



# Virtual GPU Software R440 for VMware vSphere

Release Notes

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# 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 VMware vSphere.



**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 Virtual GPU Manager, NVIDIA Windows driver, and NVIDIA Linux driver.

Software	10.0	10.1	10.2	10.3	10.4
NVIDIA Virtual GPU Manager for the VMware vSphere releases listed in <a href="#">Hypervisor Software Releases</a>	440.43	440.53	440.87	440.107	440.121
NVIDIA Windows driver	441.66	442.06	443.05	443.46	443.66
NVIDIA Linux driver	440.43	440.56	440.87	440.107	440.118.02

## 1.2. Compatibility Requirements for the NVIDIA vGPU Manager and Guest VM Driver

The releases of the NVIDIA vGPU Manager and guest VM drivers that you install must be compatible. If you install the wrong guest VM driver release for the release of the vGPU Manager that you are using, the NVIDIA vGPU fails to load.

See [VM running an incompatible NVIDIA vGPU guest driver fails to initialize vGPU when booted.](#)



**Note:** This requirement does not apply to the NVIDIA vGPU software license server. All releases in this release family of NVIDIA vGPU software are compatible with **all** releases of the license server.

### Compatible NVIDIA vGPU Manager and Guest VM Driver Releases

The following combinations of NVIDIA vGPU Manager and guest VM driver releases are compatible with each other.

- ▶ NVIDIA vGPU Manager with guest VM drivers from the same release
- ▶ NVIDIA vGPU Manager with guest VM drivers from different releases within the same major release branch



**Note:** NVIDIA vGPU Manager from releases 10.0 through 10.2 are compatible only with guest VM drivers from releases 10.0 through 10.2.

In this situation, the combination supports only the features, hardware, and software (including guest OSes) that are supported on both releases.

- ▶ NVIDIA vGPU Manager from a later major release branch with guest VM drivers from the previous branch

In this situation, the combination supports only the features, hardware, and software (including guest OSes) that are supported on both releases.

The following table lists the specific software releases that are compatible with the components in the NVIDIA vGPU software 10 major release branch.

NVIDIA vGPU Software Component	Releases	Compatible Software Releases
NVIDIA vGPU Manager	10.0 through 10.2	Guest VM driver releases 10.0 through 10.2
	10.3 through 10.4	All guest VM driver 10.x releases
Guest VM drivers	10.0 through 10.2	▶ All NVIDIA vGPU Manager 10.x releases

NVIDIA vGPU Software Component	Releases	Compatible Software Releases
		<ul style="list-style-type: none"> <li>▶ All NVIDIA vGPU Manager 11.x releases</li> </ul>
	10.3 through 10.4	<ul style="list-style-type: none"> <li>▶ NVIDIA vGPU Manager 10.3 through 10.4</li> <li>▶ All NVIDIA vGPU Manager 11.x releases</li> </ul>

### Incompatible NVIDIA vGPU Manager and Guest VM Driver Releases

The following combinations of NVIDIA vGPU Manager and guest VM driver releases are incompatible with each other.

- ▶ Any 10.x release of NVIDIA vGPU Manager with guest VM drivers from a different major release branch
- ▶ NVIDIA vGPU Manager from releases 10.0-10.2 with guest VM drivers from releases 10.3 or later

The following table lists the specific software releases that are incompatible with the components in the NVIDIA vGPU software 10 major release branch.

NVIDIA vGPU Software Component	Releases	Incompatible Software Releases
NVIDIA vGPU Manager	10.0 through 10.2	<ul style="list-style-type: none"> <li>▶ Guest VM driver releases 10.3 through 10.4</li> <li>▶ All guest VM driver releases 11.x and later</li> <li>▶ All guest VM driver releases 9.x and earlier</li> </ul>
	10.3 through 10.4	<ul style="list-style-type: none"> <li>▶ All guest VM driver releases 11.x and later</li> <li>▶ All guest VM driver releases 9.x and earlier</li> </ul>
Guest VM drivers	10.0 through 10.2	All NVIDIA vGPU Manager releases 9.x and earlier
	10.3 through 10.4	<ul style="list-style-type: none"> <li>▶ NVIDIA vGPU Manager releases 10.0 through 10.2</li> <li>▶ All NVIDIA vGPU Manager releases 9.x and earlier</li> </ul>

## 1.3. Updates in Release 10.0

### New Features in Release 10.0

- ▶ Support for NVIDIA® GRID™ Virtual PC and GRID Virtual Applications on Quadro RTX 6000 and Quadro RTX 8000 GPUs
- ▶ Increase in the maximum number of virtual display heads supported by -1Q, -2B, and -1B4 vGPUs:

- ▶ All -1Q vGPUs now support 4 heads instead of 2 heads.
- ▶ All -2B vGPUs now support 4 heads instead of 2 heads.
- ▶ All -1B4 vGPUs now support 4 heads instead of 1 head.
- ▶ Flexible virtual display resolutions

Instead of a fixed maximum resolution per head, vGPUs now support a maximum combined resolution based on their frame buffer size. This behavior allows the same number of lower resolution displays to be used as before, but alternatively allows a smaller number of higher resolution displays to be used.

- ▶ Virtual display resolutions greater than 4096×2160
- ▶ 10-bit color
- ▶ Changes to allow cross-branch driver support in future main release branches



**Note:** This feature cannot be used until the next NVIDIA vGPU software main release branch is available.

The purpose of this change is to allow a release of the Virtual GPU Manager from a later main release branch to be used with the NVIDIA vGPU software graphics drivers for the guest VMs from the previous branch.

- ▶ Miscellaneous bug fixes

## Hardware and Software Support Introduced in Release 10.0

- ▶ Support for passively cooled Quadro RTX 6000 and Quadro RTX 8000 GPUs
- ▶ Support for Tesla V100S PCIe 32GB GPUs
- ▶ Support for Red Hat Enterprise Linux 8.1 as a guest OS
- ▶ Support for Windows 10 November 2019 Update (1909) as a guest OS
- ▶ Support for VMware Horizon 7.11

## Feature Support Withdrawn in Release 10.0

- ▶ VMware Horizon 6.2 is no longer supported.

## Features Deprecated in Release 10.0

The following table lists features that are deprecated in this release of NVIDIA vGPU software. Although the features remain available in this release, they might be withdrawn in a future release. In preparation for the possible removal of these features, use the preferred alternative listed in the table.

Deprecated Feature	Preferred Alternative
-1B4 vGPU types	-1B vGPU types
-2B4 vGPU types	-2B vGPU types

## 1.4. Updates in Release 10.1

### New Features in Release 10.1

- ▶ Miscellaneous bug fixes

### Feature Support Withdrawn in Release 10.1

- ▶ Red Hat Enterprise Linux 8.0 is no longer supported as a guest OS.

## 1.5. Updates in Release 10.2

### New Features in Release 10.2

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

### Hardware and Software Support Introduced in Release 10.2

- ▶ Support for VMware vSphere 7.0
- ▶ Support for vCenter Server 7.0
- ▶ Support for the following OS releases as a guest OS:
  - ▶ Red Hat Enterprise Linux 8.2
  - ▶ CentOS Linux 8 (1911)
  - ▶ Red Hat Enterprise Linux 7.8
  - ▶ CentOS 7.8
- ▶ Support for VMware Horizon 7.12

### Feature Support Withdrawn in Release 10.2

- ▶ The following guest OS releases are no longer supported:
  - ▶ Red Hat Enterprise Linux 7.0-7.5
  - ▶ CentOS 7.0-7.5

## 1.6. Updates in Release 10.3

### New Features in Release 10.3

- ▶ Cross-branch driver support

With the release of NVIDIA vGPU software 11.0, NVIDIA vGPU software graphics drivers for the guest VMs from this release branch can be used with the Virtual GPU Manager from NVIDIA vGPU software 11.0 and later 11.x releases

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

### Hardware and Software Support Introduced in Release 10.3

- ▶ Support for VMware Horizon 2006 (8.0)

### Feature Support Withdrawn in Release 10.3

- ▶ Microsoft Windows Server 2008 R2 is no longer supported as a guest OS

## 1.7. Updates in Release 10.4

### New Features in Release 10.4

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

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# Chapter 2. Validated Platforms

This release family of NVIDIA vGPU software provides support for several NVIDIA GPUs on validated server hardware platforms, VMware vSphere hypervisor software versions, and guest operating systems. It also supports the version of NVIDIA CUDA Toolkit that is compatible with R440 drivers.

## 2.1. Supported NVIDIA GPUs and Validated Server Platforms

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

- ▶ GPUs based on the NVIDIA Maxwell™ graphic architecture:
  - ▶ Tesla M6 (NVIDIA Virtual Compute Server (vCS) is **not** supported.)
  - ▶ Tesla M10 (vCS is **not** supported.)
  - ▶ Tesla M60 (vCS is **not** supported.)
- ▶ GPUs based on the NVIDIA Pascal™ architecture:
  - ▶ Tesla P4
  - ▶ Tesla P6
  - ▶ Tesla P40
  - ▶ Tesla P100 PCIe 16 GB (vSGA, vMotion with vGPU, and suspend-resume with vGPU are **not** supported.)
  - ▶ Tesla P100 SXM2 16 GB (vSGA, vMotion with vGPU, and suspend-resume with vGPU are **not** supported.)
  - ▶ Tesla P100 PCIe 12GB (vSGA, vMotion with vGPU, and suspend-resume with vGPU are **not** supported.)
- ▶ GPUs based on the NVIDIA Volta architecture:
  - ▶ Tesla V100 SXM2 (vSGA is **not** supported.)
  - ▶ Tesla V100 SXM2 32GB (vSGA is **not** supported.)
  - ▶ Tesla V100 PCIe (vSGA is **not** supported.)

- ▶ Tesla V100 PCIe 32GB (vSGA is **not** supported.)
- ▶ Tesla V100S PCIe 32GB (vSGA is **not** supported.)
- ▶ Tesla V100 FHHL (vSGA is **not** supported.)
- ▶ GPUs based on the NVIDIA Turing™ architecture:
  - ▶ Tesla T4 (vSGA is **not** supported.)
  - ▶ Quadro RTX 6000 in displayless mode (vSGA is **not** supported.)
  - ▶ Quadro RTX 6000 passive in displayless mode (vSGA is **not** supported.)
  - ▶ Quadro RTX 8000 in displayless mode (vSGA is **not** supported.)
  - ▶ Quadro RTX 8000 passive in displayless mode (vSGA is **not** supported.)

In displayless mode, local physical display connectors are disabled.

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



**Note:**

Tesla M60 and M6 GPUs support compute mode and graphics mode. NVIDIA vGPU requires GPUs that support both modes to operate in graphics mode.

Recent Tesla M60 GPUs and M6 GPUs are supplied in graphics mode. However, your GPU might be in compute mode if it is an older Tesla M60 GPU or M6 GPU, or if its mode has previously been changed.

To configure the mode of Tesla M60 and M6 GPUs, use the `gpumodeswitch` tool provided with NVIDIA vGPU software releases.

Even in compute mode, Tesla M60 and M6 GPUs do **not** support NVIDIA Virtual Compute Server vGPU types.

## Requirements for Using C-Series vCS vGPUs

Because C-Series vCS vGPUs have large BAR memory settings, using these vGPUs has some restrictions on VMware ESXi:

- ▶ The guest OS must be a 64-bit OS.
- ▶ 64-bit MMIO and EFI boot must be enabled for the VM.
- ▶ The guest OS must be able to be installed in EFI boot mode.
- ▶ The VM's MMIO space must be increased to 64 GB as explained in [VMware Knowledge Base Article: VMware vSphere VMDirectPath I/O: Requirements for Platforms and Devices \[2142307\]](#).
- ▶ Because the VM's MMIO space must be increased to 64 GB, vCS requires ESXi 6.0 Update 3 and later, or ESXi 6.5 and later.

