

Administrator's
Guide

Keysight Licensing

Notices

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Overview

NOTE For the latest version of this document, see <https://www.keysight.com/find/licensingdoc>.

This document is intended for use by system administrators and end users who perform advanced configuration tasks as an aid in managing Keysight licensing, which utilizes the FlexNet licensing solution. For additional information on FlexNet, refer to the FlexNet Publisher's License Administration Guide, included in the [Keysight License Server download](#). This document focuses on recommendations and information specific to Keysight licensing.

Licensing governs the usage of a Keysight product. Depending on the product, you may purchase one or more licenses to enable you to run a software application on a computer or instrument, or to unlock specific features of an application or instrument. Keysight licensing is based on FlexNet Publisher and supports most of the FlexNet licenses that have been issued by Keysight for its products over the years. Keysight Licensing provides tools and processes for floating, USB portable, node-locked, and transportable licenses.

In this section

- [What Is Keysight Licensing?](#)
- [License Types](#)
- [Recognize Your License Type](#)

What Is Keysight Licensing?

Keysight Licensing includes these elements that work together to unlock applications and features of Keysight products:

- License client software, built into your licensed Keysight product, to manage feature requests
- License files, which contain licenses that unlock your licensed Keysight products
- License management tools to help you install, view, and manage your licenses
- For floating and counted licenses:
 - The FlexNet license server manager (*lmgrd*) to manage servers
 - The Keysight vendor daemon(s) (*agileesofd* and/or *agilent*) to manage product licenses

Licensed client software:

- Requests the use of a license when you try to use a licensed Keysight application or feature
- Lets you know if it cannot acquire a license

License files:

- Are identified by the *.lic* suffix
- Contain a unique signature and information that identifies the type and usage of this license; see [Recognize Your License Type](#)
- Are obtained from [the Keysight Software Manager website](#), using the certificate you received when you bought your Keysight product
- Are installed on your computer or instrument, or on a floating license server, to enable the use of your licensed product

License management tools:

- Help you to install and view licenses, and to perform various management operations (such as borrowing)
- See [What License Management Tool Should I Use?](#) for information on the specific tool(s) appropriate to your Keysight products and licenses.

License server manager *lmgrd*:

- Starts and maintains *agileesofd* and any other vendor daemons (such as *agilent*) listed in the VENDOR lines of the license file used to start *lmgrd*
- Refers license checkouts (requests) to the appropriate vendor daemon

Keysight vendor daemons *agileesofd* and *agilent*:

- Manage Keysight product licenses, mapping feature requests to the appropriate license
- For historical reasons, Keysight licensing uses either or both of the two vendor daemons *agileesofd* and *agilent*, depending on the product(s) and type(s) of licenses in use.

License Types

Keysight Licensing provides these types of licenses:

- **node-locked**
- **USB portable**
- **transportable**
- **module**
- **floating**

Each license is either **perpetual** (permanent) or **time-based** (good for a limited amount of time).

A **node-locked** license permits the licensed software to run on only one machine. Each node-locked license is locked to an instrument or computer: The license is resident on the hard disk of the system that it's locked to, and that system runs the licensed feature or product. **Trial licenses** are node-locked, time-based licenses. Trial licenses are issued for a particular instrument or computer and are provided free of charge for you to try out a Keysight product.

A **USB portable** license is locked to a USB dongle (also called a USB key). Systems that run the licensed feature or product must have the license file resident on their hard disks, and have the dongle attached when they run the licensed feature or product.

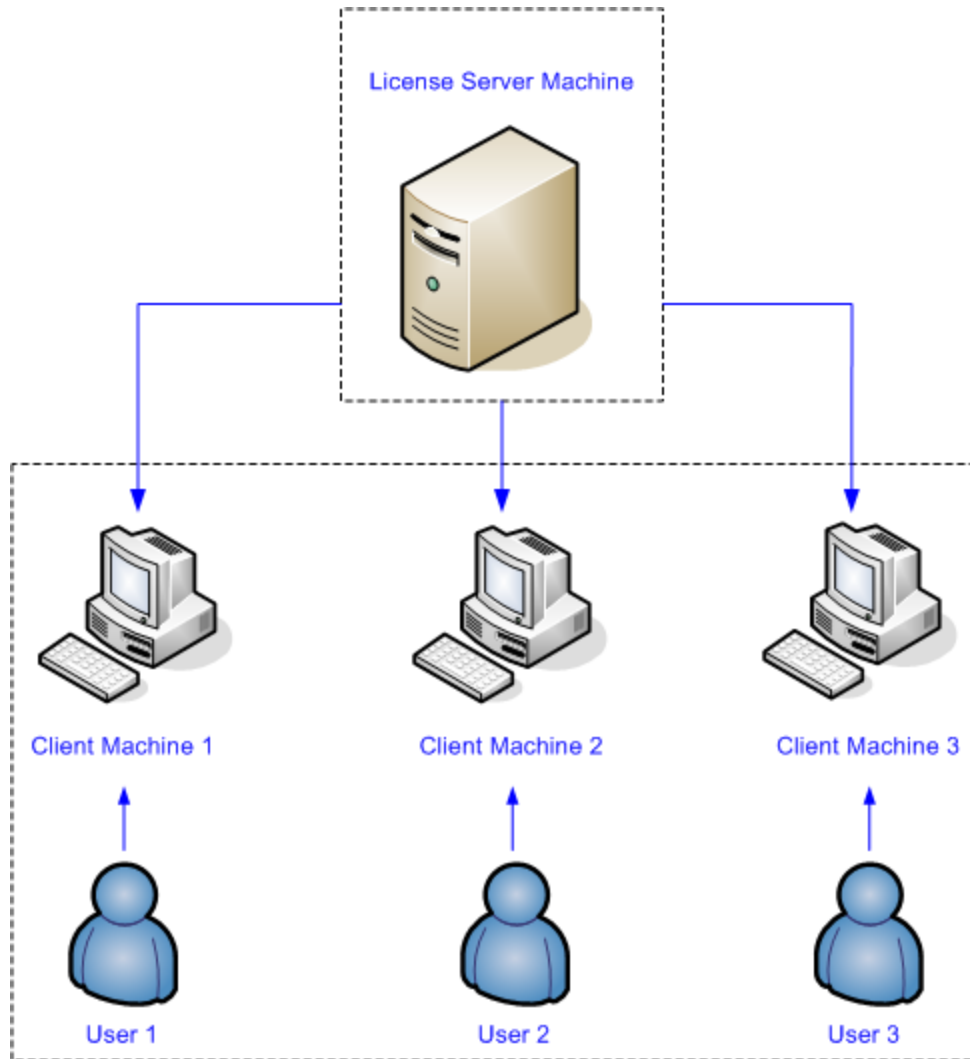
Node-locked and USB portable licenses may be **counted** or **uncounted**. Counted licenses enable a specified number of a given capability – for example, a given number of simulations in an EDA application. An uncounted license simply unlocks the licensed feature or application on the system where it is installed.

A **transportable** license is a type of node-locked license that can be unlocked from one client host and then locked to another client host, via a network-enabled process performed in conjunction with the Keysight Software Manager website.

A **module** license is locked to a PXI modular instrument and is used to enable capabilities of that modular instrument.

Floating licenses (network licenses) reside on a license server (a separate computer) and are checked out for use by Keysight products (instruments or applications), then returned (checked in) when no longer needed so that they can be used on another computer or instrument.

Some floating licenses can also be **borrowed** for a specified number of days. Once you have borrowed a license, you can disconnect the licensed instrument or computer from the license server and continue to use the license offline for the duration of the borrow period. You can distinguish borrowable licenses by the **BORROW** keyword in the license file.



See also

[Recognize Your License Type](#)

Recognize Your License Type

These examples illustrate some of the important differences among license types, and some of the important properties of Keysight licenses. Your licenses may look similar to these, or quite different, depending on the licensed product, time of issue, and other factors.

Example 1: Node-locked license (unserved, permanent)

```
FEATURE MYFEATURE1 agileesofd 2022.0910 permanent uncounted \
  VENDOR_STRING=005056905d85 HOSTID=005056905d85 \
  vendor_info="DESCRIPTION=MyProduct, node locked, permanent \
  license (MYFEATURE1)" \
  ISSUER=LICENSEID=3351795,KSM=TEST,PRODUCTID=myprod\
  ISSUED=11-sep-19 NOTICE=ORDER=I1001393228,PRODUCT=KALF101-1FP \
  START=11-sep-19 TS_OK SIGN="009C 5C2E 6CDF E5EC 6E47 9630 D6BB \
  A5A3 6C74 820C 3D01 17BE 60AB A093 CB6E A39B 78E3 9346 E1D2 \
  D591 9832"
```

In an unserved, uncounted node-locked license, there is no `SERVER` line, and there is a `FEATURE` line rather than an `INCREMENT` line. This license is used locally without a license server process. The `uncounted` keyword indicates that this license is unlimited; it does not provide a number of counts of the feature.

This license does not expire, as indicated by `permanent` on the first (`FEATURE`) line.

Example 2: Served, counted node-locked license

```
SERVER this_host 005056905d85 27009
VENDOR agileesofd
USE_SERVER
#Product: MyProduct Expires: permanent
INCREMENT MYFEATURE1 agileesofd 2022.0910 permanent 5 \
  VENDOR_STRING=005056905d85 HOSTID=005056905d85 \
  vendor_info="DESCRIPTION=MyProduct, node locked, permanent \
  license (MYFEATURE1)" \
  ISSUER=LICENSEID=3351774,KSM=TEST,PRODUCTID=myprod\
  ISSUED=11-sep-19 NOTICE=ORDER=I1001393225,PRODUCT=KALP105-1FP \
  START=11-sep-19 TS_OK SIGN="014D 92B2 4F4D 73F8 1DC2 7A8A C19D \
  FB1D DBD9 E503 6002 1C87 2298 FEC2 3D38 F608 7D3F 5F5A C2DC \
  5445 7060"
```

In the example above, the presence of `HOSTID=005056905d85` indicates that this license is tied to the host ID `005056905d85`. The presence of a `SERVER` line indicates that this is a *served* license. To use this node-locked license, you'll need to run a license server process locally on the machine where you will use the license.

The fourth line of this license, beginning with `#Product:`, is a comment. All lines beginning with `#` are human-readable comment lines; there may be any number of these in your license.

Example 3: Transportable license (unserved)

```
FEATURE MYFEATURE1 agileesofd 2022.0910 permanent uncoun ted \
  VENDOR_STRING=005056905d85 HOSTID=005056905d85 \
  vendor_info="DESCRIPTION=MyProduct, Transportable, \
  permanent license (MYFEATURE1" \
  ISSUER=LICENSEID=3351797,KSM=TEST,PRODUCTID=myprod\
  ISSUED=11-sep-19 \
  NOTICE=ORDER=I1001393228,PRODUCT=KALF101-1TP,TRANSPORTABLE=Y \
  START=11-sep-19 TS_OK SIGN="0057 567C D705 773A C454 C188 BC60 \
  0984 D19D 2614 9803 062B 1A59 EE08 5696 4642 4492 786E 533C \
  8E3C 3BF5"
```

The presence of `TRANSPORTABLE=Y` indicates that this license can be transported (rehosted via a customer-driven process).

Example 4: USB portable license (unserved, expiring)

```
FEATURE MYFEATURE1 agileesofd 2022.0911 25-sep-2022 uncoun ted \
  VENDOR_STRING=10-0bebf1c2 HOSTID=FLEXID=10-0bebf1c2 \
  vendor_info="DESCRIPTION=KAL Unit Test, USB portable, 36 \
  months license (KALFEATURE1)" \
  ISSUER=LICENSEID=3352211,KSM=TEST,PRODUCTID=myprod\
  ISSUED=12-sep-19 NOTICE=ORDER=I1001393362,PRODUCT=KALF101-1UY \
  START=12-sep-19 TS_OK SIGN="0386 5188 0054 DE5C 14F2 CAE6 5598 \
  831D C367 98A9 9A00 1732 70EB 2194 1357 5685 C821 71E1 8CD5 \
  F812 F053"
```

A USB portable license is tied to a USB key (dongle) rather than to a computer. The host ID `FLEXID=10-0b3bf1c2` identifies the USB key to which this license is tied. You can use this license on any computer by installing the license file on that computer and plugging the corresponding USB key in to that computer.

This license expires on `25-sep-2022`.

```
SERVER this_host 005056905d85 27009
VENDOR agileesofd
USE_SERVER
#Product: MyProduct Expires: permanent
INCREMENT MYFEATURE1 agileesofd 2022.0910 permanent 1 \
  VENDOR_STRING=005056905d85 vendor_info="DESCRIPTION=MyProduct, floating,
permanent license (MYFEATURE1 coun" \
  ISSUER=LICENSEID=3351792,KSM=TEST,PRODUCTID=myprod\
  ISSUED=11-sep-19 BORROW=8760 \
  NOTICE=ORDER=I1001393228,PRODUCT=KALF101-1NP START=11-sep-19 \
  TS_OK SIGN="00C8 730F 83C7 2282 01C5 174C FE59 12C2 5792 D75B \
  2D01 57BE 728E C1C9 8027 167E EEED E28D 7904 846D C64F
```

As shown above, the `INCREMENT` line with no `HOSTID` indicates that this is a floating license. It is tied to the license server whose host ID is `005056905d85`, and uses port `27009`, as indicated in the `SERVER` line. The `BORROW` keyword indicates that this license can be borrowed (taken offline to be used for a limited time). In this case, the license can be borrowed for up to 8760 hours (365 days).

Example 6: Floating license (not borrowable)

```
SERVER this_host 005056905d85 27009
VENDOR agileesofd
USE_SERVER
#Product: MyProduct Expires: permanent
INCREMENT MYFEATURE1 agileesofd 2022.0910 permanent 5 \
  VENDOR_STRING=005056905d85 vendor_info="DESCRIPTION=MyProduct, floating,
permanent license (KALFEATURE1 coun" \
  ISSUER=LICENSEID=3351766,KSM=TEST,PRODUCTID=myprod\
  ISSUED=11-sep-19 NOTICE=ORDER=I1001393225,PRODUCT=KALP105-1NP \
  START=11-sep-19 TS_OK SIGN="036F 1108 7E1F 1E07 A72B 780E 5B9A \
5658 3C50 B14E 5302 E249 78B6 DE9A 3C89 C44D D12D 2B3B B460 \
1E2F B009"
```

The floating license shown above does not have the `BORROW` keyword, indicating that it cannot be borrowed.

Example 7: Trial license

```
FEATURE MYFEATURE1 agileesofd 2022.0910 22-may-2020 uncounted \
  VENDOR_STRING=005056905d85 HOSTID=005056905d85 \
  vendor_info="DESCRIPTION=MyProduct, 30 day trial \
license (MYFEATURE1)" \
  ISSUER=LICENSEID=3351796,KSM=TEST,PRODUCTID=kalttest \
  ISSUED=21-apr-2020 NOTICE=ORDER=I1001393228,PRODUCT=KALF101-1FY \
  START=21-apr-2020 TS_OK SIGN="036F 4CED AAC2 B63A A275 D539 E905 \
BF2E F508 35CC 9402 82CA 9C6D ADCB BE72 6207 497F 1B50 B69D \
0313 1C56"
```

This is a trial license. Typically, you can use a Keysight trial license for 30 days after you receive it. It is implemented simply as a node-locked expiring license; in this case, the expiration date is `22-may-2020`.

Setting Up Licenses

This section describes how to set up Keysight Licensing, including licenses tied to an instrument or computer (via host ID), to a USB dongle (USB key), or to a PXI modular instrument, as well as floating licenses (tied to a networked license server). These setup instructions apply to both permanent and time-limited (including trial) licenses. No matter what kind of licenses you have, you'll first need to obtain your license file(s) and install the appropriate tools. Specific tools and additional setup steps vary depending on what Keysight product(s) you're licensing and on the type of licenses you'll be using: See [What License Management Tool Should I Use?](#)

Setting up licenses manually

In certain cases, you may not be able to install or manage your licenses with a Keysight licensing tool; see [What License Management Tool Should I Use?](#) to determine if this applies to you. If that is the case, you'll use FlexNet tools and some manual steps. The manual setup processes are described in [Appendix: Manual License Setup](#).

What License Management Tool Should I Use?

Refer to your Keysight product documentation to determine which of the following license management applications are appropriate for your product(s). In many cases, the appropriate license management application is included in the installation of your Keysight product, or is preinstalled on your Keysight instrument.

You can also use the Flexera license management tools for many licensing tasks. These tools and the FlexNet Publisher License Administration Guide, which describes their use, are included in the [Keysight License Server download](#).

License Management Tool Comparison

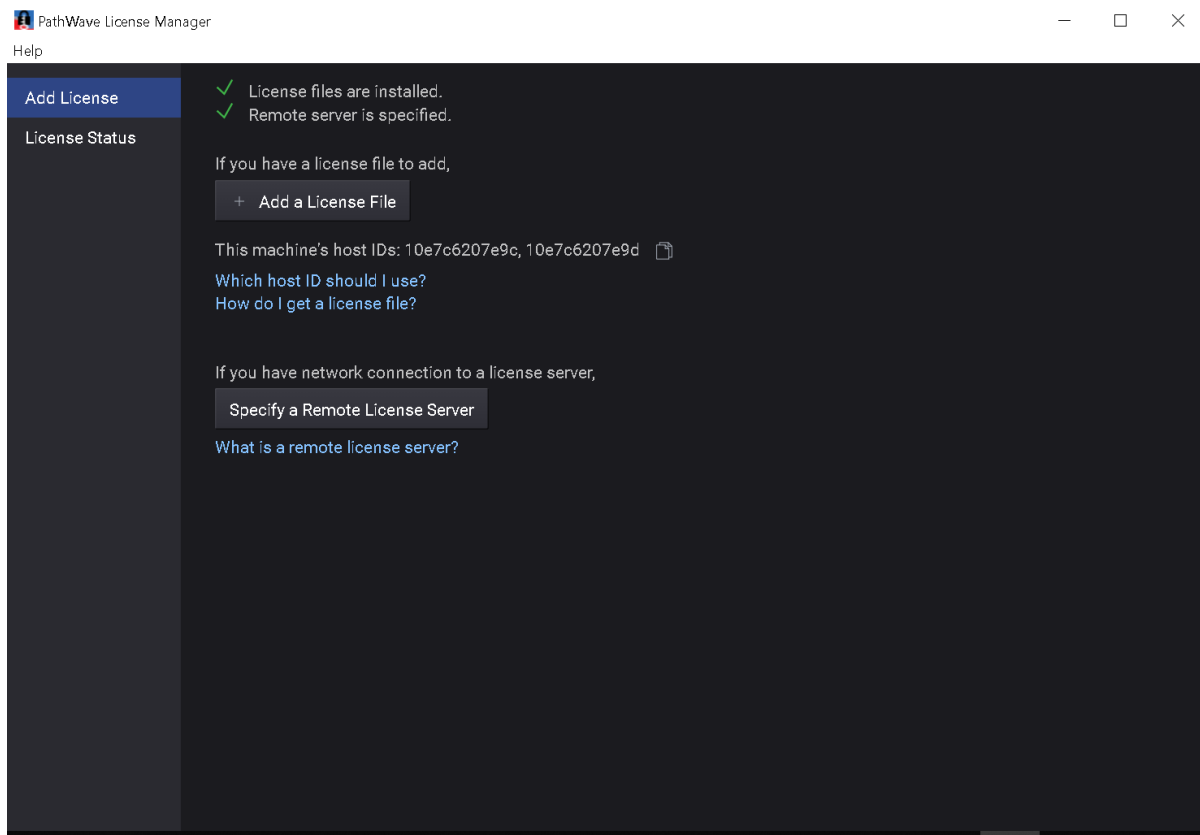
The vendor Name is found on the FEATURE or INCREMENT line of each license. Keysight licenses may have either *agileesofd* or *agilent* as the vendor Name, depending on the licensed product and when the license was issued.

