# TABLE OF CONTENTS

Chapter 1. Release Notes........................................................................................................ 1
Chapter 2. Validated Platforms.............................................................................................. 2  
  2.1. Supported NVIDIA GPUs and Validated Server Platforms........................................... 2  
  2.2. Hypervisor Software Releases..................................................................................... 2  
  2.3. Guest OS Support........................................................................................................ 3  
    2.3.1. Windows Guest OS Support.................................................................................. 3  
    2.3.2. Linux Guest OS Support.................................................................................... 3  
Chapter 3. Known Product Limitations.............................................................................. 4  
  3.1. VM running older NVIDIA vGPU drivers fails to initialize vGPU when booted.............. 4  
  3.2. Virtual GPU fails to start if ECC is enabled................................................................... 5  
  3.3. Single vGPU benchmark scores are lower than passthrough GPU............................... 5  
  3.4. nvidia-smi fails to operate when all GPUs are assigned to GPU passthrough mode........ 6  
  3.5. GRID K1 and GRID K2 cards do not support monitoring of vGPU engine usage.......... 6  
  3.6. VMs configured with large memory fail to initialize vGPU when booted....................... 7  
  3.7. vGPU host driver RPM upgrade fails........................................................................... 8  
Chapter 4. Resolved Issues............................................................................................... 9  
Chapter 5. Security Updates............................................................................................ 10  
  5.1. Restricting Access to GPU Performance Counters...................................................... 10  
    5.1.1. Windows: Restricting Access to GPU Performance Counters for One User by Using  
          NVIDIA Control Panel......................................................................................... 10  
    5.1.2. Windows: Restricting Access to GPU Performance Counters Across an Enterprise by  
          Using a Registry Key......................................................................................... 11  
    5.1.3. Linux Guest VMs and Hypervisor Host: Restricting Access to GPU Performance  
          Counters............................................................................................................ 11  
Chapter 6. Known Issues............................................................................................... 13  
  6.1. NVOS errors might be logged when the NvFBC state is changed................................. 13  
  6.2. Multiple WebGL tabs in Microsoft Internet Explorer may trigger TDR on Windows VMs.. 14
Chapter 1.
RELEASE NOTES

These Release Notes summarize current status, information on validated platforms, and known issues with NVIDIA GRID™ software and hardware on Huawei FusionCompute.

This release includes the following software:

- NVIDIA GRID Virtual GPU Manager version 367.130 for the Huawei FusionCompute releases listed in Hypervisor Software Releases
- NVIDIA Windows drivers for vGPU version 370.35
- NVIDIA Linux drivers for vGPU version 367.130

Caution
If you install the wrong package for the version of Huawei FusionCompute you are using, GRID vGPU Manager will fail to load.

The GRID vGPU Manager and Windows guest VM drivers must be installed together. Older VM drivers will not function correctly with this release of GRID vGPU Manager. Similarly, older GRID vGPU Managers will not function correctly with this release of Windows guest drivers. See VM running older NVIDIA vGPU drivers fails to initialize vGPU when booted.

Updates in this release:

- Miscellaneous bug fixes
- Security updates - see Security Updates
Chapter 2.
VALIDATED PLATFORMS

This release of NVIDIA GRID software provides support for several NVIDIA GPUs on validated server hardware platforms, Huawei FusionCompute hypervisor software versions, and guest operating systems.

2.1. Supported NVIDIA GPUs and Validated Server Platforms

This release of NVIDIA GRID software provides support for the following NVIDIA GPUs on Huawei FusionCompute, running on validated server hardware platforms:

- GRID K1
- GRID K2
- Tesla M60

For a list of validated server platforms, refer to NVIDIA GRID Certified Servers.

Tesla M60 and M6 GPUs support compute mode and graphics mode. GRID 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 GRID software releases.

2.2. Hypervisor Software Releases

This release supports only the hypervisor software releases listed in the table.

If a specific release, even an update release, is not listed, it's not supported.
2.3. Guest OS Support

NVIDIA GRID software supports several Windows releases and Linux distributions as a guest OS.

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

2.3.1. Windows Guest OS Support

NVIDIA GRID software supports only the following Windows releases as a guest OS on Huawei FusionCompute:

- Windows Server 2016 1607, 1709
- Windows Server 2012 R2
- Windows Server 2008 R2
- Windows 10 RTM (1507), November Update (1511), Anniversary Update (1607), Creators Update (1703) (32/64-bit)
- Windows 8.1 (32/64-bit)
- Windows 8 (32/64-bit)
- Windows 7 (32/64-bit)

2.3.2. Linux Guest OS Support

NVIDIA GRID software supports only the following Linux distributions as a guest OS only on supported Tesla GPUs on Huawei FusionCompute:

- Red Hat Enterprise Linux 6.6
- CentOS 6.6
- Ubuntu 14.04 LTS

GRID K1 and GRID K2 do not support vGPU on a Linux guest OS.
Chapter 3.
KNOWN PRODUCT LIMITATIONS

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

3.1. VM running older NVIDIA vGPU drivers fails to initialize vGPU when booted

Description
A VM running older NVIDIA drivers, such as those from a previous vGPU release, will fail to initialize vGPU when booted on a Huawei FusionCompute platform running the current release of GRID Virtual GPU Manager.

