



Pulsonix Design System
Network Licensing
Installation and Operation

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Chapter 1. Network Licensing Basics

Introduction

Pulsonix support two types of licensing; node-locked and network (or 'floating').

This supplement details the installation of the network licensing only. Node-locked licensing is covered in the main users guide or in the *ReadMe First* documentation that was supplied with your Pulsonix product.

Node-locked licensing

Node-locked is a single installation of Pulsonix which has the product and security device (a key or Network Address) on the same PC. This system can be 'network aware' but will not look at any other 'node' or server for its security. Installation and operation of node-locked licensing is described in the 'Node Locked & Network Installation Start-up Notes' document.

Network Licensing

What is network licensing?

Network licensing provides the ability to have an installation of Pulsonix on one PC, and its security on another, which removes the need for a security device on each machine on which Pulsonix is to be used.

This is sometimes called 'floating' licensing, and because the licensing is 'floating', this means that as long as a particular PC has an installation of Pulsonix, and it points at the correct server PC for its licensing, then it can book out the necessary licenses for use. This can happen on any PC on a given network provided enough licenses are available from the server. The number of any particular license available is predefined based on the number purchased.

Network licensing should not be confused with the use of a network card address as the security device

How network licensing operates

The network licensing is managed centrally by a network license 'server' that controls access to the licensed options, protected by the security device. This mechanism allows licenses to be 'floated' to any nominated machine within a local network. The scheme works on a book out / book in system for each available product license.

The server application can also be configured to allow particular combinations of licenses, users and/or machines to be granted or denied access to particular licenses. For example, user *Bert* might be able to use a Pulsonix Schematics license but not a PCB one, while user *Fred* can use Schematics, PCB and the Autorouter. This example also applies for machines, so that a user can log in as his name on any machine but will still only have the products available to him, ones that have been allocated to him through the administration options in the server.

The floating license scheme uses a special set of licenses; you can't 'float' normal licenses. The Network License Server will not run unless the license file contains the right type of licenses.

Terminology used

Below is a list of some of the basic terminology used in network licensing and this documentation:

Client – a computer on which Pulsonix is to be used, and which communicates with the License Server to request licenses.

Connected – in Pulsonix terms, this means a Pulsonix Client has made a successful connection to the server.

Cluster – a group of two or more servers acting together to maintain licensing in the event of machine failure.

Floating license – in this instance, when a license is referred to as floating it means that the license can be used on any client on the network.

Heartbeat – a ‘heartbeat’ message is sent by the Pulsonix client to the server to indicate that it is still running.

License – a license is an authorisation code to enable an option or feature in the Pulsonix product.

License file – a license file is an encrypted file that contains licenses.

License Manager – This is a Pulsonix-supplied and installed program which you use to configure a client to locate the licenses needed to allow the main Pulsonix application to run. It is used for both node-locked and network licensing. When used for network licensing it is used to specify the computer name and port on which the license server is situated.

Network licensing – a licensing scheme that centralises access to licenses, allowing them to be used from any machine on the network.

Network License Monitor – a program that provides a user interface on top of the server.

Network Manager or System Administrator – this is the person who looks after your network and is knowledgeable enough to know how to get the Pulsonix network licensing running.

Node-locked – a system installation where the license file (and the licenses contained within it) are locked to one PC with a local security device.

Port – a number that identifies the particular TCP/IP socket used by Pulsonix to communicate between client and server.

Security device – this is an item of hardware that provides a specific unique identification used to control access to licenses. This is usually a physical key (a “dongle”) that plugs into either the USB or parallel communications port on your computer. It can also be a network card.

Service – an application that is run automatically by the system, and is not reliant on user action to start it up.

Server or License Server – an application controlling the central repository of licenses, which is capable of being accessed across the network from other computers.

Sockets – an industry standard network communication protocol.

System Admin rights or permissions – these are system rights that you have as a user. With certain permissions, you are able to access, view or edit drives, folders and files within your network.

Chapter 2. Network Licensing Installation

Installation overview

Below is an overview of the order in which to install the various facets required to run network licensing:

- Use the Pulsonix Setup program to install the Network License Server.
- Start the Network License Server.
- On each of the machines on which Pulsonix itself is to be used, use the Pulsonix Setup program to install Pulsonix as a Network License Client.

Backing up data

If you are an existing user, it is recommended that you take a copy of the existing license file before installing the latest version of the software. Other than for any particular reason, this is good working practice, although you should have a backup already!

System permissions and storage of settings

The server needs the License Server application and associated files to run the Pulsonix network licensing; it does not require a full Pulsonix installation.

Each user who logs into a computer generally has various access permissions assigned to them. In order to install Pulsonix successfully these permissions must include Administrator rights on the local computer itself.

The settings needed for the network licensing are stored in a configuration file called "License.ini". This file is created and maintained automatically by the installer and the applications, in a folder called "C:\PulsonixConfiguration". If you prefer this file to be written to a different hard drive, you can create a "PulsonixConfiguration" folder on any hard drive up to drive letter "H" before running the installer.

Installing the Network License Server

Installing the Network License Server

A **Pulsonix Network License Server** installation has its own setup program.

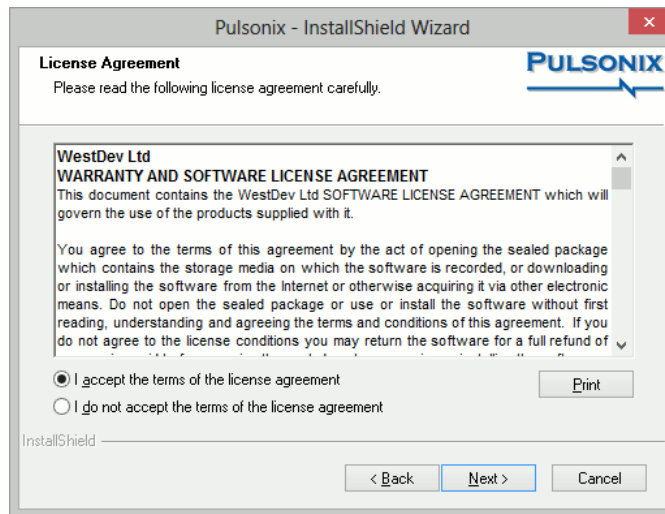
It will only install the files required to be able to run the license server. You will not be able to run Pulsonix as well from this PC unless you also install the Pulsonix Network License Client (see next section).

Before you install the Network License Server, if your license mechanism uses a dongle, then ensure that it is **not** connected. The server software supplied with the program must be installed first. This installation contains the HASP driver required by the key to enable it to run.

Important note: when installing on a 'Server' version of Windows (e.g. Windows Server 2008), if you are using a dongle (HASP key) for license protection then you cannot install the HASP driver or access the HASP key via Remote Desktop. This is a feature of the HASP driver to prevent unauthorised access from multiple desktops. You must in this situation perform the installation either from the server console itself or via another mechanism such as VNC that accesses the console screen remotely.

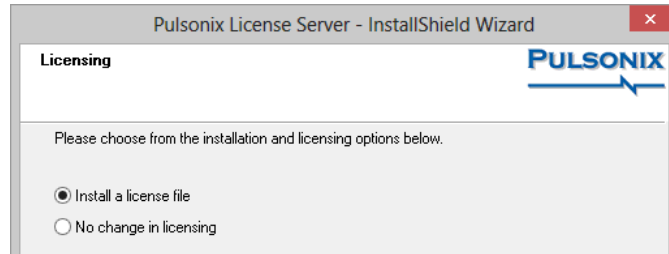
From the welcome page, press **Next>** to continue.

Select the **I Accept...** radio button to accept the terms and conditions of the agreement displayed.



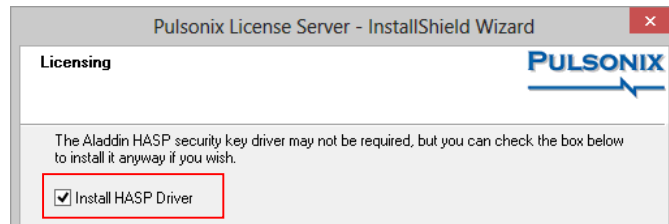
Press **Next>** to continue.

