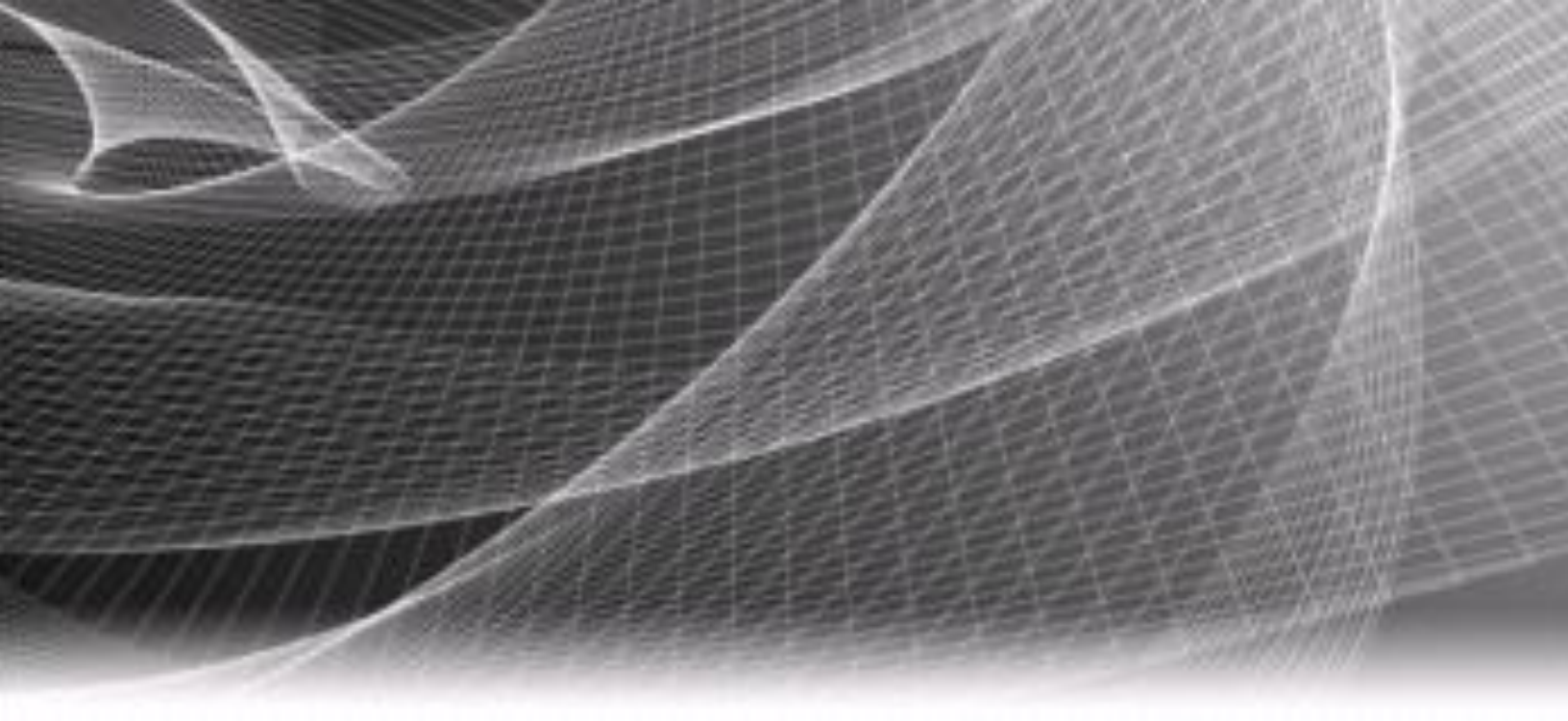

# EMC® License Server

## Installation and Administration Guide

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**License Server Installation and Administration Guide**

Part Number 302-002-433

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# Preface

As part of an effort to improve and enhance the performance and capabilities of its product line, EMC from time to time releases revisions of its hardware and software. Therefore, some functions described in this guide may not be supported by all revisions of the software or hardware currently in use. For the most up-to-date information on product features, refer to your product release notes.

If a product does not function properly or does not function as described in this document, please contact your EMC representative.

**Note** This document was accurate as of the time of publication. However, as information is added, new versions of this document may be released to the EMC online support website. Check the website to ensure that you are using the latest version of this document.

## Abstract

This is a reference guide to assist EMC personnel and customers in installing, configuring, and running the EMC License Server.

## Purpose

This document serves as a set of instructions for installing and configuring the EMC License Server and using the License Server manager. Important administrative tasks and related topics are also discussed.

## Audience

This document is intended for EMC personnel and EMC customers who have purchased the EMC License Server.

## Scope

This document provides the installation steps for the EMC License Server, along with additional information, such as troubleshooting tips that might be required before or during the installation of the EMC License Server. However, this document does not provide information about products that require and use the License Server. Such information is found in the product-specific documentation.

## Related documents

Related information can be found in your product documentation.

# Chapter 1 Introduction

This chapter presents the following topics:

## Overview of Licensing

The EMC License Solution is a method of providing software licensing that has two basic components:

*License-Enabled application* – the EMC software product that requires a license.

*A license* – contains the license rights that define how the EMC software product can be used. Typically the license defines some or all of the following characteristics:

- What software functionality you are entitled to use. Functions provided by the software can be separately licensed. The licensed functions are referred to as "features". When multiple features are defined, different versions of the product can be licensed by including different feature sets. For example, the license for the 'demo' version of the product could simply include the feature 'trial'; the 'standard' version of the product contains the features 'trial' and 'basic'; and the 'professional' version has the 'trial', 'basic' and 'extend' features.
- Which versions of the EMC software product you can use.
- How many copies of the EMC software product you can run.
- The systems on which you can use the EMC software product.
- The period during which you can use the EMC software product.

These and other items in the license define how the EMC software product can be used and collectively are referred to as a *license model.*

The license itself is stored in a *license file,* which is a text file with a `.lic` file type. Each license feature in the license file is protected by a signature that is authenticated by the EMC software licensing components in the EMC license-enabled software product.

The EMC license-enabled software product can obtain a license feature directly from a license file. Some license models, described as *served*, provide licenses that are held centrally by a *license server.* They are used by the EMC license-enabled software products connected to the EMC License Server across a TCP/IP network. Thus, it is essential that you install the License Server; it is required by your EMC software product.

This document describes how to install and use an EMC License Server to provide licenses for EMC licensed-enabled software products that use served license models. The basic license model that requires an EMC License Server is referred to by two names depending on the context:

- Concurrent
- Floating

*Concurrent* licenses allow a fixed number of concurrent users to use licensed features at any one time. The EMC License Server controls the use of these licenses, which are not normally locked to a specific machine; rather they *float* on the network. The EMC

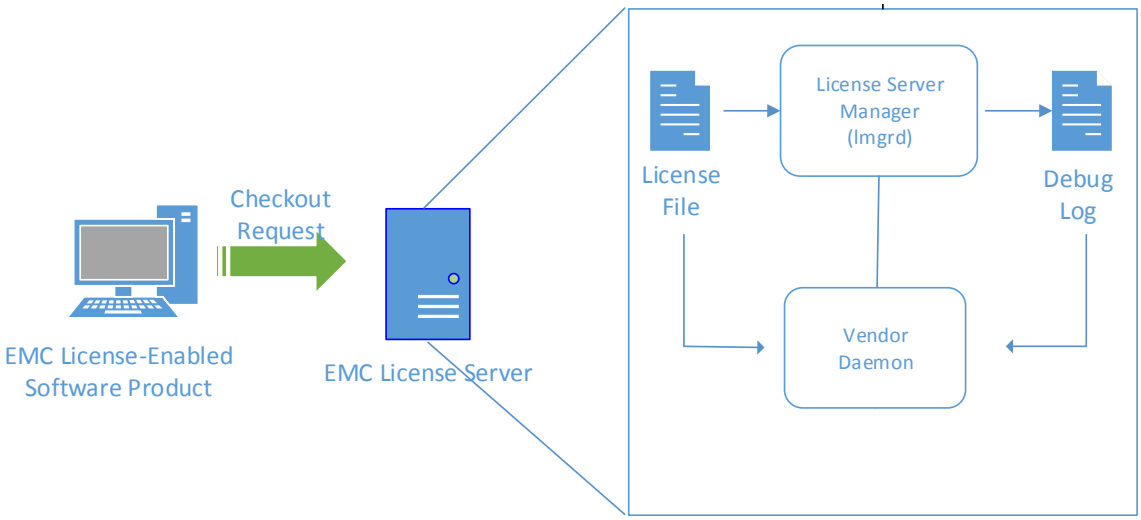
License Server provides for many variations of this basic license model. For example, the use of a set of concurrent licenses can be restricted to a group of users.

## EMC License Server

The basic components of an EMC License Server are as illustrated in the following diagram:

- **License Server Manager** - The lmgrd binary is supplied during the installation process of your software product.
- **License file** - Created by the EMC Software Licensing Central customer portal and entitlement activation.
- **Vendor Daemon** - Created during the installation process. The EMC Vendor Daemon, EMCLM, is supplied during the installation process and launched in the background by lmgrd.
- **Debug log** - Written by the License Server Manager and Vendor Daemon.

**Figure 1. Components of an EMC License Server**




## Using an EMC License Server with License Files

The following procedure gives the steps for installing an EMC License Server and for using it to serve licenses from license files. For further information about each of these steps, read the relevant sections of this document.

1. Choose the machine(s) on which the EMC License Server(s) will be installed.

a. Determine the number of licenses and machines on which to install EMC license-enabled software products.

b. Consider what method, if any, you want to use to ensure that, whenever possible, licenses are available to your end users.

2. Install the EMC License Server components; the License Server Manager (lmgrd) and the Vendor Daemon are automatically installed during the installation process.
3. Obtain details of the EMC License Server machine(s) and use this information when activating your entitlements in Software Licensing Central.
4. Licenses are locked to the License Server using an identity obtained from the machine. This identity is called a *hostid* and is platform-specific. There are several different hostids available for each platform. The EMC licensed-enable software products will provide instructions on what hostid they are using for your licenses and platforms. They may supply an EMC software product that you can run to obtain the hostid.
5. Depending on the license model, the EMC licensed-enabled software product may require other details of your EMC License Server, the machine on which it is running, and details of your network.
6. Install licenses on the EMC License Server.
7. The EMC license-enabled software product may specify a particular location for the license files on the EMC License Server machine. Install the EMC license-enabled software product on end-user machines using the instructions that EMC supplies.
8. Set up end-user machines to access the EMC License Server by completing the instructions provided for installing and configuring the EMC software product.
9. Optionally, create an options file.
10. If you need to limit license usage, configure logging, or turn off the automatic reread of licenses, create an options file and install it in the same directory as the vendor daemon. For more information, contact EMC Support.
11. Start the License Server Manager. The configuration settings are set when lmgrd is started. For more information, see lmgrd Command-Line Syntax.

You can manage and monitor the operation of the EMC License Server by using the License Server manager. Note that lmgrd provides limited information in the form of command-line output.

# Chapter 2 Best Practices for the EMC License Server

This chapter presents the following topics:

## Run the License Server on Locally Mounted Disks

EMC recommends that you do not use remote mounted disks when you run the License Server. Ensure that lmgrd, the vendor daemons, the license file, and the debug and report log files are all located on locally mounted disks. Locating any of these files on a remote mounted disk increases the risk of a failure which could lead to a temporary loss of all of your licenses. When you mount all files locally, the licenses are available as long as the server is running. When the files are on a different system, licenses may become unavailable if the License Server fails.

## Allocating Space to Datazones

Upon installation of the License Server and setup of the license file, EMC allocates 1 unit (1 TB) of data per datazone.

# Chapter 3 Installing an EMC License Server

This chapter presents the following topics:

## Introduction

The following sections provide instructions for installing the License Server on a Windows or a Linux 64-bit platform. Note that this software is only supported on the following platforms:

- Windows Server 2008 and 2012
- Linux Red Hat versions 5 and 6
- Linux SUSE versions 10 and 11

For any other operating system or version, consult EMC Support.

## Prerequisites

Install the License Server on a system that is accessible to your environment's datazones that will need to access the License Server.

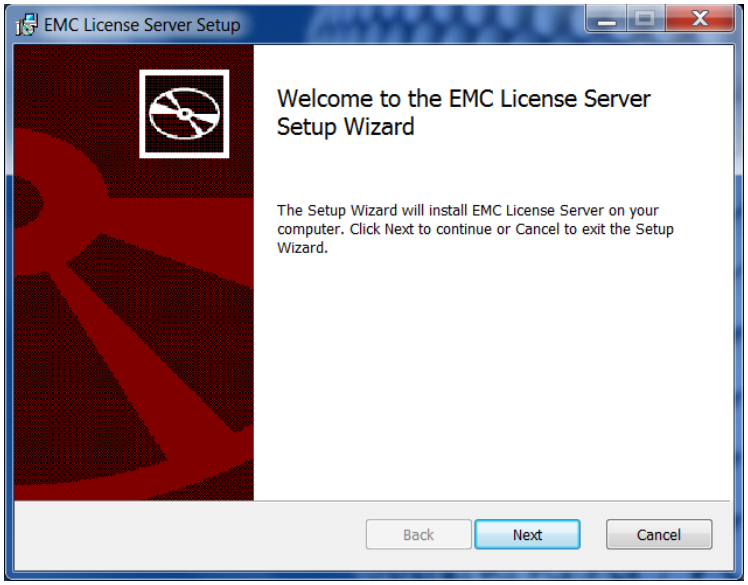
Note that in a Windows environment, you must be the Admin and use your Admin account. Similarly, for a Linux environment, you must be the root user or an unprivileged user with sudo privileges.

## Install the License Server on a Windows 64-Bit Platform

Complete the following procedure to install the EMC License Server in a Windows 64-bit environment.

