NVIDIA WMI

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White Paper

DOCUMENT CHANGE HISTORY

WP-06953-001_v02

Version	Date	Authors	Description of Change
01	July 29, 2013	CM, SM	Initial Release
02	August 8, 2013	CM, SM	•Updated “Installing NVWMI” section •Updated “GPU Support” section •Updated “Examples of Using NVWMI” section

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WHAT IS NVWMI

NVIDIA WMI (NVWMI) is a graphics and display management and control technology that interfaces to Microsoft's Windows Management Instrumentation infrastructure, specific to NVIDIA graphics processing units (GPUs). This allows scripts and programs to be created that configure specific GPU related settings, perform automated tasks, retrieve and display a range of information related to the GPU as well as many other administrative tasks and functions. Through the integration within Microsoft's WMI this management and control also operates across networks making it extremely powerful for remote administration and configuration of Windows systems on corporate networks.

NVWMI is only supported on Windows 7 and later operating systems. For more information on WMI see: MSDN

USING NVWMI

NVWMI programs can be written in C and C++, Visual Basic, while managed programs can be written in C# or Visual Basic.NET. NVWMI scripts can be written in scripting languages that support Microsoft ActiveX script hosting, which includes Visual Basic Scripting Edition (VBScript), PowerShell, and Perl. Scripts can be hosted in Windows Script Host (WSH), Active Server Pages, and Internet Explorer.

Additionally, NVWMI can be used via command line or a standard UI within Windows. For more information on programming and scripting WMI, refer to the following links respectively:

- Programing WMI: MSDN
- Scripting WMI: MSDN

INSTALLING NVWMI

NVWMI can be installed in the following three ways:

- When the NVIDIA GPU driver is installed
- Via a standalone install
- Via command line install

When installing the full GPU driver, please be aware that NVWMI is not installed by default. To ensure that it is installed, it is necessary to customize the installation and ensure that the NVWMI check box is checked, as shown in Figure 1 and Figure 2 in the following procedure.

Note: Starting with Driver Version 320.29 (branch R319_00) and Driver Version 325.66 (branch R325_00), NVWMI will be installed by default.

INSTALLING NVWMI AS PART OF THE DRIVER

1. Download the full GPU driver from www.nvidia.com/drivers.
2. Double click the **setup.exe.**
3. Select **Custom** (**Advanced Options**) under "Installation options."

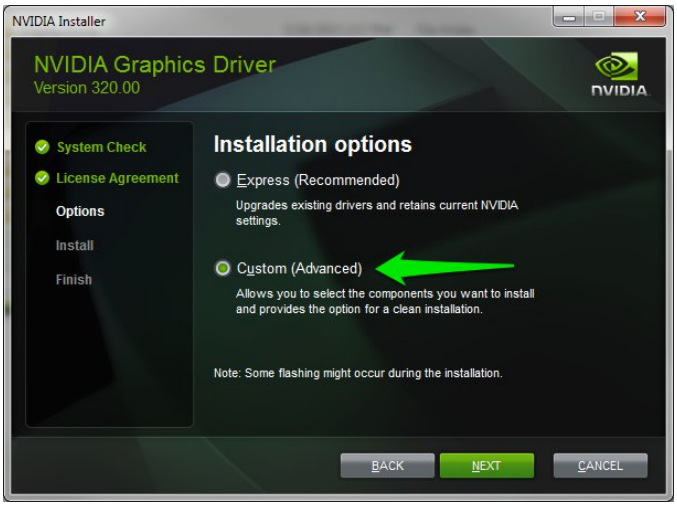

Figure 1. Custom Checkbox

4. Select the **NVIDIA WMI** checkbox under "Custom installation options."

Figure 2. NVIDIA WMI Checkbox

5. Continue to install the driver and follow the on-screen instructions to complete the installation.

INSTALLING NVWMI FROM THE STANDALONE INSTALLER

1. Go to www.nvidia.com/drivers
2. Select the **NVIDIA Enterprise Manager** under "Beta, Older drivers and more."

Figure 3. NVIDIA Enterprise Management Toolkit (NVWMI)