From the **Licensing** page there is an option to **Install a License file**. With this option selected, Setup will only install the tools required to centrally license Pulsonix.



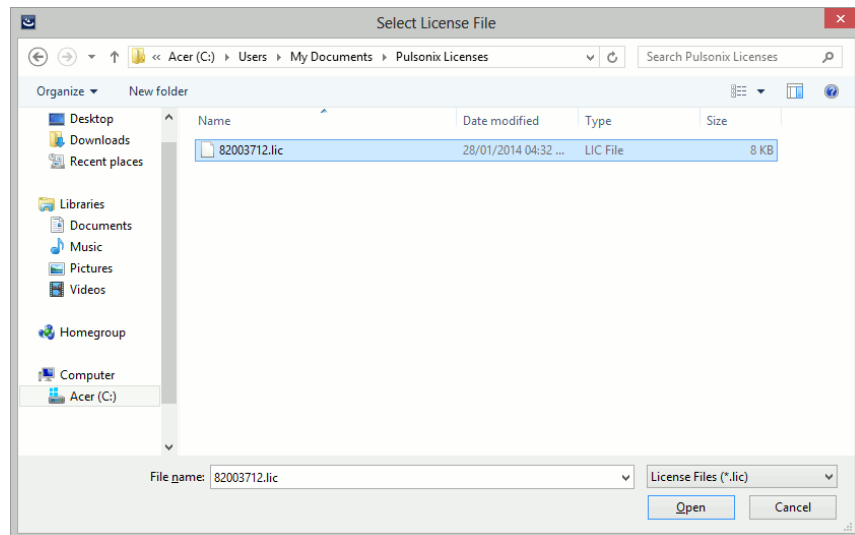
If you wish to run both the License Server and a copy of the Pulsonix application on the same computer, you will first need to install the License Server, then re-run Setup and choose the next option **Install Pulsonix as a Network License Client**, this will install Pulsonix itself.

Depending on your system configuration, you may also be prompted to install a HASP driver for a server installation. If you are using a dongle, an appropriate HASP driver must be installed otherwise the program will not run. Setup will install the HASP driver for you.



Server License

During installation you will also be requested for a license file. This would have been provided to you by email. If you have the file on email, save the attachment using the name **license.lic** and save it into the Pulsonix installation folder.



Browse to this folder when requested for the license. You cannot proceed without the license file.

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Installing the USB key driver

Once the installation is complete, if you connect the USB key, the Windows Plug & Play option will automatically detect the key and install the driver. The key will now be ready for use. DO NOT connect the USB before installing the Pulsonix-supplied HASP USB driver.

Protection considerations when installed on Windows Server

Run As Administrator

If you are using a Server version of Windows, then to carry out any configuration changes you will generally find that it is necessary to invoke the licensing applications by right-clicking on their program shortcut and choosing 'Run as administrator'. This is to elevate the program permissions to allow it to access – and potentially change – settings in the Local Machine part of the system registry.

Data Execution Prevention (DEP)

Also, if you are using a HASP key as your protection device, it may be necessary to add the licensing applications as exceptions to the 'Data Execution Prevention' settings, otherwise you may find that the operating system prevents those applications from running or causes them to quit with an exception.

To access DEP, open Windows Explorer, find your 'Computer' icon, right-click and choose Properties. In the list of Tasks, choose Advanced System Settings. In the Performance Options, click Settings, and choose the Data Execution Prevention tab.

Either change the setting to 'Turn on DEP for essential Windows programs and services only', or use the Add button to browse to each of the licensing applications to add them as an exception to DEP.

How to get the license server running

With the **Pulsonix Network License Server** installed, there are two methods for running the license server. Depending on your operating system and how it is configured, it is possible that only one method will be available to you; it is recommended that you use the second method (run as a Service) if possible.

It is recommended that you use the manual method first to verify that the server and license will run.

Running the license server manually

During Setup, a shortcut to the **Network License Server** application (nlserver.exe) is added to the 'Pulsonix' group on your Start menu. Clicking on this shortcut will start the server as a 'normal' application. As well as running it 'manually' like this, you can also opt to run the server automatically each time you log into Windows, by copying the shortcut to the 'Startup' group on your Start menu.

Once the server is running, a client (once installed) can then find the server and request to have the necessary licenses booked out.

Running the license server as a 'service'

The process of starting up the server can be automated, by installing it as a special kind of program called a 'service'. This service will then be started up automatically as the operating system itself starts up, thus allowing the license server to run entirely independent of whoever is logged onto the server computer.

To install the network license server service, first open a command prompt window (from the Taskbar go to Start and Run. Type **cmd** [or **command**] in the window and OK). Then, change the current folder to the Pulsonix program folder (for example on the default installation, use **cd "c:\program files\pulsonix\pulsonix"**)

Now type in this command to install the service:

```
nlss install
```

If you wish to remove the license server service, type the following:

```
nlss remove
```

Note that it may seem that nothing has happened at this point but the service will have been installed into the Services, viewed through the Control panel.

Next, start the license server by typing:

```
net start nlss
```

These messages should now appear:

```
The Pulsonix Network Licensing service is starting.  
The Pulsonix Network Licensing service was started successfully.
```

Your network license server is now running. If it was not started successfully, run the nlserver.exe program to sort out any problems with the license file.

Note that you will only need to follow this sequence of instructions once. Now that the network license server is installed, the operating system will take care of restarting the service if the computer is re-booted.

When the license server is being run as a service, it doesn't have any user interface, so you can't see what it's doing. The license server application can be used instead to 'interrogate' the status of the license service.

Now select the **Network License Server** program from your Start menu and 'Pulsonix' group. The license server will start up and run as a monitor to show you the status of the network license service. This monitor provides the user interface to change permissions and options on the server. It can also be used on a client machine to monitor a service running on another computer but is limited in its functionality.

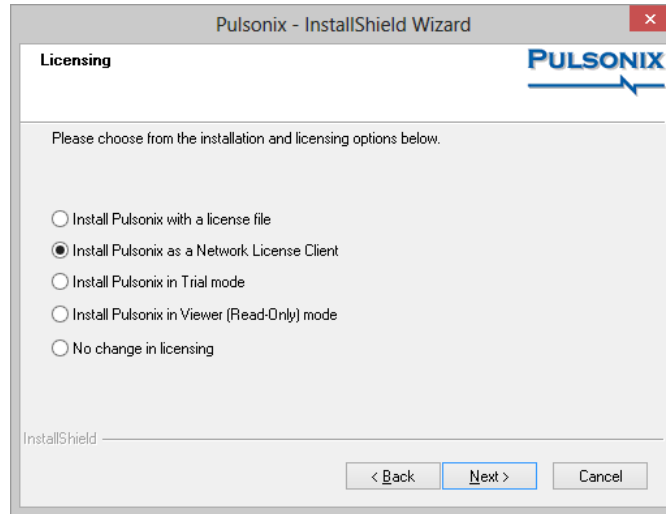
Once the service is running, the client (once installed) can then find this service and request to book out the licenses it wants.

Installing the Network License Client

A **Network License Client** is installed using the main **Pulsonix Application Setup** available from the **Setup** dialog.

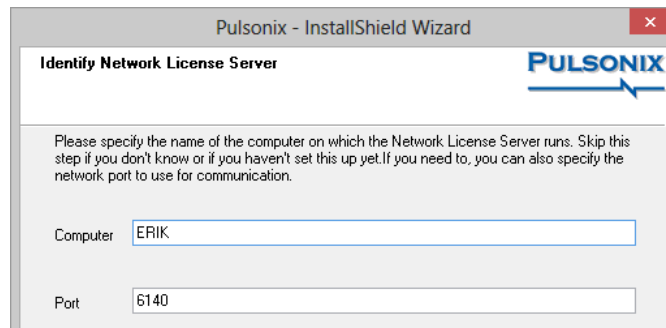
During installation it will ask you to select an installation type, select **Network License Client** installation.

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You are also requested for the **Computer name** on which the License Server will run (or is already running). The License Server does not need to be running at the time, as the Setup program will not actually attempt to communicate with the server. If installing the client on the same machine as the server, make sure that the server is not running otherwise the client installation will fail.

