

NVIDIA License Server Installation –Driver Installation on Host & Guest

As part of Citrix POC, we have used one VM for NVIDIA License server installation, Need a license from NVIDIA before install of NVIDIA License server in a VM

How to get a Trail License from NVIDIA

Prerequisites & Installation procedures

Software's Links

Host Driver (Should download from Nutanix Support)

[Nutanix Support & Insights](#)

vGPU Drivers (Should Download from NVIDIA Website)

[NVIDIA Enterprise](#)

[NLP - Dashboard \(nvidia.com\)](#)

NVIDIA License Server

<https://nvid.nvidia.com/dashboard>

[NLP - Software Downloads \(nvidia.com\)](#)

GPU profiles tool

[Releases · JeremyMain/GPUProfiler · GitHub](#)

Remote display analyzer tool

[RDAAnalyzer Pro edition – Remote Display Analyzer](#)

Host Drivers Version

Compatiblilty Matrix:

AOS Version *	AHV Version	NVIDIA Host Driver Version	Notes
AOS 6.1	20201105.30142	13.0	Download driver below
AOS 5.20.3 LTS	20201105.2244	11.5, 12.3 (EOL), 13.0	Download driver below
AOS 6.0	20201105.2076	12.2 (EOL), 12.0 (EOL), 11.4	Download driver below
AOS 5.20.2 LTS	20201105.2229	11.5, 12.3 (EOL), 13.0	Download driver below
AOS 5.20.1 LTS	20201105.2096	12.2 (EOL), 12.0 (EOL), 11.4	Download driver below
AOS 5.20 LTS	20201105.2030	12.0 (EOL), 11.4	Download driver below
AOS 5.19	20201105.12	11.1, 11.3, 11.4	Download driver below
AOS 5.18.1	20190916.294	11.1, 11.3, 11.4	vGPU live migration introduced
AOS 5.18	20190916.253	10.1 (EOL)	
AOS 5.17.1	20190916.231	10.1 (EOL), 10.3 (EOL)	
AOS 5.15.4 LTS	20190916.321	11.1, 11.3, 11.4	Download driver below
AOS 5.15.3 LTS	20170830.453	10.1 (EOL), 10.3 (EOL)	vGPU stats issue resolved
AOS 5.15.2 LTS	20170830.395	9.1 (EOL)	Missing vGPU stats >= GRID 9.2. Link
AOS 5.10 LTS	20170830.184	8.4, 9.1 (EOL)	Missing vGPU stats >= GRID 9.2. Link

[Nutanix Support & Insights](#)

vGPU version

NVIDIA vGPU Software 11 Releases

Branch status: Long-Term Support Branch supported until July 2023

vGPU Software	vGPU Manager	Linux Driver	Windows Driver	Release Date
11.7	450.172	450.172.01	453.37	January 2022
11.6	450.156	450.156.00	453.23	October 2021
11.5	450.142	450.142.00	453.10	July 2021
11.4	450.124	450.119.03	452.96	April 2021

[NVIDIA Virtual GPU \(vGPU\) Software Documentation](#)

vGPU driver can download from Nutanix or NVIDIA

NVIDIA vGPU guest OS drivers for product versions 11.0 or later can be acquired via NVIDIA Licensing Software Downloads under:

'All Available' / Product Family = vGPU / Platform = **Linux KVM** / Platform Version = All Supported / Product Version = (match host driver version)

AHV-compatible host and guest drivers for older AOS versions can be found on the NVIDIA Licensing Software Downloads [site](#) under 'Platform = Nutanix AHV'.

Best from Nutanix portal

NVIDIA GRID for AOS 5.15.4 (Version: 11.4) [Download](#)

Release Date: May 06, 2021
[Show Less ^](#)

Filename: nvidia-vgpu-450.124-2.20190916.114.e17.x86_64.rpm
Size: 11.92 MB
Md5: 0547d660fee5cdfb53a8e6f1589e91e
Release Notes: [Install Guide and Release Notes](#)

[Nutanix Support & Insights](#)

From NVIDIA portal download vGPU driver

[NLP - Software Downloads \(nvidia.com\)](#)

PLATFORM	PLATFORM VERSION	PRODUCT VERSION	DESCRIPTION	RELEASE DATE
Linux KVM	All Supported	11.1	NVIDIA vGPU for Linux KVM ALL	Sep 30, 2020
Linux KVM	All Supported	11.2	NVIDIA vGPU for Linux KVM ALL	Nov 5, 2020
Linux KVM	All Supported	11.3	NVIDIA vGPU for Linux KVM ALL	Jan 7, 2021
Linux KVM	All Supported	11.4	NVIDIA vGPU for Linux KVM ALL	Apr 23, 2021

vGPU
For information about the software lifecycle for NVIDIA virtual GPU Software visit: <https://docs.nvidia.com/grid/news/index.html>
NVIDIA vGPU documentation is available at: <https://docs.nvidia.com/grid/>

NVIDIA Host Driver Prerequisites

- Power off al VM's on all Hosts
- Download the software's from NVIDIA link

Use one of the following methods to identify the GPU card in use

```
root@ahv# lspci | grep -i nvidia
```

OR

From Prism Element or Prism Central

Select the Hardware dashboard and click Table view selector to view the hardware information in a tabular form. From the list, select a host with GPU installed on it. This displays the Host details with the GPU model listed in it.

Implementation Steps:

NVIDIA GRID Virtual GPU Manager for AHV can be installed and upgraded from any Controller VM using the **install_host_package** script. The script, when run on a Controller VM, installs the driver on all the hosts in the cluster.

1. To make the driver available to the script, do one of the following:
 - Copy the RPM package to **any** Controller VM in the cluster on which you want to install the driver.
 - You can copy the RPM package to the /home/nutanix directory.
2. Log on to any Controller VM in the cluster with SSH as the nutanix user.(Nutanix/Nutanix/4u)
3. Install Drivers

a. `nutanix@cvm$ install_host_package -r rpm`

Note: Replace `rpm` with the path to the driver on the Controller VM

Verification

```
nutanix@cvm$ hostssh "rpm -qa | grep -i nvidia"
```

or

with NCC Check detects if the NVIDIA driver is missing on any GPU node

```
ncc health_checks hypervisor_checks gpu_driver_installed_check
```

OR

This inspects the output for a table of output containing, amongst other things, the driver version and detected GPU resources.

```
nutanix@cvm$ hostssh nvidia-smi
```

Reference:

[Third-Party Integrations ANY - Installing and Upgrading NVIDIA GRID Virtual GPU Manager \(Host Driver\) \(nutanix.com\)](https://nutanix.com/Third-Party-Integrations-ANY-Installing-and-Upgrading-NVIDIA-GRID-Virtual-GPU-Manager-Host-Driver)

Note: Contact Nutanix Support if you want to uninstall the NVIDIA host driver.

NVIDIA GRID vGPU Driver Installation on VM's

Prerequisites

- Make sure that NVIDIA GRID Virtual GPU Manager (the host driver) and the NVIDIA GRID guest operating system driver are at the same version.
- The GPUs must run in graphics mode. If any GPUs are running in compute mode, switch the mode to graphics before you begin.
- If you are using NVIDIA vGPU drivers on a guest VM and you modify the vGPU profile assigned to the VM (in the Prism web console), you might need to reinstall the NVIDIA guest drivers on the guest VM.

