License Administration Guide
FlexNet Publisher Licensing Toolkit 11.10
Legal Information

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# Introduction

This document describes FlexNet Publisher licensing for license administrators. It describes how to setup and administer FlexNet Publisher licensing for license models that require a license server.

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Overview of Licensing

FlexNet Publisher is a method of providing software licensing that has two basic components:

- **FlexEnabled application** - the software application that requires a license.
- **A license** - contains the license rights that define how the software application can be used.

Typically the license defines:

- What software functionality can be used. 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 include the feature ‘trial’, the ‘standard’ version of the product the features ‘trial’ and ‘basic’ and the ‘professional’ version ‘trial’, ‘basic’ and ‘extend’ features.
- What versions of the software can be used.
- How many copies of the software can be running.
- The systems on which the software can be used.
- The period during which the software can be used.

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

The license can be stored:

- **In a license file** - a text file, *file_name.lic*, whose contents are protected by signatures that are authenticated by the FlexNet Publisher licensing components.
- **In trusted storage** - a secure location whose contents are encrypted. Licenses are stored as *fulfillment records*. Fulfillment records in trusted storage can be read only by FlexNet Publisher licensing components.

The FlexEnabled application can obtain a license directly, either from a license file or from *local* trusted storage on the same machine. Some license models, described as *served*, provide licenses that are held centrally by a *license server* and used by FlexEnabled applications connected to the license server across a TCP/IP network.
Chapter 1: Overview of Licensing
License Server

This document describes how to install and use a license server to provide licenses for FlexEnabled products that use served license models. The basic license model that requires a license server is referred to by several 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 license server controls the use of these licenses, which are not normally locked to a specific machine, and float on the network. FlexNet Publisher 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.

**License Server**

The basic components of a FlexNet Publisher license server are as illustrated in the following diagram:

- **License server manager** - lmadmin or lmgrd supplied by your software supplier or available from Flexera Software.
- **License file** - created by your software supplier. In this document the supplier of a FlexEnabled application is referred to as the **publisher**.
- **Vendor daemon** - created by the publisher. Each publisher has their own vendor daemon. If you have FlexEnabled applications from several publishers, you will need to install multiple vendor daemons.
- **Debug log** - written by the license server manager.

![Figure 1-1: FlexNet Publisher license server](image-url)
The following components may be present on a license server:

- **Options file** - optional file that you create. Use it to limit license usage; for example, to allocate particular licenses to a user or group of users.
- **Report log** - optional file that can be used by FlexNet Manager, Flexera Software’s license management product. You enable report logging using the options file.
- **Trusted storage** - some publishers use trusted storage to store licenses. When trusted storage is used, the publisher provides additional components (not shown on Figure 1-1) that create trusted storage and add licenses to it. See Trusted Storage for an overview.

# Using a License Server with License Files

The following gives an outline of the steps in installing a license server and 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 license server(s) will be installed.
   - Determine the number of licenses and machines on which FlexEnabled applications will be installed. See Selecting a License Server Machine for further information.
   - Consider what method, if any, you want to use to ensure that, whenever possible, licenses are available to your end users. See Ensuring License Availability for further information.

2. Install the license server components.
   The publisher will supply a copy of their vendor daemon and instructions for installing it. The license server manager, lmadmin or lmgrd, may be supplied by the publisher or you can download a copy from the Flexera Software website. It is recommended that you install the latest version of the license server manager.

3. Obtain details of the license server machine(s) and send them to the publisher.
   Normally publishers supply concurrent licenses that are locked to a specific license server. When licenses are held in license files, they 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 publisher will provide instructions on what hostid they are using for your licenses and platforms. They may supply an application that you can run to obtain the hostid or ask you to use the FlexNet Publisher utility, lmhostid, which you can download from the Flexera Software website. If you are using lmadmin, it displays the standard hostids for the machine on which it is running in **System Information**.
   Depending on the license model, the publisher may require other details of your license server, the machine on which it is running, and details of your network.

4. Install licenses on the license server.
   The publisher may specify a particular location for the license files on the license server. When no specific location is required, see information in Locating Licenses for instructions.

5. Install the FlexEnabled application on end user machines.
   The publisher will supply installation instructions for installing the FlexEnabled application.
6. Set up end user machines to access the license server.

There are several methods of configuring the end user machine to access a single license server or multiple
license servers. These depend on the contents of the license files supplied by the publisher and your license
server(s) configuration. See information in Locating Licenses for instructions.

7. Optionally, create an options file.

If you want 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. See instructions in Managing the
Options File.

8. Configure and start up the license server manager.

There is a fundamental difference between the configuration of lmadmin and lmgrd so the processes required
for each are separately outlined here:

**lmadmin** - the configuration settings are permanent and are mainly set using the user interface. For details
see lmadmin online help and Using lmadmin.

**lmgrd** - the configuration settings are set when lmgrd is started. They are not persistent. For details see lmgrd
- License Server Manager.

You can manage and monitor the operation of the license server using the license server manager: lmadmin
provides direct management and monitoring of the license server through its user interface; lmgrd provides limited
information as command-line output. Additional utilities are provided on the Flexera Software website for
management and monitoring of the license server: for details see Using License Administration Tools. For more
comprehensive monitoring and reporting of license usage use FlexNet Manager. FlexNet Manager is a Web-based
administration and reporting tool for FlexNet licenses and license servers.
Some publishers use trusted storage to store licenses. They may store all of their licenses in trusted storage or use a combination of licenses held in license files and in trusted storage. You can use a single license server to serve licenses from license files and from trusted storage.

**Overview of Trusted Storage**

Trusted storage is a secure location that is locked to the machine on which it is located using a combination of machine identities. The contents of trusted storage are encrypted and can only be accessed by FlexEnabled components. This method of storing licenses enables your publisher to provide additional license models and automate some licensing processes.

**Automated Delivery of Licenses to a License Server**

Using trusted storage the publisher can provide an automated method of delivering licenses to a license server. The basis of this is a series of transactions between the license server and a publisher server normally over an Internet connection. However, when a network connection is not available, the messages that implement these transactions can be transmitted by other means.

*Activation* is the basic transaction between the license server and the publisher server. It configures trusted storage for that publisher and writes a *fulfillment record* to trusted storage. The fulfillment record contains licenses defined using a similar format to that used for licenses held in license files.

The other two types of transaction between a license server using trusted storage and a publisher server are optional:

- *Return* - used to return a fulfillment record (and the licenses it contains) from trusted storage to the publisher server it was issued by.
- *Repair* - used to repair compromised fulfillment records in trusted storage.
By using a combination of return and activation transactions your publisher can automate these type of licensing scenarios:

- **Upgrade to a new version** - the old license is returned to your publisher server so that entitlement to the upgrade can be checked and then a new license is transmitted using an activation transaction. These two transactions may be completely transparent to you.

- **Rehost of license server** - when you need to move a license server to a different machine, a combination of return and then activation transactions can provide a completely automated transfer.

Please note that not all publishers will provide these facilities.

### Using Licenses from Trusted Storage on a License Server

Two types of licenses may be used in trusted storage on a license server. Your publisher may provide either or both of these types of license. They are used to provide different licensing models.

- **Concurrent** - allows a fixed number of concurrent users to use licensed features at any one time. The license server controls the use of these licenses, which are not normally locked to a specific machine, and float on the network. FlexNet Publisher 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.

- **Activatable** - licenses are distributed by the license server to network machines to provide local licenses for FlexEnabled applications. In this license model FlexEnabled components on the network machine request a license from the license server. License rights held in trusted storage on the license server are transferred to trusted storage on the network machine. This provides a license that is locked to the network machine. Depending on which license models your publisher is providing, these licenses may be of limited duration and automatically return to the license server when they expire on the network machine, or may be transferred to the network machine ‘permanently’.

### Trusted Storage Components on a License Server

The basic components of a FlexNet Publisher license server that uses licenses held in trusted storage are as illustrated in the following diagram:

- **License server manager** - lmadmin or lmgrd supplied by your publisher or available from Flexera Software.

- **Bootstrap license file** - created by your publisher. Required for starting the license server manager when the license server is using trusted storage to store all its licenses.

- **Vendor daemon** - created by the publisher. This must be the publisher vendor daemon that can access trusted storage. Ensure that you always use the correct vendor daemon supplied by the publisher: an earlier version that is only able to use license files will not be able to use licenses held in trusted storage.

- **Trusted storage** - contains licenses in fulfillment records.
• **Server activation utility** - a FlexEnabled component that manages the transactions with the publisher server and creates and manages the contents of trusted storage.

---

**Figure 2-1:** License Server Using Licenses in Trusted Storage

The following components not shown on the diagram may be present on the license server:

- **Debug log** - written by the license server manager.
- **Options file** - optional file that you create.
- **Report log** - optional file used by FlexNet Manager.

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**Using a License Server with Trusted Storage**

The following gives an outline of the steps in installing a license server and using it to serve licenses from trusted storage. For further information about each of these steps read the relevant sections of this document.

**1.** Choose the machine(s) on which the license server(s) will be installed.

- Determine the number of licenses and machines on which FlexEnabled applications will be installed. See **Selecting a License Server Machine** for further information.
- Consider what method, if any, you want to use to ensure that whenever possible licenses are available to your end users. See **Ensuring License Availability** for further information.

**2.** Install the license server components.

The publisher will supply a copy of his vendor daemon and instructions for installing it. The latest license server manager, lmadmin, displays details of licenses held in trusted storage; lmgrd includes information about concurrent licenses held in trusted storage but does not display details of activatable licenses.
Therefore it is recommended that you install lmadmin as your license server manager. It may be supplied by the publisher or alternatively you can download a copy from the Flexera Software website. It is recommended that you install the latest version of the license server manager.

3. Install licenses on the license server.

The publisher will supply instructions and software that requests licenses from the publisher server. This process may be completely transparent to you. The publisher provides the interface for the installation of licenses so publisher’s licensing solutions may differ greatly. FlexNet Publisher is designed to allow publishers maximum flexibility in licensing models and processes.

4. Install the FlexEnabled application on end user machines.

The publisher will supply installation instructions for installing the FlexEnabled application and optionally any further FlexEnabled components.

5. Set up end user machines to access the license server to obtain concurrent licenses.

There are several methods of configuring the end-user machine to access a single license server or multiple license servers. These depend on the contents of any license files that may optionally be supplied by the publisher and your license server(s) configuration. See information in Locating Licenses for instructions.

6. Optionally, create an options file.

If you want 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. See instructions in Managing the Options File.

7. Configure and start up the license server manager.

8. Optionally, install node-locked licenses on end user machines using activatable licenses from the license server.

The publisher will supply instructions for requesting licenses from the license server. Additional components may be installed on the end user machine for this licensing model, see Distribution of Node-Locked Licenses to Networked Machines.

**Distribution of Node-Locked Licenses to Networked Machines**

The distribution of licenses from a license server to machines running FlexEnabled applications via a network is one license model that can be provided using activatable licenses held in trusted storage on a license server. FlexEnabled components on the network machine send a request for a license to the license server. The vendor daemon processes this request and if a suitable license is available transfers it to the network machine.
The FlexEnabled components on the network machine install the license in trusted storage. Trusted storage is locked to the network machine and thus licenses held in trusted storage are node-locked to that machine.

**Figure 2-2:** FlexEnabled components for trusted storage on a network machine

The FlexEnabled components required to implement the distribution of node-locked licenses to networked machines using trusted storage are:

- **License server manager** - Use lmadmin as the license server manager as it displays details of activatable licenses held in trusted storage.

- **Vendor daemon** - created by the publisher. This must be the publisher vendor daemon that can access trusted storage. Ensure that you always use the correct vendor daemon supplied by the publisher: an earlier version that is only able to use license files will not be able to use licenses held in trusted storage.

- **Trusted storage on license server** - Contains activatable licenses that can be transferred to a networked machine: concurrent licenses can only be used to implement floating license models.

- **Server activation utility** (not shown) - The FlexEnabled component on the license server that requests and loads licenses into the server’s trusted storage from the publisher. This utility also manages the contents of the server’s trusted storage through return, repair, and modify requests.

- **Application activation utility** - A FlexEnabled component that requests a license from the enterprise license server or the publisher’s activation server and creates and manages the contents of trusted storage. The publisher can integrate this functionality into a component that provides other functions (for example, the utility could be integrated into the FlexEnabled application installer).

- **Trusted storage on the network machine** - Contains licenses locked to the machine.
• **FlexEnabled application** - The application that requires the license. Note that this component must have been built by your publisher so that it can access trusted storage: ensure that you use the correct version of the application.

You can use the options file to restrict the distribution of node-locked licenses to network machines. See Managing the Options File for details.

## Comparison of Trusted Storage and License Files

This section gives an overview of the significant differences between FlexEnabled products that use trusted storage and those that use license files. However, significant these changes might be, the methods for defining license rights in trusted storage are based on the methods for defining rights in license files. So if you have been using FlexEnabled products for years, the majority of your knowledge is directly applicable to licenses held in trusted storage.

### License Files and Fulfillment Records

The license model is defined primarily in the feature definition lines (FEATURE and INCREMENT) in a license file. There are the same feature definition lines inside fulfillment records in trusted storage. See the following diagram that shows a typical lmadmin display for a fulfillment record.
Figure 2-3: License server fulfillment record displayed by lmadmin

The fulfillment record PR-589df128 provides 10 activatable licenses for the product PRprofessional. Each activatable license licenses two features: PRbasic and PRadvanced. These two feature definition lines (in this example INCREMENT lines) are packaged together in a single fulfillment record.

Licenses held in trusted storage use all the mandatory fields and may contain most of the attributes described in Reading a License File. The following are the exceptions:

BORROW - normally this feature definition line attribute is not used for licenses held in trusted storage, the publisher will provide this licensing model using the Distribution of Node-Locked Licenses to Networked Machines using trusted storage on the network machine.

HOSTID - normally this feature definition line attribute is not required for licenses held in trusted storage, see Locking of Licenses using Hostid or Trusted Storage for details of how licenses are locked to a host machine.

SUPERSEDE - this feature definition line attribute is not supported for licenses held in trusted storage. A combination of return and activation transactions are used to remove the license for the old version of the application and replace it with a new license.

The following line types are not supported in trusted storage:

UPGRADE - a combination of return and activation transactions are used for an upgrade.
Chapter 2: Trusted Storage
Licensing in Virtual Environments

PACKAGE - a fulfillment record effectively packages multiple feature definition lines. When other functions for package suites are required, a PACKAGE line in a license file can be provided.

SERVER - not required.

VENDOR - not required, lmadmin provides direct vendor daemon configuration.

VM_PLATFORMS.

USE_SERVER - not required.

Locking of Licenses using Hostid or Trusted Storage

When license files are used, licenses are locked to a machine using a hostid. This identifies either the machine or a FlexNet ID dongle that is attached to a machine. The hostid is incorporated into the licenses supplied by the publisher so you must supply details of hostids before the publisher can provide your licenses. This procedure is repeated when licenses need to be moved to another machine.

Trusted storage is locked to the machine on which it is created using machine identities retrieved automatically by the FlexEnabled components when trusted storage is created. The licenses held in trusted storage are locked to the machine because they are held securely within trusted storage.

Licensing in Virtual Environments

The server-side activation application can run inside a virtual machine. See the current FlexNet Publisher Licensing Toolkit Release Notes for the hypervisors that FlexNet Publisher supports.

Binding in a Virtual Environment

The VMID (virtual machine instance ID) is the preferred binding identity used to configure trusted storage on the virtual machine. This binding element is a hash of the virtual machine’s UUID (universally unique ID). Examples of where the UUID for a virtual machine is defined include the uuid.bio entry in a VMWare vmx configuration file or the bios guid entry in a Hyper-V xml configuration file.

Note • Support for trusted-storage in virtualized environments does not require the lmbind utility.

Best Practices To Avoid Trusted-Storage Breakage

If the publisher chooses to bind trusted storage to the VMID, this binding will break should the UUID (from which the VMID is derived) ever change. The break prevents license leakage when virtual machine images are cloned. However, if you manage a virtualized environment where virtual machines are moved between different native (physical) systems, you do not want trusted storage to break each time you move a machine instance.
To prevent breakage, use these best practices:

- Do not change the UUID of the virtual machine when it is moved. (Normally, UUIDs change only if the virtual machine is cloned.)

- Save the configuration file (or at least the UUID) of each virtual machine on which trusted-storage license activation is performed. This file ensures that the UUID value used at the time of activation is available should you need to revert to this value.

- Should trusted storage break, use the activation utility to issue a Repair request; or reset the virtual machine’s UUID to the value it had at activation time (powering the machine off and then on after the reset).
Chapter 2: Trusted Storage
Licensing in Virtual Environments
Reading a License File

A license file contains information required to manage licenses for a FlexEnabled application. This information includes:

- License server names and hostids
- VENDOR names and paths to vendor daemon executables
- Feature information

The license file must be accessible to systems that run the FlexEnabled application or a license server. For details see Locating Licenses and Ensuring License Availability.

License File Format Overview

License files begins with either a single SERVER line or three SERVER lines (when configured for three-server redundancy) followed by one or more VENDOR lines, followed by one or more FEATURE or INCREMENT lines. In some cases, the license file requires no SERVER line and no VENDOR line.

Note • Eight-bit Latin-based characters are fully supported in license files, options files, log files, and FlexEnabled application environments.

See Counted vs. Uncounted Licenses for more information on SERVER and VENDOR line requirements.

You can modify these elements in the license file:

- On the SERVER line:
  - Host names on the SERVER lines
  - TCP/IP port numbers
  - HEARTBEAT_INTERVAL and PRIMARY_IS_MASTER properties
License File Syntax

This section describes the contents of the license file, including SERVER lines and VENDOR lines. This is an example of a license file for a single VENDOR name with two features.

SERVER my_server 17007ea8 1700
VENDOR sampled
FEATURE f1 sampled 1.000 01-Jan-2010 10 SIGN="..."
FEATURE f2 sampled 1.000 01-Jan-2010 10 SIGN="..."

This example allows the license server, called my_server with the hostid 17007ea8, to serve ten floating licenses for each feature, f1 and f2 to any user on the network.

SERVER Lines

The SERVER line specifies the host name and hostid of the license server and the TCP/IP port number of the license server manager (lmadmin or lmgrd). Normally a license file has one SERVER line. Three SERVER lines mean that you are using license servers configured for three-server redundancy. The absence of a SERVER line means that every feature definition line in the license file is uncounted.

The hostids from the SERVER lines are computed into the license key or signature on every feature definition line. For this reason, make sure you keep SERVER lines together with any feature definition lines as they were sent from the software publisher.

The format of the SERVER line is:

SERVER host hostid [port] [PRIMARY_IS_MASTER] [HEARTBEAT_INTERVAL=seconds]
For example:

SERVER my_server 17007ea8 21987

The following table describes the attributes on this line.

**Table 3-1 • SERVER Line Format**

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>host</td>
<td>The system host name or IP address. String returned by the UNIX hostname or uname -n command. On NT/2000/XP, ipconfig /all; on Windows 95/98/ME, winipcfg /all return the host name.</td>
</tr>
<tr>
<td>hostid</td>
<td>Usually the string returned by the lmhostid command. This is changed only by your publisher.</td>
</tr>
<tr>
<td>port</td>
<td>TCP/IP port number to use. A valid number is any unused port number between 0 and 64000. On UNIX, choose a port &gt;1024, since those &lt;1024 are privileged port numbers. If no TCP/IP port number is specified, one of the default ports in the range of 27000–27009 is used. You must specify a port number when the SERVER line defines license servers configured for three-server redundancy.</td>
</tr>
</tbody>
</table>
| PRIMARY_IS_MASTER | Used with license servers configured for three-server redundancy to indicate how master control is transferred between the primary and secondary servers.  

- If this is set and the primary server goes down, when the primary server comes back up again, it will always become the master.  
- If this is not set and the primary server goes down, the secondary server becomes the master and remains the master even when the primary server comes back up. The primary can only become the master again when the secondary license server fails.  

If both primary and secondary go down, licenses are no longer served. The tertiary server never becomes the master.  

This parameter is optional and is placed on the first SERVER line in the license file. You must be running a version 10.8 or later vendor daemon to use this parameter. |
VENDOR Lines

The VENDOR line specifies the daemon name and path. lmgrd uses this line to start the vendor daemon, and the vendor daemon reads it to find its options file. The format of the VENDOR line is shown below.

VENDOR vendor [vendor_daemon_path]\
  [[OPTIONS=]options_file_path] [[PORT=]port]

where:

Table 3-2 • VENDOR Line Format

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>vendor</td>
<td>Name of the vendor daemon used to serve some features in the file. This name cannot be changed.</td>
</tr>
<tr>
<td>vendor_daemon_path</td>
<td>Optional path to the executable for this daemon. Generally, the license administrator is free to install the vendor daemon in any directory. It is recommended, however, that it be installed in a local directory on the license server. If omitted, lmgrd looks for the vendor daemon binary in:</td>
</tr>
<tr>
<td></td>
<td>• the current directory</td>
</tr>
<tr>
<td></td>
<td>• the path specified in lmgrd's $PATH environment variable</td>
</tr>
<tr>
<td></td>
<td>• in the directory where lmgrd is located</td>
</tr>
<tr>
<td></td>
<td>If vendor_daemon_path is blank, then any options or TCP/IP port number specifications require the OPTIONS= and PORT= strings.</td>
</tr>
</tbody>
</table>
Chapter 3: Reading a License File

License File Syntax

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See Also
Managing the Options File for further information regarding options file contents.

USE_SERVER Line

The USE_SERVER line takes no arguments and has no impact on the license server. When the application sees the USE_SERVER line, it ignores everything in the license file except the preceding SERVER lines and transfers checkout validation to the vendor daemon.

USE_SERVER is recommended since it improves performance when a license server is used. For uncounted features, USE_SERVER is used to force logging of usage by the daemons.

FEATURE and INCREMENT Lines

A FEATURE and INCREMENT lines describe the license model for a product. Only the first FEATURE line for a given feature name is processed by the vendor daemon. If you want to have additional copies of the same feature (for example, to have multiple node-locked, counted features), then you must use multiple INCREMENT lines. INCREMENT lines form license groups, or pools, based on the following fields:

- feature name
- version
- DUP_GROUP
- FLOAT_OK
- HOST_BASED
- HOSTID
- PLATFORM
- USER_BASED

Table 3-2 • VENDOR Line Format

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>options_file_path</td>
<td>Full path to the options file for this daemon. An options file is not required. If omitted, the vendor daemon, by default, looks for a file called vendor.opt (where vendor is the vendor daemon name) located in the same directory as the license file.</td>
</tr>
<tr>
<td>port</td>
<td>Vendor daemon TCP/IP port number. The default, if port is not specified, is chosen by the operating system at run-time. Sites with Internet firewalls need to specify the TCP/IP port number the daemon uses. If a TCP/IP port number is specified on the VENDOR line, there may be a delay restarting the vendor daemon.</td>
</tr>
</tbody>
</table>

See Also
Managing the Options File for further information regarding options file contents.
Chapter 3: Reading a License File

License File Syntax

- VENDOR_STRING (if configured by the publisher as a pooling component)
- TZ
- VM_PLATFORMS

If two lines differ by any of these fields, a new group of licenses, called a license pool, is created in the vendor daemon, and this group is counted independently from other license pools with the same feature name. A FEATURE line does not give an additional number of licenses, whereas an INCREMENT line always gives an additional number of licenses.

The basic feature definition line format is:

```
{FEATURE|INCREMENT} feature vendor feat_version exp_date num_lic [optional_attributes] SIGN="<...>"
```

The six fields after the feature definition line keyword are required and have a fixed order. They are defined by the software publisher and cannot be changed. Table 3-3 presents these fields in the order they must appear.

### Table 3-3 • Feature Definition Line Required Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Name given to the feature by the software publisher.</td>
</tr>
<tr>
<td>vendor</td>
<td>Name of the vendor daemon; also found in the VENDOR line. The specified daemon serves this feature.</td>
</tr>
<tr>
<td>feat_version</td>
<td>Version of this feature that is supported by this license. When this field contains a date with the format yyyy.mmdd, this defines a date-based version that you can set as an Alert in the license server manager, ladmin.</td>
</tr>
<tr>
<td>exp_date</td>
<td>Expiration date of license in the format dd-mm-yyyy, for example, 07-may-2010. <strong>Note:</strong> If exp_date is the string &quot;permanent&quot; or the year is 0 (or 00, 000, 0000) then the license never expires.</td>
</tr>
<tr>
<td>num_lic</td>
<td>Number of concurrent licenses for this feature. If the num_lic is set to the string &quot;uncounted&quot; or 0, the licenses for this feature are uncounted and no license server is required but a hostid on the FEATURE line is required. See Counted vs. Uncounted Licenses.</td>
</tr>
<tr>
<td>SIGN=sign or AUTH=...</td>
<td>SIGN= signature to authenticate this FEATURE line. If your publisher has deployed his vendor daemon using the common vendor daemon technology, signatures are embedded within the AUTH= keyword. Contact your publisher for further details.</td>
</tr>
</tbody>
</table>

Table 3-4 lists attributes that may appear in a FEATURE or INCREMENT line. They are supplied at the discretion of the software publisher to define the license model. If present in the FEATURE or INCREMENT line, they must remain there and cannot be altered by the end user. These attributes have a keyword=value syntax where keyword is in uppercase.
In places where value is a string surrounded with double quotes ("..."), the string can contain any characters except a quote.

**Table 3-4 • Attributes Set by the Software Publisher**

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BORROW[=n]</strong></td>
<td>Enables license borrowing for a particular feature definition line. n is the number of hours that the license is borrowed. The default borrow period is 168 hours, or one week.</td>
</tr>
<tr>
<td><strong>DUP_GROUP=</strong></td>
<td>The syntax is:</td>
</tr>
<tr>
<td><strong>FLOAT_OK</strong></td>
<td>Enables mobile licensing via FLEXid with FLOAT_OK for a particular feature definition line. This feature definition line must also be node-locked to a FLEXid. When FLOAT_OK=server_hostid is specified on a FEATURE line: The server_hostid must refer to the same host that appears on the SERVER line of the license file. The license server runs only on the system with the hostid that lmhostid returns equal to the server_hostid specified with FLOAT_OK.</td>
</tr>
<tr>
<td><strong>HOSTID=</strong></td>
<td>Id of the host to which the feature line is bound. hostid is determined with the lmhostid utility. This field is required for uncounted licenses; but can be used for counted licenses as well. See Hostids for Supported Platforms for more information.</td>
</tr>
<tr>
<td><strong>HOST_BASED[=n]</strong></td>
<td>Host names must be specified in INCLUDE statements in the options file, and the number of hosts is limited to num_lic, or the number specified in =n.</td>
</tr>
<tr>
<td><strong>ISSUED=</strong></td>
<td>Date issued.</td>
</tr>
<tr>
<td><strong>ISSUER=</strong></td>
<td>Issuer of the license.</td>
</tr>
<tr>
<td><strong>NOTICE=</strong></td>
<td>A field for intellectual property notices.</td>
</tr>
</tbody>
</table>
### Attributes Set by the Software Publisher

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ONE_TS_OK</strong></td>
<td>Detects when a node-locked uncounted license is used by an application running under remote desktop.</td>
</tr>
<tr>
<td><strong>OVERDRAFT = ( n )</strong></td>
<td>The overdraft policy allows a software publisher to specify a number of additional licenses which users are allowed to use, in addition to the licenses they have purchased. This allows your users to not be denied service when in a &quot;temporary overdraft&quot; state. Usage above the license limit is reported by the FlexNet Manager reporting tool.</td>
</tr>
<tr>
<td><strong>PLATFORMS = &quot;...&quot;</strong></td>
<td>Usage is limited to the listed platforms.</td>
</tr>
<tr>
<td><strong>SN = serial_num</strong></td>
<td>Serial number, used to identify FEATURE or INCREMENT lines.</td>
</tr>
<tr>
<td><strong>START = dd–mmm–yyyy</strong></td>
<td>Start date.</td>
</tr>
<tr>
<td><strong>SUITE_DUP_GROUP = ( . . )</strong></td>
<td>Similar to DUP_GROUP but affects only the enabling FEATURE line for a package suite. It limits the total number of users of the package to the number of licenses, and allows the package to be shared among the users that have the SUITE checked out.</td>
</tr>
<tr>
<td><strong>SUPERSEDE = &quot;f1 f2 ...&quot;</strong></td>
<td>If this appears, all licenses issued before the date specified in ISSUED= are superseded by this line and become ineffective.</td>
</tr>
<tr>
<td><strong>SUPERSEDE_SIGN = {f1:xxxx, f2:xxxx}</strong></td>
<td>Overrides the license models of all feature definition lines or package lines defined as the value.</td>
</tr>
<tr>
<td><strong>SUPERSEDE_SIGN = {p1:xxxx, p2:xxxx}</strong></td>
<td></td>
</tr>
<tr>
<td><strong>TS_OK</strong></td>
<td>FlexNet Publisher detects when a node-locked uncounted license is running under Windows Terminal Server. To run the application via a Terminal Server client window, TS_OK must be added to the FEATURE line. Without TS_OK, a user running on a Terminal Server client is denied a license.</td>
</tr>
<tr>
<td>**TZ = [SERVERTZ] (&lt;[+-]hh&lt;.30</td>
<td>.45&gt; &lt;:[+-]hh&lt;.30</td>
</tr>
<tr>
<td><strong>USER_BASED[=( n )]</strong></td>
<td>Users must be specified in INCLUDE statements in the options file, and the number of users are limited to ( num_{_ lic} ), or the number specified in ( =n ).</td>
</tr>
<tr>
<td><strong>VENDOR_STRING = &quot;...&quot;</strong></td>
<td>This is a custom value defined by the software publisher and enclosed in double quotes.</td>
</tr>
</tbody>
</table>
Chapter 3: Reading a License File

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The following attributes listed in Table 3-5 are optional and are under control of the license administrator. These attributes have a keyword=value syntax where keyword is in lowercase.

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>asset_info=&quot;...&quot;</td>
<td>Additional information provided by the license administrator for asset management.</td>
</tr>
<tr>
<td>dist_info=&quot;...&quot;</td>
<td>Additional information provided by the software distributor.</td>
</tr>
<tr>
<td>sort=nnn</td>
<td>Specifies sort order of license file lines. See Sort Rules.</td>
</tr>
<tr>
<td>user_info=&quot;...&quot;</td>
<td>Additional information provided by the license administrator.</td>
</tr>
<tr>
<td>vendor_info=&quot;...&quot;</td>
<td>Additional information provided by the software publisher.</td>
</tr>
</tbody>
</table>

Examples
FEATURE sample_app sampled 2.300 31-dec-2010 20 SIGN="<...>"
INCREMENT f1 sampled 1.000 permanent 5 HOSTID=INTERNET=195.186.*.* NOTICE="Licensed to Sample corp" SIGN="<...>"

Sort Rules

Feature definition lines are automatically sorted when they are read from the license file. The default sorting rules are as follows:

1. License file. Automatic sorting does not occur across files in a license search path.
2. Feature name.
3. FEATURE before INCREMENT.
4. Uncounted before counted.
5. Version, later versions before earlier versions.
6. Issued date, in reverse order, newest first. The date is taken from ISSUED= or START=.
7. Original order is otherwise maintained.
To turn off automatic ordering, add \texttt{sort=nnn} to the feature definition line, where \texttt{nnn} is the same on all lines; \texttt{nnn} specifies the relative sort order. The default sort order value is \texttt{100}. Lines with a sort order value of less than \texttt{100} are sorted before all lines without this attribute, and lines with a sort order value greater than \texttt{100} appear after all unmarked lines. All lines with the same number are sorted as they appear in the file.

**Changes in FEATURE and INCREMENT Line Format**

The following lists the significant changes in the format of feature definition lines and when additional keywords were introduced.

- Version 7.1 and earlier feature definition line format uses \texttt{license_key}:
  \begin{verbatim}
  {FEATURE|INCREMENT} feature vendor feat_version exp_date \
  num_lic [optional_attributes] SIGN="<...>"
  \end{verbatim}
  The version 7.1 and earlier format is understood by the current release.

- The \texttt{SIGN=} keyword introduced in the version 7.1.

- For version 7.1 through version 8.0 client libraries and vendor daemons, the feature definition line must have a \texttt{SIGN=} signature and, for backward compatibility with version 8.1 and earlier, can contain a \texttt{license_key}:
  \begin{verbatim}
  {FEATURE|INCREMENT} feature vendor feat_version exp_date \
  num_lic [license_key] [optional_attributes] SIGN="<...>"
  \end{verbatim}

- \texttt{license_key} obsoleted in version 8.1 client library and vendor daemon

- The keyword “permanent” for \texttt{exp_date} introduced in version 6 client library.

- The keyword “uncounted” for \texttt{num_lic} introduced in version 6 client library.

- \texttt{BORROW} keyword introduced in version 8.0 client library and vendor daemon.

- \texttt{FLOAT_OK} keyword introduced in version 8.0 client library and vendor daemon.

- \texttt{TS_OK} keyword introduced in version 8.0 client library and vendor daemon.

- \texttt{AUTH} keyword introduced in version 10.8 client library and vendor daemon.

**PACKAGE Lines**

The purpose of the PACKAGE line is to support two different needs:

- To license a product SUITE, or

- To provide a more efficient way of distributing a license file that has a large number of features, which largely share the same FEATURE line arguments.

A PACKAGE line, by itself, does not license anything—it requires a matching feature definition line to license the whole package. A PACKAGE line is shipped by your software publisher with a product, independent of any licenses. Later, when you purchase a license for that package, one or more corresponding feature definition lines enable the PACKAGE line.
Chapter 3: Reading a License File

License File Syntax

Example

```plaintext
PACKAGE package vendor [pkg_version] COMPONENTS=pkg_list \ 
[OPTIONS=SUITE] [SUPERSEDE=["p1 p2 ..."]] ISSUED=date] 
SIGN="<...>"
```

Table 3-6 lists the PACKAGE line fields. They must appear in the order listed.

Table 3-6 • PACKAGE Line Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>package</td>
<td>Name of the package. The corresponding feature definition line must have the same name.</td>
</tr>
<tr>
<td>vendor</td>
<td>Name of the vendor daemon that supports this package.</td>
</tr>
<tr>
<td>pkg_version</td>
<td>Optional field specifying the package version. If specified, the enabling feature definition line must have the same version.</td>
</tr>
<tr>
<td>COMPONENTS=pkg_list</td>
<td>List of package components. The format is:</td>
</tr>
<tr>
<td></td>
<td>feature[[:version[:num_lic]]]</td>
</tr>
<tr>
<td></td>
<td>Packages must consist of at least one component. Version and count are optional, and if left out, their values come from the corresponding feature definition line. num_lic is only legal if OPTIONS=SUITE is not set—in this case the resulting number of licenses is num_lic on the COMPONENTS line multiplied by the number of licenses in the feature definition line. Examples:</td>
</tr>
<tr>
<td></td>
<td>COMPONENTS=&quot;comp1 comp2 comp3 comp4&quot;</td>
</tr>
<tr>
<td></td>
<td>COMPONENTS=&quot;comp1:1.5 comp2 comp3:2.0:4&quot;</td>
</tr>
<tr>
<td>OPTIONS=SUITE</td>
<td>Optional field. Used to denote a package suite.</td>
</tr>
<tr>
<td></td>
<td>If set, the corresponding feature of the same name as the package is checked out in addition to the component feature being checked out.</td>
</tr>
<tr>
<td></td>
<td>If not set, then the corresponding feature of the same name as the package is removed once the package is enabled; it is not checked out when a component feature is checked out.</td>
</tr>
<tr>
<td>OPTIONS=SUITE_RESERVED</td>
<td>Optional field. If set, reserves a set of package components. Once one package component is checked out, all the other components are reserved for that same user.</td>
</tr>
<tr>
<td>SUPERSEDE [=&quot;p1 p2 ...&quot;]</td>
<td>Optional field. Used in conjunction with ISSUED date. Replaces all PACKAGE lines for the same package name with ISSUED dates previous to dd-mmm-yyyy.</td>
</tr>
</tbody>
</table>
Chapter 3: Reading a License File

License File Syntax

Examples

PACKAGE suite sampled 1.0 SIGN="<...>" \
   COMPONENTS="comp1 comp2" OPTIONS=SUITE
FEATURE suite sampled 1.0 1-jan-2010 5 SIGN="<...>"

This is a typical OPTIONS=SUITE example. There are two features, “comp1” and “comp2,” which are each version 1.0, each with five non-expiring licenses available. When “comp1” or “comp2” is checked out, “suite” is also checked out.

PACKAGE suite sampled 1.0 SIGN="<...>" \
   COMPONENTS="apple:1.5:2 orange:3.0:4"
FEATURE suite sampled 1.0 1-jan-2010 3 SN=123 SIGN="<...>"

In this example, the component version overrides the feature version, and the number of licenses available for any component is the product of the three licenses for “suite” and the number of licenses for that component. The result is equivalent to:

FEATURE apple sampled 1.5 1-jan-2010 6  SN=123 SIGN="<...>"
FEATURE orange sampled 3.0 1-jan-2010 12 SN=123 SIGN="<...>"

Note • Changes to PACKAGE lines:

- Ability to store PACKAGE lines in separate files introduced in version 6 client library.
- pkg_version field required in version 7.1 and earlier client library.
- AUTH keyword introduced in version 10.8 client library and vendor daemon.

Table 3-6 • PACKAGE Line Fields

<table>
<thead>
<tr>
<th>Field</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISSUED=dd-mmm-yyyy</td>
<td>Optional field. Used in conjunction with SUPERSEDE. Replaces all PACKAGE lines for the same package name with ISSUED dates previous to dd-mmm-yyyy.</td>
</tr>
<tr>
<td>SIGN=sign or AUTH=...</td>
<td>SIGN= signature to authenticate this FEATURE line. If your publisher has deployed his vendor daemon using the common vendor daemon technology, signatures are embedded within the AUTH= keyword. Contact your publisher for further details.</td>
</tr>
</tbody>
</table>

UPGRADE Lines

UPGRADE feature vendor from_feat_version to_feat_version \
exp_date num_lic [options ... ] SIGN="<...>"

All the data is the same as for a FEATURE or INCREMENT line, with the addition of the from_feat_version field. An UPGRADE line removes up to the number of licenses specified from any old version (>= from_feat_version) and creates a new version with that same number of licenses.
For example, the two lines provide three version 1.0 licenses of f1 and two version 2.0 licenses of f1.

INCREMENT f1 sampled 1.000 1-jan-2010 5 SIGN="..."
UPGRADE f1 sampled 1.000 2.000 1-jan-2010 2 SIGN="..."

An UPGRADE line operates on the closest preceding FEATURE or INCREMENT line with a version number that is >= from_feat_version, and < to_feat_version.