## Requirements for Using vGPU on GPUs Requiring 64 GB of MMIO Space with Large-Memory VMs

Some GPUs require 64 GB of MMIO space. When a vGPU on a GPU that requires 64 GB of MMIO space is assigned to a VM with 32 GB or more of memory on ESXi 6.0 Update 3 and later, or ESXi 6.5 and later updates, the VM's MMIO space must be increased to 64 GB. For more information, see:

- ▶ [VMware Knowledge Base Article: VMware vSphere VMDirectPath I/O: Requirements for Platforms and Devices \(2142307\)](#)
- ▶ [VMs with 32 GB or more of RAM fail to boot with GPUs requiring 64 GB of MMIO space](#)

With ESXi 6.7 or later, no extra configuration is needed.

The following GPUs require 64 GB of MMIO space:

- ▶ Tesla P6
- ▶ Tesla P40
- ▶ Tesla P100 (all variants)
- ▶ Tesla V100 (all variants)

## Requirements for Using GPUs Requiring Large MMIO Space in Pass-Through Mode

- ▶ The following GPUs require 32 GB of MMIO space in pass-through mode:
  - ▶ Tesla V100 (all 16GB variants)
  - ▶ Tesla P100 (all variants)
  - ▶ Tesla P6
- ▶ The following GPUs require 64 GB of MMIO space in pass-through mode.
  - ▶ Quadro RTX 8000 passive
  - ▶ Quadro RTX 6000 passive
  - ▶ Tesla V100 (all 32GB variants)
  - ▶ Tesla P40
- ▶ Pass through of GPUs with large BAR memory settings has some restrictions on VMware ESXi:
  - ▶ The guest OS must be a 64-bit OS.
  - ▶ 64-bit MMIO must be enabled for the VM.
  - ▶ If the total BAR1 memory exceeds 256 Mbytes, EFI boot must be enabled for the VM.



**Note:** To determine the total BAR1 memory, run `nvidia-smi -q` on the host.

- ▶ The guest OS must be able to be installed in EFI boot mode.
- ▶ The Tesla V100, Tesla P100, and Tesla P6 require ESXi 6.0 Update 1 and later, or ESXi 6.5 and later.
- ▶ Because it requires 64 GB of MMIO space, the Tesla P40 requires ESXi 6.0 Update 3 and later, or ESXi 6.5 and later.

As a result, the VM's MMIO space must be increased to 64 GB as explained in [VMware Knowledge Base Article: VMware vSphere VMDirectPath I/O: Requirements for Platforms and Devices \(2142307\)](#).

## Linux Only: Error Messages for Misconfigured GPUs Requiring Large MMIO Space

In a Linux VM, if the requirements for using C-Series vCS vGPUs or GPUs requiring large MMIO space in pass-through mode are not met, the following error messages are written to the VM's `dmesg` log during installation of the NVIDIA vGPU software graphics driver:

```
NVRM: BAR1 is 0M @ 0x0 (PCI:0000:02:02.0)
[ 90.823015] NVRM: The system BIOS may have misconfigured your GPU.
[ 90.823019] nvidia: probe of 0000:02:02.0 failed with error -1
[ 90.823031] NVRM: The NVIDIA probe routine failed for 1 device(s).
```

## 2.2. Hypervisor Software Releases

### Supported VMware vSphere Hypervisor (ESXi) Releases

This release is supported on the VMware vSphere Hypervisor (ESXi) releases listed in the table.



#### Note:

Support for NVIDIA vGPU software requires the Enterprise Plus Edition of VMware vSphere Hypervisor (ESXi). For details, see [VMware vSphere Edition Comparison \(PDF\)](#).

Updates to a base release of VMware vSphere Hypervisor (ESXi) are compatible with the base release and can also be used with this version of NVIDIA vGPU software unless expressly stated otherwise.

Software	Release Supported	Notes
Since 10.2: VMware vSphere Hypervisor (ESXi) 7.0	7.0 and compatible updates	All NVIDIA GPUs that support NVIDIA vGPU software are supported.
VMware vSphere Hypervisor (ESXi) 6.7	6.7 and compatible updates	All NVIDIA GPUs that support NVIDIA vGPU software are supported.

Software	Release Supported	Notes
		<p>Starting with release 6.7 U3, the assignment of multiple vGPUs to a single VM is supported.</p> <p>Starting with release 6.7 U1, vMotion with vGPU and suspend and resume with vGPU are supported on suitable GPUs as listed in <a href="#">Supported NVIDIA GPUs and Validated Server Platforms</a>.</p> <p>Release 6.7 supports only suspend and resume with vGPU. vMotion with vGPU is <b>not</b> supported on release 6.7.</p>
VMware vSphere Hypervisor (ESXi) 6.5	6.5 and compatible updates Requires VMware vSphere Hypervisor (ESXi) 6.5 patch P03 (ESXi650-201811002, build 10884925) or later from VMware	<p>All NVIDIA GPUs that support NVIDIA vGPU software are supported.</p> <p>The following features of NVIDIA vGPU software are <b>not</b> supported.</p> <ul style="list-style-type: none"> <li>▶ Assignment of multiple vGPUs to a single VM</li> <li>▶ Suspend-resume with vGPU</li> <li>▶ vMotion with vGPU</li> <li>▶ Live VMware snapshots with vGPU</li> </ul>

## Supported Management Software and Virtual Desktop Software Releases

This release supports the management software and virtual desktop software releases listed in the table.



**Note:** Updates to a base release of VMware Horizon and VMware vCenter Server are compatible with the base release and can also be used with this version of NVIDIA vGPU software unless expressly stated otherwise.

Software	Releases Supported
VMware Horizon	<p><b>Since 10.3:</b> 2006 (8.0) and compatible updates</p> <p><b>Since 10.2:</b> 7.12 and compatible 7.12.x updates</p>

Software	Releases Supported
	7.11 and compatible 7.11.x updates 7.10 and compatible 7.10.x updates 7.9 and compatible 7.9.x updates 7.8 and compatible 7.8.x updates 7.7 and compatible 7.7.x updates 7.6 and compatible 7.6.x updates 7.5 and compatible 7.5.x updates 7.4 and compatible 7.4.x updates 7.3 and compatible 7.3.x updates 7.2 and compatible 7.2.x updates 7.1 and compatible 7.1.x updates 7.0 and compatible 7.0.x updates
VMware vCenter Server	<b>Since 10.2:</b> 7.0 and compatible updates 6.7 and compatible updates 6.5 and compatible updates

## 2.3. Guest OS Support

NVIDIA vGPU software supports several Windows releases and Linux distributions as a guest OS. The supported guest operating systems depend on the hypervisor software version.



### 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 in the table as a guest OS on VMware vSphere. The releases of VMware vSphere for which a Windows release is supported depend on whether NVIDIA vGPU or pass-through GPU is used.



### Note:

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

VMware vMotion with vGPU and suspend-resume with vGPU are supported on supported Windows guest OS releases

Guest OS	NVIDIA vGPU - VMware vSphere Releases	Pass-Through GPU - VMware vSphere Releases
Windows Server 2019	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5 update 2, 6.5 update 1</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5 update 2, 6.5 update 1</p>	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5 update 2, 6.5 update 1</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5 update 2, 6.5 update 1</p>
Windows Server 2016 1709, 1607	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>
Windows Server 2012 R2	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>
<b>10.0-10.2 only:</b> Windows Server 2008 R2	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>
Windows 10: <ul style="list-style-type: none"> <li>▶ November 2019 Update (1909)</li> <li>▶ May 2019 Update (1903)</li> <li>▶ October 2018 Update (1809)</li> <li>▶ Spring Creators Update (1803)</li> <li>▶ Fall Creators Update (1709)</li> <li>▶ Creators Update (1703)</li> <li>▶ Anniversary Update (1607)</li> <li>▶ November Update (1511)</li> <li>▶ RTM (1507)</li> </ul>	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>
Windows 8.1 Update	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p> <p><b>10.0, 10.1 only:</b> 6.7, 6.5</p>
Windows 8.1	<p><b>Since 10.2:</b> 7.0, 6.7, 6.5</p>	-

Guest OS	NVIDIA vGPU - VMware vSphere Releases	Pass-Through GPU - VMware vSphere Releases
	<b>10.0, 10.1 only:</b> 6.7, 6.5	
Windows 8	<b>Since 10.2:</b> 7.0, 6.7, 6.5 <b>10.0, 10.1 only:</b> 6.7, 6.5	-
Windows 7	<b>Since 10.2:</b> 7.0, 6.7, 6.5 <b>10.0, 10.1 only:</b> 6.7, 6.5	<b>Since 10.2:</b> 7.0, 6.7, 6.5 <b>10.0, 10.1 only:</b> 6.7, 6.5

## 2.3.2. Linux Guest OS Support

NVIDIA vGPU software supports **only** the Linux distributions listed in the table as a guest OS on VMware vSphere. The releases of VMware vSphere for which a Linux release is supported depend on whether NVIDIA vGPU or pass-through GPU is used.



### Note:

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

VMware vMotion with vGPU and suspend-resume with vGPU are supported on supported Linux guest OS releases

Guest OS	NVIDIA vGPU - VMware vSphere Releases	Pass-Through GPU - VMware vSphere Releases
<b>Since 10.2:</b> Red Hat Enterprise Linux 8.2	7.0, 6.7, 6.5 update 3	7.0, 6.7, 6.5 update 3
Red Hat Enterprise Linux 8.1	<b>Since 10.2:</b> 7.0, 6.7, 6.5 update 3 <b>10.0, 10.1 only:</b> 6.7, 6.5 update 3	<b>Since 10.2:</b> 7.0, 6.7, 6.5 update 3 <b>10.0, 10.1 only:</b> 6.7, 6.5 update 3
<b>Since 10.2:</b> CentOS Linux 8 (1911)	7.0, 6.7, 6.5 update 3	7.0, 6.7, 6.5 update 3
<b>10.0 only:</b> Red Hat Enterprise Linux 8.0	6.7, 6.5 update 3	6.7, 6.5 update 3
CentOS 8.0	<b>Since 10.2:</b> 7.0, 6.7, 6.5 update 3 <b>10.0, 10.1 only:</b> 6.7, 6.5 update 3	<b>Since 10.2:</b> 7.0, 6.7, 6.5 update 3 <b>10.0, 10.1 only:</b> 6.7, 6.5 update 3
<b>Since 10.2:</b> Red Hat Enterprise Linux 7.6-7.8 and later compatible 7.x versions	7.0, 6.7, 6.5	7.0, 6.7, 6.5
<b>Since 10.2:</b> CentOS 7.6-7.8 and later compatible 7.x versions	7.0, 6.7, 6.5	7.0, 6.7, 6.5
<b>10.0, 10.1 only:</b> Red Hat Enterprise Linux 7.0-7.5	6.7, 6.5	6.7, 6.5
<b>10.0, 10.1 only:</b> CentOS 7.0-7.5	6.7, 6.5	6.7, 6.5

Guest OS	NVIDIA vGPU - VMware vSphere Releases	Pass-Through GPU - VMware vSphere Releases
Red Hat Enterprise Linux 6.6 and later compatible 6.x versions	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5
CentOS 6.6 and later compatible 6.x versions	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5
Ubuntu 18.04 LTS	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5
Ubuntu 16.04 LTS	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5
Ubuntu 14.04 LTS	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5
SUSE Linux Enterprise Server 12 SP3	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5	Since 10.2: 7.0, 6.7, 6.5 10.0, 10.1 only: 6.7, 6.5

## 2.4. NVIDIA CUDA Toolkit Version Support

The releases in this release family of NVIDIA vGPU software support NVIDIA CUDA Toolkit 10.2.

For more information about NVIDIA CUDA Toolkit, see [CUDA Toolkit 10.2 Documentation](#).



### Note:

If you are using NVIDIA vGPU software with CUDA on Linux, avoid conflicting installation methods by installing CUDA from a distribution-independent runfile package. Do not install CUDA from distribution-specific RPM or Deb package.