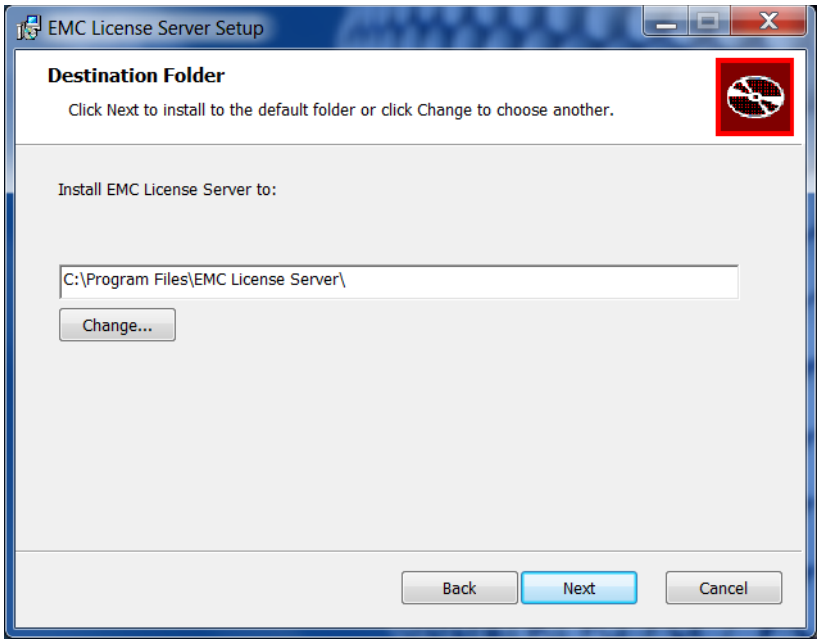
1. Download the 64-bit License Server installation package (EMC_LicenseServer_3.4.0_x64 installer) from the location specified in your EMC software product documentation. Typically, this will be the same location that you download the product software. The file name is `EMC_LicenseServer_3.4.0_x64.msi`.

2. Open the MSI file. If security warning message appears, click **Run**. The **EMC License Server Setup** Wizard opens to the **Welcome** screen.

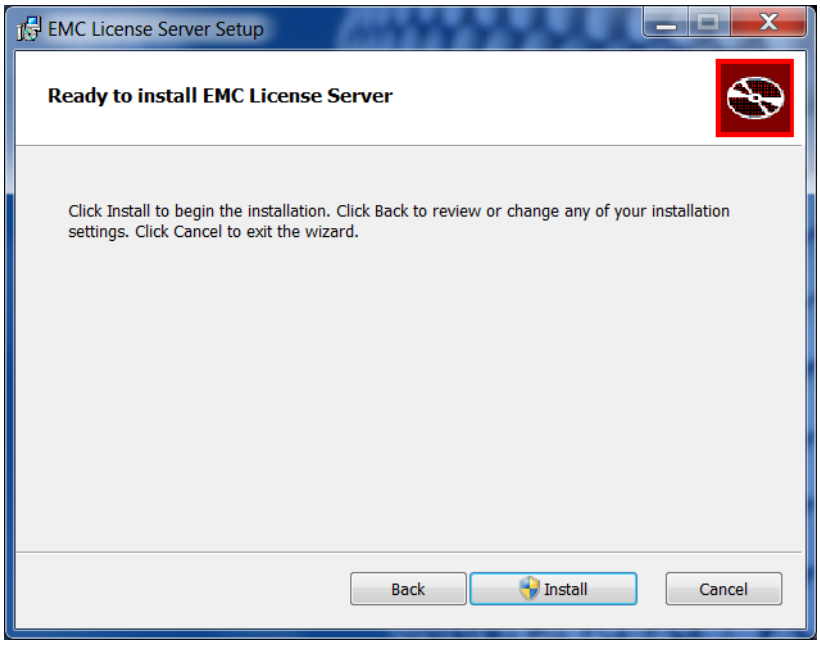



3. Click **Next**. The **End-User License Agreement** screen appears.

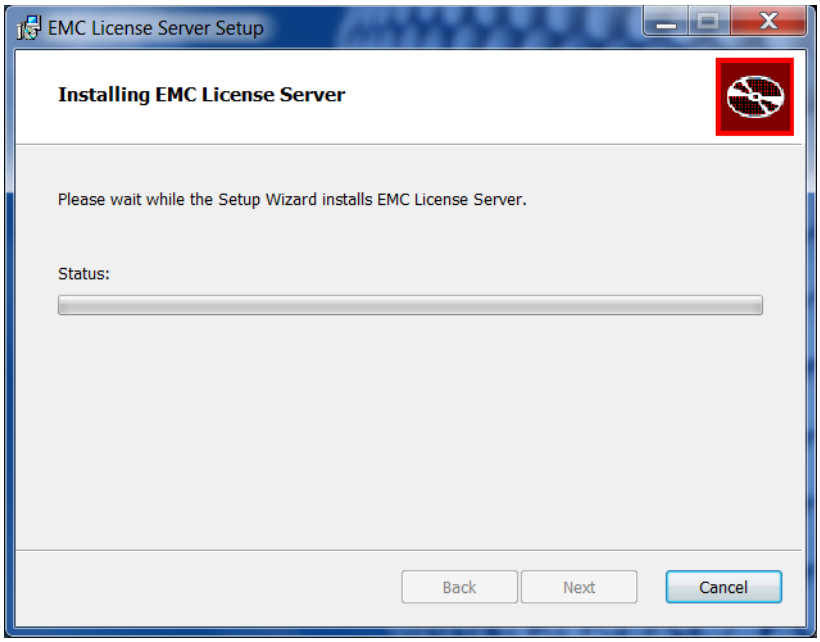
4. You must read and accept the End-User License Agreement (EULA) in order to proceed further. Select the check box for **I accept the terms in the License Agreement**, and then click the **Next** button. The **Destination Folder** screen appears.



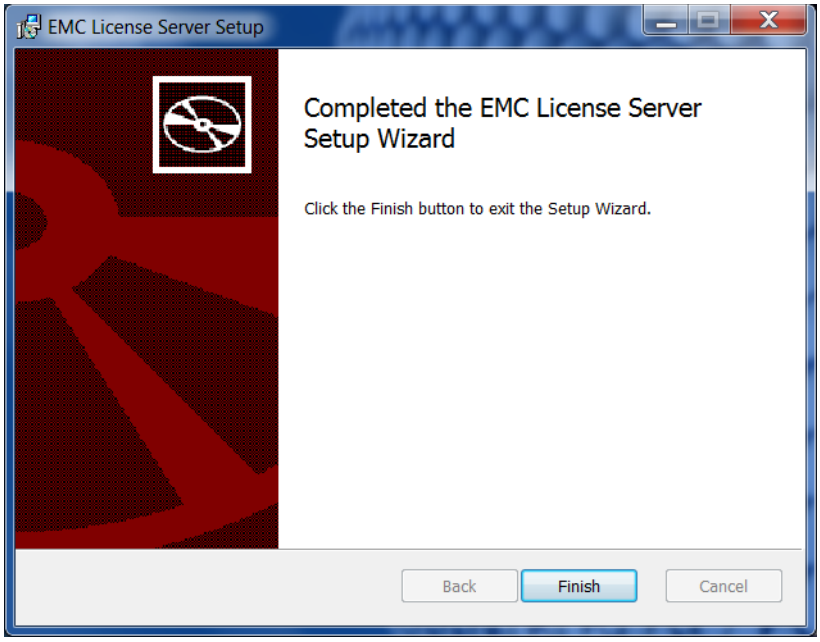

5. Either accept the default installation directory or click **Change** to select a different destination folder, and then click **Next**. The default folder is: `C:\Program Files\EMC License` Server. The **Ready to Install EMC Server** screen appears.



6. Click the **Install** button to start the installation of the files. The **Installing EMC License Server** screen appears.




7. Wait for the installation process to complete. Once it is complete, the Completed the **EMC License Server Setup Wizard** screen appears.




8. Click the **Finish** button to complete the installation of the EMC License Server software. A shortcut icon for LMTOOLS 

appears on your desktop.
9. Verify that the following files were installed in the installation directory.

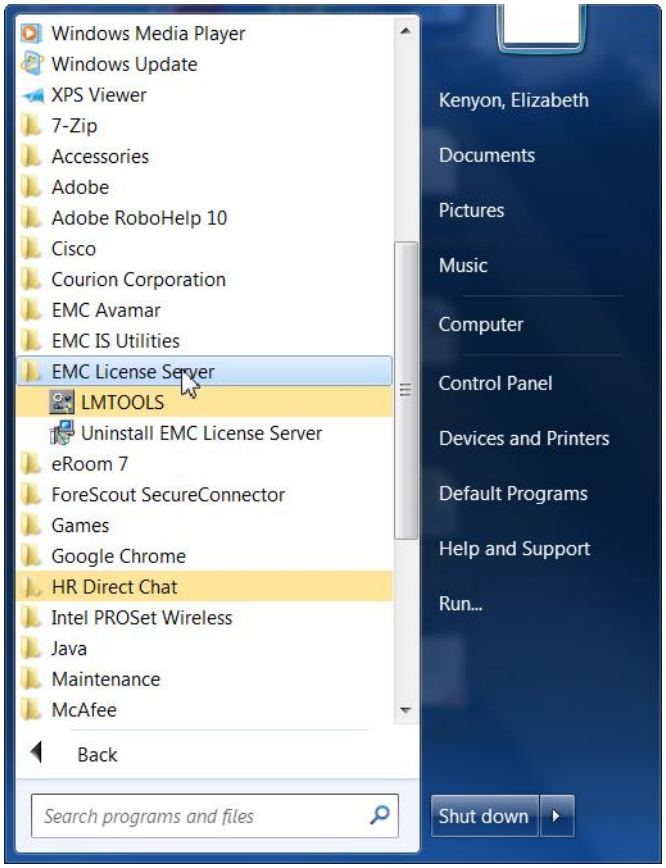
**Table 1. Files installed on a Windows platform**

| File | Description |
|---|---|
| EMC_Freeware_EULA_20130905_final.pdf | End-User License Agreement |
| EMCLM.exe | Vendor daemon executable |
| lmgrd.exe | License Server manager executable |
| lmtools.exe | License Server manager application |
| Lmutil.exe | LMUTIL executable |
| README.txt | Text file with instructions |

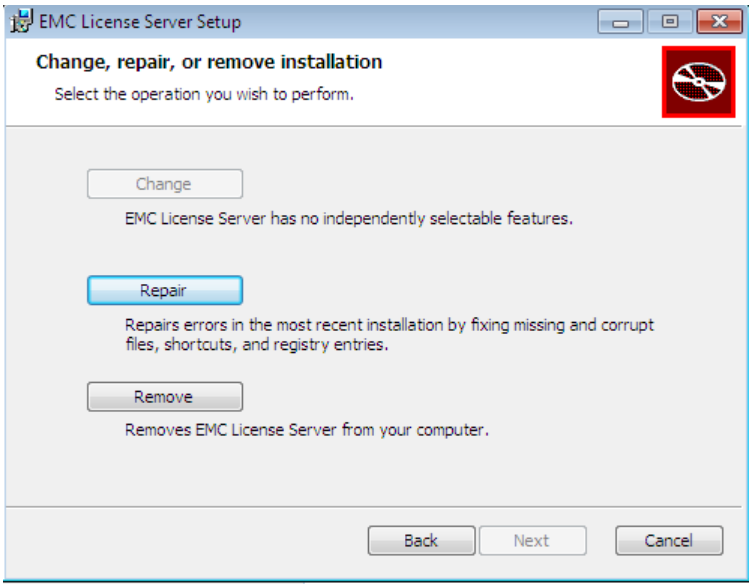
## How to Repair or Remove the Software from a Windows Platform

Complete the following procedure to repair or remove the EMC License Server software from a Windows 64-bit platform.

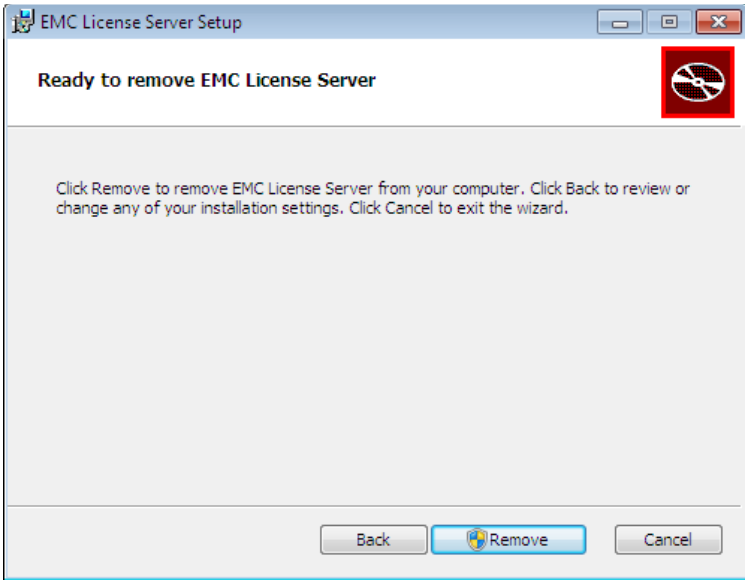
1. From the **Start** menu, select **EMC License Server › Uninstall EMC License Server**. The utility opens. Alternatively, you can remove the application using the Control Panels feature for removal.



2. Click **Next**. The **Change, repair, or remove installation** screen appears.




3. Click **Repair** or **Remove** as needed, and then click **Next**. The Ready to remove EMC License Server screen appears.



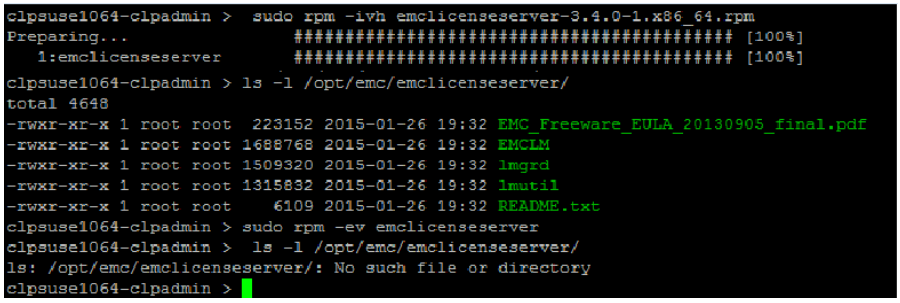

4. Confirm your choice of either **Remove** or **Repair** by clicking the respective button.
5. Once the remove or repair is complete, click the **Finish** button to exit the setup wizard.

