



Virtual GPU Software R450 for Microsoft Windows Server

Release Notes

Table of Contents

Chapter 1. Release Notes.....	1
1.1. NVIDIA vGPU Software Driver Versions.....	1
1.2. Updates in Release 11.0.....	1
1.3. Updates in Release 11.1.....	2
Chapter 2. Validated Platforms.....	3
2.1. Supported NVIDIA GPUs and Validated Server Platforms.....	3
2.2. Hypervisor Software Releases.....	4
2.3. Guest OS Support.....	4
2.3.1. Windows Guest OS Support.....	5
2.3.2. Linux Guest OS Support.....	6
Chapter 3. Known Issues.....	7
3.1. Since 11.1: Licensing event logs indicate license renewal from unavailable primary server.....	7
3.2. NVIDIA Control Panel fails to start if launched too soon from a VM without licensing information.....	7
3.4. Remoting solution session freezes with VGPU message 21 failed and VGPU message 14 failed errors.....	9
3.5. On Linux, the frame rate might drop to 1 after several minutes.....	9
3.6. Microsoft DDA fails with some GPUs.....	10
3.7. DWM crashes randomly occur in Windows VMs.....	11
3.8. NVIDIA vGPU software graphics driver fails after Linux kernel upgrade with DKMS enabled.....	12
3.9. Blue screen crash occurs or no devices are found after VM reset.....	13
3.10. Publisher not verified warning during Windows 7 driver installation.....	13
3.11. Frame capture while the interactive logon message is displayed returns blank screen.....	14
3.12. RDS sessions do not use the GPU with some Microsoft Windows Server releases.....	15
3.13. A segmentation fault in DBus code causes nvidia-gridd to exit on Red Hat Enterprise Linux and CentOS.....	15
3.14. No Manage License option available in NVIDIA X Server Settings by default.....	16
3.15. Licenses remain checked out when VMs are forcibly powered off.....	17

Chapter 1. Release Notes

These *Release Notes* summarize current status, information on validated platforms, and known issues with NVIDIA vGPU software and associated hardware on Microsoft Windows Server.



Note: The most current version of the documentation for this release of NVIDIA vGPU software can be found online at [NVIDIA Virtual GPU Software Documentation](#).

1.1. NVIDIA vGPU Software Driver Versions

Each release in this release family of NVIDIA vGPU software includes a specific version of the NVIDIA Windows driver and NVIDIA Linux driver.

Software	11.0	11.1
NVIDIA Windows driver	451.48	452.39
NVIDIA Linux driver	450.51.05	450.80.02



Note: All releases in this release family of NVIDIA vGPU software are compatible with **all** releases of the NVIDIA vGPU software license server.

1.2. Updates in Release 11.0

New Features in Release 11.0

- ▶ Licensing grace period for unlicensed GPUs
An unlicensed GPU initially operates at full capability but its performance is degraded over time if a license is not obtained.
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.0

- ▶ Support for Windows 10 May 2020 Update (2004) as a guest OS

Feature Support Withdrawn in Release 11.0

- ▶ The following guest OS releases are no longer supported:
 - ▶ Windows Server 2012
 - ▶ Windows Server 2008 R2
 - ▶ Windows 8.1
 - ▶ Windows 8
 - ▶ Windows 7

1.3. Updates in Release 11.1

New Features in Release 11.1

- ▶ Security updates - see [Security Bulletin: NVIDIA GPU Display Driver - September 2020](#)
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.1

- ▶ Support for the following GPUs:
 - ▶ NVIDIA A100 PCIe 40GB
 - ▶ NVIDIA A100 HGX 40GB
- ▶ Support for the Red Hat Enterprise Linux 7.9 as a guest OS

Feature Support Withdrawn in Release 11.1

- ▶ Windows Server 2012 R2 is no longer supported as a guest OS with GPUs based on architectures after NVIDIA Turing™ architecture.

Chapter 2. Validated Platforms

This release family of NVIDIA vGPU software provides support for several NVIDIA GPUs on validated server hardware platforms, Microsoft Windows Server hypervisor software versions, and guest operating systems.