Note • UPGRADE lines do not work for node-locked, uncounted licenses.

Feature Lines in Decimal Format

Licenses can be represented in decimal format. Decimal has the advantage that it is simpler to type in, and often the licenses are much shorter. A simple demo license in readable format:

FEATURE f1 sampled 1.00 1-jan-2010 0 HOSTID=DEMO SIGN="..."

and its decimal equivalent:

sampled-f1-00737-55296-1825

If needed, decimal lines can be mixed with readable format lines in a license file. Use the lminstall command to convert decimal licenses to readable format.

See Also
lminstall for additional information on the lminstall command.

Order of Lines in the License File

The order of the lines in a license file is not critical. They are sorted when they are processed so that in most cases the optimal result is achieved. However, version 7.0 and earlier versions of FlexEnabled applications and license servers implicitly impose an ordering to license file lines. Note the following suggestions for ordering lines in the license file:

• Place FEATURE lines before INCREMENT lines for the same feature.

The rules regarding FEATURE lines include the following: 1) only the first counted FEATURE line is observed by the license server, and 2) if both a FEATURE line and INCREMENT lines exist, the FEATURE line must appear first.
• Where multiple counted FEATURE lines exist for the same feature, make sure the desired FEATURE line appears first. All but the first is ignored.

• Place node-locked, uncounted lines before floating lines for the same FEATURE. Otherwise, it is possible the floating license is consumed instead of the node-locked license, resulting in denial for other users.

• The placement of a USE_SERVER line affects behavior. A USE_SERVER line is recommended. Normally, the USE_SERVER line is placed immediately after the SERVER line. However, place any uncounted licenses not served by SERVER before the USE_SERVER line. Make sure each user that needs the uncounted license has direct access to a current copy of the file. The advantage to placing USE_SERVER right after the SERVER line is users don’t need up-to-date copies of the license file.

See Also
Sort Rules
Locating Licenses

This section covers various topics that are related to the ability of FlexEnabled applications to locate licenses. The following are described:

- Determining a location for license files on a license server
- Configuring the machine where the FlexEnabled application is running to access licenses.

Determining the Location of the License File

Software publishers often recommend a specific location for your license file. You have the following options for making your licenses available to all systems:

- Place the license file in a partition which is available to all systems in the network that need it.
- Copy the license file to each of the individual systems.
- Set the LM_LICENSE_FILE or VENDOR_LICENSE_FILE (where VENDOR is the vendor daemon name) environment variable on the machines where the FlexEnabled applications are running to access license files or license servers. For details see Setting the License Search Path using an Environment Variable.

Do not choose a location for a license file where the path to the license file contains the @ symbol. The @ symbol is used to identify a license server as illustrated in Table 4-1.

Since the vendor daemon keeps track of license usage, and since the license file contains encrypted data to protect it against modification, you may move and copy the license file as much as necessary.

On Windows, if the application cannot find the license file, the user is presented with a dialog that asks the user to specify the license file location, the license server, or license fulfillment from the internet.

For counted licenses, no matter which option you choose, you must first copy lmadmin or lmgrd and the vendor daemon to a location that the FlexEnabled application can access on the network.
Setting the License Search Path using an Environment Variable

Most applications specify a location where they expect to find the license file and install it automatically. However, you can change the license file location by setting the LM_LICENSE_FILE environment variable to a license search path. Wherever a license search path is specified, it can consist of one or more of the following entries. On UNIX, the license search path entries are separated by colons ‘:’ and on Windows, the entries are separated by semicolons ‘;’.

- The full path to the license file
- A directory containing one or more license files with a .lic extension
- A port@host setting, where port and host are the TCP/IP port number and host name from the SERVER line in the license file. Alternatively, use the shortcut specification, @host, if the license file SERVER line uses a default TCP/IP port or specifies a port in the default port range (27000–27009).
- A three-server redundant triad. The triad is a single entry on the license search path and is specified using a comma-separated list of three port@hosts. For example, port1@host1, port2@host2, port3@host3

Table 4-1 shows some examples of LM_LICENSE_FILE and VENDOR_LICENSE_FILE environment variable settings.

<table>
<thead>
<tr>
<th>LM_LICENSE_FILE or VENDOR_LICENSE_FILE Setting</th>
<th>Description</th>
</tr>
</thead>
</table>
| 40000@myserver                                | Used where the SERVER line in the license file is: SERVER myserver 17007ea8 40000  
  • host = myserver  
  • port = 40000 |
| @myserver                                    | Used where the SERVER line in the license file is: SERVER myserver 17007ea8 27001  
  • host = myserver  
  • port = 27001, within the default range |
| @myserver                                    | Used where the SERVER line in the license file is: SERVER myserver 17007ea8  
  • host = myserver  
  • port = none specified, uses a default TCP/IP port number in the range of 27000-27009 |
Chapter 4: Locating Licenses

Setting the License Search Path using an Environment Variable

Applications accept an environment variable (or Windows Registry) named VENDOR_LICENSE_FILE, where VENDOR is the vendor daemon name, for example, DEMO_LICENSE_FILE. This environment variable’s scope is limited to just those applications from software publisher using the VENDOR name.

With lmgrd and lmutil (lmstat, lmdown, and so on), the -c option overrides the setting of the LM_LICENSE_FILE environment variable.

Note • Some applications do not recognize the LM_LICENSE_FILE environment variable. FlexEnabled Java applications, in particular, do not recognize it.

Order of Searching for a License

A FlexEnabled application looks for a license file as follows:

1. When the VENDOR_LICENSE_FILE environment variable has been set for the publisher of the application, then items in the license search path set in this environment variable are searched in order.

2. The items in a license search path set in the LM_LICENSE_FILE environment variable are searched in order.

3. When any license file specified in a license search path contains a USE_SERVER line, then a license is requested from the license server specified in the SERVER line. Any FEATURE and INCREMENT lines entries after the USE_SERVER line in the license file are ignored.

4. When the environment variables are not set and the FlexEnabled application does not specify the location of the license, then the following default locations are searched:
   - On Unix - /usr/local/flexlm/licenses/license.dat
   - On Windows - C:\\flexlm\license.dat

When licenses are held in trusted storage on the same machine as the FlexEnabled application, normally the publisher will have configured the application to search local trusted storage first and then look for license files as previously described.

Table 4-1 • Environment Variable Specification Examples

<table>
<thead>
<tr>
<th>LM_LICENSE_FILE or VENDOR_LICENSE_FILE Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>C:\licenses; 27000@host1,27000@host2,27000@host3</td>
<td>License search path on a Windows system: Unserved licenses are stored in 'C:\licenses' and served licenses are obtained from the three-server redundant triad of 27000@host1,27000@host2,27000@host3.</td>
</tr>
<tr>
<td>licenses:@myserver:@mybackupserver</td>
<td>License search path on a Unix system: Unserved licenses are stored in the local directory ‘licenses’ and served licenses are obtained from either ‘myserver’ or ‘mybackupserver.’ In the first instance a license is requested from myserver and if this fails then mybackupserver will be tried.</td>
</tr>
</tbody>
</table>
Chapter 4: Locating Licenses
Setting the License Search Path using an Environment Variable

See Also
- Managing Multiple License Files for more information about LM_LICENSE_FILE.
- Environment Variables
- Ensuring License Availability
Managing License Files

This section describes how license files may be modified. For detailed information about modifications required when combining license files see Managing Licenses from Multiple Software Publishers.

Modifying License Files

License files usually begin with a SERVER line (or three lines for three-server redundant servers) followed by one or more VENDOR lines, followed by one or more FEATURE or INCREMENT lines. In some cases, the license file requires no SERVER line and no VENDOR line.

You can modify these elements in the license file:

- Host names on the SERVER lines
- TCP/IP port numbers on the SERVER lines (useful for firewall support)
- Three-server redundant configuration for a set of SERVER lines
- Paths on the VENDOR lines
- Options file paths on the VENDOR lines
- Optional TCP/IP port numbers on the VENDOR lines (useful for firewall support)
- USE_SERVER line
- Values in keyword=value pairs on FEATURE lines, if keyword is specified in lowercase

Use the \ line-continuation character to break up long lines.
Configuring the Port Used by the License Server

The port used by the license server can be specified in the license file used to start the license server. This method is the only way to configure the port setting when lmgrd is used as the license server manager; when using lmadmin as the license server manager the port can be configured directly.

Task: To configure the port using lmgrd

1. Add the port number to the SERVER line as illustrated in the following example SERVER line:

   SERVER pat 17003456 2837

   where pat is the host name of the license server machine, 17003456 is the hostid of the license server machine and 2837 is the TCP/IP port number used by the license server.

2. Use the license file that contains the SERVER line that includes the port number to start lmgrd.
Hostids for Supported Platforms

FlexNet Publisher uses system identifiers, called hostids, to node-lock licenses to a machine. The system identifiers may be system specific. For example, all Sun Microsystems systems have a unique hostid.

Hostid Formats

Numeric, 32-bit hostids are normally used in hexadecimal format. On some systems, the system command returns the ID in decimal format. Use a # character before the hostid to indicate a decimal number. For example, if the system command returns 2005771344, FlexNet Publisher accepts #2005771344. Alternatively, convert the decimal value to hexadecimal.

Obtaining System Hostids

The lmhostid utility prints the exact hostid that FlexNet Publisher requires on any given system. If your hostid contains characters other than the ASCII A–Z, a–z, or 0–9, use the -utf8 option with lmhostid. To view a correct representation of the resulting hostid, use a utility, such as Notepad, that can display UTF-8 encoded strings.

lmadmin displays hostids available for the license server on the System Information page.

Note • For the following cases, do not use the System Information tab in the lmadmin user interface to obtain hostids. Instead, use the methods described in the Alternate Hostid Procurement Methods table.

• When the license server is operating on a virtual machine but bound to the physical hardware—A limitation in lmadmin causes the System Information tab to show virtual machine values for Host Name, Host Domain Name, IPv4 Address, IPv6 Address, Ethernet Address, and Volume Serial Number rather than the physical machine values.

• When running license clients or a license server in an Amazon EC2 environment—At this time, the System Information page is unable to show hostids specific to the Amazon EC2 environment.
The following table lists alternate methods to obtain the required hostid for each system architecture. FlexNet Publisher also supports a group of special hostids and vendor-defined hostids.

**Table 6-1 • Alternate Hostid Procurement Methods**

<table>
<thead>
<tr>
<th>Hardware Platform</th>
<th>Hostid</th>
<th>Type this command:</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX (RS/6000, PPC)</td>
<td>32-bit hostid</td>
<td><code>uname -m</code> (returns 000276513100), then remove last two digits and use remaining last eight digits</td>
<td>02765131</td>
</tr>
<tr>
<td>HP (32-bit and 64-bit non-Itanium platforms)</td>
<td>32-bit hostid</td>
<td><code>uname -i</code> and convert to hex, or prepend with #</td>
<td>778DA450 or #2005771344</td>
</tr>
<tr>
<td>HP (64-bit Itanium)</td>
<td>machine identification</td>
<td><code>getconf CS_PARTITION_IDENT</code> then prefix with &quot;ID_STRING=&quot;</td>
<td>ID_STRING=9c766319-db72-d411-af62-0060b05e4c05</td>
</tr>
<tr>
<td>Mac OS X</td>
<td>ethernet address</td>
<td><code>/sbin/ifconfig eth0</code> and remove colons from ether value</td>
<td>00A277EA17E</td>
</tr>
<tr>
<td></td>
<td>FlexNet ID USB port dongle</td>
<td><code>lmhostid -flexid</code></td>
<td>FLEXID=9-b28520b9</td>
</tr>
<tr>
<td>Linux</td>
<td>ethernet address</td>
<td><code>/sbin/ifconfig eth0</code> and remove colons from HWaddr</td>
<td>00400516E525</td>
</tr>
<tr>
<td></td>
<td>FlexNet ID USB port dongle</td>
<td><code>lmhostid -flexid</code></td>
<td>FLEXID=9-b28520b9</td>
</tr>
<tr>
<td></td>
<td>Bare-metal binding on virtual platforms</td>
<td><code>lmhostid -ptype &lt;virtual machine type&gt; -hostname</code> <code>lmhostid -ptype &lt;virtual machine type&gt; -hostdomain</code> <code>lmhostid -ptype &lt;virtual machine type&gt; -internet</code> <code>lmhostid -ptype &lt;virtual machine type&gt; -ether</code> where <code>&lt;virtual machine type&gt;</code> is VMW for VMware or HPV for Hyper-V. For example, <code>lmhostid -ptype HPV -ether</code> Only available on Hyper-V: <code>lmhostid -ptype HPV -vsn VMW_HOSTNAME=MyHost HPV_HOSTNAME=MyHost</code></td>
<td>VMW_HOSTNAME=MyHost HPV_HOSTNAME=MyHost</td>
</tr>
</tbody>
</table>
# Chapter 6: Hostids for Supported Platforms

## Obtaining System Hostids

### Linux (continued)

<table>
<thead>
<tr>
<th>Hardware Platform</th>
<th>Hostid</th>
<th>Type this command:</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>UUID support on virtual platforms</td>
<td>lmhostid -ptype &lt;virtual machine type&gt; -uuid</td>
<td>where &lt;virtual machine type&gt; is VMW for VMware or HPV for Hyper-V. For example, lmhostid -ptype VMW -uuid</td>
<td>VMW_UUID=DF440538-8EB7-11DC-BBDA-FE7FE89E000F</td>
</tr>
<tr>
<td>Bare-metal binding in Amazon EC2 environment</td>
<td>lmhostid -ptype LMB -ether</td>
<td>LMB_ETHER=0019d22f8672</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lmhostid -ptype LMB -internet</td>
<td>LMB_FLEXID=9-19dD22f86</td>
<td></td>
</tr>
<tr>
<td></td>
<td>hostid -ptype LMB -hostname</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>hostid -ptype LMB -flexid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elastic IP (EIP) address in Amazon EC2 environment</td>
<td>lmhostid -ptype AMZN -eip</td>
<td>AMZN_EIP=184.72.45.35</td>
<td></td>
</tr>
<tr>
<td>AMI Instance ID in Amazon EC2 environment</td>
<td>lmhostid -ptype AMZN -iid</td>
<td>AMZN_IID=i51e04315...SIGN=xxx</td>
<td></td>
</tr>
<tr>
<td>Enforced physical machine hostid type</td>
<td>lmhostid -ptype PHY &lt;hostidtype&gt;</td>
<td>where hostidtype is one of: -ether -hostname -internet -user -string -display -flexid -long</td>
<td>PHY_ETHER=000ffe7fe89e</td>
</tr>
<tr>
<td>Sun</td>
<td>32-bit hostid</td>
<td>hostid</td>
<td>170a3472</td>
</tr>
<tr>
<td></td>
<td>ethernet address</td>
<td>lmhostid -ether</td>
<td>00400516E525</td>
</tr>
</tbody>
</table>

**Note** • Only LMB_FLEXID=9 and LMB_FLEXID=10 are currently supported. The dongle driver must be installed on the lmbind machine before you can obtain the hostid.

### Table 6-1 • Alternate Hostid Procurement Methods

<table>
<thead>
<tr>
<th>Hardware Platform</th>
<th>Hostid</th>
<th>Type this command:</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sun</td>
<td>32-bit hostid</td>
<td>hostid</td>
<td>170a3472</td>
</tr>
<tr>
<td></td>
<td>ethernet address</td>
<td>lmhostid -ether</td>
<td>00400516E525</td>
</tr>
</tbody>
</table>
## Chapter 6: Hostids for Supported Platforms

### Obtaining System Hostids

<table>
<thead>
<tr>
<th>Hardware Platform</th>
<th>Hostid</th>
<th>Type this command:</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Windows</strong></td>
<td>ethernet address</td>
<td><code>lmhostid</code></td>
<td>00B0A9DF9A32</td>
</tr>
<tr>
<td></td>
<td>Disk serial number</td>
<td><code>DIR C: (look for Volume Serial Number is and remove -)</code></td>
<td>DISK_SERIAL_NUM=3e2e17fd</td>
</tr>
<tr>
<td></td>
<td>FlexNet ID parallel or USB port dongle</td>
<td><code>lmhostid -flexid</code></td>
<td>FLEXID=8-b28520b9</td>
</tr>
</tbody>
</table>

**Note**: For parallel port dongles, the parallel port must be configured in bi-directional mode.

<table>
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<th>Hostid</th>
<th>Type this command:</th>
<th>Example</th>
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<tr>
<td>Bare-metal binding on virtual platforms</td>
<td><code>lmhostid -ptype &lt;virtual machine type&gt; -hostname</code></td>
<td>VMW_HOSTNAME=MyHost</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>lmhostid -ptype &lt;virtual machine type&gt; -hostdomain</code></td>
<td>HPV_HOSTNAME=MyHost</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>lmhostid -ptype &lt;virtual machine type&gt; -internet</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>lmhostid -ptype &lt;virtual machine type&gt; -ether</code></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>where &lt;virtual machine type&gt; is VMW for VMware or HPV for Hyper-V. For example, <code>lmhostid -ptype HPV -ether</code></td>
<td>Only available on Hyper-V:</td>
<td></td>
</tr>
<tr>
<td></td>
<td><code>lmhostid -ptype HPV -vsn</code></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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<td><code>lmhostid -ptype &lt;virtual machine type&gt; -uuid</code></td>
<td>HPV_UUID=DF440538-8EB7-11DC-BBDA-FE7FE89E000F</td>
<td></td>
</tr>
<tr>
<td></td>
<td>where &lt;virtual machine type&gt; is VMW for VMware or HPV for Hyper-V. For example, <code>lmhostid -ptype HPV -ether</code></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Chapter 6: Hostids for Supported Platforms

Obtaining System Hostids

Table 6-1 • Alternate Hostid Procurement Methods

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<td>Windows (continued)</td>
<td>Bare-metal binding in Amazon EC2 environment</td>
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<td>lmhostid -ptype LMB -hostname</td>
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<td>lmhostid -ptype LMB -flexid</td>
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<td>Bare-metal binding in Amazon EC2 environment</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>lmhostid -ptype LMBFLEXID -internet</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>lmhostid -ptype LMBFLEXID -hostname</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>lmhostid -ptype LMBFLEXID -flexid</td>
<td></td>
</tr>
<tr>
<td>Elastic IP (EIP) address in Amazon EC2 environment</td>
<td>lmhostid -ptype AMZN -eip</td>
<td>AMZN_EIP=184.72.45.35</td>
<td></td>
</tr>
<tr>
<td>AMI Instance ID in Amazon EC2 environment</td>
<td>lmhostid -ptype AMZN -iid</td>
<td>AMZN_IID=i51e04315...SIGN=xxx</td>
<td></td>
</tr>
<tr>
<td>Enforced physical machine hostid type</td>
<td>lmhostid -ptype PHY &lt;hostidtype&gt;</td>
<td>PHY_ETHER=000fe7fe89e</td>
<td></td>
</tr>
<tr>
<td></td>
<td>where hostidtype is one of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- ether</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- hostname</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- user</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- string</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- display</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- flexid</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- long</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- utf8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- vsn</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note • Only LMB_FLEXID=9 and LMB_FLEXID=10 are currently supported. The dongle driver must be installed on the lmbind machine before you can obtain the hostid.
Special Hostids

FlexNet Publisher contains a number of special hostid types that apply to all platforms. These hostid types are valid to use in both SERVER lines and FEATURE lines, wherever a hostid is required.

Table 6-2 • Special Hostid Types

<table>
<thead>
<tr>
<th>Hostid</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANY</td>
<td>Locks the software to any system (meaning that it does not lock anything).</td>
</tr>
<tr>
<td>DEMO</td>
<td>Similar to ANY, but only for use with uncounted FEATURE lines.</td>
</tr>
<tr>
<td>COMPOSITE=</td>
<td>Locks the software to a composite hostid. A composite hostid is a hashed 12-character hexadecimal value formed by combining the values of one or more simple hostids types, as defined by the software publisher. Note that composite hostids are not returned by Imhostid, LMTOOLS, or Imadmin: when composite hostids are used, the software publisher will provide a utility that determines the publisher’s composite hostid. On some systems multiple composite hostids may be provided, any of which may be used to identify the system that the software is locked to.</td>
</tr>
<tr>
<td>DISPLAY=</td>
<td>Locks the software to a display. On UNIX, display is /dev/ttyxx (which is always /dev/tty when an application is run in the background) or the X-Display name. On Windows, it is the system name or, in the case of a terminal server environment, the terminal server client name. (version 8 or later FlexEnabled applications only)</td>
</tr>
<tr>
<td>HOSTNAME=</td>
<td>Locks the software to computer host name host.</td>
</tr>
</tbody>
</table>
| ID=n               | Functionally equivalent to the “ANY” hostid—it runs on any system. The difference is that the license is unique and is used to identify the end user. This hostid is used to lock the license server (on the SERVER line) or the FlexEnabled application (on the feature definition line). The number can have dashes included for readability—the dashes are ignored. Examples:
  - ID=12345678 is the same as
  - ID=1234-5678 is the same as
  - ID=1-2-3-4-5-6-7-8                                                                                                                                  |
| INTERNET=          | Locks the software to an Internet IP address, or group of IP addresses. Wildcards are allowed. For example, 198.156.*.* means any host with a matching internet IP address. The main use is to limit usage access by subnet, implying geographic area. For this purpose, it is used on the feature definition line as a hostid lock. |
| USER=user          | Locks the software to user name user. User names specified in license files cannot contain spaces.                                                                                                          |
Examples

FEATURE f1 demo 1.0 1-jan-2010 uncounted \
HOSTID=FLEXID=6-a6300015f SIGN="<...>"

or

FEATURE f1 demo 1.0 1-jan-2010 uncounted \
HOSTID=INTERNET=10.10.10.* SIGN="<...>"

Ethernet Hostids

The Ethernet address is used on some system architectures as the hostid. An ethernet address is a 6-byte quantity, with each byte specified as two hexadecimal digits. Specify all twelve hex digits when using an Ethernet address as a hostid. For example, if the ethernet address is “8:0:20:0:5:ac,” specify “0800200005ac” as the hostid.

Several devices with an ethernet address can be attached to a machine; some of these may be virtual devices that may generate a different ethernet address each time they are activated. An example of a virtual device that may generate an ethernet address is VPN (virtual private network) software.

Some devices that have an ethernet address can be detachable from the machine. For example, a laptop plugged into a docking station uses the ethernet address of the docking station; however, when it is disconnected from the docking station, the ethernet address is no longer available. A wireless adapter also has an ethernet address and this address is not available when either the wireless adapter is removed from the machine or when the wireless adapter is disabled, but still physically attached to the machine.

When lmhostid returns multiple ethernet hostids, ensure that you choose a 'permanent' hostid to identify your machine.

Hostids to Support Virtualization Policy

Your software publisher may choose to enforce a virtualization support policy using the special hostid constructs in the license file. Depending on the policy, the FlexNet publisher license server may be limited to run only on physical machines, only on virtual machines from specific vendors, or to have no enforcement regarding virtual machine platforms. When the bare metal binding technology is used, an additional binding agent component may need to be run on the console operating system of the virtual machine environment.

Hostids to Support Cloud Licensing

The hostids listed in this chapter for the Amazon EC2 environment support typical use cases for licensing software in a cloud. For a description of these use cases and the hostids, see Chapter 16, “Licensing in a Cloud-Computing Environment”.
License Models

License rights are created by the software publisher. License rights specify floating (concurrent) usage, node-locked (both counted and uncounted), or any combination of floating, counted, and uncounted.

Floating (Concurrent) Licenses

A floating license means anyone on the network can use the FlexEnabled application, up to the limit specified in the license file or fulfillment record (also referred to as concurrent usage or network licensing). Floating licenses have no hostids on the individual FEATURE lines. Floating licenses requires a license server manager and a vendor daemon to be running to count the concurrent usage of the licenses.

An example of a license file that provides floating licenses is:

```
SERVER lulu 17007ea8
VENDOR sampled
FEATURE f1 sampled 1.00 1-jan-2008 2 SIGN="<...>"
FEATURE f2 sampled 1.00 1-jan-2008 6 SIGN="<...>"
FEATURE f3 sampled 1.00 1-jan-2008 1 SIGN="<...>"
```

This license file specifies that two licenses for feature f1, six licenses for feature f2, and one license for feature f3 are available anywhere on the network that can access the license server, called lulu. The license server manager, lmadmin or lmgrd, uses one of the default TCP/IP ports.

The equivalent floating licenses are held in trusted storage as a fulfillment record that contains the same FEATURE lines as in the license file without any SERVER or VENDOR lines.
Node-Locked Licenses Using Hostid

This section describes node-locked licenses using a hostid. Licenses held in trusted storage are node-locked because trusted storage is locked to a machine, see Locking of Licenses using Hostid or Trusted Storage for an explanation.

Node-locking means the FlexEnabled application can be used on one system or a set of systems only. A node-locked license has a hostid on the FEATURE line that identifies a specific host. There are two types of node-locked licenses: uncounted and counted.

If the number of licenses value is set to either zero (0) or uncounted, then the license will not be counted which allows the license to be used an unlimited number of times. This configuration does not require a license server because it is not necessary to count the concurrent usage of the features.

The following license file allows unlimited usage of feature f1 on the systems with hostids of 17007ea8 and 1700ab12:

```
FEATURE f1 sampled 1.000 1-jan-2008 uncounted HOSTID=17007ea8 SIGN="<...>"
FEATURE f1 sampled 1.000 1-jan-2008 uncounted HOSTID=1700ab12 SIGN="<...>"
```

Alternately, these two FEATURE lines could have been issued by your software publisher with a hostid list:

```
FEATURE f1 sampled 1.000 1-jan-2010 uncounted HOSTID="17007ea8 1700ab12" SIGN="<...>"
```

If these were the only FEATURE lines in this license file, neither the license server manager or vendor daemon are necessary and you do not need to start one.

The following license file provides three licenses for feature f1, locked to the system with hostid 1300ab43. Since the license server and licenses are locked to the same system, the daemons run on the same system that runs the FlexEnabled application.

```
SERVER lulu 1300ab43 1700
VENDOR sampled /etc/sampled
FEATURE f1 sampled 1.00 1-jan-2008 3 HOSTID=1300ab43 SIGN="<...>"
```

Mixed Node-Locked and Floating Licenses

Uncounted node-locked and concurrent usage licenses can be mixed in the same license file.

The following license file allows unlimited use of feature f1 on systems 17007ea8 and 1700ab12, while allowing two other licenses for feature f1 to be used anywhere else on the network:

```
SERVER lulu 17001234 1700
VENDOR sampled C:\flexlm\sampled.exe
FEATURE f1 sampled 1.00 1-jan-2005 uncounted HOSTID=17007ea8 SIGN="<...>"
FEATURE f1 sampled 1.00 1-jan-2005 uncounted HOSTID=1700ab12 SIGN="<...>"
FEATURE f1 sampled 1.00 1-jan-2005 2 SIGN="<...>"
```

This configuration requires a license server manager and vendor daemon because the licenses on the third FEATURE line are counted.
Counted vs. Uncounted Licenses

The license model (as defined in the license file on the end user machine) determines whether a license server is needed. If all feature definition lines have a license count set to either zero (0) or uncounted, then the customer does not need a license server. This type of license is called uncounted. Alternatively, if any features have a non-zero license count, then the customer needs a license server to count those licenses. If a software publisher wants to use FlexNet Publisher without a license server, they must issue uncounted licenses.

The license server can serve uncounted licenses also. This is often done so that:

- Transactions can be logged into the report log for all license requests, which can then be reported on by FlexNet Manager
- Options file constraints can be applied to the licenses

To have uncounted licenses served, include a SERVER line in the license file, and put the USE_SERVER line immediately after the SERVER line. The vendor daemon serves the uncounted licenses, and the USE_SERVER line indicates to applications that requests must go to the license server for authorization.

Mobile Licensing

End users often want to use applications on computers that do not have a continuous connection to a license server. These situations include:

- Working on a laptop
- Using a computer both at work and at home
- Working from several different computers not connected to a license server

FlexNet Publisher supports licenses that allow one of several kinds of mobile licensing:

- Node-locked to a laptop
- Node-locked to a FlexNet ID dongle
- Node-locked to a FlexNet ID dongle with FLOAT_OK keyword
- License borrowing with BORROW keyword
- Node-locked to a user name
- Fulfilled from a prepaid license pool
- Optionally when provided by the publisher, Distribution of Node-Locked Licenses to Networked Machines using trusted storage can be used.

You should use license rehosting if an enterprise wants to move a license without using one of these methods. The software publisher must generate a new node-locked license file for each new client computer. Rehosting requires administrative overhead because the software publisher must be involved with each move.
Chapter 7: License Models
Mobile Licensing

Node-Locked to a Laptop Computer

To use a license exclusively on one laptop computer, the license should be node-locked to that computer. When the license is held in a license file, it resides on the laptop computer. Any license held in trusted storage on a laptop computer is node-locked to the laptop.

Node-locked to a FlexNet ID Dongle

To move a license between different systems, it can be locked to a FlexNet ID dongle (a dongle that connects to a parallel or USB port). You can move this license between systems by installing a copy of the license file with a hostid set to the FLEXid of the dongle on each system and moving the dongle from one system to another. Since the license is tied to the dongle, only the system with the dongle can use the license.

FlexNet ID dongles are made available by your software publisher. Your software publisher can also provide you with an installer that installs drivers for all FlexNet ID dongles.

Node-Locked to a FlexNet ID Dongle with FLOAT_OK

Because the hostid of the dongle (the FLEXid) defines the license server and the license floats on the network, this method has an advantage over simply using a license locked to a FLEXid.

The software publisher issues you a dongle; a license file with a FEATURE line node-locked to the FLEXid of the dongle and that contains the FLOAT_OK keyword. One dongle and FEATURE line containing the FLOAT_OK keyword is needed for each instance of a license that is mobile. When the dongle is attached to a license server, the license floats on the network. When the dongle is removed from the license server, the license is available only on the standalone computer.

This method supports parallel or USB dongles. Because it is simpler to attach multiple USB dongles to a computer, they may be preferable.

Using a FlexNet ID Dongle for Mobile Licensing using a FLOAT_OK License

The software publisher provides a dongle, a dongle driver installer, and a license file that contains a FEATURE line node-locked to the FLEXid containing the FLOAT_OK keyword. A license administrator then:

1. Installs the license file on the license server.
2. Installs the FlexNet ID dongle driver on the license server.
3. Attaches the dongle to the license server.
4. Starts the license server or rereads the license file.

While the dongle is attached to the license server, the node-locked license associated with it floats on the network.
Task: To transfer a license from the pool of floating licenses to a disconnected computer:

1. Copy the license file containing the FLOAT_OK node-locked FEATURE line from the license file on the license server to a license file on the client in the location where the FlexEnabled application expects to find its license file.
2. Install the dongle driver on the client computer, if it is not already installed.
3. Move the dongle matching the node-locked FEATURE line from the license server to the client. When the dongle is removed from the license server, this license is unavailable on the network.
4. Disconnect the client computer from the network. Now the license is available on the computer with the dongle, even though that computer is disconnected from the network.

Task: To return the license to the license server so it floats on the network again:

1. Remove the dongle from the client and replace it on the license server.
2. Reread the license file for the license server that serves the floating version of the license by running lmreread.

When the dongle is returned to the license server, the FLOAT_OK license does not float on the network again until lmreread is run.

**FLEXid with FLOAT_OK Example**

The following is a sample license file. It is shipped with two dongles: FLEXID=7-b28520b9 and FLEXID=7-b2857678.

```
SERVER myhost ANY
VENDOR sampled
FEATURE f1 sampled 1.0 permanent uncounted FLOAT_OK \
    HOSTID=FLEXID=7-b28520b9 SIGN="<...>"
FEATURE f1 sampled 1.0 permanent uncounted FLOAT_OK \
    HOSTID=FLEXID=7-b2857678 SIGN="<...>"
```

The user installs the license file and the two dongles on the license server. When attached to the license server, each uncounted FLOAT_OK license floats on the network and allows a single use. Therefore, up to two users can use f1 on the end user’s network, except on the license server itself, where the license use is disallowed.

If a user wants to work at home, the user installs a license file that contains the FEATURE line node-locked to FLEXID=7-b28520b9 (this only needs to be done once), transfers the dongle with FLEXID=7-b28520b9 from the license server to the client, and installs the dongle driver on the client computer (this also only needs to be done once). The user disconnects the client computer from the network and uses the transferred FLOAT_OK license on the client computer. The license server allows only the single remaining FLOAT_OK license to float on the network.

After returning the dongle to the license server, the license administrator runs lmreread so the returned license can float again.
License Borrowing with BORROW

This method of implementing mobile licensing is used only when license rights are held in license files.

If a license is to be used on a computer that is intermittently connected to a license server, that license can be issued as a floating license with the BORROW keyword. A BORROW license can be borrowed from a license server via a special checkout and used later to run an application on a computer that is no longer connected to the license server. License borrowing must be enabled by a software publisher before a user can borrow licenses.

With license borrowing, a software publisher issues a floating license with a FEATURE line that contains the BORROW keyword. A user specifies the expiration date a borrowed license is to be returned and runs the application while connected to the network which writes borrowing information on the client computer. The license server keeps the borrowed license checked out. The FlexEnabled application automatically uses the local borrowing data to do checkouts during the borrow period. If enabled by the software publisher, borrowed licenses can be returned early, that is, before the borrow period expires. Upon the earlier of either the expiration of the borrow period or the early return of a borrowed license, the local borrowing data no longer authorizes checkouts and the license server returns the borrowed license to the pool of available licenses. No clock synchronization is required between the license server and the system running the FlexEnabled application.

Initiating License Borrowing

If a software publisher has enabled license borrowing by issuing a license file that contains a FEATURE line with the BORROW keyword, an user initiates license borrowing in one of three ways:

- Using the borrowing interface in application, if provided in the application
- Running the `lmborrow` utility to set LM_BORROW
- Setting the LM_BORROW environment variable directly

Application Interface

The user initiates license borrowing this way only if the application provides a borrowing interface. Information about this is supplied by the software publisher.
Running the lmborrow Utility

lmborrow is one of the lmutil/lmtools utilities. To initiate borrowing, the user runs lmborrow from the command line or through lmtools:

```
lmborrow {vendor|all} enddate [time]
```

where **vendor** is the vendor daemon that serves the licenses to be borrowed, or **all** specifies all vendor daemons in the license server. **enddate** is the date the license is to be returned in **dd-mm-yyyy** format. **time** is optional and is specified in 24-hour format (**hh:mm**) in the FlexEnabled application's local time. If **time** is unspecified, the checkout lasts until the end of the given end date.

For example:
```
lmborrow sampled 20-aug-2007 13:00
```

Setting the LM_BORROW Environment Variable Directly

The lmborrow utility is a user interface to set LM_BORROW in either the registry (Windows) or in $HOME/.flexlmborrow (UNIX). LM_BORROW can also be set directly as an environment variable:

```
today:{vendor|all}:enddate[:time]
```

where:

**Table 7-1 • LM_BORROW Environment Variable Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>today</strong></td>
<td>Today's date in <strong>dd-mm-yyyy</strong> format. Any checkouts done on this date create local borrow information. If a checkout is done on a different date than this date, no local borrowing information is created.</td>
</tr>
<tr>
<td><strong>vendor</strong></td>
<td>Vendor daemon that serves the licenses to be borrowed, or <strong>all</strong> specifies all vendor daemons in the license server.</td>
</tr>
<tr>
<td><strong>enddate</strong></td>
<td>Date the license is to be returned in <strong>dd-mm-yyyy</strong> format.</td>
</tr>
<tr>
<td><strong>time</strong></td>
<td>Optional. <strong>time</strong> is specified in 24-hour format (<strong>hh:mm</strong>) in the FlexEnabled application’s local time. If <strong>time</strong> is unspecified, the checkout lasts until the end of the given end date.</td>
</tr>
</tbody>
</table>

For example:
```
```

In this example, one or more licenses served by the **sampled** vendor daemon are borrowed on August 15, 2006, and are scheduled to be returned at 1 P.M. on August 20, 2006.
Borrowing a License

To borrow a license for a desired feature, *on the same day and the same system* that the user runs `lmborrow` or sets `LM_BORROW` (and while still connected to the network), the user runs the application to check out and borrow the license. If the user runs the application more than once that day, no duplicate license is borrowed. No license is borrowed if the application is run on a day different than the date borrowing was set to be initiated.

For example, say that today you want to borrow a license for the PageWizard feature for a week. The PageWizard feature is served by the sampled vendor daemon. Today, while you are connected to the network, run `lmborrow` or set `LM_BORROW` directly. For example:

```
lmborrow sampled enddate
```

Today, after you run `lmborrow`, while you are connected to the network, run the application that checks out a license for the PageWizard feature. After the license is checked out, close the application and disconnect your system from the network. The license that you just checked out stays checked out from the license server until the borrow period expires—that license now is used on your disconnected system until the borrow period expires. Once checked out, it remains checked out for the full borrow period. The borrow period cannot be renewed until the period has expired.

Clearing the Borrow Period

Once you have borrowed all the licenses that you need for the current borrow period (defined by the `LM_BORROW` environment variable), prevent licenses for any additional features from being borrowed by running `lmborrow -clear`. This clears the `LM_BORROW` setting in the registry (Windows) or `$HOME/.flexlmborrow` (UNIX). `lmborrow -clear` does not clear the local information about licenses you have already borrowed.

Checking Borrow Status

**Task:** To print information about borrowed features:

1. Issue the following command on the system from which they are borrowed:

   `lmborrow -status`

   The system that borrowed the features does not have to be connected to the network to determine the status.
Returning a Borrowed License Early

Task: To return a borrowed license before the borrow period expires:

1. Reconnect the borrowing system back to the network.
2. From the same system that initiated the borrowing, issue the command:

   `lmborrow -return [-c license_file_list] feature`

This option may or may not be allowed by your software publisher. Check directly with your software publisher to determine if they support borrowed licenses being returned early.

Support for License Borrowing

See the following sections for more information about the utilities and keywords in the options file that support license borrowing:

- `lmborrow` utility
- `lmdown` utility
- `lmstat` utility
- `BORROW_LOWWATER` keyword
- `EXCLUDE_BORROW` keyword
- `INCLUDE_BORROW` keyword

**Note** • BORROW keyword introduced in version 8.0 client library, license server manager, and vendor daemon. All components must be version 8.0 or later in order to use BORROW.

Node-locked to a User Name

This method of implementing mobile licensing is used only when license rights are held in license files.

