



Virtual GPU Software R440 for Citrix Hypervisor

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 Citrix Hypervisor.



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 Citrix Hypervisor releases listed in Hypervisor Software Releases	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"> ▶ All NVIDIA vGPU Manager 11.x releases
	10.3 through 10.4	<ul style="list-style-type: none"> ▶ NVIDIA vGPU Manager 10.3 through 10.4 ▶ All NVIDIA vGPU Manager 11.x releases

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

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
- ▶ Support for multiple vGPUs in a single VM
- ▶ 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 Citrix Hypervisor 8.1
- ▶ Support for Red Hat Enterprise Linux 8.1 as a guest OS
- ▶ Support for Red Hat Enterprise Linux 8.0 and CentOS 8.0 as a guest OS
- ▶ Support for Windows 10 November 2019 Update (1909) as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 1912

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

Deprecated Feature	Preferred Alternative
-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

- ▶ Citrix Hypervisor 7.6 is no longer supported.
- ▶ 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 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 Citrix Virtual Apps and Desktops version 7 2003

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
- ▶ The following releases of Citrix virtual desktop software are no longer supported:
 - ▶ Citrix Virtual Apps and Desktops version 7 1808
 - ▶ Citrix XenApp/XenDesktop versions 7.18 and 7.17

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 Citrix Virtual Apps and Desktops version 7 2006

Feature Support Withdrawn in Release 10.3

- ▶ Citrix Hypervisor 8.0 is no longer supported
- ▶ 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](#)

Hardware and Software Support Introduced in Release 10.4

- ▶ Support for Citrix Virtual Apps and Desktops version 7 2009

Chapter 2. Validated Platforms

This release family of NVIDIA vGPU software provides support for several NVIDIA GPUs on validated server hardware platforms, Citrix Hypervisor 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 Citrix Hypervisor, running on validated server hardware platforms:

- ▶ GPUs based on the NVIDIA Maxwell™ graphic architecture:
 - ▶ Tesla M6
 - ▶ Tesla M10
 - ▶ Tesla M60
- ▶ GPUs based on the NVIDIA Pascal™ architecture:
 - ▶ Tesla P4
 - ▶ Tesla P6
 - ▶ Tesla P40
 - ▶ Tesla P100 PCIe 16 GB (XenMotion with vGPU is **not** supported.)
 - ▶ Tesla P100 SXM2 16 GB (XenMotion with vGPU is **not** supported.)
 - ▶ Tesla P100 PCIe 12GB (XenMotion with vGPU is **not** supported.)
- ▶ GPUs based on the NVIDIA Volta architecture:
 - ▶ Tesla V100 SXM2
 - ▶ Tesla V100 SXM2 32GB
 - ▶ Tesla V100 PCIe
 - ▶ Tesla V100 PCIe 32GB
 - ▶ Tesla V100S PCIe 32GB

- ▶ Tesla V100 FHHL
- ▶ GPUs based on the NVIDIA Turing™ architecture:
 - ▶ Tesla T4
 - ▶ Quadro RTX 6000 in displayless mode
 - ▶ Quadro RTX 6000 passive in displayless mode
 - ▶ Quadro RTX 8000 in displayless mode
 - ▶ Quadro RTX 8000 passive in displayless mode

In displayless mode, local physical display connectors are disabled.

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. Furthermore, vCS is not supported on any GPU on Citrix Hypervisor.

2.2. Hypervisor Software Releases

Changes to Citrix Product Names and Release Numbers

Citrix has changed the product names of its hypervisor and virtual desktop software.

Old Name	New Name
XenServer	Citrix Hypervisor
XenApp and XenDesktop	Citrix Virtual Apps and Desktops
Citrix Receiver	Citrix Workspace App

The release number of Citrix Virtual Apps and Desktops releases **after 7.18** is in the form 7 *yymm*, where *yymm* denotes the year and month that the product was released. For example, for a product released in August 2018, *yymm* is 1808

For more information, see these topics in the Citrix documentation:

- ▶ [New product names](#)

► [New product and component version numbers](#)

Supported Citrix Hypervisor Releases

This release family of NVIDIA vGPU software is supported on the Citrix Hypervisor releases listed in the table.



Note:

Support for NVIDIA vGPU software requires the Premium Edition (previously Enterprise Edition) of Citrix Hypervisor. For details, see [Licensing](#) in the Citrix documentation.

Cumulative update releases for a base release of Citrix Hypervisor 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	Notes
Citrix Hypervisor 8.1	RTM build and compatible cumulative update releases	<p>In NVIDIA vGPU mode, all NVIDIA GPUs that support NVIDIA vGPU software are supported.</p> <p>vCS is not supported.</p> <p>In GPU pass-through mode, the following GPUs are not supported:</p> <ul style="list-style-type: none"> ► Quadro RTX 6000 ► Quadro RTX 6000 passive ► Quadro RTX 8000 ► Quadro RTX 8000 passive <p>This release supports XenMotion with vGPU on suitable GPUs as listed in Supported NVIDIA GPUs and Validated Server Platforms.</p>
10.0-10.2 only: Citrix Hypervisor 8.0	RTM build and compatible cumulative update releases	<p>In NVIDIA vGPU mode, all NVIDIA GPUs that support NVIDIA vGPU software are supported.</p> <p>Multiple vGPUs on a single VM are not supported.</p> <p>vCS is not supported.</p>