Implementation

- Assign vGPU profile to VM
- Install NVIDIA guest driver into guest VMs.
- (Ensure the guest driver version/build matches with the host driver version/build
- <https://docs.nvidia.com/grid/>)
- Install NVIDIA license server and allocate licenses.
- Install NVIDIA license server and allocate licenses.
- Download the NVIDIA vGPU software license server from NVIDIA dashboard.

Ref:

NVIDIA GRID vGPU Driver Installation and Configuration Workflow
[Third-Party Integrations ANY - NVIDIA GRID vGPU Driver Installation and Configuration Workflow \(nutanix.com\)](#)

Nutanix Upgrade

FOR Prism Element without LCM, below is the order for one click upgrade is b

Foundation
AOS
AHV

[Latest Nutanix AOS 5.15 LTS Released – HyperHCI.com](#)

References

NVIDIA GRID Virtual GPU Support on AHV

[AHV 6.1 - NVIDIA GRID Virtual GPU Support on AHV \(nutanix.com\)](#)

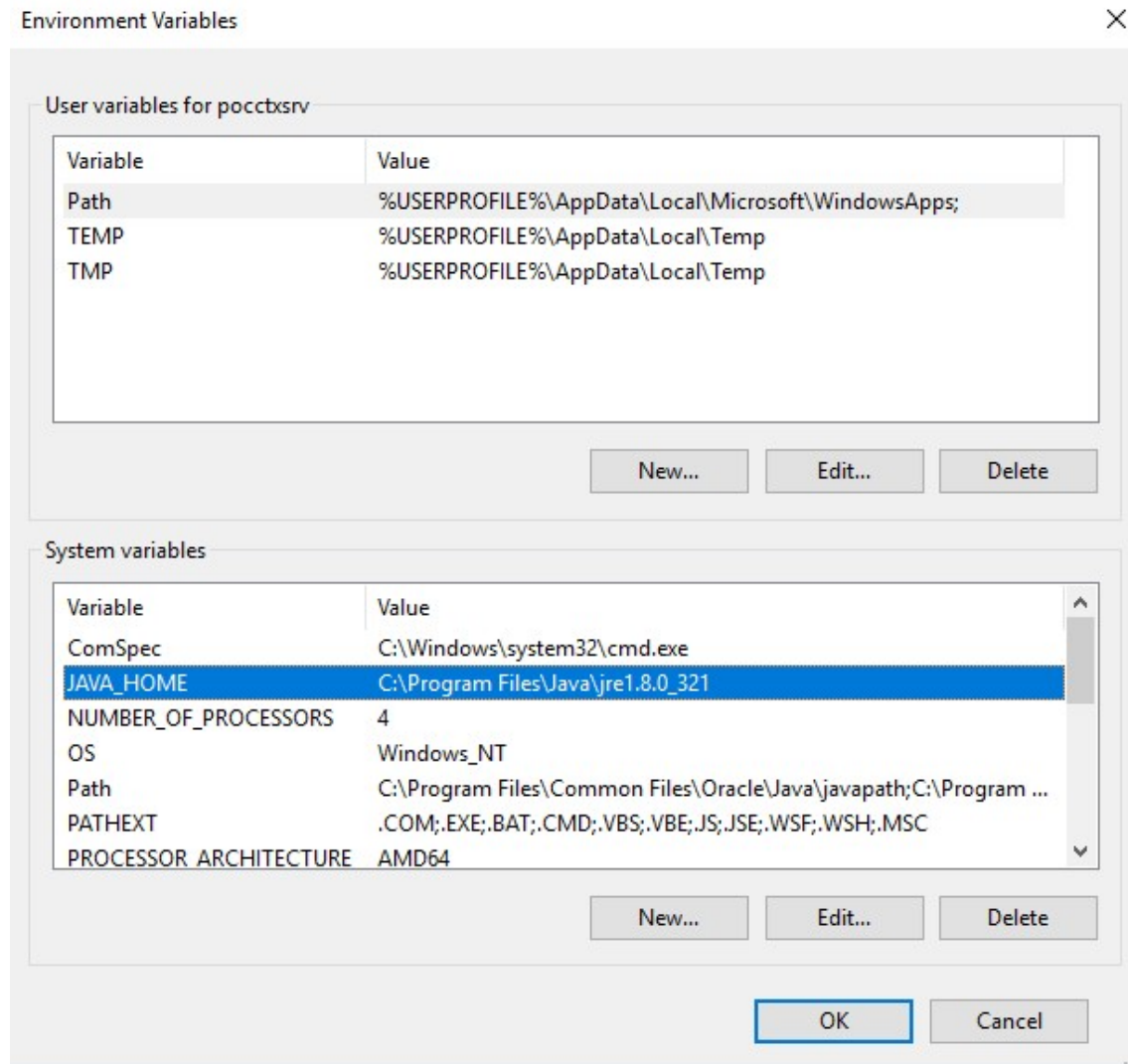
Getting your NVIDIA® Virtual GPU Software Version

