



# License Management Guide

IDL Version 5.2  
November, 1998 Edition  
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## Chapter 1

# License Management Concepts

Access to IDL, ENVI, and other products from Research Systems is controlled by software that ensures a proper software license has been installed on the system in use. In most cases, Research Systems' products will run without a license installed; unlicensed versions have some software features disabled and exit automatically after seven minutes. This unlicensed mode allows for short demonstrations and tests, but prevents unlicensed systems from running for extended periods of time. Once the license is installed, the full functionality of the product becomes available in an unlimited mode.

Depending on the type of computer you have and the type of license you have purchased, you will have received either a hardware-based node-locked license, a software-based node-locked license, or a floating (Client/Server) license. This chapter describes each type of license and discusses some general license management topics. The following chapters discuss platform-specific license management details for the different types of computers supported by Research Systems' products.

## License Types

Several types of licenses are available for Research Systems' products.

### Hardware-Based Node-Locked Licenses

*Hardware-based node-locked licenses* use of a combination of a physical hardware key and a special code that, when installed along with the software, allows Research Systems products to run in their licensed mode. The hardware key, or *Hasp*, must be installed on the same machine as the software. Both the hardware key and the license code are required in order to run the software in licensed mode.

Traditionally, Research Systems has used hardware-based node-locked licenses for machines running Microsoft Windows and the Macintosh OS. Macintosh systems continue to use these licenses, and the details on installing both the hardware key and the license code are discussed in the *Macintosh Installation Guide*.

Microsoft Windows systems can use both hardware-based and software based node-locked licenses as well as floating (Client/Server) licenses. If you are unsure about which type of license you have purchased for your Windows system, consult the *Research Systems Product Installation Form* you received with your purchase, or ask your Research Systems sales representative.

### Software-Based Node-Locked and Floating (Client/Server) Licenses

Both *software-based node-locked* and *client/server licenses* use a license file containing information based on a unique host ID from the machine or machines to be licensed. For some types of these licenses a program called a *license manager* runs on the system to determine whether the proper license for a given product is available. If the proper license is present and not already in use, the license manager allows the software to run. For some types of node-locked licenses, including those used on Windows systems, the license manager is not used.

Client/Server licensing has several advantages. Since the license manager can operate over a network, many computers can share a limited number of licenses for a Research Systems product without the need for the physical hardware key. For Unix and VMS, Client/Server licensing may allow the software to run on a remote computer; the real computational work may occur on a powerful server, while results are displayed on inexpensive terminals.

In order to gain the ability to administer licenses over a network in this way, however, the license manager software itself must be installed and run, and the central repository of license information must be maintained in a location accessible over the network.

## What is the License Manager?

Research Systems products that use Client/Server licensing use the Globetrotter Software FlexLM license manager. The license manager runs all the time your system is running, and waits for a request from a Research Systems product. When a request arrives, the license manager checks the license file for the system to determine if:

1. a license for the product being requested is installed on the system, and
2. the license is not already in use.

If a license is available, the software will run.

Before you run one of these Research Systems products, you must provide us with information so that we can create a *license file*, which you must install on your system. You must then start (or arrange to start automatically) the license manager itself.

## How do Client/Server Licenses Work?

The license file, which Research Systems provides, encodes information about your system along with a description of which products are licensed and how many copies of each can be run simultaneously. Each license you purchase provides a certain number of *license units*; when a license is requested, a certain number of these license units are “checked out” and become unavailable to other users until the software exits.

Different products and different platforms “cost” different numbers of license units in order to run. Depending on the total number of license units you have purchased, you will be able to run different numbers of concurrent sessions of the Research Systems product. For example, while a product running on a Sun Ultra workstation may require ten license units in order to run, the same product running on a Linux system may require six units. This means that if you have ten units available, you will be able to run *either* a single session on a Sun Ultra or a single session on Linux systems. If you have six units available, you will be able to run a session on a Linux or Windows system, but not on a Sun Ultra.

## Where is License Information Located?

For all systems except VMS, license information is located in a file named `license.dat`, located in the `license` subdirectory of the Research Systems product directory on your system. For example, on most Unix systems, this means that the license file is located in the `/usr/local/rsi/license` directory.

**Note** In releases of Research Systems' products prior to the release of IDL 5.1, license information was located in the main IDL directory for that release. For VMS systems, the proper location for the license file continues to be the main IDL directory.

You can locate the license file in other locations if you set the appropriate environment variables, logical names, or preferences, depending on the type of system you are using. See the chapter in this volume that discusses the platform on which your license manager runs for complete details.

## Multiple Products Using the License Manager

Since use of the FlexLM license manager is not unique to Research Systems, the possibility exists that you will need to run software from two or more software vendors that all use FlexLM licensing. In this case, the potential for license server conflict exists. Read carefully the appropriate section in the platform-specific chapter of this volume for details on using the same license manager for software from multiple vendors.



## Chapter 2

# License Management for Unix Systems

Access to IDL, ENVI, and other products from Research Systems is controlled by the Globetrotter Software FlexLM license manager. Before you run one of these Research Systems products, you must provide some information so that a license file can be created for you to install on your system. You must then start (or arrange to start automatically) the license manager itself.

Basic instructions on installing your license file and starting the license manager are contained in your installation booklet. This document provides greater detail regarding the license manager, and discusses license manager utilities you may need to use if your system is unusual or if you are administering a complex system with multiple licenses.

### **The RSI Directory**

When you install a product from Research Systems, the installation program asks you to choose a directory in which the product will be installed. In these instructions, as in your installation guide, we refer to this directory as the

*RSI-Directory*. We recommend that you install Research Systems' products in the directory `/usr/local/rsi`.

## ENVI and other Products based on IDL

Research Systems distributes several products based on IDL and written in the IDL language. License management for these products is essentially the same as for IDL itself; the differences generally consist of added *feature lines* in the license file. In these instructions, we generally talk as if you are installing a license for IDL; for example, path names are usually relative to the main IDL directory, `idl_5.2`.

## Installing your License File

Your license file will be sent to you via electronic mail or fax. If your file is sent via e-mail, simply save the e-mail message as a file named `license.dat` and remove any header lines before the beginning of the actual license information. If you receive your license file via fax or other hardcopy method, you will have to create the file on your system using your favorite plain text editor (`vi` or `emacs`, for example).

### Locate the License File

Once you have obtained your license file, you need to decide where to put it. In these instructions, we use *RSI-Directory* to signify the directory where you installed IDL. Usually, this is `/usr/local/rsi`, but you may have chosen a different directory for your installation.

### Default Location of the License File

We recommend saving your license file with the path and filename *RSI-Directory/license/license.dat*. If you put your license file in this directory, you do not have to redefine any environment variables.

Note that if you have other software that is using the Globetrotter Software FlexLM license manager, you may want to combine the IDL or ENVI license file with that existing one. See “Multiple Vendors Using The Same License Manager” on page 19.

### Using a Different Location

If you choose a location other than *RSI-Directory/license* for the license file, it must be accessible from all server nodes and from any node that runs IDL or ENVI. You must also define the Unix environment variable `LM_LICENSE_FILE` to be the actual path to the license file prior to using IDL or any license manager programs.

For example, if you save your license file as `/license/license.dat`, IDL or ENVI will not run properly until you define the `LM_LICENSE_FILE` variable as follows:

```
setenv LM_LICENSE_FILE /license/license.dat
```

## Sample License Files

Example license files, along with more information on the meanings of the individual lines in the license file is provided in the “The License File” on page 9.

## Starting the License Manager Daemon

In most cases, you will need to start the license manager daemon (as described below) before IDL or ENVI can access a network license and run in licensed mode. You should also set up your system so that the license manager daemon is automatically started when your system is booted.

If you are using a license file that contains only type MU-NS (multi-user, unlimited, no server) licenses, which do not contain `SERVER` or `DAEMON` lines, you do not need to start the license manager daemon.

## Starting the License Manager Daemon

Once you have the license file in place on your system, start the daemon interactively by entering the following command:

```
RSI-Directory/idl_5.2/bin/lmgrd [-c license_path]
```

where:

*license\_path* is the full pathname to the license file. The default is *RSI-Directory*/license/license.dat. If you use the default location or define the `LM_LICENSE_FILE` environment variable (as described in the previous section), it is not necessary to specify the `-c` option and this path.

The `lmgrd` script locates the IDL distribution by using the value of the `IDL_DIR` environment variable. Failing that, it looks for a directory named `/usr/local/rsi/idl_5.2`. Therefore, if the main IDL directory is not accessible as `/usr/local/rsi/idl_5.2`, the `IDL_DIR` environment variable must be defined prior to using `lmgrd` (see your Installation booklet or *Using IDL* for details.)

If you receive an error message while trying to start the license manager daemon, consult “License Manager Startup Troubleshooting” on page 25 for possible solutions to your problem.

## Privileges Needed to Run the License Manager

The daemon does not require any special privileges to work, and can be started by any user. Therefore, if you are concerned about the security ramifications of running the daemon from the `root` account, it can be started by any user. Note that special privileges *are* required to *shut down* the license manager.

## Starting the Daemon at Boot Time

To have the license server daemon automatically start every time your servers are booted, you should add the license manager startup command (described above) to the system startup script. (On some systems, you may need to install a controlling script rather than changing the system startup script.)

Although the general idea is the same for all Unix systems, the exact details differ between platforms. In all cases, you should consult the documentation for your system. The guidelines below are intended to serve as a starting point.

These systems all require modification of system files and/or directories to start the daemon. Such changes may be lost when you update the operating system. Therefore, you should keep notes on the changes made, so that you can properly customize new operating system releases.

### BSD Unix

BSD Operating systems that are based on the Berkeley 4.2 and 4.3 distributions (SunOS) use the file `/etc/rc.local` for this purpose. Add the daemon startup command to the end of this file.

### IBM AIX

Add the daemon startup command to the end of the `/etc/rc` file.

### System V Unix

Sun Solaris, SGI IRIX, Hewlett-Packard HP/UX, and Digital UNIX systems use the System V approach to starting programs at boot time. This technique consists of placing a controlling script in a directory (usually `/etc/init.d` or `/sbin/init.d`) and creating links to that script that are run at system startup and shutdown.

A template for the controlling script can be found in the file *RSI-Directory/idl\_5.2/bin/sys5\_idl\_lmgrd*. Read this file for instructions that apply to your system. After customizing this script for your site, copy the file to the appropriate directory and create the links that are described in the file. For additional information, see the system administrator's manual for your system or the manual pages for `init`, `rc0`, `rc2`, and `rc3`.

## Accessing Floating Licenses from Non-server Workstations

If your license file allows access to floating licenses (type “FL”), they can be accessed from different machines on a network. In order to start IDL or ENVI and obtain a floating license, the client machines must have access to both the IDL or ENVI software and the license file used by the license server. This access can be ensured in several ways.

One way is to use NFS to mount the partition on the license server containing the *RSI-Directory* onto the client machines. Assuming that the license file was in the *RSI-Directory/license* directory, this method would give access to both the IDL or ENVI software and the license file.

Another method is to have a separate *RSI-Directory* on the client machine. In this case, a copy of the license file from the license server could be placed in the local IDL directory to allow access to the floating licenses on the license server. Note that the hostname and LMHostid on the SERVER line of the `license.dat` file indicate which machine should be contacted to obtain a license.

The two methods described above are the most simple. There are other possible configurations, however. A file server could be used for the IDL or ENVI software and this machine may be different from either the license server or the client machine on which you want to run IDL or ENVI. Also, the environment variable `LM_LICENSE_FILE` could be used to change license access from a local `license.dat` file in the default location to a `license.dat` file in a different location. The key is to make sure that both the IDL or ENVI software and the correct license file are accessible.