If you don't know the name of the License Server Computer, you can skip this step by leaving the Computer name blank. You can set up the name of the License Server later by using the Pulsonix License Manager program once you have finished installing Pulsonix.



You will also be requested for the **Port** number of the license server, by default this is **8083**.

If necessary, you can also change the network **Port** used by Pulsonix to communicate with the License Server. This should only be necessary if you are already using other software that uses a network 'Socket' on this port number. This number is generally only changed with the assistance of a member of our Technical Support Team.

Once you have set up the Computer and/or Port, click **Next** to proceed. The values you have specified will be stored in the system registry for later use by the various Pulsonix programs that need to use the Network Licensing scheme.

The remaining installation will be as a normal Pulsonix user.

Running the Server and Pulsonix on the same machine

If you intend running the Network License Server and the Pulsonix program on the same machine (and it is perfectly okay to do so) then you must install both the **Server** program and the **Client** on the same machine.

In this case, once the Server is installed and the Client is installed, the network license server is run as normal but the client is simply looking at its own machine rather than looking across the network for this service. The name given for the server will be that of the machine hosting it, the one which you are on.

Chapter 3. Running the License Server

How to get the license server running

With the **Pulsonix Network License Server** installed, there are two methods for running the license server, either as an ‘application’ or as a ‘service’.

Although it is possible to run it in ‘application mode’ all the time, it is recommended that you only use Application mode to carry out the initial configuration and verification of proper operation, then run it as a Service.

Running the license server manually

During Setup, a shortcut to the **Network License Server** application (nlserver.exe) is added to the ‘Pulsonix’ group on your Start menu. Clicking on this shortcut will start the server as a ‘normal’ application.

Once the server is running, a client (once installed) can then find the server and request to have the necessary licenses booked out.

Running the license server as a ‘service’

The process of starting up the server can be automated, by installing it as a special kind of program called a ‘service’. This service will be started up automatically as the operating system itself starts up, allowing the license server to run entirely independent of whoever is logged onto the server computer.

To install the Network License Server Service, first open a command prompt window (from the Taskbar go to **Start** and **Run**. Type **cmd** [or **command**] in the window and OK). For Windows Vista and Windows 7, you will need to open the **Start** menu, then **All Programs**, then **Accessories**, then right-click on the ‘**Command Prompt**’ menu entry and choose ‘**Run As Administrator**’. For Windows 8, you will need to press the Windows ‘Flag’ key

Then, change the current folder to the Pulsonix program folder (for example on the default installation, use **cd “c:\program files\pulsonix\pulsonix”**)

Now type in this command to install the service:

```
nlss install
```

If you wish to remove the license server service, type the following:

```
nlss remove
```

Note that it may seem that nothing has happened at this point but the service will have been installed into the set of Services on this computer, which can be viewed through the appropriate section of the Control Panel.

Next, start the license server by typing:

```
net start nlss
```

18 Running the License Server

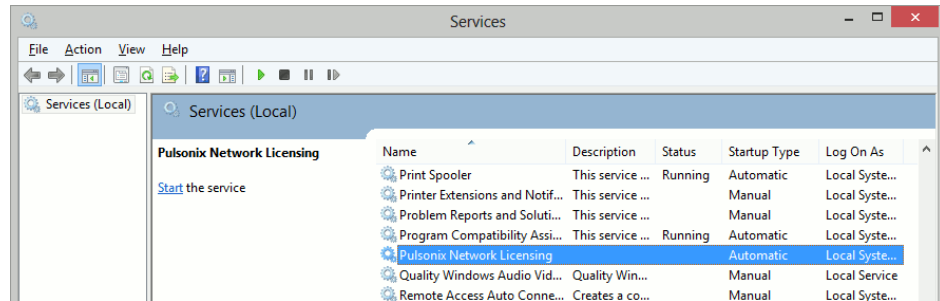
These messages should now appear:

The Pulsonix Network Licensing service is starting.

The Pulsonix Network Licensing service was started successfully.

Your network license server is now running. If it was not started successfully, run the program as an ‘application’ (as described above) to sort out any problems with the license file or other settings.

Alternatively, you can use the Services feature of the Windows Control Panel to locate the service in the list, and start it from there:



Once the service is running, the client (once installed) can then find this service and request to book out the licenses it wants.

Note that you will only need to follow this sequence of instructions once. Now that the network license server is installed, the operating system will take care of restarting the service if the computer is re-booted.

When the license server is being run as a service, it doesn't have any user interface, so you can't see what it's doing. The license server application can be used instead to ‘interrogate’ the status of the license service as described below.

Running the Server and Pulsonix on the same machine

If you intend running the Network License Server and the Pulsonix program on the same machine (and it is perfectly okay to do so) then you must install both the **Server** program (as described above) and the **Client** (as described in the ‘Startup Notes’) on the same machine.

In this case, once the Server is installed and the Client is installed, the network license server is run as normal but the client is simply looking at its own machine rather than looking across the network for this service. The name given for the server will be that of the machine hosting it, the one which you are on.

Monitoring the license server

When the license server is running, you can use the license server application to ‘monitor’ its operation remotely.

Select the **Network License Server** program from your Start menu and ‘Pulsonix’ group. The license server will start up and run as a monitor to show you the status of the network license service. This monitor provides the user interface to change permissions and options on the server. It can also be used on a client machine to monitor a service running on another computer.

Complete details of the various configuration and management options available in the server application are given in the next chapter.

Stopping the license server

Stopping the license service

When running the license server as a service, you can stop the service by typing:

```
net stop nlss
```

or you can use the Services section of the Windows Control Panel to locate the service in the list and stop it from there.

Stopping the license server application

When running the license server as an application, stopping the server is as simple as exiting from the application using the Exit menu option or the Exit button on the toolbar.

Stopping when users are still connected

Care should be taken when stopping or restarting the Network License Server when there are still users connected to it. A warning message is displayed if you attempt to do this from the server running as an application, but not when running as a service (because the service does not have any user interaction).

If the server is simply being restarted, the server will attempt to re-establish the link to those connected clients/users, but depending on what the client applications are doing there is no guarantee that communication will be successfully re-established, or it may take longer than expected and the client end may assume the server has gone and will then start closing itself down.

Therefore, it is recommended that you **do not** stop or restart the server when client applications are connected. It may however be necessary to restart the server if client/server communications have been disrupted for some reason. Before doing so, it is recommended that you ensure that all the users who might be affected have saved their work.

Command-line parameters for NLServer application

The NLServer application can be run with various command-line parameters to specify certain behaviour or over-ride previous settings stored in the system registry. These parameters may be required for example to allow you to monitor a server that is running on a different machine to your usual server.

Running as a monitor

To force the application to act as a monitor onto another server that is already running:

```
nlserver monitor
```

If you have not previously specified where your server is running, or you need to over-ride this setting and monitor a specific server, add a colon followed by the name of the server to monitor, like this:

```
nlserver monitor:servername
```

20 Running the License Server

Running as a server

To force the application to launch as a server, perhaps to create a new license server on a machine which has previously only run as a monitor to a different server:

```
nlserver server
```

Specifying the port number

The default or stored settings for the TCP/IP port to use can be over-ridden from the command-line if required:

```
nlserver port:portnumber
```

Editing the configuration file

To open the Configuration file in a text editor without launching the server application:

```
nlserver config
```

Command-line example

This is an example command-line:

```
nlserver monitor:mars port:14220
```

This would launch the program to monitor a server on computer 'mars' using port 14220.

Chapter 4. Managing the License Server

Overview

This chapter covers the various administration options that allow you to control the operation of network licensing.

These options work in the same way whether running the application as a server, or as a monitor onto another license server application or service.

Controlling permission to manage the License Server

In a default installation, anyone who has is able to launch the License Server application in 'application mode' can gain access to the license server and hence manage its operation.

To prevent this happening, you should use the commands available in the configuration file (see "Chapter 5. Configuration File Commands" starting on page 27) to create an administrators group; if the configuration file used by the server specifies an administrators group, only those people specified as members of that group will be able to change any settings when 'monitoring' the license server. Without an administrators group, permission to modify the server operation is 'wide open' to anyone who can run the license server application to monitor the server.