Software	Releases Supported	Notes
		<p>In GPU pass-through mode, the following GPUs are not supported:</p> <ul style="list-style-type: none"> ▶ Quadro RTX 6000 ▶ Quadro RTX 6000 passive ▶ Quadro RTX 8000 ▶ Quadro RTX 8000 passive <p>This release supports XenMotion with vGPU on suitable GPUs as listed in Supported NVIDIA GPUs and Validated Server Platforms.</p>
10.0 only: Citrix Hypervisor (XenServer) 7.6	RTM build and compatible cumulative update releases	<p>All NVIDIA GPUs that support NVIDIA vGPU software are supported.</p> <p>Multiple vGPUs on a single VM are not supported.</p> <p>vCS is not supported.</p> <p>This release supports XenMotion with vGPU on suitable GPUs as listed in Supported NVIDIA GPUs and Validated Server Platforms.</p>
Citrix Hypervisor (XenServer) 7.1	RTM build and compatible cumulative update releases	<p>Not supported on the following GPUs:</p> <ul style="list-style-type: none"> ▶ Tesla T4 ▶ Quadro RTX 6000 passive ▶ Quadro RTX 8000 passive <p>Multiple vGPUs on a single VM are not supported.</p> <p>vCS is not supported.</p> <p>XenMotion with vGPU is not supported.</p>
Citrix Hypervisor (XenServer) 7.0	RTM build 125380 and compatible cumulative update releases	<p>Not supported on the following GPUs:</p> <ul style="list-style-type: none"> ▶ Tesla T4 ▶ Quadro RTX 6000 passive

Software	Releases Supported	Notes
		<p>► Quadro RTX 8000 passive</p> <p>Multiple vGPUs on a single VM are not supported.</p> <p>vCS is not supported.</p> <p>XenMotion with vGPU is not supported.</p>

Supported Virtual Desktop Software Releases

This release supports **only** the virtual desktop software releases listed in the table. Except where otherwise stated, HDX 3D Pro mode is supported but not required.

Software	Releases Supported
Citrix Virtual Apps and Desktops	<p>Since 10.4: Versions 7 2009, 7 2006, 7 2003, 7 1912, 7 1909, 7 1906, and 7 1903</p> <p>10.3 only: Versions 7 2006, 7 2003, 7 1912, 7 1909, 7 1906, and 7 1903</p> <p>10.2 only: Versions 7 2003, 7 1912, 7 1909, 7 1906, and 7 1903</p> <p>10.0, 10.1 only: Versions 7 1912, 7 1909, 7 1906, 7 1903, and 7 1808</p>
XenApp/XenDesktop	<p>Since 10.2: Version 7.15</p> <p>10.0, 10.1 only: Versions 7.18, 7.17, and 7.15</p> <div> <p> Note: Version 7.15 is supported only in HDX 3D Pro mode. HDX 3D Pro mode is required to ensure that the NVIDIA GPU can be used unrestricted.</p> </div>

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.

In GPU pass-through mode, the following GPUs are **not** supported on Citrix Hypervisor 8.0:

- ▶ Quadro RTX 6000
- ▶ Quadro RTX 8000

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 Citrix Hypervisor. The releases of Citrix Hypervisor 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.

XenMotion with vGPU is supported on supported Windows guest OS releases.

Guest OS	NVIDIA vGPU - Citrix Hypervisor Releases	Pass-Through GPU - Citrix Hypervisor Releases
Windows Server 2019	Since 10.3: 8.1, 7.1 cumulative update 2 10.0-10.2 only: 8.1, 8.0, 7.1 cumulative update 2	Since 10.3: 8.1, 7.1 cumulative update 2 10.0-10.2 only: 8.1, 8.0, 7.1 cumulative update 2
Windows Server 2016 1709, 1607	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0
Windows Server 2012 R2	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 Since 10.1: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0
10.0-10.2 only: Windows Server 2008 R2	Since 10.1: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0	Since 10.1: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0 Supported only on GPUs based on the Maxwell architecture
Windows 10:	Since 10.3: 8.1, 7.1, 7.0	Since 10.3: 8.1, 7.1, 7.0

Guest OS	NVIDIA vGPU - Citrix Hypervisor Releases	Pass-Through GPU - Citrix Hypervisor Releases
<ul style="list-style-type: none"> ▶ November 2019 Update (1909) ▶ May 2019 Update (1903) ▶ October 2018 Update (1809) ▶ Spring Creators Update (1803) ▶ Fall Creators Update (1709) ▶ Creators Update (1703) ▶ Anniversary Update (1607) ▶ November Update (1511) ▶ RTM (1507) 	<p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p>	<p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p>
Windows 8.1 Update	<p>Since 10.3: 8.1, 7.1, 7.0</p> <p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p>	<p>Since 10.3: 8.1, 7.1, 7.0</p> <p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p>
Windows 8.1	<p>Since 10.3: 8.1, 7.1, 7.0</p> <p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p>	-
Windows 8	<p>Since 10.3: 8.1, 7.1, 7.0</p> <p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p>	-
Windows 7	<p>Since 10.3: 8.1, 7.1, 7.0</p> <p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p>	<p>Since 10.3: 8.1, 7.1, 7.0</p> <p>10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0</p> <p>10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0</p> <p>Supported only on GPUs based on the Maxwell architecture</p>

2.3.2. Linux Guest OS Support

NVIDIA vGPU software supports **only** the Linux distributions listed in the table as a guest OS on Citrix Hypervisor. The releases of Citrix Hypervisor 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.

XenMotion with vGPU is **not** supported on any Linux guest OS release.

