



TESLA DRIVER VERSION 440.64.00(LINUX)/442.50(WINDOWS)

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Release Notes



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Chapter 1.

VERSION HIGHLIGHTS

This section provides highlights of the NVIDIA Tesla 440 Driver, version 440.64.00 for Linux and 442.50 for Windows. For changes related to the 440 release of the NVIDIA display driver, review the file "NVIDIA_Changelog" available in the .run installer packages.

1.1. Improvements

- ▶ Added support for Red Hat Enterprise Linux 8.1.

1.2. Fixed Issues

- ▶ Various security issues were addressed, for additional details on the med-high severity issues please review [NVIDIA Security Bulletin 4996](#) and also [NVIDIA Product Security](#) for more information.

1.3. Known Issues

GPU Performance Counters

The use of developer tools from NVIDIA that access various performance counters requires administrator privileges. See this [note](#) for more details. For example, reading NVLink utilization metrics from `nvidia-smi` (`nvidia-smi nvlink -g 0`) would require administrator privileges.

NVML

NVML APIs may report incorrect values for NVLink counters (read/write). This issue will be fixed in a later release of the driver.

NoScanout Mode

NoScanout mode is no longer supported on NVIDIA Tesla products. If NoScanout mode was previously used, then the following line in the “screen” section of /etc/X11/xorg.conf should be removed to ensure that X server starts on Tesla products:

```
Option      "UseDisplayDevice" "None"
```

Tesla products now support one display of up to 4K resolution.

Unified Memory Support

Some Unified Memory APIs (for example, CPU page faults) are not supported on Windows in this version of the driver. Review the CUDA Programming Guide on the system requirements for Unified Memory

CUDA and unified memory is not supported when used with Linux power management states S3/S4.

IMPU FRU for Volta GPUs

The driver does not support the IPMI FRU multi-record information structure for NVLink. See the Design Guide for Tesla P100 and Tesla V100-SXM2 for more information.

Video Memory Support

For Windows 7 64-bit, this driver recognizes up to the total available video memory on Tesla cards for Direct3D and OpenGL applications.

For Windows 7 32-bit, this driver recognizes only up to 4 GB of video memory on Tesla cards for DirectX, OpenGL, and CUDA applications.

Experimental OpenCL Features

Select features in OpenCL 2.0 are available in the driver for evaluation purposes only.

The following are the features as well as a description of known issues with these features in the driver:

Device side enqueue

- ▶ The current implementation is limited to 64-bit platforms only.
- ▶ OpenCL 2.0 allows kernels to be enqueued with `global_work_size` larger than the compute capability of the NVIDIA GPU. The current implementation supports only combinations of `global_work_size` and `local_work_size` that are within the compute capability of the NVIDIA GPU. The maximum supported CUDA grid and block size of NVIDIA GPUs is available at <http://docs.nvidia.com/cuda/cuda-c-programming-guide/index.html#computecapabilities>. For a given grid dimension, the `global_work_size` can be determined by CUDA grid size x CUDA block size.

- ▶ For executing kernels (whether from the host or the device), OpenCL 2.0 supports non-uniform ND-ranges where `global_work_size` does not need to be divisible by the `local_work_size`. This capability is not yet supported in the NVIDIA driver, and therefore not supported for device side kernel enqueues.

Shared virtual memory

- ▶ The current implementation of shared virtual memory is limited to 64-bit platforms only.

1.4. Virtualization

To make use of GPU passthrough with virtual machines running Windows and Linux, the hardware platform must support the following features:

- ▶ A CPU with hardware-assisted instruction set virtualization: Intel VT-x or AMD-V.
- ▶ Platform support for I/O DMA remapping.
- ▶ On Intel platforms the DMA remapper technology is called Intel VT-d.
- ▶ On AMD platforms it is called AMD IOMMU.

Support for these feature varies by processor family, product, and system, and should be verified at the manufacturer's website.