NOTE Different tools can see and act on different licenses, depending on the vendor Name and other particulars of the license. Again, refer to your Keysight product documentation to ensure you are using the best tool to manage your licenses.

	Node-locked licenses	Transportable licenses	USB portable licenses	Floating licenses
Keysight PathWave License Manager	Install, view	View (<i>agileesofd</i> and <i>agilent</i>) Install, transport (<i>agileesofd</i> only)	Install, view	Install, view, borrow
Keysight PathWave Desktop Edition	Install, view	View (<i>agileesofd</i> and <i>agilent</i>) Install, transport (<i>agileesofd</i> only)	Install, view	Install, view, borrow
Keysight License Manager 6	counted node-locked only: install, view, delete	Not supported	Install, view, delete	Install, view, delete, borrow, configure license server
Keysight License Manager 5	Install, view, delete	Install, view, delete, transport	not supported	not supported
Keysight Floating License Manager for EEs of EDA Products	Install, view, delete	Not supported	Install, view, delete	Install, view, delete, configure license server

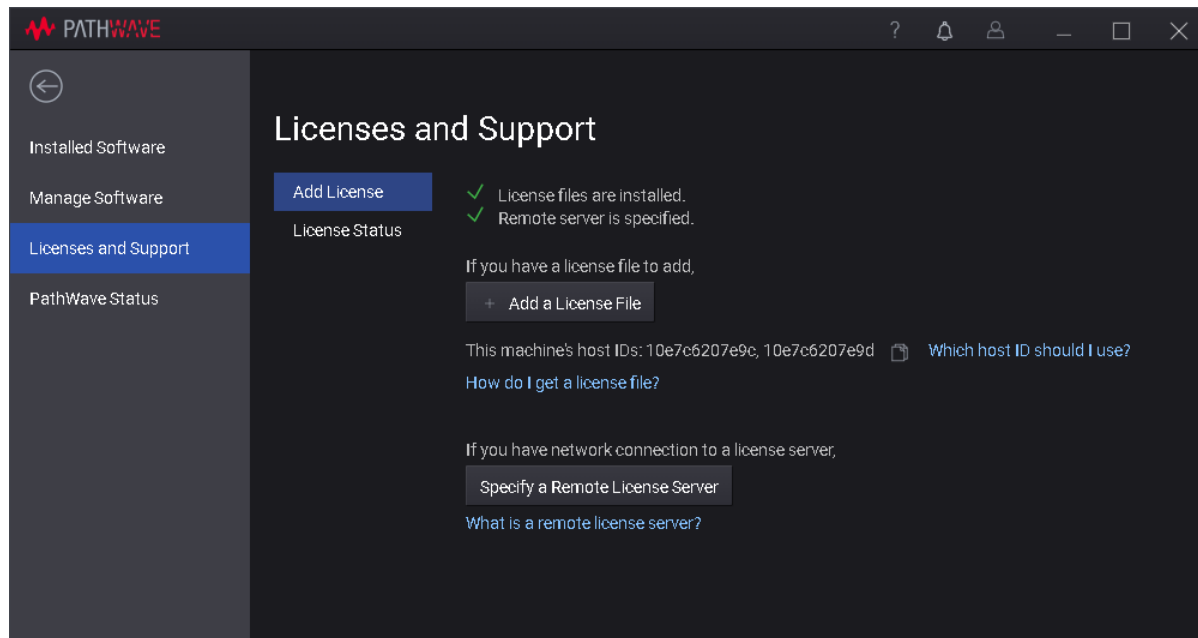
Keysight PathWave License Manager

Setting Up Licenses



PathWave License Manager is a new license management tool that can install, view, and manage many of the latest Keysight product licenses. This tool will be installed with your licensed Keysight software if it is appropriate for managing your licenses. PathWave License Manager utilizes the *agileesofd* and *agilent* vendor daemons. It is installed with your Keysight software product, if needed.

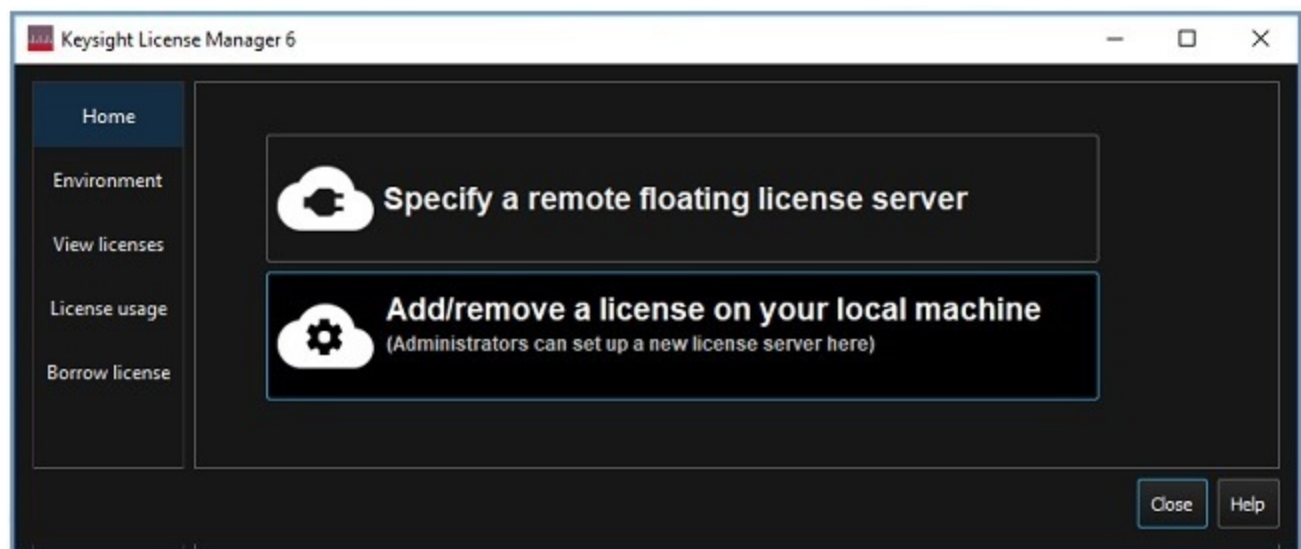
Keysight PathWave Desktop Edition



PathWave Desktop Edition is a new software platform that includes a Licenses and Support View, which is equivalent and similar in appearance to the PathWave License Manager tool (above).

PathWave Desktop Edition utilizes the *agileesofd* and *agilent* vendor daemons. It is installed with your Keysight software product, if needed.

Keysight License Manager 6



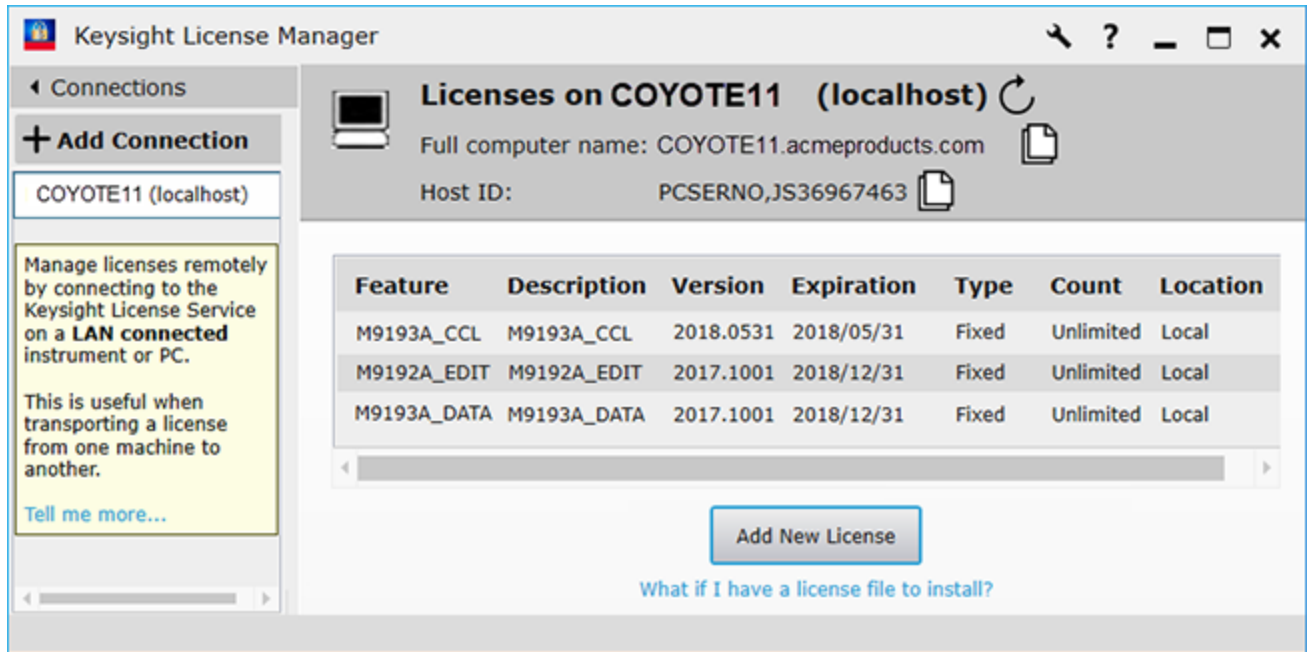
This license management application allows you to manage floating and USB portable licenses for a variety of software products and instruments.

You can also use the Keysight License Manager 6 to configure remote license servers for sharing licenses across a network, or to configure a local license server (used with

certain types of node-locked licenses) on the computer or instrument where your Keysight software is installed.

Keysight License Manager 6 utilizes the *agileesofd* vendor daemon. You can download Keysight License Manager 6 at <https://www.keysight.com/find/KLM6>.

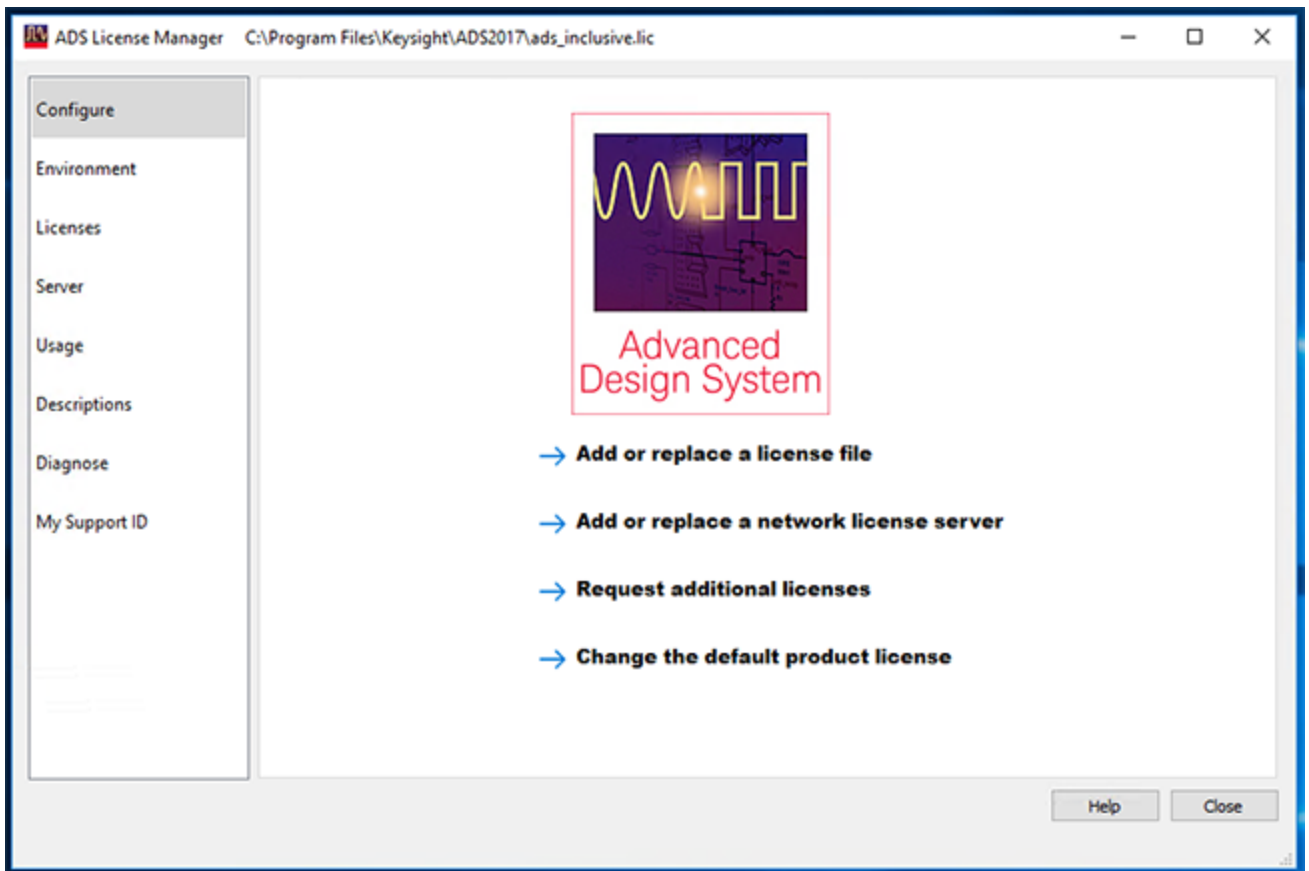
Keysight License Manager 5



This license management application allows you to manage node-locked and transportable licenses for a variety of software products and instruments.

Keysight License Manager 5 utilizes the *agilent* vendor daemon. You can download Keysight License Manager 5 at <https://www.keysight.com/find/KLM5>.

Keysight Floating License Manager for EEs of EDA Products



This license management application allows you to manage many types of licenses specifically for EEsof EDA products.

You can also use the Keysight Floating License Manager for EDA to configure remote license servers for sharing licenses across a network, or to configure a local license server (used with EEsof EDA node-locked licenses) on the computer or instrument where your Keysight software is installed.

The Keysight Floating License Manager for EDA utilizes the *agileesofd* vendor daemon. You can download Keysight Floating License Manager for EDA at <https://www.keysight.com/find/eesof-flexnet-downloads>.

Related Links

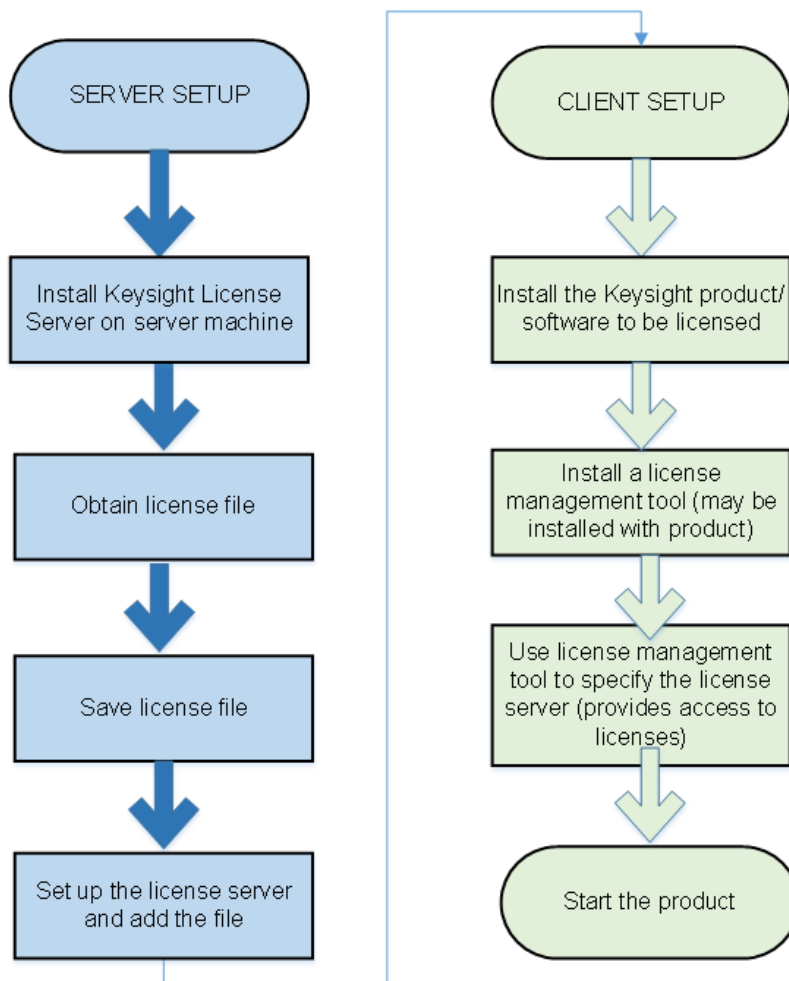
- [Keysight Licensing Overview](#)
- [Keysight Software Manager Overview](#)
- [Keysight License Manager 5 Download](#)
- [Keysight License Manager 6 Download](#)
- [Keysight EDA Knowledge Center](#)

Setting Up Floating Licenses

This section describes the high-level setup process for floating licenses (tied to a networked license server). The details depend on your license management tool; see [What License Management Tool Should I Use?](#) These setup instructions apply to both permanent and time-limited licenses. If you have already set up your license server, and just need to add a new license, go to [Add a Floating License](#)

Floating License Setup: First Time

To set up floating licensing, you'll need to configure the license server and the client (the instrument or computer running the licensed Keysight product). The first time you configure a particular license server machine, you'll need to install server software and configure the license server process on the server machine.



You'll first need to choose a license server machine, install the Keysight License Server software on that machine, install at least one license, and start the server process. For details of initial license server setup, see:

- [Windows License Server Setup](#)
- [Linux License Server Setup](#)

Then, you'll need to go to the client machine (the machine where the licensed Keysight software will be used), install the licensed software and license management tool, and configure it to get its licenses from the license server machine you just set up. For details of client setup, see the Help for [your license management tool](#).