## Install the License Server on a Linux Platform

Complete the following procedure to install the EMC License Server Setup in a Linux environment. Note that you must be a root user or an unprivileged user with sudo privileges.

1. Download the EMC License Server installation package for Linux from the location specified in your EMC software product documentation. Typically, this will be the same location that you download the product software.
2. Log in to your Linux server as a superuser.
3. Execute the following command:

```
sudo rpm –ivh emclicenseserver-3.4.1-2.x86_64_lsb.rpm
```




4. (Optional) The default path of installation is `/opt/emc/emclicenseserver/`. However, you can relocate the package during installation by using the relocate option from command line. The prefix used for relocation of the package is `/opt`. For example, on relocating to `/usr/local` during install, the installation will be in the `/usr/local/emc/emclicenseserver` directory. To perform relocate the pacakge, use the following command:

```
rpm --prefix= /usr/local -ivh emclicenseserver-3.4.1-
2.x86_64_lsb.rpm
```

5. To confirm that the install was successful, examine the directory in which the EMC License Server was installed and verify that the following files have been installed:

**Table 2. Files installed on a Linux platform**

| File | Description |
|---|---|
| EMC_Freeware_EULA_20130905_final.pdf | End-User License Agreement |
| emclicservd | Post install script |
| emclicservd.conf | License Server configuration file |
| EMCLM.exe | Vendor daemon executable |
| lmgrd | License Server manager executable |
| lmutil | LMUTIL executable |
| lock | Directory for creating server log files |
| logs | Directory for creating lock files |
| README.txt | Text file with instructions |

6. Start the License Server, as described in the section EMC License Server Management on Linux.

**Note:** Upon starting the License server (lmgrd), if an lmgrd error appears indicating "no such file or directory", follow the troubleshooting instructions in the section Lmgrd error "no such file or directory" upon License Server startup on Linux.

## How to Remove the Software from a Linux Platform

To uninstall the EMC License Server, execute the following command:

```
sudo rpm –ev emclicenseserver
```

# Chapter 4 Utilities

This chapter presents the following topics:

License administration tools help license administrators manage licenses and license servers. Always use the latest version of the utilities.

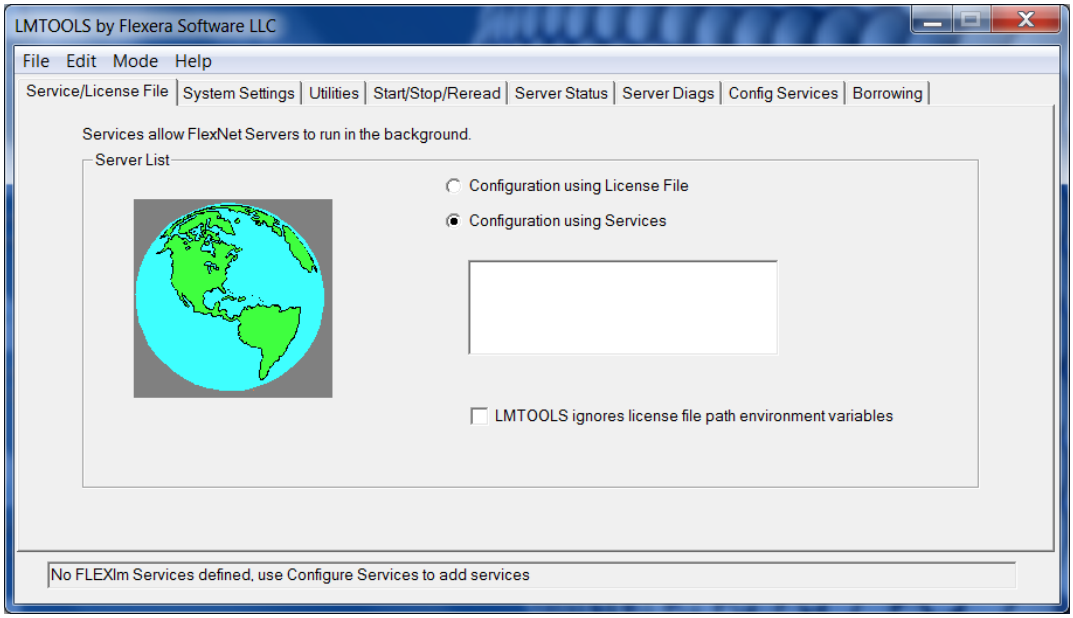
## LMTOOLS Application for Windows

The LMTOOLS application gets installed when you install the EMC License Server on a Windows 64-bit platform. An icon appears on the desktop after the installation.

This Windows-only application provides all LMUTIL capabilities and other functionality in an interface application. LMTOOLS enables you to configure the License Server by using a license file or by using the configure services option.

**Note:** On some Windows platforms, you may be required to run LMTOOLS as an administrator.

The following figure shows the various tabs that represent all of the functions that LMTOOLS can perform. Many of these functions execute specific LMUTIL commands and show the output. LMTOOLS will use an already configured License Server to allow selection of the proper service. You can then examine its status under the **Server Status** tab.



## Service/License File Tab

When you launch LMTOOLS, the window displays the **Service/License File** tab first. In the **Server List** area, you will see a list of existing License Servers services. Since other software vendors may also use the License Server for licensing, the list of services may display more than one service. LMTOOLS requires you to select the appropriate service in the server list box. To do this, select the **Configuration using Services** radio button and select the **license server** in the list box. Operations performed on other tabs will refer to this selected service.

## System Settings Tab

This tab shows system information that LMTOOLS has gathered. The `lmutil lmhostid` can yield some of this information. This is useful for troubleshooting a licensing problem since this is the information that the License Server uses to perform licensing functions. If a license file refers to a License Server (the SERVER line) or a license feature is locked to a particular host, then some of this information must match what is in the license file.

## Utilities Tab

Use the features on this tab to show License Server version information associated with a selected `.dll` or `.exe` file. These features are analogous to the `lmutil lmpath` and `lmutil lmver` commands.

## Start/Stop/Reread Tab

This tab has important management features that allow you to stop and start the license service, and to reread the license file. The service selected on the first tab is already selected on this tab. You must return to the first tab to select a different license service.

Modifying and then rereading license files allows you to make the license service and vendor daemons, aware of newly added features within the license files without fully stopping and starting the license service. Thus you maintain the current status of all feature check-outs.

The features on this tab are analogous to the `lmgrd`, `lmutil lmdown`, and `lmutil lmreread` console commands.

## Server Status Tab

Use the features here to report on the status of a license service and the EMC vendor daemon. As a result, it displays your status as running normally or not running. If the service is not running, then go to the previous tab and start the service. This tab executes the `lmutil lmstat -a` command and shows its output.

## Server Diags Tab

This feature is similar to the `lmutil lmdiag` command and attempts a checkout of all license features or a single license feature given its name. The message output of the operation is shown in the large text area and includes the name of the license file,

the feature name, some feature attributes, and whether it is available for checkout, or not.

### Config Services Tab

No information appears in this tab upon a new installation. Enter information for the following, or click **Browse** next to the following entries and navigate to the appropriate path.

- Service name
- Full path to the `lmgrd.exe` file
- Full path to the license file
- Full path to the lmgrd output debug log (`lmgrd.log`). Note that you must create this log manually

**Note:** You should only use the features available on other tabs if you are directed to do so by your EMC software product.

You can then reference this tab to review information for the current License Server configuration or features that you can use to create a new license service configuration. Note that subsequent changes to any of these values may cause the license service to immediately fail. Do not change this information unless otherwise instructed by EMC support.

The **View Log** button displays the contents of the lmgrd debug log file. The text in the view log window can only be viewed and not modified. To close the view log window, click the **Close Log** button.

The debug log file shows you which client systems have connected to the License Server to check out a license, and other licensing information that is available when the License Server starts and stops. The log file also records information resulting from diagnostics performed from the other LMTOOLS tabs.

## LMUTIL Application

In addition to lmgrd, you can also use the LMUTIL application to manage some aspects of the License Server. This application is available on all platforms.

All license server utilities are packaged as a single executable called LMUTIL. The LMUTIL is either installed as individual commands (by creating links to the individual command names or by making copies of LMUTIL as individual command names), or as a wrapper that runs individual commands such as the LMUTIL command. In Windows, a graphical user interface is available for these commands (LMTOOLS).

### LMUTIL application arguments

The following table summarizes valid arguments for most LMUTIL syntax.

**Table 3. Summary of LMUTIL arguments**

| Argument | Description |
|---|---|
| -c <license_file_path> | Most LMUTIL utilities need to know the path to the license file. This is specified with a -c license_file_path argument, or by setting the LM_LICENSE_FILE environment variable.<br>Otherwise, the default location is used. The utilities also honor all VENDOR_LICENSE_FILE environment variables. Some utilities take more than one license file path in a license search path separated by colons on Linux and semicolons on Windows.<br>You must enclose path names that include spaces in double quotes. |
| -help | Displays usage information and exits. |
| -v | Displays the version of the utility and exits |
| -verbose | Displays a longer description for errors found |

For the first argument of an LMUTIL command, you can specify one of the following commands:

- `lmdown` - gracefully stop a license server system (manager and vendor daemon)
- `lmhostid` - calculate a hostid to identify a system or user
- `lmreread` - instruct the license server system to reread license and option files, and start new vendor daemons
- `lmstat` - display the status of a license server system
- `lmswitch` - controls License Server log location and size
- `lmver` - display the version of a FLEXnet executable

The following topics provide more information for the most common or useful commands to aid in troubleshooting License Server issues.

## lmutil lmhostid

Use the `lmhostid` command to obtain the MAC address system information from the current system. A MAC address is a valid node locking choice (HOSTID=) and can also be used in the SERVER line of a license file to identify the License Server. If multiple MAC addresses are listed by the command, use the first one.

```
lmutil lmhostid
```

Verify the MAC address with its use in any license files. If the MAC address does not match any of the relevant uses, then you may have entered system information incorrectly while activating a license.

### lmutil lmreread

Force the License Server to instruct the EMC vendor daemon to reread the license file for changes. Execute this command if new or changed license files are made available. Using this command allows the License Server and the EMC vendor daemon to continue running and update its internal cache of license features from newly updated license files.

```
lmutil lmreread -vendor EMCLM
```

### lmutil lmstat

Use the following command to determine the running status of the License Server lmgrd:

```
lmutil lmstat –a
```

### lmutil lmdown

Use the `lmdown` command to gracefully shut down the License Server and EMC vendor daemon given the names of the license file used to start the License Server. Specifying the license file name ensures that the proper processes are terminated. You may be asked to confirm the shut down before proceeding.

```
lmlmutil lmdown -c <license_file_list>
```

## Examples of common LMUTIL commands

The "lmutil" program performs license administration operations to affect a running license server (lmgrd), or ascertain its status, using these command options:

```
lmutil lmborrow -status
lmutil lmborrow -purge
 lmutil lmborrow -purge -status
 lmutil lmborrow -clear
 lmutil lmborrow {all|vendor} dd-mmm-yyyy:[time]
 lmutil lmborrow -return [-c licfile] [-d display_name] [-fqdn] [-
vendor name] feature
 lmutil lmdiag [-c licfile] [-n]
 lmutil lmdown [-c licfile] [-q] [-all] [-vendor name] [-force] [-
help]
 lmutil lmhostid [-ptype (VMW|HPV|PHY|AMZN|LMB|VM)] [-ether|-
internet (v4|v6)|-user|-n|
 -string|-display|-hostname|-hostdomain|-vsn|-flexid|-long| -
utf8|-uuid|-eip|-ami|iid]
 lmutil lminstall [-i infile] [-o outfile]
 [-overfmt {2, 3, 4, 5, 5.1, 6, 7.1, 8}]
 [-odecimal] [-maxlen n]
 lmutil lmnewlog [-c licfile] vendor new-file, or
 lmutil lmnewlog [-c licfile] feature new-file
 lmutil lmpath -status
 lmutil lmpath -override {all | vendor } path
 lmutil lmpath -add {all | vendor } path
 lmutil lmremove [-c licfile] feature user host display
 lmutil lmremove [-c licfile] -h feature host port handle
 lmutil lmreread [-c licfile] [-vendor name] [-all]
```

```
lmutil lmswitchr [-c licfile] vendor new-file, or
lmutil lmswitchr [-c licfile] feature new-file
lmutil lmstat [-c licfile] [lmstat-args]
lmutil lmswitch [-c licfile] vendor new-file, or
lmutil lmswitch [-c licfile] feature new-file
lmutil lmver flexlm_binary
lmutil -help (prints this message)
lmutil utility_name -help (display detailed usage information)
```

The `lmutil lmhostid` option displays the default hostid type for the current platform. Otherwise, the host corresponding to the requested type is displayed, if supported on the current platform. This knowledge can be useful to aid in troubleshooting problems. Using this option can also assist in providing the node locking identifier that is needed when entitlements are activated to create licenses.

# Chapter 5 Licensing Components

This chapter presents the following topics:

## License Files

All EMC software products that employ software licensing technology rely on license files to indicate product options purchased by the customer, default options, or options made available for the purposes of evaluating an EMC product. Note the following details about license files:

- License files are generated by an EMC customer-facing Software Licensing Central portal.
- Software Licensing Central features must be used to activate entitlements that generate the license files. Such entitlements are created automatically by the EMC sales order process.
- License files must be located in a directory that is accessible by the EMC product via its embedded licensing software.
- Multiple license files may be used depending on the EMC product's licensing implementation and/or subsequent customer actions.

## License Features

A license file contains one or more named license "feature", which represents the actual product options purchased by a customer or other default product options. From an EMC part number perspective, each feature generally relates to one part or model number.