3. Ensure to verify the minimum driver version is met and download the driver.

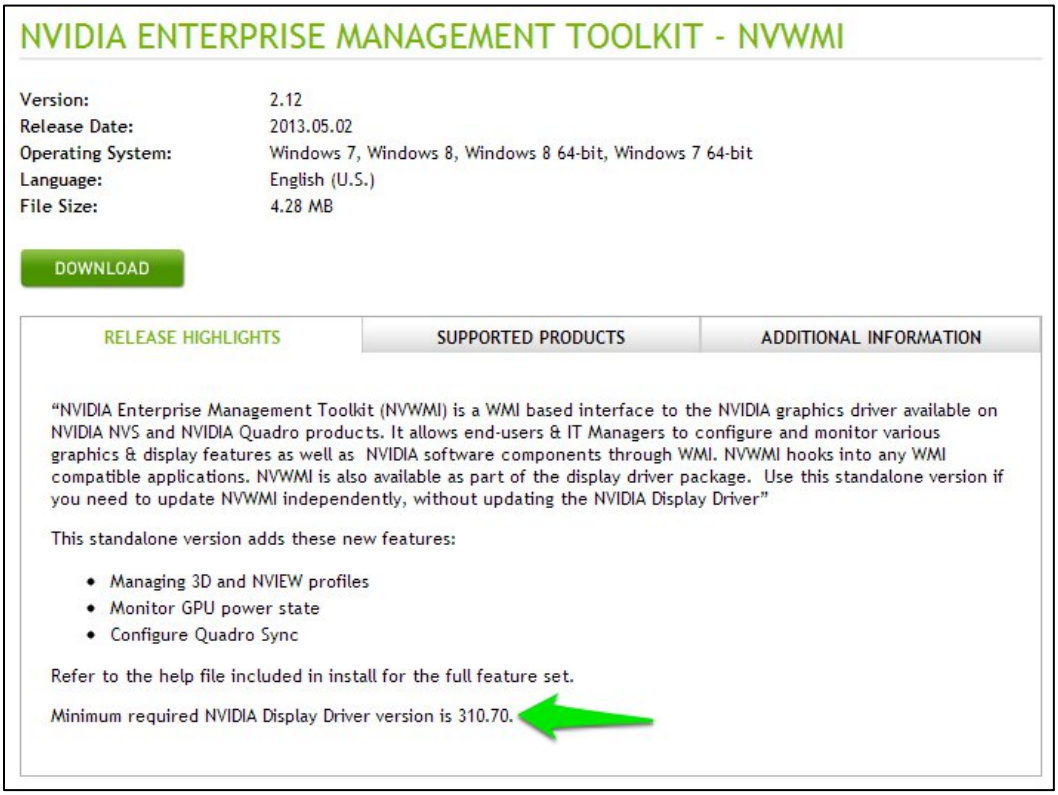

Figure 4. NVIDIA WMI Minimum Driver Requirements

4. Continue to install the driver and follow the on-screen instructions to complete the installation.

INSTALLING NVWMI VIA THE COMMAND LINE

Using the command line navigate to the extracted directory of the downloaded driver

Use command: `setup.exe [switches][package]`

Where:

- package = Display.NVWMI
- switches (most frequently used options as listed in Table 1)

Table 1. Most Frequently Used Switch Options

Switches	Description
-s	Silent install or uninstall
-k	Force a reboot after install or uninstall
-uninstall	Performs an uninstall instead of an install

To confirm if NVIDIA WMI is already installed, simply look in the list of programs available to change or uninstall in the Control Panel under Programs and Features heading.

