

# **iFOR/LS Quick Start Guide**



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## Quick Start

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### Introduction

Use this document for the initial configuration of Gradient Technologies network licensing system, *i*FOR/LS. Once configured, other software products can use *i*FOR/LS to meet their licensing requirements.

When you install a software product that is licensed with *i*FOR/LS, you will most likely also be installing the *i*FOR/LS Application Runtime Kit (ARK). After installing the software product according to its instructions, you can use this document to configure the *i*FOR/LS license server. Additional detailed documents from Gradient Technologies may accompany your software product. In most cases, you can use this document to configure your licensing.

Depending upon the software products licensing, you may have two choices in configuring your product licensing:

- Single-system usage, called “nodelocked” licensing
- Networked usage, called “concurrent” licensing

For “nodelocked” licensing, skip ahead to Chapter 2.

For “concurrent” licensing, skip ahead to Chapter 3.

If you are not sure, continue reading this chapter.

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## Fundamentals of Licensing with iFOR/LS

iFOR/LS provides a variety of licensing models that enable software product providers to enforce the license agreements established with their customers. Two license types, *nodelocked* and *concurrent use*, are the most commonly used. Once the installation and configuration of the licensing system are understood for these two types, any other license type will be managed in a like manner.

### Nodelocked Licenses

Nodelocked licenses allow the software product to run on just one node. This license type does not make use of the network, or the license server. When the licensed product starts up, it checks the contents of a nodelocked license file for an entry that is specific to the system ID of the node and the licensed product. If it finds the appropriate entry, the licensed product will execute in the normal manner.

Note that not all products use nodelocks or require target IDs.

To obtain a nodelocked license from your software vendor, you must provide the vendor with the system ID of your computer. The required information is printed when you run the `i4target` tool. Detailed instructions are provided below.

### Concurrent and Use-Once Licenses

The iFOR/LS concurrent and use-once licensing system uses a typical client/server architecture. One or more nodes on the network function as iFOR/LS license servers. They maintain information about the licensed software, including vendor names, product IDs, and the number of iFOR/LS licenses purchased for each product.

When the licensed product is started, it becomes an iFOR/LS client. Using the **Network Computing System** (NCS), the licensed product looks for iFOR/LS License Server nodes. A License Server node can be the computer that the licensed product is running on or a different system connected through the network.

If a License Server is found, communication is established using NCS protocols, and the licensed product requests a license. If that License Server has been set up to grant concurrent licenses for that product and has licenses available, the license is granted and the licensed product executes normally. Otherwise, the procedure is repeated for every License Server that can be located. If no

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License Server can provide a license, the licensed product executes in a manner determined by the software provider.

To make additions to the database of vendors and products maintained by each License Server, two programs are supplied with the iFOR/LS License Server: `i4target` and `i4admin`. Run `i4target` to determine the system ID of your server node, then contact the software vendor with the system ID and the number of licenses you require for the software product. The software vendor will reply with information for the `i4admin` tool to register the product licenses. From then on, the License Server can grant those licenses for the licensed product. Details of this procedure are provided below.

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## Next Steps

The remaining chapters of this guide are:

- Chapter 2:** Nodelocked License Configuration
- Chapter 3:** Concurrent License Configuration
- Chapter 4:** Manual Configuration
- Chapter 5:** System Administration
- Chapter 6:** Common Questions and Answers



## Configuring Nodelocked Licenses

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Follow these instructions to configure nodelocked licensed products.

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**Note** Path names are *i*FOR/LS defaults. Check your software product's installation guide for possible differences.

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1. Install only the licensed product module and not the *i*FOR/LS License Server module. Follow the procedures detailed in your software product's installation procedure.

2. Next, use `i4target` to find your workstation's System ID. The syntax is:

```
$ /opt/ifor/ls/bin/i4target
```

```
Permanent Target ID: 85057c
```

The response (85057c) will be different for your computer, of course.

3. Supply this response information to your software vendor to receive the license password.

When you have the returned information:

1. Log in as root (or use the UNIX `su` command).
2. Create or edit the file `/var/opt/ifor/nodelock`. The file permissions must be set to 644.

If the licensed product is the first *i*FOR/LS nodelocked file on your system, you must create the file as root. This file could initially have entries similar to the following two lines:

```
# Gradient Nodelock license for product iFOR/LS expires 12/25/94  
4ca0f7ea1000.0d.00.02.1a.9a.00.00.00 7dp63x23jqevxenx7ccr4ejmwn "" "2.0"
```

The first line starts with the comment character, #, and the name of the product *i*FOR/LS which expires on 12/25/94. The second line contains the following:

- Vendor ID (the first long number).
- Following the space is an example of a long, alphanumeric password that enables the nodelock license.
- The next field is a blank optional field but could contain an annotation field up to 80 characters. If the annotation contains spaces it must be enclosed in quotation marks.
- The last field "2.0" is a version field.

The password for your workstation will, of course, be different. The correct password for your workstation is included in the information returned by your vendor.

3. It is a good idea to include the first line to remind you what the second line means. It is best to include the full product name, version, and expiration date (if any), since there may be other nodelocked software on the same computer.
4. Double-check the information to ensure it is the same as that supplied by the vendor. Then try the product. If all is as it should be, the product will function properly and you will not have to worry about it again.
5. *You're finished!* The rest of this document describes setup and configuration in a client/server environment and does not pertain to nodelock passwords.

## 2.2 Configuring Nodelocked Licenses

## Concurrent License Configuration

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### Introduction

There are three main components of the *i*FOR/LS licensing system. Although they will be invisible to end users, system administrators must be sure the components are properly installed and configured.

- The *i*FOR/LS code embedded in the client application
- The remote service (in this case the *i*FOR/LS license server)
- The location broker system

### The License Broker Components

*i*FOR/LS is a distributed application that utilizes communications technology based on the **Network Computing System** (NCS). NCS is a remote procedure call system that allows applications on one machine to invoke procedures that run on another—a true client/server environment. For the client application to locate procedures on remote machines, NCS utilizes a naming service—referred to as location brokers.

There are two main components of the location broker system.

- The Global Location Broker Daemon (`glbd`)
- The Local Location Broker Daemon (`llbd`)

In more recent versions of *i*FOR/LS, the `llbd` daemon is superseded by the Distributed Computing Environment (`dced`) and Remote Procedure Call Daemons (`rpcd`).

In most cases, two shell scripts are used to configure the brokers and the license server; both scripts are usually located in `/opt/ifor/ls/conf/`.