## Running Older Versions of IDL Concurrently with IDL 5.2

It is sometimes possible to run older versions of IDL using the IDL 5.2 license manager. If you have both IDL 5.2 and older versions of IDL installed on the same network, refer to “Running Older Versions of IDL with IDL 5.2” on page 20.

## If You Encounter Errors

If the license manager gives an error message when starting, turn to “License Manager Startup Troubleshooting” on page 25.

## The License File

The license file controls:

- Which products can run
- Which machines they can run on

- How many copies can run concurrently

The `FEATURE` lines of the license file determine which products are available. The `SERVER` lines define which machines the products run on. The number of copies of the product that can run concurrently is controlled by the number of *license units* available, as specified by either the `FEATURE` or `INCREMENT` lines.

## A Note about License Units

Different types of computers require different numbers of license units to run IDL. Workstation-class machines require 10 license units per copy of IDL. PC-class machines (computers using Intel processors) require 6 license units per copy of IDL. For example, in order to run IDL on a Sun workstation, you need 10 license units. To run IDL on a computer running Linux, you need 6 license units. This means that if you have a mixed network consisting of both workstations and PC-class machines, the number of copies of IDL available at any given time depends on which machines have checked out licenses.

## Sample License Files

The following are examples of what different license files look like.

### An IDL License File

The following example license file is built for the license server “hal” which has the LMHostid 1497946. The machine hal also has an unlimited usage node-locked license given by the `FEATURE` line. Note the LMHostid 1497946 at the end of the `VENDOR_STRING` line which goes with the `FEATURE` line.

There is another system, with the LMHostid number 5720ff5f, which has a six user node-locked license given by the first `INCREMENT` line. The last `INCREMENT` line allows four floating licenses on the network.

The last line in the license file is the `FEATURESET` line which ties all the `FEATURE` and `INCREMENT` lines together:

```
SERVER hal 1497946 1700
DAEMON idl_lmgrd /usr/local/rsi/idl_5.2/bin
FEATURE idl idl_lmgrd 5.200 1-jan-00 0 DB2CE0E19251E66D16FA \
    VENDOR_STRING="1234-1Acme Datawack Corp - hal" HOSTID=1497946 \
    ck=69
INCREMENT idl idl_lmgrd 5.200 1-jan-00 60 2BBC1021D4C72A51501F \
    VENDOR_STRING="1234-2Acme Datawack Corp - 1 tom" \
    HOSTID=5720ff5f ck=215
INCREMENT idl idl_lmgrd 5.200 1-jan-00 40 6B0CC081E93439AF61C2 \
    VENDOR_STRING="1234-3Acme Datawack Corp - 4 FL" ck=65
FEATURESET idl_lmgrd 8F51913A3B9BABCA
```

**Note** The `INCREMENT` line for the six user node-locked license (the first `INCREMENT` line) shows 60 license units. This is not an error. Each counted IDL

license requires 10 license units on the FEATURE or INCREMENT line. Similarly, the INCREMENT line for the four floating licenses shows 40 license units.

The following example ENVI license files are built for the license server “hal”, which has the LMHostid 1497946.

### A Full ENVI License (Includes IDL)

The following is a typical ENVI license that includes one IDL floating license and one “envi” feature:

```
SERVER hal 1497946 1700
DAEMON idl_lmgrd /usr/local/rsi/idl_5.1/bin
FEATURE envi idl_lmgrd 3.000 1-jan-00 1 BB86C00111B946E38EA1 \
    VENDOR_STRING="1234-2Acme Datawack Corp" ck=234
FEATURE idl idl_lmgrd 5.000 1-jan-00 10 1BD610C1414838270B20 \
    VENDOR_STRING="1234-1Acme Datawack Corp" ck=155
FEATURESET idl_lmgrd E6881FB3C58A4ECD
```

### An ENVI Runtime License (Does Not Include IDL)

The following is a typical ENVI runtime license that includes one floating IDL runtime license and one “envi” feature:

```
SERVER hal 1497946 1700
DAEMON idl_lmgrd /usr/local/rsi/idl_5.1/bin
FEATURE envi idl_lmgrd 3.000 1-jan-00 1 EB36501154E7A8A4D5BA \
    VENDOR_STRING="1234-3Acme Datawack Corp" ck=15
FEATURE idl_rt idl_lmgrd 5.000 1-jan-00 10 9BB6A041006CB24EFB96 \
    VENDOR_STRING="1234-3Acme Datawack Corp" ck=67
FEATURESET idl_lmgrd 2993C72E80158A68
```

## The Individual Lines of the License File

The lines in a license file have the following meanings:

### SERVER

There is one SERVER line for each license server node on your network. This line is not present if you have only MU type licenses. The fields contained in this line are:

#### nodename

The string returned by the Unix hostname command.

#### id

The string returned by the lmhostid command.

#### port\_number

The TCP port number to use. The TCP port is described in more detail below. The daemon uses port 1700 by default but this can be changed if it conflicts

with some other application running on your network. You should consult the `/etc/services` file on your system to determine if such a conflict exists. Note that if the daemons are to be run from a non-root account, the specified port number must be greater than 1024.

## DAEMON

There is only one DAEMON line related to Research Systems software in a license file. This line is not present if you have only type MU licenses. The fields contained in this line are:

### daemon\_name

The name of the daemon that serves the IDL licenses. This daemon is always called `idl_lmgrd`.

### path

The path to the directory containing the daemon. The daemon is always located in the `bin` subdirectory of the IDL distribution.

Note that the name and location of the options file is no longer included on the DAEMON line. See the section below on the option file for details on the use of an options file.

## FEATURE

There is one FEATURE line per node-locked host, and a single FEATURE line for floating licenses. The floating license line is always listed after any node-locked FEATURE lines. The fields in a FEATURE line are:

### name

The name of the program whose license is being managed. Examples include `idl`, `envi`, and `insight`.

### daemon

The name of the daemon that controls access to IDL. This field is always `idl_lmgrd`.

### version

The license version number.

### exp\_date

Expiration date for this FEATURE.



**#license\_units**

If non-zero, the number of license units allowed. Otherwise, the line is for an unlimited number of node-locked licenses, and this field is set to zero.

The number of license units is a platform-dependent scale factor times the number of licenses you own. For example, if you have 3 floating licenses for a Sun system, this field is set to 30.

**code**

The encryption code for this license.

**VENDOR\_STRING**

The user's site number and site notice combined into a single string.

**HOSTID**

If present, the host ID of the machine to which this license is node-locked. This field is only used in node-locked FEATURE lines. If this field is empty, this license is for floating network licenses.

**ck**

A checksum number can be used to check the validity of the FEATURE or INCREMENT line.

**INCREMENT**

Some license files may use INCREMENT lines in addition to (or instead of) FEATURE lines. INCREMENT lines contain the same fields as FEATURE lines. INCREMENT lines are used when a user's license configuration includes multiple-user node-locked licenses or a combination of multi-user node locked and floating licenses.

**FEATURESET**

The FEATURESET line ties all of the lines related to the daemon `idl_lmgrd` together. No lines with the daemon name `idl_lmgrd` can be removed from or added to the license file. FEATURE or INCREMENT lines for other products are not affected by the use of the FEATURESET line for the `idl_lmgrd` daemon.

## Altering the License File

Only four data items in the license file can be modified by the user:

- hostnames (but not host IDs) on SERVER lines

- port numbers on SERVER lines
- pathnames on DAEMON lines
- options file pathnames on DAEMON lines

Changing any other field will render your license file unusable. Adding or removing any FEATURE or INCREMENT lines with the daemon name “idl\_lmgrd” renders the license file unusable.

## The License Manager Daemon

The license manager daemon provides access for floating licenses to machines on the network.

### Starting the Server Daemon

The license manager server daemon can be started by entering the following command:

```
RSI-dir/idl_5.2/bin/lmgrd [-c path] [-t timeout]
```

where:

*path* is the full pathname to the license file. The default is *RSI-dir*/license/license.dat. If you use the default location or define the LM\_LICENSE\_FILE environment variable (as described in the previous section), it is not necessary to specify the -c option and this path.

*timeout* is the time-out, in seconds, for “connect” calls to other daemons operating in multi-server mode. The default is usually sufficient, and this option is rarely needed. Use it if network traffic or server loads are unusually high in your environment. If you want to use the default time-out, it is not necessary to specify the -t option and the time-out value.

### More Information on the lmgrd Script

The file *RSI-Directory*/idl\_5.2/bin/lmgrd is a shell script that determines the type of system it is running on and then overlays itself with the real lmgrd from the appropriate bin subdirectory of the IDL distribution.

This script locates the IDL distribution by using the value of the IDL\_DIR environment variable. Failing that, it looks for a directory named /usr/local/rsi/idl\_5.2. Therefore, if the main IDL directory is not in /usr/local/rsi/idl\_5.2, you must make sure that the IDL\_DIR environment variable is defined prior to starting the daemon.

## The License Manager Log File

The license manager daemon writes a log of its activities to its standard output. If you don't want to keep a log, you can redirect the standard output to the null device (`/dev/null`) by starting the license manager with the command:

```
RSI-Directory/idl_5.2/bin/lmgrd > /dev/null
```

It is also possible to direct the log to the system console with the command:

```
RSI-Directory/idl_5.2/bin/lmgrd > /dev/console
```

If you wish to keep a permanent log file, you should choose a location on your system where a growing log won't cause disk space problems. On Sun systems, the `/var./adm` directory is a reasonable choice.

## The Options File

You can customize IDL license management by creating a daemon options file. This file allows you to reserve licenses for specified users or groups of users, and allow or disallow the use of IDL by certain users.

To customize the license manager, create an options file as described below. In versions of IDL prior to IDL 5.2 the name and location of the options file was specified in the license file itself. With IDL 5.2 the options file must be called "idl\_lmgrd.opt" and must be in the same location as the license.dat file. With the file named as described the license manager will recognize the options file and the file does not need to be included in the license file.

Each option is specified on a separate line of the file, and each line starts with one of the keywords described below:

### RESERVE

Ensures that IDL will always be available to a specified user, host, display, or group of users.

### INCLUDE

Specifies the users, hosts, displays, or group of users allowed to use IDL.

### EXCLUDE

Specifies the users, hosts, displays, or group of users not allowed to use IDL. When used in conjunction with the INCLUDE keyword, EXCLUDE takes precedence.

### GROUP

Specifies a group of users for use with the other option keywords.

## NOLOG

As the daemon runs, it sends log messages to its standard output. These log messages are generally captured in a log file, as described in “The License Manager Log File” above. This option causes log messages of the specified type to be filtered out of the daemon’s log file.

Messages that can be filtered are IN, OUT, DENIED, and QUEUED.

## Format of Lines in the Options File

A daemon options file consists of lines with the following format:

```
RESERVE # idl [USER | HOST | DISPLAY | GROUP] name
INCLUDE idl [USER | HOST | DISPLAY | GROUP] name
EXCLUDE idl [USER | HOST | DISPLAY | GROUP] name
GROUP name <list_of_users>
NOLOG [IN | OUT | DENIED | QUEUED]
```

Lines beginning with the pound sign (#) are ignored, and can be used as comments. For example, the following options file would reserve one copy of IDL for user pat, 3 copies for user lee, and a copy for anyone on a computer with the hostname terry (remember that each IDL license uses 10 floating license units), and would cause QUEUED messages to be omitted from the log file:

```
RESERVE 10 idl USER pat
RESERVE 30 idl USER lee
RESERVE 10 idl HOST terry
NOLOG QUEUED
```

## License Manager Support Utilities

We supply several license manager support utilities for controlling the operation of the license server daemon. These commands are all found in the `bin` subdirectory of the IDL distribution as shell scripts.

