# GRID VGAMING R440 GA4

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**Application Note**

# TABLE OF CONTENTS

# Chapter 1.
# GRID VGAMING RELEASE INFORMATION

This *Application Note* supplements the documentation for NVIDIA vGPU software with information that is specific to GRID vGaming.

GRID vGaming supports NVIDIA vGPU, GPU pass through, and bare-metal deployments.

This release of GRID vGaming includes the software listed in the following table:

| Software | Version |
|---|---|
| NVIDIA Virtual GPU Manager | 440.43 |
| NVIDIA Windows driver | 441.66 |
| NVIDIA Linux driver | 440.43 |

**Caution**

If you install the wrong GRID vGaming packages for the version of the hypervisor you are using, NVIDIA Virtual GPU Manager will fail to load.

The vGPU Manager and guest VM drivers must be installed together. Older VM drivers will not function correctly with this release of vGPU Manager. Similarly, older releases of vGPU Manager will not function correctly with this release of the guest VM drivers.

This requirement does not apply to the NVIDIA vGPU software license sever. All releases of GRID vGaming are compatible with **all** releases of the license server.

# Chapter 2. VALIDATED PLATFORMS

This release of GRID vGaming provides support for several NVIDIA GPUs on validated server hardware platforms, hypervisor software versions, and guest operating systems. It also supports NVIDIA CUDA Toolkit 10.2.

## 2.1. Supported NVIDIA GPUs and Validated Server Platforms

This release of GRID vGaming provides support for the following NVIDIA GPUs running on validated server hardware platforms:

- GPUs based on the NVIDIA Maxwell™ graphic architecture:
  - Tesla M60 in GPU pass through mode and bare-metal deployments only (**not** supported with NVIDIA vGPU)
- GPUs based on the NVIDIA Pascal™ architecture:
  - Tesla P4
  - Tesla P40
- GPUs based on the NVIDIA Volta architecture:
  - Tesla V100 PCIe 32GB
- GPUs based on the NVIDIA Turing™ architecture:
  - Tesla T4
  - Tesla T10
  - Quadro RTX 6000 in displayless mode
  - Quadro RTX 8000 in displayless mode

These GPUs are supported as a secondary device in a bare-metal deployment.

In displayless mode, local physical display connectors are disabled.

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

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

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

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

## 2.2. Hypervisor Software Releases

This release of GRID vGaming is supported on the hypervisor software releases listed in the table.

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

| Software | Releases Supported | Notes |
|---|---|---|
| Citrix Hypervisor | 8.0<br>7.6 | The RTM build and compatible cumulative update releases are supported. |
| Red Hat Enterprise Linux with KVM | 8.0 | All NVIDIA GPUs that GRID vGaming supports are supported with vGPU and in pass-through mode. |
| | 7.6, 7.5 | All NVIDIA GPUs that GRID vGaming supports are supported with vGPU and in pass-through mode. |
| | 7.2 through 7.4 | All NVIDIA GPUs that GRID vGaming supports are supported in pass-through mode only. |
| | 7.0, 7.1 | Only the Tesla M60 GPU is supported in pass-through mode only. |

## 2.3. Guest OS Support

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

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

GRID vGaming supports **only** 64-bit guest operating systems. No 32-bit guest operating systems are supported.

### 2.3.1. Windows Guest OS Support

GRID vGaming supports **only** the 64-bit Windows releases listed as a guest OS.

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

- Windows Server 2019 (**not** supported on Citrix Hypervisor)
- Windows Server 2016
- Windows Server 2012 R2

### 2.3.2. Linux Guest OS Support

GRID vGaming supports **only** the Linux distributions listed as a guest OS.

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

- Ubuntu 18.04

## 2.4. NVIDIA CUDA Toolkit Version Support

This release of GRID vGaming supports NVIDIA CUDA Toolkit 10.2.

For more information about NVIDIA CUDA Toolkit, see CUDA Toolkit 10.2 Documentation.

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

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

For more information, see *NVIDIA CUDA Installation Guide for Linux*.