## Selecting a License Server

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**Note** *i*FOR/LS License Server capability is not fully adaptable to an MC/ServiceGuard cluster configuration. If the system designated as the License Server fails, its functionality cannot be automatically transferred to another system in the ServiceGuard cluster.

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If using concurrent use licenses, determine which computer or computers are to be used as *i*FOR/LS License Servers. The following are a few suggestions for selecting License Servers:

- A License Server should be a computer that stays on at all times, or at least at all times that someone might use the licensed product. Computers that are frequently unavailable—unreliable systems, ones taken down often for testing or maintenance—are not good candidates.
- Diskless nodes do not make good License Servers.
- Ideally, License Servers should be on the same LAN as the majority of computers that will run the licensed product. Accessing License Servers in another LAN, across a bridge or router, may not be quite as fast. Also, some routers can make setting up License Servers less convenient.
- Licenses can also be distributed between two or more *i*FOR/LS License Servers. When a computer is down, the licenses assigned to the License Server on that system are unavailable, but licenses assigned to other License Servers remain available. If you have several licenses for one product, consider having more than one License Server and distributing the licenses.
- Version 3.0 *i*FOR/LS servers (`i41md`) can inter-operate with the older version of the *i*FOR/LS server (`net1sd`); however, you cannot use both version 3.0 and pre-version 2.0 servers on the same machine.
- Computers that function as License Server nodes can run the licensed product. The License Server software does not have a noticeable effect on the licensed product's performance.
- It is not necessary to install the licensed product software on License Server nodes if you are not going to run the product on those nodes.
- If you have a computer that is not in a network but you have purchased a concurrent use license, you can install the *i*FOR/LS License Server software on that computer. It then acts as both the License Server and the client. This

### 3-2 Concurrent License Configuration

is a common configuration; however, the licenses installed in that server will not be accessible by other workstations until it is connected to the network.

If a computer has already been designated as a file server, it is a good choice because it satisfies many of the previously mentioned criteria. In most cases, it will also function well as a License Server.

A typical installation program lets you install the licensed product, the *i*FOR/LS Licensing System, or both. However, *i*FOR/LS is automatically installed with HP 10.20 for your convenience. Remember that you must log in as root (or use the UNIX `su` command) to install the *i*FOR/LS License Server software. Follow the instruction supplied in the release notes or installation manual for your software product.

## Basic and Advanced Configurations

*i*FOR/LS provides two methods of server “discovery”: *direct binding* and *namespace binding*. Direct binding allows a client system to communicate directly with a license server via a well-known port (usually port 1515). No location brokers are employed.

Namespace binding uses location broker daemons which dynamically track license servers and vendors across a network. The Version 3 license server `i4lmd`, shipped with the HP-UX 10.20 operating system, can use both direct and NCS namespace binding.

The `/opt/ifor/ls/conf/i4config` configuration shell script supplied with the software lets you configure the license server in one of two ways: Basic or Advanced.

When you run the `i4config` script you will be requested to decide if you want to configure your machine as an *i*FOR/LS Client or Server. Once you enter your choices, in both cases, you will be requested to select between Basic and Advanced Configuration.

If you select Basic Configuration, you will only be requested to enter the name of the *i*FOR/LS servers that will be contacted when requesting a license. If you are configuring a server you will be asked to decide if you want to start the license server daemon: `i4lmd`.

If you select Advanced Configuration, you will be requested to make more than one decision depending on the whether you are configuring a Client or a Server.

If you are configuring a Client, you need to decide if you want to join the default cell or an alternate cell. You can join to any of the cells that `i4config`

will show you. Since there are no License Daemons running on the Client machine, `i4config` will not start any process.

If you are going to configure a Server, and if a previous configuration exists, the first question you will be requested to answer will be:

*Do you wish to remain in the cell to which your system is currently assigned when starting the 'glbd' daemon?*

After that you will need to decide if you want to join an existing cell or if you want to create a new one.

Once you are done with the configuration, `i4config` will ask if you want to start the NCS daemons (`llbd` or `rpcd`, and `glbd`) and the license server daemon (`i4lmd`).

`i4config` also creates the file `/opt/ifor/conf/i4ls.ini` which contains the appropriate information for the license server. Here is a sample of the `$$/opt/ifor/conf/i4ls.ini$$` file:

```
[iFOR/LS NCS-Server]
llbd=no
glbd=no
ipPort=1515
AllyPort=10000
[iFOR/LS NCS-Client]
NumDirectBindServers=1
DirectBindServer1=ip:hp1020[1515] #Assigned port 1515 by NIC
UseDirectBindingOnly=yes
```

The Advanced method allows the administrator to configure the license server using namespace binding. If you're not sure what version of *iFOR/LS* was used when your application was built, you should configure your license server using the Advanced option.

## **If You are Upgrading iFOR/LS**

If Gradient's *iFOR/LS* is already installed and running on your system, stop the `i4lmd`, `glbd` and `dcad` processes before doing the installation. Refer to your application's installation documentation on how to properly stop the daemons and remove existing versions of *iFOR/LS* for your platform.

If your system was properly configured and running *iFOR/LS* prior to the upgrade, run `i4config`. Answer the questions, but answer YES to the following question:

### **3-4 Concurrent License Configuration**

There is already an initialized database for the glbd.  
Do you wish to remain in the cell to which your system is currently assigned when starting the glbd daemon?

i4config will then start the global location broker daemon (glbd) with no options.

## Configuring Concurrent Licenses

Follow these instructions to configure concurrent licensed products.

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**Note** Path names are *i*FOR/LS defaults. Check your software product's installation guide for possible differences.

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1. The file `/opt/ifor/ls/conf/i4config` is a shell script that is used to configure *i*FOR/LS. This script facilitates the proper setup of NCS for *i*FOR/LS. The script will check for the global broker, and if one is not currently available, it will ask if you want this machine to be set up as the global broker; otherwise, it will query you on the global brokers currently in use. The script also assumes that `dced`, `glbd` and `i4lmd` are not running at the time of invocation.

2. *You're finished*

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**Note** After the GLB database is created, `glbd` must be started on that machine with no options. You cannot simply take down the brokers and rerun `i4config`.

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## Manual Configuration

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### Network Computing System Concepts

The software product licenses are granted by *i*FOR/LS, which runs on top of the **Network Computing System** (NCS). After installing the licensed product, getting the NCS services started on the License Servers is the first step toward running the licensed product.

The NCS provides a standard way to make the services offered by server systems available to client systems. To locate the services, the clients utilize a naming or locating service called a location broker. The location broker guides the client to the server that provides the specific service required. Location broker tasks are split into two components, the Global Location Broker and the Local Location Broker.

