

Virtual GPU Software

Quick Start Guide

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About this Guide

Virtual GPU Software Quick Start Guide provides minimal instructions for installing and configuring NVIDIA[®] vGPU software on the XenServer or VMware vSphere hypervisor and for installing and configuring a Cloud License Service (CLS) instance or a standalone Delegated License Service (DLS) instance. The instructions for configuring a DLS instance assume that the VM that hosts the DLS instance has been assigned an IP address automatically.

If you need complete instructions for installing and configuring NVIDIA vGPU software or are using other platforms, refer to <u>Virtual GPU Software User Guide</u>.

If you are hosting a DLS instance on a VM that has not been assigned an IP address automatically, or require high availability for a DLS instance, refer to <u>NVIDIA License</u> <u>System User Guide</u>.

Chapter 1. Getting NVIDIA vGPU Software

After your order for NVIDIA vGPU software is processed, you will receive an order confirmation message from NVIDIA. This message contains information that you need for getting NVIDIA vGPU software and technical support from NVIDIA.

To get NVIDIA vGPU software and technical support from NVIDIA, you must have an NVIDIA Enterprise Account, which provides login access to the following NVIDIA web properties:

- ► **NVIDIA Licensing Portal**, which provides access to your entitlements, software downloads, and options for managing your NVIDIA vGPU software license servers
- NVIDIA Enterprise Support Portal, which provides access to NVIDIA vGPU software support services

These web properties can be reached from the NVIDIA Application Hub.

To activate the accounts for getting NVIDIA vGPU Software, create or link to an NVIDIA Enterprise Account:

- Creating your NVIDIA Enterprise Account
- Linking an Evaluation Account to an NVIDIA Enterprise Account for Purchased Licenses

1.1. Before You Begin

Before following the procedures in this guide, ensure that the following prerequisites are met:

- You have a server platform that is capable of hosting your chosen hypervisor and NVIDIA GPUs that support NVIDIA vGPU software. For a list of validated server platforms, refer to <u>NVIDIA GRID Certified Servers</u>.
- One or more NVIDIA GPUs that support NVIDIA vGPU software is installed in your server platform.
- A supported virtualization software stack is installed according to the instructions in the software vendor's documentation.
- A virtual machine (VM) running a supported Windows guest operating system (OS) is configured in your chosen hypervisor.

> You have a valid NVIDIA software subscription.

For information about supported hardware and software, and any known issues for this release of NVIDIA vGPU software, refer to the *Release Notes* for your chosen hypervisor:

- Virtual GPU Software for XenServer Release Notes
- Virtual GPU Software for VMware vSphere Release Notes

1.2. Your Order Confirmation Message

After your order for NVIDIA vGPU software is processed, you will receive an order confirmation message to which your NVIDIA Entitlement Certificate is attached. Your NVIDIA Entitlement Certificate contains your product activation keys and provides instructions for using the certificate.

If you are a data center administrator, follow the instructions in the NVIDIA Entitlement Certificate to use the certificate. Otherwise, forward your order confirmation message, including the attached NVIDIA Entitlement Certificate, to a data center administrator in your organization.

1.3. NVIDIA Enterprise Account Requirements

To get NVIDIA vGPU software, you must have a suitable NVIDIA Enterprise Account for getting NVIDIA vGPU software and technical support from NVIDIA.

Note: For a Support, Upgrade, and Maintenance Subscription (SUMS) renewal, you should already have a suitable NVIDIA Enterprise Account and this requirement should already be met. However, if you have an account that was created for an evaluation license and you want to access licenses that you purchased, you must repeat the registration process.

Whether or not you have a suitable NVIDIA Enterprise Account depends on whether you have previously purchased NVIDIA vGPU software.

 If you have previously purchased NVIDIA vGPU software, you already have a suitable NVIDIA Enterprise Account.

To use this account to get NVIDIA vGPU software, follow the **Login** link in the instructions for using the certificate to log in to the <u>NVIDIA Application Hub</u>, go to the NVIDIA Licensing Portal, and download your NVIDIA vGPU software. For details, refer to <u>Downloading NVIDIA vGPU Software</u>.

If you have obtained an evaluation license but have not previously purchased NVIDIA vGPU software, you do **not** have a suitable NVIDIA Enterprise Account.

To create a suitable NVIDIA Enterprise Account, follow the **Register** link in the instructions for using the certificate to create an account for your **purchased** licenses.

You can choose to create a separate account for your purchased licenses or link your existing account for an evaluation license to the account for your purchased licenses.

- ► To create a separate account for your purchased licenses, follow the instructions in <u>Creating your NVIDIA Enterprise Account</u>, specifying a different e-mail address than the address with which you created your existing account.
- ► To link your existing account for an evaluation license to the account for your purchased licenses, follow the instructions in <u>Linking an Evaluation Account to an NVIDIA Enterprise Account for Purchased Licenses</u>, specifying the e-mail address with which you created your existing account.
- If you have not previously purchased NVIDIA vGPU software, you do not have a suitable NVIDIA Enterprise Account.

To create a suitable NVIDIA Enterprise Account, follow the **Register** link in the instructions for using the certificate to create your account. For details, refer to <u>Creating your NVIDIA Enterprise Account</u>.

1.4. Creating your NVIDIA Enterprise Account

If you do not have an NVIDIA Enterprise Account, you must create an account to be able to log in to the web properties for getting NVIDIA vGPU software and technical support from NVIDIA.

For details of these web properties, refer to Getting NVIDIA vGPU Software.

If you already have an account, skip this task and go to <u>Downloading NVIDIA vGPU</u> <u>Software</u>.

However, if you have an account that was created for an evaluation license and you want to access licenses that you purchased, you must repeat the registration process when you receive your purchased licenses. You can choose to create a separate account for your purchased licenses or link your existing account for an evaluation license to the account for your purchased licenses.

- To create a separate account for your purchased licenses, perform this task, specifying a different e-mail address than the address with which you created your existing account.
- To link your existing account for an evaluation license to the account for your purchased licenses, follow the instructions in <u>Linking an Evaluation Account to an</u> <u>NVIDIA Enterprise Account for Purchased Licenses</u>, specifying the e-mail address with which you created your existing account.

Before you begin, ensure that you have your order confirmation message.

1. In the instructions for using your NVIDIA Entitlement Certificate, follow the **Register** link.

2. Fill out the form on the **NVIDIA Enterprise Account Registration** page and click **REGISTER**.

A message confirming that an account has been created appears. An e-mail instructing you to log in to your account on the <u>NVIDIA Application Hub</u> is sent to the e-mail address you provided.

- 3. Open the e-mail instructing you to log in to your account and click Log In.
- 4. On the **NVIDIA Application Hub Login** page that opens, in the text-entry field, type the e-mail address you provided and click **Sign In**.
- On the Create Your Account page that opens, provide and confirm a password for the account and click Create Account.
 A message prompting you to verify your e-mail address appears. An e-mail instructing you to verify your e-mail address is sent to the e-mail address you provided.
- 6. Open the e-mail instructing you to verify your e-mail address and click **Verify Email Address**.

A message confirming that your email address is confirmed appears.

From the <u>NVIDIA Application Hub</u> page, you can now log in to the web properties that are listed in <u>Getting NVIDIA vGPU Software</u>.

1.5. Linking an Evaluation Account to an NVIDIA Enterprise Account for Purchased Licenses

If you have an account that was created for an evaluation license, you must repeat the registration process when you receive your purchased licenses. To link your existing account for an evaluation license to the account for your purchased licenses, register for an NVIDIA Enterprise Account with the e-mail address with which you created your existing account.

If you want to create a separate account for your purchased licenses, follow the instructions in <u>Creating your NVIDIA Enterprise Account</u>, specifying a different e-mail address than the address with which you created your existing account.

- 1. In the instructions for using the NVIDIA Entitlement Certificate **for your purchased licenses**, follow the **Register** link.
- 2. Fill out the form on the **NVIDIA Enterprise Account Registration** page, specifying the e-mail address with which you created your existing account, and click **Register**.