If a license is to be used exclusively by one user on different systems, that license can be node-locked to the user’s user name. The license file is copied to the different systems on which the user might work; the user’s user name must be identical on each system. For this method to be useful, individual user names in an organization must be unique. Note that a user name, when used in a license file in this way, cannot contain spaces.
Fulfilled from a Prepaid License Pool

In this method, the user buys a prepaid number of license-days from the software publisher. The user can then fulfill a license using a partial amount of the total license-days for the given borrow period, node-locked to a particular system. For example, in preparation for a business trip (or even during a business trip), the user fulfills a license that expires in five days that is node-locked to their laptop. Each fulfillment can be node-locked to a different system (or even multiple times to the same system), thus allowing mobility of license usage within the prepaid number of license-days.

This model is like pay-per-use because each fulfillment is made from a decreasing number of license-days. It is different than other pay-per-use models because, once node-locked to a system, that system is allowed unlimited use of the application until the license expires. This short-term license cannot be returned early; once fulfilled, those license-days cannot be refunded. Other pay-per-use models charge based on the number of times the application is used.
Selecting a License Server Machine

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. Normally, it is not required that each system be the same architecture or operating system as other license servers or the client machines on which the FlexEnabled applications are running.

The following sections discuss the resources used by the license server. When you select a machine on which to install a license server, you may need to consider whether it has sufficient resources. For small numbers of licenses (under about 100), most of these system limits are not a problem on any workstation.

License Server Sockets

When using TCP/IP ports, each FlexEnabled application connected to a license server uses one or more sockets. Depending on how the publisher implemented licensing, the FlexEnabled application may need one or more sockets. Ask the publisher for this information. 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 FlexEnabled 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. This reduces the networking traffic to each license server. See Redundancy Using the License Search Path for instructions and information about this configuration. Your publisher will need to agree to issue new license files, if you want to move licenses from an existing license server. If the licenses are held in trusted storage, the publisher may provide an automated process for returning them and activating them on another license server.
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), or for high checkout and checkin activity levels (hundreds per second), the amount of CPU time consumed by the server may start to become significant; although, 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 and report log files. FlexNet Manager, Flexera Software’s Web-based software license management system, uses the report log files to generate accurate usage reports. If there is a lot of license activity, these log files grow very large. You need to consider where to put these files and how often to rotate and archive them. You have the option to suppress log file output if disk space is at a premium.

It is recommended that the log files are local files on the server systems to avoid networking dependencies.

See Also
Report Log File
Debug Log File

License Server Memory

The license server uses little memory. The vendor daemons use approximately 2 MB each, although memory usage increases in the vendor daemon with the number of concurrent licenses, size of the options file, and the number of concurrent users. `lmadmin`, uses between 7 and 10 MB of memory during typical usage. Typically, the command-line license server manager, `lmgrd`, uses approximately 2 MB.

Network Bandwidth for License Server

FlexNet Publisher sends relatively small amounts of data across the network. Each transaction, such as a checkout or checkin of a license, generally transfers less than 1 KB of data. This means that FlexNet Publisher can be effectively run over slow networks (such as dial-up SLIP lines) for small numbers of clients.

For a large number of FlexEnabled applications (hundreds), each of which exchange heartbeat messages with the vendor daemon, the network bandwidth used may become significant. In this case, run the FlexEnabled 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 FlexEnabled clients are using a dial-up link to connect to the network.
When you are using `lmadmin`, which uses HTTP, you need to consider the clients that connect to the `lmadmin` user interface. 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**

It is recommended that you do not use remote mounted disks when you run the license server. In other words, it is recommended that `lmadmin` or `lmgrd`, the vendor daemons, the license file, and the debug and report log files are all on locally mounted disks. If any of these files are on a remote mounted disk, this doubles the points of failure, which could lead to a temporary loss of all of your licenses. When all files are mounted 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 or file server fails.

**License Server Port**

It is recommended that a specific port is designated on the license server machine to be used only by license server components. The benefits of this are that it is:

- Easy to track processes by the port that they are run on.
- Easier to configure FlexEnabled clients to access 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:

**Using lmgrd** - specify it in the license file used to start the license server; see Configuring the Port Used by the License Server.

**Using lmadmin** - configure the license server manager port either:

- Using online help for information about the *license server manager port*.
- Using lmadmin command-line - use the `-licport` argument as described in *lmadmin Command-line Arguments*. 
Running the License Server on a Virtual Machine

If you plan to run the license server on a virtual machine, your software publisher may ask you to utilize a bare-metal hostid. If so, you will be required to run the binding agent (lmbind) on the console of the virtual machine. For more information on lmbind, see Chapter 15, "Managing Virtualized License Servers for File-Based Licensing".

Running the License Server in a Cloud

Operating in a public or virtual private cloud in an Amazon EC2 environment, you can run the license server on an AMI instance and then deploy instances of the FlexEnabled application as one or more license clients in the cloud, in your enterprise network, or in both, with all clients pointing to the license server in the cloud.

In a public cloud, you can run lmhostid directly on the AMI instance containing the license server to obtain the hostid needed to bind the license. However, in a virtual private cloud, your software publisher might require a bare-metal-binding hostid. If so, you can easily run the binding agent (lmbind) on a physical machine in your enterprise data center and extract the hostid from this machine. For more information about these use cases and the required hostids, see Chapter 16, "Licensing in a Cloud-Computing Environment".
Imadmin License Server Manager

The license server manager is one of the components that makes up a license server (the other being the vendor daemon). It handles the initial contact with FlexEnabled applications, passing the connection on to the appropriate vendor daemon. The purpose of the license server manager is to:

- Start and maintain vendor daemons as required for serving license rights from different software publishers.
- Refer application checkout (or other) requests to the correct vendor daemon.

There are two versions of the license server manager:

- **lmadmin** - a Web-based license server manager.
- **lmgrd** - the original license server manager with a command-line interface.

This section describes lmadmin; for information on lmgrd, see lmgrd - License Server Manager.

lmadmin provides improved methods of managing the license server and vendor daemons. A brief description of the improved capabilities follows: For a more detailed comparison of lmgrd and lmadmin, see Migrating from lmgrd to lmadmin.

**Imadmin Capabilities**

- Direct configuration of the vendor daemons and license server manager - license server port number; vendor daemon path and port; and three-server redundant port can be configured without any edits to the license files.
- Configurable alerts - you can set up lmadmin to issue alerts to warn you of potential problems, for example: license expiry, no available licenses, or vendor daemon status.
- License rights status display - configurable display of all available and in-use license rights. This display can include all concurrent (floating) licenses both from license files and from trusted storage. It can also include activatable licenses (held in trusted storage) when these are available on the license server.
- Buttons replace command-line utilities - for example ‘Stop Server’ and ‘Reread License Files’. For a list of license administration functions that are available directly from lmadmin, see lmadmin License Administration Functions.
Minimal editing of license files - option file specification requires editing.

This release of lmadmin is available for use on a limited number of platforms. For full details, contact your software publisher or see the Flexera Software download site. lmadmin is compatible with licensing components from version 9.2 or later. See Version Compatibility Between Components for detailed information on how to determine what versions of the licensing components are provided in your licensed applications.

## Downloading and Installing lmadmin License Server

This section contains instructions for downloading and installing lmadmin.

### System Requirements for lmadmin

lmadmin can be run on the following platforms.

**Table 9-1 • Supported Platforms for lmadmin**

<table>
<thead>
<tr>
<th>Platform Architecture</th>
<th>Processor Type</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows 32-bit</td>
<td>x86</td>
<td>• Windows Server 2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Windows Server 2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Windows 7 (Ultimate)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Windows Vista (Ultimate)</td>
</tr>
<tr>
<td>Windows 64-bit</td>
<td>x64</td>
<td>• Windows Server 2008</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Windows Server 2003</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Windows 7 (Ultimate)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Windows Vista (Ultimate)</td>
</tr>
<tr>
<td>AIX 32-bit</td>
<td>PowerPC</td>
<td>AIX 5.3</td>
</tr>
<tr>
<td>AIX 64-bit</td>
<td>PowerPC</td>
<td>AIX 5.3</td>
</tr>
<tr>
<td>Linux 32-bit</td>
<td>x86, PowerPC</td>
<td>Certified with the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RedHat Enterprise Linux 4, 5, 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SUSE Linux Enterprise 9,10, 11</td>
</tr>
<tr>
<td>Linux 64-bit</td>
<td>x86-64, PowerPC-64</td>
<td>Certified with the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• RedHat Enterprise Linux 4, 5, 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• SUSE Linux Enterprise 9,10, 11</td>
</tr>
</tbody>
</table>
Chapter 9: lmadmin License Server Manager

Downloading and Installing lmadmin License Server

Note • To use lmadmin on Windows platforms, the Microsoft Visual C++ 2005 SP1 Redistributable Package (x86) must be installed. You can choose to install this package during the FlexNet Publisher License Server Installer process.

lmadmin is supported on the following Web browsers:
- On RedHat Linux, Mozilla Firefox 3
- On Windows, Microsoft Internet Explorer 6, 7 and 8
- On Mac OS X, Apple Safari 4.0.

Using the License Server Installer

Download the FlexNet Publisher lmadmin installer from Flexera Software’s website; or, if the software publisher has provided their own lmadmin installation program, locate that program. If you have an existing installation of the lmadmin license server, see Upgrading lmadmin for instructions. This section describes how to install the license server for the first time.

Note • The FlexNet Publisher License Server Installer requires Java Runtime Environment 1.5 or later.

Whether running the FlexNet Publisher lmadmin installer or the software publisher’s version of the lmadmin installer, accept the default settings whenever possible. If you are given the option to modify installation settings, keep the following information in mind. (This information refers mainly to windows and options in the FlexNet Publisher lmadmin installer, but you can apply the information to the software publisher’s installation program as well.)

- Choose Install Folder window - Do not install the lmadmin license server in the same folder as an existing FlexNet Publisher installation.

Table 9-1 • Supported Platforms for lmadmin

<table>
<thead>
<tr>
<th>Platform Architecture</th>
<th>Processor Type</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mac OS 32-bit</td>
<td>x86, PowerPC</td>
<td>Mac OS X 10.4, 10.5, and 10.6</td>
</tr>
<tr>
<td>Mac OS 64-bit</td>
<td>x64</td>
<td>Mac OS X 10.5 and 10.6</td>
</tr>
<tr>
<td>Solaris 32-bit</td>
<td>x86, SPARC 32-bit</td>
<td>Solaris 9 and 10</td>
</tr>
<tr>
<td>Solaris 64-bit</td>
<td>x64, SPARC 64-bit</td>
<td>Solaris 10</td>
</tr>
</tbody>
</table>
• **Service Configuration window** - While it is possible to manually start and stop the lmadmin license server manager, it is recommended that you install it as an operating system service so that it will automatically start whenever the operating system restarts. The installer will set up the service for you on Windows. For UNIX or Mac, see Installing lmadmin License Server Manager as an Operating System Service for more details.

• **Windows Active Directory domain user or group prompts** - During installation on a Windows machine, the installer might prompt you for an Active Directory domain user or group name. If you specify a domain user name, you can sign into the lmadmin user interface with this user name and its associated password as defined in Active Directory. If you specify a domain group name, you can sign in with the name and password of any domain user belonging to the specified group. Setting a domain group as the administrator is helpful in a large enterprise where you might have several license administrators who need access to the interface. For more information, see the online help once you have opened the interface.

  **Note** • These prompts might be available in a software publisher’s version of the lmadmin installer. However, they are not available in the FlexNet Publisher lmadmin installer you download from the Flexera website.

• **Start the Server window** - It is recommended that you select **Start server now**. If the server is started successfully, the License Server Manager Interface is displayed. Typical output is shown in the following figure (although you might have to sign in initially, depending on whether this page is password-protected). If the server is not started successfully, see License Server Manager Not Starting for instructions.

**Figure 9-1:** License Server Manager Interface - Dashboard
After installing \texttt{imadmin} with the default configuration, you may want to configure the location where it stores the license files it uses. See \textit{Configuring the License File Upload Directory} for details.

**License Server Directory Structure**

After installing the \texttt{imadmin} license server, you will see the following files and directories. Do \textit{not} edit the contents of any file or directory except where explicitly instructed to by this \textit{License Administration Guide}, or by other supplied licensing documentation.

**Table 9-2 • Directories Used by the License Server Manager**

<table>
<thead>
<tr>
<th>Directory</th>
<th>Description of Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>$install_dir$</td>
<td>The installation folder that you specified when installing \texttt{imadmin}, often referred to in this documentation as the installation root directory. Configuration paths are usually specified relative to this directory location. This directory contains \texttt{imadmin} (\texttt{imadmin.exe} on Windows), the license server executable.</td>
</tr>
<tr>
<td>/cache</td>
<td>System directory that is created after you start any vendor daemon using the license server management interface.</td>
</tr>
<tr>
<td>/conf</td>
<td>Contains the system files that define the license server configuration.</td>
</tr>
<tr>
<td>/demo</td>
<td>Contains sample license files and the \texttt{demo} vendor daemon.</td>
</tr>
<tr>
<td>/eventlog</td>
<td>Exists on Window systems only and includes the files needed to allow the license server to record messages to the Windows event log.</td>
</tr>
<tr>
<td>/examples</td>
<td>Contains code samples that show how to build capabilities using the Web services.</td>
</tr>
<tr>
<td>/logs</td>
<td>Contains the application log files. This directory is created after the license server is started for the first time.</td>
</tr>
<tr>
<td>/web</td>
<td>Contains the license server management interface.</td>
</tr>
<tr>
<td>/wsdl</td>
<td>Contains the WSDL file that you can use to generate a client proxy for the Web services.</td>
</tr>
</tbody>
</table>

**Upgrading Imadmin**

Before installing a new version of \texttt{imadmin}:

- If you have configured \texttt{imadmin} as a system service, shut down the service.
- Shut down any \texttt{imadmin} processes running on the system.
Chapter 9: lmadmin License Server Manager

Downloading and Installing lmadmin License Server

The \texttt{lmadmin} installer provides the option \textbf{Import files from Previous Installation}. This option allows you to upgrade \texttt{lmadmin} while retaining a previous \texttt{lmadmin} configuration. The installer does not allow you to install \texttt{lmadmin} over an existing installation.

The following files and folders are imported from an existing \texttt{lmadmin} installation:

- **\texttt{lmadmin} configuration data**—permanent \texttt{lmadmin} settings that were configured either via the license server management interface or via the command-line. For example, license server port number; vendor daemon path and port; and three-server redundant port. These and other configuration data are held in the file `server.xml` which is imported to the `conf` directory.

- **Vendor daemon files and license files**—the vendor daemon executable, the license file used to start the vendor daemon, and additional license files imported via the license server management interface after the initial import of a vendor daemon. A copy of the directory structure is created and these files are imported.

- **Log files**—the vendor daemon log files, `<vendor>.log`.

\textbf{Note} • Only files held in the \texttt{lmadmin} installation root directory or its sub-directories are imported.

This section describes the upgrade procedure when you are installing the latest version of \texttt{lmadmin} and want to import files from a previous \texttt{lmadmin} installation. To determine which version of \texttt{lmadmin} you are using, see Release Version value displayed on the System Information page.

\textbf{Task:} \textbf{To upgrade an existing lmadmin installation:}

1. Run the \texttt{lmadmin} installer.

2. In \textbf{Choose Install Folder} set the installation root directory. Ensure that this is not a sub-directory of the existing installation.

3. In \textbf{Import files from Previous Installation} enter the path to the installation root directory of the \texttt{lmadmin} installation that you want to import and check **Yes Import**.

4. If you have configured the license server manager port, in \textbf{Launch Configuration} enter the License Server Port Number. (See License Server Manager Not Starting.)

5. If you have configured the TCP/IP port that the Web server uses to listen for communication with clients connecting to the license server management interface, in \textbf{Launch Configuration} enter the HTTP Port Number. (See License Server Manager Not Starting.)

6. Complete the remaining installation dialogs.

\textbf{Note} • Observe the following points when upgrading \texttt{lmadmin}:

- The \texttt{lmadmin} installer imports an existing vendor daemon and its associated files only when the license file used to import the vendor daemon contains the license file path as a relative path on its VENDOR line.

- If a vendor daemon uses trusted storage, you must manually copy the activation library, `<vendor>_libFNP.*`, from the existing installation to the new installation.
Any existing demo vendor daemon and associated license files and log files are not imported. The installer always installs an up-to-date version of the demo vendor daemon and the files required to run it.

Using lmadmin

Manually Starting the License Server Manager

You can start the license server using one of the following methods:

- On Windows platforms, open the installation directory in Windows Explorer and then double-click the lmadmin.exe file. This mechanism does not allow you to specify non-default command-line arguments.
- Execute the lmadmin command from the root installation directory. To see a list of available command-line arguments, execute the command:
  
  `lmadmin -help`

  The help display identifies the default arguments and which arguments are persistent, options that will remain in effect for later instances of lmadmin.
- Create a shell script file (Unix) or a batch file (Windows) that will run the lmadmin command with your desired command-line arguments and then execute that file.

Note • If either the default license server port or the HTTP port for the user interface is in use, the license server manager will not start. For instructions see License Server Manager Not Starting.

License Server Manager Not Starting

The license server manager will not start if either of the following ports are in use:

- Default license server port (no ports in range 27000 to 27009 available)
- Default HTTP port for the license server manager user interface (port 8080)

Task: To check for this error and correct it:

1. Run lmadmin from the command line using the -foreground argument:

   `lmadmin -foreground`

2. Examine the output at the command prompt. The following shows typical output when there is a clash on the HTTP port:

   ```
   <OS 10048>Only one usage of each socket address <protocol/network address/port> is normally permitted. : make_sock: could not bind to address 0.0.0.0:8080 no listening sockets available, shutting down
   Unable to open logs
   ```
3. Reconfigure any port where there is a clash:
   • Use the -licPort argument for the license server port.
   • Use the -webPort argument for the HTTP port.

   The following command reconfigures the HTTP port to 8081:

   `lmadmin -webPort 8081`

   When you have reconfigured the HTTP port, you access the license server management interface using the new port number. So for `lmadmin -webPort 8081`, connect to the URL, \http://<server>:8081\.

### Manually Stopping the License Server Manager

The allowStopServer command-line argument toggles the presence of the Stop Server button in the lmadmin user interface. The default is the Stop Server button is present. Click the Stop Server button in the Administration section of the license server management interface to shut down the license server manager (lmadmin) and all vendor daemons.

If lmadmin is started with the command-line argument -allowStopServer no, or if -allowStopServer no was the most recent use of the -allowStopServer argument, you cannot stop the license server using the license server management interface. In this situation, to stop the license server you must stop the lmadmin process.

On Unix systems, you can use the ps utility to identify the process and the kill command to terminate it.

---

**Caution** • Do not use kill -9, use only kill with its default signal; otherwise, the license server will not shut down cleanly.

On Windows systems, you can use the Task Manager to identify the lmadmin.exe process and stop it.

You cannot restart the license server from the management interface. You must restart the license server as described in the previous section.

### Accessing the License Server Management Interface

The license server management interface has two modes of operation—Standard mode and Section 508 mode. Either mode is accessible from a supported Web browser. See System Requirements for lmadmin for a list of supported Web browsers.

1. Make sure that you have started the license server.
2. Open the Web browser and browse to one of the following URLs:
   - **Standard mode**: This is the standard license server management interface:
     
     \http://<server>:8080\        
     where \<server>\ is the system name where the license server is running.
• **Section 508 mode**: Section 508 mode provides access to people with disabilities and has the same capabilities that are available in Standard mode:

   \[ \text{http://}<server>:8080/login508 \]

   where \(<server>\) is the system name where the license server is running. (The term “Section 508 mode” comes from Section 508, 36 CFR 1194.21, “Requirements for Software Applications and Operating Systems” of the 1998 amendment to the Federal Rehabilitation Act.)

**Signing in to lmadmin as an Administrator**

To use the following pages of the license server management interface, you must sign in as an administrator:

- System Information
- User Configuration
- Alert Configuration
- Server Configuration
- Vendor Daemon Configuration

When lmadmin is first installed, the administrator user name and password are both set to `admin`. Use this information when you first sign in to the interface as an administrator.

\[ \text{Note} \] If lmadmin is running on a Windows machine, you can also sign in to the interface using the Active Directory user ID specified as an lmadmin Administrator (either directly or via the specified Active Directory group) during lmadmin installation. However, this type of sign-in is available only if your lmadmin installation prompted for an Active Directory domain user or group name and if this information was provided.

**Viewing the lmadmin Log Files**

Application log files (except the `report.log` file) are written to the `<install_dir>/logs` directory.

**Table 9-3 • Log files**

<table>
<thead>
<tr>
<th>Log File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>access.log</td>
<td>Contains information recorded about access to the license server management interface.</td>
</tr>
<tr>
<td>lmadmin.log</td>
<td>Contains information recorded by the license server.</td>
</tr>
<tr>
<td>web.log</td>
<td>Contains information recorded by the license server management interface. This file does not contain information about login events. See the <code>access.log</code> file for that information.</td>
</tr>
</tbody>
</table>
Chapter 9: lmadmin License Server Manager
Managing lmadmin from the Command Line

This section describes some of the common tasks that can be performed using the lmadmin command line and the command-line arguments.

Adding a Vendor Daemon to lmadmin

The lmadmin license server must be configured with data about vendor daemons and license files. The license server ships with an example demo vendor daemon. To add a vendor daemon, you must import the information using a license file. You can do this from the command line or using the license server management interface.

Task: To add a vendor daemon from the command line:

1. Create or locate a valid license file (e.g., mylicense.lic) with the appropriate SERVER lines, VENDOR lines, and feature definition lines.
2. Make sure that the vendor daemon executable is in the correct location relative to lmadmin. This location is defined in the VENDOR line.
3. Import the license file by executing the following command:
   \[ lmadmin -import <mylicense.lic> \]
   where <mylicense.lic> is the name and location of the license file. This command imports the license file, but does not start the license server.
4. Start the license server.

When you import a license file, the license server configuration file (<install_dir>/conf/server.xml) is populated with the vendor daemon information (vendor name, vendor daemon path, port number, etc.).

<table>
<thead>
<tr>
<th>Log File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;vendor&gt;.log</td>
<td>These files contain information recorded by the corresponding vendor daemons (where &lt;vendor&gt; is the vendor daemon name). Each vendor daemon has its own log file, called the debug log file. In the installation package, you should see the demo.log file as the debug log file for the default demo vendor daemon.</td>
</tr>
<tr>
<td>report.log</td>
<td>A sample report log for the demo vendor daemon. Each vendor daemon can maintain a separate report log to record information about features that have been checked out by users. By default, a vendor daemon does not maintain report logs. This capability (in addition to the location of the report log file) must be enabled using the Options file.</td>
</tr>
</tbody>
</table>
Configuring the License File Upload Directory

The license file upload directory is the location where copies of license files used by lmadmin are stored when license files are imported using the Import License button on the Vendor Daemon Configuration tab or the -import command-line argument.

When this location is not configured, the default settings create the following directory structure into which license files are uploaded:

`.../<installation directory for lmadmin>/licenses/<vendor daemon name>/`

For example, on Windows when lmadmin is installed in the default location and two vendor daemons, demo and publisherA, are being managed by lmadmin, the following directories are created when license files for these vendor daemons are imported:

C:\Program Files\FlexNet Publisher License Server Manager\licenses\demo\
C:\Program Files\FlexNet Publisher License Server Manager\licenses\publisherA\

The license file that contains license rights for the vendor daemon demo is copied to the ..\demo directory. The license file that contains license rights for the vendor daemon publisherA is copied to the ..\publisherA directory. When additional license files are imported for either of these vendor daemons, they are uploaded to the appropriate vendor daemon-specific directory.

You can replace this default configuration as described in the following instructions. Typically the license file upload directory is configured when lmadmin is installed for the first time and then not altered. This ensures that license files, once imported, are available to lmadmin and the vendor daemons it manages.

**Task:** To configure the license file upload directory:

1. If lmadmin is running, shut it down (Manually Stopping the License Server Manager).
2. From the command line, execute an lmadmin command using the -uploadDir argument.

   The upload directory can be specified either as a relative or absolute path. When a relative path is used, it is relative to the current directory. Additionally a special string, %v, can be used to include the vendor daemon name in the directory path. Thus the following example specifies that the upload directory will be located at C:\Program Files\FlexNet Publisher License Server Manager\<vendor>\licenses:

   `lmadmin -uploadDir C:\Program Files\FlexNet Publisher License Server Manager\%v\licenses`
Installing lmadmin License Server Manager as an Operating System Service

While it is possible to manually start and stop the lmadmin license server manager, it is recommended that you install it as an operating system service so that it will automatically start whenever the operating system restarts.

Windows Systems

On Windows systems, you can install the lmadmin license server manager as a service. Only users in the Windows Administrators group can perform this action. The Startup Type is set to Automatic so that the service starts automatically when the system is restarted. Use the following license server manager (lmadmin) command-line arguments to install and uninstall the service (see Table 9-4).

**Important** • After executing the command to install the license server manager as a Windows service, it is not started automatically. You must start the service for the first time using the Windows Services Console.

**Table 9-4** • Command-line arguments to lmadmin used to configure lmadmin as a Windows service.

<table>
<thead>
<tr>
<th>lmadmin Command-line Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>–installService service name</td>
<td>Creates a Windows service (with the name you provide) to run the license server manager.</td>
</tr>
<tr>
<td>–removeService</td>
<td>Uninstalls the Windows service with the name you specified. Make sure you stop the service before removing it.</td>
</tr>
<tr>
<td>–delay nn</td>
<td>Sets the number of seconds (nn) to delay between the time you start the service and the time it actually begins running. This delay is helpful when a FlexNet ID dongle is used to lock the license server to a machine (that is, when the FLEXid is used on the SERVER line). The license server can sometimes fail to start when a system reboots because the license server loads before the dongle device driver has a chance to load properly.</td>
</tr>
</tbody>
</table>

**Note** • Use this option with the -installService argument.

Windows Vista

To run lmadmin with any of the command-line arguments used to configure lmadmin as a Windows service requires that the user has administrator privilege (Vista enforces administrator privileges for installation or removal of a service). Therefore, to use these arguments you must do the following:

- Sign in as an administrator before running lmadmin with these arguments.
- Start the command prompt using the option Run as Administrator.
Red Hat Linux and Sun Solaris Systems

On Red Hat Linux and Sun Solaris Systems, the installed /examples directory contains a sub-directory, /service. In the /service directory is a shell-script file, lmadmin. Do not confuse this lmadmin file with the license server manager. In the script file are installation instructions including details on where this file should be installed for either Red Hat Linux or Sun Solaris Systems. This script has been tested and will work in the majority of installations. It may need to be modified for your specific requirements.

Mac OS Systems

On Mac OS Systems, administrators have to create their own startup script in a directory such as /Library/StartupItems/LMadmin. The installed /examples/service/lmadmin script is the same script as installed for Linux and Solaris systems and is provided for reference only; it will not work properly on Mac OS systems. For more information on installing an executable file as a system service on Mac OS systems, see any of the many publicly available references such as http://www.oreilly.com/pub/a/mac/2003/10/21/startup.html. (Please note that Flexera Software cannot be responsible for the accuracy of information obtained from such reference sources or for the startup script that you write.)

lmadmin Command-line Arguments

This section describes in outline each of the lmadmin command-line arguments. Arguments defined as persistent will remain set until they are reset.

Usage

```
lmadmin [-version] [-config <configFile> | -configDir <configFileDirectory>]
[-root <install_dir>] [-force] [-import <licenseFileList>]
[-importInstallation <oldInstallDirectory>] [-config <configFileForImport>]
[-configDir <configDirForImport>] [-licPort <licenseServerPort>]
[-webPort <httpPort>] [-allowStopServer <yes|no>]
 [-allowRemoteStopServer <yes|no>] [-allowLicenseReclaim <yes|no>]
[-installService <servicename>] [-delay <seconds>] [-removeService <serviceName>]
[-defaultAdminUser <domain\username>] [-defaultAdminGroup <domain\groupName>]
[-uploadDir <uploadDirectory>] [-foreground] [-adminOnly <yes|no>]
[-logDir <logDirectory>]
```
### Table 9-5 • lmadmin Command-line Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>-adminOnly &lt;yes</td>
<td>no&gt;</td>
<td>Default - yes Persistent - yes Set from UI - no</td>
</tr>
<tr>
<td>-allowLicenseReclaim &lt;yes</td>
<td>no&gt;</td>
<td>Default - no Persistent - yes Set from UI - no</td>
</tr>
</tbody>
</table>
### Table 9-5 • Iadmin Command-line Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>-allowStopServer</td>
<td>Default: yes, Persistent: yes, Set from UI: no</td>
<td>Configures how the license server can be stopped.</td>
</tr>
<tr>
<td>&lt;yes</td>
<td>no&gt;</td>
<td></td>
</tr>
<tr>
<td>-allowRemoteStopServer</td>
<td>Default: no, Persistent: yes, Set from UI: no</td>
<td>Configures whether the license server can be stopped from a remote location. If set to yes, then you can stop the license server from a remote location and local clients can stop the license server using either <code>lmdown</code> or the Stop Server button in the UI. Note: Restrictions from the <code>-adminOnly yes</code> argument may prohibit remotely stopping the server from the command line even if you set <code>-allowRemoteStopServer yes</code>. If set to no, then it must be stopped from a local client. See online help for further details. Note: Setting <code>-allowRemoteStopServer yes</code> when <code>-allowStopServer is not defined, forces </code>-allowStopServer to be set to yes.</td>
</tr>
<tr>
<td>&lt;yes</td>
<td>no&gt;</td>
<td></td>
</tr>
<tr>
<td>-config</td>
<td>Default: server.xml, Persistent: yes, Set from UI: no</td>
<td>Defines the name of the license server configuration file to use when starting the license server manager. If all defaults are set, the path and name will be: <code>&lt;ladmin directory&gt;/conf/server.xml</code>.</td>
</tr>
<tr>
<td>&lt;configFile&gt;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-configDir</td>
<td>Default: <code>&lt;install_dir&gt;/conf</code>, Persistent: yes, Set from UI: no</td>
<td>Defines the directory where the license server configuration files are located.</td>
</tr>
<tr>
<td>&lt;configDir&gt;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 9-5 • Imadmin Command-line Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>-delay &lt;seconds&gt;</td>
<td>Default - 0</td>
<td>Used when configuring the license server as a service on Windows. See Installing Imadmin License Server Manager as an Operating System Service.</td>
</tr>
<tr>
<td></td>
<td>Persistent - yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set from UI - no</td>
<td></td>
</tr>
<tr>
<td>-defaultAdminUser &lt;domain\username&gt;</td>
<td>Default - n/a</td>
<td>Adds the specified Windows Active Directory user as an Imadmin Administrator. The license administrator can then log in to the Imadmin user interface initially using this user ID (and its Active Directory password) and proceed to perform administrative tasks.</td>
</tr>
<tr>
<td></td>
<td>Persistent - yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set from UI - yes</td>
<td></td>
</tr>
</tbody>
</table>

To identify this user, use the format *domain\username*, where *domain* is a valid Active Directory domain to which the machine running Imadmin has a trusted relationship, and *username* identifies a valid account within that domain. This value is not case-sensitive and can include up to 32 characters.

**Note** • Use this argument sparingly. Its main purpose is to provide initial access to the Imadmin interface.
### Table 9-5 • lmadmin Command-line Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
</table>
| -defaultAdminGroup | Default - n/a | Adds the specified Windows Active Directory group as an lmadmin Administrator. The license administrator can then log in to the lmadmin user interface initially using any Active Directory user ID (and its associated password) belonging to this group and proceed to perform administrative tasks. To identify this group, use the format domain\groupname, where domain is a valid Active Directory domain to which the machine running lmadmin has a trusted relationship, and groupname identifies a valid account within that domain. This value is not case-sensitive and can include up to 32 characters.  

**Note** • Consider the following:  
* Setting a domain group as the lmadmin Administrator is helpful in a large enterprise where you might have several license administrators who need access to the interface. For more information, see the online help once you have opened the interface.  
* Use this argument sparingly. Its main purpose is to provide initial access to the lmadmin interface. |
| -force            | Default - not overwrite settings | Use with the -import argument to overwrite existing vendor daemon settings in the license server configuration file. The following settings are overwritten or reset to the default:  
* License file location (overwritten).  
* Vendor daemon location (overwritten).  
* Vendor daemon port (reset to default).  
* Restart retries (reset to default).  
* Date-based versions (reset to default).  
* Overwrite vendor daemon log (reset to default).  
* Vendor daemon log location and name (reset to default). |
### Table 9-5 • Imadmin Command-line Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>-foreground</td>
<td>Default - run in background</td>
<td>Run Imadmin in the foreground: Output status and errors to the command line.</td>
</tr>
<tr>
<td></td>
<td>Persistent - no</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set from UI - n/a</td>
<td></td>
</tr>
<tr>
<td>-import &lt;licenseFileList&gt;</td>
<td>Default - n/a</td>
<td>Updates the license server configuration file with information extracted from the specified license files. See license_file_list for details of the format of licenseFileList. This option does not start lmadmin. This argument can be combined with -config, -configDir and -force.</td>
</tr>
<tr>
<td></td>
<td>Persistent - n/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set from UI - Import License button</td>
<td></td>
</tr>
<tr>
<td>-importInstallation &lt;oldInstallDirectory&gt; [-config &lt;configFileForImport&gt;] [-configDir &lt;configDirForImport&gt;]</td>
<td>Default - n/a</td>
<td>Imports configuration information from the specified existing Imadmin installation directory or from a specified location for the license server configuration files (optional use of -config and/ or -confDir). This option does not start lmadmin. This argument can be combined with -config, -configDir and -root.</td>
</tr>
<tr>
<td></td>
<td>Persistent - n/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set from Installer - specify in Import files from Previous Installation in the Imadmin Installer.</td>
<td></td>
</tr>
<tr>
<td>-installService &lt;serviceName&gt;</td>
<td>Default - do not install Imadmin as a Windows service</td>
<td>Used when configuring the license server as a service on Windows. See Installing Imadmin License Server Manager as an Operating System Service.</td>
</tr>
<tr>
<td></td>
<td>Persistent - n/a</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set from UI - no</td>
<td></td>
</tr>
<tr>
<td>-licPort &lt;licenseServerPort&gt;</td>
<td>Default - first available in range 27000-27009</td>
<td>Configures the license server manager port. To set a specific port, enter a positive integer for licenseServerPort. To set the default, enter 0 (zero) for licenseServerPort.</td>
</tr>
<tr>
<td></td>
<td>Persistent - yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set from UI - License Server Manager Port</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Persistent - yes</td>
<td>Assuming no vendor daemon logs have been set (in the options file) to write to a custom location, Imadmin writes all Imadmin logs to the location you set for &lt;logDirectory&gt;. When a custom vendor daemon log location is set, that setting overrides the -logDir setting for that particular vendor daemon log.</td>
</tr>
<tr>
<td></td>
<td>Set from UI - no</td>
<td></td>
</tr>
</tbody>
</table>
### Task: To see a full list of available command-line arguments for the license server manager (lmadmin):

1. Open a command-prompt window.
2. Change to the directory where the lmadmin file is located.
3. Enter the following command to view a list of available arguments with a description of each:

   `lmadmin -help`

   The help descriptions identify the default arguments and which arguments are persistent, arguments that will remain in effect for later instances of lmadmin.

### Table 9-5 • lmadmin Command-line Arguments

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-removeService &lt;serviceName&gt;</code></td>
<td>Default - n/a Persistent - n/a Set from UI - no</td>
<td>Used when configuring the license server as a service on Windows. See Installing lmadmin License Server Manager as an Operating System Service.</td>
</tr>
<tr>
<td><code>-root &lt;install_dir&gt;</code></td>
<td>Default - current directory Persistent - no Set from UI - no</td>
<td>Specifies where lmadmin is installed. This enables you to issue an lmadmin command from somewhere other than the directory where lmadmin is installed. Note that any command-line arguments that specify relative paths define paths relative to the current directory and not the directory specified with -root.</td>
</tr>
<tr>
<td><code>-uploadDir &lt;uploadDirectory&gt;</code></td>
<td>Default - &lt;install_dir&gt;/licenses/&lt;vendor&gt; Persistent - yes Set from UI - no</td>
<td>Configures the directory where license files that are uploaded to the license server manager are stored. A directory with the name of the vendor daemon can be set by using the string &quot;%v&quot; as in the following example: <code>-uploadDir flexlicenses\%v</code></td>
</tr>
<tr>
<td><code>-webPort &lt;httpPort&gt;</code></td>
<td>Default - 8080 Persistent - yes Set from UI - HTTP Port</td>
<td>Configures the TCP/IP port that the Web server uses to listen for communication with clients connecting to the license server management interface. See License Server Manager Not Starting for an example of how to use this argument.</td>
</tr>
<tr>
<td><code>-version</code></td>
<td>n/a</td>
<td>Outputs details of the lmadmin version to the command prompt.</td>
</tr>
</tbody>
</table>
Extending lmadmin License Server Capability

lmadmin can be customized. These customizations require some programming. The lmadmin installation package includes some example applications and files that demonstrate simple customizations.

Using the lmadmin Web Service Interface

lmadmin provides a Web service interface that exposes certain APIs that can be called from a custom-built utility. These services enable you to extend the core license server capabilities. The WSDL file needed to generate the client proxy can be found in the /wsdl sub-directory.

The lmadmin installation package includes a set of examples in the <install_dir>/examples directory that demonstrate how to implement certain capabilities using the Web service interface.

Creating an lmadmin Alerter Service

The lmadmin license server installation includes an example of how to implement an email alerter service. This service will poll for alerts and then send a user an email when an alert has been triggered.

Using the Alerter Service Email Alerts

The sample Alerter service utility runs on the license server and enables a user to receive alert notifications by email. To use the Alerter service, you must install Java Runtime Environment (JRE) 1.5 on the license server.

To start the Alerter service, there are two files in the <install_dir>/examples/aleter directory:

- For Windows systems, the runalerter.bat file.
- For UNIX systems, the runalerter file.

When starting this service, you must configure certain command-line arguments to define the mail server, sender, receiver, and so on. To see the list of available command-line arguments for the runalerter script, type the following command:

runalerter -help

The source code for this utility is in the <install_dir>/examples/aleter/src directory.
The license server manager is one of the components that make up a license server (the other being the vendor daemon). It handles the initial contact with FlexEnabled applications, passing the connection on to the appropriate vendor daemon. The purposes of the license server manager are to:

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

lmgrd is an application-based version of the license server manager. On most platforms it is controlled from a command-line. On Windows LMTOOLS can be used to manage lmgrd.

A newer lmgrd can be used with an older vendor daemon or FlexEnabled application, but a newer vendor daemon or FlexEnabled application might not work properly with an older lmgrd. Always use the latest version of lmgrd, which is available from the download site. See Version Compatibility Between Components for detailed information.