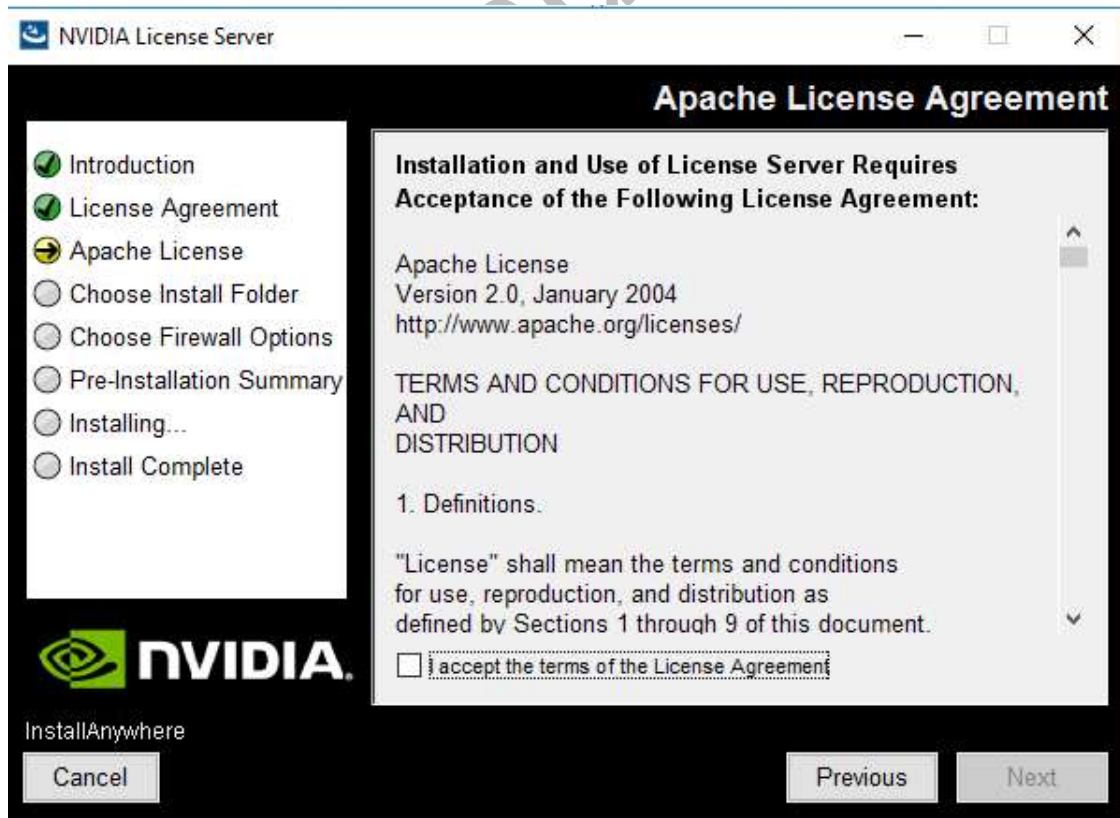
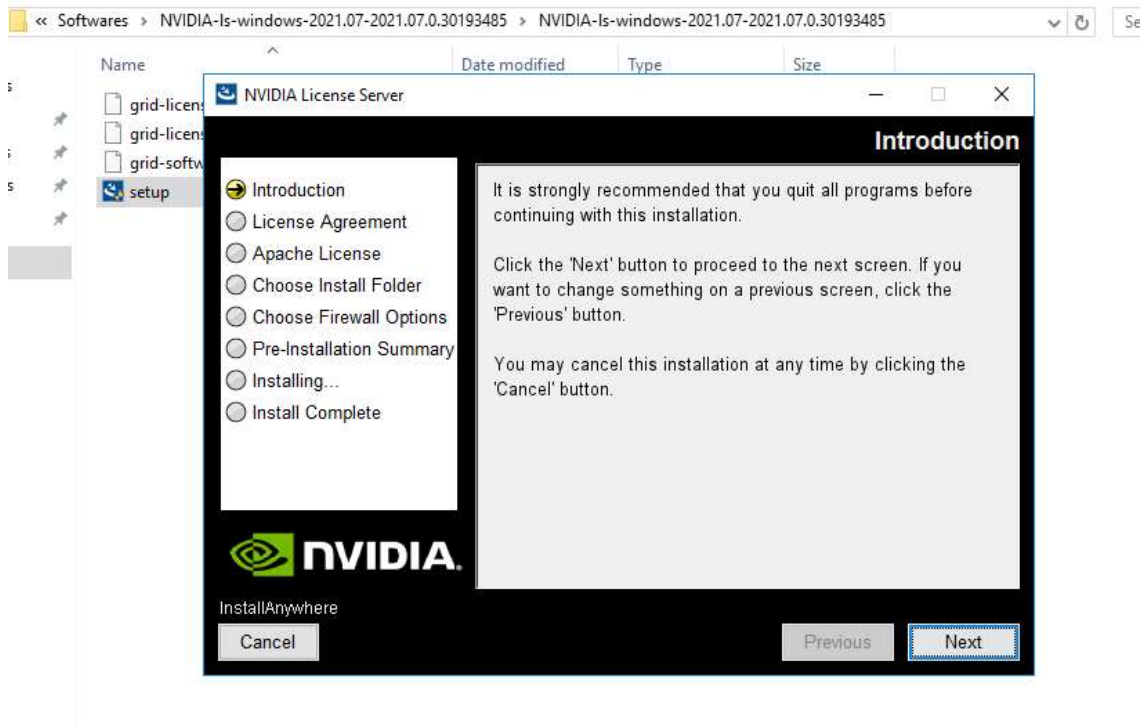
[Getting your NVIDIA Virtual GPU Software Version](#)

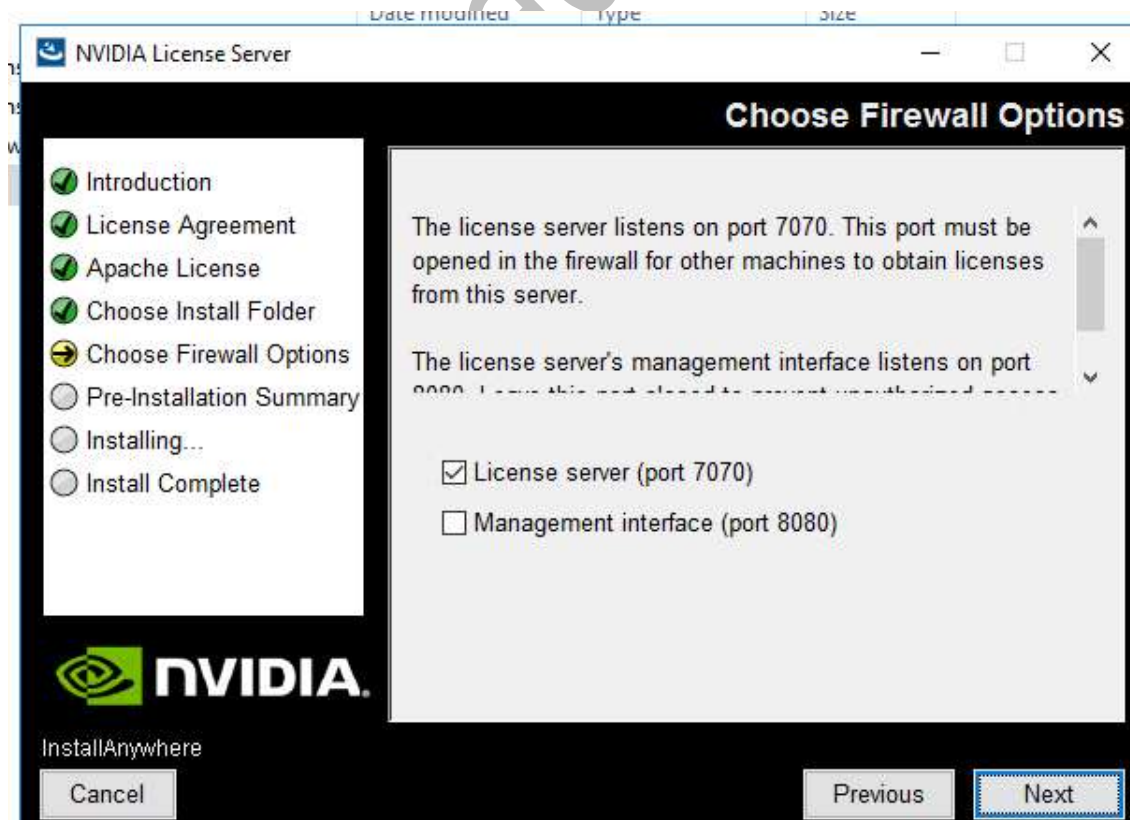
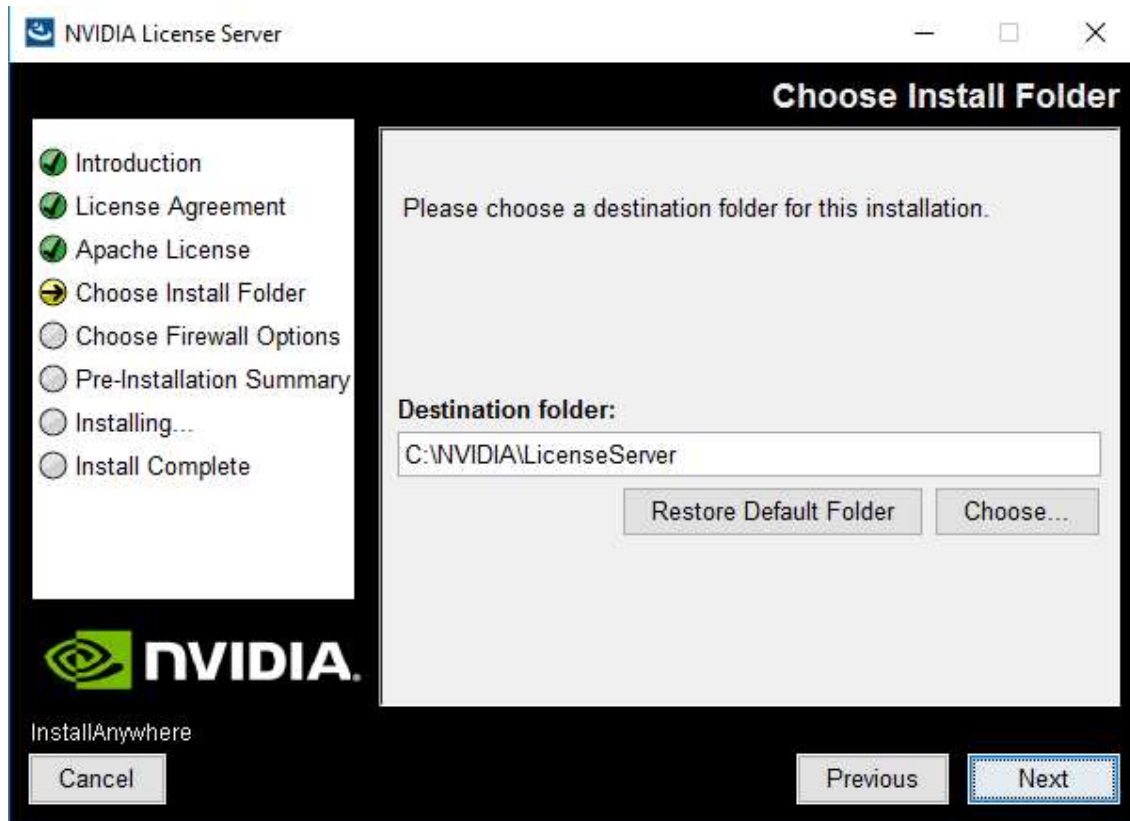
POC Implementation screenshots

