



NVIDIA Data Center GPU Driver version 573.96 (Windows)

Release Notes

Table of Contents

Chapter 1. Version Highlights.....	1
1.1. Software Versions.....	1
1.2. Fixed Issues.....	1
1.3. Known Issues.....	2
Chapter 2. Virtualization.....	6
Chapter 3. Hardware and Software Support.....	8

Chapter 1. Version Highlights

This section provides highlights of the NVIDIA Data Center GPU R570 Driver (version 573.96 Windows).

For changes related to the 570 release of the NVIDIA display driver, review the file "NVIDIA_Changelog" available in the .run installer packages.

- ▶ Linux driver release date: 01/08/2026
- ▶ Windows driver release date: 01/08/2026

1.1. Software Versions

For this release, the software versions are as follows:

- ▶ CUDA Toolkit 12: 12.x
Note that starting with CUDA 11, individual components of the toolkit are versioned independently. For a full list of the individual versioned components (for example, nvcc, CUDA libraries, and so on), see the [CUDA Toolkit Release Notes](#).
- ▶ NVIDIA Data Center GPU Driver: 573.96 (Windows)
- ▶ NVFlash: 5.791

For more information on getting started with the NVIDIA Fabric Manager on NVSwitch-based systems (for example, NVIDIA HGX A100), refer to the [Fabric Manager User Guide](#).

1.2. Fixed Issues

- ▶ Set GPU health after the link state has been set to down for remove operations.
- ▶ GFM will request RM to retry MCFLA allocations if it detects a packet loss.
- ▶ Fixed RM's credit check code for RM-MSE communication.
- ▶ Whenever GFM restarts with `FABRIC_MODE_RESTART` config set to 1, if a partition is determined to be unhealthy, we trigger the reroute flow to reassign trunk links and get the partition to a healthy state.
- ▶ For GB20x and GB20y, GDMA HW deadlocks no longer occur under high load situations.

- ▶ Enable RM-based retry mechanism. LFM/GFM now returns `NV_ERR_BUSY_RETRY` when segment timeouts are hit. RM that supports this feature will then re-submit requests.
- ▶ Eliminated the Fabric Manager circular dependency by avoiding taking the lock.
- ▶ Enabled workaround against GDMA HW deadlock under high load situations for non CC mode. CC mode does not currently have enough DTCM for this workaround.
- ▶ Remove the old workaround in the NVIDIA driver to promote all spinlocks to raw spinlocks under `PREEMPT_RT`, which are no longer necessary.
- ▶ Aliasing of UVM gpu objects was fixed by adjusting their lookup in the RM `nv_gpu_ops` layer.
- ▶ Adjust event processing to handle the other order of events being generated, so that IMEX properly cleans up and establishes new connections and data streams.

1.3. Known Issues

- ▶ In Hopper-based systems that contain an NVSwitch (HGX Platform), some intra-node NCCL operations (via `nccl-tests`) that use the NVSwitch by forcing `NCCL_ALGO=NVL5` may result in out-of-bounds values being observed. This behavior is believed to be topology-induced and originates in software. It is specific to NVL4, and the suggested workaround is to use a different `NCCL_ALGO` (or leave `NCCL_ALGO` unset) while a fix is further investigated.
- ▶ This version of the GPU driver will fail to initialize on systems with Hopper GPUs subrevision = 3 and VBIOS versions older than 96.00.68.00.xx. Please ensure the system is using a VBIOS version 96.00.68.00.xx or newer before upgrading to this version of the driver.
- ▶ When upgrading from ClosedRM to OpenRM, `nvidia-smi` may fail.

Workaround

Run the following commands:

```
sudo rpm -e nvidia-open-driver-G06-kmp-default --nodeps
sudo zypper in nvidia-driver-G06-kmp-default
sudo zypper install -y nvidia-open-570
```

- ▶ The default TCC mode in the NVIDIA driver does not support IOMMU-based isolation (necessary for Windows features such as DMA protection, kernel DMA guard, virtualization-based security, etc.). The impacted GPUs are NVIDIA L40, NVIDIA L40S, NVIDIA L20, NVIDIA L4, and NVIDIA RTX PRO 6000 Blackwell Server Edition.
- ▶ When installing the `nvlink5-570` package, there is a potential version mismatch with its dependencies, specifically `nvidia-fabric-manager`, `libnvidia-nscq`, `libnvsm` and `nvidia-imex`. The `nvlink5-570` package requires dependencies that are expected to be of the same version (570.148.08 or higher) to ensure compatibility, particularly with the `nvls` and its dependency on `nvidia-fabric-manager`.

