# Tesla Driver version 418.165.02 (Linux)/426.94 (Windows)

Release Notes

RN-08625-418.165.02_426.94 _v01 | September 2020

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# Chapter 1. Version Highlights

This section provides highlights of the NVIDIA Tesla 418 Driver, version 418.165.02 for Linux and 426.94 for Windows. For changes related to the 418 release of the NVIDIA display driver, review the file "NVIDIA_Changelog" available in the .run installer packages.

Driver release date: 9/30/2020

## 1.1. Fixed Issues

- Various security issues were addressed, for additional details on the med-high severity issues, review the NVIDIA Security Bulletin 5075 .

## 1.2. 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 Data Center GPU 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 data center 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 data center cards for Direct3D and OpenGL applications.

For Windows 7 32-bit, this driver recognizes only up to 4 GB of video memory on data center 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.

# 1.3. 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 |
| 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 / CentOS 8.y (where y <= 2)
  - Red Hat Enterprise Linux / CentOS 7.y (where y <= 8)
  - Red Hat Enterprise Linux / CentOS 6.10 (**Deprecated**)
  - SUSE Linux Enterprise Server 15.1
  - SUSE Linux Enterprise Server 12.4 (Service Pack 4)
  - Ubuntu 18.04.z LTS (where z <= 4)
  - Ubuntu 16.04.z LTS (where z <= 6)
  - 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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