

Remote Desktop Services Management Pack Guide for Operations Manager 2007

Microsoft Corporation

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# Remote Desktop Services Management Pack Guide for Operations Manager 2007

The Remote Desktop Services Management Pack helps you manage your computers that are running Remote Desktop Services on Windows Server 2008 R2 by monitoring the health of the following Remote Desktop Services role services:

 Remote Desktop Session Host: A Remote Desktop Session Host (RD Session Host) server hosts Windows–based programs or the full Windows desktop. Users can connect to an RD Session Host server to run programs, save files, and use network resources on that server.

 Remote Desktop Licensing: Remote Desktop Licensing (RD Licensing) manages the Remote Desktop Services client access licenses (RDS CALs) that are required for each device or user to connect to an RD Session Host server.

 Remote Desktop Web Access: Remote Desktop Web Access (RD Web Access) allows you to access RemoteApp programs, session-based desktops, and virtual desktop by using a Web site.

 Remote Desktop Gateway: Remote Desktop Gateway (RD Gateway) allows authorized remote users to connect to resources on an internal corporate network from any Internet-connected device that can run the Remote Desktop Connection (RDC) client.

 Remote Desktop Connection Broker: Remote Desktop Connection Broker (RD Connection Broker) supports session load balancing between RD Session Host servers in a farm, reconnection to an existing session in a load-balanced RD Session Host server farm, and connections to virtual desktops.

 Remote Desktop Virtualization Host: Remote Desktop Virtualization Host (RD Virtualization Host) integrates with the Hyper-V role to provide virtual machines that can be used as virtual desktops.

When there is problem with the availability or performance of one of these components, Microsoft System Center Operations Manager 2007 uses the Windows Server 2008 R2 Remote Desktop Services Management Pack to detect the issue and alert you so that you can diagnose the problem and fix it.

The management pack can help you identify issues before they disrupt your infrastructure, improving the availability and performance of the Windows-based servers that your business depends on.

## Document version

This guide was written based on the 6.0.6278.22 version of the Windows Server 2008 R2 Remote Desktop Services Management Pack.

## Getting the latest management pack and documentation

You can find the Windows Server 2008 R2 Remote Desktop Services Management Pack in the [System Center Operations Manager 2007 Catalog](http://go.microsoft.com/fwlink/?LinkId=82105) (http://go.microsoft.com/fwlink/?LinkId=82105).

## Supported configurations

The following table details the supported configurations for the Remote Desktop Services Management Pack:

| **Configuration** | **Support** |
| --- | --- |
| Windows Server 2008 R2 | All editions |

# Getting Started

This section describes the actions you should take before you import the management pack, any steps you should take after you import the management pack, and information about customizations.

## Before you import the management pack

For the Remote Desktop Services Management Pack to function optimally, your computers must meet the following requirements:

 Each RD Session Host server must be managed by Operations Manager 2007.

 Each Remote Desktop license server must be managed by Operations Manager 2007.

 Each RD Connection Broker server must be managed by Operations Manager 2007.

 Each RD Web Access server must be managed by Operations Manager 2007.

 Each RD Gateway server must be managed by Operations Manager 2007.

 Each RD Virtualization Host server must be managed by Operations Manager 2007.

 The Windows Server Base Operating System Management Pack must be installed on the computer running Operations Manager 2007.

## Files in this management pack

To monitor Remote Desktop Services, you must first download the Remote Desktop Services Management Pack from the [Management Pack Catalog](http://go.microsoft.com/fwlink/?LinkId=82105) (http://go.microsoft.com/fwlink/?LinkId=82105).

The Remote Desktop Services Management Pack includes the following files:

| **File Name** | **Description** |
| --- | --- |
| Microsoft.Windows.Server.RemoteDesktopServices.2008R2.mp | Required for monitoring computers running Remote Desktop Services. |
| Microsoft.Windows.Server.RemoteDesktopServices.Library.mp | Required for discovering objects, monitoring objects, and viewing information. |
| EULA.RTF | End User License Agreement. |

## How to import the Remote Desktop Services Management Pack

For instructions about importing a management pack, see [How to Import a Management Pack in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkID=98348) (http://go.microsoft.com/fwlink/?LinkID=98348).

After the Remote Desktop Services Management Pack is imported, create a new management pack in which you store overrides and other customizations.