Served licenses contain features that are either counted or uncounted if applicable. Unserved licenses always contain uncounted features.

## Node-Locked License Features

A license file may contain features that are to be used only by certain systems that are identified by the MAC address, the IP address, the host name, the serial number, or another unique value. These features are "locked" to a specific "node" or system and cannot be used by other systems.

Served licenses, those that are made available by the EMC License Server, use a form of node locking as well. The licenses must be served by a specific instance of the EMC License Server and cannot be served by a different instance. The license file will contain information that uniquely identifies the EMC License Server instance.

## Software Licensing Central Web Application

Software Licensing Central is an EMC customer-facing web application that can be used by the customer to review their EMC product entitlements and to redeem their license authorization for a license file.

## EMC License Server

Licenses can be served over the network if the EMC product has chosen to use this particular architecture. The EMC License Server manager is an executable program—named "lmgrd"—that is placed on an accessible server, is started using a command line with options, and should be constantly running to serve licenses to the client EMC software products.

The EMC vendor daemon, named "EMCLM", is a companion executable that is managed by the License Server. This vendor daemon delivers license features to the EMC product and keeps track of counted features.

The License Server automatically manages the EMC vendor daemon by starting, restarting, and stopping it as needed. The server also writes to the License Server manager's debug log file to report errors and license feature activity.

# Chapter 6 Selecting a License Server Machine

This chapter presents the following topics:

## Introduction

When selecting a machine on which to install a License Server, select a stable system; do not choose systems that are frequently rebooted or shut down. The following sections discuss the resources used by the License Server.

## License Server Sockets

When using TCP/IP ports, each licensed software application connected to a license server uses one or more sockets. Depending on how the EMC software product has implemented licensing, the application may need one or more sockets.

The per-process system limit for file descriptors determines the number of sockets available to the license server. The total number of sockets that the license server uses is slightly larger than the total number needed by the licensed applications that connect to it. If the number of sockets required by the license server on a single system becomes excessive, then one solution is to run multiple license servers and split the licenses between them.

## License Server CPU Time

For small numbers of clients, the license servers use very little CPU time. The servers might have consumed only a few seconds of CPU time after many days.

For a large number of clients, where each are exchanging heartbeat messages with the license server the amount of CPU time consumed by the server may start to become significant. Even here, CPU usage is normally not high. In this case, you may need to ensure that the system you select has enough CPU cycles to spare.

## License Server Disk Space

The only output files created by the license servers are the debug log files. If there is a lot of license activity, these log files grow to be very large. You need to consider where to put these files and how often to rotate and archive them. It is your responsibility to manage these files so as not to disrupt server operations. You have the option to suppress log file output if disk space is at a premium.

EMC recommends that the log files are local files on the server systems to avoid networking dependencies. The log files also aid in troubleshooting licensing operations; you can provide the log files to EMC support personnel should the need arise. However, you must manage the log files to prevent them from consuming all available disk space.

## License Server Memory

The License Server uses little memory. The vendor daemons use approximately 2 MB each. Memory usage increases in the vendor daemon with the number of concurrent

licenses, size of the options file, and the number of concurrent users. Typically, the License Server manager, lmgrd, uses approximately 2 MB.

## Network Bandwidth for License Server

The licensed-enabled software client sends relatively small amounts of data across the network. Each transaction, such as a check-out or check-in of a license, generally transfers less than 1 KB of data. This means that the client can be effectively run over slow networks (such as dial-up SLIP lines) for small numbers of clients.

For a large number of licensed applications (hundreds), who each exchange heartbeat messages with the vendor daemon, the network bandwidth used may become significant. In this case, run the licensed application and server on the same local area network, and run multiple license servers if required. Users can use a license search path in the LM_LICENSE_FILE environment variable to have effective access to both servers.

Enterprises can experience a performance issue when there is slow network communication or if licensed clients are using a dial-up link to connect to the network. Depending on the number of clients and the frequency of the page refresh, they can impose a significant burden on network traffic.

## License Server Locally Mounted Disks

EMC recommends that you refrain from using remote mounted disks when you run the license server. In other words, EMC recommends that lmgrd, the vendor daemons, the license file, and the debug log files are all on locally mounted disks. If any of these files are on a remote mounted disk, then the points of failure double. Such doubling could lead to a temporary loss of all licenses. When all files are mounted locally, the licenses are available as long as the server is running. In contrast, when the files are on a different system, licenses may become unavailable if the License Server or file server fails.

## License Server Port

EMC recommends that you designate a specific port on the License Server machine to be used only by License Server components. This specification is beneficial because it is:

- Easy to track processes by the port that they are run on.
- Easier to configure licensed clients for access to the License Server.
- Easier to manage License Server components in an environment where a firewall and/or antivirus software is in use.
- Useful in preventing port conflicts and the hijacking of the port by other processes.

To configure the License Server port, specify it in the license file used to start the License Server.

## Running the License Server on a Virtual Machine

If you plan to run the license server on a virtual machine, then the EMC software may need you to utilize a baremetal hostid. If so, you will be required to run the binding agent (lmbind) on the console of the virtual machine.

**Note:** EMC does not recommend using lmbind unless bare metal recovery blocking or binding is required with your licensed software product.

# Chapter 7 Managing the EMC License Server

This chapter presents the following topics:

# Introduction

After installing the License Server, you must configure it. Starting and managing the License Server is different on Windows and Linux systems; however, both cases rely on the License Server manager, lmgrd. lmgrd is an application-based version of the License Server manager. On most platforms, it is controlled from a command line. On Windows, you can use LMTOOLS to manage lmgrd.

The License Server manager is one of the components that make up a license server, the other being the vendor daemon. The manager handles the initial contact with licensed applications, passing the connection on to the appropriate vendor daemon. The purposes of the License Server manager are to:

- Start and maintain the vendor daemons listed in VENDOR lines of the license file used to start lmgrd.
- Refer to application checkout and other requests to the correct vendor daemon.

A newer lmgrd can be used with an older vendor daemon or licensed application, but a newer vendor daemon or licensed application might not work properly with an older lmgrd. Always use the latest version of lmgrd, which is available from the download site.

# EMC License Server Management on Linux

The following sections contain information on starting and managing the License Server using the lmgrd command on Linux.

## Before You Begin

Before running lmgrd, ensure that you create the suggested directories for the license file (`/opt/emc/emclicenseserver/license`) and the log files (`/opt/emc/emclicenseserver/logs`), and add the license file that you obtained from EMC Licensing in the `/license` directory.

## Procedure

1. Run the lmgrd command to start the License Server.

   ```
   # lmgrd -l /opt/emc/emclicenseserver/logs/lmgrd.log -c
   /opt/emc/emclicenseserver/license
   ```

2. Run the lmgrd command with the following arguments to manage the License Server.

   ```
   . lmgrd [-c license_file_list] [-l [+]debug_log_path] [-2 -
   p] [-local] [-x lmdown] [-x lmremove] [-z] [-v] [-help]
   ```

## lmgrd Command-Line Syntax

When you invoke lmgrd at the command line, it looks for a license file that contains information about vendors and features, and then starts those vendor daemons.

The following table provides command-line usage information. The section LMUTIL Application provides more information on available commands.

### Usage

lmgrd [-c license_file_list] [-l [+]debug_log_path] [-2 -p] [-local] [-x lmdown] [-x lmremove] [-z] [-v] [-help]

| Term | Description |
|---|---|
| -c license_file_list | Use the specified license files. |
| -l [+]debug_log_path | Write debugging information to file debug_log_path. This option uses the letter l. Prepending debug_log_path with the + character appends logging entries. Use -l option before other options to log all debugging information to debug_log_path. |
| -2 –p | Restricts usage of lmdown, lmreread, and lmremove—as well as lmswitch, lmswitchr, and lmnewlog—to a license administrator who is by default root. If there is a UNIX group called lmadmin, then use is restricted to members of that group only. If root is not a member of this group, then root does not have permission to use any of the above utilities. If -2 -p is used when starting lmgrd, then no user on Windows can shut down the license server with lmdown, nor can they use the lmswitch, lmswitchr, and lmnewlog command-line utilities. |
| -local | Restricts the lmdown and lmreread commands to be run only from the same system where lmgrd is running. |
| -x lmdown | Disable the lmdown command (no user can run lmdown). If lmdown is disabled, stop lmgrd via kill pid (Linux), or stop the lmgrd and vendor daemon processes through the Windows Task Manager or Windows service. On Linux, be sure the kill command does not have a -9. argument. |
| -x lmremove | Disable the lmremove command. No user can run lmremove. |
| -z | Run in foreground. The default behavior is to run in the background. If -l debug_log_path is present, then no windows are used. If no -l argument is specified, then separate windows are used for lmgrd and each vendor daemon. |
| -v | Displays lmgrd version number, copyright and exits. |
| -help | Displays usage information and exits. |
| -reuseaddr | Allows the server to explicitly bind to the same port, which remains in TIME_WAIT state after the server restarts or crashes.<br>**Note**: Recommended use is only on a non-Windows OS. |

## Start the License Server without a License File

If you have not obtained a license file, you can still start the License Server by using the lmgrd command. When you add a license file, you can also run a command to reread the file.

### Procedure

1. To start the License Server without copying a license file to the license directory, run the following:

```
/opt/emc/emclicenseserver
/opt/emc/emclicenseserver/lmgrd -l
/opt/emc/emclicenseserver/logs/lmgrd.log -c
/opt/emc/emclicenseserver/license
```

2. To view the log file:

```
/opt/emc/emclicenseserver # cat
/opt/emc/emclicenseserver/logs/lmgrd.log
```

3. To view what is running as the License Server:

```
/opt/emc/emclicenseserver # ps -aef | grep lmgrd
```

4. Once you obtain a license file, copy the file to the license directory and then run:

```
/opt/emc/emclicenseserver # cp ../<filename>.lic license/
/opt/emc/emclicenseserver # ls license
```

5. To reread the license file:

```
# lmutil lmstat -a -c /opt/emc/emclicenseserver/license
# lmutil lmreread -c /opt/emc/emclicenseserver/license
# lmutil lmdown -c /opt/emc/emclicenseserver/license
```

## EMC License Server Management on Windows

The following sections address managing the License Server on a Windows platform.

### Manually Starting From the Command Line

This section provides procedural information on manual starts from the command line.

Start lmgrd as an application from a Windows command shell using the following syntax:

```
C:\> lmgrd -c license_file_list -L [+]debug_log_path
```

where `license_file_list` is one or more of the following:

- the full path to a single license file
- a directory, where all files named `*.lic` in that directory are used

and `debug_log_path` is the full path to the debug log file.

Prepending `debug_log_path` with the '+' character appends logging entries. Spaces in pathnames require double quotes around the path.

## Configuring the License Server as a Windows service

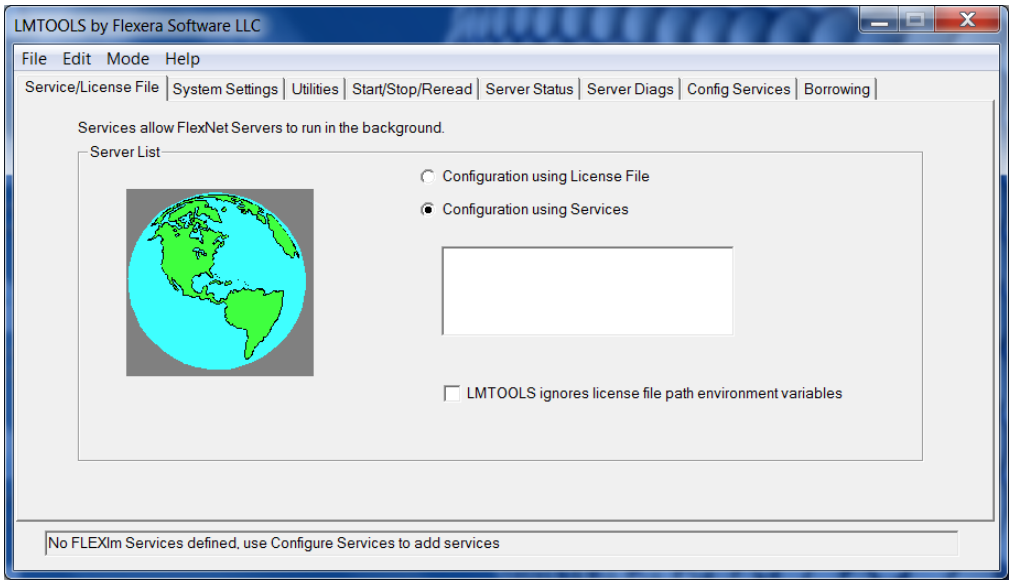
The following section contains information on starting and managing the License Server using LMTOOLS on Windows.

### Before You Begin

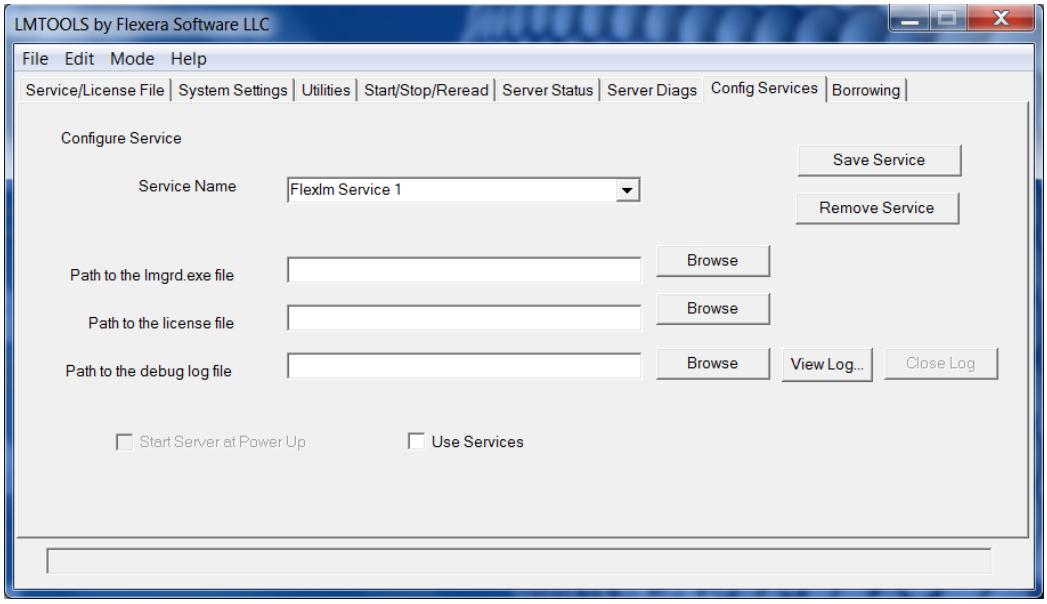
- To configure a License Server manager (lmgrd) as a service, you must have Administrator privileges. The service will run under the Local System account. This account is required to run this utility as a service.
- Before running LMTOOLS, create a new folder under `\EMC License Server` called `\elms\licenses`, for example, `C:\Program Files\EMC License Server\elms\licenses`, and add the license file that you obtained from EMC Licensing in this new location. Review the section LMTOOLS application for more information on LMTOOLS.

