CHAPTER 3

WAE Design Floating License Server

The FlexNet Publisher license server must be set up if WAE Design users are to use floating licenses. Using this server, you can control access to the licenses, monitor who has them checked out, and check log activity.

The FlexNet Publisher license server has two interfaces. One is a CLI, which requires that you start an `lmgrd` daemon so all users can access the floating licenses. The other is a web UI, wherein you must install and configure an `lmadmin` tool. Best practice is to use only one or the other interface (CLI or web) to administer the license server.

Note
- For information about FlexNet Publisher and for more details on all FlexNet Publisher CLI commands and GUI, refer to the *FlexNet Publisher License Administration Guide* (`FlexLM_EndUser_LicAdmin.pdf`). This is located in `$CARIDEN_HOME/docs`, which by default is `/opt/cariden/software/mate/current/docs`. This chapter includes some FlexNet Publisher instructions for both the CLI and GUI that could change without Cisco's knowledge.

- All instructions and examples assume you used `/opt/cariden` as the default installation directory. If you did not, substitute your installation directory for `/opt/cariden`.

- Throughout this chapter, `bin` is `/opt/cariden/software/flexlm/current/bin`.

Prerequisites

- You must have the required packages installed. For a list of package dependencies, see the "Installation Requirements" chapter in the *Cisco WAE 7.0.1 Installation Guide*. For port information, see Configuring License Server Ports.

- You must have a WAE Design floating license installed on the same device or VM as the FlexNet Publisher floating license server, which means you must have WAE Design installed. Contact your Cisco representative for this license, and see License Installation to install this license.

Best Practices

- If you are also installing a WAE package that requires servers, then install this first and install it on the same device as the FlexNet Publisher license server. Doing so simplifies administration tasks.

- Update the WAE user's PATH variable so you can invoke FlexNet commands without having to specify the full path.

Example: Edit `~/.profile`.

```
export PATH=$PATH:$CARIDEN_ROOT/software/flexlm/current/bin
export PATH=$PATH:$CARIDEN_ROOT/software/flexlm/current/bin
```

Pre-Installation

✎
Note   If you are installing the FlexNet Publisher license server *on a different Linux device* than the one on which a WAE server installation resides, complete Step 1 to Step 4. Otherwise, skip to Step 5. Follow all steps on the device where the FlexNet Publisher license server resides.

Step 1   Log in to the FlexNet Publisher license server as root or as a user with administrative capabilities.

Step 2   Create a lowercase, alphanumeric username where the first letter is an alphabetical character.

/usr/sbin/useradd *<username>*

Step 3   Set a password.

passwd *<username>*

Step 4   Create an installation directory that has root privileges. The best practice is to use the default installation directory, which is `/opt/cariden`.

cd ~/
mkdir -p /opt/cariden

Step 5   Change the owner of the installation directory to the newly created user.

chown *<username>* **/opt/cariden**

Step 6   Verify that there are no local firewalls blocking the services. For a list of ports used, see Configuring License Server Ports and the "Installation Requirements" chapter in the *Cisco WAE 7.0.1 Installation Guide*.

The following example shows how to disable the iptables firewall as root:

```
service iptables save
service iptables stop
sudo chkconfig iptables off
```

Step 7   Check if the redhat-lsb (Linux Standards Base) package is installed. This package is required to run the FlexLM license server.

```
yum list installed | greb redhat-lsb
```

If it is not there, install it.

```
yum install redhat-lsb-4.0-7.el6.centos.x86_64
```

Step 8   If you already have a license server installed and running, enter one of the following commands to stop it gracefully:

bin/lmdown -c *<license_file>*
bin/lmdowm -all

If the server is distributing borrowed licenses, enter one of the following commands:

bin/lmdown -c *<license_file>* **-force**
bin/lmdowm -all -force

Step 9   Download the License Server Software package from the Cisco download site. If you want to use the borrow license feature, you need to get a new license if you have one older than 2015. *Note that you must download a new license package regardless of whether this is an upgrade or a new installation.*

Step 10   The WAE Design license file's SERVER statement must be the same hostname as the output from the hostname CLI command.

   a.   Determine the hostname.

   hostname

   b.   Edit the `/etc/sysconfig/network` file to include the hostname returned in the preceding step.