In this scenario, the VM boots in standard VGA mode with reduced resolution and color depth. The NVIDIA GRID 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)

Depending on the versions of drivers in use, the Huawei FusionCompute VM's /var/log/messages log file reports one of the following errors:

» An error message:

vmiop_log: error: Unable to fetch Guest NVIDIA driver information

» A version mismatch between guest and host drivers:

vmiop_log: error: Guest VGX version(1.1) and Host VGX version(1.2) do not match

» A signature mismatch:

vmiop_log: error: VGPU message signature mismatch.
Resolution
Install the latest NVIDIA vGPU release drivers in the VM.

3.2. Virtual GPU fails to start if ECC is enabled

Description
Tesla M60 GPUs support error correcting code (ECC) memory for improved data integrity. Tesla M60 GPUs in graphics mode are supplied with ECC memory disabled by default, but it may subsequently be enabled using `nvidia-smi`.

However, NVIDIA GRID vGPU does not support ECC memory. If ECC memory is enabled, NVIDIA GRID vGPU fails to start. The following error is logged in the Huawei FusionCompute VM's `/var/log/messages` log file:

```
vmiop_log: error: Initialization: VGX not supported with ECC Enabled.
```

Resolution
Ensure that ECC is disabled on all GPUs.

1. Use `nvidia-smi` to list the status of all GPUs, and check for ECC noted as enabled on GPUs.
2. Change the ECC status to off on each GPU for which ECC is enabled by executing the following command:

```
nvidia-smi -i id -e 0
```

   `id` is the index of the GPU as reported by `nvidia-smi`.
3. Reboot the host.

3.3. Single vGPU benchmark scores are lower than passthrough GPU

Description
A single vGPU configured on a physical GPU produces lower benchmark scores than the physical GPU run in passthrough mode.

Aside from performance differences that may be attributed to a vGPU’s smaller framebuffer size, vGPU incorporates a performance balancing feature known as Frame Rate Limiter (FRL), which is enabled on all vGPUs. 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 passthrough GPU.

Resolution

FRL is controlled by an internal vGPU setting. NVIDIA does not validate vGPU with FRL disabled, but for validation of benchmark performance, FRL can be temporarily disabled by setting `plugin0.frame_rate_limiter=0` in the vGPU configuration file. vGPU configuration files are stored in `/usr/share/nvidia/vgx` and are named for the vGPU types they define, for example, `grid_k100.conf`.

The setting takes effect the next time any VM using the given vGPU type 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 by setting `plugin0.frame_rate_limiter=1` in the vGPU configuration file.

3.4. `nvidia-smi` fails to operate when all GPUs are assigned to GPU passthrough mode

Description

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

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

This is because GPUs operating in passthrough mode are not visible to `nvidia-smi` and the NVIDIA kernel driver operating in the Huawei FusionCompute dom0.

Resolution

N/A

3.5. GRID K1 and GRID K2 cards do not support monitoring of vGPU engine usage

Description

GRID K1 and GRID K2 cards do not support monitoring of vGPU engine usage. All tools and APIs for any vGPU running on GRID K1 or GRID K2 cards report 0 for the following usage statistics:
3.6. 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 GRID 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 Huawei FusionCompute 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 plugin0.enable_large_sys_mem=1 in the vGPU configuration file.

vGPU configuration files are stored in /usr/share/nvidia/vgx and are named for the vGPU types they define, for example, grid_k100.conf.

The setting takes effect the next time any VM using the given vGPU type 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 plugin0.extra_fb_reservation in the vGPU configuration file.
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:

```
plugin0.extra_fb_reservation=128
```

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

- Removing `enable_large_sys_mem` from the vGPU configuration file
- Setting `enable_large_sys_mem=0`

### 3.7. vGPU host driver RPM upgrade fails

**Description**

Upgrading vGPU host driver RPM fails with the following message on the console:

```
[root@uvp ~]# rpm -U NVIDIA-vGPU-kepler-uvp-210.0-352.70.x86_64
error: Failed dependencies: NVIDIA-vgx-uvp conflicts with NVIDIA-vGPU-kepler-uvp-210.0-352.70.x86_64
[root@uvp ~]#
```

**Resolution**

Uninstall the older vGPU RPM before installing the latest driver.