To add a floating license to your license server:

Step 1: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine the license server's host ID or the USB dongle ID in one of these ways:
 - On the server machine, execute `lmutil lmhostid` to get the FlexNet host ID directly.
 - On the server machine, execute `getmac /v /fo list`. Your host ID is listed as the Physical Address of the Network Adapter.
 - If you want the license tied to a dongle, read the dongle ID directly from the key or, with the dongle connected to your computer, execute `lmutil lmhostid -flexid`.
- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.
- d. Follow additional instructions to request a license file, which will be emailed to you.

Step 2: Save the license file on the license server machine

- a. Ensure that your intended usage conforms to your purchased license types. Your floating licenses may be single site, single region, or worldwide licenses; you can find this information in the license files.
- b. Make a copy of the license file on your hard disk, either:
 - in the license file directory from Step 1 above, or
 - if you do not have an existing location, in `C:\ProgramData\Keysight\Licensing\Licenses\Server` (Windows) or `/opt/keysight/licensing/agileesofd` (Linux).
- c. Open or view the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their SERVER statements. If not, edit them to have the same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.

Step 3: Restart the license service

- Windows: In the Windows Services app, **Restart** the license server service (such as **EEsof EDA License Server**).
- Linux:
 - Stop *lmgrd* and *agileesofd*:

```
lmutil lmdown -c  
"/var/opt/keysight/licensing/licenses/server"
```
 - Restart *lmgrd* and *agileesofd*:

```
lmgrd.exe -c /var/opt/keysight/licensing/licenses/server-  
l <license log file path>
```

Windows License Server Setup

If your license management tool supports license server setup, you can choose to follow the prompts in your tool or consult the Help in the tool for detailed instructions. Keysight License Manager 6 supports license server setup. See [What License Management Tool Should I Use?](#) for information on other tools.

The following steps describe license server setup using Flex tools and manual steps. You can use this process in any case, regardless of which tools you are using on the client machines.

Ensure that your chosen license server conforms to your purchased license types. Your floating licenses may be single site, single region, or worldwide licenses; you can find this information in the license files. For additional help on choosing a license server, see the FlexNet Publisher License Administration Guide, included in the [Keysight License Server download](#).

Determine your executable and license locations and stop any existing server process
Step 1:

- a. Check whether there is already an *agileesofd* process running on your license server.
 - Windows: Run Task Manager. The process may be listed as **VendorDaemon agileesofd**.
- b. If you find such a process, determine the path to its executable:
 - i. Right-click the process in Task Manager.
 - ii. Select **Properties**.
 - iii. Make note of the full path, shown in the **Location** field.
- c. Open a command prompt, go to the executable path, and run *lmtools.exe*.
- d. In the LMTOOLS window, go to the Config Services tab and take note of the **Path to the license file**. This is where you'll put your new licenses.
- e. Close LMTOOLS.
- f. Right-click the *agileesofd* process in Task Manager and select **End task**.

Step 2: Install Keysight License Server on the license server machine

NOTE PathWave licensing requires version **2019.05.17** or later of the Keysight License Server.

- a. On your license server machine, open your web browser and navigate to <http://www.keysight.com/find/licenseserver>.
- b. Download the *agileesofd-
<version>-<platform>.zip* archive.
- c. Extract the files, either:
 - to the executable location from Step 1 above, or
 - if you do not have an existing location, to *C:\Program Files\Common Files\Keysight\Licensing\Agileesofd*.

Step 3: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.

- b. Determine the license server's host ID or the dongle ID in one of these ways:
 - On the server machine, execute `lmutil lmhostid` to get the FlexNet host ID directly.
 - On the server machine, execute `getmac /v /fo list`. Your host ID is listed as the Physical Address of the Network Adapter.
 - If you want the license tied to a dongle, read the dongle ID directly from the key or, with the dongle connected to your computer, execute `lmutil lmhostid -flexid`.
- a. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID.
 - NOTE** If you haven't done this before, you may need to create an account and add the Software Manager capability.
- b. Follow additional instructions to request a license file, which will be emailed to you.

Step 4: Save the license file on the license server machine

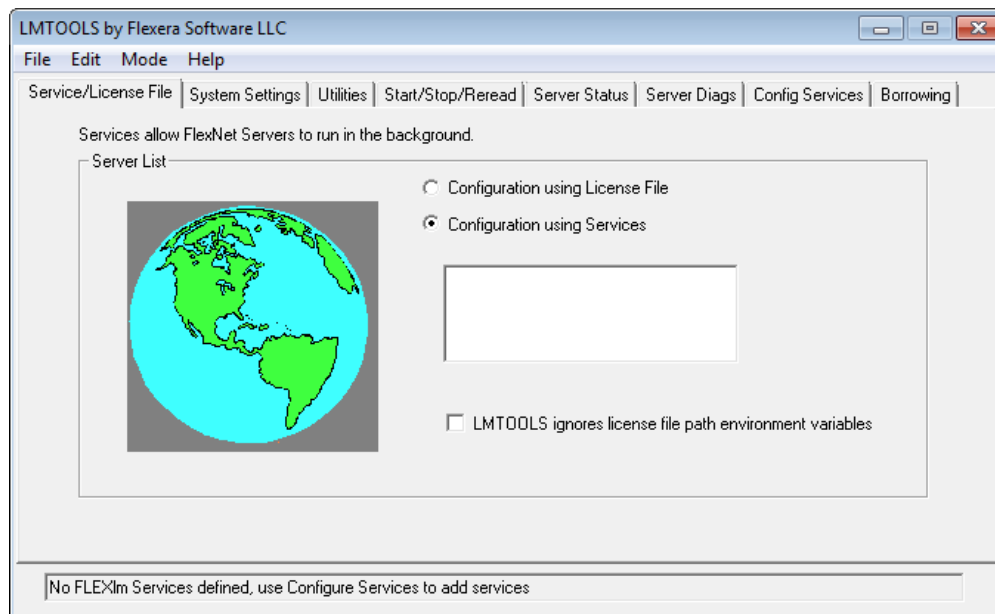
- a. Make a copy of the license file on your hard disk, either:
 - in the license file directory from Step 1 above, or
 - if you do not have an existing location, in `C:\ProgramData\Keysight\Licensing\Licenses\Server`.
- b. Open or view the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their SERVER statements. If not, edit them to have the same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.
- c. If you want the license to be served from multiple servers, put a copy of the license file on each server machine.

NOTE You must install a license (Step 3 above) before you can start the license server manager and the vendor daemon.

To start the FlexNet license server manager (*lmgrd*) and vendor daemon (*agileesofd*) and automate their restart upon PC reboot, configure a Windows service as follows:

NOTE You must have administrator privileges to configure a Windows service. The service will run under the local system account as the special *Local Server* user, which does not have special system privileges. This means you should consider the following:

- The log file must be in a location that is writable by all users. If you specify a log file location that is not writable, the service will immediately exit, and will not indicate any errors (it returns an exit code of 0 even though it encountered an error). Since the log file was not writable, you will have no error message anywhere to indicate what went wrong, or even that there was a problem.
 - The license files must be in a location that is readable by all users. If you specify a location that isn't readable, the log file will contain an error indicating that the license file couldn't be found.
 - Keysight recommends you put the log file and license files somewhere under *C:\ProgramData\Keysight*, which will allow them to inherit the appropriate permissions.
- a. Run *lmtools.exe* from *C:\Program Files\Common Files\Keysight\Licensing\Agileesofd*. The **LMTOOLS** window is displayed.
 - b. In the **Service/License File** tab, select the **Configuration using Services** option.

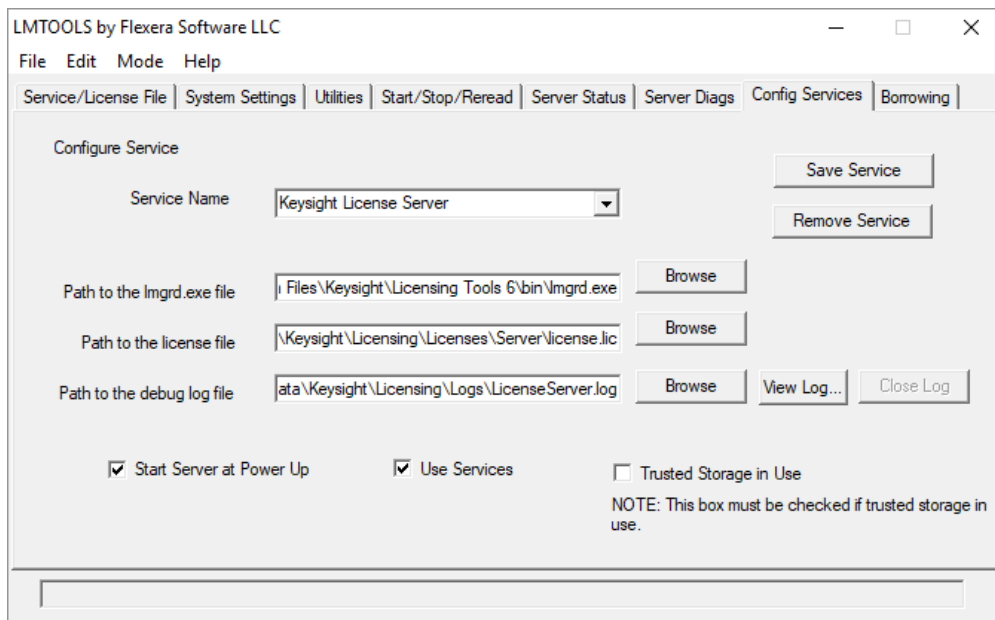


- c. Click the **Config Services** tab and enter the following details. See the NOTE above for additional information about paths.
 - i. **Service Name:** For compatibility with Keysight EDA products, use the Name **EEsof EDA License Server**.
 - ii. **Path to the Imgrd.exe file:** Click **Browse** and specify the path to the *Imgrd.exe* file on the license server (for example, *C:\Program Files\Common Files\Keysight\Licensing\Agileesofd\Imgrd.exe*).

- iii. **Path to the license file:** Click **Browse** and specify the path to the license file on the license server (for example, *C:\ProgramData\Keysight\Licensing\Licenses\Server\license.lic*). If you have multiple license files for multiple Keysight products, include them all.

Path to the debug log file: Click **Browse** and specify the path to the debug log file on the license server (for example, *C:\ProgramData\Keysight\Licensing\Log\LicenseServer.log*).

- d. Select the **Use Services** option.
- e. Select the **Start Server at Power Up** option.
- f. Click **Save Service**. The following figure shows the configured services in the **LMTOOLS** window.



- g. Click the **Start/Stop/Reread** tab and observe that your service shows up in the **FlexNet license services installed on this computer** list.
- h. To start the service, on the **Start/Stop/Reread** tab, select your service and click **Start Server**.

NOTE To verify that the license server manager and the vendor daemon are running, click the **Config Services** tab again and click **View Log**. A log window appears that indicates whether *lmgrd* and *agileesofd* are up and running.

If you need to stop the license server, execute the following (substituting your license location if it is different):

```
lmutil lmdown -c C:\ProgramData\Keysight\Licensing\Licenses
```

Linux License Server Setup

If your license management tool supports license server setup, you can choose to follow the prompts in your tool or consult the Help in the tool for detailed instructions. See [What license management tool should I use?](#) for more information.

The following steps describe license server setup using Flex tools and manual steps. You can use this process in any case, regardless of which tools you are using on the client machines.

Ensure that your chosen license server conforms to your purchased license types. Your floating licenses may be single site, single region, or worldwide licenses; you can find this information in the license files. For additional help on choosing a license server, see the FlexNet Publisher License Administration Guide, included in the [Keysight License Server download](#).

License server setup...

Repeat the following steps on each license server. (For help on choosing a license server, see the *FlexNet Publisher's License Administration Guide*, installed with Keysight License Server 6.)

Step 1: Determine your executable location and stop any existing server process

- a. First, run `ps -ef | grep agileesofd` to see whether there is already an *agileesofd* process running on your license server.
- b. If you find such a process, determine the path to its executable by executing `readlink -f /proc/<pid>/exe`. Make note of this path.
- c. Kill the *agileesofd* process.

Step 2: Install Keysight License Server on the license server machine

NOTE PathWave licensing requires version **2019.05.17** or later of the Keysight License Server.

- a. On your license server machine, open your web browser and navigate to <http://www.keysight.com/find/licenseserver>.
- b. Download the *agileesofd-<version>-<platform>.tar.gz* archive.
- c. Untar the files, either:
 - to the executable location from Step 1 above, or
 - if you do not have an existing location, to `/opt/keysight/licensing/agileesofd`.

Step 3: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine the license server's host ID in one of these ways:
 - On the server machine, execute `lmutil lmhostid` to get the FlexNet host ID directly.

NOTE If you see a No such file or directory error when you try to run `lmutil`, then you need to install the [Linux Standard Base library](#). Use `yum` to install `redhat-1sb`.

- On the server machine, execute `/sbin/ifconfig -a`
Examine the `ifconfig` results to find your Ethernet interface (often called `eth0`) and use its hardware address (`HWaddr`). For example, in the `ifconfig` output shown below, the host ID is `00:0c:29:c0:06:65`.

```
eth0 Link encap:Ethernet HWaddr 00:0c:29:c0:06:65
      inet addr:156.140.113.178 Bcast:156.140.113.255
Mask:255.255.254.0
      inet6 addr: fe80::20c:29ff:fec0:665/64 Scope:Link
      UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
      RX packets:36522 errors:0 dropped:0 overruns:0 frame:0
      TX packets:10160 errors:0 dropped:0 overruns:0
carrier:0
      collisions:0 txqueuelen:1000
      RX bytes:38094114 (38.0 MB)
      TX bytes:695114 (695.1 KB)
```

- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.

- d. Follow additional instructions to request a license file, which will be emailed to you.

Step 4: Save the license file

To save the license file for use by Keysight licensing:

- a. Make a copy of the license file on your hard disk, either:
 - to the location where you have installed past license files, or
 - if you do not have an existing location, in `/var/opt/keysight/licensing/licenses/server`.
- b. Open or cat the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their `SERVER` statements. If not, edit them to have the same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.
- c. Set the file permissions so that it can be read by `lmgrd`. For example:


```
chmod a+r <fileName.lic>
```

 This example gives all users read access to the license.

Step 5: Start the license server manager

NOTE You must install a license (Step 3 above) before you can start the license server.

Start the license server manager (`lmgrd`) and vendor daemon (`agileesofd`) on the machine to which the license is tied as follows:

- a. Change directory to the location of your server files (for example, `/opt/keysight/licensing/agileesofd`).

- b. Run the following command to start *lmgrd*:

```
./lmgrd -c <license file path> -l <license log file path>
```

where:

<license file path> specifies one or more full path Names to license file(s) and/or folder(s) containing license files.

<license log file path> is the full path Name to the debug log file.

To automate the license server manager's startup upon system reboot, add something similar to the following sample script in the system boot services directory or in */etc/rc.d/init.d*.

```
#!/bin/sh
#
# Sample FlexNet startup script for restarting Keysight License Server
#
### BEGIN INIT INFO
# Provides: license server
# Required-Start: $network
# Required-Stop:
# Default-Start: 3 4 5
# Default-Stop:
# Description: Start License Server
### END INIT INFO
sudo /opt/keysight/licensing/agileesofd/lmgrd -c
/var/opt/keysight/licensing/licenses -l
/var/log/keysight/licensing/log/license-server.log
echo "Starting Keysight FlexNet license daemon....."
sleep 5
```

Once you implement your version of the FlexNet startup script using the above sample, follow the steps below to complete the automation:

1. Change to the system boot services directory */etc/rc.d/init.d*.
2. Create a startup script (for example, *keysight_lmgrd_restart*) in the system boot services directory.
3. Insert your FlexNet startup script (above) into the startup script.
4. Set the permissions for this script as follows:

```
chmod 755 keysight_lmgrd_restart
chown root keysight_lmgrd_restart
chgrp sys keysight_lmgrd_restart
```

5. If this machine is your license server, run this command:

```
/sbin/chkconfig --add keysight_lmgrd_restart
```
6. Create a system service file (*keysight_lmgrd.service*), with the contents shown below, in the system boot services directory */etc/systemd/system*.

```
[Unit]
Description=Keysight License Service
After= multi-user.target
[Service]
Type=simple
ExecStart= /etc/rc.d/init.d/keysight_lmgrd_restart.sh
TimeoutStartSec=0
[Install]
WantedBy= default .target
```

7. From the terminal, execute the command:
`systemctl enable keysight_lmgrd.service`

The license server will be automatically started as soon as the system is restarted.

NOTE If you see one of these errors when you start *lmgrd*:

```
lmgrd: /lib64/ld-1sb-x86-64.so.3: bad ELF interpreter: No
such file or directory
```

```
lmgrd: No such file or directory
```

then you need to install the **Linux Standard Base library** . Use `yum` to install `redhat-1sb` .

If you need to stop the license server manually, execute the following (substituting your license location if it is different):

```
lmutil lmdown -c /var/opt/keysight/licensing/licenses
```

Setting Up Node-Locked and Transportable Licenses

This section provides a high-level description of how to set up node-locked licenses (tied to a specific computer or instrument). For specific setup information, see the help for your license management tool.

In certain cases, you may not be able to install or manage your licenses with a Keysight licensing tool; see [What License Management Tool Should I Use?](#) to determine if this applies to you. If that is the case, you'll use FlexNet tools and some manual steps. The manual setup processes are described in [Appendix: Manual License Setup](#).

To set up node-locked or transportable licenses, perform all the following steps on your local machine (the instrument or computer on which you'll run the licensed Keysight product).

Prerequisite task for counted licenses only: Install Keysight License Server and set up a server process

Counted node-locked and transportable licenses require a license server process to be running on the same machine where you will use the licenses. The license server process "serves" the licenses and keeps track of the counts in use. Follow the instructions for license server setup, but do this on the same machine where you will use the licensed software:

- [Windows License Server Setup](#)
- [Linux License Server Setup](#)

Step 1: Install the licensed Keysight software and the licensing software

Your Keysight product may install the necessary licensing tool(s). If not, see <http://www.keysight.com/find/licensingtools> for free, downloadable licensing tools.

Step 2: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine your local machine's host ID in one of these ways:
- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.

- d. Follow additional instructions to request a license file, which will be emailed to you.

Step 3: Save the license file

Make a copy of the license file on your local machine, and note the location.

Step 4: Add your license(s)

See the Help for [your license management tool](#).

Step 5: For counted licenses only: Start the license server manager

If all your licenses are unserved, uncounted licenses (do not contain a `SERVER` line), you do not need to start the license server manager, and you have now finished your setup.

Counted node-locked and transportable licenses require the license server manager to run on the local machine.

- Windows: In the Windows Services app, **Restart** the license server service (such as **EEsof EDA License Server**).
- Linux:
 - Stop *lmgrd* and *agileesofd*:

```
lmutil lmdown -c  
"/var/opt/keysight/licensing/licenses/server"
```
 - Restart *lmgrd* and *agileesofd*:

```
lmgrd.exe -c /var/opt/keysight/licensing/licenses/server-  
l <license log file path>
```

Setting Up USB Portable Licenses

In certain cases, you may not be able to install or manage your licenses with a Keysight licensing tool; see [What License Management Tool Should I Use?](#) to determine if this applies to you. If that is the case, you'll use FlexNet tools and some manual steps. The manual setup processes are described in [Appendix: Manual License Setup](#).