## Create a new management pack for customizations

Most vendor management packs are sealed so that you cannot change any of the original settings in the management pack file. However, you can create customizations, such as overrides or new monitoring objects, and save them to a different management pack. By default, Operations Manager 2007 saves all customizations to the Default Management Pack. As a best practice, you should instead create a separate management pack for each sealed management pack you want to customize.

Creating a new management pack for storing overrides has the following advantages:

 It simplifies the process of exporting customizations that were created in your test and pre-production environments to your production environment. For example, instead of exporting a Default Management Pack that contains customizations from multiple management packs, you can export just the management pack that contains customizations of a single management pack.

 You can delete the original management pack without first needing to delete the Default Management Pack. A management pack that contains customizations is dependent on the original management pack. This dependency requires you to delete the management pack with customizations before you can delete the original management pack. If all of your customizations are saved to the Default Management Pack, you must delete the Default Management Pack before you can delete an original management pack.

 It is easier to track and update customizations to individual management packs.

For more information about sealed and unsealed management packs, see [Management Pack Formats](http://go.microsoft.com/fwlink/?LinkId=108355) (http://go.microsoft.com/fwlink/?LinkId=108355). For more information about management pack customizations and the default management pack, see [About Management Packs in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkId=108356) (http://go.microsoft.com/fwlink/?LinkId=108356).

# Optional Configuration

You can configure the Remote Desktop Services Management Pack for your environment and your preferences.

The following table lists optional configurations for the Remote Desktop Services Management Pack and specifies where you can find more information about each option.

| **Configuration option** | **Additional information** |
| --- | --- |
| Change the default settings by overriding rules. | See [How to Monitor Using Overrides in Operations Manager 2007](http://technet.microsoft.com/en-us/library/bb309719.aspx) on Microsoft TechNet (http://technet.microsoft.com/en-us/library/bb309719.aspx) |
| Turn on rules that collect performance data. | See [Turn on rules to collect performance data](#z1) |

## Turn on rules to collect performance data

The Remote Desktop Services Management Pack is installed with most of the rules that collect performance data disabled by default. To collect performance data, you can use overrides to turn on the performance rules that you want.

Note

Turning on performance rules increases network traffic and might degrade performance on servers with slow connections.

To collect performance data

|  |
| --- |
| 1. In the Operations Console, click Authoring.2. Expand Management Pack Objects, and then click Rules.Note To only show rules for the Windows Server 2008 R2 Remote Desktop Services Management Pack, click Scope, and select the check boxes for the Remote Desktop Services components.3. Right-click the performance-measuring rule that you want, point to Overrides, point to Override the Rule, and then click For all objects of type: <type of object>.4. In the Override column, select the Enabled check box.5. In the Override Setting column, click True, and then click OK. |

# Security Considerations

You may need to customize your management pack. Certain accounts cannot be run in a low-privilege environment or must have minimum permissions.

## Low-privilege environments

The Remote Desktop Services Management Pack uses the agent action account to perform discovery and to run rules, tasks, and monitors. The agent action account can run as Local System or as a named account. When running as Local System, the agent action account has all the privileges needed to discover objects and to run rules, tasks, and monitors.

To use the Remote Desktop Services Management Pack in a low-privilege environment, the account must have the following privileges on the target computer:

 Must be a member of the local users group

 Must be a member of the local Performance Monitor users group

 Must be granted the Log On Locally user right

## Computer groups

You can delegate authority to a precise level with user roles. For more information about user roles, see [Role-based Security in Operations Manager 2007](http://technet.microsoft.com/en-us/library/bb735424.aspx) on Microsoft TechNet (http://technet.microsoft.com/en-us/library/bb735424.aspx).

In the Remote Desktop Services Management Pack, you can scope and authorize roles by using the Remote Desktop Services Computer Group, which is a group that contains all computers running Remote Desktop Services.

## Agentless monitoring

You can use the Remote Desktop Services Management Pack to monitor agentless-managed computers. However, to run a task on an agentless-managed computer, you must change the action account to an account that has access to the target computer.

# Understanding Management Pack Operations

This section describes the objects that the Remote Desktop Services Management Pack discovers, how health rolls up, console views that display monitoring and performance information related to Remote Desktop Services, and key monitoring scenarios.

## Objects the Remote Desktop Services Management Pack discovers

The Remote Desktop Services Management Pack discovers the object types described in the following list. For information about discovering objects, see [Object Discoveries in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkId=108505) on Microsoft TechNet (http://go.microsoft.com/fwlink/?LinkId=108505).

