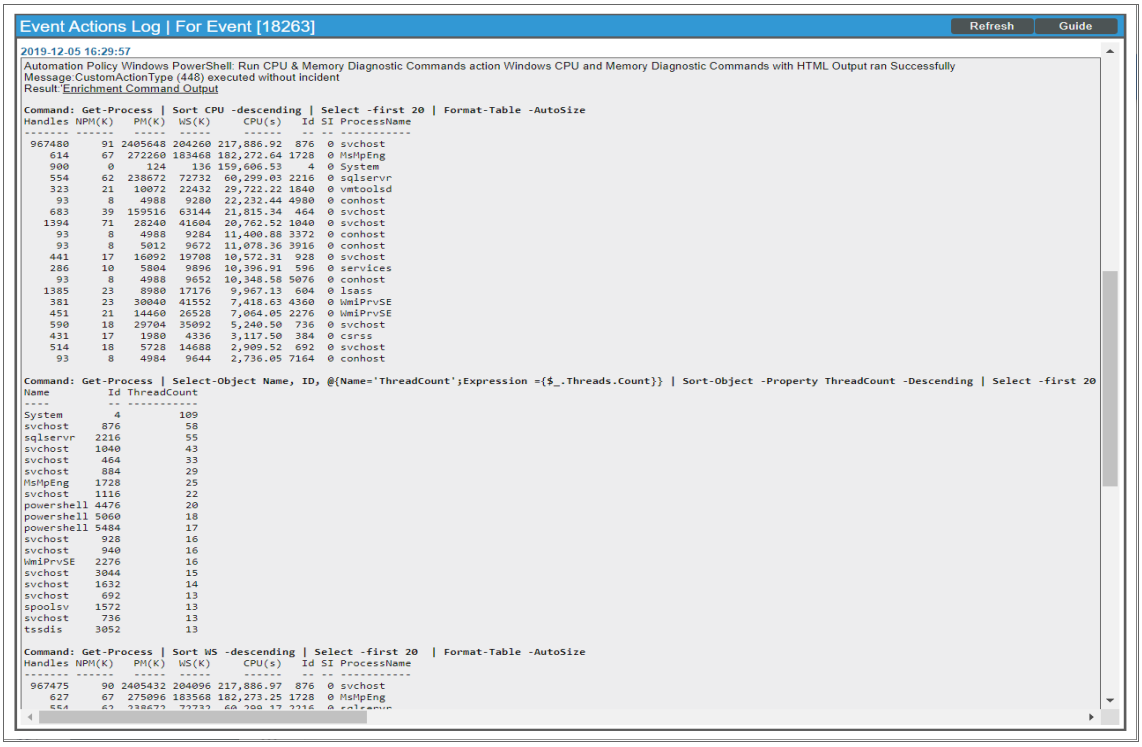
Automation Policy Name	Aligned Events	Automation Action
Windows PowerShell: Run CPU & Memory Diagnostic Commands	• Minor: Microsoft: Windows Disk Transfer Time (Physical Disk) exceeded threshold	Windows CPU and Memory Diagnostic Commands
Windows PowerShell: Run CPU Diagnostic Commands	• Minor: Microsoft: Windows CPU Utilization has exceeded the threshold	Windows CPU Diagnostic Commands

Automation Policy Name	Aligned Events	Automation Action
	• Minor: Microsoft: Windows Processor Queue Length exceeded the threshold	
Windows PowerShell: Run Disk I/O Diagnostic Commands	• Minor: Microsoft: Windows % Disk Time (Logical Disk) exceeded threshold • Minor: Microsoft: Windows % Disk Time (Physical Disk) exceeded threshold • Minor: Microsoft: Windows Current Disk QueueLength (Physical Disk)exceeded threshold	Windows Disk I/O Diagnostic Commands
Windows PowerShell: Run Memory Diagnostic Commands	• Major: Microsoft: Windows Available Memory below threshold • Major: Microsoft: Windows Pages per Second has exceeded threshold • Minor: Microsoft: Windows Paging File Usage has exceeded threshold	Windows Memory Diagnostic Commands
Windows PowerShell: Run Print Job Error Diagnostic Commands	• Minor: Microsoft: Windows: PowerShell: Print Job Errors exceeded threshold	Windows Print Job Error Diagnostic Commands

The following figure shows a memory event with a classification of "Major" appears on the **Events** page. Click the **[Actions]** button (⋯) for an event, and select *View Automation Actions* to see the automation actions triggered by the events.



The results shown for this event, in the Event Actions Log, include the automation policy that ran (shown at the top of the following figure), along with the automation actions (commands) that ran. Results for each command are also displayed. The following figure shows an example of this HTML output.



To learn more about which commands are executed by default for a given automation action, see *Customizing Actions*.

TIP: Although you can edit the automation actions described in this section, it is a best practice to use "Save As" to create a new automation action, rather than to customize the standard automation policies.

Chapter 3

Configuring Device Credentials

Overview

This chapter describes how to configure the credentials required by the automation actions in the *Windows PowerShell Automations* PowerPack.

This chapter covers the following topics:

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Authentication for Windows Devices with the Windows PowerShell Automations PowerPack

The "Execute Remote PowerShell Request" custom action type supports hard-coded credentials (wherein you specify the ID of a credential in the automation action), or the custom action type can dynamically determine the credential to use. By default, the automation actions use the dynamic method (by specifying credential ID 0 in the input parameters). The dynamic method uses the first credential that matches the following rules:

- If the "Microsoft: Windows Server Configuration Cache" Dynamic Application (from the *Microsoft: Windows Server* PowerPack) is aligned to the device associated with the triggering event, the credential aligned to that Dynamic Application is used.
- If the "Microsoft: Windows Server Performance Cache" Dynamic Application (from the Microsoft: Windows ServerPowerPack) is aligned to the device associated with the triggering event, the credential aligned to that Dynamic Application is used.
- If the "Microsoft: Windows Server OS Configuration" Dynamic Application (from the Microsoft: Windows ServerPowerPack) is aligned to the device associated with the triggering event, the credential aligned to that Dynamic Application is used.
- If none of the listed Dynamic Applications are aligned to the device associated with the triggering event, the first available credential aligned to the device as a secondary credential is used.

Creating a Credential

If you do not have the *Microsoft: Windows Server* PowerPack installed, you must create a credential that includes the username and password to communicate with your Windows devices.

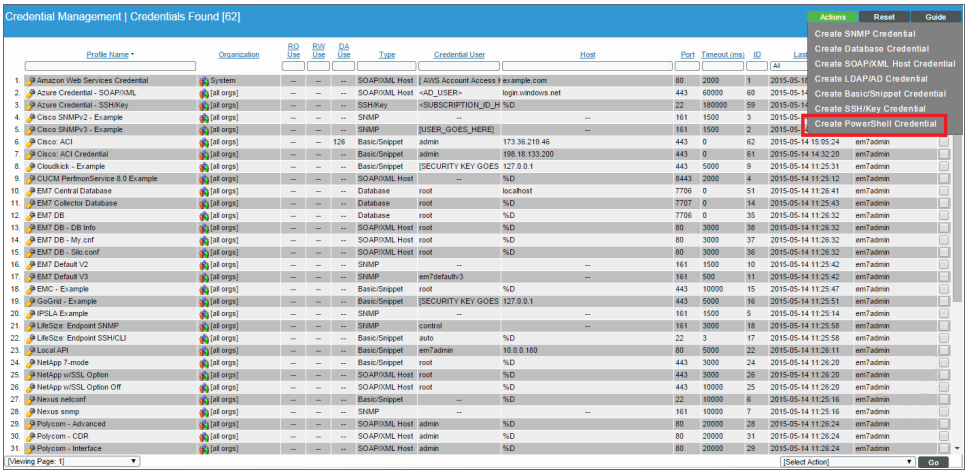
To prepare your Windows systems for monitoring, follow the instructions in ***Configuring Windows Servers for Monitoring with PowerShell***.

> **NOTE:** If you have the *Microsoft: Windows Server* PowerPack installed and configured, you may skip this section.

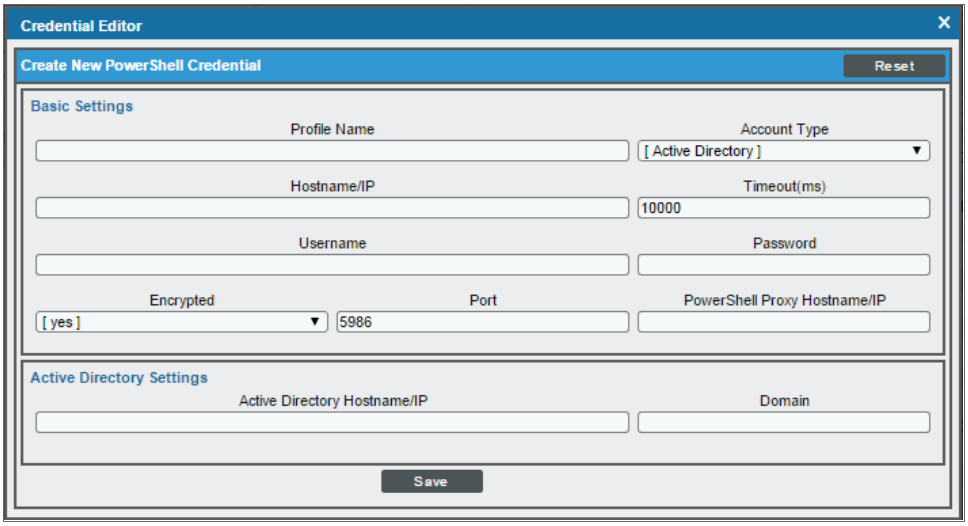
To define a PowerShell credential in SL1:

1. Collect the information you need to create the credential:
    - The username and password for a user on the Windows device.
    - If the user is an Active Directory account, the hostname or IP address of the Active Directory server and the domain.
    - Whether an encrypted connection should be used.
    - If you are using a Windows Management Proxy, the hostname or IP address of the proxy server.
2. Go to the **Credential Management** page (System > Manage > Credentials).

3. In the **Credential Management** page, click the **[Actions]** menu. Select ***Create PowerShell Credential***.



4. The **Credential Editor** page appears, where you can define the following fields:



- ***Profile Name***. Name of the credential. Can be any combination of alphanumeric characters.

- ***Hostname/IP***. Hostname or IP address of the device from which you want to retrieve data.
    - You can include the variable **%D** in this field. SL1 will replace the variable with the IP address of the device that is currently using the credential.
    - You can include the variable **%N** in this field. SL1 will replace the variable with the hostname of the device that is currently using the credential. If SL1 cannot determine the hostname, SL1 will replace the variable with the primary, management IP address for the current device.
    - You can include the prefix **HOST** or **WSMAN** before the variable **%D** in this field if the device you want to monitor uses a service principal name (for example, "HOST://%D" or "WSMAN://%D"). SL1 will use the WinRM service HOST or WSMan instead of HTTP and replace the variable with the IP address of the device that is currently using the credential.
- ***Username***. Username for an account on the Windows device to be monitored or on the proxy server.

NOTE: The user should not include the domain name prefix in the username for Active Directory accounts. For example, use "em7admin" instead of "MSDOMAIN\em7admin".

- ***Encrypted***. Select whether SL1 will communicate with the device using an encrypted connection. Choices are:
    - *yes*. When communicating with the Windows server, SL1 will use a local user account with authentication of type "Basic Auth". You must then use HTTPS and can use a Microsoft Certificate or a self-signed certificate.
    - *no*. When communicating with the Windows server, SL1 will not encrypt the connection.
- ***Port***. The port number used by the WinRM service on the Windows device. This field is automatically populated with the default port based on the value you selected in the ***Encrypted*** field.
- ***Account Type***. Type of authentication for the username and password in this credential. Choices are:
    - *Active Directory*. On the Windows device, Active Directory will authenticate the username and password in this credential.
    - *Local*. Local security on the Windows device will authenticate the username and password in this credential.
- ***Timeout (ms)***. Time, in milliseconds, after which SL1 will stop trying to collect data from the authenticating server. For collection to be successful, SL1 must connect to the authenticating server, execute the PowerShell command, and receive a response within the amount of time specified in this field.
- ***Password***. Password for the account on the Windows device to be monitored or on the proxy server.
- ***PowerShell Proxy Hostname/IP***. If you use a proxy server in front of the Windows devices you want to communicate with, enter the fully-qualified domain name or the IP address of the proxy server in this field.
- ***Active Directory Hostname/IP***. If you selected Active Directory in the ***Account Type*** field, specify the hostname or IP address of the Active Directory server that will authenticate the credential.

- ***Domain***. If you selected Active Directory in the ***Account Type*** field, specify the domain where the monitored Windows device resides.

5. To save the credential, click the **[Save]** button. To clear the values you set, click the **[Reset]** button.

For more information about configuring credentials in SL1, see Credentials in the SL1 user documentation.

Chapter 4

Creating and Customizing Automation Policies

Overview

This chapter describes how to create automation policies using the automation actions in the *Windows PowerShell Automations* PowerPack.

This chapter covers the following topics:

Prerequisites

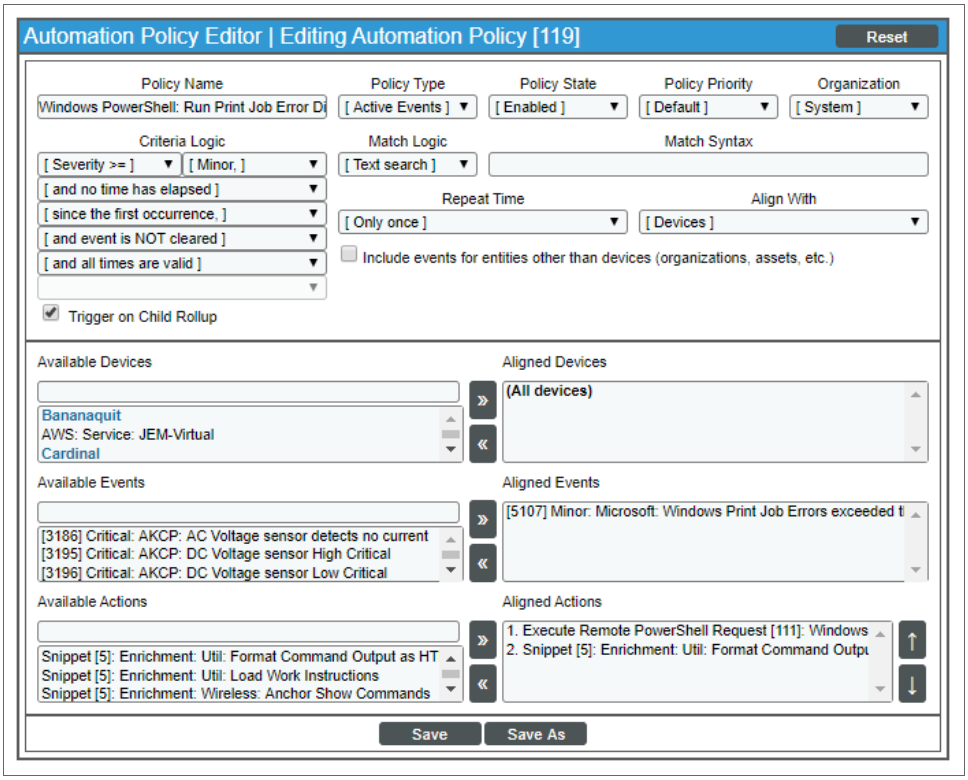
Before you create an automation policy using the automation actions in the *Windows PowerShell Automations* PowerPack, you must determine:

- Which set of commands you want to run on a monitored device when an event occurs. There are ten automation actions in the PowerPack that run the "Execute Remote PowerShell Request" action type with different commands. You can also create your own automation actions using the custom action type supplied in the PowerPack.
- What event criteria you want to use to determine when the automation actions will trigger, or the set of rules that an event must match before the automation is executed. This can include matching only specific event policies, event severity, associated devices, and so on. For a description of all the options that are available in Automation Policies, see the ***Run Book Automation*** manual.

Creating an Automation Policy

To create an automation policy that uses the automation actions in the *Windows PowerShell Automations* PowerPack, perform the following steps:

1. Go to the **Automation Policy Manager** page (Registry > Run Book > Automation).
2. Click **[Create]**. The **Automation Policy Editor** page appears.



3. Complete the following required fields:
    - ***Policy Name***. Enter a name for the automation policy.
    - ***Policy Type***. Select whether the automation policy will match events that are active, match when events are cleared, or run on a scheduled basis. Typically, you would select *Active Events* in this field.
    - **Policy State**. Specifies whether the policy will be evaluated against the events in the system. If you want this policy to begin matching events immediately, select *Enabled*.
    - **Policy Priority**. Specifies whether the policy is high-priority or default priority. These options determine how the policy is queued.
    - ***Organization***. Select one or more organizations to associate with the automation policy. The automation policy will execute only for devices in the selected organizations (that also match the other criteria in the policy). To configure a policy to execute for all organizations , select *System* without specifying individual devices to align to.
    - ***Aligned Action***s. This field includes the actions from the *Windows PowerShell Automations* PowerPack. To add an action to the ***Aligned Actions*** field, select the action in the ***Available Actions*** field and click the right arrow (>>). To re-order the actions in the ***Aligned Actions*** field, select an action and use the up arrow or down arrow buttons to change that action's position in the sequence.

    > **NOTE:** You must have two Aligned Actions: one that runs the diagnostic or remediation commands and one that provides the output format. The actions providing the output formats are contained in the Datacenter Utilities PowerPack, which is a prerequisite for running automations in this PowerPack.

4. Optionally, supply values in the other fields on this page to refine when the automation will trigger.
5. Click **[Save]**.

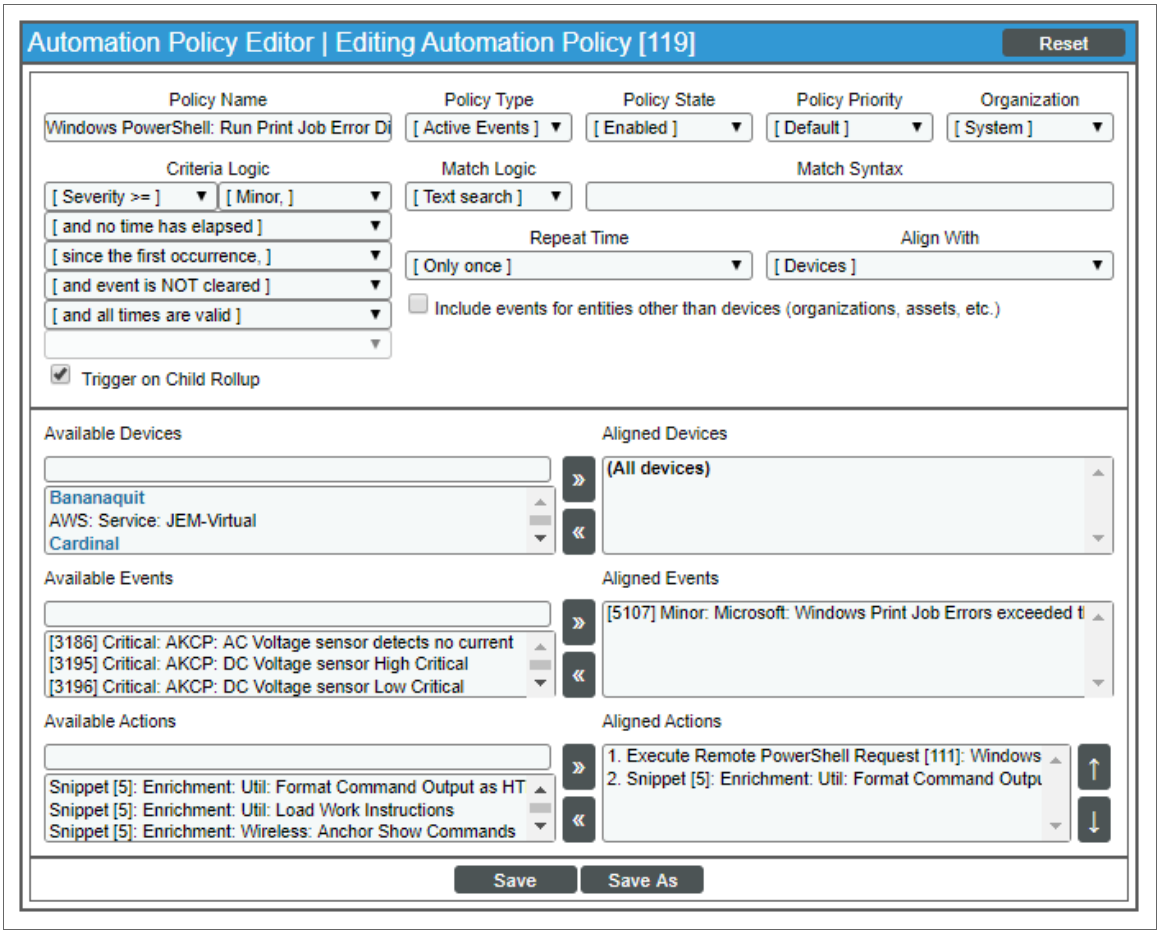
> **NOTE:** You can also modify one of the automation policies included with this PowerPack. Best practice is to use the **[Save As]** option to create a new, renamed automation policy, instead of customizing the standard automation policies.
>
> **NOTE:** If you modify one of the included automation policies and save it with the original name, the customizations in that policy will be overwritten when you upgrade the PowerPack unless you remove the association between the automation policy and the PowerPack before upgrading.