Guest OS	NVIDIA vGPU - Citrix Hypervisor Releases	Pass-Through GPU - Citrix Hypervisor Releases
Since 10.2: Red Hat Enterprise Linux 8.2	8.1	8.1
Red Hat Enterprise Linux 8.1	8.1	8.1
Since 10.2: CentOS Linux 8 (1911)	8.1	8.1
10.0 only: Red Hat Enterprise Linux 8.0	8.1	8.1
CentOS 8.0	8.1	8.1
Since 10.2: Red Hat Enterprise Linux 7.6-7.8	Since 10.3: 8.1, 7.1, 7.0 10.2 only: 8.1, 8.0, 7.1, 7.0	Since 10.3: 8.1, 7.1, 7.0 10.2 only: 8.1, 8.0, 7.1, 7.0
Since 10.2: CentOS 7.6-7.8	Since 10.3: 8.1, 7.1, 7.0 10.2 only: 8.1, 8.0, 7.1, 7.0	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0
10.0, 10.1 only: Red Hat Enterprise Linux 7.0-7.5	10.1 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0	10.1 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0
10.0, 10.1 only: CentOS 7.0-7.5	10.1 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0	10.1 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0
Ubuntu 18.04 LTS	Since 10.3: 8.1, 7.1 cumulative update 2 10.1, 10.2 only: 8.1, 8.0, 7.1 cumulative update 2 10.0 only: 8.1, 8.0, 7.6, 7.1 cumulative update 2	Since 10.3: 8.1, 7.1 cumulative update 2 10.1, 10.2 only: 8.1, 8.0, 7.1 cumulative update 2 10.0 only: 8.1, 8.0, 7.6, 7.1 cumulative update 2

Guest OS	NVIDIA vGPU - Citrix Hypervisor Releases	Pass-Through GPU - Citrix Hypervisor Releases
Ubuntu 16.04 LTS	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0
Ubuntu 14.04 LTS	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0	Since 10.3: 8.1, 7.1, 7.0 10.1, 10.2 only: 8.1, 8.0, 7.1, 7.0 10.0 only: 8.1, 8.0, 7.6, 7.1, 7.0

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. XenMotion with vGPU Support

XenMotion with vGPU is supported only on a subset of supported GPUs, Citrix Hypervisor 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 Citrix Hypervisor releases:

- ▶ **Since 10.3:** 8.1 only
- ▶ **10.1, 10.2 only:** 8.1 and 8.0 only
- ▶ **10.0 only:** 8.1, 8.0, and 7.6 only

Supported guest OS releases: Windows only. XenMotion with vGPU is **not** supported on 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 Citrix Hypervisor 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

GPU Architecture	Board	vGPU
	Quadro RTX 6000	T4-16C
		RTX6000-24Q
	Quadro RTX 6000 passive	RTX6000-24C
		RTX6000P-24Q
	Quadro RTX 8000	RTX6000P-24C
		RTX8000-48Q
	Quadro RTX 8000 passive	RTX8000-48C
		RTX8000P-48Q
Volta	Tesla V100 SXM2 32GB	RTX8000P-48C
		V100DX-32Q
	Tesla V100 PCIe 32GB	V100D-32C
		V100D-32Q
	Tesla V100S PCIe 32GB	V100D-32C
		V100S-32Q
	Tesla V100 SXM2	V100S-32C
		V100X-16Q
	Tesla V100 PCIe	V100X-16C
		V100-16Q
Pascal	Tesla P100 SXM2	V100-16C
		V100L-16Q
	Tesla P100 PCIe 16GB	V100L-16C
		P100X-16Q
	Tesla P100 PCIe 12GB	P100X-16C
		P100-16Q
	Tesla P40	P100-16C
		P100C-12Q
	Tesla P6	P100C-12C
		P40-24Q
	Tesla P4	P40-24C
		P6-16Q
		P6-16C
		P4-8Q

GPU Architecture	Board	vGPU
		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 16 vGPUs per VM on Citrix Hypervisor.

Supported Hypervisor Releases

Citrix Hypervisor 8.1 only.

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, Citrix Hypervisor 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

GPU Architecture	Board	vGPU
		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 *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, *page-retirement-allocation* = $4 \div \text{max-vgpus-per-gpu}$.

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

max-vgpus-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-vgpus-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 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 Citrix Hypervisor 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 Citrix Hypervisor VM's `/var/log/messages` 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 Citrix Hypervisor VM's `/var/log/messages` 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.

3.8. 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 specifying `frame_rate_limiter=0` in the VM's `platform:vgpu_extra_args` parameter:

```
[root@xenserver ~]# xe vm-param-set uuid=e71afda4-53f4-3a1b-6c92-a364a7f619c2
platform:vgpu_extra_args="frame_rate_limiter=0"
[root@xenserver ~]#
```

The setting takes effect the next time the VM is started or rebooted.

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 in one of the following ways:

- ▶ Removing the `vgpu_extra_args` key from the `platform` parameter
- ▶ Removing `frame_rate_limiter=0` from the `vgpu_extra_args` key
- ▶ Setting `frame_rate_limiter=1`. For example:

```
[root@xenserver ~]# xe vm-param-set uuid=e71afda4-53f4-3a1b-6c92-a364a7f619c2
platform:vgpu_extra_args="frame_rate_limiter=1"
[root@xenserver ~]#
```

3.9. `nvidia-smi` fails to operate when all GPUs are assigned to GPU pass-through mode

Description

If all GPUs in the platform are assigned to VMs in pass-through mode, `nvidia-smi` will return an error:

```
[root@xenserver-vgx-test ~]# nvidia-smi
Failed to initialize NVML: Unknown Error
```

This is because GPUs operating in pass-through mode are not visible to `nvidia-smi` and the NVIDIA kernel driver operating in the Citrix Hypervisor dom0.


