



Virtual GPU Software R450 for Citrix Hypervisor

Release Notes

Table of Contents

Chapter 1. Release Notes.....	1
1.1. NVIDIA vGPU Software Driver Versions.....	1
1.2. Compatibility Requirements for the NVIDIA vGPU Manager and Guest VM Driver.....	2
1.3. Updates in Release 11.13.....	3
1.4. Updates in Release 11.12.....	4
1.5. Updates in Release 11.11.....	4
1.6. Updates in Release 11.10.....	4
1.7. Updates in Release 11.9.....	5
1.8. Updates in Release 11.8.....	5
1.9. Updates in Release 11.7.....	6
1.10. Updates in Release 11.6.....	6
1.11. Updates in Release 11.5.....	6
1.12. Updates in Release 11.4.....	7
1.13. Updates in Release 11.3.....	7
1.14. Updates in Release 11.2.....	8
1.15. Updates in Release 11.1.....	8
1.16. Updates in Release 11.0.....	8
Chapter 2. Validated Platforms.....	10
2.1. Supported NVIDIA GPUs and Validated Server Platforms.....	10
2.2. Hypervisor Software Releases.....	15
2.3. Guest OS Support.....	18
2.3.1. Windows Guest OS Support.....	18
2.3.2. Linux Guest OS Support.....	19
2.4. NVIDIA CUDA Toolkit Version Support.....	21
2.5. XenMotion with vGPU Support.....	22
2.6. Multiple vGPU Support.....	24
2.7. Peer-to-Peer CUDA Transfers over NVLink Support.....	25
Chapter 3. Known Product Limitations.....	27
3.1. NVENC does not support resolutions greater than 4096×4096.....	27
3.2. Issues occur when the channels allocated to a vGPU are exhausted.....	28
3.3. Total frame buffer for vGPUs is less than the total frame buffer on the physical GPU.....	29
3.4. Issues may occur with graphics-intensive OpenCL applications on vGPU types with limited frame buffer.....	31

3.5. In pass through mode, all GPUs connected to each other through NVLink must be assigned to the same VM.....	32
3.6. vGPU profiles with 512 Mbytes or less of frame buffer support only 1 virtual display head on Windows 10.....	32
3.7. NVENC requires at least 1 Gbyte of frame buffer.....	33
3.8. VM running an incompatible NVIDIA vGPU guest driver fails to initialize vGPU when booted.....	34
3.9. Single vGPU benchmark scores are lower than pass-through GPU.....	35
3.10. nvidia-smi fails to operate when all GPUs are assigned to GPU pass-through mode.....	36
3.11. Windows Aero is disabled on Citrix Virtual Apps and Desktops session using 3 or 4 monitors in 2560×1600 resolution.....	38
3.12. VMs configured with large memory fail to initialize vGPU when booted.....	38
3.13. vGPU host driver RPM upgrade fails.....	39
Chapter 4. Resolved Issues.....	41
Chapter 5. Known Issues.....	46
5.1. NVIDIA Control Panel crashes if a user session is disconnected and reconnected...46	46
5.2. 11.0-11.12 Only: Remote desktop connection is lost and the NVIDIA vGPU software graphics driver is unloaded.....	47
5.3. With multiple active sessions, NVIDIA Control Panel incorrectly shows that the system is unlicensed.....	48
5.4. VP9 and AV1 decoding with web browsers are not supported on Microsoft Windows Server 2019.....	48
5.5. 11.0-11.7 Only: Linux VM might fail to return a license after shutdown if the license server is specified by its name.....	49
5.6. NVIDIA Control Panel is started only for the RDP user that logs on first.....	50
5.7. 11.0-11.7 Only: Windows vGPU VM sometimes crashes after guest OS upgrade.....	50
5.8. 11.0-11.7 Only: Memory leaks in the vGPU manager plugin cause the VM to hang.....	51
5.9. nvidia-smi ignores the second NVIDIA vGPU device added to a Microsoft Windows Server 2016 VM.....	52
5.10. The reported NVENC frame rate is double the actual frame rate.....	53
5.11. VM hangs after vGPU migration from a host running a vGPU manager 11 release to a host running a vGPU manager 13 release.....	54
5.12. Desktop session freezes when a VM is migrated to or from a host running an NVIDIA vGPU software 11 release.....	54
5.13. Linux VM hangs after vGPU migration to a host running a newer vGPU manager version.....	55
5.14. Since 11.6: NVENC does not work with Teradici Cloud Access Software on Windows.....	56
5.15. A licensed client might fail to acquire a license if a proxy is set.....	57

5.16. Session connection fails with four 4K displays and NVENC enabled on a 2Q, 3Q, or 4Q vGPU.....	58
5.17. Disconnected sessions cannot be reconnected or might be reconnected very slowly with NVWMI installed.....	59
5.18. 11.3, 11.4 Only: Citrix XenCenter console display shows full-screen corruption with A-Series vGPUs.....	59
5.19. 11.0-11.3 Only: NVIDIA vGPU software graphics driver installation fails in Ubuntu guest VMs.....	60
5.20. For some accounted processes, nvidia-smi incorrectly reports maximum memory use of 0 MiB.....	61
5.21. Migrating a VM with a Tesla T4 vGPU between a host running NVIDIA vGPU software 11.3 and a host running a different release fails.....	61
5.22. 11.0 Only: Desktop sessions disconnect after the server becomes unresponsive.....	62
5.23. 11.0-11.2 Only: Sessions freeze randomly with XID errors 38, 43, 32, and 31.....	63
5.24. Migrated VM with more than two vGPUs crashes on destination host.....	63
5.25. 11.1 Only: Licensing event logs indicate license renewal from unavailable primary server.....	64
5.26. 11.0 Only: The NVIDIA license not present notification appears even for VMs for which the vGPU is licensed.....	64
5.27. Driver upgrade in a Linux guest VM with multiple vGPUs might fail.....	68
5.28. 11.0 Only: Failure to allocate resources causes VM failures or crashes.....	69
5.29. NVIDIA Control Panel fails to start if launched too soon from a VM without licensing information.....	69
5.30. VNC client session goes blank and console VNC is corrupted when the guest driver is uninstalled.....	70
5.32. Suspend and resume between hosts running different versions of the vGPU manager fails.....	71
5.33. 11.0 Only: Remoting solution session freezes with VGPU message 21 failed and VGPU message 14 failed errors.....	72
5.34. On Linux, the frame rate might drop to 1 after several minutes.....	72
5.35. Citrix XenCenter displays misleading information about vGPU types.....	73
5.36. Citrix Virtual Apps and Desktops connection freezes initially.....	74
5.37. DWM crashes randomly occur in Windows VMs.....	75
5.38. NVIDIA Control Panel fails to launch in a platform layer or published image.....	76
5.39. Remote desktop session freezes with assertion failure and XID error 43 after migration.....	76
5.40. Citrix Virtual Apps and Desktops session freezes when the desktop is unlocked..	77
5.41. NVIDIA vGPU software graphics driver fails after Linux kernel upgrade with DKMS enabled.....	77
5.42. On Citrix Hypervisor, all vGPUs in a VM must be of the same type.....	78

5.43. Console VGA cannot be disabled.....	79
5.44. Console VNC is unusable with Xorg on multiple vGPUs in a VM.....	80
5.45. Publisher not verified warning during Windows 7 driver installation.....	80
5.46. Migration of VMs configured with vGPU stops before the migration is complete..	81
5.47. ECC memory settings for a vGPU cannot be changed by using NVIDIA X Server Settings.....	82
5.48. Changes to ECC memory settings for a Linux vGPU VM by nvidia-smi might be ignored.....	82
5.49. Incorrect GPU type shown for Quadro RTX 8000 GPUs in Citrix XenCenter.....	83
5.50. NVIDIA Notification Icon prevents log off of Citrix Published Application user sessions.....	84
5.51. Vulkan applications crash in Windows 7 guest VMs configured with NVIDIA vGPU.	84
5.52. Host core CPU utilization is higher than expected for moderate workloads.....	85
5.53. Frame capture while the interactive logon message is displayed returns blank screen.....	86
5.54. RDS sessions do not use the GPU with some Microsoft Windows Server releases	86
5.55. When the scheduling policy is fixed share, GPU utilization is reported as higher than expected.....	87
5.56. nvidia-smi reports that vGPU migration is supported on all hypervisors.....	88
5.57. NVIDIA Control Panel Crashes in a VM connected to two 4K displays.....	88
5.58. vGPU guest VM driver not properly loaded on servers with more than 512 GB or 1 TB or more of system memory.....	89
5.59. Luxmark causes a segmentation fault on an unlicensed Linux client.....	90
5.60. A segmentation fault in Dbus code causes nvidia-gridd to exit on Red Hat Enterprise Linux and CentOS.....	90
5.61. No Manage License option available in NVIDIA X Server Settings by default.....	91
5.62. Licenses remain checked out when VMs are forcibly powered off.....	92
5.63. Memory exhaustion can occur with vGPU profiles that have 512 Mbytes or less of frame buffer.....	93
5.64. VM bug checks after the guest VM driver for Windows 10 RS2 is installed.....	94
5.65. On Citrix Hypervisor 7.0, VMs unexpectedly reboot and Citrix Hypervisor crashes or freezes.....	95
5.66. With no NVIDIA driver installed, Citrix Hypervisor misidentifies Tesla M10 cards...	96
5.67. GNOME Display Manager (GDM) fails to start on Red Hat Enterprise Linux 7.2 and CentOS 7.0.....	96
5.68. Video goes blank when run in loop in Windows Media Player.....	97
5.69. Local VGA console is momentarily unblanked when Citrix Virtual Apps and Desktops changes resolution of the VM desktop.....	98
5.70. VM bugchecks on shutdown/restart when Citrix Virtual Apps and Desktops is installed and NVIDIA driver is uninstalled or upgraded.....	99

5.71. Application frame rate may drop when running Citrix Virtual Apps and Desktops at 2560×1600 resolution.....	99
5.72. Windows VM BSOD.....	100
5.73. Windows VM BSOD when upgrading NVIDIA drivers over a Citrix Virtual Apps and Desktops session.....	101
5.74. XenCenter does not allow vGPUs to be selected as a GPU type for Linux VMs.....	102
5.75. If X server is killed on a RHEL7 VM running vGPU, XenCenter console may not automatically switch to text console.....	102
5.76. Citrix Virtual Apps and Desktops shows only a black screen when connected to a vGPU VM.....	103

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.