### Procedure

1. Double-click the LMTOOLS utility icon on your desktop. LMTOOLS opens.



2. In the **Service/License File** tab, ensure that you select **Configuration using Services**, and then select the **Config Services** tab.




3. In the **Config Services** tab, navigate to **Service Name** text box and replace **Flexlm Service 1** with your desired service name.

4. In the **Path to the lmgrd.exe file** text box, type the path or browse to the lmgrd.exe location.

5. In the **Path to the license file** text box, type the path or browse to the license file location.

6. In the **Path to the debug log file** text box, type the path or browse to the debug log file location.

7. Save the new service by clicking **Save Service.**

8. Note that prepending the debug log file name with the '+' character appends logging entries.

## Configuring the License Server for a Delayed Start

In situations where the License Server needs to wait for other drivers or services to start before it starts, you can configure a delay before the License Server service starts.

### Procedure

1. Configure the License Server manager as a service by completing the instructions in *Configuring the License Server manager as a Windows service*.

2. Locate the registry entry for your License Server manager service at:

```
HKEY_LOCAL_MACHINE\SOFTWARE\FLEXlm License
Manager\service_name
```

where `service_name` is the name of the License Server manager service.

3. Optionally, to configure a delay longer than 20 seconds, add a string value to the registry entry and set the fields in this entry as follows:

```
Name – unlimitedServiceDelay
Type - REG_SZ (set automatically when a string value
is created)
Data - no value set
```

4. Add a string value to the registry entry and set the fields in this entry as follows:

```
Name - serviceDelay
Type - REG_SZ (set automatically when a string value
is created)
Data - the service delay in seconds. This value is
limited to the range 1-20 seconds unless
unlimitedServiceDelay has previously been defined (see
Step 3).
```

## Manually Starting the License Server Using LMTOOLS

A graphical user interface to the License Server manager tools is provided and is called LMTOOLS. The LMTOOLS performs functions that include starting, stopping, and configuring license servers, retrieving system information, including hostids, and retrieving the server status.

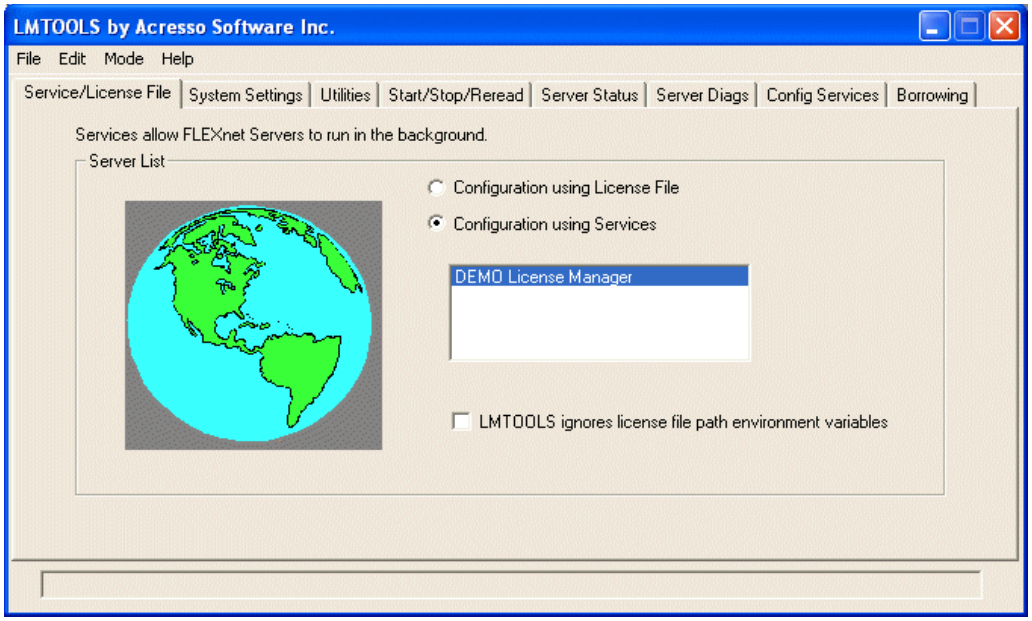
### Before You Begin

In order to control the operation of lmgrd from the LMTOOLS user interface, you first must configure it as a License Server manager service. Once the License Server manager service is configured, lmgrd is started by starting the service from the LMTOOLS interface.

### Procedure

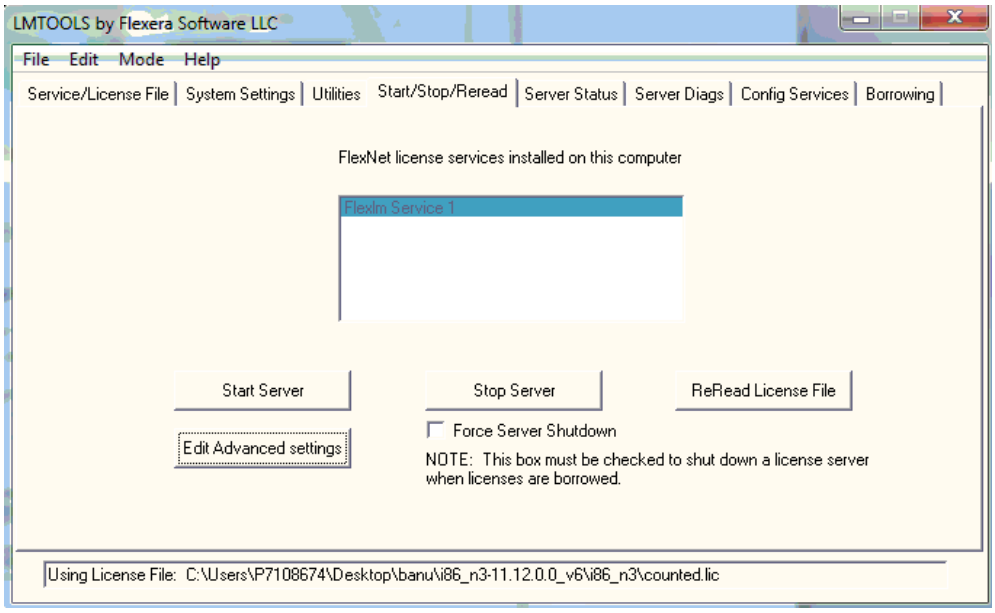
1. Start LMTOOLS and select the **Service/License File** tab.
2. Select **Configuration using Services.**

3. Select the service name from the list presented in the list box. In this example, the service name is “DEMO License Manager”.




4. Select the **Start/Stop/Reread** tab.

5. Start the DEMO License Manager by clicking the **Start Server** button. The DEMO License Manager license server starts and writes its debug log output.

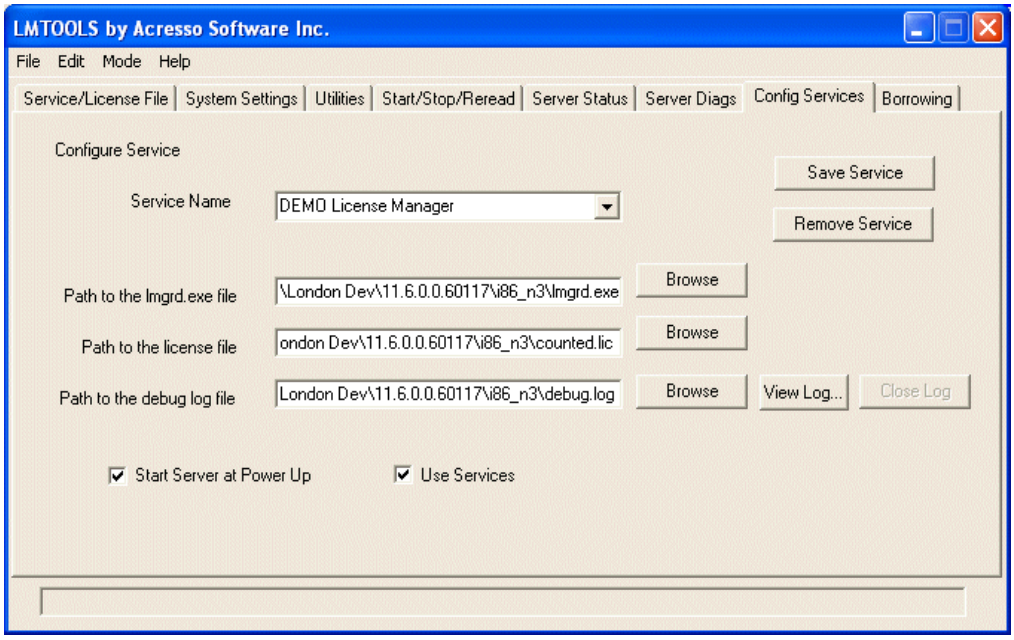



## Automatically Start the License Server When the System Starts

In order for lmgrd to start up automatically at system start-up time, you first must configure it as a service. Follow the procedure in *Configuring the License Server*

*manager as a Windows service* before proceeding, and then continue with the following steps.

1. With LMTOOLS started and the desired service name selected, select the **Config Services** tab.




2. Make this License Server manager a Windows service by selecting the **Use Services** check box.

3. Configure it to start at system start-up time by selecting the **Start Server at Power Up** check box.

4. From now on, when the system is rebooted, this License Server manager starts automatically as a Windows service.

# Chapter 8 Managing Licenses From Multiple Software Publishers

This chapter presents the following topics:

# Introduction

When you are running licensed applications from multiple software publishers, you might need to take steps to prevent conflicts during installation. There are several strategies to accomplish this, three of which are given here:

- Multiple systems, each running one License Server manager, managing one vendor daemon, and using one or more license files.
- One system running multiple License Server managers, each managing one vendor daemon and one or more license files.
- One system running one License Server manager, which manages multiple vendor daemons, each using its own license files. License files share a common directory.

# Multiple Systems

In this scenario, each License Server instance (lmgrd, vendor daemon, license file, and other files) is located on a separate system. Each system serves licenses just for its vendor daemon and runs its own local copy of the License Server manager.

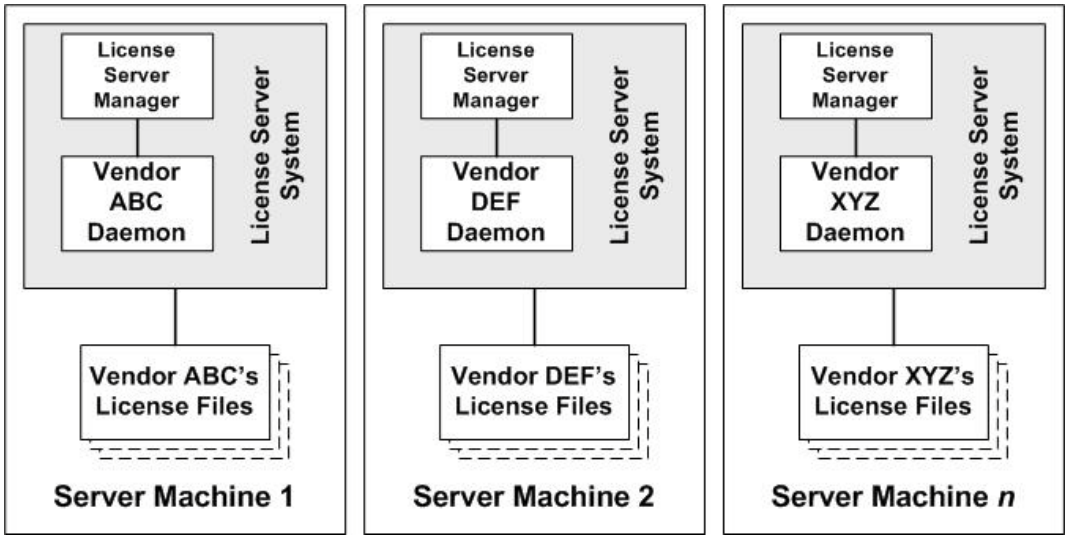



**Figure 2. Multiple License Server systems**

## Advantages

- The license files for each software publisher are independent of one another.
- Systems are maintained separately. If one system goes down, the other systems continue to serve licenses for their software publishers.
- Each server has its own debug log.

- The license requests are distributed.

### Disadvantages

This scenario requires the highest administrative overhead.

## One System with Multiple License Server Instances

In this model, each vendor daemon and its associated license file or files is served by its own License Server manager, and everything is contained in one system.