To confirm that all GPUs are operating in pass-through mode, use XenCenter's GPU tab to review current GPU assignment:

xenserver-vgx-test (VM IPs 10.31.223.0-49, dom0 .96, OOB .97) Logged in as: Local root account

Search General Memory Storage Networking NICs GPU Console Performance Users Logs

GPU

Placement policy: Maximum density: put as many VMs as possible on the same GPU [Edit...](#)

 GK104GL [GRID K2]

☒

Test VM
passthrough

☒

Test VM
passthrough

☒

vgx-base-image-win7-64
passthrough

☒

Test VM
passthrough

☒

Test VM
passthrough

☒

Test VM
passthrough

[Select All](#) [Clear All](#)

Allowed vGPU types:

- ✓ Pass-through whole GPU
- ✓ GRID K260Q vGPU (2 per GPU)
- ✓ GRID K240Q vGPU (4 per GPU)
- ✓ GRID K220Q vGPU (8 per GPU)
- ✓ GRID K200 vGPU (8 per GPU)

[Edit Selected GPUs...](#)

Resolution

N/A

3.10. Windows Aero is disabled on Citrix Virtual Apps and Desktops session using 3 or 4 monitors in 2560×1600 resolution

Description

Windows Aero may be disabled when Citrix Virtual Apps and Desktops is connected to a VM with a vGPU or passthrough GPU, with 3 or 4 monitors at 2560×1600 resolution.

This limitation is a limitation of Windows 7. For details, see the Microsoft knowledge base article [Desktop background disappears with very large extended desktop on Windows 7](#).

3.11. 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 standard VGA mode with reduced resolution and color depth. 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 Citrix Hypervisor VM's /var/log/messages log file contains these error messages:

```
vmiop_log: error: NVOS status 0x29
vmiop_log: error: Assertion Failed at 0x7620fd4b:179
vmiop_log: error: 8 frames returned by backtrace
...
vmiop_log: error: VGPU message 12 failed, result code: 0x29
...
vmiop_log: error: NVOS status 0x8
vmiop_log: error: Assertion Failed at 0x7620c8df:280
vmiop_log: error: 8 frames returned by backtrace
...
vmiop_log: error: 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 specifying `enable_large_sys_mem=1` in the VM's `platform:vgpu_extra_args` parameter:


```
[root@xenserver ~]# xe vm-param-set uuid=e71afda4-53f4-3a1b-6c92-a364a7f619c2
platform:vgpu_extra_args="enable_large_sys_mem=1"
```

The setting takes effect the next time the VM is started or rebooted. With this setting in place, less GPU FB is available to applications running in the VM. To accommodate system memory larger than 64GB, the reservation can be further increased by specifying `extra_fb_reservation` in the VM's `platform:vgpu_extra_args` parameter, and setting its value to the desired reservation size in megabytes. The default value of 64M is sufficient to support 64GB of RAM. We recommend adding 2M of reservation for each additional 1GB of system memory. For example, to support 96GB of RAM, set `extra_fb_reservation` to 128:

```
platform:vgpu_extra_args="enable_large_sys_mem=1, extra_fb_reservation=128"
```

The reservation can be reverted back to its default setting in one of the following ways:

- ▶ Removing the `vgpu_extra_args` key from the `platform` parameter
- ▶ Removing `enable_large_sys_mem` from the `vgpu_extra_args` key
- ▶ Setting `enable_large_sys_mem=0`

3.12. vGPU host driver RPM upgrade fails

Description

Upgrading vGPU host driver RPM fails with an error message about failed dependencies on the console.

```
[root@xenserver ~]# rpm -U NVIDIA-vGPU-xenserver-6.5-352.46.x86_64.rpm
error: Failed dependencies:
        NVIDIA-vgx-xenserver conflicts with NVIDIA-vGPU-xenserver-6.5-352.46.x86_64
[root@xenserver ~]#
```

Resolution

Uninstall the older vGPU RPM before installing the latest driver.

Use the following command to uninstall the older vGPU RPM:

```
[root@xenserver ~]# rpm -e NVIDIA-vgx-xenserver
```

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 Citrix Hypervisor.

Issues Resolved in Release 10.1

Bug ID	Summary and Description
200556412	<p><u>10.0 Only: XID errors and TDR occur after vGPU migration</u></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>

Issues Resolved in Release 10.2

Bug ID	Summary and Description
200594274	<p><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></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.</p>
2836226	<p><u>10.0, 10.1 Only: vGPU migration might time out with some vGPU types</u></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><u>10.0, 10.1 Only: NVIDIA Control Panel cannot be used to change the display resolution</u></p>

Bug ID	Summary and 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.
200555917	<p><u>10.0, 10.1 Only: The Desktop color depth list is empty</u></p> <p>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.</p>

Issues Resolved in Release 10.3

Bug ID	Summary and Description
200626446	<p><u>10.0-10.2 Only: Failure to allocate resources causes VM failures or crashes</u></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 hypervisor host. Depending on the resource and the underlying cause of the failure, <code>VGPU message 52 failed</code>, <code>VGPU message 4 failed</code>, <code>VGPU message 21 failed</code>, and <code>VGPU message 10 failed</code> might also be written to the log file on the hypervisor host.</p>
200494400	<p><u>10.0-10.2 Only: Citrix Virtual Apps and Desktops connection freezes initially</u></p> <p>When -0B and -0Q vGPU types are used with Citrix Virtual Apps and Desktops version 7 1903 and later versions, the session freezes or a black screen is seen when the connection is first made. When this issue occurs, the error message <code>DXGI_ERROR_DEVICE_REMOVED</code> is displayed. The affected versions of Citrix Virtual Apps and Desktops use Microsoft DDAPI.</p>
2870295	<p><u>10.0-10.2 Only: Out of memory errors cause VM crashes on Citrix Hypervisor</u></p> <p>Out of memory errors caused by extreme memory fragmentation cause VM crashes on Citrix Hypervisor.</p>
2814740	<p><u>10.0-10.2 Only: Uncorrectable machine check exception occurs after initial reboot of the hypervisor host</u></p> <p>When the hypervisor host is first rebooted after the Virtual GPU Manager is installed, an uncorrectable machine check exception occurs during POST immediately after the message <code>SYSTEM CHIPSET INITIALIZATION UPI LINK INITIALIZATION - START</code>. This issue affects HP systems that are running a hypervisor release that has a newer kernel, for example, Citrix Hypervisor 8.0 or 8.1.</p>

Issues Resolved in Release 10.4

No resolved issues are reported in this release for Citrix Hypervisor.

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.

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.

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. 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

5.6. 10.0-10.2 Only: Out of memory errors cause VM crashes on Citrix Hypervisor

Description

Out of memory errors caused by extreme memory fragmentation cause VM crashes on Citrix Hypervisor.

When this issue occurs, error messages similar to the following examples are logged:

```
Feb 4 10:45:53 copic-xs-4 kernel: [3067294.076077] Out of memory: Kill process 6989 (xapi) score 7 or sacrifice child
Feb 4 10:45:53 copic-xs-4 kernel: [3067294.076399] Killed process 6989 (xapi) total-vm:638288kB, anon-rss:53824kB, file-rss:9292kB, shmem-rss:4kB
Feb 4 10:45:53 copic-xs-4 kernel: [3067294.138425] oom_reaper: reaped process 6989 (xapi), now anon-rss:0kB, file-rss:8kB, shmem-rss:4kB
```

The kill process in the messages might be different than xapi.

Workaround

Increase the memory for the Citrix Hypervisor dom0 domain to at least 16 GB.

Status

Resolved in NVIDIA vGPU software 10.3

Ref.

2870295

5.7. 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

5.8. 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.

Workaround

For information about display configurations supported by Q-series and B-series vGPU types, see [Virtual GPU Software User Guide](#).

Status

Not an NVIDIA bug

Ref.

200556224

5.10. 10.0-10.2 Only: Citrix Virtual Apps and Desktops connection freezes initially

Description

When -0B and -0Q vGPU types are used with Citrix Virtual Apps and Desktops version 7 1903 and later versions, the session freezes or a black screen is seen when the connection is first made. When this issue occurs, the error message `DXGI_ERROR_DEVICE_REMOVED` is displayed. The affected versions of Citrix Virtual Apps and Desktops use Microsoft DDAPI.

Version

Citrix Virtual Apps and Desktops version 7 1903 and later versions

Workaround

Disable the **use hardware encoding for video codec** Citrix policy, which is enabled by default.

Status

Resolved in NVIDIA vGPU software 10.3

Ref.

200494400

5.11. 10.0-10.2 Only: Uncorrectable machine check exception occurs after initial reboot of the hypervisor host

Description

When the hypervisor host is first rebooted after the Virtual GPU Manager is installed, an uncorrectable machine check exception occurs during POST immediately after the message `SYSTEM CHIPSET INITIALIZATION UPI LINK INITIALIZATION - START`. This issue affects HP systems that are running a hypervisor release that has a newer kernel, for example, Citrix Hypervisor 8.0 or 8.1.

After the uncorrectable machine check exception, the hypervisor host is automatically reset and returns to a working state.

When this issue occurs, the following error messages are logged:

```
Uncorrectable Machine Check Exception (Processor 1, APIC ID 0x00000000, Bank
0x00000006,
Status 0xFB800000'00000E0B, Address 0x00000000'00000000, Misc 0x00000000'5B000000).
Uncorrectable PCI Express Error Detected. Slot 255 (Segment 0x0, Bus 0x5D, Device
0x48, Function 0x0)
Uncorrectable PCI Express Error Detected. Slot 255 (Segment 0x0, Bus 0x5D, Device
0x88, Function 0x0)
Uncorrectable PCI Express Error Detected. Slot 255 (Segment 0x0, Bus 0x5D, Device
0x80, Function 0x0)
Uncorrectable PCI Express Error Detected. Slot 255 (Segment 0x0, Bus 0x5D, Device
0x40, Function 0x0)
```

Workaround

Wait for the host to return to a working state. No other action is required.

Status

Resolved in NVIDIA vGPU software 10.3

Ref.

2814740

5.12. 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

5.13. NVIDIA Control Panel fails to launch in a platform layer or published image

Description

When NVIDIA vGPU software is used with Citrix App Layering and a platform layer for a vGPU is being configured, **NVIDIA Control Panel** might fail to launch. The driver might be working normally or it might fail with code 31 or code 43.

For more information and a workaround for this issue, see [NVIDIA Control Panel fails to launch in platform layer or published image](#) in the Citrix Support Knowledge Center.

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 Citrix Hypervisor log file `/var/log/messages`:

```
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. A PCIe bus error occurs in iLO after Tesla M10 installation

Description

When a Tesla M10 GPU is installed in an HPE ProLiant DL380 Gen9 or Gen10 server that is running Citrix Hypervisor 8.0, a PCIe bus error occurs in the Integrated Lights-Out (iLO) remote server management processor. When this error occurs, the server can no longer be shut down, the error message `CPU Panic` is issued, and a reboot of the server is forced.