NVIDIA vGPU Software Version	NVIDIA Virtual GPU Manager Version	NVIDIA Windows Driver Version	NVIDIA Linux Driver Version
11.13	450.248.03	454.23	450.248.02
11.12	450.236.03	454.14	450.236.01
11.11	450.216.04	454.02	450.216.04
11.10	450.216.04	453.94	450.216.04
11.9	450.203	453.64	450.203.02
11.8	450.191	453.51	450.191.01
11.7	450.172	453.37	450.172.01
11.6	450.156	453.23	450.156.00
11.5	450.142	453.10	450.142.00
11.4	450.124	452.96	450.119.03
11.3	450.102	452.77	450.102.04
11.2	450.89	452.57	450.89
11.1	450.80	452.39	450.80.02
11.0	450.55	451.48	450.51.05

For details of which Citrix Hypervisor releases are supported, see [Hypervisor Software Releases](#).

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



Note:

When NVIDIA vGPU Manager is used with guest VM drivers from a different release within the same branch or from the previous branch, the combination supports **only** the features, hardware, and software (including guest OSes) that are supported on both releases.

For example, if vGPU Manager from release 11.13 is used with guest drivers from release 10.4, the combination does **not** support Windows 7 because NVIDIA vGPU software release 11.13 does not support Windows 7.

The following table lists the specific software releases that are compatible with the components in the NVIDIA vGPU software 11 major release branch.

NVIDIA vGPU Software Component	Releases	Compatible Software Releases
NVIDIA vGPU Manager	11.0 through 11.13	<ul style="list-style-type: none"> ▶ Guest VM driver releases 11.0 through 11.13 ▶ All guest VM driver 10.x releases
Guest VM drivers	11.0 through 11.13	NVIDIA vGPU Manager releases 11.0 through 11.13

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.

- ▶ NVIDIA vGPU Manager from a later major release branch with guest VM drivers from two or more major releases before the release of the vGPU Manager
- ▶ NVIDIA vGPU Manager from an earlier major release branch with guest VM drivers from a later branch

The following table lists the specific software releases that are incompatible with the components in the NVIDIA vGPU software 11 major release branch.

NVIDIA vGPU Software Component	Releases	Incompatible Software Releases
NVIDIA vGPU Manager	11.0 through 11.13	All guest VM driver releases 9.x and earlier
Guest VM drivers	11.0 through 11.13	All NVIDIA vGPU Manager releases 10.x and earlier

1.3. Updates in Release 11.13

New Features in Release 11.13

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - June 2023*, which is posted shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.13

- ▶ Support for Red Hat Enterprise Linux 8.8 as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 2305

Feature Support Withdrawn in Release 11.13

- ▶ Red Hat Enterprise Linux 8.7 and 8.4 are no longer supported as a guest OS.

1.4. Updates in Release 11.12

New Features in Release 11.12

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - March 2023*, which is posted shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.12

- ▶ Support for Windows 10 2022 Update (22H2) as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 2303

1.5. Updates in Release 11.11

New Features in Release 11.11

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - November 2022*, which is updated shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page

1.6. Updates in Release 11.10

New Features in Release 11.10

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - November 2022*, which is posted shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.10

- ▶ Support for Red Hat Enterprise Linux 8.7 as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 2209

Feature Support Withdrawn in Release 11.10



Note: All versions of Microsoft Windows Server 2016 remain supported as a guest OS. The earlier statement that Microsoft Windows Server 2016 is no longer supported is **incorrect**.

1.7. Updates in Release 11.9

New Features in Release 11.9

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - August 2022*, which is posted shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.9

- ▶ Support for Citrix Virtual Apps and Desktops version 7 2206

Feature Support Withdrawn in Release 11.9

- ▶ Citrix XenServer 7.1 is no longer supported.

1.8. Updates in Release 11.8

New Features in Release 11.8

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - May 2022*, which is posted shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.8

- ▶ Support for Red Hat Enterprise Linux 8.6 as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 2203

Feature Support Withdrawn in Release 11.8

- ▶ Red Hat Enterprise Linux 8.5 and 8.2 are no longer supported as a guest OS.

1.9. Updates in Release 11.7

New Features in Release 11.7

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - February 2022*, which is posted shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.7

- ▶ Support for Red Hat Enterprise Linux 8.5 as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7.2112

Feature Support Withdrawn in Release 11.7

- ▶ Red Hat Enterprise Linux 8.1 is no longer supported as a guest OS.
- ▶ Red Hat Enterprise Linux 7.8 and 7.7 are no longer supported as a guest OS.

1.10. Updates in Release 11.6

New Features in Release 11.6

- ▶ Security updates - see *Security Bulletin: NVIDIA GPU Display Driver - October 2021*, which is posted shortly after the release date of this software and is listed on the [NVIDIA Product Security](#) page
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.6

- ▶ Support for Citrix Virtual Apps and Desktops version 7.2109

1.11. Updates in Release 11.5

New Features in Release 11.5

- ▶ Security updates - see [Security Bulletin: NVIDIA GPU Display Driver - July 2021](#)
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.5

- ▶ Support for Citrix Virtual Apps and Desktops version 7 2106

Feature Support Withdrawn in Release 11.5

- ▶ Citrix Hypervisor 7.0 is no longer supported.
- ▶ Red Hat Enterprise Linux 8.3 is no longer supported as a guest OS.

1.12. Updates in Release 11.4

New Features in Release 11.4

- ▶ Security updates - see [Security Bulletin: NVIDIA GPU Display Driver - April 2021](#)
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.4

- ▶ Support for Red Hat Enterprise Linux 8.4 as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 2103

1.13. Updates in Release 11.3

New Features in Release 11.3

- ▶ Security updates - see [Security Bulletin: NVIDIA GPU Display Driver - January 2021](#)
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.3

- ▶ Support for Windows 10 October 2020 Update (20H2) as a guest OS
Windows 10 May 2021 Update (21H1), which is a bug fix release for Windows 10 October 2020 Update (20H2), is also supported.
- ▶ Support for Red Hat Enterprise Linux 8.3 as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 2012

Feature Support Withdrawn in Release 11.3

- ▶ Citrix Hypervisor 8.1 is no longer supported.
- ▶ Red Hat Enterprise Linux 7.6 is no longer supported as a guest OS

1.14. Updates in Release 11.2

New Features in Release 11.2

- ▶ Miscellaneous bug fixes

1.15. Updates in Release 11.1

New Features in Release 11.1

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

Hardware and Software Support Introduced in Release 11.1

- ▶ Support for the following GPUs:
 - ▶ NVIDIA A100 PCIe 40GB
 - ▶ NVIDIA A100 HGX 40GB
- ▶ Support for the Red Hat Enterprise Linux 7.9 as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops version 7 2009

Feature Support Withdrawn in Release 11.1

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

1.16. Updates in Release 11.0

New Features in Release 11.0

- ▶ Cross-branch driver support

This change allows a release of the Virtual GPU Manager from a later major release branch to be used with the NVIDIA vGPU software graphics drivers for the guest VMs from the previous branch.
- ▶ Licensing grace period for unlicensed virtual GPUs and physical GPUs

An unlicensed virtual GPU or physical GPU initially operates at full capability but its performance is degraded over time if a license is not obtained.
- ▶ Miscellaneous bug fixes

Hardware and Software Support Introduced in Release 11.0

- ▶ Support for Citrix Hypervisor 8.2
- ▶ Support for Windows 10 May 2020 Update (2004) as a guest OS
- ▶ Support for Ubuntu 20.04 LTS as a guest OS
- ▶ Support for Citrix Virtual Apps and Desktops 7 2006

Feature Support Withdrawn in Release 11.0

- ▶ Citrix Hypervisor 8.0 is no longer supported.
- ▶ The following guest OS releases are no longer supported:
 - ▶ Windows Server 2012
 - ▶ Windows Server 2008 R2
 - ▶ Windows 8.1
 - ▶ Windows 8
 - ▶ Windows 7

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 R450 drivers.

2.1. Supported NVIDIA GPUs and Validated Server Platforms

This release of NVIDIA vGPU software on Citrix Hypervisor provides support for several NVIDIA GPUs running on validated server hardware platforms. For a list of validated server platforms, refer to [NVIDIA GRID Certified Servers](#).

The supported products for each type of NVIDIA vGPU software deployment depend on the GPU.

GPUs Based on the NVIDIA Ampere Architecture

GPU	Supported NVIDIA vGPU Software Products ^{1' 2' 3' 4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
Since 11.1: NVIDIA A100 PCIe 40GB	N/A	N/A	vCS
Since 11.1: NVIDIA A100 HGX 40GB	N/A	N/A	vCS

GPUs Based on the NVIDIA Turing™ Architecture

GPU	Supported NVIDIA vGPU Software Products ^{1' 2' 3' 4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
Tesla T4	▶ Quadro vDWS	N/A	▶ vCS

GPU	Supported NVIDIA vGPU Software Products ^{1'2'3'4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
	<ul style="list-style-type: none"> ▶ GRID Virtual PC ▶ GRID Virtual Applications 		<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual Applications
Quadro RTX 6000 ⁵	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Quadro RTX 6000 passive ⁵	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Quadro RTX 8000 ⁵	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Quadro RTX 8000 passive ⁵	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications

GPUs Based on the NVIDIA Volta Architecture

GPU	Supported NVIDIA vGPU Software Products ^{1'2'3'4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
Tesla V100 SXM2	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla V100 SXM2 32GB	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS

GPU	Supported NVIDIA vGPU Software Products ^{1 2 3 4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
	<ul style="list-style-type: none"> ▶ GRID Virtual Applications 		<ul style="list-style-type: none"> ▶ GRID Virtual Applications
Tesla V100 PCIe	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla V100 PCIe 32GB	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla V100S PCIe 32GB	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla V100 FHHL	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications

GPUs Based on the NVIDIA Pascal™ Architecture



Note: XenMotion with vGPU is **not** supported on any variant of the Tesla P100 GPU.

GPU	Supported NVIDIA vGPU Software Products ^{1 2 3 4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
Tesla P4	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla P6	<ul style="list-style-type: none"> ▶ Quadro vDWS 	N/A	<ul style="list-style-type: none"> ▶ vCS

GPU	Supported NVIDIA vGPU Software Products ^{1' 2' 3' 4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
	<ul style="list-style-type: none"> ▶ GRID Virtual PC ▶ GRID Virtual Applications 		<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla P40	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla P100 PCIe 16 GB	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla P100 SXM2 16 GB	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla P100 PCIe 12GB	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ vCS ▶ Quadro vDWS ▶ GRID Virtual Applications

GPUs Based on the NVIDIA Maxwell™ Graphic Architecture



Note: NVIDIA Virtual Compute Server (vCS) is **not** supported on GPUs based on the NVIDIA Maxwell graphic architecture.