The manual setup processes are described in [Appendix: Manual License Setup](#).

To set up USB portable licenses, perform the following steps:

Prerequisite task for counted licenses only: Install Keysight License Server and set up a server process

Counted USB portable licenses require a license server process to be running on the same machine where you will use the licenses. The license server process "serves" the licenses and keeps track of the counts in use. Follow the instructions for license server setup, but do this on the same machine where you will use the licensed software:

- [Windows License Server Setup](#)
- [Linux License Server Setup](#)

Step 1: Install the licensed Keysight software and the licensing software

Your Keysight product may install the necessary licensing tool(s). If not, see <http://www.keysight.com/find/licensingtools> for free, downloadable licensing tools.

Install the software on each machine on which you plan to use the Keysight product and the USB portable license:

Step 2: Install dongle drivers

Repeat these steps on each machine on which you plan to use the USB portable license:

- a. If installing the driver onto a Keysight instrument, make sure you are logged in as Administrator.
- b. Download the FLEXID10 USB Dongle Driver package for your platform from <http://www.keysight.com/find/LicensingUsbDriver>.
- c. The driver files are provided in .zip format. Extract the files to a convenient location on the machine.
- d. Execute *Setup64.exe* (on 64-bit Windows) or *Setup32.exe* (on 32-bit Windows).
- e. Follow the installer prompts, accepting the default values.

For more information and detailed instructions, see the *FlexNet Publisher Driver Installation Guide for FlexNet ID Dongles*, available from <https://flexeracommunity.force.com/customer/CCDocumentation> (login required).

Step 3: Obtain a license file

Do this on any machine with an internet connection:

- a. If you have ordered a licensed Keysight product with a USB portable license, you'll receive a license certificate (paper or email) and you will have the option of ordering a USB hardware key (dongle). If you don't order a new dongle, you will use one you already have to perform the following steps. Note the order number and certificate number from the paper or emailed certificate.
- b. To determine your dongle ID, either read the dongle ID directly from the key or, with the dongle connected to your computer, execute `lmutil lmhostid -flexid`.
- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.

- d. Follow additional instructions to request a license file, which will be emailed to you.

Step 5: Save the license file

Make a copy of the license file on each machine on which you plan to use the USB portable license, and note the location of the copy.

Step 6: Add your license(s)

Perform the following steps on each machine on which you plan to use the USB portable license:

- a. Connect the dongle to a USB port.
- b. See the Help for [your license management tool](#) for instructions to add/install the license file.
- c. You will not be able to add a license if it specifies a different port number from Keysight licenses already installed on this machine. You will need to edit your license file(s) to specify the same port number. See [Port Number Conflicts](#) for details.

Step 7: For counted licenses only: Start the license server manager

If all your licenses are unserved, uncounted licenses (do not contain a `SERVER` line), you do not need to start the license server manager, and you have now finished your setup.

Counted USB portable licenses require the license server manager to run on the local machine. Do this for each machine where you will use the counted USB portable licenses.

- Windows: In the Windows Services app, **Restart** the license server service (such as **EEsof EDA License Server**).
- Linux:
 - Stop `lmgrd` and `agileesofd`:

```
lmutil lmdown -c  
"/var/opt/keysight/licensing/licenses/server"
```

- Restart *lmgrd* and *agileesofd*:

```
lmgrd.exe -c /var/opt/keysight/licensing/licenses/server-  
l <license log file path>
```

Setting Up Module Licenses

This section provides a high-level description of how to set up node-locked licenses (tied to a specific computer or instrument). For specific setup information, see the help for your license management tool.

In certain cases, you may not be able to install or manage your licenses with a Keysight licensing tool; see [What License Management Tool Should I Use?](#) to determine if this applies to you. If that is the case, you'll use FlexNet tools and some manual steps. The manual setup processes are described in [Appendix: Manual License Setup](#).

To set up node-locked or transportable licenses, perform all the following steps on your local machine (the instrument or computer on which you'll run the licensed Keysight product).

Step 1: Install the licensed Keysight module and the licensing software

Your Keysight product may install the necessary licensing tool(s). If not, see <http://www.keysight.com/find/licensingtools> for free, downloadable licensing tools.

Step 2: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Your module identifier is the module serial number, an alphanumeric string of 10 characters (e.g. AB10002345).
- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.

- d. Follow additional instructions to request a license file, which will be emailed to you.

Step 3: Save the license file

Make a copy of the license file on your local machine, and note the location.

Step 4: Add your license(s)

See the Help for [your license management tool](#).

Advanced Licensing Configuration Options

This section provides information on various advanced licensing configuration options:

[Accessing Floating Licenses through a Firewall](#)

[Creating an Options File](#)

[Licensing Environment](#)

[Multiple Server Configurations](#)

[Setting Up Three-Server Redundancy](#)

Accessing Floating Licenses through a Firewall

You can access (check out) Keysight licenses through a firewall (or router) as per your license agreement. To enable license checkout, configure your firewall to allow TCP/IP communication through the TCP ports used by *lmgrd* and *agileesofd*.

Step 1. Specify TCP port numbers

On the license server machine, specify a TCP port number for *lmgrd* on the **SERVER** line of your license file, and for *agileesofd* on the **VENDOR** lines. Stop and restart the license servers after you modify the port numbers.

NOTE The port numbers must be the same for all licenses on one server. *lmgrd* will fail if license files have conflicting port numbers.

If no port is specified on the **SERVER** line, one of the default ports in the range 27000 to 27009 is used. If no port is specified on the **VENDOR** line, a port is chosen by the operating system at runtime; this may not work if a firewall is in place and the port used is not opened in the firewall.

Example

```
SERVER myserver 00809AC7123F8 27009
VENDOR agileesofd "C:\Program Files\Common
Files\Keysight\Licensing\Agileesofd\agileesofd.exe" port=1705
```

Step 2. Configure the firewall

On both the license server and license client machines, configure your firewall (or router) to allow TCP communication through the TCP ports you specified in Step 1.

Step 3. Edit the licensing configuration to include the port number

On the client side, use your Keysight license management tool (such as PathWave License Manager) to modify the specified license server to include the port number: for example, `27009@myserver.myDomain`.

After you do this, clients outside of the firewall will be able to access licenses from your server.

NOTE Some clients may time out before they can connect to a license server through a firewall. The default timeout period is 3 seconds. If you need a longer timeout period, you can modify the environment Variable `FLEXLM_TIMEOUT` to a larger value. Refer to FlexNet documentation for details.

Creating an Options File

An *options file* allows administrators to control licensing parameters of FlexNet floating licensing:

- Restricts and/or reserves the use of features based on user, hostName, or display Name.
- Controls the level of information logged about license usage.
- Controls parameters of borrowing, including the "low water" level (number of licenses that cannot be borrowed), users to be included or excluded from borrowing, maximum borrow period

NOTE

- You can create an options file using any text editor.
- Ideally, you should keep this file in the same directory as your license files.

For details of how to create an options file and of the options that can be defined, refer to the FlexNet Publisher License Administration Guide, included in the [Keysight License Server download](#).

Licensing Environment

This table describes the environment used by Keysight licensing. In some cases, these may be Windows registry keys, rather than environment Variables.

Viewing the licensing environment

To see the values of all the listed environment Variables and registry keys, run Keysight License Manager 6 and select **Environment** from the menu on the left.

Working with environment Variables

When possible, use a **license management tool** to install your licenses. The tool will configure the licensing environment appropriately

However, if you have already set up licenses on your system manually – that is, using the FlexNet tools rather than a Keysight license management tool – you should continue to set up subsequent licenses manually, using the procedures in **Appendix: Manual License Setup**. This is because the manual process involves creating environment Variables for license search paths, but the tools typically (on Microsoft Windows) use registry entries for the same purpose. Environment Variables override registry entries; therefore, if you use a license management tool after using the manual process, your changes will not take effect.

Because some values may be stored in either environment Variables or registry keys, the best way to examine the values is to run Keysight License Manager 6 and select **Environment**.

Environment Variables and registry keys

Variable/Key Name	Description
KAL_LICENSE_MANAGER_BIN_PATH	This is where licensing tools are installed, including Keysight License Manager 6 and Flexera tools. <ul style="list-style-type: none"> Windows: <i>C:\Program Files\Common Files\Keysight\License Manager 6\bin</i>
<PRODUCT>_LICENSE_FILE	Specifies the list of license files/servers to search when a license is requested by a particular Keysight product. Each Keysight product has a dedicated Variable or registry entry to serve this purpose. Normally, these Variables are set by Keysight Licensing, using information provided by each product's installation.
AGILEESOFD_DEBUG_MODE	Turns on the debug mode in the <i>agileesofd</i> vendor daemon when this Variable is set to anything other than 0, no , or off . Since this Variable is only read at server startup, you need to stop and restart the license server to allow this setting to take effect.
AGILEESOFD_SERVER_LOGFILE	The log file used by <i>agileesofd</i> . This file records general information at all times, and debug information when <i>AGILEESOFD_DEBUG_MODE</i> is on.
AGILEESOFD_SERVER_CONFIG	The search path used by <i>lmgrd</i> and <i>agileesofd</i> to find licenses to serve.

Multiple Server Configurations

Keysight Licensing supports all the popular server configurations supported by FlexNet. This includes redundant servers as well as multiple servers. Refer to the FlexNet Publisher License Administration Guide (included in the [Keysight License Server download](#)) for details.

Specific instructions for triple-redundant servers are available in [Setting Up Three-Server Redundancy](#).

Setting Up Three-Server Redundancy

Configuring three-server redundancy (also called triple-redundant servers) allows your licensed products to continue to operate even if one of the three servers goes down. To configure three-server redundancy, you *must* have license files issued for the three redundant servers.

To configure three-server redundancy

1. Start by reviewing Chapter 14, "Ensuring License Availability", in the FlexNet Publisher License Administration Guide, installed with your Keysight licensing software at *C:\Program Files\Common Files\Keysight\License Manager 6* or *C:\Program Files\Common Files\Keysight\Licensing\Agileesofd* (on Windows) or */opt/keysight/licensing/agileesofd* (on Linux).
2. Follow the instructions in the section of Chapter 14, "Configuring License Servers for Three-Server Redundancy".

Tips for setting up servers

- The license files must have been issued for three redundant servers and must contain `SERVER` lines for each of the servers, as shown in the following example:

```
SERVER firstHost D0BF9C261574 27009 PRIMARY_IS_MASTER HEARTBEAT_INTERVAL=10
SERVER secondHost B88A6060903C 27009
SERVER thirdHost 000C29078EBE 27009
USE_SERVER
VENDOR agileesofd
INCREMENT myFeature agileesofd 2018.09 21-sep-2018 1 ...
```

- The license files installed on each of the three servers must be identical to each other.
- The host Name for each server (e.g. `firstHost` in above example) must be defined in `SERVER` lines. You can edit the host Names; you *cannot* edit the host IDs. If your license specifies `this_host` instead of specific host Names, edit it to include the specific host Names.
- The TCP/IP port value used by each server (e.g. 27009 in the above example) must be defined in the `SERVER` lines. You can edit the port values (again, you *cannot* edit the host IDs).
- The Keysight license management tools do not support configuration of three-server redundancy, so you must use Flexera tools – either *lmttools* or *lmadmin* – to perform the configuration.
- Start up the license servers in the same order that they are designated: primary, then secondary, then tertiary servers (that is, in the same order as they appear in the license files). This will ensure that your designated primary server takes the role of master.

- The license search path environment Variable (`<PRODUCT>_LICENSE_FILE`) on the client should include all three servers in the same order as specified in the license files. This ensures that checkout requests are satisfied efficiently in the minimum possible time.
- The delimiter between the three server values in the license search path environment Variable is a comma (for Windows) or a colon (for Linux), rather than the typical semicolon used between values for multiple single servers.

Windows example:

```
KAL_LICENSE_FILE=27009@firstHost,27009@secondHost,27009@thirdHost
```

Linux example:

```
KAL_LICENSE_FILE=27009@firstHost:27009@secondHost:27009@thirdHost
```

Three-server redundancy and borrowing

Three-server redundancy is not compatible with **license borrowing**, because the information that identifies the state of a borrowed license can persist only on the license server that provided the borrowed licenses, and cannot be transferred to another license server when a failure occurs.

Multiple vendor daemons

Be aware that the license server manager (*ladmin* or *lmgrd*), when configured for three-server redundancy, cannot start and manage multiple vendor daemons. If you need to use multiple vendor daemons on a three-server redundant system, you must run separate instances of the license server manager on that system to support each vendor daemon. Make sure you use a different port number for each instance.

NOTE Different Keysight products may use different vendor daemons, typically *agileesofd* and *agilent*.

Tips for troubleshooting

- When each of the redundant servers starts up, it will continually try to contact the other two servers. In the log files you'll see several "Connection attempt" and "Failed to connect" messages until the servers establish communication and a quorum (two out of three) is reached. Once a quorum is reached, the licenses being served will be shown as available in the primary server's log file.
- If you start and stop a server multiple times in quick succession while configuring the three redundant servers, it is possible that the TCP/IP port may not get released between a stop and the next start. This may result in the error "Fail to open the TCP port number in the license." You can check to see if port is still in use by running `netstat -n -b` at the command line (this requires your console to have administrator privileges). If the port is not released in a reasonable amount of time, you may need to restart the computer.
- If you experience *lmgrd* startup problems, check your license file to see if it specifies `this_host` instead of specific host Names. If so, edit it to include the specific host Names.

Keysight Licensing FAQs

The following table lists frequently asked questions about Keysight Licensing.

Question	Answer
What files and folders are used by Keysight Licensing?	See What Files and Paths are Used By Keysight Licensing?
How can I manually start the license server?	<p>Start the FlexNet license server manager and vendor daemon (<i>lmgrd</i> and <i>agileesofd</i>) as follows:</p> <ol style="list-style-type: none"> 1. Open a command prompt and go to the directory where your licensing tools are installed. 2. Specify the full path and location of the license file and the license log file, respectively, by typing the following command <pre>lmgrd.exe -c <license file path> -l <license log file path></pre> where: <ul style="list-style-type: none"> - <license file path> specifies one or more fully-qualified directory Names <i>or</i> full path Names of the license file(s) - <license log file path> is the full path Name to the debug log file <p>NOTE If there are spaces in your path Names, use double quotes around the path Names.</p>

Example

```
lmgrd.exe -c "
C:\ProgramData\Keysight\Licensing\Licenses\Server;
C:\ProgramData\Keysight\Licensing\Licenses\Other"
-l "C:\ProgramData\Keysight\Licensing\Log\PC1_server_
log.txt"
```

NOTE If you see one of these errors when you start *lmgrd* on Linux:

```
lmgrd: /lib64/ld-lsb-x86-64.so.3: bad ELF
interpreter: No such file or directory
lmgrd: No such file or directory
```

then you need to install the [Linux Standard Base library](#). Use `yum` to install `redhat-lsb`.

How can I stop the license server?	<p>To stop <i>lmgrd</i> and <i>agileesofd</i>, go to the directory where your licensing tools are installed, and execute:</p> <pre>lmutil lmdown -c " C:\ProgramData\Keysight\Licensing\Licenses\Server; C:\ProgramData\Keysight\Licensing\Licenses\Other"</pre> <p>or</p> <pre>lmutil lmdown -c "/var/opt/keysight/licensing/licenses/server; /var/opt/keysight/licensing/licenses/other"</pre>
------------------------------------	--

- Can I change the port number in my license file?** You will not normally need to modify the [SERVER](#) line of your local node-locked license file. Licenses provided by the Keysight Software Manager (KSM) will have a port number of 27009 on the [SERVER](#) line. If you do want to use a different port number, then you need to modify all of your license files for a given license server to have the same port number in order for the license sever to recognize them and start properly. If you need to access licenses through a firewall, you may need to modify the port number on the [VENDOR](#) line of your license file(s). Refer to [Accessing Floating Licenses through a Firewall](#).
- What are the default SERVER and VENDOR ports?** Licenses provided by the Keysight Software Manager (KSM) typically have a port number of 27009 on the [SERVER](#) line; if no port is specified on the [SERVER](#) line, one of the default ports in the range 27000 to 27009 is used. If no port is specified on the [VENDOR](#) line, a port is chosen by the operating system at runtime. (This will not work if a firewall is in place; see [Accessing Floating Licenses through a Firewall](#).)
- Why am I getting a license denial message?** If your Keysight product cannot obtain a floating license, that usually means that other users have all the licenses in use. Some licenses may be borrowed (i.e., reserved for a period of time to be used offline). Check the **License usage** tab of Keysight License Manager 6 to see how many license counts are in use.
- Occasionally you may receive a license denial message unexpectedly. When that happens, check to see if there are any "runaway" Keysight processes that need to be killed, as they might be holding on to a license.
- When should I change FLEXLM_TIMEOUT?** Keysight recommends using a port number and not changing [FLEXLM_TIMEOUT](#). This timeout is used by Flexera software when connecting to a license server. The default value of 3 seconds (3000000 microseconds) is sufficient to allow remote connections with typical latencies. You generally will not need to change it. This value is also used when scanning for ports, when no port is specified in the license file or in the server string. If you know that there are no latency issues with a server, you can reduce the value of [FLEXLM_TIMEOUT](#). The minimum possible value is 200 milliseconds (200000 microseconds).
- Do I need to explicitly specify a TCP/IP port?** If you do not specify the TCP/IP port for the license server during license setup, you may experience checkout delays, unexpected behavior, and/or license checkout failure on the Windows platform. Therefore, it is highly recommended that you always explicitly specify the TCP/IP port associated with each license server.
- What can I do to clean my existing license** On a Windows license server machine, when you suspect that your license setup is outdated or behaving strangely, run [lmttools](#), then go to the **Start/Stop/Reread** tab and restart the

setup?

Windows service related to Keysight Licensing.

How do I find the Flex ID of my hardware key (USB dongle)?

You need the ID of your USB key (also called a dongle, sold separately) to get licenses from Keysight. You may also need this information when you contact Keysight Technical Support. There are two ways to find this ID:

- Before you install (plug in) the USB key on your PC, you can read the ID directly from the key.
- If you have installed the hardware key on your PC, and have also already installed your licenses and the FlexNet software, go to your licensing tools directory and enter the following command to check the ID:

```
lmutil lmhostid -flexid
```

This ID is a valid USB key serial number: 9 or 10, a dash, and 8 hexadecimal characters. Examples: **9-1234abcd** or **10-1234abcd**.

How do I find my host ID?

There are several ways to determine the host ID of your local system (computer or instrument):

- From the directory containing your licensing tools, execute

```
lmutil lmhostid
```

 to get the FlexNet host ID directly.
- On Windows, execute

```
getmac /v /fo list
```

 Your host ID is listed as the **Physical Address** of the physical Network Adapter.
- On Linux, execute

```
/sbin/ifconfig -a eth0
```

 Examine the `ifconfig` results to find your Ethernet interface (often called `eth0`) and use its hardware address (`Hwaddr`).