2.1. Supported NVIDIA GPUs and Validated Server Platforms

This release of NVIDIA vGPU software provides support for the following NVIDIA GPUs on Microsoft Windows Server, running on validated server hardware platforms:

- ▶ GPUs based on the NVIDIA Maxwell™ graphic architecture:
 - ▶ Tesla M6
 - ▶ Tesla M10
 - ▶ Tesla M60
- ▶ GPUs based on the NVIDIA Pascal™ architecture:
 - ▶ Tesla P4
 - ▶ Tesla P6
 - ▶ Tesla P40
 - ▶ Tesla P100 PCIe 16 GB
 - ▶ Tesla P100 SXM2 16 GB
 - ▶ Tesla P100 PCIe 12GB
- ▶ GPUs based on the NVIDIA Volta architecture:
 - ▶ Tesla V100 SXM2
 - ▶ Tesla V100 SXM2 32GB
 - ▶ Tesla V100 PCIe
 - ▶ Tesla V100 PCIe 32GB
 - ▶ Tesla V100S PCIe 32GB
 - ▶ Tesla V100 FHHL

- ▶ GPUs based on the NVIDIA Turing™ architecture:
 - ▶ Tesla T4
 - ▶ Quadro RTX 6000 in displayless mode
 - ▶ Quadro RTX 6000 passive in displayless mode
 - ▶ Quadro RTX 8000 in displayless mode
 - ▶ Quadro RTX 8000 passive in displayless mode

In displayless mode, local physical display connectors are disabled.

- ▶ GPUs based on the NVIDIA Ampere architecture:
 - ▶ **Since 11.1:** NVIDIA A100 PCIe 40GB
 - ▶ **Since 11.1:** NVIDIA A100 HGX 40GB



Note: These GPUs are supported as a secondary device in a bare-metal deployment. Tesla M6 is also supported as the primary display device in a bare-metal deployment.

For a list of validated server platforms, refer to [NVIDIA GRID Certified Servers](#).

2.2. Hypervisor Software Releases

This release supports **only** the hypervisor software versions listed in the table.



Note: If a specific release, even an update release, is not listed, it's **not** supported.

Software	Version Supported	Notes
Microsoft Windows Server 2019	Windows Server 2019 with Hyper-V role	
Microsoft Windows Server 2016	Windows Server 2016 1803 with Hyper-V role Windows Server 2016 1709 with Hyper-V role Windows Server 2016 1607 with Hyper-V role	Not supported on the following GPUs: <ul style="list-style-type: none"> ▶ NVIDIA A100 PCIe 40GB ▶ NVIDIA A100 HGX 40GB

2.3. Guest OS Support

NVIDIA vGPU software supports several Windows releases and Linux distributions as a guest OS using GPU pass-through.

Microsoft Windows Server with Hyper-V role supports GPU pass-through over Microsoft Virtual PCI bus. This bus is supported through paravirtualized drivers.

**Note:**

Use only a guest OS release that is listed as supported by NVIDIA vGPU software with your virtualization software. To be listed as supported, a guest OS release must be supported not only by NVIDIA vGPU software, but also by your virtualization software. NVIDIA **cannot** support guest OS releases that your virtualization software does not support.

NVIDIA vGPU software supports **only** 64-bit guest operating systems. No 32-bit guest operating systems are supported.

2.3.1. Windows Guest OS Support

NVIDIA vGPU software supports **only** the 64-bit Windows releases listed as a guest OS on Microsoft Windows Server.

**Note:**

If a specific release, even an update release, is not listed, it's **not** supported.

- ▶ Windows Server 2019
- ▶ Windows Server 2016 1607, 1709
- ▶ Windows Server 2012 R2 with patch windows8.1-KB3133690-x64.msu (not supported on GPUs based on architectures after the NVIDIA Turing architecture)
- ▶ Windows 10
 - ▶ Windows 10 May 2020 Update (2004)
 - ▶ November 2019 Update (1909)
 - ▶ May 2019 Update (1903)
 - ▶ October 2018 Update (1809)
 - ▶ Spring Creators Update (1803)
 - ▶ Fall Creators Update (1709)
 - ▶ Creators Update (1703)
 - ▶ Anniversary Update (1607)
 - ▶ November Update (1511)
 - ▶ RTM (1507)

2.3.2. Linux Guest OS Support

NVIDIA vGPU software supports **only** the 64-bit Linux distributions listed as a guest OS on Microsoft Windows Server.

**Note:**

If a specific release, even an update release, is not listed, it's **not** supported.

- ▶ **Since 11.1:** Red Hat Enterprise Linux 7.6-7.9, 8.0, 8.1
- ▶ **11.0 only:** Red Hat Enterprise Linux 7.6-7.8, 8.0, 8.1
- ▶ CentOS 7.6, 7.7, 8.0, 8 (1911)
- ▶ Ubuntu 18.04 LTS
- ▶ Ubuntu 16.04 LTS
- ▶ SUSE Linux Enterprise Server 12 SP2

Chapter 3. Known Issues

3.1. Since 11.1: Licensing event logs indicate license renewal from unavailable primary server

Description

Licensing event logs for the guest VM indicate that a license is renewed from primary license server even when primary license server is unavailable and the license is renewed from the secondary server.