NVIDIA Enterprise Account Registration	
Peace nginte mith you coyante mui abhea. I' shawan nginten (cirk. I' you med positione des highistich give ann a' Sharaman ann ann ann ann ann ann ann ann ann	
Entitlement	
PAK ID Extilement ID Inclusion	
Primary Contact	
* Email Address	
* Claiming Entitiement as: Select an Option •	
Primary Contact Details	
*Location: Select a Location •	
* Street 1:	
Street 2:	
* City:	
* Postal Code/Zio Code:	
* Phone:	
* Job Role: Select an Option 🔹	

3. When a message stating that your e-mail address is already linked to an evaluation account is displayed, click **LINK TO NEW ACCOUNT**.

Your email ID is already linked to an EVAL account in our systems. Do you want to link your credentials to the new account? By clicking on "Link to new account", your existing EVAL entitlements will be merged into this new account. Clicking on "Cancel Registration" will retain your EVAL entitlements linked to your existing email ID and you can register for a new account using a different email ID
Cancel Registration

Log in to the NVIDIA Licensing Portal with the credentials for your existing account.

1.6. Downloading NVIDIA vGPU Software

Before you begin, ensure that you have your order confirmation message and have created an NVIDIA Enterprise Account.

- 1. Visit the <u>NVIDIA Application Hub</u> by following the **Login** link in the instructions for using your NVIDIA Entitlement Certificate or when prompted after setting the password for your NVIDIA Enterprise Account.
- 2. When prompted, provide your e-mail address and password, and click **LOGIN**.
- 3. On the NVIDIA APPLICATION HUB page that opens, click NVIDIA LICENSING PORTAL.

The NVIDIA Licensing Portal dashboard page opens.



Note: Your entitlement might not appear on the NVIDIA Licensing Portal dashboard page until 24 business hours after you set your password during the initial registration process.

- 4. In the left navigation pane of the NVIDIA Licensing Portal dashboard page, click **ENTITLEMENTS** to view details of the NVIDIA vGPU software entitlements that you purchased.
- 5. In the left navigation pane of the NVIDIA Licensing Portal dashboard page, click **SOFTWARE DOWNLOADS**.
- 6. On the **Software Downloads** page that opens, download the software that you need for your NVIDIA vGPU software deployment.

For an NVIDIA vGPU software deployment, you need at minimum the NVIDIA vGPU software release for your hypervisor that you want, for example, NVIDIA vGPU for vSphere 8.0.0 for NVIDIA vGPU software release 18.3.

You might also need additional software for your deployment, for example:

- If your system does not allow the installation of apps from the Microsoft Store, you need the standalone NVIDIA Control Panel installer.
- If you are using Delegated License Service (DLS) instances to serve licenses, you need the NLS License Server (DLS) for the platform on which you want to deploy the DLS.

For information about installing and configuring DLS instances, refer to <u>NVIDIA</u> <u>License System User Guide</u>.

▶ If you want to use NVIDIA GPU Operator, you need the vGPU Driver Catalog.

Find and download each software item that you need as follows:

- a). Filter and sort the items in the table to find the software item.
- b). In the row in the table for the software item, click **Download**.
- c). When prompted to accept the license for the software item that you are downloading, click **Agree and Download**.

Chapter 2. Installing Your NVIDIA vGPU Software License Server and License Files

The NVIDIA License System is used to serve a pool of floating licenses to licensed NVIDIA software products. The NVIDIA License System is configured with licenses obtained from the NVIDIA Licensing Portal.

Note: These instructions cover only the configuration of a Cloud License Service (CLS) instance or a standalone Delegated License Service (DLS) instance. The instructions for configuring a DLS instance assume that the VM that hosts the DLS instance has been assigned an IP address automatically. If you need complete instructions, are hosting a DLS instance on a VM that has not been assigned an IP address automatically, or require high availability for a DLS instance, refer to <u>NVIDIA License System User Guide</u>.

2.1. Introduction to NVIDIA Software Licensing

To activate licensed functionalities, a licensed client must obtain a software license when it is booted.

A client with a network connection obtains a license by leasing it from a NVIDIA License System service instance. The service instance serves the license to the client over the network from a pool of floating licenses obtained from the NVIDIA Licensing Portal. The license is returned to the service instance when the licensed client no longer requires the license.

2.2. Configuring a CLS Instance

A Cloud License Service (CLS) instance is hosted on the NVIDIA Licensing Portal.

2.2.1. Creating a License Server on the NVIDIA Licensing Portal

To be able to allot licenses to an NVIDIA License System instance, you must create at least one license server on the NVIDIA Licensing Portal. Creating a license server defines the set of licenses to be allotted.

- 1. In the NVIDIA Licensing Portal, navigate to the organization or virtual group for which you want to create the license server.
 - a). If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
 - b). **Optional:** If your assigned roles give you access to multiple virtual groups, click **View settings** at the top right of the page and in the **My Info** window that opens, select the virtual group from the **Virtual Group** drop-down list, and close the **My Info** window.

If no license servers have been created for your organization or virtual group, the NVIDIA Licensing Portal dashboard displays a message asking if you want to create a license server.

2. In the left navigation pane of the NVIDIA Licensing Portal dashboard, expand **LICENSE SERVER** and click **CREATE SERVER**. The Create License Server wizard is started.



The Create License Server wizard opens.

Create License Server ⑦ Help? Create a license server in <u>NVIDIA INFR-GEN (lic-0011w000027i5yiqay</u>) / <u>Group NVIDIA INFR-GEN (5468)</u>	
STEP 1 STEP 2 STEP 3 STEP 4 REVIEW	Server Summary Step 1 - Identification
Step 1 - Identification Choose a unique name for this license server. You may optionally provide a description. Name	(No name) (No description) Step 2 - Features
Enter a name for this license server Description	(No features selected) Step 3 - Environment
Enter a description for this license server	(not selected) Step 4 - Configuration

- 3. On the Create License Server page of the wizard, step through the configuration requirements to provide the details of your license server.
 - a). **Step 1 Identification**: In the **Name** field, enter your choice of name for the license server and in the **Description** field, enter a text description of the license server.

The description is required and will be displayed on the details page for the license server that you are creating.

- b). **Step 2 Features**: Select one or more available features from your entitlements to allot to this license server.
- c). Step 3 Environment: Select Cloud (CLS) or On-Premises (DLS) to install this license server.

To make the selection after the license server has been created, select the **Deferred** option.

d). **Step 4 – Configuration**: From the **Leasing mode** drop-down list, select one of the following leasing modes:

Standard Networked Licensing

Select this mode to simplify the management of licenses on a license server that supports networked licensing. In this mode, no additional configuration of the licenses on the server is required.

Advanced Networked Licensing

Select this mode if you require control over the management of licenses on a license server that supports networked licensing. This mode requires additional configuration to create license pools and fulfillment conditions on the server.

Node-Locked Licensing

Select this mode **only** if the license server will serve clients that cannot obtain a license from a remote license server over a network connection. In this mode,

the clients obtain a node-locked license from a file installed locally on the client system.

<u>.</u>

CAUTION: This mode requires additional work to create the license file to be installed locally and to return licenses when the client is shut down. If this mode is set, the mode of the license server **cannot** be changed.

- e). Click **REVIEW SUMMARY** to review the configuration summary before creating the license server.
- 4. On the Create License Server page, from the **Step 4 Configuration** menu, click the **CREATE SERVER** option to create this license server.

Alternatively, you can click **CREATE SERVER** on the Server Summary page.

2.2.2. Creating a CLS Instance on the NVIDIA Licensing Portal

When you create a CLS instance, the instance is automatically registered with the NVIDIA Licensing Portal. This task is only necessary if you are not using the default CLS instance.

- 1. If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
- 2. In the left navigation pane of the NVIDIA Licensing Portal dashboard, click **SERVICE INSTANCES**.



3. On the Service Instances page, from the **Actions** menu, choose **Create cloud (CLS) instance**.

The Create cloud (CLS) instance pop-up window opens.

- 4. Provide the details of your cloud service instance.
 - a). In the **Name** field, enter your choice of name for the service instance.
 - b). In the **Description** field, enter a text description of the service instance. This description is required and will be displayed on the **Service Instances** page when the entry for service instance that you are creating is expanding.
- 5. Click **CREATE CLS INSTANCE**.

2.2.3. Binding a License Server to a Service Instance

Binding a license server to a service instance ensures that licenses on the server are available only from that service instance. As a result, the licenses are available only to the licensed clients that are served by the service instance to which the license server is bound.