How can I borrow a floating license to use offline?

Many Keysight floating licenses can be borrowed for up to 365 days. Once you have borrowed a license, you can disconnect from the network and continue to use the license until its return date, or until you explicitly return it.

- You can determine whether your license can be borrowed by looking in the license file (.lic) for the BORROW keyword, or by attempting to borrow it as described below.
- Keysight PathWave License Manager, Keysight PathWave Desktop Edition, and Keysight License Manager 6 have license borrow and early return capabilities. Consult the Help for those tools.
- If you don't return a borrowed license explicitly, it will revert to the server at midnight (23:59:59) on the return date that you specified when you borrowed it. This means it will no longer be available to your offline machine, and will be available to other clients to be checked out from the server.

NOTE

Keysight recommends that you always use a license management tool or the menus of your Keysight product to borrow licenses. Due to a FlexNet limitation, it is possible for early returns to be attributed to the wrong user if you use the Flex tools (`lmutil` `lmborrow`) or environment Variable (`LM_BORROW`).

I used Keysight License Manager 6 to set up a license for one of my Keysight products, and now I want to use it to set up a different product's license. How can I do that?

Once you have chosen a product (from the list presented at various points in the setup flow, depending on what you are doing), if you want to select a different product, you must close Keysight License Manager 6 and re-open it. If you started Keysight License Manager 6 from a menu of your Keysight product, that product will be selected automatically; you will need to open Keysight License Manager 6 from your Start menu to open it with no product selected.

When does my time-based license stop working? On the expiration date, or on the next day?

Your time-based license stops working immediately AFTER the expiration date in the license file. If your license file specifies an expiration date of `28-Jul-2018`, the licensed feature will work on July 28, but will not work on July 29.

Why do I see delays when using floating

There are several factors that can lead to slow license checkouts when you are using floating licenses; you will experience this as delays in your Keysight application when it starts up or when you

licenses?

try to use a licensed feature of the software. The same factors can also cause slow refresh of the list of licenses when viewed in your license management tool.

- If you have multiple floating license servers in a product's search path, checkouts can be slow for that product's licenses. Check your configuration for unused license servers, and if you have multiple servers for different products, make sure you configure each server only for the products that need that server. See [Setting Up Floating Licenses](#) and [Licensing Environment](#).
- If your floating license server is on a different site from your client machine, checkouts may be slow.
- If your overall network performance is poor, your floating license checkouts will be slow.

What Files and Paths are Used By Keysight Licensing?

These are some of the directories and files used by Keysight licensing and by various license management tools. These are default paths; in some cases you may be able to change the installation path when installing your software.

Directory	Files / File Types	Use
Windows: <ul style="list-style-type: none"> - <i>C:\Program Files\Common Files\Keysight</i> - <i>C:\Program Files (x86)\Agilent\</i> Linux: <i>/opt/keysight/licensing/agileesofd</i>	various	License management tools
Windows: <ul style="list-style-type: none"> - <i>C:\ProgramData\Keysight\Licensing\Licenses:</i> <ul style="list-style-type: none"> - <i>Server</i> subdirectory for counted, served licenses - <i>Other</i> subdirectory for uncounted, unserved licenses - <i>C:\Program Files\Agilent\licensing</i> Linux: <i>/var/opt/keysight/licensing/licenses:</i> <ul style="list-style-type: none"> - <i>server</i> subdirectory for counted, served licenses - <i>other</i> subdirectory for uncounted, unserved licenses 	.lic	Installed license files
Windows: <i>C:\ProgramData\Keysight\Licensing\Log\</i> Linux: <i>/var/log/keysight/licensing/log</i>	.txt	Licensing log files

How to Troubleshoot Problems

This section lists troubleshooting steps that can help you resolve common problems with Keysight licensing.

Before you start

Consider rebooting the machine

A restart will often quickly and easily resolve transient problems caused by software or hardware changes.

Follow these test steps

Test 1: Operating system...

Are you using an unsupported platform?

Ensure that you're using a supported operating system: Consult the documentation for [your license management tool](#) and/or the [License Server page](#) for the version you are using.

Note that virtual machines (such as VMWare) are not supported.

Test 2

Inspect the active license directory

List the files

```

Window  dir
s       C:\ProgramData\Keysight\Licensing\Licenses\Server
       dir
       C:\ProgramData\Keysight\Licensing\Licenses\Other
Linux   ls -al /var/opt/keysight/licensing/licenses/server
       ls -al /var/opt/keysight/licensing/licenses/other

```

Verify...

- A license file exists in the expected location.
- The license file has an `.lic` extension.
- Only license files are in the directory. Remove any files that do not have a `.lic` extension.
- All license files in the directory use the same port. Open or view the `.lic` files and determine whether they all specify the same port value (between 27000 and 27009, inclusive) in their SERVER statements. If not, edit them to have the

same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.

Linux only:

- **Verify the license file has read permissions for all users.**

To fix permissions, execute:

```
chmod a+r /var/opt/keysight/licensing/licenses/server/*
chmod a+r /var/opt/keysight/licensing/licenses/other/*
```

Need a license file? See [Setting Up Licenses](#).

Test 3 If you're using a USB dongle,

lmutil lmhostid -flexid Run:

A. Run `lmutil lmhostid -flexid` to determine the FlexNet ID of the connected dongle.

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
The FlexNet host ID of this machine is "FLEXID=10-0bebf3bd"
```

- If `missing dongle driver` is reported, follow the dongle driver installation instructions in [Setting Up USB Portable Licenses](#) to install it.
- If The FlexNet host ID of this machine is "", check to see if the dongle is plugged in appropriately.

B. Open your license file in your preferred text editor (notepad, gedit, etc).

C. Find the host ID. Here's an example .lic file with the host ID `FLEXID=10-0bebf3bd`.

```
#
# For a Keysight Licensing overview and detailed instructions,
# see http://www.keysight.com/find/Licensing
#
# Use of this license constituted acceptance of the Keysight end-user
# license agreement at http://www.keysight.com/find/sweula
#
SERVER this_host FLEXID=10-0bebf3bd 27009
USE_SERVER
VENDOR agileesofd
# Product: N7640APPC-1FL LMR, PC application, node-locked 12 month license
Expires: 16-OCT-2018
INCREMENT b_sigstu_x_lmr agileesofd 2018.1016 16-oct-2018 1 VENDOR_
STRING="40b0341a9df1P=#1003D=#Signal_Studio_X_for_LMR : RFZ2AQN D2HWSGS
X1J2HXG JWEJWVY 2BHAHBG 2CELGBJ XJLCRXF TGRAM" HOSTID=FLEXID=10-0bebf3bd
SIGN="0029 81D7 708F 2B79 95CB 64A2 6227 6D0E 72B4 3902 E301 F3E4 900B A504
7731 25AF A34C 9A70 8626 7F31 4DBB"
```

Verify...

- The FLEXID in the active license file matches the FLEXID of the connected dongle.

NOTE **Need a license?** See [Setting Up Licenses](#)

Test 3 otherwise,

lmutil lmhostid Run:

A. Run `lmutil lmhostid` to determine the host ID of the machine. (There may be multiple host IDs.)

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
The FlexNet host ID of this machine is "480fcf62402c"
```

B. Open your license file in your preferred text editor (notepad, gedit, etc).

C. Find the host ID. Here's an example .lic file with the host ID `40b0341a9df1`.

```
# Use of this license constituted acceptance of the Keysight end-user
# license agreement at http://www.keysight.com/find/sweula
#
SERVER this_host 40b0341a9df1 27009
USE_SERVER
VENDOR agileesofd
# Product: N7640APPC-1FL LMR, PC application, node-locked 12 month license
Expires: 16-OCT-2018
INCREMENT b_sigstu_x_lmr agileesofd 2018.1016 16-oct-2018 1 VENDOR_
STRING=&quot;40b0341a9df1P=#1003D=#Signal_Studio_X_for_LMR : RFZ2AQN D2HWSGS
X1J2HXG JWEJWVY 2BHAHBG 2CELGBJ XJLCRXF TGRAM&quot;; HOSTID=40b0341a9df1
SIGN=&quot;;0029 81D7 708F 2B79 95CB 64A2 6227 6D0E 72B4 3902 E301 F3E4 900B
A504 7731 25AF A34C 9A70 8626 7F31 4DBB&quot;;
```

Verify...

- The host ID in the active license file matches a host ID of the machine. (If your machine has multiple host IDs, the license file may match any one of them.)

Recommendation: Remove any files that have the wrong host ID. They shouldn't cause problems, but they are confusing and unnecessary.

NOTE **Need a license?** See [Setting Up Licenses](#)

Before you proceed: Do you have SERVER license files?

Several of the troubleshooting steps require you to understand whether the license server manager (*lmgrd.exe*) and vendor daemon (*agileesofd.exe*) – sometimes referred to collectively as the license server process – should be running as a part of your licensing configuration.

The license server process is needed:

- if your machine is acting as a license server, serving floating licenses to other computers
- or if your machine is utilizing *counted* licenses that are not floating – for example, if you are using a Keysight product with a per-process licensing model. In this configuration, your machine needs to run a *local license server process*.

You can tell whether your machine needs a license server process by examining the installed licenses.

- If there is at least one license file in `C:\ProgramData\Keysight\Licensing\Licenses\Server` (on Windows) or `/var/opt/keysight/licensing/licenses/server` (on Linux), then you need the

- license server process. **Proceed with Test 4: Inspect your SERVER files.**
- If not, **skip to Test 10: Repeated entries in LICENSE_PATH Variables.**

Test 4: Inspect your SERVER files

A. Open a command line interpreter:

- Windows: command prompt
- Linux: terminal window **as root user**

B. Change directory to the location for server license files:

```
Window cd
s      C:\ProgramData\Keysight\Licensing\Licenses\Server
Linux  cd /var/opt/keysight/licensing/licenses/server
```

C. Examine each license file in that location.

Verify...

- Each license file contains a **SERVER** line
- The server line contains a host ID (example: **10e7c61be28e**) that matches this machine
- The license file contains **VENDOR agileesofd**

Test 5: Flexera software version

lmutil lmstat -v Run:

Flexera utilities, run from the command line, are a fundamental tool used in the license troubleshooting process.

A. Change directory to the location for Flexera utilities:

```
Windows cd C:\Program Files\Common Files\Keysight\License
Manager 6\bin
or
cd C:\Program Files\Common Files\Keysight\Licensing\Agileesofd
Linux cd /opt/keysight/licensing/agileesofd
```

Don't have the directory? Install Keysight Licensing from <http://www.keysight.com/find/LicensingTools>.

B. Run **lmstat** to view the Flexera software version.

```
Windows lmutil lmstat -v
Linux ./lmutil lmstat -v
```

Note the version: it must be v11.13.1.4 or better.

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
lmstat v11.13.1.4 build 179569 x64_n6
```

Is Linux showing lmutil: No such file or directory? Install the **Linux Standard Base library**. On RHEL, it's **redhat-lsb**, which is installed through yum.

Is your Flexera software version out of date? Install a newer version of Keysight Licensing:

<http://www.keysight.com/find/LicensingTools>
or <http://www.keysight.com/find/licenseserver>.

NOTE If you're using a floating (network) license, go to **Floating License Problems**.

Test 6:

Run: `lmutil lmstat -lm`

Run `lmstat` to see license manager status:

Windows `lmutil lmstat -lm`

Linux `./lmutil lmstat -lm`

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
```

```
Flexible License Manager status on Mon 4/23/2018 14:03
```

```
[Detecting lmgrd processes...]
```

```
License server status: 27009@PC1
```

```
License file(s) on
```

```
PC1:C:\ProgramData\Keysight\Licensing\Licenses\Server\>941784_1001302725.lic
```

```
PC1: license server UP (MASTER) v11.13.1
```

Verify...

- The license file (.lic) is listed
 - The license server is **UP**
- lmgrd not running?** Skip to Test 8: Inspect License Log

Test 7:

-c @localhost `lmutil lmstat` Run:

Run `lmstat` to see the vendor daemon status.

Windows `lmutil lmstat -c @localhost -S agileesofd`

Linux `./lmutil lmstat -c @localhost -S agileesofd`

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
```

```
Flexible License Manager status on Mon 10/23/2017 14:19
```

```
[Detecting lmgrd processes...]
```

```
License server status: 27009@PC1
```

```
License file(s) on PC1:
```

```
C:\ProgramData\Keysight\Licensing\Licenses\Server\941784_1001302725.lic:
```

```
PC1: license server UP v11.13.1
```

```
Vendor daemon status (on PC1):
```

```
agileesofd: UP v11.13.1
```

```
Feature usage info:
```

```
Users of b_sigstu_x_lmr: (Total of 1 license issued; Total of 0 licenses in use)
```

Verify...

- The vendor daemon (*agileesofd*) is **UP**.
- There could be several causes of a problem with the vendor daemon. You

should consider...

- Restarting the machine
- Re-installing the licensing software: See [Setting Up Licenses](#).
- ...Or proceed to Test 8: Inspect License Log
- **The version of *agileesofd* is 6.0 or greater.**
Examine the properties of *agileesofd.exe* to find its version. Versions earlier than 6.0 do not support early return of borrowed licenses.

Test 8

Inspect the license server log

The license manager (*lmgrd*) and its vendor daemon (*agileesofd*) append text to a log file for most license actions. The log file is a timestamped record of most licensing activities.

NOTE Most licensing operations add entries to the log file.

Frequently refresh your editor to see the most recent entries (messages since you opened the log file).

A. Open the log file with your preferred text editor.

- If you are using Keysight License Manager 6, find the location of the log file by selecting **Environment** and locating the `AGILEESOFD_SERVER_LOGFILE`. The file Name in the Keysight License Manager 6 window is a clickable link to open the log file in a text editor.
- If you are using another tool, try the typical locations below or consult the help for your tool.

Typical locations for log files are:

Windows `C:\ProgramData\Keysight\Licensing\Log`

Linux `/var/log/keysight/licensing/log`

B. Search the log for these keywords to find common problems:

Find...	Problem
EXPIRED	License has expired
agileesofd exited	vendor daemon shut down. (Reason will be described on next line of log file.)
Failed to open the TCP port number in the license.	There is another version of <i>lmgrd</i> running, that needs to be stopped. In certain cases on Linux, <i>lmgrd</i> will refuse to use a port number until the machine has been restarted.
EESOF	Verify that the vendor daemon version is 2018.06 or higher. This will appear as something like: <code>(agileesofd) EESOF 2018.06 (06/07/2018)</code>

Test 9:

Windows `tasklist | FIND "lm"`

Linux `ps -ef |grep lm`

Verify:

- There are not any unexpected Flexera software tools running.

Test 10:

Examine the `<PRODUCT>_LICENSE_PATH` values:

- On 64-bit Windows systems, find these in the Environment tab in Keysight License Manager 6
- On other systems, or if you are using a different license management tool, use **Control Panel, System, Advanced system settings, System Properties, Advanced, Environment Variables, System Variables**. Note that some values may also be in the Windows registry.

Verify:

- No `<PRODUCT>_LICENSE_PATH` value includes the same directory or server multiple times.
- No `<PRODUCT>_LICENSE_PATH` value includes invalid directories or servers (for example, outdated entries for license servers that no longer exist).

Repeated or invalid values in these Variables can cause licensing performance problems.

Still having problems?

Restart your machine *or* follow [Flexera Communication Problems](#).

Floating License Problems

NOTE Consider rebooting the server and or client machine.

A restart will often quickly and easily resolve transient problems caused by software or hardware changes.

If you see unexpected behavior of borrowed licenses

NOTE Keysight recommends that you always use a license management tool or the menus of your Keysight product to borrow licenses. Due to a FlexNet limitation, it is possible for early returns to be attributed to the wrong user if you use the Flex tools (`lmutil lmborrow`) or environment Variable (`LM_BORROW`).

Step 1: Verify the license server

Test 1.1

lmutil lmstat -a Run:

A. Log in to the license server machine.

If you do not have permission to use the license server machine, proceed to Step 2: Verify the license client.

B. Open a command line interpreter and change directory to the location for Flexera utilities.

```
Windows cd C:\Program Files\Common Files\Keysight\License Manager 6\bin
or
cd C:\Program Files\Common Files\Keysight\Licensing\Agileesofd
Linux cd /opt/keysight/licensing/agileesofd
```

lmstat C. Use

```
Windows lmutil lmstat -a
Linux ./lmutil lmstat -a
```

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
Flexible License Manager status on Thu 10/26/2017 13:19
```

```
License server status: 27009@server1.com
```

```
License file(s) on computer1.com.com:
```

```
/var/opt/keysight/licensing/licenses/server/942839_1001301945.lic:
```

```
server1.com: license server UP (MASTER) v11.13.1
```

```
Vendor daemon status (on server1.com):
```

```
agileesofd: UP v11.13.1
```

```
Feature usage info:
```

```
Users of b_sigstu_x_lmr: (Total of 1 license issued; Total of 0 licenses in use)
```

Verify

- There is only one *lmgrd* (not multiple at different ports)
- license server UP (MASTER)
- *agileesofd*: UP
- The necessary licenses are available for checkout. (Example: Total of 1 license issued; Total of 0 licenses in use)

To stop the server:

Windows `cd C:\Program Files\Common Files\Keysight\License Manager 6\bin`
 (or `cd C:\Program Files\Common Files\Keysight\Licensing\Agileesofd`)
`lmutil lmdown -c`
`C:\ProgramData\Keysight\Licensing\Licenses\Server`

Linux `cd /opt/keysight/licensing/agileesofd`
`./lmutil lmdown -c /var/opt/keysight/licensing/licenses/server`

NOTE **Shutdown failed: Cannot connect to license server system. (-15,570:115 "Operation now in progress")**

This happens when *lmgrd* is already stopped.

To start the server:

Windows `cd C:\Program Files\Common Files\Keysight\License Manager 6\bin`
 (or `cd C:\Program Files\Common Files\Keysight\Licensing\Agileesofd`)
`lmgrd -c C:\Program Files\Common Files\Keysight\Licensing\Licenses\Server`

Linux `cd /opt/keysight/licensing/agileesofd`
`./lmgrd -c /var/opt/keysight/licensing/licenses/server`

NOTE **Can't make directory /usr/tmp/.flexlm, errno: 2(No such file or directory).**

This error occurs if the directory */usr/tmp*, used by the license manager, is missing on your system.

This error doesn't prevent the license manager from checking out licenses.

Solution: Create a symbolic link */usr/tmp* that points to */tmp*. For example:

```
sudo -ln -s /tmp /usr/tmp
```

License server will not start and the debug log shows an error `Not a valid server hostName, exiting`

The license server will not start when the server *hostName* in the license file does not match the server's actual host Name.