GPU	Supported NVIDIA vGPU Software Products ^{1' 2' 3' 4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
Tesla M6	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC 	N/A	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual Applications

GPU	Supported NVIDIA vGPU Software Products ^{1 2 3 4}		
	Time-Sliced NVIDIA vGPU	MIG-Backed NVIDIA vGPU	GPU Pass Through
	<ul style="list-style-type: none"> ▶ GRID Virtual Applications 		
Tesla M10	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual Applications
Tesla M60	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual PC ▶ GRID Virtual Applications 	N/A	<ul style="list-style-type: none"> ▶ Quadro vDWS ▶ GRID Virtual Applications

**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.

¹ The supported products are as follows:

- ▶ vCS: NVIDIA Virtual Compute Server
- ▶ Quadro vDWS: NVIDIA Quadro Virtual Data Center Workstation
- ▶ GRID Virtual PC: NVIDIA GRID Virtual PC
- ▶ GRID Virtual Applications: NVIDIA GRID Virtual Applications

² N/A indicates that the deployment is not supported.

³ vCS is supported only on Linux operating systems.

⁴ GRID Virtual Applications is supported only on Windows operating systems.

⁵ This GPU is supported only in displayless mode. In displayless mode, local physical display connectors are disabled.

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_yyymm , where $yyymm$ denotes the year and month that the product was released. For example, for a product released in August 2018, $yyymm$ 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 8.2	RTM build and compatible cumulative update releases	<p>This release supports XenMotion with vGPU on suitable GPUs as listed in Supported NVIDIA GPUs and Validated Server Platforms.</p> <p>Since 11.1: The following GPUs are supported in GPU pass through mode only and are</p>

Software	Releases Supported	Notes
		<p>not supported in any mode on NVIDIA vGPU software 11.0:</p> <ul style="list-style-type: none"> ▶ NVIDIA A100 PCIe 40GB ▶ NVIDIA A100 HGX 40GB <p>vCS is not supported.</p>
<p>11.0-11.2 only: Citrix Hypervisor 8.1</p>	<p>RTM build and compatible cumulative update releases</p>	<p>All NVIDIA GPUs that support NVIDIA vGPU software are supported.</p> <p>Since 11.1: The following GPUs are supported in GPU pass through mode only and are not supported in any mode on NVIDIA vGPU software 11.0:</p> <ul style="list-style-type: none"> ▶ NVIDIA A100 PCIe 40GB ▶ NVIDIA A100 HGX 40GB <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>
<p>11.0-11.8 only: Citrix XenServer 7.1</p>	<p>RTM build and compatible cumulative update releases</p>	<p>Not supported on the following GPUs:</p> <ul style="list-style-type: none"> ▶ Tesla T4 ▶ Quadro RTX 6000 passive ▶ Quadro RTX 8000 passive ▶ NVIDIA A100 PCIe 40GB ▶ NVIDIA A100 HGX 40GB <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>

Software	Releases Supported	Notes
11.0-11.4 only: Citrix 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 ▶ Quadro RTX 8000 passive ▶ NVIDIA A100 PCIe 40GB ▶ NVIDIA A100 HGX 40GB <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	<div style="background-color: #f0f0f0; padding: 5px; border: 1px solid #ccc;">  Note: All versions supported by earlier NVIDIA vGPU software 11 releases are also supported. </div> <p>Since 11.13: Version 7 2305</p> <p>Since 11.12: Version 7 2303</p> <p>Since 11.10: Version 7 2209</p> <p>Since 11.9: Version 7 2206</p> <p>Since 11.8: Version 7 2203</p> <p>Since 11.7: Version 7 2112</p> <p>Since 11.6: Version 7 2109</p> <p>Since 11.5: Version 7 2106</p> <p>Since 11.4: Version 7 2103</p> <p>Since 11.3: Version 7 2012</p> <p>Since 11.1: Version 7 2009</p>

Software	Releases Supported
	Versions 7 2006, 7 2003, 7 1912, 7 1909, 7 1906, and 7 1903
XenApp/XenDesktop	Version 7.15 <div style="background-color: #f0f0f0; padding: 5px; border: 1px solid #ccc;">  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. </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.

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	<p>Since 11.9: 8.2</p> <p>11.3-11.8 only: 8.2, 7.1 cumulative update 2</p> <p>11.0-11.2 only: 8.2, 8.1, 7.1 cumulative update 2</p>	<p>Since 11.9: 8.2</p> <p>11.3-11.8 only: 8.2, 7.1 cumulative update 2</p> <p>11.0-11.2 only: 8.2, 8.1, 7.1 cumulative update 2</p>

Guest OS	NVIDIA vGPU - Citrix Hypervisor Releases	Pass-Through GPU - Citrix Hypervisor Releases
Windows Server 2016 1709, 1607	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 7.1, 7.0	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 7.1, 7.0
Windows Server 2012 R2 (not supported on GPUs based on architectures after the NVIDIA Turing™ architecture)	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 7.1, 7.0	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 7.1, 7.0
Since 11.12: Windows 10 2022 Update (22H2) and all Windows 10 releases supported by Microsoft up to and including this release See Note (1)	8.2	8.2
11.3-11.11 only: Windows 10 May 2021 Update (21H1) and all Windows 10 releases supported by Microsoft up to and including this release See Note (1)	11.9-11.11 only: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0	11.9-11.11 only: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0
11.0-11.2 only: Windows 10 May 2020 Update (2004) and all Windows 10 releases supported by Microsoft up to and including this release See Note (1)	8.2, 8.1, 7.1, 7.0	8.2, 8.1, 7.1, 7.0

**Note:**

1. The hardware-accelerated GPU scheduling feature introduced in Windows 10 May 2020 Update (2004) is **not** supported on GPUs based on the Maxwell architecture and is supported only in pass-through mode on GPUs based on later architectures.

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 11.13: Red Hat Enterprise Linux 8.8	8.2	8.2
11.10-11.12 only: Red Hat Enterprise Linux 8.7	8.2	8.2
Since 11.8: Red Hat Enterprise Linux 8.6	8.2	8.2
11.7 only: Red Hat Enterprise Linux 8.5	8.2	8.2
11.4-11.12 only: Red Hat Enterprise Linux 8.4	8.2	8.2
11.3, 11.4 only: Red Hat Enterprise Linux 8.3	8.2	8.2
11.0-11.7 only: Red Hat Enterprise Linux 8.2	11.3-11.7 only: 8.2 11.0-11.2 only: 8.2, 8.1	11.3-11.7 only: 8.2 11.0-11.2 only: 8.2, 8.1
11.0-11.6 only: Red Hat Enterprise Linux 8.1	11.3-11.6 only: 8.2 11.0-11.2 only: 8.2, 8.1	11.3-11.6 only: 8.2 11.0-11.2 only: 8.2, 8.1
11.7 only: CentOS Linux 8 (2111)	8.2	8.2
Since 11.4: CentOS Linux 8 (2105)	8.2	8.2
11.3, 11.4 only: CentOS Linux 8 (2011)	8.2	8.2
CentOS Linux 8 (2004)	Since 11.3: 8.2 11.0-11.2 only: 8.2, 8.1	Since 11.3: 8.2 11.0-11.2 only: 8.2, 8.1
11.0-11.6 only: CentOS Linux 8 (1911)	11.3-11.6 only: : 8.2 11.0-11.2 only: 8.2, 8.1	11.3-11.6 only: 8.2 11.0-11.2 only: 8.2, 8.1
Since 11.7: Red Hat Enterprise Linux 7.9	Since 11.9: 8.2 11.7, 11.8 only: 8.2, 7.1	Since 11.9: 8.2 11.7, 11.8 only: 8.2, 7.1
11.3-11.6 only: Red Hat Enterprise Linux 7.7-7.9	11.5, 11.6 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0	11.5, 11.6 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0
11.1, 11.2 only: Red Hat Enterprise Linux 7.6-7.9	8.2, 8.1, 7.1, 7.0	8.2, 8.1, 7.1, 7.0
11.0 only: Red Hat Enterprise Linux 7.6-7.8	8.2, 8.1, 7.1, 7.0	8.2, 8.1, 7.1, 7.0
CentOS 7.6-7.8	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0

Guest OS	NVIDIA vGPU - Citrix Hypervisor Releases	Pass-Through GPU - Citrix Hypervisor Releases
	11.0-11.2 only: 8.2, 8.1, 7.1, 7.0	11.0-11.2 only: 8.2, 8.1, 7.1, 7.0
Ubuntu 20.04 LTS	8.2	8.2
Ubuntu 18.04 LTS	Since 11.9: 8.2 11.3-11.8 only: 8.2, 7.1 cumulative update 2 11.0-11.2 only: 8.2, 8.1, 7.1 cumulative update 2	Since 11.9: 8.2 11.3-11.8 only: 8.2, 7.1 cumulative update 2 11.0-11.2 only: 8.2, 8.1, 7.1 cumulative update 2
Ubuntu 16.04 LTS	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 7.1, 7.0	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 7.1, 7.0
Ubuntu 14.04 LTS	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 7.1, 7.0	Since 11.9: 8.2 11.5-11.8 only: 8.2, 7.1 11.3, 11.4 only: 8.2, 7.1, 7.0 11.0-11.2 only: 8.2, 8.1, 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 11.0.

To build a CUDA application, the system must have the NVIDIA CUDA Toolkit and the libraries required for linking. For details of the components of NVIDIA CUDA Toolkit, refer to [CUDA Toolkit 11.0 Release Notes for Windows, Linux, and Mac OS](#).

To run a CUDA application, the system must have a CUDA-enabled GPU and an NVIDIA display driver that is compatible with the NVIDIA CUDA Toolkit release that was used to build the application. If the application relies on dynamic linking for libraries, the system must also have the correct version of these libraries.

For more information about NVIDIA CUDA Toolkit, refer to [CUDA Toolkit 11.0 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 a 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 11.3:** 8.2 only
- ▶ **11.0-11.2 only:** 8.2 and 8.1 only

Supported Guest OS Releases

Windows only. XenMotion with vGPU is **not** supported on Linux.

