



iDRAC Service Module – Windows Management Instrumentation

This White paper is about using iDRAC Service Module to monitor the various hardware profiles through the Windows Management Instrumentation (WMI) client interfaces such as Windows PowerShell, Windows Management Instrumentation Command-line, Windows Remote Management client (WINRM), WBEMTEST.

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Revisions

Date	Description
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Executive summary

The iDRAC Service Module 2.0 or later versions provides you the ability to query or monitor a set of profiles from the host Operating System using any of the Windows Management Instrumentation (WMI) interfaces. The namespace used by iDRAC Service Module on all flavors of Microsoft Windows Operating System is *root/cimv2/dcim*. The WMI provider in iDRAC Service Module supports inventory and monitoring of iDRAC WSMAN profiles using WMI interfaces.



1 Profiles Supported by iDRAC Service Module

iDRAC Service Module supports all the profiles supported by iDRAC. Following table gives a quick view of all the supported profiles.

Profile Registration	Persistent Storage	SystemQuickSync
Base Metrics	Power State Management	Base Metrics
Base Server and Physical Asset	Power Supply	Base Server
BIOS and Boot Management	Profile Registration	Command Line Protocol Service
CPU	Record Log	Physical Asset
Event Filter	Role Based Authorization	Power State Management
Fan	Sensors	Record Log
Fiber Channel	Service Processor	Role Based Authorization
iDRAC Card	Simple Identity Management	Service Processor
Job Control	Simple NIC	Simple Identity Management
operationsLC Management	Simple RAID	SM CLP Admin Domain
License Management	Software Inventory	SMASH Collections
Memory	Software Update	Physical Computer System View
OS Deployment	System Info	SystemQuickSync
PCI Device	Video	Base Metrics

1.1 Supported WMI Operations

The following operations are supported in iDRAC Service Module.

- Enumerate class
- Get Class
- Enumerate Instance
- Get instance
- Associators
- References

However, the **Set Instance**, **Method**, and **Event Provider** operations are not supported.



1.2 Supported WMI Client Interfaces

The profiles supported by iDRAC Service Module contain useful information for the administrator such as the health of the Server, Network Interface details, and so on. These information can be obtained by querying the profiles using any of the WMI client interfaces. iDRAC Service Module WMI provider supports the following WMI client interfaces.

- **Windows Powershell**

- To enumerate all instances of a class:
Get-WmiObject dcim_account -namespace root/cimv2/dcim
- To get a specific instance of a class:
Get-WmiObject -Namespace root\cimv2\dcim -Class dcim_account -filter "Name='iDRAC.Embedded.1#Users.16'"
- To get Associators of an instance.
Get-Wmiobject -Query "ASSOCIATORS OF {DCIM_Account.CreationClassName='DCIM_Account',Name='iDRAC.Embedded.1#Users.2',SystemCreationClassName='DCIM_SPComputerSystem',SystemName='systemmmc'}" -namespace root/cimv2/dcim
- To get references of an instance
Get-Wmiobject -Query "REFERENCES OF {DCIM_Account.CreationClassName='DCIM_Account',Name='iDRAC.Embedded.1#Users.2',SystemCreationClassName='DCIM_SPComputerSystem',SystemName='systemmmc'}" -namespace root/cimv2/dcim
- Command usage example – To view the system related property information, type the following command:
Get-WmiObject -namespace root/cimv2/dcim dcim_systemview -property systemid, model, AssetTag
In the example, **SystemID**, **Model**, and the **AssetTag** properties are used.