1. In the NVIDIA Licensing Portal, navigate to the organization or virtual group to which the **license server** belongs.

- a). If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
- b). **Optional:** If your assigned roles give you access to multiple virtual groups, click **View settings** at the top right of the page and in the **My Info** window that opens, select the virtual group from the **Virtual Group** drop-down list, and close the **My Info** window.
- 2. In the left navigation pane of the NVIDIA Licensing Portal dashboard, expand **LICENSE SERVERS** and click **LIST SERVERS**.
- 3. In the list of license servers on the **License Servers** page that opens, from the **Actions** menu for the license server, choose **Bind**.
- In the Bind Service Instance pop-up window that opens, select the service instance to which you want to bind the license server and click BIND. The Bind Service Instance pop-up window confirms that the license server has been bound to the service instance.

2.2.4. Installing a License Server on a CLS Instance

This task is necessary only if you are not using the default CLS instance.

- 1. In the NVIDIA Licensing Portal, navigate to the organization or virtual group for which you want to install the license server.
 - a). If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
 - b). Optional: If your assigned roles give you access to multiple virtual groups, click View settings at the top right of the page and in the My Info window that opens, select the virtual group from the Virtual Group drop-down list, and close the My Info window.
- 2. In the left navigation pane of the NVIDIA Licensing Portal dashboard, expand LICENSE SERVER and click LIST SERVERS.
- 3. In the list of license servers on the **License Servers** page that opens, click the name of the license server that you want to install.
- 4. In the License Server Details page that opens, from the Actions menu, choose Install.
- 5. In the Install License Server pop-up window that opens, click INSTALL SERVER.

2.2.5. Generating a Client Configuration Token for a CLS Instance

- 1. Log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
- 2. If your assigned roles give you access to multiple virtual groups, select the virtual group for which you are managing licenses from the list of virtual groups at the top right of the NVIDIA Licensing Portal dashboard.
- 3. In the left navigation pane, click **SERVICE INSTANCES**.



- 4. On the Service Instances page that opens, from the **Actions** menu for the CLS instance for which you want to generate a client configuration token, choose **Generate client configuration token**.
- 5. In the **Generate Client Configuration Token** pop-up window that opens, select the references that you want to include in the client configuration token.
 - a). From the list of scope references, select the scope references that you want to include.

	Generate Client Configuration Token Create a configuration token for client access to server resources				
	Scope references Fulfillment class references				
l	\sum Search scope references				
n	$\blacksquare \qquad \text{SERVER NAME } \bigtriangledown \diamondsuit \qquad \qquad \text{REFERENCE } \bigtriangledown \diamondsuit $				
	Example_DLS				
	$<\!\!<$ < (1 - 1 of 1 scope references) 1 of 1 pages $>$ >>	>			
		EN			

You must select **at least one** scope reference.

Each scope reference specifies the license server that will fulfil a license request.

b). **Optional:** Click the **Fulfillment class references** tab, and from the list of fulfillment class references, select the fulfillment class references that you want to include.

Gene Create a	erate Client	Configuration T	oken ×
Scope	e references	ulfillment class reference	S
γs	earch class references		
		$\overrightarrow{\gamma}$ \diamondsuit server name $\overrightarrow{\gamma}$ \diamondsuit	Reference \bigtriangledown
	HighPriority	Example_DLS	
		< 🛛 < (1 - 1 of 1 class r	references) 1 of 1 pages $>$ $>>$
			D CLIENT CONFIGURATION TOKEN

Including fulfillment class references is optional.

- c). **Optional:** In the **Expiration** section, select an expiration date for the client configuration token. If you do not select a date, the default token expiration time is 12 years.
- d). Click DOWNLOAD CLIENT CONFIGURATION TOKEN.

A file named client_configuration_token_mm-dd-yyyy-hh-mm-ss.tok is saved to your default downloads folder.

After creating a client configuration token from a service instance, copy the client configuration token to each licensed client that you want to use the combination of license servers and fulfillment conditions specified in the token. For more information, see <u>Configuring a Licensed Client</u>.

2.3. Configuring a DLS Instance

A Delegated License Service (DLS) instance is hosted on-premises at a location that is accessible from your private network, such as inside your data center.

Before configuring a DLS instance, ensure that the DLS appliance is installed in a suitable VM or deployed in a suitable container on a bare-metal OS as explained in <u>Installing and</u> <u>Configuring the DLS Virtual Appliance</u> in *NVIDIA License System User Guide*.

2.3.1. Registering the DLS Administrator User

Each DLS virtual appliance is configured with a user account specifically for administering the DLS. This account provides access through a web-based management interface to the **NVIDIA Licensing** application on the appliance. Before administering a DLS virtual appliance, you must register this user to be able to access this management interface.

1. Open a web browser and connect to the URL https://dls-vm-ip-address.

dls-vm-ip-address

The IP address or, if defined, the fully qualified domain name or the CNAME of the VM on which the DLS virtual appliance is installed.

You can get the IP address from the management console of your hypervisor.

- 2. On the **Set Up** page that opens, click **NEW INSTALLATION**.
- 3. On the **Register User** page that opens, provide the credentials for the DLS administrator user.

Note: If the DLS administrator user has already been registered, the login page opens instead of the **Register User** page.

- a). **Optional:** If you want to change the user name from the preset name **dls_admin**, replace the text in the **Username** field with your choice of user name.
- b). Provide a password for the DLS administrator user and confirm the password.

The password must be at least eight characters long and is case sensitive.

Note: You can change the DLS administrator user name and password at any time after the DLS administrator user is registered.

- 4. Determine whether you want to enable an additional user that will be able to access the log files for the DLS virtual appliance.
 - If you want to enable this additional user, ensure that the Create a diagnostic user option remains selected.
 - Otherwise, deselect the **Create a diagnostic user** option.

5. Click **REGISTER**.

The **Register User** page is refreshed to confirm that the user has been registered and displays a local reset secret to enable you to reset the user's password.

- Copy the local reset secret and store it securely, for example, by clicking the clipboard icon and pasting the local reset secret into a plain text file that is readable only by you. You will need this key to reset the DLS administrator user's password.
- 7. Click **CONTINUE TO LOGIN**.
- 8. On the login page that opens, type the user name of the DLS administrator user, provide the password that you set for this user, and click **LOGIN**.

2.3.2. Configuring a Standalone DLS Instance

A standalone DLS instance must be registered before it can be used.

Ensure that the following prerequisites are met:

- The DLS virtual appliance that will host the instance has been installed and started.
- The DLS administrator user has been registered on the virtual appliance that will host the DLS instance.
- The DLS instance has **not** been configured as a member of a highly available (HA) cluster of DLS instances.
- 1. Log in to the DLS virtual appliance that will host the DLS instance.
- 2. In the left navigation pane, click **SERVICE INSTANCE**.
- 3. On the **Service Instance** page that opens, under **Node Configuration**, ensure that the **Enable High Availability** option is **not** set.
- 4. Click **CREATE STANDALONE** to start the configuration and wait for it to complete. The **Service Instance** page displays the progress of the standalone DLS instance configuration.

When the configuration is complete, the **Service Instance** page is updated to show the node health of the standalone DLS instance.

2.3.3. Changing the Name and Description of a DLS Instance

By default, a DLS instance is created with the name <code>DEFAULT_timestamp</code> and the description <code>on_PREM_SERVICE_INSTANCE</code>. To distinguish a DLS instance on the NVIDIA Licensing Portal when multiple DLS instances are configured, change these defaults to a meaningful name and the description.

Perform this task from the DLS virtual appliance.

- 1. Log in to the DLS virtual appliance that is hosting the instance whose name and description you want to change.
- 2. In the left navigation pane of the **NVIDIA Licensing** dashboard, click **SERVICE INSTANCE**.
- 3. On the Service Instance page that opens, click EDIT.
- 4. In the **Edit Service Instance** dialog box that opens, type your choice of name and description for the instance and click **UPDATE**.



Note: The instance name cannot contain special characters.

The name and description of the instance are updated on the Service Instance page.

2.3.4. Creating a License Server on the NVIDIA Licensing Portal

To be able to allot licenses to an NVIDIA License System instance, you must create at least one license server on the NVIDIA Licensing Portal. Creating a license server defines the set of licenses to be allotted.