To ensure that the NVIDIA vGPU software graphics driver is not overwritten when CUDA is installed, deselect the CUDA driver when selecting the CUDA components to install.

For more information, see [NVIDIA CUDA Installation Guide for Linux](#).

## 2.5. vGPU Migration Support

vGPU migration, which includes vMotion and suspend-resume, is supported only on a subset of supported GPUs, VMware vSphere Hypervisor (ESXi) releases, and guest operating systems.

Supported GPUs:

- Tesla M6

- ▶ Tesla M10
- ▶ Tesla M60
- ▶ Tesla P4
- ▶ Tesla P6
- ▶ Tesla P40
- ▶ Tesla V100 SXM2
- ▶ Tesla V100 SXM2 32GB
- ▶ Tesla V100 PCIe
- ▶ Tesla V100 PCIe 32GB
- ▶ Tesla V100S PCIe 32GB
- ▶ Tesla V100 FHHL
- ▶ Tesla T4
- ▶ Quadro RTX 6000
- ▶ Quadro RTX 6000 passive
- ▶ Quadro RTX 8000
- ▶ Quadro RTX 8000 passive

Supported VMware vSphere Hypervisor (ESXi) releases:

- ▶ **Since 10.2:** Release 7.0 and compatible updates support vMotion with vGPU and suspend-resume with vGPU.
- ▶ Release 6.7 U1 and compatible updates support vMotion with vGPU and suspend-resume with vGPU.
- ▶ Release 6.7 supports only suspend-resume with vGPU.
- ▶ Releases earlier than 6.7 do not support any form of vGPU migration.

Supported guest OS releases: Windows and Linux.

Migration between hosts that are running different releases of the vGPU manager in this major release branch are supported except for migrations between hosts running certain combinations of vGPU manager releases with certain GPUs. See the following table for details.

GPU	Unsupported Migrations
Tesla V100S PCIe 32GB	Between hosts running 10.0 and hosts running 10.1 through 10.4
Tesla T4	Between hosts running 10.0 or 10.1 and hosts running 10.2 through 10.4

## 2.6. Multiple vGPU Support

To support applications and workloads that are compute or graphics intensive, multiple vGPUs can be added to a single VM. The assignment of more than one vGPU to a VM is supported only on a subset of vGPUs and VMware vSphere Hypervisor (ESXi) releases.

### Supported vGPUs

Only Q-series and C-series vGPUs that are allocated all of the physical GPU's frame buffer are supported.

GPU Architecture	Board	vGPU	
Turing	Tesla T4	T4-16Q	
		T4-16C	
	Quadro RTX 6000	RTX6000-24Q	
		RTX6000-24C	
	Quadro RTX 6000 passive	RTX6000P-24Q	
		RTX6000P-24C	
	Quadro RTX 8000	RTX8000-48Q	
		RTX8000-48C	
	Quadro RTX 8000 passive	RTX8000P-48Q	
		RTX8000P-48C	
	Volta	Tesla V100 SXM2 32GB	V100DX-32Q
			V100D-32C
Tesla V100 PCIe 32GB		V100D-32Q	
		V100D-32C	
Tesla V100S PCIe 32GB		V100S-32Q	
		V100S-32C	
Tesla V100 SXM2		V100X-16Q	
		V100X-16C	
Tesla V100 PCIe		V100-16Q	
		V100-16C	
Tesla V100 FHHL		V100L-16Q	
		V100L-16C	
Pascal		Tesla P100 SXM2	P100X-16Q
			P100X-16C

GPU Architecture	Board	vGPU
	Tesla P100 PCIe 16GB	P100-16Q
		P100-16C
	Tesla P100 PCIe 12GB	P100C-12Q
		P100C-12C
	Tesla P40	P40-24Q
		P40-24C
	Tesla P6	P6-16Q
		P6-16C
	Tesla P4	P4-8Q
		P4-8C
Maxwell	Tesla M60	M60-8Q
	Tesla M10	M10-8Q
	Tesla M6	M6-8Q

### Maximum vGPUs per VM

NVIDIA vGPU software supports up to a maximum of four vGPUs per VM on VMware vSphere Hypervisor (ESXi).

### Supported Hypervisor Releases

Only these VMware vSphere Hypervisor (ESXi) releases:

- ▶ **Since 10.2:** 7.0 and 6.7 U3 and later compatible updates
- ▶ **10.0, 10.1 only:** 6.7 U3 and later compatible updates

If you upgraded to VMware vSphere 6.7 Update 3 from an earlier version and are using VMs that were created with that version, change the VM compatibility to **vSphere 6.7 Update 2 and later**. For details, see [Virtual Machine Compatibility](#) in the VMware documentation.

## 2.7. Peer-to-Peer CUDA Transfers over NVLink Support

Peer-to-peer CUDA transfers enable device memory between vGPUs on different GPUs that are assigned to the same VM to be accessed from within the CUDA kernels. NVLink is a high-bandwidth interconnect that enables fast communication between such vGPUs. Peer-to-Peer CUDA Transfers over NVLink is supported only on a subset of vGPUs, VMware vSphere Hypervisor (ESXi) releases, and guest OS releases.

## Supported vGPUs

Only Q-series and C-series vGPUs that are allocated all of the physical GPU's frame buffer on physical GPUs that support NVLink are supported.

GPU Architecture	Board	vGPU
Turing	Quadro RTX 6000	RTX6000-24Q
		RTX6000-24C
	Quadro RTX 6000 passive	RTX6000P-24Q
		RTX6000P-24C
	Quadro RTX 8000	RTX8000-48Q
		RTX8000-48C
	Quadro RTX 8000 passive	RTX8000P-48Q
		RTX8000P-48C
Volta	Tesla V100 SXM2 32GB	V100DX-32Q
		V100DX-32C
	Tesla V100 SXM2	V100X-16Q
		V100X-16C
Pascal	Tesla P100 SXM2	P100X-16Q
		P100X-16C

## Supported Hypervisor Releases

Peer-to-Peer CUDA Transfers over NVLink are supported on all hypervisor releases that support the assignment of more than one vGPU to a VM. For details, see [Multiple vGPU Support](#).

## Supported Guest OS Releases

Linux only. Peer-to-Peer CUDA Transfers over NVLink are **not** supported on Windows.

## Limitations

- ▶ Only direct connections are supported. NVSwitch is not supported.
- ▶ PCIe is not supported.
- ▶ SLI is not supported.

---

# Chapter 3. Known Product Limitations

Known product limitations for this release of NVIDIA vGPU software are described in the following sections.

## 3.1. Issues occur when the channels allocated to a vGPU are exhausted

### Description

Issues occur when the channels allocated to a vGPU are exhausted and the guest VM to which the vGPU is assigned fails to allocate a channel to the vGPU. A physical GPU has a fixed number of channels and the number of channels allocated to each vGPU is inversely proportional to the maximum number of vGPUs allowed on the physical GPU.

When the channels allocated to a vGPU are exhausted and the guest VM fails to allocate a channel, the following errors are reported on the hypervisor host or in an NVIDIA bug report:

```
Jun 26 08:01:25 srvxen06f vgpu-3[14276]: error: vmiop_log: (0x0): Guest attempted to
allocate channel above its max channel limit 0xfb
Jun 26 08:01:25 srvxen06f vgpu-3[14276]: error: vmiop_log: (0x0): vGPU message 6
failed, result code: 0x1a
Jun 26 08:01:25 srvxen06f vgpu-3[14276]: error: vmiop_log: (0x0):
0xc1d004a1, 0xff0e0000, 0xff0400fb, 0xc36f,
Jun 26 08:01:25 srvxen06f vgpu-3[14276]: error: vmiop_log: (0x0):          0x1,
0xff1fe314, 0xff1fe038, 0x100b6f000, 0x1000,
Jun 26 08:01:25 srvxen06f vgpu-3[14276]: error: vmiop_log: (0x0):
0x80000000, 0xff0e0200, 0x0, 0x0, (Not logged),
Jun 26 08:01:25 srvxen06f vgpu-3[14276]: error: vmiop_log: (0x0):          0x1, 0x0
Jun 26 08:01:25 srvxen06f vgpu-3[14276]: error: vmiop_log: (0x0): , 0x0
```

### Workaround

Use a vGPU type with more frame buffer, thereby reducing the maximum number of vGPUs allowed on the physical GPU. As a result, the number of channels allocated to each vGPU is increased.

## 3.2. Total frame buffer for vGPUs is less than the total frame buffer on the physical GPU

Some of the physical GPU's frame buffer is used by the hypervisor on behalf of the VM for allocations that the guest OS would otherwise have made in its own frame buffer. The frame buffer used by the hypervisor is not available for vGPUs on the physical GPU. In NVIDIA vGPU deployments, frame buffer for the guest OS is reserved in advance, whereas in bare-metal deployments, frame buffer for the guest OS is reserved on the basis of the runtime needs of applications.

If error-correcting code (ECC) memory is enabled on a physical GPU that does not have HBM2 memory, the amount of frame buffer that is usable by vGPUs is further reduced. All types of vGPU are affected, not just vGPUs that support ECC memory.

On all GPUs that support ECC memory and, therefore, dynamic page retirement, additional frame buffer is allocated for dynamic page retirement. The amount that is allocated is inversely proportional to the maximum number of vGPUs per physical GPU. All GPUs that support ECC memory are affected, even GPUs that have HBM2 memory or for which ECC memory is disabled.

The approximate amount of frame buffer that NVIDIA vGPU software reserves can be calculated from the following formula:

$$\text{max-reserved-fb} = \text{vgpu-profile-size-in-mb} \div 16 + 16 + \text{ecc-adjustments} + \text{page-retirement-allocation}$$

### **max-reserved-fb**

The maximum total amount of reserved frame buffer in Mbytes that is not available for vGPUs.

### **vgpu-profile-size-in-mb**

The amount of frame buffer in Mbytes allocated to a single vGPU. This amount depends on the vGPU type. For example, for the T4-16Q vGPU type, *vgpu-profile-size-in-mb* is 16384.

### **ecc-adjustments**

The amount of frame buffer in Mbytes that is not usable by vGPUs when ECC is enabled on a physical GPU that does not have HBM2 memory.

- ▶ If ECC is enabled on a physical GPU that does not have HBM2 memory *ecc-adjustments* is  $\text{fb-without-ecc} / 16$ , which is equivalent to 64 Mbytes for every Gbyte of frame buffer assigned to the vGPU. *fb-without-ecc* is total amount of frame buffer with ECC disabled.
- ▶ If ECC is disabled or the GPU has HBM2 memory, *ecc-adjustments* is 0.

### **page-retirement-allocation**

The amount of frame buffer in Mbytes that is reserved for dynamic page retirement.

- ▶ On GPUs based on the NVIDIA Maxwell GPU architecture,  $\text{page-retirement-allocation} = 4 \div \text{max-vgpus-per-gpu}$ .

- ▶ On GPUs based on NVIDIA GPU architectures **after** the Maxwell architecture, *page-retirement-allocation* =  $128 \div \text{max-vgpu-per-gpu}$

#### ***max-vgpu-per-gpu***

The maximum number of vGPUs that can be created simultaneously on a physical GPU. This number varies according to the vGPU type. For example, for the T4-16Q vGPU type, *max-vgpu-per-gpu* is 1.



**Note:** In VMs running a Windows guest OS that supports Windows Display Driver Model (WDDM) 1.x, namely, Windows 7, Windows 8.1, Windows Server 2008, and Windows Server 2012, an additional 48 Mbytes of frame buffer are reserved and not available for vGPUs.

## 3.3. Issues may occur with graphics-intensive OpenCL applications on vGPU types with limited frame buffer

### Description

Issues may occur when graphics-intensive OpenCL applications are used with vGPU types that have limited frame buffer. These issues occur when the applications demand more frame buffer than is allocated to the vGPU.