If you are restricting access to administrators, you should also use the operating system permissions to control access to the configuration file. Otherwise anyone could edit the configuration file to add themselves to the administrators group!

Connecting to the server to be managed

If you have previously connected to a license server (either through the license server application as a monitor, or using the License Manager program), the same server will be contacted next time because the name of the last-visited server is stored in your system registry settings.

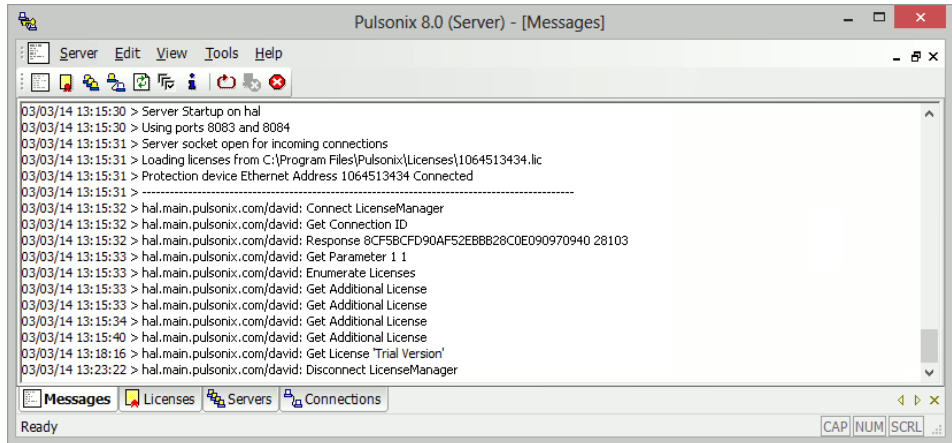
If you wish to monitor or manage a different server, you should use the command-line parameters described above (see page 19) to specify which server you wish to access.

22 Managing the License Server

License server screens

Messages

The **Messages** screen shows you a rolling history of messages showing you what is happening as the server runs and clients ‘talk’ to the server. This includes information about clients connecting and disconnecting, licenses being booked out and returned, and so on. The level of detail shown in this screen is controlled by settings on the **Options** dialog (see page 24).



Licenses

The **Licenses** screen shows you a table of the licenses from the license file, and how many of each license are currently booked out or still available to be booked out.

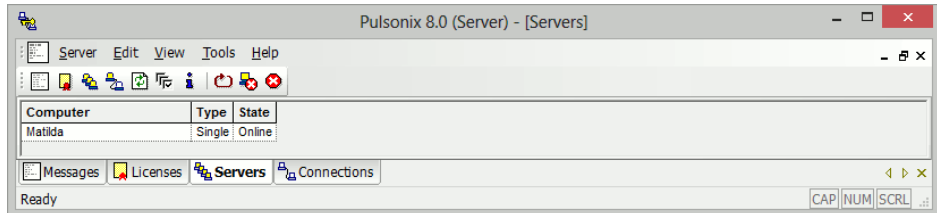
The screenshot shows the 'Licenses' window in Pulsonix 8.0. The table displays the following data:

License Name	Total			Normal			Reserved			Loan		
	Used	Free	Total	Used	Free	Total	Used	Free	Total	Used	Free	Total
Add Spirals	0	3	3	0	3	3	0	0	0	0	0	0
Auto Gate & Pin Swap	0	3	3	0	3	3	0	0	0	0	0	0
Auto Place	0	3	3	0	3	3	0	0	0	0	0	0
Auto Placement	0	3	3	0	3	3	0	0	0	0	0	0
Auto Route	0	3	3	0	3	3	0	0	0	0	0	0
Auto Router	0	3	3	0	3	3	0	0	0	0	0	0
Auto Swap	0	3	3	0	3	3	0	0	0	0	0	0
Basic AutoRouter	0	3	3	0	3	3	0	0	0	0	0	0
Chip Packaging Toolkit	0	3	3	0	3	3	0	0	0	0	0	0
Database Connection	0	3	3	0	3	3	0	0	0	0	0	0
Embedded Component Technology	0	3	3	0	3	3	0	0	0	0	0	0
Export Spice	0	3	3	0	3	3	0	0	0	0	0	0
Full Edition	1	2	3	0	2	2	0	0	0	1	0	1
Interactive High Speed	0	3	3	0	3	3	0	0	0	0	0	0
PCB Layout	1	2	3	0	2	2	0	0	0	1	0	1
PLM Interface	0	3	3	0	3	3	0	0	0	0	0	0
Pulsonix Application	1	2	3	0	2	2	0	0	0	1	0	1
Run Spice Simulator	0	3	3	0	3	3	0	0	0	0	0	0
Save PCB Designs	0	3	3	0	3	3	0	0	0	0	0	0
Save Schematic Designs	0	3	3	0	3	3	0	0	0	0	0	0
Schematic Capture	1	2	3	0	2	2	0	0	0	1	0	1
Unlimited Pin Count	0	3	3	0	3	3	0	0	0	0	0	0

If there are no more of a particular license available to be booked out, the 'Free' entry will be highlighted in red. Where licenses are still available, these are highlighted in green.

Servers

This screen shows you the status of the license servers you are monitoring. Generally this is only one server, so the type is shown as 'Single'.

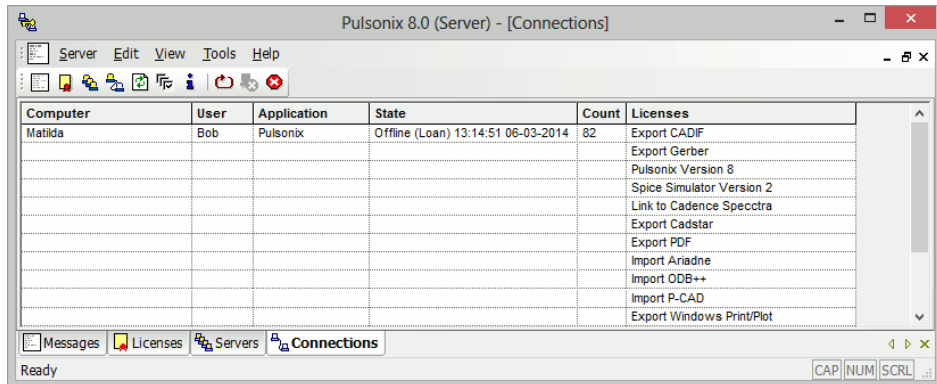


However, depending on the options enabled by your server license file it may be possible to run two or more License Servers as a 'cluster' to provide protection against hardware or software failures on one particular server. This is described in more detail in the chapter entitled "Server Clustering" (see page 45).

In that case, this screen will show you the name, type and status of each server in the cluster. If you have permission to do so, you can also carry out administrative tasks on the servers in the cluster, for example to stop or restart a particular server.

Connections

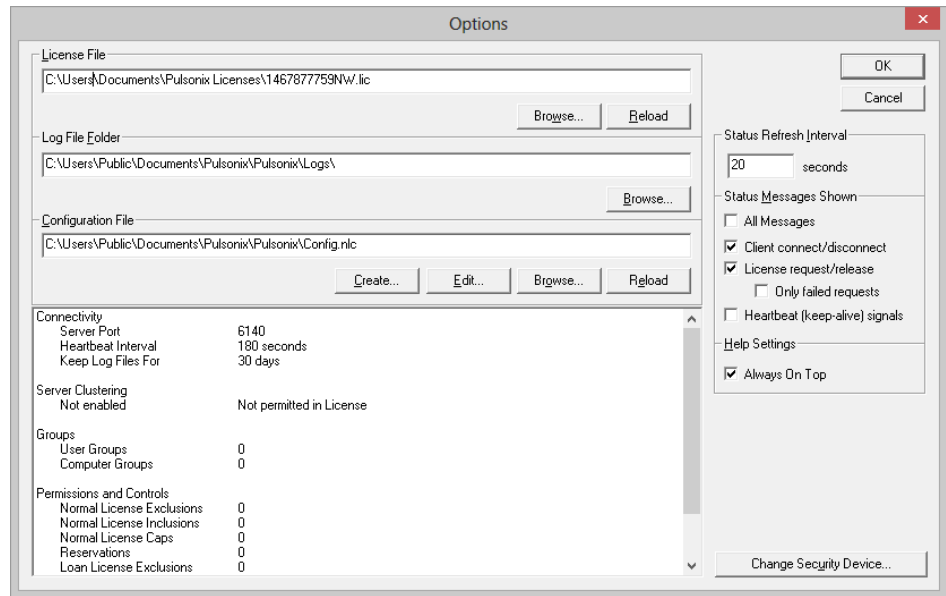
This screen shows you details of each of the clients connected to the server, including the computer and user name, and the licenses they are currently holding.



