# DOCUMENT CHANGE HISTORY

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<tr>
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</tbody>
</table>
Chapter 1. Introduction ........................................................................... 1
  1.1 Overview ...................................................................................... 1

Chapter 2. Installation ........................................................................... 3
  2.1 Platform requirements ....................................................................... 3
    2.1.1 Network ports and management interface ................................... 4
  2.2 Installing on Windows ......................................................................... 4
    2.2.1 Installing Java runtime environment ........................................... 4
    2.2.2 License server installation ......................................................... 5
  2.3 Installing on Linux ............................................................................... 8
    2.3.1 Installing Java runtime environment ........................................... 8
    2.3.2 Installing Apache Tomcat ......................................................... 9
    2.3.3 License server installation ......................................................... 10
  2.4 Verifying installation ......................................................................... 11

Chapter 3. Operation .............................................................................. 13
  3.1 Accessing the management interface ................................................ 13
  3.2 Reading the license server’s MAC address ......................................... 13
  3.3 Installing licenses ............................................................................ 14
  3.4 Viewing available licenses .................................................................. 16
    3.4.1 Licensed feature properties ....................................................... 16
    3.4.2 License borrow period ............................................................. 18
  3.5 Viewing license usage ....................................................................... 18

Chapter 4. Troubleshooting .................................................................. 20
  4.1 Log files ........................................................................................ 20
    4.1.1 Changing server log levels ......................................................... 21
  4.2 Management interface connection errors .......................................... 21
    4.2.1 Failure to connect to the management interface .......................... 21
  4.3 License server connection errors ....................................................... 22
  4.4 License upload failures ...................................................................... 24
    4.4.1 License response fails trust criteria ............................................ 24
    4.4.2 Capability response rejected - response time too old .................. 24
    4.4.3 Capability response rejected – update time invalid ..................... 24
LIST OF FIGURES

Figure 1 GRID licensing architecture .............................................................. 2
Figure 2 Java 32-bit runtime installation on Windows ........................................ 5
Figure 3 License agreements ............................................................................ 6
Figure 4 Firewall settings ................................................................................ 7
Figure 5 Completed Windows installation .......................................................... 8
Figure 6 Verifying Apache Tomcat installation ................................................. 9
Figure 7 Firewall settings ................................................................................ 10
Figure 8 Completed Linux installation ............................................................... 11
Figure 9 Management interface ...................................................................... 12
Figure 10 Reading the license server's MAC address ......................................... 14
Figure 11 Selecting a license file ..................................................................... 15
Figure 12 Successful upload of a license file ..................................................... 16
Figure 13 Viewing available licenses ............................................................... 16
Figure 14 Licensed feature usage details .......................................................... 17
Figure 15 Viewing license usage ..................................................................... 18
Figure 16 Licensed client details .................................................................... 19
Figure 17 Changing the license server log level ................................................. 21
Figure 18 Tomcat status in Windows Services Manager ..................................... 22
Figure 19 License server connection error ....................................................... 23
Figure 20 License server status in Windows Services Manager ....................... 23

LIST OF TABLES

Table 1 Licensed feature properties ................................................................. 17
Table 2 Log files .............................................................................................. 20
Chapter 1. INTRODUCTION

NVIDIA GRID™ License Server is used to serve a pool of floating licenses to NVIDIA GRID licensed products. The License Server is designed to be installed locally within a customer’s network, and be configured with licenses obtained from NVIDIA’s Licensing Portal.

This guide describes how to install, configure, and operate NVIDIA GRID License Server.

1.1 OVERVIEW

Certain NVIDIA GRID products, such as GRID vGPU™ and GRID Virtual Workstation, are available as licensed features on NVIDIA Tesla™ GPUs. When enabled on Tesla, these features are activated during OS boot by “borrow” of a software license served over the network from an NVIDIA GRID license server. The license is returned to the license server when the OS shuts down.
The licenses served by the GRID license server are obtained from NVIDIA’s Licensing Portal as downloadable license files, and installed into the license server via its management interface.

The rest of this guide is organized as follows:

- Chapter 2 covers installations of the license server software.
- Chapter 3 describes operation of the server, including installing licenses and monitoring their usage.
- Chapter 4 gives troubleshooting information.

For information on GRID licensed products and how to configure them for use with GRID License Server, refer to the NVIDIA GRID Licensing Guide.
This chapter provides a step-by-step guide on installing NVIDIA License Server.