- 1. In the NVIDIA Licensing Portal, navigate to the organization or virtual group for which you want to create the license server.
 - a). If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
 - b). **Optional:** If your assigned roles give you access to multiple virtual groups, click **View settings** at the top right of the page and in the **My Info** window that opens, select the virtual group from the **Virtual Group** drop-down list, and close the **My Info** window.

If no license servers have been created for your organization or virtual group, the NVIDIA Licensing Portal dashboard displays a message asking if you want to create a license server.

2. In the left navigation pane of the NVIDIA Licensing Portal dashboard, expand **LICENSE SERVER** and click **CREATE SERVER**. The Create License Server wizard is started.



The Create License Server wizard opens.

Create License Server ③ нер? Create a license server in <u>NVIDIA INFR-GEN (lic-0011w00002715yiqay</u>) / Group <u>NVIDIA INFR-GEN (5468)</u>	
STEP 1 STEP 2 STEP 3 STEP 4 REVIEW	Server Summary Step 1 - Identification
Step 1 - Identification Choose a unique name for this license server. You may optionally provide a description. Name	(No name) (No description) Step 2 - Features
Enter a name for this license server	(No features selected)
Description	Step 3 - Environment
Enter a description for this license server	(not selected) Step 4 - Configuration CREATE SERVER
	NEXT STEP

- 3. On the Create License Server page of the wizard, step through the configuration requirements to provide the details of your license server.
 - a). **Step 1 Identification**: In the **Name** field, enter your choice of name for the license server and in the **Description** field, enter a text description of the license server.

The description is required and will be displayed on the details page for the license server that you are creating.

- b). **Step 2 Features**: Select one or more available features from your entitlements to allot to this license server.
- c). Step 3 Environment: Select Cloud (CLS) or On-Premises (DLS) to install this license server.

To make the selection after the license server has been created, select the **Deferred** option.

d). **Step 4 – Configuration**: From the **Leasing mode** drop-down list, select one of the following leasing modes:

Standard Networked Licensing

Select this mode to simplify the management of licenses on a license server that supports networked licensing. In this mode, no additional configuration of the licenses on the server is required.

Advanced Networked Licensing

Select this mode if you require control over the management of licenses on a license server that supports networked licensing. This mode requires additional configuration to create license pools and fulfillment conditions on the server.

Node-Locked Licensing

Select this mode **only** if the license server will serve clients that cannot obtain a license from a remote license server over a network connection. In this mode,

the clients obtain a node-locked license from a file installed locally on the client system.

4

CAUTION: This mode requires additional work to create the license file to be installed locally and to return licenses when the client is shut down. If this mode is set, the mode of the license server **cannot** be changed.

- e). Click **REVIEW SUMMARY** to review the configuration summary before creating the license server.
- 4. On the Create License Server page, from the **Step 4 Configuration** menu, click the **CREATE SERVER** option to create this license server.

Alternatively, you can click **CREATE SERVER** on the Server Summary page.

2.3.5. Registering an on-Premises DLS Instance with the NVIDIA Licensing Portal

A DLS instance is created automatically when the virtual appliance on which the instance resides is installed. However, to enable the instance to be bound to a license server, you must register the instance with the NVIDIA Licensing Portal.

Registering an on-premises DLS instance with the NVIDIA Licensing Portal involves the exchange of a **DLS instance token** between the instance and the NVIDIA Licensing Portal.

A DLS instance token is created by a DLS instance. It identifies the DLS instance to the NVIDIA Licensing Portal and enables it to locate the NVIDIA Licensing Portal. After downloading the token from the DLS instance, you must upload it to the NVIDIA Licensing Portal to complete the registration of the service instance.

- 1. If you are not already logged in, log in to the **NVIDIA Licensing** application at the IP address of the VM on which the DLS virtual appliance is installed.
- 2. In the left navigation pane of the **NVIDIA Licensing** dashboard, click **SERVICE INSTANCE**.
- 3. On the **Service Instance Details** page that opens, from the **ACTIONS** menu, choose **Download DLS Instance Token**.

A DLS instance token file that is named

dls_instance_token_mm-dd-yyyy-hh-mm-ss.tok is downloaded.

- 4. In the NVIDIA Licensing Portal, navigate to the organization or virtual group for which you are registering the service instance.
 - a). If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
 - b). **Optional:** If your assigned roles give you access to multiple virtual groups, click **View settings** at the top right of the page and in the **My Info** window that opens, select the virtual group from the **Virtual Group** drop-down list, and close the **My Info** window.
- 5. On Service Instances page that opens, from the Actions menu, choose Register DLS Instance.

6. In the **Register DLS Instance** window that opens, select the **New installation** option and click **SELECT INSTANCE TOKEN**.



- 7. In the file browser that opens, navigate to the folder that contains the DLS instance token file that is named dls_instance_token_mm-dd-yyyy-hh-mm-ss.tok that you downloaded and select the file.
- 8. Back in the **Register DLS Instance** window, click **UPLOAD TOKEN**. The service instance is added to the list of registered service instances.

2.3.6. Binding a License Server to a Service Instance

Binding a license server to a service instance ensures that licenses on the server are available only from that service instance. As a result, the licenses are available only to the licensed clients that are served by the service instance to which the license server is bound.

- 1. In the NVIDIA Licensing Portal, navigate to the organization or virtual group to which the **license server** belongs.
 - a). If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
 - b). Optional: If your assigned roles give you access to multiple virtual groups, click View settings at the top right of the page and in the My Info window that opens, select the virtual group from the Virtual Group drop-down list, and close the My Info window.

- 2. In the left navigation pane of the NVIDIA Licensing Portal dashboard, expand **LICENSE SERVERS** and click **LIST SERVERS**.
- 3. In the list of license servers on the **License Servers** page that opens, from the **Actions** menu for the license server, choose **Bind**.
- In the Bind Service Instance pop-up window that opens, select the service instance to which you want to bind the license server and click BIND. The Bind Service Instance pop-up window confirms that the license server has been bound to the service instance.

2.3.7. Installing a License Server on a DLS Instance

- 1. In the NVIDIA Licensing Portal, navigate to the organization or virtual group for which the license server was created.
 - a). If you are not already logged in, log in to the <u>NVIDIA Application Hub</u> and click **NVIDIA LICENSING PORTAL** to go to the NVIDIA Licensing Portal.
 - b). **Optional:** If your assigned roles give you access to multiple virtual groups, click **View settings** at the top right of the page and in the My Info window that opens, select the virtual group from the **Virtual Group** drop-down list, and close the **My Info** window.
- 2. In the left navigation pane of the NVIDIA Licensing Portal dashboard, expand LICENSE SERVER and click LIST SERVERS.
- 3. In the list of license servers on the License Servers page that opens, click the name of the license server that you want to install.
- 4. In the **License Server Details** page that opens, from the **Actions** menu, choose **Download**.
- 5. In the **Download License File** window that opens, click **Download**. A license server file that is named license_mm-dd-yyyy-hh-mm-ss.bin is downloaded.
- 6. If you are not already logged in, log in to the NVIDIA Licensing application at the IP address of the VM on which the DLS virtual appliance is installed. After you log in, the information that is displayed on the NVIDIA Licensing dashboard depends on whether a license server has already been installed on the DLS virtual appliance.
 - If a license server has not been installed on the DLS virtual appliance, the NVIDIA Licensing dashboard displays a message asking if you want to install a license server.
 - Otherwise, the NVIDIA Licensing dashboard displays the License Server Details page for the installed license server.
- 7. Install or update the license server on the DLS virtual appliance.

Whether you install or update the license server depends on whether a license server has already been installed on the DLS virtual appliance.

If a license server has not been installed on the DLS virtual appliance, on the NVIDIA Licensing dashboard, click SELECT LICENSE SERVER FILE.

Dashboard Complete basic setup	
Service instance not registered	No license server installed
This service instance has not yet been registered with the NVIDIA Licensing Portal	Select the license server bin file downloaded from the NVIDIA Licensing Portal
Download DLS Instance Token	Install server

- If a license server has already been installed on the DLS virtual appliance, update the license server.
 - a). From the **ACTIONS** menu for the license server, choose **Update server from NLP**.
 - b). In the **Update License Server** pop-up window that opens, click **SELECT LICENSE SERVER FILE**.