If a client has taken out Loan licenses (see page 39), the date those licenses are due to expire will be shown on this screen.

The Options dialog

The Options dialog is where you control how the server operates. Each of the sections on the dialog is described in detail below.



License File

The server uses a license file to determine how many of each licensed option are available to be handed out to clients that request them. The License File section of the dialog is where you specify where that license file lives.

Use the **Browse** button to locate the license file if you have not yet specified its location, or to change to a different license file. Use the **Reload** button to request that the server re-read the existing license file. This can be useful for example if you have been sent a new license file with a higher license count for some options.

Both **Browse** and **Reload** can be used to load a license file into a server that is already running. Existing client connections will not be lost or broken by doing this. Any increased license counts will become available immediately to be requested by clients. Any reduced license counts will also be taken into account; if this means that the count on a particular license option is lower than the number of that option currently booked out, those licenses will be automatically removed from the server's internal license table as they are returned to the server.

If you use the **Browse** or **Reload** buttons to change or reload the license file, those changes will not be committed to the server until you click the **OK** button.

Log File Folder

The Server writes log files to record many of the things that happen to the server as it is running. These files are written to the location specified here for the Log File Folder.

Each log file is named for the date on which it is written. The server automatically ‘rolls over’ to start a new log file for the first message it needs to record after midnight.

For more details on log files and how they are used, refer to “Chapter 6. Log Files” on page 35.

Configuration File

Many of the settings for the license server are controlled from a Configuration File.

The server will run without a configuration file, so you would only need to create and use one if you need to specify any of the additional controls or features that are not available directly from the Options dialog, or to over-ride any of the default settings such as port numbers.

To create a new configuration file, use the **Create** button. This will prompt you to specify the name and location of your new configuration file, then open that empty file in your normal text editor so you can start adding your configuration commands.

If you already have a configuration file and wish to change commands in it, use the **Edit** button to open your file in your normal text editor.

Use the **Browse** button to instruct the server to use a different configuration file.

Use the **Reload** button to instruct the server to re-read the configuration file after you have finished editing it, or perhaps after you have restored a previous version of the file from backup.

Below these buttons is a list of the key information that has been loaded from the current configuration file. This list is useful to verify that you have set up the correct commands in your configuration file before pressing **OK** to commit the server to using it.

For full details of all the commands that can be used in a configuration file refer to “Chapter 5. Configuration File Commands” starting on page 27.

Change Security Device

In some circumstances it may be necessary to select a specific security device to match your license file. For example, if your computer has multiple network devices it may be necessary to indicate the specific device which should be used to unlock your license file.

To do this, use the **Change Security Device** dialog to select the required device.

Command-Line Device Selection

As well as accessing this dialog through the Options dialog, you can invoke it through a command-line switch using the NLServer.exe application. This may be necessary during initial setup so that the server can find the right device and use it to unlock the license file.

The command line to use is:-

```
nlserver device
```

Other settings

Status Refresh Interval

This setting controls how often the current status (as shown on the Connections, Servers and Licenses screens) is updated.

Status Messages Shown

These checkboxes control how many of the possible messages are actually displayed on the Messages screen. Generally you would not want to display all the messages as this would usually fill the Messages screen with too much information. However, this setting can be useful if you are just setting up your network licensing or if you need to trouble-shoot a particular problem.

Help Settings

Check the box to force the online help for the application to stay 'above' the other windows of the application and not disappear behind.

Chapter 5. Configuration File Commands

Overview

Locating your Configuration file

You should place your Configuration file where it is going to be 'safe'. Anyone who has the rights to edit the configuration file can potentially alter the permissions and other settings for your license server. You may therefore wish to place the file in a folder for which only selected users have write permissions. You will need to use your operating system features to set this up.

Your file should also be placed somewhere where your server can always reach it. So don't place it on external media that may sometimes be disconnected, or on a network or subst'd drive that the server may not have permission to reach.

Order of precedence of commands

If there are no PERMIT or DENY commands in the file, there are no restrictions on how license requests are granted or denied. This is the default setting, and access to licenses is only controlled by the total number of each license available in the license file.

Once the file contains an PERMIT or DENY list for a particular license, all other entities are automatically outside the group. So if for example the file contains one or more PERMIT commands for a license option, anyone not covered by the names or groups in those commands will not be granted access to that license.

Other licenses not mentioned with PERMIT or DENY commands will default to being free of any access restrictions. You can change this using the command PERMITUNLISTEDOPTIONS (see below).

Depending on how you wish to structure the access rights, you can quickly cover all basic possibilities without having to list every possible user or computer in your configuration file. You can either:

- Permit access by most users and only DENY those not permitted, or
- Heavily restrict access for most, and only PERMIT those for whom access is granted

When using PERMIT and DENY commands in combination to define access to the same licenses, rules defining the order of precedence are applied to decide whether that requests for that license can be granted to particular users or groups. The rules are as follows:

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

For the License Loan feature, the PERMIT_LOAN and DENY_LOAN commands work together in the same way as described above for PERMIT and DENY.

28 Configuration File Commands

Option names

Various commands in the configuration file use names for licenses in the license file. The following table lists the name and description for each license or group of licenses that can be managed using the configuration file:

Name	Description
Application	The main license for the Pulsonix application itself
PcbLayout	Access to PCB designs
ScmLayout	Access to Schematic designs
SavePCBDesigns	The ability to save PCB designs
SaveSCMDesigns	The ability to save Schematic designs
PcbViewer	Put PCB designs into 'viewer-only' mode
ScmViewer	Put SCM designs into 'viewer-only' mode
SaveLibraries	The ability to save to Pulsonix libraries
UnlimitedPins	Designs with no pin limits
PinLimit	Designs with a limit on the number of pins
PinLimit2	Secondary pin limit where multiple pin limits are defined
HighSpeed	Interactive High-Speed command set
AutoRoute	Advanced PCB auto-router
BasicAutoRouter	Basic PCB auto-router
AutoPlace	PCB automatic placement
AutoSwap	PCB automatic gate and pin swap
Embedded	Embedded Components command set
Spirals	Add Spirals
Barcodes	Add and edit barcode text
NefTestability	Net testability checker
PDC	Pulsonix Database Connection
LibKit	Library Integration Toolkit
ChipKit	Chip Packaging Toolkit
IntegratePLM	Interface with 'Integrate' toolkit for PLM system
RouteEditor	Interface with Zuken Route Editor
Specctra	Interface with Cadence Specctra
Spice	Run Pulsonix-Spice simulator
FullEdition	Full-capability edition of the Pulsonix application
LiteEdition	Reduced-capability edition of the Pulsonix application

There is also a special license name "*" (asterisk, star) that means all possible licenses. This can be used in commands requiring a license name where access to the complete set of licenses needs to be controlled, for example to permit one person to access any license that might be available on the server.

Case sensitivity

All the commands in the configuration file are case insensitive; that is, all names are compared ignoring their case.

Keywords and commands are shown in upper case for clarity in the Command Reference below, but are always compared ignoring their case.

Comments

Any line starting with # or ; will be treated as a 'comment' line and ignored when the configuration file is loaded.

User management commands

ADMINISTRATOR

ADMINISTRATOR type name

This command is used to control who is allowed to perform administration tasks on the license server using the ‘monitor’ application. If no administrators are specified in the configuration file, no control is imposed and anyone running the monitor can administer the server.

type USER, COMPUTER, USERS or COMPUTERS.

name Name of the entity allowed to administer the server.