# Chapter 3.
# GRID VGAMING VIRTUAL GPU TYPES

A physical GPU can support several different types of virtual GPU (vGPU). Different GRID vGaming vGPU types have different amounts of frame buffer, but they all support a single virtual display head with a maximum resolution of 4K. They are grouped into different series according to the different classes of workload for which they are optimized. Each series is identified by a three-letter prefix in the vGPU type name.

| Series | Optimal Workload |
|---|---|
| GTX series | GRID vGaming on GPUs based on the NVIDIA Pascal™ architecture and the NVIDIA Volta architecture |
| RTX series | GRID vGaming on GPUs based on the NVIDIA Turing™ architecture |

The number after the board type in the vGPU type name denotes the amount of frame buffer that is allocated to a vGPU of that type. For example, a vGPU of type RTX T10-4 is allocated 4096 Mbytes of frame buffer on a Tesla T10 16GB board.

Due to their differing resource requirements, the maximum number of vGPUs that can be created simultaneously on a physical GPU varies according to the vGPU type. For example, a Tesla T10 16GB board can support up to four RTX T10-4 vGPUs on its physical GPU, but only two RTX T10-8 vGPUs, and only one RTX T10-16 vGPU.

GRID vGaming is a licensed product on all supported GPU boards. A GRID vGaming software license is required to enable all vGPU features within the guest VM.

## 3.1. Tesla P40 Virtual GPU Types

Physical GPUs per board: 1

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| GTX P40-24 | GRID vGaming | 24576 | 1 | 4096×2160 | 1 | 1 | GRID vGaming |
| GTX P40-12 | GRID vGaming | 12288 | 1 | 4096×2160 | 2 | 2 | GRID vGaming |
| GTX P40-8 | GRID vGaming | 8192 | 1 | 4096×2160 | 3 | 3 | GRID vGaming |
| GTX P40-6 | GRID vGaming | 6144 | 1 | 4096×2160 | 4 | 4 | GRID vGaming |

## 3.2. Tesla P4 Virtual GPU Types

Physical GPUs per board: 1

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| GTX P4-8 | GRID vGaming | 8192 | 1 | 4096×2160 | 1 | 1 | GRID vGaming |
| GTX P4-4 | GRID vGaming | 4096 | 1 | 4096×2160 | 2 | 2 | GRID vGaming |
| GTX P4-2 | GRID vGaming | 2048 | 1 | 4096×2160 | 4 | 4 | GRID vGaming |

## 3.3. Tesla T10 16GB Virtual GPU Types

Physical GPUs per board: 1

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| RTX T10-16 | GRID vGaming | 16384 | 1 | 4096×2160 | 1 | 1 | GRID vGaming |
| RTX T10-8 | GRID vGaming | 8192 | 1 | 4096×2160 | 2 | 2 | GRID vGaming |
| RTX T10-4 | GRID vGaming | 4096 | 1 | 4096×2160 | 4 | 4 | GRID vGaming |

## 3.4. Tesla T4 Virtual GPU Types

Physical GPUs per board: 1

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| RTX T4-16 | GRID vGaming | 16384 | 1 | 4096×2160 | 1 | 1 | GRID vGaming |
| RTX T4-8 | GRID vGaming | 8192 | 1 | 4096×2160 | 2 | 2 | GRID vGaming |
| RTX T4-4 | GRID vGaming | 4096 | 1 | 4096×2160 | 4 | 4 | GRID vGaming |

## 3.5. Tesla V100 PCIe 32GB Virtual GPU Types

Physical GPUs per board: 1

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| GTX V100D-32 | GRID vGaming | 32768 | 1 | 4096×2160 | 1 | 1 | GRID vGaming |
| GTX V100D-16 | GRID vGaming | 16384 | 1 | 4096×2160 | 2 | 2 | GRID vGaming |
| GTX V100D-8 | GRID vGaming | 8192 | 1 | 4096×2160 | 4 | 4 | GRID vGaming |