Known Issues with XenMotion with vGPU Support

Use Case	Affected GPUs	Issue
Migration to or from a host running an NVIDIA vGPU software 11 release before 11.6	Tesla T4	VM hangs after vGPU migration from a host running a vGPU manager 11 release to a host running a vGPU manager 13 release
<ul style="list-style-type: none"> ▶ Migration from a host running NVIDIA vGPU software 11.3 to a host running a different release ▶ Migration to a host running NVIDIA vGPU software 11.3 from a host running a different release 	Tesla T4	Migrating a VM with a Tesla T4 vGPU between a host running NVIDIA vGPU software 11.3 and a host running a different release fails
Migration from a host that is running a vGPU manager 11 release to a host that is running a vGPU manager 13 release.	<ul style="list-style-type: none"> ▶ Tesla T4 ▶ Tesla V100 	Linux VM hangs after vGPU migration to a host running a newer vGPU manager version
Migration to or from a host running an NVIDIA vGPU software 11 release	GPUs based on the NVIDIA Volta™ architecture	Desktop session freezes when a VM is migrated to or from a host running an NVIDIA vGPU software 11 release
Migration between hosts with different ECC memory configuration	All GPUs that support XenMotion with vGPU	Migration of VMs configured with vGPU stops before the migration is complete

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	
		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 16 vGPUs per VM on Citrix Hypervisor.

Supported Hypervisor Releases

Since 11.3: Citrix Hypervisor 8.2 only.

11.0-11.2 only: Citrix Hypervisor 8.2 and 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 are 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
		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. NVENC does not support resolutions greater than 4096×4096

Description

The NVIDIA hardware-based H.264 video encoder (NVENC) does not support resolutions greater than 4096×4096. This restriction applies to all NVIDIA GPU architectures and is imposed by the GPU encoder hardware itself, not by NVIDIA vGPU software. The maximum supported resolution for each encoding scheme is listed in the documentation for [NVIDIA Video Codec SDK](#). This limitation affects any remoting tool where H.264 encoding is used with a resolution greater than 4096×4096. Most supported remoting tools fall back to software encoding in such scenarios.

Workaround

If your GPU is based on a GPU architecture later than the NVIDIA Maxwell[®] architecture, use H.265 encoding. H.265 is more efficient than H.264 encoding and has a maximum resolution of 8192×8192. On GPUs based on the NVIDIA Maxwell architecture, H.265 has the same maximum resolution as H.264, namely 4096×4096.



Note: Resolutions greater than 4096×4096 are supported only by the H.265 decoder that 64-bit client applications use. The H.265 decoder that 32-bit applications use supports a maximum resolution of 4096×4096.

Because the client-side Workspace App on Windows is a 32-bit application, resolutions greater than 4096×4096 are not supported for Windows clients of Citrix Virtual Apps

and Desktops. Therefore, if you are using a Windows client with Citrix Virtual Apps and Desktops, ensure that you are using H.264 hardware encoding with the default [Use video codec for compression](#) Citrix graphics policy setting, namely **Actively Changing Regions**. This policy setting encodes only actively changing regions of the screen (for example, a window in which a video is playing). Provided that the number of pixels along any edge of the actively changing region does not exceed 4096, H.264 encoding is offloaded to the NVENC hardware encoder.

3.2. 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.

3.3. 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:

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

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.

compression-adjustment

The amount of frame buffer in Mbytes that is reserved for the higher compression overhead in vGPU types with 12 Gbytes or more of frame buffer on GPUs based on the Turing architecture.

compression-adjustment depends on the vGPU type as shown in the following table.

vGPU Type	Compression Adjustment (MB)
T4-16Q T4-16C T4-16A	28
RTX6000-12Q RTX6000-12C RTX6000-12A	32
RTX6000-24Q RTX6000-24C RTX6000-24A	104
RTX6000P-12Q RTX6000P-12C RTX6000P-12A	32
RTX6000P-24Q RTX6000P-24C RTX6000P-24A	104
RTX8000-12Q RTX8000-12C RTX8000-12A	32
RTX8000-16Q RTX8000-16C RTX8000-16A	64
RTX8000-24Q	96

vGPU Type	Compression Adjustment (MB)
RTX8000-24C RTX8000-24A	
RTX8000-48Q RTX8000-48C RTX8000-48A	238
RTX8000P-12Q RTX8000P-12C RTX8000P-12A	32
RTX8000P-16Q RTX8000P-16C RTX8000P-16A	64
RTX8000P-24Q RTX8000P-24C RTX8000P-24A	96
RTX8000P-48Q RTX8000P-48C RTX8000P-48A	238

For all other vGPU types, *compression-adjustment* is 0.



Note: In VMs running Windows Server 2012 R2, which supports Windows Display Driver Model (WDDM) 1.x, an additional 48 Mbytes of frame buffer are reserved and not available for vGPUs.

3.4. 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.

3.5. 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.

3.6. 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.

3.7. 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.

3.8. 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 Citrix Hypervisor platform running that release of Virtual GPU Manager.

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 branch two or more major releases 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.

3.9. 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 specifying `frame_rate_limiter=0` in the vGPU's plugin parameters.

- ▶ **Citrix Hypervisor 8.1 or later:** Specify `frame_rate_limiter=0` in the `extra_args` parameter for the group to which the vGPU belongs:

```
[root@xenserver ~]# xe vgpu-param-set uuid=vgpu-uuid extra_args=frame_rate_limiter=0
```

- ▶ **Citrix Hypervisor earlier than 8.1:** Specify `frame_rate_limiter=0` in the VM's `platform:vgpu_extra_args` parameter:

```
[root@xenserver ~]# xe vm-param-set uuid=vm-uuid
platform:vgpu_extra_args="frame_rate_limiter=0"
```

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 plugin's parameters:
 - ▶ **Citrix Hypervisor 8.1 or later:** Removing the `extra_args` key the from group to which the vGPU belongs
 - ▶ **Citrix Hypervisor earlier than 8.1:** Removing the `vgpu_extra_args` key from the `platform` parameter

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

- ▶ **Citrix Hypervisor 8.1 or later:**

```
[root@xenserver ~]# xe vgpu-param-set uuid=vgpu-uuid
extra_args=frame_rate_limiter=1
```

- ▶ **Citrix Hypervisor earlier than 8.1:**

```
[root@xenserver ~]# xe vm-param-set uuid=vm-uuid
platform:vgpu_extra_args="frame_rate_limiter=1"
```

3.10. `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]

<input checked="" type="checkbox"/>	Test VM passthrough
<input checked="" type="checkbox"/>	Test VM passthrough
<input checked="" type="checkbox"/>	vgx-base-image-win7-64 passthrough
<input checked="" type="checkbox"/>	Test VM passthrough
<input checked="" type="checkbox"/>	Test VM passthrough
<input checked="" type="checkbox"/>	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

3.11. 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](#).

3.12. 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 vGPU's plugin parameters:

- ▶ **Citrix Hypervisor 8.1 or later:** Specify `enable_large_sys_mem=1` in the `extra_args` parameter for the group to which the vGPU belongs:

```
[root@xenserver ~]# xe vgpu-param-set uuid=vgpu-uuid extra_args=enable_large_sys_mem=1
```

- ▶ **Citrix Hypervisor earlier than 8.1:** Specify `enable_large_sys_mem=1` in the VM's `platform:vgpu_extra_args` parameter:

```
[root@xenserver ~]# xe vm-param-set uuid=vm-uuid
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:

- ▶ **Citrix Hypervisor 8.1 or later:**

```
extra_args="enable_large_sys_mem=1,extra_fb_reservation=128"
```

- ▶ **Citrix Hypervisor earlier than 8.1:**

```
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 plugin's parameters:
 - ▶ **Citrix Hypervisor 8.1 or later:** Removing the `extra_args` key the from group to which the vGPU belongs
 - ▶ **Citrix Hypervisor earlier than 8.1:** Removing the `vgpu_extra_args` key from the `platform` parameter
- ▶ Removing `enable_large_sys_mem` from the `extra_args` or `vgpu_extra_args` key
- ▶ Setting `enable_large_sys_mem=0`

3.13. 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 11.13

Bug ID	Summary and Description
3596327	<p><u>11.0-11.12 Only: Remote desktop connection is lost and the NVIDIA vGPU software graphics driver is unloaded</u></p> <p>The remote desktop connection is lost and the NVIDIA vGPU software graphics driver is unloaded after an attempt to access a VM over RDP and VMware Horizon agent direct connect. After an attempt to log in again, a black screen is displayed.</p>

Issues Resolved in Release 11.12

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

Issues Resolved in Release 11.11

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

Issues Resolved in Release 11.10

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

Issues Resolved in Release 11.9

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

Issues Resolved in Release 11.8

Bug ID	Summary and Description
200756399	<p><u>11.0-11.7 Only: Linux VM might fail to return a license after shutdown if the license server is specified by its name</u></p>

Bug ID	Summary and Description
	<p>If the license server is specified by its fully qualified domain name, a Linux VM might fail to return its license when the VM is shut down. This issue occurs if the <code>nvidia-gridd</code> service cannot resolve the fully qualified domain name of the license server because <code>systemd-resolved.service</code> is not available when the service attempts to return the license. When this issue occurs, the <code>nvidia-gridd</code> service writes the following message to the <code>systemd</code> journal:</p> <pre>General data transfer failure. Couldn't resolve host name</pre>
3465448	<p><u>11.0-11.7 Only: Windows vGPU VM sometimes crashes after guest OS upgrade</u></p> <p>When a VM that is configured with NVIDIA vGPU is rebooted after an OS upgrade from Windows 10 1909 to Windows 10 20H2, the VM sometimes crashes. This issue is caused by a <code>NULL</code> pointer exception in the Virtual GPU Manager plugin (<code>libnvidia-vgx.so</code>). This <code>NULL</code> pointer exception might also cause the VM to crash in other situations. When this issue occurs, error messages that indicate that the Virtual GPU Manager process crashed are written to the standard activity log <code>/var/log/messages</code> on the hypervisor host.</p>
200724807	<p><u>11.0-11.7 Only: Memory leaks in the vGPU manager plugin cause the VM to hang</u></p> <p>Applications running in a VM request memory to be allocated and freed by the vGPU manager plugin, which runs on the hypervisor host. When an application requests the vGPU manager plugin to free previously allocated memory, some of the memory is not freed. Some applications request memory more frequently than other applications. If such applications run for a long period of time, for example for two or more days, the failure to free all allocated memory might cause the hypervisor host to run out of memory. As a result, memory allocation for applications running in the VM might fail, causing the applications and, sometimes, the VM to hang.</p>

Issues Resolved in Release 11.7

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

Issues Resolved in Release 11.6

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

Issues Resolved in Release 11.5

Bug ID	Summary and Description
200718945	<p><u>11.3, 11.4 Only: Citrix XenCenter console display shows full-screen corruption with A-Series vGPUs</u></p> <p>The Citrix XenCenter console display shows full-screen corruption with A-series vGPUs. Sometimes when this issue occurs, the error message <code>VGPU message 45 failed, result code: 0x1f</code> is written to the Citrix Hypervisor VM's log file <code>/var/log/daemon.log</code>.</p>