Customizing an Automation Policy

To customize an automation policy:

1. Go to the **Automation Policy Manager** page (Registry > Run Book > Automation).

2. Search for the *Windows PowerShell Automations* automation policy you want to edit and click the wrench icon ( ) for that policy . The **Automation Policy Editor** page appears:



3. Complete the following fields as needed:

   - ***Policy Name***. Type a new name for the automation policy to avoid overwriting the default policy.
   - ***Policy Type***. Select whether the automation policy will match events that are active, match when events are cleared, or run on a scheduled basis. Typically, you would select *Active Events* in this field.
   - ***Policy State***. Specifies whether the policy will be evaluated against the events in the system. If you want this policy to begin matching events immediately, select *Enabled*.
   - **Policy Priority**. Specifies whether the policy is high-priority or default priority. These options determine how the policy is queued.

- ***Aligned Actions***. This field includes the actions from the Windows PowerShell Automations PowerPack. You should see "Execute Remote PowerShell Request" action in this field. To add an action to the ***Aligned Actions*** field, select the action in the ***Available Actions*** field and click the right arrow (**>>**). To re-order the actions in the ***Aligned Actions*** field, select an action and use the up arrow or down arrow buttons to change that action's position in the sequence.

  > **NOTE:** You must have two Aligned Actions: one that runs the diagnostic or remediation commands and one that provides the output format. The actions providing the output formats are contained in the Datacenter Utilities PowerPack, which is a prerequisite for running automations in this PowerPack.

- ***Organization***. Select the organization that will use this policy.

4. Optionally, supply values in the other fields on the **Automation Policy Editor** page to refine when the automation will trigger.
5. Click **[Save As]**.

Removing an Automation Policy from a PowerPack

After you have customized a policy from a *Windows PowerShell Automations PowerPack*, you might want to remove that policy from that PowerPack to prevent your changes from being overwritten if you update the PowerPack later. If you have the license key with author's privileges for a PowerPack or if you have owner/administrator privileges with your license key, you can remove content from a PowerPack.

To remove content from a PowerPack:

1. Go to the **PowerPack Manager** page (System > Manage > PowerPacks).
2. Find the *Windows PowerShell Automations* PowerPack. Click its wrench icon ().
3. In the **PowerPack Properties** page, in the navigation bar on the left side, click **Run Book Policies**.
4. In the **Embedded Run Book Polices** pane, locate the policy you updated, and click the bomb icon () for that policy. The policy will be removed from the PowerPack and will now appear in the bottom pane.

Chapter 5

Customizing Windows PowerShell Actions

Overview

This manual describes how to customize the automation actions embedded in the Windows PowerShell Automations PowerPack to create automation actions to meet your organization's specific requirements.

For more information about creating automation policies using custom action types, see *Creating and Customizing Automation Policies*.

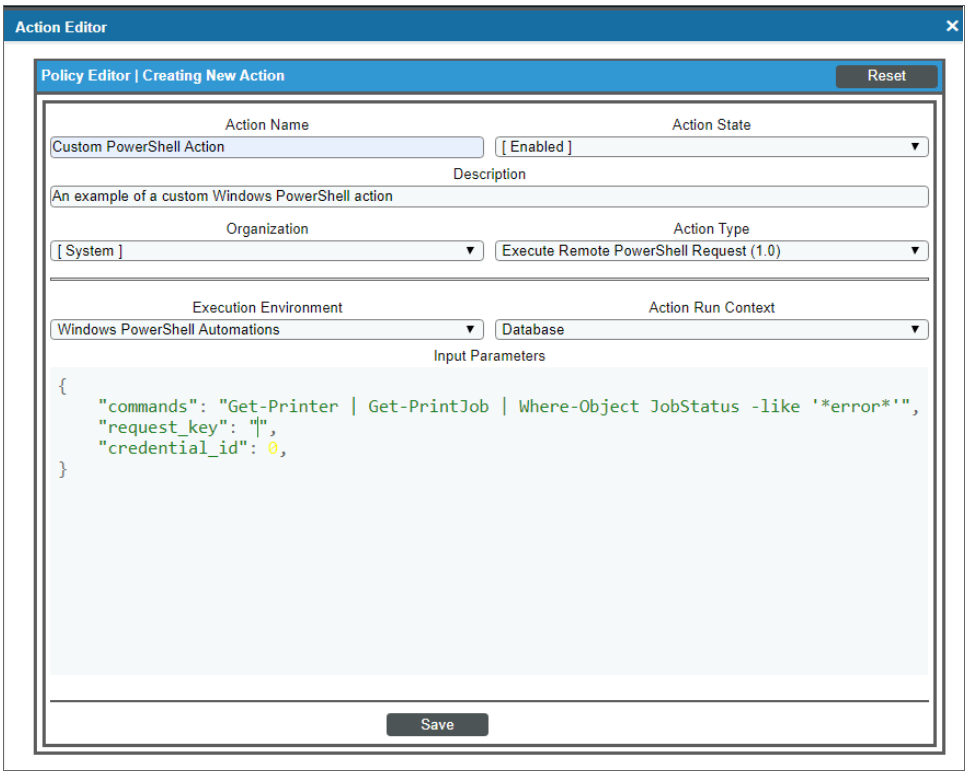
This chapter covers the following topics:

Creating a Custom Action Policy

You can use the "Execute Remote PowerShell Request" action type included with the Windows PowerShell Automations PowerPack to create custom automation actions that you can then use to build custom automation policies.

To create a custom action policy using the "Execute Remote PowerShell Request" action type:

1. Navigate to the **Action Policy Manager** page (Registry > Run Book > Actions).
2. In the **Action Policy Manager** page, click the **[Create]** button.
3. The **Action Policy Editor** modal appears.



4. In the **Action Policy Editor** page, supply a value in each field.

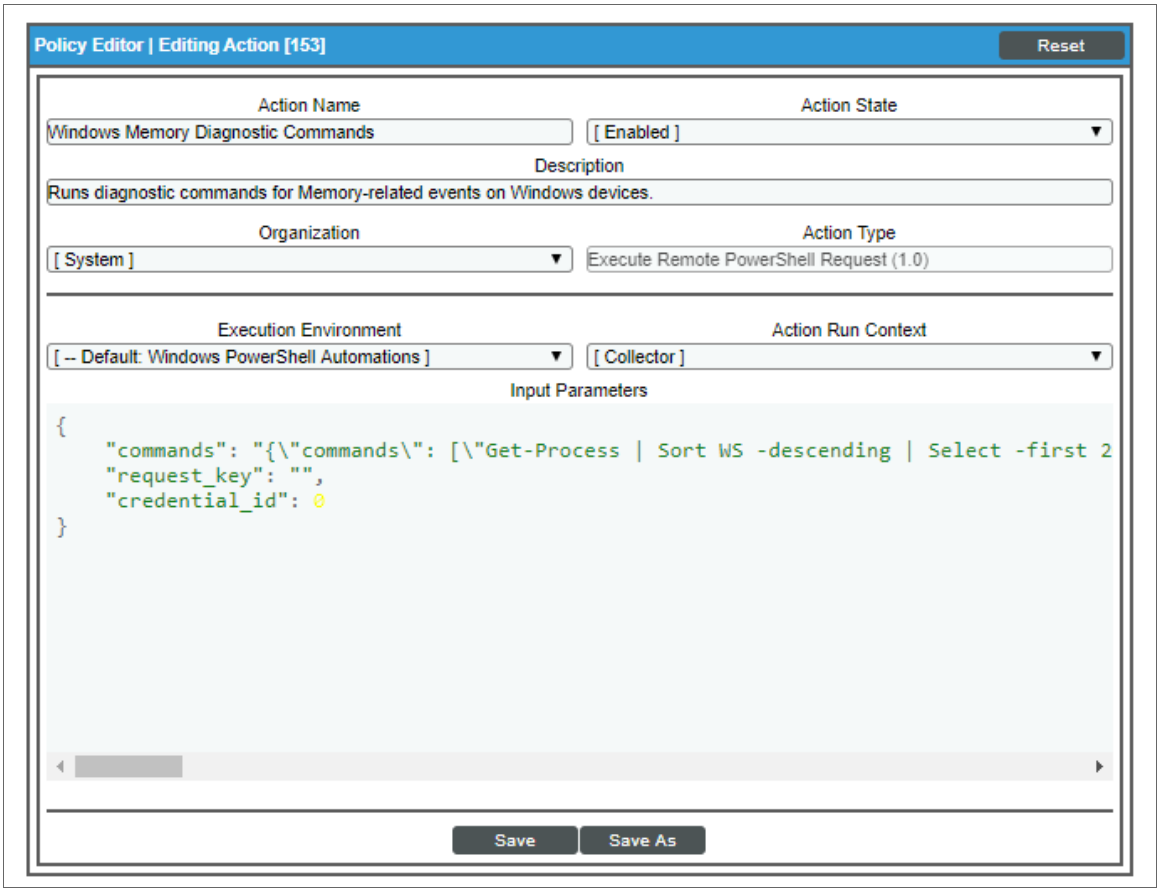
   - ***Action Name***. Specify the name for the action policy.
   - ***Action State***. Specifies whether the policy can be executed by an automation policy (enabled) or cannot be executed (disabled).
   - ***Description***. Allows you to enter a detailed description of the action.
   - ***Organization***. Organization to associate with the action policy.
   - ***Action Type***. Type of action that will be executed. Select the "Execute Remote PowerShell Request (0.9)" action type (highlighted in the figure above).
   - ***Execution Environment***. Select from the list of available Execution Environments. The default execution environment is *System*.
   - ***Action Run Context***. Select *Database* or *Collector* as the context in which the action policy will run.
   - ***Input Parameters***. A JSON structure that specifies each input parameter. Each parameter definition includes its name, data type, and whether the input is optional or required for this Custom Action Type. For more information about the available input parameters, see the table in *Creating a New Windows PowerShell Automation Action*

NOTE: Input parameters must be defined as a JSON structure.

6. Click **[Save]**. If you are modifying an existing action policy, click **[Save As]**. Supply a new value in the ***Action Name*** field, and save the current action policy, including any edits, as a new policy.

Customizing Automation Actions

The *Windows PowerShell Automations*PowerPack includes 5 automation actions that execute the "Execute Remote PowerShell Request" action type to request diagnostic information or remediate an issue. You can specify the host and the options in a JSON structure that you enter in the ***Input Parameters*** field in the **Action Policy Editor** modal.



The following automation actions that use the "Execute Remote PowerShell Request" action type are included in the *Windows PowerShell Automations* PowerPack. Compare the commands run with the example in the image above. For more information about input parameter fields,
see the table in *Creating a New Windows PowerShell Automation Action*.

Action Name	Description	Commands Run
Windows CPU and Memory Diagnostic Commands	Runs diagnostc commads for CPU and Memory events on Windows devices	• `Get-Process | Sort CPU -descending | Select -first 20`

Action Name	Description	Commands Run
		• `Get-Process | Select-Object Name, ID, @ {Name='ThreadCount';Expression = {$_.Threads.Count}} | Sort-Object -Property ThreadCount -Descending | Select -first 20` • `Get-Process | Sort WS -descending | Select -first 20` • `Get-CimInstance -Class Win32_PageFileUsage | Format-Table -Property Caption,Name,Status,Description,InstallDate, AllocatedBaseSize,PeakUsage,TempPageFile` • A command that collects the memory usage of running processes, where the memory usage is aggregated across all instances of each named process. The command is not listed here for clarity.
Windows CPU Diagnostic Commands	Runs diagnostic commads for CPU-related events on Windows devices	• `Get-Process | Sort CPU -descending | Select -first 20` • `Get-Process | Select-Object Name, ID, @ {Name='ThreadCount';Expression = {$_.Threads.Count}} | Sort-Object -Property ThreadCount -Descending | Select -first 20`
Windows Disk I/O Diagnostic Commands	Runs diagnostic commads for Disk I/O events on Windows devices	• A command that collects the "IO Data Bytes per second" counter for each running process. The command takes 10 samples at 1-second intervals and returns the average of all samples for each process. The command is not listed here for clarity. • A command that collects the "IO Data Operations per second" counter for each running process. The command takes 10 samples at 1-second intervals and returns the average of all samples for each process. The command is not listed here for clarity.
Windows Memory Diagnostic Commands	Runs diagnostc commads for Memoy-related events on Windows devicess devices.	• `Get-Process | Sort WS -descending | Select -first 20` • `Get-CimInstance -Class Win32_PageFileUsage | Format-Table -Property Caption,Name,Status,Description,InstallDate, AllocatedBaseSize,PeakUsage,TempPageFile` • A command that collects the memory usage of running processes, where the memory usage is aggregated across all instances of each named process. The command is not listed here for clarity.
Windows Print	Runs diagnostic commands for	• `Get-Printer | Get-PrintJob | Where-Object JobStatus -like '*error*'`

Action Name	Description	Commands Run
Job Error Diagnostic Commands	Print Job Error events on Windows devices.	

TIP: For more information about substitution variables, see *Appendix A*.

Creating a New Windows PowerShell Automation Action

You can create a new automation action that runs remote PowerShell requests using the supplied "Execute Remote PowerShell Request" custom action type. To do this, select "Execute Remote PowerShell Request" in the Action Type drop-down list when you create a new automation action. You can also use the existing automation actions in the PowerPack as a template by using the **[Save As]** option.

The Windows PowerShell automation actions accept the following parameters in JSON:

Paramter	Input type	Description
commands	string	Specifies a single command or a list of commands, in JSON format, to execute. You can use substitution variables in the commands.
request_key	string	**(Optional field)** **Default value**: empty The unique key for each instance (row) returned by the request. This unique key must be a property name, and the request must include that property (column) and return values from that property name (column). **Example:** Suppose you want to get the ID, number of cores, name, and maximum clock speed of every CPU installed on a Windows system, run the following command, where "DeviceID" is the request key. `Get-WmiObject -Class Win32_Processor -Property DeviceID, NumberOfCores, Name, MaxClockSpeed | Format-List DeviceID, NumberOfCores, Name, MaxClockSpeed`
credential_id	integer	**Default value**: 0 Specifies the credential_id to use for the connection. • If set to 0 (false), the custom action type will dynamically determine the credential. For more information, see *Authentication for Windows Devices*.

Paramter	Input type	Description
		• If set to an ID number, it maps to the credential ID specified. You can find credential IDs by going to System > Manage > Credentials.

Using Substitution Values. The commands input can contain substitution values that match the keys in EM7_VALUES.

TIP: For more information about substitution variables, see *Appendix A*.

For a description of all options that are available in Automation Policies, see the ***Run Book Automation*** manual.

Appendix A

Run Book Variables

Overview

This appendix defines the different variables you can use when creating an action policy.

Use the following menu options to navigate the SL1 user interface:

- To view a pop-out list of menu options, click the menu icon ( ).
- To view a page containing all of the menu options, click the Advanced menu icon ( ).

This appendix covers the following topics:

Run Book Variables

You can include variables when creating an action policy. These variables are listed in the table below.

- In an action policy of type ***Send an Email Notification***, you can include one or more of these variables in the fields ***Email Subject*** and ***Email Body***.
- In an action policy of type ***Send an SNMP Trap***, you can include one or more of these variables in the ***Trap OID*** field, ***Varbind OID*** field, and the ***Varbind Value*** field.
- In an action policy of type ***Create a New Ticket***, you can include one or more of these variables in the ***Description*** field or the ***Note*** field of the related Ticket Template.
- In an action policy of type ***Send an SNMP Set***, you can include one or more of these variables in the ***SNMP OID*** field and the ***SNMP Value*** field.
- In an action policy of type ***Run A Snippet***, you can access variables from the global dictionary ***EM7_VALUES***.
- In a policy of type ***Execute an SQL Query***, you can include one or more of these variables in the ***SQL Query*** field.

Variable	Source	Description
%A	Account	Username
%N	Action	Automation action name
%g	Asset	Asset serial
%h	Asset	Device ID associated with the asset
%i (lowercase "eye")	Asset	Asset Location
%k	Asset	Asset Room
%K	Asset	Asset Floor
%P	Asset	Asset plate
%p	Asset	Asset panel
%q	Asset	Asset zone
%Q	Asset	Asset punch
%U	Asset	Asset rack
%u	Asset	Asset shelf
%v	Asset	Asset tag
%w	Asset	Asset model

Variable	Source	Description
%W	Asset	Asset make
%m	Automation	Automation policy note
%n	Automation	Automation policy name
%F	Dynamic Alert	Alert ID for a Dynamic Application Alert
%I (uppercase "eye")	Dynamic Alert	For events with a source of "dynamic", this variable contains the index value from SNMP. For events with a source of "syslog" or "trap", this variable contains the value that matches the ***Identifier Pattern*** field in the event definition.
%T	Dynamic Alert	Value returned by the Threshold function in a Dynamic Application Alert.
%V	Dynamic Alert	Value returned by the Result function in a Dynamic Application Alert.
%a	Entity	IP address
%_category_id	Entity	Device category ID associated with the entity in the event.
%_category_name	Entity	Device category name associated with the entity in the event.
%_class_id	Entity	Device class ID associated with the entity in the event.
%_class_name	Entity	Device class name associated with the entity in the event.
%_parent_id	Entity	For component devices, the device ID of the parent device.
%_parent_name	Entity	For component devices, the name of the parent device.
%_root_id	Entity	For component devices, the device ID of the root device.
%_root_name	Entity	For component devices, the name of the root device.

Variable	Source	Description
%1 (one)	Event	Entity type. Possible values are: • 0. Organization • 1. Device • 2. Asset • 4. IP Network • 5. Interface • 6. Vendor • 7. Account • 8. Virtual Interface • 9. Device Group • 10. IT Service • 11. Ticket
%2	Event	Sub-entity type. Possible values for organizations are: • 9. News feed Possible values for devices are: • 1. CPU • 2. Disk • 3. File System • 4. Memory • 5. Swap • 6. Component • 7. Interface • 9. Process • 10. Port • 11. Service • 12. Content • 13. Email
%4	Event	Text string of the user name that cleared the event.
%5	Event	Timestamp of when event was deleted.
%6	Event	Timestamp for event becoming active.

Variable	Source	Description
%7	Event	Event severity (1-5), for compatibility with previous versions of SL1. 1=critical, 2=major, 3=minor, 4=notify, 5=healthy. **NOTE**: When referring to an event, %7 represents severity (for previous versions of SL1). When referring to a ticket, %7 represents the subject line of an email used to create a ticket.
%c	Event	Event counter
%d	Event	Timestamp of last event occurrence.
%D	Event	Timestamp of first event occurrence.
%e	Event	Event ID
%H	Event	URL link to event
%M	Event	Event message
%s	Event	severity (0 - 4). 0=healthy, 1=notify, 2=minor, 3=major, 4=critical.
%S	Event	Severity (Healthy - Critical)
%_user_note	Event	Current note about the event that is displayed on the **Events** page.
%x	Event	Entity ID
%X	Event	Entity name
%y	Event	Sub-entity ID
%Y	Event	Sub-entity name
%Z	Event	Event source (Syslog - Group)
%z	Event	Event source (1 - 8)
%_ext_ticket_ref	Event	For events associated with an external Ticket ID, this variable contains the external Ticket ID.
%3	Event Policy	Event policy ID
%E	Event Policy	External ID from event policy
%f	Event Policy	Specifies whether event is stateful, that is, has an associated event that will clear the current event. 1 (one)=stateful; 0 (zero)=not stateful.

Variable	Source	Description
%G	Event Policy	Event Category
%R	Event Policy	Event policy cause/action text
%_event_policy_name	Event Policy	Name of the event policy that triggered the event.
%B	Organization	Organization billing ID
%b	Organization	Impacted organization
%C	Organization	Organization CRM ID
%o (lowercase "oh")	Organization	Organization ID
%O (uppercase "oh")	Organization	Organization name
%r	System	Unique ID / name for the current SL1 system
%7	Ticket	Subject of email used to create a ticket. If you specify this variable in a ticket template, SL1 will use the subject line of the email in the ticket description or note text when SL1 creates the ticket. **NOTE**: When referring to a ticket, %7 represents the subject line of an Email used to create a ticket. When referring to an event, %7 represents severity (for previous versions of SL1).
%t	Ticket	Ticket ID

Appendix B

Configuring Windows Servers for Monitoring with PowerShell

Overview

The following sections describe how to configure Windows Server 2016, 2012, 2012 R2, or 2008 R2 for monitoring by SL1 using PowerShell:

Prerequisites

Before configuring PowerShell, ensure the following:

- Forward and Reverse DNS should be available for the target Windows server from the SL1 Data Collector. Port 53 to the domain's DNS server should thus be available.
- When using an Active Directory user account as the SL1 credential, port 88 on the Windows Domain Controller, for the Active Directory domain, should be open for Kerberos authentication.
- If encrypted communication between the SL1 Data Collector and monitored Windows servers is desired, port 5986 on the Windows server should be open for HTTPS traffic. If unencrypted communications is being used, then port 5985 on the Windows server should be opened for HTTP traffic
- If multiple domains are in use, ensure that they are mapped in the [domain_realm] section of the Kerberos krb5.conf file.

