



Discrete Device Assignment

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What is Discrete Device Assignment?

- Starting with Windows Server 2016, you can use Discrete Device Assignment, or DDA, to pass an entire PCIe Device into a VM.
- This will allow high performance access to devices like NVMe storage or Graphics Cards from within a VM while being able to leverage the devices native drivers.

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Three Required Steps

There are three steps to using a device with Discrete Device Assignment:

- Configure the VM for Discrete Device Assignment
- Dismount the Device from the Host
- Assigning the Device to the Guest VM

All commands can be executed on the Host on a Windows PowerShell console as an Administrator.

Configure the VM for DDA

Discrete Device Assignment imposes some restrictions to the VMs, so VMs need to be turned off when going through this process

Either manually turn off the VM or you can use the following command:

```
Set-VM -Name VMName -AutomaticStopAction TurnOff
```

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Additional Steps for using Graphics Devices

Some hardware performs better if the VM is configured in a certain way. For details on whether or not you need the following configurations for your hardware, please reach out to the hardware vendor.

Enable Write-Combining on the CPU:

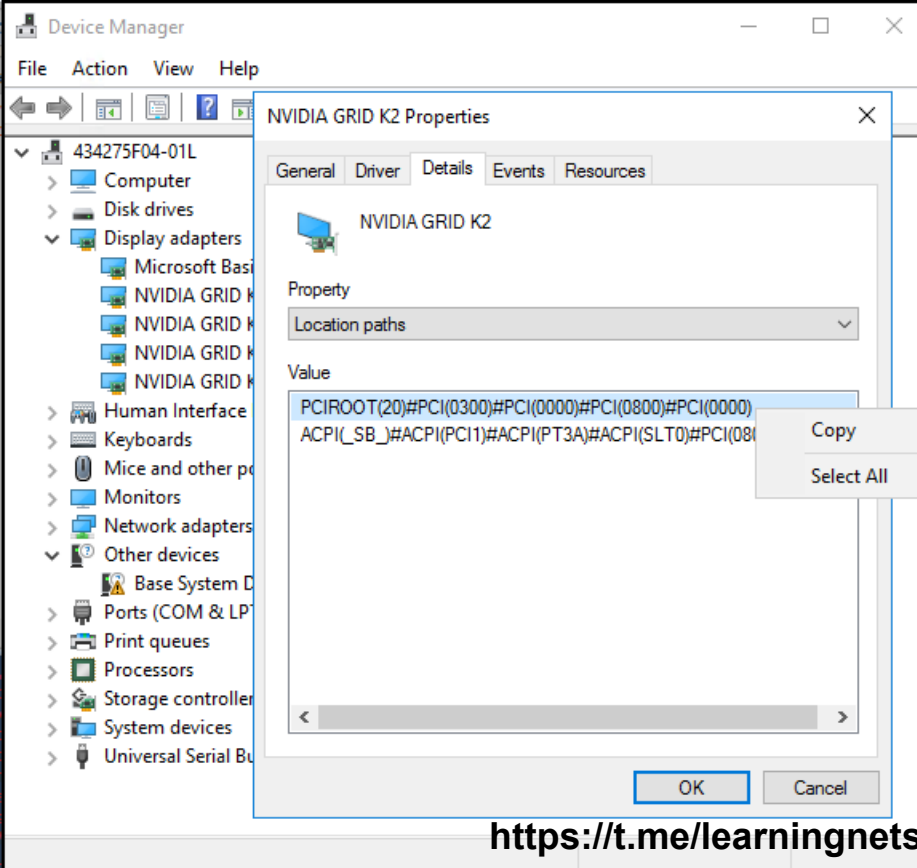
```
Set-VM -GuestControlledCacheTypes $true -VMName VMName
```

Configure the 32 bit MMIO space

```
Set-VM -LowMemoryMappedIoSpace 3Gb -VMName VMName
```

Configure greater than 32 bit MMIO space
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Device Location Path



The screenshot shows the Windows Device Manager window with the 'NVIDIA GRID K2 Properties' dialog box open. The 'Details' tab is selected, and the 'Location paths' property is expanded. The value field contains the following text:

```
PCIROOT(20)#PCI(0300)#PCI(0000)#PCI(0800)#PCI(0000)  
ACPI_SB_#ACPI(PC11)#ACPI(PT3A)#ACPI(SLT0)#PCI(08
```

A context menu is open over the text, with 'Copy' and 'Select All' options visible. The background of the image features a light blue background with gear icons and a cloud containing various application icons (YouTube, photos, documents, folders, etc.).

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Assigning the Device to the Guest VM

The final step is to tell Hyper-V that a VM should have access to the device. In addition to the location path found above, you'll need to know the name of the vm.

```
Add-VMAssignableDevice -LocationPath locationpath -VMName VMName
```

Removing a Device and Returning it to the Host

If you want to return the device back to its original state, you will need to stop the VM and issue the following:

```
Remove-VMAssignableDevice -LocationPath $locationPath -  
VMName VMName
```

```
Mount-VMHostAssignableDevice -LocationPath $locationPath
```