The Global Location Broker maintains a database of where all services reside on the network. A Local Location Broker must run on each node that provides a service. It handles communication between the Global Location Broker and the actual servers.

A cell is a subset of a network or Internet in which all hosts use the same Global Location Broker object UUID. Cells have independent GLB databases. For client hosts in cells that do not use the default GLB object UUID, the configuration file `glb_obj.txt` specifies an alternate UUID.

At least one node on the network must run the Global Location Broker daemon, `glbd`. If the network already uses NCS, one or more Global Location Brokers will already be in place and you may not need to worry about this issue. Otherwise, plan the Global Location Brokers with these points in mind:

- If the network is small to medium in size with high-speed connections throughout, one Global Location Broker is probably sufficient. Choose one of the *i*FOR/LS License Servers to run the Global Location Broker.
- With a larger network, it may be best to set up one Global Location Broker server on each LAN. The service location database is *replicated* in each

server. The LANs may be connected by routers that do not support NCS broadcasts to License Servers. If so, each computer that may need to access a License Server across such a router must be provided with the file `glb_site.txt` as described in the *man* page for `glb_site.txt`.

- Note that some systems do not support replicatable location brokers. A global location broker running on such a system is referred to as *non-replicatable global location broker* or `nrglbd`. There are several implications to running a non-replicatable location broker:
  1. There can be only one `nrglbd` running per cell. This can have an impact on the availability of the license servers. If the system running the `nrglbd` goes down, applications will not be able to “see” the license servers.
  2. If the cell is made up of mixed systems, some of which support replicatable location brokers and some of which do not, it is a good idea to stop the `nrglbd`, and move the location broker services to one or more of the systems that support the replicatable location brokers. You cannot run both a `glbd` and an `nrglbd` simultaneously within the same cell. If you decide to convert from non-replicatable to replicatable location brokers after *iFOR/LS* has been installed, you must stop all license servers first and then restart them after you have finished the conversion.
- Sometimes it is best to isolate the location broker servers from network-wide location broker servers. For example, if *iFOR/LS* Services are set up for a department, and the department is networked throughout (or beyond) your company, you may want to make sure that the concurrent licenses are limited just to that department. This is done by setting up an NCS *cell*. Location broker requests and replies are then limited to those between nodes in the same cell, limiting the scope of the concurrent licensing.

Applying what has been learned about NCS, an *iFOR/LS* License Server can be set up. A node that functions as a License Server provides an NCS service. It must run the Remote Procedure Call daemon, `rpcd`, to make the presence of the service known to the Global Location Broker daemon, `glbd`. The daemon that provides the actual license services is called the *iFOR/LS* License Server Daemon, `i4lmd`.

To summarize the requirements for concurrent use licensing with an *iFOR/LS* License Server:

- There must be one or more nodes running the `glbd`, on the network.
- Any node that runs `glbd`, or `nrglbd` must also run the `rpcd`.

## 4-2 Manual Configuration

- There must be one or more Network License Server Daemon, `i4lmd`, on the network.
- Any node that runs `i4lmd` must also run the `rpcd`.
- Gradient recommends that for each license server, `rpcd`, `glbd`, and `i4lmd` should all be running.

---

## Setting up the Network Computing System

This section describes starting and testing the NCS software.

*iFOR/LS* now features an automatic configuration procedure as part of the installation process, detailed in the *iFOR/LS* Installation Guide. You can complete the configuration either as a part of the installation process, or at a later time by electing to have the installation procedure build a shell script expressly for that purpose. In either case, you can then skip to the section about verifying the operation of the *iFOR/LS* license server.

Please note, however, that at least one cell must be configured one way or another. If you have already run `/opt/ifor/ls/conf/i4config` and answered the question `Continue the installation without joining a cell?` during the installation procedure, simply run `i4config` again and answer the appropriate questions.

---

## Manually Configuring NCS and iFOR/LS

If, for some reason, you cannot use the automatic configuration, then you must configure NCS manually. You may proceed with a manual configuration by selecting the option to “Continue the installation without joining a cell” during the installation.

Possible scenarios under which manual configuration might be desired include:

- `i4config` was deleted.
- NCS is already running but may not be configured correctly.
- You are running VMS and need to set this up manually.
- You really know what you’re doing.

The typical installation process puts all the necessary files on the system in the correct places. It also modifies the startup file that is executed during boot-up when networking is being enabled; for example, `/etc/rc.config.d/ncs`. The changes that the install procedure makes to the file are commented out. They will have no effect unless manually edited, removing the comment characters (`#`) at the beginning of the lines that are to execute. Refer to the release notes and installation procedure that comes with your software product.

The following paragraphs step through deciding which lines to activate in this manner and performing the other necessary steps. The examples given assume that the default paths are used—refer to the Release Notes for your product to determine if there are differences. The first step is to determine if in fact NCS is already running on your network, in which case you may not have to do anything at all.

1. Log onto a node on the network as root.
2. Invoke the `i4lbfind` command (located in `/opt/ifor/ls/bin`).
3. If NCS is installed and running on the network, the display should be similar to that shown below:

```
# i4lbfind

sent to broadcast address 192.92.110.255
waiting for replies

received response from glb daemon at ip:daffy(192.92.110.4)port 1243

received response from glb daemon at ip:stimp(192.92.110.43)port 1110

received response from glb daemon at ip:apollo(192.92.110.12)port 1024

.
.
.

replicable ip:daffy alternate_1      54bdad9a4000.0d.00.01.83.0f.00.00.00

replicable ip:stimp alternate_1      54bdad9a4000.0d.00.01.83.0f.00.00.00

replicable ip:apollo alternate_1     54bdad9a4000.0d.00.01.83.0f.00.00.00
```

The example output shown above indicates that there are three global location brokers running, that they all belong to the same cell, and that the cell is not the default cell.

#### 4.4 Manual Configuration

4. If the display looks similar to the one shown below, it means that NCS is not installed and running on the network:

```
# i4lbfind

sent to broadcast address 192.92.110.255

waiting for replies

received response from glb daemon at ip:daffy(192.92.110.4)port 1243

received response from glb daemon at ip:stimp(192.92.110.43)port 1110

received response from glb daemon at ip:apollo(192.92.110.12)port 1024
...

#
```

For more information on the `i4lbfind` command, see the man page.