Solution: If only the server *hostName* is incorrect, you can manually correct it in the license file by editing the license file in Notepad and changing the server *hostName* in the *SERVER* line. If the MAC address has also changed, the license file will need to be regenerated with the new information: contact support for a new license file

(<http://www.keysight.com/find/contactus>).

Test 1.2:

If there are multiple license managers running, unexpected results can occur

Windows `tasklist | FIND "lm"`

Linux `ps -ef |grep lm`

Verify

- There are not any unexpected Flexera software tools running.

Test 1.3

lmutil lmstat -lm Run:

Windows `cd C:\Program Files\Common Files\Keysight\License Manager 6\bin`
(or `cd C:\Program Files\Common Files\Keysight\Licensing\Agileesofd`)
`lmutil lmstat -lm`

Linux `cd /opt/keysight/licensing/agileesofd`
`./lmutil lmstat -lm`

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
Flexible License Manager status on Mon 10/30/2017 10:49
License server status: 27007@server1.site.com
    License file(s) on server1.site.com:
    /var/opt/keysight/licensing/licenses/server/943297_1001302552.lic:
server1.site.com: license server UP (MASTER) v11.13.1
```

Take note of the `<port>` and `<server-Name>` of the license manager (in this example, `27007@server1.site.com`). This will be used for license client tests (below).

Step 2: Verify the license client

Test 2.1:

Ping the license server

- Log in to the license client machine.
- Open a command line interpreter.
- Ping the remote license server to ensure it is on the network:

`ping <server-Name>`

For `<server-Name>`, use the value found on the server in the previous test (Test1.3)

Example: `ping server1.site.com`

Verify that `ping` can successfully transmit packets from the client to the license server.

NOTE Flexera supports multiple ways of identifying your server.

Examples are:

- 156.140.113.7
- server1.site.com
- server1

Test 2.2:

Run: `lmutil lmdiag -c`

A. Log in to the license client machine....B. Open a command line interpreter....C. Run diagnostic...

Windows `cd C:\Program Files\Common Files\Keysight\License Manager 6\bin`
 (or `cd C:\Program Files\Common Files\Keysight\Licensing\Agileesofd`)
`lmutil lmdiag -a -c <port>@<license-server>`

Linux `cd /opt/keysight/licensing/agileesofd`
`./lmutil lmdiag -a -c <port>@<license-server>`

Example: `lmutil lmdiag -a -c 27009@server1.site.com`

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
FlexNet diagnostics on Mon 10/30/2017 13:15
```

```
-----
License file: 27009@server1.site.com
-----
```

```
"b_sigstu_x_lmr" v2018.1025, vendor: agileesofd, expiry: 1-jan-0
License server: 156.140.113.7
floating license starts: 1-jan-1990, no expiration date
This license can be checked out
-----
```

Verify

- The license server and *agileesofd* are UP
- The licenses are floating licenses and are not in use by other users.
- No errors are reported

NOTE **Error: Can't fetch the requested information!!**

Perform **Test 1.1** License Server UP (above)

If the server is running, then **FlexNet communications might be blocked.**

See **Flexera Communication Problems.**

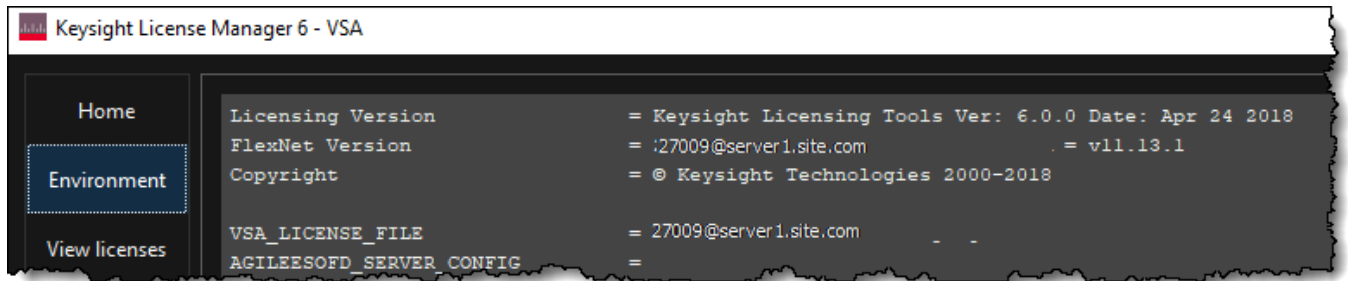
Test 2.3

`lmdiag -c <PRODDNAME_LICENSE_FILE>` Run:

In this test, we are verifying that the search path for the selected product's license files has been correctly set.

A. Check the value of the Variable/registry key

To find this value, run Keysight License Manager 6 and select the **Environment** tab. Locate the entry that corresponds to your Keysight product's Name: for example, `VSA_LICENSE_FILE` for the VSA product.



B. Run `lmutil lmdiag -c <PRODNAME_LICENSE_FILE>`

Type the value you found in the previous step. Example: `lmutil lmdiag -c 27009@server1.site.com`

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
FlexNet diagnostics on Mon 10/30/2017 13:15
-----
License file: 27009@server1.site.com
-----
"b_sigstu_x_lmr" v2018.1025, vendor: agileesofd, expiry: 1-jan-0
License server: 27009@server1.site.com
floating license starts: 1-jan-1990, no expiration date
This license can be checked out
-----
```

Verify

- The `<port>@<server-Name>` value of `<PRODNAME>_LICENSE_FILE` matches values from the previous test (Test 2.2)
- Output from `lmdiag` matches output from the previous test (Test 2.2)

Test 2.4

In some instances, the license server is working, the client setup is correct, licenses are available for use (not in use by others), license versions are correct, and the licenses are not expired, but a license still cannot be checked out. This can be caused by accidental installation of a node-locked license file tied to the host ID of the machine intended to be the floating (network) license server. Use the `<port>@<server-Name>` that you recorded in previous tests.

```

Windows cd C:\Program Files\Common Files\Keysight\License Manager 6\bin
         (or cd C:\Program Files\Common
         Files\Keysight\Licensing\Agileesofd)
         lmutil lmdiag -c <port>@<server-Name> <feature Name to be
         checked>

Linux   cd /opt/keysight/licensing/agileesofd
         ./lmutil lmdiag -c <port>@<server-Name><feature Name to be
         checked>

```

Example: `lmutil lmdiag -c 27009@server1.site.com b_sigstu_x_lmr`

```

lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
FlexNet diagnostics on Mon 10/30/2017 13:15
-----

```

```

License file: 27009@server1.site.com
-----

```

```

"b_sigstu_x_lmr" v2018.1025, vendor: agileesofd, expiry: 1-jan-0
License server: 27009@server1.site.com
floating license starts: 1-jan-1990, no expiration date
This license can be checked out
-----

```

Verify that the license can be checked out. This confirms that the server has a valid network license.

Test 2.5

Remove expired or invalid license files

Avoid unexpected problems by cleaning up the active licenses folders.

lmdiag Use

```

Wind          lmutil lmdiag -c
ows   C:\ProgramData\Keysight\Licensing\Licenses\Server

          lmutil lmdiag -c
          C:\ProgramData\Keysight\Licensing\Licenses\Other

Linux         lmutil lmdiag -c
          /var/opt/keysight/licensing/licenses/server

          lmutil lmdiag -c
          /var/opt/keysight/licensing/licenses/other

```

If licenses are found, consider removing them if they are expired or unnecessary.

If you are using .lic files instead of the environment to redirect:

- A. Open your license file in your preferred text editor (notepad, gedit, etc) .**
- B. Find the SERVER line.**

The format of the **SERVER** line is:

```
SERVER hosthostid[port]
```


Example:

```
SERVER server1.site.com 40b0341a9df1 27009
```

Verify

- The **host** matches the `<server-Name>` from **Test 1.3** (above)
- The **hostid** matches the host ID of the license server machine.
- The **port** matches the `<port>` of the license server machine from **Test 1.3** (above)

Test 2.6:

If there are multiple license managers running, unexpected results can occur

```
Windows tasklist | FIND "lm"
```

```
Linux ps -ef |grep lm
```

Verify

- There are not any unexpected Flexera software tools running.

Flexera Communication Problems

Third-party programs may block or interfere with Flexera communications. This section addresses how to resolve these issues. FlexNet communication blockage and/or interference is most typically due to firewalls, and less often to antivirus software; these causes are covered here. However, it can also be caused by VPN tunnel programs or other third-party programs. Blockage/interference from those programs is beyond the scope of this document.

Since firewall and antivirus software are typical causes of FlexNet communication problems, you should investigate these possibilities first. The quickest way to investigate is to temporarily disable your firewall and antivirus software.

NOTE Ensure that disabling any security software (such as firewall or antivirus) is done in such a manner that it does not cause harm to your system. Keysight cannot be held responsible for any harm caused. Keysight recommends that you work with your local IT support professional.

Perform this test by methodically running `lmutil lmstat -c @<server-Name>` across different permutations of disabling firewall and antivirus software. When `lmstat` reports a correct license path and reports `lmgrd` and `agileesofd` UP after a firewall or antivirus is disabled, this is a positive test result (implicating the disabled software). The `lmstat` result when there is no communications blockage will be similar to this:

```
lmutil - Copyright (c) 1989-2015 Flexera Software LLC. All Rights Reserved.
Flexible License Manager status on Thu 10/26/2017 13:19
[Detecting lmgrd processes...]
License server status: 27009@server1.com
    License file(s) on server1.com:
/var/opt/keysight/licensing/licenses/server/942839_1001301945.lic:
server1.com: <mark>license server UP (MASTER) v11.13.1</mark>Vendor daemon
status (on server1.com):
agileesofd: UP v11.13.1
```

Below is an example test matrix. Keysight recommends you start by disabling your firewall.

	Client Firewall	Server Firewall	Client Antivirus	Server Antivirus
Test 1	off	on	on	on
Test 2	on	off	on	on
Test 3	off	off	on	on
Test 4	off	off	off	on
Test 5	off	off	off	off

If both firewall and antivirus on server and client machines are simultaneously disabled (in other words, all security software on both license client and server is turned off) and `lmstat` does not give a positive result, then some other third-party software might be causing the issue. Consult with your IT professional.

If, after running the above tests, you identify an interfering firewall and/or antivirus, then you must configure exceptions in these tools so that the FlexNet software functions properly. The steps to do this are covered here; however, due to the wide variation in firewall and antivirus user interfaces and use models, only generic instructions are provided.

1. Edit the current license file on the license server machine. Add a port number for both *lmgrd* and *agileesofd* as shown below:

```
SERVER this_host B8AC6F80C09D 27005
VENDOR agileesofd PORT=5346
#
INCREMENT b_hb_layout_momentum agileesofd 2.9 31-mar-2013 1 VENDOR_
STRING...
```

Stop and restart the license server so that these changes can take effect.

2. Firewall and antivirus exclusions:
 - a. Firewall: Specify TCP port numbers 27005 and 5346 to be allowed through the firewall on both license server and license client machines.
 - b. Firewall and/or antivirus: Configure the following executables as exclusions (both are typically installed in *C:\Program Files\Common Files\Keysight\License Manager 6\agileesofd*):
agileesofd.exe
lmgrd.exe

Port Number Conflicts

All the Keysight *agileesofd* (vendor daemon) licenses on your system must use the same port. If license files have conflicting port numbers, or if some licenses have port numbers and others do not, you will experience licensing failures.

To check and correct the port numbers in your license files, do the following **on the license server machine**.

First list the files in your licensing directories:

```

Window  dir
s       C:\ProgramData\Keysight\Licensing\Licenses\Server

        dir
        C:\ProgramData\Keysight\Licensing\Licenses\Other

Linux   ls -al /var/opt/keysight/licensing/licenses/server

        ls -al /var/opt/keysight/licensing/licenses/other

```

Open or view each .lic file to determine whether they all specify the same port value (between 27000 and 27009, inclusive) in their SERVER statements. The format of the SERVER statement is:

```
SERVER host hostid [port] [PRIMARY_IS_MASTER] [HEARTBEAT_INTERVAL=seconds]
```

For example, a license file with port 27009 might have the following SERVER statement:

```
SERVER my_server 17007ea8 27009
```

With no port number specified, the file might look like this:

```
SERVER my_server 17007ea8
```

If your license files have different port numbers, or if not all your license files have port numbers, choose a single port number to use (between 27000 and 27009, inclusive). Then open each license file in your preferred text editor (notepad, gedit, etc.) and modify it to specify that port number.

When you add a new license to a machine, if its port number does not match others already installed, the license installation may fail; or, when you attempt to restart the license server process, it may fail. Either at installation time or when you try to start the server process, you may see an error message explaining that the port numbers do not match. If this happens, edit the port numbers to match, as described above, then try again.

Glossary and Abbreviations

The following table lists commonly used licensing terms and abbreviations in Keysight Licensing.

Term	Definition
Dongle	A serialized hardware key that can be attached to a USB port of a computer to limit or lock software access to whoever has the dongle attached to his/her system via the associated Keysight license file. A license dongle always has a unique ID called the FlexNet ID.
Dongle Device Drivers	These drivers must be installed before the dongle device can serve as the locking device for a license. Get them from http://www.keysight.com/find/LicensingUsbDriver .
Feature	A licensed capability.
FlexNet	The third-party licensing technology that the Keysight Licensing scheme is based on.
Floating (Network) License	A license that can be shared among multiple users across a network. It is installed on a license server to fulfill the license requests from one or more client machines. Floating license support is provided for single and multiple servers (including distributed product servers, peak servers, and redundant servers).
Host ID	Specifies the unique ID of a machine. There are various types of host ID, but often the host ID is the MAC address, physical address, or CPU ID of the computer system.
License File	Each Keysight license is stored in a file. The license file must be installed on a PC, instrument, or floating license server before it can be used.
License Pool	A collection of purchased licenses for the same feature or capability.
License Server Manager (Imgrd)	One of the components of FlexNet technology. <i>Imgrd</i> is the license daemon process running on the license server system to manage vendor daemon processes (such as <i>agileesofd</i>) that govern the use of licensed features.
Node-Locked License	Node-locking means that the application can be used only on a specific host or on a host that has a specific dongle physically connected. It allows a single instance of a Keysight product to be used on a single computer with a single display. The user, license, and computer must be physically co-located.
Transportable License	A transportable license is a type of node-locked license, which can be unlocked from one client host and then locked to another client host, via a network enabled process where the customer interacts with the Keysight Software Manager website.
UDH	User, Display, and Host. Keysight licenses are typically tied to a single user, single display, and single host.
USB Portable License	A license that is locked to a USB hardware key (dongle) so that it can be used on any of a number of computers, but only when the dongle is connected to that computer.
Vendor Daemon (agileesofd or agilent)	Keysight Licensing uses either or both of the <i>agileesofd</i> and <i>agilent</i> vendor daemons (depending on the types of licenses in use). The vendor daemon partners with <i>Imgrd</i> to perform license usage policing for the license codewords issued by Keysight.

Appendix: Manual License Setup

This section describes how to set up Keysight Licensing manually – that is, using the Flex tools and not a Keysight license management tool. The easiest way to set up licensing is to use a Keysight license management tool; see [What License Management Tool Should I Use?](#).

In certain cases, you may not be able to install or manage your licenses with a Keysight licensing tool; see [What License Management Tool Should I Use?](#) to determine if this applies to you. If that is the case, you'll use FlexNet tools and some manual steps. The manual setup processes are described in [Appendix: Manual License Setup](#).

NOTE Counted node-locked, counted USB portable, and floating licenses require a license server to get installed and started. For a counted node-locked or USB portable license, the license server and the client are the same machine (that is, your local machine). For floating licenses, these can be separate machines.

For manual setup instructions, see the section that fits your license type and operating system:

- [Manual Setup: Node-Locked or Transportable Licenses on Windows](#)
- [Manual Setup: USB Portable Licenses on Windows](#)
- [Manual Setup: Floating Licenses on Windows](#)
- [Manual Setup: Node-Locked or Transportable Licenses on Linux](#)
- [Manual Setup: USB Portable Licenses on Linux](#)
- [Manual Setup: Floating Licenses on Linux](#)

Manual Setup: Node-Locked or Transportable Licenses on Windows

This section describes how to set up node-locked or transportable licenses (locked to a particular computer or instrument), including perpetual, time-based, and trial licenses.

Prerequisite task for counted licenses only: Install Keysight License Server

If you plan to use counted licenses on this machine and have not already set up the local license server, follow the instructions on the page [Windows License Server Setup](#), setting up the license server on the computer or instrument where you plan to run your licensed Keysight software. This is necessary to set up the local license server required for counted node-locked licenses.

If you have already set up the local license server, stop the server process as described in Step 1 of [Windows License Server Setup](#).

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine your host ID in one of these ways:
 - From your executable path (typically *C:\Program Files\Common Files\Keysight\Licensing\Agileesoft*), execute `lmutil lmhostid` to get the FlexNet host ID directly.
 - Execute `getmac /v /fo list`. Your host ID is listed under **Connection Name: Ethernet as the Physical Address**.