**lmgrd Command-Line Syntax**

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

**Usage**

```
lmgrd [-c license_file_list] [-l [+]debug_log_path]
```

**where:**

**Table 10-1 • lmgrd Command-Line Syntax Usage**

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c license_file_list</td>
<td>Use the specified license files.</td>
</tr>
</tbody>
</table>
Starting the License Server Manager on UNIX Platforms

If any licenses in the license file are counted (license count > 0), the license server manager, and hence the license server, must be started before the FlexEnabled application can be used.

The license server manager, lmgrd, is started either manually on the command line or automatically at system startup. Both methods are discussed in the following sections.

**Note** • Start lmgrd only on the system specified on the SERVER line in the license file.

### Starting the License Server Manager on UNIX Platforms

If any licenses in the license file are counted (license count > 0), the license server manager, and hence the license server, must be started before the FlexEnabled application can be used.

The license server manager, lmgrd, is started either manually on the command line or automatically at system startup. Both methods are discussed in the following sections.

**Note** • Start lmgrd only on the system specified on the SERVER line in the license file.

### Table 10-1 • lmgrd Command-Line Syntax Usage

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-l [+] debug_log_path</td>
<td>Write debugging information to file debug_log_path. This option uses the letter l, not the numeral 1. Prepending debug_log_path with the + character appends logging entries. See Debug Log File for more information on this file.</td>
</tr>
<tr>
<td>-2 -p</td>
<td>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 a UNIX group called lmadmin, then use is restricted to only members of that group. 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, no user on Windows can shut down the license server with lmdown, nor can they use the lmswitch, lmswitchr, and lmnewlog command-line utilities.</td>
</tr>
<tr>
<td>-local</td>
<td>Restricts the lmdown and lmreread commands to be run only from the same system where lmgrd is running.</td>
</tr>
<tr>
<td>-x lmdown</td>
<td>Disable the lmdown command (no user can run lmdown). If lmdown is disabled, stop lmgrd via kill pid (UNIX), or stop the lmgrd and vendor daemon processes through the Windows Task Manager or Windows service. On UNIX, be sure the kill command does not have a -9 argument.</td>
</tr>
<tr>
<td>-x lmremove</td>
<td>Disable the lmremove command (no user can run lmremove).</td>
</tr>
<tr>
<td>-z</td>
<td>Run in foreground. The default behavior is to run in the background. If -l debug_log_path is present, then no windows are used, but if no -l argument specified, separate windows are used for lmgrd and each vendor daemon.</td>
</tr>
<tr>
<td>-v</td>
<td>Displays lmgrd version number and copyright and exits.</td>
</tr>
<tr>
<td>-help</td>
<td>Displays usage information and exits.</td>
</tr>
</tbody>
</table>
If you are running license servers configured for three-server redundancy, maintain an identical copy of the license file (as well as the lmgrd and the vendor daemons binaries) locally on each system rather than on a file server. If you do not do this, you lose all the advantages of having redundant servers, as the file server holding these files becomes a single point of failure.

**Manual Start**

Start lmgrd from the UNIX command line using the following syntax:

```
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

If the license_file_list value contains more than one license file or directory, they must be separated by colons on UNIX or semicolons on Windows.

- **debug_log_path** is the full path to the debug log file

Prepending debug_log_path with the + character appends logging entries.

Start lmgrd by a user other than root since processes started by root can introduce security risks. If lmgrd must be started by the root user, use the su command to run lmgrd as a non-privileged user:

```
su username -c "lmgrd -c license_file_list -L debug_log_path"
```

where **username** is a non-privileged user. You must ensure that the vendor daemons listed in the license file have execute permissions for **username**. The paths to all the vendor daemons in the license file are listed on each VENDOR line.

**Automatic Start**

On UNIX, edit the appropriate boot script, which may be /etc/rc.boot, /etc/rc.local, /etc/rc2.d/Sxxx, /sbin/rc2.d/Sxxxx. Include commands similar to the following. See the following notes for a full explanation.

```
/bin/sudaniel -c 'echo starting lmgrd > \
/home/flexlm/v11/hp700_u9/boot.log'

/bin/nophup /bin/sudaniel -c 'umask 022; \n/home/flexlm/v11/hp700_u9/lmgrd -c \n/home/flexlm/v11/hp700_u9/license.dat >> \n/home/flexlm/v11/hp700_u9/boot.log'

/bin/sudaniel -c 'echo sleep 5 >> \n/home/flexlm/v11/hp700_u9/boot.log'

/bin/sleep 5
```
Chapter 10: lmgrd - License Server Manager
Starting the License Server Manager on Windows

Note: This does not start the vendor daemon until you reboot the system.

Starting the License Server Manager on Windows

This section provides procedural information on manual starts from the command line and how to configure the License Server Manager (lmgrd) as a service.

Manual Start from the Command Line

To start lmgrd from the command line:

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

```
C:\fnp> 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
- `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 Manager as a Windows Service

To configure a license server manager (`lmgrd`) as a service, you must have Administrator privileges. The service will run under the `LocalSystem` account. This account is required to run this utility as a service.

Task: To configure a license server as a service:

1. Run the `lmtools` utility.
2. Click the `Configuration using Services` button, and then click the `Config Services` tab.
3. In the `Service Name`, type the name of the service that you want to define, for example, `DEMO License Manager`. If you leave this field blank, the service will be named `FlexNet Publisher Service`.
4. In the `Path to the lmgrd.exe file` field, enter or browse to `lmgrd.exe` for this license server.
5. In the `Path to the license file` field, enter or browse to the license file for this license server.
6. In the `Path to the debug log file`, enter or browse to the debug log file that this license server writes. Prepending the debug log file name with the `+` character appends logging entries. The default location for the debug log file is the `c:\winnt\System32` folder. To specify a different location, make sure you specify a fully qualified path.
7. To save the new **DEMO License Manager** service, click **Save Service**.

**Figure 10-1:** Completed Config Services Tab

![Completed Config Services Tab](image)

**Configuring the License Server Manager Service 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. A typical scenario where a delay is needed is when a FlexNet ID dongle is used to lock the license server to a machine (the FLEXid is used on the SERVER line). In this scenario the license server will sometimes fail to start upon reboot of the system because the license server is loaded before the dongle device driver has loaded properly.

**Task:** **To Configure a delayed start for the license server manager service:**

1. Configure the license server manager as a service ([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 Start the License Server Using the lmtools Utility**

A graphical user interface to the license server manager tools is provided called lmtools. Some of the functions lmtools performs include:

- starting, stopping, and configuring license servers.
- getting system information, including hostids.
- getting server status.

In order to control the operation of lmgrd from the lmtools user interface, you first must configure it as a license server manager service. Follow the procedure in Configuring the License Server Manager as a Windows Service before proceeding.

Once the license server manager service is configured, lmgrd is started by starting the service from the lmtools interface.

---

**Task:** To start the service from the lmtools interface:

1. Start lmtools and display the Service/License File tab.
2. Click Configuration using Services button.
3. Select the service name from the list presented in the selection box. In this example, the service name is **DEMO License Manager**.

**Figure 10-2: Service/License File Tab**

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

5. Start DEMO License Manager by clicking the **Start Server** button. DEMO License Manager license server starts and writes its debug log output to `c:\prods\i86_n3\debug.log`.

**Figure 10-3: Start/Stop/Reread Tab**
Automatically Start the License Server when 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 steps below.

**Task:** **To configure lmgrd as a service:**

1. With lmtools started and the desired service name selected, click the **Config Services** tab.

   **Figure 10-4: 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 startup time by selecting the **Start Server at Power Up** check box.

   From now on, when the system is rebooted, this license server manager starts automatically as a Windows service.
Migrating from lmgrd to lmadmin

A Fundamental Mode Change

The lmadmin license server manager combines all the functionality of the lmgrd license server manager with a Web-based, administrative interface. However, the lmadmin license server manager operates in some fundamentally different ways than the lmgrd license server manager.

The obvious change is that previous versions of the license server manager (lmgrd) used a command-line interface and the new license server manager (lmadmin) supports a browser-based client connection over HTTP. A more fundamental change in operation is that configuration options are now persistent—if you change settings and relaunch the tool, the previously set options stay in effect.

With lmgrd, the primary mode of operation is to run one instance of lmgrd for each vendor daemon where lmgrd obtains its configuration information from the command-line options used when the program is started, including the required specifying of a license file. To change settings you typically stop the license server, edit the license file and/or the script containing your command-line options, and relaunch the tool.

In contrast, the lmadmin license server manager is designed to:

- Support multiple vendor daemons with one lmadmin process.
- Launch without requiring any configuration options.
- Perform all server configuration and administration functions from the browser. (For special circumstances, the lmutil package provides additional functions.)
- Import existing license files (the new lmadmin license server manager is compatible with license files and vendor daemons produced using FlexNet Publisher 9.2 and later).
- Keep configuration options persistent.
Persistent configuration options is a significant change. Once set, settings remain in effect until changed. For example, if two vendor daemons are specified to use the same TCP port, only one will run. With lmgrd, this requires making changes to at least one of the license files as well as stopping and restarting the server. With lmadmin, you can change the TCP port for a vendor daemon while the license server is running. The manually specified port is then persistent and will remain as it was manually set the next time the license server is started, even if the license file is changed. The changes set in the license server manager override the license files.

Command Changes

Because of the changes in the fundamental operation of the system, many features have been redesigned. The following lmgrd command-line options are not supported by lmadmin.

Table 11-1 • Command-line options to lmgrd that are not supported by lmadmin.

<table>
<thead>
<tr>
<th>lmgrd option</th>
<th>lmadmin notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2 -p</td>
<td>The replacement option is -adminOnly yes, which is the default for lmadmin.</td>
</tr>
<tr>
<td>-z</td>
<td>The replacement option is -foreground.</td>
</tr>
<tr>
<td>-c license_file_list</td>
<td>License files are now managed using either the license server management interface or the new -import option.</td>
</tr>
<tr>
<td>-v</td>
<td>Version information is now displayed in the license server management interface. The equivalent is -version option.</td>
</tr>
<tr>
<td>-l [+]debug_log_path</td>
<td>The -logDir option defines the path to the debug log file (lmadmin.log) written by the lmadmin license server manager. The default location is &lt;install_dir&gt;/logs. The default location for the vendor daemon debug log files is &lt;install_dir&gt;/logs/&lt;vendor&gt;.log. The path to vendor daemon debug logs can be changed via either the lmadmin license management interface or the options file.</td>
</tr>
<tr>
<td>-local</td>
<td>The replacement is to use the following argument settings:</td>
</tr>
<tr>
<td></td>
<td>-allowStopServer Yes -allowRemoteStopServer No</td>
</tr>
<tr>
<td>-x lmdown</td>
<td>The replacement option is -allowStopServer. Note that the logical direction of this option has been reversed.</td>
</tr>
<tr>
<td>-x lmremove</td>
<td>The replacement option is -allowLicenseReclaim. Note that the logical direction of this option has been reversed.</td>
</tr>
</tbody>
</table>
lmadmin License Administration Functions

lmadmin provides some of the license administration functions previously provided by the command-line based license administration utilities or LMTOOLS on the Windows platform. The following table lists functions provided within lmadmin that replace those provided by the license administration utilities.

Table 11-2 • lmadmin License Administration Functions

<table>
<thead>
<tr>
<th>lmadmin Function</th>
<th>Description</th>
<th>Replaces Utility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dashboard - Licenses</td>
<td>Displays details of licenses rights available and in use.</td>
<td>lmstat</td>
</tr>
<tr>
<td>Vendor Daemon Configuration - Administer - Stop</td>
<td>Stops the vendor daemon.</td>
<td>lmdown - some usage cases</td>
</tr>
<tr>
<td>Vendor Daemon Configuration - Administer - Reread License Files</td>
<td>Rereads license rights from license files included in the lmadmin configuration. Required only when the content of a license file is updated.</td>
<td>lmrdread - see also Changes in lmrdread Behavior when Using lmadmin</td>
</tr>
<tr>
<td>Vendor Daemon Configuration - Administer - Rotate Report Logs</td>
<td>Switches the report log to a new file name.</td>
<td>lmswitchr</td>
</tr>
<tr>
<td>Server Configuration - Stop Server</td>
<td>Stops the license server. Note that lmadmin’s default setting enables this button; to disable it start lmadmin with the -allowStopServer No argument.</td>
<td>lmdown - some usage cases</td>
</tr>
</tbody>
</table>

The following table details which command-line utilities may no longer be required and which utilities are required when using lmadmin.

Table 11-3 • lmadmin Use of License Administration Utilities

<table>
<thead>
<tr>
<th>Utility</th>
<th>Required when using lmadmin</th>
</tr>
</thead>
<tbody>
<tr>
<td>lmborrow</td>
<td>Yes, if using license rights in license files and borrow capability.</td>
</tr>
<tr>
<td>lmdiag</td>
<td>Yes, to diagnose license checkout problems.</td>
</tr>
<tr>
<td>lmdown</td>
<td>Not normally required.</td>
</tr>
<tr>
<td>lmhostid</td>
<td>Not normally required for lmadmin as it displays information about the system it is running on that includes the various identities normally used as hostids. Required for determining the hostids of client systems.</td>
</tr>
<tr>
<td>lminstall</td>
<td>Yes, converts license files between different formats.</td>
</tr>
</tbody>
</table>
Chapter 11: Migrating from lmgrd to lmadmin

Imadmin License Administration Functions

Table 11-3 • Imadmin Use of License Administration Utilities

<table>
<thead>
<tr>
<th>Utility</th>
<th>Required when using Imadmin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imnewlog</td>
<td>Yes, if you use this function instead of Imswitchr to change to a new report log because</td>
</tr>
<tr>
<td></td>
<td>you do not want to edit the report log file name in the Options file.</td>
</tr>
<tr>
<td>Impath</td>
<td>Yes, allows users direct control over license file path settings.</td>
</tr>
<tr>
<td>Imremove</td>
<td>Yes, releases a hung license to the pool of free licenses. Note that Imadmin’s default</td>
</tr>
<tr>
<td></td>
<td>setting disables the operation of Imremove, to enable it start Imadmin with the -</td>
</tr>
<tr>
<td></td>
<td>allowLicenseReclaim argument.</td>
</tr>
<tr>
<td>Imreread</td>
<td>Not normally required. See also Changes in Imreread Behavior when Using Imadmin.</td>
</tr>
<tr>
<td>Imstat</td>
<td>Only required to show additional information (such as borrow or reservations).</td>
</tr>
<tr>
<td>Imswitch</td>
<td>Yes, controls debug log location and size.</td>
</tr>
<tr>
<td>Imswitchr</td>
<td>Not required.</td>
</tr>
<tr>
<td>Imver</td>
<td>Yes, reports the version of a library or binary file. Note that you can determine the</td>
</tr>
<tr>
<td></td>
<td>version of Imadmin by starting it with the -version argument.</td>
</tr>
</tbody>
</table>

Changes in Imreread Behavior when Using Imadmin

Normally Imreread is not required when using Imadmin, however if you use Imreread with Imadmin the following use cases are not supported:

- **Using Imreread to restart a vendor daemon** - when using lmgrd you can shut down a vendor daemon using lmdown and then use the Imreread command to restart the vendor daemon. The following sequence of commands will result in an error when using Imadmin:
  
  lmdown -vendor demo
  Imreread -vendor demo

- **Using Imreread to load and start a new vendor daemon** - you can start lmgrd with a license file that specifies a vendor daemon and then replace this license file with one that includes information about a second vendor daemon. When Imreread is run, this second vendor daemon will be started. Using Imreread in this way with Imadmin will not load or start the vendor daemon. When using Imadmin, load and start a new vendor daemon as follows:
  
  1. Import a license file for the vendor daemon - Administration> Vendor Daemon Configuration> Import License.
  2. Start the vendor daemon - Administration> Vendor Daemon Configuration> Click Administer for vendor daemon > Start.
License administration tools are available from the Flexera Software download site to help license administrators manage licenses and license servers. Always use the latest version of the utilities. If you are using `lmadmin` as your license server manager, then it provides functionality that replace some of these utilities. The table, License Administration Utilities, lists these utilities and indicates when `lmadmin` provides an alternative.

**Command-Line Utilities**

All license server utilities are packaged as a single executable called `lmutil`. The `lmutil` is either installed as individual commands (either by creating links to the individual command names, or making copies of `lmutil` as the individual command names), or as a wrapper that runs the individual command as `lmutil` command. For example, `lmutil lmdown`.

On Windows systems, the `lmutil` command form of the commands are available. There is also a graphical user interface available for these commands—see `lmtools` (Windows only).

<table>
<thead>
<tr>
<th>Utility</th>
<th>Description</th>
<th>lmadmin Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>lmborrow</code></td>
<td>Supports license borrowing.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmdiag</code></td>
<td>Diagnoses license checkout problems.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmdown</code></td>
<td>Gracefully shuts down selected vendor daemons (both <code>lmgrd</code> or <code>lmadmin</code> and all vendor daemons) on the license server (or on all three systems in the case of three-server redundancy).</td>
<td>Vendor Daemon Configuration - Administer - Stop</td>
</tr>
<tr>
<td><code>lmhostid</code></td>
<td>Reports the hostid of a system.</td>
<td>System Information displays hostids for the license server.</td>
</tr>
</tbody>
</table>
### Chapter 12: Using License Administration Tools

#### Command-Line Utilities

- The `lmpath` utility introduced in the version 7.0 utilities.
- The `lmnewlog` utility introduced in the version 8.0 utilities.
- The `lmswitch` utility introduced in version 8.0 vendor daemon.
- The `lmswitchr` utility introduced in version 5.0 vendor daemon.

<table>
<thead>
<tr>
<th>Utility</th>
<th>Description</th>
<th>lmadmin Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>lminstall</code></td>
<td>Converts license files between different formats.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmnewlog</code></td>
<td>Moves existing report log information to a new file name and starts a new report log file with existing file name.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmpath</code></td>
<td>Allows users direct control over license file path settings.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmremove</code></td>
<td>Releases a hung license to the pool of free licenses.</td>
<td>None. Note <code>lmadmin</code> default setting disables <code>lmremove</code>.</td>
</tr>
<tr>
<td><code>lmreread</code></td>
<td>Causes the license daemon to reread the license file and start any new vendor daemons.</td>
<td>Vendor Daemon Configuration - Administer - Reread License Files</td>
</tr>
<tr>
<td><code>lmstat</code></td>
<td>Displays the status of a license server.</td>
<td>Dashboard - Licenses</td>
</tr>
<tr>
<td><code>lmswitch</code></td>
<td>Controls debug log location and size.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmswitchr</code></td>
<td>Switches the report log to a new file name.</td>
<td>Vendor Daemon Configuration - Administer - Rotate Report Logs</td>
</tr>
<tr>
<td><code>lmver</code></td>
<td>Reports the version of a library or binary file.</td>
<td>None</td>
</tr>
</tbody>
</table>

---

**Table 12-1 • License Administration Utilities**

<table>
<thead>
<tr>
<th>Utility</th>
<th>Description</th>
<th>lmadmin Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>lminstall</code></td>
<td>Converts license files between different formats.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmnewlog</code></td>
<td>Moves existing report log information to a new file name and starts a new report log file with existing file name.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmpath</code></td>
<td>Allows users direct control over license file path settings.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmremove</code></td>
<td>Releases a hung license to the pool of free licenses.</td>
<td>None. Note <code>lmadmin</code> default setting disables <code>lmremove</code>.</td>
</tr>
<tr>
<td><code>lmreread</code></td>
<td>Causes the license daemon to reread the license file and start any new vendor daemons.</td>
<td>Vendor Daemon Configuration - Administer - Reread License Files</td>
</tr>
<tr>
<td><code>lmstat</code></td>
<td>Displays the status of a license server.</td>
<td>Dashboard - Licenses</td>
</tr>
<tr>
<td><code>lmswitch</code></td>
<td>Controls debug log location and size.</td>
<td>None</td>
</tr>
<tr>
<td><code>lmswitchr</code></td>
<td>Switches the report log to a new file name.</td>
<td>Vendor Daemon Configuration - Administer - Rotate Report Logs</td>
</tr>
<tr>
<td><code>lmver</code></td>
<td>Reports the version of a library or binary file.</td>
<td>None</td>
</tr>
</tbody>
</table>
Common Arguments for lmutil

The following are valid arguments for most lmutil utilities:

**Table 12-2 • lmutil Valid Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-c license_file_path</code></td>
<td>Most lmutil utilities need to know the path to the license file. This is specified with a <code>-c license_file_path</code> argument, or by setting the LM_LICENSE_FILE environment variable. 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 UNIX and semicolons on Windows. Pathnames that include spaces must be enclosed in double quotes.</td>
</tr>
<tr>
<td><code>-help</code></td>
<td>Displays usage information and exits.</td>
</tr>
<tr>
<td><code>-v</code></td>
<td>Displays the version of the utility and exits.</td>
</tr>
<tr>
<td><code>-verbose</code></td>
<td>Displays longer description for all errors found.</td>
</tr>
</tbody>
</table>

**Note** • VENDOR_LICENSE_FILE environment variable honored in utilities starting with version 7.0 utilities.

- `-verbose` option introduced in version 6.0 of the utilities.

**lmborrow**

lmborrow supports borrowing of licenses that contain the BORROW attribute. It must be run on the system where licenses are borrowed. It is used to perform the following:

- Initiating borrowing by setting the borrow period
- Clearing the borrow period
- Determining borrow status
- Returning a borrowed license early
Chapter 12: Using License Administration Tools
Command-Line Utilities

Initiating Borrowing

To initiate borrowing, the user sets the borrow period by running `lmborrow` from the command line or through `lmtools`:

```
lmborrow {vendor | all} enddate [time]
```

where:

**Table 12-3 • `lmborrow` Arguments for Initiating Borrowing**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>vendor</code></td>
<td>The vendor daemon name that serves the licenses to be borrowed, or <code>all</code> specifies all vendor daemons in that license server.</td>
</tr>
<tr>
<td><code>enddate</code></td>
<td>Date the license is to be returned in <code>dd-mmm-yyyy</code> format. <code>time</code> is optional and is specified in 24-hour format (<code>hh:mm</code>) in the FlexEnabled application's local time. If <code>time</code> is unspecified, the checkout lasts until the end of the given end date.</td>
</tr>
</tbody>
</table>

For example:

```
lmborrow sampled 20-aug-2007 13:00
```

This has the effect of setting `LM_BORROW` with the borrow period in either the registry (Windows) or in `$HOME/.flexlmborrow` (UNIX).

To borrow licenses for the desired vendor name, *on the same day and the same system* that the user runs `lmborrow`, run the applications to check out the licenses. If you run the applications more than once that day, no duplicate licenses are borrowed. No licenses are borrowed if the application is run on a day different than the date borrowing is initiated.

In addition to the `lmborrow` utility, there are other ways to initiate borrowing:

- Using the borrowing interface in application, if provided in the application.
- Setting the `LM_BORROW` environment variable directly.

See [Initiating License Borrowing](#) for more information on these other ways.

Clearing the Borrowed License Setting

To clear the `LM_BORROW` setting in the registry or `$HOME/.flexlmborrow`:

- Issue the command `lmborrow -clear`.

Clearing the `LM_BORROW` setting stops licenses from being borrowed until borrowing is initiated again. A user might run `lmborrow -clear` after she has borrowed licenses for features that are used offline if—before disconnecting from the network—she wants to run an application that checks out additional features, served by that vendor name, that are not meant to be borrowed. Clearing `LM_BORROW` does not change the status for already borrowed licenses.
Chapter 12: Using License Administration Tools

Command-Line Utilities

Chapter 12: Using License Administration Tools

Command-Line Utilities

Determining Borrowed License Status

To print information about borrowed features:

- Issue the following command on the system from which they are borrowed:

  `lmborrow -status`

  The borrowing system does not have to be connected to the network to determine the status.

Returning a Borrowed License Early

Task: To return a borrowed license early:

1. Reconnect the borrowing system back to the network.
2. From the same system that initiated the borrowing, issue the command:

  `lmborrow -return [-fqdn] [-c license_file_list] [-d display] feature`

where:

Table 12-4 • `lmborrow` Arguments for Returning a Borrowed License Early

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-fqdn</td>
<td>Directs <code>lmborrow</code> to access the borrowing system using its fully qualified host name. Use this option if the license was borrowed based on the fully qualified host name, rather than the relative distinguished name. Use <code>lmstat</code> to determine the format of the host name used when the license was borrowed.</td>
</tr>
<tr>
<td>-c license_file_list</td>
<td>Use the specified license files. In some configurations, the license file needs to be specified in order to return the license file early.</td>
</tr>
<tr>
<td>-d display</td>
<td>Used to specify the display from which the borrow was initiated. Required if your current display is different than what was used to initiate the borrow. On Windows, it is the system name or, in the case of a terminal server environment, the terminal server client name. On UNIX, it is in the form <code>/dev/ttyxx</code> or the X-Display name.</td>
</tr>
<tr>
<td>feature</td>
<td>The name of the borrowed feature to be returned early. Use <code>lmborrow -status</code> to get a list of borrowed feature names.</td>
</tr>
</tbody>
</table>

If the borrowing system is not placed back on the network before attempting the early return, the license is not returned and `LM_BORROW` is kept intact. Additionally, an error message is issued to the user with notification that the system needs to be connected to the network.
Chapter 12: Using License Administration Tools
Command-Line Utilities

Note • Early borrowed license return was introduced in version 8.3 utilities.

lmdiag

lmdiag allows you to diagnose problems when you cannot check out a license.

Usage

lmdiag [-c license_file_list] [-n] [feature[:keyword=value]]

where:

Table 12-5 • lmdiag Argument Usage

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c license_file_list</td>
<td>Diagnose the specified files.</td>
</tr>
<tr>
<td>-n</td>
<td>Run in non-interactive mode; lmdiag does not prompt for any input in this mode. In this mode, extended connection diagnostics are not available.</td>
</tr>
<tr>
<td>feature</td>
<td>Diagnose this feature only.</td>
</tr>
</tbody>
</table>
| keyword=value | If a license file contains multiple lines for a particular feature, select a particular line for lmdiag to report on. For example:
|              | lmdiag f1:HOSTID=12345678 attempts a checkout on the line with the hostid “12345678.” keyword is one of the following: VERSION, HOSTID, EXPDATE, KEY, VENDOR_STRING, ISSUER |

If no feature is specified, lmdiag operates on all features in the license files in your list. lmdiag first prints information about the license, then attempts to check out each license. If the checkout succeeds, lmdiag indicates this. If the checkout fails, lmdiag gives you the reason for the failure. If the checkout fails because lmdiag cannot connect to the license server, then you have the option of running extended connection diagnostics.

These extended diagnostics attempt to connect to each TCP/IP port on the license server, and detects if the port number in the license file is incorrect. lmdiag indicates each TCP/IP port number that is listening, and if it is an lmgrd or lmadmin process, lmdiag indicates this as well. If lmdiag finds the vendor daemon for the feature being tested, then it indicates the correct port number for the license file to correct the problem.

See Also

FLEXLM_DIAGNOSTICS
lmdown

The lmdown utility allows for the graceful shutdown of selected license daemons (both lmgrd and selected vendor daemons) on all systems.

Usage

lmdown -c license_file_list [-vendor vendor_daemon] [-q] [-all] [-force]

where:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c license_file_list</td>
<td>Use the specified license files. Note that specifying -c license_file_list is always recommended with lmdown.</td>
</tr>
<tr>
<td>-vendor vendor_daemon</td>
<td>Shut down only this vendor daemon. lmgrd continues running. Requires version 6.0 lmdown and lmgrd.</td>
</tr>
<tr>
<td>-q</td>
<td>Don’t prompt: otherwise lmdown asks “Are you sure? [y/n]: ”</td>
</tr>
<tr>
<td>-all</td>
<td>If multiple servers are specified, automatically shuts down all of them. -q is implied with -all.</td>
</tr>
<tr>
<td>-force</td>
<td>If licenses are borrowed, lmdown runs only from the system where the license server is running, and then only if the user adds -force.</td>
</tr>
</tbody>
</table>

If lmdown encounters more than one server (for example if -c specifies a directory with many *.lic files) and -all is not specified, a choice of license servers to shut down is presented.

Note • On UNIX, do not use kill -9 to shut down license servers. On Windows, if you must use the Task Manager to kill the FlexNet Licensing Service, be sure to end the lmgrd process first, then all the vendor daemon processes.

When using the lmdown utility to shut down license servers configured for three-server redundancy, there is a one-minute delay. The lmdown utility shuts down all three license servers. If you need to shut down only one of these license servers (this is not recommended because you are left with two points of failure), you must shut down both the lmgrd and vendor daemon processes on that license server.

You can protect the unauthorized execution of lmdown when you start up the license server manager, lmadmin or lmgrd. Shutting down the servers causes users to lose their licenses.

See Also

[1] Downloading and Installing lmadmin License Server

lmgrd Command-Line Syntax for details about securing access to lmdown

lmreread
lmhostid

The `lmhostid` utility returns the hostid of the current platform. Invoked without any arguments, `lmhostid` displays the default hostid type for the current platform. Otherwise, the hostid corresponding to the requested type is displayed, if supported on the current platform.

**Usage**

`lmhostid [-n] [-utf8] [-ptype argument] [hostid_type]

Where:

**Table 12-7 • lmhostid Argument Usage**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-n</td>
<td>Only the hostid, itself, is returned as a string, which is appropriate to use with HOSTID= in the license file. Header text is suppressed.</td>
</tr>
</tbody>
</table>
Chapter 12: Using License Administration Tools
Command-Line Utilities

Table 12-7 • lmhostid Argument Usage

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
</table>
| hostid_type | One of the following hostid types. If not specified, the default hostid for the current platform is displayed. See Hostids for Supported Platforms for a list of the default types. **PLATFORM-DEPENDENT HOSTIDS**
| -ether | Ethernet address. |
| -string | String id. |
| -vsn | Volume serial number. (Windows platforms only). |
| -flexid | Parallel or USB FLEXid identification. This is applicable only for those platforms that support FlexNet ID dongles. See Obtaining System Hostids for a complete list. |
| -long | 32-bit hostid. |
| -uid | UUID binding value. Used with the -ptype command line option, shown under -ptype below. Only permitted with platform types (ptype) VMW and HPV. |
| -iid | AMI (Amazon Machine Image) Instance ID. Used with the -ptype AMZN command line option to capture this ID from an Amazon EC2 AMI instance containing the FlexEnabled application. The ID is used for node-locked licenses only. |
| -eip | Elastic IP address. Used with the -ptype AMZN command line option to capture this address from an Amazon EC2 AMI instance containing the license server. **PLATFORM-INDEPENDENT HOSTIDS**
| -user | Current user name. Note that user names that contain spaces, for example ‘test user’ cannot be used in the Options file. Use the first word of the user name, for example ‘test’, in the Options file. |
| -display | Current display name. On Windows, it is the system name or, in the case of a terminal server environment, the terminal server client name. On UNIX, it is in the form /dev/ttyxx or the X-Display name. |
| -hostname | Current host name. |
| -hostdomain | Current host domain. |
| -internet | IP address of current platform in the form ###.###.###.###. |
| -utf8 | The hostid is output as a UTF-8 encoded string rather than an ASCII string. If your hostid contains characters other than ASCII A through Z, a through z, or 0 through 9, use this option with lmhostid. To view a correct representation of the resulting hostid, use a utility, such as Notepad, that can display UTF-8 encoded strings. |
Chapter 12: Using License Administration Tools
Command-Line Utilities

Table 12-7 • lmhostid Argument Usage

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
</table>
| -ptype   | Indicates the platform type. This option must be used in conjunction with the hostid binding types listed under -hostid_type. -ptype requires one of the following arguments, which prefixes the generated hostid with the appropriate prefix:  
  • PHY—Physical machine. Prefixes hostid with PHY_.  
  • VMW—VMWare virtual platform. Prefixes hostid with VMW_.  
  • HPV—Hyper-V virtual platform. Prefixes hostid with HPV_.  
  • AMZN—Amazon EC2 cloud environment. Prefixes hostid with AMZN_.  
  • LMB—Bare-metal binding in an Amazon EC2 cloud environment. Prefixes hostid with LMB_. |

Examples of output from lmhostid:

lmhostid

lmhostid - Copyright (c) 1989-2011 Flexera Software Inc. All Rights Reserved.
The FlexNet host ID of this machine is ""00ff5f01c819 0019d244e9fc 0016cfdaf65d 001558809422 005056c00001 005056c00008"

Only use ONE from the list of hostids.

lmhostid -ptype VMW -ether

lmhostid - Copyright (c) 1989-2011 Flexera Software Inc. All Rights Reserved.
The FlexNet host ID of this machine is "VMW_ETHER=0019d22f8672 VMW_ETHER=005056c00001 VMW_ETHER=005056c00000"

Only use ONE from the list of hostids.

lmhostid -ptype VMW -uuid

lmhostid - Copyright (c) 1989-2011 Flexera Software Inc. All Rights Reserved.
The FlexNet host ID of this machine is "VMW_UUID=0011223445566778991bbccddeeff"

lmhostid -ptype PHY -display

lmhostid - Copyright (c) 1989-2011 Flexera Software Inc. All Rights Reserved.
The FlexNet host ID of this machine is "PHY_DISPLAY=sc-EXAMPLE"

Note • Some limitations exist with hostid reporting on virtual devices:

• Ethernet hostids on Windows platforms - from lmutil version 11.6.1 onwards it reports only the hostids of physical ethernet adapters. Devices identified as virtual ethernet adapters are not reported as these identities are not permanent.

• Physical (bare metal) hostids on virtual machines - when run from a virtual machine, lmhostid cannot return hostids for the physical machine that hosts the virtual machine. To obtain hostids for the physical machine lmhostid must be run from the Console OS.
See Also

Hostids for Supported Platforms

lminstall

The lminstall utility is designed primarily for typing in decimal format licenses to generate a readable format license file.

Usage

lminstall [-i in_lic_file] [-maxlen n] [-e err_file] [-o out_lic_file] 
[-overfmt {2 | 3 | 4 | 5 | 5.1 | 6 | 7 | 7.1 | 8}] [-odecimal]

Normally, to convert from decimal to readable format, lminstall is used with no arguments; you are prompted for the name of the output license file. The default file name is today's date in yyyyymmdd.lic format. Move this file to the application's default license file directory, if specified by the software publisher. Otherwise, use the LM_LICENSE_FILE or VENDOR_LICENSE_FILE environment variables to specify the directory where the *.lic files are located.

To finish entering, type q on a line by itself or enter two blank lines.

When an input file is specified with no output file specified, output goes to stdout; if neither input nor output file is specified, lminstall assumes that input comes from stdin and prompts the user for an output file name.

lminstall is also used to convert licenses from readable to decimal format and between different license versions.

To convert from readable to decimal:

lminstall -i in_lic_file -o out_lic_file -odecimal

To convert to v5.1 format:

lminstall -i in_lic_file -o out_lic_file -overfmt 5.1

To enforce a maximum line length of, for example, 50 characters:

lminstall -maxlen 50

Conversion errors are reported as necessary and can be written to a file by specifying -e err_file. lminstall has a limit of 1,000 lines of input.

lmnewlog

The lmnewlog utility switches the report log file by moving the existing report log information to a new file, then starting a new report log with the original report log file name. If you rotate report logs with lmnewlog instead of lmswitchr, you do not have to change the file name in the REPORTLOG line of the vendor daemon's option file. Requires a version 7.1 or later vendor daemon.
Chapter 12: Using License Administration Tools
Command-Line Utilities

Usage

`lmnewlog [-c license_file_list] feature renamed_report_log`

or:

`lmnewlog [-c license_file_list] vendor renamed_report_log`

where:

<table>
<thead>
<tr>
<th>Table 12-8 • lmnewlog Argument Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Argument</strong></td>
</tr>
<tr>
<td>-c license_file_list</td>
</tr>
<tr>
<td>feature</td>
</tr>
<tr>
<td>vendor</td>
</tr>
<tr>
<td>renamed_report_log</td>
</tr>
</tbody>
</table>

Impath

The `lmpath` utility allows direct control over license path settings. It is used to add to, override, or get the current license path settings.

Usage

`lmpath {-add | -override} {vendor | all} license_file_list`

where:

<table>
<thead>
<tr>
<th>Table 12-9 • Impath Argument Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Argument</strong></td>
</tr>
<tr>
<td>-add</td>
</tr>
<tr>
<td>-override</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>vendor</td>
</tr>
<tr>
<td>all</td>
</tr>
</tbody>
</table>
Chapter 12: Using License Administration Tools
Command-Line Utilities

Chapter 12: Using License Administration Tools
Command-Line Utilities

**Note** • `lmpath` works by setting the registry entry on Windows or `$HOME/.flexlmrc` on UNIX.

To display the current license path settings:

```
lmpath -status
```

The following is displayed:

```
lmpath - Copyright (C) 1989-2010 Flexera Software Inc.
Known Vendors:
    demo: ./counted.lic:/uncounted.lic
Other Vendors:
    /usr/local/flexlm/licenses/license.lic
```

Note that where the path is set to a directory, all the `.lic` files are listed separately.

**lmremove**

The `lmremove` utility allows you to remove a single user’s license for a specified feature. If the application is active, it rechecks out the license shortly after it is freed by `lmremove`. Note that `lmadmin`’s default setting disables `lmremove`. To enable `lmremove`, start `lmadmin` with the `-allowLicenseReclaim` argument.

**Usage**

```
lmremove [-c license_file_list] feature user user_host display
```

or

```
lmremove [-c license_file_list] -h feature server_host port handle
```

where:

**Table 12-10 • lmremove Argument Usage**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-c license_file_list</code></td>
<td>Specify license files.</td>
</tr>
</tbody>
</table>
Command-Line Utilities

The user, user_host, display, server_host, port, and handle information must be obtained from the output of `lmstat -a`.

`lmremove` removes all instances of user on user_host and display from usage of feature. If the optional `-c license_file_list` is specified, the indicated files are used as the license file.

The `-h` variation uses the server_host, port, and license handle, as reported by `lmstat -a`. Consider this example `lmstat -a` output:

```
joe nirvana /dev/ttyp5 (v1.000) (cloud9/7654 102), start Fri 10/29 18:40
```

In this example, the user is `joe`, the user host is `nirvana`, the display is `/dev/ttyp5`, the server host is `cloud9`, the TCP/IP port is `7654`, and the license handle is `102`.

To remove this license, issue one of the following commands:

```
lmremove f1 joe nirvana /dev/ttyp5
```

or

```
lmremove -h f1 cloud9 7654 102
```

When removing by handle, if licenses are grouped as duplicates, all duplicate licenses are also removed. If license lingering is set and `lmremove` is used to reclaim the license, `lmremove` starts, but does not override, the license's linger time.