- **Windows Remote Management (WinRM)**

- To enumerate all instances of a class:
winrm e wmi/root/cimv2/dcim/dcim_account
- To get a specific instance of a class:
winrm g wmi/root/cimv2/dcim/DCIM_Account?CreationClassName=DCIM_Account+Name=iDRAC.Embedded.1#Users.2+SystemCreationClassName=DCIM_SPComputerSystem+SystemName=systemmmc
- To get Associators of an instance.
winrm e wmi/root/cimv2/dcim/ -dialect:association -filter:{object=DCIM_Account?CreationClassName=DCIM_Account+Name=iDRAC.Embedded.1#Users.1+SystemCreationClassName=DCIM_SPComputerSystem+SystemName=systemmmc}*
- To get references of an instance
winrm e wmi/root/cimv2/dcim/ -dialect:association -associations -filter:{object=DCIM_Account?CreationClassName=DCIM_Account+Name=iDRAC.Embedded.1#Users.1+SystemCreationClassName=DCIM_SPComputerSystem+SystemName=systemmmc}*

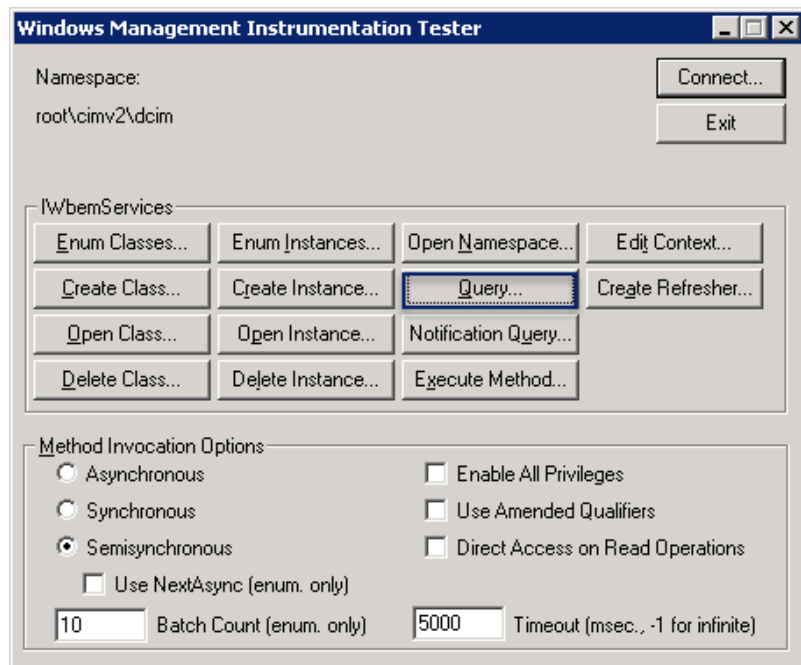


- **Windows Management Instrumentation Command-line (WMIC)**

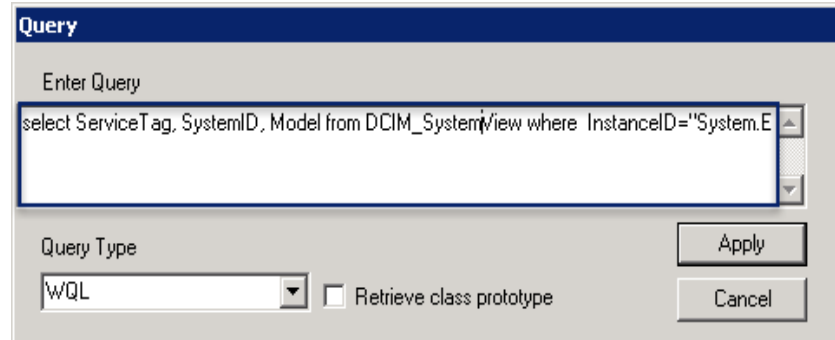
- To enumerate all instances of a class:
wmic /namespace:\\root\\cimv2\\dcim PATH dcim_account
- To get a specific instance of a class:
wmic /namespace:\\root\\cimv2\\dcim PATH dcim_account where Name="iDRAC.Embedded.1#Users.16"
- To get Associators of an instance
wmic /namespace:\\root\\cimv2\\dcim PATH dcim_account where Name='iDRAC.Embedded.1#Users.2' ASSOC

- **WBEMTEST**

- Command usage example - To view the system related property information:
 - On the **Windows Management Instrumentation Tester** window, click the **Query** option.