- If NCS is not running on your network and you intend to use the default `glb` cell, then follow the procedure entitled: “Installing the First Global Location Broker Daemon”
- If you intend to establish a new `glb` cell, then follow the procedure entitled: “Establishing a New NCS Cell”
- If NCS is running on your network and you want to create an additional `glbd` then follow the procedure entitled: “Installing Additional GLB Daemons”

## Installing the First Global Location Broker Daemon

To install the first Global Location Broker daemon:

1. Choose the node to run the Global Location Broker daemon, `glbd`.
2. Log into that node as root.
3. Use this syntax to start the `rpcd` running in the background:

```
/opt/dce/sbin/rpcd
```

4. Initialize the first Global Location Broker daemon in the NCS cell (or in the default cell that you get if you do not explicitly create your own cell) with this syntax:

```
/usr/sbin/ncs/glbd -create -first -family ip
```

This command creates the global location database, tells the Global Location Broker daemon that it is the first one in the network, and tells it to use the TCP/IP network protocol.

5. Make sure that the Global Location Broker daemon is running with the UNIX `ps` command.
6. Verify that the Global Location Broker daemon is communicating properly by starting the `drm_admin` utility:

```
/usr/sbin/ncs/drm_admin
```

The `drm_admin` facility will prompt you for further actions. With the `set` command, you set the object you want to administer to `glb`, and the host to the system you are working on:

```
drm_admin: set -o glb -host ip:hostname
```

`drm_admin` reports the status of the Global Location Broker on the host. Its state should be: `in service`.

7. Now make sure that `rpcd` and `glbd` are correctly started when rebooting the system. To do this, edit the file `/etc/rc.config.d/ncs`. Find the lines that indicate starting the LLBD and GLBD, and set them to the value "1":

*preceding lines*

```
START_LLBD=1
START_GLBD=1
```

*more lines*

8. Reboot the system and verify that `rpcd` and `glbd` were started automatically.
9. Try `drm_admin` again to make sure that the `glbd` is in service.
10. If you plan to install the *iFOR/LS* License Server daemon on this system, you may want to do that before rebooting. See "Setting Up the *iFOR/LS* License Server", below.

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## Establishing a New NCS Cell

1. Choose the node to run the Global Location Broker daemon, `glbd`.
2. Log into that node as root.
3. Generate a Universal Unique Identifier (uuid) for the cell and put this uuid into a special file called `glb_obj.txt` in the `/var/ncs` directory. UUIDs are generated with the `uuid_gen` program supplied. Use the following syntax:

```
/usr/sbin/ncs/uuid_gen >/var/ncs/glb_obj.txt
```

The content of the `glb_obj.txt` file created with `uuid_gen` is a string somewhat like the following:

```
54c7874546ae.02.81.87.92.34.00.00.00
```

Since the string is generated from the unique System ID of the workstation and a time stamp, the number is uniquely different than the number that anyone else would generate with `uuid_gen`, and different than the number that would be generated with `uuid_gen` at a different time. The `glb_obj.txt` file uniquely identifies an NCS cell.

4. Put the `glb_obj.txt` file that was just generated into the `/var/ncs` directory of every node that is part of the cell. This includes both *i*FOR/LS License Servers and nodes that have the licensed product installed but are not set up to be *i*FOR/LS License Servers. Use the `ftp` program to make sure the exact same file is present on all nodes.
5. Use this syntax to start the `rpcd`:

```
/opt/dce/local/rpcd
```

6. Initialize the first Global Location Broker daemon in the NCS cell (or in the default cell that you get if you do not explicitly create your own cell) with this syntax:

```
/usr/sbin/ncs/glbd -create -first -family ip
```

This command creates the global location database, tells the Global Location Broker daemon that it is the first one in the network, and tells it to use the TCP/IP network protocol.

7. Make sure that the Global Location Broker daemon is running with the UNIX `ps` command.
8. Verify that the Global Location Broker daemon is communicating properly by starting the `drm_admin` utility:

```
/usr/sbin/ncs/drm_admin
```

The `drm_admin` facility will prompt you for further actions. With the `set` command, you set the object you want to administer to `glb`, and the host to the system you are working on:

```
drm_admin: set -o glb -host ip:hostname
```

`drm_admin` reports the status of the Global Location Broker on the host. Its state should be: “in service”. (To quit, type: `quit`.)

9. Now make sure that `dced` and `glbd` are correctly started when rebooting the system. To do this, edit the file `/etc/rc.config.d/ncs`. Find the lines that are commented out that start the `dced` and `glbd` programs, and delete the comment characters from the beginning of the executable lines. The final result should look like this:

*preceding lines*

```
START_LLBD=1  
START_GLBD=1
```

10. Reboot the system and verify that `rpcd` and `glbd` were started automatically.
11. Try `drm_admin` again to make sure that the `glbd` is in service.
12. If you plan to install the *i*FOR/LS License Server daemon on this system, you may want to do that before rebooting. See “Setting Up the *i*FOR/LS License Server”, below.

## Installing Additional GLB Daemons

If you decide to run more than one Global Location Broker daemon on the network, use the following procedure to install each additional `glbd`:

1. If you set up an NCS cell, copy the `/var/ncs/glb_obj.txt` file from the first `glbd` node to the next one rather than generating a new file.
2. Use the `date` command to find the date on the node.
3. Use the `drm_admin` command to find the date on nodes where other `glbd` servers are running:

```
/usr/sbin/ncs/drm_admin
```

```
drm_admin: set -o glb -h ip:otherglbhost
```

### 4-8 Manual Configuration

`drm_admin` will show the dates on other Global Location Broker Servers.

4. If the dates differ by more than 2 minutes, restore the dates of all `glb` servers to within 2 minutes of each other using the `date` command on systems whose dates must be changed.
5. If the `dced` is not running, start it:

```
/opt/dce/sbin/rpcd
```

6. Initialize the Global Location Broker daemon with the command:

```
/usr/sbin/ncs/glbd -create -from ip:otherglbhost
```

This command creates the global location database and creates a replica of the contents of the database found on node *otherglbhost*.

7. Make sure that `glbd` is running with the UNIX `ps` command.
8. Verify that `glbd` is communicating properly by starting the `drm_admin` utility:

```
/usr/sbin/ncs/drm_admin
```

The `drm_admin` facility will prompt for further actions. With this command, set the object you want to administer to `glb`, and the host to system you are working on:

```
drm_admin: set -o glb -host ip:hostname
```

`drm_admin` will tell you the status of the Global Location Broker on the host. Its state should be: "in service". (To quit, type: `quit`.)