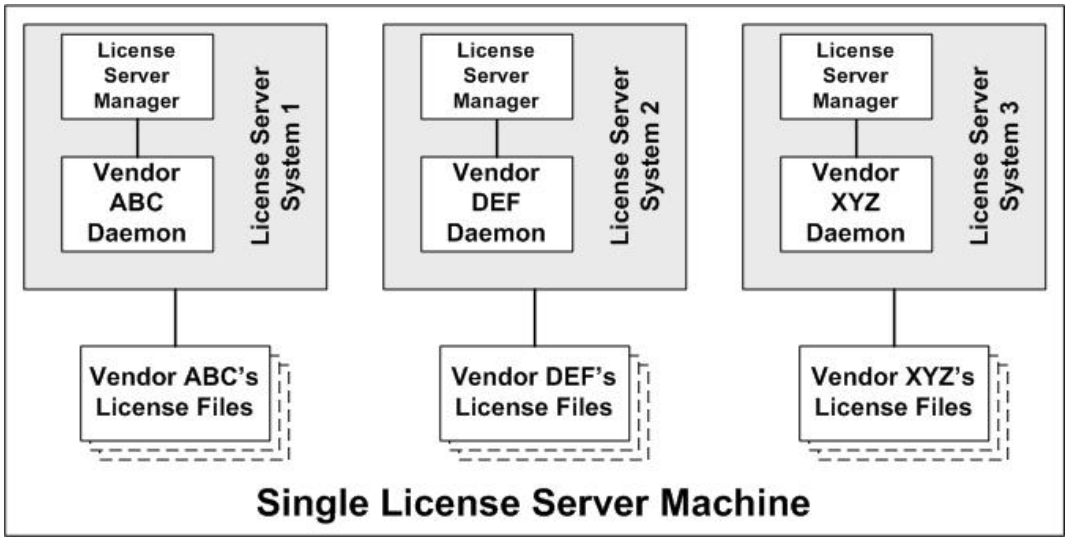



**Figure 3. Multiple License Server managers, multiple license files**

### Advantages

- The license files for each software publisher are independent of one another.
- License servers are maintained separately. If one server goes down, then the other servers continue to serve licenses.
- Each server has its own debug log.

### Disadvantages

- Administrative overhead is high.
- If the system goes down, all licenses are disabled.
- License request load is concentrated in one system.

## One System with One License Server and Multiple License Files

In this scenario, one License Server manager runs on the system and serves one or more vendor daemons, each with one or more license files. All of the license files are

usually held in the same directory. The standard filename extension for license files is `.lic`. The number of vendor daemons is not limited by the EMC License Server.

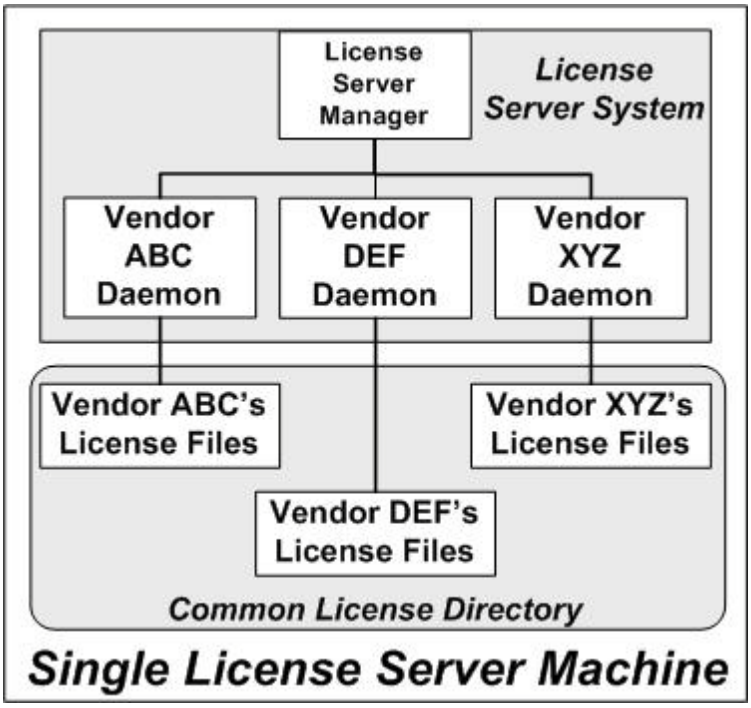



**Figure 4. One License Server manager, multiple license files**

## Advantages

- The license files can be maintained separately.
- Administrative overhead is reduced.

## Disadvantages

- One License Server manager serves all vendor daemons. If the License Server manager goes down, all licenses are unavailable.
- If the system goes down, then all licenses are unavailable.
- Output from all vendor daemons goes into one common debug log unless separate debug logs are specified with DEBUGLOG in each vendor daemon's options file. Having one common debug log makes it harder to debug a single vendor daemon's problem.
- Maximizes licensing load to one system and one License Server manager.

# Chapter 9 Troubleshooting

This chapter presents the following topics:

# Introduction

Troubleshooting licensing problems for the EMC Licensing Solution can be difficult because the application architecture used to serve licenses requires the use of a network, TCP/IP for communication, and running the License Server and EMC vendor daemon processes. However, there are some tools and techniques available. This section examines common problems and discusses these techniques.

## Before You Begin

- When you start the License Server, be sure that you direct the output to a local log file so that you can examine it. The log file often contains useful information. Examine it when you have a problem, and be prepared to answer questions about it when you talk to an EMC support person.
- You can determine if the License Server appears to have started correctly from the log file. If so, try running `lmstat -a` and `lmdiag` to determine if that program has the same problem as your application.
- You can use the FLEXLM_DIAGNOSTICS environment variable. Set FLEXLM_DIAGNOSTICS to 1, 2, or 3.

# Common Licensing Problems

The most common licensing problems and symptoms can result from the following causes.

A problem with the license file:

- License Server is unable to locate the license file. License files must be placed in a specific directory known to the License Server.
- A problem exists with the file's encryption due to file modification.
- The information provided during the time of license activation is incorrect. For example, an incorrect server host ID and/or MAC address.
- License Server is unable to check out a specific license feature.

A problem connecting to the License Server:

- License Server fails to start. On Windows, you can configure the License Server to run as a Windows Service.
- The License Server debug log file shows one or more failure messages.
- License Server is unable to locate the license file. License files are typically located in the same directory as the lmgrd executable file.

License features can also expire, which prevents their check out after the date specified within each feature.

**Note:** evaluation licenses are designed to expire.

# Debug Log Example

This section provides the individual sections of a sample debug log file. The sections are listed in the order in which they appear in the log file.

## Flexera end-user notice (#1)

```
File  Edit  Format  View  Help
11:53:28 (lmgrd) -------------------------------------------------
11:53:28 (lmgrd)   Please Note: (#1)
11:53:28 (lmgrd)
11:53:28 (lmgrd)   This log is intended for debug purposes only.
11:53:28 (lmgrd)   In order to capture accurate license
11:53:28 (lmgrd)   usage data into an organized repository,
11:53:28 (lmgrd)   please enable report logging. Use Flexera Software LLC's
11:53:28 (lmgrd)   software license administration  solution,
11:53:28 (lmgrd)   FlexNet Manager, to  readily gain visibility
11:53:28 (lmgrd)   into license usage data and to create
11:53:28 (lmgrd)   insightful reports on critical information like
11:53:28 (lmgrd)   license availability and usage. FlexNet Manager
11:53:28 (lmgrd)   can be fully automated to run these reports on
11:53:28 (lmgrd)   schedule and can be used to track license
11:53:28 (lmgrd)   servers and usage across a heterogeneous
11:53:28 (lmgrd)   network of servers including Windows NT, Linux
11:53:28 (lmgrd)   and UNIX. Contact Flexera Software LLC at
11:53:28 (lmgrd)   www.flexerasoftware.com for more details on how to
11:53:28 (lmgrd)   obtain an evaluation copy of FlexNet Manager
11:53:28 (lmgrd)   for your enterprise.
11:53:28 (lmgrd)
```

## License files identified by lmgrd (#2)

```
11:53:28 (lmgrd)
11:53:28 (lmgrd)
11:53:28 (lmgrd) Server's System Date and Time: Thu Aug 20 2015 11:53:28 Eastern Daylight Time
11:53:28 (lmgrd) pid 4484
11:53:28 (lmgrd) SLOG: Summary LOG statistics is enabled.
11:53:28 (lmgrd) Done rereading
11:53:28 (lmgrd) FlexNet Licensing (v11.12.0.0 build 136775 i86_n3) started on <LSsystemname> (IBM PC) (8/20/2015)
11:53:28 (lmgrd) Copyright (c) 1988-2013 Flexera Software LLC. All Rights Reserved.
11:53:28 (lmgrd) World Wide Web:  http://www.flexerasoftware.com
11:53:28 (lmgrd) License file(s): <path>\ALL_IN_USE_TEST.lic (#2)
11:53:28 (lmgrd) lmgrd tcp-port 27001
```

## lmgrd startup information (#3)

```
11:53:28 (lmgrd) (@lmgrd-SLOG@) ===============================================
11:53:28 (lmgrd) (@lmgrd-SLOG@) === LMGRD === (#3)
11:53:28 (lmgrd) (@lmgrd-SLOG@) Start-Date: Thu Aug 20 2015 11:53:28 Eastern Daylight Time
11:53:28 (lmgrd) (@lmgrd-SLOG@) PID: 4484
11:53:28 (lmgrd) (@lmgrd-SLOG@) LMGRD Version: v11.12.0.0 build 136775 i86_n3 ( build 136775 (ipv6))
11:53:28 (lmgrd) (@lmgrd-SLOG@)
11:53:28 (lmgrd) (@lmgrd-SLOG@) === Network Info ===
11:53:28 (lmgrd) (@lmgrd-SLOG@) Socket interface: IPV6
11:53:28 (lmgrd) (@lmgrd-SLOG@) Listening port: 27001
11:53:28 (lmgrd) (@lmgrd-SLOG@)
11:53:28 (lmgrd) (@lmgrd-SLOG@) === Startup Info ===
11:53:28 (lmgrd) (@lmgrd-SLOG@) Is LS run as a service: Yes
11:53:28 (lmgrd) (@lmgrd-SLOG@) Server Configuration: Single Server
11:53:28 (lmgrd) (@lmgrd-SLOG@) Command-line options used at LS startup: -c <licpath>\ALL_IN_USE_TEST.lic -l <logpath>\lmgrd.log -z -s
11:53:28 (lmgrd) (@lmgrd-SLOG@) License file(s) used:  <licpath>\ALL_IN_USE_TEST.lic
```

## Vendor daemon initial startup information (#4)

The vendor daemon startup information includes the daemon name (EMCLM) and the license keys found with comments as to whether they are expired or available for checkout.

```
11:53:28 (lmgrd) (@lmgrd-SLOG@) ===============================================
11:53:28 (lmgrd) Starting vendor daemons ... (#4)
11:53:28 (lmgrd) Started EMCLM (pid 7604)
11:53:28 (EMCLM) FlexNet Licensing version v11.12.0.0 build 136775 i86_n3
11:53:28 (EMCLM) Feature lic010 superseded by lic004
11:53:28 (EMCLM) Feature lic010 superseded by lic004
11:53:28 (EMCLM) SLOG: Summary LOG statistics is enabled.
11:53:28 (EMCLM) SLOG: FNPLS-INTERNAL-CKPT1
11:53:28 (EMCLM) SLOG: FNPLS-INTERNAL-CKPT2
11:53:28 (EMCLM) EXPIRED: s2
11:53:28 (EMCLM) EXPIRED: s4
11:53:28 (EMCLM) EXPIRED: s99
11:53:28 (EMCLM) EXPIRED: lic001
11:53:28 (EMCLM) EXPIRED: lic004
11:53:28 (EMCLM) EXPIRED: lic008
11:53:28 (EMCLM) Server started on <LSsystemname> for:  s1
11:53:28 (EMCLM) s3              s5              s6
11:53:28 (EMCLM) s7              lic001          lic001
11:53:28 (EMCLM) lic001          lic009          lic011
11:53:28 (EMCLM) lic011          lic012          lic013
11:53:28 (EMCLM) lic014          lic111          lic114
11:53:28 (EMCLM) EXTERNAL FILTERS are OFF
11:53:28 (lmgrd) EMCLM using TCP-port 21980
EMC vendor daemon built from FNP 11.12.0 IPv6 for Windows server 2008 SP2 32-bit and CLP 3.4.011:53:28 (EMCLM)
```

### Vendor daemon detailed startup information (#5)

```
11:53:28 (EMCLM) (@EMCLM-SLOG@) ================================================
11:53:28 (EMCLM) (@EMCLM-SLOG@) === Vendor Daemon === (#5)
11:53:28 (EMCLM) (@EMCLM-SLOG@) Vendor daemon: EMCLM
11:53:28 (EMCLM) (@EMCLM-SLOG@) Start-Date: Thu Aug 20 2015 11:53:28 Eastern Daylight Time
11:53:28 (EMCLM) (@EMCLM-SLOG@) PID: 7604
11:53:28 (EMCLM) (@EMCLM-SLOG@) VD Version: v11.12.0.0 build 136775 i86_n3 ( build 136775 (ipv6))
11:53:28 (EMCLM) (@EMCLM-SLOG@)
11:53:28 (EMCLM) (@EMCLM-SLOG@) === Startup/Restart Info ===
11:53:28 (EMCLM) (@EMCLM-SLOG@) Options file used: None
11:53:28 (EMCLM) (@EMCLM-SLOG@) Is vendor daemon a CVD: No
11:53:28 (EMCLM) (@EMCLM-SLOG@) Is TS accessed: No
11:53:28 (EMCLM) (@EMCLM-SLOG@) TS accessed for feature load: -NA-
11:53:28 (EMCLM) (@EMCLM-SLOG@) Number of VD restarts since LS startup: 0
11:53:28 (EMCLM) (@EMCLM-SLOG@)
11:53:28 (EMCLM) (@EMCLM-SLOG@) === Network Info ===
11:53:28 (EMCLM) (@EMCLM-SLOG@) Socket interface: IPV6
11:53:28 (EMCLM) (@EMCLM-SLOG@) Listening port: 21980
11:53:28 (EMCLM) (@EMCLM-SLOG@) Daemon select timeout (in seconds): 1
11:53:28 (EMCLM) (@EMCLM-SLOG@)
11:53:28 (EMCLM) (@EMCLM-SLOG@) === Host Info ===
11:53:28 (EMCLM) (@EMCLM-SLOG@) Host used in license file: <LSsystemname>
11:53:28 (EMCLM) (@EMCLM-SLOG@) Running on <Physical/Virtual>:  Virtual
11:53:28 (EMCLM) (@EMCLM-SLOG@) Hypervisor (if virtual): Unknown Hypervisor
11:53:28 (EMCLM) (@EMCLM-SLOG@) LMBIND needed: No
11:53:28 (EMCLM) (@EMCLM-SLOG@) LMBIND port: -NA-
```