For example, these issues may occur with the Adobe Photoshop and LuxMark OpenCL Benchmark applications:

- ▶ When the image resolution and size are changed in Adobe Photoshop, a program error may occur or Photoshop may display a message about a problem with the graphics hardware and a suggestion to disable OpenCL.
- ▶ When the LuxMark OpenCL Benchmark application is run, XID error 31 may occur.

### Workaround

For graphics-intensive OpenCL applications, use a vGPU type with more frame buffer.

### 3.4. In pass through mode, all GPUs connected to each other through NVLink must be assigned to the same VM

#### Description

In pass through mode, all GPUs connected to each other through NVLink must be assigned to the same VM. If a subset of GPUs connected to each other through NVLink is passed through to a VM, unrecoverable error `XID 74` occurs when the VM is booted. This error corrupts the NVLink state on the physical GPUs and, as a result, the NVLink bridge between the GPUs is unusable.

#### Workaround

Restore the NVLink state on the physical GPUs by resetting the GPUs or rebooting the hypervisor host.

### 3.5. vGPU profiles with 512 Mbytes or less of frame buffer support only 1 virtual display head on Windows 10

#### Description

To reduce the possibility of memory exhaustion, vGPU profiles with 512 Mbytes or less of frame buffer support only 1 virtual display head on a Windows 10 guest OS.

The following vGPU profiles have 512 Mbytes or less of frame buffer:

- ▶ Tesla M6-0B, M6-0Q
- ▶ Tesla M10-0B, M10-0Q
- ▶ Tesla M60-0B, M60-0Q

#### Workaround

Use a profile that supports more than 1 virtual display head and has at least 1 Gbyte of frame buffer.

## 3.6. NVENC requires at least 1 Gbyte of frame buffer

### Description

Using the frame buffer for the NVIDIA hardware-based H.264/HEVC video encoder (NVENC) may cause memory exhaustion with vGPU profiles that have 512 Mbytes or less of frame buffer. To reduce the possibility of memory exhaustion, NVENC is disabled on profiles that have 512 Mbytes or less of frame buffer. Application GPU acceleration remains fully supported and available for all profiles, including profiles with 512 MBytes or less of frame buffer. NVENC support from both Citrix and VMware is a recent feature and, if you are using an older version, you should experience no change in functionality.

The following vGPU profiles have 512 Mbytes or less of frame buffer:

- ▶ Tesla M6-0B, M6-0Q
- ▶ Tesla M10-0B, M10-0Q
- ▶ Tesla M60-0B, M60-0Q

### Workaround

If you require NVENC to be enabled, use a profile that has at least 1 Gbyte of frame buffer.

## 3.7. VM failures or crashes on servers with 1 TB or more of system memory

### Description

Support for vGPU and vSGA is limited to servers with less than 1 TB of system memory. On servers with 1 TB or more of system memory, VM failures or crashes may occur. For example, when Citrix Virtual Apps and Desktops is used with a Windows 7 guest OS, a blue screen crash may occur. However, support for vDGA is not affected by this limitation.

Depending on the version of NVIDIA vGPU software that you are using, the log file on the VMware vSphere host might also report the following errors:

```
2016-10-27T04:36:21.128Z cpu74:70210)DMA: 1935: Unable to perform element mapping:
DMA mapping could not be completed
2016-10-27T04:36:21.128Z cpu74:70210)Failed to DMA map address 0x118d296c000
(0x4000): Can't meet address mask of the device..
2016-10-27T04:36:21.128Z cpu74:70210)NVRM: VM: nv_alloc_contig_pages: failed to
allocate memory
```

This limitation applies only to systems with supported GPUs based on the Maxwell architecture: Tesla M6, Tesla M10, and Tesla M60.

## Resolution

1. Limit the amount of system memory on the server to 1 TB minus 16 GB by setting `memmapMaxRAMMB` to 1032192, which is equal to 1048576 minus 16384.
2. Reboot the server.

If the problem persists, contact your server vendor for the recommended system memory configuration with NVIDIA GPUs.

## 3.8. VM running an incompatible NVIDIA vGPU guest driver fails to initialize vGPU when booted

### Description

A VM running a version of the NVIDIA guest VM driver that is incompatible with the current release of Virtual GPU Manager will fail to initialize vGPU when booted on a VMware vSphere platform running that release of Virtual GPU Manager.



**Note:** NVIDIA vGPU Manager from releases 10.0 through 10.2 are compatible only with guest VM drivers from releases 10.0 through 10.2.

A guest VM driver is incompatible with the current release of Virtual GPU Manager in either of the following situations:

- ▶ The guest driver is from a release in a major release branch before the current release, for example release 9.4.

In this situation, the VMware vSphere VM's log file reports the following error:

```
vmiop_log: (0x0): Incompatible Guest/Host drivers: Guest VGX version is older than the minimum version supported by the Host. Disabling vGPU.
```

- ▶ The guest driver is from a later release than the Virtual GPU Manager.

In this situation, the VMware vSphere VM's log file reports the following error:

```
vmiop_log: (0x0): Incompatible Guest/Host drivers: Guest VGX version is newer than the maximum version supported by the Host. Disabling vGPU.
```

In either situation, the VM boots in standard VGA mode with reduced resolution and color depth. The NVIDIA virtual GPU is present in **Windows Device Manager** but displays a warning sign, and the following device status:

```
Windows has stopped this device because it has reported problems. (Code 43)
```

## Resolution

Install a release of the NVIDIA guest VM driver that is compatible with current release of Virtual GPU Manager.

## 3.9. Single vGPU benchmark scores are lower than pass-through GPU

### Description

A single vGPU configured on a physical GPU produces lower benchmark scores than the physical GPU run in pass-through mode.

Aside from performance differences that may be attributed to a vGPU's smaller frame buffer size, vGPU incorporates a performance balancing feature known as Frame Rate Limiter (FRL). On vGPUs that use the best-effort scheduler, FRL is enabled. On vGPUs that use the fixed share or equal share scheduler, FRL is disabled.

FRL is used to ensure balanced performance across multiple vGPUs that are resident on the same physical GPU. The FRL setting is designed to give good interactive remote graphics experience but may reduce scores in benchmarks that depend on measuring frame rendering rates, as compared to the same benchmarks running on a pass-through GPU.

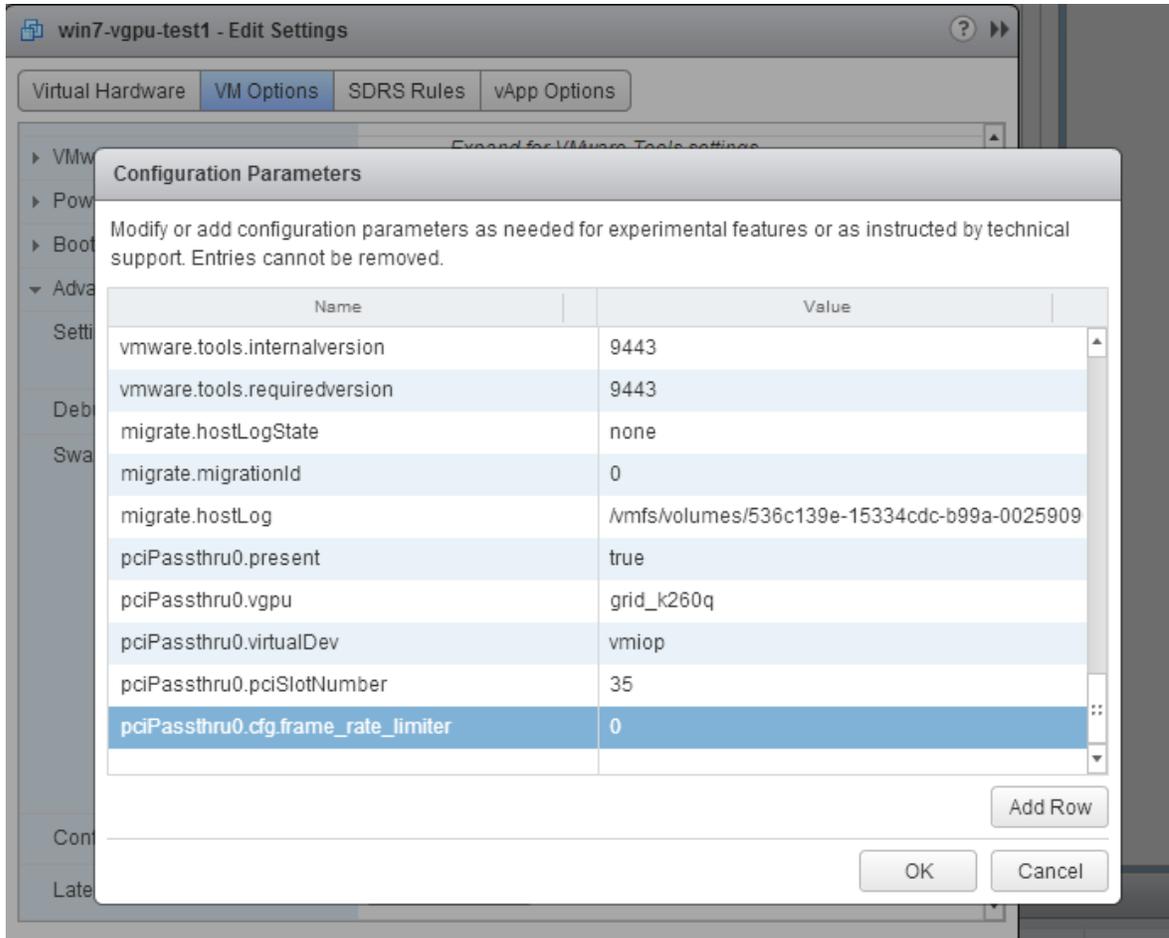
### Resolution

FRL is controlled by an internal vGPU setting. On vGPUs that use the best-effort scheduler, NVIDIA does not validate vGPU with FRL disabled, but for validation of benchmark performance, FRL can be temporarily disabled by adding the configuration parameter `pciPassthru0.cfg.frame_rate_limiter` in the VM's advanced configuration options.



**Note:** This setting can only be changed when the VM is powered off.

1. Select **Edit Settings**.
2. In **Edit Settings** window, select the **VM Options** tab.
3. From the **Advanced** drop-down list, select **Edit Configuration**.
4. In the **Configuration Parameters** dialog box, click **Add Row**.
5. In the **Name** field, type the parameter name `pciPassthru0.cfg.frame_rate_limiter`, in the **Value** field type 0, and click **OK**.



With this setting in place, the VM's vGPU will run without any frame rate limit. The FRL can be reverted back to its default setting by setting `pciPassthru0.cfg.frame_rate_limiter` to 1 or by removing the parameter from the advanced settings.

## 3.10. VMs configured with large memory fail to initialize vGPU when booted

### Description

When starting multiple VMs configured with large amounts of RAM (typically more than 32GB per VM), a VM may fail to initialize vGPU. In this scenario, the VM boots in VMware SVGA mode and doesn't load the NVIDIA driver. The NVIDIA vGPU software GPU is present in **Windows Device Manager** but displays a warning sign, and the following device status:

```
Windows has stopped this device because it has reported problems. (Code 43)
```

The VMware vSphere VM's log file contains these error messages:

```
vthread10|E105: NVOS status 0x29
vthread10|E105: Assertion Failed at 0x7620fd4b:179
```

```

vthread10|E105: 8 frames returned by backtrace
...
vthread10|E105: VGPU message 12 failed, result code: 0x29
...
vthread10|E105: NVOS status 0x8
vthread10|E105: Assertion Failed at 0x7620c8df:280
vthread10|E105: 8 frames returned by backtrace
...
vthread10|E105: VGPU message 26 failed, result code: 0x8

```

## Resolution

vGPU reserves a portion of the VM's framebuffer for use in GPU mapping of VM system memory. The reservation is sufficient to support up to 32GB of system memory, and may be increased to accommodate up to 64GB by adding the configuration parameter `pciPassthru0.cfg.enable_large_sys_mem` in the VM's advanced configuration options



**Note:** This setting can only be changed when the VM is powered off.

1. Select **Edit Settings**.
2. In **Edit Settings** window, select the **VM Options** tab.
3. From the **Advanced** drop-down list, select **Edit Configuration**.
4. In the **Configuration Parameters** dialog box, click **Add Row**.
5. In the **Name** field, type the parameter name `pciPassthru0.cfg.enable_large_sys_mem`, in the **Value** field type 1, and click **OK**.