For example, the following lines in the configuration file create a user group called admins, then sets that group as having admin rights, thus allowing the two named users to administer the server:

```
USERS admins michael alice
ADMINISTRATOR USERS admins
```

This command does not control operating-system access to the server application or service, or to the configuration file itself. Control over those should be exercised using the permissions or policies available through your operating system. Thus the definition of an administrators group in a configuration file does not stop someone else – provided they have operating system permissions – from stopping the network license service.

Care should be taken when setting up administrator groups, to avoid the possibility that no valid users would be able to administer the server. In the event that the server is using an ADMINISTRATOR command that does not specify any valid users, recovery would require you to edit the configuration file to correct the error, then manually stop and restart the server (assuming you have operating system permissions to do so).

USERS

USERS group_name user_list

This command defines a name to be used for a group of users for use in other commands in the file. Multiple USERS lines for the same group name will add all the specified users into the same named group.

group_name Name of the group being defined.

user_list List of user names in that group.

For example, this command defines a group of users called “fabshop” with 4 members:

```
USERS fabshop peter martin susan toni
```

30 Configuration File Commands

COMPUTERS

COMPUTERS group_name computer_list

This command defines a name to be used to identify a group of computers, for use in other commands. Multiple COMPUTERS lines with the same name will add all the specified computers into the same named group. An IP address can be used in place of a computer name.

group_name Name of the group being defined.

computer_list List of computer names in that group.

For example, the following commands will add four computers to a group called “drawing_office”

```
COMPUTERS drawing_office neptune pluto 216.43.12.11
COMPUTERS drawing_office mars
```

License management commands

DENY

DENY license type name

Denies a named entity or group access to the specified license. See Order of Precedence above for details on how this command works in combination with others.

license Name of the license being affected, or ALL for all licenses.

type USER, COMPUTER, USERS or COMPUTERS.

name Name of the entity which is excluded from accessing this license.

For example, to prevent the user “ramiro” from being able to use the license “autoroute”:

```
DENY autoroute USER ramiro
```

DENY_LOAN

DENY_LOAN license type name

Prevents a named entity or group from Loaning out copies of a license to take away using the License Loan feature.

license Name of the license being denied, or ALL for all licenses.

type USER, COMPUTER, USERS or COMPUTERS.

name Name of the entity which is excluded from Loaning this license.

For example, to prevent the user “fred” from loaning an Autoroute license:

```
DENY_LOAN autoroute USER fred
```

LOAN_FLOOR

LOAN_FLOOR license number [type name]

Where a particular license has Loans enabled, this command is used to reduce the number of copies of that license can be loaned out. You can use this command to ensure that more licenses are kept available 'in-house' for general use (i.e. cannot be loaned out) than the level that the license file originally specified.

license Name of the license to be controlled.
 number Number of Loan copies of this license to be held back.
 type USER, COMPUTER, USERS or COMPUTERS.
 name Name of the entity which is excluded from Loaning this license.

For example, if the license "HighSpeed" has a Loan count of 9, the following line in the configuration file keeps 2 of those back, allowing only 7 licenses to be taken out on loan:

```
LOAN_FLOOR highspeed 2
```

MAX

MAX license number type name

Limits usage for a particular group to a maximum number of a given license. This command only applies to groups, as an individual user or computer can only acquire one instance of a given license at any one time. Specifying a limit larger than the total number of this license available in the license file will have no effect.

license Name of the license to be controlled.
 number Maximum number of instances of this license the group can acquire.
 type USERS or COMPUTERS.
 name Name of the group for which license usage is limited.

For example, to limit the group "designers" to 5 licenses for the option "savepcbdesigns", include the following line in the configuration file:

```
MAX savepcbdesigns 5 USERS designers
```

MAX_LOAN_HOURS

MAX_LOAN_HOURS license hours

Reduces the maximum length of time a license can be loaned out from that defined in the license file or by the application. Setting a time longer than that specified in the license file has no effect.

license Name of the license to be controlled.
 hours The maximum number of hours this license can be loaned out.

32 Configuration File Commands

PERMIT

PERMIT license type name

Allows a named entity to be granted access to this license. See Order of Precedence above for details on how this command works in combination with others.

license Name of the license being permitted.

type USER, COMPUTER, USERS or COMPUTERS.

name Name of the entity which is permitted to use this license.

To allow user “francois” to use an “autoplace” license:

```
PERMIT autoplace USER francois
```

PERMIT_LOAN

PERMIT_LOAN license type name

Allows a named entity to Loan out a particular license.

license Name of the license being affected, or ALL for all licenses.

type USER, COMPUTER, USERS or COMPUTERS.

name Name of the entity which is permitted to Loan out this license.

To allow user “tom” to Loan out an “autoplace” license:

```
PERMIT_LOAN autoplace USER tom
```

PERMITUNLISTEDOPTIONS

PERMITUNLISTEDOPTIONS true | false

Specifies whether any license option not mentioned in any PERMIT command will be automatically denied or not. The default setting is TRUE, which means that any unlisted option will remain as permitted.

RESERVE

RESERVE license number type name

This command will reserve one or more instances of a license for a specific entity. Reserving licenses in this way will reduce the number available to other users, even if the named user/group is not currently using that license. When specifying an individual user or computer, the value of ‘number’ will be ignored as any individual can only book out one instance of any particular license anyway.

license Name of the license to reserve.

type USER, COMPUTER, USERS or COMPUTERS.

name Name of the entity for which the license is reserved.

Number How many licenses to reserve.

For example, to reserve 2 autoroute licenses for the design_office:

```
RESERVE autoroute 2 USERS design_office
```


Configuration commands

HEARTBEAT

HEARTBEAT seconds

Specifies how often clients should send a 'heartbeat' signal to the server to indicate that the connection is still live. Although you can in theory stop the heartbeat signal completely (by setting the interval to zero), this is not recommended in a normal configuration because it can result in the server holding client connections open for long periods when the client application has actually closed. High values should also be avoided for the same reason.

A reasonable value for this setting is within the range 30 – 180.

seconds Integer number of seconds

KEEPLOGFILES

KEEPLOGFILES number

Specifies the number of days for which log files will be kept. The default setting for this is 7 days.

PORT

PORT portnumber

Specifies the port number to be used for communication from client to server or between cluster servers. The default value for this port is 6140 which has been assigned by IANA (Internet Assigned Names Authority) as the port for Pulsonix Network Licensing. This should not generally clash with other applications, but you can use this command to choose an alternative number if you find you have problems establishing communication with the default setting.

portnumber Integer port number in the range 1024 - 49151.

It is recommended that you do not use port numbers outside this range. Even within this range you may find problems with other software in some networks. Refer to this web page:

<http://www.iana.org/assignments/port-numbers>

for a complete list of assigned port numbers if you need to resolve clashes with other 'known' applications.

SERVER

SERVER servername [servername servername]

Identifies the name of one or more servers that are to be part of a Server Cluster (see page 47). You can specify your cluster server names either using separate SERVER commands or by listing them all together in one command.

servername Computername of a server

34 Configuration File Commands

SERVERHEARTBEAT

SERVERHEARTBEAT seconds

Specifies how often cluster servers should communicate with each other to indicate that the connection is still live.

A reasonable value for this setting is within the range 5 – 20.

seconds Integer number of seconds

Alternative command names

For users who have previously administered network license servers for other products using floating license services such as Flex/LM, you may prefer to use the following alternative commands in place of those shown above.

<u>Standard command</u>	<u>Alternative command</u>
COMPUTER	HOST
COMPUTERS	HOST_GROUP
DENY	EXCLUDE
DENY_LOAN	EXCLUDE_LOAN
LIMIT	MAX
LOAN_FLOOR	BORROW_LOWWATER
MAX_LOAN_HOURS	MAX_BORROW_HOURS
PERMIT	INCLUDE
PERMIT_LOAN	INCLUDE_BORROW
USERS	GROUP

Chapter 6. Log Files

Overview

Log files are written by the server as it processes client connections, license requests and other events.

Two types of log file are written, one recording diagnostic information about startup, shutdown and connectivity, and the other recording information about license check-out and check-in.