9. Now make sure that `dced` and `glbd` are correctly started when rebooting the system. To do this, edit the file `/etc/rc.config.d/ncs`. Find the lines that are commented out that start the `rpcd` and `glbd` programs, and delete the comment characters from the beginning of the executable lines. The final result should look like this:

*preceding lines*

```
START_LLBD=1  
START_GLBD=1
```

*more lines*

10. Reboot the system and verify that `dced` and `glbd` were started automatically.

## Setting Up the iFOR/LS License Server

After setting up one or more Global Location Brokers on the network, one or more iFOR/LS License Server daemons can be enabled as follows:

1. Log in as root.
2. Determine if `rpcd` and the Global Location Broker (`glbd`) are running on the system using the UNIX `ps` command.

```
ps -ef | grep rpcd
```

```
196 ? 0:56 /opt/dce/sbin/rpcd
```

```
ps -ef | grep glbd
```

```
199 ? 3:22 /usr/sbin/ncs/glbd
```

3. If the brokers are running go to step 4. If they are not running, then it is likely that something has gone awry during the configuration process. Read the previous section titled “Manually Configuring NCS and iFOR/LS” and the man pages for the `dced`, `glbd`, `drm_admin` and `lb_admin` commands for further information.
4. Now start the iFOR/LS daemon, `i4lmd`:

```
/opt/ifor/ls/bin/i4lmd
```

5. Make sure that `rpcd` will be started when rebooting the system. If you have followed the directions to set the node up to be a Global Location Broker, `rpcd` is already enabled on bootup, skip to step 7.

Otherwise, edit the file `/etc/rc.config.d/ncs`. Find the lines that have “`START_LLBD`” and “`START_GLBD`” and set them to the value “1”.

The file should have this:

*preceding lines*

```
START_LLBD=1
```

```
START_GLBD=0
```

*more lines*

In this configuration, the `rpcd` is started but not `glbd`.

### 4-10 Manual Configuration

6. Finally, make sure that `i4lmd` will be started when the system is rebooted, again by making changes to `/etc/rc.config.d/iforls`. Find the line and set: `"START_I4LMD"`.

The `iFOR/LS` section of the file should look like this, and this section should follow the NCS section of the file:

*preceding lines*

```
START_I4LMD=1
```

7. Reboot the computer to make sure that the appropriate daemons are started. If they are not, check the contents of the `/etc/rc.config.d/iforls` file carefully.



## System Administration

---

### Verifying the License Server

After having set up one or more *i*FOR/LS License Servers, verify that they are active on the network using the *i4tv* (license server test and verification) program. This test can be performed from any node on which the licensed product or the *i*FOR/LS Server Module is installed. In fact, the test should be performed on every node on which the licensed product is installed. You need not be logged in as root for this test. Use the form shown below:

```
$ /opt/ifor/ls/bin/i4tv
```

The report printed out should be somewhat like this:

```
i4tv Version GR3.0.3 -- iFOR/LS Test and Verification Tool
(c) Copyright 1991, 1992, 1993 Hewlett-Packard Company, All Rights Reserved
(c) Copyright 1991-1995, Gradient Technologies Inc., All Rights Reserved

Completed license transaction on node 55004748 running iFOR/LS GR3.0.3
active iFOR/LS servers:
jolly running MetLS 2.0.1 (GR1.0.3)
giant (HP-UX) running iFOR/LS GR3.0.3
```

All the *i*FOR/LS License Servers in the network should be listed.

Make these checks if you have trouble getting a response from the *i*FOR/LS License Servers on the network:

- Make sure the *glbd* is running somewhere on the network and that *dced* is running on each of the Global Location Broker nodes.
- Make sure that both *dced* and *i4lmd* are running on the *i*FOR/LS License Server nodes.
- If an NCS cell is set up, make sure the */var/ncs/glb\_obj.txt* files are identical for all the nodes in the cell.

Make a point of periodically running *i4tv* and make sure that all the servers on your network actually respond.

---

## Messages

The most common messages are described in this section.

`netls_request_license`      Communication failure (networking computing system/RPC runtime)

The server is not functioning properly or the server is down. Either someone has taken the server down ungracefully or the location brokers are out of sync/down. Determine what the problem is and take proper action. Commands to use are `lb_admin` and `drm_admin`. You may want to take down all brokers and start them up cleanly. See the man pages for further details on these commands.

`netls_no_svrs_found`      No servers available for this vendor.

Either no license servers are running, or someone has deleted the vendor from the license server. The vendor that `i4tv` uses in *Hewlett-Packard NetLS Test* which contains 10000 concurrent licenses.

If your vendor's product returns this message, the most likely cause is that you have not added the licenses using `i4admin`.

If a client receives this message:

- Can the client ping or telnet to the server?
- The client may require a `glb_site.txt` file pointing to the server.
- If the server is in an alternate cell, does the client have a copy of `/var/ncs/glb_obj.txt` that is identical to the one on the server?

`netls_license_not_found`      License not found in the database.

Someone has deleted the licenses for `i4tv`; this prohibits anyone from using the test and verification tool. The license is 10000 concurrent licenses for the vendor *Hewlett-Packard NetLS Test*.

`netls_not_authorized`      The user is not authorized to use this product.

Someone has edited the user file to restrict the use of `i4tv`.

`netls_bad_timestamp`      Time disparity too large.

Node clocks have not been synchronized properly. You must synchronize your nodes to be less than 12 hours of each other.

### 5-2 System Administration

---

## Administering Concurrent Use Licenses

After verifying the operation of the *i*FOR/LS License Servers, you are ready to install the concurrent use licenses for the licensed product.

1. The first step is to obtain the system IDs for the *i*FOR/LS License Server nodes that will grant the licenses. On each such node, run the `i4target` program with this syntax:

```
$ /opt/ifor/ls/bin/i4target
```

```
Permanent Target ID: 85057c
```

The response will be different for each node, of course.

2. Request licenses from the product vendor. If more than one *i*FOR/LS License Server is configured, the licenses should be divided between the indicated servers.
3. When the information is returned from the vendor, log in as root (or use the UNIX `su` command).
4. Run the License Administration Program, `i4admin`, which can be run with a graphic user interface by starting `i4admin` from within a GUI window or run in command line form. If the GUI version is to be used, refer to the *Managing Software Products with the Network License System* document for complete instructions. If the command line version is used, provide the information you received from the vendor.

You can install the licenses for all the nodes from any node that has `i4admin` installed on it.

The first time a new vendor's product is installed in the license servers, the vendor ID and Product ID must be entered. For subsequent license entries, this information will already exist.