Issues Resolved in Release 11.4

Bug ID	Summary and Description
3226853	<p><u>11.0-11.3 Only: NVIDIA vGPU software graphics driver installation fails in Ubuntu guest VMs</u></p> <p>Installation of the NVIDIA vGPU software graphics driver from a <code>.run</code> file fails in Ubuntu guest VMs that are running Linux kernel version 5.8 or later.</p>

Issues Resolved in Release 11.3

Bug ID	Summary and Description
200664572	<p><u>11.0-11.2 Only: Sessions freeze randomly with XID errors 38, 43, 32, and 31</u></p> <p>Issues such as a session freeze, black screen, application crash, or VM crash might randomly occur with VMs that are configured with a Tesla T4 vGPU. When these issues occur, XID error 38 followed by multiple instances of XID errors 43, 32, and 31 are written to the log files on the hypervisor host. This issue is caused by a regression in the NVIDIA firmware code for the Tesla T4 GPU and affects only VMs that are configured with a vGPU that resides on a Tesla T4 GPU.</p>

Issues Resolved in Release 11.2

Bug ID	Summary and Description
200658253	<p><u>11.1 Only: Licensing event logs indicate license renewal from unavailable primary server</u></p> <p>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.</p>

Issues Resolved in Release 11.1

Bug ID	Summary and Description
200627445	<p><u>11.0 Only: Remoting solution session freezes with VGPU message 21 failed and VGPU message 14 failed errors</u></p> <p>The remoting solution session sometimes freezes while a window is being resized. For a Windows guest VM, the error message <code>VGPU message 21 failed</code> is written to the log file on the hypervisor host. For a Linux guest VM, the error messages <code>VGPU message 21 failed</code> and <code>VGPU message 14 failed</code> are written to the log file on the hypervisor host.</p>
200626446	<p><u>11.0 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>
3087984	<p><u>11.0 Only: The NVIDIA license not present notification appears even for VMs for which the vGPU is licensed</u></p> <p>After starting and logging on to a Windows VM that is configured with NVIDIA vGPU, users see the NVIDIA license not present notification even when the vGPU is already licensed. This notification is misleading and should be ignored. This issue occurs because the NVIDIA driver is not storing the correct NVIDIA vGPU software license state.</p>
2925629	<p><u>11.0 Only: Desktop sessions disconnect after the server becomes unresponsive</u></p> <p>Desktop sessions disconnect after the server becomes unresponsive. Before the sessions disconnect, the error message <code>VGPU message 32 failed, result code: 0x59</code> is written to the log files on the hypervisor host.</p>

Issues Resolved in Release 11.0

Bug ID	Summary and Description
2870295	<p>Out of memory errors cause VM crashes on Citrix Hypervisor</p> <p>Out of memory errors caused by extreme memory fragmentation cause VM crashes on Citrix Hypervisor.</p>

Bug ID	Summary and Description
200275925	<p data-bbox="500 258 1398 289">Resolution is not updated after a VM acquires a license and is restarted</p> <p data-bbox="500 317 1409 464">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 <code>gridd</code> service is restarted. This issue occurs if the <code>multimonitor</code> parameter is added to the <code>xorg.conf</code> file.</p>
2175888	<p data-bbox="500 497 1414 569">Even when the scheduling policy is equal share, unequal GPU utilization is reported</p> <p data-bbox="500 594 1398 659">When the scheduling policy is equal share, unequal GPU engine utilization can be reported for the vGPUs on the same physical GPU.</p>

Chapter 5. Known Issues

5.1. **NVIDIA Control Panel** crashes if a user session is disconnected and reconnected

Description

On all supported Windows Server guest OS releases, **NVIDIA Control Panel** crashes if a user session is disconnected and then reconnected while **NVIDIA Control Panel** is open.

Version

This issue affects all supported Windows Server guest OS releases.

Status

Open

Ref.

4086605

5.2. 11.0-11.12 Only: Remote desktop connection is lost and the NVIDIA vGPU software graphics driver is unloaded

Description

The remote desktop connection is lost and the NVIDIA vGPU software graphics driver is unloaded after an attempt to access a VM over RDP and VMware Horizon agent direct connect. After an attempt to log in again, a black screen is displayed.

When this issue occurs, the following errors are written to the log files on the guest VM:

- ▶ A timeout detection and recovery (TDR) error:

```
vmiop_log: (0x0): Timeout occurred, reset initiated.  
vmiop_log: (0x0): TDR_DUMP:0x52445456 0x006907d0 0x000001cc 0x00000001
```

- ▶ XID error 43:

```
vmiop_log: (0x0): XID 43 detected on physical_chid
```

- ▶ vGPU error 22:

```
vmiop_log: (0x0): vGPU message 22 failed
```

- ▶ Guest driver unloaded error:

```
vmiop_log: (0x0): Guest driver unloaded!
```

Workaround

To recover from this issue, reboot the VM.

11.12 only: To prevent this issue from occurring, disable translation lookaside buffer (TLB) invalidation by setting the vGPU plugin parameter `tlb_invalidate_enabled` to 0.

Status

Resolved in NVIDIA vGPU software 11.13

Ref.

3596327

5.3. With multiple active sessions, NVIDIA Control Panel incorrectly shows that the system is unlicensed

Description

In an environment with multiple active desktop sessions, the **Manage License** page of **NVIDIA Control Panel** shows that a licensed system is unlicensed. However, the `nvidia-smi` command and the management interface of the NVIDIA vGPU software license server correctly show that the system is licensed. When an active session is disconnected and reconnected, the **NVIDIA Display Container** service crashes.

The **Manage License** page incorrectly shows that the system is unlicensed because of stale data in **NVIDIA Control Panel** in an environment with multiple sessions. The data is stale because **NVIDIA Control Panel** fails to get and update the settings for remote sessions when multiple sessions or no sessions are active in the VM. The **NVIDIA Display Container** service crashes when a session is reconnected because the session is not active at the moment of reconnection.

Status

Open

Ref.

3761243

5.4. VP9 and AV1 decoding with web browsers are not supported on Microsoft Windows Server 2019

Description

VP9 and AV1 decoding with web browsers are not supported on Microsoft Windows Server 2019. This issue occurs because starting with Windows Server 2019, the required codecs are not included with the OS and are not available through the **Microsoft Store** app. As a result, hardware decoding is not available for viewing YouTube videos or using collaboration tools such as Google Meet in a web browser.

Version

This issue affects Microsoft Windows Server releases starting with Windows Server 2019.

Status

Not an NVIDIA bug

Ref.

200756564

5.5. 11.0-11.7 Only: Linux VM might fail to return a license after shutdown if the license server is specified by its name

Description

If the license server is specified by its fully qualified domain name, a Linux VM might fail to return its license when the VM is shut down. This issue occurs if the `nvidia-gridd` service cannot resolve the fully qualified domain name of the license server because `systemd-resolved.service` is not available when the service attempts to return the license. When this issue occurs, the `nvidia-gridd` service writes the following message to the `systemd` journal:

```
General data transfer failure. Couldn't resolve host name
```

Status

Resolved in NVIDIA vGPU software 11.8

Ref.

200756399

5.6. NVIDIA Control Panel is started only for the RDP user that logs on first

Description

On all supported Windows Server guest OS releases, **NVIDIA Control Panel** is started only for the RDP user that logs on first. Other users cannot start **NVIDIA Control Panel**. If more than one RDP user is logged on when **NVIDIA Control Panel** is started, it always opens in the session of the RDP user that logged on first, irrespective of which user started **NVIDIA Control Panel**. Furthermore, on Windows Server 2016, **NVIDIA Control Panel** crashes if a user session is disconnected and then reconnected while **NVIDIA Control Panel** is open.

Version

This issue affects all supported Windows Server guest OS releases.

Status

Open

Ref.

3334310

5.7. 11.0-11.7 Only: Windows vGPU VM sometimes crashes after guest OS upgrade

Description

When a VM that is configured with NVIDIA vGPU is rebooted after an OS upgrade from Windows 10 1909 to Windows 10 20H2, the VM sometimes crashes. This issue is caused by a `NULL` pointer exception in the Virtual GPU Manager plugin (`libnvidia-vgx.so`). This `NULL` pointer exception might also cause the VM to crash in other situations. When this issue occurs, error messages that indicate that the Virtual GPU Manager process crashed are written to the standard activity log `/var/log/messages` on the hypervisor host.

Status

Resolved in NVIDIA vGPU software 11.8

Ref.

3465448

5.8. 11.0-11.7 Only: Memory leaks in the vGPU manager plugin cause the VM to hang

Description

Applications running in a VM request memory to be allocated and freed by the vGPU manager plugin, which runs on the hypervisor host. When an application requests the vGPU manager plugin to free previously allocated memory, some of the memory is not freed. Some applications request memory more frequently than other applications. If such applications run for a long period of time, for example for two or more days, the failure to free all allocated memory might cause the hypervisor host to run out of memory. As a result, memory allocation for applications running in the VM might fail, causing the applications and, sometimes, the VM to hang.

When memory allocation fails, the error messages that are written to the log file on the hypervisor host depend on the hypervisor.

- ▶ For VMware vSphere ESXi, the following error messages are written to `vmware.log`:


```
2021-10-05T04:57:35.547Z| vthread-2329002| E110: vmiop_log: Fail to create the
  buffer for translate pte rpc node

2021-06-05T10:48:33.007Z| vcpu-3| E105: PANIC: Unrecoverable memory allocation
  failure
```
- ▶ For Citrix Hypervisor and hypervisors based on Linux KVM, the following messages are written to the standard activity log in the `/var/log` directory (`/var/log/messages` or `/var/log/syslog`):


```
Feb 15 09:27:48 bkrz xen1 kernel: [1278743.170072] Out of memory: Kill process
  20464 (vgpu) score 9 or sacrifice child

Feb 15 09:27:48 bkrz xen1 kernel: [1278743.170111] Killed process 20464 (vgpu)
  total-vm:305288kB, anon-rss:56508kB, file-rss:30828kB, shmem-rss:0kB

Feb 15 09:27:48 bkrz xen1 kernel: [1278743.190484] oom_reaper: reaped process
  20464 (vgpu), now anon-rss:0kB, file-rss:27748kB, shmem-rss:4kB".
```

Workaround

If an application or a VM hangs after a long period of usage, restart the VM every couple of days to prevent the hypervisor host from running out of memory.