   HOSTNAME=<*hostname*>

Step 11   Ensure the `/etc/hosts` file on the client devices contains the same hostname as identified in Step 4. (Client devices are the devices that will be checking the licenses in and out of the server.)

Installing the License Server

Step 1   Confirm that you have downloaded the Cisco WAE License Server installer package from the WAE Automation Software Download site (WAE_License_Server-2.0-Linux-x86_64.sh).

The installer runs `/lmadmin-i86_lsb-11_11_1_1.bin` from the installed folder (`/opt/cariden/software/wae-license-server`).

Step 2   If you want to run the license server web UI, run `/lmadmin-i86_lsb-11_11_1_1.bin` from the `/opt/cariden/software/wae-license-server/bin` directory.

Although the default is to install `lmadmin` into `/opt/FNPLicenseServerManager`, the best practice is to install it into `/opt/cariden/software/flexlm/current/web`.

chmod 755./<*lmadmin_package*>**.bin;./**<*lmadmin_package*>**.bin**

Example:

```
chmod 755./lmadmin-i86_lsb-11_11_1_1.bin;./lmadmin-i86_lsb-11_11_1_1.bin
```

Configuring License Server Ports

To check out or borrow a floating license, client devices must establish two TCP connections to the license server. One connection is to the floating license server daemon. Unless otherwise configured, this daemon listens on the first available port in the range of 27000 and 27009. The other connection is to the Cisco daemon, which the license server randomly selects from the ephemeral range (which often ranges from 49152 to 65535).

If firewall policies block the above ports, you can change the ports by adding the port information to the floating license server's license file. By default, the file contains the following information:

```
SERVER <hostname> <MAC address>
VENDOR Cisco
```

Modify the preceding lines as follows to change the ports that these daemons use.

Port Type	Syntax	Example
Server daemon	SERVER *<hostname> <MAC address> <port>*	SERVER Centos10 525400232200 5053
Cisco daemon	VENDOR cisco PORT=*<port>*	VENDOR cisco PORT=27010

Starting the License Server

> **Note** The following instructions are for using either the CLI or license web server, but not both. The recommended practice is to install and use one or the other.

To start the license server, you must have access to its license file, which is not the same as the WAE license.

Download the floating license server file (.lic extension) to a directory of your choice on the device where the license server will be installed. Best practice is to put it in `/opt/cariden/etc`.

CLI

To start the license server daemon (`lmgrd`) and specify the `lmgrd` log file name and location, enter the following from `/opt/cariden/software/flexlm/current/bin`.

./lmgrd -c *<license_filename>* **-l** *<log_path_filename>*.**log**

Example:

```
/lmgrd -c /opt/cariden/etc/MATE_Floating.lic -l /opt/cariden/logs/lmgrd.log
```

Web UI

Step 1 Create a backup of the Cisco daemon file so that it can be easily restored in case of failure.

```
cp /opt/cariden/software/flexlm/current/bin/cisco
/opt/cariden/software/flexlm/current/bin/cisco.bak
```

Step 2 Copy the Cisco daemon files to the `flexlm/web` directory.

```
cp /opt/cariden/software/flexlm/current/bin/cisco /opt/cariden/software/flexlm/web/cisco
```

Step 3 To start the license server using the web UI, first configure the following parameters from the `/opt/cariden/software/flexlm/web` directory. For more information, see `lmadmin -help`.

   a. By default, the lmadmin server has a user named "admin" with a password of "admin." If needed, add another user to this lmadmin server.

      ./lmadmin -useradd *<username>* **- pass** *<password>*

   b. Import the WAE Design license file that was installed.

      ./lmadmin -import *<path>***/***<license_filename>*

      Example:

```
lmadmin -import ~/.cariden/etc/MATE_Floating.lic
```

  c. Start the lmadmin process with its default settings.

```
./lmadmin
```

Step 4   Start the license server web UI, which by default uses a non-secure port of 8090. By entering the following in a web browser, you are redirected to the secure port.

```
http:<server_hostname>:8091
```

Step 5   Click the **Administration** link, and log in using the an administrative username and password. Both have a default of "admin."

Step 6   Click the **Vendor Daemon Configuration** tab, click the **Administer** link, and then click **Start**.

Post-Installation

Log Files

By default, the lmadmin logs are in /opt/cariden/software/flexlm/web/logs.