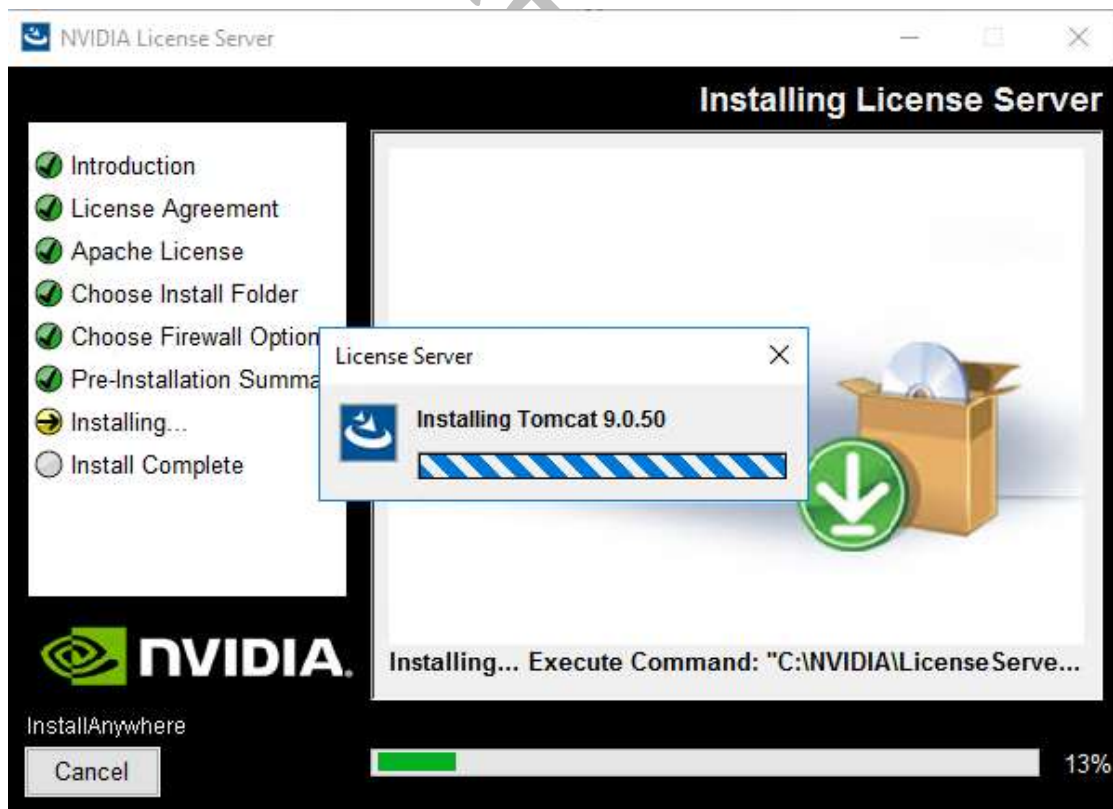
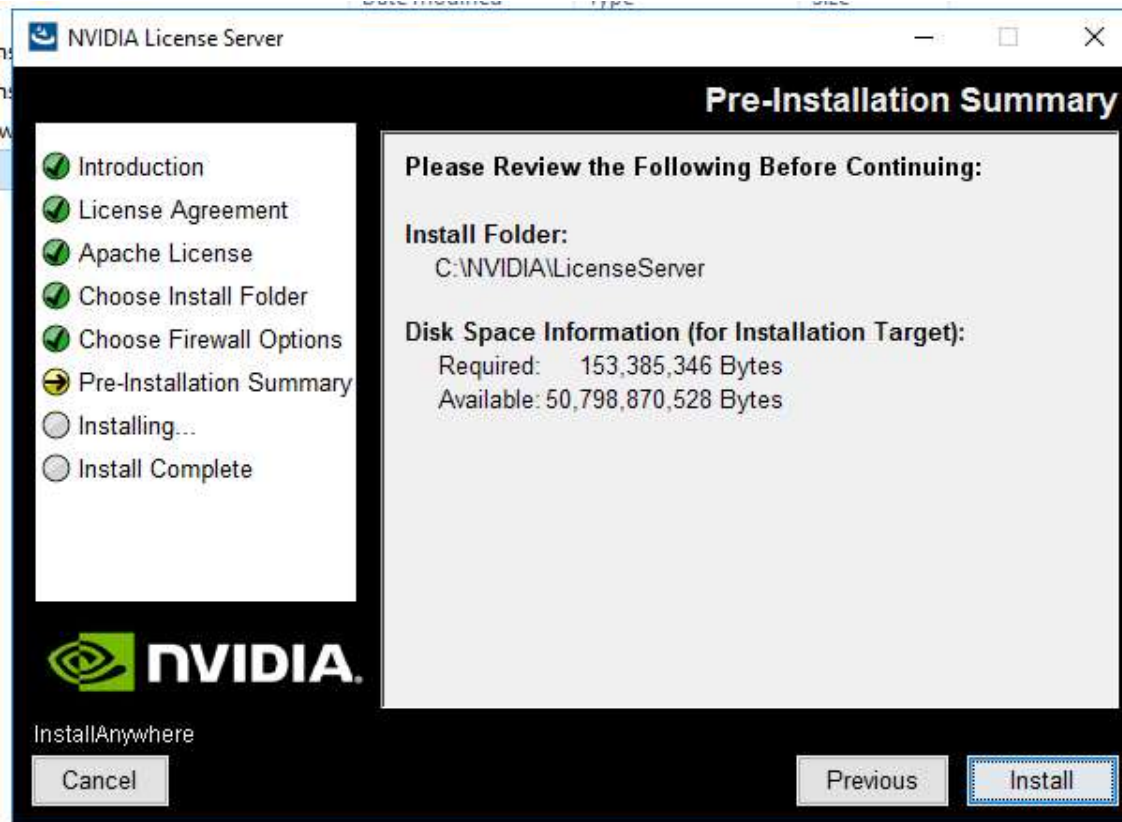
NVIDIA License Server Installation on a VM