Note

Not all the objects are automatically discovered. To discover those that are not automatically discovered, you must use overrides.

The Remote Desktop Services Management Pack discovers the following objects:

 RD Session Host server

 Remote Desktop license server

 RD Gateway server

 RD Connection Broker server

 RD Web Access server

 RD Virtualization Host server

## Classes

The following table describes the classes defined in this management pack.

| **Available classes** | **Description** |
| --- | --- |
| Microsoft.Windows.Server.2008R2.RemoteDesktopServicesRole | Computer group containing all computers running Remote Desktop Services |
| Microsoft.Windows.Server.2008R2.RemoteDesktopServicesRole.Service | Computer group containing computers running at least one Remote Desktop Services role service |
| Microsoft.Windows.Server.2008R2.RDSessionHost | Computer group containing computers running the Remote Desktop Session Host role service |
| Microsoft.Windows.Server.2008R2.RDLicensing | Computer group containing computers running the Remote Desktop Licensing role service |
| Microsoft.Windows.Server.2008R2.RDConnectionBrokerRole | Computer group containing computers running the Remote Desktop Connection Broker role service |
| Microsoft.Windows.Server.2008R2.RDGateway | Computer group containing computers running the Remote Desktop Gateway role service |
| Microsoft.Windows.Server.2008R2.RDWebAccess | Computer group containing computers running the Remote Desktop Web Access role service |
| Microsoft.Windows.Server.2008R2.RDVirtualizationHost | Computer group containing computers running the Remote Desktop Virtualization Host role service |

## How health rolls up

The Remote Desktop Services Management Pack views Remote Desktop Services as a hierarchy. The health of each level depends on the health of the level below it. The top level contains the following: RD Session Host role service, RD Virtualization Host role service, RD Gateway role service, RD Licensing role service, RD Connection Broker role service, and RD Web Access role service. The lowest level monitors for a server's service states, events, and counters. When a number of these monitors changes state, the level above changes state to match; in other words, the health of the lower level rolls up to the level above it.

For example, the state of the RD Session Host server's performance monitors rolls up to the RD Session Host server's overall performance state. In the meantime, the state of the RD Session Host server’s health monitors rolls up to the RD Session Host server's overall availability state. The performance state and the availability state then roll up to set the overall state of the RD Session Host server.

The Remote Desktop Services Computer Role is the highest-level object in the health hierarchy and is hosted as a computer role of the computer object. Below the Remote Desktop Services Computer Role, one or more role service classes exist depending on which of the various role services have been added to the server with the Remote Desktop Services role installed. Each of these role services has its own state that is driven by various monitors, and the state of all these role services is reflected back to the Remote Desktop Services Computer Role.

A diagram illustrating how health rolls up is shown below.



## Viewing information in the Operations Manager Console

After your Remote Desktop Services Management Pack has had time to gather some data, you begin to see monitoring information in the Operations Manager Console. The Microsoft Windows Remote Desktop Services folder contains views that present information about the state, health, and performance of Remote Desktop Services.

### Views

The Remote Desktop Services Management Pack includes a variety of views that you can use to check the status or performance of your features and services. The Remote Desktop Services Management Pack provides the default views described in the tables in the following sections.

#### Overall

| **View name** | **Description** |
| --- | --- |
| Active Alerts | Displays active alerts from all Remote Desktop Services features |
| Remote Desktop Services (2008 R2) State | Displays state and attributes for your Remote Desktop Services computers |

#### Health monitoring

| **View name** | **Description** |
| --- | --- |
| Remote Desktop Licensing Service Health | A dashboard view that displays the state of, and the alerts for, the Remote Desktop Licensing service |
| Remote Desktop Connection Broker Service Health | A dashboard view that displays the state of, and the alerts for, the Remote Desktop Connection Broker service |
| Remote Desktop Services Service Health | A dashboard view that displays the state of, and the alerts for, the Remote Desktop Services service |
| Remote Desktop Virtualization Host Agent Service Health | A dashboard view that displays the state of, and the alerts for, the Remote Desktop Virtualization Host Agent service |
| Remote Desktop Web Access Server Health | A dashboard view that displays the state of, and the alerts for, the Remote Desktop Web Access server |
| Remote Desktop Gateway Service Health | A dashboard view that displays the state of, and the alerts for, the Remote Desktop Gateway service |