These scripts run the correct binary executable for your system by determining the type of system they are running on and then invoking the actual binary executable from the appropriate `bin` subdirectory. These scripts locate the IDL distribution by using the value of the `IDL_DIR` environment variable. Failing that, they look for a directory named `/usr/local/rsi/idl_5.2`. Therefore, if the main IDL directory is not accessible as `/usr/local/rsi/idl_5.2`, the `IDL_DIR` environment variable must be defined prior to using any license manager support utilities.

If your license file is not located in `RSI-Directory/license/license.dat`, you will need to define the `LM_LICENSE_FILE` environment variable to point at the actual license file before most of these support programs will work. For example,

if you placed the license file in `/usr/local/licenses` you would use the following Bourne shell statements:

```
LM_LICENSE_FILE=/usr/local/licenses/license.dat
export LM_LICENSE_FILE
```

Using the C-shell (`/bin/csh`), the equivalent command would be:

```
setenv LM_LICENSE_FILE /usr/local/licenses/license.dat
```

### Shutting Down The License Manager

The `lmdown` program initiates a graceful shutdown of all license daemons by sending a message to every license daemon asking it to shut down. The license daemons write out their last messages to the log file, close the file, and exit. All licenses which have been given out by those daemons are rescinded, so that the next time an IDL process goes to verify its license, it will not be valid. The syntax for the `lmdown` command is:

```
lmdown [-c license_file] [-q]
```

OPTIONS:

**-c license\_file**

Include this command line option to use the specified license file. If this switch is not specified, `lmdown` looks for the environment variable `LM_LICENSE_FILE`. If that environment variable is not set, `lmdown` looks for the file `RSI-Directory/license/license.dat`.

**-q**

Include this option to run `lmdown` in “quiet mode”. If this switch is not specified, `lmdown` asks for confirmation before asking the license daemons to shut down. If this switch is specified, `lmdown` does not ask for confirmation.

Security note: Unauthorized use of the `lmdown` command can be disruptive because when the server daemon shuts down, all current IDL sessions are terminated. You should ensure that the file access modes on your system are sufficiently restrictive. We recommend setting the permissions for `lmdown` with the following Unix command:

```
chmod 500 RSI-Directory/idl_5.2/bin/lmdown
```

### Obtaining a Host ID

The `lmhostid` program calls the license manager version of `gethostid` and displays the results. The output of `lmhostid` looks like this:

```
lmhostid - Copyright (C) 1989-1994 Globetrotter Software, Inc.
The FLEXlm host ID of this machine is "8002add0"
```

## Removing a License

If a licensed user is running IDL when the machine crashes, the license that was in use may fail to be returned to the server. In this case, the license is not available to other users. The `lmremove` program allows the system administrator to remove a single user's license for a specified feature and allow the license to return to the pool of available licenses. The syntax for the `lmremove` command is:

```
lmremove [-c license_file] idl user host display
```

The three required arguments correspond to the username, hostname, and terminal device associated with the checked out license. The `lmstat` command, described below, can be used to obtain this information prior to using `lmremove`.

Optional flags for `lmremove` are:

### -c license\_file

Include this option to use the specified license file. If this switch is not specified, `lmremove` looks for the `LM_LICENSE_FILE` environment variable. If that environment variable is not set, `lmremove` looks for the file *RSI-Directory/license/license.dat*.

Security note: Unauthorized use of the `lmremove` command can be disruptive because when an IDL session has its license removed, that session is terminated. You should ensure that the file access modes on your system are sufficiently restrictive. We recommend setting the permissions for `lmremove` with the following Unix command:

```
chmod 500 RSI-Directory/idl_5.2/bin/lmremove
```

which allows access only to the file owner. This is the default protection we apply to `lmremove` in the IDL distribution.

## License Manager Status

The `lmstat` program provides information about the status of the server nodes, license daemons, and currently checked out licenses. The syntax for the `lmstat` command is:

```
lmstat [-a] [-A] [-c license_file] [-l [regular_expr]]
                                             [-s [server]]
```

Optional flags for `lmstat` are:

### -a

Include this option to display all available information about the license manager status. If this argument is not present, only a brief summary of the daemon's state is given.

-A

Include this option to see a list of all active licenses.

-c *license\_file*

Include this option to use the specified license file. If this switch is not specified, `lmstat` looks for the `LM_LICENSE_FILE` environment variable. If that environment variable is not set, `lmstat` looks for the file *RSI-Directory/license/license.dat*.

-l [*regular\_expression*]

Include this option to list all users of the features matching the given regular expression.

-s [*server*]

Include this option to display the status of the specified server node(s).

## Multiple Vendors Using The Same License Manager

IDL's network license management facility is provided by the FLEXible License Manager (FLEXlm), a product of Globetrotter Software (previously Highland Software). Since this license manager is not unique to IDL, the possibility exists that you will need to run software from two or more software vendors that all use FLEXlm. In this case, the potential for license server conflict exists. There are two cases to be considered:

- All products use the same set of license server nodes.
- The products use different license servers.

### All Products Use the Same Set of Server Nodes

If all products use the same set of license server nodes, the solution is simple. Use a text editor to combine license files by taking the set of `SERVER` lines from any *one* license file, and add *all* the `DAEMON`, `FEATURE`, `FEATURESET`, and `INCREMENT` lines from *all* of the license files. Note that you must shut down the license server before editing the license file.

Multiple copies of this combined license file can be placed in the locations required by the various software vendors. Alternatively, a single copy of the license file can be located in any convenient location, in which case end users must set the `LM_LICENSE_FILE` environment variable to point to it.

When you have finished editing the license file, restart the license manager with the *most recent* version of `lmgrd` that you have installed. The version number of

`lmgrd` is displayed when it is started. If an older version of `lmgrd` is used, the license manager daemon from the product with a more recent `lmgrd` will not operate correctly.

### The Products Use Different Server Nodes

If the products use different license servers, separate license files are required—one for each distinct set of license servers. The resulting license files can then be installed in a convenient location, and shell aliases can be created for all the applications with the following single-line command (shown here as two lines):

```
alias prog 'setenv LM_LICENSE_FILE lfpath;prog_path; unsetenv
LMLICENSE_FILE'
```

where:

*prog* is the name the user will call the program.

*lfpath* is the path to the appropriate license file.

*prog\_path* is the path to the application program.

In this case, each license file must specify a different TCP port number for its servers. See “The License File” on page 9.

For example, to create the appropriate alias for IDL, you might use the following single-line command (shown here as two lines):

```
alias idl 'setenv LM_LICENSE_FILE /usr/local/rsi/license/li-
cense.dat;
/usr/local/rsi/idl_5.2/bin/idl; unsetenv LM_LICENSE_FILE'
```

If you have edited the license file, restart the license manager with the most recent version of `lmgrd` that you have installed. The version number of `lmgrd` is displayed when it is started. If an older version of `lmgrd` is used, the license manager daemon from the product with a more recent `lmgrd` will not operate correctly.

## Running Older Versions of IDL with IDL 5.2

In many cases, it is possible to run older versions of IDL concurrently with the most recent version. If a FEATURE line has the version number 5.200, for example, it will allow IDL 5.2 and all earlier versions of IDL to run. In some cases, new license manager capabilities such as the INCREMENT line may prevent an older versions of IDL from working with the latest version of the license manager.

### Start the Latest Version of the License Manager

In general, it is important to start the license manager from the latest IDL distribution and use the same license file for the older IDL distribution. The



license manager should only be started once, from the new distribution. It should not be started from the old IDL distribution.

### Using IDL Version 5 and 4 with the IDL Version 5.2 License Manager

The license manager from IDL version 5.2 will support IDL 5.0 and IDL 4.0 clients. No modifications to the IDL 5.2 license file are necessary to run IDL 5.0 and IDL 4.0 concurrently with IDL 5.2.

### Using IDL Version 3.6 or Earlier with the IDL Version 5.2 License Manager

IDL 5.2 uses INCREMENT lines to support combinations of multiple counted licenses such as floating licenses with a single user node-locked license. If the IDL 5.2 license file contains “idl” INCREMENT lines, it is not possible to run IDL 3.6 concurrently with IDL 5.2. If the IDL 5.2 license file does not contain INCREMENT lines, the file must be modified to match the IDL 3.6 format.

To allow IDL version 3.6 or earlier to run with the IDL version 5.2 license manager, you must make a copy of your version 5.2 license file, modify it as described below, and place it in the older IDL directory. Alternatively, you can change the LM\_LICENSE\_FILE environment variable to point to the modified license file.

Suppose your IDL 5.2 format license file looks like this:

```
SERVER hal 1497946 1700
DAEMON idl_lmgrd /usr/local/rsi/idl_5.2/bin
FEATURE idl idl_lmgrd 5.200 1-jan-00 60 4B5C0031FAEDA3438F7E \
    VENDOR_STRING="1234-1Acme Datawack Corp" \
    HOSTID=1497946 ck=49
FEATURESET idl_lmgrd 07CD2F44BA73799D
```

To modify this file to the old format, remove the VENDOR\_STRING= keyword (leave the quoted string unchanged). For node-locked licenses, remove the HOSTID= keyword (leave the hostid number.) Remove the ck=nnn item and the continuation backslashes from the previous line (making the FEATURE line a single line).

Our example file, in the modified format that can be used by both IDL 5.2 and IDL 3.6 becomes:

```
SERVER hal 1497946 1700
DAEMON idl_lmgrd /usr/local/rsi/idl_5.2/bin
FEATURE idl idl_lmgrd 5.200 1-jan-00 60 4B5C0031FAEDA3438F7E "1234-1Acme Datawack Corp"
1497946
FEATURESET idl_lmgrd 07CD2F44BA73799D
```

**Note** In the actual license file, the `hostid` immediately before the `FEATURESET` line should be on the end of the `FEATURE` line. It has been wrapped to a different line in this document.

## Troubleshooting

If IDL or ENVI runs in demo mode after you have attempted to license the product, follow the appropriate suggestions below and try running IDL again. If you see errors from the license manager itself, turn to “License Manager Startup Troubleshooting” on page 25.

1. Is the proper executable file (`idl`) in your command search path?

The Unix command:

```
which idl
```

will tell you if it is in your command search path and where it is. You can verify that the search path is the problem by executing IDL directly. If the command:

```
RSI-Directory/idl_5.2/bin/idl
```

(where *RSI-Directory* is the main installation directory specified previously) runs IDL, you know that the search path is to blame.

2. Are the file protections correct?

If you receive the error message “Permission denied” when you try to run IDL, check the protections set on all the executables. They should have execute permission set for all categories. Set execute permissions for IDL by entering:

```
chmod ugo+x RSI-Directory/idl_5.2/bin/idl
```

3. Check the location of the main IDL directory.

Make sure that IDL knows the location of the main IDL directory. If you installed IDL in `/usr/local/rsi` or if there is a symbolic link from there to *RSI-Directory*, then no special action is necessary. Otherwise, the environment variable `IDL_DIR` must be defined to point to the actual location of IDL (see your Installation booklet or *Using IDL* for details.)

4. Check that the server daemon is running.

The `lmstat` license manager utility provides information on the status of the license manager. Enter:

```
RSI-Directory/idl_5.2/bin/lmstat
```

If you receive the following message:

```
License server status:
name: cannot connect to license server (Connection refused)
```

```
Vendor daemon status (on name):  
idl_lmgrd : cannot connect to license server (Connection refused)  
the server is not running correctly.
```

**5. Stop and restart the license manager.**

Exit IDL and stop the license manager, then restart it, directing the output of the daemon to a file. Enter:

```
RSI-Directory/idl_5.2/bin/lmdown
```

Check to make sure that all the license manager processes have shut down with a command like:

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

If there are any license manager processes still running, use the kill command to stop them. Restart the license manager with the following command:

```
RSI-Directory/idl_5.2/bin/lmgrd > logfile
```

Examine the resulting file *logfile* for error messages, and refer to “License Manager Startup Troubleshooting” on page 25.