Status

Resolved in NVIDIA vGPU software 11.8

Ref.

200724807

5.9. `nvidia-smi` ignores the second NVIDIA vGPU device added to a Microsoft Windows Server 2016 VM

Description

After a second NVIDIA vGPU device is added to a Microsoft Windows Server 2016 VM, the device does not appear in the output from the `nvidia-smi` command. This issue occurs only if the VM is already running NVIDIA vGPU software for the existing NVIDIA vGPU device when the second device is added to the VM.

The `nvidia-smi` command cannot retrieve the guest driver version, license status, and accounting mode of the second NVIDIA vGPU device.

```
nvidia-smi vgpu --query
GPU 00000000:37:00.0
  Active vGPUs           : 1
  vGPU ID                : 3251695793
  VM ID                  : 3575923
  VM Name                 : SVR-Reg-W(P)-KuIn
  vGPU Name              : GRID V100D-32Q
  vGPU Type              : 185
  vGPU UUID              : 29097249-2359-11b2-8a5b-8e896866496b
  Guest Driver Version : 453.51
  License Status      : Licensed
  Accounting Mode    : Disabled
...
GPU 00000000:86:00.0
  Active vGPUs           : 1
  vGPU ID                : 3251695797
  VM ID                  : 3575923
  VM Name                 : SVR-Reg-W(P)-KuIn
  vGPU Name              : GRID V100D-32Q
  vGPU Type              : 185
  vGPU UUID              : 2926dd83-2359-11b2-8b13-5f22f0f74801
  Guest Driver Version : Not Available
```

License Status	: N/A
Accounting Mode	: N/A

Version

This issue affects only VMs that are running Microsoft Windows Server 2016 as a guest OS.

Workaround

To avoid this issue, configure the guest VM with both NVIDIA vGPU devices **before** installing the NVIDIA vGPU software graphics driver.

If you encounter this issue after the VM is configured, use one of the following workarounds:

- ▶ Reinstall the NVIDIA vGPU software graphics driver.
- ▶ Forcibly uninstall the Microsoft Basic Display Adapter and reboot the VM.
- ▶ Upgrade the guest OS on the VM to Microsoft Windows Server 2019.

Status

Not an NVIDIA bug

Ref.

3562801

5.10. The reported NVENC frame rate is double the actual frame rate

Description

The frame rate in frames per second (FPS) for the NVIDIA hardware-based H.264/HEVC video encoder (NVENC) reported by the `nvidia-smi encodersessions` command and NVWMI is double the actual frame rate. Only the reported frame rate is incorrect. The actual encoding of frames is **not** affected.

This issue affects only Windows VMs that are configured with NVIDIA vGPU.

Status

Open

Ref.

2997564

5.11. VM hangs after vGPU migration from a host running a vGPU manager 11 release to a host running a vGPU manager 13 release

Description

When a VM configured with a Tesla T4 vGPU is migrated from a host that is running a vGPU manager 11 release **before 11.6** to a host that is running a vGPU manager 13 release, the VM hangs. When this issue occurs, XID error 31 is written to the log files on the destination hypervisor host.

Version

This issue affects migration from a host that is running a vGPU manager 11 release **before 11.6**, such as 11.4 or 11.5, to a host that is running a vGPU manager 13 release, such as 13.0 or 13.1.

Workaround

Upgrade the host that is running a vGPU manager 11 release to release 11.6 before attempting the migration.

Status

Open

5.12. Desktop session freezes when a VM is migrated to or from a host running an NVIDIA vGPU software 11 release

Description

The remote desktop session freezes when a VM is migrated to or from a host running an NVIDIA vGPU software 11 release. This issue affects only VMs configured with vGPUs on GPUs based on the NVIDIA Volta™ architecture.

When this issue occurs, the following error messages are written to the Citrix Hypervisor VM's log file `/var/log/daemon.log` on the destination host:

- ▶ XID error 13
- ▶ XID error 43

Version

The issue affects migrations to and from a host that is running an NVIDIA vGPU software 11 release.

Status

Open

Ref.

200707632

5.13. Linux VM hangs after vGPU migration to a host running a newer vGPU manager version

Description

When a Linux VM configured with a Tesla V100 or Tesla T4 vGPU is migrated from a host that is running a vGPU manager 11 release before 11.6 to a host that is running a vGPU manager 13 release, the VM hangs. After the migration, the destination host and VM become unstable. When this issue occurs, XID error 31 is written to the log files on the destination hypervisor host.

Version

This issue affects migration from a host that is running a vGPU manager 11 release before 11.6 to a host that is running a vGPU manager 13 release.

Workaround

If the VM is configured with a Tesla T4 vGPU, perform the following sequence of steps before attempting the migration:

1. Upgrade the host that is running a vGPU manager 11 release to release 11.6 or a later vGPU manager 11 release.

2. Disconnect any remoting tool that is using NVENC.



Note: You cannot use this workaround for a VM that is configured with a Tesla V100 vGPU.

Status

Open

Ref.

200691445

5.14. Since 11.6: NVENC does not work with Teradici Cloud Access Software on Windows

Description

The NVIDIA hardware-based H.264/HEVC video encoder (NVENC) does not work with Teradici Cloud Access Software on Windows. This issue affects NVIDIA vGPU and GPU pass through deployments.

This issue occurs because the check that Teradici Cloud Access Software performs on the DLL signer name is case sensitive and NVIDIA recently changed the case of the company name in the signature certificate.

Status

Not an NVIDIA bug

This issue is resolved in the latest 21.07 and 21.03 Teradici Cloud Access Software releases.

Ref.

200749065

5.15. A licensed client might fail to acquire a license if a proxy is set

Description

If a proxy is set with a system environment variable such as `HTTP_PROXY` or `HTTPS_PROXY`, a licensed client might fail to acquire a license.

Workaround

Perform this workaround on each affected licensed client.

1. Add the address of the NVIDIA vGPU software license server to the system environment variable `NO_PROXY`.

The address must be specified exactly as it is specified in the client's license server settings either as a fully-qualified domain name or an IP address. If the `NO_PROXY` environment variable contains multiple entries, separate the entries with a comma (,).

If high availability is configured for the license server, add the addresses of the primary license server and the secondary license server to the system environment variable `NO_PROXY`.

2. Restart the NVIDIA driver service that runs the core NVIDIA vGPU software logic.
 - ▶ On Windows, restart the **NVIDIA Display Container** service.
 - ▶ On Linux, restart the `nvidia-gridd` service.

Status

Closed

Ref.

200704733

5.16. Session connection fails with four 4K displays and NVENC enabled on a 2Q, 3Q, or 4Q vGPU

Description

Desktop session connections fail for a 2Q, 3Q, or 4Q vGPU that is configured with four 4K displays and for which the NVIDIA hardware-based H.264/HEVC video encoder (NVENC) is enabled. This issue affects only Teradici Cloud Access Software sessions on Linux guest VMs.

This issue is accompanied by the following error message:

```
This Desktop has no resources available or it has timed out
```

This issue is caused by insufficient frame buffer.

Workaround

Ensure that sufficient frame buffer is available for all the virtual displays that are connected to a vGPU by changing the configuration in one of the following ways:

- ▶ Reducing the number of virtual displays. The number of 4K displays supported with NVENC enabled depends on the vGPU.

vGPU	4K Displays Supported with NVENC Enabled
2Q	1
3Q	2
4Q	3

- ▶ Disabling NVENC. The number of 4K displays supported with NVENC disabled depends on the vGPU.

vGPU	4K Displays Supported with NVENC Disabled
2Q	2
3Q	2
4Q	4

- ▶ Using a vGPU type with more frame buffer. Four 4K displays with NVENC enabled on any Q-series vGPU with at least 6144 MB of frame buffer are supported.

Status

Not an NVIDIA bug

Ref. #

200701959

5.17. Disconnected sessions cannot be reconnected or might be reconnected very slowly with NVWMI installed

Description

Disconnected sessions cannot be reconnected or might be reconnected very slowly when the NVIDIA Enterprise Management Toolkit (NVWMI) is installed. This issue affects Citrix Virtual Apps and Desktops and VMware Horizon sessions on Windows guest VMs.

Workaround

Uninstall NVWMI.

Status

Open

Ref. #

3262923

5.18. 11.3, 11.4 Only: Citrix XenCenter console display shows full-screen corruption with A-Series vGPUs

Description

The Citrix XenCenter console display shows full-screen corruption with A-series vGPUs. Sometimes when this issue occurs, the error message `vGPU message 45 failed, result code: 0x1f` is written to the Citrix Hypervisor VM's log file `/var/log/daemon.log`.

Status

Resolved in NVIDIA vGPU software 11.5

Ref.

200718945

5.19. 11.0-11.3 Only: NVIDIA vGPU software graphics driver installation fails in Ubuntu guest VMs

Description

Installation of the NVIDIA vGPU software graphics driver from a `.run` file fails in Ubuntu guest VMs that are running Linux kernel version 5.8 or later.

Version

Ubuntu 20.04 LTS and 18.04 with Linux kernel version 5.8 or later

Workaround

Revert to a Linux kernel version earlier than 5.8.

Status

Resolved in NVIDIA vGPU software 11.4

Ref.

3226853

5.20. For some accounted processes, `nvidia-smi` incorrectly reports maximum memory use of 0 MiB

Description

When the `--query-accounted-apps` option is used to list accounted compute processes, the `nvidia-smi` command incorrectly reports that the maximum memory use of some processes is 0 MiB. With the `--query-accounted-apps` option, `nvidia-smi` reports the maximum memory used by an application during its lifetime, and other information such as which GPU the application is running on and GR engine utilization.

Status

Open

Ref.

200647764

5.21. Migrating a VM with a Tesla T4 vGPU between a host running NVIDIA vGPU software 11.3 and a host running a different release fails

Description

Migrating a VM with a Tesla T4 vGPU between hosts where one host is running NVIDIA vGPU software 11.3 and the other host is running a different release fails. After the migration, the destination host and VM become unstable.

When this issue occurs, error message `XID error 38` is written to the Citrix Hypervisor VM's log file `/var/log/daemon.log`. Depending on the host configurations, the following messages might also be written to the log file:

- ▶ `XID error 43`
- ▶ `VGPU message 58`

- ▶ VGPU message 4

Version

This issue affects migrations between a host that is running NVIDIA vGPU software release 11.3 and a host that is running a different release. The issue affects migrations to and from the host that is running NVIDIA vGPU software release 11.3.

This issue does **not** affect migrations between two hosts that are both running NVIDIA vGPU software 11.3.