Update License Server Add new features or replace the license server by upload downloaded from NVIDIA Licensing Portal.	ing a new license server .bin file,
Select the license server bin file downloaded from the N	IVIDIA Licensing Portal
if you install a license server different from the currently inst server will get replaced.	alled license server, the existing license
riangle SELECT LICENSE SERVER FILE	INSTALL SERVER UPDATE

- 8. In the file browser that opens, navigate to the folder that contains the license server file named license_mm-dd-yyyy-hh-mm-ss.bin that you downloaded and select the file.
- 9. When asked if you want to install the selected file, click **INSTALL**.

NVIDIA Licensing dashboard is updated with the details of the license server that you installed.

2.3.8. Generating a Client Configuration Token for a DLS Instance

- 1. If you are not already logged in, log in to the **NVIDIA Licensing** application at the IP address of the VM on which the DLS instance resides.
- 2. In the left navigation pane, click **SERVICE INSTANCE**.
- 3. On the **Service Instance** page that opens, from the **Actions** menu for the DLS instance for which you want to generate a client configuration token, choose **Generate client configuration token**.

Service Instance Detail Manage the DLS service instance and customize to your e	S				ONS
Example_DLS					
Id:	Type: DLS State:	Registered Create	d: Jan 18, 2022 4:57 AM	Modified: Jan 20, 2022 3:46 PM	
Description: Example DLS to show features a	nd procedures to config	uring an on-premise NI	S appliance.		
High availability: Standalone 🖫 Configure hig	h availability				
💭 Primary Node Health					iss
Domain name:	IPv4 address:	IPv6 address	not assigned		
Critical services: O Active 🖓 Restart Othe	er services: 🥑 Active 🗧	Restart			

- 4. In the **Generate Client Configuration Token** pop-up window that opens, select the references that you want to include in the client configuration token.
 - a). Click the **Scope references** tab, and from the list of scope references, select the scope references that you want to include.

	Generate Client Configuration Token				
ł	Scope references Fulfillment class references				
ŀ	γ Search scope references				
1	SERVER NAME \bigtriangledown \diamondsuit REFERENCE \bigtriangledown \diamondsuit				
	Example_DLS				
l	$<\!\!<$ < (1 - 1 of 1 scope references) 1 of 1 pages $>$ $>$	>			
		EN			

You must select **at least one** scope reference.

Each scope reference specifies the license server that will fulfil a license request.

b). **Optional:** Click the **Fulfillment class references** tab, and from the list of fulfillment class references, select the fulfillment class references that you want to include.

Generate Client Configuration Token Create a configuration token for client access to server resources						
Scope references Fulfilln	nent class references					
CONDITION NAME \bigtriangledown	Server name $~\bigtriangledown~~\diamondsuit$	reference \bigtriangledown				
HighPriority	Example_DLS					
	(1 - 1 of 1 class ref	ferences) 1 of 1 pages $>$ >>				
		CLIENT CONFIGURATION TOKEN				

Including fulfillment class references is optional.

c). Optional: If you want the service instance, or each node in an HA cluster of instances, to be identified through its IP address, click the Server address preferences tab and select the address for the IP version that you want: IPv6 or IP v4.

By default, a service instance, or each node in an HA cluster of instances, is identified through its fully qualified domain name.

Server address preferences	Scope references	Fulfillment class references
ollowing address selections will be incl	uded in the client configuration	n token and will be used by the clients to connect to
ne license server.		
📮 Primary Node		
Primary Node FQDN () 🔘 IPv6 (not assigned) () IPv4 (
Primary Node FQDN Secondary Node) 🔘 IPv6 (not assigned) (IPv4 (

d). **Optional:** In the **Expiration** section, select an expiration date for the client configuration token. If you do not select a date, the default token expiration time is 12 years.

e). Click DOWNLOAD CLIENT CONFIGURATION TOKEN.

A file named client_configuration_token_mm-dd-yyyy-hh-mm-ss.tok is saved to your default downloads folder.

After creating a client configuration token from a service instance, copy the client configuration token to each licensed client that you want to use the combination of license servers and fulfillment conditions specified in the token. For more information, see <u>Configuring a Licensed Client</u>.

You can decouple the leasing port from the UI port for auth and lease operations. Once you have done so, you can block the UI port for the client VM.

Note: For backward compatibility, leasing operations will still be supported by the default HTTPS port (443) in the VM version.

- ▶ All UI and leasing operations will be supported on the default HTTPS port, 443.
- Only leasing operations will be supported on the leasing port, 8082.

Chapter 3. Installing and Configuring NVIDIA vGPU Manager and the Guest Driver

Before installing and configuring NVIDIA vGPU Manager and the guest driver, ensure that a VM running a supported Windows guest OS is configured in your chosen hypervisor.

The factory settings of some supported GPU boards are incompatible with NVIDIA vGPU software. Before configuring NVIDIA vGPU software on these GPU boards, you must configure the boards to change these settings.

3.1. Switching the Mode of a GPU that Supports Multiple Display Modes

Some GPUs support display-off and display-enabled modes but must be used in NVIDIA vGPU software deployments in display-off mode.

The GPUs listed in the following table support multiple display modes. As shown in the table, some GPUs are supplied from the factory in display-off mode, but other GPUs are supplied in a display-enabled mode.

GPU	Mode as Supplied from the Factory
NVIDIA A40	Display-off
NVIDIA L40	Display-off
NVIDIA L40S	Display-off
NVIDIA L20	Display-off
NVIDIA L20 liquid cooled	Display-off
NVIDIA RTX 5000 Ada	Display enabled
NVIDIA RTX 6000 Ada	Display enabled
NVIDIA RTX A5000	Display enabled
NVIDIA RTX A5500	Display enabled
NVIDIA RTX A6000	Display enabled

A GPU that is supplied from the factory in display-off mode, such as the NVIDIA A40 GPU, might be in a display-enabled mode if its mode has previously been changed.

To change the mode of a GPU that supports multiple display modes, use the displaymodeselector tool, which you can request from the <u>NVIDIA Display Mode</u> <u>Selector Tool</u> page on the NVIDIA Developer website.

Note: Only the GPUs listed in the table support the displaymodeselector tool. Other GPUs that support NVIDIA vGPU software do not support the displaymodeselector tool and, unless otherwise stated, do not require display mode switching.

3.2. Installing the NVIDIA Virtual GPU Manager

Before guests enabled for NVIDIA vGPU can be configured, the NVIDIA Virtual GPU Manager must be installed in your chosen hypervisor. The process for installing the NVIDIA Virtual GPU Manager depends on the hypervisor that you are using.

If you need more detailed instructions, refer to the appropriate NVIDIA vGPU installation guide.

3.2.1. Installing the NVIDIA Virtual GPU Manager on VMware vSphere

The NVIDIA Virtual GPU Manager runs on the ESXi host. It is distributed as a number of software components in a ZIP archive.

The NVIDIA Virtual GPU Manager software components are as follows:

- A software component for the NVIDIA vGPU hypervisor host driver
- A software component for the NVIDIA GPU Management daemon

Before you begin, ensure that the following prerequisites are met:

- The ZIP archive that contains NVIDIA vGPU software has been downloaded from the NVIDIA Licensing Portal.
- The software components for the NVIDIA Virtual GPU Manager have been extracted from the downloaded ZIP archive.
- 1. Copy the NVIDIA Virtual GPU Manager component files to the ESXi host.
- 2. Put the ESXi host into maintenance mode.
 \$ esxcli system maintenanceMode set --enable true
- 3. Install the NVIDIA vGPU hypervisor host driver and the NVIDIA GPU Management daemon from their software component files.
 - a). Run the esxcli command to install the NVIDIA vGPU hypervisor host driver from its software component file.

\$ esxcli software vib install -d /vmfs/volumes/datastore/host-driver-component.zip

b). Run the esxcli command to install the NVIDIA GPU Management daemon from its software component file.