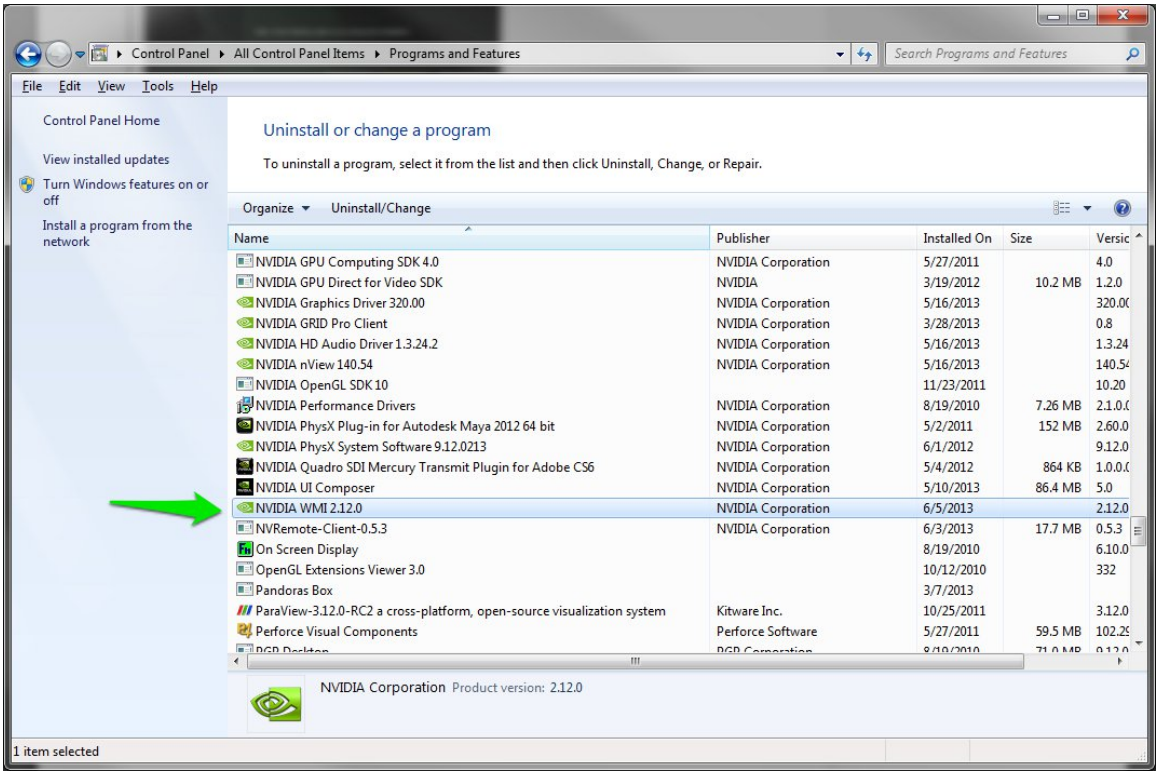

Figure 5. NVIDIA WMI in Control Panel

GPU SUPPORT

The following NVIDIA products support NVWMI:

- NVIDIA Quadro® K600
- Quadro® K6000
- Quadro K5000
- Quadro K4000
- Quadro K2000D
- Quadro K2000
- Quadro FX 5800
- Quadro FX 580
- Quadro FX 570
- Quadro FX 5600
- Quadro FX 4800
- Quadro FX 4700 X2
- Quadro FX 4600
- Quadro FX 380 Low Profile
- Quadro FX 3800
- Quadro FX 380
- Quadro FX 3700
- Quadro FX 370
- Quadro FX 3450
- Quadro FX 1800
- Quadro FX 1700
- Quadro CX
- Quadro 7000
- Quadro 6000
- Quadro 600
- Quadro 5000
- Quadro 410
- Quadro 4000 for Mac
- Quadro 4000
- Quadro 400
- Quadro 2000D
- Quadro 2000
- NVIDIA® NVS® 510
- NVS 450
- NVS 420
- NVS 315
- NVS 310
- NVS 300
- NVS 295
- NVS 290
- Quadro Plex S Series
- Quadro Plex Model IV
- Quadro Plex D Series
- Quadro Plex 7000

CONFIGURABLE AND/OR OBSERVABLE PARAMATERS

NVWMI provides information and configuration options for many areas of the GPU. Broadly, they can be categorized into the following key areas:

- System
- GPU
- Board
- Cooler and thermal details
- NVWMI performance counter

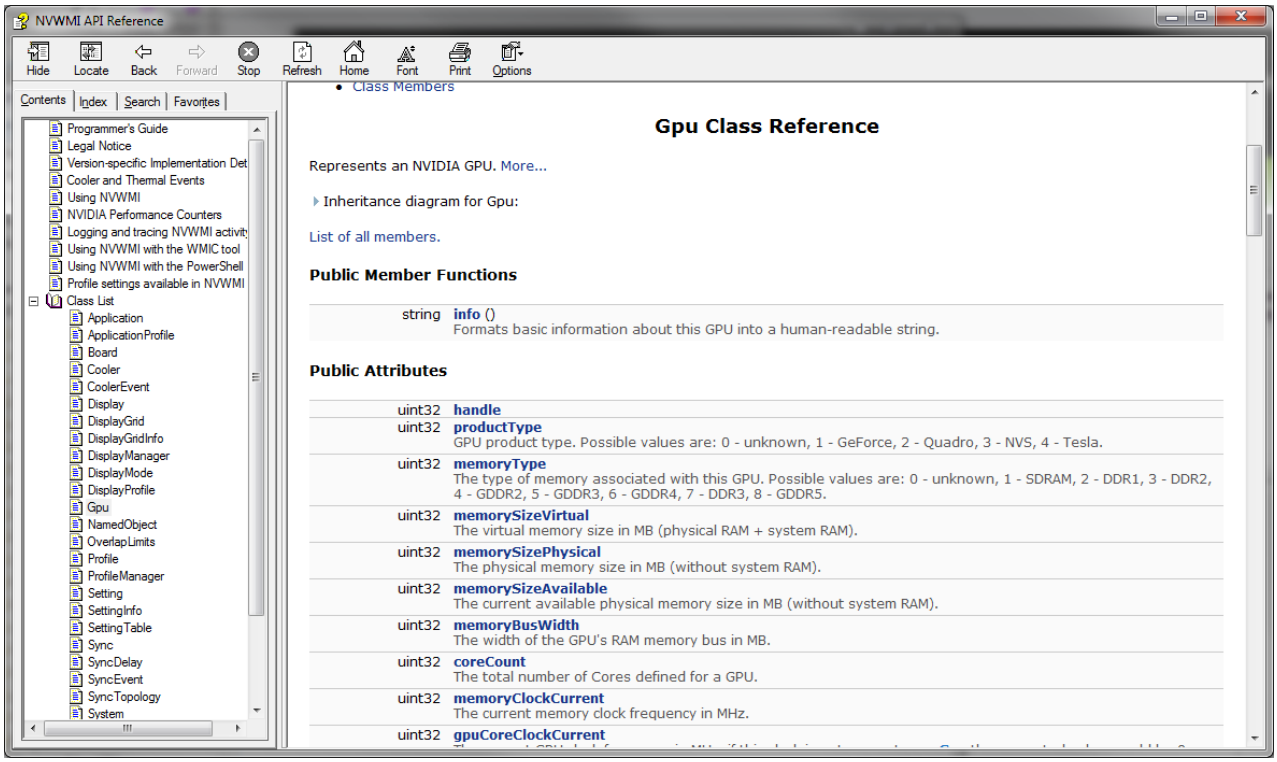

Figure 6. NVIDIA WMI API Help File

The full list of classes and methods for a specific version of NVWMI are detailed in the documentation that comes with that version. Over time there will be additional methods and classes available exposing more information and control.

DOCUMENTATION

Every version of NVWMI includes full documentation of all the classes and methods for that version. The help files are documented in a file ‘nvwmi.chm’ that is automatically installed, when NVWMI is installed along with the NVIDIA drivers.

Once NVWMI is installed in the end-user system, the help file (nvwmi.chm) is copied by the NVIDIA installer into a predefined location ("%ProgramFiles%\NVIDIA Corporation\NVIDIA WMI Provider\nvwmi.chm").