The lmgrd log files are located wherever you specified the *<log_path_filename>*.log when starting the lmgrd daemon (lmgrd -l *<log_path_filename>*.log).

Port Verification

To verify the ports, you can use any of several methods, as follows.

- Verify the license server daemon port is running. For example, you can telnet to this port to verify that it is running.

```
telnet <license_server_IP_address> <license_server_daemon_port>
```

Example:

```
telnet 127.0.0.1 27000
```

- Verify the license server is listening to the specified port.

Example:

```
netstat -a | egrep '27000[0-9]'
```

tcp	0	0	* :27000	*.*	LISTEN
tcp	0	0	localhost:48245	localhost:27000	ESTABLISHED
tcp	0	0	localhost:27000	localhost:48245	ESTABLISHED

- View the lmgrd log file, which indicates on which ports the license server and Cisco daemons are listening.

Example:

```
13:00:14 (lmgrd) lmgrd tcp-port 27001
```

```
13:00:14 (lmgrd) cisco using TCP-port 42207
```

- For `lmadmin`, go to the admin page.
  - To verify the server daemon's port, choose **Administration > Server Configuration > License Server Configuration**.
  - To verify the Cisco daemon's port, choose **Administration > Server Configuration > Vendor Daemon Configuration**.

Distributing Information to Clients

Either distribute the same floating .lic file that you installed to all WAE Design users who need it, or give them both the MAC address and hostname for the license server. Having users install licenses via the MAC address and port is the recommended practice since it eases administration.

After end users install the floating license once, the license is automatically validated from the server each time the user opens the WAE Design GUI or runs the CLI tools.

Setting Up an Access Control List for the Web Server

If you are using the web server to administer licenses, you can set up an access control list. This is optional, but doing so can improve the security of who can access the web server, as well as give you an easily maintainable list of license users. To do this, you need to know the user ID for all users who are checking out licenses from the license server. The user ID is what they use to log in to their operating systems.

Step 1 Create and open a file named cisco.opt in `/opt/cariden/software/flexlm/current/bin`.

Step 2 Create groups to make it easier and faster to configure inclusions and exclusions. You can then use these groups, rather than specifying individual users.

GROUP *group_name user_name1 user_name2 user_username3..*

Example: The group name is `akdevops`, and each name following it is a user.

```
GROUP akdevops theresa lone loretta byron patrick sharon
```

Step 3 For each user or group that you want to grant license access, add an INCLUDEALL line.

INCLUDEALL type {user_name | group_name}

Example:

```
INCLUDEALL GROUP akdevops
INCLUDEALL USER gbd456
INCLUDEALL USER odd789
```

Step 4 For each user or group you want to exclude from accessing the license server, add an EXCLUDEALL USER line.

EXCLUDEALL type {user_name | group_name}

Example:

```
EXCLUDEALL GROUP region_fea
EXCLUDEALL USER rgu456
EXCLUDEALL USER ilt789
```

Step 5   Save the file.

Configuring Borrowing Parameters

Note   If you have a floating license that was generated prior to May 2015, you must acquire a new one to enable borrow licenses.

Step 1   Configure the `/opt/cariden/bin/cisco.opt` file to define who is permitted to borrow licenses.

Anyone not in an INCLUDE_BORROW statement is not permitted to borrow licenses. Thus, it is easier to use groups that user names.

The inclusion format is as follows. You must specify a line item for each feature. For a list of these features, use the `license_check` tool.

INCLUDE_BORROW feature type {user_name | group_name}

Example:

```
INCLUDE_BORROW MD_Layer1 USER ohara
INCLUDE_BORROW MD_SegmentRouting GROUP akdevops
```

Step 2   You can refine this INCLUDE_BORROW list by excluding users. The EXCLUDE_BORROW has precedence over the INCLUDE_BORROW statements such that if a user or group is identified in both lists, that user or group will be excluded as specified.

EXCLUDE_BORROW feature type {user | group_name}

Example:

```
EXCLUDE_BORROW MD_VPN USER diana
EXCLUDE_BORROW MD_BGP GROUP acme
```

Step 3   Optional: Specify the number of licenses for a feature that cannot be borrowed. This is useful for ensuring that users who need to check out licenses will have them available.