Configuring PowerShell

To monitor a Windows Server using PowerShell Dynamic Applications, you must configure the Windows Server to allow remote access from SL1. To do so, you must perform the following general steps:

1. *Configure a user account* that SL1 will use to connect to the Windows Server. The user account can either be a local account or an Active Directory account.

TIP: For ease of configuration, ScienceLogic recommends using an Active Directory account that is a member of the local Administrators group on the Windows Server.

2. *Configure a Server Authentication Certificate* to encrypt communication between SL1 and the Windows Server.
3. *Configure Windows Remote Management*.
4. Optionally, *configure a Windows server as a Windows Management Proxy*.

NOTE: If you are configuring multiple Windows servers for monitoring by SL1, you can apply these settings using a Group Policy.

5. Optionally, you can *increase the number of PowerShell Dynamic Applications that can run simultaneously* against a single Windows server.

A

Step 1: Configuring the User Account for the ScienceLogic Platform

To enable SL1 to monitor Windows servers, you must first configure a user account on a Windows Server that SL1 can use to make PowerShell requests. You will include this user account information when creating the PowerShell credential that SL1 uses to collect data from the Windows Server.

To configure the Windows Server user account that SL1 can use to make PowerShell requests, complete one of the following options:

- **Option 1:** *Create an Active Directory Account with Administrator access*
- **Option 2:** *Create a local user account with Administrator access*
- **Option 3:** *Create a non-administrator user account*

TIP: For ease-of-configuration, ScienceLogic recommends creating an Active Directory user account.

After creating your Windows Server user account, depending on your setup and the servers you want to monitor, you might also need to configure the user account for remote PowerShell access to the following server types:

- *Microsoft Exchange Server*
- *Hyper-V Servers*

Option 1: Creating an Active Directory Account with Administrator Access

For each Windows server that you want to monitor with PowerShell or WinRM, you can create an Active Directory account that is a member of the local Administrators group on each server. For instructions, consult Microsoft's documentation. On Windows Domain Controller servers, you can use a domain account that is not in the Domain Administrators group by following the configuration instructions for *Option 3: Creating a Non-Administrator User Account*.

After creating your Active Directory account:

- If you use SL1 to monitor Microsoft Exchange Servers, you must *configure the user account for remote PowerShell access to Microsoft Exchange Server*.
- If you use SL1 to monitor Hyper-V Servers, you must *configure the user account for remote PowerShell access to the Hyper-V Servers*.
- Otherwise, ***you can skip the remainder of this section and*** *proceed to Step 3*.

Option 2: Creating a Local User Account with Administrator Access

If you have local Administrator access to the servers you want to monitor and are monitoring Windows Server 2016 or Windows Server 2012, you can alternatively create a local user account with membership in the Administrators group instead of an Active Directory account. For instructions, consult Microsoft's documentation.

> **WARNING:** This method does not work for Windows Server 2008.

After creating your local user account with Local Administrator access:

- If you use SL1 to monitor Microsoft Exchange Servers, you must *configure the user account for remote PowerShell access to Microsoft Exchange Server*.
- If you use SL1 to monitor Hyper-V Servers, you must *configure the user account for remote PowerShell access to the Hyper-V Servers*.
- Otherwise, ***you can skip the remainder of this section and*** *proceed to Step 2*.

Option 3: Creating a Non-Administrator User Account

If you do not have Local Administrator access to the servers that you want to monitor with PowerShell or WinRM, or if the monitored Windows server is a Domain Controller that will not be in the local Administrators group, then you must first create a domain user account or create a local user account on the Windows Server. For instructions, consult Microsoft's documentation.

After creating your domain user account or local user account:

- You must configure the Windows servers to allow that non-administrator user access. To do so, ***follow the steps in this section***.
- If you use SL1 to monitor Microsoft Exchange Servers, you must also *configure the user account for remote PowerShell access to Microsoft Exchange Server*.
- If you use SL1 to monitor Hyper-V Servers, you must also *configure the user account for remote PowerShell access to the Hyper-V Servers*.

To configure Windows Servers to allow access by your non-administrator user account:

1. Start a Windows PowerShell shell with ***Run As Administrator*** and execute the following command:

   ```
   winrm configsddl default
   ```

2. On the **Permissions for Default** window, click the **[Add]** button, and then add the non-administrator user account.
3. Select the *Allow* checkbox for the ***Read (Get, Enumerate, Subscribe)*** and ***Execute (Invoke)*** permissions for the user, and then click **[OK]**.

4. Access the Management console. To do this:
   - In Windows Server 2008, click **[Start]**, right-click **[Computer]**, click **[Manager]**, and then expand **[Configuration]**.
   - In Windows Server 2016 and 2012, right-click the Windows icon, click **[Computer Management]**, and then expand **[Services and Applications]**.
5. Right-click on **[WMI Control]** and then select *Properties*.
6. On the **WMI Control Properties** window, click the **[Security]** tab, and then click the **[Security]** button.
7. Click the **[Add]** button, and then add the non-administrator user or group in the **Select Users, Service Accounts, or Groups** dialog, then click **[OK]**.
8. On the **Security for Root** window, select the user o group just added, then in the **Permissions** section at the bottom of the window, select the ***Allow*** checkbox for the *Execute Methods*, *Enable Account*, and *Remote Enable* permissions.
9. Under the **Permissions** section of the **Security for Root** window, click the **[Advanced]** button.
10. In the **Advanced Security Settings** window, double-click on the user account or group you are modifying.
11. On the **Permission Entry** window, in the ***Type*** field, select *Allow*.
12. In the ***Applies to*** field, select *This namespace and subnamespaces*.
13. Select the ***Execute Methods***, ***Enable Account***, and ***Remote Enable*** permission checkboxes, and then click **[OK]** several times to exit the windows opened for setting WMI permissions.
14. Restart the WMI Service from services.msc.

NOTE: To open services.msc, press the Windows + R keys, type "services.msc", and then press Enter.

15. In the Management console, go to System Tools > Local Users and Groups > Groups.
16. Right-click ***Performance Monitor Users***, and then select *Properties*.
17. On the **Performance Monitor Users Properties** window, click the **[Add]** button.
18. In the ***Enter the object names to select*** field, type the non-administrator domain user or group name, and then click **[Check Names]**.
19. Select the user or group name from the list and then click **[OK]**.
20. In the **Performance Monitor Users Properties** window, click **[OK]**.
21. Perform steps 16-20 for the **Event Log Readers** user group and again for the **Distributed COM Users** user group, the R**emote Management Users** user group, and if it exists on the server, the **WinRMRemoteWMIUsers__** user group.
22. If you intend to use encrypted communications between the SL1 collector host and your monitored Windows servers, each Windows server must have a digital certificate installed that has "Server Authentication" as an Extended Key Usage property. You can create a self-signed certificate for WinRM by executing the following command:

```
$Cert = New-SelfSignedCertificate -CertstoreLocation Cert:\LocalMachine\My -DnsName
"myHost"
```

23. Add an HTTPS listener by executing the following command:

```
New-Item -Path WSMan:\LocalHost\Listener -Transport HTTPS -Address * -
CertificateThumbPrint $Cert.Thumbprint –Force
```

NOTE: This command should be entered on a single line.

24. Ensure that your local firewall allows inbound TCP connections on port 5986 if you are going to use encrypted communications between the SL1 collector(s) and the Windows server, or port 5985 if you will be using unencrypted communications between the two. You may have to create a new rule on Windows Firewall if one does not already exist.

Optional: Configuring the User Account for Remote PowerShell Access to Microsoft Exchange Server

If you use SL1 to monitor Microsoft Exchange Servers:

1. Follow the steps in the section *Configuring the User Account for SL1*.
2. Add the new user account to the "Server Management" Exchange security group in Active Directory.
3. The user account will then be able to connect to the relevant WinRM endpoint to use cmdlets installed with the Exchange Management Shell. For example, this will give the user account access to the cmdlet "Get-ExchangeServer".

Optional: Configuring the User Account for Remote PowerShell Access to Hyper-V Servers

To use PowerShell Dynamic Applications to monitor a Hyper-V server, you must:

- Create a user group in Active Directory
- Add the user account you will use to monitor the Hyper-V server to the group
- Set the session configuration parameters on the Hyper-V Server
- Set the group permissions on the Hyper-V Server
- Create a PowerShell credential using the new user account

Creating a User Group and Adding a User in Active Directory

To create a group in Active Directory and add a user:

1. In Active Directory, in the same DC as the Hyper-V host you want to monitor, in the OU called ***Users***, create a group. For example, we called our group ***PSSession Creators***.
2. Add a user that meets the requirements for monitoring a Windows server via PowerShell to the group. This is the user that you will specify in the PowerShell credential.

NOTE: For details on using Active Directory to perform these tasks, consult Microsoft's documentation.

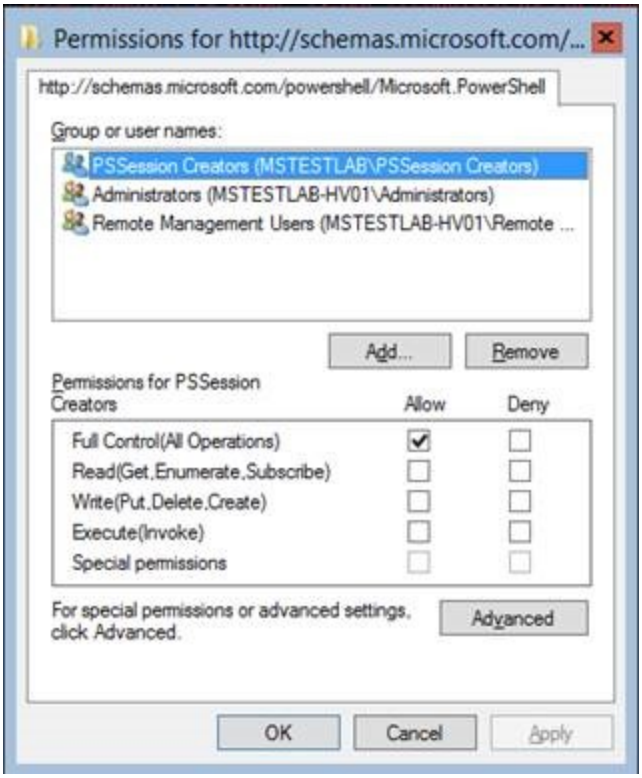
Setting the Session Configuration Parameters and Group Permissions

To set the Session Configuration and the Group Permissions on the Hyper-V Server:

1. Login to the Hyper-V server.
2. Open a PowerShell session. Enter the following command:

```
Set-PSSessionConfiguration -ShowSecurityDescriptorUI -Name Microsoft.PowerShell
```

3. When prompted, select **A**.
4. The **Permissions** dialog appears.



5. In the **Permissions** dialog, supply values in the following fields:
   - ***Group or user names***. Select the name of the group you created in Active Directory.
   - ***Permissions for group***. For ***Full Control (All Operations)***, select the *Allow* checkbox.
6. Click the **[OK]** button.

Creating a PowerShell Credential

To create a PowerShell credential using the new user account, follow the instructions in the *Creating a PowerShell Credential* section.

Step 2: Configuring a Server Authentication Certificate

ScienceLogic highly recommends that you encrypt communications between SL1 and the Windows Servers you want it to monitor.

If you have created a ***local account on the Windows Server that uses Basic Auth*** and that account will allow communication between SL1 and the Windows server, the best practice for security is to enable HTTPS to support encrypted data transfer and authentication. To do this, you must configure WinRM to listen for HTTPS requests. This is called configuring an HTTPS listener.

NOTE: For details on configuring WinRM on your Windows servers to use HTTPS, see https://support.microsoft.com/en-us/help/2019527/how-to-configure-winrm-for-https.

The sections below describe how to configure a Server Authentication Certificate on the Windows Server. This is only one task included in configuring an HTTPS listener. However, not all users need to configure a Server Authentication Certificate. You can find out if your Windows computer has a digital certificate installed for Server Authentication by running `'Get-ChildItem -Path Cert:\LocalMachine\My -EKU "*Server Authentication*"'` from a PowerShell command shell.

To support encrypted data transfer and authentication between SL1 and the servers, one of the following must be true:

- You have created an ***Active Directory*** user account on the Windows Server to allow communication between SL1 and the server. In this scenario, Active Directory will use Kerberos and AES-256 encryption to ensure secure data transfer and authentication, which means you do not need to configure a self-signed Server Authentication Certificate. ***You can skip this section and proceed to Step 3***.
- You have created a ***local account*** on the Windows Server that uses Basic Auth to allow communication between SL1 and the server, and your network ***includes a Microsoft Certificate server***. In this scenario, you should work with your Microsoft administrator to get a certificate for your Windows Server instead of configuring a self-signed Server Authentication Certificate. ***You can skip this section and proceed to Step 3***.
- You have created a ***local account*** on the Windows Server that uses Basic Auth to allow communication between SL1 and the server, and your network ***does not include a Microsoft Certificate server***. In this scenario, you must configure a self-signed Server Authentication Certificate on the Windows Server that you want to monitor with SL1 using one of the following methods:
    - **Option 1:** *Use the Microsoft Management Console*.
    - **Option 2:** If your Windows Server includes Windows Software Development Kit (SDK), you can *use the makecert tool*.

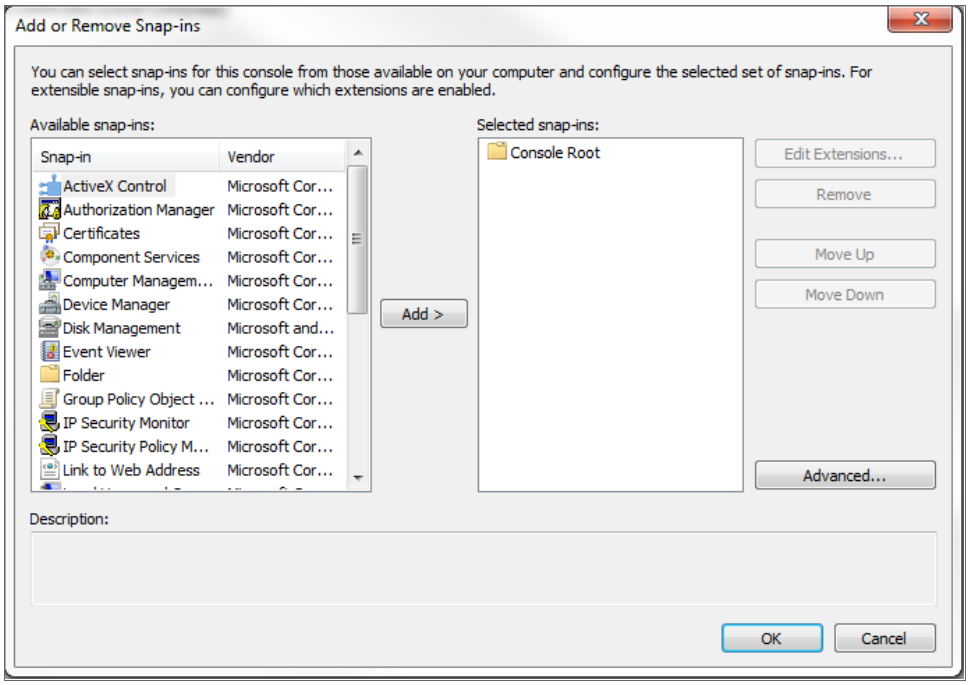
- **Option 3:** If you are running PowerShell 4.0 or later, you can *use the New-SelfSignedCertificate and Export-PfxCertificate commands*.

NOTE: Self-signed certificates are appropriate for use on a trusted network, such as a LAN that includes both a ScienceLogic Data Collector and the Windows Server to be monitored.

Option 1: Using the Microsoft Management Console to Create a Self-Signed Authentication Certificate

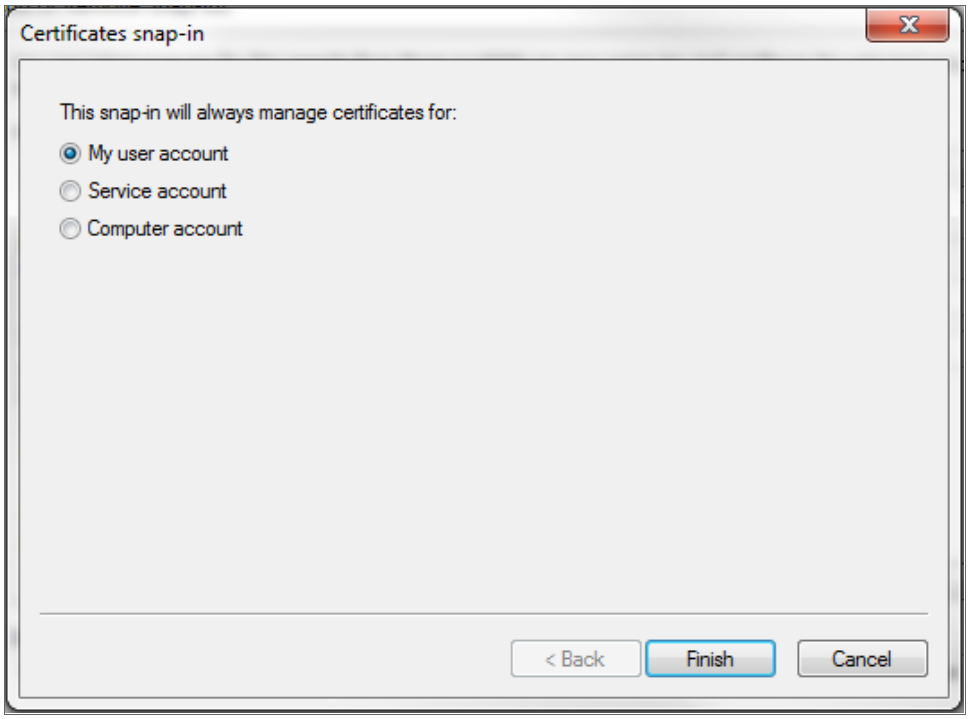
To use the **Microsoft Management Console** to create a self-signed certificate:

1. Log in to the Windows Server that you want to monitor with SL1.
2. In the Start menu search bar, enter "mmc" to open a **Microsoft Management Console** window.
3. Select **[File]**, then *Add/Remove Snap-Ins*. The **Add or Remove Snap-ins** window is displayed:



4. In the ***Available snap-ins*** list, select *Certificates*.

5. Click the **[Add >]** button. The **Certificates snap-in** window is displayed:



6. Select *Computer account*.
7. Click the **[Next >]** button.
8. Click the **[Finish]** button.
9. In the **Add or Remove Snap-ins** window, click the **[OK]** button.
10. In the left pane of the **Microsoft Management Console** window, navigate to Console Root > Certificates (Local Computer) > Personal.
11. Right-click in the middle pane and select *All Tasks* > *Request New Certificate*…. The **Certificate Enrollment** window is displayed.
12. Click the **[Next]** button. The **Select Certificate Enrollment Policy** page is displayed.
13. Select *Active Directory Enrollment Policy*.
14. Click the **[Next]** button. The **Request Certificates** page is displayed.
15. Select the ***Computer*** checkbox.
16. Click the **[Enroll]** button.
17. After the certificate is installed, click the **[Finish]** button.

Option 2: Using the MakeCert Tool to Create a Self-Signed Authentication Certificate

If your Windows system includes Windows Software Development Kit (SDK), you can use the MakeCert tool that is included in the kit to create a self-signed certificate.

- For information on the MakeCert tool, see:

  https://msdn.microsoft.com/library/windows/desktop/aa386968.aspx

- For details on creating a self-signed certificate with MakeCert and installing the certificate in the Trusted Root Certification Authorities store, see:

  https://msdn.microsoft.com/en-us/library/ms733813%28v=vs.110%29.aspx

Option 3: Using PowerShell Commands to Create a Self-Signed Authentication Certificate

If your Windows system includes PowerShell 4.0 or later, you can use the following PowerShell commands to create a self-signed certificate:

- You can use the **New-SelfSignCertificate** command to create a self-signed certificate. For information on **New-SelfSignCertificate**, see:

  https://docs.microsoft.com/en-us/powershell/module/pkiclient/new-selfsignedcertificate?view=win10-ps

- You can use the **Export-PfxCertificate** command to export the private certificate. For information on the **Export-PfxCertificate**, see:

  https://docs.microsoft.com/en-us/powershell/module/pkiclient/export-pfxcertificate?view=win10-ps

Step 3: Configuring Windows Remote Management

To provide SL1 remote access to the Windows Servers you want to monitor, you must configure Windows Remote Management.