Workaround

Downgrade Packages: For the packages with the wrong major version, you need to downgrade them to the required version (570).

You can use the zypper package manager on OpenSUSE to perform these downgrades.

Example Commands for Downgrading:

You can use the zypper package manager on OpenSUSE to perform these downgrades.

```
zypper remove \
    libnvidia-nscq-575 \
    libnvdsdm-575 \
    nvidia-fabric-manager \
    nvidia-imex

zypper install \
    libnvidia-nscq-570 \
    libnvdsdm-570 \
    nvidia-imex-570 \
    nvidia-fabric-manager=570.148.08-1
```

Verify Versions: After downgrading, verify the installed versions to ensure they meet the requirements.

```
rpm -qa | grep -Ei 'collectx|mft|nvlsdm|nscq|nvdsdm|fabric|imex|open-570' | sort
```

Resolution

- This issue is recognized and will be addressed in the upcoming TeslaRD releases (versions 575 and 580). Future releases will ensure that all dependencies are aligned to prevent such mismatches.

Action Required

- Users are advised to manually verify and align the versions of the dependencies with the TRD version 570.148.08 or higher during installation.
- Stay updated with the release notes for versions 575 and 580 for the resolution of this issue.

Disable GPU initiated RO traffic on Ada Lovelace and older GPUs

Historically, for GPUDirect P2P over PCIe (i.e., not for NVLink where that may apply), Ada Lovelace and older GPU architectures rely on the host platform to keep the order of GPU-initiated posted PCIe transactions targeting a peer GPU, regardless of the Relaxed Ordering (RO) bit. That is due to a hardware issue.

It was later noted that some data center platforms, like those based on Intel Xeon (codenamed Sapphire Rapids) and later, do not provide that guarantee. Therefore, using GPUDirect P2P may lead to run-time silent data corruption. For example, see below for the data validation errors possibly detected by simpleP2P :

```
$ cuda-samples/Samples/0_Introduction/simpleP2P/simpleP2P
...
Checking for multiple GPUs...
CUDA-capable device count: 3

Checking GPU(s) for support of peer to peer memory access...
> Peer access from NVIDIA A2 (GPU0) -> NVIDIA A2 (GPU1) : Yes
> Peer access from NVIDIA A2 (GPU0) -> NVIDIA A2 (GPU2) : Yes
> Peer access from NVIDIA A2 (GPU1) -> NVIDIA A2 (GPU0) : Yes
> Peer access from NVIDIA A2 (GPU1) -> NVIDIA A2 (GPU2) : Yes
> Peer access from NVIDIA A2 (GPU2) -> NVIDIA A2 (GPU0) : Yes
```

```

> Peer access from NVIDIA A2 (GPU2) -> NVIDIA A2 (GPU1) : Yes
Enabling peer access between GPU0 and GPU1...
Allocating buffers (64MB on GPU0, GPU1 and CPU Host)...
Creating event handles...
cudaMemcpyPeer / cudaMemcpy between GPU0 and GPU1: 9.66GB/s
Preparing host buffer and memcpy to GPU0...
Run kernel on GPU1, taking source data from GPU0 and writing to GPU1...
Run kernel on GPU0, taking source data from GPU1 and writing to GPU0...
Copy data back to host from GPU0 and verify results...
Verification error @ element 0: val = 5888.000000, ref = 0.000000
Verification error @ element 1: val = 5892.000000, ref = 4.000000
Verification error @ element 2: val = 5896.000000, ref = 8.000000
Verification error @ element 3: val = 5900.000000, ref = 12.000000
Verification error @ element 4: val = 5904.000000, ref = 16.000000
Verification error @ element 5: val = 5908.000000, ref = 20.000000
Verification error @ element 6: val = 5912.000000, ref = 24.000000
Verification error @ element 7: val = 5916.000000, ref = 28.000000
Verification error @ element 8: val = 5920.000000, ref = 32.000000
Verification error @ element 9: val = 5924.000000, ref = 36.000000
Verification error @ element 10: val = 5928.000000, ref = 40.000000
Verification error @ element 11: val = 5932.000000, ref = 44.000000
Disabling peer access...
Shutting down...
Test failed!