Log file location

Log files are written to the location specified on the Options dialog (see page 25). This location should ideally be on a hard drive on the computer on which the server is running to avoid problems of the log file location becoming unavailable if the server experiences network problems.

It might be tempting – particularly when using a server cluster – to set up a single shared network folder for all the log files from all servers. However, this introduces a potential point of failure which may prevent any of the servers from operating if this one shared folder is inaccessible.

Log file ageing

Each log file contains events for one day, with the name of the file showing the date. Thus a ‘usage’ log file for March 7th 2008 would be called “usage.nlserver.20080307.log”.

The log files are ‘rolled over’ automatically as the system clock passes through midnight, so each file should not usually grow too large to manage. However, over time your log file folder may grow to contain many log files, so you should review this folder from time to time and remove any old log files you no longer require.

How long you keep them is up to you, as it depends largely on how much analysis of the license usage you are going to do (see “Reading usage log files” below).

Reading diagnostic log files

Diagnostic log files are plain text files that can be read using any text editor. They are intended for use in tracking and trouble-shooting connectivity-related issues, and generally record the information shown in the Messages screen of the server / monitor.

You are unlikely to need to access these files yourself, but you may be asked to provide copies of the files to Technical Support as part of the diagnostic process for resolving operational issues.

Client application version numbers

From Pulsonix Version 5.1 onwards, the 'Connect' message contains the version and build number of the application that is connecting to the server. This value will be shown in the Messages screen of the server (or monitor), but you can also if you wish extract this value from the log file.

The relevant line in the log file will look something like this:

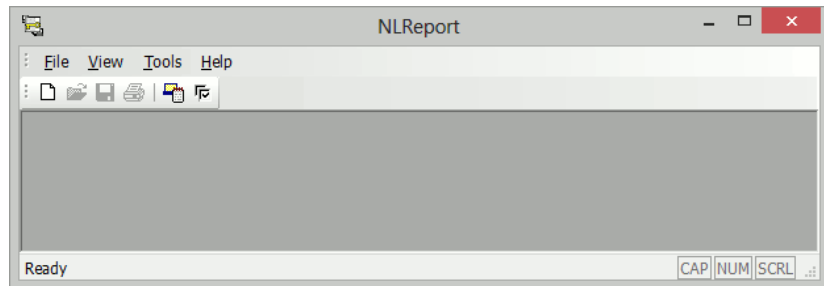
```
2014-02-19 09:27:43,2004,0,titan.pulsonix.com/jon: Connect Pulsonix 8.0.5540
```

Reading usage log files

The Network License Report application

The **Network License Report** application is used to analyse the log files and report on license usage over time. It does this by collecting log file information into a database, then analysing this information to produce summary reports of license usage.

The **Network License Report** program is installed as part of the Network License Server setup, and is accessed from a shortcut on the **Start** menu. Under Windows 8, this is installed onto the Start screen as an application icon.



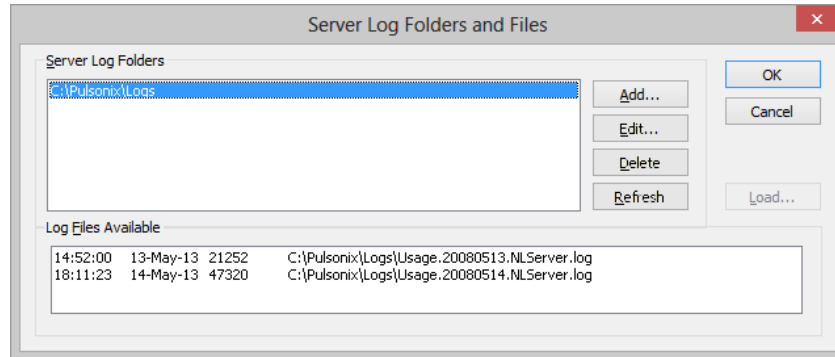
Collecting log file information

The first stage is to set up the location of the log file folder (or folders if you are using a server cluster).

From the **View** menu choose **Server Logs**, or click on the **Check Server Logs** button on the main toolbar. The upper part of this dialog specifies the locations of the folder or folders containing server log files. You will need to have network read access to these folders and files.

Use the **Add**, **Edit** and **Delete** buttons to set up or modify the server log folder locations. Once you have a list of the folders prepared, selecting any of the folders in the list will update the lower part of the dialog to show you a list of the log files present in that folder. The **Refresh** button simply re-reads the currently selected server folder to update this list of log files.

For each log file, the list shows the last modification time and date, the size of the file, and the full pathname of the file.



Assuming there are some log files present, select one or more of those files in the **Log Files Available** list, and click **Load** to load the information from the log files into the reporting database.

As each log file is loaded, the name of the file is changed from 'Usage...' to 'Archive...' to indicate that the information has already been loaded into the database. These archive files can be backed up and/or removed as you see fit.

Which log files you choose to load into the database at any one time will depend on which information you would like to report. For example, if you only want to look at information up to the previous day, you can leave the log files for today in place. But you can if you wish load all the files into the database, the License Servers will simply carry on logging where they left off and you can load that information later on.

Log files for server clusters

The log files for each server in a cluster should – for the reasons given above - be written to a hard drive on their own computer so that each server is 'self-contained' and not relying on access to other network resources.

However, for reporting license usage over time when running a server cluster, the reporting program will need to access the usage log files for all servers in the cluster, as any one of those servers could have been acting as the 'master' server at any one time.

So you would need to set up the location of all the server log folders, and load log information from all of them into the database. But the process for each server folder is just the same as for a single folder, as described already.

Producing reports

To create a report, from the **File** menu choose **New**, or click the **New** button on the toolbar. This will open a dialog where you can specify the parameters for your report.

Chapter 7. Loan Licenses

Overview

Loan Licenses refers to the ability to 'loan out' licenses from the license server and take them away with you. This feature can be used for example to set up a notebook computer ready to take away and run the Pulsonix application at an exhibition where you cannot directly access the license server. The Loan Licenses feature is a cost option and is not automatically available.

The act of Loaning licenses creates a new license file to contain all the details of the licenses being loaned out.

Licenses borrowed from the server in this way have an 'expiry date'. When this date passes, those loan licenses are automatically returned on the server into the available 'pool' of licenses for other users to access, and the loan license file is no longer useable.

Enabling license loans

The ability to loan out licenses is initially controlled by settings in the license file. These are set up when your license file is generated by the Pulsonix sales team and sent to you. If your server license file does not have loan licensing enabled at all, you will not have access to the loan features described in this chapter.

Assuming loans are enabled in the license file, access to the loan features are then controlled by settings in the Configuration file. These settings allow you for example to permit only certain groups of users to loan out licenses, and to control how many of the available licenses for a particular option can be loaned out.

How to loan licenses

Any user that has permission to loan licenses can do so using the License Manager application. This is done in one of two ways, depending on whether or not the computer on which the licenses are to be used is currently connected to the server.

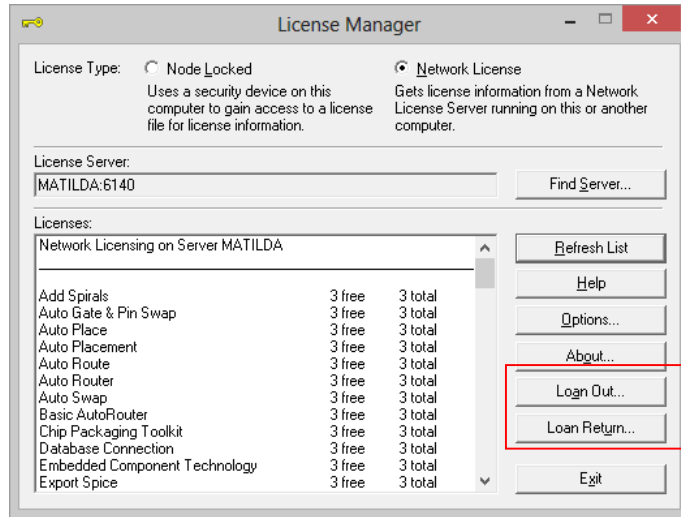
Loaning licenses for a connected client

If your computer is already connected to the license server as a client, you can loan out the licenses you require by launching the **License Manager** application.