EXAMPLES OF USING NVWMI

This section provides examples of using NVWMI in both scripts and programs. While not exhaustive to all the ways NVWMI can be used and implemented, they are intended to be a useful starting point to highlight how to use NVWMI in different forms such as scripting and a managed program. Once installed the help file *nvwmi.chm*, as listed above, contains more detailed information and examples.

USING NVWMI TO SHOW GPU TEMPERATURE WITH POWER SCRIPT

```
###############################################################################
#
# PowerShell script that examines GPU class instances
#
###############################################################################

$computer = "localhost"         # substitute with remote name as necessary
$namespace = "root\CIMV2\NV"
$classname = "ThermalProbe"

# For local system (e.g. "LocalHost", ".") '-computername $computer' could be omitted
# retrieve all instances of the ThermalProbe class and store them:
$probes =Get-WmiObject -class $classname -computername $computer -namespace $namespace

# print all ThermalProbe instances
$probes

# iterate through all Probe instances
foreach( $probe in $probes )
{
    "Call the info() method and print all the data"
    $res = $probe.InvokeMethod("info",$Null)
    $res

    "Query just the temperature"
    $temp = $probe.temperature
    $temp
}
```

Figure 7. NVIDIA WMI PowerShell Example

Running the script yield the following output:

```
PS C:\src\wmi> .\GpuTemp.ps1

__GENUS          : 2
__CLASS          : ThermalProbe
__SUPERCLASS     :
__DYNASTY        : ThermalProbe
__RELPATH        : ThermalProbe.handle=256
__PROPERTY_COUNT : 4
__DERIVATION     : {}
__SERVER         : APAGE-LTW7
__NAMESPACE      : root\CIMV2\NV
__PATH           : \\MISC\root\CIMV2\NV:ThermalProbe.handle=256
handle           : 256
temperature      : 52
thermalLevel     : 0
ver              : System.Management.ManagementBaseObject

Call the info() method and print all the data
class: ThermalProbe
class version: 1.3.0
GPU handle: 0x100
Thermal level: 0
Temperature: 52 °C

Query just the temperature
52
```

WORKING WITH WINDOWS PERFORMANCE MONITOR

The following is an example of the steps to add information about your NVIDIA GPU to the Windows performance monitor.

1. From the command prompt of from the search bar in the Start window, run `perfmon.exe`.
2. Browse to Performance->Monitoring Tools->Performance Monitor in the navigation bar.
3. Select item **Add counters** from context menu (right-click in graph area).
4. Select target system (local or remote).
5. Browse the list to find **NVIDIA GPU.**
6. Expand **NVIDIA GPU** item.