---

## Periodic Maintenance

The following tasks should be completed periodically by the system administrator or the person responsible for iFOR/LS maintenance.

If more than one Global Location Broker is established in the network, use the `drm_admin` utility to check and maintain the network-wide Location Broker Database. Make sure that the dates of the computers that Global Location Broker daemons are running on are within two minutes of each other. Every week or so merge the databases on all the Global Location Broker daemons on the network. For more information about using `drm_admin`, see the appropriate man pages. Use the UNIX `man drm_admin` command to learn more about the program.

*First determine which information is needed for your report.*

Report information is derived from the log file located in `/opt/ifor/ls/conf/log_file`.

When `i4lmd` is started, you can turn off logging events that are not needed for your company. After determining what events you no longer need you must take down the `i4lmd` daemon and restart it with the proper options. You would also need to change the startup script `netls` on each machine/platform to represent this change in the future. Explore the man pages for `i4lmd` for additional options.

### Example

The following command starts a license server without logging check-in, vendor, product, timeout, or message events:

```
i4lmd -no cvptm
```

If you have options set for the `i4lmd`, Gradient recommends that you periodically delete some of these stale entries. There are two ways to delete the log entries.

1. You can delete the log entries written on and before a specified date.

Example:

```
/opt/ifor/ls/bin/i4admin -x 07/31/96 -n <server.name>
```

This is the recommended way to delete entries.

## 5.4 System Administration

---

**Note** No licenses will be granted until `i4admin -x` has finished executing. We recommend that you run this command during off peak hours. In all cases the server will restart properly.

---

2. Take the server down, and delete `/opt/ifor/ls/conf/log_file` and restart the server. However, you will lose all entries.

*Periodically, run `/usr/sbin/ncs/lb_admin` on one of the server machines.*

If you run the following command and do not see any error messages, then the brokers are in sync.

```
# /usr/sbin/ncs/lb_admin

lb_admin: clean
lb_admin: use global
lb_admin: clean

Data from GLB replica: ip:AIX
working . . . . .

0 entries deleted of 7 entries processed

lb_admin: quit
```

Please note that the number of entries will be different. If you do have errors, answer yes to all the questions and determine why these errors occurred.

*Periodically make a backup of the CONF directory located in `/opt/ifor/ls/conf` that contains the license database.*

*Once every few weeks run the `drm_admin` utility and `merge_all`.*

The role of `drm_admin` is to administer the replication of databases, not to change the data they contain. See the man page for further details.

```
/usr/sbin/ncs/drm_admin

drm_admin: set -o glb ip:default_glbhost
drm_admin: merge_all
```

---

## More Information About the Network Computing System and iFOR/LS

To learn more about the Network Computing System, explore the following manpages: `glb_obj.txt`, `glb_site.txt`, `uidname.txt`, `drm_admin`, `glbd`, `lb_admin`, `rpcd`, `nrgbld`, and `uuid_gen`.

This guide provides the fundamentals for getting started with *iFOR/LS* and NCS. For a more complete description of the licensing system and the broad range of tools available, refer to:

- *Managing Software Products with iFOR/LS* HP Pub. No. B2355-90064
- *Managing NCS Software* HP Pub. No. D-11895-E

The *iFOR/LS and EZ-Lok Administrator's Guide* is available on the World Wide Web at:

[http://www.gradient.com/support/pub/iforls\\_docs/eag.htm](http://www.gradient.com/support/pub/iforls_docs/eag.htm)

## Common Questions and Answers

---

**Q: What do DCED and GLBD do?**

**A:** The DCE daemon (dced) maintains a database of servers local to the host it runs on.

There should be an dced running on every host system that is running a license server.

The dced program also supports the forwarding function of the database.

The global location broker daemon (glbd) maintains a global location database for the network. There are as many local databases as there are server hosts; however, conceptually there is only one global database on a network. On a large network, with many servers registering and even more clients making queries, database contention can become a problem; a single glbd might not be able to keep up with all the requests. NCS allows for replication of the GLB database and allows more than one glbd program to run within the same network. Having multiple glbd programs running in a network helps ensure that a GLB service is always available.

Each glbd in the network maintains a replica of the GLB database and propagates any registrations it receives to other glbd programs on the network. The propagation protocol ensures that, given a respite in updates, communicating glbd programs will force the replicas to a common state. It is important to realize that the replicas maintained by the glbd programs are not different databases. A change made to any replica, if it persists, will eventually be reflected in all of them. At any moment, there may be differing views of the database depending on which glbd responds to a query, but over time those views converge.

It is extremely important to maintain these databases. Refer to the man pages for lb\_admin and drm\_admin for information about proper maintenance procedures.

**Q: What does i4config do?**

A: Regardless of the platform you have, the system administrator doing the installation must answer the following questions. A decision should already have been made on how the network is to be configured. Consult your installation guide for more details about your specific iFOR/LS Platform.

```
/opt/ifor/ls/conf/i4config
```

You have four options:

1. Continue with installation without choosing a Cell Name.
2. Use the default for the system Cell Name.
3. Create a new alternate cell for the system Cell Name.
4. Choose an existing alternate cell for the system Cell Name.

**Option #1: Continue with installation without choosing a cell name.**

You will have to run i4config again, no startup scripts will be completed. We simply exit the configuration script.

**Option #2: Use the default for the system Cell Name.**

The first time you configure NCS on your system (i.e. no brokers are running on the system) when you answer the default cell for the first time we start the rpcd, glbd and i4lmd. Since this is the “first time,” we need to establish the first glbd, which would be the following:

Example syntax:

```
glbd -create -first -family ip &
```

The first time glbd is started on a host, the `-first` option must be used. This creates the GLB database on this host. After the GLB database has been created, glbd must be started with no options. This is taken care of automatically at boot time from the `/etc/rc` boot file. A UUID is created; for example,

```
333b91c50000.0d.00.00.87.84.00.00.00
```

The UUID is a character-string representation. The first three characters 333 in this case refer to the default cell.

## 6-2 Common Questions and Answers

---

**Note**            `i4config` should only be run once. If a broker is already running somewhere on your network and you choose the default cell again, the script runs `i4lbfind`, and then greps for the first word, *default*, and establishes the second `glbd`.

---

Example syntax:

```
glbd -create -from ip:otherserver
```

We grep the first `glbd` that `i4lbfind` locates, since it established the connection the quickest and is most likely more reliable. Then start your `rpcd`, `glbd` and `i4lmd`.