> **NOTE:** This step is required regardless of the user account type that SL1 will use to connect to the Windows Server.

There are three ways to configure Windows Remote Management:

- **Option 1:** *Use the script provided by ScienceLogic.*
- **Option 2:** *Manually perform the configuration*.
- **Option 3:** *Use a group policy*.

Option 1: Using a Script to Configure Windows Remote Management

ScienceLogic provides a PowerShell script on the ScienceLogic portal that automates configuration of Windows Remote Management and permissions required for the user account that will be used in the SL1 credential. The script configures all of the base Windows permissions required, except for opening up Windows Firewall ports for HTTP and/or HTTPS traffic. The configuration performed by the script is useful primarily for running collection with the **Microsoft: Windows Server**, **Microsoft: Windows Server Services**, **Microsoft: Windows Server Event Logs**, and **Microsoft: SQL Server Enhanced** PowerPacks. (Microsoft: SQL Server Enhanced requires further instance-specific permissions. See the ***Monitoring SQL Servers*** manual for more information.)

To use the PowerShell script, perform the following steps:

1. Log in to the ScienceLogic portal, go to **Downloads > Miscellaneous**, and download the PowerShell script named ***WinRM Configuration Wizard Script (winrm_configuration_wizard.ps1)***. The link is : https://portal.sciencelogic.com/portal/miscellaneous/download/3943
2. Unzip the downloaded file.
3. Using the credentials for an account that is a member of the Administrator's group, log in to the Windows server you want to monitor. You can log in directly or use Remote Desktop to log in.
4. Copy the PowerShell script named ***winrm_configuration_wizard.ps1*** to the Windows server that you want to monitor with SL1.
5. Right-click on the PowerShell icon and select ***Run As Administrator***.
6. At the PowerShell prompt, navigate to the directory where you copied the PowerShell script named ***winrm_configuration_wizard.ps1***.
7. At the PowerShell prompt, enter the following to enable execution of the script:

```
Set-ExecutionPolicy -ExecutionPolicy Unrestricted -Scope Process -Force
```

NOTE: The execution policy setting persists only during the current PowerShell session.

8. After the warning text, select Y.

NOTE: If your Windows configuration requires further steps to allow execution of the script, PowerShell will display prompts. Follow the prompts.

9. To run the script with interactive dialogs, enter the following at the PowerShell prompt:

```
.\winrm_configuration_wizard.ps1 -user <domain>\<username>
```

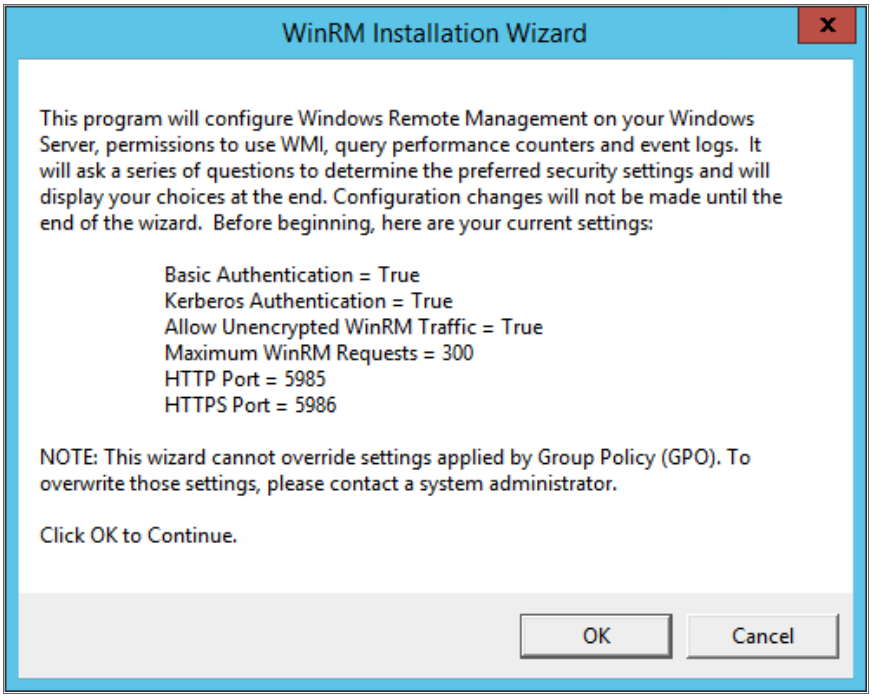
The user account you wish to use for SL1 collection must be specified with the `-user` command-line argument regardless of other arguments used. You can obtain the full help for the PowerShell configuration script by entering the following:

```
help .\winrm_configuration_wizard.ps1 -full
```

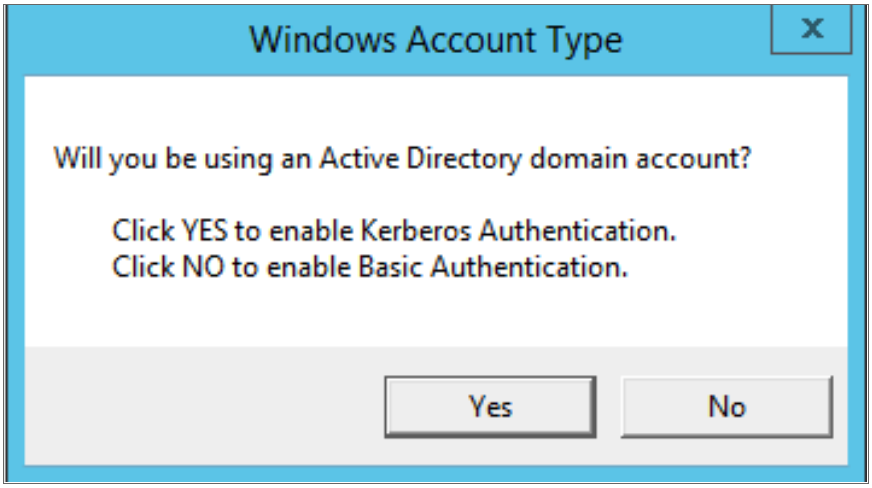
The most common way to run the script is silently:

```
.\winrm_configuration_wizard.ps1 -user <domain>\<username> -silent
```

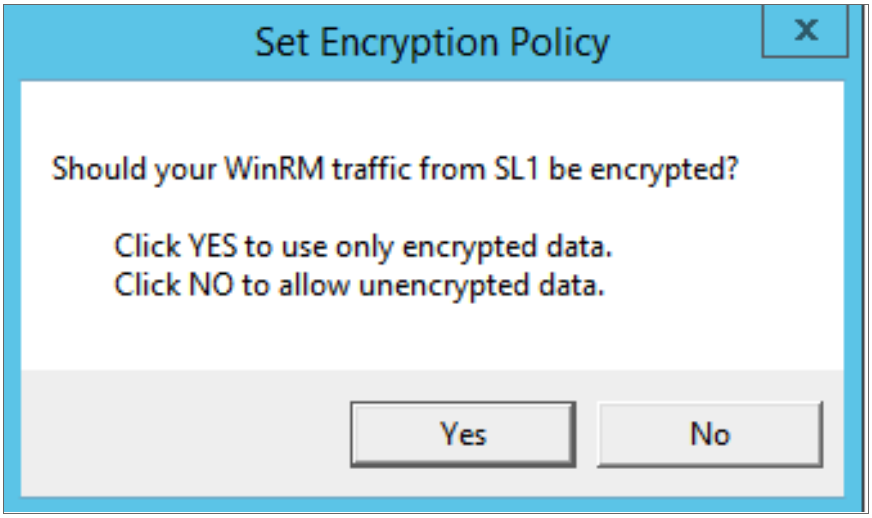
10. If you start the script without using the `-silent` command-line argument, the **WinRM Installation Wizard** modal page appears. Click **[OK]**.



11. The **Windows Account Type** modal page appears. Select the appropriate choice for your environment.

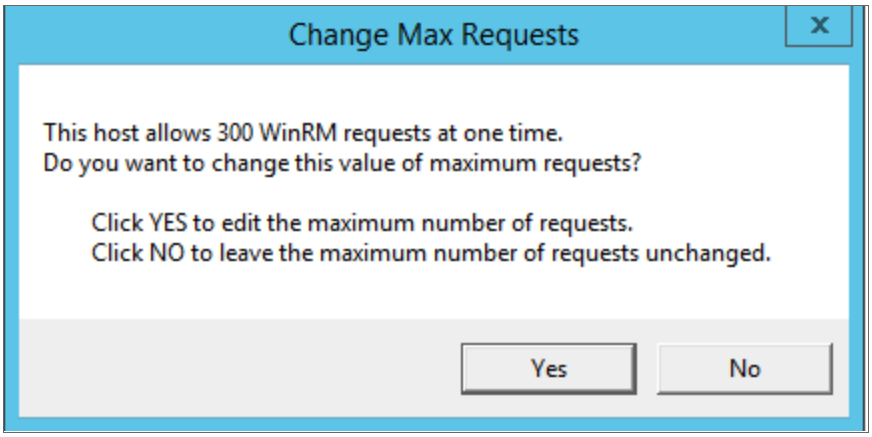


12. The **Set Encryption Policy** modal page appears. Select the appropriate choice for your environment.

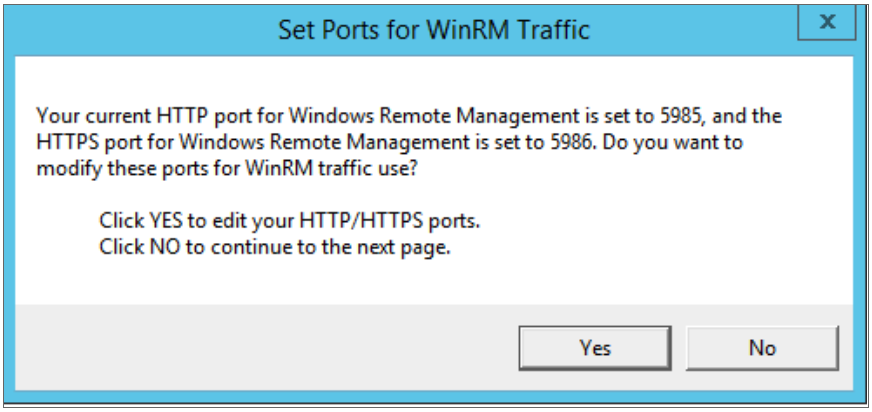


- ***Click YES to us only encrypted data***. Click Yes to configure an HTTPS listener for using encrypted communications between the SL1 collectors and the Windows server. Setting up an HTTPS listener requires a digital certificate with Server Authentication EKU to be available on the server. For information on creating a self-signed certificate, see *Configuring a Server Authentication Certificate*.
- ***Click NO to allow unencrypted data***. For communication between SL1 collectors and the Windows server, if unencrypted traffic is allowed, an HTTP listener will be configured for communication.

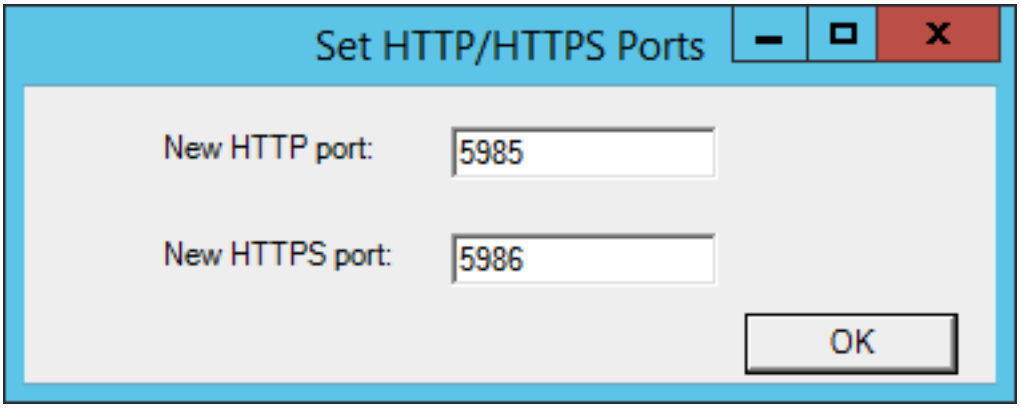
13. The **Change Max Requests** modal page appears. Click **[Yes]**.



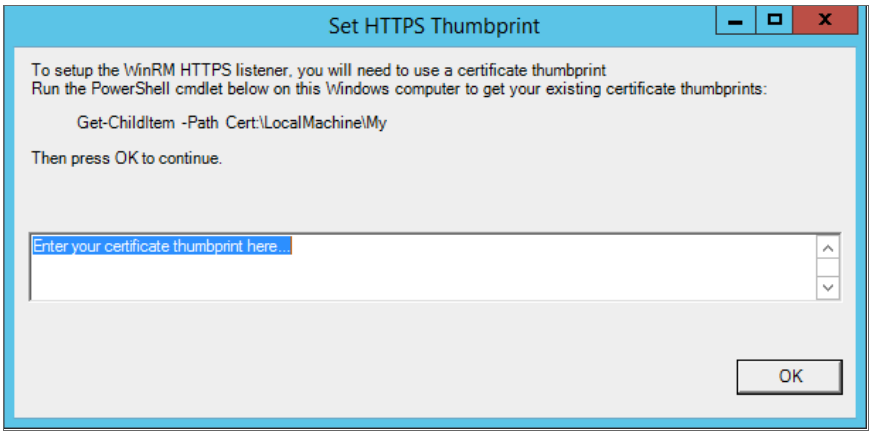
14. The **Set Ports for WinRM Traffic** modal page appears, and it shows the current settings for the HTTP and HTTPS ports. If you want to make a change to these, click **[YES]**; otherwise, click **[NO]** to continue.



15. Choose which port values you would like SL1 to use when communicating with the Windows server.

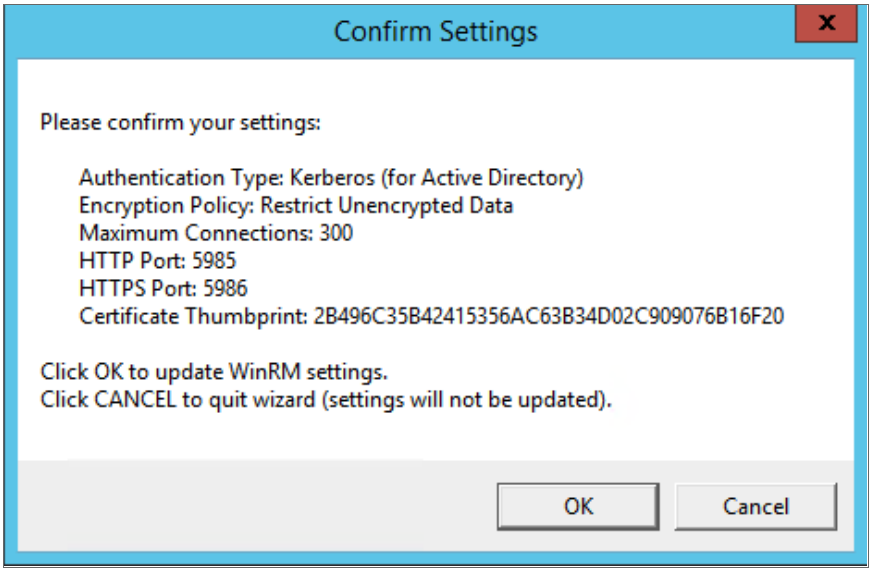


16. The **Set HTTPS Thumbprint** modal page appears. Enter the information for your certificate thumbprint, which is used to create an HTTPS listener, then click **[OK]**.

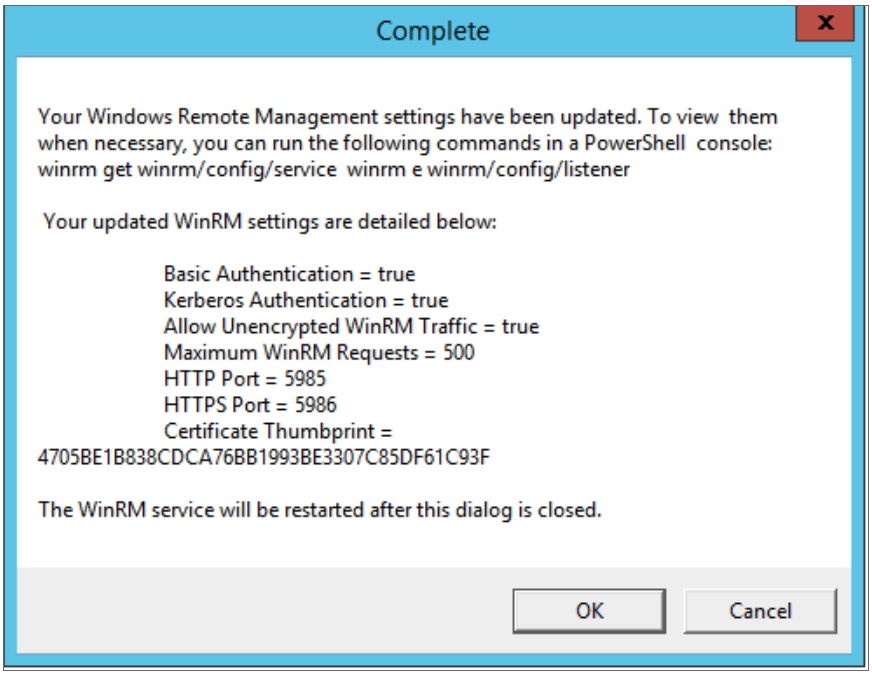


NOTE: If the certificate structure for your certificate thumbprint is incomplete or incorrect, an error message appears indicating that the WinRM client cannot process the request. If you think you made an error, click **[OK]** and try to correct it. Otherwise, contact a system administrator for help.

17. The **Confirm Settings** modal page appears. If the settings are as you specified, click **[OK]**.



18. The **Complete** modal page appears. If the settings are correct, click **[OK]**.



19. Exit the PowerShell session.

Option 2: Manually Configuring Windows Remote Management

To configure a Windows server for monitoring via PowerShell directly, perform the following steps:

1. Log in to the server with an account that is a member of the local Administrators group, or a Domain Administrator's account if on a Windows server with the Domain Controller role installed.
2. Right-click on the PowerShell icon in the taskbar or the **Start** menu, and select *Run as Administrator*.
3. Execute the following command:

   ```
   Get-ExecutionPolicy
   ```

4. If the output is "Restricted", execute the following command:

   ```
   Set-ExecutionPolicy RemoteSigned
   ```

5. Enter "Y" to accept.
6. Execute the following command:

   ```
   winrm quickconfig
   ```

7. Enter "Y" to accept.
8. If you are configuring this Windows server for encrypted communication, execute the following command:

   ```
   winrm quickconfig -transport:https
   ```

9. Enter "Y" to accept.
10. Execute the following command:

    ```
    winrm get winrm/config
    ```

    The output should look like this (additional lines indicated by ellipsis):

    ```
    Config
       ...
       Client
          ...
          Auth
             Basic = true
             ...
             Kerberos = true
             ...
          ...
       Service
          ...
          AllowUnencrypted = false
          ...
          DefaultPorts
             HTTP = 5985
             HTTPS = 5986
          ...
          AllowRemoteAccess = true
       Winrs
          AllowRemoteShellAccess = true
          ...
    ```

11. In the Service section, if the parameter ***AllowRemoteAccess*** is set to *false*, execute the following command:

> **NOTE:** This setting does not appear for all versions of Windows. If this setting does not appear, no action is required.

```
Set-Item WSMan:\Localhost\Service\AllowRemoteAccess -value true
```

12. In the Winrs section, if the parameter ***AllowRemoteShellAccess*** is set to *false*, execute the following command:

```
Set-Item WSMan:\Localhost\Winrs\AllowRemoteShellAccess -value true
```

13. If you are configuring this Windows server for unencrypted communication and the parameter ***AllowUnencrypted*** (in the Service section) is set to *false*, execute the following command:

```
Set-Item WSMan:\Localhost\Service\AllowUnencrypted -value true
```

14. If you are configuring this Windows server for unencrypted communication, verify that "HTTP = 5985" appears in the DefaultPorts section.

> **NOTE:** ScienceLogic recommends using encrypted communication, particularly if you are also using an Active Directory account. Using an Active Directory account for encrypted authentication enables you to use Kerberos ticketing for authentication.

15. If you are configuring this Windows server for encrypted communication, verify that "HTTPS = 5986" appears in the DefaultPorts section.
16. If you are using an Active Directory account to communicate with this Windows server and in the Auth section, the parameter ***Kerberos*** is set to *false*, execute the following command:

```
Set-Item WSMan:\Localhost\Service\Auth\Kerberos -value true
```

> **NOTE:** ScienceLogic recommends using an Active Directory account.