Workaround

None. However, these incorrect event log entries are benign and can be ignored.

Status

Open

Ref.

200658253

3.2. NVIDIA Control Panel fails to start if launched too soon from a VM without licensing information

Description

If NVIDIA licensing information is not configured on the system, any attempt to start **NVIDIA Control Panel** by right-clicking on the desktop within 30 seconds of the VM being started fails.

Workaround

Restart the VM and wait at least 30 seconds before trying to launch **NVIDIA Control Panel**.

Status

Open

Ref.

200623179

3.3. Citrix Virtual Apps and Desktops session corruption occurs in the form of residual window borders

Description

When a window is dragged across the desktop in a Citrix Virtual Apps and Desktops session, corruption of the session in the form of residual window borders occurs.

Version

This issue affects only Citrix Virtual Apps and Desktops version 7 2003

Workaround

Use Citrix Virtual Apps and Desktops version 7 1912 or 2006.

Status

Not an NVIDIA bug

Ref.

200608675

3.4. Remoting solution session freezes with VGPU message 21 failed and VGPU message 14 failed errors

Description

The remoting solution session sometimes freezes while a window is being resized. For a Windows guest VM, the error message `VGPU message 21 failed` is written to the log file on the hypervisor host. For a Linux guest VM, the error messages `VGPU message 21 failed` and `VGPU message 14 failed` are written to the log file on the hypervisor host.

Workaround

Try resizing the window again.

Status

Open

Ref.

200627445

3.5. On Linux, the frame rate might drop to 1 after several minutes

Description

On Linux, the frame rate might drop to 1 frame per second (FPS) after NVIDIA vGPU software has been running for several minutes. Only some applications are affected, for example, `g1xgears`. Other applications, such as Unigine Heaven, are not affected. This behavior occurs because Display Power Management Signaling (DPMS) for the Xorg server is enabled by default and the display is detected to be inactive even when the application is running. When DPMS is enabled, it enables power saving behavior of the display after several minutes of inactivity by setting the frame rate to 1 FPS.

Workaround

1. If necessary, stop the Xorg server.

```
# /etc/init.d/xorg stop
```

2. In a plain text editor, edit the `/etc/X11/xorg.conf` file to set the options to disable DPMS and disable the screen saver.

- a). In the `Monitor` section, set the `DPMS` option to `false`.

```
Option "DPMS" "false"
```

- b). At the end of the file, add a `ServerFlags` section that contains option to disable the screen saver.

```
Section "ServerFlags"
    Option "BlankTime" "0"
EndSection
```

- c). Save your changes to `/etc/X11/xorg.conf` file and quit the editor.

3. Start the Xorg server.

```
# etc/init.d/xorg start
```

Status

Open

Ref.

200605900

3.6. Microsoft DDA fails with some GPUs

Description

Microsoft Discrete Device Assignment (DDA) fails with GPUs that have more than 16 GB of GPU memory. After the NVIDIA vGPU software graphics driver is installed in the guest VM, a second display device appears on the GPU and the driver prompts for a reboot. After the reboot, the device disappears and the Microsoft Hyper-V Video device appears.

This issue occurs because less memory-mapped input/output (MMIO) space is configured for the operating system than the device requires.

Workaround

Perform this workaround in a **Windows Power Shell** window on the hypervisor host.

Set the upper MMIO space to the amount that the device requires to allow all of the MMIO to be mapped. Upper MMIO space starts at approximately 64 GB in address space.

```
Set-VM -HighMemoryMappedIoSpace mmio-space -VMName vm-name
```

mmio-space

The amount of MMIO space that the device requires, appended with the appropriate unit of measurement, for example, **64GB** for 64 GB of MMIO space.

The required amount of MMIO space depends on the amount of BAR1 memory on the installed GPUs and the number of GPUs assigned to the VM as follows:

```
mmio-space = 2 # gpu-bar1-memory # assigned-gpus
```

gpu-bar1-memory

The amount of BAR1 memory on one of the installed GPUs. For example, in a server in which eight GPUs are installed and each GPU has 32 GB of BAR1 memory, *gpu-bar1-memory* is 32 GB.

assigned-gpus

The number of GPUs assigned to the VM.

vm-name

The name of the VM to which the GPU is assigned.