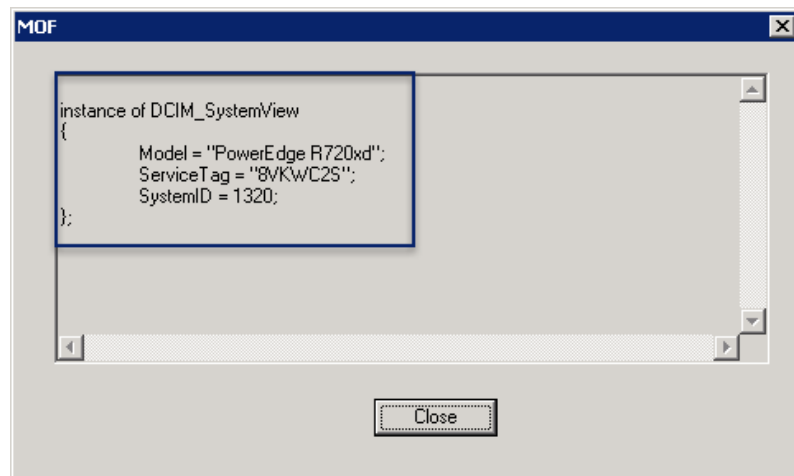


- ii. Type the following command in the **Enter Query** text box : **select ServiceTag, SystemID, Model from DCIM_SystemView where InstanceID="System.Embedded.1"**



The image shows a 'Query' dialog box with a title bar. Inside, there is a text area labeled 'Enter Query' containing the command: `select ServiceTag, SystemID, Model from DCIM_SystemView where InstanceID="System.Embedded.1"`. Below the text area is a 'Query Type' dropdown menu set to 'WQL'. To the right of the dropdown is a checkbox labeled 'Retrieve class prototype' which is unchecked. At the bottom right are 'Apply' and 'Cancel' buttons.

The result of the queried parameters is displayed.



The image shows a 'MOF' dialog box with a title bar. The main text area displays the result of the query as an instance of DCIM_SystemView:

```
instance of DCIM_SystemView
{
    Model = "PowerEdge R720xd";
    ServiceTag = "8VKWC2S";
    SystemID = 1320;
};
```

At the bottom center is a 'Close' button.

2 Common use case scenarios

Here are some of the common use case scenarios with the corresponding WinRM commands and PowerShell scripts. For simplicity; a single instance has been captured for the below queries. For a detailed set of Value-Maps for the properties; please refer to the corresponding MOF files. A **typical** Install of iDRAC Service Module will install all the MOF files in the location: **C:\Program Files\Dell\SysMgt\iSM\ini\mof\DCIM**.

1. View hardware inventory of the system and system health status (Overall status, CPU status, Power status, Voltage status etc)

- a. Windows Powershell: `Get-WmiObject -namespace root/cimv2/dcim dcim_systemview`

AssetTag	: Test1234
BaseBoardChassisSlot	: NA
BatteryRollupStatus	: 1
BIOSReleaseDate	: 05/20/2014
BIOSVersionString	: 2.2.3
BladeGeometry	: 255
BoardPartNumber	: 061P35A00
BoardSerialNumber	: CN701632410054
ChassisName	: Main System Chassis
ChassisServiceTag	: 8VKWC2S
ChassisSystemHeight	: 2
CPLDVersion	: 1.0.3
CPURollupStatus	: 1 {0=unknown, 1=OK, 2=Degraded, 3=Error}
DeviceDescription	: System
EstimatedSystemAirflow	: 255
ExpressServiceCode	: 19323811108
FanRollupStatus	: 1
FQDD	: System.Embedded.1
HostName	: WIN-LPQ6C99LA5P
InstanceID	: System.Embedded.1
LastSystemInventoryTime	: 20150325225105.000000+000
LastUpdateTime	: 20141121233557.000000+000
LicensingRollupStatus	: 2
LifecycleControllerVersion	: 2.10.10.10
Manufacturer	: Dell Inc.
MaxCPUSockets	: 2
MaxDIMMSlots	: 24
MaxPCleSlots	: 6
MemoryOperationMode	: OptimizerMode
Model	: PowerEdge R720xd
NodeID	: 8VKWC2S
PlatformGUID	: 5332434f-c0b8-5780-4b10-00564c4c4544
PopulatedCPUSockets	: 2