This issue is specific to the PLX chip on the Tesla M10 GPU.

Version

This issue affects **only** the following combination of software and hardware:

- **Hypervisor software:** Citrix Hypervisor 8.0
- **Server hardware:** HPE ProLiant DL380 Gen9 or Gen10
- **GPU hardware:** Tesla M10

Status

Open

Ref.

200588187

5.19. 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 Citrix Hypervisor `/var/log/messages` 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

5.20. On Citrix Hypervisor, all vGPUs in a VM must be of the same type

Description

When a VM on Citrix Hypervisor is configured with multiple vGPUs, all vGPUs must be of the same type. Citrix Hypervisor does **not** support the assignment multiple vGPUs of different types to a single VM.

What happens when you try to assign a different type of vGPU than the vGPUs already assigned to a VM depends on the Citrix utility that you are using.

- ▶ If you are using Citrix XenCenter, only vGPUs of the same type as the vGPUs already assigned are available for selection.
- ▶ If you are using the `xe` command, the command fails and the following error message is displayed:

```
Cannot create a virtual GPU that is incompatible with the existing types on the VM.
```

Status

Not an NVIDIA bug.

Ref.

200568154

5.21. Console VGA cannot be disabled

Description

In Citrix Hypervisor releases since 8.1, a VM's console VGA interface cannot be disabled by using the command `xe vm-param-set uuid=vm-uuid platform:vgpu_extra_args="disable_vnc=1"`.

This behavior is the result of the following changes that Citrix introduced in Citrix Hypervisor release 8.1:

- ▶ The command `xe vm-param-set` for assigning plugin configuration parameters has been withdrawn.
- ▶ Plugin parameters can no longer be set for vGPUs that were created by using Citrix XenCenter. They can be set only for vGPUs that were created from the command line by using the `xe` command.

Version

Since Citrix Hypervisor release 8.1

Workaround

Create the vGPU by using the `xe` command and specify plugin parameters for the group to which the vGPU belongs as explained in [Virtual GPU Software User Guide](#).

Status

Not a bug

Ref.

200569785

5.22. Console VNC is unusable with Xorg on multiple vGPUs in a VM

Description

If a Linux VM is configured with multiple vGPUs and the Xorg display server is running on more than one vGPU in the VM, severe corruption in console VNC is observed.

Workaround

Ensure that the Xorg display server is running on only one vGPU in the VM.

Status

Not an NVIDIA bug.

Ref.

200568261

5.23. 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

5.24. 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

5.25. 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

5.26. 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

5.27. 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

5.28. Incorrect GPU type shown for Quadro RTX 8000 GPUs in Citrix XenCenter

Description

On the **GPU** tab in **Citrix XenCenter**, Quadro RTX 8000 GPUs are incorrectly shown as `[QUADRO RTX 6000]`.

However, the virtual GPU types for a Quadro RTX 8000 GPU are listed correctly.

NVIDIA vGPU software does not support systems with a mixture of GPU types. Therefore, you can assume that any GPU in a system that you know to contain Quadro RTX 8000 GPUs that is shown as `[QUADRO RTX 6000]` is, in fact, a Quadro RTX 8000 GPU.

Status

Not an NVIDIA bug

Ref.

200492607

5.29. NVIDIA Notification Icon prevents log off of Citrix Published Application user sessions

Description

By default on Windows Server operating systems, the **NVIDIA Notification Icon** application is started with every Citrix Published Application user session. This application might prevent the Citrix Published Application user session from being logged off even after the user has quit all other applications.

Resolution

Disable the **NVIDIA Notification Icon** application for Citrix Published Application user sessions as explained in [Virtual GPU Software User Guide](#).

Status

Resolved by the provision of Windows registry keys for disabling the **NVIDIA Notification Icon** application for Citrix Published Application user sessions.

Ref.

2206368

5.30. 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

5.31. 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

5.32. 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

See [Black Screen at Logon with Nvidia HDX 3D Pro enabled](#) in the Citrix knowledge base.

Status

Not a bug

Ref.

2115733

5.33. 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.

5.34. 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...
2122663	GRID P40-8Q	2122692	centos7.4-xmpl-211...
2122659	GRID P40-8Q	2122664	centos7.4-xmpl-211...
1	Tesla P40	00000000:85:00.0	58%
2122662	GRID P40-8Q	2122689	centos7.4-xmpl-211...
2122658	GRID P40-8Q	2122667	centos7.4-xmpl-211...
2122660	GRID P40-8Q	2122670	centos7.4-xmpl-211...

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

5.35. 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%	
85109	GRID P40-4Q	85110	win7-xmpl-146048-1	32%
87195	GRID P40-4Q	87196	win7-xmpl-146048-2	39%
88095	GRID P40-4Q	88096	win7-xmpl-146048-3	26%
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

5.36. `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

5.37. NVIDIA Control Panel Crashes in a VM connected to two 4K displays

Description

When **NVIDIA Control Panel** is started in a VM connected through a pass-through GPU to two 4K displays, a **Citrix HDX 3D Pro Warning** pop-up window opens containing the following error message:

```
Full screen applications are not supported on Citrix HDX 3D Pro. Press Ok to exit
```

NVIDIA Control Panel then crashes.

After the VM is rebooted, **NVIDIA Control Panel** is available again.

Version

Citrix Virtual Apps and Desktops 7.16

Status

Not an NVIDIA bug

Ref.