You can protect the unauthorized execution of `lmremove` when you start up `lmgrd`. The default for `lmadmin` is to disable `lmremove` because removing a user's license is disruptive.

### See Also

* Downloading and Installing lmadmin License Server
* `lmgrd Command-Line Syntax` for details about securing access to `lmremove`
lmreread

The following description refers to the operation of lmreread with lmgrd.

Note • lmadmin includes functionality to read license files and start vendor daemons instead of using lmreread.

The lmreread utility causes the license server manager to reread the license file and start any new vendor daemons that have been added. In addition, all currently running vendor daemons are signaled to reread the license file and their options files for changes. If report logging is enabled, any report log data still in the vendor daemon’s internal data buffer is flushed. lmreread recognizes changes to system host names, but cannot be used to change server TCP/IP port numbers.

If the optional vendor daemon name is specified, only the named daemon rereads the license file and its options file (in this case, lmgrd does not reread the license file).

Usage

lmreread [-c license_file_list] [-vendor vendor] [-all]

where:

Table 12-11 • Lmreread Argument Usage

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c license_file_list</td>
<td>Use the specified license files.</td>
</tr>
<tr>
<td>-vendor vendor</td>
<td>Only the vendor daemon, specified by the vendor option, rereads the license file and the options file. Additionally, lmgrd restarts vendor if necessary.</td>
</tr>
<tr>
<td>-all</td>
<td>If more than one lmgrd is specified, instructs all lmgrds to reread.</td>
</tr>
</tbody>
</table>

Note • If you use the -c license_file_list option, the license files specified are read by lmreread, not by lmgrd; lmgrd rereads the file it read originally.

You can protect the unauthorized execution of lmreread when you start up the license server manager, lmgrd.

Note • Ability for vendor daemon to participate in rereading of its option file introduced in version 8.0 vendor daemon

See Also

Downloading and Installing Lmadmin License Server
Changes in Lmreread Behavior when Using Lmadmin
Lmgrd Command-Line Syntax for details about securing access to lmreread
**lmstat**

The `lmstat` utility helps you monitor the status of all network licensing activities, including:

- Daemons that are running
- License files
- Users of individual features
- Users of features served by a specific vendor daemon
- BORROW licenses borrowed

The `lmstat` utility prints information that it receives from the license server; therefore, it does not report on unserved licenses such as uncounted licenses. To report on an uncounted license, the license must be added to a served license file and the application must be directed to use the license server for that license file (via `@host`, `port@host`, or `USE_SERVER`). Queued users and licenses shared due to duplicate grouping are also not returned by `lmstat`.

**Usage**

```
lmstat [-a] [-c license_file_list] [-f [feature]] [-i [feature]] [-s[server]]
        [-S [vendor]] [-t timeout_value]
```

where:

**Table 12-12 • lmstat Argument Usage**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-a</td>
<td>Displays all information. This option is a potentially expensive command. With many active users, this command option generates a lot of network activity.</td>
</tr>
<tr>
<td>-c license_file_list</td>
<td>Uses the specified license files.</td>
</tr>
<tr>
<td>-f [feature]</td>
<td>Displays users of <code>feature</code>. If <code>feature</code> is not specified, usage information for all features is displayed.</td>
</tr>
<tr>
<td>-i [feature]</td>
<td>Displays information from the feature definition line for the specified <code>feature</code>, or all features if <code>feature</code> is not specified.</td>
</tr>
<tr>
<td>-s [server]</td>
<td>Displays status of all license files listed in <code>$VENDOR_LICENSE_FILE</code> or <code>$LM_LICENSE_FILE</code> on <code>server</code>, or on all servers if <code>server</code> is not specified.</td>
</tr>
<tr>
<td>-S [vendor]</td>
<td>Lists all users of <code>vendor</code>'s features.</td>
</tr>
<tr>
<td>-t timeout_value</td>
<td>Sets connection timeout to <code>timeout_value</code>. This limits the amount of time <code>lmstat</code> spends attempting to connect to <code>server</code>.</td>
</tr>
</tbody>
</table>
The output of `lmstat -a` looks similar to:

```
lmstat - Copyright (c) 1989-2010 Flexera Software Inc. All Rights Reserved.
Flexible License Manager status on Wed 11/28/2007 14:49
[Detecting lmgrd processes...]
License server status: 27000@prod
  License file(s) on prod: C:\prod\i86_n3\counted.lic:
  prod: license server UP v11.5
Feature usage info:
Users of f1:  (Total of 4 licenses issued;  Total of 1 license in use)
  "f1" v1.0, vendor: demo
    floating license
    daniel myhost2 19.36.18.26 (v1.0) (myhost1/27000 102), start Fri 5/3 7:29
```

where:

**Table 12-13 • lmstat Output**

<table>
<thead>
<tr>
<th>Output</th>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>daniel</td>
<td>user</td>
<td>User name.</td>
</tr>
<tr>
<td>myhost2</td>
<td>user_host</td>
<td>Host where user is running.</td>
</tr>
<tr>
<td>19.36.18.26</td>
<td>display</td>
<td>Display where user is running.</td>
</tr>
<tr>
<td>v1.0</td>
<td>version</td>
<td>Version of feature.</td>
</tr>
<tr>
<td>myhost1</td>
<td>server_host</td>
<td>Host where license server is running.</td>
</tr>
<tr>
<td>27000</td>
<td>port</td>
<td>TCP/IP port on server_host where license server is running.</td>
</tr>
<tr>
<td>102</td>
<td>handle</td>
<td>License handle.</td>
</tr>
<tr>
<td>start Fri 5/3 7:29</td>
<td>checkout_time</td>
<td>Time that this license was checked out.</td>
</tr>
</tbody>
</table>

The `user, user_host, display, server_host, port, and handle` information is used when removing licenses with `lmremove`.

**lmswitch**

The `lmswitch` utility switches the debug log file written by a particular vendor daemon by closing the existing debug log for that vendor daemon and starting a new debug log for that vendor daemon with a new file name. It also starts a new debug log file written by that vendor daemon if one does not already exist.
Chapter 12: Using License Administration Tools
Command-Line Utilities

Usage

```
lmswitch [-c license_file_list] vendor new_debug_log
```

where:

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>-c license_file_list</code></td>
<td>Use the specified license files.</td>
</tr>
<tr>
<td><code>vendor</code></td>
<td>Vendor daemon in this license file.</td>
</tr>
<tr>
<td><code>new_debug_log</code></td>
<td>Path to new debug log file.</td>
</tr>
</tbody>
</table>

By default, debug log output from `lmgrd` and all vendor daemons started by that `lmgrd` get written into the same debug file. `lmswitch` allows companies to keep separate log files for different vendor daemons and control the size of their debug log file.

If debug log output is not already directed to a separate file for this vendor daemon, `lmswitch` tells the vendor daemon to start writing its debug log output to a file, `new_debug_log`. If this vendor daemon is already writing to its own debug log, `lmswitch` tells the vendor daemon to close its current debug log file and start writing its debug log output to `new_debug_log`.

**Note** • The effect of `lmswitch` continues only until the vendor daemon is shut down or its options file is reread via `lmreread`. When the vendor daemon is restarted or its options file is reread, it looks for a `DEBUGLOG` line in the options file to determine whether or not to write its debug log output into its own file and, if so, what file to write.

See Also:
- Downloading and Installing `lmadmin License Server` for information on `lmadmin display DEBUGLOG`
- `lmreread`
- Debug Log File

**lmswitchr**

The `lmswitchr` utility switches the report log file by closing the existing report log and starting a new report log with a new file name. It also starts a new report log file if one does not already exist.

Usage

```
lmswitchr [-c license_file_list] feature new_report_log
```

With version 5.0 or later vendor daemon, the command looks like this:
lmswitchr [-c license_file_list] vendor new_report_log

where:

Table 12-15 • lmswitchr Argument Usage

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-c license_file_list</td>
<td>Use the specified license files.</td>
</tr>
<tr>
<td>feature</td>
<td>Any feature in this license file.</td>
</tr>
<tr>
<td>vendor</td>
<td>Vendor daemon in this license file.</td>
</tr>
<tr>
<td>new_report_log</td>
<td>Path to new report log file.</td>
</tr>
</tbody>
</table>

If report logging is not enabled for the vendor daemon, lmswitchr tells it to start writing its report log output to new_report_log. If report logging is already enabled for the vendor daemon, lmswitchr tells the vendor daemon to close its report log file and start writing its new report log output to new_report_log.

Note • The effect of lmswitchr continues only until the vendor daemon is shut down or its options file is reread via lmread. When the vendor daemon is restarted or its options file is reread, it looks for a REPORTLOG line in the options file to determine whether or not to write report log output to a file and, if so, what file to write.

See Also:
REPORTLOG
lmnewlog
lmreread
Report Log File

lmver

The lmver utility reports the version of a FlexNet Publisher library or binary file.

Usage
lmver filename

where filename is one of the following:

- The name of an executable file built with FlexNet Publisher
- lmgrd
- A license administration tool
- A vendor daemon

For example, if you have an application called spell, type lmver spell.
Imtools (Windows only)

The lmtools utility is a graphical user interface that allows you to administer the license server. This executable is available in the 32-bit and 64-bit Windows packages. Always use the newest version possible. You can get it from the software download site.

Some of the functions this utility performs include:

- Starting, stopping, and configuring license servers
- Getting system information, including hostids
- Getting server status

The lmtools utility has two modes in which to configure a license server:

- Configuration using a license file
- Configuration using services

On Windows Vista, you must run the lmtools utility as an administrator. If you do not run this executable as an administrator, the User Account Control (UAC) dialog will display as soon as it is started (as long as the UAC prompt is not disabled on the system).

Configuration Using License File

Operations are performed on a particular license file. The file can be either local or remote. In this mode, you cannot start the lmgrd process, but you can do everything else.

To configure this mode:

1. Run the lmtools utility.
2. Click the Configuration using License File button.
3. Enter one or more the license file names or port@host specifications.

Configuration Using Services

Operations are performed on a service, which allows starting lmgrd processes local to the system on which lmtools is running. For details on configuring services, see Configuring the License Server Manager as a Windows Service.

Limitation on File Path Lengths

The following file paths, used when configuring lmtools, are limited to 255 characters:

- Path to the lmgrd.exe file
- Path to the license file
- Path to the debug log file
Chapter 12: Using License Administration Tools
lmtools (Windows only)

Ethernet hostids on Windows platforms

From version 11.6.1 onwards lmtools reports only the hostids of physical ethernet adapters. Devices identified as virtual ethernet adapters are not reported as these identities are not permanent.

Physical (Bare Metal) hostids on Virtual Machines

When run from a virtual machine, lmtools cannot return hostids for the physical machine that hosts the virtual machine. To obtain hostids for the physical machine lmhostid must be run from the Console OS.

Japanese User Identities

lmtools, when running on a system where native Microsoft shift-js user identities are used, does not correctly display the user identity using non-ASCII, multi-byte (such as Japanese) characters. Use lmstat instead: It correctly displays the user identity using multi-byte characters.
Chapter 12: Using License Administration Tools

lmtools (Windows only)
Managing the Options File

The options file allows the license administrator to control various operating parameters within the constraints of the license model. Users are identified by their user name, host name, display, IP address, or PROJECT (which is set with the LM_PROJECT environment variable).

For concurrent (floating) licenses, the license administrator can:

- Allow the use of features
- Deny the use of features
- Reserve licenses

The concurrent licenses can be held either in license files or in fulfillment records within trusted storage.

For activatable licenses, the license administrator can:

- Allow activation of licenses in a specific fulfillment record
- Deny activation of licenses in a specific fulfillment record

For all licenses, the license administrator can:

- Restrict the number of licenses available
- Control the amount of information logged about license usage
- Enable a report log file
- Control the automatic rereading of licenses

Options files allow you, as the license administrator, to be as secure or open with licenses as you like.

Lines in the options file are limited to 4000 characters. The \ character is the line-continuation character.

Note • Changes in the Options file for FlexNet Publisher versions:
Chapter 13: Managing the Options File
Creating an Options File

• PROJECT identification (set by LM_PROJECT) in options file was introduced in version 7.0 vendor daemon.
• Option file control for licenses held in fulfillment records in trusted storage introduced in 11.3 vendor daemon.
• AUTOMATIC_REREAD keyword introduced in version 11.7 vendor daemon.

Creating an Options File

Task: To create an options file:

1. Use the appropriate options listed in Options File Syntax to create the options file for a vendor daemon using any text editor.
2. Locate the options file anywhere; however, it is recommended that the options file be placed in the same directory as the license file.
3. Add the path to the options file in the license file as the fourth field on the VENDOR line for the application’s vendor daemon. For example:

   VENDOR sampled /etc/sampled \
   [options=]/sample_app/sampled/licenses/sampled.opt

   enables the sampled vendor daemon to look at the specified options file.

   If the path is omitted, the vendor daemon automatically looks for a file according to the following criteria:

   • The name of the file is vendor.opt, where vendor is the vendor daemon name.
   • The directory that contains the license file used by the license server manager.

Note • The default options file name, vendor.opt, introduced in version 6 vendor daemon.

Options File Syntax

Below is an overview of the options file syntax. See Options File Examples for examples and additional information.

Each line of the file controls one option. Table 13-1 lists the option keywords.

Table 13-1 • Option Keywords

<table>
<thead>
<tr>
<th>Option Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTOMATIC_REREAD</td>
<td>Turn off automatic reread of licenses at midnight.</td>
</tr>
<tr>
<td>BORROW_LOWWATER</td>
<td>Set the number of BORROW licenses that cannot be borrowed.</td>
</tr>
</tbody>
</table>
### Table 13-1 • Option Keywords

<table>
<thead>
<tr>
<th>Option Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEBUGLOG</td>
<td>Writes debug log information for this vendor daemon to the specified file (version 8.0 or later vendor daemon).</td>
</tr>
<tr>
<td>EXCLUDE</td>
<td>Deny a user access to a feature.</td>
</tr>
<tr>
<td>EXCLUDE_BORROW</td>
<td>Deny a user the ability to borrow BORROW licenses.</td>
</tr>
<tr>
<td>EXCLUDE_ENTITLEMENT</td>
<td>Deny a user the ability to activate licenses held in a fulfillment record in trusted storage.</td>
</tr>
<tr>
<td>EXCLUDEALL</td>
<td>Deny a user access to all features served by this vendor daemon.</td>
</tr>
<tr>
<td>FQDN_MATCHING</td>
<td>Sets the level of host name matching.</td>
</tr>
<tr>
<td>GROUP</td>
<td>Define a group of users for use with any options.</td>
</tr>
<tr>
<td>GROUPCASESENSITIVE</td>
<td>Sets case sensitivity for user and host lists specified in GROUP and HOST_GROUP keywords.</td>
</tr>
<tr>
<td>HOST_GROUP</td>
<td>Define a group of hosts for use with any options (version 4.0 or later).</td>
</tr>
<tr>
<td>INCLUDE</td>
<td>Allow a user to use a feature.</td>
</tr>
<tr>
<td>INCLUDE_BORROW</td>
<td>Allow a user to borrow BORROW licenses.</td>
</tr>
<tr>
<td>INCLUDE_ENTITLEMENT</td>
<td>Allow a user to activate licenses held in a fulfillment record in trusted storage.</td>
</tr>
<tr>
<td>INCLUDEALL</td>
<td>Allow a user to use all features served by this vendor daemon.</td>
</tr>
<tr>
<td>LINGER</td>
<td>Allow a user to extend the linger time for a feature beyond its check in.</td>
</tr>
<tr>
<td>MAX</td>
<td>Limit usage for a particular feature/group—prioritizes usage among users.</td>
</tr>
<tr>
<td>MAX_BORROW_HOURS</td>
<td>Changes the maximum borrow period for the specified feature.</td>
</tr>
<tr>
<td>MAX_OVERDRAFT</td>
<td>Limit overdraft usage to less than the amount specified in the license.</td>
</tr>
<tr>
<td>NOLOG</td>
<td>Turn off logging of certain items in the debug log file.</td>
</tr>
<tr>
<td>REPORTLOG</td>
<td>Specify that a report log file suitable for use by the FlexNet Manager license usage reporting tool be written.</td>
</tr>
<tr>
<td>RESERVE</td>
<td>Reserve licenses for a user or group of users/hosts.</td>
</tr>
</tbody>
</table>
Table 13-1 • Option Keywords

<table>
<thead>
<tr>
<th>Option Keyword</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIMEOUT</td>
<td>Specify idle timeout for a feature, returning it to the free pool for use by another user.</td>
</tr>
<tr>
<td>TIMEOUTALL</td>
<td>Set timeout on all features.</td>
</tr>
</tbody>
</table>

Comments
Include comments in your options file by starting each comment line with the hash symbol, #.

Specifying Features
When used within an options file entry, the feature name can be modified with an optional keyword-value pair to fully qualify it. This notation is used for distinguishing a particular group of licenses when there are multiple FEATURE lines for a single feature. The following syntax is used:

feature: keyword=value

For example:

f1:VERSION=2.0

specifies the version 2.0 pool of licenses for feature f1.

The following option keywords are used as feature name modifiers to denote a specific group of licenses:

- VERSION=
- HOSTID=
- EXPDATE=
- KEY=
- SIGN=
- ISSUER=
- NOTICE=
- VENDOR_STRING= (if configured by the publisher as a pooling component)
- dist_info=
- user_info=
- asset_info=

If the USER_BASED or HOST_BASED keywords appear in a feature line, this feature specification syntax must be used to qualify the feature.

Using a package name in place of a feature name applies the option to all of the components in the package.
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**Note** • A colon (:) is a valid feature name character. If colons are in your feature names, specify a group of licenses with the following alternative syntax using quotation marks and spaces:

"feature keyword=value"

Specifying License Restrictions Using Type

Some option keywords restrict who may use licenses or where licenses may be used. These options take a type argument that specifies what the restriction is based on.

When using the option keywords EXCLUDE, EXCLUDE_ENTITLEMENT, EXCLUDEALL, EXCLUDE_BORROW, INCLUDE, INCLUDE_ENTITLEMENT, INCLUDEALL, INCLUDE_BORROW, MAX, and RESERVE, the following values can be used for type:

- **USER**—user name of the user executing the FlexEnabled application. User names are case sensitive and cannot contain spaces.
- **HOST**—system host name or IP address where the application is executing. Host names are case sensitive. The IP address can contain wildcard characters.

The IP-address can contain wildcard characters.

When using the option keywords EXCLUDE, EXCLUDEALL, EXCLUDE_BORROW, INCLUDE, INCLUDEALL, INCLUDE_BORROW, MAX, and RESERVE, the following values can be used for type:

- **DISPLAY**—display where the application is displayed. On UNIX, DISPLAY is `/dev/ttyxx` (which is always `/dev/tty` when an application is run in the background) or the X-Display name. On Windows, it is the system name or, in the case of a terminal server environment, the terminal server client name. Display names are case sensitive.
- **INTERNET**—IP address of the system where the application is executing (wildcard characters can be used in the IP address)
- **PROJECT**—`LM_PROJECT` environment variable set by the user who is executing the FlexEnabled application. Project names are case sensitive.

On Windows (without terminal server), the HOST and DISPLAY names are both set to the system name. For licenses that allow checkouts from a terminal server (TS_OK keyword in the feature line), the USER, HOST, and DISPLAY names can be different from one another.

The types listed above take a single member. For example:

```
EXCLUDE coolsoft USER joe
```

To specify a list of users or hosts, first define the list using the GROUP or HOST_GROUP option lines, then use the GROUP or HOST_GROUP type to specify the group name. For example:

```
GROUP stars joe barbara susan
EXCLUDE coolsoft GROUP stars
```

- IP address as a HOST specification introduced in version 8 vendor daemon.
- Colons in feature names introduced in version 8 vendor daemon.
Chapter 13: Managing the Options File
Options File Syntax

**AUTOMATIC_REREAD**

This option applies to all concurrent licenses held in license files or trusted storage.

`AUTOMATIC_REREAD OFF|ON`

Controls the automatic rereading of license files and trusted storage when any features are found to have expired. The default when this option is not set is that at midnight each day a check of each license is made to determine if it has expired. When any license is found to have expired, all license files and trusted storage are reread.

To turn off this automatic reread at midnight, enter `AUTOMATIC_REREAD OFF` in the options file.

**BORROW_LOWWATER**

This option is used for licenses held in license files. When licenses are available in trusted storage, activation is normally provided instead of BORROW.

`BORROW_LOWWATER feature[:keyword=value] n`

Sets the number of licenses for a BORROW feature that cannot be borrowed.

<table>
<thead>
<tr>
<th>Table 13-2 • BORROW_LOWWATER Terms</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term</strong></td>
</tr>
<tr>
<td>feature</td>
</tr>
<tr>
<td><strong>keyword=value</strong></td>
</tr>
<tr>
<td>n</td>
</tr>
</tbody>
</table>

For example, if a feature "f1" has a count of 10 and borrowing is enabled in the application and on the FEATURE line:

```
FEATURE f1 ... 10 ... BORROW SIGN=...
```

the following line in the options file allows only 7 licenses to be borrowed.

```
BORROW_LOWWATER f1 3
```

**DEBUGLOG**

`DEBUGLOG [+]debug_log_path`

Specifies a location for the debug log output from the vendor daemon associated with this options file. Preceding the `debug_log_path` with a `+` character appends logging entries; otherwise, the file is overwritten each time the daemon is started. Note that this affects output from only the vendor daemon associated with this options file. The debug log output of `lmadmin` or `lmgrd` and any other vendor daemons in the same license file is not captured in this file.
On Windows, path names which include spaces have to be enclosed in double quotes. If lmgrd is started as a service, the default location for the report log file is the `c:\winnt\System32` folder unless a fully qualified path is specified.

**See Also:**
- Configuring the License Server Manager as a Windows Service
- lmswitch
- Debug Log File—Debug log output restricted to that of just the vendor daemon introduced in version 8 vendor daemon.

## EXCLUDE

This option applies to concurrent licenses held in license files and trusted storage.

EXCLUDE feature[:keyword=value] type {name | group_name}

Excludes a user or predefined group of users from the list of who is allowed to use the feature. EXCLUDE supersedes INCLUDE; conflicts between the EXCLUDE list and the INCLUDE list are resolved by the EXCLUDE taking precedence.

### Table 13-3 • EXCLUDE Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Name of the feature or package being affected.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See “Specifying Features” for details.</td>
</tr>
<tr>
<td>type</td>
<td>One of USER, HOST, DISPLAY, INTERNET, PROJECT, GROUP, or HOST_GROUP. See “Specifying License Restrictions Using Type” for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license usage is excluded.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of the group to exclude. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

**Task:** To exclude the user hank from the list of users able to use feature f1:

EXCLUDE f1 USER hank

## EXCLUDE_BORROW

This option is used for licenses held in license files. When licenses are available in trusted storage, activation is normally provided instead of BORROW.
EXCLUDE_BORROW feature[:keyword=value] type \{name | group_name\}

Excludes a user or predefined group of users from the list of who is allowed to borrow licenses for this BORROW feature. EXCLUDE_BORROW supersedes INCLUDE_BORROW; conflicts between the EXCLUDE_BORROW list and the INCLUDE_BORROW list are resolved by the EXCLUDE_BORROW taking precedence.

Table 13-4 • EXCLUDE_BORROW Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Name of the feature being affected.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See Specifying Features for details.</td>
</tr>
<tr>
<td>type</td>
<td>One of USER, HOST, DISPLAY, INTERNET, PROJECT, GROUP, or HOST_GROUP. See Specifying License Restrictions Using Type for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license borrowing is excluded.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of the group to exclude from borrowing. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

To exclude the user fred from the list of users able to borrow feature f1 assuming the feature has the BORROW attribute:

EXCLUDE_BORROW f1 USER fred

**EXCLUDE_ENTITLEMENT**

This option only applies to licenses held in trusted storage and supplied using activation.

EXCLUDE_ENTITLEMENT entitlementId type \{name | group_name\}

Excludes a user or pre-defined group of users, etc., from the list of who is allowed to activate the licenses contained in a fulfillment record held in trusted storage. EXCLUDE_ENTITLEMENT supersedes INCLUDE_ENTITLEMENT; conflicts between the EXCLUDE_ENTITLEMENT list and the INCLUDE_ENTITLEMENT list are resolved by the EXCLUDE_ENTITLEMENT taking precedence.

Table 13-5 • EXCLUDE_ENTITLEMENT Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>entitlementId</td>
<td>The entitlement Id used when requesting a license activation.</td>
</tr>
<tr>
<td>type</td>
<td>One of USER, HOST, GROUP, or HOST_GROUP. See Specifying License Restrictions Using Type for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license usage is excluded.</td>
</tr>
</tbody>
</table>
Chapter 13: Managing the Options File

Options File Syntax

Table 13-5 • EXCLUDE_ENTITLEMENT Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>group_name</td>
<td>Name of the group to exclude. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

To exclude the user “pete” from the list of users able to activate licenses provided in the fulfillment record specified by the entitlement ID “AB456”:

EXCLUDE_ENTITLEMENT AB456 USER pete

EXCLUDEALL

This option applies to concurrent licenses held in license files and trusted storage.

EXCLUDEALL  type {name | group_name}

Excludes a user or predefined group of users from the list of who is allowed to use all features served by this vendor daemon.

Table 13-6 • EXCLUDEALL Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>One of USER, HOST, DISPLAY, INTERNET, PROJECT, GROUP, or HOST_GROUP. See Specifying License Restrictions Using Type for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license usage is excluded.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of the group to exclude. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

To exclude any user on the system called chaos using all features served by this vendor daemon:

EXCLUDEALL HOST chaos

FQDN_MATCHING

This option applies to all licenses held in license files or trusted storage.

FQDN_MATCHING exact | lenient

Sets the level to which host names used in HOST type-specifiers must match the host name sent by the FlexEnabled application. The application is configured to send either its host name or its fully qualified domain name (FQDN) to the vendor daemon for validation with HOST type-specifiers. Check with your software publisher to determine fully qualified domain name support.
Table 13-7 • FQDN_MATCHING Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>exact</td>
<td>The host name in the HOST type specifier must match in content and format to that sent by the application. This is the default setting.</td>
</tr>
<tr>
<td>lenient</td>
<td>The host name sent by the application needs match to the extent supplied in the HOST type specifier or by the application, which ever is less restrictive.</td>
</tr>
</tbody>
</table>

Only the last FQDN_MATCHING keyword in the options file has effect; all others are ignored.

Table 13-8 shows the outcome of matching attempts between HOST type-specifiers in the options file and host names sent by the application.

Table 13-8 • Host Name Matching Matrix

<table>
<thead>
<tr>
<th>Options File Settings</th>
<th>Application configured for FQDN—sends myhost.abc.com</th>
<th>Application not configured for FQDN—sends myhost</th>
</tr>
</thead>
<tbody>
<tr>
<td>FQDN_MATCHING exact</td>
<td>INCLUDE feature HOST myhost</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>INCLUDE feature HOST myhost.abc.com</td>
<td>yes</td>
</tr>
<tr>
<td>FQDN_MATCHING lenient</td>
<td>INCLUDE feature HOST myhost</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>INCLUDE feature HOST myhost.abc.com</td>
<td>yes</td>
</tr>
</tbody>
</table>

Examples

Consider the following example that demonstrates restrictive host name matching:

INCLUDE f1 HOST myhost.abc.com
FQDN_MATCHING exact

This includes myhost.abc.com on the list of hosts able to use feature f1. Furthermore, the host name sent by the application must be a fully qualified domain name that matches myhost.abc.com exactly.
In contrast, consider this example, which is less restrictive:

```plaintext
INCLUDE f2 HOST myhost.abc.com
FQDN_MATCHING lenient
```

This includes `myhost.abc.com` on the list of hosts able to use feature f2. The license rights are authenticated and a checkout allowed if any of the following match:

- The FQDN - `myhost.abc.com`
- The host name - `myhost`
- The domain name - `.abc.com`

The example below is even more lenient:

```plaintext
INCLUDE f2 HOST myhost
FQDN_MATCHING lenient
```

This includes the host name, `myhost`, on the list of hosts for feature f3. Since lenient matching is specified, host names such as `myhost`, `myhost.abc.com`, and `myhost.xyz.com` match, whereas `yourhost` or `yourhost.abc.com` do not match.

**See Also**

“Specifying License Restrictions Using Type”

FQDN_MATCHING introduced in version 9.3 client library and vendor daemon.

---

**GROUP**

```
GROUP group_name user_list
```

Defines a group of users for use in INCLUDE, INCLUDEALL, INCLUDE_ENTITLEMENT, EXCLUDE, EXCLUDEALL, EXCLUDE_ENTITLEMENT, and RESERVE option lines.

**Table 13-9 • GROUP Terms**

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>group_name</strong></td>
<td>Name of the group being defined. Group names are case sensitive.</td>
</tr>
</tbody>
</table>
| **user_list**   | List of user names in that group. Names are case sensitive and cannot contain
                  | spaces. Set the GROUPCASEINSENSITIVE options file keyword to turn on case
                  | insensitivity. See GROUPCASEINSENSITIVE.                                      |

To create a large user group, define several GROUP lines each containing up to the maximum of 4,000 characters. All the users will be placed in a single group: Multiple GROUP lines for the same group name add all the specified users into the group.
To define the group **Hackers** consisting of **bob**, **howard**, and **james**:

```plaintext
GROUP Hackers bob howard james
```

*Note* • **USER_GROUP** is an alias for **GROUP**.

## GROUPCASEINSENSITIVE

**GROUPCASEINSENSITIVE OFF|ON**

If set to **ON**, user names and host names specified with the options file **GROUP** and **HOST_GROUP** keywords, respectively, are treated as case insensitive.

By default, **GROUPCASEINSENSITIVE** is **OFF**, and user names and host names are treated as case sensitive.

## HOST_GROUP

**HOST_GROUP group_name host_list**

Defines a group of hosts for use in **INCLUDE**, **INCLUDEALL**, **INCLUDE_ENTITLEMENT**, **EXCLUDE**, **EXCLUDEALL**, **EXCLUDE_ENTITLEMENT**, and **RESERVE** option lines. Multiple **HOST_GROUP** lines add all the specified hosts into the group.

**Table 13-10 • HOST_GROUP Terms**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>group_name</td>
<td>Name of the group being defined. Host group names are case sensitive.</td>
</tr>
<tr>
<td>host_list</td>
<td>List of host names in that group. Names are case sensitive. Set the GROUPCASEINSENSITIVE options file keyword to turn on case insensitivity. See GROUPCASEINSENSITIVE.</td>
</tr>
</tbody>
</table>

To define the host group **Pacific** consisting of **tokyo**, **seattle**, and **auckland**:

```plaintext
HOST_GROUP Pacific tokyo seattle auckland
```

Anywhere a host name can be used in an options file, an IP address can be used instead.
INCLUDE

This option applies to concurrent licenses held in license files and trusted storage.

INCLUDE feature[:keyword=value] type {name | group_name}

Includes a user or predefined group of users in the list of who is allowed to use licenses for this feature. Any user who is not in an INCLUDE or INCLUDEALL statement is not allowed to use that feature. EXCLUDE supersedes INCLUDE; conflicts between the EXCLUDE list and the INCLUDE list are resolved by the EXCLUDE taking precedence.

Table 13-11 • INCLUDE Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Name of the feature or package being affected.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See Specifying Features for details.</td>
</tr>
<tr>
<td>type</td>
<td>One of USER, HOST, DISPLAY, INTERNET, PROJECT, GROUP, or HOST_GROUP. See Specifying License Restrictions Using Type for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license usage is included.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of the group for which license usage is included. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

To include user bob in the list of users able to use feature f1:

INCLUDE f1 USER bob

The include list is created from all the INCLUDEALL and INCLUDE lines in the options file.

Note • INCLUDE is required for USER_BASED or HOST_BASED features. The license administrator specifies which users are allowed to use the product, via INCLUDE, and the license limits the number of users that are INCLUDED. In a USER_BASED or HOST_BASED license model, users (or predefined groups of users) who are not listed with the INCLUDE keyword cannot check out a license.
INCLUDE_BORROW

This option is used for licenses held in license files. When licenses are available in trusted storage, normally activation is provided instead of BORROW.

```
INCLUDE_BORROW feature[:keyword=value] type {name | group_name}
```

Includes a user or predefined group of users in the list of who is allowed to borrow the BORROW feature. Anyone not in an INCLUDE_BORROW statement is not allowed to borrow licenses. EXCLUDE_BORROW supersedes INCLUDE_BORROW; conflicts between the EXCLUDE_BORROW list and the INCLUDE_BORROW list are resolved by the EXCLUDE_BORROW taking precedence.

### Table 13-12 • INCLUDE_BORROW Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Name of the feature being affected.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See Specifying Features for details.</td>
</tr>
<tr>
<td>type</td>
<td>One of USER, HOST, DISPLAY, INTERNET, PROJECT, GROUP, or HOST_GROUP. See Specifying License Restrictions Using Type for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license borrowing is included.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of the group for which license borrowing is included. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

To include user tom in the list of users able to borrow feature f1:

```
INCLUDE_BORROW f1 USER tom
```

**Note** • For USER_BASED or HOST_BASED features a user or predefined group of users must be on both an INCLUDE list and an INCLUDE_BORROW list to borrow a feature.

INCLUDE_ENTITLEMENT

This option only applies to licenses held in trusted storage.

```
INCLUDE_ENTITLEMENT entitlementId type {name | group_name}
```

Includes a user or predefined group of users in the list of who is allowed to activate the licenses contained in a fulfillment record held in trusted storage. EXCLUDE_ENTITLEMENT supersedes INCLUDE_ENTITLEMENT; conflicts between the EXCLUDE_ENTITLEMENT list and the INCLUDE_ENTITLEMENT list are resolved by the EXCLUDE_ENTITLEMENT taking precedence.
### Options File Syntax

**INCLUDE_ENTITLEMENT**

To include the user **claire** in the list of users able to activate licenses provided in the fulfillment record specified by the entitlement Id AB456:

```
INCLUDE_ENTITLEMENT AB456 USER claire
```

**INCLUDEALL**

This option applies to concurrent licenses held in license files and trusted storage.

```
INCLUDEALL  type {name | group_name}
```

Includes a user or predefined group of users in the list of who is allowed to use all features served by this vendor daemon.

**Table 13-13 • INCLUDE_ENTITLEMENT Terms**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>entitlementId</td>
<td>The entitlement Id originally used when requesting a license activation.</td>
</tr>
<tr>
<td>type</td>
<td>One of USER, HOST, GROUP, or HOST_GROUP. See <a href="#">Specifying License Restrictions Using Type</a> for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license usage is included.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of the group to include. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

**Table 13-14 • INCLUDEALL Terms**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>One of USER, HOST, DISPLAY, INTERNET, PROJECT, GROUP, or HOST_GROUP. See <a href="#">Specifying License Restrictions Using Type</a> for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license usage is included.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of the group to include. Group names are case sensitive.</td>
</tr>
</tbody>
</table>

To allow the user **jane** to use all features served by this vendor daemon:

```
INCLUDEALL USER jane
```

The include list is created from all the INCLUDEALL and INCLUDE lines in the options file.
LINGER

This option applies to concurrent licenses held in license files and trusted storage.

LINGER \texttt{feature[::keyword=value]} \texttt{seconds}

A lingering license stays checked out for a specified period of time beyond its checkin or FlexEnabled application exit, whichever comes first. The linger time may have been configured by the software publisher in the FlexEnabled application. When this is the case, then the longer linger time is applied. Thus you can set a longer linger time than configured by the software publisher but not shorten the linger time.

To set the linger value for feature \texttt{f1} to one hour (3600 seconds):

\begin{verbatim}
LINGER f1 3600
\end{verbatim}

The actual linger time varies somewhat since the vendor daemon checks all lingering licenses just once per minute. Also if a new license request is made that would otherwise be denied, a check of the lingering licenses is made immediately to attempt to satisfy the new request.

MAX

This option applies to concurrent licenses held in license files and trusted storage.

MAX \texttt{num\_lic feature[::keyword=value]} \texttt{type \{name | group\_name\}}

Limits usage for a group or user.

\begin{table}[h]
\centering
\begin{tabular}{ |c|c| }
\hline
\textbf{Term} & \textbf{Definition} \\
\hline
feature & Name of the feature. \\
\hline
keyword=value & Feature name modifier to denote a group of licenses. See Specifying Features for details. \\
\hline
seconds & Number of seconds the license lingers. The software publisher sets a minimum value. If you specify a value for \texttt{seconds} that is smaller than the minimum, the minimum is used. \\
\hline
\end{tabular}
\caption{LINGER Terms}
\end{table}

\begin{table}[h]
\centering
\begin{tabular}{ |c|c| }
\hline
\textbf{Term} & \textbf{Description} \\
\hline
num\_lic & Usage limit for this user or group. \\
\hline
feature & Feature or package this limit applies to. \\
\hline
keyword=value & Feature name modifier to denote a group of licenses. See Specifying Features for details. \\
\hline
\end{tabular}
\caption{MAX Terms}
\end{table}
Chapter 13: Managing the Options File

Options File Syntax

For example, to limit the user jan to five licenses for feature f1, include the following line in the option file:

```
MAX 5 f1 USER jan
```

Queueing Behavior When Requested Licenses Exceed MAX Limit

For current version vendor daemons, if queuing is allowed by the application, requests for licenses that exceed the limit set by the MAX keyword will be denied. From the above example, if the user jan requests six licenses for feature f1, the request will be denied. Requests from users or groups within the MAX limit that exceed the number of available licenses will be queued. For example, if the license file includes ten licenses for feature f1 and nine of those licenses are already checked out, a request from the user jan for two licenses will be queued.

MAX_BORROW_HOURS

This option is used for licenses held in license files. When licenses are available in trusted storage, normally activation is provided instead of BORROW.

```
MAX_BORROW_HOURS feature[:keyword=value] num_hours
```

Changes the maximum period a license can be borrowed from that specified in the license file for feature. The new period must be less than that in the license file. If multiple MAX_BORROW_HOURS keywords appear in the options file, only the last one is applied to feature.

Table 13-17 • MAX_BORROW_HOURS Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Feature this borrow period applies to. The feature must have BORROW enabled.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See Specifying Features for details.</td>
</tr>
<tr>
<td>num_hours</td>
<td>Number of hours in the new borrow period. This value must be less than that specified in the license file for feature (the default, if not specified, is 168 hours).</td>
</tr>
</tbody>
</table>
MAX_OVERDRAFT

This option applies to concurrent licenses held in license files and trusted storage.

MAX_OVERDRAFT feature[:keyword=value] num_lic

Limits OVERDRAFT license usage below the OVERDRAFT allowed by the license file.