PopulatedDIMMSlots	: 8	
PopulatedPCleSlots	: 1	
PowerCap	: 448	
PowerCapEnabledState	: 3	
PowerState	: 2	
PrimaryStatus	: 1	
PSRollupStatus	: 1	{0=unknown, 1=OK, 2=Degraded, 3=Error}
RollupStatus	: 1	
ServiceTag	: 8VKWC2S	
smbiosGUID	: 44454c4c-5600-104b-8057-b8c04f433253	
StorageRollupStatus	: 1	
SysMemErrorMethodology	: 6	
SysMemFailOverState	: NotInUse	
SysMemLocation	: 3	
SysMemMaxCapacitySize	: 1572864	
SysMemPrimaryStatus	: 1	
SysMemTotalSize	: 65536	
SystemGeneration	: 12G Monolithic	
SystemID	: 1320	
SystemRevision	: 0	
TempRollupStatus	: 1	
UUID	: 4c4c4544-0056-4b10-8057-b8c04f433253	
VoltRollupStatus	: 1	{0=unknown, 1=OK, 2=Degraded, 3=Error}

2. View software inventory of the system

a. Windows Powershell: Get-WmiObject -namespace root/cimv2/dcim DCIM_SoftwareIdentity

BuildNumber	: 0
Classifications	: {10}
ComponentID	: 27763
ComponentType	: FRMW
ElementName	: System CPLD
FQDD	: CPLD.Embedded.1
IdentityInfoType	: {OrgID:ComponentType:ComponentID}
IdentityInfoValue	: {DCIM:firmware:27763}
impactsTPMmeasurements	: False
InstallationDate	: 2013-05-17T11:04:59Z
InstanceID	: DCIM:INSTALLED#803__CPLD.Embedded.1
IsEntity	: True
IsLargeBuildNumber	: False
MajorVersion	: 1
RevisionNumber	: 3
Status	: Installed



Updateable : True
VersionString : 1.0.3

3. View System Event Logs, Lifecycle Logs and Tech support reports for Troubleshooting

- a. Windows Powershell (LC Logs): Get-WmiObject -namespace root/cimv2/dcim DCIM_LCLogEntry

AgentID : RACLOG
Category : Audit
Comment : [set comment here]
ConfigResultsAvailable : False
CreationTimeStamp : 20150311200640.000000-300
ElementName : USR0030
FQDD : iDRAC.Embedded.1
InstanceID : DCIM:LifeCycleLog:65821
LogInstanceID : DCIM:LifeCycleLog
LogName : LifeCycle Log
Message : Successfully logged in using root, from 169.254.0.2 and WS-MAN.
MessageArguments : {root, 169.254.0.2, WS-MAN}
MessageID : USR0030
PerceivedSeverity : 2
RecordID : 65821

- b. Windows Powershell (SEL Logs): Get-WmiObject -namespace root/cimv2/dcim DCIM_SELLogEntry

CreationTimeStamp : 20150311184329.000000-300
ElementName : System Event Log Entry
InstanceID : DCIM:SEL:Entry:52
LogInstanceID : DCIM:SEL:1
LogName : System Event Log
PerceivedSeverity : 2 {0=unknown, 1=other, 2=Info, 3=degraded, 4=minor, 5=major, 6=critical,, 7=fatal}
RecordData : CPU 1 is operating correctly.
RecordFormat : string Description
RecordID : 52

4. Monitor the power consumption and power statistics of the system

- a. Windows Powershell: Get-WmiObject -namespace root/cimv2/dcim DCIM_PowerSupplyView

DetailedState : Presence Detected
DeviceDescription : Power Supply 1
FQDD : PSU.Slot.1
InputVoltage : 0
InstanceID : PSU.Slot.1