**6. Is the LM\_LICENSE\_FILE environment variable set to the license file of another application?**

Enter the command:

```
echo $LM_LICENSE_FILE
```

to see the current definition of the environment variable. If this environment variable points to some other license file, you will need to unset it prior to starting IDL by entering:

```
unsetenv LM_LICENSE_FILE
```

**7. Is the license server reachable from your machine?**

If IDL displays the following error message at startup:

```
LICENSE MANAGER: cannot connect to license server.
```

make sure that you can `rlogin` to the server machine. If you can remotely log in to the server machine, ensure that the license manager is running on that machine.

**8. Has your license file been copied correctly?**

If IDL displays the following error message at startup:

```
% LICENSE MANAGER: encryption code in license file is inconsistent.  
some of the encrypted information in the license file is not correct. This can  
involve the server hostid, the daemon name, and any character on the FEATURE  
line.
```

Examine your license file and correct the FEATURE line so that it exactly matches the one sent to you by Research Systems. Check for capitalization and spaces. Shut down the license manager (by running `RSI-Directory/idl_5.2/bin/lmdown`) and restart it using the corrected license file.

**9. Is the license manager using the correct license file?**

If IDL displays the following error message at startup:

```
LICENSE MANAGER: no such feature exists.
LICENSE MANAGER: license file does not support this feature.
```

the license manager may be using the wrong license file. Reset the `LM_LICENSE_FILE` environment variable to point to IDL's license file using the command:

```
setenv LM_LICENSE_FILE RSI-dir/license/license.dat
```

**10. Does the license file contain the correct hostname?**

If IDL displays the following error message at startup:

```
% LICENSE MANAGER: cannot find SERVER hostname in network database.
the hostname in the license file does not agree with the actual hostname for the
server, or cannot be accessed from the client node. Edit the license file and correct
the hostname.
```

**11. Are network permissions set properly?**

If IDL displays the following message at startup, *except when run from the root account*:

```
% LICENSE MANAGER: invalid host.
```

make sure that the ethernet device (usually `/dev/lan0`) has `rw` permission for owner, group and other. It probably just has `rw` permission for owner (`root`).

This error occurs most often on HP-UX systems. You can use `/etc/lanscan` to check for the name of the ethernet device. It's the item under the heading "NameUnit".

**12. Is the license file in the correct location and are its permissions set correctly?**

If you receive one of the following three error messages, IDL is unable to access the `license.dat` file:

```
% Trial version expired.
% Machine not licensed for IDL. Entering 7 minute Demo mode. This
Demo mode is for short-term product evaluation purposes only.
% Unable to open validation file:
/pathname/idl.genver.
```

```
No such file or directory
% Machine not licensed for IDL. Entering 7 minute Demo mode. This
Demo mode is for short-term product evaluation purposes only.
% Unexpected validation error.
% Machine not licensed for IDL. Entering 7 minute Demo mode. This
Demo mode is for short-term product evaluation purposes only.
```

Check the permissions on the `license.dat` file. All users need read permission. Also make sure the `license.dat` filename is spelled correctly. If you are using the environment variable `LM_LICENSE_FILE`, make sure that the full path and filename of the `license.dat` file are set correctly.

### 13. Contact Research Systems technical support.

If the above suggestions do not clear up the problem, contact Research Systems technical support at (303) 413-3920 or by e-mail at [support@rsinc.com](mailto:support@rsinc.com). International customers should contact their local RSI office or distributor for technical support.

It is often helpful to submit a copy of your license file as well as a copy of any error messages produced by IDL or the license manager program.

## License Manager Startup Troubleshooting

If the license manager gives an error message when starting, find the error message below and follow the instructions to eliminate the error.

### 14. Invalid Server Hostname

```
date time (lmgrd) "Hostname1": Not a valid server hostname, exiting.
date time (lmgrd) Valid server hosts are: "Hostname2"
```

In spite of the error message, *Hostname1* is the hostname of the server that probably *should* be in the license file, while *Hostname2* is the incorrect hostname currently in the license file. Edit your license file to contain the correct hostname.

### 15. Inconsistent Encryption Code

```
date time (idl_lmgrd) Inconsistent encryption code for idl
```

There is a problem with the information on the `FEATURE` or `INCREMENT` line of the license file. It has not been copied correctly from the fax or e-mail message. Also, check to make sure that the usage of capitalization and spaces is exactly as in the message. Finally, check to make sure that long lines in the license file have not been inadvertently wrapped to a new line. (Refer to “The License File” on page 9 for examples of the correct license file format.)

### 16. No Features to Serve

```
date time (idl_lmgrd) No features to serve!
```

There are no valid FEATURE or INCREMENT lines. This is most commonly due to the “inconsistent encryption code” error described above.

### 17. Retrying Socket Bind

```
date time (lmgrd) Retrying socket bind (address in use: port 1700)
```

An attempt has been made to start the license manager when it was already (at least partially) running. This often happens when the license file contains a mistake, the mistake is corrected, and the license manager is started again before the first attempt has been shut down or killed. There may also be some other software product using the default port number, 1700.

Run `lmdown` to shut down the license manager, or kill the `lmgrd` and `idl_lmgrd` processes before starting the license manager again.

### 18. No Such File or Directory

```
license daemon: execl failed: ../idl -T host 2.40 3 -c
license daemon: system error code: No such file or directory
```

The path on the DAEMON line of the license file is incorrect. It should point to the bin subdirectory of the IDL or ENVI distribution. Edit the license file and correct the DAEMON line.

### 19. No "License" Server Found

```
date time (lmgrd) No "license" service found.
```

This error means that no TCP/IP service port number is specified or no TCP/IP service is available.

Check for the existence of the `/etc/services` file. Make sure that the file contains the following line:

```
tcpmux          1/tcp
```

### 20. Cannot Find License File

```
license manager: can't initialize: cannot find license file
(No such file or directory)
```

```
date time (lmgrd) Using license file "filename"
```

The license manager cannot find the `license.dat` file. Either the `license.dat` file is not in the default location or the file specified in the environment variable `LM_LICENSE_FILE` is incorrect. Also, make sure that the filename `license.dat` is spelled correctly and that you have read permission for the `license.dat` file.

### 21. Cannot Read License File

```
license manager: can't initialize: cannot read license file
(Permission denied)
```

The permissions are set incorrectly on the `license.dat` file. Set the file to read permission for all users. For example, use the command:

```
chmod 444 license.dat
```

## 22. Wrong Hostid

```
date time (idl_lmgrd) Wrong hostid, exiting (expected xxxx, got
xxxx)
```

```
date time (lmgrd) Please correct problem and restart daemons
```

The permissions are set incorrectly on the ethernet device. This is a common problem on HP systems. Set read-write permission on the ethernet device (`/dev/lan0`) with the command:

```
chmod 666 /dev/lan0
```

Shutdown the license manager if it is still running and then restart it.

## 23. Path Not Found

```
lmgrd: PATH/bin.platform/lmgrd: not found.
```

This error indicates that the IDL directory is not in a standard location and that the environment variable `IDL_DIR` is not set to the actual IDL directory. There are several solutions to the problem:

- Change directories to the IDL directory and issue the following command:

```
bin/lmgrd
```

- Set the environment variable `IDL_DIR` to point to the main IDL directory and then execute the `lmgrd` startup command.
- Edit the script *RSI-Directory*/`idl_5.2/bin/lmgrd` and add the location of your IDL directory to the `for` loop found on line 59 of this file. This addition will probably be required to successfully start the license manager at boot time if IDL is located in a non-standard location.

Change directories to *RSI-Directory*/`idl_5.2/bin`. Make a copy of the `lmgrd` script:

```
cp lmgrd lmgrd.bak
```

Open the `lmgrd` script with an editor. Go to the loop after the comment about finding the main IDL directory and add your IDL directory to the `for` loop.

Change the following line (shown below as 2 lines):

```
for DIR in /usr/local/rsi/idl_5.2 /usr/local/idl
/usr/local/bin/idl . ./idl
```

to:

```
for DIR in RSI-Directory/idl_5.2 /usr/local/idl
/usr/local/bin/idl . ./idl
```

Again, this line is shown as 2 lines, but should be a single line in the `lmgrd` script.

**24. Check out the Globetrotter Web Site.**

The Globetrotter Web site contains on-line documentation and an excellent FLEXlm FAQ. This information can be helpful when trying to combine licenses from different vendors. See the following Web pages:

Globetrotter home page: <http://www.globetrotter.com>

FLEXlm FAQ: <http://www.globetrotter.com/flmfaq.htm>

**25. Contact Research Systems Technical Support.**

If the above suggestions do not clear up the problem, contact Research Systems technical support at (303) 413-3920 or by e-mail at [support@rsinc.com](mailto:support@rsinc.com). International customers should contact their local RSI office or distributor for technical support.

It is often helpful to submit a copy of your license file as well as a copy of any error messages produced by IDL or the license manager program.



## Chapter 3

# License Management for Windows Systems

Access to IDL, ENVI, and other products from Research Systems is controlled by either a hardware-based node-locked license, a software-based node-locked license, or by a floating (Client/Server) license managed by the Globetrotter Software FlexLM license manager. If you have a hardware-based node-locked license, see your Installation Guide for details on installing the license. If you have a software-based node-locked license or a floating license, you must provide some information so that a license file can be created for you to install on your system before you run one of these Research Systems products. For floating licenses, you must then start (or arrange to start automatically) the license manager itself. For node-locked licenses, the license manager does not need to be started.

This document describes the license manager, and discusses license manager utilities you may need to use if your system is unusual or if you are administering a complex system with multiple licenses. For node-locked licenses that do not

require the use of the license manager, the instructions in the *Windows Installation Guide* should be adequate to license IDL.

## The RSI Directory

When you install a product from Research Systems, the installation program asks you to choose a directory in which to install the product. In these instructions, as in your installation guide, we refer to this directory as the *RSI-Directory*. We recommend that you install Research Systems products in the directory `C:\RSI`.

## ENVI and other Products based on IDL

Research Systems distributes several products based on IDL and written in the IDL language. License management for these products is essentially the same as for IDL itself; the differences generally consist of added *feature lines* in the license file. In these instructions, we generally talk as if you are installing a license for IDL; for example, path names are usually relative to the main IDL directory, `IDL52`.

## Installing Your License File

Your license file will be sent to you via electronic mail or fax. If your file is sent via e-mail, simply save the e-mail message as a file named `license.dat` and remove any header lines before the beginning of the actual license information. If you receive your license file via fax or other hardcopy method, you will have to create the file on your system using a Windows text editor (Notepad, for example).

## Locate the License File

Once you have obtained your license file, you need to decide where to put it. In these instructions, we use *RSI-Directory* to signify the directory where you installed IDL. Usually, this is `C:\RSI`, but you may have chosen a different directory for your installation.

### Default Location of the License File

We recommend saving your license file with the path and filename *RSI-Directory\license\license.dat*. If you put your license file in this directory, you do not have to redefine any environment variables.

Note that if you have other software that is using the Globetrotter Software FlexLM license manager, you may want to combine the IDL or ENVI license file with that existing one. See “Multiple Vendors Using The Same License Manager” on page 42.