Table 13-18 • MAX_OVERDRAFT Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Feature this limit applies to.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See Specifying Features for details.</td>
</tr>
<tr>
<td>num_lic</td>
<td>Usage limit for this user or group.</td>
</tr>
</tbody>
</table>

NOLOG

NOLOG { IN | OUT | DENIED | QUEUED | UNSUPPORTED}

Suppresses logging the selected type of event in the debug log file.

Table 13-19 • NOLOG Terms

<table>
<thead>
<tr>
<th>Entry</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOLOG IN</td>
<td>Turns off logging of checkins. Two separate NOLOG lines are required to turn off logging of checkouts and queued requests.</td>
</tr>
<tr>
<td>NOLOG DENIED</td>
<td>Turns off logging of checkouts and queued requests. License administrators use this option to reduce the size of the debug log file. However, it can reduce the usefulness of the debug log when debugging license server problems.</td>
</tr>
<tr>
<td>NOLOG QUEUED</td>
<td></td>
</tr>
<tr>
<td>NOLOG UNSUPPORTED</td>
<td>Suppresses “UNSUPPORTED” messages in the debug log. This suppresses error messages in the debug log that report a failure due to the feature being unsupported.</td>
</tr>
</tbody>
</table>

See Also

lmswitch
**REPORTLOG**

REPORTLOG [-] report_log_path

REPORTLOG specifies the report log file for this vendor daemon. It is recommended preceding the `report_log_path` with a `-` character to append logging entries; otherwise, the file is overwritten each time the daemon is started.

On Windows, path names that include spaces have to be enclosed in double quotes. If `lmgrd` is started as a service, the default location for the report log file is the `c:\winnt\System32` folder unless a fully qualified path is specified.

---

**Note** • FlexNet Manager is a separate product available from Flexera Software, it is used to process report log files. FlexNet Manager processes only report log files, not debug log files.

**Reporting on Projects with LM_PROJECT**

The FlexNet Manager report writer reports on projects. A project is set up by having all users working on the same project set their `LM_PROJECT` environment variable (or registry on Windows) to a string that describes the project. FlexNet Manager groups usage by project, as defined by what `LM_PROJECT` was set to when the application was run.

**See Also**
- Configuring the License Server Manager as a Windows Service
- Environment Variables
- Report Log File

**RESERVE**

This option applies to concurrent licenses held in license files and trusted storage.

RESERVE num_lic feature[::keyword=value] type {name | group_name}

Reserves licenses for a specific user.

**Table 13-20 • RESERVE Terms**

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>num_lic</td>
<td>Number of licenses to reserve for this user or group.</td>
</tr>
<tr>
<td>feature</td>
<td>Feature or package this reservation applies to.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See Specifying Features for details.</td>
</tr>
</tbody>
</table>
Chapter 13: Managing the Options File

Options File Syntax

To reserve one license of feature f1 for user mel:

RESERVE f1 USER mel

If you want to reserve a license for each of several users or groups, you must use a separate RESERVE line for each user or group. If a package name is specified, all components that comprise the package are reserved.

The RESERVE keyword should not be used on packages and package suites that also use the SUITE_RESERVED option. The RESERVE keyword in the options file includes static information about the reservation policy. The SUITE_RESERVED option reserves a set of package components. Once one package component is checked out, all the other components are reserved for that same user. When the license keys are checked out by a user, the SUITE_RESERVED option within the Package will dictate additional reservation policy which can dynamically change depending on the product usage pattern. Because these options present conflicting reserve parameters, they can not be used together.

**Note** • Any licenses reserved for a user are dedicated to that user. Even when that user is not actively using the license, it is unavailable to other users. However, a RESERVEd license does not cause usage to be reported by FlexNet Manager if the license is not actually in use.

### TIMEOUT

This option applies to concurrent licenses held in license files and trusted storage.

TIMEOUT feature[:keyword=value] seconds

Sets the time after which an inactive license is freed and reclaimed by the vendor daemon.

**Note** • The software publisher must have enabled this feature in the FlexEnabled application for it to work. Contact your software publisher to find out if this feature is implemented.

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>type</td>
<td>One of USER, HOST, DISPLAY, INTERNET, PROJECT, GROUP, or HOST_GROUP. See Specifying License Restrictions Using Type for details.</td>
</tr>
<tr>
<td>name</td>
<td>Name of an item of type type for which license usage is reserved.</td>
</tr>
<tr>
<td>group_name</td>
<td>Name of group for which license usage is reserved. Group names are case sensitive.</td>
</tr>
</tbody>
</table>
Table 13-21 • TIMEOUT Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>Name of the feature.</td>
</tr>
<tr>
<td>keyword=value</td>
<td>Feature name modifier to denote a group of licenses. See Specifying Features for details.</td>
</tr>
<tr>
<td>seconds</td>
<td>Number of seconds after which inactive license is reclaimed. The software publisher sets a minimum value. If you specify a value for seconds that is smaller than the minimum, the minimum is used.</td>
</tr>
</tbody>
</table>

To set the timeout for feature f1 to one hour (3600 seconds):

TIMEOUT f1 3600

TIMEOUT checks in the licenses if the FlexEnabled application has been inactive for a period longer than the specified time period. The daemon declares a process inactive when it has not received heartbeats from it whereas an active FlexEnabled application sends heartbeats.

A TIMEOUT line must be present in the options file in order to take advantage of this feature.

**TIMEOUTALL**

This option applies to concurrent licenses held in license files and trusted storage.

TIMEOUTALL seconds

Same as TIMEOUT, but applies to all features.

**How the Vendor Daemon Uses the Options File**

When the vendor daemon is started by lmadmin or lmgrd, the vendor daemon reads its options file. There is only one options file per vendor daemon and each vendor daemon needs its own options file. For any changes in an options file to take effect, the vendor daemon must read its options file. The lmreread utility causes the vendor daemon to reread its options file.

The lmreread utility enhanced in version 8.0 vendor daemon so that it causes the vendor daemon to reread the options file. If you are using earlier versions, the vendor daemon must be stopped and restarted in order for the options file to be reread.
Chapter 13: Managing the Options File

Rules of Precedence in Options Files

Rules of precedence take effect when INCLUDE and EXCLUDE statements are combined in the same options file and control access to the same feature (in license files) or fulfillment record (in trusted storage). The following define the precedence when both types of statements appear together:

- If there is only an EXCLUDE list, everyone who is not on the list is allowed to use the feature.
- If there is only an INCLUDE list, only those users on the list are allowed to use the feature.
- If neither list exists, everyone is allowed to use the feature.
- The EXCLUDE list is checked before the INCLUDE list; someone who is on both lists is not allowed to use the feature.

Once you create an INCLUDE or EXCLUDE list, everyone else is implicitly outside the group. This feature allows you, as a license administrator, the ability to control licenses without having to explicitly list each user that you wish to allow or deny access to. In other words, there are two approaches; you either:

- Give most users access and list only the exceptions, or
- Severely limit access and list only the those users that have access privileges

Options File Examples

The following information gives some examples of options files intended to illustrate ways to effectively control access to your licenses.

Simple Options File Example

```
RESERVE 1 compile USER robert
RESERVE 3 compile HOST mainline
EXCLUDE compile USER lori
NOLOG QUEUED
```

This options file restricts the use of concurrent licenses as follows:

- Reserves one license for the feature `compile` for the user `robert`.
- Reserves three licenses for the feature `compile` for anyone on the system with the host name `mainline`.
- Prevents the user `lori` from using the `compile` feature on any system on the network.
- Causes QUEUED messages to be omitted from the debug log file.

The sum total of the licenses reserved must be less than or equal to the number of licenses specified in the FEATURE line. In the example above, there must be a minimum of four licenses on the `compile` FEATURE line. If fewer licenses are available, only the first set of reservations (up to the license limit) is used.
If this data were in file /a/b/sampled/licenses/sampled.opt, then modify the license file VENDOR line as follows:

VENDOR sampled /etc/sampled /sample_app/sampled/licenses/sampled.opt

### Limiting Access for Multiple Users

Each INCLUDE, INCLUDEALL, INCLUDE_BORROW, INCLUDE_ENTITLEMENT, EXCLUDE, EXCLUDEALL, EXCLUDE_BORROW, EXCLUDE_ENTITLEMENT, MAX, and RESERVE line must have a single user name (or group) listed. To affect more than one user name create a GROUP. For example to exclude bob, howard, and james from using the feature called toothbrush, create the following options file:

```plaintext
EXCLUDE toothbrush USER bob
EXCLUDE toothbrush USER howard
EXCLUDE toothbrush USER james
```

However, there is an easier way. Create a GROUP and exclude the list of users from using the feature. Like the previous example, the following options file excludes bob, howard, and james from using the feature called toothbrush:

```plaintext
# First define the group "Hackers"
GROUP Hackers bob howard james
# Then exclude the group
EXCLUDE toothbrush GROUP Hackers
```

Now when you want to allow or deny access to any feature to that group, you have an alias list to make it simple.

Use HOST_GROUP to allow, deny, or reserve licenses for multiple hosts. For example, to exclude all users logged in on the hosts fred and barney from using a feature called f1, add these lines to your options file:

```plaintext
HOST_GROUP writers fred barney
EXCLUDE f1 HOST_GROUP writers
```

### See Also

HOST_GROUP for more information about defining groups

#### EXCLUDE Example

```plaintext
#First Define the group "painters"
GROUP painters picasso mondrian klee
EXCLUDE spell GROUP painters
EXCLUDE spell USER bob
EXCLUDE spell INTERNET 123.123.123.*
```

This options file:

- Prevents the users picasso, mondrian, and klee from using the feature spell on any system on the network.
- Prevents the user bob from using the feature spell on any system on the network.
- Prevents any user logged into a host with an IP address in the range 123.123.123.0 through 123.123.123.255 from using the feature spell.
Chapter 13: Managing the Options File

Options File Examples

• Allows any other user, as long as they are not on the excluded IP addresses, and they are not a member of the painters GROUP, and they are not bob, to use feature spell (by implication).

Note that bob could have been added to the group painters. However, painters might be used for some other purpose in the future so the license administrator chose to handle bob as a special case here. In this case, the two EXCLUDE statements concatenate to create a list of four users.

EXCLUDE_ENTITLEMENT Example

#First Define the group "admin"
GROUP admin johns adrianp maryt
EXCLUDE_ENTITLEMENT qf573k GROUP admin
EXCLUDE_ENTITLEMENT qf573k USER bob
EXCLUDE_ENTITLEMENT qf573k HOST cordelia

This options file:

• Prevents the users johns, adrianp, and maryt from activating any licenses contained in the fulfillment record obtained using the entitlement Id qf573k on any system on the network.

• Prevents the user bob from activating any licenses contained in the fulfillment record obtained using the entitlement Id qf573k on any system on the network.

• Prevents any user on the system called cordelia from activating any licenses contained in the fulfillment record obtained using the entitlement Id qf573k.

• By implication allows any other users on any system other than cordelia to activate the licenses contained in the fulfillment record obtained using the entitlement Id qf573k.

INCLUDE Example

INCLUDE paint USER picasso
INCLUDE paint USER mondrian
INCLUDE paint HOST bigbrush

This options file:

• Allows the user picasso to use the feature paint on any system on the network.

• Allows the user mondrian to use the feature paint on any system on the network.

• Allows any user, as long as they are on the host bigbrush, to use feature paint.

• Denies access to the feature paint to anyone except picasso, mondrian, or anyone from the host bigbrush (by implication).
INCLUDE_ENTITLEMENT Example

INCLUDE_ENTITLEMENT gy7210 USER tom
INCLUDE_ENTITLEMENT gy7210 USER anthony
INCLUDE_ENTITLEMENT gy7210 HOST jupiter

This options file:

• Allows the user tom to activate any licenses contained in the fulfillment record obtained using the entitlement Id gy7210 on any system on the network.

• Allows the user anthony to activate any licenses contained in the fulfillment record obtained using the entitlement Id gy7210 on any system on the network.

• Allows any user, as long as they are on the host jupiter to activate any licenses contained in the fulfillment record obtained using the entitlement Id gy7210.

• By implication denies the activation of any licenses contained in the fulfillment record obtained using the entitlement Id gy7210 to anyone except tom, anthony, or someone on the host jupiter.
Ensuring License Availability

You can configure multiple license servers to allow FlexEnabled applications to continue to check our licenses if one of the license servers goes down. This failover protection for license servers can be provided using either of the following methods:

- **Redundancy using the license search path**: configure and maintain multiple independent license servers, each with a subset of the total licenses available to the enterprise. Configure the FlexEnabled client with the license servers in the license search path. This provides load balancing capabilities and limited failover protection. You must manage different versions of the license rights on each license server. This configuration option is available when licenses are held in license files and in trusted storage.

- **Three-server redundancy**: configure and maintain a set of three license server systems configured specifically for three-server redundancy. This provides failover protection only. You manage only one version of the license file and vendor daemon on all three license servers. This configuration option is only available when licenses are held in license files.

Do not store your license files on a single network file server (separate from the license servers) if you are using either of these methods of failover protection: The failure of the file server will cause all the license servers to fail.

**Redundancy Using the License Search Path**

In this configuration you install multiple license servers that each use a subset of the available licenses. Network machines are configured with a license search path that contains details of each license server. A FlexEnabled application tries each license server on the license search path in order until it succeeds or gets to the end of the list.
Example of Redundancy Using the License Search Path

This example demonstrates the use of two license servers, **chicago** and **tokyo**, that serve five licenses each for the features f1 and f2. The publisher supplies the following license files:

- **For chicago**
  
  ```
  SERVER chicago 17007ea8 1700
  VENDOR sampled /etc/mydaemon
  FEATURE f1 sampled 1.000 01-jan-2010 5 SIGN=.....
  FEATURE f2 sampled 1.000 01-jan-2010 5 SIGN=.....
  ```

- **For tokyo**
  
  ```
  SERVER tokyo 17007ea8 1700
  VENDOR sampled /etc/mydaemon
  FEATURE f1 sampled 1.000 01-jan-2010 5 SIGN=.....
  FEATURE f2 sampled 1.000 01-jan-2010 5 SIGN=.....
  ```

The license search path is set on the network machines using the `LM_LICENSE_FILE` environment variable so that machines in the US request licenses first from the license server **chicago** and machines in Japan request licenses first from the license server **tokyo**.

- **US machines** set `LM_LICENSE_FILE` to - 1700@chicago:1700@tokyo
- **Japanese machines** set `LM_LICENSE_FILE` to - 1700@tokyo:1700@chicago

This example uses Unix syntax (:) for separating entries on the license search path. See [Setting the License Search Path using an Environment Variable](#) for full details of the license search path syntax.

Limitations of Redundancy Using the License Search Path

The main limitation is that this method only provides limited protection: When a license server fails, the licenses it serves are no longer available.

**All licenses must be checked out from a single server**

By default, once a FlexEnabled application has successfully checked out a license from a license server, all subsequent license requests from that application must be served by the same license server. When an application makes subsequent license requests and no more licenses are available from that license server, the license request is denied even though licenses may exist on another server. However, this behavior is configurable by software publishers. Contact your software publisher to determine whether or not each new license request scans all the license servers.

**Licenses are queued from a single server**

If the application supports license queuing, all licenses are queued from the first license server on the list rather than the request moving to another license server.
Overview of Three-Server Redundancy

Using the three-server redundancy capability in FlexNet Publisher, all three license servers operate to form a triad. The license servers send periodic messages to each other to make sure that at least two servers are running and communicating. A quorum is formed when at least two of the three license servers are running and communicating with each other.

The license servers are identified as either primary, secondary, or tertiary. One license server is also designated as the master [m] and is responsible for:

- serving licenses to FlexEnabled applications
- recording information into the debug log.
- recording information into the report log.

If the master fails, then another license server becomes the master.

In the following figure, the primary license server is the master [m]. When a FlexEnabled application sends a checkout request for a license, the master responds and then serves the license to the FlexEnabled application.

**Figure 14-1: Three-Server Redundancy Overview**
If the master fails, then the secondary license server becomes the master (see the following figure) and will serve licenses to FlexEnabled applications. The tertiary license server can never be the master. If both the primary and secondary license servers go down, licenses are no longer served to FlexEnabled applications. The master will not serve licenses unless there are at least two license servers in the triad running and communicating.

**Figure 14-2:** Three-Server Redundancy Backup Failover

---

**Understanding How License Servers Communicate**

When started, each license server reads the license file and checks that it can communicate with the other license servers. Until each license server establishes this first connection with the others, it will continue to send messages periodically.

Once the initial communication has been established, each license server periodically sends a heartbeat to the others. Heartbeats are messages sent over TCP/IP. Each license server sends a heartbeat and waits for a response from the other license servers. If a license server does not receive a response, it shuts down the vendor daemon so that it cannot serve licenses. A publisher or license administrator can configure the amount of time a license server waits to receive a heartbeat using the HEARTBEAT_INTERVAL property.

Poor network communication causes system performance to slow. Slow network communication can also cause a delay in the transmission of heartbeats between license servers.
Configure License Servers for Three-Server Redundancy

Both the software publisher and the license administrator must perform certain configuration steps. This section describes the steps that each must perform.

Configuration for License Administrators

The license administrators should perform the following steps:

1. Before the license administrator gets the license server software package, they should identify and set up the three systems. When selecting systems, make sure they are stable. Do not use systems that are frequently rebooted or shut down.

2. Send the publisher the hostname and hostid values for these systems. Ask the publisher what system identifier they need for the hostid. This could be an Ethernet address, disk serial number, etc. The publisher will create license server components specifically for these systems.

3. After receiving the license server package from the publisher, change the following SERVER line properties in the license file if necessary:
   - port number
   - PRIMARY_IS_MASTER keyword
   - HEARTBEAT_INTERVAL property

Do not change the hostid values. If the hostid changes at any time, the license administrator must work with the software publisher to obtain a new license file.

4. Perform any additional configuration as required by the software publisher.

5. Copy or install the license server software package to each of the three systems.

6. Start the license servers in the following order: primary, secondary, and then tertiary.

An Example License File

The following is an example of a license file that is configured for three-server redundancy.

```
SERVER pat 17003456 2837 PRIMARY_IS_MASTER
SERVER lee 17004355 2837
SERVER terry 17007ea8 2837
VENDOR demo
FEATURE f1 demo 1.0 1-Jan-2018 10 SIGN="<...>"
FEATURE f2 demo 1.0 1-Jan-2018 10 SIGN="<...>"
```
The following portions of the license file directly affect the three-server redundant configuration:

- SERVER lines: These three lines define each of the systems involved.
  - The host values: they are: pat, lee, and terry.
  - The hostid values: they are: 17003456, 17004355, and 17007ea8. This example uses the value returned by the lmhostid utility default hostid type. The default hostid type is different for every platform.
- The TCP/IP ports: All servers use the same port (2837, in the example) to listen for communication.

The following properties of the license file do not affect the three-server redundant configuration directly, but are used to define license rights or configure the license server.

- VENDOR line: this is required and references the publisher’s vendor daemon.
- FEATURE lines: The two features, f1 and f2, define the license rights. The SIGN value for each FEATURE line encodes the license server hostid values.

Managing License Servers in a Three-Server Redundant Configuration

Using the lmstat Utility

The output message generated by the lmstat utility identifies which license server is the master. In the following example lmstat output, the secondary license server is the master.

[Detecting lmgrd processes...]
License server status: 30000@RMD-PRIMARY, 30000@RMD-SECONDARY, 30000@RMD-TERTIARY
License file(s) on RMD-PRIMARY: C:\server\3.lic:
  RMD-PRIMARY: license server UP v11.4
  RMD-SECONDARY: license server UP (MASTER) v11.4
  RMD-TERTIARY: license server UP v11.4

Starting and Stopping License Servers

To start the entire system, you must start each license server manager (lmadmin or lmgrd). Generally, it is good practice to start the primary license server before the secondary or tertiary license server. This allows the primary license server to become the master before the others start. If you start the secondary and tertiary before the primary, then the secondary will establish itself as master.

If you do not set the PRIMARY_IS_MASTER keyword for the primary license server, then the order in which you start the license servers is important. If you do not set this property, when you start the primary license server after the secondary license server control will not transfer to the primary license server. By setting the PRIMARY_IS_MASTER keyword, you ensure that when the primary license server is running, it is always the master.

The lmdown utility will shut down all three license servers using a single command. You do not have to shut down each license server separately.
Running the License Server Manager as a Service on Windows

There are no dependencies or known issues related to running the license server manager as a service in this configuration.

Logging and the Debug Log

When using three-server redundancy, the master records information to its local debug log and report log (and the Windows event log if this is configured). If this system fails, another license server becomes the master and records information to its local debug log and report log. Subsequently, there may be different versions of the debug log and report log on the primary and secondary license server which each contains different information.

Using Other Capabilities with Three-Server Redundancy

The following section describe other capabilities available in FlexNet Publisher Licensing Toolkit and how they interact with three-server redundancy.

Configuring the License Search Path

This configuration can be performed by either the software publisher or the license administrator. Before a FlexEnabled application can check out a license, it must know where to locate the license rights. The license search path identifies the location of license rights.

When connecting to a license server configured for three-server redundancy, the FlexEnabled application must use the port@host convention (and not a license file location) in the license search path.

The license search path should list the license servers in the same order that they appear in the license file. This helps shorten the amount of time it takes to identify the master server and respond to the checkout request.

Although the configuration will work if you include only one of the license servers in the license search path, this may lengthen the amount of time it takes for the license server to respond to the checkout request. This is because the license server must identify all other license servers and designate a master.

Separate each port@host entry with a comma. Using the previous license file as an example, the license search path should be

2837@pat,2837@lee,2837@terry

The FlexEnabled application will try to connect to each of the license servers in the list, in the order listed, until it either successfully connects to a license server or reaches the end of the list. This helps ensure that the FlexEnabled application can connect to the quorum.

Specifying Three-Server Redundancy in the License Finder

When the license search path has not been configured, the FLEXlm License Finder dialog is displayed on Windows platforms when a FlexEnabled application is run.
Chapter 14: Ensuring License Availability
Using Other Capabilities with Three-Server Redundancy

Task: To specify a triad of license servers in the License Finder dialog:

1. Select Specify the License File.
2. Click Next.
3. Type the path name or use the browse button to specify your three-server redundant license file. An Example License File shows a typical three-server redundant license file.
4. Click Next.

Note that the License Finder dialog option, Specify the License Server System, allows you to only specify a single license server and not a triad of license servers.

Using License File Keywords

The following keywords and properties for the SERVER line allow you to modify the configuration.

- **Host:** this is the hostname of the system. The publisher should know this information when generating the license file. This value can be changed after the license file has been signed.

- **Port:** the port number that the license server uses to listen for communication. Unlike single license servers, each SERVER line must include a port number. This can be any number between 1024 and 64000 that is not used by another process running on the system. This value can be changed after the license file has been signed. If you are using `lmadmin`, you do not need to edit the license file: you can configure the port number using the interface. See on-line help for more details.

To make it easier to administer the license server, we strongly recommend that you define the same port number for each SERVER line. This value can be changed after the license file has been signed.

- **PRIMARY_IS_MASTER:** this keyword ensures that the primary server is the master whenever it is running and communicating with one of the other license servers.
  - If this is set and the primary server goes down, when the primary server comes back up again, it will always become the master.
  - If this is not set and the primary server goes down, the secondary server becomes the master and remains the master even when the primary server comes back up. The primary can only become the master again when the secondary license server fails.

This parameter is optional and should be placed on the first SERVER line. This value can be changed after the license file has been signed. The license server must be running a version 10.8 or later vendor daemon to use this keyword.

- **HEARTBEAT_INTERVAL=seconds:** this indicates how long the license servers wait to receive a heartbeat from another license server before shutting down the vendor daemon. This value is used in the following equation to calculate the actual timeout value:

  \[
  \text{timeout} = (3 \times \text{seconds}) + (\text{seconds} - 1)
  \]
The default value is 20, which equates to an actual timeout of 79 seconds. Valid values are 0 through 120. This parameter is optional and should be placed on the first SERVER line in the license file. This value can be changed after the license file has been signed. The license server must be running a version 10.8 or later vendor daemon to use this keyword.

**Using Options File Keywords**

None of the keywords in the options file affect three-server redundancy.

**Troubleshooting Tips and Limitations for Three-Server Redundancy**

**Important**

Three-server redundancy configurations require all three servers use the same platform type. You can use any of the following platform types in the configuration, but each server must use the same platform type: HPV_*, VMW_* or PHY_*.

**Separating the Contents of a License File**

Because the hostid values in the SERVER lines are computed into the signature of each feature definition line, make sure you keep SERVER lines together with any feature definition lines as they were generated. This means that if you move a feature definition line to another file, you must also move the respective SERVER lines and VENDOR line.

**Putting the License File on a Network File Server**

Do not put the license file on a network file server. If you do this, you lose the advantages of having failover protection because the file server becomes a possible single point of failure.

**Using License Servers in Heavy Network Traffic**

On a network with excessive traffic, the license servers may miss heartbeats which causes them to shut down the vendor daemon. The master may then stop serving licenses. If you find that heavy network traffic causes this to occur, you should set the HEARTBEAT_INTERVAL to a larger value. Enterprises can experience a performance issue when there is slow network communication or if FlexEnabled clients are using a dialup link to connect to the network.

**Using Multiple Vendor Daemons**

The license server manager (lmadmin or lmgrd) can not start vendor daemons from multiple software publishers when configured for three-server redundancy. The license server manager can only manage one vendor daemon. If one of the systems runs more that one vendor daemon, then the license administrator must run separate instances of the license server on that system to support the other vendor daemons. Make sure that the port numbers do not clash.
Avoiding Undefined lmdown Behavior

If any two license servers in a three-server redundancy group are started with the -allowStopServer no option (lmadmin) or the -x lmdown option (lmgrd), then the behavior of lmdown is undefined for that system.
Managing Virtualized License Servers for File-Based Licensing

Virtualization software allows you to run multiple instances of a license server on a single machine. You can use virtualized license servers to take advantage of the high availability and fault tolerance that virtual machines offer.

In FlexNet Publisher, license servers can be secured to the physical binding (“bare metal”) elements of a host, to prevent duplicate license servers and license overuse. A binding element for a license server could be the MAC address of the host, its IP address, or another identifying element.

FlexNet Publisher supports the following virtualization solutions.

- VMware ESX, a server product which runs on a built-in operating system called a Console OS, which is a variant of Linux running on the physical hardware.
- Microsoft Hyper-V, which implements a hypervisor and provides a Windows-based Console OS.

The FlexNet Publisher binding agent, `lmbind`, is used to enforce a mutex lock on a host so that only a single instance of a vendor daemon can be run on a machine running virtualization software. When a license server connects to the binding agent, it performs these services:

- Provides the requested physical binding information (for example, the Ethernet address of the physical host).
- Verifies that no other license server (of the same publisher) with the same binding information is currently connected.
- Maintains a heartbeat contact with the license server.
Setting Up a Virtual License Server on VMware ESX

The process of setting up a virtual license server for VMware ESX depends on the hostid chosen to identify the virtual machine instance. Two examples of this process for license administrators are given here.

Using the VMW_UUID Hostid

In general, the process of using the **VMW_UUID** would follow this outline:

1. Identify the virtual machine on which the license server will be run, and download the platform specific lmhostid utility from the Flexera website.
2. Run the command `lmhostid -ptype VMW -uuid` at the command line of the virtual machine where the license server will be run, and send the output of this command to the software publisher. The software publisher sends back a license certificate in which the license server is bound to the UUID value.
3. Modify the license certificate to configure server parameters (like TCP port number, options file, or other parameters.)
4. Launch the license server on the virtual machine by pointing to the license certificate.
5. If the license server has to be moved to another physical machine, simply copy the VM image and move it to the new physical host machine.

Using the VMW_ETHER Hostid

In this case, you have made a request of the software publisher to run the license server on a virtual machine instance. The publisher has mandated using physical bindings using the **VMW_ETHER** option. In general, this process would follow this outline:

1. Identify the virtual machine on which the license server will be run, and download the Linux lmhostid utility from the Flexera Software website.
2. Log in to the Console OS (COS) of the VMware ESX machine and run the command `lmhostid -ptype VMW -ether` at the command-line of the Console OS. Send the output of this command to the software publisher. The software publisher sends back a license certificate in which the license server is bound to the Ethernet address of the Console OS.
3. Modify the license certificate to configure server parameters (like TCP port number, options file, and other parameters.)
4. Log in as root, and then open the lmbind port on the COS firewall for both incoming and outgoing traffic, as follows:
   ```
   #usr/sbin/esxcfg-firewall -o 27010, tcp, in, lmbind
   #usr/sbin/esxcfg-firewall -o 27010, tcp, out, lmbind
   ```
5. Launch the binding agent on the COS of the VMware ESX Server at port 27010. (enter lmbind -port 27010 -l lmbind.log).

6. On the virtual machine that hosts the license server, configure the environment variable LM_BINDING_AGENT port@host, where port is the TCP port number at which the binding agent is listening to (27010 in the above example), and host is the fully qualified host name or IP address of the COS.

7. Launch the license server on the virtual machine by pointing to the license certificate.

8. If the license server has to be moved to another physical machine, make a re-host request to the software publisher. However, if the license server has to be moved to another virtual machine on the same physical host, then you do not need to contact the software publisher. The license server can simply be run on a different instance of the virtual machine hosted on the same physical host, after shutting down the license server running on the first virtual machine.

---

**Setting Up a Virtual License Server on Microsoft Hyper-V**

The process of setting up a virtual license server for Microsoft Hyper-V depends on the hostid chosen to identify the virtual machine instance. Two examples of this process for license administrators are given here.

**Using the HPV_UUID Hostid**

In general, the process of using the HPV_UUID would follow this outline:

1. Identify the virtual machine on which the license server will be run, and download the platform-specific lmbhostid utility from the Flexera website.

2. Run the command lmbhostid -ptype HPV -uuid at the command line of the virtual machine where the license server will be run, and send the output of this command to the software publisher. The software publisher sends back a license certificate in which the license server is bound to the UUID value.

3. Modify the license certificate to configure server parameters (like TCP port number, options file, or other parameters.)

4. Launch the license server on the virtual machine by pointing to the license certificate.

5. If the license server has to be moved to another physical machine, simply copy the virtual machine image (while preserving the UUID value) and move it to the new physical host machine.
Using the HPV_ETHER Hostid

In this case, you have made a request of the software publisher to run the license server on a virtual machine instance. The publisher has mandated using physical bindings using the HPV_ETHER option. In general, this process would follow this outline:

1. Identify the virtual machine on which the license server will be run, and download the Windows `lmhostid` utility from the Flexera Software website.

2. At the command line of the Windows console OS, run the command `lmhostid -ptype HPV -ether`. Send the output of this command to the software publisher. The software publisher sends back a license certificate in which the license server is bound to the Ethernet address of the host machine.

3. Modify the license certificate to configure server parameters (like TCP port number, options file, and other parameters.)

4. Launch the binding agent on the Windows console OS at port 27010. (enter `lmbind -port 27010 -l lmbind.log`).

5. On the virtual machine that hosts the license server, configure the environment variable `LM_BINDING_AGENT port@host`, where `port` is the TCP port number at which the binding agent is listening to (27010 in the above example), and `host` is the fully qualified host name or IP address of the host running the console OS.

6. Launch the license server on the virtual machine by pointing to the license certificate.

7. If the license server has to be moved to another physical machine, make a re-host request to the software publisher. However, if the license server has to be moved to another virtual machine on the same physical host, then you do not need to contact the software publisher. The license server can simply be run on a different instance of the VM hosted on the same physical host, after shutting down the license server running on the first virtual machine.

Installing lmbind

The specific procedure for installing the binding agent depends on your choice of platforms.

Installing lmbind for VMware ESX (with Linux Console OS)

`lmbind` is included in the FNP toolkit installation package. As a 32-bit Linux application, it will run on the console OS of VMware ESX versions 3.5 and 4.0. The binding agent only supports IPv4 connections.
Chapter 15: Managing Virtualized License Servers for File-Based Licensing

Imbind Command Line Options

Task: To install Imbind for Linux

1. Select a VMware ESX host on which to install Imbind.

2. Select a port number for the Agent to listen to. The default port number range is 27010 - 27019, if no port is specified while starting Imbind. (Any port is permitted provided incoming and outgoing communication is enabled for that port.)

3. To start Imbind, enter `imbind --port portNumber`, where `portNumber` is the TCP port number you selected in Step 2. (See Imbind Command Line Options, below, for more information.) Only a single instance of Imbind can run on a given host.

Installing Imbind for Microsoft Hyper-V

Imbind is included in the FNP toolkit installation package. As a 64-bit Windows application, it will run on Windows 2008 R2 Console OS of Microsoft Hyper-V.

The binding agent only supports IPv4 connections.

The Windows Management Instrumentation (WMI) service is required for virtualization support of Hyper-V.

Task: To install Imbind using the Windows command line

1. Select a Hyper-V host on which to install Imbind.

2. Start the Windows Management Instrumentation (WMI) service on the host.

3. Select a port number for the Imbind to listen to. The default port number range is 27010 - 27019, if no port is specified while starting Imbind. (Any port is permitted provided incoming and outgoing communication is enabled for that port.)

To start Imbind, enter `imbind --port portNumber`, where `portNumber` is the TCP port number you selected in Step 3. (See Imbind Command Line Options, below, for more information.) Only a single instance of Imbind can run on a given host. In addition, the WMI service should be in running mode whenever Imbind is started.

Imbind Command Line Options

Table 15-1 lists the command line options supported by all versions of Imbind.

Note: Command line options can optionally be specified by a single dash and the first letter of the option. For example, `--port portNumber` can be specified instead by `-p portNumber`.
### Additional Considerations

Consider the following when configuring the binding agent:

- **3-server Redundancy**: When using the license server in a 3-server redundant configuration using hostid types that require connection to the binding agent, each license server that is part of the quorum must be connecting to a unique instance of the lmbind process. The hostids for all three servers must use the same platform type (VMW\_*, HPV\_*, or PHY\_*). It is recommended that only PHY\_* hostid types be used for a 3-server redundant configuration.

- **CVD Support**: If you desire a combined vendor daemon (CVD) to support the virtualization hostid types (such as VMW\_*, HPV\_*, or PHY\_*), both the primary and all the secondary vendor daemons that constitute the CVD must have the appropriate vendor keys that support virtualization. If only some of the secondary vendor daemons have the requisite vendor keys that support virtualization, the behavior of the CVD is unpredictable with respect to the support for virtualization hostid types.

---

#### Table 15-1 • lmbind Command Line Options

<table>
<thead>
<tr>
<th>lmbind option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>--help</strong></td>
<td>Display the copyright and version information and command-line options.</td>
</tr>
<tr>
<td><strong>--port</strong> portNumber</td>
<td>Specify the TCP port number at which the binding agent will be listening at. If the specified port number is not available, the program will exit with an error. If this option is not specified, the first available port in the range of 27010 - 27019 will be chosen.</td>
</tr>
</tbody>
</table>
| **--log** logFile | Write the log information that includes the following information:  
  - Copyright information  
  - Version number  
  - Listening port  
  - For each license server that is connected: Vendor daemon name binding hostid, and port at which vendor daemon is communicating |
| **--verbosity** level | Verbosity level controls how much information gets written to the log file. Default is 1. Verbosity levels include:  
  - 0: Turn off all logging.  
  - 1: Default level.  
  - 2: Default messaging, plus when the vendor daemon connects and disconnects.  
  - 3: Messages from level 2, plus vendor daemon heartbeat messages.  
  - 4: Verbose information that helps in debugging connectivity problems. |
• Running a license server or a FlexEnabled client application on the Console of a Virtual Machine is not supported. The license server and FlexEnabled client application must run either on a physical machine or on a virtual machine.
Licensing in a Cloud-Computing Environment

This chapter provides the following information to help the license administrator implement secure software licensing in a cloud-computing:

- Licensing Challenges in a Cloud Environment
- Scope of Support for Cloud Licensing
- Use Cases for Licensing Software in the Cloud
- Hostids for Binding

**Note** • For simplification, the remainder of this chapter refers to the cloud-computing environment as the cloud environment.

Licensing Challenges in a Cloud Environment

The fundamental concept of software licensing involves binding the license to characteristics of the physical machine on which the software resides and, for served licenses, on which the license server resides. These characteristics, called *binding elements*, include machine identities such as the Ethernet address or the host name.

However, a cloud environment runs on virtual machines that are instantiated and brought down frequently. Consequently, the traditional hardware-based binding elements are not reliable in a cloud environment.

Additionally, the FlexNet Publisher bare-metal-bindings (BMB) feature available in prior releases for on-premises virtual machines is unusable in a cloud environment; the license administrator does not have access to the physical hardware on which the virtual instances are running. This access is a prerequisite for the BMB feature.

A public cloud provider charges the customer based on the number of hours a machine instance is used. To optimize billing charges, a user typically stops or terminates an instance when it is not in use. This type of stop-restart usage is contrary to the on-premises machine usage, which is typically continuous. Therefore, the ideal binding element in the cloud environment is one that has these attributes:

- Globally unique within the cloud infrastructure to prevent over-licensing by cloned images
Unchanging between normal start/stop, suspend/resume, live-process migration, and reboots of machine instances

Not easily changed by the user

Not usable when the license is outside the cloud

FlexNet Publisher provides licensing solutions that meet these binding-element requirements. These solutions are based on typical licensing use cases in a cloud environment and are within the scope of cloud-licensing support for this release.

Scope of Support for Cloud Licensing

In this release, FlexNet Publisher limits its initial support for cloud licensing to the following:

- Licensing in the Amazon EC2 environment only
- Certificate-based licensing only
- 32-bit Windows, 64-bit Windows, 32-bit Linux, or 64-bit Linux machine instances (all in IPv4 format) for running FlexEnabled applications and license servers

Additionally, FlexNet Publisher does not support the following for cloud licensing:

- Cross-version signatures on served, node-locked license clients
- Composite hostids using Amazon machine bindings
- Three-server redundancy

Note • Cloud environments have other methods that compensate for three-server redundancy to ensure high availability of the license server.

Use Cases for Licensing Software in the Cloud

The following use cases describe typical licensing scenarios in a cloud environment. For each case, FlexNet Publisher provides a binding-element solution specific to the Amazon EC2 environment.

Note • The machine instance referenced in these use cases is known as the AMI (Amazon Machine Image) instance in the Amazon EC2 environment.
Case 1: Traditional Served and Unserved Licensing in a Public Cloud

This use case involves software users (end-users or license administrators) deploying FlexEnabled applications in a public cloud much like deploying these applications on user premises. In the case of served licenses, the user can deploy and bind the FlexNet Publisher license server to a machine instance in the cloud. The user then deploys the FlexEnabled application as a license client to machines instances in the cloud, to machines in the enterprise network, or to both, with all clients pointing to the license server in the cloud. In the case of unserved licenses, the user simply deploys the node-locked FlexEnabled application to one or more machine instances in the cloud.