\$ esxcli software vib install -d /vmfs/volumes/datastore/gpu-management-daemoncomponent.zip

datastore

The name of the VMFS datastore to which you copied the software components.

host-driver-component

The name of the file that contains the NVIDIA vGPU hypervisor host driver in the form of a software component. Ensure that you specify the file that was extracted from the downloaded ZIP archive. For example, for VMware vSphere 8.0.0, *host-driver-component* is NVD-VMware-x86_64-570.158.02-10EM.800.1.0.20613240-bundle-build-number.

gpu-management-daemon-component

The name of the file that contains the NVIDIA GPU Management daemon in the form of a software component. Ensure that you specify the file that was extracted from the downloaded ZIP archive. For example, for VMware vSphere 8.0.0, *gpu-management-daemon-component* is VMW-esx-8.0.0-nvd-gpu-mgmt-daemon-1.0-0.0001.

4. Exit maintenance mode.

\$ esxcli system maintenanceMode set --enable false

5. Reboot the ESXi host.

\$ reboot

- 6. Verify that the NVIDIA GPU Management daemon has started.
 - \$ /etc/init.d/nvdGpuMgmtDaemon status
- 7. Verify that the NVIDIA kernel driver can successfully communicate with the physical GPUs in your system by running the nvidia-smi command without any options.
 \$ nvidia-smi

If successful, the nvidia-smi command lists all the GPUs in your system.

3.2.2. Installing the NVIDIA Virtual GPU Manager on XenServer

The NVIDIA Virtual GPU Manager for XenServer is distributed as an RPM Package Manager (RPM) file. It runs in the XenServer Control Domain (dom0) shell.

- 1. Copy the NVIDIA Virtual GPU Manager RPM file to the XenServer dom0 shell.
- 2. Run the rpm command to install the package. [root@xenserver ~] # rpm -iv NVIDIA-**.rpm
- Reboot the XenServer platform.
 [root@xenserver ~] # shutdown -r now
- 4. After the XenServer host has rebooted, verify the installation of the NVIDIA Virtual GPU Manager package for XenServer by checking for the NVIDIA kernel driver in the list of kernel-loaded modules.

```
[root@xenserver ~]# lsmod |grep nvidia
nvidia 8152994 0
i2c_core 20294 2 nvidia,i2c_
```

3.3. Disabling and Enabling ECC Memory

Some GPUs that support NVIDIA vGPU software support error correcting code (ECC) memory with NVIDIA vGPU. ECC memory improves data integrity by detecting and handling double-bit errors. However, not all GPUs, vGPU types, and hypervisor software versions support ECC memory with NVIDIA vGPU.

On GPUs that support ECC memory with NVIDIA vGPU, ECC memory is supported with Cseries and Q-series vGPUs, but not with A-series and B-series vGPUs. Although A-series and B-series vGPUs start on physical GPUs on which ECC memory is enabled, enabling ECC with vGPUs that do not support it might incur some costs.

On physical GPUs that do not have HBM2 memory, the amount of frame buffer that is usable by vGPUs is reduced. All types of vGPU are affected, not just vGPUs that support ECC memory.

The effects of enabling ECC memory on a physical GPU are as follows:

- ▶ ECC memory is exposed as a feature on all supported vGPUs on the physical GPU.
- ▶ In VMs that support ECC memory, ECC memory is enabled, with the option to disable ECC in the VM.
- ECC memory can be enabled or disabled for individual VMs. Enabling or disabling ECC memory in a VM does not affect the amount of frame buffer that is usable by vGPUs.

GPUs based on the Pascal GPU architecture and later GPU architectures support ECC memory with NVIDIA vGPU. To determine whether ECC memory is enabled for a GPU, run **nvidia-smi -q** for the GPU.

Tesla M60 and M6 GPUs support ECC memory when used without GPU virtualization, but NVIDIA vGPU does not support ECC memory with these GPUs. In graphics mode, these GPUs are supplied with ECC memory disabled by default.

Some hypervisor software versions do not support ECC memory with NVIDIA vGPU.

If you are using a hypervisor software version or GPU that does not support ECC memory with NVIDIA vGPU and ECC memory is enabled, NVIDIA vGPU fails to start. In this situation, you must ensure that ECC memory is disabled on all GPUs if you are using NVIDIA vGPU.

3.3.1. Disabling ECC Memory

If ECC memory is unsuitable for your workloads but is enabled on your GPUs, disable it. You must also ensure that ECC memory is disabled on all GPUs if you are using NVIDIA vGPU with a hypervisor software version or a GPU that does not support ECC memory with NVIDIA vGPU. If your hypervisor software version or GPU does not support ECC memory and ECC memory is enabled, NVIDIA vGPU fails to start.

Where to perform this task depends on whether you are changing ECC memory settings for a physical GPU or a vGPU.

- For a physical GPU, perform this task from the hypervisor host.
- For a vGPU, perform this task from the VM to which the vGPU is assigned.

Note: ECC memory must be enabled on the physical GPU on which the vGPUs reside.

Before you begin, ensure that NVIDIA Virtual GPU Manager is installed on your hypervisor. If you are changing ECC memory settings for a vGPU, also ensure that the NVIDIA vGPU software graphics driver is installed in the VM to which the vGPU is assigned.

1. Use nvidia-smi to list the status of all physical GPUs or vGPUs, and check for ECC noted as enabled.

```
# nvidia-smi -q
-----NVSMI LOG-------
Timestamp : Mon Jun 16 18:36:45 2025
Driver Version : 570.158.02
Attached GPUs : 1
GPU 0000:02:00.0
[...]
Ecc Mode
Current : Enabled
Pending : Enabled
```

[...]

- 2. Change the ECC status to off for each GPU for which ECC is enabled.
 - If you want to change the ECC status to off for all GPUs on your host machine or vGPUs assigned to the VM, run this command:
 # nvidia-smi -e 0
 - If you want to change the ECC status to off for a specific GPU or vGPU, run this command:

nvidia-smi -i *id* -e O

id is the index of the GPU or vGPU as reported by nvidia-smi.

This example disables ECC for the GPU with index 0000:02:00.0.

- # nvidia-smi -i 0000:02:00.0 -e 0
- 3. Reboot the host or restart the VM.
- 4. Confirm that ECC is now disabled for the GPU or vGPU.

[...]

3.3.2. Enabling ECC Memory

If ECC memory is suitable for your workloads and is supported by your hypervisor software and GPUs, but is disabled on your GPUs or vGPUs, enable it.

Where to perform this task depends on whether you are changing ECC memory settings for a physical GPU or a vGPU.

- For a physical GPU, perform this task from the hypervisor host.
- For a vGPU, perform this task from the VM to which the vGPU is assigned.

Note: ECC memory must be enabled on the physical GPU on which the vGPUs reside.

Before you begin, ensure that NVIDIA Virtual GPU Manager is installed on your hypervisor. If you are changing ECC memory settings for a vGPU, also ensure that the NVIDIA vGPU software graphics driver is installed in the VM to which the vGPU is assigned.

1. Use nvidia-smi to list the status of all physical GPUs or vGPUs, and check for ECC noted as disabled.

```
# nvidia-smi -q
-----NVSMI LOG-------
Timestamp : Mon Jun 16 18:36:45 2025
Driver Version : 570.158.02
Attached GPUs : 1
GPU 0000:02:00.0
[...]
Ecc Mode
Current : Disabled
Pending : Disabled
```

- 2. Change the ECC status to on for each GPU or vGPU for which ECC is enabled.
 - If you want to change the ECC status to on for all GPUs on your host machine or vGPUs assigned to the VM, run this command:

```
# nvidia-smi -e 1
```

If you want to change the ECC status to on for a specific GPU or vGPU, run this command:

```
# nvidia-smi -i id -e 1
```

id is the index of the GPU or vGPU as reported by nvidia-smi.

This example enables ECC for the GPU with index 0000:02:00.0.

```
# nvidia-smi -i 0000:02:00.0 -e 1
```

- 3. Reboot the host or restart the VM.
- 4. Confirm that ECC is now enabled for the GPU or vGPU.

```
# nvidia−smi −q
```

^[...]

====NVSMI LOG======	=
Timestamp Driver Version	: Mon Jun 16 18:37:53 2025 : 570.158.02
Attached GPUs GPU 0000:02:00.0 []	: 1
Ecc Mode Current Pending	: Enabled : Enabled

3.4. Attaching an NVIDIA vGPU Profile to a VM

To attach an NVIDIA vGPU profile to a virtual machine (VM), you must configure the VM hardware. The process for attaching an NVIDIA vGPU profile to a VM depends on the hypervisor that you are using.