### Using a Different Location

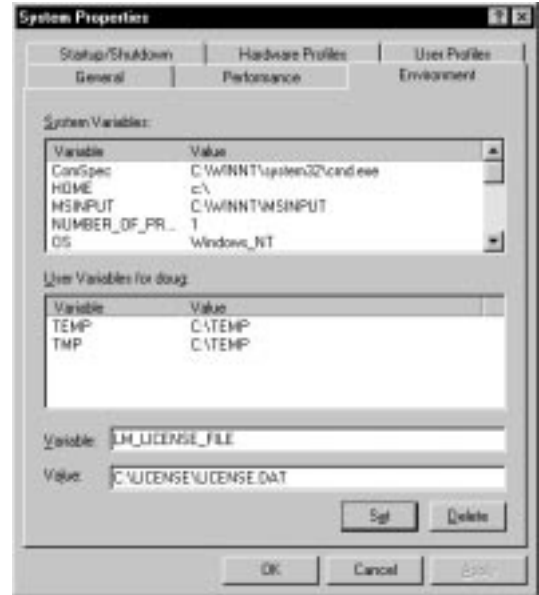
If you choose a location other than *RSI-Directory\license* for the license file, it must be accessible from all server nodes and from any node that runs IDL or ENVI. You must also define the environment variable `LM_LICENSE_FILE` to be the actual path to the license file prior to using IDL or any license manager programs.

For example, if you save your license file as

`C:\license\license.dat`,  
Research Systems products will not run properly until you define the `LM_LICENSE_FILE` variable as follows:

For Windows NT systems

1. Double-click on the "System" icon in the Control Panel and click on the "Environment" tab.
2. Enter "`LM_LICENSE_FILE`" in the Variable field.
3. Enter the path to the license file in the Value field.
4. Click "Set".



For Windows 95 systems

Add the setting for the environment variable to the `autoexec.bat` file as follows:

```
SET LM_LICENSE_FILE = C:\RSI\license\license.dat
```

### Sample License Files

Example license files, along with more information on the meanings of the individual lines in the license file is provided in "The License File" on page 34.

## Starting the License Manager

If you are running only node-locked licenses, you do not need to start the license manager. (If your license file does not contain `SERVER` or `DAEMON` lines then it contains only node-locked licenses and the license manager does not need to be started.)

For other licenses such as floating licenses you will need to start the license manager (as described below) before Research Systems products can access a network license and run in licensed mode. You must also set up your system so that the license manager is automatically started when your system is booted.

If you plan to access licenses from a license manager on some other machine in the network, such as a Unix machine, you will not need to start the license manager on your Windows machine. See “Accessing Floating Licenses from Non-server Workstations” on page 34 for more information.

## Installing the License Manager

The Client/Server license manager is a custom install option in IDL for Windows. You must install the license manager on the Windows NT machine that will be the license server. (The license manager runs as a Windows NT service, so the license server must be a machine running NT. It is not necessary to install the server option on NT machines that will be license clients.)

To install the license manager, select Custom Install when running the installation program, then select the Client/Server Licensing option to install the files necessary to start the license manager. This will install the following files in the IDL52 directory:

<code>install_lm_server.exe</code>	<i>Program to install the license manager as an NT service.</i>
<code>lmgrd.exe</code>	<i>Main license manager daemon.</i>
<code>idl_lmgrd.exe</code>	<i>License manager vendor daemon.</i>

Once you have installed the product, run the `install_lm_server.exe` program to install the license manager as an NT service. To do this, open a Command Prompt window on the machine that will be the license server and change directories to the IDL directory of the newly installed product. Be sure to use a DOS command prompt window, rather than any other shell window that may be available on your system. Enter the following command:

```
INSTALL_LM_SERVER -C <LICENSE FILE PATH> -L <LOG FILE PATH> -E <PATH TO LMGRD>
```

For example, for an installation of IDL 5.2 in the RSI-directory is `C:\RSI`, the command to install the license manager service would be:

```
INSTALL_LM_SERVER -C C:\RSI\LICENSE\LICENSE.DAT
-L C:\RSI\LICENSE\LMGR_LOG.TXT -E C:\RSI\IDL52\LMGRD.EXE
```

**Caution** Some common command shell replacements for Windows NT use an alternate path separator character (usually “/” instead of “\”), which may cause

the license manager to look in the wrong place for the files it uses. Always use a “real” Command Prompt window to start the license manager.

The service is installed with the start mode set to “Automatic”. After installing the service, the license manager will not be started automatically until the next time the machine is rebooted. See the section below for details on starting the service manually. Once you have started the service manually and it is operating as desired, you may want to restart your machine to verify that automatic startup is operating correctly.

## Starting and Stopping the License Server Service Manually

Prior to starting the license manager service, make sure that the license file is installed as described above.

To start the License Server service manually, do the following:

1. Double-click on the “Services” icon in the Control Panel.
2. Select FLEXlm License Server from the list and click “Start” or “Stop”.
3. To toggle the service between automatic and manual startup modes, click “Startup” and select the desired startup mode from the dialog.

The Windows NT Services dialog appears with the License Server service selected.

## Starting the License Server Service At Boot Time

Once the service has been started manually and is operating as desired check to make sure that the startup mode is set to start the service automatically when the machine is started. To start the License Server service automatically on machine startup, do the following:

1. Double-click on the “Services” icon in the Control Panel.
2. Select FLEXlm License Server from the list.
3. Click Startup and select the “Automatic” startup mode from the dialog.

## Removing the License Server Service

To remove the license manager service from the machine use the program `install_lm_server.exe`.

```
INSTALL_LM_SERVER -R
```

Note that this removes the license manager service, and should not be used to simply stop the service. To stop the service, see “Starting and Stopping the License Server Service Manually” on page 33.

## Setting Clients to use Client/Server Licensing

After you have installed Research Systems software on a new Windows client machine, start the software and open the License dialog as described in the Installation Guide. Choose “Floating” on the licensing dialog, and paste in the text of the license file into the text field provided. If you prefer not to paste the text into the dialog, you can place the `license.dat` file in the default location, `RSI-directory\license\license.dat`, prior to starting IDL.

If you wish to switch the licensing mode of a previously installed and licensed copy of a Research Systems product, start the software and open the License dialog by entering CTRL-ALT-L and following the procedure outlined above.

## Accessing Floating Licenses from Non-server Workstations

If your license file allows access to floating licenses (type “FL”), the licenses can be accessed from different machines on a network. In order to start a Research Systems product and obtain a floating license, the client machines must have access to both the Research Systems software and the license file used by the license server. This access can be ensured in several ways.

Another method is to have a separate *RSI-Directory* on the client machine. In this case, a copy of the license file from the license server could be placed in the local `license` directory to allow access to the floating licenses on the license server. Note that the hostname and LMHostid on the SERVER line of the `license.dat` file indicate which machine should be contacted to obtain a license.

## If You Encounter Errors

If the license manager gives an error message when starting, see “License Manager Startup Troubleshooting” on page 45.

## The License File

The license file controls:

- Which products can run,
- Which machines they can run on,
- How many copies can run concurrently.

The FEATURE lines of the license file determine which products are available. The SERVER lines define the machines on which the products run. The number of copies of the product that can run concurrently is controlled by the number of *license units* available, as specified by either the FEATURE or INCREMENT lines.

## A Note about License Units

Different types of computers require different numbers of license units to run IDL. Workstation-class machines require 10 license units per copy of IDL. PC-class machines (computers using Intel processors) require 6 license units per copy of IDL. For example, in order to run IDL on a Sun workstation, you need 10 license units. To run IDL on a computer running Windows, you need 6 license units. This means that if you have a mixed network consisting of both workstations and PC-class machines, the number of copies of IDL available at any given time depends on which machines have checked out licenses.

## Sample License Files

The following are examples of what different license files look like.

### An IDL License File

The following example license file is built for the license server “hal”, which has the LMHostid 0000c09a23f0. This license has one floating license for Windows machines plus companion feature lines for Insight and the IDL ActiveX controls.

The last line in the license file is the FEATURESET line, which ties all the FEATURE and INCREMENT lines together:

```
SERVER hal 0000c09a23f0 1700
DAEMON idl_lmgrd C:\RSI\IDL52\idl_lmgrd.exe
INCREMENT insight idl_lmgrd 2.000 1-jan-0000 1 4B46A061D7D5FECE654D \
    VENDOR_STRING="1234-1Acme Datawack Corp" ck=25
FEATURE idl idl_lmgrd 5.200 1-jan-0000 6 5BC6A081FA3009FA5673 \
    VENDOR_STRING="1234-1Acme Datawack Corp" ck=16
FEATURE idl_drawx idl_lmgrd 1.000 1-jan-0000 1 6B76D081B2B69E3A2A59 \
    VENDOR_STRING="1234-1Acme Datawack Corp" ck=230
FEATURESET idl_lmgrd 96C31B1FB71BCAE9
```

**Note** The FEATURE line for the IDL floating license shows 6 license units. This is not an error. Each counted IDL license requires 6 license units on the FEATURE or INCREMENT line.

## The Individual Lines of the License File

The lines in a license file have the following meanings:

### SERVER

There is one SERVER line for each license server node on your network. This line is not present if you have only node-locked licenses. The fields contained in this line are:

### nodename

The string returned by the Unix hostname command.

**id**

The string returned by the `lmhostid` command.

**port\_number**

The TCP port number to use. The TCP port is described in more detail below. The daemon uses port 1700 by default, but this can be changed if it conflicts with some other application running on your network. You should consult the file on your system to determine if such a conflict exists. Note that if the daemons are to be run from a non-root account, the specified port number must be greater than 1024.

**DAEMON**

There is only one DAEMON line related to Research Systems software in a license file. This line is not present if you have only node-locked licenses. The fields contained in this line are:

**daemon\_name**

The name of the daemon that serves the IDL licenses. This daemon is always called `idl_lmgrd`.

**path**

The path to the directory containing the daemon. The daemon is always located in the `bin` subdirectory of the IDL distribution.

**options**

The pathname of the end-user-specified options file. Such a file lets you customize the behavior of the license server. The options file is optional and is described in more detail below.

**FEATURE**

There is one FEATURE line per node-locked host, and a single FEATURE line for floating licenses. The floating license line is always listed after any node-locked FEATURE lines. The fields in a FEATURE line are:

**name**

The name of the program whose license is being managed. Examples include `idl`, `envi`, `insight`, and `idl_drawx`.



**daemon**

The name of the daemon that controls access to IDL. This field is always `idl_lmgrd`.

**version**

The license version number.

**exp\_date**

Expiration date for this FEATURE.

**#license\_units**

If non-zero, the number of license units allowed. Otherwise, the line is for an unlimited number of node-locked licenses, and this field is set to zero.

The number of license units is a platform-dependent scale factor times the number of licenses you own. For example, if you have 3 Windows floating licenses, this field is set to 18.

**code**

The encryption code for this license.

**VENDOR\_STRING**

The user's site number and site notice combined into a single string.

**HOSTID**

If present, the host ID of the machine to which this license is node-locked. This field is used only in node-locked FEATURE lines. If this field is empty, this license is for floating network licenses.

**ck**

A checksum number can be used to check the validity of the FEATURE or INCREMENT line.

**INCREMENT**

Some license files may use INCREMENT lines in addition to (or instead of) FEATURE lines. INCREMENT lines contain the same fields as FEATURE lines. INCREMENT lines are used when a user's license configuration includes multiple-user node-locked licenses or a combination of multi-user node locked and floating licenses.

## FEATURESET

The FEATURESET line ties all of the lines related to the daemon `idl_lmgrd` together. No lines with the daemon name `idl_lmgrd` can be removed from or added to the license file. FEATURE or INCREMENT lines for other products are not affected by the use of the FEATURESET line for the `idl_lmgrd` daemon.