2.1 PLATFORM REQUIREMENTS

Before proceeding, ensure that you have a platform suitable for hosting the license server:

- The hosting platform may be a physical or virtual machine (VM). **We recommend using a host that is dedicated solely to running the license server.**
- The recommended minimum configuration is 2 CPU cores, 4 gigabytes of RAM. A high-end configuration of 4+ CPU cores with 16 gigabytes of RAM is suitable for handling up to 150k licensed clients.
- The hosting platform must run a supported Windows OS.

**Note:** Consult the License Server Release Notes for details on supported OS and known issues before proceeding with installation.

Additionally:

- The platform must have a fixed (unchanging) IP address. The IP address may be assigned dynamically via DHCP or statically configured, but must be constant.
- The platform must have at least one unchanging Ethernet MAC address, to be used as a unique identifier when registering the server and generating licenses in NVIDIA’s licensing portal.
- The platform’s date/time must be set accurately.
2.1.1 Network ports and management interface

The license server requires TCP port 7070 to be open in the platform’s firewall, in order to serve licenses to clients. By default, the installer will automatically open this port.

The license server’s management interface is web-based, and uses TCP port 8080. The management interface itself does not implement access control; instead, the installer does not open port 8080 by default, so that the management interface is only available to web browsers running locally on the license server host. Access to the management interface is therefore controlled by limiting remote access (via VNC, RDP, etc.) to the license server platform.

![Note: If you choose to open port 8080 during license server installation, or at any time afterwards, the license server’s management interface is unprotected.]

2.2 INSTALLING ON WINDOWS

The license server requires a Java runtime environment which must be installed separately before installing the license server.

2.2.1 Installing Java runtime environment

Prior to running the NVIDIA license server installer, download the current Java 32-bit runtime environment from www.oracle.com and install it.

![Note: Install the 32-bit Java runtime, regardless of whether your platform is Windows 32-bit or 64-bit.]
Installation

![Java 32-bit runtime installation on Windows](image)

**Figure 2** Java 32-bit runtime installation on Windows

2.2.2 License server installation

With Java installed on the platform, unzip the license server installer and run `setup.exe`.

Accept the EULA for the license server software and the Apache Tomcat software used to support the license server’s management interface:
On the Firewall Options dialog (Figure 4), select the ports to be opened in the firewall. We recommend you use the default setting, which opens port 7070 so that remote clients can access licenses from the server, but leaves port 8080 closed, so that the management interface is only available via web browser running locally on the license server host.
After installation has completed successfully, exit the installer and then verify the installation using the steps in section 2.4.

**Figure 4 Firewall settings**
2.3 INSTALLING ON LINUX

The license server requires a Java runtime environment and an Apache Tomcat installation, which must be installed separately before installing the license server.

2.3.1 Installing Java runtime environment

Most Linux distributions install a Java runtime environment by default. Verify that your Linux installation has Java installed:

```
[nvidia@localhost ~]$ java -version
java version "1.7.0_51"
OpenJDK Runtime Environment (rhel-2.4.5.5.el7-x86_64 u51-b31)
OpenJDK 64-Bit Server VM (build 24.51-b03, mixed mode)
[nvidia@localhost ~]$ 
```

If Java is not installed, use your Linux distribution’s package manager to install Java:
2.3.2 Installing Apache Tomcat

The license server’s management interface requires Apache Tomcat. Use your Linux distribution’s package manager to install the `tomcat` and `tomcat-webapps` packages:

```
[nvidia@localhost ~]$ sudo yum install java
```

Once installed, enable the Tomcat service for automatic startup on boot:

```
[nvidia@localhost ~]$ sudo systemctl enable tomcat.service
```

Start the Tomcat service:

```
[nvidia@localhost ~]$ sudo systemctl start tomcat.service
```

Verify the Tomcat service is operational by opening a web browser and open the URL `http://localhost:8080`. The default Tomcat webapp should be displayed, as shown in Figure 6:

![Figure 6 Verifying Apache Tomcat installation](image)
2.3.3 License server installation

Unpack the license server tarball:

[nvidia@localhost ~]$ tar xzf NVIDIA-linux-2015.09-0001.tgz

Run the unpacked setup binary as root:

[nvidia@localhost ~]$ sudo ./setup.bin

Accept the EULA to proceed with installation.

On the Firewall Options dialog (Figure 7), select the ports to be opened in the firewall. We recommend you use the default setting, which opens port 7070 so that remote clients can access licenses from the server, but leaves port 8080 closed, so that the management interface is only available via web browser running locally on the license server host.

![Choose Firewall Options dialog](image)

*Figure 7 Firewall settings*
After installation has completed successfully, exit the installer and then verify the installation using the steps in section 2.4.