```

In GPU drivers 525 and newer, the issue is mitigated. The mitigation relies on disabling Relaxed Ordering traffic for all GPU-initiated PCIe transactions, including toward host memory. At load time, the GPU kernel-mode driver enables the mitigation based on the vendor and device IDs of the PCIe host bridge.

Note that other host platforms may be affected by the same issue, and that its occurrence may be influenced by the specific platform configuration; for example, whether the IOMMU is enabled, or whether the GPU-to-GPU traffic runs over the inter-socket bus.

More recently it has been noted that since the exact platform PCIe topology may not always be exposed to the GPU driver — for example, when running on the guest OS within a Virtual Machine (VM) — the mitigation might not be applied even when necessary. This is currently tracked as a known issue.

Workaround

When in doubt, consider forcefully disabling all GPU initiated Relaxed Ordering PCIe transactions. As an example, see the sequence below:

1. Enable persistence mode, using the NVIDIA persistence daemon. As a fallback, use `nvidia-smi -pm 1`.
2. Disable Relaxed Ordering in the GPU PCIe config space as shown below.
3. Run the applications.

The config space change:

```

# Take note of the current value:
$ setpci -s <GPU BDF> CAP_EXP+8.w
# Write back the original value after resetting bit 4 to 0
$ setpci -s <GPU BDF> CAP_EXP+8.w=<modified value>

```

Alternatively, that can be done in a single invocation:

```

$ setpci -s <GPU BDF> CAP_EXP+8.w=0x0000:0x0010

```

For reference, before applying that change:

```
$ sudo lspci -s 09:00.0 -vv
09:00.0 3D controller: NVIDIA Corporation Device 2235 (rev a1)
...
    Capabilities: [78] Express (v2) Legacy Endpoint, MSI 00
        DevCap: MaxPayload 256 bytes, PhantFunc 0, Latency L0s unlimited, L1
<64us
                ExtTag+ AttnBtn- AttnInd- PwrInd- RBE+ FLReset+
    DevCtl: CorrErr- NonFatalErr- FatalErr- UnsupReq-
                RlxdOrd+ ExtTag+ PhantFunc- AuxPwr- NoSnoop+ FLReset-
                MaxPayload 256 bytes, MaxReadReq 512 bytes
...
$ sudo setpci -s 09:00.0 CAP_EXP+8.w
2930
```

After applying the suggested change:

```
$ sudo setpci -s 09:00.0 CAP_EXP+8.w=0x0000:0x0010
$ sudo setpci -s 09:00.0 CAP_EXP+8.w
2920
$ sudo lspci -s 09:00.0 -vv
09:00.0 3D controller: NVIDIA Corporation Device 2235 (rev a1)
...
    Capabilities: [78] Express (v2) Legacy Endpoint, MSI 00
        DevCap: MaxPayload 256 bytes, PhantFunc 0, Latency L0s unlimited, L1
<64us
                ExtTag+ AttnBtn- AttnInd- PwrInd- RBE+ FLReset+
    DevCtl: CorrErr- NonFatalErr- FatalErr- UnsupReq-
                RlxdOrd- ExtTag+ PhantFunc- AuxPwr- NoSnoop+ FLReset-
                MaxPayload 256 bytes, MaxReadReq 512 bytes
...

```

Note the RlxdOrd bit of the DevCtl register flipping its value.

Chapter 2. 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 features varies by processor family, product, and system, and should be verified at the manufacturer's website.

The following hypervisors are supported for virtualization:

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 2019 Hyper-V Generation 2

Data Center products now support one display of up to 2560x1600 resolution.

The following GPUs are supported for device passthrough for virtualization:

GPU Family	Boards Supported
NVIDIA Blackwell	NVIDIA HGX GB200 NVL, NVIDIA HGX B200
NVIDIA Grace Hopper	NVIDIA GH200
NVIDIA Hopper	NVIDIA H100, NVIDIA H800
NVIDIA Ada Lovelace	NVIDIA L40, L4, L2, L20
NVIDIA Ampere GPU Architecture	NVIDIA A800, A100, A40, A30, A16, A10, A10G, A2, AX800
NVIDIA Turing	NVIDIA T4, NVIDIA T4G
NVIDIA Volta	NVIDIA V100