LastSystemInventoryTime : 20150325225105.000000+000
 LastUpdateTime : 20150331192816.000000+000
 Manufacturer : N/A
 PMBusMonitoring : 1
PrimaryStatus : 1 {0=unknown, 1=OK, 2=Degraded, 3=Error}
Range1MaxInputPower : 0
 RedMinNumberNeeded: 1
 RedTypeOfSet : {2, 4}
 RedundancyStatus : 0
 TotalOutputPower : 0
 Type : 0

5. View the Network Device Settings and Statistics

a. Windows Powershell: Get-WmiObject -namespace root/cimv2/dcim DCIM_NICStatistics

DiscardedPkts : 0
FQDD : NIC.Integrated.1-2-1
 InstanceID : NIC.Integrated.1-2-1
LinkStatus : 3 {0=unknown, 1=up, 2=down}
 OSDriverState : 1
 RxBroadcast : 0
 RxBytes : 0
 RxErrorPktAlignmentErrors : 0
 RxErrorPktFCSErrors : 0
 RxJabberPkt : 0
 RxMulticast : 0
 RxPauseXOFFFrames : 0
 RxPauseXONFrames : 0
 RxRuntPkt : 0
 RxUnicast : 0
 SampleInterval : 000000000000000.000000:000
StartStatisticTime : 20150325174418.000000-300
 StatisticTime : 20150331143008.000000-300
 TxBroadcast : 0
 TxBytes : 0
 TxErrorPktExcessiveCollision : 0
 TxErrorPktLateCollision : 0
 TxErrorPktMultipleCollision : 0
 TxErrorPktSingleCollision: 0
 TxMulticast : 0
 TxPauseXOFFFrames : 0
 TxPauseXONFrames : 0
 TxUnicast : 0



6. View the Virtual Disks and Physical Disk configurations

- a. Windows Powershell (Physical disk): Get-WmiObject -namespace root/cimv2/dcim
DCIM_PhysicalDiskView

BlockSizeInBytes : 512
BusProtocol : 5
Connector : 0
DeviceDescription : Disk 3 in Backplane 1 of Integrated RAID Controller 1
DriveFormFactor : 0
FQDD : **Disk.Bay.3:Enclosure.Internal.0-1:RAID.Integrated.1-1**
FreeSizeInBytes : 0
HotSpareStatus : 0
InstanceID : Disk.Bay.3:Enclosure.Internal.0-1:RAID.Integrated.1-1
LastSystemInventoryTime : 20150325225115.000000+000
LastUpdateTime : 20150325225115.000000+000
Manufacturer : ATA
ManufacturingDay : 0
ManufacturingWeek : 0
ManufacturingYear : 0
MaxCapableSpeed : 2
MediaType : 0
Model : FUJITSU MHZ2080B
OperationName : None
OperationPercentComplete : 0
PPID : TH0T010F268128BB007JA01
PredictiveFailureState : 0
PrimaryStatus : 1
RaidStatus : **2** {0=unknown, 1=ready, 2=online, 3=foreign, 4=offline, 5=blocked, 6=failed, 7=degraded, 8=non-raid, 9=missing}
RemainingRatedWriteEndurance : 255
RollupStatus : 1
SASAddress : 500056B37789ABE1
SecurityState : 0
SerialNumber : K85CT8B256TV
SizeInBytes : **79456894976**
Slot : 3
SupportedEncryptionTypes : {None}
T10PICapability : 0
UsedSizeInBytes : **79456894976**

- b. Windows Powershell (Virtual disk): Get-WmiObject -namespace root/cimv2/dcim
DCIM_VirtualDiskView