200393766

5.38. vGPU guest VM driver not properly loaded on servers with more than 512 GB or 1 TB or more of system memory

Description

If PV IOMMU is enabled, support for vGPU is limited to servers with a maximum of 512 GB of system memory. On servers with more than 512 GB of system memory and PV IOMMU enabled, the guest VM driver is not properly loaded. **Device Manager** marks the vGPU with a yellow exclamation point.

If PV IOMMU is disabled, support for vGPU is limited to servers with less than 1 TB of system memory. This limitation applies only to systems with supported GPUs based on the Maxwell architecture: Tesla M6, Tesla M10, and Tesla M60. On servers with 1 TB or more of system memory, VMs configured with vGPU fail to power on. However, support for GPU pass through is not affected by this limitation.

Resolution

1. If PV IOMMU is enabled, disable it.

```
[root@xenserver ~]# /opt/xensource/libexec/xen-cmdline --set-xen iommu=dom0-passthrough
```

2. If the server has 1 TB or more of system memory, limit the amount of system memory on the server to 1 TB minus 16 GB.

If the server has less than 1 TB or more of system memory, omit this step.

3. Reboot the server.

Status

Not an NVIDIA bug

Ref.

1799582

5.39. Luxmark causes a segmentation fault on an unlicensed Linux client

Description

If the Luxmark application is run on a Linux guest VM configured with NVIDIA vGPU that is booted without acquiring a license, a segmentation fault occurs and the application core dumps. The fault occurs when the application cannot allocate a CUDA object on NVIDIA vGPUs where CUDA is disabled. On NVIDIA vGPUs that can support CUDA, CUDA is disabled in unlicensed mode.

Status

Not an NVIDIA bug.

Ref.

200330956

5.40. 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

5.41. 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

5.42. 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

5.43. 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

5.44. 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 Citrix Hypervisor `/var/log/messages` file.

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](#).

For more information, see also [Windows 10 Optimization for XenDesktop](#) on the Citrix blog.

Status

Open

Ref.

- ▶ 200130864
- ▶ 1803861

5.45. VM bug checks after the guest VM driver for Windows 10 RS2 is installed

Description

When the VM is rebooted after the guest VM driver for Windows 10 RS2 is installed, the VM bug checks. When Windows boots, it selects one of the standard supported video modes. If Windows is booted directly with a display that is driven by an NVIDIA driver, for example a vGPU on Citrix Hypervisor, a blue screen crash occurs.

This issue occurs when the screen resolution is switched from VGA mode to a resolution that is higher than 1920×1200.

Fix

Download and install [Microsoft Windows Update KB4020102](#) from the Microsoft Update Catalog.

Workaround

If you have applied the fix, ignore this workaround.

Otherwise, you can work around this issue until you are able to apply the fix by not using resolutions higher than 1920×1200.

1. Choose a GPU profile in Citrix XenCenter that does not allow resolutions higher than 1920×1200.
2. Before rebooting the VM, set the display resolution to 1920×1200 or lower.

Status

Not an NVIDIA bug

Ref.

200310861

5.46. On Citrix Hypervisor 7.0, VMs unexpectedly reboot and Citrix Hypervisor crashes or freezes

Description

On Citrix Hypervisor 7.0, VMs to which a vGPU is attached unexpectedly reboot and Citrix Hypervisor crashes or freezes.

The event log in the Citrix Hypervisor `/var/log/crash/xen.log` file lists the following errors:

- ▶ A fatal bus error on a component at the slot where the GPU card is installed
- ▶ A fatal error on a component at bus 0, device 2, function 0

This issue occurs when page-modification logging (PML) is enabled on Intel Broadwell CPUs running Citrix Hypervisor 7.0. Citrix is aware of this issue and is working on a permanent fix.

Workaround

Disable page-modification logging (PML) as explained in [XenServer 7 host crash while starting multiple virtual machines](#) in the Citrix Support Knowledge Center.

Status

Not an NVIDIA bug

Ref.

1853248

5.47. With no NVIDIA driver installed, Citrix Hypervisor misidentifies Tesla M10 cards

Description

An erroneous entry in the `pci.ids` database causes Citrix Hypervisor to identify Tesla M10 cards as GRID M40 when no NVIDIA driver is installed.

Version

Citrix Hypervisor 6.5 and 7.0

Workaround

None

Status

Not an NVIDIA bug

Ref.

NVIDIA-420/1792341

5.48. 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`.

```
SELINUX=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

5.49. Video goes blank when run in loop in Windows Media Player

Description

When connected to a vGPU-enabled VM using Citrix Virtual Apps and Desktops, a video played back in looping mode on Windows Media Player goes blank or freezes after a few iterations.

Workaround

None

Status

Not an NVIDIA bug

Ref.

1306623

5.50. Local VGA console is momentarily unblanked when Citrix Virtual Apps and Desktops changes resolution of the VM desktop

Description

When Citrix Virtual Apps and Desktops establishes a remote connection to a VM using vGPU, the VM's local VGA console display in XenCenter is blanked (assuming the VM local console has not been disabled by setting `platform:vgpu_extra_args="disable_vnc=1"`). If the Citrix Virtual Apps and Desktops session changes resolution of the VM's desktop, the local VGA console momentarily unblanks, allowing a XenCenter user to briefly view the desktop.

Workaround

Disable the VM's local VGA console