### License operations (#6)

```
11:53:28 (EMCLM) (@EMCLM-SLOG@) ================================================
11:55:30 (EMCLM) TCP_NODELAY NOT enabled
11:55:30 (EMCLM) OUT: "s1" <username>@<systemname> (#6)
11:55:30 (EMCLM) OUT: "s1" <username>@<systemname>
11:55:30 (EMCLM) UNSUPPORTED: "s2" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) UNSUPPORTED: "s2" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) OUT: "s3" <username>@<systemname>
11:55:30 (EMCLM) OUT: "s3" <username>@<systemname>
11:55:30 (EMCLM) UNSUPPORTED: "s4" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) UNSUPPORTED: "s4" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) OUT: "s5" <username>@<systemname>
11:55:30 (EMCLM) OUT: "s5" <username>@<systemname>
11:55:30 (EMCLM) DENIED: "s6" <username>@<systemname>  (Invalid host. (-9,333))
11:55:30 (EMCLM) DENIED: "s6" <username>@<systemname>  (Invalid host. (-9,333))
11:55:30 (EMCLM) OUT: "s7" <username>@<systemname>
11:55:30 (EMCLM) OUT: "s7" <username>@<systemname>
11:55:30 (EMCLM) UNSUPPORTED: "s99" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) UNSUPPORTED: "s99" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) OUT: "lic001" <username>@<systemname>
11:55:30 (EMCLM) OUT: "lic001" <username>@<systemname>
11:55:30 (EMCLM) OUT: "lic001" <username>@<systemname>
11:55:30 (EMCLM) OUT: "lic001" <username>@<systemname>
11:55:30 (EMCLM) UNSUPPORTED: "lic004" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) UNSUPPORTED: "lic004" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) UNSUPPORTED: "lic008" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) UNSUPPORTED: "lic008" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:30 (EMCLM) OUT: "lic009" <username>@<systemname>
11:55:30 (EMCLM) OUT: "lic009" <username>@<systemname>
11:55:30 (EMCLM) UNSUPPORTED: "lic010" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
11:55:53 (EMCLM) UNSUPPORTED: "s2" (PORT_AT_HOST_PLUS   ) <username>@<systemname>.corp.emc.com  (License server system does not support this feature. (
11:55:53 (EMCLM) UNSUPPORTED: "s2" (PORT_AT_HOST_PLUS   ) <username>@<systemname>.corp.emc.com  (License server system does not support this feature. (
11:56:32 (EMCLM) OUT: "s7" <username>@<systemname>.corp.emc.com  (500 licenses)
11:57:04 (EMCLM) IN: "s7" <username>@<systemname>.corp.emc.com  (500 licenses)
13:15:51 (EMCLM) OUT: "s1" <username>@<systemname>
13:15:51 (EMCLM) OUT: "s1" <username>@<systemname>
13:15:51 (EMCLM) UNSUPPORTED: "s2" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
13:15:51 (EMCLM) UNSUPPORTED: "s2" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
13:15:51 (EMCLM) OUT: "s3" <username>@<systemname>
13:15:51 (EMCLM) OUT: "s3" <username>@<systemname>
13:15:51 (EMCLM) UNSUPPORTED: "s4" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
13:15:51 (EMCLM) UNSUPPORTED: "s4" (PORT_AT_HOST_PLUS   ) <username>@<systemname>  (License server system does not support this feature. (-18,327))
13:15:51 (EMCLM) OUT: "s5" <username>@<systemname>
13:15:51 (EMCLM) OUT: "s5" <username>@<systemname>
13:15:51 (EMCLM) DENIED: "s6" <username>@<systemname>  (Invalid host. (-9,333))
```

### License Server and vendor daemon shutdown process (#7)

```
13:26:46 (lmgrd) EMCLM exited with status 58 () (#7)
13:26:46 (lmgrd) Since this is an unknown status, license server
13:26:46 (lmgrd) manager (lmgrd) will attempt to re-start the vendor daemon.
13:26:46 (lmgrd) EXITING DUE TO SIGNAL 1
```

## Lmgrd error “no such file or directory” upon License Server startup on Linux

After you install the EMC License Server software on a Linux platform, the following error regarding a missing file may appear upon starting the License Server (lmgrd), even if you determine the file does exist by running `# ls -l ./lmgrd -rwxr-xr-x 1 root root 1509320 Aug13 22:44 ./lmgrd`.

```
"-bash: ./lmgrd: No such file or directory"
```

This error occurs due to a missing library, typically **ld-lsb-x86-64.so.3**. To determine the missing library, run the readelf utility and search for the text `[Requesting program interpreter: /lib64/<library name>]`. For example, running `# readelf -a ./lmgrd | grep interpreter` will return the output `[Requesting program interpreter: /lib64/ld-lsb-x86-64.so.3]` if the missing library is **ld-lsb-x86-64.so.3**.

**Note:** Use `grep` within the command as shown in the example above to reduce the length of output from `readelf -a` so that you can more easily identify the missing library.

If the library does not exist on your system, or the incorrect version is installed, you must install the correct package. To verify the package the library belongs to, you can run an rpm query if rpm packages are on your system.

```
# rpm -qf /lib64/ld-lsb-x86-64.so.3 lsb-4.0-22.3.1.x86_64
```

After installing the package that contains the required library, the License Server should start as long as you properly installed valid license files.

# License Server Management Troubleshooting

You first need to determine if the License Server, and its companion EMC vendor daemon process, are both running. The following topics provide techniques for checking the status.

## List All Processes

Use a tool, a utility, or a system command appropriate for your server platform to list all running processes or services. You should see the lmgrd and EMCLM processes listed and running.

The License Server communicates with the EMC vendor daemon, which performs the license check out and check in operations.

If either process is not running, then examine the `lmgrd.log` file for error messages.

If the processes are not running or if the debug log file indicates that the License Server was stopped, start LMTOOLS and check the **Server Status** tab, or run lmgrd from the command line with appropriate options.

## Run “lmutil lmstat –a”

Run the "`lmutil lmstat -a`" console command and review its output. This command uses the license file path to locate the license file and determine if the file is being used with a running License Server.

## Enable Vendor Daemon Debug Log

The EMCLM vendor daemon can output debug messages to its own log file. This will help isolate EMC product messages from all lmgrd output messages.

Add the DEBUGLOG line to the options file for the EMCLM vendor daemon. Specify just the file name or the full path to the file. Precede the path with a '+' character to append log entries; otherwise, the file is overwritten each time the daemon is started.

```
DEBUGLOG [+]debug_log_path
```

Name the file `EMCLM.opt` and place it in the same directory as the License Server files. Edit the license file to alter the VENDOR line to point to the options file:

```
VENDOR EMCLM OPTIONS=<options_file_path>
```

Then run the "`lmutil lmreread`" console command to force the License Server to re-read the license files and the new options file.

### Windows and LMTOOLS

On the Windows platform, you can manage the License Server by using the LMTOOLS Windows application.

Verify that the service is running by checking the **Config Services** tab and verify the service name and paths.

Click the **View Log** button to examine the License Server log file.

Go to the **Server Status** tab and click the **Perform Status Enquiry** button to review messages in a scrolled text region.

## FLEXLM_DIAGNOSTICS

The ability for an EMC licensed-enable software product to produce diagnostic output is controlled by the product and implementations likely vary across products.

FLEXLM_DIAGNOSTICS is an environment variable that causes the application to produce diagnostic information when a checkout is denied. The format of the diagnostic information may change over time.

On Linux, the diagnostic output goes to stderr.

On Windows, the output is a file called `flexpid.log` where pid is the application's process ID. The file is found in the client's main installation directory.

### Level 1 Content

If FLEXLM_DIAGNOSTICS is set to 1, then the standard error message is presented, along with a complete list of license files that the application tried to use.

```
setenv FLEXLM_DIAGNOSTICS 1
```

### Level 2 Content

If FLEXLM_DIAGNOSTICS is set to 2, then in addition to level 1 output, the checkout arguments are presented.

```
setenv FLEXLM_DIAGNOSTICS 2
```

## Preparing For a Service Call

When you call an EMC support person, be prepared with answers to the following questions:

- What kind of system is your License Server running on?
- What version of the operating system are you running?
- What system and operating system is the application running on?
- What version of EMC License Server does the licensed application use?
- What error or warning messages appear in the log file?
- What is the output from running lmstat -a?
- Did the server start correctly?
- Are you running other EMC or non-EMC licensed products?

# Chapter 10 Error Codes

This chapter presents the following topics:

# Introduction

This section documents license error messages, including general format and error message descriptions. Most of these errors are generated by the EMC license-enabled software and not the EMC License Server. The EMC product software must be able to report these errors in log files or user interfaces.

# Error Message Format

FlexNet Publisher error messages presented by applications have multiple components, which are described in the following table. An error message may also contain other optional supporting information.

**Table 4. Descriptions of error message components**

| Component | Description | Required |
|---|---|---|
| Error Number | A positive or negative integer that identifies the error. | Yes |
| Error Text | A sentence that summarizes the issue. | Yes |
| Error Explanation | A paragraph that explains the problem and provides possible solutions or workarounds. | No |
| Minor Error Number | A positive integer. These numbers are unique error identifiers and are used by software publishers for more advanced support assistance. Their meaning is not documented. | Yes |
| System Error Number | An error code last set by the operating system. | No |
| System Error Explanation | Sentence that explains the system error. | No |

These error messages may occur in one of two formats, or they may appear in a format customized by the application.

## Format 1 (short)

```
error text (lm_errno, minor_num:sys_errno) [sys_error_text]
```

## Format 2 (long)

```
error text
error explanation
[Optional Supporting information]
error: lm_errno, minor_num. [System Error: sys_errno]
["system_error_text"]
```

# Tabular Summaries of Error Codes

The following tables summarize the most common errors produced by licensed applications.

**Table 5. Error codes and their descriptions**

| Error Code | Description |
|---|---|
| 21 | lc_flexinit failed because of insufficient rights to start the FlexNet Publisher Licensing Service. Resolve this by setting the service to start automatically. |
| 20 | The Licensing Service is not installed. |
| 13 | The computed path to the required file is too long for the Mac OS X operating system. |
| 12 | An invalid bundle ID on Mac OS X operating system. |
| 11 | The framework specified by the bundle ID was not loaded. |
| 10 | Error creating path from URL. |
| 9 | Error creating URL. |
| 8 | The path string was not specified in UTF-8 format. |
| 7 | A call to lc_flexinit is not allowed after a call to lc_flexinit_cleanup. |
| 6 | Either the activation utility has not been processed using the preptool, or the activation library for the activation utility cannot be found. |
| 5 | Unable to allocate resources. |
| 4 | Initialization failed. |
| 3 | Unsupported version of the operating system. |
| 2 | Unable to load activation library. |
| 1 | Unable to find activation library. |
| -1 | Cannot find license file. |
| -2 | Invalid license file syntax. |
| -3 | No license server system for this feature. |
| -4 | The licensed number of users already has been reached. |
| -5 | No such feature exists. |
| -6 | No TCP/IP port number in license file, and the License Service does not exist. (pre-v6 only) |
| -7 | No socket connection to license server manager service. |
| -8 | Invalid (inconsistent) license key or signature.<br>The license key/signature and data for the feature do not match. This usually happens when a license file has been altered. |
| -9 | Invalid host:<br>The hostid of this system does not match the hostid specified in the license file. |

| Error Code | Description |
|---|---|
| -10 | A feature has expired. |
| -11 | Invalid date format in license file. |
| -12 | Invalid returned data from license server system. |
| -13 | No SERVER lines in license file. |
| -14 | Cannot find SERVER host name in network database.<br><br>The lookup for the host name on the SERVER line in the license file failed. This often happens when NIS or DNS or the hosts file is incorrect. Work around: Use the IP address. For example,123.456.789.123, instead of host name. |
| -15 | Cannot connect to license server system.<br><br>The server (lmadmin or lmgrd) has not been started yet, or the wrong port@host or license file is being used, or the TCP/IP port or host name in the license file has been changed.<br><br>Windows XP SP2 platforms have a limit on the number of TCP/IP connection attempts per second that can be made, which your application may have exceeded. Refer to the manufacturer's documentation on how to change this limit. |
| -16 | Cannot read data from License Server system. |
| -17 | Cannot write data to License Server system. |
| -18 | License Server system does not support this feature. |
| -19 | Error in select system call. |
| -20 | License Server system is busy (no majority). |
| -21 | License file does not support this version. |
| -22 | Feature check-in failure detected at License Server system. |
| -23 | License Server system temporarily busy (new server connecting). |
| -24 | Users are queued for this feature. |
| -25 | License Server system does not support this version of this feature. |
| -26 | Request for more licenses than this feature supports. |
| -29 | Cannot find Ethernet device. |

| Error Code | Description |
|---|---|
| -30 | Cannot read license file. |
| -31 | The feature start date is in the future. |
| -32 | No such attribute. |
| -33 | A bad encryption handshake with the vendor daemon occurred. |
| -34 | The clock difference between client and License Server system is too large. |
| -35 | In the queue for this feature. |
| -36 | The feature database is corrupted in the vendor daemon. |
| -37 | Duplicate selection mismatch for this feature. Obsolete with version 8.0 or later vendor daemon. |
| -38 | User/host on EXCLUDE list for feature. |
| -39 | User/host not on INCLUDE list for feature. |
| -40 | Cannot allocate dynamic memory. |
| -41 | The feature was never checked out. |
| -42 | Invalid parameter. |
| -47 | The clock setting check was not available in the vendor daemon. |
| -52 | The vendor daemon did not respond within the timeout interval. |
| -53 | The checkout request was rejected by the vendor-defined checkout filter. |
| -54 | No FEATURESET line in license file. |
| -55 | Incorrect FEATURESET line in license file. |
| -56 | Cannot compute FEATURESET data from license file. |
| -57 | A socket call failed. |
| -59 | A message checksum failure occurred. |
| -60 | The License Server system message checksum failed. |
| -61 | Cannot read license file data from License Server system. |