The following example sets the upper MMIO space to 64 GB for the VM named `mygpupvm`, to which one GPU with 32 GB of BAR1 memory is assigned.

```
Set-VM -HighMemoryMappedIoSpace 64GB -VMName mygpupvm
```

For more information, see [Deploy graphics devices using Discrete Device Assignment](#) on the Microsoft technical documentation site.

Status

Not an NVIDIA bug

Ref.

2812853

3.7. DWM crashes randomly occur in Windows VMs

Description

Desktop Windows Manager (DWM) crashes randomly occur in Windows VMs, causing a blue-screen crash and the bug check `CRITICAL_PROCESS_DIED`. Computer Management shows problems with the primary display device.

Version

This issue affects Windows 10 1809, 1903 and 1909 VMs.

Status

Not an NVIDIA bug

Ref.

2730037

3.8. NVIDIA vGPU software graphics driver fails after Linux kernel upgrade with DKMS enabled

Description

After the Linux kernel is upgraded (for example by running `sudo apt full-upgrade`) with Dynamic Kernel Module Support (DKMS) enabled, the `nvidia-smi` command fails to run. If DKMS is enabled, an upgrade to the Linux kernel triggers a rebuild of the NVIDIA vGPU software graphics driver. The rebuild of the driver fails because the compiler version is incorrect. Any attempt to reinstall the driver fails because the kernel fails to build.

When the failure occurs, the following messages are displayed:

```
-> Installing DKMS kernel module:
    ERROR: Failed to run `/usr/sbin/dkms build -m nvidia -v 450.51.05 -k
5.3.0-28-generic`:
    Kernel preparation unnecessary for this kernel. Skipping...
    Building module:
    cleaning build area...
    'make' -j8 NV_EXCLUDE_BUILD_MODULES='' KERNEL_UNAME=5.3.0-28-generic
IGNORE_CC_MISMATCH='' modules...(bad exit status: 2)
    ERROR (dkms apport): binary package for nvidia: 450.51.05 not found
    Error! Bad return status for module build on kernel: 5.3.0-28-generic
(x86_64)
    Consult /var/lib/dkms/nvidia/450.51.05/build/make.log for more information.
-> error.
    ERROR: Failed to install the kernel module through DKMS. No kernel module
was installed;
    please try installing again without DKMS, or check the DKMS logs for more
information.
    ERROR: Installation has failed. Please see the file '/var/log/nvidia-
installer.log' for details.
    You may find suggestions on fixing installation problems in the README
available on the Linux driver download page at www.nvidia.com.
```

Workaround

When installing the NVIDIA vGPU software graphics driver with DKMS enabled, specify the `--no-cc-version-check` option.

Status

Not a bug.

Ref.

2836271

3.9. Blue screen crash occurs or no devices are found after VM reset

Description

If a VM on Microsoft Windows Server with Hyper-V role is reset from the hypervisor host, a blue screen crash (BSOD) occurs on Windows VMs and the `nvidia-smi` command reports `no devices were found` on Linux VMs. This issue occurs only with Tesla T4 GPUs with SRIOV enabled, Quadro RTX 8000 passive GPUs, and Quadro RTX 6000 passive GPUs.

Workaround

Perform a manual secondary bus reset (SBR) and restart the VM.

Status

Not an NVIDIA bug

Ref.

200567935

3.10. Publisher not verified warning during Windows 7 driver installation

Description

During installation of the NVIDIA vGPU software graphics driver for Windows on Windows 7, Windows warns that it can't verify the publisher of the driver software. If **Device Manager** is used to install the driver, **Device Manager** warns that the driver is not digitally signed. If you install the driver, error 52 (`CM_PROB_UNSIGNED_DRIVER`) occurs.

This issue occurs because Microsoft is no longer dual signing WHQL-tested software binary files by using the SHA-1 and SHA-2 hash algorithms. Instead, WHQL-tested software binary files are signed only by using the SHA-2 hash algorithm. All NVIDIA vGPU software graphics drivers for Windows are WHQL tested.

By default, Windows 7 systems cannot recognize signatures that were created by using the SHA-2 hash algorithm. As a result, software binary files that are signed only by using the SHA-2 hash algorithm are considered unsigned.

For more information, see [2019 SHA-2 Code Signing Support requirement for Windows and WSUS](#) on the Microsoft Windows support website.

Version

Windows 7

Workaround

If you experience this issue, install the following updates and restart the VM or host before installing the driver:

- ▶ Servicing stack update (SSU) ([KB4490628](#))
- ▶ SHA-2 update ([KB4474419](#))

Status

Not a bug

3.11. Frame capture while the interactive logon message is displayed returns blank screen

Description

Because of a known limitation with NvFBC, a frame capture while the interactive logon message is displayed returns a blank screen.