BORROW_LOWWATER feature number

Example: Save 23 MD_Sim licenses for use by those who are not borrowing licenses.

```
BORROW_LOWWATER MD_Sim 23
```

Verifying Licenses in Use

Use the `lmstat` command to summarize how many licenses are in the original license file and how many are in use.

lmstat -a

The results show how many licenses are checked out and borrowed. The output contains *_Users entries and entries for each feature. The *_Users is determined by the users who have access to the license. Each feature lists a set of licenses checked out for that feature.

Example output:

```
Users of MD_Users:  (Total of 300 licenses issued;  Total of 295 licenses in use)
"MD_Users" v5, vendor:cisco
```

Checked-out licenses are only displayed for *_Users, whereas borrowed licenses are shown for *_Users, as well as for individual features.

The output uses the following format, where <time> is the time at which the license was checked out or borrowed. The `<license_handle>` is a unique ID for the license. If a user has the same license checked out twice, for example, each instance has a unique `<license_handle>`.

```
<feature> <version> <vendor>
<username> <user_hostname> <display> (<license>/<port> <license_handle>) <time>
```

Example checked-out license:

```
dusan md1 /dev/pts/0 (v5) (matelic.cisco.com/27000 37337), start Wed 5/20 11:50
```

Licenses that are borrowed are listed with a `(linger: #)` notation, where # is the number of seconds for which the license is borrowed.

```
<username> <user_hostname> <display> (<license>/<port> <license_handle>) <time> <linger>
```

Example borrowed license:

```
obi obi-mbpr /dev/pts/18 (v5) (matelic.cisco.com/27000 18848), start Fri 5/8 16:26
(linger: 2532780)
```

Reclaiming Unused Licenses

You can reclaim licenses that have been checked out or borrowed. This feature is useful when a license remains idle, such as when an employee is on vacation or accidentally has the license running on two devices.

Reclaiming licenses is only valid through the CLI `lmremove` command.

Use the `lmstat -a` command described in Verifying Licenses in Use to identify the required inputs to the `lmremove` command.

lmstat -a Output for Examples

In the next two sections, examples use the following `lmstat -a` output as their starting point. Compare the results of these examples to this output to see the differences between the two.

```
bin/lmstat -a
   "MD_Users" v5, vendor:cisco
   obi obi-mbpr /dev/pts/18 (v5) (matelic.cisco.com/27000 18848), start Fri 5/8 16:26
   (linger: 2532780)
   dusan md1 /dev/pts/0 (v5) (matelic.cisco.com/27000 37337), start Wed 5/20 11:50
   dusan md1 /dev/pts/0 (v5) (matelic.cisco.com/27000 42295), start Wed 5/20 11:51
   llonned woql077 /dev/tty (v5) (matelic.cisco.com/27000 50668), start Thu 5/14 13:53
   (linger: 554760)
```

Reclaiming All Licenses for a Specific User

To reclaim all licenses for a specific user, enter this command:

bin/lmremove *<feature> <user> <user_host> <display>*

Example: This example reclaims all licenses for the user named "dusan."

```
bin/lmremove MD_Users dusan md1 /dev/pts/0
```

The `lmstat -a` command now shows dusan removed as a user.

```
obi obi-mbpr /dev/pts/18 (v5) (matelic.cisco.com/27000 18848), start Fri 5/8 16:26
(linger: 2532780)
llonned woql077 /dev/tty (v5) (matelic.cisco.com/27000 50668), start Thu 5/14 13:53
(linger: 554760)
```

Reclaiming a License for a Specific Feature

To reclaim a license for a specific feature, enter this command:

bin/lmremove *<feature> <server_host> <port> <license_handle>*

Example: This example reclaims a single license from the user named "dusan."

```
bin/lmremove MD_Users matelic.cisco.com 27000 37337
```

The `lmstat -a` command now shows the license 37337 removed for the user named dusan, though dusan still has use of license 42295.

```
obi obi-mbpr /dev/pts/18 (v5) (matelic.cisco.com/27000 18848), start Fri 5/8 16:26
(linger: 2532780)
dusan md1 /dev/pts/0 (v5) (matelic.cisco.com/27000 42295), start Wed 5/20 11:51
llonned woql077 /dev/tty (v5) (matelic.cisco.com/27000 50668), start Thu 5/14 13:53
(linger: 554760)
```