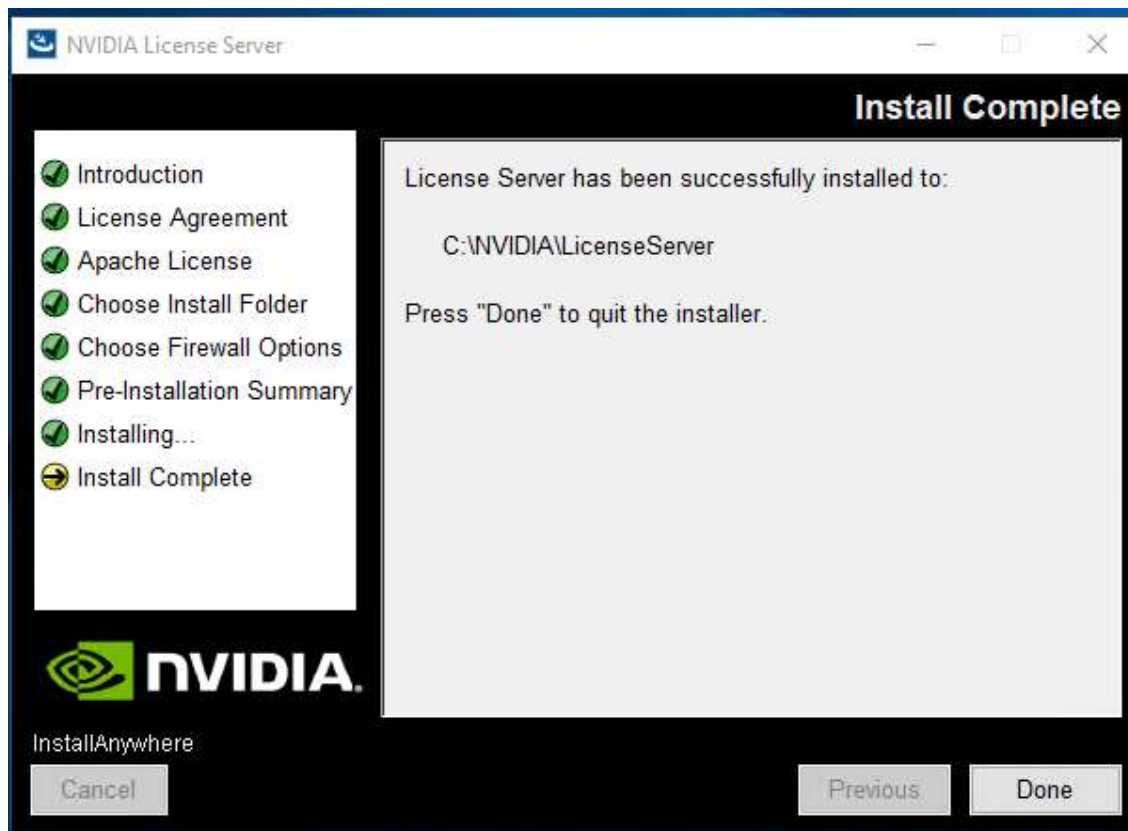
- Install JRE & JDK
- And set JAVA_HOME environment variable to JRE Path