17. If you are using a local account to communicate with this Windows server and in the Auth section, the parameter ***Basic*** is set to *false*, execute the following command:

```
Set-Item WSMan:\Localhost\Service\Auth\Basic -value true
```

Option 3: Using a Group Policy to Configure Windows Remote Management

You can use a group policy object (GPO) to configure the following Windows Remote Management settings on Windows Server 2012 or Windows Server 2016:

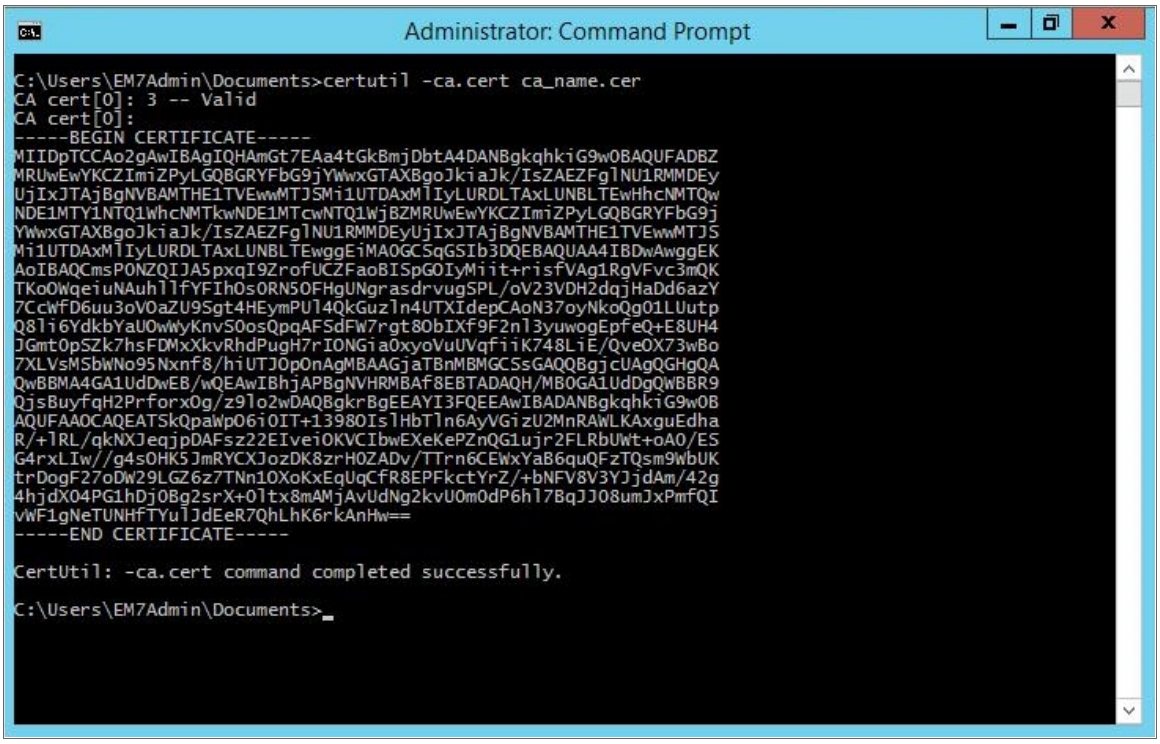
- A registry key to enable Local Account access to Windows Remote Management
- Firewall rules
- Certificates
- HTTP and HTTPS listeners, including authentication and encryption settings
- Service start and recovery settings

To create the group policy object, perform the following steps:

1. Log in to the server as an administrator.
2. Right-click on the PowerShell icon in the taskbar and select *Run as Administrator*.
3. At the PowerShell prompt, use the change directory (CD) command to navigate to a folder where you can create new files.

4. Save the root Certification Authority certificate to the local directory by executing the following command:

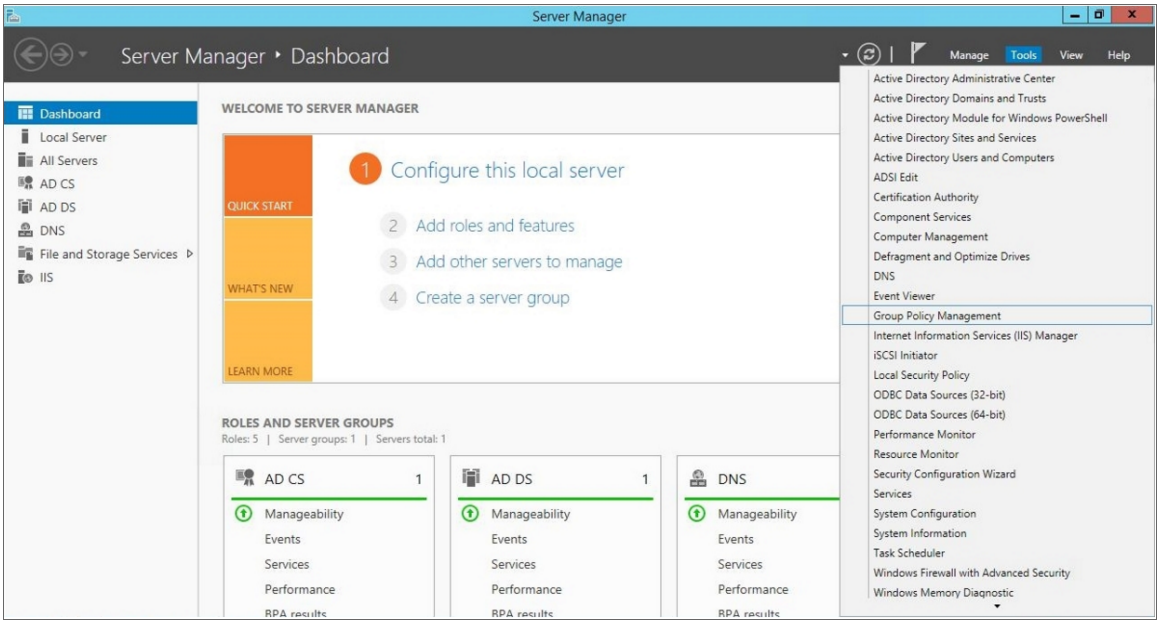
```
certutil.exe –ca.cert ca_name.cer
```



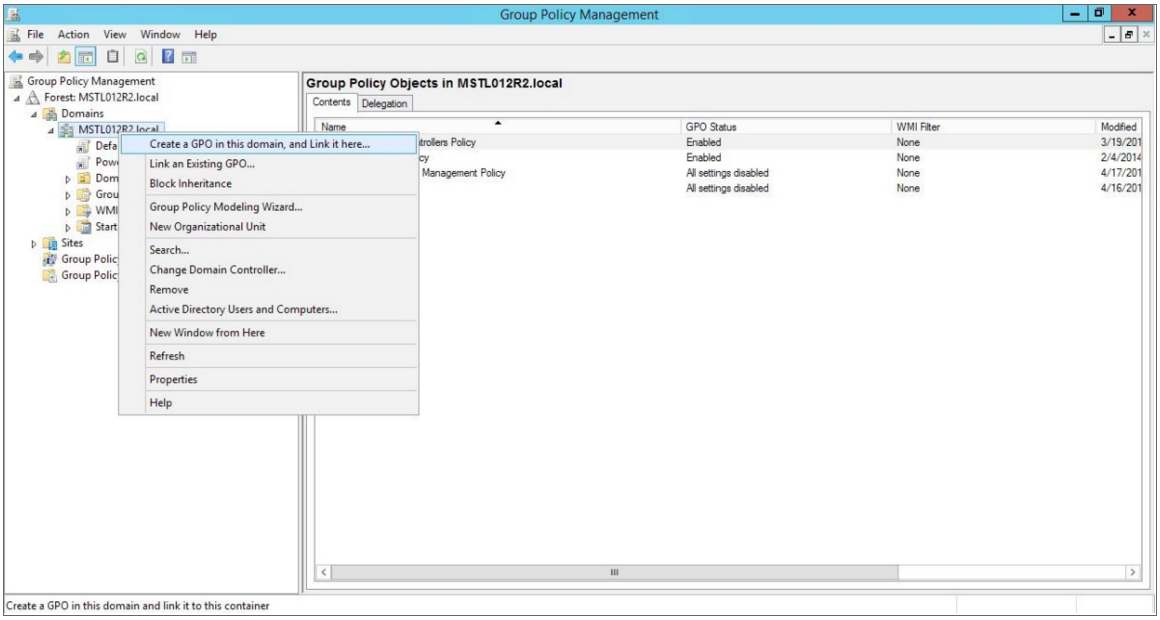
TIP: You will import this certificate into the new group policy in step 21.

5. Exit the command prompt.
6. Log in to a domain controller in your Active Directory forest and navigate to the System Manager dashboard.

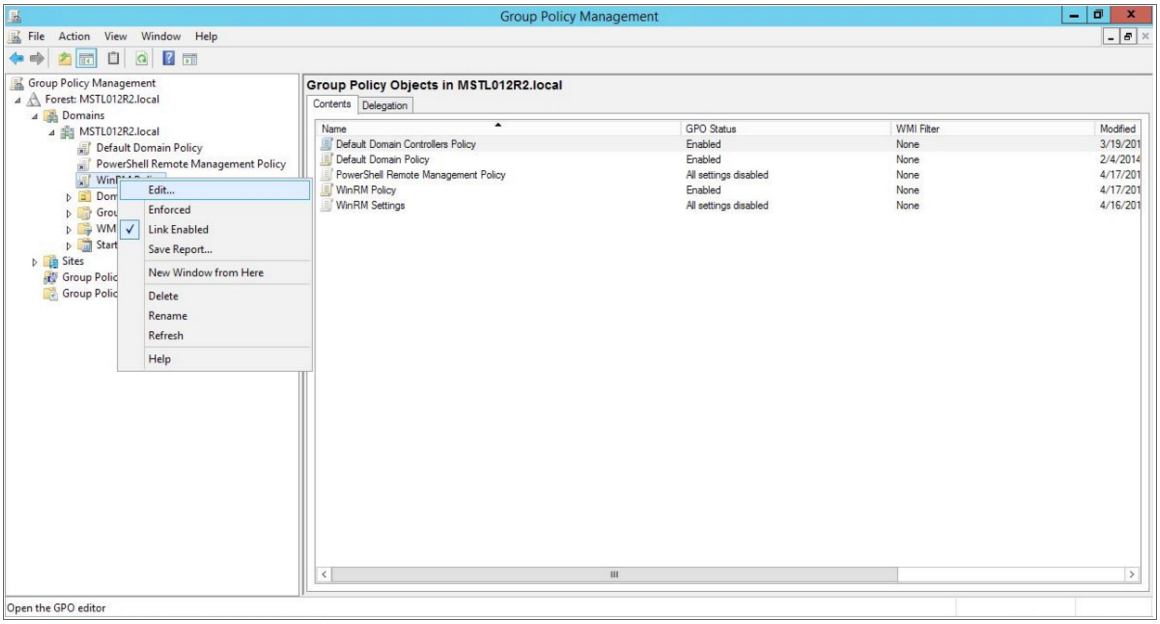
7. Click the **Tools** menu, then select *Group Policy Management*.



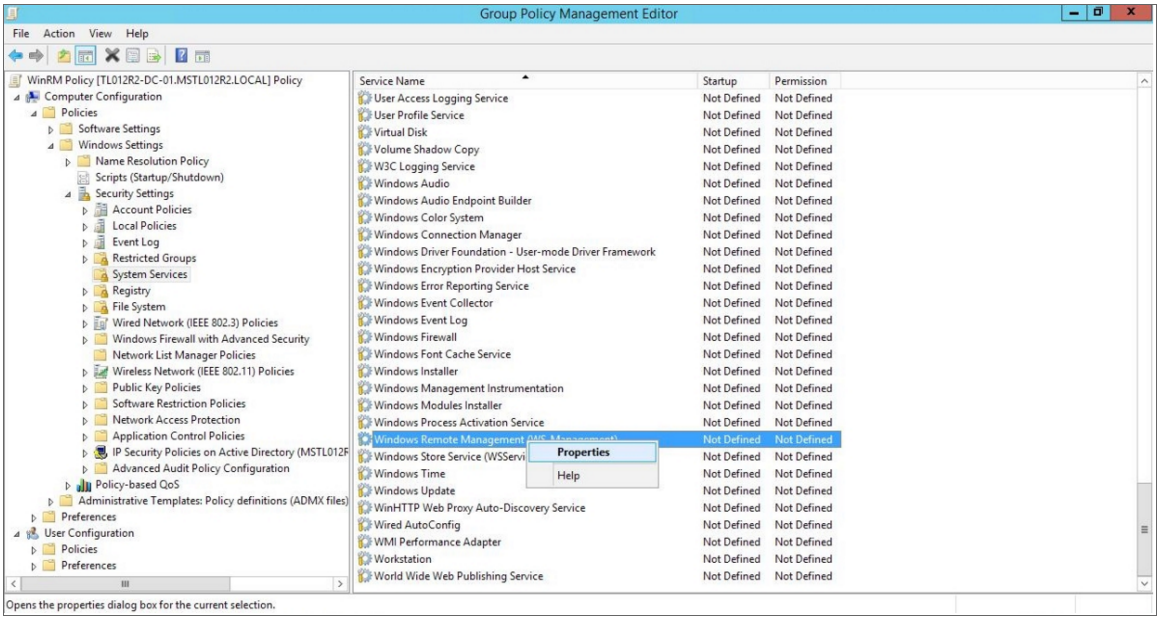
8. On the **Group Policy Management** page, in the left panel, right-click the domain name where you want the new group policy to resideand then select *Create a GPO in this domain and Link it here*.



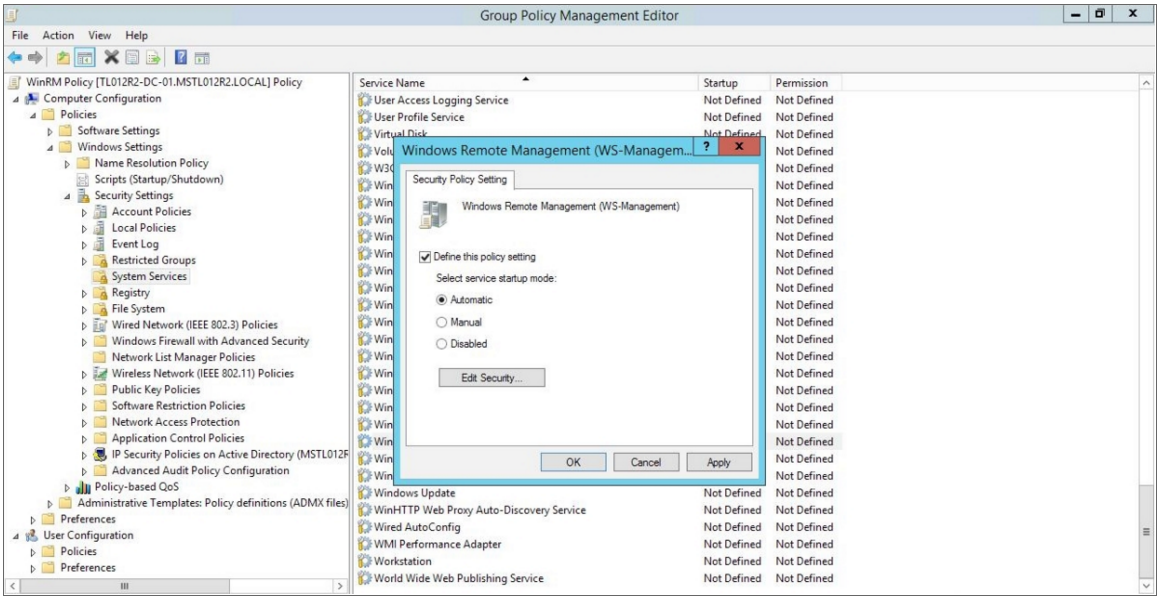
9. In the left panel, right-click the new group policy and select *Edit*. The **Group Policy Management Editor** page for the new Windows Remote Management group policy appears.



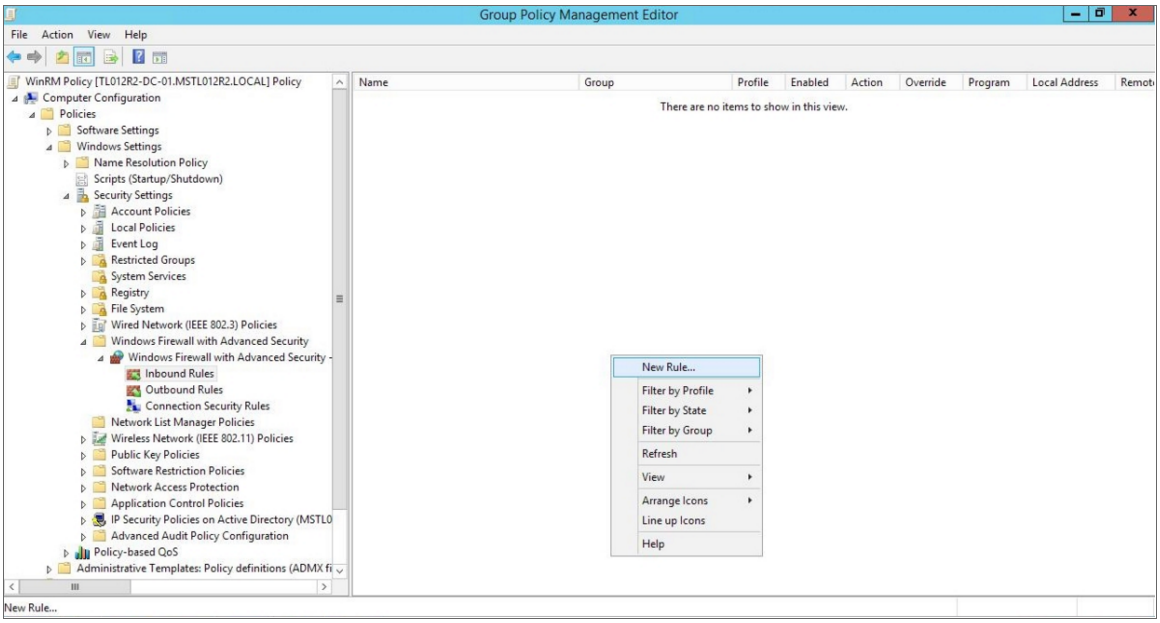
10. In the left panel, navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > System Services**. In the right panel, locate the **Windows Remote Management (WS-Management)** service. Right-click the service, then select *Properties*.



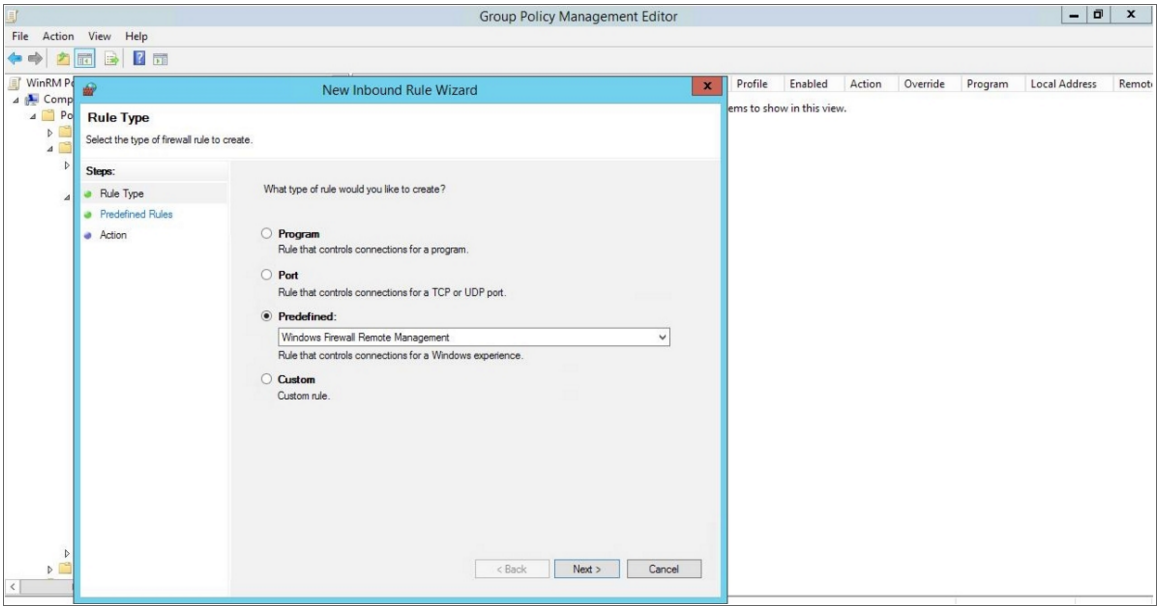
11. The **Windows Remote Management (WS-Management)** modal page appears. Select the **Define this policy setting** check box and the **Automatic** radio button, then click **[OK]**.