```
xe vm-param-set uuid=vm-uuid platform:vgpu_extra_args="disable_vnc=1"
```

Status

Open

Ref.

NVIDIA-145/1375164

5.51. VM bugchecks on shutdown/restart when Citrix Virtual Apps and Desktops is installed and NVIDIA driver is uninstalled or upgraded.

Description

If the Citrix Virtual Apps and Desktops agent is installed in a VM before any NVIDIA GPU driver is installed, the VM will bugcheck (bluescreen) when the NVIDIA driver is subsequently upgraded or uninstalled. The bugcheck code is 0x7E, `SYSTEM_THREAD_EXCEPTION_NOT_HANDLED`.

Workaround

Use one of the following workarounds:

- ▶ Do a force shutdown of the VM and restart it.
- ▶ Install the NVIDIA driver in guest VMs before installing Citrix Virtual Apps and Desktops.

Status

Open

Ref.

NVIDIA-295/200018125

5.52. Application frame rate may drop when running Citrix Virtual Apps and Desktops at 2560×1600 resolution.

Description

An application's rendering frame rate may drop when running Citrix Virtual Apps and Desktops at 2560×1600 resolution, relative to the frame rate obtained at lower resolutions.

Fix

Using the Windows `regedit` utility within the VM, open the `HKLM\SOFTWARE\Citrix\Graphics` registry key and create a new `DWORD` value, `EncodeSpeed`, with a value of 2. Reboot the VM. This setting may improve the delivered frame rate at the expense of a reduction in image quality.

Status

Open

Ref.

NVIDIA-190/1416336

5.53. Windows VM BSOD

Description

Windows VM bugchecks on Citrix Hypervisor when running a large number of vGPU based VMs.

The Citrix Hypervisor `/var/log/messages` file contains these error messages:

```
NVRM: Xid (PCI:0000:08:00): 31, Ch 0000001e, engmask 00000111, intr 10000000
NVRM: Xid (PCI:0000:08:00): 31, Ch 00000016, engmask 00000111, intr 10000000
...
vmiop_log: error: Assertion Failed at 0xb5b898d8:4184
vmiop_log: error: 8 frames returned by backtrace
vmiop_log: error: /usr/lib/libnvidia-vgx.so(_nv000793vgx+0x69d) [0xb5b8064d]
vmiop_log: error: /usr/lib/libnvidia-vgx.so(_nv000479vgx+0x118) [0xb5b898d8]
vmiop_log: error: /usr/lib/libnvidia-vgx.so(_nv000782vgx+0x59) [0xb5b85f49]
vmiop_log: error: /usr/lib/libnvidia-vgx.so(_nv000347vgx+0x3db) [0xb5b932db]
vmiop_log: error: /usr/lib/libnvidia-vgx.so [0xb5b78e4a]
vmiop_log: error: /usr/lib/xen/bin/vgpu [0x80554be]
vmiop_log: error: /lib/libpthread.so.0 [0xb7612912]
vmiop_log: error: /lib/libc.so.6(clone+0x5e) [0xb76fc5ee]
vmiop_log: error: failed to initialize guest PTE entries
vmiop_log: error: failed to fill up guest PTE entries 3
vmiop_log: error: VGPU message 27 failed, result code: 0xff000003
vmiop_log: error: 0xc1d00001, 0xff010000, 0x1a77ba00, 0x0, 0x1,
vmiop_log: error: 0x1, 0x1000, 0x10202, 0xc1d00001, 0xff010000,
vmiop_log: error: 0xcaf00004, 0x0
vmiop_log: error: Timeout occurred, reset initiated.
```

Version

Citrix Hypervisor 6.2

Fix

Ensure that you are running the latest OEM firmware for your NVIDIA vGPU software boards.

Status

Closed

Ref.

NVIDIA-327/1632120

5.54. Windows VM BSOD when upgrading NVIDIA drivers over a Citrix Virtual Apps and Desktops session

Description

Windows VM bugchecks when NVIDIA guest drivers are upgraded over a Citrix Virtual Apps and Desktops session.

If the VM is restarted after the bugcheck, the upgraded driver loads correctly and full functionality is available.

Fix

Upgrade Citrix Virtual Apps and Desktops to 7.6 Feature Pack 3

Status

Closed

Ref.

NVIDIA-370/200130780

5.55. XenCenter does not allow vGPUs to be selected as a GPU type for Linux VMs

Description

When creating a new Linux VM or editing the properties of an existing Linux VM, XenCenter does not allow vGPUs to be selected as a GPU type.

vGPU on Linux VMs is supported as a technical preview on Citrix Hypervisor 6.5, and does include XenCenter integration.

Version

Affects the XenCenter integration with Citrix Hypervisor 6.5 only.

Resolved in the XenCenter integration with Citrix Hypervisor 7.0.

Workaround

Refer to XenServer vGPU Management in [Virtual GPU Software User Guide](#) for how to configure vGPU by using the xe CLI.

Status

Closed

Ref.

NVIDIA-360

5.56. If X server is killed on a RHEL7 VM running vGPU, XenCenter console may not automatically switch to text console

Description

If X server is killed on a RHEL7 VM running vGPU, XenCenter console may display a corrupted image and fail to switchover to text console.

The failure to switchover to text console is due to a bug in RHEL7, which causes X server to not start correctly under certain configurations.

Workaround

Use **CTRL+ALT+F1**, **F2**, or **F3** to switch between Linux terminals.

Status

Closed

Ref.

NVIDIA-350/200123378

5.57. Citrix Virtual Apps and Desktops shows only a black screen when connected to a vGPU VM

Description

Citrix Virtual Apps and Desktops sometimes displays only a black screen when it is connected to an NVIDIA vGPU VM. The probable cause is that the display that is connected to the NVIDIA vGPU is entering a lower power state.

Fix

Disable all display-related power management settings.

For detailed instructions, visit [Microsoft power plans frequently asked questions](#) and from the list, select your OS version.

Status

Not an NVIDIA bug

Ref.

1719877

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