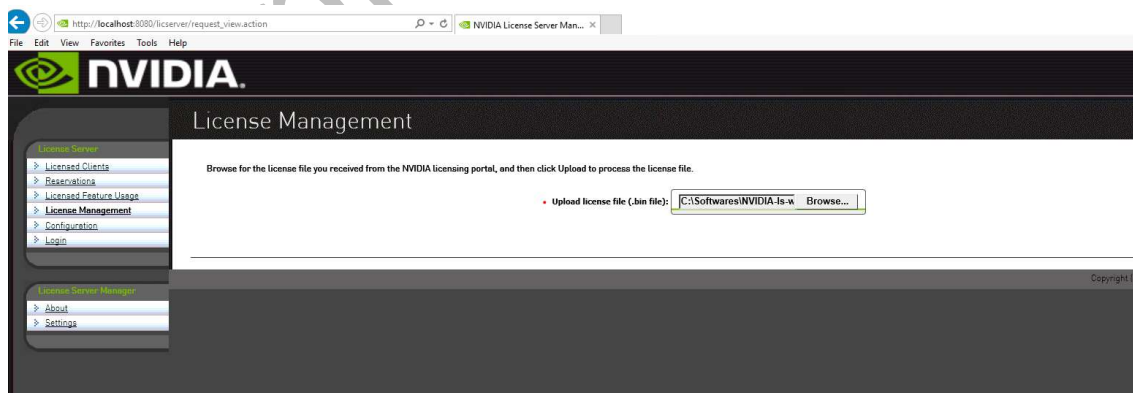


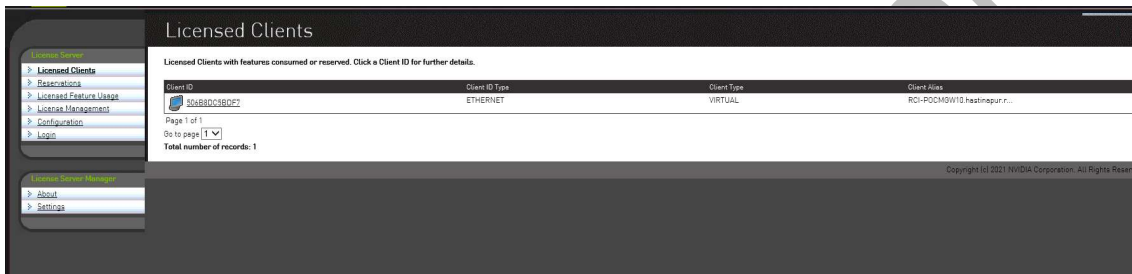
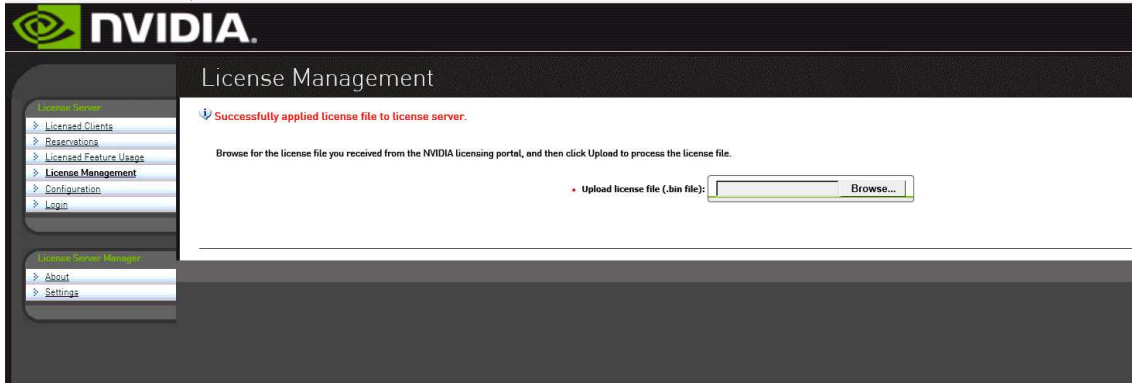




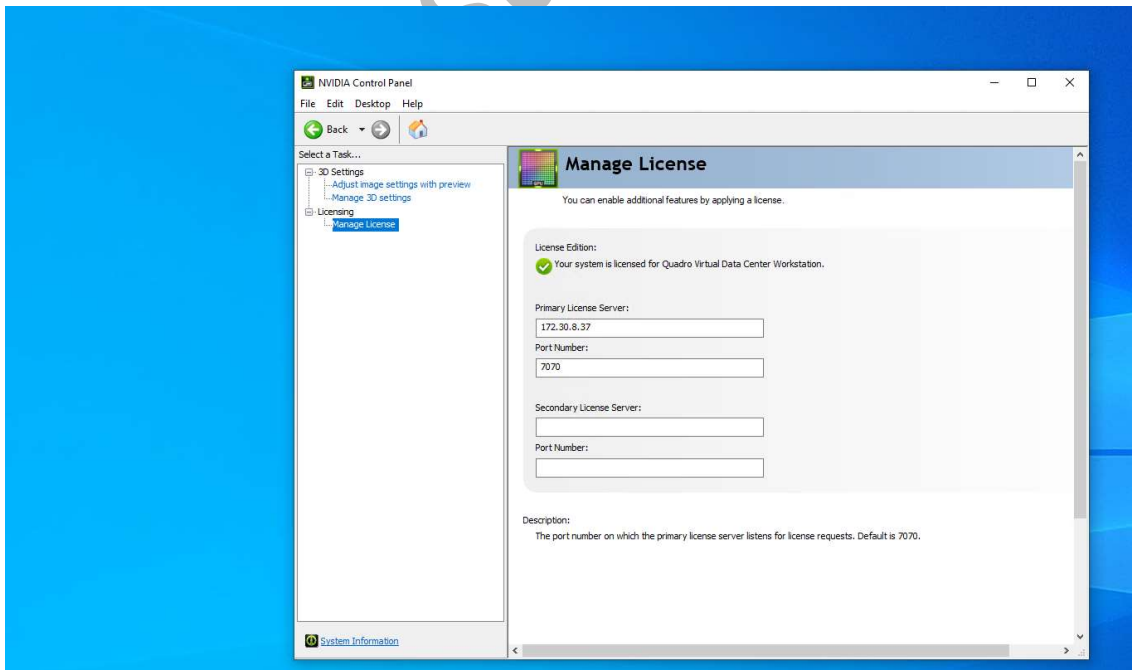


License upload





From Client point(VDI) point to License Server



NVIDIA Drives installation on Hypervisor Host

Implementation Steps:

NVIDIA GRID Virtual GPU Manager for AHV can be installed and upgraded from any Controller VM using the `install_host_package` script. The script, when run on a Controller VM, installs the driver on all the hosts in the cluster.

4. To make the driver available to the script, do one of the following:
 - Copy the RPM package to **any** Controller VM in the cluster on which you want to install the driver.
 - You can copy the RPM package to the `/home/nutanix` directory.
5. Log on to any Controller VM in the cluster with SSH as the nutanix user.(Nutanix/Nutanix/4u)
6. Install Drivers

a. `nutanix@cvm$ install_host_package -r rpm`

Note: Replace `rpm` with the path to the driver on the Controller VM

Verification

```
nutanix@cvm$ hostssh "rpm -qa | grep -i nvidia"
```

or

with NCC Check detects if the NVIDIA driver is missing on any GPU node

```
ncc health_checks hypervisor_checks gpu_driver_installed_check
```

OR

This inspects the output for a table of output containing, amongst other things, the driver version and detected GPU resources.

```
nutanix@cvm$ hostssh nvidia-smi
```

```
nutanix@NTNX-SGH012W6B5-A-CVM:172.30.8.31:~$ hostssh "rpm -qa | grep -i nvidia"
===== 172.30.8.29 =====
nvidia-vgpu-450.124-2.20190916.1.14.e17.x86_64
===== 172.30.8.28 =====
nvidia-vgpu-450.124-2.20190916.1.14.e17.x86_64
===== 172.30.8.27 =====
nvidia-vgpu-450.124-2.20190916.1.14.e17.x86_64
nutanix@NTNX-SGH012W6B5-A-CVM:172.30.8.31:~$
```

```

nutanix@NTNX-SGH012W6B5-A-CVM:172.30.8.31:~$ hostssh nvidia-smi
===== 172.30.8.29 =====
Thu Mar 24 08:33:33 2022
+-----+
| NVIDIA-SMI 450.124      Driver Version: 450.124      CUDA Version: N/A      |
+-----+-----+-----+
| GPU  Name      Persistence-M| Bus-Id      Disp.A      Volatile Uncorr. ECC  |
| Fan  Temp  Perf  Pwr:Usage/Cap|      Memory-Usage      GPU-Util  Compute M.  |
|                                           MIG M.  |
+-----+-----+-----+
|  0  Tesla T4      On      | 00000000:37:00:0  Off      |           0      |
| N/A   63C   P8     21W / 70W      | 75MiB / 15359MiB      0%      Default  |
|                                           N/A      |
+-----+-----+-----+

Processes:
+-----+-----+-----+
| GPU  GI  CI      PID  Type  Process name      GPU Memory  |
|   ID  ID  ID                Usage      |
+-----+-----+-----+
| No running processes found |
+-----+

```

```

===== 172.30.8.28 =====
Thu Mar 24 08:34:02 2022
+-----+
| NVIDIA-SMI 450.124      Driver Version: 450.124      CUDA Version: N/A      |
+-----+-----+-----+
| GPU  Name      Persistence-M| Bus-Id      Disp.A      Volatile Uncorr. ECC  |
| Fan  Temp  Perf  Pwr:Usage/Cap|      Memory-Usage      GPU-Util  Compute M.  |
|                                           MIG M.  |
+-----+-----+-----+
|  0  Tesla T4      On      | 00000000:37:00:0  Off      |           0      |
| N/A   61C   P8     19W / 70W      | 79MiB / 16383MiB      0%      Default  |
|                                           N/A      |
+-----+-----+-----+

Processes:
+-----+-----+-----+
| GPU  GI  CI      PID  Type  Process name      GPU Memory  |
|   ID  ID  ID                Usage      |
+-----+-----+-----+
| No running processes found |
+-----+