| Error Code | Description |
|---|---|
| -62 | The network software (TCP/IP) is not available. |
| -63 | You are not a license administrator. |
| -64 | An lmremove request occurred before the minimum lmremove interval. |
| -67 | No licenses are available to borrow. |
| -68 | The license BORROW support is not enabled. |
| -69 | FLOAT_OK cannot run standalone on a License Server system. |
| -71 | Invalid TZ environment variable. |
| -73 | A local checkout filter rejected the request. |
| -74 | Attempt to read beyond end of license file path. |
| -75 | SYS$SETIMR call failed (VMS). Indicates an error due to an operating system failure. |
| -76 | Internal licensing error. |
| -77 | An invalid version number was used; it must be a floating-point number with no letters. |
| -82 | Invalid PACKAGE line in license file. |
| -83 | The licensing version of client is newer than the server. |
| -84 | USER_BASED license has no specified users. See the License Server system log. |
| -85 | License Server system does not support this request. |
| -87 | Checkout exceeds the MAX specified in the options file. |
| -88 | The system clock has been set back. |
| -89 | This platform is not authorized by your license. |
| -90 | Future license file format or misspelling in license file.<br>The file was issued for a later version of FlexNet Licensing than this program understands. |
| -91 | Encryption seeds are non-unique. |
| -92 | A feature was removed during lmreread, or a wrong SERVER line hostid was used. |

| Error Code | Description |
|---|---|
| -93 | This feature is available in a different license pool.<br>This is a warning condition. The server has pooled one or more INCREMENT lines into a single pool, and the request was made on an INCREMENT line that has been pooled. |
| -94 | Attempt to generate a license with incompatible attributes. |
| -95 | Network connect to THIS_HOST failed.<br>Change this_host on the SERVER line in the license file to the actual host name. |
| -96 | The License Server machine is down or not responding.<br><br>See the system administrator about starting the server, or make sure that you are referring to the correct host (see LM_LICENSE_FILE environment variable). |
| -97 | The desired vendor daemon is down.<br>1) Check the lmadmin or lmgrd log file<br>2) Try lmreread. |
| -98 | This FEATURE line cannot be converted to decimal format. |
| -99 | The decimal format license is typed incorrectly. |
| -100 | Cannot remove a linger license. |
| -101 | All licenses are reserved for others.<br><br>The system administrator has reserved all the licenses for others. Reservations are made in the options file. The server must be restarted for options file changes to take effect. |
| -102 | A FLEXid borrow error occurred. |
| -103 | A Terminal Server remote client is not allowed. |
| -104 | Cannot borrow that long. |
| -105 | Feature already returned to License Server. |
| -106 | The License Server system is out of network connections.<br><br>The vendor daemon cannot handle any more users. See the debug log for further information. |
| -110 | Cannot read dongle: check dongle or driver. Either the dongle is unattached, or the necessary software driver for this dongle type is not installed. |

| Error Code | Description |
|---|---|
| -112 | Missing dongle driver.<br><br>In order to read the FLEXID hostid, the correct driver must be installed. These drivers are available from your software publisher. |
| -114 | A SIGN= keyword is missing from the license certificate.<br>You need to obtain a SIGN= version of this license from your publisher. |
| -115 | An error exists in the Public Key package. |
| -116 | TRL is not supported for this platform. |
| -117 | BORROW failed. |
| -118 | BORROW period expired. |
| -119 | You must run lmdown and lmreread on the license server. |
| -120 | You cannot lmdown the server when licenses are borrowed. |
| -121 | FLOAT_OK requires exactly one FLEXid hostid. |
| -122 | Unable to delete local borrow information. |
| -123 | Returning a borrowed license early is not supported. Contact the publisher for further details. |
| -124 | Error returning a borrowed license. |
| -125 | You must specify a PACKAGE component. |
| -126 | Composite hostid is not initialized. |
| -127 | An item needed for the composite hostid is missing or invalid. |
| -128 | Error: the borrowed license does not match any known server license. |
| -135 | Error enabling the event log. |
| -136 | Event logging is disabled. |
| -137 | Error writing to the event log. |
| -139 | Communications timeout. |

| Error Code | Description |
|---|---|
| -140 | Bad message command. |
| -141 | Error writing to a socket. Peer has closed the socket. |
| -142 | Error: you cannot generate version specific license tied to a single hostid, which is composite. |
| -143 | Version-specific signatures are not supported for uncounted licenses. |
| -144 | License template contains redundant signature specifiers. |
| -145 | Bad V71_LK signature. |
| -146 | Bad V71_SIGN signature. |
| -147 | Bad V80_LK signature. |
| -148 | Bad V80_SIGN signature. |
| -149 | Bad V81_LK signature. |
| -150 | Bad V81_SIGN signature. |
| -151 | Bad V81_SIGN2 signature. |
| -152 | Bad V84_LK signature. |
| -153 | Bad V84_SIGN signature. |
| -154 | Bad V84_SIGN2 signature. |
| -155 | A required license key is missing from the license certificate. The application requires a license key in the license certificate. You need to obtain a license key version of this certificate from your publisher. |
| -156 | An invalid signature was specified with the AUTH= keyword. |
| -157 | The trusted storage has been compromised; a repair is needed. Contact your publisher for repair instructions. |
| -158 | Trusted storage open failure. Contact your publisher for further information. |
| -159 | Invalid fulfillment record. Contact your publisher for further information. |
| -160 | An invalid activation request was received. Contact your publisher for further information. |

| Error Code | Description |
|---|---|
| -161 | No fulfillment exists in the trusted storage which matches the request. Contact your publisher for further information. |
| -162 | An invalid activation response was received. Contact your publisher for further information. |
| -163 | Cannot return the specified activation. Contact your publisher for further information. |
| -164 | Return count(s) would exceed the maximum for the fulfillment. Contact your publisher for further information. |
| -165 | No repair count is left. Contact your publisher for further repair authorization. |
| -166 | Specified operation is not allowed. Contact your publisher for further information. |
| -167 | The requested activation has been denied because the user or host is excluded from activating this entitlement by a specification in the options file. |
| -168 | The options file contains include specifications for the entitlement, and this user or host is not included in these specifications. |
| -169 | Activation error. Contact your publisher for further information. |
| -170 | An invalid date format occurred in trusted storage. It may have been caused by setting your system clock to an earlier date. Check that your system clock is set to the current date and time. |
| -171 | Message encryption failed: Internal error. |
| -172 | Message decryption failed: Internal error. |
| -173 | Bad filter context: Internal error. |
| -174 | A SUPERSEDE feature conflict exists. Contact your publisher for further information. |
| -175 | An invalid SUPERSEDE_SIGN syntax exists. Contact your publisher for further information. |
| -176 | SUPERSEDE_SIGN does not contain a feature name and license signature. Contact your publisher for further information. |
| -177 | ONE_TS_OK is not supported in this Windows platform. |
| -178 | Internal error. |
| -179 | Only one terminal server remote client checkout is allowed for this feature. |
| -180 | Internal error. |

| Error Code | Description |
|---|---|
| -181 | Internal error. |
| -182 | Internal error. |
| -183 | More than one Ethernet hostid is not supported in the composite hostid definition. Contact your publisher for further information. |
| -184 | The number of characters in the license file paths exceeds the permissible limit.<br>There is a limit on the number of license files that can be used by a License Server manager. This limit is on the number of characters in the combined license file paths to the license files:<br>• Linux—40,960 characters<br>• Windows—20,400 characters<br>Reduce the number of license files, or relocate them so that the paths are shorter. |
| -187 | The time zone information could not be obtained.<br>A license that is time zone-limited could not be checked out because time zone information could not be obtained for the machine on which the license is required. Contact your publisher for further information. |
| -188 | License client time zone is not authorized for license rights. A license that is time zone-limited could not be checked out because the time zone of the machine on which the license is required does not match the time zone specified in the license. |
| -190 | The license specifies that it cannot be used on a virtual machine: The licensed application is installed on a virtual machine so checkout has been denied. Install the licensed application on a physical machine. Checked in physical machine only. |
| -191 | FEATURE can be checked out only from a virtual machine. The license specifies that it cannot be used on a physical machine. The licensed application is installed on a physical machine so checkout has been denied. Install the licensed application on a virtual machine. |
| -192 | A VM platform is not authorized by your license. |
| -193 | FNP vendor keys do not support Virtualization feature. |
| -194 | Checkout request was denied as it exceeds the MAX limit specified in the options file. |
| -195 | Binding agent API: Internal error. |
| -196 | Binding agent communication error. |
| -197 | Invalid Binding agent version. |
| -201 | Invalid IP address was used while overriding.<br>The IP address specified for the LM_A_INTERNET_OVERRIDE attribute, used to override the existing IP address, is invalid. |

# Chapter 11 Environment Variables

This chapter presents the following topic:

Environment variables are not required for the use of licensed applications. Environment variables are normally used for debugging or for changing the license default location.

The EMC license-enabled software product may instruct you to use, or not to use, these environment variables.

# How to Set Environment Variables

License-related environment variables are set two different ways:

- In the process environment
- In the Windows registry or in $HOME/.flexlmrc

## Windows Registry

On Windows XP systems, the registry location is:

```
HKEY_LOCAL_MACHINE\Software\FLEXlm License Manager
```

On Windows systems later than Windows XP, the location is:

```
HKEY_CURRENT_USER\Software\FLEXlm License Manager
```

**Table 6. Definitions of Window Registry Variables**

| Variable | Definition |
|---|---|
| EVENTTIMEOUT | (Windows only) Sets the maximum amount of time (in microseconds) that the License Server service (lmgrd) waits for the vendor daemon to start before switching to a "Running" status:<br>• If this variable is not defined, the default value 300000 is used.<br>• If the vendor daemon starts before the time limit is reached, the server service switches to "Running" once the vendor daemon starts.<br>• When the time limit is reached and the vendor daemon has not yet started, the server service does not start.<br>• A zero (0) value means that the server service does not attempt to start at all.<br>This variable is especially useful in scenarios where the licensed client and the license server are both running as services on the same machine. If the client service has a dependency on the License Server service, then checkouts fail if the vendor daemon is not running. Adjust this variable to allow enough time for the vendor daemon to start, thus increasing the likelihood of synchronization between service startups and initial checkouts. |
| FLEXLM_BATCH | (Windows only) Prevents interactive pop-ups from appearing. Set to 1 if you are using a batch application. (Version 7.0 and later clients) |
| FLEXLM_DIAGNOSTICS | Used for debugging where applications do not print error message text. Set to 1, 2, or 3, depending on the amount of diagnostic information desired. See FLEXLM_DIAGNOSTICS (Version 5.0 and later clients) |

| | |
|---|---|
| FLEXLM_TIMEOUT | (Windows only) Sets the timeout value that a licensed application uses when attempting to connect to a license server port in the range of 27000 through 27009.<br>Values are in microseconds, and fall within the range of 0 through 2,147,483,647. The default setting is 100,000 microseconds.<br>**Note**: For security purposes, best practice is not to use a default port for the license server. Instead, specify a port number outside the range of 27000 through 27009. |

On Linux, the equivalent information is stored in $HOME/.flexlmrc. In this file, the syntax is variable=value.

## Precedence

If the variable is LM_LICENSE_FILE or VENDOR_LICENSE_FILE, then both the environment and the registry are used, with the environment used first, and the registry appended to the path.

If it is a different variable, then if the environment is set, only that is used; otherwise, the registry is used. That is, the registry is only used if the environment is not set.

## Environment variables

The following table summarizes various environment variables and their definitions:

**Table 7. Definitions of environment variables**

| Variable | Definition |
|---|---|
| LM_BINDING_AGENT | LM_BINDING_AGENT must be of the form port@host, where port is the port number, which falls in the range of 27010 through 27019, and host is the hostname or IP address of the physical system on which lmbind is running. This physical system can be the hypervisor itself or a remote physical machine that communicates with the virtual machine through this protocol. Depending on your network settings, the host name might need to be a fully qualified domain name. For example, this variable might look like:<br>LM_BINDING_AGENT=27011@hostname.example.com<br>**Note:** EMC does not recommend using lmbind unless bare metal recovery blocking or binding is required with your licensed software product. |
| LM_BORROW | Used for initiating license borrowing and for setting the borrow period. On Linux, $HOME/<br>`.flexlmborrow` is used for the registry instead of $HOME/.flexlmrc. |
| LM_LICENSE_FILE or<br><br>VENDOR_LICENSE_FILE | Use to reset the path to the license file. Can be a license search path, separated by " : " on Linux and " ; " on Windows. If the VENDOR_LICENSE_FILE is used, then the VENDOR is the vendor daemon name used by this application. For example, EMC software products use EMCLM_LICENSE_FILE, which can be a file name or port@host. See also Setting the License Search Path Using an Environment Variable. VENDOR_LICENSE_FILE requires version 6.0 and later clients. |
| LM_SERVER_HIGHEST_FD | Used to set the highest file descriptor value, above which the License Server will not access. |

# Chapter 12 Contacting EMC Worldwide Licensing Support

This chapter presents the following topic:

# Contacting EMC Worldwide Licensing Support

If you have any questions about EMC Software Licensing, please contact our Worldwide Licensing Support team by following the below instructions:

1. Visit https://support.emc.com/servicecenter/ to:
   - Use the Live Chat between the hours of 3:00 AM and 7:00 PM Eastern.
   - Open a Service Request.
2. Contact EMC's live support team by calling 1-800-782-4362, option 4, option 4 (24/7).