## Altering the License File

Only four data items in the license file can be modified by the user:

- hostnames (but not host IDs) on SERVER lines
- port numbers on SERVER lines
- pathnames on DAEMON lines
- options file pathnames on DAEMON lines

Changing any other field will render your license file unusable. Adding or removing any FEATURE or INCREMENT lines with the daemon name “`idl_lmgrd`” renders the license file unusable.

## The License Manager Daemon

The license manager daemon is a program that runs as a Windows NT service. It provides access for floating licenses to machines on the network.

## The License Manager Log File

The license manager daemon writes a log of its activities to the location specified when installing the service.

## The Options File

You can customize IDL license management by creating a daemon options file. This file allows you to reserve licenses for specified users or groups of users, and allow or disallow the use of IDL by certain users.

To customize the license manager, create an options file as described below. Then edit the license file and specify the option file path as the third field on the DAEMON line (the DAEMON line is described under “The License File” above). For example, the DAEMON line might become:

```
DAEMON idl_lmgrd IDL-dir IDL-dir\options.dat
```

Each option is specified on a separate line of the file, and each line starts with one of the keywords described below:

**RESERVE**

Ensures that IDL will always be available to a specified user, host, display, or group of users.

**INCLUDE**

Specifies the users, hosts, displays, or group of users allowed to use IDL.

**EXCLUDE**

Specifies the users, hosts, displays, or group of users *not* allowed to use IDL. When used in conjunction with the INCLUDE keyword, EXCLUDE takes precedence.

**GROUP**

Specifies a group of users for use with the other option keywords.

**NOLOG**

As the daemon runs, it sends log messages to its standard output. These log messages are generally captured in a log file, as described in “The License Manager Log File” above. This option causes log messages of the specified type to be filtered out of the daemon’s log file.

Messages that can be filtered are IN, OUT, DENIED, and QUEUED.

**Format of Lines in the Options File**

A daemon options file consists of lines with the following format:

```
RESERVE # idl [USER | HOST | DISPLAY | GROUP] name
INCLUDE idl [USER | HOST | DISPLAY | GROUP] name
EXCLUDE idl [USER | HOST | DISPLAY | GROUP] name
GROUP name <list_of_users>
NOLOG [IN | OUT | DENIED | QUEUED]
```

Lines beginning with the pound sign (#) are ignored, and can be used as comments. For example, the following options file would reserve one copy of IDL for user pat, 3 copies for user lee, and a copy for anyone on a computer with the hostname terry (remember that each IDL license uses 10 floating license units), and would cause QUEUED messages to be omitted from the log file:

```
RESERVE 10 idl USER pat
RESERVE 30 idl USER lee
RESERVE 10 idl HOST terry
NOLOG QUEUED
```

## License Manger Support Utilities

We supply a license manager support utility for controlling the operation of the license server daemon. This command is found in the `IDL` directory.

If your license file is not located in `RSI-Directory\license\license.dat`, you will need to use the `-c <license file path>` to specify the location of the license file or define the `LM_LICENSE_FILE` environment variable to point at the actual license file before most of these support programs will work. For example, if you placed the license file in `C:\license`, you would set the `LM_LICENSE_FILE` environment variable to `C:\license\license.dat`.

### Shutting Down The License Manager

The `lmdown` program initiates a graceful shutdown of all license daemons by sending a message to every license daemon asking it to shut down. The license daemons write out their last messages to the log file, close the file, and exit. All licenses that have been given out by those daemons are rescinded, so that the next time an `IDL` process goes to verify its license, it will not be valid. The syntax for the `lmdown` command is:

```
lmutil lmdown [-c license_file] [-q]
```

#### OPTIONS:

##### -c license\_file

Include this command line option to use the specified license file. If this switch is not specified, `lmdown` looks for the environment variable `LM_LICENSE_FILE`. If that environment variable is not set, `lmdown` looks for the file `RSI-Directory\license\license.dat`.

##### -q

Include this option to run `lmdown` in “quiet mode.” If this switch is not specified, `lmdown` asks for confirmation before asking the license daemons to shut down. If this switch is specified, `lmdown` does not ask for confirmation.

### Obtaining a Host ID

The `lmhostid` program calls the license manager version of `gethostid` and displays the results.

```
lmutil lmhostid
```

The output of `lmhostid` looks like this:

```
lmutil lmhostid - Copyright (C) 1989-1994 Globetrotter Software,
Inc.
The FLEXlm host ID of this machine is "8002add0"
```

## Removing a License

If a licensed user is running IDL when the machine crashes, the license that was in use may fail to be returned to the server. In this case, the license is not available to other users. The `lmremove` program allows the system administrator to remove a single user's license for a specified feature and return the license to the pool of available licenses. The syntax for the `lmremove` command is:

```
lmutil lmremove [-c license_file] idl user host display
```

The three required arguments correspond to the username, hostname, and terminal device associated with the checked-out license. The `lmstat` command, described below, can be used to obtain this information prior to using `lmremove`.

Optional flags for `lmremove` are:

### -c license\_file

Include this option to use the specified license file. If this switch is not specified, `lmremove` looks for the `LM_LICENSE_FILE` environment variable. If that environment variable is not set, `lmremove` looks for the file `RSI-Directory\license\license.dat`.

## License Manager Status

The `lmstat` program provides information about the status of the server nodes, license daemons, and currently checked out licenses. The syntax for the `lmstat` command is:

```
lmutil lmstat [-a] [-A] [-c license_file] [-l [regular_expr]]  
[-s [server]]
```

Optional flags for `lmstat` are:

### -a

Include this option to display all available information about the license manager status. If this argument is not present, only a brief summary of the daemon's state is given.

### -A

Include this option to see a list of all active licenses.

### -c license\_file

Include this option to use the specified license file. If this switch is not specified, `lmstat` looks for the `LM_LICENSE_FILE` environment variable. If that environment variable is not set, `lmstat` looks for the file `RSI-Directory\license\license.dat`.

-l [regular\_expression]

Include this option to list all users of the features matching the given regular expression.

-s [server]

Include this option to display the status of the specified server node(s).

## Multiple Vendors Using The Same License Manager

IDL's network license management facility is provided by the FLEXible License Manager (FLEXlm), a product of Globetrotter Software (previously Highland Software). Since this license manager is not unique to IDL, the possibility exists that you will need to run software from two or more software vendors that all use FLEXlm. In this case, the potential for license server conflict exists. There are two cases to be considered:

- All products use the same set of license server nodes.
- The products use different license servers.

### All Products Use the Same Set of Server Nodes

If all products use the same set of license server nodes, the solution is simple. Use a text editor to combine license files by taking the set of SERVER lines from any *one* license file, and add *all* the DAEMON, FEATURE, FEATURESET, and INCREMENT lines from *all* of the license files. Note that you must shut down the license server before editing the license file.

Multiple copies of this combined license file can be placed in the locations required by the various software vendors. Alternatively, a single copy of the license file can be located in any convenient location, in which case end users must set the LM\_LICENSE\_FILE environment variable to point to it.

When you have finished editing the license file, restart the license manager with the *most recent* version of `lmgrd` that you have installed. The version number of `lmgrd` is displayed when it is started. If an older version of `lmgrd` is used, the license manager daemon from the product with a more recent `lmgrd` will not operate correctly.

### The Products Use Different Server Nodes

If the products use different license servers, separate license files are required—one for each distinct set of license servers. The resulting license files can then be installed in the default location for each product.

In this case, each license file must specify a different TCP port number for its servers. See “The License File” on page 34.

## Troubleshooting

If your Research Systems product runs in demo mode after you have attempted to license the product, follow the appropriate suggestions below and try running the product again. If you see errors from the license manager itself, turn to “License Manager Startup Troubleshooting” on page 45.

1. **Check that the server daemon is running.**

The `lmstat` license manager utility provides information on the status of the license manager. Enter:

```
RSI-Directory\idl5.2\bin\lmutil lmstat
```

If you receive the following message:

```
License server status:  
name: cannot connect to license server (Connection refused)  
Vendor daemon status (on name):  
idl_lmgrd : cannot connect to license server (Connection refused)  
the server is not running correctly. Proceed with step 5.
```

2. **Stop and restart the license manager.**

Exit IDL and stop the license manager, then restart it.

3. **Is the `LM_LICENSE_FILE` environment variable set to the license file of another application?**

See “Using a Different Location” on page 31 to check the setting of the `LM_LICENSE_FILE` environment variable. If `LM_LICENSE_FILE` points to some other license file, you will need to unset it prior to starting IDL. See “Installing Your License File” on page 30 for details on setting `LM_LICENSE_FILE`.

4. **Is the license server reachable from your machine?**

If IDL displays the following error message at startup:

```
LICENSE MANAGER: cannot connect to license server.
```

make sure that you can use the network utility “ping” to contact the server machine:

```
ping <server name>
```

If you can ping the server machine, ensure that the license manager is running on that machine.

5. **Has your license file been copied correctly?**

If IDL displays the following error message at startup:

```
% LICENSE MANAGER: encryption code in license file is inconsistent.  
some of the encrypted information in the license file is not correct. This can  
involve the server hostid, the daemon name, and any character on the FEATURE  
line.
```

Examine your license file and correct the FEATURE line so that it exactly matches the one sent to you by Research Systems. Check for capitalization and spaces. Shut down the license manager service, make any corrections necessary, and restart the service with the corrected license file. To shut down the service, use `RSI-Directory\idl_5.2\bin\lmdown`. See “Starting the License Manager” on page 31 for more information.

6. **Is the license manager using the correct license file?**

If IDL displays the following error message at startup:

```
LICENSE MANAGER: no such feature exists.  
LICENSE MANAGER: license file does not support this feature.  
the license manager may be using the wrong license file. See the section,  
“Installing Your License File” on page 30 for details.
```

7. **Does the license file contain the correct hostname?**

If IDL displays the following error message at startup:

```
% LICENSE MANAGER: cannot find SERVER hostname in network database.  
the hostname in the license file does not agree with the actual hostname for the  
server, or cannot be accessed from the client node. Edit the license file and correct  
the hostname.
```

8. **Check out the Globetrotter Web Site.**

The Globetrotter Web site contains on-line documentation and an excellent FLEXlm FAQ. This information can be helpful when trying to combine licenses from different vendors. See the following Web pages:

Globetrotter home page: <http://www.globetrotter.com>

FLEXlm FAQ: <http://www.globetrotter.com/flmfaq.htm>

9. **Contact Research Systems Technical Support.**

If the above suggestions do not clear up the problem, contact Research Systems technical support at (303) 413-3920 or by e-mail at [support@rsinc.com](mailto:support@rsinc.com). International customers should contact their local RSI office or distributor for technical support.



It is often helpful to submit a copy of your license file as well as a copy of any error messages produced by IDL or the license manager program.

## License Manager Startup Troubleshooting

If the license manager gives an error message when starting, find the error message below and follow the instructions to eliminate the error.

### 1. Invalid Server Hostname

```
date time (lmgrd) "Hostname1": Not a valid server hostname, exiting.  
date time (lmgrd) Valid server hosts are: "Hostname2"
```

In spite of the error message, *Hostname1* is the hostname of the server that probably *should* be in the license file, while *Hostname2* is the incorrect hostname currently in the license file. Edit your license file to contain the correct hostname.

### 2. Inconsistent Encryption Code

```
date time (idl_lmgrd) Inconsistent encryption code for idl
```

There is a problem with the information on the FEATURE or INCREMENT line of the license file. It has not been copied correctly from the fax or e-mail message. Also, check to make sure that the usage of capitalization and spaces is exactly as in the message. Finally, check to make sure that long lines in the license file have not been inadvertently wrapped to a new line. (Refer to “The License File” on page 34 for examples of the correct license file format.)

### 3. No Features to Serve

```
date time (idl_lmgrd) No features to serve!
```

There are no valid FEATURE or INCREMENT lines. This is most commonly due to the “inconsistent encryption code” error described above.