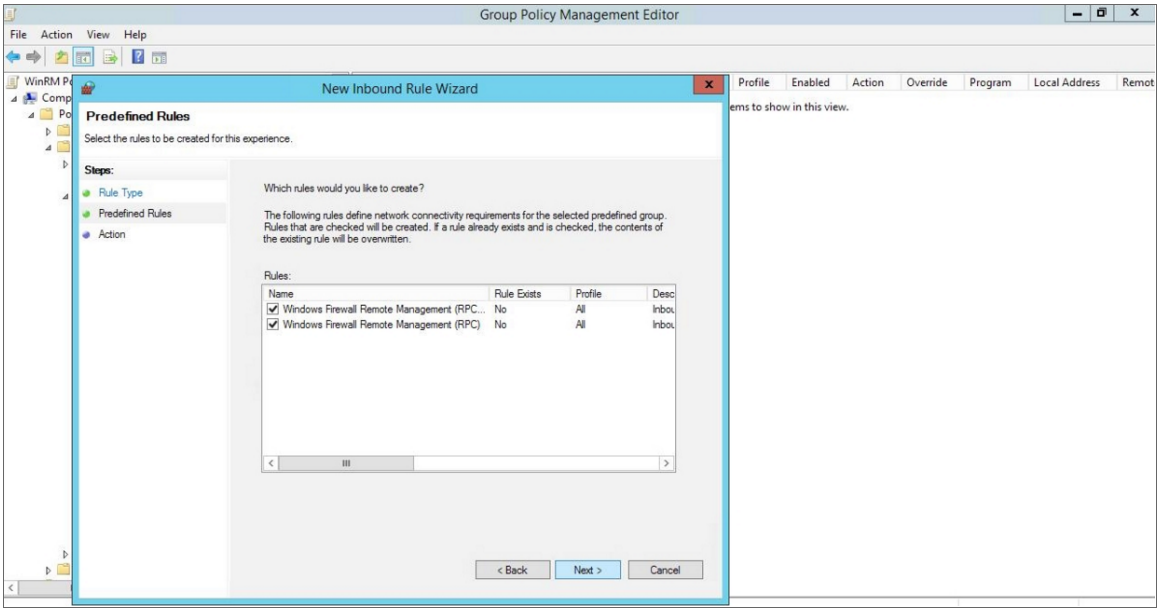
12. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > Windows Firewall with Advanced Security > Windows Firewall with Advanced Security - LDAP > Inbound Rules**. In the right panel, right-click and select *New Rule*.



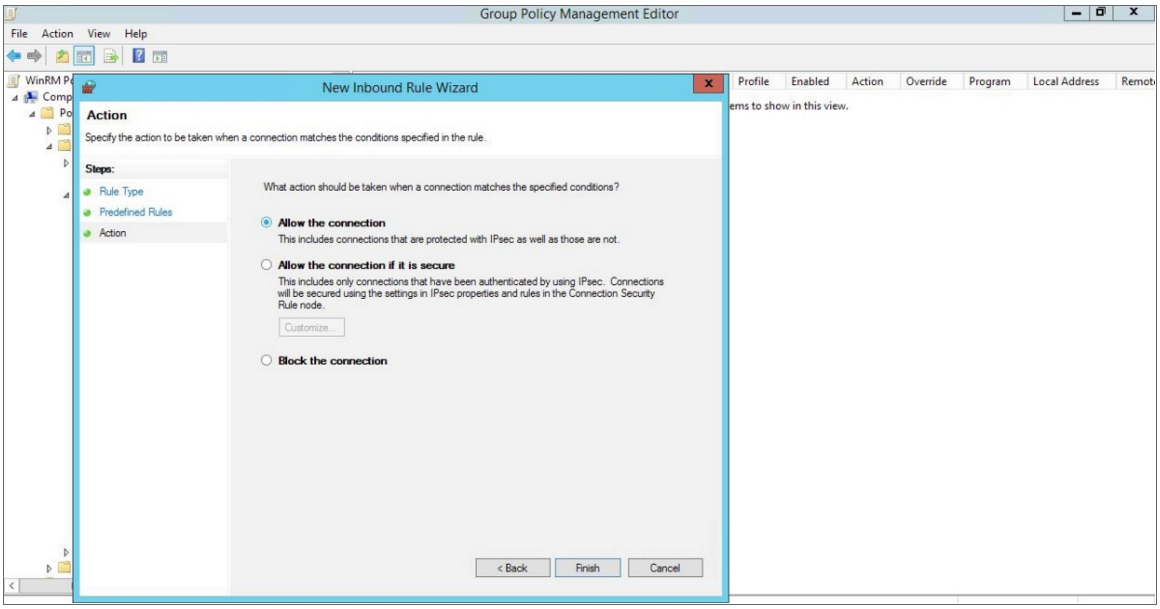
13. The **New Inbound Rule Wizard** modal page appears. Click the **Predefined** radio button, select *Windows Firewall Remote Management* from the list, and then click **[Next]**.



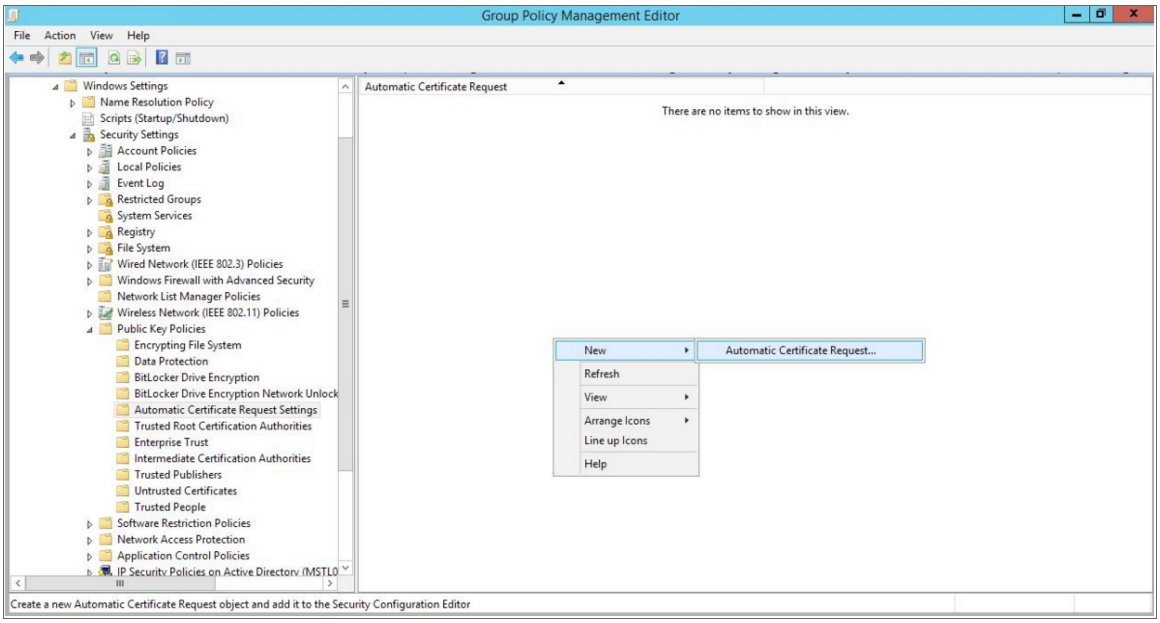
14. Select the *Windows Firewall Remote Management (RPC)* and *Windows Firewall Remote Management (RPC-EPMAP)* check boxes, then click **[Next]**.



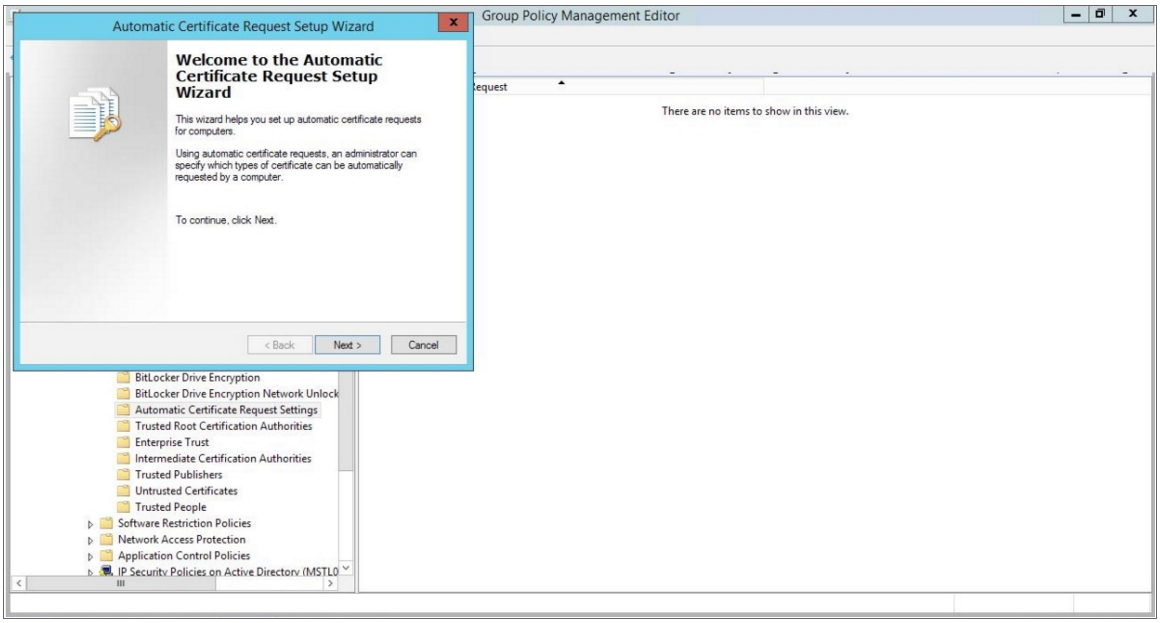
15. Select the *Allow the connection* radio button, then click **[Finish]**.



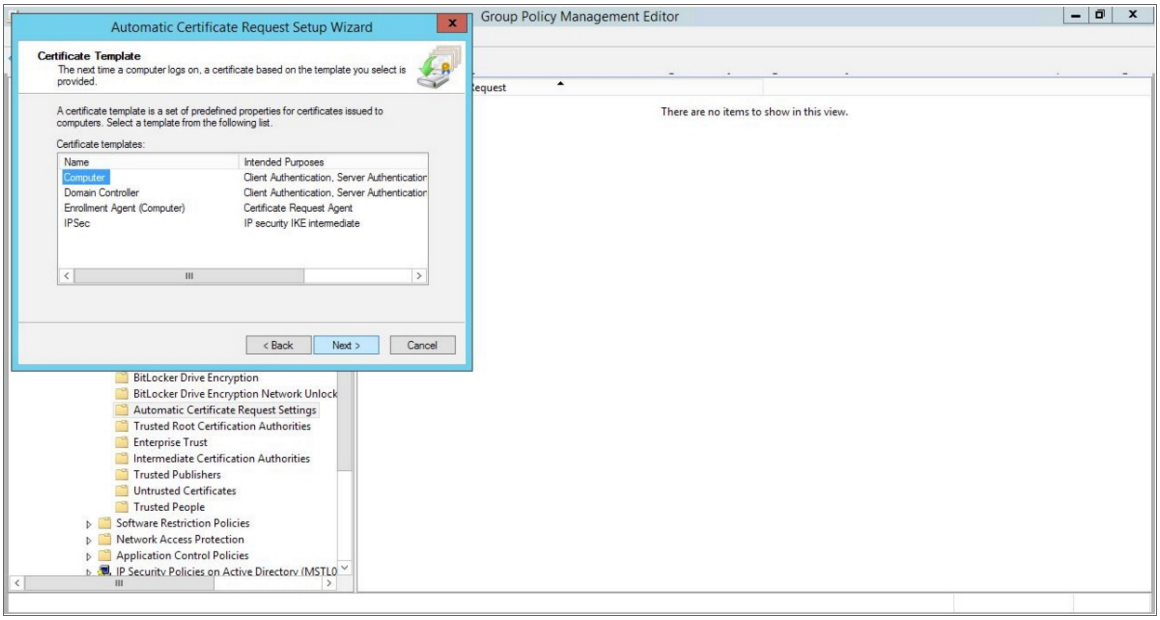
16. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies > Automatic Certificate Request Settings**. In the right panel, right-click and select *New > Automatic Certificate Request*.



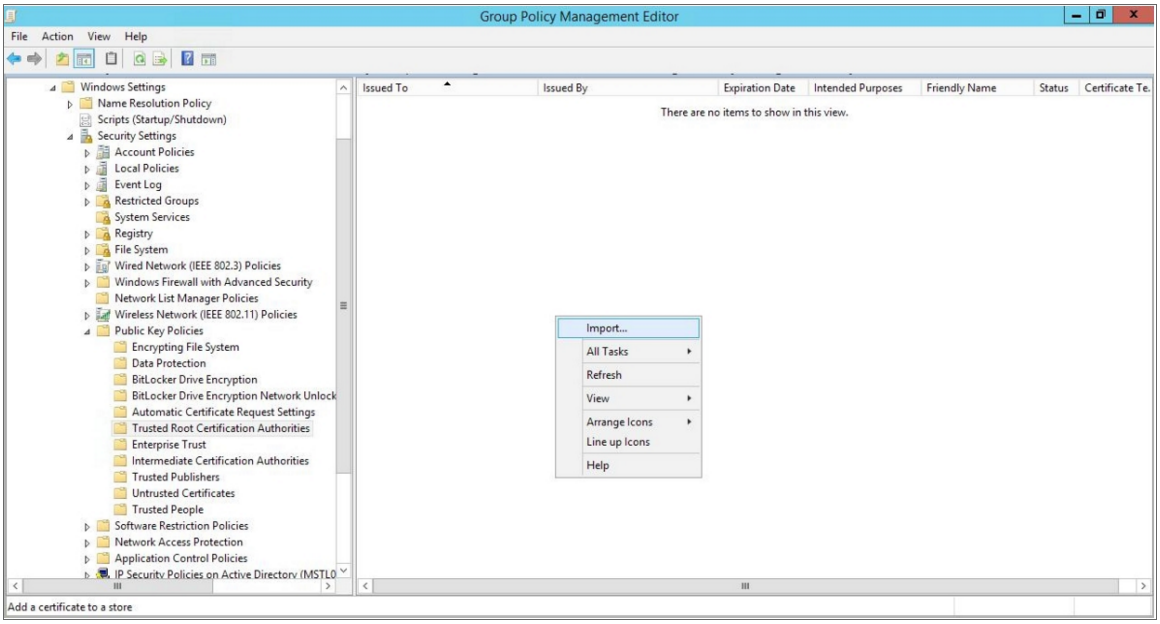
17. The **Automatic Certificate Request Setup Wizard** modal page appears. Click **[Next]**.



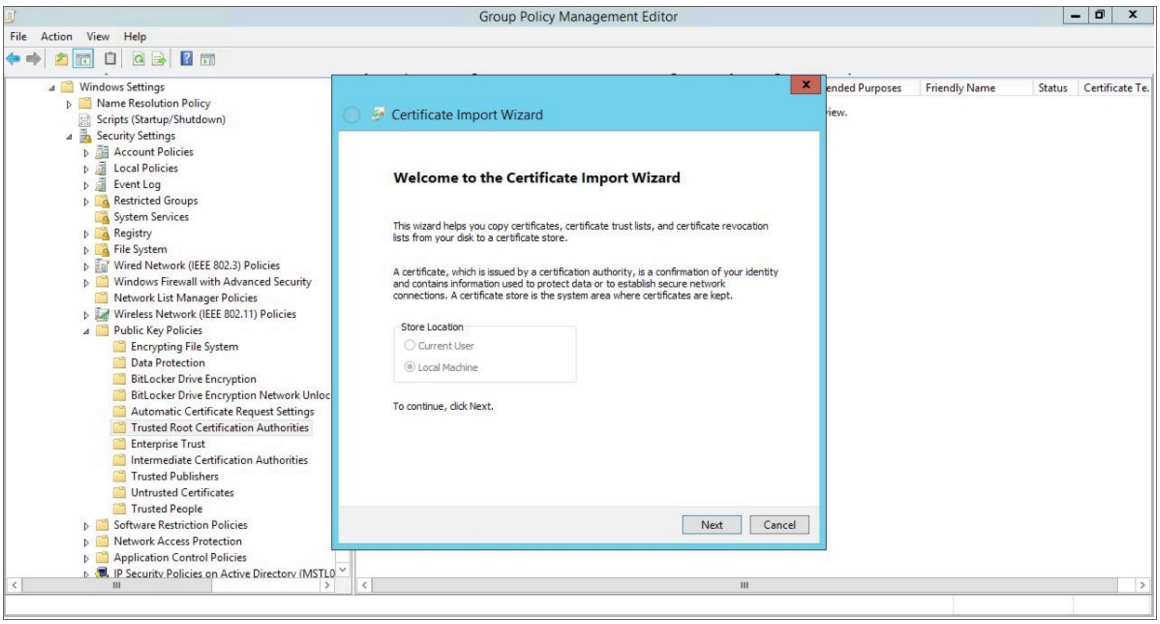
18. Select the *Computer* certificate template. Click **[Next]**, and then click **[Finish]**.



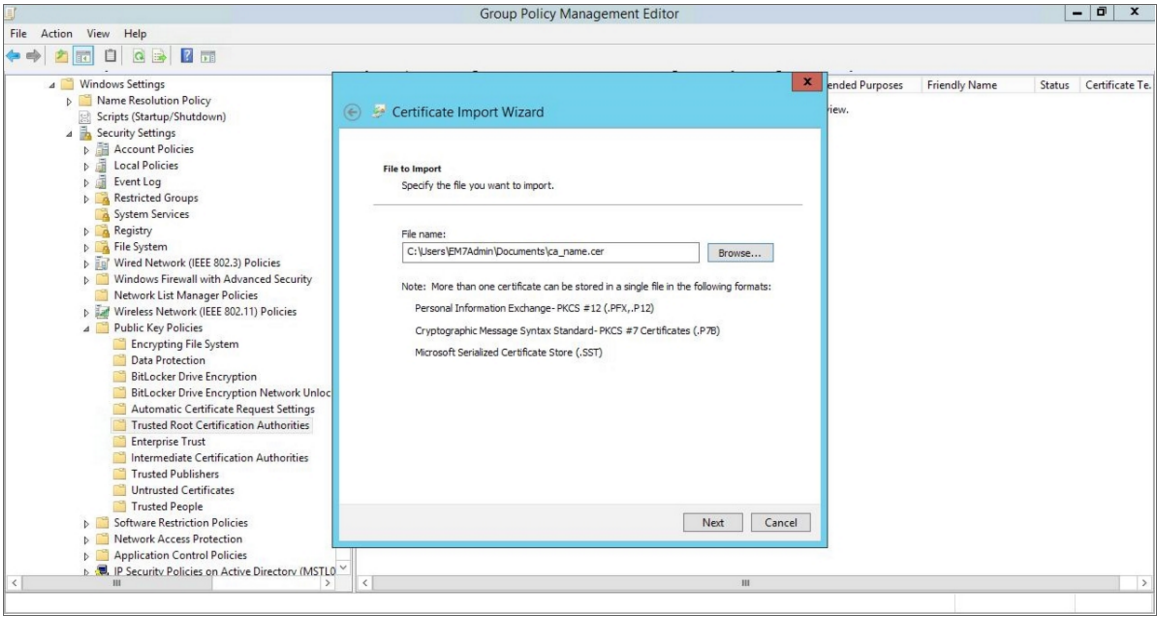
19. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Policies > Windows Settings > Security Settings > Public Key Policies > Trusted Root Certification Authorities**. In the right panel, right-click and select *Import*.



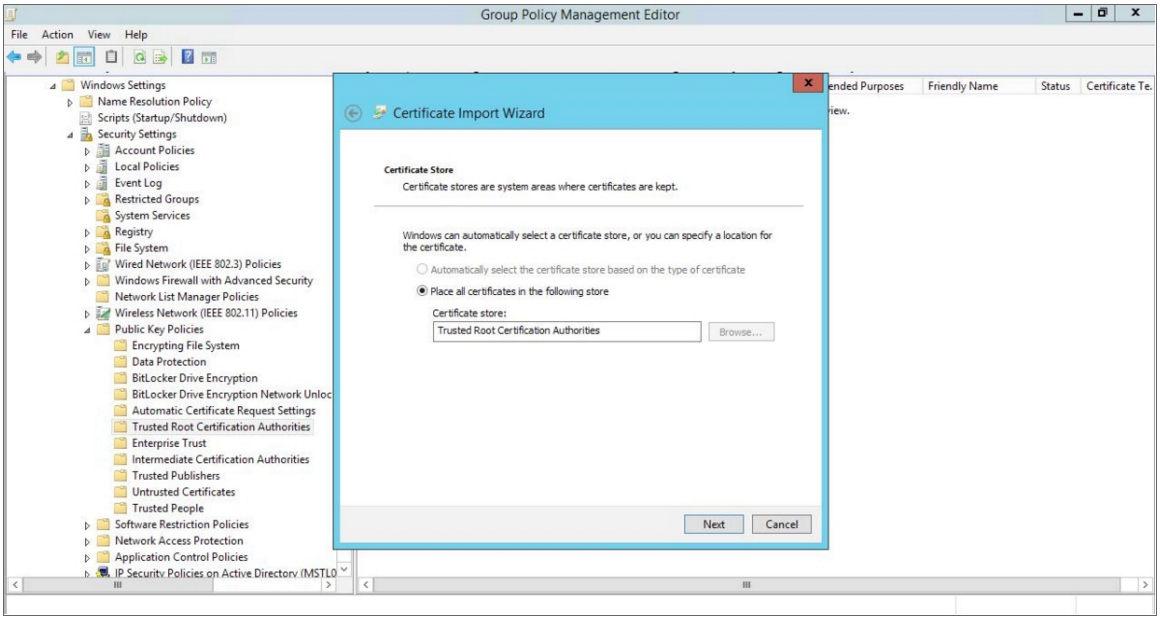
20. The **Certificate Import Wizard** modal page appears. Click **[Next]**.