Workaround

If you are migrating a VM between a host that is running NVIDIA vGPU software 11.3 and a host that is running a another NVIDIA vGPU software 11 release, contact NVIDIA Enterprise Support for assistance.

Otherwise, avoid migrating a VM between a host that is running NVIDIA vGPU software 11.3 and a host that is running a different NVIDIA vGPU software release.

Status

Closed

Ref.

200691763

200735219

5.22. 11.0 Only: Desktop sessions disconnect after the server becomes unresponsive

Description

Desktop sessions disconnect after the server becomes unresponsive. Before the sessions disconnect, the error message `VGPU message 32 failed, result code: 0x59` is written to the log files on the hypervisor host.

Status

Resolved in NVIDIA vGPU software 11.1

Ref. #

2925629

5.23. 11.0-11.2 Only: Sessions freeze randomly with XID errors 38, 43, 32, and 31

Description

Issues such as a session freeze, black screen, application crash, or VM crash might randomly occur with VMs that are configured with a Tesla T4 vGPU. When these issues occur, XID error 38 followed by multiple instances of XID errors 43, 32, and 31 are written to the log files on the hypervisor host. This issue is caused by a regression in the NVIDIA firmware code for the Tesla T4 GPU and affects only VMs that are configured with a vGPU that resides on a Tesla T4 GPU.

Status

Resolved in NVIDIA vGPU software 11.3

Ref. #

200664572

5.24. Migrated VM with more than two vGPUs crashes on destination host

Description

When a VM that is configured with more than two vGPUs is migrated, the VM crashes on the destination host. When this issue occurs, the log file on the hypervisor host is flooded with NVOS status messages 0x23, 0x33, 0x5, and 0x21 and vGPU failure messages 4, 6, 7, 9, 12, 14, 19, 21, 23, 26, 32, 43, 54, and 56.

Status

Open

Ref.

200660221

5.25. 11.1 Only: 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

Resolved in NVIDIA vGPU software 11.2

Ref.

200658253

5.26. 11.0 Only: The NVIDIA license not present notification appears even for VMs for which the vGPU is licensed

Description

After starting and logging on to a Windows VM that is configured with NVIDIA vGPU, users see the **NVIDIA license not present** notification even when the vGPU is already licensed. This notification is misleading and should be ignored. This issue occurs because the NVIDIA driver is not storing the correct NVIDIA vGPU software license state.

Users can confirm that their vGPU is licensed in one of the following ways:

- ▶ Opening **NVIDIA Control Panel** and checking the **Licensing > Manage License** page.
- ▶ Running the following command in a **Command Prompt** window:

```
C:\Program Files\NVIDIA Corporation\NVSMI\nvidia-smi -q
```

Version

This issue affects Windows server and Windows desktop operating systems.

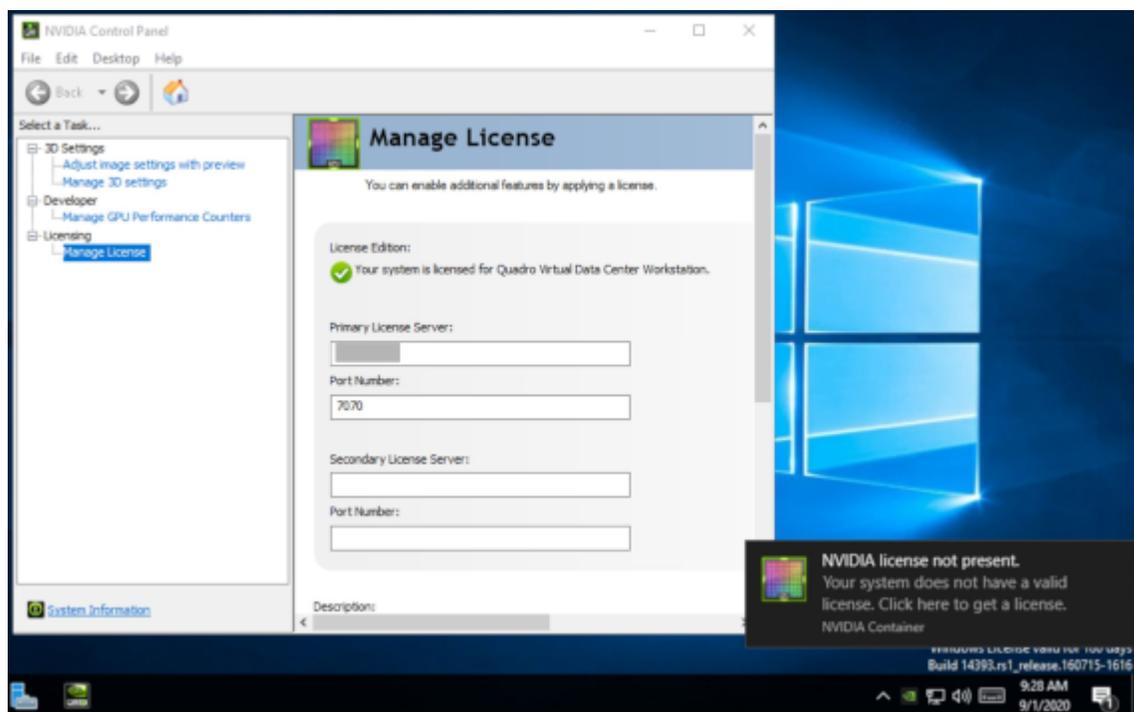
Workaround

While the misleading notifications can be ignored, this workaround can be used to suppress the notifications if they cause confusion.

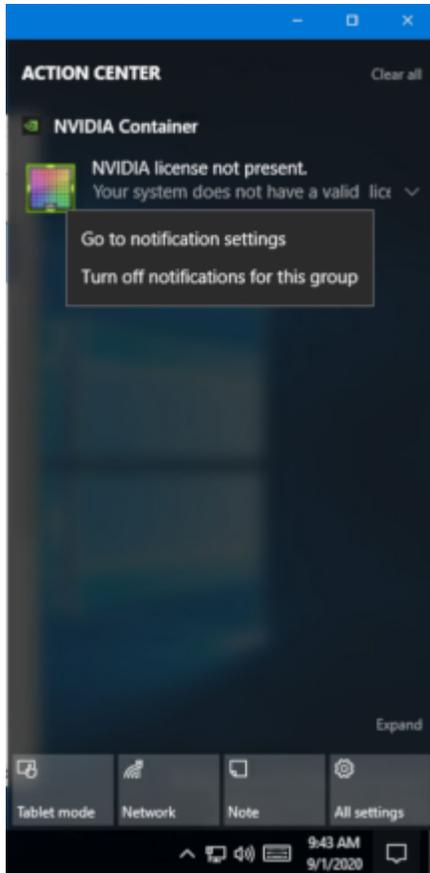


CAUTION: This workaround suppresses **all** notifications, **even valid notifications**, from **NVIDIA Container**. Therefore, use this workaround only if immediate resolution is needed.

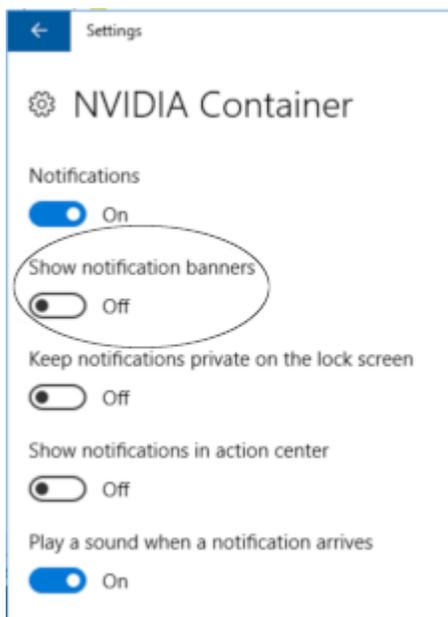
1. When the notification appears, grab it by right-clicking in the notification window.



2. In **Action Center**, go to Windows notifications for **NVIDIA Container**, right-click the notification, and click **Go to notification settings**.



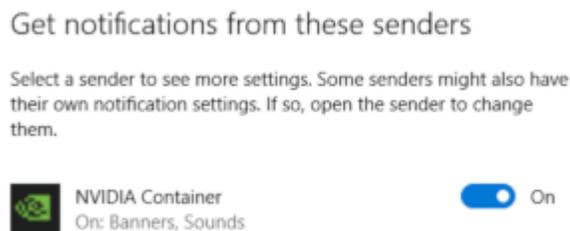
3. In the notification settings for **NVIDIA Container**, set **Show notification banners** to **Off**.



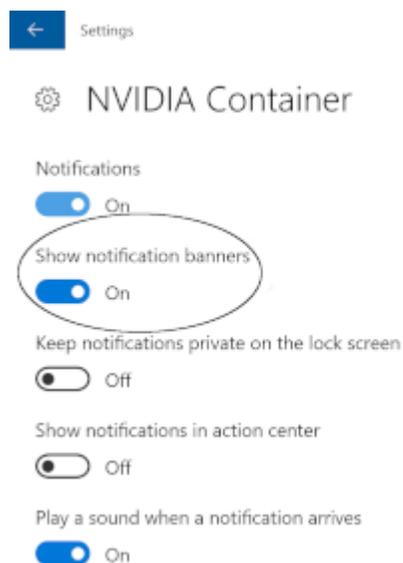
If necessary, you can reenable these notifications in one of the following ways:

- Use **System settings** as follows:

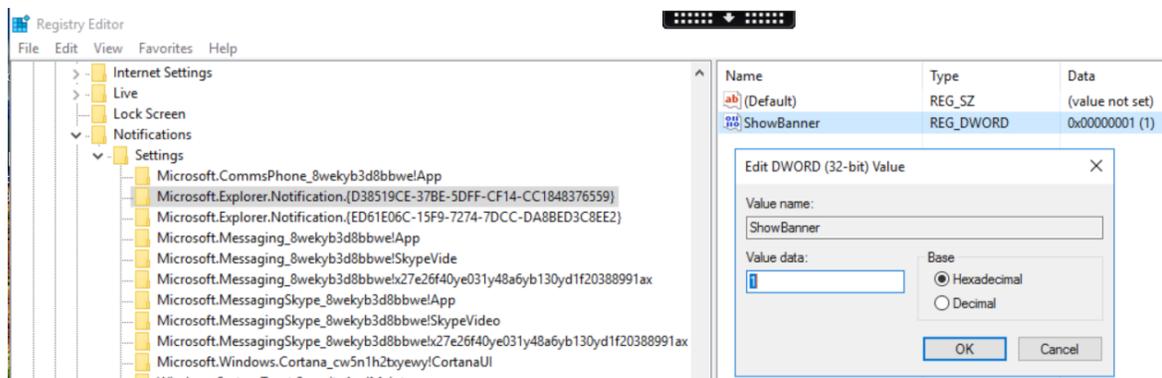
1. In **Notifications & actions**, under **Get notifications from these senders**, select **NVIDIA Container** to see more settings.