### 4. Retrying Socket Bind

```
date time (lmgrd) Retrying socket bind (address in use: port 1700)
```

An attempt has been made to start the license manager when it was already (at least partially) running. This often happens when the license file contains a mistake, the mistake is corrected, and the license manager is started again before the first attempt has been shut down or killed. There may also be some other software product using the default port number, 1700. Stop the service using the Services dialog in the Control Panel and restart the service. See “Starting the License Manager” on page 31 for more details.

### 5. No Such File or Directory

```
license daemon: execl failed: ../idl -T host 2.40 3 -c  
license daemon: system error code: No such file or directory
```

The path on the DAEMON line of the license file is incorrect. It should point to the IDL directory. Edit the license file and correct the DAEMON line.

#### 6. Cannot Find License File

```
license manager: can't initialize: cannot find license file  
(No such file or directory)  
date time (lmgrd) Using license file "filename"
```

The license manager cannot find the `license.dat` file. Either the `license.dat` file is not in the default location or the file specified in the environment variable `LM_LICENSE_FILE` is incorrect. Also, make sure that the filename `license.dat` is spelled correctly and that you have read permission for the `license.dat` file.

#### 7. Cannot Read License File

```
license manager: can't initialize: cannot read license file  
(Permission denied)
```

The permissions are set incorrectly on the `license.dat` file. Set the file to read permission for all users.

#### 8. Wrong Hostid for Server

```
Wrong hostid on Server line for license file: C:\RSI\LICENSE\LICENSE.DAT.  
SERVER line says 000c0123454, hostid is 000c0abcde  
Invalid host on SERVER line.
```

The hostid in the license file does not match the hostid of the machine. Verify that you are using the correct machine. You may need to request a corrected license file. Make sure that the license file has been correctly copied from the original information sent to you from Research Systems.

#### 9. Contact Research Systems technical support.

If the above suggestions do not clear up the problem, contact Research Systems technical support at (303) 413-3920 or by e-mail at [support@rsinc.com](mailto:support@rsinc.com). International customers should contact their local RSI office or distributor for technical support.

It is often helpful to submit a copy of your license file as well as a copy of any error messages produced by IDL or the license manager program.

## Chapter 4

# License Management for VMS Systems

### The License Manager

Access to IDL and other products from Research Systems is controlled by the Globetrotter Software FlexLM license manager. Before you run one of these Research Systems products, you must provide some information so that a license file can be created for you to install on your system. You must then start (or arrange to start automatically) the license manager itself.

Basic instructions on installing your license file and starting the license manager are contained in your installation booklet. This document provides greater detail regarding the license manager, and discusses license manager utilities you may need to use if your system is unusual or if you are administering a complex system with multiple licenses.

### The RSI Directory

When you install a product from Research Systems, the installation program asks you to choose a directory in which the product will be installed. We recommend that you

install IDL in the directory `SYS$SYSDEVICE:[IDL]`. In these instructions, as in your installation guide, we refer to this directory as *IDL-Directory*.

## Installing your License File

Your license file will be sent to you via electronic mail or fax. If your file is sent via e-mail, simply save the e-mail message as a file named `LICENSE.DAT` and remove any header lines before the beginning of the actual license information. If you receive your license file via fax or other hardcopy method, you will have to create the file on your system using your favorite text editor.

### Location of the License File

The IDL for VMS license file must be located in the main IDL directory. Therefore, save your license file with the path and filename:

```
IDL-directory: [000000]license.dat
```

### Sample License Files

Examples license files, along with more information on the meanings of the individual lines in the license file is provided in the “The License File” on page 50.

## Start the License Manager Daemon

The server daemon (or daemons in the case of multiple servers) must be running before IDL can use network licensing. The license server daemon is a detached VMS process that handles the task of checking IDL license units in and out.

You must start the license manager now so that IDL can run properly, as described below. You must also set up your system so that the license manager daemon is automatically started when your system is booted.

If you are running only type MU (unlimited usage) licenses, you do not need to start the license manager daemon.

### Starting the License Manager Daemon

Once you have the license file in place on your system, start the daemon interactively by entering the following command:

```
$ @IDL-directory: [BIN]START_LMGRD
```

### Privileges Needed to Run the License Manger

The `START_LMGRD` command file can only be invoked by a privileged user such as `SYSTEM`.

## Starting The Daemon At Boot Time

To have the license server daemon automatically start every time your servers are booted, you should add the license manager startup command (described above) to the system startup command procedure.

You must modify the system startup procedure to start the daemon. Such changes may be lost when you update the operating system. Therefore, you should keep notes on the changes made, so that you can properly customize new operating system releases.

### Edit the System Startup File

The call to `START_LMGRD.COM` should be placed in the system startup file after the call to `IDL_SETUP.COM` and after DECnet is started (the license manager requires the use of DECnet). The lines in the system startup file will appear similar to:

```
$ @SYS$SYSDEVICE:[IDL.BIN]IDL_SETUP SYSLOG
$ @IDL_DIR:[BIN]START_LMGRD
```

For operating system versions 6.x and later, this file is named:

```
SYS$MANAGER:SYSTARTUP_VMS.COM
```

### Create DECnet Logical Links

Each IDL invocation requires a pair of DECnet logical links. A typical default for the maximum number of logical links is 32. Therefore, you should increase this parameter on your server node. Setting the number of links to 100 should allow for 30 IDL sessions with a sufficient number of links available for other uses.

To increase the number of available logical links, execute the following series of NCP commands:

```
$ MCR NCP Run the Network Control Program.
NCP> SHOW EXEC CHAR
```

Examine the current network volatile characteristics. Look for the line starting with “Maximum Links” to determine the current number of allowed logical links.

```
NCP> SET EXEC MAX LINKS 100
```

Set the current number of allowed logical links to 100. If the current number of links on your system is greater than 32, increase the value here by the amount of the difference.

```
NCP> DEFINE EXEC MAX LINKS 100
```

Set the permanent number of allowed logical links to the same number as in the previous statement. The effect of the `SET` command executed above lasts only until the next system reboot. This command makes the change permanent.

## Running Older Versions of IDL Concurrently with IDL 5.2

It is sometimes possible to run older versions of IDL using the IDL 5.2 license manager. If you have both IDL 5.2 and older versions of IDL installed on the same network, refer to “Running Older Versions of IDL with IDL 5.2” on page 57.

## The License File

The following example license file is built for the license server “HAL” which has the LMHostid 08002B123456. The machine HAL also has an unlimited usage node-locked license given by the FEATURE line. Note the LMHostid 08002B123456 at the end of the VENDOR\_STRING line which goes with the FEATURE line.

There is another system, with the LMHostid number 08002B345678, which has a six user node-locked license given by the first INCREMENT line. The last INCREMENT line allows four floating licenses on the network.

The last line in the license file is the FEATURESET line which ties all the FEATURE and INCREMENT lines together:

```
SERVER HAL 08002B123456
DAEMON idl_lmgrd IDL_DIR:[BIN] 200
FEATURE idl_lmgrd 5.200 1-jan-00 0 4B2CC001C30469E875D9 \
  VENDOR_STRING="1234-1ACME DATAWACK CORP - 1 MU ON HAL" \
  HOSTID=08002b123456 ck=6
INCREMENT idl_lmgrd 5.200 1-jan-00 60 0BFCD0D1CD1EFEC6B3D0 \
  VENDOR_STRING="1234-2ACME DATAWACK CORP - 1 M6 ON TOM" \
  HOSTID=08002b345678 ck=117
INCREMENT idl_lmgrd 5.200 1-jan-00 40 3B6CA00113B35B7A9562 \
  VENDOR_STRING="1234-3ACME DATAWACK CORP - 4 FL" ck=5
FEATURESET idl_lmgrd 5D45E884E779B1CB
```

**Note** The INCREMENT line for the six user node-locked license (the first INCREMENT line) shows 60 license units. This is not an error. Each IDL counted license requires 10 license units on the FEATURE or INCREMENT line. Similarly, the INCREMENT line for the four floating licenses shows 40 license units.

### The Individual Lines of the License File

The lines in a license file have the following meanings:

#### SERVER

There is one SERVER line for each license server node on your network. This line is not present if you have only MU type licenses. The fields contained in this line are:

**nodename**

The name of the machine on which the server is running.

**id**

The string returned by the LMHOSTID command.

**DAEMON**

There is only one DAEMON line (per product) in a license file. This line is not present if you have only type MU licenses. The fields contained in this line are:

**daemon-name**

The name of the daemon that serves the IDL licenses. This daemon is always called `idl_lmgrd`.

**path**

The path to the directory containing the daemon. The daemon is always located in the BIN subdirectory of the IDL distribution.

**object**

The DECnet object number to use. For a full description of network objects, consult the *Guide to DECnet-VAX Networking* or the *OpenVMS System Manager's Manual: Tuning, Monitoring, and Complex Systems*. The daemon uses object 200 by default but this number can be changed if it conflicts with some other application running on your network. Use the following VMS commands to determine if such a conflict exists:

```
$ RUN SYS$SYSTEM:NCP
NCP> SHOW KNOWN OBJECTS
NCP> EXIT
```

**options**

The pathname of the end-user-specified options file. Such a file lets you customize the behavior of the license server. The options file is described in more detail below.

**FEATURE**

There is one FEATURE line per node-locked host, and a single FEATURE line for floating licenses. The floating license line is always listed after any node-locked FEATURE lines. The fields in a FEATURE line are:

**name**

The name of the program whose license is being managed. This field is always `idl`.

**daemon**

The name of the daemon that controls access to IDL. This field is always `idl_lmgrd`.

**version**

The license version number.

**exp\_date**

Expiration date for this FEATURE.

**#license\_units**

If non-zero, the number of license units allowed (ten times the number of licenses you own). Otherwise, the line is for an unlimited number of node-locked licenses, and this field is set to zero.

For floating IDL licenses, the number of license units is ten times the number of floating license you own. For example, if you have 3 floating licenses, this field is set to 30.

**code**

The hexadecimal encryption code for this license.

**VENDOR\_STRING**

The user's site number and site notice combined into a single string.

**HOSTID**

If present, the host ID of the machine to which this license is node-locked. This field is only used in node-locked license FEATURE lines. If this field is empty, this license is for floating network licenses.

**ck**

The checksum number can be used to check the validity of the FEATURE or INCREMENT line.



### INCREMENT

Some license files may use INCREMENT lines in addition to (or instead of) FEATURE lines. INCREMENT lines contain the same fields as FEATURE lines. INCREMENT lines are used when a user's license configuration includes multiple-user node-locked licenses or a combination of multi-user node locked and floating licenses.

### FEATURESET

The FEATURESET line ties all of the lines related to the daemon `idl_lmgrd` together. No lines with the daemon name `idl_lmgrd` can be removed from or added to the license file. FEATURE or INCREMENT lines for other products are not affected by the use of the FEATURESET line for the `idl_lmgrd` daemon.

## Altering the License File

Only four data items in the license file can be modified by the user:

- hostnames (but not host IDs) on SERVER lines
- pathnames on DAEMON lines
- object names on DAEMON lines
- options file pathnames on DAEMON lines

Changing any other field will render your license file unusable. Adding or removing any FEATURE or INCREMENT lines with the feature name "idl" renders the license file unusable.

## License Management Utilities

### Starting the Server Daemon

The license manager server daemon can be started by entering the following command:

```
@IDL-Directory: [BIN] START_LMGRD LOGFILE UIC
```

where:

*LOGFILE* is the filename to be used for log and error files. If this argument is supplied, the daemon writes any errors to an error file and all daemon activity is written to a log file (usually, the daemon writes a log of its activities to its standard output). The error file is saved with the filename *LOGFILE.ERR*. The log file is saved with the filename *LOGFILE.LOG*.