```

Connection Name: Ethernet
Network Adapter: Intel(R) Ethernet Connection (2) I218-LM
Physical Address: 48-0F-CF-62-40-2C
Transport Name: \Device\NPF_{A8B9A8FD0-41EF-45C3-8E44-27930974677A}

Connection Name: VMware Network Adapter VMnet1
Network Adapter: VMware Virtual Ethernet Adapter for VMnet1

```

- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID. Your license file will be emailed to you.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.

Step 2: Save the license file

NOTE Be sure to save the license file on *each* system (instrument or computer) where you plan to use the licensed Keysight software.

To save the license file for use by Keysight Licensing:

- a. Make a copy of the license file on your hard disk, either in the license file directory from Step 1 above, or if you do not have an existing location:
 - If the license is served and counted (license file contains a `SERVER` line), place it in
`C:\ProgramData\Keysight\Licensing\Licenses\Server`
 - If the license is unserved and uncounted (license file does not contain a `SERVER` line), place it in
`C:\ProgramData\Keysight\Licensing\Licenses\Other`
 See [Recognize Your License Type](#) for more information.
- b. Open or view the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their `SERVER` statements. If not, edit them to have the same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.

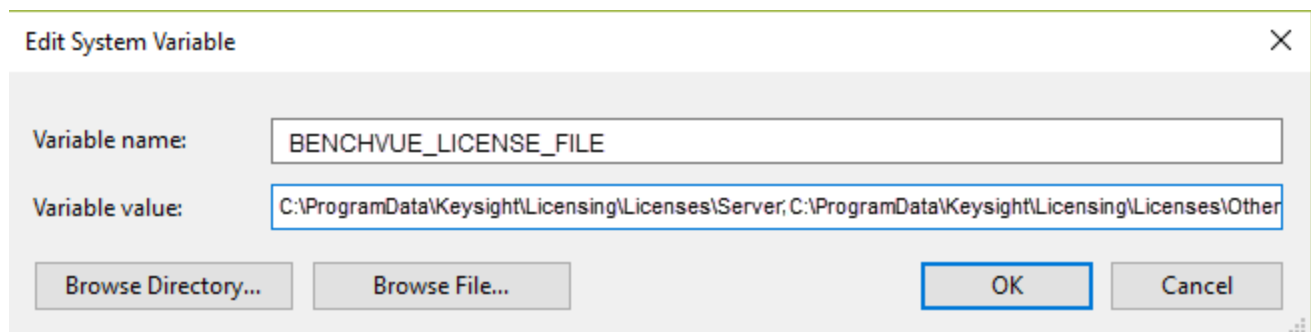
Step 3: Set the license search path

This process allows the licensed product to find its licenses efficiently.

To set the license search path, set the environment Variable `<PRODNAME>_LICENSE_FILE` to contain the list of license files and/or license servers to search when a license is requested for this product, where `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `C:\ProgramData\Keysight\Licensing\Configuration`. (If this client will run multiple Keysight products, set a Variable for each.) The location you need to specify as the value of this environment Variable is the one where you saved the license file in Step 2, above. You can specify the directory rather than the individual license file; this will save time if you add additional licenses later. If there are multiple paths for one product, separate them with semicolons (;), as shown below.

To set the environment Variables, go to **Control Panel, System, Advanced system settings, System Properties, Advanced, Environment Variables, System Variables**. You may need to restart the PC after setting environment Variables.

Example



NOTE You must install a license (Step 2 above) before you can start the license server manager.

If all your licenses are unserved, uncounted licenses (do not contain a [SERVER](#) line), you do not need to start the license server manager, and you have now finished your setup.

Counted node-locked, transportable, and USB portable licenses require the license server manager to run on the local machine.

- Windows: In the Windows Services app, **Restart** the license server service (such as **EEsof EDA License Server**).
- Linux:
 - Stop *lmgrd* and *agileesofd*:

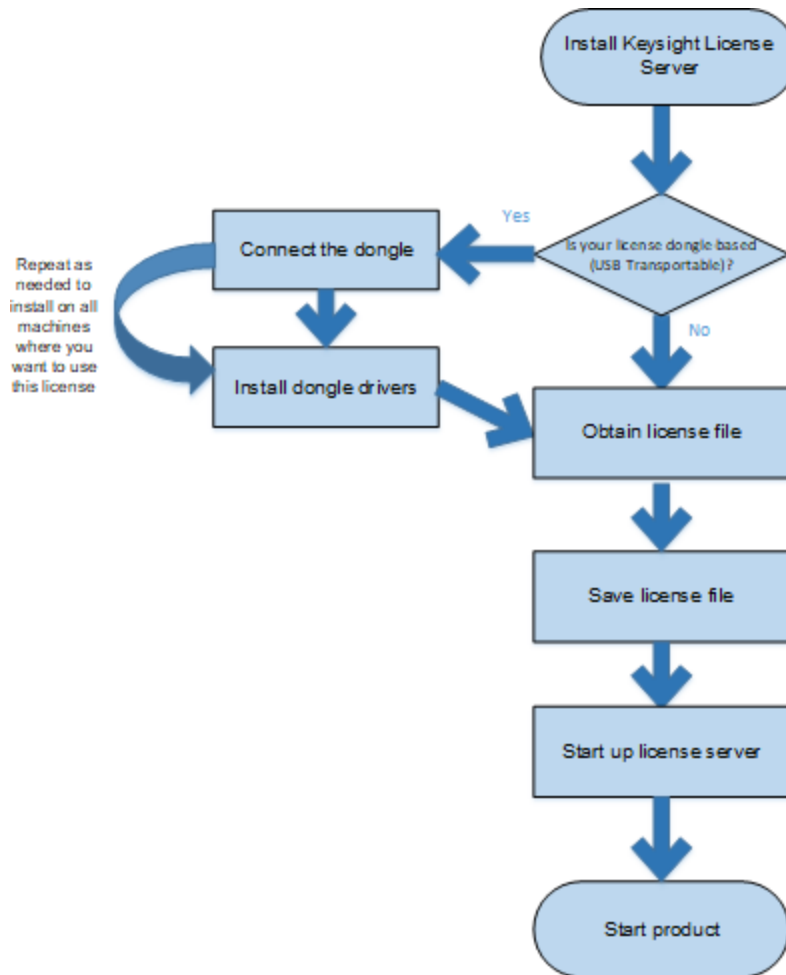
```
lmutil lmdown -c  
"/var/opt/keysight/licensing/licenses/server"
```
 - Restart *lmgrd* and *agileesofd*:

```
lmgrd.exe -c /var/opt/keysight/licensing/licenses/server-  
l <license log file path>
```

Manual Setup: USB Portable Licenses on Windows

This section describes how to set up USB portable licenses, which are locked to a USB key (dongle).

License setup process: USB portable licenses



Prerequisite task for counted licenses only: Install Keysight License Server

If you plan to use counted licenses on this machine and have not already set up the local license server, follow the instructions on the page [Windows License Server Setup](#), setting up the license server **on the computer or instrument where you plan to run your licensed Keysight software**. This is necessary to set up the local license server required for counted node-locked licenses.

If you have already set up the local license server, stop the server process as described in Step 1 of [Windows License Server Setup](#).

Make sure that the dongle is securely attached to the USB port of your computer. Some systems may require up to a few minutes to detect the dongle; therefore, make sure to allow sufficient time before the next step.

Repeat these steps on each machine on which you plan to use the USB portable license:

- a. If installing the driver onto a Keysight instrument, make sure you are logged in as Administrator.
- b. Download the FLEXID10 USB Dongle Driver package for your platform from <http://www.keysight.com/find/LicensingUsbDriver>.
- c. The driver files are provided in .zip format. Extract the files to a convenient location on the machine.
- d. Execute *Setup64.exe* (on 64-bit Windows) or *Setup32.exe* (on 32-bit Windows).
- e. Follow the installer prompts, accepting the default values.

For more information and detailed instructions, see the *FlexNet Publisher Driver Installation Guide for FlexNet ID Dongles*, available from <https://flexeracommunity.force.com/customer/CCDocumentation> (login required).

Step 3: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine your dongle ID in one of these ways:

- Before you install the hardware key on your PC, you can read the ID directly from the key.
- If you have installed the hardware key on your PC, and have also already installed your licenses and the FlexNet software, go to *C:\Program Files\Common Files\Keysight\License Manager 6\bin* or *C:\Program Files\Common Files\Keysight\Licensing\Agileesofd* and enter the following command to check the ID:

```
lmutil lmhostid -flexid
```

This ID is a valid USB Key serial number: 9 or 10, a dash, and 8 hexadecimal characters. Examples: **9-1234abcd** or **10-1234abcd**.

- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and dongle ID. Your license file will be emailed to you.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.

Step 4: Save the license file

NOTE Be sure to save the license file on *each* system (instrument or computer) where you plan to use the licensed Keysight software.

To save the license file for use by Keysight Licensing:

- a. Make a copy of the license file on your hard disk, either in the license file directory from Step 1 above, or if you do not have an existing location:
 - If the license is served and counted (license file contains a `SERVER` line), place it in
`C:\ProgramData\Keysight\Licensing\Licenses\Server`
 - If the license is unserved and uncounted (license file does not contain a `SERVER` line), place it in
`C:\ProgramData\Keysight\Licensing\Licenses\Other`
 See [Recognize Your License Type](#) for more information.
- b. Open or view the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their `SERVER` statements. If not, edit them to have the same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.

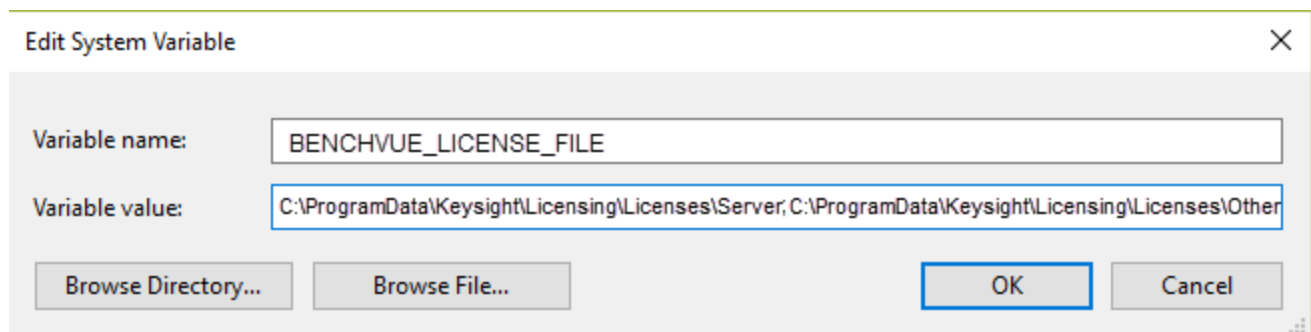
Step 5: Set the license search path

This process allows the licensed product to find its licenses efficiently.

To set the license search path, set the environment Variable `<PRODNAME>_LICENSE_FILE` to contain the list of license files and/or license servers to search when a license is requested for this product, where `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `C:\ProgramData\Keysight\Licensing\Configuration`. (If this client will run multiple Keysight products, set a Variable for each.) The location you need to specify as the value of this environment Variable is the one where you saved the license file in Step 2, above. You can specify the directory rather than the individual license file; this will save time if you add additional licenses later. If there are multiple paths for one product, separate them with semicolons (;), as shown below.

To set the environment Variables, go to **Control Panel, System, Advanced system settings, System Properties, Advanced, Environment Variables, System Variables**. You may need to restart the PC after setting environment Variables.

Example



NOTE You must install a license (Step 4 above) before you can start the license server.

If all your licenses are unserved, uncounted licenses (do not contain a [SERVER](#) line), you do not need to start the license server manager, and you have now finished your setup.

- Windows: In the Windows Services app, **Restart** the license server service (such as **EEsof EDA License Server**).
- Linux:
 - Stop *lmgrd* and *agileesofd*:

```
lmutil lmdown -c  
"/var/opt/keysight/licensing/licenses/server"
```
 - Restart *lmgrd* and *agileesofd*:

```
lmgrd.exe -c /var/opt/keysight/licensing/licenses/server-  
l <license log file path>
```

Manual Setup: Floating Licenses on Windows

To set up floating (network) licensing, you'll need to do license server setup and client setup.

License server setup

Follow the instructions on the page [Windows License Server Setup](#). Repeat on each license server. (For help on choosing a license server, see the FlexNet Publisher License Administration Guide, included in the [Keysight License Server download](#).)

Client setup

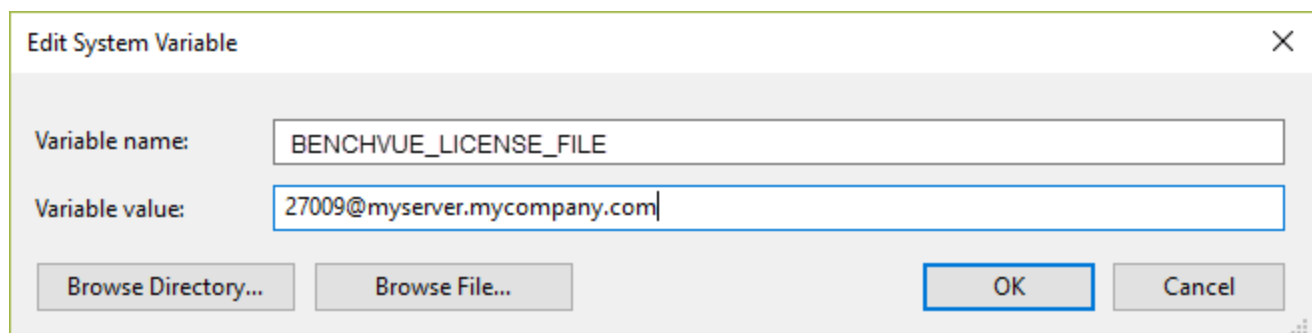
Clients of a Microsoft Windows license server can run Windows and/or Linux. These instructions are for Windows client setup. See [Manual Setup: Floating Licenses on Linux](#) for Linux client setup.

Step 1: Provide access to licenses

Once you have successfully configured all the license servers, configure each client (the instruments and/or computers on which you will run Keysight products) to point to the appropriate license server. To do this, set the environment Variable `<PRODNAME>_LICENSE_FILE` to contain the list of license files, directories, and/or license servers to search when a license is requested for this product, where `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `C:\ProgramData\Keysight\Licensing\Configuration`. (If this client will run multiple Keysight products, set a Variable for each.) Specify the network license server in the format of `port@host.domain` or, if no static TCP port is used on the license server, use the format `@host.domain`. (Your port will typically be 27009. You can find your "host.domain" value in **Control Panel, System, Full computer Name**.) If there are multiple paths/servers for one product, separate them with semicolons (;).

To set the environment Variables, go to **Control Panel, System, Advanced system settings, System Properties, Advanced, Environment Variables, System Variables**. You may need to restart the PC after setting environment Variables.

Example



Manual Setup: Node-Locked or Transportable Licenses on Linux

This section describes how to set up node-locked or transportable licenses (locked to a particular computer or instrument), including perpetual, time-based, and trial licenses.

If you plan to use counted licenses on this machine and have not already set up the local license server, follow the instructions on the page [Linux License Server Setup](#), setting up the license server **on the computer or instrument where you plan to run your licensed Keysight software**. This is necessary to set up the local license server required for counted node-locked licenses.

If you have already set up the local license server, stop the server process as described in Step 1 of [Linux License Server Setup](#).

Step 1: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine your host ID in one of these ways:
 - Execute `lmutil lmhostid` to get the FlexNet host ID directly.
 - Execute `/sbin/ifconfig -a`
Examine the `ifconfig` results to find your Ethernet interface (often called `eth0`) and use its hardware address (`Hwaddr`).
- a. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID. Your license file will be emailed to you.

NOTE If you haven't done this before, you may need to create an account and/or add the Software Manager capability.

Step 2: Save the license file

NOTE Be sure to save the license file on the same system (instrument or computer) where you plan to use the licensed Keysight software.

To save the license file for use by Keysight Licensing:

- a. Make a copy of the license file on your hard disk, either:
 - in the license file directory from Step 1 above, or
 - if you do not have an existing location, in `/var/opt/keysight/licensing/licenses/other`.
- b. Open or cat the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their SERVER statements. If not, edit them to have the same port value. You will

experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.

- c. Set the file permissions so that it can be read by *lmgrd*. For example:


```
chmod a+r <fileName.lic>
```

 This example gives all users read access to the license.

Step 3: Set the license search path

This process allows the licensed product to find its licenses efficiently.

If you have not set up licenses using environment Variables in the past, do the following:

Create (or edit) a file called `~/.eesoflic` in your HOME directory. Each line of this file takes the form:

```
<PRODNAME>_LICENSE_FILE = <license search path>
```

where:

- `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `/var/opt/keysight/licensing/config`. These Names must be in all upper case (they are case sensitive); except for the case, they must match the registered product Name exactly. There must be **only one line per product** in `~/.eesoflic`. If there are multiple license paths for one product, include them on the same line, separated by colons, as shown in the example below.
- `<license search path>` is a colon-separated list of license files, directories, and/or license servers to search when a license is requested for each product. The location you need to specify as the value of this environment Variable is the one where you saved the license file in Step 2, above. You can specify the directory rather than the individual license file; this will save time if you add additional licenses later.
- There must be **exactly one space** on each side of the `=` character, as shown in the example below. If the space is missing, the entry will be ignored.

Example `.eesoflic` file

```
VSA_LICENSE_FILE =
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
BENCHVUE_LICENSE_FILE =
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
```

Now skip to Test your setup, below.

If you HAVE set up licenses using environment Variables in the past, do the following:

If you have already set up licenses on your system using environment Variables (rather than the `.eesoflic` file described below), you should continue to set up subsequent licenses using environment Variables. This is because environment Variables override

the `.eesoflic` file; therefore, if you add entries to `.eesoflic` that conflict with existing environment Variables, your changes will not take effect.

To set up licenses using environment Variables, set the environment Variable(s) `<PRODNAME>_LICENSE_FILE` to contain the colon-separated list of license files, directories, and/or license servers to search when a license is requested for each product, where `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `/var/opt/keysight/licensing/config`. This environment Variable can be set in the user login startup file, such as `.cshrc` (for C shell) or `.profile` (for Bourne shell) in the `$HOME` directory. Alternatively, you can set the Variable on the command line, as shown below.

The location you need to specify as the value of this environment Variable is the one where you saved the license file in Step 2, above. You can specify the directory rather than the individual license file; this will save time if you add additional licenses later.

Example command line for `csch`, `tcsh`, `cshrc`

```
setenv <PRODNAME>_LICENSE_FILE
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
```

Example command line for `ksh`, `bash`

```
export <PRODNAME>_LICENSE_FILE=
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
```

Test your setup

To test your configuration, run