Binding Elements Required for Case 1

In the Amazon EC2 environment, this use case involves binding licenses to the AMI instance on which the license server resides or, for any node-locked licenses, to the AMI instance on which the specific license client resides. The required binding elements include the following:

- For served licenses, the **elastic IP (EIP) address** for the AMI instance on which the server resides
- For node-locked licenses (served or unserved), the **AMI instance ID** for the AMI instance containing the license client

For a description of these binding elements and how to obtain them, see the Hostids for Binding section.

License Administrator Tasks for Case 1

Perform the following basic tasks for traditional served and unserved licensing in the cloud:

1. Open an Amazon Web Services account to use Amazon EC2.
2. Depending on the use case, set up a separate AMI instance for each license client and for the license server.

   **Note** • A large-sized AMI instance is recommended for the license server.

3. On the AMI instance for the license server, perform the following additional tasks:
   - Ensure that the ports for the license server, vendor daemon, and the webport (for the license server manager user interface) allow incoming connections.
   - Set the appropriate EC2 security group to control access to the license server port.
   - Associate an Elastic IP (EIP) address with the AMI instance.

4. Download the platform-specific `lmhostid` utility from the Flexera website to these locations:
   - For served licenses, the AMI instance hosting the license server
   - For node-locked licenses, each license-client AMI instance to which you intend to bind licenses
5. To obtain the required hostids listed in Binding Elements Required for Case 1, run the appropriate `lmhostid` command on the AMI instances.

   See Hostids for Binding for more information about the different `lmhostid` commands.

6. Send the hostids to the software publisher, who then uses this information to generate the license certificate.

7. When you receive the license file from the publisher, modify the license certificate to configure server parameters (like TCP port number, options file, or other parameters.)

8. Install the required FlexEnabled components on the AMI instances, using methods similar to on-premises deployment.

### Case 2: Virtual Appliance Licensing in a Public Cloud

In this use case, the software publisher sets up a virtual appliance (VA)—that is, a machine instance on which the publisher pre-install and pre-configures their FlexEnabled software product and supporting software stack. The publisher then makes the complete software setup available to customers in the public cloud. For example, if Flexera Software were to set up a VA for their product, FlexNet Operations, a machine image containing these software components is made available to customers:

- Red Hat Enterprise Linux 5.0
- FlexNet Operations
- Oracle database

Because the software is already installed and configured to use all these components, the time that the software user requires to get started is significantly reduced.

### Basic VA Licensing Scenario

The software publisher advertises the availability of the VA on a pay-as-you-go basis, while the cloud provider handles the metering and billing of the VA (as it does for any machine instance in the cloud).

1. The publisher advertises the availability and the cost of the VA to the customer base and provides a hostid that allows the customer access to the appliance.

2. The customer opens an Amazon account, instantiates the VA, and is billed by Amazon. Except for product support, no interaction needs to exist between the customer and the publisher.

3. Amazon tracks the usage of the VA and pays the publisher their share of the usage.

### Binding Element Required for Case 2

In this use case, the software publisher handles retrieving the binding element and setting up the licensing on the VA.
Chapter 16: Licensing in a Cloud-Computing Environment
Use Cases for Licensing Software in the Cloud

License Administrator Tasks for Case 2

Generally, license administration for virtual appliances is handled by the software publisher. Contact the software publisher for any tasks you might have to perform.

Case 3: Traditional Served and Unserved Licensing in a Virtual Private Cloud

A virtual private cloud (VPC) is a portion of the public cloud that forms the private cloud for a specific corporate enterprise. The enterprise deploys all of its network security policies on this VPC by establishing a secure tunneling mechanism (a virtual private network, or VPN) between the corporate network and the cloud components. This model is popular with enterprises who are concerned about security issues associated with the public cloud. Cloud providers, such as Amazon EC2, typically charge for both VPC machine-instance usage and for data crossing the VPN tunnel.

Basic VPC Licensing Scenario

A secure and cost-effective scenario for this use case is to run the license server in the cloud, deploy the FlexEnabled application as one or more license clients in the cloud, and run the license-server binding agent (lmbind) on a physical machine in the enterprise data center. Advantages to this setup include the following:

- License enforcement is based on the bare-metal binding (BMB) method, which FlexNet Publisher introduced for non-cloud virtual environments in a previous release. Binding the license file to a physical machine provides more license protection than binding the file to a virtual machine instance.

- In a non-cloud virtual environment, the BMB method requires that you run lmbind on the physical machine hosting the virtual machine instance on which the license server runs. This requirement limits BMB support to Hyper-V and VMWare virtual environments, which have the console operating systems necessary for running lmbind. However, in the VPC environment, this setup is virtual-machine-vendor independent. That is, you can run lmbind separately on any physical Windows or Linux machine in the enterprise; and the license server can run on any machine instance whose operating system is by the FlexNet Publisher license servers.

- While you can always run the license server on a physical machine in the enterprise data center, the server has higher availability inside the cloud environment. By contrast, the lmbind agent requires less availability and is better suited for a physical machine in the data center; it is needed only at license-server startup and for heartbeat connections with the server, which are set at configurable intervals.

- The data transferred between lmbind and the license server is a fraction of the data that is transferred between the license server and the application. Because VPC providers typically charge by the amount of data that crosses the VPN gateway, the more cost-effective option is to host lmbind, but not the server, inside the enterprise data center.
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Use Cases for Licensing Software in the Cloud

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Binding Elements Required for Case 3

In the Amazon EC2 environment, this use case involves binding licenses to the machine on which the `lmbind` component of the license server resides and, for any served node-locked licenses, to the AMI instance on which the specific license client resides. The required binding elements include the following:

- **The `lmbind` binding identity** for the physical enterprise machine where you intend `lmbind` to run. The software publisher specifies the type of `lmbind` hostid needed.
- For any served node-locked licenses, the **AMI instance ID** for the AMI instance containing the license client.

For a description of these binding elements and how to obtain them, see the Hostids for Binding section.

License Administrator Tasks for Case 3

Perform the following basic tasks for traditional served and unserved licensing in a virtual private cloud:

1. Set up a separate AMI instance for each license client and for the license server.

   ![Note](https://example.com) **Note** • A large-sized AMI instance is recommended for the license server.

2. On the AMI instance for the license server, perform the following additional tasks:

   - Ensure that the ports for the license server, vendor daemon, and the webport (for the license server manager user interface) allow incoming connections.
   - Set the appropriate EC2 security group to control access to the license server port.

3. Download the platform-specific `lmhostid` utility from the Flexera website to these locations:

   - The physical machine in your enterprise on which you intend to run `lmbind`
   - For any served node-locked licenses, each license-client AMI instance to which you intend to bind licenses

4. To obtain the hostids listed in Binding Elements Required for Case 3, run the appropriate `lmhostid` command on the AMI instances and on the physical machine running `lmbind`.

   See Hostids for Binding for information about the different `lmhostid` commands.

5. Send the hostids to the software publisher, who then uses this information to generate the license certificate.

6. When you receive the license file from the publisher, modify the license certificate to configure server parameters (like TCP port number, options file, or other parameters.)

7. Install the required FlexEnabled components on the AMI instances, using methods similar to on-premises deployment.

   For served licenses, continue with these steps:

8. Install `lmbind` on the physical enterprise machine, and launch it on port 27010. (Enter `lmbind -port 27010 -l lmbind.log`.)
Note • To obtain lmbind, download this utility from the Flexera website.

9. On the virtual machine that hosts the license server, configure the environment variable LM_BINDING_AGENT `<port>@<host>`, where `<port>` is the TCP port number at which the binding agent is listening to (27010 in the above example), and `<host>` is the fully qualified host name or IP address of the physical machine hosting lmbind.

10. Launch the license server on the virtual machine by pointing to the license certificate.

Hostids for Binding

The binding element used to bind a license to the specific AMI instance on which the license client or the licence server resides is called the hostid of the AMI instance. This section discusses the types of hostids that FlexNet Publisher supports for licensing in the Amazon EC2 environment.

Supported Hostid Types

The following table describes the hostids that FlexNet Publisher supports in the Amazon EC2 environment. For instructions on how to retrieve each hostid, see the next section, Retrieving and Specifying Hostids.

Table 16-1 • Hostid Types Supported in Amazon EC2

<table>
<thead>
<tr>
<th>Hostid Type</th>
<th>Binding Applicability</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastic IP (EIP) address</td>
<td>Licence server only</td>
<td>• IPv4 format only.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For use only on the SERVER line in the license file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Manually assigned to any running AMI instance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Static identity—that is, can be reassigned to another AMI instance if the current instance crashes. For example, if the instance containing the license server crashes, the license administrator can copy the server to another instance and reassign the EIP.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cross-version signatures not required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Specific to <a href="#">Case 1: Traditional Served and Unserved Licensing in a Public Cloud</a>.</td>
</tr>
</tbody>
</table>
### Table 16-1 • Hostid Types Supported in Amazon EC2

<table>
<thead>
<tr>
<th>Hostid Type</th>
<th>Binding Applicability</th>
<th>Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMI instance ID</td>
<td>License client only (node-locked)</td>
<td>• Unique ID automatically assigned to an AMI instance.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• For use only on the INCREMENT or FEATURE line in the license file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Remains in tact when the instance is suspended, resumed, or rebooted, but disappears if the instance terminates accidentally or crashes.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cross-version signatures not supported. Therefore, legacy FlexEnabled applications cannot obtain licenses that are bound to this hostid.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Specific to Case 1: Traditional Served and Unserved Licensing in a Public Cloud and Case 3: Traditional Served and Unserved Licensing in a Virtual Private Cloud.</td>
</tr>
<tr>
<td>lmbind binding identity</td>
<td>License server only</td>
<td>• For use only on the SERVER line in the license file.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Cross-version signatures not required.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Specific to Case 3: Traditional Served and Unserved Licensing in a Virtual Private Cloud.</td>
</tr>
</tbody>
</table>
Retrieving and Specifying Hostids

The following table lists the methods used by the software user or publisher (depending on the use case) to retrieve hostids in the Amazon EC2 environment. The table also shows how a given hostid is used in the license file.

**Note** • The System Info page in the lmadmin user interface does not show these hostids specific to the Amazon EC2 environment. To obtain these hostids, you must use the methods described the following table.

**Table 16-2 • Retrieving and Specifying Hostids**

<table>
<thead>
<tr>
<th>Hostid Type</th>
<th>Method to Obtain ID</th>
<th>License File Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elastic IP (EIP)</td>
<td>Use either method:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On the AMI instance containing the server, run the following command:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lmhostid -ptype AMZN -eip</td>
<td>Syntax:</td>
</tr>
<tr>
<td></td>
<td>• Obtain the EIP from the Amazon infrastructure.</td>
<td>AMZN_EIP=IPv4 address</td>
</tr>
<tr>
<td></td>
<td>Syntax:</td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td>AMZN_EIP=IPv4 address</td>
<td>SERVER this_host</td>
</tr>
<tr>
<td></td>
<td>Example:</td>
<td>AMZN_EIP=184.72.45.35</td>
</tr>
</tbody>
</table>

**Note** • This lmhostid command actually returns the public IP address for the AMI instance, and this value might not always be the EIP address. Consider the following:

- If the AMI instance is associated with an EIP address, the EIP address is the public IP address. Consequently, lmhostid returns the EIP address.
- If the AMI instance has no EIP address associated with it, EC2 assigns a default public IP address, which is the value that lmhostid returns.

*FlexNet Publisher strongly recommends obtaining the EIP address. To ensure lmhostid returns this value, associate the instance with an EIP address before running the command. If necessary, consult Amazon for help with this process.*
Chapter 16: Licensing in a Cloud-Computing Environment

Hostids for Binding

### Table 16-2 • Retrieving and Specifying Hostids

<table>
<thead>
<tr>
<th>Hostid Type</th>
<th>Method to Obtain ID</th>
<th>License File Syntax</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMI instance ID</td>
<td>Use either method:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• On the AMI instance containing the license client, run the following command:</td>
<td>Syntax:</td>
</tr>
<tr>
<td></td>
<td>lmhostid -ptype AMZN -iid</td>
<td>AMZN_IID=AMI instance ID</td>
</tr>
<tr>
<td></td>
<td>• Obtain the instance ID from the Amazon infrastructure.</td>
<td>Example:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>INCREMENT F1 demo... HOSTID=AMZN_IID=i51e04315...SIGN=xxx</td>
</tr>
<tr>
<td>lmbind binding identity</td>
<td>On the physical machine hosting lmbind, run the appropriate command:</td>
<td>Syntax:</td>
</tr>
<tr>
<td></td>
<td>• lmhostid -ptype LMB -ether (to obtain ethernet address)</td>
<td>LMB_ETHER=ethernet address</td>
</tr>
<tr>
<td></td>
<td>• lmhostid -ptype LMB -internet (to obtain IP address)</td>
<td>LMB_FLEXID=9</td>
</tr>
<tr>
<td></td>
<td>• hostid -ptype LMB -hostname (to obtain hostname)</td>
<td>Examples:</td>
</tr>
<tr>
<td></td>
<td>• hostid -ptype LMB -fleid (to obtain dongle FLEXID)</td>
<td>SERVER this_host</td>
</tr>
<tr>
<td></td>
<td></td>
<td>LMB_ETHER=0019d22f8672</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SERVER this_host LMB_FLEXID=9-19dD22f86</td>
</tr>
</tbody>
</table>

**Note** • For dongles, only LMB_FLEXID=9 and LMB_FLEXID=10 are currently supported. The dongle driver must be installed on the lmbind machine before you can obtain the hostid.
IPv6 Support

Internet Protocol version 6 (IPv6) is the next generation IP protocol. This section contains information for license administrators who have networks that support IPv6 addresses. The information in this section assumes the reader has a familiarity with the IPv6 networking protocols. The following sections of this chapter describe the FlexNet Publisher support for IPv6.

- Capabilities that Support IPv6
- Deploying License Servers in Mixed Protocol Environments

Capabilities that Support IPv6

This section describes the capabilities in the FlexNet Publisher Licensing toolkit configurable by license administrators that support IPv6. This section describes components used with both license file-based licensing and trusted storage-based licensing.

When working with a software publisher to obtain a software package that supports IPv6, you should collect and provide the IP addresses of systems (FlexEnabled clients and license servers) that will be used in the license file.

License File

In a license file, the SERVER line can define an IPv6 address as the host value.

Options File

An options file can contain an IPv6 address to specify host restrictions when using the:

- INTERNET type in these keywords - EXCLUDE, EXCLUDEALL, EXCLUDE_BORROW, INCLUDE, INCLUDEALL, INCLUDE_BORROW, MAX, and RESERVE.
- HOST type in these keywords - EXCLUDE, EXCLUDE_ENTITLEMENT, EXCLUDEALL, EXCLUDE_BORROW, INCLUDE, INCLUDE_ENTITLEMENT, INCLUDEALL, INCLUDE_BORROW, MAX, and RESERVE
- HOST_GROUP keyword (it takes IP addresses).
License Search Path

Entries in the license search path that use the ‘port@host’ convention to identify the license server, can specify an IPv6 address as the ‘host’ value.

Deploying License Servers in Mixed Protocol Environments

For FlexNet Publisher components to work properly using IPv6 addresses, all systems in an enterprise (including the network hardware and software) must be configure properly to support communication using IPv6 addresses. Before testing or deploying a FlexEnabled application that supports IPv6 or IPv4/IPv6 dual communication, make sure that all systems on the network can communicate successfully.

If the license server will run under any of the following operating systems, it can communicate with FlexEnabled clients using either IPv4 or IPv6 (as long as the network is configured properly).

- Any supported edition of Windows Vista
- Any supported Linux platform
- Any supported Unix platform

Because these operating systems support dual-layer communication, both IPv4 and IPv6 FlexEnabled clients can communicate with an IPv6 license server. In addition, IPv6 clients can communicate with an IPv4 license server using the IPv4 address. Figure 17-1 illustrates this behavior.

If you are using lmadmin as your license server, it supports both IPv4 and IPv6 clients. You must rename one of your vendor daemon executable files, because separate IPv4 and IPv6 vendor daemons are required.

Figure 17-1: License Server Running on Windows Vista, Unix, or Linux
If the license server runs on Windows XP or Windows Server 2003, there are certain limitations because of the limited dual-layer support on these operating systems. IPv4 FlexEnabled clients cannot communicate with a IPv6 license server running on these operating systems. However, IPv6 FlexEnabled clients can communicate with an IPv4 license server running on these operating systems. Figure 17-2 illustrates this behavior.

Figure 17-2: License Server running on Windows 2003 or XP

If an enterprise runs license servers on Windows 2003 or Windows XP the license administrators should create and maintain two separate networks - one for IPv6 FlexEnabled clients (that will use the IPv6 license server) and the other for IPv4 FlexEnabled clients (that uses the IPv4 license server). The following figure illustrates this configuration.

Figure 17-3: Separate IPv4 and IPv6 Environments
Chapter 17: IPv6 Support
Using Wildcards in an IPv6 Address

Using Wildcards in an IPv6 Address

The wildcard character, "*", may be used in place of an entire field or on a byte-by-byte basis to specify a range of addresses without having to list them all. For example, this example feature definition line is locked to four specific addresses:

```
FEATURE f1 myvendor 1.0 1-jan-2010 uncounted \ 
   HOSTID="INTERNET=127.17.0.1,\ 
       INTERNET=2001:0db8:0000:0000:ff8f:effa:13da:0001,\ 
       INTERNET=127.17.0.4,\ 
       INTERNET=2001:0db8:0000:0000:ff8f:effa:13da:0004" \ 
   SIGN="<...>"
```

The following example feature definition line specifies an entire range of addresses, including the four specific ones from the line above:

```
FEATURE f1 myvendor 1.0 1-jan-2010 uncounted \ 
   HOSTID="INTERNET=127.17.0.*,\ 
       INTERNET=2001:0db8:0000:0000:::*:0000:*:*:000*"\ 
   SIGN="<...>"
```
Managing Licenses from Multiple Software Publishers

You may need to administer licenses from more than one software publisher.

**Overview of Multiple License Management Strategies**

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

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

Each of these three strategies is described in detail in the following sections. Variations are mentioned in Additional Considerations.
Multiple Systems

In this scenario, each license server instance (lmadmin or 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 18-1 shows this arrangement.

**Figure 18-1: Multiple License Server Systems**

Advantages

- The license files for each software publisher are independent from 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

- Administrative overhead is the highest.
Starting the License Server

The following example uses `lmgrd` as the license server manager.

To start the license server: Invoke the license server manager on each system:

```
lmgrd -c server_system_n_license_list
```

where `server_system_n_license_list` is a list of license files as described in Managing Multiple License Files. Each `lmgrd` starts the vendor daemon referred to in its license files.

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 18-2 depicts this scheme.

Figure 18-2: Multiple license server managers, Multiple License Files

When maintaining separate license servers on the same system, keep in mind:

- If the TCP/IP port number is specified on the SERVER line, it must be different for each license server instance. Use a standard text editor to change the TCP/IP port number in each license file so that they are all different. If you are running 10 instances or less, you can omit all port numbers and `lmadmin` or `lmgrd` will choose unique ones for you within the default range of 27000–27009.
You must make sure that you are using a compatible version of `lmadmin` or `lmgrd` for each particular license file. This is done by using an explicit path. See *Version Component Compatibility*.

The number of license server instances is limited only by the CPU, available memory, and networking of the system.

**Advantages**

- The license files for each software publisher are independent from one another.
- License servers are maintained separately. If one server goes down, 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 to one system.

### Starting the License Server

The following example uses `lmgrd` as the license server manager.

**Task:** To start the license server:

Invoke each license server:

1. For Server 1: `lmgrd -c vendor_ABC_license_dir_list`
2. For Server 2: `lmgrd -c vendor_DEF_license_dir_list`
3. For Server 3: `lmgrd -c vendor_XYZ_license_dir_list`

where `vendor_nnn_license_list` is a list of license files as described in *Managing Multiple License Files*. Each `lmgrd` starts the vendor daemon referred to in its license files.
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. If you are using `lmadmin`, you can maintain license files from different publishers in separate directories. If you are using `lmgrd`, all 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 FlexNet Publisher. Figure 18-3 illustrates this scenario.

**Figure 18-3:** One license server manager, Multiple License Files

**Advantages**
- The license files can be maintained separately.
- Reduced administrative overhead.

**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, all licenses are unavailable.
Chapter 18: Managing Licenses from Multiple Software Publishers

Managing Multiple License Files

- 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.

Starting the License Server

The following example uses `lmgrd` as the license server manager.

**Task: To start the license server:**

Invoke the license server manager once on the system.

```
lmgrd -c common_license_directory
```

`lmgrd` processes all files with the `.lic` extension in `common_license_directory` and starts all vendor daemons referred to in those files, so there is no need to enumerate each license file name on the `lmgrd` command line.

See Also
Managing Multiple License Files
Capturing Debug Log Output for a Particular Vendor Daemon

Managing Multiple License Files

When using `lmgrd` as the license server manager, you can manage multiple license files that are on the same system via a license search path. A license search path is specified two ways:

- By using the `-c` option to `lmgrd`

  `lmgrd -c license_file_list [other lmgrd options]`

- By defining the `LM_LICENSE_FILE` environment variable within the scope of the `lmgrd` process's environment.

Install the license files in convenient locations on the system and then define the `license_file_list`. Wherever `license_file_list` is specified it consists of a list of one or more of the following components:

- the full path to the license file
- a directory containing one or more license files with a `.lic` extension
- a `port@host` setting, where `port` and `host` are the TCP/IP port number and host name from the SERVER line in the license file. Alternatively, use the shortcut specification, `@host`, if the license file SERVER line uses a default TCP/IP port or specifies a port in the default port range (27000–27009).
- A comma separated list of three `port@host` specifiers denoting a license servers configured for three-server redundancy. For example,

  `port1@host1,port2@host2,port3@host3`
Chapter 18: Managing Licenses from Multiple Software Publishers

Additional Considerations

**Note** • Use a colon (:) to separate the license file names on UNIX; on Windows, use a semicolon (;).

`lmgrd` builds up an internal license search path when it starts up by parsing each entry in the order listed.

Some scenarios where a license search path is used include those described in Multiple Systems, One System with Multiple License Server Instances, or One System with One License Server and Multiple License Files.

When using `lmadmin` as your license server manager, you specify the list of license files for each vendor daemon. Use the Import License File screen (accessed from within the Vendor Daemon Configuration screen) to specify a license file. Refer to `lmadmin` help for more information.

**See Also**
- Setting the License Search Path using an Environment Variable
- Ensuring License Availability
- Environment Variables

## Additional Considerations

### Combining license files

If you have two or more products whose licenses are intended for the same system, as specified by their SERVER lines, you may be able to combine the license files into a single license file. This has advantages if you are using `lmgrd` as your license server manager. If you are using `lmadmin` as your license server manager, you do not need to combine license files. When using multiple license files with `lmadmin`, import each license file and launch `lmadmin`, which launches each of the vendor daemons defined in the imported license files.
The license files for the models described in One System with Multiple License Server Instances and One System with One License Server and Multiple License Files could be combined if they met certain criteria. See Criteria for Combining License Files. Figure 18-4 shows one possible scenario using a combined license file.

**Figure 18-4:** One lmgrd, One License File

![Diagram of Single License Server Machine](image)

**Advantages**
- A single license file to administer.
- Once the files are combined, there is low administrative overhead.

**Disadvantage**
- Careful planning must be given in combining license lines from multiple software publishers into one file, initially and over time.

**Starting the License Server**

**Task:** To start the license server:

Invoke the license server manager once on the system.

```
lmgrd -c combined_license_file
```

**Criteria for Combining License Files**

Your product’s license files define the license server systems by host name and hostid in the SERVER lines in the license file. License files are candidates for combining under the following conditions:
• The number of SERVER lines in each file is the same.
• The hostid field of each SERVER line in one file exactly matches the hostid field of each SERVER line in the other file.

Some possible reasons license files may not be compatible are:
• License files are set up to run on different server systems, so hostids are different.
• One file is set up for a single license server (has only one SERVER line), the other is set up for a three-server redundancy (has three SERVER lines).
• Hostids for the same system use different hostid types. For example, the SERVER line in one license file uses INTERNET= for its hostid type and the other file uses the ethernet MAC address for its hostid type.

If your license files are compatible as described above, then you have the option of combining license files as summarized in Figure 18-4 and below in How to Combine License Files. Note that you are not required to combine compatible license files. There is no performance or system-load penalty for not combining the files.
How to Combine License Files

If your license files are compatible, use any text editor to combine them. To combine license files, read all of the compatible license files into one file, then edit out the extra SERVER lines so that only one set of SERVER lines remains. Save the resulting data, and you have your combined license file. Figure 18-5 shows an example of combining license files.

**Figure 18-5:** Combining License Files

<table>
<thead>
<tr>
<th>Vendor ABC’s License File</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVER alpha 17007ea8</td>
</tr>
<tr>
<td>VENDOR ABC</td>
</tr>
<tr>
<td>INCREMENT f1 ABC...</td>
</tr>
<tr>
<td>INCREMENT f2 ABC...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor DEF’s License File</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVER alpha 17007ea8</td>
</tr>
<tr>
<td>VENDOR DEF</td>
</tr>
<tr>
<td>INCREMENT f3 DEF...</td>
</tr>
<tr>
<td>INCREMENT f4 DEF...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor XYZ’s License File</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVER alpha 17007ea8</td>
</tr>
<tr>
<td>VENDOR XYZ</td>
</tr>
<tr>
<td>INCREMENT f5 XYZ...</td>
</tr>
<tr>
<td>INCREMENT f6 XYZ...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor GHI’s License File</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVER tao 13004dfe</td>
</tr>
<tr>
<td>VENDOR GHI</td>
</tr>
<tr>
<td>INCREMENT f5 GHI...</td>
</tr>
<tr>
<td>INCREMENT f6 GHI...</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Vendor JKL’s License File</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVER alpha INTERNET=10.10.10*</td>
</tr>
<tr>
<td>VENDOR JKL</td>
</tr>
<tr>
<td>INCREMENT f5 GHI...</td>
</tr>
<tr>
<td>INCREMENT f6 GHI...</td>
</tr>
</tbody>
</table>

This license file cannot be combined with the ones above because its server is different.

This license file cannot be combined with the ones above for server alpha because the host Id is a different type even though the server name is the same.

Version Component Compatibility

When one license server manager manages multiple vendor daemons, it may be the case that those vendor daemons do not use the same version of FlexNet Publisher. By observing the FlexNet Publisher version compatibility rules described in *Version Compatibility Between Components* you are assured that all of your FlexNet Publisher components are compatible.

You can maintain multiple versions of FlexEnabled applications in the enterprise. The vendor daemon for an application must be at least the same version as the FlexNet Publisher version used in the FlexEnabled application.
Troubleshooting

This section documents areas of the license server that have given customers difficulty in the past.

General Troubleshooting Hints

This list provides some general debugging information:

- When you start the license server be sure that you direct the output into a local log file where 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 a support person.

- If the license server appears to have started correctly (which you can determine from the log file), try running `lmstat -a` and `lmdiag` to see if that program has the same problem as your application.

- If your application is version 4.1 or later (version 5 or later on Windows), you can use the `FLEXLM_DIAGNOSTICS` environment variable. Set `FLEXLM_DIAGNOSTICS` to 1, 2, or 3. A setting of 3 gives more information than 2, 2 gives more information than 1 (in particular, the feature name that was denied). See `FLEXLM_DIAGNOSTICS` for more information.

- When you talk to a 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?
  - What system and operating system is the application running on?
  - What version of FlexNet Publisher does the FlexEnabled application use?

Use the `lmver` script, or, on UNIX, execute the following command on your license server manager, vendor daemon, and application:

```
strings binary_name | grep Copy
```

Alternatives are: for `lmadmin`, use the command `lmadmin -version`; for `lmgrd` and the vendor daemon use the `-v` argument, for example `lmgrd -v`. 
Chapter 19: Troubleshooting

FLEXLM_DIAGNOSTICS

- What error or warning messages appear in the log file?
- Did the server start correctly? Look for a message such as:
  
  server xyz started for: feature1 feature2.
- What is the output from running `lmstat -a`?
- Are you running other FlexEnabled products?
- Are you using a combined license file or separate license files?
- Are you using three-server redundancy (i.e. there are multiple SERVER lines in your license file)?

FLEXLM_DIAGNOSTICS

Note • The ability for FlexNet Publisher to produce diagnostic output is controlled by your software publisher.

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 UNIX, the diagnostic output goes to stderr.

On Windows, the output is a file in the `<platform>` directory called `flexpid.log`, where `pid` is the application’s process ID.

Level 1 Content

If FLEXLM_DIAGNOSTICS is set to 1, then the standard FlexNet Publisher error message is be presented, plus a complete list of license files that the application tried to use. For example:

```
setenv FLEXLM_DIAGNOSTICS 1
FlexNet checkout error: Cannot find license file (-1,73:2) No such file or directory
license file(s):  /usr/myproduct/licenses/testing.lic license.lic
```

Level 2 Content

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

```
setenv FLEXLM_DIAGNOSTICS 2
FlexNet checkout error: No such feature exists (-5,116:2) No such file or directory
license file(s):  /usr/myproduct/licenses/testing.lic license.lic
lm_checkout("f1", 1.0, 1, 0x0, ..., 0x4000)
```

Note that the error message actually contains two separate problems, which both occurred during the checkout:

- There is no such feature in the license it did find.
- It was unable to find the other license file, which is what produces the message `No such file or directory`. 
This is a description of the arguments to `lm_checkout`:

\[
\text{lm_checkout}(\text{feature, version, num_lic, queue_flag, ... , dupgroup_mask})
\]

where:

**Table 19-1 • lm_checkout Arguments**

<table>
<thead>
<tr>
<th>Argument</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>feature</td>
<td>The requested feature.</td>
</tr>
<tr>
<td>version</td>
<td>The requested version. The license file must contain a version &gt;= the requested version.</td>
</tr>
<tr>
<td>num_lic</td>
<td>Number of licenses requested. Usually 1.</td>
</tr>
</tbody>
</table>
| queue_flag | If 0, no queueing
If 1, queue for license (“blocking” queue)
If 2, queue for licenses, but return to application (“non-blocking” queue) |
| dupgroup_mask | Indicates duplicate grouping, also called license sharing. User, host, and display are as shown by `lmstat -a`. |

**Level 3 Content (Version 6.0 or Later Only)**

If `FLEXLM_DIAGNOSTICS` is set to 3, then, in addition to level 1 and 2 output, if a checkout is successful, information is printed explaining how the license was granted:

```
setenv FLEXLM_DIAGNOSTICS 3
app
Checkout succeeded: f0/14263EAEA8E0
License file: ./servtest.lic
No server used
app2
Checkout succeeded: f1/BC64A7B120AE
License file: @localhost
License Server Machine: @localhost
app3
Checkout succeeded: f1/BC64A7B120AE
License file: servtest.lic
License Server Machine: @speedy
```

Note that the feature name and license key are printed, along with the license file location (or host name if `@host` were used) and host name of the server, where applicable.
Error Codes

This section documents FlexNet Publisher error messages, including general format and error message descriptions.

Error Message Format

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

Table 20-1 • FlexNet Publisher Error Message Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Error Number</td>
<td>A positive or negative integer that identifies the error.</td>
<td>✔️</td>
</tr>
<tr>
<td>Error Text</td>
<td>Sentence that summarizes the issue.</td>
<td>✔️</td>
</tr>
<tr>
<td>Error Explanation</td>
<td>Paragraph that explains the problem and provides possible solutions or workarounds.</td>
<td></td>
</tr>
<tr>
<td>Minor Error Number</td>
<td>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.</td>
<td>✔️</td>
</tr>
<tr>
<td>System Error Number</td>
<td>Error code last set by the operating system.</td>
<td></td>
</tr>
<tr>
<td>System Error Explanation</td>
<td>Sentence that explains the system error.</td>
<td></td>
</tr>
</tbody>
</table>
These error messages may occur in two formats available with FlexNet Publisher, or they may appear in a format customized by the application.

**Format 1 (short)**

FlexNet error text \((lm\_errno, minor\_num[:sys\_errno])\) \(\text{[sys\_error\_text]}\)

The error information may be missing.

**Example**

Can't connect to license server machine (-15,12:61) Connection refused

**Format 2 (long)**

FlexNet error text

FlexNet error explanation

[Optional Supporting information]

FlexNet error: \(lm\_errno, minor\_num\). [System Error: \(sys\_errno\) \(\text{"system\_error\_text"}\)]

**Example**

Cannot connect to license server system

The server (lmgrd) has not been started yet, or

the wrong port@host or license file is being used, or the

port or hostname in the license file has been changed.

Feature: \(f1\)

Server name: localhost

License path: @localhost:license.dat:./*.lic

FlexNet error: -15,12. System Error: 61 "Connection refused"

**Error Code Descriptions**

The following table lists the most common errors produced by FlexEnabled applications.

**Table 20-2 • Error Codes**

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>lc_flexinit failed because there were insufficient rights to start the FlexNet Publisher Service. Resolve this by setting the service to start automatically.</td>
</tr>
<tr>
<td>20</td>
<td>FlexNet Publisher Service is not installed.</td>
</tr>
<tr>
<td>13</td>
<td>Computed path to required file is too long for Mac OS X operating system.</td>
</tr>
<tr>
<td>12</td>
<td>Invalid bundle ID on Mac OS X operating system.</td>
</tr>
</tbody>
</table>
### Table 20-2 • Error Codes

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Framework specified by bundle ID was not loaded.</td>
</tr>
<tr>
<td>10</td>
<td>Error creating path from URL.</td>
</tr>
<tr>
<td>9</td>
<td>Error creating URL.</td>
</tr>
<tr>
<td>8</td>
<td>Path string not specified in UTF-8 format.</td>
</tr>
<tr>
<td>7</td>
<td>A call to lc_flexinit is not allowed after a call to lc_flexinit_cleanup.</td>
</tr>
<tr>
<td>6</td>
<td>Activation application has not been processed using the preptool, or the activation library for the activation application cannot be found.</td>
</tr>
<tr>
<td>5</td>
<td>Unable to allocate resources.</td>
</tr>
<tr>
<td>4</td>
<td>Initialization failed.</td>
</tr>
<tr>
<td>3</td>
<td>Unsupported version of the operating system.</td>
</tr>
<tr>
<td>2</td>
<td>Unable to load activation library.</td>
</tr>
<tr>
<td>1</td>
<td>Unable to find activation library.</td>
</tr>
<tr>
<td>-1</td>
<td>Cannot find license file.</td>
</tr>
<tr>
<td>-2</td>
<td>Invalid license file syntax.</td>
</tr>
<tr>
<td>-3</td>
<td>No license server system for this feature.</td>
</tr>
<tr>
<td>-4</td>
<td>Licensed number of users already reached.</td>
</tr>
<tr>
<td>-5</td>
<td>No such feature exists.</td>
</tr>
<tr>
<td>-6</td>
<td>No TCP/IP port number in license file and FlexNet Licensing Service does not exist. (pre-v6 only)</td>
</tr>
<tr>
<td>-7</td>
<td>No socket connection to license server manager service.</td>
</tr>
</tbody>
</table>
| -8         | Invalid (inconsistent) license key or signature.  
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.  
The hostid of this system does not match the hostid specified in the license file. |
## Table 20-2 • Error Codes

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td>Feature has expired.</td>
</tr>
<tr>
<td>-11</td>
<td>Invalid date format in license file.</td>
</tr>
<tr>
<td>-12</td>
<td>Invalid returned data from license server system.</td>
</tr>
<tr>
<td>-13</td>
<td>No SERVER lines in license file.</td>
</tr>
</tbody>
</table>
| -14        | Cannot find SERVER host name in network database.  
            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 IP address (for example, 123.456.789.123) instead of host name. |
| -15        | Cannot connect to license server system.  
            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.  
            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. |
<p>| -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 busy (no majority). |
| -21        | License file does not support this version. |
| -22        | Feature checkin 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. |</p>
<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-30</td>
<td>Cannot read license file.</td>
</tr>
<tr>
<td>-31</td>
<td>Feature start date is in the future.</td>
</tr>
<tr>
<td>-32</td>
<td>No such attribute.</td>
</tr>
<tr>
<td>-33</td>
<td>Bad encryption handshake with vendor daemon.</td>
</tr>
<tr>
<td>-34</td>
<td>Clock difference too large between client and license server system.</td>
</tr>
<tr>
<td>-35</td>
<td>In the queue for this feature.</td>
</tr>
<tr>
<td>-36</td>
<td>Feature database corrupted in vendor daemon.</td>
</tr>
<tr>
<td>-37</td>
<td>Duplicate selection mismatch for this feature. Obsolete with version 8.0 or later vendor daemon.</td>
</tr>
<tr>
<td>-38</td>
<td>User/host on EXCLUDE list for feature.</td>
</tr>
<tr>
<td>-39</td>
<td>User/host not on INCLUDE list for feature.</td>
</tr>
<tr>
<td>-40</td>
<td>Cannot allocate dynamic memory.</td>
</tr>
<tr>
<td>-41</td>
<td>Feature was never checked out.</td>
</tr>
<tr>
<td>-42</td>
<td>Invalid parameter.</td>
</tr>
<tr>
<td>-47</td>
<td>Clock setting check not available in vendor daemon.</td>
</tr>
<tr>
<td>-52</td>
<td>Vendor daemon did not respond within timeout interval.</td>
</tr>
<tr>
<td>-53</td>
<td>Checkout request rejected by vendor-defined checkout filter.</td>
</tr>
<tr>
<td>-54</td>
<td>No FEATURESET line in license file.</td>
</tr>
<tr>
<td>-55</td>
<td>Incorrect FEATURESET line in license file.</td>
</tr>
<tr>
<td>-56</td>
<td>Cannot compute FEATURESET data from license file.</td>
</tr>
<tr>
<td>-57</td>
<td><strong>socket</strong> call failed.</td>
</tr>
<tr>
<td>-59</td>
<td>Message checksum failure.</td>
</tr>
<tr>
<td>-60</td>
<td>License server system message checksum failure.</td>
</tr>
<tr>
<td>-61</td>
<td>Cannot read license file data from license server system.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>-62</td>
<td>Network software (TCP/IP) not available.</td>
</tr>
<tr>
<td>-63</td>
<td>You are not a license administrator.</td>
</tr>
<tr>
<td>-64</td>
<td>lmremove request before the minimum lmremove interval.</td>
</tr>
<tr>
<td>-67</td>
<td>No licenses available to borrow.</td>
</tr>
<tr>
<td>-68</td>
<td>License BORROW support not enabled.</td>
</tr>
<tr>
<td>-69</td>
<td>FLOAT_OK can’t run standalone on license server system.</td>
</tr>
<tr>
<td>-71</td>
<td>Invalid TZ environment variable.</td>
</tr>
<tr>
<td>-73</td>
<td>Local checkout filter rejected request.</td>
</tr>
<tr>
<td>-74</td>
<td>Attempt to read beyond end of license file path.</td>
</tr>
<tr>
<td>-75</td>
<td>SYS$$SETIMR call failed (VMS). Indicates an error due to an operating system failure.</td>
</tr>
<tr>
<td>-76</td>
<td>Internal FlexNet Licensing error. Please report error to Flexera Software.</td>
</tr>
<tr>
<td>-77</td>
<td>Bad version number must be floating-point number with no letters.</td>
</tr>
<tr>
<td>-82</td>
<td>Invalid PACKAGE line in license file.</td>
</tr>
<tr>
<td>-83</td>
<td>FlexNet Licensing version of client newer than server.</td>
</tr>
<tr>
<td>-84</td>
<td>USER_BASED license has no specified users; see license server system log.</td>
</tr>
<tr>
<td>-85</td>
<td>License server system doesn’t support this request.</td>
</tr>
<tr>
<td>-87</td>
<td>Checkout exceeds MAX specified in options file.</td>
</tr>
<tr>
<td>-88</td>
<td>System clock has been set back.</td>
</tr>
<tr>
<td>-89</td>
<td>This platform not authorized by license.</td>
</tr>
<tr>
<td>-90</td>
<td>Future license file format or misspelling in license file. The file was issued for a later version of FlexNet Licensing than this program understands.</td>
</tr>
<tr>
<td>-91</td>
<td>Encryption seeds are non-unique.</td>
</tr>
<tr>
<td>-92</td>
<td>Feature removed during lmrreread, or wrong SERVER line hostid.</td>
</tr>
</tbody>
</table>
## Chapter 20: Error Codes

### Error Code Descriptions

This feature is available in a different license pool.