Supported Hypervisors

The following hypervisors are supported:

Hypervisor	Notes
Citrix XenServer	Version 6.0 and later
VMware vSphere (ESX / ESXi)	Version 5.1 and later.
Red Hat KVM	Red Hat Enterprise Linux 7 with KVM
Microsoft Hyper-V	Windows Server 2016 Hyper-V Generation 2

Tesla products now support one display of up to 4K resolution.

Supported Graphics Cards

The following GPUs are supported for device passthrough:

GPU Family	Boards Supported
Turing	Tesla: T4
Volta	Tesla: V100
Pascal	Tesla: P100, P40, P4

GPU Family	Boards Supported
Maxwell	Tesla: M60, M40, M6, M4
Kepler	Tesla: K520, K80

Chapter 2.

HARDWARE AND SOFTWARE SUPPORT

Support for these feature varies by processor family, product, and system, and should be verified at the manufacturer's website.

Supported Operating Systems

The Release 440 driver is supported on the following operating systems:

- ▶ Windows 64-bit operating systems:
 - ▶ Microsoft Windows® Server 2019
 - ▶ Microsoft Windows® Server 2016
 - ▶ Microsoft Windows® Server 2012 R2
 - ▶ Microsoft Windows® 10
 - ▶ Microsoft Windows® 8.1 (**Not supported starting with Volta**)
 - ▶ Microsoft Windows® 7 (**Not supported starting with Volta**)
- ▶ Linux 64-bit distributions:
 - ▶ Red Hat Enterprise Linux 8.1
 - ▶ Red Hat Enterprise Linux 8.0
 - ▶ Red Hat Enterprise Linux 7.7
 - ▶ Red Hat Enterprise Linux 6.10 (**Deprecated**)
 - ▶ SUSE Linux Enterprise Server 15.1
 - ▶ SUSE Linux Enterprise Server 12.4 (Service Pack 4)
 - ▶ Ubuntu 18.04.3 LTS
 - ▶ Ubuntu 16.04.6 LTS
 - ▶ Fedora 29
 - ▶ OpenSUSE Leap 15.1

API Support

This release supports the following APIs:

- ▶ NVIDIA[®] CUDA[®] 10.1 for NVIDIA[®] Kepler[™], Maxwell[™], Pascal[™], Volta[™] and Turing[™] GPUs
- ▶ OpenGL[®] 4.5
- ▶ Vulkan[®] 1.1
- ▶ DirectX 11
- ▶ DirectX 12 (Windows 10)
- ▶ Open Computing Language (OpenCL[™] software) 1.2

Note that for using graphics APIs on Windows (i.e. OpenGL, Vulkan, DirectX 11 and DirectX 12) or any WDDM 2.0+ based functionality on Tesla GPUs, vGPU is required. See the [vGPU documentation](#) for more information.

Supported NVIDIA Tesla GPUs

The Tesla driver package is designed for systems that have one or more Tesla products installed. This release of the Tesla driver supports CUDA C/C++ applications and libraries that rely on the CUDA C Runtime and/or CUDA Driver API.

Tesla Server Platforms	
Product	Architecture
NVIDIA HGX-2	V100 and NVSwitch

Tesla T-Series Products	
Product	GPU Architecture
NVIDIA Tesla T4	Turing

Tesla V-Series Products	
Product	GPU Architecture
NVIDIA Tesla V100	Volta

Tesla P-Series Products	
Product	GPU Architecture
NVIDIA Tesla P100	Pascal
NVIDIA Tesla P40	Pascal
NVIDIA Tesla P4	Pascal

Tesla K-Series Products	
Product	GPU Architecture
NVIDIA Tesla K520	Kepler
NVIDIA Tesla K80	Kepler

Tesla M-Class Products	
Product	GPU Architecture
NVIDIA Tesla M60	Maxwell
NVIDIA Tesla M40 24 GB	Maxwell
NVIDIA Tesla M40	Maxwell
NVIDIA Tesla M6	Maxwell
NVIDIA Tesla M4	Maxwell

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