GPU Family	Boards Supported
NVIDIA Pascal	Quadro: P2000, P4000, P5000, P6000, GP100 Tesla: P100, P40, P4
NVIDIA Maxwell	Quadro: K2200, M2000, M4000, M5000, M6000, M6000 24GB Tesla: M60, M40, M6, M4

Chapter 3. Hardware and Software Support

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

Supported Operating Systems for NVIDIA Data Center GPUs

The Release 570 driver is supported on the following operating systems:

- ▶ Windows x86_64 operating systems:
 - ▶ Microsoft Windows® Server 2025 24H2
 - ▶ Microsoft Windows® Server 2022 21H2
 - ▶ Microsoft Windows® 11 24H2 - SV4
 - ▶ Microsoft Windows® 11 23H2
 - ▶ Microsoft Windows® 11 22H2 - SV2
 - ▶ Microsoft Windows® 10 22H2

Supported Operating Systems and CPU Configurations for NVIDIA HGX B200

- ▶ Windows 64-bit distributions:
 - ▶ Windows Server 2022

Supported Operating Systems and CPU Configurations for NVIDIA HGX H20

- ▶ Windows 64-bit distributions:
 - ▶ Windows Server 2025
 - ▶ Windows Server 2022

Supported Operating Systems and CPU Configurations for NVIDIA HGX H200

The Release 570 driver is validated with NVIDIA HGX H200 on the following operating systems and CPU configurations:

- ▶ Windows 64-bit distributions:
 - ▶ Windows Server 2025
 - ▶ Windows Server 2022
 - ▶ Windows is supported only in shared NVSwitch virtualization configurations.

Supported Operating Systems and CPU Configurations for NVIDIA HGX H100/H800

The Release 570 driver is validated with NVIDIA HGX H100 on the following operating systems and CPU configurations:

- ▶ Windows 64-bit distributions:
 - ▶ Windows Server 2025
 - ▶ Windows Server 2022
 - ▶ Windows is supported only in shared NVSwitch virtualization configurations.

Supported Operating Systems and CPU Configurations for NVIDIA HGX A100/A800

The Release 570 driver is validated with NVIDIA HGX A100 on the following operating systems and CPU configurations:

- ▶ Windows 64-bit distributions:
 - ▶ Windows Server 2025
 - ▶ Windows Server 2022
 - ▶ Windows is supported only in shared NVSwitch virtualization configurations.
- ▶ CPU Configurations:
 - ▶ AMD Rome in PCIe Gen4 mode
 - ▶ Intel Skylake/Cascade Lake (4-socket) in PCIe Gen3 mode

API Support

This release supports the following APIs:

- ▶ NVIDIA® CUDA® 12.x for NVIDIA® Maxwell™, Pascal™, Volta™, Turing™, Hopper™, NVIDIA Ampere architecture, and NVIDIA Ada Lovelace architecture GPUs

- ▶ OpenGL® 4.6
- ▶ Vulkan® 1.3
- ▶ DirectX 11
- ▶ DirectX 12 (Windows 10)
- ▶ Open Computing Language (OpenCL™ software) 3.0

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

Supported NVIDIA Data Center GPUs

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

Attention: Release 470 was the last driver branch to support Data Center GPUs based on the NVIDIA Kepler architecture. This includes discontinued support for the following compute capabilities:

- ▶ sm_30 (NVIDIA Kepler)
- ▶ sm_32 (NVIDIA Kepler)
- ▶ sm_35 (NVIDIA Kepler)
- ▶ sm_37 (NVIDIA Kepler)

For more information on GPU products and compute capability, see <https://developer.nvidia.com/cuda-gpus>.

NVIDIA Server Platforms	
Product	Architecture
NVIDIA HGX GB200 NVL	GB200 and NVLink
NVIDIA HGX B200 8-GPU	B200 and NVSwitch
NVIDIA HGX H20-3e 8-GPU	H20 and NVSwitch
NVIDIA HGX H20 8-GPU	H20 and NVSwitch
NVIDIA HGX H200 8-GPU	H200 and NVSwitch
NVIDIA HGX H100 8-GPU	H100 and NVSwitch
NVIDIA HGX H800 8-GPU	H800 and NVSwitch
NVIDIA HGX H100 4-GPU	H100 and NVLink
NVIDIA HGX A800 8-GPU	A800 and NVSwitch
NVIDIA HGX A100 8-GPU	A100 and NVSwitch
NVIDIA HGX A100 4-GPU	A100 and NVLink