```
lmutil lmdiag -c $<PRODNAME>_LICENSE_FILE
```

If it doesn't find licenses, see [How to Troubleshoot Problems](#).

NOTE You must install a license (Step 2 above) before you can start the license server manager and vendor daemon.

If all your licenses are unserved, uncounted licenses (do not contain a `SERVER` line), you do not need to start the license server manager, and you have now finished your setup.

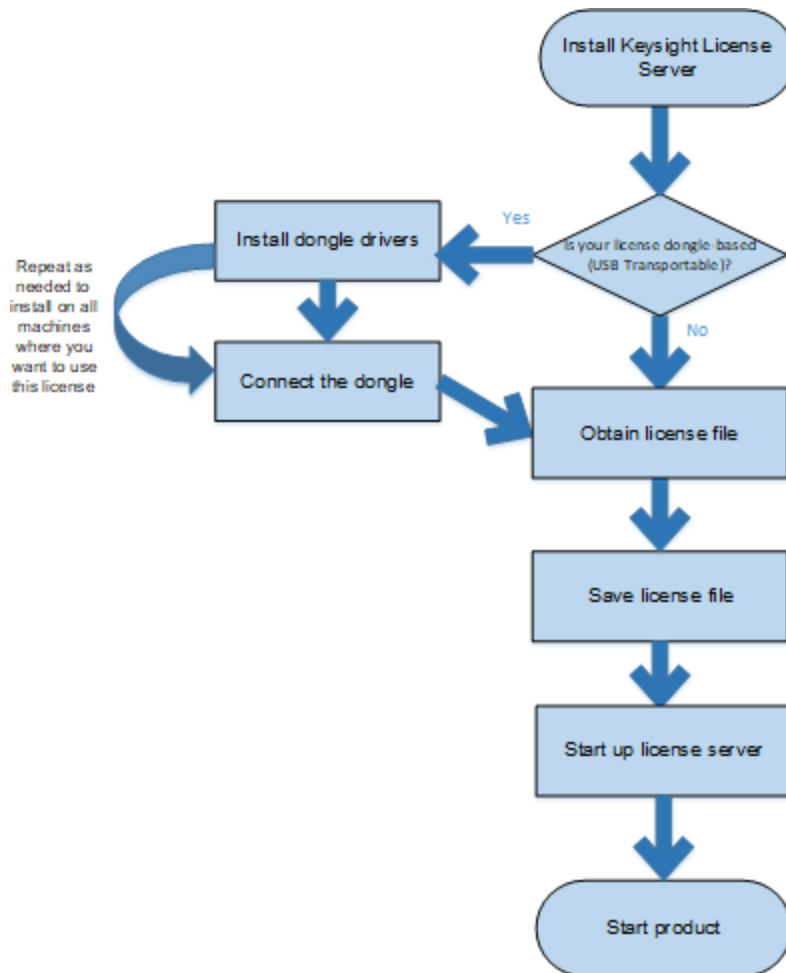
Counted node-locked, transportable, and USB portable licenses require the license server manager to run on the local machine.

- Windows: In the Windows Services app, **Restart** the license server service (such as **EEsof EDA License Server**).
- Linux:
 - Stop `lmgrd` and `agileesofd`:
`lmutil lmdown -c "/var/opt/keysight/licensing/licenses/server"`
 - Restart `lmgrd` and `agileesofd`:
`lmgrd.exe -c /var/opt/keysight/licensing/licenses/server-1 <license log file path>`

Manual Setup: USB Portable Licenses on Linux

This section describes how to set up USB portable licenses, which are locked to a USB key (dongle).

License setup process: USB portable licenses



Do this step if you plan to use counted licenses on this machine.

On each computer or instrument where you plan to run your licensed Keysight software, follow these steps to download and install the Keysight License Server. This is necessary to set up the local license server required for USB portable licenses.

NOTE PathWave licensing requires version **2019.05.17** or later of the Keysight License Server.

- On your license server machine, open your web browser and navigate to <http://www.keysight.com/find/licenseserver>.
- Download the *agilesofd-
<version>-<platform>.tar.gz* archive.

- c. Untar the files, either:
 - to the executable location from Step 1 above, or
 - if you do not have an existing location, to `/opt/keysight/licensing/agileesofd`.

Follow these steps on each system (instrument or computer) that is intended to run Keysight product(s) with USB portable license(s).

- a. Download the FLEXID10 USB Dongle Driver from <http://www.keysight.com/find/LicensingUsbDriver>.
- b. Ensure that the USB dongle is not connected to your system.
- c. Change directory to the location of your license server files (such as `/opt/keysight/licensing/agileesofd`).
- d. Execute the following command (you may need root privileges):
`rpm -i WkRt-Lin-6.32.1504-500.x86_64.rpm`
- e. Connect the USB dongle to your local machine.
- f. To determine whether the FlexNet ID of the USB dongle is correct, type:
`lmutil lmhostid -flexid`

NOTE

For more information and detailed instructions, see the *FlexNet Publisher Driver Installation Guide for FlexNet ID Dongles*, available from <https://flexeracomunity.force.com/customer/CCDocumentation> (login required).

Step 2: Connect the dongle

Make sure that the dongle is securely attached to the USB port of your computer. Some systems may require up to a few minutes to detect the dongle; therefore, make sure to allow sufficient time before the next step

Step 3: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine your dongle ID in one of these ways:
 - Before you install the hardware key on your machine, you can read the ID directly from the key.
 - If you have installed the hardware key on your machine, and have also already installed your licenses and the FlexNet software, go to `/opt/keysight/licensing/agileesofd` and enter the following command to check the ID:
`lmutil lmhostid -flexid`
This ID is a valid USB Key serial number: 9 or 1, a dash, and 8 hexadecimal characters. Examples: **9-1234abcd** or **10-1234abcd**.

NOTE

If you see a No such file or directory error when you try to run `lmutil`, then you need to install the [Linux Standard Base library](#). Use `yum` to install `redhat-1sb`.

- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and dongle ID. Your license file will be emailed to you.

NOTE If you haven't done this before, you may need to create an account and/or add the Software Manager capability.

Step 4: Save the license file

NOTE Be sure to save the license file on *each* system (instrument or computer) where you plan to use the licensed Keysight software.

To save the license file for use by Keysight Licensing:

- a. Make a copy of the license file on your hard disk, either in the license file directory from Step 1 above, or if you do not have an existing location:
 - If the license is served and counted (license file contains a `SERVER` line), place it in in `/var/opt/keysight/licensing/licenses/server`
 - If the license is unserved and uncounted (license file does not contain a `SERVER` line), place it in in `/var/opt/keysight/licensing/licenses/other`

See [Recognize Your License Type](#) for more information.
- b. Open or cat the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their `SERVER` statements. If not, edit them to have the same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.
- c. Set the file permissions so that it can be read by `lmgrd`. For example:


```
chmod a+r <fileName.lic>
```

This example gives all users read access to the license.

Step 5: Set the license search path

This process allows the licensed product to find its licenses efficiently.

If you have not set up licenses using environment Variables in the past, do the following:

Create (or edit) a file called `~/.eesoflic` in your HOME directory. Each line of this file takes the form:

```
<PRODNAME>_LICENSE_FILE = <license search path>
```

where:

- `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `/var/opt/keysight/licensing/config`.
These Names must be in all upper case (they are case sensitive); except for the case, they must match the registered product Name exactly.
There must be **only one line per product** in `~/.eesoflic`. If there are multiple license paths for one product, include them on the same line, separated by colons, as shown in the example below.

- `<license search path>` is a colon-separated list of license files, directories, and/or license servers to search when a license is requested for each product. The location you need to specify as the value of this environment Variable is the one where you saved the license file in Step 2, above. You can specify the directory rather than the individual license file; this will save time if you add additional licenses later.
- There must be **exactly one space** on each side of the = character, as shown in the example below. If the space is missing, the entry will be ignored.

Example .eesoflic file

```
VSA_LICENSE_FILE =
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
BENCHVUE_LICENSE_FILE =
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
```

Now skip to Test your setup, below.

If you HAVE set up licenses using environment Variables in the past, do the following:

If you have already set up licenses on your system using environment Variables (rather than the .eesoflic file described below), you should continue to set up subsequent licenses using environment Variables. This is because environment Variables override the .eesoflic file; therefore, if you add entries to .eesoflic that conflict with existing environment Variables, your changes will not take effect.

To set up licenses using environment Variables, set the environment Variable(s) `<PRODNAME>_LICENSE_FILE` to contain the colon-separated list of license files, directories, and/or license servers to search when a license is requested for each product, where `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `/var/opt/keysight/licensing/config`. This environment Variable can be set in the user login startup file, such as `.cshrc` (for C shell) or `.profile` (for Bourne shell) in the `$HOME` directory. Alternatively, you can set the Variable on the command line, as shown below.

The location you need to specify as the value of this environment Variable is the one where you saved the license file in Step 2, above. You can specify the directory rather than the individual license file; this will save time if you add additional licenses later.

Example command line for csh, tcsh, cshrc

```
setenv <PRODNAME>_LICENSE_FILE
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
```

Example command line for ksh, bash

```
export <PRODNAME>_LICENSE_FILE=
/var/opt/keysight/licensing/licenses/server:/var/opt/keysight/licensing/licen
ses/other
```

Test your setup

To test your configuration, run

```
lmutil lmdiag -c $<PRODNAME>_LICENSE_FILE
```

If it doesn't find licenses, see [How to Troubleshoot Problems](#).

NOTE You must install a license (Step 4 above) before you can start the license server manager and vendor daemon.

If all your licenses are unserved, uncounted licenses (do not contain a `SERVER` line), you do not need to start the license server manager, and you have now finished your setup.

Counted node-locked, transportable, and USB portable licenses require the license server manager to run on the local machine.

- Windows: In the Windows Services app, **Restart** the license server service (such as **EEsof EDA License Server**).
- Linux:
 - Stop *lmgrd* and *agileesofd*:


```
lmutil lmdown -c
"/var/opt/keysight/licensing/licenses/server"
```
 - Restart *lmgrd* and *agileesofd*:


```
lmgrd.exe -c /var/opt/keysight/licensing/licenses/server-
l <license log file path>
```


Manual Setup: Floating Licenses on Linux

To set up floating (network) licensing, you'll need to do license server setup and client setup.

License server setup

Repeat the following steps on each license server. (For help on choosing a license server, see the *FlexNet Publisher's License Administration Guide*, installed with Keysight License Server 6.)

Step 1: Determine your executable and license locations and stop any existing server process

- a. First, run `ps -ef | grep agileesofd` to see whether there is already an *agileesofd* process running on your license server.
- b. If you find such a process, determine the path to its executable by executing `readlink -f /proc/<pid>/exe`. Make note of this path.
- c. Go to that location and run *lmtools.exe*.
- d. In the LMTOOLS window, go to the Config Services tab and take note of the **Path to the license file**. This is where you'll put your new licenses.
- e. Close LMTOOLS.
- f. Kill the *agileesofd* process.

Step 2: Install Keysight License Server on the license server machine

- a. On your license server machine, open your web browser and navigate to <http://www.keysight.com/find/licenseserver>.
- b. Download the *agileesofd-<version>-<platform>.tar.gz* archive.
- c. Untar the files, either:
 - to the executable location from Step 1 above, or
 - if you do not have an existing location, to `/opt/keysight/licensing/agileesofd`.

Step 3: Obtain a license file

- a. If you have ordered a licensed Keysight product, you'll receive (typically by email) a license certificate. Note the order number and certificate number.
- b. Determine the license server's host ID in one of these ways:
 - On the server machine, execute `lmutil lmhostid` to get the FlexNet host ID directly.

NOTE If you see a No such file or directory error when you try to run `lmutil`, then you need to install the **Linux Standard Base library**. Use `yum` to install `redhat-1sb`.
 - On the server machine, execute `/sbin/ifconfig -a`
Examine the `ifconfig` results to find your Ethernet interface (often called `eth0`) and use its hardware address (`Hwaddr`). For example, in the `ifconfig` output shown below, the host ID is

```
00:0c:29:c0:06:65.
```

```
eth0 Link encap:Ethernet HWaddr 00:0c:29:c0:06:65
      inet addr:156.140.113.178 Bcast:156.140.113.255
Mask:255.255.254.0
      inet6 addr: fe80::20c:29ff:fec0:665/64 Scope:Link
      UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
      RX packets:36522 errors:0 dropped:0 overruns:0 frame:0
      TX packets:10160 errors:0 dropped:0 overruns:0
carrier:0
      collisions:0 txqueuelen:1000
      RX bytes:38094114 (38.0 MB)
      TX bytes:695114 (695.1 KB)
```

- c. Go to <http://www.keysight.com/find/softwaremanager> to obtain your license file. Follow the instructions on screen to enter your order number, certificate number, and host ID.

NOTE If you haven't done this before, you may need to create an account and add the Software Manager capability.

- d. Follow additional instructions to request a license file, which will be emailed to you.

Step 4: Save the license file

To save the license file for use by Keysight Licensing:

- a. Make a copy of the license file on your hard disk, either:
 - in the license file directory from Step 1 above, or
 - if you do not have an existing location, in `/var/opt/keysight/licensing/licenses/server` .
- b. Open or cat the license files in the directory to ensure they all specify the same port value (between 27000 and 27009, inclusive) in their SERVER statements. If not, edit them to have the same port value. You will experience licensing failures if the licenses have conflicting port numbers. See [Port Number Conflicts](#) for more information.
- c. Set the file permissions so that it can be read by *lmgrd*. For example:


```
chmod a+r <fileName.lic>
```

 This example gives all users read access to the license.

Step 5: Start the license server manager

NOTE You must install a license (Step 3 above) before you can start the license server.

Start the license server manager (*lmgrd*) and vendor daemon (*agileesofd*) on the machine to which the license is tied as follows:

- a. Change directory to the location of your server files (for example, `/opt/keysight/licensing/agileesofd`).
- b. Run the following command to start *lmgrd*:


```
./lmgrd -c <license file path> -l <license log file path>
```

 where:

<license file path> specifies one or more full path Names to license file(s) and/or folder(s) containing license files.

<license log file path> is the full path Name to the debug log file.

To automate the license server manager's startup upon system reboot, add something similar to the following sample script in the system boot services directory or in */etc/rc.d/init.d*.

```
#!/bin/sh
#
# Sample FlexNet startup script for restarting Keysight License Server
#
### BEGIN INIT INFO
# Provides: license server
# Required-Start: $network
# Required-Stop:
# Default-Start: 3 4 5
# Default-Stop:
# Description: Start License Server
### END INIT INFO
sudo /opt/keysight/licensing/agileesofd/lmgrd -c
/var/opt/keysight/licensing/licenses -l
/var/log/keysight/licensing/log/license-server.log
echo "Starting Keysight FlexNet license daemon....."
sleep 5
```

Once you implement your version of the FlexNet startup script using the above sample, follow the steps below to complete the automation:

1. Change to the system boot services directory */etc/rc.d/init.d*.
2. Create a startup script (for example, *keysight_lmgrd_restart*) in the system boot services directory.
3. Insert your FlexNet startup script (above) into the startup script.
4. Set the permissions for this script as follows:

```
chmod 755 keysight_lmgrd_restart
chown root keysight_lmgrd_restart
chgrp sys keysight_lmgrd_restart
```

5. If this machine is your license server, run this command:


```
/sbin/chkconfig --add keysight_lmgrd_restart
```
6. Create a system service file (*keysight_lmgrd.service*), with the contents shown below, in the system boot services directory */etc/systemd/system*.

```
[Unit]
Description=Keysight License Service
After= multi-user.target
[Service]
Type=simple
ExecStart= /etc/rc.d/init.d/keysight_lmgrd_restart.sh
TimeoutStartSec=0
[Install]
WantedBy= default .target
```

7. From the terminal, execute the command:
`systemctl enable keysight_lmgrd.service`

The license server will be automatically started as soon as the system is restarted.

NOTE If you see one of these errors when you start *lmgrd*:

```
lmgrd: /lib64/ld-1sb-x86-64.so.3: bad ELF interpreter: No
such file or directory
```

```
lmgrd: No such file or directory
```

then you need to install the **Linux Standard Base library**. Use `yum` to install `redhat-1sb`.

If you need to stop the license server manually, execute the following (substituting your license location if it is different):

```
lmutil lmdown -c /var/opt/keysight/licensing/licenses
```

Client setup

Clients of a Linux license server can run Linux and/or Microsoft Windows. These instructions are for Linux client setup. See **Setting Up Floating Licenses** for Windows client setup.

Step 1: Provide access to licenses

Once you have successfully configured all the license servers, configure each client (the instruments and/or computers on which you will run Keysight products) to point to the appropriate license server.

If you have not set up licenses using environment Variables in the past, do the following:

To configure a client, create (or edit) a file called `~/.eesofflic` in your HOME directory. Each line of this file takes the form:

```
<PRODNAME>_LICENSE_FILE = <license search path>
```

where:

- **<PRODNAME>** is the short Name of the product, matching the prefix of the **<PRODNAME>.xml** file installed with each product at `/var/opt/keysight/licensing/config`. These Names must be in all upper case (they are case sensitive); except for the case, they must match the registered product Name exactly. There must be **only one line per product** in `~/.eesofflic`. If there are multiple license paths for one product, include them on the same line, separated by colons, as shown in the example below.

- `<License search path>` is a comma-separated list of license files, directories, and/or license servers to search when a license is requested for each product. Be sure to specify the network license server Name in the format `port@host.domain`, or, if no static TCP port is used on the license server, use the format `@host.domain`. To determine your server Name, run `lmutil lmstat -lm`
- There must be **exactly one space** on each side of the `=` character, as shown in the example below. If the space is missing, the entry will be ignored.

Example `.eesoflic` file

```
VSA_LICENSE_FILE = 27009@es-
okra.cos.is.keysight.com:27009@myserver.company.com
BENCHVUE_LICENSE_FILE =
/var/opt/keysight/licensing/licenses/other:/var/opt/keysight/license_files
```

Now skip to Test your setup, below.

If you have already set up licenses on your system using environment Variables

If you have already set up licenses on your system using environment Variables (rather than the `.eesoflic` file described below), you should continue to set up subsequent licenses using environment Variables. This is because environment Variables override the `.eesoflic` file; therefore, if you add entries to `.eesoflic` that conflict with existing environment Variables, your changes will not take effect.

To set up licenses using environment Variables, set the environment Variable(s) `<PRODNAME>_LICENSE_FILE` to contain the list of license files, directories, and/or license servers to search when a license is requested for each product, where `<PRODNAME>` is the short Name of the product, matching the prefix of the `<PRODNAME>.xml` file installed with each product at `/var/opt/keysight/licensing/config`. This environment Variable can be set in the user login startup file, such as `.cshrc` (for C shell) or `.profile` (for Bourne shell) in the `$HOME` directory. Alternatively, you can set the Variable on the command line, as shown below.

Be sure to specify the network license server Name in the format `port@host.domain`, or, if no static TCP port is used on the license server, use the format `@host.domain`. To determine your server Name, run `lmutil lmstat -lm`

Command line for `csh`, `tcsh`, `cshrc`

```
setenv <PRODNAME>_LICENSE_FILE port@host.domain
```

Command line for `ksh`, `bash`

```
export <PRODNAME>_LICENSE_FILE= port@host.domain
```

Test your setup





To test your configuration, run

```
lmutil lmdiag -c $<PRODNAME>_LICENSE_FILE
```

If it doesn't find licenses, see [Floating License Problems](#) for troubleshooting assistance.

Appendix: Migrating from Older Versions of Keysight Licensing

This table describes the differences and equivalencies of Keysight license management tool versions, as well as actions you can take to minimize headaches when using different generations of Keysight licenses together.

PathWave License Manager / PathWave Desktop Edition	Keysight License Manager 6	Keysight Floating License Manager	EDA License Manager	Function
Add a License File	Add/remove a license on your local machine	Start a floating license server with a license file (or "Change floating license server files" if the server is already running)	Add or replace a license file	Installs a license on the machine where the tool is running (this may be the machine where the licensed product will run, or it may be a network license server) and starts the license server process
Specify a Remote License Server	Specify remote license server(s)	Connect to a floating license server	Add or replace a network license server	Allows you to configure where your licensed product will look to find floating licenses.
Not in this tool;	Not in this tool	Not in this tool	Request additional licenses	Takes you to the Keysight Software Manager web site.
Close button	Close button	I will do this later	Close button	Closes the tool without making any changes to your licensing.
Not in this tool	Not in this tool	Not in this tool	Change the default product license	When there are multiple licenses available for the same product/feature, but in different bundles, this option allows you to choose which one is preferred.
Add License	Home	 Configure	Configure	Takes you to the "home" initial screen of the tool.
Not in this tool	Environment	 Environment	Environment	Displays environment Variables and other system configuration information.
License Status	View licenses	 Licenses	Licenses	Displays a list of available licenses.
Not in this tool	License usage	 Usage	Usage	Displays the usage of floating licenses.
Borrow Licenses (under License)	Borrow license	Not in this tool	Not in this tool	Allows you to use a floating (network) license offline for an extended period of time.

Status >
Floating
Licenses)



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5951-5739
www.keysight.com