Use the following command to uninstall the older vGPU RPM:

```
[root@uvp ~]# rpm -e NVIDIA-vgx-uvp
```
## Chapter 4.
RESOLVED ISSUES

<table>
<thead>
<tr>
<th>Bug ID</th>
<th>Summary and Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2477339</td>
<td>NVIDIA Control Panel crashes during licensing</td>
</tr>
<tr>
<td></td>
<td>NVIDIA Control Panel crashes during an attempt to license NVIDIA GRID Software.</td>
</tr>
</tbody>
</table>
5.1. Restricting Access to GPU Performance Counters

The NVIDIA graphics driver contains a vulnerability (CVE-2018-6260) that may allow access to application data processed on the GPU through a side channel exposed by the GPU performance counters. To address this vulnerability, update the driver and restrict access to GPU performance counters to allow access only by administrator users and users who need to use CUDA profiling tools.

The GPU performance counters that are affected by this vulnerability are the hardware performance monitors used by the CUDA profiling tools such as CUPTI, Nsight Graphics, and Nsight Compute. These performance counters are exposed on the hypervisor host and in guest VMs only as follows:

- On the hypervisor host, they are always exposed. However, the Virtual GPU Manager does not access these performance counters and, therefore, is not affected.
- In Windows and Linux guest VMs, they are exposed only in VMs configured for GPU pass through. They are not exposed in VMs configured for NVIDIA vGPU.

5.1.1. Windows: Restricting Access to GPU Performance Counters for One User by Using NVIDIA Control Panel

Perform this task from the guest VM to which the GPU is passed through.

Ensure that you are running NVIDIA Control Panel version 8.1.950.

1. Open NVIDIA Control Panel:
   - Right-click on the Windows desktop and select NVIDIA Control Panel from the menu.
   - Open Windows Control Panel and double-click the NVIDIA Control Panel icon.
2. In NVIDIA Control Panel, select the Manage GPU Performance Counters task in the Developer section of the navigation pane.

3. Complete the task by following the instructions in the Manage GPU Performance Counters > Developer topic in the NVIDIA Control Panel help.

5.1.2. Windows: Restricting Access to GPU Performance Counters Across an Enterprise by Using a Registry Key

You can use a registry key to restrict access to GPU Performance Counters for all users who log in to a Windows guest VM. By incorporating the registry key information into a script, you can automate the setting of this registry for all Windows guest VMs across your enterprise.

Perform this task from the guest VM to which the GPU is passed through.

Caution Only enterprise administrators should perform this task. Changes to the Windows registry must be made with care and system instability can result if registry keys are incorrectly set.

1. Set the RmProfilingAdminOnly Windows registry key to 1.

   [HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\Global\NVTweak]
   Value: "RmProfilingAdminOnly"
   Type: DWORD
   Data: 00000001

   The data value 1 restricts access, and the data value 0 allows access, to application data processed on the GPU through a side channel exposed by the GPU performance counters.

2. Restart the VM.

5.1.3. Linux Guest VMs and Hypervisor Host: Restricting Access to GPU Performance Counters

On systems where unprivileged users don’t need to use GPU performance counters, restrict access to these counters to system administrators, namely users with the CAP_SYS_ADMIN capability set. By default, the GPU performance counters are not restricted to users with the CAP_SYS_ADMIN capability.

Perform this task from the guest VM to which the GPU is passed through or from your hypervisor host machine.

In Linux guest VMs, this task requires sudo privileges. On your hypervisor host machine, this task must be performed as the root user on the machine.

1. Log in to the guest VM or open a command shell on your hypervisor host machine.

2. Set the kernel module parameter NVreg_RestrictProfilingToAdminUsers to 1 by adding this parameter to the /etc/modprobe.d/nvidia.conf file.
If you are setting only this parameter, add an entry for it to the `/etc/modprobe.d/nvidia.conf` file as follows:

```bash
options nvidia
   NVreg_RegistryDwords="NVreg_RestrictProfilingToAdminUsers=1"
```

If you are setting multiple parameters, set them in a single entry as in the following example:

```bash
options nvidia NVreg_RegistryDwords="RmPVMRL=0x0"
   "NVreg_RestrictProfilingToAdminUsers=1"
```

If the `/etc/modprobe.d/nvidia.conf` file does not already exist, create it.

3. Restart the VM or reboot your hypervisor host machine.
Chapter 6.
KNOWN ISSUES

6.1. NVOS errors might be logged when the NvFBC state is changed

Description
When the NvFBC state is changed in the VM, the following error messages might be written to the log files:

 NVOS status 0x56
 Failed to reset guest’s license info in host

If you see these errors in the log files, ignore them.

Workaround
None required.

Status
Open

Ref. #
200494421
6.2. Multiple WebGL tabs in Microsoft Internet Explorer may trigger TDR on Windows VMs

Description
Running intensive WebGL applications in multiple IE tabs may trigger a TDR on Windows VMs.

Workaround
Disable hardware acceleration in IE.
To enable software rendering in IE, refer to the Microsoft knowledge base article How to enable or disable software rendering in Internet Explorer.

Status
Open

Ref. #
200148377
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