With this setting in place, less GPU framebuffer is available to applications running in the VM. To accommodate system memory larger than 64GB, the reservation can be further increased by adding `pciPassthru0.cfg.extra_fb_reservation` in the VM's advanced configuration options, and setting its value to the desired reservation size in megabytes. The default value of 64M is sufficient to support 64 GB of RAM. We recommend adding 2 M of reservation for each additional 1 GB of system memory. For example, to support 96 GB of RAM, set `pciPassthru0.cfg.extra_fb_reservation` to 128.

The reservation can be reverted back to its default setting by setting `pciPassthru0.cfg.enable_large_sys_mem` to 0, or by removing the parameter from the advanced settings.

---

# Chapter 4. Resolved Issues

Only resolved issues that have been previously noted as known issues or had a noticeable user impact are listed. The summary and description for each resolved issue indicate the effect of the issue on NVIDIA vGPU software **before the issue was resolved**.

## Issues Resolved in Release 10.0

No resolved issues are reported in this release for VMware vSphere.

## Issues Resolved in Release 10.1

Bug ID	Summary and Description
2740072	<p><b><u>10.0 Only: Random purple screen crashes with nv_interrupt_handler can occur</u></b></p> <p>Random purple screen crashes can occur, accompanied by a stack trace that contains <code>nv_interrupt_handler</code>.</p>
2840380	<p><b><u>10.0 Only: Desktop cannot be used when user logs off and logs on again after a long-running session</u></b></p> <p>After a long-running session, such as a session that was left running overnight, the desktop cannot be used when the user logs off and logs on again. When the user logs on, the GPU disappears from the virtual desktop infrastructure, the guest VM fails to allocate a channel, and multiple assertion failures occur.</p>
200556412	<p><b><u>10.0 Only: XID errors and TDR occur after vGPU migration</u></b></p> <p>After several vGPU migrations, Direct X 12 applications might show corruption or crash with XID errors 13 or 32 and a TDR followed by XID error 43. This issue affects only GPUs based on the NVIDIA Turing™ architecture.</p>
200576239	<p><b><u>10.0 Only: Information about peer-to-peer CUDA transfers over NVLink cannot be obtained for individual VMs</u></b></p> <p>On some releases of VMware vSphere, the command <code>nvidia-smi vgpu topo vm-uuid -tm</code> fails to retrieve information about peer-to-peer CUDA transfers over NVLink for the specified VM.</p>

## Issues Resolved in Release 10.2

Bug ID	Summary and Description
200594274	<p><b><u>10.0, 10.1 Only: When the VMs to which 16 vGPUs on a single GPU are assigned are started simultaneously, one VM fails to boot</u></b></p> <p>When the VMs to which 16 vGPUs on a single GPU (for example 16 T4-1Q vGPUs on a Tesla T4 GPU) are assigned are started simultaneously, only 15 VMs boot and the remaining VM fails to start. When the other VMs are shut down, the VM that failed to start boots successfully. When this issue occurs, the error message failed to boot up due to the error of plugin /usr/lib64/vmware/plugin/libnvidia-vgx.so initialized is reported by VMware vCenter Server.</p>
2836226	<p><b><u>10.0, 10.1 Only: vGPU migration might time out with some vGPU types</u></b></p> <p>When a VM configured with a vGPU with 4 GB or more of frame buffer (for example P40-4Q) is migrated, the migration might time out. This issue is more likely to occur with vGPUs that have larger amounts of frame buffer.</p>
2920224	<p><b><u>10.0, 10.1 Only: NVIDIA Control Panel cannot be used to change the display resolution</u></b></p> <p>After the user selects a new display resolution in <b>NVIDIA Control Panel</b> and clicks <b>Apply</b>, the resolution is not changed and the selection on the list is reset to the previous value.</p>
2852349	<p><b><u>10.0, 10.1 Only: VM crashes with memory regions error</u></b></p> <p>Windows or Linux VMs might hang while users are performing multiple resize operations. This issue occurs with VMware Horizon 7.10 or later versions. This issue is caused by a race condition, which leads to deadlock that causes the VM to hang.</p>
200555917	<p><b><u>10.0, 10.1 Only: The Desktop color depth list is empty</u></b></p> <p>The <b>Desktop color depth</b> list on the <b>Change resolution</b> page in <b>NVIDIA Control Panel</b> for the VM display <b>NVIDIA VGX</b> is empty. This list should include options such as <b>SDR 24 bit</b> and <b>SDR 30 bit</b>.</p>

## Issues Resolved in Release 10.3

Bug ID	Summary and Description
200626446	<p><b><u>10.0-10.2 Only: Failure to allocate resources causes VM failures or crashes</u></b></p> <p>Failure to allocate resources causes VM failures or crashes. When the error occurs, the error message <code>NVOS status 0x19</code> is written to the log file on the</p>

Bug ID	Summary and Description
	hypervisor host. Depending on the resource and the underlying cause of the failure, VGPU message 52 failed, VGPU message 4 failed, VGPU message 21 failed, and VGPU message 10 failed might also be written to the log file on the hypervisor host.
3025842	<p><b><u>10.0-10.2 Only: Application software randomly freezes while opening files</u></b></p> <p>Application software randomly freezes while opening files, which are rendered while they are being opened. When this issue occurs, the log file on the hypervisor host reports the error <code>vmiop_log: (0x0): VGPU message 14 failed, result code: 0x37.</code></p>

### Issues Resolved in Release 10.4

No resolved issues are reported in this release for VMware vSphere.

---

## Chapter 5. Known Issues

### 5.1. Since 10.4: 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

## 5.2. 10.0, 10.1 Only: When the VMs to which 16 vGPUs on a single GPU are assigned are started simultaneously, one VM fails to boot

### Description

When the VMs to which 16 vGPUs on a single GPU (for example 16 T4-1Q vGPUs on a Tesla T4 GPU) are assigned are started simultaneously, only 15 VMs boot and the remaining VM fails to start. When the other VMs are shut down, the VM that failed to start boots successfully. When this issue occurs, the error message failed to boot up due to the error of plugin /usr/lib64/vmware/plugin/libnvidia-vgx.so initialized is reported by VMware vCenter Server.

The log file on the hypervisor host contains these error messages:

```
2020-03-04T16:01:13.626Z| vmx| E110: vmiop_log: NVOS status 0x51
2020-03-04T16:01:13.626Z| vmx| E110: vmiop_log: Assertion Failed at 0x5e530d8c:303
...
2020-03-04T16:01:13.626Z| vmx| E110: vmiop_log: (0x0): Failed to alloc guest FB
memory
2020-03-04T16:01:13.626Z| vmx| E110: vmiop_log: (0x0): init_device_instance failed
for inst 0 with error 2 (vmiop-display: error allocating framebuffer)
2020-03-04T16:01:13.626Z| vmx| E110: vmiop_log: (0x0): Initialization:
init_device_instance failed error 2
2020-03-04T16:01:13.629Z| vmx| E110: vmiop_log: display_init failed for inst: 0
```

### Status

Resolved in NVIDIA vGPU software 10.2

### Ref. #

200594274

## 5.3. 10.0, 10.1 Only: vGPU migration might time out with some vGPU types

### Description

When a VM configured with a vGPU with 4 GB or more of frame buffer (for example P40-4Q) is migrated, the migration might time out. This issue is more likely to occur with vGPUs that have larger amounts of frame buffer.

When this issue occurs, the log file on the hypervisor host contains these error messages:

```
WARNING: VMotion: 1297: 4141389893689754239 D: Maximum switchover time (100 seconds)
reached. Failing VMotion; VM should resume on source.
WARNING: Migrate: 6248: 4141389893689754239 D: Migration considered a failure by the
VMX. It is most likely a timeout, but check the VMX log for the true error.
Migrate: 103: 4141389893689754239 D: MigrateState: Failed
WARNING: Migrate: 254: 4141389893689754239 D: Failed: Migration determined a failure
by the VMX (0xbad0092) @0x42001cc1f823
```

### Status

Resolved in NVIDIA vGPU software 10.2

### Ref. #

2836226

## 5.4. 10.0-10.2 Only: Failure to allocate resources causes VM failures or crashes

### Description

Failure to allocate resources causes VM failures or crashes. When the error occurs, the error message `NVOS status 0x19` is written to the log file on the hypervisor host. Depending on the resource and the underlying cause of the failure, `VGPU message 52 failed`, `VGPU message 4 failed`, `VGPU message 21 failed`, and `VGPU message 10 failed` might also be written to the log file on the hypervisor host.

### Status

Resolved in NVIDIA vGPU software 10.3

### Ref. #

200626446

## 5.5. 10.0-10.2 Only: Application software randomly freezes while opening files

### Description

Application software randomly freezes while opening files, which are rendered while they are being opened. When this issue occurs, the log file on the hypervisor host reports the error `vmiop_log: (0x0): VGPU message 14 failed, result code: 0x37`.

### Status

Resolved in NVIDIA vGPU software 10.3

### Ref. #

3025842

## 5.6. 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

Wait at least 30 seconds before trying to launch **NVIDIA Control Panel**.

### Status

Open

### Ref. #

200623179

## 5.7. On Linux, a VMware Horizon 7.12 session with two 4K displays freezes

### Description

On a Linux VM configured with a -1Q vGPU, two 4K displays, and VMware Horizon 7.12, the VMware Horizon session might become unresponsive. When this issue occurs, the VMware vSphere VM's log file contains the error message `Failed to setup capture session (error 8). Unable to allocate video memory.`

### Version

This issue affects deployments that use VMware Horizon 7.12.

### Workaround

Use VMware Horizon 7.11 or a vGPU with more frame buffer.

### Status

Open

### Ref. #

200617081

## 5.8. 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, `glxgears`. 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

# 5.9. Frame buffer consumption grows with VMware Horizon over Blast Extreme

## Description

When VMware Horizon is used with the Blast Extreme display protocol, frame buffer consumption increases over time after multiple disconnections from and reconnections to a VM. This issue occurs even if the VM is in an idle state and no graphics applications are running.

## Workaround

Reboot the VM.

## Status

Open

## Ref. #

200602520

## 5.10. 10.0, 10.1 Only: NVIDIA Control Panel cannot be used to change the display resolution

### Description

After the user selects a new display resolution in **NVIDIA Control Panel** and clicks **Apply**, the resolution is not changed and the selection on the list is reset to the previous value.

### Workaround

Use Microsoft **Display settings** in **System settings** to change the display resolution.

### Status

Resolved in NVIDIA vGPU software 10.2

### Ref. #

2920224

## 5.11. 10.0 Only: Random purple screen crashes with `nv_interrupt_handler` can occur

### Description

Random purple screen crashes can occur, accompanied by a stack trace that contains `nv_interrupt_handler`.

When the purple screen crash occurs, the hypervisor host displays a stack trace that contains entries similar to the following examples:

```
_nv010143rm  
_nv005916rm  
_nv017782rm  
_nv21250rm  
_nv021218rm  
nv_interrupt_handler
```

### Version

NVIDIA vGPU software 10.0 only

### Workaround

Reboot the ESXi hypervisor host.

### Status

Resolved in NVIDIA vGPU software 10.1

### Ref. #

2740072

## 5.12. 10.0, 10.1 Only: VM crashes with memory regions error

### Description

Windows or Linux VMs might hang while users are performing multiple resize operations. This issue occurs with VMware Horizon 7.10 or later versions. This issue is caused by a race condition, which leads to deadlock that causes the VM to hang.

### Version

This issue affects deployments that use VMware Horizon 7.10 or later versions.