The installation script modifies your system configuration file in `/etc/rc.config.d`. Since the GLB database is now created, the next time the system is booted, `glbd` will start automatically with no options.

**Files Created:**

<code>/var/ncs/glb_log</code>	Log File
<code>/var/ncs/glb.e</code>	Entries in the GLB
<code>/var/ncs/glb.p</code>	Propagation queue

**Option #3: Create a new alternate cell for the system Cell Name.**

Why would I create an alternate cell?

The reason for creating an alternate cell is to isolate the cell from the rest of the world. You might do this for any of the following:

- To limit a group of users.
- Use for testing and development.
- You don't want to interfere with other NCS applications
- The system may not be very stable but a few people use it.
- For demo purposes, such as a machine that needs to be set up in advance and may not be part of a network.
- For a small system configuration.

**File Created:**

<code>/var/ncs/glb_log</code>	Log File
<code>/var/ncs/glb.e</code>	Entries in the GLB

<code>/var/ncs/glb.p</code>	Propagation queue
<code>/var/ncs/glb_obj.txt</code>	Object UUID

What is a `glb_obj.txt` file?

The `glb_obj.txt` file is simply a file specifying the object UUID of the Global Location Broker. The `glb_obj.txt` file allows you to override the default value by specifying a different GLB object UUID for a particular host. *The `glb_obj.txt` file is used only in special configurations that require several disjoint GLB databases* (each of which is possibly replicated) thereby establishing separate cells. In most networks and Internets, there is only one GLB database (possibly replicated), and hosts do not need to have a `glb_obj.txt` file. If a host has a `glb_obj.txt` file, the UUID in the file identifies the GLB object to which that host will direct lookups and updates. You would only have a `glb_obj.txt` file if you have created an alternate cell or if you choose an existing alternate cell for the system Cell Name.

**Option #4: Choose an existing alternate cell for the system Cell Name.**

If you already have chosen option #3, option #4 will be displayed only if an alternate `glbd` is running somewhere on your system. If you choose an existing alternate cell for the system Cell Name it takes the `glb_obj.txt` file from the other host and replicates it. The files are identical on both nodes. You can look in the directory `/var/ncs` and check that `glb_obj.txt` is identical on both nodes.

**Files Created:**

<code>/var/ncs/glb_log</code>	Log File
<code>/var/ncs/glb.e</code>	Entries in the GLB
<code>/var/ncs/glb.p</code>	Propagation queue
<code>/var/ncs/glb_obj.txt</code>	Object UUID

There is no mechanism in NCS to share services between cells. A host in any cell (default or an alternate) can only communicate with servers in the same cell. Cells were designed to isolate a group of servers and clients.

**6.4 Common Questions and Answers**

**Q: When do I need a `glb_site.txt` file?**

A: In most cases you don't need to have a `glb_site.txt` file!

If your networks don't support broadcast addresses (can't broadcast), you must have a `glb_site.txt` file on every machine in the cell.

---

**Note** The `glb_site.txt` file must be located in `/var/ncs` directory.

---

The `glb_site.txt` may point to other machines running `glbd`, but they must all be in the same cell (i.e., the contents of `glb_obj.txt` must be identical). There is no provision for bridging between cells.

If you have multiple machines running `glbd`, you can have multiple host entries in the `glb_site.txt` file.

Ordinarily, programs contact a GLB by broadcasting on the local network. However, some systems do not support broadcasting. Also, in certain Internet configurations, not every network can have a GLB. (This typically occurs on Internets that use `nrglbd`, the Non-Replicable Global Location Broker daemon (rarely used), but it can also occur on an Internet that uses `glbd` if not all networks include a host that can run a `glbd`.) For hosts that cannot locate a GLB via broadcast, the `glb_site.txt` file provides a list of addresses where the host can try to directly contact a GLB.

Each line in `glb_site.txt` contains a network address where a `glbd` may be running. Hosts that have a `glb_site.txt` file will try each address in turn. Each address has the following form:

*family: host*

The *family* is the name of an address family. Possible values include `ip` and `dds`.

*host* is the name of the host system. A leading `#` can be used to indicate that the host name is in the standard numeric form (such as `#192.9.8.7` or `#515c.111g`).

Blank lines are ignored.

Note that the `glb_site.txt` file does not override the cell boundaries. It is useful only in locating `glbd` servers that have the same value in the `glb_obj.txt` file, but that might not reside on the same physical network.

**Q: I have NCS installed on the server machine but my clients don't have NCS. How can I make my clients get a token?**

A: Use the following procedure:

1. First, there must be at least one `rpcd`, `glbd` and `i4lmd` running on the network.
2. On the client machine, start the application without doing any additional setup, you should be able to get a license.
3. If you can't get a license, it's possible that broadcasting is not working correctly or you created an alternate cell and did not copy the `glb_obj.txt` file over from the server to the client or the server is on a separate network and a `glb_site.txt` file is needed..
4. Log in as `root` or `su` to the client machine.
5. On your client machine create a directory `/var/ncs`.
6. Create a file call `glb_site.txt`. Note: If an alternate cell was setup, you need to copy the `glb_obj.txt` file as well.
7. Edit the file and enter the address family of the machine or machines running the servers:

The following are sample `glb_site.txt` files for the IP and DDS address families:

```
ip:ren
```

```
ip:#192.9.8.5
```

```
dds://stimp
```

```
dds:#135f.132a
```

8. Run your application. You should be able to get a token, provided that you added the license to the server.

## 6-6 Common Questions and Answers

**Q: I'm on the same subnet, I want to have three servers each with 50 licenses. What is the best way to configure and setup my network?**

A: All three servers should have `rpcd`, `glbd` and `i4lmd` running. Each `glbd` is the default cell.

Running several `glbds` are useful in the following situations:

- Load sharing.
- Availability.
- A complex network topology.

**An alternative solution:**

This second solution is not recommended and will not occur in our standard configuration. `i4config` will always attempt to run the `rpcd`, `glbd`, and `i4lmd`.

---

**Note**            You must manually run this configuration.

---

- One of the machines needs to have the `rpcd`, `glbd` and `i4lmd` all running.
- The second and third machine need only have the `rpcd` and the `i4lmd` running.

**Q: I'm on two different subnets. I want to have three servers each with 50 licenses. What is the best way to configure and set up my network?**

A: You need to determine which subnet will be running two `i4lmd` servers and which one will be running one. The subnet that is running two servers needs to have the following:

- Both machines should have the `rpcd`, `glbd` and `i4lmd` all running. Both machines should also be in the default cell.