```

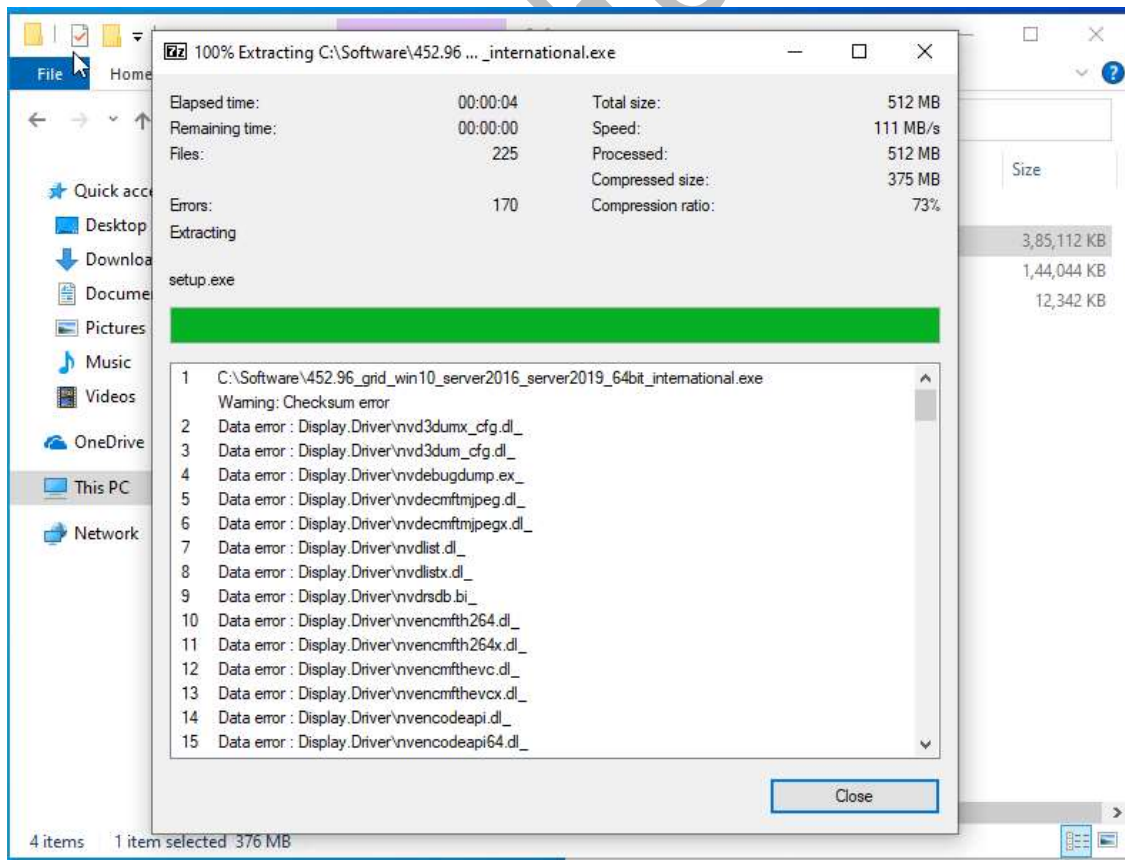


```

===== 172.30.8.27 =====
Thu Mar 24 08:34:45 2022
-----+-----
| NVIDIA-SMI 450.124      Driver Version: 450.124      CUDA Version: N/A      |
|-----+-----+-----|
| GPU   Name      Persistence-M| Bus-Id        Disp.A | Volatile Uncorr. ECC |
| Fan  Temp  Perf  Pwr:Usage/Cap|      Memory-Usage | GPU-Util  Compute M. |
|-----+-----+-----|
| 0    Tesla T4      On          | 00000000:37:00.0 Off  |      0%      Default |
| N/A   53C    P8     18W / 70W | 75MiB / 15359MiB |           | MIG M. |
|-----+-----+-----|
+-----+-----+-----+
| Processes: |
| GPU   GI    CI          PID    Type   Process name                      GPU Memory |
| ID   ID   ID              |                 | Usage     |
|-----+-----+-----|
| No running processes found |
+-----+-----+-----+

```

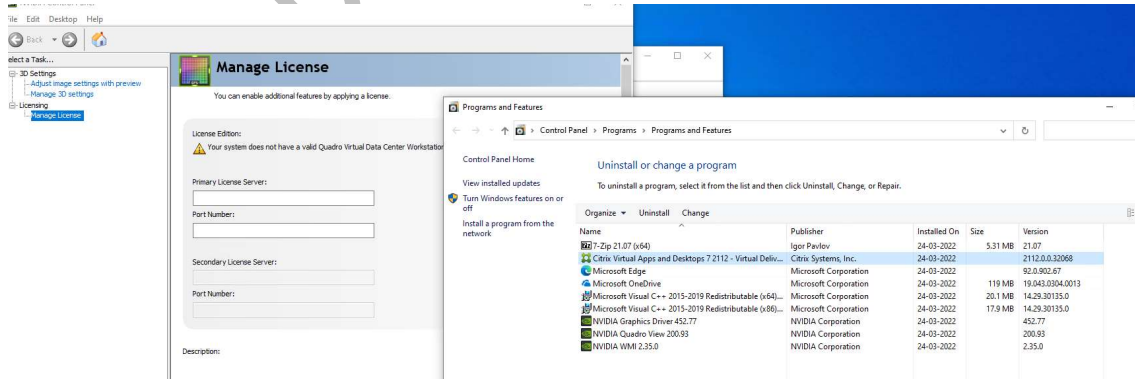
NVIDIA Drivers installation on Guest (VDI)