### Workaround

Use VMware Horizon 7.9 or an earlier supported version.

### Status

Resolved in NVIDIA vGPU software 10.2

### Ref. #

2852349

## 5.13. 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

## 5.14. Remote desktop session freezes with assertion failure and XID error 43 after migration

### Description

After multiple VMs configured with vGPU on a single hypervisor host are migrated simultaneously, the remote desktop session freezes with an assertion failure and XID error 43. This issue affects only GPUs that are based on the Volta GPU architecture. It does not occur if only a single VM is migrated.

When this error occurs, the following error messages are logged to the VMware vSphere Hypervisor (ESXi) log file:

```
Jan  3 14:35:48 ch81-m1 vgpu-12[8050]: error: vmiop_log: NVOS status 0x1f
Jan  3 14:35:48 ch81-m1 vgpu-12[8050]: error: vmiop_log: Assertion Failed at
0x4b8cacf6:286
...
Jan  3 14:35:59 ch81-m1 vgpu-12[8050]: error: vmiop_log: (0x0): XID 43 detected on
physical_chid:0x174, guest_chid:0x14
```

## Status

Open

## Ref. #

200581703

# 5.15. 10.0, 10.1 Only: The Desktop color depth list is empty

## Description

The **Desktop color depth** list on the **Change resolution** page in **NVIDIA Control Panel** for the VM display **NVIDIA VGX** is empty. This list should include options such as **SDR 24 bit** and **SDR 30 bit**.

## Status

Resolved in NVIDIA vGPU software 10.2

## Ref. #

200555917

# 5.16. Citrix Virtual Apps and Desktops session freezes when the desktop is unlocked

## Description

When a Citrix Virtual Apps and Desktops session that is locked is unlocked by pressing **Ctrl+Alt+Del**, the session freezes. This issue affects only VMs that are running Microsoft Windows 10 1809 as a guest OS.

## Version

Microsoft Windows 10 1809 guest OS

## Workaround

Restart the VM.

## Status

Not an NVIDIA bug

## Ref. #

2767012

# 5.17. 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 440.43 -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='1' modules...(bad exit status: 2)
      ERROR (dkms apport): binary package for nvidia: 440.43 not found
      Error! Bad return status for module build on kernel: 5.3.0-28-generic
      (x86_64)
      Consult /var/lib/dkms/nvidia/ 440.43/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

# 5.18. Red Hat Enterprise Linux and CentOS 6 VMs hang during driver installation

## Description

During installation of the NVIDIA vGPU software graphics driver in a Red Hat Enterprise Linux or CentOS 6 guest VM, a kernel panic occurs, and the VM hangs and cannot be rebooted. This issue is observed on older Linux kernels when the NVIDIA device is using message-signaled interrupts (MSIs).

## Version

This issue affects the following guest OS releases:

- ▶ Red Hat Enterprise Linux 6.6 and later compatible 6.x versions
- ▶ CentOS 6.6 and later compatible 6.x versions

## Workaround

1. Disable MSI in the guest VM to fall back to INTx interrupts by adding the following line to the file `/etc/modprobe.d/nvidia.conf`:  

```
options nvidia NVreg_EnableMSI=0
```

If the file `/etc/modprobe.d/nvidia.conf` does not exist, create it.
2. Install the NVIDIA vGPU Software graphics driver in the guest VM.

## Status

Closed

## Ref. #

200556896

## 5.19. 10.0 Only: Desktop cannot be used when user logs off and logs on again after a long-running session

### Description

After a long-running session, such as a session that was left running overnight, the desktop cannot be used when the user logs off and logs on again. When the user logs on, the GPU disappears from the virtual desktop infrastructure, the guest VM fails to allocate a channel, and multiple assertion failures occur.

The failure to allocate a channel and the multiple assertion failures are logged to the VMware vSphere Hypervisor (ESXi) log file:

```
2020-01-23T10:25:17.349Z| vthread-2124768| E110: vmiop_log: (0x0): Guest attempted
to allocate channel above its max channel limit 0xf8
2020-01-23T10:25:17.349Z| vthread-2124768| E110: vmiop_log: (0x0): VGPU message 6
failed, result code: 0x1a
2020-01-23T10:25:17.349Z| vthread-2124768| E110: vmiop_log: (0x0):
0xc1d005ff, 0xff0e0000, 0xff0400f8, 0xa06f,
2020-01-23T10:25:17.349Z| vthread-2124768| E110: vmiop_log: (0x0):          0x1, 0x0,
0xff1fe038, 0x11a7de000, 0x800,
2020-01-23T10:25:17.349Z| vthread-2124768| E110: vmiop_log: (0x0):
0x80000000, 0x0, 0x0, 0x0, (Not logged),
2020-01-23T10:25:17.349Z| vthread-2124768| E110: vmiop_log: (0x0):          0x1, 0x0
2020-01-23T10:25:17.349Z| vthread-2124768| E110: vmiop_log: (0x0): , 0x0
...
2020-01-20T11:36:53.073Z| vthread-2128813| E110: vmiop_log: Assertion Failed at
0xb056bd94:381
2020-01-20T11:36:53.073Z| vthread-2128813| E110: vmiop_log: 13 frames returned by
backtrace
...
2020-01-20T11:36:53.073Z| vthread-2128813| E110: vmiop_log: Assertion Failed at
0xb056bd94:381
2020-01-20T11:36:53.074Z| vthread-2128813| E110: vmiop_log: 13 frames returned by
backtrace
...
2020-01-20T11:36:53.074Z| vthread-2128813| E110: vmiop_log: Assertion Failed at
0xb056bd94:381
2020-01-20T11:36:53.074Z| vthread-2128813| E110: vmiop_log: 13 frames returned by
backtrace
```

### Status

Resolved in NVIDIA vGPU software 10.1.

### Ref. #

2840380

## 5.20. 10.0 Only: XID errors and TDR occur after vGPU migration

### Description

After several vGPU migrations, Direct X 12 applications might show corruption or crash with XID errors 13 or 32 and a TDR followed by XID error 43. This issue affects only GPUs based on the NVIDIA Turing™ architecture.

The VMware vSphere log file contains these error messages:

```
WARNING: NVRM: Xid (PCI:0000:05:00): 13, pid=2103457, Graphics Exception on GPC 0:
3D-Z KIND Violation. Coordinates: (0x0, 0x0)
WARNING: NVRM: Xid (PCI:0000:05:00): 13, pid=2103457, Graphics Exception: ESR
0x500420=0x80000080 0x500434=0x0 0x500438=0xd0000 0x50043c=0x10006
WARNING: NVRM: Xid (PCI:0000:05:00): 32, pid=2103457, Channel ID 00000036 intr0
00040000
WARNING: NVRM: Xid (PCI:0000:05:00): 43, pid=2103457, Ch 00000015
```

### Status

Resolved in NVIDIA vGPU software 10.1

### Ref. #

200556412

## 5.21. 10.0 Only: Information about peer-to-peer CUDA transfers over NVLink cannot be obtained for individual VMs

### Description

On some releases of VMware vSphere, the command `nvidia-smi vgpu topo vm-uuid -tm` fails to retrieve information about peer-to-peer CUDA transfers over NVLink for the specified VM.

This issue does **not** affect the functionality of peer-to-peer CUDA transfers over NVLink.

### Version

VMware vSphere ESXi 6.7 build 14320388. Later builds might also be affected.

## Workaround

To obtain information about peer-to-peer CUDA transfers over NVLink, do not specify the UUID of the VM. Instead, obtain this information for all VMs by using the command **nvdiagsmi topo -m**.

## Status

Resolved in NVIDIA vGPU software 10.1

## Ref. #

200576239

# 5.22. 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

## 5.23. Tesla T4 is enumerated as 32 separate GPUs by VMware vSphere ESXi

### Description

Some servers, for example, the Dell R740, do not configure SR-IOV capability if the SR-IOV SBIOS setting is disabled on the server. If the SR-IOV SBIOS setting is disabled on such a server that is being used with the Tesla T4 GPU, VMware vSphere ESXi enumerates the Tesla T4 as 32 separate GPUs. In this state, you cannot use the GPU to configure a VM with NVIDIA vGPU or for GPU pass through.

### Workaround

Ensure that the SR-IOV SBIOS setting is enabled on the server.

### Status

Open

### Ref. #

2697051

## 5.24. VMware vCenter shows GPUs with no available GPU memory

### Description

VMware vCenter shows some physical GPUs as having 0.0 B of available GPU memory. VMs that have been assigned vGPUs on the affected physical GPUs cannot be booted. The `nvidia-smi` command shows the same physical GPUs as having some GPU memory available.

### Workaround

Stop and restart the Xorg service and `nv-hostengine` on the ESXi host.

1. Stop all running VM instances on the host.
2. Stop the Xorg service.  

```
[root@esxi:~] /etc/init.d/xorg stop
```
3. Stop nv-hostengine.  

```
[root@esxi:~] nv-hostengine -t
```
4. Wait for 1 second to allow nv-hostengine to stop.
5. Start nv-hostengine.  

```
[root@esxi:~] nv-hostengine -d
```
6. Start the Xorg service.  

```
[root@esxi:~] /etc/init.d/xorg start
```

## Status

Not an NVIDIA bug

A fix is available from VMware in VMware vSphere ESXi 6.7 U3. For information about the availability of fixes for other releases of VMware vSphere ESXi, contact VMware.

## Ref. #

2644794

# 5.25. RAPIDS cuDF `merge` fails on NVIDIA vGPU

## Description

The `merge` function of the RAPIDS cuDF GPU data frame library fails on NVIDIA vGPU. This function fails because RAPIDS uses the Unified Memory feature of CUDA, which NVIDIA vGPU does not support.

## Status

Open

## Ref. #

2642134

## 5.26. Users' sessions may freeze during vMotion migration of VMs configured with vGPU

### Description

When vMotion is used to migrate a VM configured with vGPU to another host, users' sessions may freeze for up to several seconds during the migration.

These factors may increase the length of time for which a session freezes:

- ▶ Continuous use of the frame buffer by the workload, which typically occurs with workloads such as video streaming
- ▶ A large amount of vGPU frame buffer
- ▶ A large amount of system memory
- ▶ Limited network bandwidth

### Workaround

Administrators can mitigate the effects on end users by avoiding migration of VMs configured with vGPU during business hours or warning end users that migration is about to start and that they may experience session freezes.

End users experiencing this issue must wait for their sessions to resume when the migration is complete.

### Status

Open

### Ref. #

2569578

## 5.27. Migration of VMs configured with vGPU stops before the migration is complete

### Description

When a VM configured with vGPU is migrated to another host, the migration stops before it is complete. After the migration stops, the VM is no longer accessible.

This issue occurs if the ECC memory configuration (enabled or disabled) on the source and destination hosts are different. The ECC memory configuration on both the source and destination hosts must be identical.

### Workaround

Reboot the hypervisor host to recover the VM. Before attempting to migrate the VM again, ensure that the ECC memory configuration on both the source and destination hosts are identical.

### Status

Not an NVIDIA bug

### Ref. #

200520027

## 5.28. ECC memory settings for a vGPU cannot be changed by using NVIDIA X Server Settings

### Description

The ECC memory settings for a vGPU cannot be changed from a Linux guest VM by using **NVIDIA X Server Settings**. After the ECC memory state has been changed on the **ECC Settings** page and the VM has been rebooted, the ECC memory state remains unchanged.

### Workaround

Use the `nvidia-smi` command in the guest VM to enable or disable ECC memory for the vGPU as explained in [Virtual GPU Software User Guide](#).

If the ECC memory state remains unchanged even after you use the `nvidia-smi` command to change it, use the workaround in [Changes to ECC memory settings for a Linux vGPU VM by `nvidia-smi` might be ignored](#).