#### Performance

| **View name** | **Description** |
| --- | --- |
| RD Session Host Session Statistics | A dashboard view that displays performance data for active Remote Desktop sessions and total Remote Desktop sessions |
| RD Gateway Session Statistics | A dashboard view that displays performance data for RD Gateway |
| RD Virtualization Host Session Statistics | A dashboard view that displays performance data for RD Virtualization Host |

#### Performance – Windows Server

| **View name** | **Description** |
| --- | --- |
| Disk Capacity | A dashboard view that displays free space as a percentage and in MegabytesNote To use this view, the Windows Server Operating System Management Pack must be installed. |
| Disk Performance | A dashboard view that displays, in seconds, average disk read performance and average disk queue lengthNote To use this view, the Windows Server Operating System Management Pack must be installed. |
| Disk Utilization | A dashboard view that displays, in seconds, the performance of disk bytes and disk readsNote To use this view, the Windows Server Operating System Management Pack must be installed. |
| Memory Utilization (Page File) | A dashboard view that displays the percent usage of the paging file and memory page writes per secondNote To use this view, the Windows Server Operating System Management Pack must be installed. |
| Memory Utilization (Physical) | A dashboard view that displays performance data related to using physical memoryNote To use this view, the Windows Server Operating System Management Pack must be installed. |
| Network Adapter Utilization | A dashboard view that displays, in seconds, the bytes received through the network interface and the network interface's total bytesNote To use this view, the Windows Server Operating System Management Pack must be installed. |
| Processor Performance | A dashboard view that displays performance data on processor time and processor queue lengthNote To use this view, the Windows Server Operating System Management Pack must be installed. |

## Key monitoring scenarios

The Remote Desktop Services Management Pack monitors the availability and performance of the following servers: the RD Session Host server, the Remote Desktop license server, the RD Connection Broker server, the RD Web Access server, the RD Gateway server, and the RD Virtualization Host server. The following table describes the key monitoring scenarios:

| **Scenario** | **Description** |
| --- | --- |
| RD Session Host server performance | Checks the status of the RD Session Host server by using three key performance monitors that are enabled by default: the number of active sessions, the number of inactive sessions, and the total processor time per session.When the number of active sessions approaches the performance limit of the computer's hardware, the monitor changes to a critical health state and alerts you.When a number of inactive sessions exceeds the idle session limit field of either the Remote Desktop Services node in Group Policy or the Remote Desktop Session Host Configuration console, the monitor changes to a critical state and alerts you.When the total processing time per session exceeds 80 percent of the CPU's total capacity for 15 minutes, the monitor changes to a critical state and alerts you. |
| RD Session Host server monitoring | Ensures that the Remote Desktop Services service is running, and tests for connectivity to the Remote Desktop license server and the RD Connection Broker server. It also monitors the number of open sessions and disconnected sessions. |
| Remote Desktop license server monitoring | Ensures that the Remote Desktop Licensing service is running, and that Remote Desktop Services client access licenses (RDS CALs) are installed and available on the Remote Desktop license server. The Remote Desktop Licensing database file is restored when there is a modification to the old database file. |
| RD Gateway server monitoring | Ensures that the Remote Desktop Gateway service is running, and checks that it is able to connect to the RD Session Host server. Monitors the number of current connections. |
| RD Connection Broker server monitoring | Ensures that the Remote Desktop Connection Broker service is running. Monitors the availability and configuration of the RD Web Access role service. |
| RD Web Access server monitoring | Ensures that the RD Web Access server is running. Monitors connectivity between the RD Session Host server and the RD Web Access server. |

### Get information about a monitor

By viewing a monitor's product knowledge, you can get information about a monitor and read potential solutions for the problem that it detects.

To view product knowledge for a monitor

|  |
| --- |
| 1. In the Operations console, click Authoring.2. In the navigation pane, expand Management Pack Objects, and then click Monitors.3. In the list of monitors, expand the target that you want until the monitor appears.Note To search for a monitor, in the Look for box, type the name of a monitor or words that its name might contain, and then click Find Now.4. Right-click the monitor that you want, click Properties, and then click the Product Knowledge tab. |

## Placing monitored objects in maintenance mode

When a monitored object, such as a computer or distributed application, goes offline for maintenance, Operations Manager 2007 detects that no agent heartbeat is being received and, as a result, might generate numerous alerts and notifications. To prevent alerts and notifications, place the monitored object into maintenance mode. In maintenance mode, the following are suppressed at the agent: alerts, notifications, rules, monitors, automatic responses, state changes, and new alerts.