On the subnet running the third server:

- If you already tried to bring up the servers and failed, make sure you take down the `rpcd`, `glbd` and possible `i4lmd` before continuing.
- Before running `i4config`, set up a `glb_site.txt` file that points to one of the default cells that is running on the other subnet. Run `i4config`,

and if a database already exists, don't use it. You should see that `i4lbfind` actually broadcasts to the cell that was in the `glb_site.txt` file. Select option 2 Use the default for the system Cell Name.

- You have the option of keeping the `glb_site.txt` file or removing it. Once you have established that the system is actually running correctly, you should remove this file to avoid confusion in the future.

**Q: I created an alternate cell, but no one else can communicate with this server. Why?**

**A:** The reason is that you have isolated this system from all other systems on the network, it now has its own cell.

If you want your client machines to access this alternate cell, they must do the following:

- Create a directory in `/ncs`.
- Copy the `glb_obj.txt` file from the alternate cell to the client's workstation.
- You may need to have a `glb_site.txt` file that points to the server. In most cases, you will not need this file.

---

**Note**

Suppose you have two servers each using the default cell, and you decide to create an additional alternate cell. Each server has 10 licenses each. You now have two choices to make:

- The client machine can either get licenses from the server that are using the default cell for a total of 20 licenses.
  - The client can use the alternate cell and have only 10 licenses.
  - You can't do both!
-

**Q: I have multiple licensed products running. During the installation of another licensed product the i4lmd attempts to start. Will this produce a problem?**

A: It shouldn't. The i4lmd will detect that an existing license server is already running on this machine and, if this is the case, the new server will exit gracefully and never start a process.

If the user tries to run another rpcd, the result is the following error:  
LLBD: Unable to obtain any sockets: No process will start.

If the user tries to run another glbd, the result is the following error:  
(GLB) cannot open log file. Nothing should happen.

**Q: How does my application get a license? What actual NCS/iFOR/LS components get called?**

A: Each license server (i4lmd) registers itself and the vendor ID of all vendors for which there are installed licenses with the Remote Procedure Call daemon (rpcd) when it starts up. The user invokes the application program, which requires a license in order to execute. The netls\_init( ) call prepares to request a license by finding all the possible servers that have licenses installed for that vendor.

If a nodelock entry for this vendor is in the nodelock file, and the application allows a nodelock license to be used, that license will be checked. Otherwise, the netls\_init( ) call gets a list of iFOR/LS servers from the location brokers. A broadcast message is sent out to a well known port that all rpcds are listening on to locate a glbd. Once a glbd is located, a message is sent to it. This message asks the question, *Any iFOR/LS servers out there with licenses that match my vendor ID?*

Optionally static configuration files glb\_site.txt can preclude the use of broadcasts and direct the library to one of list of glbds.

The glbd looks up the iFOR/LS servers and sends a reply to the application saying *Here are the places you can try to get a license for your application!*

The client receives this message, and rearranges the list of servers into a random order. By doing this, the license requests will be spread among the servers, so the first server in the list doesn't get tried first every time.

The application requests a license from a server. The server checks the user's access rights and the license database. The server returns the status of the license request to the application.

If the status is success, the application designers can allow it to run as they choose.

If the status is unsuccessful and there are more servers to try, the application goes on to try the next server. If all the servers return unsuccessful status, the application will perform as determined by the application designer which in many cases may be that the application will not run.

**Q: I have set up two alternate cells, cell A on host1 and cell B on host2. Can users of host1 get licenses from cell B?**

A: There is no mechanism in NCS to share services between cells. A host in any cell (default or an alternate) can only communicate with servers in the same cell. Cells were designed to isolate a group of servers and clients.

**Q: I have DCE installed. Can I run NetLS/iFOR?**

A: If the DCE daemon called `rpcd` is built with NCS 1.5.1 compatibility mode, then the `rpcd` daemon replaces the `llbd` daemon. If the `rpcd` is running and you try to start `llbd`, an error will occur: `LLBD: Unable to obtain any sockets`. This error is normal in this case since the `rpcd` is listening on socket 135 which is the same socket address as the `llbd`. The `glbd` and the `i4lmd` are then started normally.

**Q: What is NCS?**

A: NCS is a set of software components that provide remote procedure calls and the Location Broker.

**Q: What is a cell?**

A: A cell is a subset of a network or Internet in which all hosts use the same Global Location Broker object UUID. Cells have independent GLB databases. For client hosts in cells that do not use the default GLB object UUID, the configuration file `glb_obj.txt` specifies an alternate UUID.

**Q: What protocols are supported as of Jan. 1995?**

A: *i*FOR/LS supports the following protocols:

- TCP/IP for heterogeneous networks.
- DECNET and TCP/IP on VMS.
- IPX and TCP/IP for Netware for MS-DOS/Windows systems.

## 6-10 Common Questions and Answers

**Q: It seems to take a rather long period of time to get a license, could there be something wrong with the license server?**

A: In most cases the server is not the problem. It may however be related to the fact that stale entries exist in the GLB database. The following commands can be used to resolve this issue.

Run lb\_admin on the offending server.

```
# /usr/sbin/ncs/lb_admin

lb_admin: clean
lb_admin: use global
lb_admin: clean
```

If stale entries exist, answer yes to all the questions and determine why these errors occurred.

If no errors occur, then the brokers are in sync. Contact your system administrator to determine if network problems may exist.

**Q: I booted my machine and the i4lmd terminates. How do I resolve this problem?**

A: It is possible that the boot files for your platform are not correct. Refer to your Installation Procedure for the proper locations of the boot files. You could also view the i4config file for most platforms to determine the location of these files.

If you determined that the rpcd and glbd are properly running try the following:

As root, move to the /opt/ifor/ls/conf directory and delete the file log\_file. Start i4lmd. In most cases, this will resolve the server termination.

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**Note**            If you remove the log\_file you have lost all entries to i4admin -r.

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If the server still terminates, it is possible that the license server database is corrupted. To determine that this is the case, try the following:

As root, remove the following files:

/opt/ifor/ls/conf/log\_file, cur\_db, and lic\_db.

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**Note**            If you remove these files some of the entries may be removed from the license database. Determine the differences between `lic_db` and `lic_db.bak` before doing this step.

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Start the license server; this should resolve the server termination.

If the server still terminates you need to delete the above files as well as the `lic_db.bak`. Get the `lic_db` from a backup tape and restart the server. This should resolve the server termination. Please note that if you do not have a backup and the license database was corrupted, you will need to add all the licenses to the server with `i4admin`.