## Status

Open

## Ref. #

200523086

# 5.29. Changes to ECC memory settings for a Linux vGPU VM by `nvidia-smi` might be ignored

## Description

After the ECC memory state for a Linux vGPU VM has been changed by using the `nvidia-smi` command and the VM has been rebooted, the ECC memory state might remain unchanged.

This issue occurs when multiple NVIDIA configuration files in the system cause the kernel module option for setting the ECC memory state `RMGuestECCState` in `/etc/modprobe.d/nvidia.conf` to be ignored.

When the `nvidia-smi` command is used to enable ECC memory, the file `/etc/modprobe.d/nvidia.conf` is created or updated to set the kernel module option `RMGuestECCState`. Another configuration file in `/etc/modprobe.d/` that contains the keyword `NVreg_RegistryDwordsPerDevice` might cause the kernel module option `RMGuestECCState` to be ignored.

## Workaround

This workaround requires administrator privileges.

1. Move the entry containing the keyword `NVreg_RegistryDwordsPerDevice` from the other configuration file to `/etc/modprobe.d/nvidia.conf`.
2. Reboot the VM.

## Status

Open

**Ref. #**

200505777

## 5.30. Black screens observed when a VMware Horizon session is connected to four displays

**Description**

When a VMware Horizon session with Windows 7 is connected to four displays, a black screen is observed on one or more displays.

This issue occurs because a VMware Horizon session does not support connections to four 4K displays with Windows 7.

**Status**

Not an NVIDIA bug

**Ref. #**

200503538

## 5.31. Quadro RTX 8000 and Quadro RTX 6000 GPUs can't be used with VMware vSphere ESXi 6.5

**Description**

Quadro RTX 8000 and Quadro RTX 6000 GPUs can't be used with VMware vSphere ESXi 6.5. If you attempt to use the Quadro RTX 8000 or Quadro RTX 6000 GPU with VMware vSphere ESXi 6.5, a purple-screen crash occurs after you install the NVIDIA Virtual GPU Manager.

**Version**

VMware vSphere ESXi 6.5

## Workaround

Upgrade VMware vSphere ESXi to patch level ESXi 6.5 P04 (ESXi650-201912002, build 15256549) or later.

VMware resolved this issue in this patch for VMware vSphere ESXi.

## Status

Not an NVIDIA bug

## Ref. #

200491080

# 5.32. Vulkan applications crash in Windows 7 guest VMs configured with NVIDIA vGPU

## Description

In Windows 7 guest VMs configured with NVIDIA vGPU, applications developed with Vulkan APIs crash or throw errors when they are launched. Vulkan APIs require sparse texture support, but in Windows 7 guest VMs configured with NVIDIA vGPU, sparse textures are not enabled.

In Windows 10 guest VMs configured with NVIDIA vGPU, sparse textures are enabled and applications developed with Vulkan APIs run correctly in these VMs.

## Status

Open

## Ref. #

200381348

## 5.33. Host core CPU utilization is higher than expected for moderate workloads

### Description

When GPU performance is being monitored, host core CPU utilization is higher than expected for moderate workloads. For example, host CPU utilization when only a small number of VMs are running is as high as when several times as many VMs are running.

### Workaround

Disable monitoring of the following GPU performance statistics:

- ▶ vGPU engine usage by applications across multiple vGPUs
- ▶ Encoder session statistics
- ▶ Frame buffer capture (FBC) session statistics
- ▶ Statistics gathered by performance counters in guest VMs

### Status

Open

### Ref. #

2414897

## 5.34. H.264 encoder falls back to software encoding on 1Q vGPUs with a 4K display

### Description

On 1Q vGPUs with a 4K display, a shortage of frame buffer causes the H.264 encoder to fall back to software encoding.

### Workaround

Use a 2Q or larger virtual GPU type to provide more frame buffer for each vGPU.

## Status

Open

## Ref. #

2422580

# 5.35. H.264 encoder falls back to software encoding on 2Q vGPUs with 3 or more 4K displays

## Description

On 2Q vGPUs with three or more 4K displays, a shortage of frame buffer causes the H.264 encoder to fall back to software encoding.

This issue affects only vGPUs assigned to VMs that are running a Linux guest OS.

## Workaround

Use a 4Q or larger virtual GPU type to provide more frame buffer for each vGPU.

## Status

Open

## Ref. #

200457177

# 5.36. 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

## 5.37. 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.

## 5.38. VMware vMotion fails gracefully under heavy load

### Description

Migrating a VM configured with vGPU fails gracefully if the VM is running an intensive workload.

The error stack in the task details on the vSphere web client contains the following error message:

```
The migration has exceeded the maximum switchover time of 100 second(s).
ESX has preemptively failed the migration to allow the VM to continue running on the
source.
To avoid this failure, either increase the maximum allowable switchover time or wait
until
the VM is performing a less intensive workload.
```

### Workaround

Increase the maximum switchover time by increasing the `vmotion.maxSwitchoverSeconds` option from the default value of 100 seconds.

For more information, see [VMware Knowledge Base Article: vMotion or Storage vMotion of a VM fails with the error: The migration has exceeded the maximum switchover time of 100 second\(s\) \[2141355\]](#).

### Status

Not an NVIDIA bug

### Ref. #

200416700

## 5.39. View session freezes intermittently after a Linux VM acquires a license

### Description

In a Linux VM, the view session can sometimes freeze after the VM acquires a license.

### Workaround

Resize the view session.

## Status

Open

## Ref. #

200426961

# 5.40. Even when the scheduling policy is equal share, unequal GPU utilization is reported

## Description

When the scheduling policy is equal share, unequal GPU engine utilization can be reported for the vGPUs on the same physical GPU.

For example, GPU engine usage for three P40-8Q vGPUs on a Tesla P40 GPU might be reported as follows:

```
[root@localhost:~] nvidia-smi vgpu
Wed Jun 27 10:33:18 2018
```

NVIDIA-SMI 390.59		Driver Version: 390.59	
GPU	Name	Bus-Id	GPU-Util
vGPU ID	Name	VM ID	vGPU-Util
0	Tesla P40	00000000:81:00.0	52%
2122661	GRID P40-8Q	2122682 centos7.4-xmpl-211...	19%
2122663	GRID P40-8Q	2122692 centos7.4-xmpl-211...	0%
2122659	GRID P40-8Q	2122664 centos7.4-xmpl-211...	25%
1	Tesla P40	00000000:85:00.0	58%
2122662	GRID P40-8Q	2122689 centos7.4-xmpl-211...	0%
<b>2122658</b>	<b>GRID P40-8Q</b>	<b>2122667 centos7.4-xmpl-211...</b>	<b>59%</b>
2122660	GRID P40-8Q	2122670 centos7.4-xmpl-211...	0%

The vGPU utilization of the vGPU 2122658 is reported as 59%. However, the expected vGPU utilization should not exceed 33%.

This behavior is a result of the mechanism that is used to measure GPU engine utilization.

## Status

Open

## Ref. #

2175888

## 5.41. When the scheduling policy is fixed share, GPU utilization is reported as higher than expected

### Description

When the scheduling policy is fixed share, GPU engine utilization can be reported as higher than expected for a vGPU.

For example, GPU engine usage for six P40-4Q vGPUs on a Tesla P40 GPU might be reported as follows:

```
[root@localhost:~] nvidia-smi vgpu
Mon Aug 20 10:33:18 2018
```

NVIDIA-SMI 390.42		Driver Version: 390.42	
GPU	Name	Bus-Id	GPU-Util
vGPU ID	Name	VM ID	vGPU-Util
0	Tesla P40	00000000:81:00.0	99%
	<b>85109</b> <b>GRID P40-4Q</b>	<b>85110</b> <b>win7-xmpl-146048-1</b>	<b>32%</b>
	<b>87195</b> <b>GRID P40-4Q</b>	<b>87196</b> <b>win7-xmpl-146048-2</b>	<b>39%</b>
	<b>88095</b> <b>GRID P40-4Q</b>	<b>88096</b> <b>win7-xmpl-146048-3</b>	<b>26%</b>
	89170     GRID P40-4Q	89171     win7-xmpl-146048-4	0%
	90475     GRID P40-4Q	90476     win7-xmpl-146048-5	0%
	93363     GRID P40-4Q	93364     win7-xmpl-146048-6	0%
1	Tesla P40	00000000:85:00.0	0%

The vGPU utilization of vGPU 85109 is reported as 32%. For vGPU 87195, vGPU utilization is reported as 39%. And for 88095, it is reported as 26%. However, the expected vGPU utilization of any vGPU should not exceed approximately 16.7%.

This behavior is a result of the mechanism that is used to measure GPU engine utilization.

### Status

Open

### Ref. #

2227591

## 5.42. `nvidia-smi` reports that vGPU migration is supported on all hypervisors

### Description

The command `nvidia-smi vgpu -m` shows that vGPU migration is supported on all hypervisors, even hypervisors or hypervisor versions that do not support vGPU migration.

### Status

Closed

### Ref. #

200407230

## 5.43. GPU resources not available error during VMware instant clone provisioning

### Description

A `GPU resources not available` error might occur during VMware instant clone provisioning. On Windows VMs, a `video TDR failure - NVLDDMKM.sys` error causes a blue screen crash.

This error occurs when options for VMware Virtual Shared Graphics Acceleration (vSGA) are set for a VM that is configured with NVIDIA vGPU. VMware vSGA is a feature of VMware vSphere that enables multiple virtual machines to share the physical GPUs on ESXi hosts and can be used as an alternative to NVIDIA vGPU.

Depending on the combination of options set, one of the following error messages is seen when the VM is powered on:

- ▶ `Module 'MKS' power on failed.`

This message is seen when the following options are set:

- ▶ **Enable 3D support** is selected.
- ▶ **3D Renderer** is set to **Hardware**

- ▶ The graphics type of all GPUs on the ESXi host is Shared Direct.
- ▶ Hardware GPU resources are not available. The virtual machine will use software rendering.

This message is seen when the following options are set:

- ▶ **Enable 3D support** is selected.
- ▶ **3D Renderer** is set to **Automatic**.
- ▶ The graphics type of all GPUs on the ESXi host is Shared Direct.

## Resolution

If you want to use NVIDIA vGPU, unset any options for VMware vSGA that are set for the VM.

1. Ensure that the VM is powered off.
2. Open the vCenter Web UI.
3. In the vCenter Web UI, right-click the VM and choose **Edit Settings**.
4. Click the **Virtual Hardware** tab.
5. In the device list, expand the **Video card** node and de-select the **Enable 3D support** option.
6. Start the VM.

## Status

Not a bug

## Ref. #

2369683

# 5.44. VMs with 32 GB or more of RAM fail to boot with GPUs requiring 64 GB of MMIO space

## Description

VMs with 32 GB or more of RAM fail to boot with GPUs that require 64 GB of MMIO space. VMs boot successfully with RAM allocations of less than 32 GB.

The following GPUs require 64 GB of MMIO space:

- ▶ Tesla P6
- ▶ Tesla P40

## Version

This issue affects the following versions of VMware vSphere ESXi:

- ▶ 6.0 Update 3 and later updates
- ▶ 6.5 and later updates

## Workaround

If you want to use a VM with 32 GB or more of RAM with GPUs that require 64 GB of MMIO space, use this workaround:

1. Create a VM to which less than 32 GB of RAM is allocated.
2. Choose **VM Options** > **Advanced** and set `pciPassthru.use64bitMMIO="TRUE"`.
3. Allocate the required amount of RAM to the VM.

For more information, see [VMware Knowledge Base Article: VMware vSphere VMDirectPath I/O: Requirements for Platforms and Devices \(2142307\)](#).

## Status

Not an NVIDIA bug

Resolved in VMware vSphere ESXi 6.7

## Ref. #

2043171

# 5.45. Module load failed during VIB downgrade from R390 to R384

## Description

Some registry keys are available only with the R390 Virtual GPU Manager, for example, `NVreg_IgnoreMMIOCheck`. If any keys that are available only with the R390 Virtual GPU Manager are set, the NVIDIA module fails to load after a downgrade from R390 to R384.