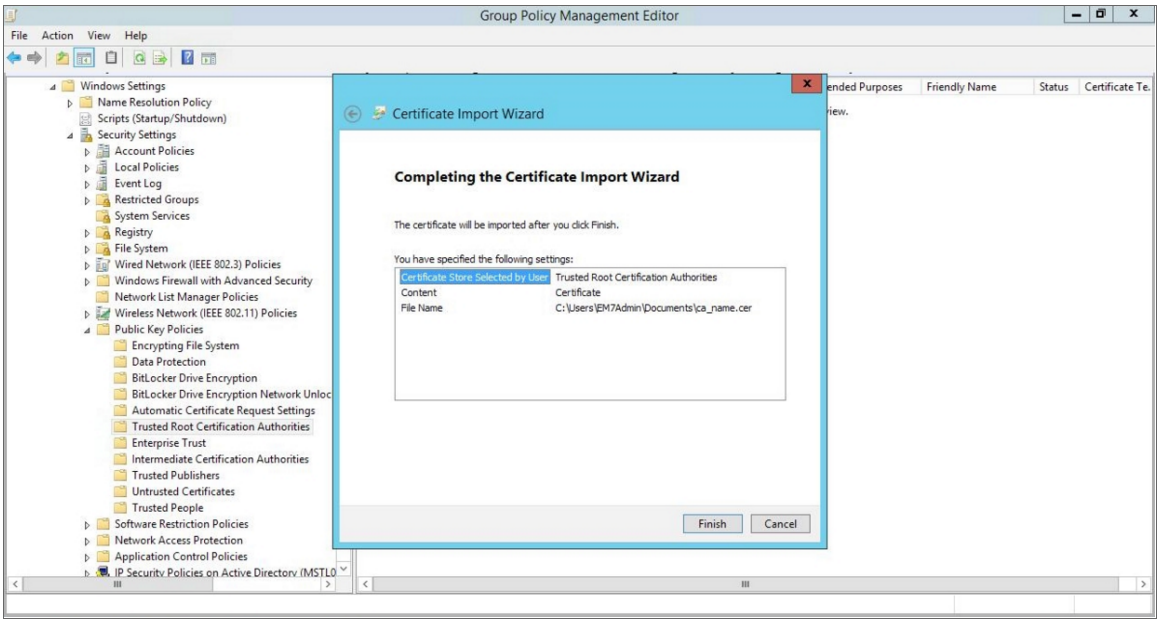
21. Browse to the Certification Authority certificate that you saved to your local directory in step 4, then click **[Next]**.



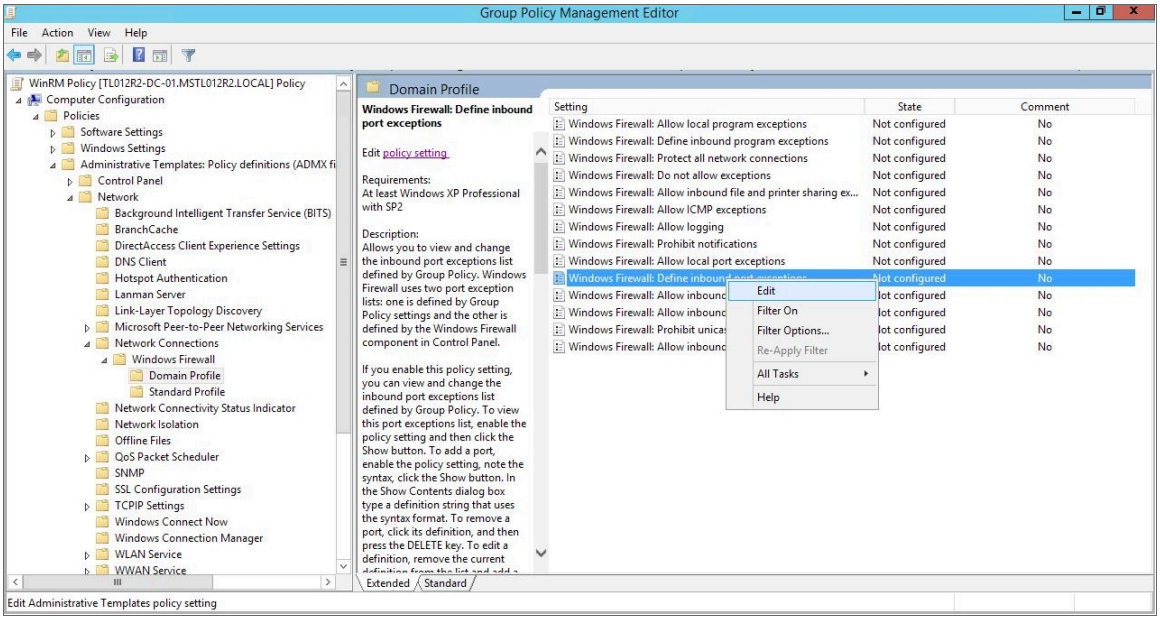
22. Select the **Place all certificates in the following store** radio button, then select the *Trusted Root Certification Authorities* certificate store and click **[Next]**.



23. Click **[OK]** to confirm that the certificate was successfully imported, and then click **[Finish]**.

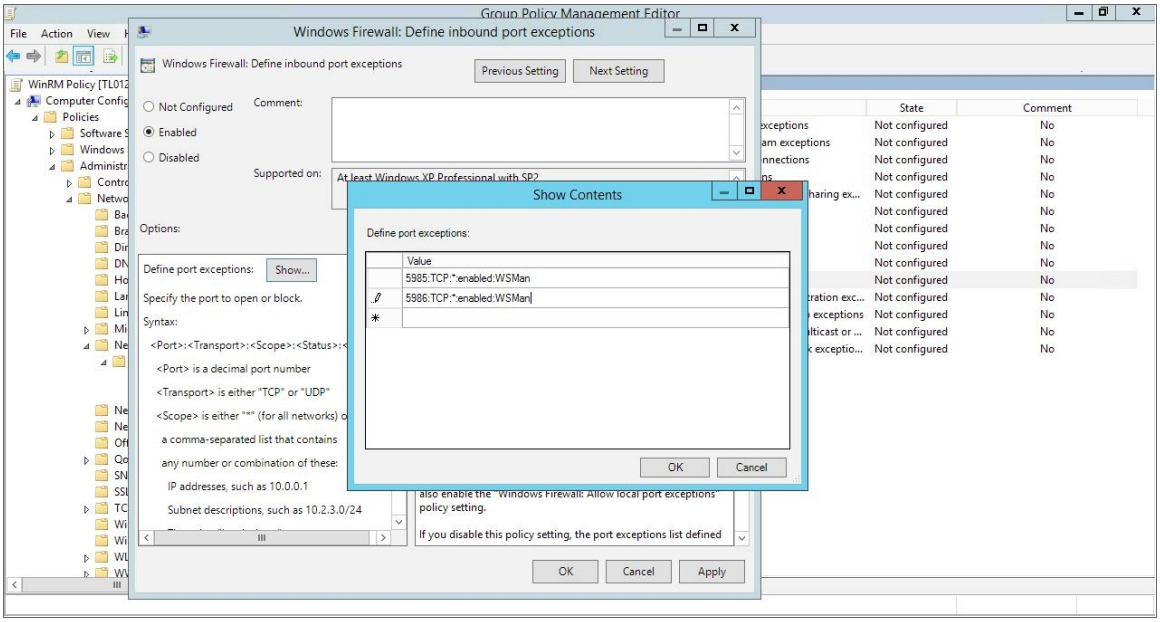


24. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Policies > Administrative Templates > Network > Network Connections > Windows Firewall > Domain Profile**. In the right panel, right-click **Windows Firewall: Define inbound port exceptions** and select *Edit*.



25. The **Windows Firewall: Define inbound port exceptions** modal page appears. Under **Options**, click **[Show]**.

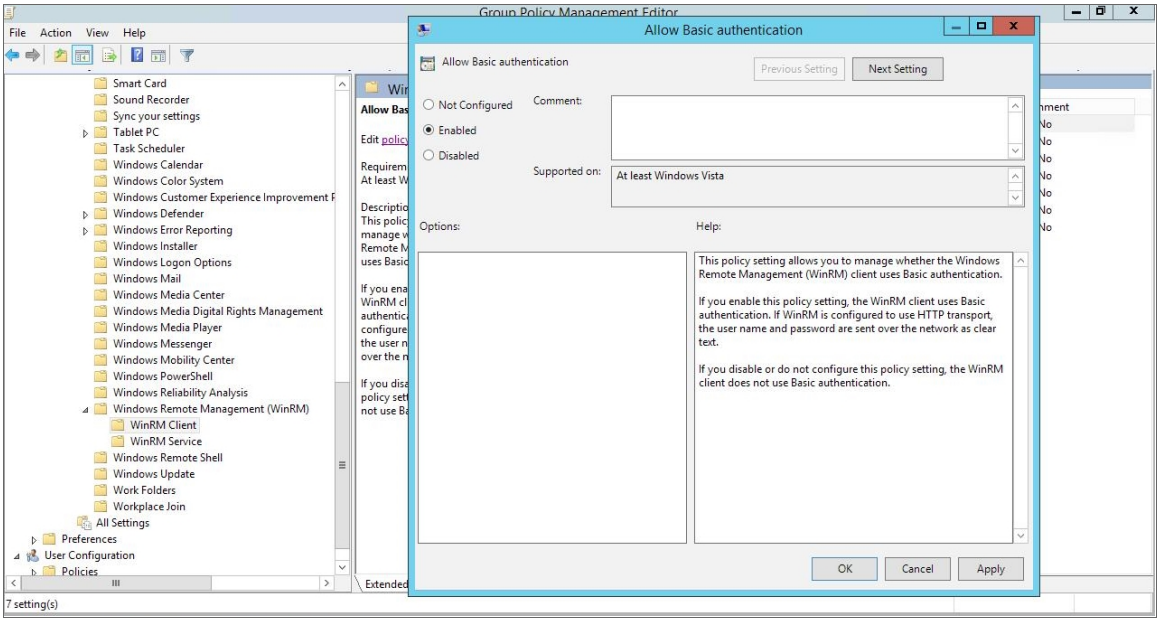
26. The **Show Contents** modal page appears. Enter the following values:



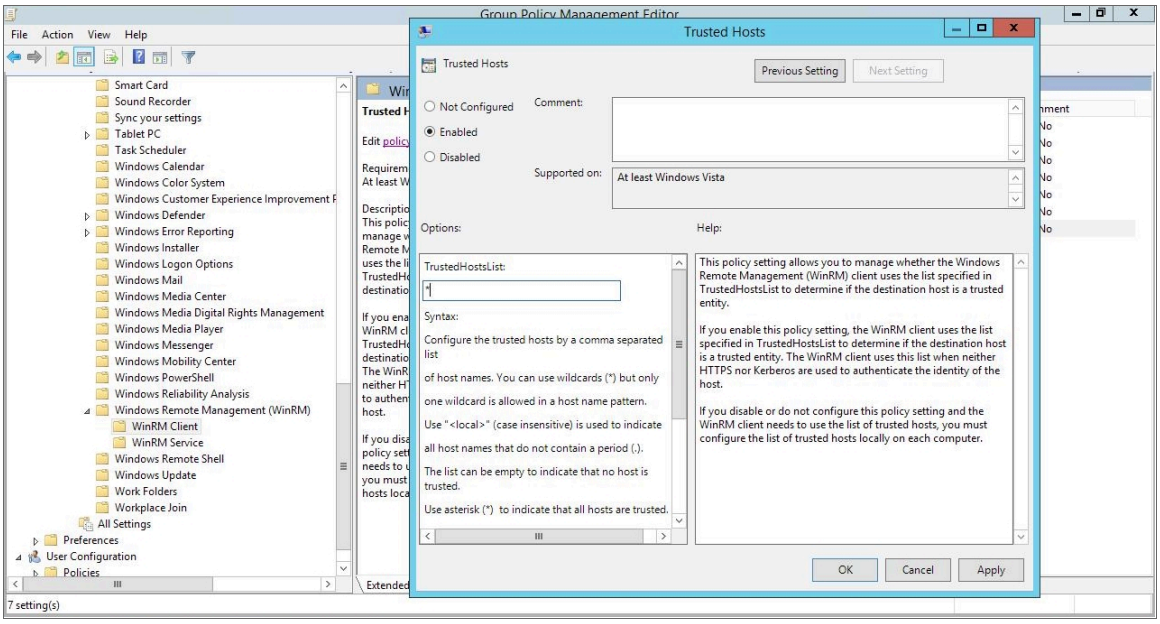
- 5985:TCP:*:enabled:WSMan
- 5986:TCP:*:enabled:WSMan

27. Click **[OK]**, then click **[OK]** again.

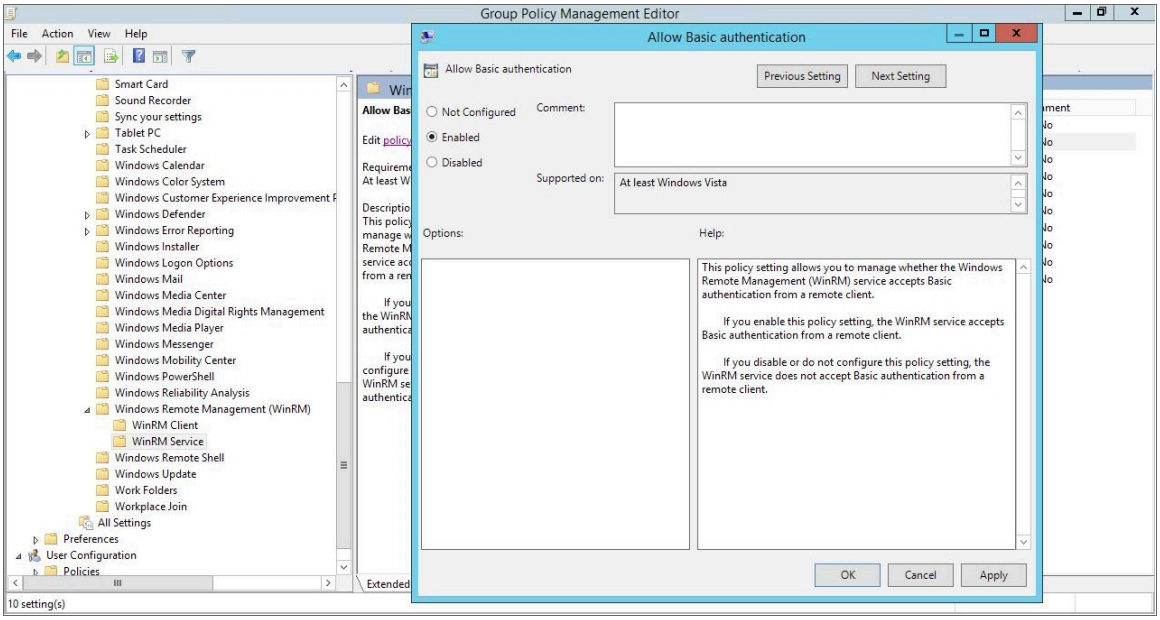
28. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Policies > Administrative Templates > Windows Components > Windows Remote Management (WinRM) > WinRM Client**. In the right panel, double-click the **Allow Basic authentication** setting.



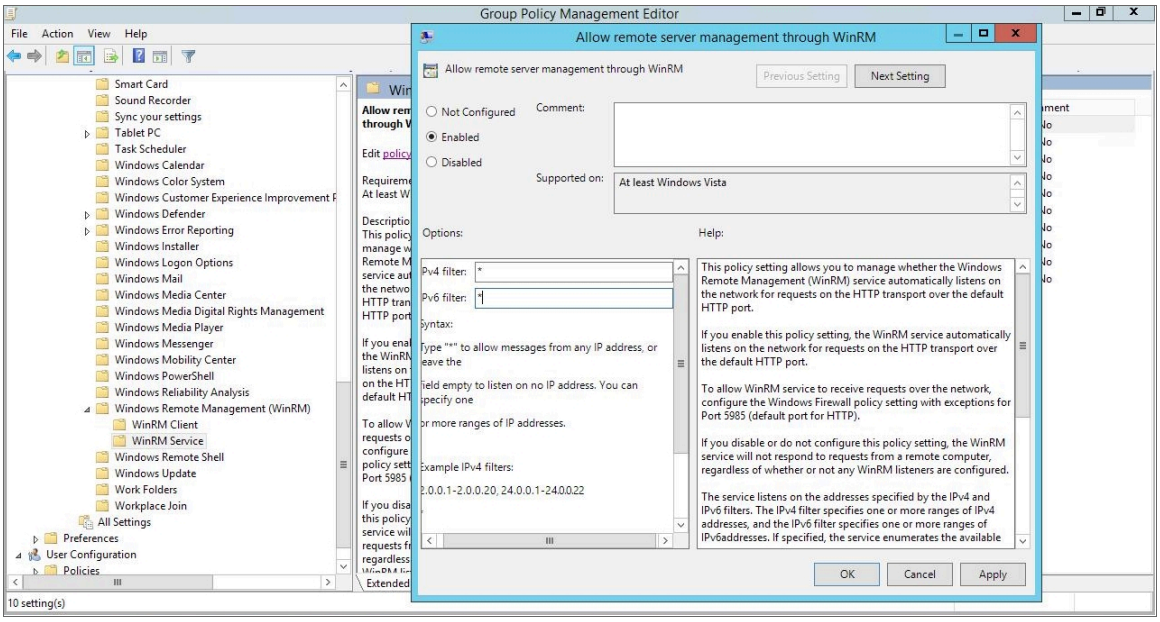
29. Select the **Enabled** radio button, then click **[OK]**.
30. Repeat steps 28 and 29 for the **Allow unencrypted traffic** setting.
31. Double-click the **Trusted Hosts** setting. Select the **Enabled** radio button, enter an asterisk (*) in the **TrustedHostsList** field (under **Options**), and then click **[OK]**.



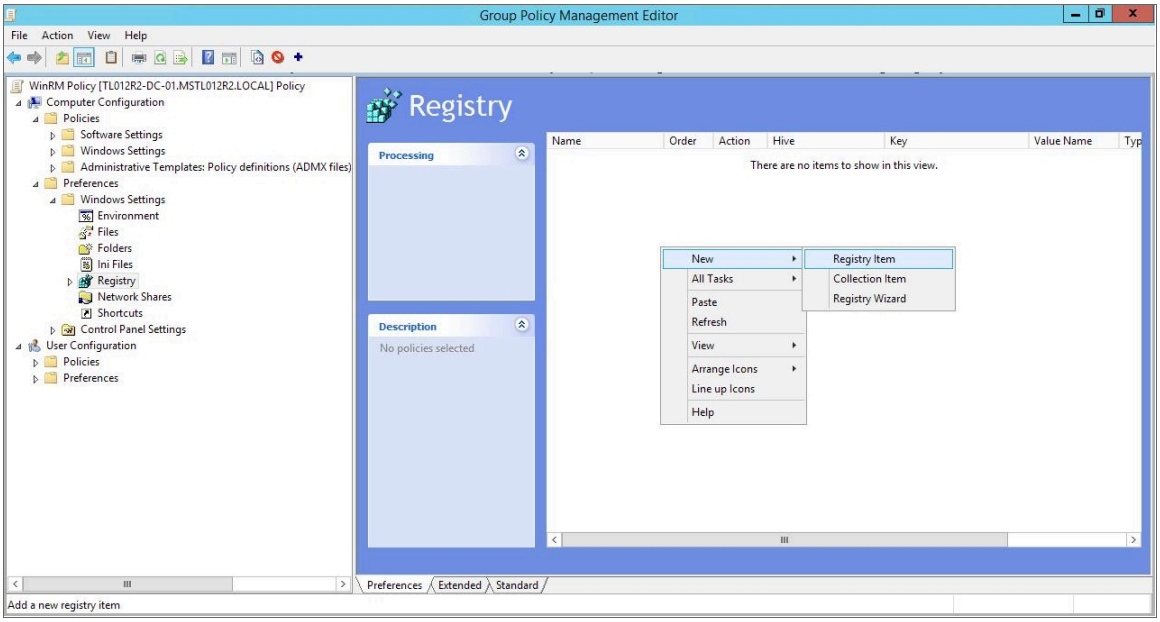
32. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Policies > Administrative Templates > Windows Components > Windows Remote Management (WinRM) > WinRM Service**. In the right panel, double-click the **Allow Basic authentication** setting.