BlockSizeInBytes : 512



BusProtocol : 5 {0=unknown, 1=scsi, 2=pata, 3=fibre, 4=usb, 5=sata, 6=sas}
 Cachecade : 0
 DeviceDescription : Virtual Disk 2 on Integrated RAID Controller 1
DiskCachePolicy : 256
 FQDD : Disk.Virtual.2:RAID.Integrated.1-1
 InstanceID : Disk.Virtual.2:RAID.Integrated.1-1
 LastSystemInventoryTime : 20150325225115.000000+000
 LastUpdateTime : 20150325225115.000000+000
 LockStatus : 0
 MediaType : 1
 Name : BOOT VD
 ObjectStatus : 0
 OperationName : None
 OperationPercentComplete : 0
 PendingOperations : {0}
 PhysicalDiskIDs : {Disk.Bay.3:Enclosure.Internal.0-1:RAID.Integrated.1-1}
 PrimaryStatus : 1
 RAIDStatus : 2
 RAIDTypes : 2
 ReadCachePolicy : 16
 RemainingRedundancy : 0
 RollupStatus : 1
 SizeInBytes : 79456894976
SpanDepth : 1
SpanLength : 1
 StartingLBAinBlocks : 0
 StripeSize : 128
 T10PIStatus : 0
 VirtualDiskTargetID : 2
WriteCachePolicy : 1 {0=unknown, 1=write-through, 2=write-back, 4=write-back-force}

7. View BIOS settings

a. Windows Powershell: Get-WmiObject -namespace root/cimv2/dcim DCIM_BIOSInteger

AttributeDisplayName : Number of Cores
AttributeName : Proc1NumCores
CurrentValue : {6}
 DisplayOrder : 446
 FQDD : BIOS.Setup.1-1
 GroupDisplayName : Processor Settings
 GroupID : ProcSettings
 InstanceID : BIOS.Setup.1-1:Proc1NumCores
 IsReadOnly : True
 LowerBound : 0
 PendingValue : {}



ScalarIncrement : 1
UpperBound : 65535

8. View iDRAC & Lifecycle Controller settings

- a. Windows Powershell: Get-WmiObject -namespace root/cimv2/dcim DCIM_iDRACCardAttribute

AttributeDisplayName : Virtual Media Encrypt Enable
AttributeName : EncryptEnable
CurrentValue : {AES}
DefaultValue : {AES}
DisplayOrder : 715
FQDD : iDRAC.Embedded.1
GroupDisplayName : Virtual Media
GroupID : VirtualMedia.1
InstanceID : iDRAC.Embedded.1#VirtualMedia.1#EncryptEnable
IsReadOnly : False
PendingValue : {}
PossibleValues : {None, AES}

9. View Alert settings

- a. Windows Powershell: Get-WmiObject -namespace root/cimv2/dcim DCIM_LCRecordLog

CurrentNumberOfRecords : 4618
ElementName : LifeCycle Log
EnabledDefault : 2 {2=enabled, 3=disabled, 5=not-applicable, 6=enabled-but-offline, 7=no-default, 9=quiesce, ".."=DMTF-reserved, "32768..65535"=Vendor Reserved}
EnabledState : 2 {0=unknown, 1=other, 2=enabled, 3=disabled, 4=shutting-down, 5=not-applicable, 6=enabled-but-offline, 7=in-test, 8=deferred, 9=quiesce, 10=starting, "11..32767"=DMTF-reserved, "32767..65535"=vendor-reserved}
HealthState : 5
InstanceID : DCIM:LifeCycleLog
LogState : 2
MaxNumberOfRecords : 0
OperationalStatus : {2}
OverwritePolicy : 8
RequestedState : 12
TransitioningToState : 12



3 Troubleshooting

This section lists some of the troubleshooting information about using the WMI commands from the iDRAC Service Module.

- *Root\cimv2\dcim* Namespace is not accessible.
 - Possible cause: iDRAC Service Module is not installed or the WMI feature in iDRAC Service Module is disabled.
 - Solution: Install iDRAC Service Module or enable WMI feature using any of the iDRAC consoles.
- The WMI queries are timing out.
 - Possible cause: The instrumentation server is busy or loaded.
 - Solution: Retry after some time.
- Server Busy or Server Buffers Full
 - Possible cause: The instrumentation server is busy or loaded.
 - Solution: Retry after some time.