An NvFBC session can capture screen updates that occur after the session is created. Before the logon message appears, there is no screen update after the message is shown and, therefore, a black screen is returned instead. If the NvFBC session is created after this update has occurred, NvFBC cannot get a frame to capture.

Workaround

Press **Enter** or wait for the screen to update for NvFBC to capture the frame.

Status

Not a bug

Ref.

2115733

3.12. RDS sessions do not use the GPU with some Microsoft Windows Server releases

Description

When some releases of Windows Server are used as a guest OS, Remote Desktop Services (RDS) sessions do not use the GPU. With these releases, the RDS sessions by default use the Microsoft Basic Render Driver instead of the GPU. This default setting enables 2D DirectX applications such as Microsoft Office to use software rendering, which can be more efficient than using the GPU for rendering. However, as a result, 3D applications that use DirectX are prevented from using the GPU.

Version

- ▶ Windows Server 2019
- ▶ Windows Server 2016
- ▶ Windows Server 2012

Solution

Change the local computer policy to use the hardware graphics adapter for all RDS sessions.

1. Choose **Local Computer Policy > Computer Configuration > Administrative Templates > Windows Components > Remote Desktop Services > Remote Desktop Session Host > Remote Session Environment**.
2. Set the **Use the hardware default graphics adapter for all Remote Desktop Services sessions** option.

3.13. A segmentation fault in DBus code causes `nvidia-gridd` to exit on Red Hat Enterprise Linux and CentOS

Description

On Red Hat Enterprise Linux 6.8 and 6.9, and CentOS 6.8 and 6.9, a segmentation fault in DBus code causes the `nvidia-gridd` service to exit.

The `nvidia-gridd` service uses DBus for communication with **NVIDIA X Server Settings** to display licensing information through the **Manage License** page. Disabling the GUI for licensing resolves this issue.

To prevent this issue, the GUI for licensing is disabled by default. You might encounter this issue if you have enabled the GUI for licensing and are using Red Hat Enterprise Linux 6.8 or 6.9, or CentOS 6.8 and 6.9.

Version

Red Hat Enterprise Linux 6.8 and 6.9

CentOS 6.8 and 6.9

Status

Open

Ref.

- ▶ 200358191
- ▶ 200319854
- ▶ 1895945

3.14. No Manage License option available in NVIDIA X Server Settings by default

Description

By default, the **Manage License** option is not available in **NVIDIA X Server Settings**. This option is missing because the GUI for licensing on Linux is disabled by default to work around the issue that is described in [A segmentation fault in DBus code causes nvidia-gridd to exit on Red Hat Enterprise Linux and CentOS](#).

Workaround

This workaround requires `sudo` privileges.



Note: Do **not** use this workaround with Red Hat Enterprise Linux 6.8 and 6.9 or CentOS 6.8 and 6.9. To prevent a segmentation fault in DBus code from causing the `nvidia-gridd` service from exiting, the GUI for licensing must be disabled with these OS versions.

If you are licensing a physical GPU for vCS, you **must** use the configuration file `/etc/nvidia/gridd.conf`.

1. If **NVIDIA X Server Settings** is running, shut it down.
2. If the `/etc/nvidia/gridd.conf` file does not already exist, create it by copying the supplied template file `/etc/nvidia/gridd.conf.template`.
3. As root, edit the `/etc/nvidia/gridd.conf` file to set the `EnableUI` option to `TRUE`.
4. Start the `nvidia-gridd` service.

```
# sudo service nvidia-gridd start
```

When **NVIDIA X Server Settings** is restarted, the **Manage License** option is now available.

Status

Open

3.15. Licenses remain checked out when VMs are forcibly powered off

Description

NVIDIA vGPU software licenses remain checked out on the license server when non-persistent VMs are forcibly powered off.

The NVIDIA service running in a VM returns checked out licenses when the VM is shut down. In environments where non-persistent licensed VMs are not cleanly shut down, licenses on the license server can become exhausted. For example, this issue can occur in automated test environments where VMs are frequently changing and are not guaranteed to be cleanly shut down. The licenses from such VMs remain checked out against their MAC address for seven days before they time out and become available to other VMs.

Resolution

If VMs are routinely being powered off without clean shutdown in your environment, you can avoid this issue by shortening the license borrow period. To shorten the license borrow period, set the `LicenseInterval` configuration setting in your VM image. For details, refer to [Virtual GPU Client Licensing User Guide](#).

Status

Closed

Ref.

1694975

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