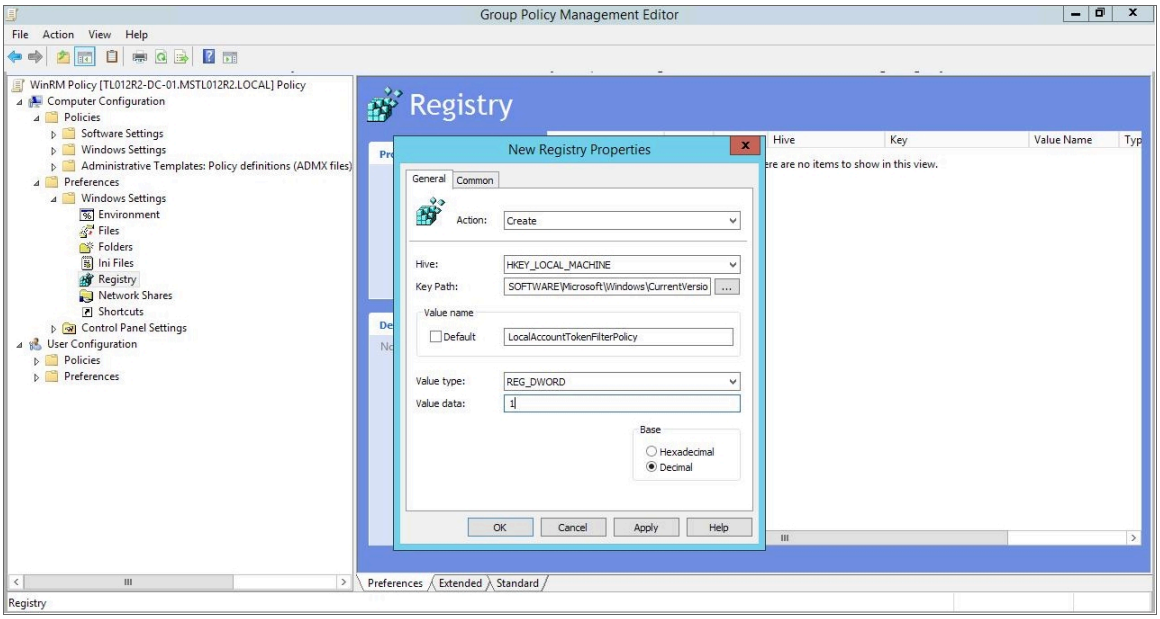
33. Select the **Enabled** radio button, then click **[OK]**.
34. Repeat steps 32 and 33 for the **Allow unencrypted traffic** setting.
35. Double-click the **Allow remote server management through WinRM** setting. Select the **Enabled** radio button, enter an asterisk (*) in the **Pv4 filter** and **Pv6 filter** fields (under **Options**), and then click **[OK]**.



36. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Preferences > Windows Settings > Registry**. In the right panel, right-click and select *New > Registry Item*.



37. In the **New Registry Properties** modal page, edit the values in one or more of the following fields:

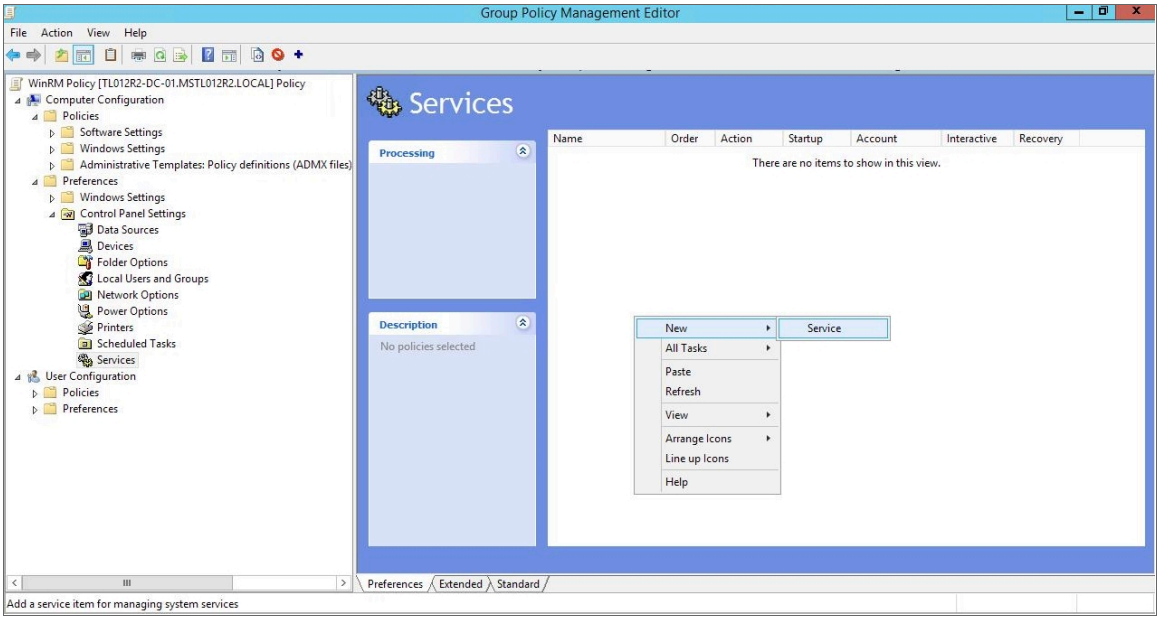


- ***Action***. Select *Create*.
- ***Hive***. Select *HKEY_LOCAL_MACHINE*.
- ***Key Path***. Enter "SOFTWARE\Microsoft\Windows\CurrentVersion\policies\system".
- ***Value name***. Enter "LocalAccountTokenFilterPolicy".
- ***Value type***. Enter "REG_DWORD".
- ***Value data***. Enter "1".
- ***Base***. Select *Decimal*.

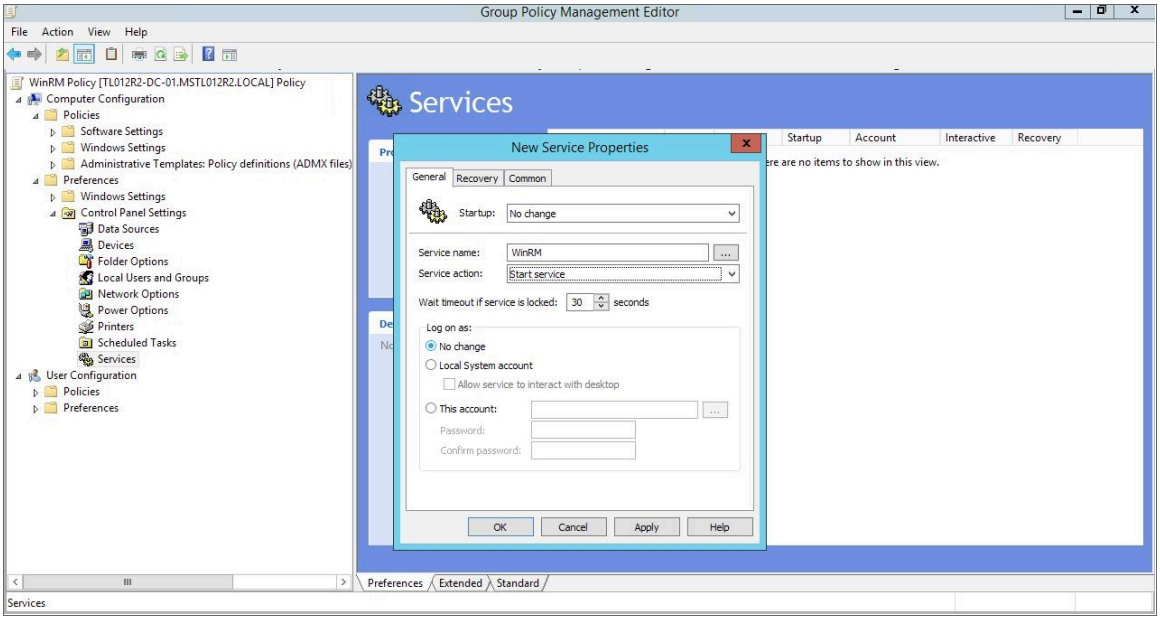
38. Click the **[OK]** button.
39. Repeat steps 36-38 to make an additional registry change to increase the maximum number of users who can access Windows Remote Management. In the **New Registry Properties** modal page, edit the following values:

- ***Action***. Select *Create*.
- ***Hive***. Select *HKEY_LOCAL_MACHINE*.
- ***Key Path***. Enter "SOFTWARE\Policies\Microsoft\Windows\WinRM\Service\".
- ***Value name***. Enter "WinRS!MaxConcurrentUsers".
- ***Value type***. Enter "REG_DWORD".
- ***Value data***. Enter "0x64 (100)".
- ***Base***. Select *Decimal*.

40. In the left panel of the **Group Policy Management Editor** page, navigate to **Computer Configuration > Preferences > Control Panel Settings > Services**. In the right panel, right-click and select *New > Service*.



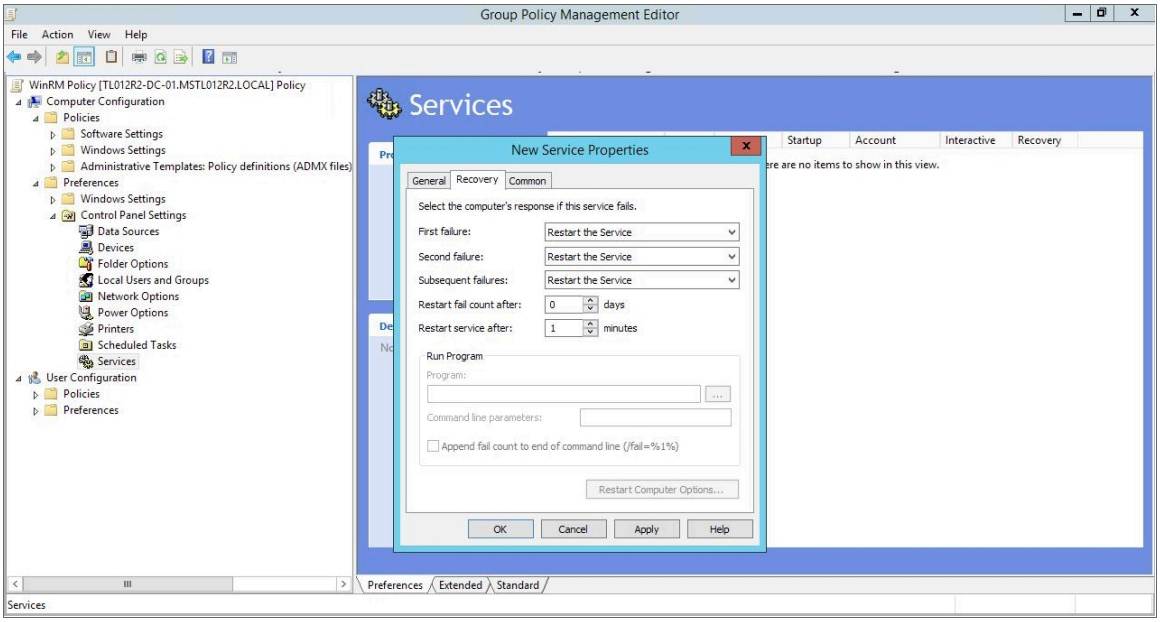
41. In the **New Service Properties** modal page, edit the values in one or more of the following fields:



- ***Startup***. Select *No change*.

- ***Service name***. Enter "WinRM".
- ***Service action***. Select *Start service*.
- ***Wait timeout if service is locked***. Select *30* seconds.
- ***Log on as***. Select *No change*.

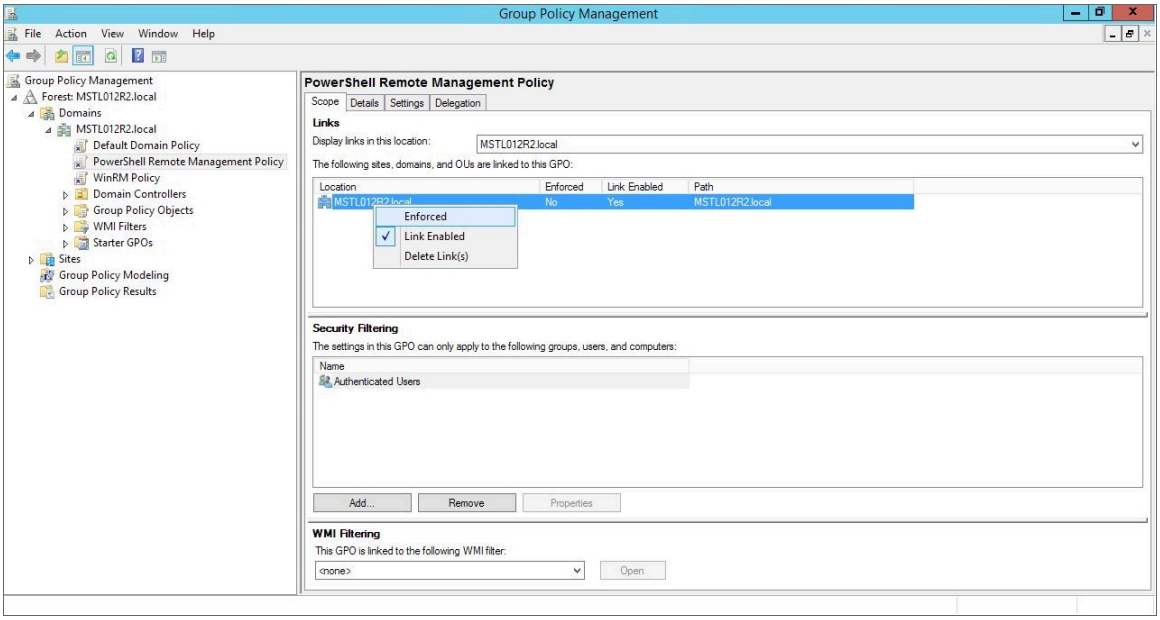
42. Click the **[Recovery]** tab, then edit the values in one or more of the following fields:



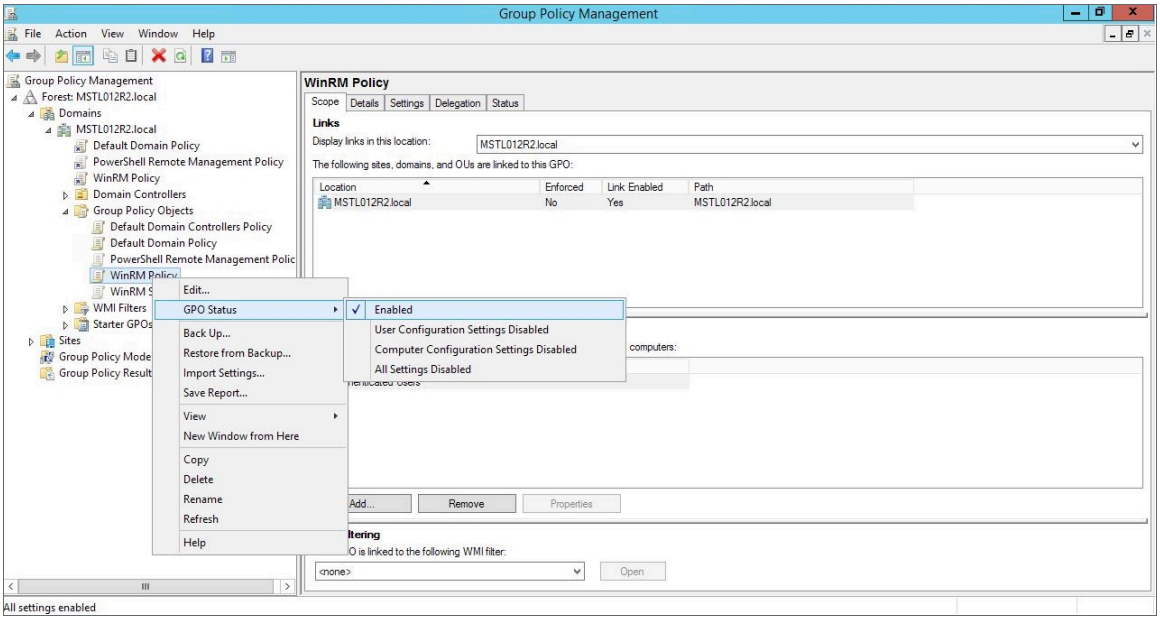
- ***First failure***. Select *Restart the Service*.
- ***Second failure***. Select *Restart the Service*.
- ***Subsequent failures***. Select *Restart the Service*.
- ***Restart fail count after***. Select *0* days.
- ***Restart service after***. Select *1* minute.

43. Click the **[OK]** button.

44. To enforce your group policy, in the left panel of the **Group Policy Management Editor** page, navigate to **Forest > Domains > [your local domain] > PowerShell Remote Management Policy**. In the **PowerShell Remote Management Policy** panel on the right, right-click the local domain name under ***The following sites, domains, and OUs are linked to this GPO*** and select *Enforced*.



45. To enable your group policy, in the left panel of the **Group Policy Management Editor** page, navigate to **Forest > Domains > [your local domain] > Group Policy Objects > WinRM Policy**. Right-click **WinRM Policy**, then select *GPO Status > Enabled*.



Step 4: (Optional) Configuring a Windows Management Proxy

If SL1 cannot execute PowerShell requests directly on a Windows server, you can optionally configure an additional Windows server to act as a proxy for those PowerShell requests. To use a proxy, you must configure at least two Windows servers:

- A target server that SL1 cannot communicate with directly.
- A proxy server that SL1 will communicate with to execute PowerShell requests on the target server.

To configure the target and proxy servers, perform the following steps:

1. Configure a user account that SL1 will use to connect to the proxy server and the proxy server will use to connect to the target server. The user account can either be a local account or an Active Directory account; however, the user account must have the same credentials on the target and proxy servers and be in the Local Administrator's group on both servers.
2. If you have created a local user account on the Windows Server instead of an Active Directory account, you must configure encrypted communication between SL1 and the Windows server. To do this, you must *configure a Server Authentication certificate*.
3. *Configure Windows Remote Management* on the target server and the proxy server.
4. Log in to the proxy server as an administrator.
5. Open the PowerShell command window.
6. Right-click on the PowerShell icon in the taskbar and select *Run as Administrator*.
7. Execute one of the following commands on the proxy server to allow the proxy server to trust one or more target servers:
   - To allow the proxy server to trust all servers (not recommended), execute the following command:

     ```
     Set-Item WSMan:\Localhost\Client\TrustedHosts -value *
     ```

   - To allow the proxy server to trust only specific target servers, execute the following command, inserting a list that includes the IP address for each target server. Separate the list of IP addresses with commas.

     ```
     Set-Item WSMan:\Localhost\Client\TrustedHosts -value <comma-delimited-list-of-target-server-IPs>
     ```

8. Execute the following command on the proxy server to configure the LocalAccountTokenFilterPolicy:

   ```
   New-ItemProperty
   “HKLM:\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\System” -Name
   “LocalAccountTokenFilterPolicy” -Value 1 -PropertyType “DWORD"
   ```

NOTE: If the proxy server is in a different Windows domain (domain A) than the target servers (domain B), and the proxy server uses a user account from Active Directory, and Active Directory is in the same Windows domain as the target servers (domain B), you must perform the following to allow the proxy server to send PowerShell commands to the target servers:

- On the domain controller for each domain (domain A and domain B), create new forward-lookup zones and reverse-lookup zones that allow name resolution to work between the two domains.
- On the domain controller for each domain (domain A and domain B), create a non-transitive realm trust between the two domains.
- Login to the proxy server and add the Active Directory account (from domain A) to the Local Administrator's group for the proxy server. You should be able to select the account on the proxy server after you create the non-transitive realm trust between the two domains.

Step 5: (Optional) Increasing the Number of PowerShell Dynamic Applications That Can Run Simultaneously

You can optionally execute a series of commands that will allow SL1 to increase the default maximum number of PowerShell Dynamic Applications that can run simultaneously.

To do so:

1. Determine the number of Dynamic Applications that will be used to monitor the Windows server. Multiply this number by three.
2. Open a PowerShell command prompt. Log in as an Administrator.
3. At the prompt, execute the following commands:

```
Set-Item WSMan:\Localhost\Shell\MaxShellsPerUser –value <number you
calculated in step 1>

Set-Item WSMan:\Localhost\Service\MaxConcurrentOperationsPerUser –value
<number you calculated in step 1>

Restart-Service WinRM
```

4. Repeat these steps on each Windows server that will be monitored by SL1.

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