WMI in PowerShell 3.0

Finding Namespaces and Classes in WMI

New CIM Cmdlets shipping in Windows PowerShell 3.0 have made it easier to discover WMI namespaces and classes. Using Tab completion for CIM Cmdlet Parameters (Tab+Space in ISE shows a drop down) Get-CimInstance -Namespace <Tab> #Finding top level namespaces #Tab completion for class names #If namespace is not specified, shows classes from default root/cimv2 namespace Get-CimInstance -ClassName *Bios<Tab> Get-CimInstance -Namespace root/Microsoft/Windows/smb -ClassName <tab>

Note: Tab completion only works on the local computer.

Using Get-CimClass for advanced class search Get-CimClass #All classes in root/cimv2 Get-CimClass -MethodName Stop* #Find classes that have a method like Stop* Get-CimClass -PropertyName Handle #Find classes that have a property name handle Get-CimClass -ClassName *Partition -QualifierName Association #Find Association classes Get-CimClass -Namespace root/Microsoft/Windows/smb -class *Smb* -QualifierName Indication

Note: Get-CimClass only works for computers that support Schema retrieval operations (GetClass and EnumerateClasses). WMI supports these operations for a rich client experience.

Getting data from WMI

Get-CimInstance -ClassName Win32_Service #Find instances of Win32_Service class
#Output of Get-CimInstance is Microsoft.Management.Infrastructure.CimInstance#<ClassName>
#Getting data through a WQL Query
Get-CimInstance -Query "Select * from Win32_Service Where Name like 'app%'"
#Get only a subset of Properties - typically used to reduce network/memory footprint
Get-CimInstance -ClassName Win32_Service -KeyOnly
Get-CimInstance is a snapshot of the object state from server on client.
\$a = Get-CimInstance -ClassName Win32_Process
Get-CimInstance -InputObject \$a[0] #Note object passed as input object is not changed

#If you have scripts that use WMI cmdlets, it is easy to migrate them to new CIM Cmdlets

Peeping into CimInstance

The CimInstance class has the following properties

.CimInstanceProperties - List of properties of this class.

.CimClass - Schema provided by CIM for this class*.

.CimClass.CimClassMethods - Methods supported by this class.

.CimSystemProperties - System properties like namespace.

Note: *For CIM Schema to be accurate, CIM Server must support class schema retrieval operations.

CimInstance is portable - supports full serialization and deserialization
Get-CimInstance Win32_Service -Filter 'Name Like "app%"|export-clixml t1.xml
\$x = import-clixml .\t1.xml
\$x[0].pstypenames
diff (\$x) (Get-CimInstance win32_service -Filter 'Name Like "app%"')

Working with Associations

Get instance of win32_LogicalDisk class with DriveType==3 (hard drives)
\$disk1, \$diskn = Get-CimInstance -class win32_LogicalDisk -Filter 'DriveType = 3'
Get the associated instance disk1
Get-CimAssociatedInstance -CimInstance \$disk1
Given an instance of win32_LogicalDisk, get the associated instances of specific type
Get-CimAssociatedInstance -CimInstance \$disk1 -ResultClassName win32_DiskPartition

\$service = Get-CimInstance Win32_Service -Filter 'Name Like "winrm%"'
#Find Services upon which WinRM service depends
Get-CimAssociatedInstance -InputObject \$service -Association Win32_DependentService

What is CIM/WMI?

CIM: Common Information Model (CIM) is the DMTF standard [DSP0004] for describing the structure and behavior of managed resources such as storage, network, or software components. **WMI:** Windows Management Instrumentation (WMI) is a CIM server that implements the CIM standard on Windows.

What is WS-Man/WinRM?

WS-Man: WS-Management (WS-Man) protocol is a SOAP-based, firewall-friendly protocol for management clients to communicate with CIM severs.

WinRM: Windows Remote Management (WinRM) is the Microsoft implementation of the WS-Man protocol on Windows.

What is WQL?

The WMI Query Language (WQL) is used by management clients to query for data from WMI. WQL is very similar, but not identical, to the CIM Query

Language (CQL) defined by the DMTF.

What are new CIM Cmdlets?

Windows PowerShell 2.0 shipped with WMI and WS-Man cmdlets. Why another set of cmdlets in 3.0? WMI cmdlets (like Get-WmiObject) work over DCOM, and work only with WMI/Windows.

WS-Man cmdlets (like Get-WsManInstance) work over the WS-Man protocol, but they are not IT Pro-friendly. New CIM cmdlets provide best of both worlds:

- Rich Windows PowerShell experience, no more XML
- Work over both WS-Man (remote default) and DCOM (local default)
- Work with non-Windows devices that implement WS-Man protocol

- Simplify discovery of namespace of classes in WMI. Old WMI and WS-Man Cmdlets are still supported in Windows 8 and Windows Server 2012. It is easy to change scripts to new standard-based CIM cmdlets.

#Get a list of CIM cmdlets Get-Command -Module CimCmdlets

What is an Association

An association represents a relationship between two or more instances of managed resources, like disk and volumes, or directories and files. Given an instance of a class, a CIM server returns all instances that are related to the instance. You can also filter the results by specifying a target class or the name of the association relationship.

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Working with remote servers #CIM CmdTets have -ComputerName and -CimSession parameters for managing remote servers Get-CimInstance win32_Service -ComputerName Server1 #By default, WS-Man protocol is used when ComputerName is passed (including localhost or 127.0.0.1) #If multiple operations are performed against the same server, creating a CIM session is recommended. Ss = New-CimSession -CN server1 gcim win32_Service -CimSession Ss #Managing older Windows Server operating systems #There are two ways to manage older windows Server operating systems: # Tinstall windows Management Framework 3.0 (recommended) \$ So = New-CimSession -CN server1_Session Or Protocol DCOM \$ Ss = New-CimSession -CN server1_Session Ss #PSComputerName property of CimInstance shows the source computer name gcim win32_Process -CN server1_server2 Select Name, PSComputerName #If a computer name or CIM session was passed to get a CimInstance, it does not have to be specified again for subsequent operations. #If a computer name or CIM session was passed to get a CimInstance, it does not have to be specified again for subsequent operations. #Gim win32_Process -CN server1_iserver2 #If a computer name or CIM session was passed to get a CimInstance, it does not have to be specified again for subsequent operations. #Gim win32_Process -CN server1_iserver2 icim -MethodName Getowner WMI Blog: http://blogs.m	"ProcessWatch"	so a CimSession is a very lightweight client-side connection
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<pre>#CIM cmdlets have -ComputerName and -CimSession parameters for managing remote servers Get-CimInstance win32_Service -ComputerName Server1 #By default, WS-Man protocol is used when ComputerName is passed (including localhost or 127.0.0.1) #If multiple operations are performed against the same server, creating a CIM session is recommended. Ss = New-CimSession -CN server1 gcim Win32_Service -CimSession Ss #Managing older windows Server operating systems #There are two ways to manage older Windows Server operating systems: # Install Windows Management Framework 3.0 (recommended) # OR use DCOM protocol Ss = New-CimSession -CN server1 -SessionOption \$so Get-CimInstance Win32_Service -CimSession \$s #PSComputerName property of CimInstance shows the source computer name gcim Win32_Process -CN server1, server2 Select Name, PSComputerName #If a computer name or CIM session was passed to get a CimInstance, it does not have to be specified again for subsequent operations. gcim Win32_Process -CN server1 icim -MethodName GetOwner</pre>	Working with remote servers	supports the WS-Man protocol.
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