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.

Attempt to generate license with incompatible attributes.

Network connect to THIS`HOST failed.

Change this_host on the SERVER line in the license file to the actual host name.

License server machine is down or not responding.

See the system administrator about starting the server, or make sure that you’re referring to the right host (see LM_LICENSE_FILE environment variable).

The desired vendor daemon is down.

1) Check the `lmadmin` or `lmgrd` log file, or 2) Try `lmreread`.

This FEATURE line can’t be converted to decimal format.

The decimal format license is typed incorrectly.

Cannot remove a linger license.

All licenses are reserved for others.

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.

A FLEXid borrow error occurred.

Terminal Server remote client not allowed.

Cannot borrow that long.

Feature already returned to license server.

License server system out of network connections.

The vendor daemon can't handle any more users. See the debug log for further information.

Cannot read dongle: check dongle or driver.

Either the dongle is unattached, or the necessary software driver for this dongle type is not installed.

### Table 20-2 • Error Codes

<table>
<thead>
<tr>
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<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-93</td>
<td>This feature is available in a different license pool. 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.</td>
</tr>
<tr>
<td>-94</td>
<td>Attempt to generate license with incompatible attributes.</td>
</tr>
<tr>
<td>-95</td>
<td>Network connect to THIS`HOST failed. Change this_host on the SERVER line in the license file to the actual host name.</td>
</tr>
<tr>
<td>-96</td>
<td>License server machine is down or not responding. See the system administrator about starting the server, or make sure that you’re referring to the right host (see LM_LICENSE_FILE environment variable).</td>
</tr>
<tr>
<td>-97</td>
<td>The desired vendor daemon is down. 1) Check the <code>lmadmin</code> or <code>lmgrd</code> log file, or 2) Try <code>lmreread</code>.</td>
</tr>
<tr>
<td>-98</td>
<td>This FEATURE line can’t be converted to decimal format.</td>
</tr>
<tr>
<td>-99</td>
<td>The decimal format license is typed incorrectly.</td>
</tr>
<tr>
<td>-100</td>
<td>Cannot remove a linger license.</td>
</tr>
<tr>
<td>-101</td>
<td>All licenses are reserved for others. 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.</td>
</tr>
<tr>
<td>-102</td>
<td>A FLEXid borrow error occurred.</td>
</tr>
<tr>
<td>-103</td>
<td>Terminal Server remote client not allowed.</td>
</tr>
<tr>
<td>-104</td>
<td>Cannot borrow that long.</td>
</tr>
<tr>
<td>-105</td>
<td>Feature already returned to license server.</td>
</tr>
<tr>
<td>-106</td>
<td>License server system out of network connections. The vendor daemon can't handle any more users. See the debug log for further information.</td>
</tr>
<tr>
<td>-110</td>
<td>Cannot read dongle: check dongle or driver. Either the dongle is unattached, or the necessary software driver for this dongle type is not installed.</td>
</tr>
</tbody>
</table>
### Table 20-2 • Error Codes

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
</table>
| -112       | Missing dongle driver.  
In order to read the FLEXid hostid, the correct driver must be installed. These drivers are available from your software publisher. |
| -114       | SIGN= keyword required, but missing from license certificate.  
You need to obtain a SIGN= version of this license from your publisher. |
| -115       | Error in Public Key package. |
| -116       | TRL not supported for this platform. |
| -117       | BORROW failed. |
| -118       | BORROW period expired. |
| -119       | lmdown and lmreread must be run on license server. |
| -120       | Cannot lmdown the server when licenses are borrowed. |
| -121       | FLOAT_OK requires exactly one FLEXid hostid. |
| -122       | Unable to delete local borrow info. |
| -123       | Returning a borrowed license early is not supported.  
Contact the publisher for further details. |
| -124       | Error returning borrowed license. |
| -125       | A PACKAGE component must be specified. |
| -126       | Composite hostid not initialized. |
| -127       | A item needed for the composite hostid is missing or invalid. |
| -128       | Error, borrowed license doesn't 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. |
### Table 20-2 • Error Codes

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-140</td>
<td>Bad message command.</td>
</tr>
<tr>
<td>-141</td>
<td>Error writing to socket. Peer has closed socket.</td>
</tr>
<tr>
<td>-142</td>
<td>Error, cannot generate version specific license tied to a single hostid, which is composite.</td>
</tr>
<tr>
<td>-143</td>
<td>Version-specific signatures are not supported for uncounted licenses.</td>
</tr>
<tr>
<td>-144</td>
<td>License template contains redundant signature specifiers.</td>
</tr>
<tr>
<td>-145</td>
<td>Bad V71_LK signature.</td>
</tr>
<tr>
<td>-146</td>
<td>Bad V71_SIGN signature.</td>
</tr>
<tr>
<td>-147</td>
<td>Bad V80_LK signature.</td>
</tr>
<tr>
<td>-148</td>
<td>Bad V80_SIGN signature.</td>
</tr>
<tr>
<td>-149</td>
<td>Bad V81_LK signature.</td>
</tr>
<tr>
<td>-150</td>
<td>Bad V81_SIGN signature.</td>
</tr>
<tr>
<td>-151</td>
<td>Bad V81_SIGN2 signature.</td>
</tr>
<tr>
<td>-152</td>
<td>Bad V84_LK signature.</td>
</tr>
<tr>
<td>-153</td>
<td>Bad V84_SIGN signature.</td>
</tr>
<tr>
<td>-154</td>
<td>Bad V84_SIGN2 signature.</td>
</tr>
<tr>
<td>-155</td>
<td>License key required but 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.</td>
</tr>
<tr>
<td>-156</td>
<td>Invalid signature specified with the AUTH= keyword.</td>
</tr>
<tr>
<td>-157</td>
<td>Trusted storage has been compromised; repair needed. Contact your publisher for repair instructions.</td>
</tr>
<tr>
<td>-158</td>
<td>Trusted storage open failure. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-159</td>
<td>Invalid fulfillment record. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-160</td>
<td>Invalid activation request received. Contact your publisher for further information.</td>
</tr>
<tr>
<td>Error Code</td>
<td>Description</td>
</tr>
<tr>
<td>------------</td>
<td>-------------</td>
</tr>
<tr>
<td>-161</td>
<td>No fulfillment exists in trusted storage which matches the request. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-162</td>
<td>Invalid activation response received. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-163</td>
<td>Cannot return the specified activation. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-164</td>
<td>Return count(s) would exceed the maximum for the fulfillment. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-165</td>
<td>No repair count left. Contact your publisher for further repair authorization.</td>
</tr>
<tr>
<td>-166</td>
<td>Specified operation not allowed. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-167</td>
<td>The requested activation has been denied because the user or host is excluded from activating this entitlement by a specification in the options file.</td>
</tr>
<tr>
<td>-168</td>
<td>The options file contains include specifications for the entitlement, and this user or host is not included in these specifications.</td>
</tr>
<tr>
<td>-169</td>
<td>Activation error. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-170</td>
<td>Invalid date format in trusted storage. Can be caused by setting your system clock to an earlier date. Check that your system clock is set to the current date and time.</td>
</tr>
<tr>
<td>-173</td>
<td>Bad filter context. Internal error. Please report to Flexera Software Inc.</td>
</tr>
<tr>
<td>-174</td>
<td>SUPERSEDE feature conflict. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-175</td>
<td>Invalid SUPERSEDE_SIGN syntax. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-176</td>
<td>SUPERSEDE_SIGN does not contain a feature name and license signature. Contact your publisher for further information.</td>
</tr>
<tr>
<td>-177</td>
<td>ONE_TS_OK is not supported in this Windows Platform.</td>
</tr>
<tr>
<td>-178</td>
<td>Internal error. Please report to Flexera Software Inc.</td>
</tr>
<tr>
<td>-179</td>
<td>Only one terminal server remote client checkout is allowed for this feature.</td>
</tr>
<tr>
<td>-180</td>
<td>Internal error. Please report to Flexera Software Inc.</td>
</tr>
</tbody>
</table>
## Table 20-2 • Error Codes

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-181</td>
<td>Internal error. Please report to Flexera Software Inc.</td>
</tr>
<tr>
<td>-182</td>
<td>Internal error. Please report to Flexera Software Inc.</td>
</tr>
<tr>
<td>-183</td>
<td>More than one ethernet hostid not supported in composite hostid definition. Contact your publisher for further information.</td>
</tr>
</tbody>
</table>
| -184       | The number of characters in the license file paths exceeds the permissible limit. 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:  
  - Unix—40,960 characters  
  - Windows—20,400 characters  
  Reduce the number of license files, or relocate them so that the paths are shorter. |
| -187       | The time zone information could not be obtained. 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 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       | Feature can be checked out from Physical machine only. The license specifies that it cannot be used on a virtual machine: The FlexEnabled application is installed on a virtual machine so checkout has been denied. Install the FlexEnabled application on a physical machine. |
| -191       | FEATURE can be checked out from Virtual machine only. The license specifies that it cannot be used on a physical machine. The FlexEnabled application is installed on a physical machine so checkout has been denied. Install the FlexEnabled application on a virtual machine. |
| -192       | VM platform not authorized by license. |
| -193       | FNP vendor keys do not support Virtualization feature. |
| -194       | Checkout request denied as it exceeds the MAX limit specified in the options file. |
| -195       | Binding agent API - Internal error. |
Table 20-2 • Error Codes

<table>
<thead>
<tr>
<th>Error Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>-196</td>
<td>Binding agent communication error</td>
</tr>
<tr>
<td>-197</td>
<td>Invalid Binding agent version.</td>
</tr>
</tbody>
</table>
Report Log File

The license server produces both report log files and debug log files. The focus of this section is report log files. For information on debug log files see Debug Log File.

The report log file contains feature usage information and is generated by the vendor daemon. However, a vendor daemon does not write report logs by default; this action must be enabled. The data in report logs is compressed, authenticated, and organized into a repository.

Use Flexera Software’s software license administration solution, FlexNet Manager, to gain exceptional visibility into license usage data and to create insightful reports on critical information like license availability and usage. FlexNet Manager can be fully automated to run these reports on schedule and can be used to track license servers and usage across a heterogeneous network of server including Windows NT, Linux and UNIX. Contact Flexera Software at www.flexerasoftware.com for more details on how to obtain an evaluation copy of FlexNet Manager for your enterprise.

Managing Report Log Output

As a vendor daemon runs for a period of time, the volume of report log output increases. If you have a lot of license activity, these log files grow very large. You need to consider where to put these files and how often to rotate and archive them. Therefore, it may be necessary to rotate or switch report log output into different files over time, each file containing license activity over a particular period of time.

Report log data is collected by the vendor daemon into an internal data buffer area before being flushed to the output file. The daemon’s internal buffer is flushed once a minute or whenever it gets full, whichever occurs first. To ensure the freshest data possible in the report log file, flush the buffer on demand with the `lmreread` command. Use standard file compression tools to reduce the size of a report log file when it is no longer being written.

To avoid corruption and for performance, it is suggested that the vendor daemon write its report log to a file on a disk local to the system running the vendor daemon. Each vendor daemon must write to its own report log file.
Enabling Report Log Output for a Vendor Daemon

There are two ways to enable report logging for a particular vendor daemon either before or after starting the license server.

- Add the REPORTLOG line to the options file for that vendor daemon. See REPORTLOG for more details.
- Invoke lmswitchr on the vendor daemon. See lmswitchr for more details.

Redirecting Report Log Output for a Vendor Daemon

The report log output for a particular vendor daemon can be moved into separate files, each file representing activity over a different period of time. There are three ways in which to do this whether the vendor daemon is running or not:

- Change the REPORTLOG line in the vendor daemon's options file and reread its options file by invoking lmreread (version 8.0 or later vendor daemon) or restart.
- Invoke lmswitchr on the vendor daemon. See lmswitchr for more details.
- Invoke lmnewlog on the vendor daemon. Requires a version 7.1 or later vendor daemon. See lmnewlog for more details.
Debug Log File

The license server produces both debug log files and report log files. For information on report log files, see Report Log File.

A debug log file contains status and error messages useful for debugging the license server. A license server always generates debug log output. Some of the debug log output describes events specific to lmadmin or lmgrd and some of the debug log output describes events specific to each vendor daemon.

Managing Debug Log Output

As the license server manager and its vendor daemons run for a period of time, the volume of this output increases. As it gets older, the value of the debug log output decreases; therefore, it may be necessary for you to separate old debug log output from current output; either archive or delete the old output.

For performance, it is suggested that each debug log file be on a disk that is local to the system that is running the license server manager and its vendor daemons. However, if the debug log file must be on a remotely-mounted disk and you find that the license server is too slow, start lmgrd with the -nfs_log option to improve performance.

See Debug Log Messages for a description of the debug log output format.

Capturing Debug Log Output for a License Server

If you are using lmadmin as your license server manager, separate log files are created for lmadmin and each vendor daemon that it manages. The log files are written to the logs directory within the lmadmin install directory; however, you can use the -logDir option on the command line to change the location to which lmadmin writes lmadmin.log. See lmadmin Command-line Arguments for details.

By default, lmgrd and the vendor daemons it manages write debug log output to standard out. To put this debug log output in a file, either redirect the output of the license server to a file or start lmgrd with the -l debug_log_path option. See Lmgrd Command-Line Syntax for more information.
Capturing Debug Log Output for a Particular Vendor Daemon

The debug log output from different vendor daemons controlled by the same license server can be written to their own files (version 8.0 and later vendor daemon). There are three ways to do this:

- If you are using `lmadmin` as your license server manager, you configure the location and file name from the Vendor Daemon Configuration screen. See on-line help for information on Vendor Daemon Log.
- Add the DEBUGLOG line to the options file for each vendor daemon. See `DEBUGLOG` for more details.
- Invoke `lmswitch` on the vendor daemon. See `lmswitch` for more details.

Note that `lmgrd` writes its own debug log output to standard out.

Redirecting Debug Log Output for a Running Vendor Daemon

It is possible to redirect the debug log output for a particular vendor daemon to a different file. There are two ways to do this:

- Change the DEBUGLOG line to the options file for the vendor daemon and reread its options file by invoking `lmreread`. See `DEBUGLOG` for more details.
- Invoke `lmswitch` on the vendor daemon. See `lmswitch` for more details.

Limiting Debug Log Output for a Vendor Daemon

By default, debug log output contains all events. To limit the events that are logged for a particular vendor daemon, add a NOLOG line to the options file of that vendor daemon. One of the reasons you may want to limit the events that are logged is to reduce the size of the debug log output.

See Also

NOLOG

Debug Log Messages

FlexNet Publisher processes generate debug log files in the following format:

```
hh:mm:ss (daemon) message
```
The debug log files can be used to:

- Diagnose configuration problems
- Diagnose daemon software errors

**Note** • A debug log file cannot be used for usage reporting with FlexNet Manager.

### Informational Messages

Table 22-2 lists the various informational messages used within FlexNet Publisher.

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connected to host</td>
<td>This daemon is connected to its peer on host.</td>
</tr>
<tr>
<td>CONNECTED, master is host</td>
<td>The license daemons log this message when a quorum is up and everyone has</td>
</tr>
<tr>
<td></td>
<td>selected a master.</td>
</tr>
<tr>
<td>DENIED: num_lic feature to user</td>
<td>user was denied access to num_lic licenses of feature.</td>
</tr>
<tr>
<td>EXITING DUE TO SIGNAL nnn</td>
<td>All daemons list the reason that the daemon has exited.</td>
</tr>
<tr>
<td>EXITING with code nnn</td>
<td></td>
</tr>
<tr>
<td>EXPIRED: feature</td>
<td>feature has passed its expiration date.</td>
</tr>
<tr>
<td>IN: “feature” user (num_lic licenses)</td>
<td>user has checked in num_lic licenses of feature.</td>
</tr>
</tbody>
</table>
Chapter 22: Debug Log File

Debug Log Messages

Table 22-2 • Information Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lost connection to host</td>
<td>A daemon can no longer communicate with its peer on node host, which can cause the clients to have to reconnect, or cause the number of daemons to go below the minimum number, in which case clients may start exiting. If the license daemons lose the connection to the master, they kill all the vendor daemons; vendor daemons shut themselves down.</td>
</tr>
<tr>
<td>Lost quorum</td>
<td>The daemon lost quorum, so it processes only connection requests from other daemons.</td>
</tr>
<tr>
<td>MULTIPLE vendor servers running.</td>
<td></td>
</tr>
<tr>
<td>Kill and restart license daemon.</td>
<td>The license server manager has detected that multiple vendor daemons with the same vendor name are running. Shutdown <code>lmadmin</code> or <code>lmgrd</code> and all vendor daemons and then restart <code>lmadmin</code> or <code>lmgrd</code>.</td>
</tr>
<tr>
<td>OUT: feature user (num_lic licenses)</td>
<td>user has checked out num_lic licenses of feature.</td>
</tr>
<tr>
<td>RESERVE feature for USER user</td>
<td>A license of feature is reserved for either user or host.</td>
</tr>
<tr>
<td>RESERVE feature for HOST host</td>
<td>A license of feature is reserved for either user or host.</td>
</tr>
<tr>
<td>RESTarted vendor (internet port nnn)</td>
<td>Vendor daemon vendor was restarted at TCP/IP port nnn.</td>
</tr>
<tr>
<td>Retrying socket bind (address in use)</td>
<td>The license servers try to bind their sockets for approximately six minutes if they detect “address in use” errors.</td>
</tr>
<tr>
<td>Selected (EXISTING) master host.</td>
<td>This license daemon has selected an existing master host as the master.</td>
</tr>
<tr>
<td>SERVER shutdown requested.</td>
<td>A daemon was requested to shut down via a user-generated <code>kill</code> command.</td>
</tr>
<tr>
<td>Server started on host for: feature_list</td>
<td>A (possibly new) server was started for the features listed.</td>
</tr>
<tr>
<td>Shutting down vendor</td>
<td>The license server manager is shutting down the vendor daemon vendor.</td>
</tr>
<tr>
<td>SIGCHLD received. Killing child servers.</td>
<td>A vendor daemon logs this message when a shutdown was requested by the license daemon.</td>
</tr>
<tr>
<td>Started vendor</td>
<td>The license server manager logs this message whenever it starts a new vendor daemon.</td>
</tr>
</tbody>
</table>
**Configuration Problem Messages**

Table 22-3 lists configuration problem messages found in FlexNet Publisher.

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>host: Not a valid server host, exiting</strong></td>
<td>This daemon was run on an invalid host name.</td>
</tr>
<tr>
<td><strong>host: Wrong hostid, exiting</strong></td>
<td>The hostid is wrong for host.</td>
</tr>
<tr>
<td><strong>BAD CODE for feature</strong></td>
<td>The specified feature name has a bad license key or signature. It was probably typed in wrong, or modified by the end user.</td>
</tr>
<tr>
<td><strong>CANNOT OPEN options file</strong></td>
<td>The options file specified in the license file could not be opened.</td>
</tr>
<tr>
<td><strong>Couldn't find a master</strong></td>
<td>The daemons could not agree on a master.</td>
</tr>
<tr>
<td><strong>License daemon: lost all connections</strong></td>
<td>This message is logged when all the connections to a server are lost, which often indicates a network problem.</td>
</tr>
<tr>
<td><strong>Lost lock, exiting</strong></td>
<td>The vendor daemon has a problem with its lock file, usually because of an attempt to run more than one copy of the daemon on a single node. Locate the other daemon that is running via a ps command, and kill it with kill -9.</td>
</tr>
<tr>
<td><strong>Error closing lock file</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Unable to re-open lock file</strong></td>
<td></td>
</tr>
<tr>
<td><strong>No DAEMON line for vendor</strong></td>
<td>The license file does not contain a DAEMON or VENDOR line for vendor.</td>
</tr>
<tr>
<td><strong>No DAEMON lines, exiting</strong></td>
<td>The license daemon logs this message if there are no DAEMON or VENDOR lines in the license file. Because there are no vendor daemons to start, there is nothing for the license daemon to do.</td>
</tr>
</tbody>
</table>
Chapter 22: Debug Log File

Debug Log Messages

Table 22-4 • Daemon Software Error Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No features to serve!</td>
<td>A vendor daemon found no features to serve. This could be caused by a corrupted or incorrectly entered license file.</td>
</tr>
<tr>
<td>UNSUPPORTED FEATURE request: feature by user</td>
<td>The user has requested a feature that this vendor daemon does not support. This can happen for a number of reasons: the license file is bad, the feature has expired, or the daemon is accessing the wrong license file.</td>
</tr>
<tr>
<td>Unknown host: host</td>
<td>The host name specified on a SERVER line in the license file does not exist in the network database (probably /etc/hosts).</td>
</tr>
</tbody>
</table>

Daemon Software Error Messages

Table 22-4 lists various daemon software error messages:

Table 22-4 • Daemon Software Error Messages

<table>
<thead>
<tr>
<th>Message</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>accept: message</td>
<td>An error was detected in the accept system call.</td>
</tr>
<tr>
<td>Can’t allocate server table space</td>
<td>A malloc error. Check swap space.</td>
</tr>
<tr>
<td>Connection to host TIMED OUT</td>
<td>The daemon could not connect to host.</td>
</tr>
<tr>
<td>Illegal connection request to vendor</td>
<td>A connection request was made to vendor, but this vendor daemon is not vendor.</td>
</tr>
<tr>
<td>read: error message</td>
<td>An error in a “read” system call was detected.</td>
</tr>
<tr>
<td>select: message</td>
<td>An error in a “select” system call was detected. This is usually a sign of a system networking failure.</td>
</tr>
<tr>
<td>Server exiting</td>
<td>The server is exiting. This is normally due to an error.</td>
</tr>
</tbody>
</table>
Environment Variables

Environment variables are not required in order to use FlexEnabled applications. Environment variables are normally used for debugging or for changing license default location.

How to Set Environment Variables

FlexNet Publisher environment variables are set in two different ways:

- In the process' environment
- In the registry (Windows version 6.0 or earlier) or in $HOME/.flexlmrc (UNIX version 7.0 or earlier), which functions like the registry on UNIX.

Windows Registry

On Windows systems other than Windows Vista, the registry location is HKEY_LOCAL_MACHINE\Software\FLEXlm License Manager

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

On Windows Vista, the location is HKEY_CURRENT_USER\Software\FLEXlm License Manager.

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's 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 table below provides various environment variables and their definitions:

**Table 23-1 • Environment Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FLEXLM_BATCH</strong></td>
<td>Windows only: prevents interactive pop-ups from appearing. Set to 1 if a batch application. (Version 7.0 and later clients)</td>
</tr>
<tr>
<td><strong>FLEXLM_DIAGNOSTICS</strong></td>
<td>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 <strong>FLEXLM_DIAGNOSTICS</strong> (Version 5.0 and later clients)</td>
</tr>
<tr>
<td><strong>FLEXLM_TIMEOUT</strong></td>
<td>Windows only: Sets the timeout value a FlexEnabled application uses when attempting to connect to a license server port in the range 27000–27009. Values are in microseconds, within the range 0–2,147,483,647. The default setting is 100,000 microseconds.</td>
</tr>
<tr>
<td><strong>LM_BORROW</strong></td>
<td>Used for initiating license borrowing and setting the borrow period. See <strong>Initiating License Borrowing</strong> for more details. On UNIX platforms, $HOME/.flexlmborrow is used for the registry instead of $HOME/.flexlmrc.</td>
</tr>
<tr>
<td><strong>LM_PROJECT</strong></td>
<td><strong>LM_PROJECT</strong>’s value is logged in the report log file and later reported on by FLEXnet Manager. Limited to 30 characters. (Version 5.0 or later client required.) This can also be used to RESERVE, INCLUDE, and so on licenses with PROJECT. For example: \nRESERVE 1 f1 PROJECT airplane \nVersion 5.0 and later clients and version 7.0 and later vendor daemons are required for this feature.</td>
</tr>
<tr>
<td><strong>LM_SERVER_HIGHEST_FD</strong></td>
<td>Used to set the highest file descriptor value, above which the license server will not access.</td>
</tr>
<tr>
<td><strong>LM_UTIL_CASE_SENSITIVE</strong></td>
<td>Used by the FLEXlm utilities. If set to 1, the utilities process license file lines as case sensitive. By default, this variable is set to 0; license files are treated as case insensitive. This environment variable is applicable only when the license server, itself, has been configured by your software publisher to treat license files in a case sensitive manner.</td>
</tr>
<tr>
<td><strong>TCP_NODELAY</strong></td>
<td>Improves license server performance when processing license requests. Set to 1 to enable performance enhancements. Use with caution: when enabled it may cause an increase in network traffic.</td>
</tr>
</tbody>
</table>
### Table 23-1 • Environment Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LM_LICENSE_FILE or VENDOR_LICENSE_FILE</strong></td>
<td>Reset path to license file. Can be a license search path, separated by &quot;::&quot; on UNIX and &quot;;;&quot; on Windows. If VENDOR_LICENSE_FILE used, VENDOR is the vendor daemon name used by this application. For example, Flexera Software products use MVSN_LICENSE_FILE. Can be a file name, or <code>port@host</code>. See also <a href="#">Setting the License Search Path using an Environment Variable</a> (VENDOR_LICENSE_FILE requires version 6.0 and later clients).</td>
</tr>
<tr>
<td><strong>LM_BINDING_AGENT</strong></td>
<td><strong>LM_BINDING_AGENT</strong> must be of the form <code>port@host</code>, where <code>port</code> is port number in the range 27010 - 27019, and <code>host</code> is the hostname of the VMware ESX COS. (Depending on your network settings, this may need to be a fully-qualified domain name.) For example, <strong>LM_BINDING_AGENT</strong>=<a href="mailto:27011@hostname.example.com">27011@hostname.example.com</a>.</td>
</tr>
</tbody>
</table>
Identifying FlexNet Publisher Versions

Version Compatibility Between Components

In general, always use the latest version of `lmadmin`, `lmgrd` and `lmutil/lmtools`, all of which are available from www.flexerasoftware.com, and you will automatically enjoy many of the enhancements available in the most recent versions of FlexNet Licensing. However, some enhancements require a vendor daemon built with a newer version of FlexNet Publisher, and yet others require a FlexEnabled application built with a newer version of FlexNet Publisher. Contact your software publisher for the latest version of their vendor daemon.

The rules about FlexNet Licensing component version compatibility are summarized as:

- Version of `lmutil/lmtools` must be $\geq$
- Version of `lmadmin` (see note) or `lmgrd`, which must be $\geq$
- Version of vendor daemon, which must be $\geq$
- Version of the client library linked to the FlexEnabled application, which must be $\geq$
- Activation utility, which must be $\geq$
- Version of license file format

Except for the license file, use `lmver` to discover the version of all these components. For the vendor daemon, `lmgrd`, and `lmutil`, you can also use the `-v` argument to print the version.

**Note** • `lmadmin` can only be used with components with a version of 9.2 or later.
Determining the License File Version

The following rules apply to individual FEATURE, INCREMENT or UPGRADE lines. It is possible to have a mix of versions in a single file. Only the features that a particular application checks out determine the version of the license for that feature.

Table 24-1 • Determining the License File Version

<table>
<thead>
<tr>
<th>Version</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Version 2</td>
<td>Blank quotes or a quoted string at the end of the FEATURE line.</td>
</tr>
<tr>
<td>&gt;= Version 3</td>
<td>INCREMENT or UPGRADE line.</td>
</tr>
<tr>
<td>&gt;= Version 4</td>
<td>OVERDRAFT, DUP_GROUP, INTERNET, or PACKAGE appear.</td>
</tr>
<tr>
<td>&gt;= Version 5</td>
<td>SUPERSEDE, ISSUED, USER_BASED, HOST_BASED, or SN appear.</td>
</tr>
<tr>
<td>&gt;= Version 6</td>
<td>START appears.</td>
</tr>
<tr>
<td>&gt;= Version 7.1</td>
<td>SIGN= keyword appears.</td>
</tr>
<tr>
<td>&gt;= Version 8.0</td>
<td>BORROW, FLOAT_OK, and TS_OK appear.</td>
</tr>
<tr>
<td>&gt;= Version 8.1</td>
<td>SUITE_RESERVED appears.</td>
</tr>
<tr>
<td>&gt;= Version 8.4</td>
<td>COMPOSITE appears.</td>
</tr>
<tr>
<td>&gt;= Version 11.5</td>
<td>ONE_TS_OK and SUPERSEDE_SIGN appear.</td>
</tr>
<tr>
<td>&gt;= Version 11.7</td>
<td>VM_PLATFORMS and TZ appear.</td>
</tr>
</tbody>
</table>

Version Summary

Version 1.0—1988
First FLEXlm Release, containing all the basic FLEXlm features

Version 1.5—February 1990
First widely used version including DEMO

Version 2.1—March 1991
- Improved TIMEOUT support
- Improved ethernet hostid support
Version 2.21—November 1991
- Added support for many platforms and some platform-specific improvements, such as hostid
- Hostid ANY added

Version 2.26—March 1992 (Used only by Sun)
- Added license lingering

Version 2.4—December 1992
- Added use-all-feature-lines capability for incremental license distribution
- Enhanced vendor customization routines
- Enhanced options file
- Added new hostid types: USER, HOSTNAME, and DISPLAY
- Added port@host to locate license file—downloads license file from server

Version 2.61—March 1993 (Used only by Sun)
- Added INCREMENT and UPGRADE lines to license file

Version 3.0—May 1994
- INCREMENT and UPGRADE behavior changed and improved
- Added UDP protocol support
- Addeduname -i hostid for HP
- Added multiple jobs for enhanced support of LM_LICENSE_FILE environment variable as a license search path
- New, optional license file format with keyword=value syntax for optional new features, including: asset_info, ISSUER, and NOTICE, " \ " license file continuation character, 2,048 character limit per feature

Version 4.0—December 1994
- Removed use of floating point, for enhanced reliability
- FEATURE line additions: ck, OVERDRAFT, DUP_GROUP, INTERNET hostid
- PACKAGE line
- License Finder
- lmdiag and FLEXLM_DIAGNOSTICS for diagnostics

Version 4.1—May 1995
- Performance improvements and new platform support
Chapter 24: Identifying FlexNet Publisher Versions

Version Summary

**Version 4.1—Patch Release 6, October 1995**
- Windows patch release for Windows 95 with various performance improvements

**Version 5.0—March 1996**
- Improved `port@host` behavior—FlexEnabled application doesn’t read license file
- Automatic `port@host` via USE_SERVER line in license file
- Hostid lists—lock a feature to several hostids
- New FEATURE attributes: SN (serial number), USER_BASED, HOST_BASED, MINIMUM, SUPERSEDE, ISSUED (issued date), CAPACITY (charging based on system capacity)
- Optional avoidance of NIS and DNS via IP address instead of host name
- Improved report log file format
- Server, upon startup, notifies of licenses that expire within two weeks
- Improved options file functionality

**Version 5.11—February 1997**
- SUPERSEDE lists, PLATFORMS= license attribute,
- new options: MAX, TIMEOUTALL
- Windows control panel added
- Windows license generator GENLIC added

**Version 5.12—April 1997**
- Performance improvements and new platform support

**Version 6.0—September 1997**
- `lmgrd` can read multiple license files
- `FLEXlm` license directory support: *.lic automatically used
- License files require no editing for use at the site
- Optional path on DAEMON/VENDOR line; `$PATH` environment variable used
- Decimal license format, with `lminstall` utility for typing in licenses
- FEATURE lines are shorter, easier to understand and type in
- PACKAGE lines can be shipped in separate files that never require user editing
- Default TCP/IP port numbers make SERVER line port number optional
- Default options file path
- `this_host` host name supported on SERVER line
Chapter 24: Identifying FlexNet Publisher Versions

Version Summary

- VENDOR_LICENSE_FILE supported (for example, DEMO_LICENSE_FILE)
- @host supported where default port numbers are used
- Windows only: user prompted for license file or license server name
- License files are optionally case insensitive
- lmdown and lmreread accept -vendor vendor argument
- START=dd-mm-yyyy optional license attribute

Version 6.1—June 1998
- Performance improvements

Version 7.0—August 1999
- License Certificate Manager support for automatic license fulfillment
- Support for try-before-you-buy licensing
- License file handles inserted new lines from emailers
- License lines automatically optimally sorted
- Improved lmtools interface for Windows
- lmgrd, when run at command line on Windows, runs in background by default
- Improved three-server redundancy reliability (version 7.0 vendor daemon and lmgrd)
- lmreread and lmdown take -all argument to shut down or reread all lmgrds
- Support registry (Windows) and $HOME/.flexlmrc (UNIX) for FLEXlm environment variables
- Automatically install license path in registry or $HOME/.flexlmrc after successful checkout
- Options support for LM_PROJECT with PROJECT
- Performance improvements, especially for Windows NT
- Intel Pentium III CPU-ID (version 7.0d or later, November 1999)

Version 7.1—August 2000
- Security enhancements
- SIGN= keyword in license
- lmnewlog utility (version 7.0d or later vendor daemon)

Version 7.2—December 2000
- Performance enhancements
Version 8.0—October 2001
- `lmborrow` (version 8.0 or later components), `lmpath` (version 8.0 or later vendor daemon), `lmswitch` (version 8.0 or later vendor daemon) utilities
- `lmreread` rereads options file and SERVER host name
- License borrowing with BORROW keyword

Version 8.1—January 2002
- CRO Security enhancements

Version 8.2—August 2002
- Support added for Windows XP compliance

Version 8.3—October 2002
- Support added for returning borrowed licenses early

Version 8.4—January 2003
- Support for reserved package suites

Version 9.0—March 2003
- Support for COMPOSITE= hostid type

Version 9.2—July 2003
- Options file keywords added: GROUPCASEINSENSITIVE and MAX_BORROW_HOURS

Version 9.5—November 2004
- New environment variable: LM_UTIL_CASE_SENSITIVE

Version 10.0—April 2004
- Released as FlexNet Publisher
- Support for fully qualified domain names

Version 10.1—November 2004
- Additional FLEXid driver support for USB dongles

Version 10.8—April 2005
- IPv6 address support for hostids
- Enhanced three-server redundant configuration support
- Support for common vendor daemons
Version 11.1—November 2005
- Support for license rights in trusted storage
- IPv6 support for hostids reverted in this release

Version 11.5—February 2008
- Support new attribute for the NOLOG Option keyword
- IPv6 support
- New error codes
- New feature definition line keywords–ONE_TS_OK and SUPERSEDE_SIGN

Version 11.6—August 2008
- New license server manager, lmadmin, which requires components with a minimum version of 9.2
- Support for multiple ethernet hostids on Linux platforms

Version 11.6.1—April 2009
- Queuing of license requests when MAX as defined in the option file is exceeded. Note that queuing must be configured in the FlexEnabled application

Version 11.7—July 2009
- New feature definition line keywords–TZ and VM_PLATFORMS
- New error codes
- (License-file licensing only) Support for license servers and clients running in virtual environments on VMware platforms
- Policies that let you limit usage of FlexEnabled applications to physical machines only or to supported virtual machines only
- Support for more than 255 trial IDs by means of trial packs

Version 11.8—March 2010
- Support for composite transactions in trusted-storage licensing
- (License-file licensing only) Bare-metal binding and binding to the Universally Unique Identifier (UUID) of the virtual container now available for virtualized license servers on the VMware ESX platform
- (License-file licensing only) New binding agent, lmbind, which enforces bare-metal binding on virtualized license servers and ensures that only one instance of a specific vendor daemon is running across all virtual machines on a given host machine
Chapter 24: Identifying FlexNet Publisher Versions

Version Summary

**Version 11.9—September 2010**
- (License-file licensing only) Full support—including policies, bare-metal binding, lmbind—for virtualized license servers and clients on the Microsoft Hyper-V platform
- Improvements to the lmstrip utility to handle ELF object files properly
- Support for the WibuKey dongle on Windows, Linux, and Mac OS X systems
- Support for Visual Studio 2010 Compiler for building the FlexNet Publisher Licensing Toolkit and FlexEnabled applications on Windows x86 and x64 platforms
- Sample implementation of activation APIs encapsulated in C# now available in the FlexNet Publisher Licensing Toolkit

**Version 11.9.1—February 2011**
- Command-line options -ADMINONLY and -LOGDIR added to lmadmin to increase the parity between lmadmin and lmgrd
- Aladdin USB FlexNet ID dongle driver updated to support Windows 7 and Windows Server 2008
- Java toolkit support for Wibu dongles

**Version 11.10—July 2011**
- Support for virtualization in trusted-storage licensing
- (License-file licensing only) Support (including lmbind support) for license servers and clients running in an Amazon EC2 cloud environment
- Implementation of Secure Data Types (SDTs) available for license-file licensing
- lmadmin updated to support customized installations, silent installations, and Windows Active Directory users or groups
- Support for flash-based hardware dongles (SafeNet HL 2GB)
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