*UIC* is the UIC under which the license daemon should be run. The default is [SYSTEM]. The files *LOGFILE.ERR* and *LOGFILE.LOG* will be written to the login directory of the specified UIC. By default, this is the SYSSMANAGER directory.

## The Options File

You can customize IDL license management by creating a daemon options file. This file allows you to reserve licenses for specified users or groups of users, allow or disallow the use of IDL by certain users, and set software timeouts.

To customize the license manager, create an options file as described below. Then, edit the license file and specify the option file path as the third field on the DAEMON line (the DAEMON line is described under “The License File” above). For example, the DAEMON line might become:

```
DAEMON idl_lmgrd IDL-dir: [BIN] 200 IDL-dir: [000000]OPTIONS.DAT
```

Each option is specified on a separate line of the file, and each line starts with one of the keywords described below:

### RESERVE

Ensures that IDL will always be available to a specified user, host, display, or group of users.

### INCLUDE

Specifies the users, hosts, displays, or group of users allowed to use IDL.

### EXCLUDE

Specifies the users, hosts, displays, or group of users not allowed to use IDL. When used in conjunction with the INCLUDE keyword, EXCLUDE takes precedence.

### GROUP

Specifies a group of users for use with the other keywords.

### NOLOG

As the daemon runs, it sends log messages to its standard output. These log messages are generally captured in a log file, as described in “The License Manager Log File” above. This option causes log messages of the specified type to be filtered out of the daemon’s log file.

## Format of Lines in the Options File

A daemon options file consists of lines with the following format:

```
RESERVE # idl [USER | HOST | DISPLAY | GROUP] name
INCLUDE idl [USER | HOST | DISPLAY | GROUP] name
```

```
EXCLUDE idl [USER | HOST | DISPLAY | GROUP] name
GROUP name <list_of_users>
NOLOG [IN | OUT | DENIED | QUEUED]
```

Lines beginning with the pound sign (#) are ignored, and can be used as comments. For example, the following options file would reserve one copy of IDL for user pat, 3 copies for user lee, and a copy for anyone on a computer with the hostname terry (remember that each IDL license uses 10 floating license units), and would cause QUEUED messages to be omitted from the log file:

```
RESERVE 10 idl USER pat
RESERVE 30 idl USER lee
RESERVE 10 idl HOST terry
NOLOG QUEUED
```

## Support Utilities

We supply several license manager support utilities for controlling the operation of the license server daemon. These commands are all found in the BIN subdirectory of the IDL distribution. To define the symbols to run these commands, execute the following DCL command:

```
$ @IDL_Directory:[BIN]SETUP_LMGR_SYMBOLS
```

### Shutting Down The License Manager

To stop the license manager process, enter the following command at the server machine:

```
$ LMDOWN
```

### Obtaining a Host ID

The LMHOSTID program calls the license manager version of gethostid and displays the results. The output of LMHOSTID looks like this:

```
lmhostid-Copyright(C) 1989, 1994 Globetrotter Software, Inc.
The FLEXlm host ID of this machine is "08002b1127ce"
```

### Removing a License

If a licensed user is running IDL when the machine crashes, the license that was in use may fail to be returned to the server. In this case, the license is not available to other users. The LMREMOVE program allows the system administrator to remove a single user's license for a specified feature and allow the license to return to the pool of available licenses. The syntax for the LMREMOVE command is:

```
$ LMREMOVE USER HOST DISPLAY
```

The three required arguments correspond to the username, hostname, and terminal device associated with the checked-out license. The LMSTAT command,

described below, can be used to obtain this information prior to using LMREMOVE.

**Security Note:** Unauthorized use of the LMREMOVE command can be disruptive because when an IDL session has its license removed, that session will be terminated. You should ensure that the file access modes on your system are sufficiently restrictive. In general, no GROUP or WORLD access is necessary. This is the default protection we apply to LMREMOVE in the IDL distribution.

### License Manager Status

The LMSTAT program provides information about the status of the server nodes, license daemons, and currently checked out licenses. The syntax for the LMSTAT command is:

```
$ LMSTAT [ALL]
```

Options for LMSTAT are described below:

#### ALL

Include this option to display all available information about the license manager status. If this argument is not present, only a brief summary of the daemon's state is given.

## Multiple Vendors Using The Same License Manager

IDL's network license management facility is provided by the FLEXible License Manager (FLEXlm), a product of Globetrotter Software (previously Highland Software). Since this license manager is not unique to IDL, the possibility exists that you will need to run software from two or more software vendors that all use FLEXlm. In this case, the potential for license server conflict exists. There are two cases to be considered:

### All Products Use the Same Set of Server Nodes

If all products use the same set of license server nodes, the solution is simple. Use a text editor to combine license files by taking the set of SERVER lines from any *one* license file, and add *all* the DAEMON and FEATURE lines from *all* of the license files.

Multiple copies of this combined license file can be placed in the locations required by the various software vendors. Note that IDL requires that a license file be present in the main IDL directory. Other products could refer to the LICENSE.DAT file in the IDL directory via the logical name LM\_LICENSE\_FILE.

### The Products Use Different Server Nodes

If the products use different license servers, separate license files are required—one for each distinct set of license servers. The resulting license files can then be located at the locations required by the various software vendors. Note that IDL requires that a license file be present in the main IDL directory.

## Running Older Versions of IDL with IDL 5.2

In many cases, it is possible to run older versions of IDL concurrently with the most recent version. If a FEATURE line has the version number 5.200, for example, it will allow IDL 5.2 and all earlier versions of IDL to run. In some cases, new license manager capabilities such as the INCREMENT line may prevent an older versions of IDL from working with the latest version of the license manager. In addition, versions 3.6.x and earlier of IDL need a reformatted version of an IDL 5.2 or later file (see below). No change is required for use with IDL 4.0.x.

### Start the Latest Version of the License Manager

In general, it is important to start the license manager from the latest IDL distribution and use the same license file for the older IDL distribution. The license manager should only be started once, from the new distribution. It should not be started from the old IDL distribution.

### Relocate and Modify the Latest Version of the License File

To allow the older version to run, place a copy of the new license file in the older IDL directory after making the changes described below.

IDL 5.2 uses a license file format which is not recognized by IDL 3.6 or earlier versions. In order to run IDL 3.6 using a version 5.2 license file, the format must be changed back to the old IDL 3.6 format as shown in the example below. Note that if your license file contains INCREMENT lines, this modification is not possible. See “Using Incompatible License Files” on page 58 for an alternative method.

Note that this change is not required for use with IDL 4.0.

Suppose your IDL 5.2 format license file looks like this:

```
SERVER HAL 08002B123456
DAEMON idl_lmgrd IDL_DIR:[BIN] 200
FEATURE idl idl_lmgrd 5.200 1-jan-00 60 CB4CA03114B823FAC8BC \
      VENDOR_STRING="1234-1ACME" HOSTID=08002b123456 \
      ck=65
FEATURESET idl_lmgrd CF214E75C96B146D
```

To modify this file to the old format, remove the VENDOR\_STRING= keyword (leave the quoted string unchanged.) For node-locked licenses, remove the

HOSTID= keyword (leave the hostid number.) Remove the `ck=nnn` item and the continuation backslashes from the previous line (making the FEATURE line a single line).

Our example file, in IDL 3.6 format, becomes:

```
SERVER HAL 08002B123456
DAEMON idl_lmgrd IDL_DIR:[BIN] 200
FEATURE idl idl_lmgrd 5.200 1-jan-00 60 CB4CA03114B823FAC8BC "1234-1ACME" 08002b123456
FEATURESET idl_lmgrd CF214E75C96B146D
```

## Using Incompatible License Files

IDL 5.2 uses INCREMENT lines to support combinations of multiple counted licenses such as floating licenses with a single user node-locked license. The INCREMENT line is not recognized by IDL 3.6 or earlier. If the IDL 5.2 license file contains INCREMENT lines, it is not possible to run IDL 3.6 or earlier versions concurrently with IDL 5.2.

To run earlier versions of IDL, the IDL 5.2 license manager should be shut down and the IDL 3.6 license manager should be started using the IDL 3.6 license file. IDL 3.6 can then be started. To resume using IDL 5.2, shut down the IDL 3.6 license manager and start the IDL 5.2 license manager.

## Troubleshooting

If IDL runs in demo mode after you have attempted to license the product, follow the appropriate suggestions below and try running IDL again.

### 1. Is the IDL symbol properly defined?

The VMS command:

```
$ SHOW SYMBOL IDL
```

will tell you the full pathname for IDL. You can verify if the search path is the problem by executing IDL directly. If the command:

```
$ RUN [IDL-directory.BIN.BIN_VAX]IDL for VAX
```

or

```
$ RUN [IDL-directory.BIN.BIN_ALPHA]IDL for ALPHA
```

(where *IDL-directory* is the main IDL directory) works, you know that the logical definition is to blame.

2. Check that the server daemon is running.

The LMSTAT license manager utility provides information on the status of the license manager. Enter:

```
$ @IDL-directory:[BIN]SETUP_LMGR_SYMBOLS
$ LMSTAT
```

3. Stop and restart the license manager.

Stop the license manager, then restart it, directing the output of the daemon to a file. Enter the following commands at the server machine:

```
$ @IDL-directory:[BIN]SETUP_LMGR_SYMBOLS
$ LMDOWN
```

Restart the license manager, directing the output to a log file:

```
$ @IDL_DIR:[BIN]START_LMGRD LOGFILE
```

Examine the resulting file LOGFILE.ERR for error messages.

4. If you receive the error message: %LICENSE MANAGER: encryption code in license file is inconsistent.

If you receive the error message shown above, there is an error in the FEATURE or INCREMENT line in your license file. Check the contents of the license file to confirm that they are the same as the file Research Systems sent you.

5. If you receive the error message: %Unable to open validation file: IDL\_DIR:[000000]idl.genver. no such file or directory.

If you receive the error message shown above, either your license file does not have read permission, the filename is spelled incorrectly, or there is not a LICENSE.DAT file in the main IDL directory. Check that the file is located in the main IDL directory, that it has the name LICENSE.DAT and that its file protections include read permission (use the command DIR/FULL LICENSE.DAT).

6. If you receive the error message: %Unexpected validation error.

If you receive the error message shown above, IDL is unable to access the LICENSE.DAT file and an invalid trial license file is located in the main IDL directory. Check that the correct license file is located in the main IDL directory, that it has the name LICENSE.DAT and that its file protections include read permission (use the command DIR/FULL LICENSE.DAT).

7. If you receive the error message: %LICENSE MANAGER: cannot connect to license server.

If you receive the error message shown above, the license server is not running or your network is not working properly. Check that the network is operating (e.g.,

set host to another machine). If you can remotely log into another machine, ensure that the license manager is running by entering:

```
$ @IDL-directory:[BIN]SETUP_LMGR_SYMBOLS  
$ LMSTAT
```

**8. Check out the Globetrotter Web Site.**

The Globetrotter Web site contains on-line documentation and an excellent FLEXlm FAQ. This information can be helpful when trying to combine licenses from different vendors. See the following Web pages:

Globetrotter home page: <http://www.globetrotter.com>

FLEXlm FAQ: <http://www.globetrotter.com/flmfaq.htm>

**9. Contact Research Systems Technical Support.**

If the above suggestions do not clear up the problem, contact Research Systems technical support at (303) 413-3920 or by e-mail at [support@rsinc.com](mailto:support@rsinc.com). International customers should contact their local RSI office or distributor for technical support.

It is often helpful to submit a copy of your license file as well as a copy of any error messages produced by IDL or the license manager program.