If a dependent server is in maintenance mode, alerts can still be raised from other Remote Desktop Services role services. For example, if the Remote Desktop license server is put into maintenance mode and is offline, alerts can occur from other servers running Remote Desktop Services role services that fail to get a license from the offline Remote Desktop license server.

For more information about placing a monitored object in maintenance mode, see [How to Put a Monitored Object into Maintenance Mode in Operations Manager 2007](http://go.microsoft.com/fwlink/?LinkId=108358) on Microsoft TechNet (http://go.microsoft.com/fwlink/?LinkId=108358).

# Troubleshooting

The following table describes issues that can occur with the Remote Desktop Services Management Pack, and presents possible solutions.

| **Problem** | **Solution** |
| --- | --- |
| The management pack discovers no objects. | Make sure that your RD Session Host servers are using application mode, not Remote Administration mode.Discovery of RD Session Host servers running in Remote Administration mode is disabled by default. |
| Most performance views are empty. | Install the Windows Server Operating System Management Pack.The Windows Server Operating System Management Pack is required for all the performance views except Session Statistics.You can download the [Windows Server Operating System Management Pack](http://go.microsoft.com/fwlink/?LinkId=82105) from the Management Pack Catalog (http://go.microsoft.com/fwlink/?LinkId=82105). |
| The management pack did not discover an RD Connection Broker server in a cluster. | Turn on the object discovery that finds an RD Connection Broker server in a cluster. |
| The management pack is not collecting much performance data. | Enable the desired performance-measuring rules. |
| The management pack does not generate an alert when an RD Session Host server fails to print on a local printer. | Enable the rule that alerts you about a failed printer redirection operation. |

# Appendix: Monitors and Overrides for Management Packs

This section provides detailed procedures and scripts that you can use to display rules and other information about the management packs that you import.

## How to view management pack details

For more information about a monitor and the associated override values, see the Product Knowledge tab for the monitor.

To view the Product Knowledge tab for a monitor

|  |
| --- |
| 1. In the Operations Console, click Authoring.2. Expand Management Pack Objects, and then click Monitors.3. In the Monitors pane, expand the targets until you reach the desired monitor.4. Right-click the monitor, and then click Properties. 5. Click the Product Knowledge tab. |

## How to display monitors for a management pack

To display a list of outputs for a management pack's monitors and overrides by using the Command Shell, use the following procedure.

To display monitors for a management pack

|  |
| --- |
| 1. Click Start, point to All Programs, point to System Center Operations Manager 2007 R2, and then click Operations Manager Shell.2. Type the following command: get-monitor -managementPack name.mp | export-csv filename, where filename is the name of the output file, and then press ENTER.3. A .csv file is created. The .csv file can be opened in Microsoft Office Excel. |

## How to display overrides for a management pack

To display overrides for a management pack, use the following procedure.

To display overrides for a management pack

|  |
| --- |
| 1. Click Start, point to All Programs, point to System Center Operations Manager 2007 R2, and then click Operations Manager Shell.2. Type the following command: get-override -managementPack name.mp | export-csv filename, where filename is the name of the output file, and then press ENTER.3. A .csv file is created. The .csv file can be opened in Microsoft Office Excel. |

## How to display all management pack rules

To display a list of rules for the management packs that you imported, use the following procedure.

To display management pack rules

|  |
| --- |
| 1. Click Start, point to All Programs, point to System Center Operations Manager 2007 R2, and then click Operations Manager Shell.2. Type the following command: get-rule | select-object @{Name="MP";Expression={ foreach-object {$\_.GetManagementPack().DisplayName }}},DisplayName | sort-object -property MP | export-csv filename, where filename is the name of the output file, and then press ENTER.3. A .csv file is created. The .csv file can be opened in Microsoft Office Excel. |

## How to display monitor thresholds

To display monitor thresholds, use the script described in this section. This script works for the majority of monitors. It creates a .csv file that can be opened in Microsoft Office Excel, and includes the following columns.

| **Column** | **Description** |
| --- | --- |
| Type | The type of objects the monitor is targeted to |
| DisplayName | The display name of the monitor |
| Threshold | The threshold used by the monitor |
| AlertOnState | Determines whether the monitor generates an alert when the state changes |
| AutoResolveAlert | Determines whether the generated alert will be automatically resolved when the monitor state goes back to green |
| AlertSeverity | The severity of the generated alert |