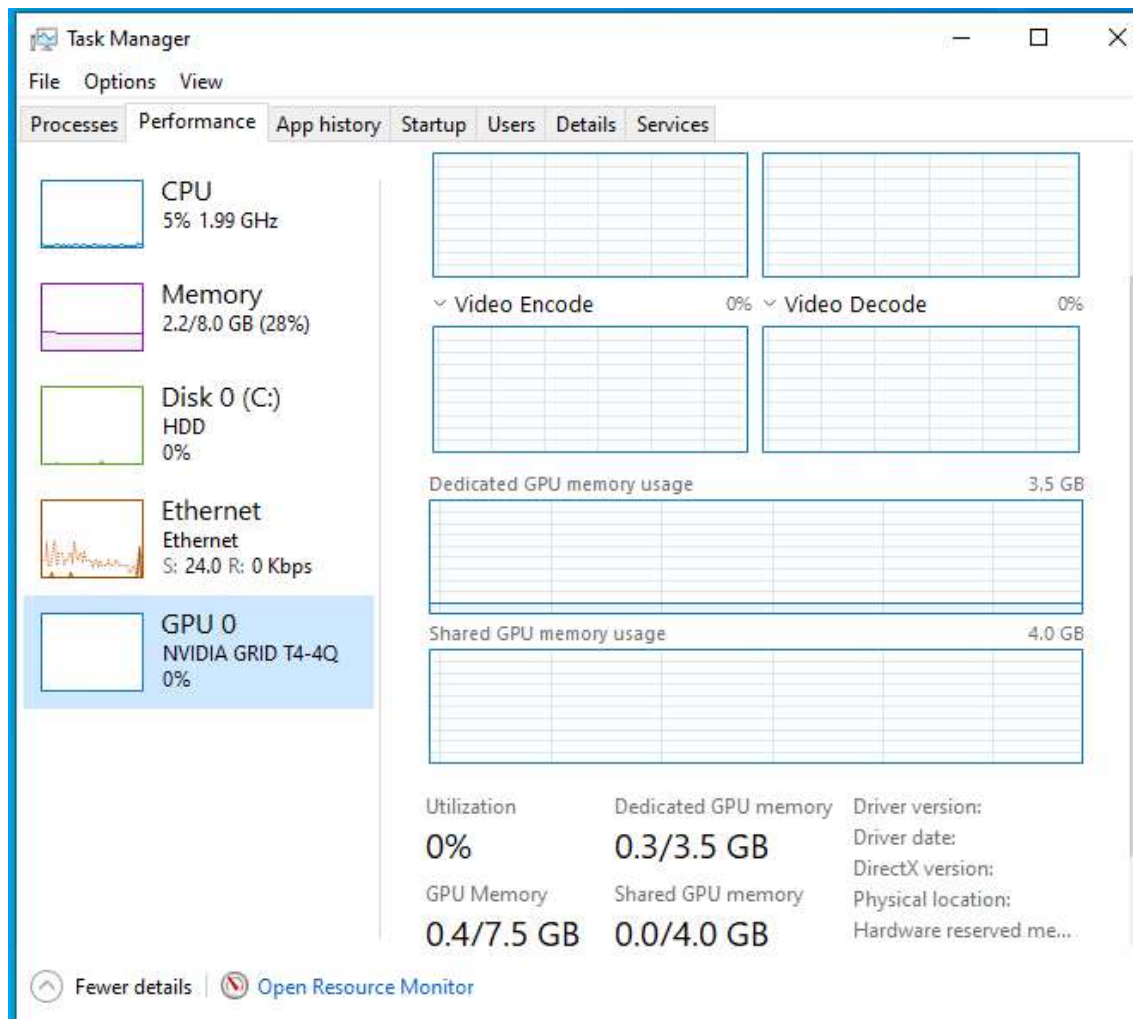


Download Lower Version & installed (NVIDIA-GRID-Linux-KVM-450.102-450.102.04-452.77)



Post Installation





Important Notes & KB References

vGPU

Dedicated GPU (Pass through GPU) assign to single VM which limits scalability

Shared GPU (vGPU) can be shared across all VM's -> 64 users per card (need to check limit for T4)

NVIDIA GRID Virtual GPU Manager -> means it is Host Drivers which will be installed on Hosts(hyperisor)

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Install and upgrade NVIDIA drivers

- The NVIDIA GRID API provides direct access to the frame buffer of the GPU, providing the fastest possible frame rate for a smooth and interactive user

experience. If you install NVIDIA drivers before you install a VDA with HDX 3D Pro, NVIDIA GRID is enabled by default.

- To enable NVIDIA GRID on a VM, disable Microsoft Basic Display Adapter from the Device Manager. Run the following command and then restart the VDA:
NVFBCEnable.exe -enable -noreset
- If you install NVIDIA drivers after you install a VDA with HDX 3D Pro, NVIDIA GRID is disabled. Enable NVIDIA GRID by using the NVFBCEnable tool provided by NVIDIA.
- **To disable NVIDIA GRID, run the following command and then restart the VDA:**
NVFBCEnable.exe -disable -noreset

<https://docs.citrix.com/en-us/xenapp-and-xendesktop/7-15-ltsr/graphics/hdx-3d-pro/gpu-acceleration-desktop.html>

=====

<https://discussions.citrix.com/topic/410107-nvidia-gpu-not-used-as-primary-display-driver-on-passthrough-mode/>

Q: Nvidia GPU not used as primary display driver on passthrough mode

Do you have the licensing from NVIDIA installed on a license server and the service registered with your VM(s)? Are the drivers properly installed on your host? What do you get if you run nvidia-smi from the CLI on your XenServer/Citrix Hypervisor host? You won't be able to run it without properly installed and configured licensing.

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Installing and Upgrading NVIDIA GRID Virtual GPU Manager (Host Driver) -Good

<https://portal.nutanix.com/page/documents/details?targetId=NVIDIA-Grid-Host-Driver-For-AHV-Install-Guide:nvi-nvidia-grid-vgpu-host-drivers-install-t.html>

NVIDIA GRID Host Driver for AHV Installation Guide

<https://portal.nutanix.com/page/documents/details?targetId=NVIDIA-Grid-Host-Driver-For-AHV-Install-Guide:NVIDIA-Grid-Host-Driver-For-AHV-Install-Guide>

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VIRTUAL GPU SOFTWARE EVALUATION - Free 90 Days Trial

<https://www.nvidia.com/en-us/data-center/resources/vgpu-evaluation/>

List of Certified Hardware from NVIDIA

<https://www.nvidia.com/en-us/data-center/resources/vgpu-certified-servers/>

=====
VIRTUAL GPU SOFTWARE

<https://docs.nvidia.com/grid/10.0/grid-vgpu-release-notes-nutanix-ahv/index.html>

Good for Tesla Details

<https://docs.nvidia.com/grid/13.0/grid-vgpu-user-guide/index.html>

Getting your NVIDIA® Virtual GPU Software Version -Good

<https://docs.nvidia.com/grid/get-grid-version.html>

=====
GPU ACCELERATED VDI DEPLOYMENTS WITH NVIDIA AND NUTANIX - Very Good

<https://www.nvidia.com/en-us/data-center/nutanix/>

=====
HDX 3D Pro GPU Support and Deployment Considerations -Good

<https://support.citrix.com/article/CTX131385>

=====
NVIDIA GRID Virtual GPU Support on AHV

https://portal.nutanix.com/page/documents/details?targetId=AHV-Admin-Guide-v6_1:ahv-nvidia-grid-vgpu-support-on-ahv-c.html

=====
The Prism web console does not support console access for VMs that are configured with a vGPU

https://portal.nutanix.com/page/documents/details?targetId=AHV-Admin-Guide-v6_1:ahv-nvidia-grid-vgpu-support-on-ahv-c.html

vGPU VMs may not power on after AHV 20190916.x upgrade

<https://portal.nutanix.com/page/documents/kbs/details?targetId=kA00e000000bsLmCAI>

From AOS 5.18.1 with NVIDIA Virtual GPU software 10.1 (440.53) on, you can live-migrate vGPU-supported VMs.

<https://portal.nutanix.com/page/documents/solutions/details?targetId=TN-2046-vGPU-on-Nutanix:TN-2046-vGPU-on-Nutanix>

AHV-compatible host and guest drivers and GRID software for AOS versions 5.15.4 and on are available on the Nutanix portal under Downloads > AHV > NVIDIA downloads.

rampurasadtech.com