3.4.1. Changing the Default Graphics Type in VMware vSphere

After the vGPU Manager VIB for VMware vSphere VIB is installed, the default graphics type is Shared. To enable vGPU support for VMs in VMware vSphere, you must change the default graphics type to Shared Direct.

If you do not change the default graphics type, VMs to which a vGPU is assigned fail to start and the following error message is displayed:

```
The amount of graphics resource available in the parent resource pool is insufficient for the operation.
```

Note: Change the default graphics type **before** configuring vGPU. Output from the VM console in the VMware vSphere Web Client is not available for VMs that are running vGPU.

Before changing the default graphics type, ensure that the ESXi host is running and that all VMs on the host are powered off.

- 1. Log in to vCenter Server by using the vSphere Web Client.
- 2. In the navigation tree, select your ESXi host and click the **Configure** tab.
- 3. From the menu, choose **Graphics** and then click the **Host Graphics** tab.
- 4. On the Host Graphics tab, click Edit.

vm ware [®] vSphere	Web Client ↑ = ℃ Administrator@PSG-HOME.LOCAL - Help -
Navigator I	📴 192.168.11.30 🛛 🥵 📴 🕼 🧔 🥸 Actions 👻 🗮
Back	Getting Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks
Navigator ● Back ● 192.168.11.6 ● 192.168.11.20 ● 192.168.11.30	I 192.168.11.30 Image: Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started Summary Monitor Image: Configure Permissions VMs Resource Pools Datastores Networks Image: Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started Summary Monitor Configure Permissions VMs Resource Pools Datastores Networks Image: Cetting Started St
	→ Hardware
	Memory
	Graphics Power Management PCI Devices ✓ Virtual Flash
•	

5. In the **Edit Host Graphics Settings** dialog box that opens, select **Shared Direct** and click **OK**.

192.168.11.30 - Edit Host Graphics Settings	?
A Settings will take effect after restarting the host or "xorg" service.	
 Shared VMware shared virtual graphics 	
 Shared Direct Vendor shared passthrough graphics 	
 Shared passthrough GPU assignment policy: Spread VMs across GPUs (best performance) Group VMs on GPU until full (GPU consolidation) 	
ОК	Cancel

After you click OK, the default graphics type changes to Shared Direct.

VMs associated with the graphics device "NVIDIATesia M60"

6. Click the **Graphics Devices** tab to verify the configured type of each physical GPU on which you want to configure vGPU.

The configured type of each physical GPU must be Shared Direct. For any physical GPU for which the configured type is Shared, change the configured type as follows: a). On the **Graphics Devices** tab, select the physical GPU and click the **Edit icon**.

etting started Summary Monito	or 0	Configure Permissions VMs F	tesource Pools Datastores Networks	Update Manager		
Time Configuration	•	Host Graphics Graphics Device Graphics Devices	\$			
Certificate		1				Q Filter
Power Management		Name	Vendor	Active Type	Configured Type	Memory
Advanced System Settings		NVIDIATesla M60	NVIDIA Corporation	Shared	Shared	7.98 GB
System Resource Reservation		NVIDIATesla M60	NVIDIA Corporation	Shared	Shared	7.99 GB
Security Profile						
System Swan						
oyeren enap						

b). In the **Edit Graphics Device Settings** dialog box that opens, select **Shared Direct** and click **OK**.

Processors

📡 🔍 Filter

•

Getting Started Summary Monitor	Configure Pe	ermissions VMs F	Resource Pools Datastores	Networks Update Manager			
**	Host Graphic	Graphics Device	28				
Authentication Services	Graphics Dev	ices					
Power Management	/						Q Filter
Advanced System Settings	Name		Vendor	Active Type	Configure	d Type	Memory
System Resource Reservation	NVIDIATesia	M60	NVIDIA Corporation	Shared	Shared		7.98 GB
Security Profile	NVIDIATesla	M60	NVIDIA Corporation	Shared	Shared		7.98 GB
System Swap							
Host Profile							
	MA O Find	NVIDIATesia M60 -	Edit Graphics Device Setting	js	?		2 items 🗳 Export - 🏠 Cop
Processors		A			_		
Memory	VMs associat	Settings will ta	ike effect after restarting the no	st or "xorg" service.			
Graphics		 Shared VMware sha 	red virtual graphics				😨 🛛 Q Filter
Power Management	Name	Shared Dire	et		Used Space	Host CPU	Host Mem
PCI Devices		Vendor share	ed passthrough graphics				
▼ Virtual Flash							
Virtual Flash Resource Management							
Virtual Flash Host Swap Cache Configuration				OK Cancel			
	84A						Objects 📄 Export 🖺 Cop
• • •							

7. Restart the ESXi host **or** stop and restart the Xorg service if necessary and nvhostengine on the ESXi host.

To stop and restart the Xorg service and nv-hostengine, perform these steps:

a). Stop nv-hostengine.

[root@esxi:~] nv-hostengine -t

- b). Wait for 1 second to allow nv-hostengine to stop.
- c). Start nv-hostengine.
 - [root@esxi:~] nv-hostengine -d
- 8. In the **Graphics Devices** tab of the VMware vCenter Web UI, confirm that the active type and the configured type of each physical GPU are Shared Direct.

Getting Started Summary Monitor	Configure Permissions VMs Res	source Pools Datastores Networks	Update Manager		
 Time Configuration Authentication Services 	Host Graphics Graphics Devices Graphics Devices				
Certificate	/				Q Filter -
Power Management	Name	Vendor	Active Type	Configured Type	Memory
Advanced System Settings	NVIDIATesla M60	NVIDIA Corporation	Shared Direct	Shared Direct	7.98 GB
System Resource Reservation	NVIDIATesla M60	NVIDIA Corporation	Shared Direct	Shared Direct	7.99 GB
Security Profile					
System Swap					
Host Profile					
+ Hardware	Maga (Q. Find -				2 items 📑 Export 👻 🎦 Copy 🗸
Processors	VMs associated with the graphics dev	ice "NVIDIATesla M60"	-		
Memory					
Graphics	📝 🖒 📕 🧐 📇 🖓 Action	18 v			📡 🔍 Filter 👻
	Name	Crate Crater	Denvicionad Conson Licod Conson	Hart CBLL Hart Man	

3.4.2. Configuring a vSphere VM with NVIDIA vGPU

CAUTION: Output from the VM console in the VMware vSphere Web Client is not available for VMs that are running vGPU. Make sure that you have installed an alternate means of accessing the VM (such as Omnissa Horizon or a VNC server) before you configure vGPU.

VM console in vSphere Web Client will become active again once the vGPU parameters are removed from the VM's configuration.

How to configure a vSphere VM with a vGPU depends on your VMware vSphere version as explained in the following topics:

- Configuring a vSphere 8 VM with NVIDIA vGPU
- Configuring a vSphere 7 VM with NVIDIA vGPU

After you have configured a vSphere VM with a vGPU, start the VM. VM console in vSphere Web Client is not supported in this vGPU release. Therefore, use Omnissa Horizon or VNC to access the VM's desktop.

3.4.2.1. Configuring a vSphere 8 VM with NVIDIA vGPU

- 1. Open the vCenter Web UI.
- 2. In the vCenter Web UI, right-click the VM and choose **Edit Settings**.
- 3. In the **Edit Settings** window that opens, configure the vGPUs that you want to add to the VM.

Add each vGPU that you want to add to the VM as follows:

a). From the ADD NEW DEVICE menu, choose PCI Device.

	ADD NEW DEVICE
<u>2 v</u>	Disks, Drives and Storage Hard Disk
8 <u>GB v</u>	Existing Hard Disk
50 GB ~	RDM Disk
VMware Paravirtual	Host USB Device
VM Network ~ Connected	CD/DVD Drive
Datastore ISO File V Connected	Controllers NVMe Controller
Specify custom settings $ \lor $	SATA Controller
AHCI	SCSI Controller
Not Configured	USB Controller Other Devices
Additional Hardware	PCI Device
	Trusted Platform Module
	Watchdog Timer
	Precision Clock
	Serial Port
	2 × 8 × 50 GB × 50 GB × VMware Paravirtual VM Network × Onnected Datastore ISO File × Connected Specify custom settings × AHCI Not Configured Additional Hardware

b). In the **Device Selection** window that opens, select the type of vGPU you want to configure and click **SELECT**.