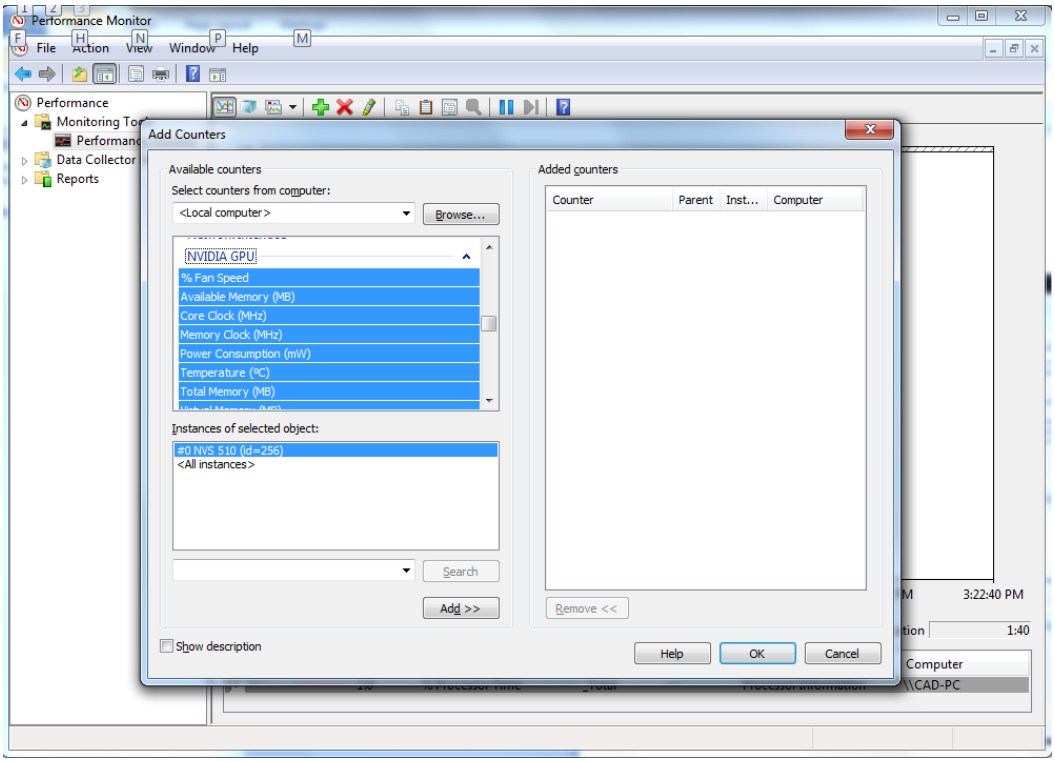

Figure 8. Perfmon Counter Options

7. Select any counter from the list, multiple selections supported.
8. Select the instance of that counter from the instance list below.
9. Add the counter instance and press OK.
10. Choose appropriate graph scale and sampling rate.

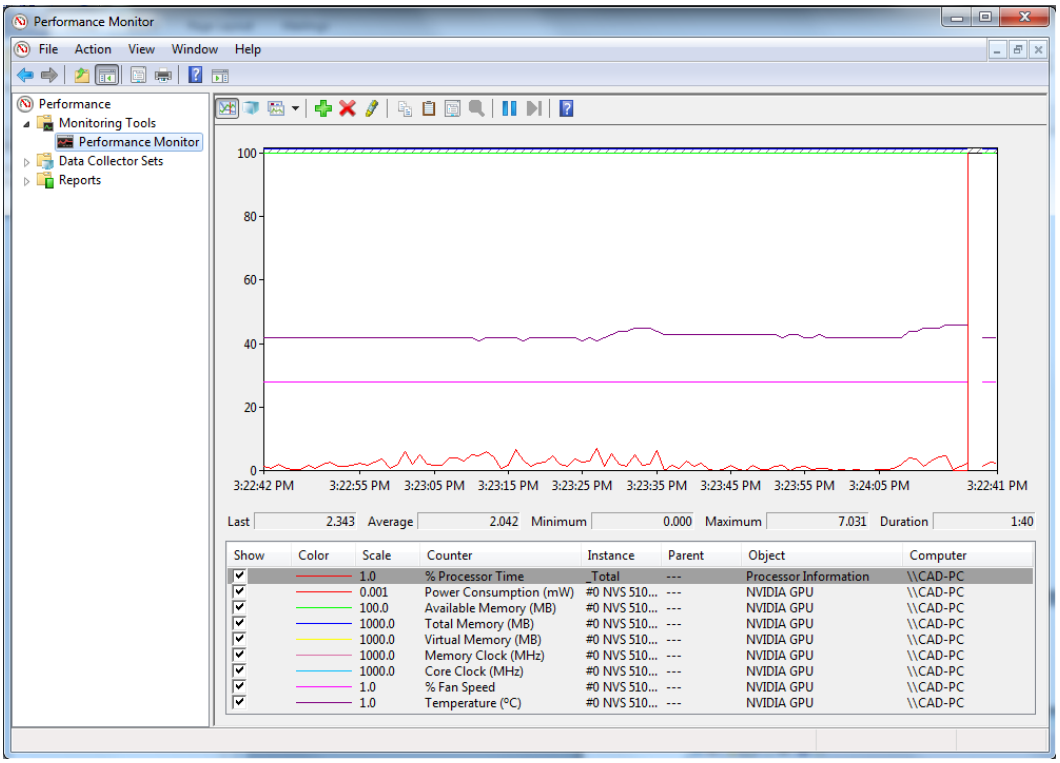

Figure 9. Perfmon Counter Output

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