![Completed Linux installation](image)

**Figure 8 Completed Linux installation**

## 2.4 VERIFYING INSTALLATION

To verify that the license server is operating correctly, open a web browser on the license server host and connect to URL [http://localhost:8080/licserver](http://localhost:8080/licserver). The browser should display the management interface home page, as shown in Figure 9.
Figure 9 Management interface

If the management interface is not displayed, consult Chapter 4 for troubleshooting steps.
This chapter describes how to install licenses on the license server, and monitor their usage.

### 3.1 ACCESSING THE MANAGEMENT INTERFACE

To access the license server’s management interface, open a web browser on the license server host, and open the URL [http://localhost:8080/licserver](http://localhost:8080/licserver).

If you have configured the license server host’s network firewall to permit remote access to the license server, the license server’s management interface is accessible from remote machines at the URL [http://hostname:8080/licserver](http://hostname:8080/licserver), where **hostname** is the fully-qualified domain name or IP address of the license server host.

### 3.2 READING THE LICENSE SERVER’S MAC ADDRESS

The license server’s Ethernet MAC address is used as a unique identifier when registering the server with NVIDIA’s Licensing Portal, in order to generate license files.

To read the license server’s Ethernet MAC address, select Configuration, to open the license server configuration page, and use the Server host ID drop-down to select the platform’s ETHERNET address from the options available:
Figure 10 Reading the license server’s MAC address

Note: Depending on the server platform you have installed the License Server on, multiple options may be displayed in the Server host ID dropdown. If your platform has multiple Ethernet interfaces, multiple ETHERNET entries may be visible. We recommend selecting one entry that corresponds to a primary / non-removable interface on the platform.

It is important to use the same ETHERNET ID to consistently identify the server when generating licenses on NVIDIA’s Licensing Portal.

3.3 INSTALLING LICENSES

To install a license .bin file downloaded from the NVIDIA licensing portal, select the License Management menu, click on Choose File, and use the file browser to select the .bin file, as shown in Figure 11:
Figure 11 Selecting a license file

Select Open, then select Upload to install the license file on the license server. The license server should confirm successful installation of the license file, as shown in Figure 12:
3.4 VIEWING AVAILABLE LICENSES

Confirm the licenses installed on the server by selecting Licensed Feature Usage:

![Figure 13 Viewing available licenses](image)

3.4.1 Licensed feature properties

For each licensed feature, the following fields are reported:
### Table 1 Licensed feature properties

<table>
<thead>
<tr>
<th>Feature property</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feature</td>
<td>An abbreviated name for the feature.</td>
</tr>
<tr>
<td>Version</td>
<td>The version number associated with the feature.</td>
</tr>
<tr>
<td>Count</td>
<td>The number of licenses for the feature that are currently installed on the license server. Each concurrent user of a feature normally consumes one license.</td>
</tr>
<tr>
<td>Available</td>
<td>The number of licenses for the feature that are currently available to borrow from the server. This number decreases as users borrow licenses from the server, and increases as licenses are returned.</td>
</tr>
<tr>
<td>Expiry</td>
<td>The date on which the right to use the licensed feature expires. If the licenses are perpetual use licenses, they have no expiration date; these are indicated by “permanent” in place of an expiration date.</td>
</tr>
</tbody>
</table>

Clicking on an individual licensed feature provides a summary of current usage of that feature. Figure 14 shows details of GRID-Virtual-WS feature usage, where a single client VM is using the feature:

![Licensed Feature Details](image)

**Figure 14 Licensed feature usage details**

Note that the Expiry date shown for the client is the end of that client’s license **borrow period**, described in the next section.
3.4.2 License borrow period

The license expiry time shown for each licensed client indicates the end of the client’s *borrow period*, and is distinct from the lifetime of the license.

At the end of the borrow period, typically multiple days, a borrowed license is automatically freed by the license server for use by other clients, and becomes unavailable on the licensed client that previously held it. While active, a licensed client *renews* its license periodically to ensure the borrow period does not expire, if it continues to use the license and has ongoing network connectivity to the license server.

3.5 VIEWING LICENSE USAGE

To view information about which licenses are currently “in use” or borrowed from the server, select Licensed Clients. Figure 15 shows an example where three NVIDIA GRID client virtual machines are using GRID-Virtual-WS licenses:

![Figure 15 Viewing license usage](image)

To view detailed information about a single licensed client, click on its Client ID in the Licensed Clients list:
Figure 16 Licensed client details
Chapter 4. TROUBLESHOOTING

This chapter describes common issues that can occur with the license server, and how to troubleshoot them.