## 3.6. Quadro RTX 8000 Virtual GPU Types

Physical GPUs per board: 1

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| RTX8000-48 | GRID vGaming | 49152 | 1 | 4096×2160 | 1 | 1 | GRID vGaming |
| RTX8000-24 | GRID vGaming | 24576 | 1 | 4096×2160 | 2 | 2 | GRID vGaming |

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| RTX8000-16 | GRID vGaming | 16384 | 1 | 4096×2160 | 3 | 3 | GRID vGaming |
| RTX8000-12 | GRID vGaming | 12288 | 1 | 4096×2160 | 4 | 4 | GRID vGaming |

## 3.7. Quadro RTX 6000 Virtual GPU Types

Physical GPUs per board: 1

| Virtual GPU Type | Intended Use Case | Frame Buffer (MB) | Virtual Display Heads | Maximum Resolution per Display Head | Maximum vGPUs per GPU | Maximum vGPUs per Board | Required License Edition |
|---|---|---|---|---|---|---|---|
| RTX6000-24 | GRID vGaming | 24576 | 1 | 4096×2160 | 1 | 1 | GRID vGaming |
| RTX6000-12 | GRID vGaming | 12288 | 1 | 4096×2160 | 2 | 2 | GRID vGaming |
| RTX6000-8 | GRID vGaming | 8192 | 1 | 4096×2160 | 3 | 3 | GRID vGaming |
| RTX6000-6 | GRID vGaming | 6144 | 1 | 4096×2160 | 4 | 4 | GRID vGaming |

# Chapter 4.
# GRID VGAMING LICENSING

GRID vGaming is a licensed product on NVIDIA GPUs that support it.

## 4.1. GRID vGaming Licensed Deployments

The GRID vGaming license supports different classes of deployments.

| Licensed Product | Target Users | Supported Deployments |
|---|---|---|
| GRID vGaming | Online gamers using a cloud gaming service | ▸ GTX series NVIDIA vGPUs<br>▸ RTX series NVIDIA vGPUs<br>▸ GPU pass through<br>▸ Bare metal |

## 4.2. How GRID vGaming Licensing Is Enforced

All GRID vGaming deployments require a GRID vGaming license. Licensing for all GRID vGaming deployments is enforced through software.

## 4.3. Licensing an NVIDIA vGPU or Physical GPU

Licensing through **NVIDIA Control Panel** on Windows and **NVIDIA X Server Settings** on Linux is disabled for GRID vGaming guest drivers. How to license an NVIDIA vGPU or a pass-through or bare-metal physical GPU for GRID vGaming depends on your guest OS:

- On Windows, you must use the Windows registry key `HKEY_LOCAL_MACHINE\SOFTWARE\NVIDIA Corporation\Global\GridLicensing`.
- On Linux, you must use the `/etc/nvidia/gridd.conf` configuration file.

If you do not require high availability for the license server and are using the default license server port (7070), you need set only the configuration parameters in the following table.

| Configuration Parameter | Windows Data Type | Setting |
|---|---|---|
| `ServerAddress` | String (`REG_SZ`) | The address of your license server.<br>The address can be a fully-qualified domain name such as `gridlicense1.example.com`, or an IP address such as `10.31.20.45`. |
| `FeatureType` | DWord (`REG_DWORD`) | **NVIDIA vGPU**:<br>▸ Windows: Do **not** change the value of this registry key.<br>▸ Linux: Set to `1`. |
| | | **Physical GPU:** Set to `3` to specify a GRID vGaming license. |

# Appendix A.
# GRID VGAMING RESOURCES

### Getting Started

- *Virtual GPU Software Quick Start Guide*
- *Virtual GPU Software for Citrix Hypervisor Release Notes*
- *Virtual GPU Software for Red Hat Enterprise Linux with KVM Release Notes*

### License Server Installation and Setup

- *Virtual GPU License Server Release Notes*
- *Virtual GPU License Server User Guide*

### GRID vGaming Installation, Setup, and Client-Side Licensing

- *Virtual GPU Software User Guide*
- *Virtual GPU Client Licensing User Guide*
- *gpumodeswitch User Guide*

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