When `nvidia-smi` is run without any arguments to verify the installation, the following error message is displayed:

```
NVIDIA-SMI has failed because it couldn't communicate with the NVIDIA driver. Make sure that the latest NVIDIA driver is installed and running.
```

## Workaround

Before uninstalling the R390 VIB, clear all parameters of the `nvidia` module to remove any registry keys that are available only for the R390 Virtual GPU Manager.

```
# esxcli system module parameters set -p "" -m nvidia
```

## Status

Not an NVIDIA bug

## Ref. #

200366884

## 5.46. Resolution is not updated after a VM acquires a license and is restarted

### Description

In a Red Enterprise Linux 7.3 guest VM, an increase in resolution from 1024×768 to 2560×1600 is not applied after a license is acquired and the `gridd` service is restarted. This issue occurs if the `multimonitor` parameter is added to the `xorg.conf` file.

### Version

Red Enterprise Linux 7.3

### Status

Open

### Ref. #

200275925

## 5.47. Tesla P40 cannot be used in pass-through mode

### Description

Pass-through mode on Tesla P40 GPUs and other GPUs based on the Pascal architecture does not work as expected. In some situations, after the VM is powered on, the guest OS crashes or fails to boot.

## Workaround

Ensure that your GPUs are configured as described in [Requirements for Using GPUs Requiring Large MMIO Space in Pass-Through Mode](#)

## Status

Not a bug

## Ref. #

1944539

## 5.48. On Linux, 3D applications run slowly when windows are dragged

### Description

When windows for 3D applications on Linux are dragged, the frame rate drops substantially and the application runs slowly.

This issue does not affect 2D applications.

## Status

Open

## Ref. #

1949482

## 5.49. 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

# 5.50. 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

## 5.51. 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

## 5.52. Memory exhaustion can occur with vGPU profiles that have 512 Mbytes or less of frame buffer

### Description

Memory exhaustion can occur with vGPU profiles that have 512 Mbytes or less of frame buffer.

This issue typically occurs in the following situations:

- ▶ Full screen 1080p video content is playing in a browser. In this situation, the session hangs and session reconnection fails.
- ▶ Multiple display heads are used with Citrix Virtual Apps and Desktops or VMware Horizon on a Windows 10 guest VM.
- ▶ Higher resolution monitors are used.
- ▶ Applications that are frame-buffer intensive are used.
- ▶ NVENC is in use.

To reduce the possibility of memory exhaustion, NVENC is disabled on profiles that have 512 Mbytes or less of frame buffer.

When memory exhaustion occurs, the NVIDIA host driver reports Xid error 31 and Xid error 43 in the VMware vSphere log file `vmware.log` in the guest VM's storage directory.

The following vGPU profiles have 512 Mbytes or less of frame buffer:

- ▶ Tesla M6-0B, M6-0Q
- ▶ Tesla M10-0B, M10-0Q
- ▶ Tesla M60-0B, M60-0Q

The root cause is a known issue associated with changes to the way that recent Microsoft operating systems handle and allow access to overprovisioning messages and errors. If your systems are provisioned with enough frame buffer to support your use cases, you should not encounter these issues.

### Workaround

- ▶ Use an appropriately sized vGPU to ensure that the frame buffer supplied to a VM through the vGPU is adequate for your workloads.
- ▶ Monitor your frame buffer usage.
- ▶ If you are using Windows 10, consider these workarounds and solutions:
  - ▶ Use a profile that has 1 Gbyte of frame buffer.

- ▶ Optimize your Windows 10 resource usage.

To obtain information about best practices for improved user experience using Windows 10 in virtual environments, complete the [NVIDIA GRID vGPU Profile Sizing Guide for Windows 10 download request form](#).

Additionally, you can use the [VMware OS Optimization Tool](#) to make and apply optimization recommendations for Windows 10 and other operating systems.

## Status

Open

## Ref. #

- ▶ 200130864
- ▶ 1803861

# 5.53. vGPU VM fails to boot in ESXi 6.5 if the graphics type is Shared

## Description



**Note:** If vSGA is being used, this issue shouldn't be encountered and changing the default graphics type is not necessary.

On VMware vSphere Hypervisor (ESXi) 6.5, after vGPU is configured, VMs to which a vGPU is assigned may fail to start and the following error message may be displayed:

```
The amount of graphics resource available in the parent resource pool is
insufficient for the operation.
```

The vGPU Manager VIB provides vSGA and vGPU functionality in a single VIB. After this VIB is installed, the default graphics type is Shared, which provides vSGA functionality. To enable vGPU support for VMs in VMware vSphere 6.5, you must change the default graphics type to Shared Direct. If you do not change the default graphics type you will encounter this issue.

## Version

VMware vSphere Hypervisor (ESXi) 6.5

## Workaround

Change the default graphics type to Shared Direct as explained in [Virtual GPU Software User Guide](#).

## Status

Open

## Ref. #

200256224

# 5.54. ESXi 6.5 web client shows high memory usage even when VMs are idle

## Description

On VMware vSphere Hypervisor (ESXi) 6.5, the web client shows a memory usage alarm with critical severity for VMs to which a vGPU is attached even when the VMs are idle. When memory usage is monitored from inside the VM, no memory usage alarm is shown. The web client does not show a memory usage alarm for the same VMs without an attached vGPU.

## Version

VMware vSphere Hypervisor (ESXi) 6.5

## Workaround

Avoid using the VMware vSphere Hypervisor (ESXi) 6.5 web client to monitor memory usage for VMs to which a vGPU is attached.

## Status

Not an NVIDIA bug

## Ref. #

200191065

## 5.55. NVIDIA driver installation may fail for VMs on a host in a VMware DRS cluster

### Description

For VMware vSphere releases before 6.7 Update 1, the ESXi host on which VMs configured with NVIDIA vGPU reside must not be a member of an automated VMware Distributed Resource Scheduler (DRS) cluster. The installer for the NVIDIA driver for NVIDIA vGPU software cannot locate the NVIDIA vGPU software GPU card on a host in an automated VMware DRS Cluster. Any attempt to install the driver on a VM on a host in an automated DRS cluster fails with the following error:

```
NVIDIA Installer cannot continue  
This graphics driver could not find compatible graphics hardware.
```



**Note:** This issue does not occur with VMs running VMware vSphere 6.7 Update 1 or later without load balancing support. For these releases, vSphere DRS supports automatic initial placement of VMs configured with NVIDIA vGPU.

### Version

VMware vSphere Hypervisor (ESXi) releases **before** 6.7 Update 1.

### Workaround

Ensure that the automation level of the DRS cluster is set to **Manual**.

For more information about this setting, see [Edit Cluster Settings](#) in the VMware documentation.

### Status

Open

### Ref. #

1933449

## 5.56. GNOME Display Manager (GDM) fails to start on Red Hat Enterprise Linux 7.2 and CentOS 7.0

### Description

GDM fails to start on Red Hat Enterprise Linux 7.2 and CentOS 7.0 with the following error:

```
Oh no! Something has gone wrong!
```

### Workaround

Permanently enable permissive mode for Security Enhanced Linux (SELinux).

1. As root, edit the `/etc/selinux/config` file to set `SELINUX` to `permissive`.
2. Reboot the system.

```
~]# reboot
```

For more information, see [Permissive Mode](#) in *Red Hat Enterprise Linux 7 SELinux User's and Administrator's Guide*.

### Status

Not an NVIDIA bug

### Ref. #

200167868

## 5.57. NVIDIA Control Panel fails to start and reports that “you are not currently using a display that is attached to an Nvidia GPU”

### Description

When you launch NVIDIA Control Panel on a VM configured with vGPU, it fails to start and reports that you are not using a display attached to an NVIDIA GPU. This happens because Windows is using VMware's SVGA device instead of NVIDIA vGPU.

## Fix

Make NVIDIA vGPU the primary display adapter.

Use Windows screen resolution control panel to make the second display, identified as "2" and corresponding to NVIDIA vGPU, to be the active display and select the Show desktop only on 2 option. Click Apply to accept the configuration.

You may need to click on the Detect button for Windows to recognize the display connected to NVIDIA vGPU.



**Note:** If the VMware Horizon/View agent is installed in the VM, the NVIDIA GPU is automatically selected in preference to the SVGA device.

## Status

Open

## Ref. #

# 5.58. VM configured with more than one vGPU fails to initialize vGPU when booted

## Description

Using the current VMware vCenter user interface, it is possible to configure a VM with more than one vGPU device. When booted, the VM boots in VMware SVGA mode and doesn't load the NVIDIA driver. The additional vGPU devices are present in Windows Device Manager but display a warning sign, and the following device status:

```
Windows has stopped this device because it has reported problems. (Code 43)
```

## Workaround

NVIDIA vGPU currently supports a single virtual GPU device per VM. Remove any additional vGPUs from the VM configuration before booting the VM.

## Status

Open

Ref. #

## 5.59. A VM configured with both a vGPU and a passthrough GPU fails to start the passthrough GPU

### Description

Using the current VMware vCenter user interface, it is possible to configure a VM with a vGPU device and a passthrough (direct path) GPU device. This is not a currently supported configuration for vGPU. The passthrough GPU appears in Windows Device Manager with a warning sign, and the following device status:

```
Windows has stopped this device because it has reported problems. (Code 43)
```

### Workaround

Do not assign vGPU and passthrough GPUs to a VM simultaneously.

### Status

Open

Ref. #

1735002

## 5.60. vGPU allocation policy fails when multiple VMs are started simultaneously

### Description

If multiple VMs are started simultaneously, vSphere may not adhere to the placement policy currently in effect. For example, if the default placement policy (breadth-first) is in effect, and 4 physical GPUs are available with no resident vGPUs, then starting 4 VMs simultaneously should result in one vGPU on each GPU. In practice, more than one vGPU may end up resident on a GPU.

### Workaround

Start VMs individually.

### Status

Not an NVIDIA bug

### Ref. #

200042690

## 5.61. Before Horizon agent is installed inside a VM, the Start menu's sleep option is available

### Description

When a VM is configured with a vGPU, the **Sleep** option remains available in the **Windows Start** menu. Sleep is not supported on vGPU and attempts to use it will lead to undefined behavior.

### Workaround

Do not use Sleep with vGPU.

Installing the VMware Horizon agent will disable the **Sleep** option.

### Status

Closed

### Ref. #

200043405

## 5.62. vGPU-enabled VMs fail to start, `nvidia-smi` fails when VMs are configured with too high a proportion of the server's memory.

### Description

If vGPU-enabled VMs are assigned too high a proportion of the server's total memory, the following errors occur:

- ▶ One or more of the VMs may fail to start with the following error:

```
The available Memory resources in the parent resource pool are insufficient for the operation
```

- ▶ When run in the host shell, the `nvidia-smi` utility returns this error:

```
-sh: can't fork
```

For example, on a server configured with 256G of memory, these errors may occur if vGPU-enabled VMs are assigned more than 243G of memory.

### Workaround

Reduce the total amount of system memory assigned to the VMs.

### Status

Closed

### Ref. #

200060499

## 5.63. On reset or restart VMs fail to start with the error `VMIOP: no graphics device is available for vGPU...`

### Description

On a system running a maximal configuration, that is, with the maximum number of vGPU VMs the server can support, some VMs might fail to start post a reset or restart operation.

### Fix

Upgrade to ESXi 6.0 Update 1.

### Status

Closed

### Ref. #

200097546

## 5.64. `nvidia-smi` shows high GPU utilization for vGPU VMs with active Horizon sessions

### Description

vGPU VMs with an active Horizon connection utilize a high percentage of the GPU on the ESXi host. The GPU utilization remains high for the duration of the Horizon session even if there are no active applications running on the VM.

### Workaround

None

### Status

Open

Partially resolved for Horizon 7.0.1:

- ▶ For Blast connections, GPU utilization is no longer high.
- ▶ For PCoIP connections, utilization remains high.

### Ref. #

1735009

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