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

Data Center H-Series Products	
Product	GPU Architecture
NVIDIA H100 PCIe	NVIDIA Hopper
NVIDIA H100 NVL	NVIDIA Hopper
NVIDIA H200 NVL	NVIDIA Hopper
NVIDIA H800 PCIe	NVIDIA Hopper
NVIDIA H800 NVL	NVIDIA Hopper

Data Center L-Series Products	
Product	GPU Architecture
NVIDIA L2	NVIDIA Ada Lovelace
NVIDIA L20	NVIDIA Ada Lovelace
NVIDIA L40	NVIDIA Ada Lovelace
NVIDIA L40S	NVIDIA Ada Lovelace
NVIDIA L4	NVIDIA Ada Lovelace

RTX-Series / T-Series Products	
Product	GPU Architecture
NVIDIA RTX PRO 6000 Blackwell Workstation Edition	NVIDIA Blackwell
NVIDIA RTX PRO 6000 Blackwell Max-Q Workstation Edition	NVIDIA Blackwell
NVIDIA RTX PRO 5000 Blackwell	NVIDIA Blackwell
NVIDIA RTX PRO 4500 Blackwell	NVIDIA Blackwell
NVIDIA RTX PRO 4000 Blackwell	NVIDIA Blackwell
NVIDIA RTX 6000 Ada Generation	NVIDIA Ada Lovelace
NVIDIA RTX 5880 Ada Generation	NVIDIA Ada Lovelace
NVIDIA RTX 5000 Ada Generation	NVIDIA Ada Lovelace
NVIDIA RTX 4500 Ada Generation	NVIDIA Ada Lovelace
NVIDIA RTX 4000 Ada Generation	NVIDIA Ada Lovelace
NVIDIA RTX 4000 SFF Ada Generation	NVIDIA Ada Lovelace

RTX-Series / T-Series Products	
Product	GPU Architecture
NVIDIA RTX 2000 Ada Generation	NVIDIA Ada Lovelace
NVIDIA RTX 2000E Ada Generation	NVIDIA Ada Lovelace
NVIDIA RTX A6000	NVIDIA Ampere architecture
NVIDIA RTX A5500	NVIDIA Ampere architecture
NVIDIA RTX A5000	NVIDIA Ampere architecture
NVIDIA RTX A4500	NVIDIA Ampere architecture
NVIDIA RTX A4000H	NVIDIA Ampere architecture
NVIDIA RTX A4000	NVIDIA Ampere architecture
NVIDIA RTX A2000 12GB	NVIDIA Ampere architecture
NVIDIA RTX A2000	NVIDIA Ampere architecture
NVIDIA RTX A1000	NVIDIA Ampere architecture
NVIDIA RTX A400	NVIDIA Ampere architecture
NVIDIA RTX A800 40GB Active	NVIDIA Ampere architecture
Quadro RTX 8000	NVIDIA Turing
Quadro RTX 6000	NVIDIA Turing
Quadro RTX A6000	NVIDIA Turing
Quadro RTX 5000	NVIDIA Turing
Quadro RTX A5000	NVIDIA Turing
Quadro RTX 4000	NVIDIA Turing
Quadro RTX A4000	NVIDIA Turing
NVIDIA T1000 8GB	NVIDIA Turing
NVIDIA T600	NVIDIA Turing
NVIDIA T400 4GB	NVIDIA Turing
NVIDIA T400	NVIDIA Turing
NVIDIA T400E	NVIDIA Turing

Data Center A-Series Products	
Product	GPU Architecture
NVIDIA A2	NVIDIA Ampere architecture
NVIDIA A800, AX800	NVIDIA Ampere architecture
NVIDIA A100X	NVIDIA Ampere architecture
NVIDIA A100	NVIDIA Ampere architecture

Data Center A-Series Products	
Product	GPU Architecture
NVIDIA A100 80 GB PCIe	
NVIDIA A40	NVIDIA Ampere architecture
NVIDIA A30, A30X	NVIDIA Ampere architecture
NVIDIA A16	NVIDIA Ampere architecture
NVIDIA A10, A10M, A10G	NVIDIA Ampere architecture

Data Center T-Series Products	
Product	GPU Architecture
NVIDIA T4, T4G	NVIDIA Turing

Data Center V-Series Products	
Product	GPU Architecture
NVIDIA V100	Volta

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

Data Center 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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