Run the following script to create the .csv file that displays the monitor thresholds:

function GetThreshold ([String] $configuration)

{

 $config = [xml] ("<config>" + $configuration + "</config>")

 $threshold = $config.Config.Threshold

 if($threshold -eq $null)

 {

 $threshold = $config.Config.MemoryThreshold

 }

 if($threshold -eq $null)

 {

 $threshold = $config.Config.CPUPercentageThreshold

 }

 if($threshold -eq $null)

 {

 if($config.Config.Threshold1 -ne $null -and $config.Config.Threshold2 -ne $null)

 {

 $threshold = "first threshold is: " + $config.Config.Threshold1 + " second threshold is: " + $config.Config.Threshold2

 }

 }

 if($threshold -eq $null)

 {

 if($config.Config.ThresholdWarnSec -ne $null -and $config.Config.ThresholdErrorSec -ne $null)

 {

 $threshold = "warning threshold is: " + $config.Config.ThresholdWarnSec + " error threshold is: " + $config.Config.ThresholdErrorSec

 }

 }

 if($threshold -eq $null)

 {

 if($config.Config.LearningAndBaseliningSettings -ne $null)

 {

 $threshold = "no threshold (baseline monitor)"

 }

 }

 return $threshold

}

$perfMonitors = get-monitor -Criteria:"IsUnitMonitor=1 and Category='PerformanceHealth'"

$perfMonitors | select-object @{name="Target";expression={foreach-object {(Get-MonitoringClass -Id:$\_.Target.Id).DisplayName}}},DisplayName, @{name="Threshold";expression={foreach-object {GetThreshold $\_.Configuration}}}, @{name="AlertOnState";expression={foreach-object {$\_.AlertSettings.AlertOnState}}}, @{name="AutoResolveAlert";expression={foreach-object {$\_.AlertSettings.AutoResolve}}}, @{name="AlertSeverity";expression={foreach-object {$\_.AlertSettings.AlertSeverity}}} | sort Target, DisplayName | export-csv "c:\monitor\_thresholds.csv"

## How to display performance collection rules

To display performance collection rules, use the script in this section. This script works for the majority of monitors. It creates a .csv file that can be opened in Microsoft Office Excel, and includes the following columns.

| **Column** | **Description** |
| --- | --- |
| WriteAction | Contains information about where the performance counter is written |
| WriteToDB or CollectionPerformanceData | Writes to the Operations Manager 2007 database |
| WriteToDW or CollectPerfDataWarehouse | Writes to the data warehouse |
| WC | Stores baseline data for a performance counter into the operational database |

To display the performance collection rules present in the management group, run the following script:

function GetPerfCounterName ([String] $configuration)

{

 $config = [xml] ("<config>" + $configuration + "</config>")

 return ($config.Config.ObjectName + "\" + $config.Config.CounterName)

}

function GetFrequency ([String] $configuration)

{

 $config = [xml] ("<config>" + $configuration + "</config>")

 $frequency = $config.Config.Frequency;

 if($frequency -eq $null)

 {

 $frequency = $config.Config.IntervalSeconds;

 }

 return ($frequency)

}

function GetDisplayName($performanceRule)

{

 if($performanceRule.DisplayName -eq $null)

 {

 return ($performanceRule.Name);

 }

 else

 {

 return ($performanceRule.DisplayName);

 }

}

function GetWriteActionNames($performanceRule)

{

 $writeActions = "";

 foreach($writeAction in $performanceRule.WriteActionCollection)

 {

 $writeActions += " " + $writeAction.Name;

 }

 return ($writeActions);

}

$perf\_collection\_rules = get-rule -criteria:"Category='PerformanceCollection'"

$perf\_collection\_rules | select-object @{name="Type";expression={foreach-object {(Get-MonitoringClass -id:$\_.Target.Id).DisplayName}}},@{name="RuleDisplayName";expression={foreach-object {GetDisplayName $\_}}} ,@{name="CounterName";expression={foreach-object {GetPerfCounterName $\_.DataSourceCollection[0].Configuration}}},@{name="Frequency";expression={foreach-object {GetFrequency $\_.DataSourceCollection[0].Configuration}}},@{name="WriteActions";expression={foreach-object {GetWriteActionNames $\_}}} | sort Type,RuleDisplayName,CounterName | export-csv "c:\perf\_collection\_rules.csv"