Note: Before troubleshooting, review the release notes that accompany each license server release, for information about known issues and potential workarounds.

4.1 LOG FILES

Log files from the installer and license server are in these locations:

<table>
<thead>
<tr>
<th>Host OS</th>
<th>Log</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows</td>
<td>Installer</td>
<td>C:\Program Files (x86)\NVIDIA\License Server\Logs</td>
</tr>
<tr>
<td></td>
<td>License server</td>
<td>C:\Windows\ServiceProfiles\NetworkService\flexnetls\nvidia\logs</td>
</tr>
<tr>
<td>Linux</td>
<td>Installer</td>
<td>/opt/flexnetls/nvidia/Logs/</td>
</tr>
<tr>
<td></td>
<td>License server</td>
<td>/var/opt/flexnetls/nvidia/logs</td>
</tr>
</tbody>
</table>

Table 2 Log files

The license server generates two types of run-time log file:

- Management interface accesses are recorded in access_*.request.log files.
- License server logs are recorded in flexnetls_*.log files.
### 4.1.1 Changing server log levels

The license server log level defaults to ‘Info’. To enable a higher level, check the ‘Debug’ option in the Log Level settings on the License Server Configuration page (Figure 17):

![License Server Configuration](image)

**Figure 17 Changing the license server log level**

### 4.2 MANAGEMENT INTERFACE CONNECTION ERRORS

#### 4.2.1 Failure to connect to the management interface

If the management interface is unreachable on `http://hostname:8080/licserver`:

- If accessing the interface from a remote machine, try accessing the interface from a web browser running directly on the license server host, using the URL `http://localhost:8080/licserver`.
- If this is successful, verify that the host’s firewall is configured to allow remote access to server TCP port 8080.
▶ If the management interface still fails to respond, check that the Apache Tomcat service is running on the license server host.

▶ On Windows, use the Service Manager accessible from Task Manager, where you can restart the service if it is not running:

![Windows Task Manager](image)

**Figure 18 Tomcat status in Windows Services Manager**

▶ On Linux, check the `tomcat` status:

```
[nvidia@localhost ~]$ systemctl status tomcat.service
```

```
tomcat.service - Apache Tomcat Web Application Container
     Loaded: loaded (/usr/lib/systemd/system/tomcat.service; enabled)
     Active: active (running) since Fri 2015-09-11 07:39:11 PDT; 9h ago
 Main PID: 1373 (java)
 CGROUP: /system.slice/tomcat.service
     └─1373 java -classpath /usr/share/tomcat/bin/bootstrap.jar:/usr/sh...
```

### 4.3 LICENSE SERVER CONNECTION ERRORS

If the license server’s management interface is unable to establish communications with the license server, the following error is displayed:
To troubleshoot this error:

- Verify that the license service is running.
- On Windows, use the Service Manager accessible from Task Manager, where you can restart the service if it is not running:

```
Figure 20 License server status in Windows Services Manager
```

- On Linux, check the `flexnetls-nvidia` service status:

```
[nvidia@localhost ~]$ systemctl status flexnetls-nvidia.service
flexnetls-nvidia.service - LSB: start and stop FlexNet License Server
   Loaded: loaded (/etc/rc.d/init.d/flexnetls-nvidia)
   Active: active (running) since Fri 2015-09-11 14:44:34 PDT; 2h 49min ago
   Process: 4502 ExecStart=/etc/rc.d/init.d/flexnetls-nvidia start (code=exited, status=0/SUCCESS)
   CGroup: /system.slice/flexnetls-nvidia.service
     ⎯4567 java -Dbase.dir=/var/opt/flexnetls/nvidia -jar /opt/flexnet...
     ⎯4609 java -Dbase.dir=/var/opt/flexnetls/nvidia -jar /opt/flexnet...
```
Troubleshooting

Inspect the license server log files (see 4.1).

4.4 LICENSE UPLOAD FAILURES

This section describes some common errors that may occur when uploading a license file to the license server.

4.4.1 License response fails trust criteria

The license server will report a trust failure when attempting to re-load the same license file that’s already loaded will produce this error.

Verify that the license file being uploaded is not already active on the server.

4.4.2 Capability response rejected - response time too old

This error is reported if the license file you are attempting to upload has expired. Licenses generated on the NVIDIA licensing portal must be installed onto your license server within a few days of generation.

To remedy this, generate a new license file on the licensing portal, and promptly upload it to your license server.

4.4.3 Capability response rejected - update time invalid

This error is reported if the license server is already configured with a license file that is newer than the license file you are attempting to upload: you cannot ‘roll back’ an active license server to an older license file.
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