2. In the notification settings for **NVIDIA Container**, set the **Show notification banners** option to **On**.



- Set the Windows registry key `HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Notifications\Settings\Microsoft.Explorer.Notification.{D38519CE-37BE-5DFF-CF14-CC1848376559}\ShowBanner` to 1.



Status

Resolved in NVIDIA vGPU software 11.1

Ref.

3087984

5.27. Driver upgrade in a Linux guest VM with multiple vGPUs might fail

Description

Upgrading the NVIDIA vGPU software graphics driver in a Linux guest VM with multiple vGPUs might fail. This issue occurs if the driver is upgraded by overinstalling the new release of the driver on the current release of the driver while the `nvidia-gridd` service is running in the VM.

Workaround

1. Stop the `nvidia-gridd` service.
2. Try again to upgrade the driver.

Status

Open

Ref.

200633548

5.28. 11.0 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 11.1

Ref.

200626446

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

Description

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

Workaround

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

Status

Open

Ref.

200623179

5.30. VNC client session goes blank and console VNC is corrupted when the guest driver is uninstalled

Description

When the NVIDIA vGPU software graphics driver is uninstalled from a Windows 10 guest VM for which the boot mode is UEFI, the VNC client session goes blank and console VNC is corrupted.

This issue affects only Windows 10 guest VMs for which the boot mode is UEFI. It does **not** affect Windows 10 guest VMs for which the boot mode is BIOS.

Workaround

Reboot the VM by using Citrix XenCenter.

Status

Not an NVIDIA bug

Ref.

200609669

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

Description

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

Version

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

Workaround

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

Status

Not an NVIDIA bug

Ref.

200608675

5.32. Suspend and resume between hosts running different versions of the vGPU manager fails

Description

Suspending a VM configured with vGPU on a host running one version of the vGPU manager and resuming the VM on a host running a version from an older main release branch fails. For example, suspending a VM on a host that is running the vGPU manager from release 11.13 and resuming the VM on a host running the vGPU manager from release 10.4 fails. When this issue occurs, the error `There were no servers available to complete the specified operation` is reported on Citrix XenCenter.

Status

Not an NVIDIA bug

Ref.

200602087

5.33. 11.0 Only: Remoting solution session freezes with VGPU message 21 failed and VGPU message 14 failed errors

Description

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

Workaround

Try resizing the window again.

Status

Resolved in NVIDIA vGPU software 11.1

Ref.

200627445

5.34. 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.

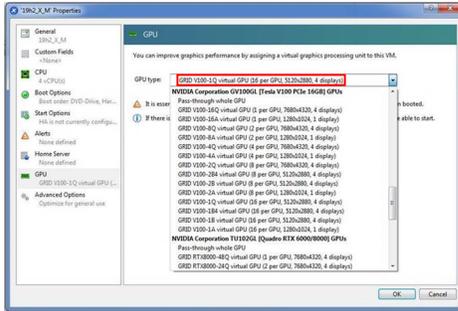
200605900

5.35. Citrix XenCenter displays misleading information about vGPU types

Description

The **GPU type** drop-down list in the Citrix XenCenter management GUI displays misleading information about the maximum combined resolution supported by Q-series and B-series vGPU types. The GUI lists the maximum number of displays supported and the highest resolution supported in a manner that implies a maximum combined resolution higher than is actually supported. These vGPU types support the number of displays listed only at resolutions lower than the resolution listed and support the resolution listed only with fewer displays than the number listed.

For example, as shown in the following screen capture, the GUI lists a resolution of 5120×2880 and four displays for the V100-1Q vGPU type. However, this vGPU type supports only one display at a resolution of 5120×2880 and supports a maximum of four displays only at resolutions of 2560×1600 and lower.



Version

All supported Citrix Hypervisor versions.

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

5.36. 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

Open

Ref.

200494400

5.37. 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

5.38. 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.

5.39. 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

5.40. 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

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

Description

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

When the failure occurs, the following messages are displayed:

```
-> Installing DKMS kernel module:
```

```

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

```

Workaround

When installing the NVIDIA vGPU software graphics driver with DKMS enabled, use one of the following workarounds:

- ▶ Before running the driver installer, install the `dkms` package, then run the driver installer with the `-dkms` option.
- ▶ Run the driver installer with the `--no-cc-version-check` option.

Status

Not a bug.

Ref.

2836271

5.42. 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

5.43. 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

5.44. 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

5.45. 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

5.46. 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. When this issue occurs, the message `The vGPU is not compatible with any pGPU in the destination.` appears in the Citrix XenCenter management GUI.

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

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

5.47. 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

5.48. 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

5.49. 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

5.50. 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

5.51. 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

5.52. 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

5.53. 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

5.54. 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.

5.55. 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

5.56. `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

5.57. 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

5.58. 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

5.59. 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

5.60. 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

5.61. 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

5.62. 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

5.63. 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

5.64. 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

5.65. 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

5.66. 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

5.67. 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

5.68. 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

5.69. 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 `disable_vnc=1` in the vGPU plugin's parameters). 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.

► **Citrix Hypervisor 8.1 or later:**

```
[root@xenserver ~]# xe vgpu-param-set uuid=vgpu-uuid extra_args=disable_vnc=1
```

► **Citrix Hypervisor earlier than 8.1:**

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

Status

Open

Ref.

NVIDIA-145/1375164

5.70. 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

5.71. 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

5.72. 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, 0x1a77ba000, 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

5.73. 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

5.74. 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

5.75. 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

5.76. 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

Notice

This document is provided for information purposes only and shall not be regarded as a warranty of a certain functionality, condition, or quality of a product. NVIDIA Corporation ("NVIDIA") makes no representations or warranties, expressed or implied, as to the accuracy or completeness of the information contained in this document and assumes no responsibility for any errors contained herein. NVIDIA shall have no liability for the consequences or use of such information or for any infringement of patents or other rights of third parties that may result from its use. This document is not a commitment to develop, release, or deliver any Material (defined below), code, or functionality.

NVIDIA reserves the right to make corrections, modifications, enhancements, improvements, and any other changes to this document, at any time without notice.

Customer should obtain the latest relevant information before placing orders and should verify that such information is current and complete.

NVIDIA products are sold subject to the NVIDIA standard terms and conditions of sale supplied at the time of order acknowledgement, unless otherwise agreed in an individual sales agreement signed by authorized representatives of NVIDIA and customer ("Terms of Sale"). NVIDIA hereby expressly objects to applying any customer general terms and conditions with regards to the purchase of the NVIDIA product referenced in this document. No contractual obligations are formed either directly or indirectly by this document.

NVIDIA products are not designed, authorized, or warranted to be suitable for use in medical, military, aircraft, space, or life support equipment, nor in applications where failure or malfunction of the NVIDIA product can reasonably be expected to result in personal injury, death, or property or environmental damage. NVIDIA accepts no liability for inclusion and/or use of NVIDIA products in such equipment or applications and therefore such inclusion and/or use is at customer's own risk.

NVIDIA makes no representation or warranty that products based on this document will be suitable for any specified use. Testing of all parameters of each product is not necessarily performed by NVIDIA. It is customer's sole responsibility to evaluate and determine the applicability of any information contained in this document, ensure the product is suitable and fit for the application planned by customer, and perform the necessary testing for the application in order to avoid a default of the application or the product. Weaknesses in customer's product designs may affect the quality and reliability of the NVIDIA product and may result in additional or different conditions and/or requirements beyond those contained in this document. NVIDIA accepts no liability related to any default, damage, costs, or problem which may be based on or attributable to: (i) the use of the NVIDIA product in any manner that is contrary to this document or (ii) customer product designs.

No license, either expressed or implied, is granted under any NVIDIA patent right, copyright, or other NVIDIA intellectual property right under this document. Information published by NVIDIA regarding third-party products or services does not constitute a license from NVIDIA to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property rights of the third party, or a license from NVIDIA under the patents or other intellectual property rights of NVIDIA.

Reproduction of information in this document is permissible only if approved in advance by NVIDIA in writing, reproduced without alteration and in full compliance with all applicable export laws and regulations, and accompanied by all associated conditions, limitations, and notices.

THIS DOCUMENT AND ALL NVIDIA DESIGN SPECIFICATIONS, REFERENCE BOARDS, FILES, DRAWINGS, DIAGNOSTICS, LISTS, AND OTHER DOCUMENTS (TOGETHER AND SEPARATELY, "MATERIALS") ARE BEING PROVIDED "AS IS." NVIDIA MAKES NO WARRANTIES, EXPRESSED, IMPLIED, STATUTORY, OR OTHERWISE WITH RESPECT TO THE MATERIALS, AND EXPRESSLY DISCLAIMS ALL IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY, AND FITNESS FOR A PARTICULAR PURPOSE. TO THE EXTENT NOT PROHIBITED BY LAW, IN NO EVENT WILL NVIDIA BE LIABLE FOR ANY DAMAGES, INCLUDING WITHOUT LIMITATION ANY DIRECT, INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES, HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY, ARISING OUT OF ANY USE OF THIS DOCUMENT, EVEN IF NVIDIA HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. Notwithstanding any damages that customer might incur for any reason whatsoever, NVIDIA's aggregate and cumulative liability towards customer for the products described herein shall be limited in accordance with the Terms of Sale for the product.

VESA DisplayPort

DisplayPort and DisplayPort Compliance Logo, DisplayPort Compliance Logo for Dual-mode Sources, and DisplayPort Compliance Logo for Active Cables are trademarks owned by the Video Electronics Standards Association in the United States and other countries.

HDMI

HDMI, the HDMI logo, and High-Definition Multimedia Interface are trademarks or registered trademarks of HDMI Licensing LLC.

OpenCL

OpenCL is a trademark of Apple Inc. used under license to the Khronos Group Inc.

Trademarks

NVIDIA, the NVIDIA logo, NVIDIA GRID, NVIDIA GRID vGPU, NVIDIA Maxwell, NVIDIA Pascal, NVIDIA Turing, NVIDIA Volta, GPUDirect, Quadro, and Tesla are trademarks or registered trademarks of NVIDIA Corporation in the U.S. and other countries. Other company and product names may be trademarks of the respective companies with which they are associated.

Copyright

© 2013-2023 NVIDIA Corporation. All rights reserved.