Note: NVIDIA vGPU software does **not** support vCS on VMware vSphere. Therefore, C-series vGPU types are not available for selection in the **Device Selection** window.



Device Selection

Name T	Access Type	Manufacturer
0000:81:00.0 Starship/Matisse PCIe Dummy Functi	DirectPath IO	Advanced Micro Devices, Inc. [AM.
Starship/Matisse PCIe Dummy Function	Dynamic DirectPath	Advanced Micro Devices, Inc. [AM.
nvidia_a40-1b	NVIDIA GRID VGPU	NVIDIA
nvidia_a40-2b	NVIDIA GRID VGPU	NVIDIA
nvidia_a40-1q	NVIDIA GRID VGPU	NVIDIA
nvidia_a40-2q	NVIDIA GRID VGPU	NVIDIA
		CANCEL
	Name 0000:81:00.0 Starship/Matisse PCle Dummy Function Starship/Matisse PCle Dummy Function nvidia_a40-1b nvidia_a40-2b nvidia_a40-1q nvidia_a40-2q	Name Access Type 0000:81:00.0 Starship/Matisse PCle Dummy Function DirectPath IO Starship/Matisse PCle Dummy Function Dynamic DirectPath I nvidia_a40-1b NVIDIA GRID vGPU nvidia_a40-2b NVIDIA GRID vGPU nvidia_a40-1q NVIDIA GRID vGPU nvidia_a40-2q NVIDIA GRID vGPU

4. Back in the Edit Settings window, click OK.

3.4.2.2. Configuring a vSphere 7 VM with NVIDIA vGPU

If you are adding multiple vGPUs to a single VM, perform this task for each vGPU that you want to add to the VM.

- 1. Open the vCenter Web UI.
- 2. In the vCenter Web UI, right-click the VM and choose Edit Settings.
- 3. Click the Virtual Hardware tab.
- In the New device list, select Shared PCI Device and click Add.
 The PCI device field should be auto-populated with NVIDIA GRID VGPU.

Installing and Configuring NVIDIA vGPU Manager and the Guest Driver

🖶 Win7x86 - Edit Settir	igs						? >
Virtual Hardware VM C)ptions	SDRS Rules	vA	op Options			
▶ 🛄 CPU	1		-	0			
► 🌆 Memory	1024		-	MB .	•		
▶ 🛄 Hard disk 1	24		•	GB	•		
▶ E SCSI controller 0	LSI Log	ic SAS					
Network adapter 1	VM Ne	twork			•	Connect	
▶	Datast	tore ISO File			•	Connect	
▶ Floppy drive 1	Client	Device			•	Connect	
▶ 🛄 Video card	Specif	y custom setting	ļs		•		
	NVIDI	A GRID vGPU		.	•		
GPU Profile	grid_m	n10-4q			•		
	grid_m	10-8q			-	are unavailable when	
	grid_m	n10-8a			ent. You cannot		
	grid_rr	n10-4q					
SATA SATA controller 0	grid_rr	n10-4a					
MCI device	grid_rr	10-2q					
Other Devices	grid_m	110-2a			Ŧ		
The maximum number of	devices	of this type has I	been	reached.			
New device	:	Shared P	CI De	vice	-	Add	
Compatibility: ESXi 6.0 an	d later (\	/M version 11)				ОК Са	ancel

- 5. From the **GPU Profile** drop-down menu, choose the type of vGPU you want to configure and click **OK**.
 - Note: NVIDIA vGPU software does not support vCS on VMware vSphere. Therefore, C-series vGPU types are not available for selection from the GPU Profile drop-down menu.
- 6. Ensure that VMs running vGPU have all their memory reserved:
 - a). Select Edit virtual machine settings from the vCenter Web UI.
 - b). Expand the Memory section and click Reserve all guest memory (All locked).

3.4.3. Configuring a XenServer VM with Virtual GPU

- 1. Ensure the VM is powered off.
- 2. Right-click the VM in XenCenter, select **Properties** to open the VM's properties, and select the **GPU** property.

The available GPU types are listed in the GPU type drop-down list:



After you have configured a XenServer VM with a vGPU, start the VM, either from XenCenter or by using xe vm-start in a dom0 shell. You can view the VM's console in XenCenter.

3.5. Installing the NVIDIA vGPU Software Graphics Driver

After you create a Windows VM on the hypervisor and boot the VM, the VM should boot to a standard Windows desktop in VGA mode at 800×600 resolution. You can use the Windows screen resolution control panel to increase the resolution to other standard resolutions, but to fully enable GPU operation, the NVIDIA vGPU software graphics driver must be installed.

1. Copy the NVIDIA Windows driver package to the guest VM where you are installing the driver.

2. Execute the package to unpack and run the driver installer.



- 3. Click through the license agreement.
- Select Express Installation and click NEXT. After the driver installation is complete, the installer may prompt you to restart the platform.
- 5. If prompted to restart the platform, do one of the following:
 - Select Restart Now to reboot the VM.
 - Exit the installer and reboot the VM when you are ready.

After the VM restarts, it boots to a Windows desktop.

- 6. Verify that the NVIDIA driver is running.
 - a). Right-click on the desktop.
 - b). From the menu that opens, choose NVIDIA Control Panel.
 - c). In the NVIDIA Control Panel, from the Help menu, choose System Information.

NVIDIA Control Panel reports the vGPU that is being used, its capabilities, and the NVIDIA driver version that is loaded.



3.6. Configuring a Licensed Client

A client with a network connection obtains a license by leasing it from a NVIDIA License System service instance. The service instance serves the license to the client over the network from a pool of floating licenses obtained from the NVIDIA Licensing Portal. The license is returned to the service instance when the licensed client no longer requires the license.

The graphics driver creates a default location in which to store the client configuration token on the client.

The process for configuring a licensed client is the same for CLS and DLS instances but depends on the OS that is running on the client.

3.6.1. Configuring a Licensed Client on Windows with Default Settings

Perform this task from the client.

- 1. Copy the client configuration token to the %SystemDrive%\Program Files\NVIDIA Corporation\vGPU Licensing\ClientConfigToken folder.
- 2. Restart the NvDisplayContainer service.

The NVIDIA service on the client should now automatically obtain a license from the CLS or DLS instance.

3.6.2. Verifying the NVIDIA vGPU Software License Status of a Licensed Client

After configuring a client with an NVIDIA vGPU software license, verify the license status by displaying the licensed product name and status.

To verify the license status of a licensed client, run nvidia-smi with the -q or -query optionfrom the licensed client, **not** the hypervisor host. If the product is licensed, the expiration date is shown in the license status.

Timestamp	: Wed Nov 23 10:52:59 2022
Driver Version	: 525.60.06
CUDA Version	: 12.0
Attached GPUs	: 2
GPU 0000000:02:03.0	
Product Name	: NVIDIA A2-8Q
Product Brand	: NVIDIA RTX Virtual Workstation
Product Architecture	: Ampere
Display Mode	: Enabled
Display Active	: Disabled
Persistence Mode	: Enabled
MIG Mode	
Current	: Disabled
Pending	: Disabled
Accounting Mode	: Disabled
Accounting Mode Buffer Size	: 4000
Driver Model	
Current	: N/A
Pending	: N/A
Serial Number	: N/A
GPU UUID	: GPU-ba5b1e9b-1dd3-11b2-be4f-98ef552f4216
Minor Number	: 0
VBIOS Version	: 00.00.00.00
MultiGPU Board	: No
Board ID	: 0x203
Board Part Number	: N/A
GPU Part Number	: 25B6-890-A1
Module ID	: N/A
Inforom Version	
Image Version	: N/A
OEM Object	: N/A
ECC Object	: N/A
Power Management Object	: N/A
GPU Operation Mode	
Current	: N/A
Pending	: N/A
GSP Firmware Version	: N/A
GPU Virtualization Mode	
Virtualization Mode	: VGPU
Host VGPU Mode	: N/A
vGPU Software Licensed Product	
Product Name	: NVIDIA RTX Virtual Workstation
License Status	: Licensed (Expiry: 2022-11-23 10:41:16
GMT)	

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