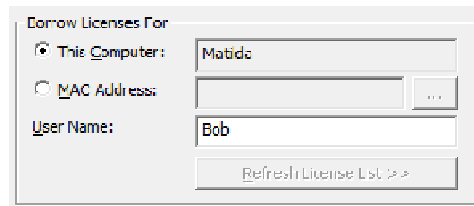
As the action of loaning out licenses will be making changes to the way your Pulsonix application is licensed on this computer, you should first close down the Pulsonix application if it is currently running.

From the License Manager dialog, click **Loan Out** to open the **Loan Licenses** dialog:

40 Loan Licenses



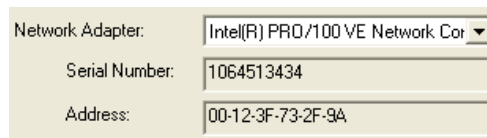
In the section **Loan Licenses For**, choose **This Computer**.



Loaning licenses when not connected as a client

If you need to loan licenses for a computer that is not connected to the license server, you can still do this, but it cannot be done from that computer. Instead, you need to run the **License Manager** on a computer that *is* connected. It needs to be connected because the **Loan Licenses** dialog needs to communicate with the license server to actually book out the loan licenses.

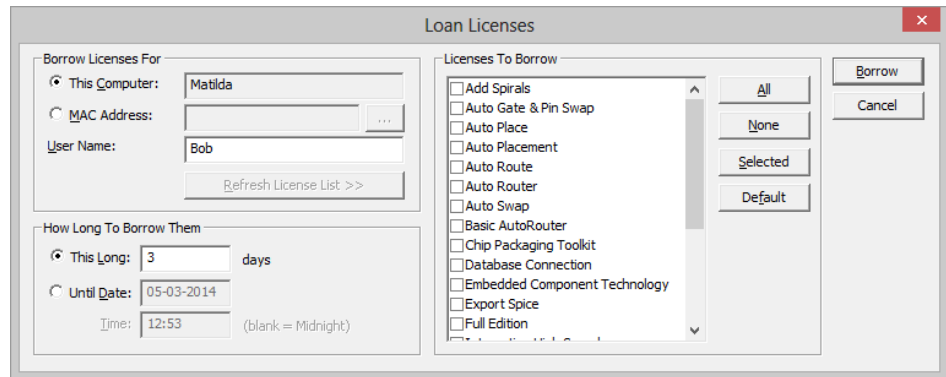
You will also need to know the 'MAC Address' for the 'target' computer. This is a 12-character string of letters and numbers like '00-12-CF-3D-49-00'. You can find the number you need on the target computer by running the License Manager on that machine and clicking on the **About** button. The MAC address is shown as the Address at the end of this dialog.



Once you have the MAC address and username for which the loan is to be made, run the License Manager on the connected computer and click **Loan Out**.

Using the Loan Licenses dialog

Using the **Loans Out** button from the **License Manager**, the **Loan Licenses** dialog is divided into three main sections:



Loan Licenses For

Under this section, you specify the computer for which the loan is to be made (as described above).

If you change the settings in this section, the button **Refresh License List** will become enabled. Click this button to update the list of the **Licenses To Loan** to show those which the selected computer and/or user is permitted to use. This allows you to see whether any of the licenses you think you need are not permitted for use by the selected computer and/or user.

How Long To Borrow Them

Choose how long the licenses need to be loaned out. You should bear in mind that while the licenses are loaned out they will not be available to other users on the network until the chosen 'return date', so you should not loan out licenses for longer than is strictly necessary.

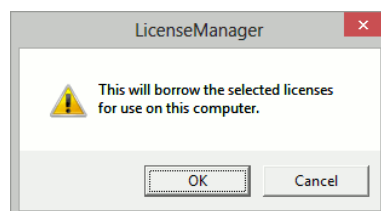
Licenses to Loan

From this list, you can choose which of the licenses you would like to loan out.

Although you can choose to loan out individual licenses, Pulsonix requires a minimum set of licenses to operate correctly so these will always be added to the requested set anyway. You can click the **Default** button to select those licenses in the list if you want to see which ones they are.

What happens next?

When you have set up the necessary information about your loan, click **Loan Now** to begin the loan process.



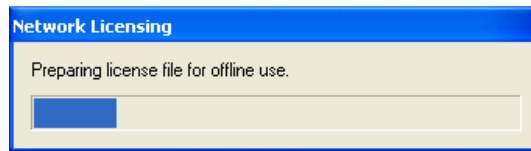
42 Loan Licenses

Confirm that you wish to proceed with the loan by clicking **OK**, at which point you are prompted with a standard file browser dialog to specify the name and location of the license file to be created to contain your loaned licenses.

Next, the License Manager will contact the license server with the information you have provided, to make sure that the licenses you have requested are still available and you have permission to loan them out, and that the loan period you have chosen fits with the rules defined by the server.

If any of the licenses you have chosen are not available for any reason, the loan process will stop and you will be told which of the licenses are affected. You can then choose either to try again later, or deselect those licenses if you decide you can work without them.

If the server is happy to loan out the chosen licenses to you, there will be a short delay while the license information is transferred from the server to create a new node-locked license file on your system. During this time, a progress bar is displayed as the license file is generated.



If you are loaning out licenses for the computer on which you are working, when the loan process is complete the License Manager will automatically switch from networked to node-locked operation, at which point you are ready to close down your computer and disconnect it from the network.

For licenses loaned out for a different computer, once the new license file has been created you can send it to the intended recipient. They will then be able to copy it onto their machine and use their License Manager to point to it, just like any normal node-locked license file.

What happens at the end of the loan period?

When the end of the loan period arrives, the expiry date and time built into the node-locked loan license file will automatically prevent the file being used to launch Pulsonix.

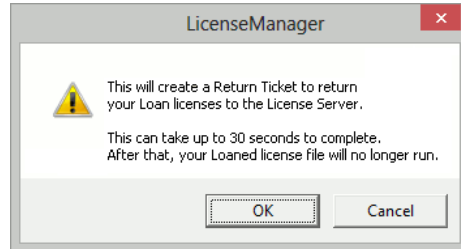
On the server, as the expiry date and time passes, the licenses booked out on that loan will be automatically returned to the pool of available licenses.

Returning loan licenses early

We have already recommended that you don't loan out licenses for longer than is strictly necessary. However, you may discover that for some reason you need to return the loaned licenses earlier than originally planned.

Starting the early return process

Early return of loaned licenses can only be initiated on the computer for which the licenses were loaned. On that computer, start the License Manager and click **Loan Return** to start the return process.

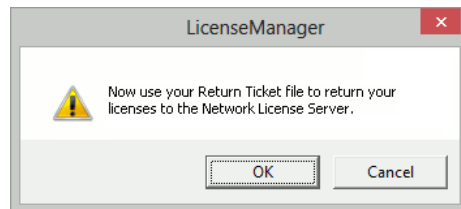


As the message box shows, this will create a 'Return Ticket', a special kind of license file which you will need to return the loaned licenses to the free pool on the server.

Generating the loan Return Ticket

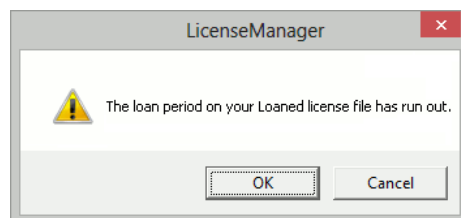
A standard file browser will open, so that you can specify the name and location of this Return Ticket. The Return Ticket license file will then be generated, which can take around 30 seconds to complete.

Once completed, the next message indicates that the Return Ticket is now ready to be used to free up the loaned licenses on the server.



Loan license now expired

How you actually apply the Return Ticket to the server will be explained in a moment, but first your own License Manager will recognise that you have returned your loan licenses, and tell you that the loans have 'expired'.



As you have elected to return your loans earlier than planned, they are now marked as expired just as if the expected expiry date had passed.

44 Loan Licenses

Applying the Return Ticket to the server

You will now be able to use the Return Ticket to release the loaned licenses back into the available pool on the server.

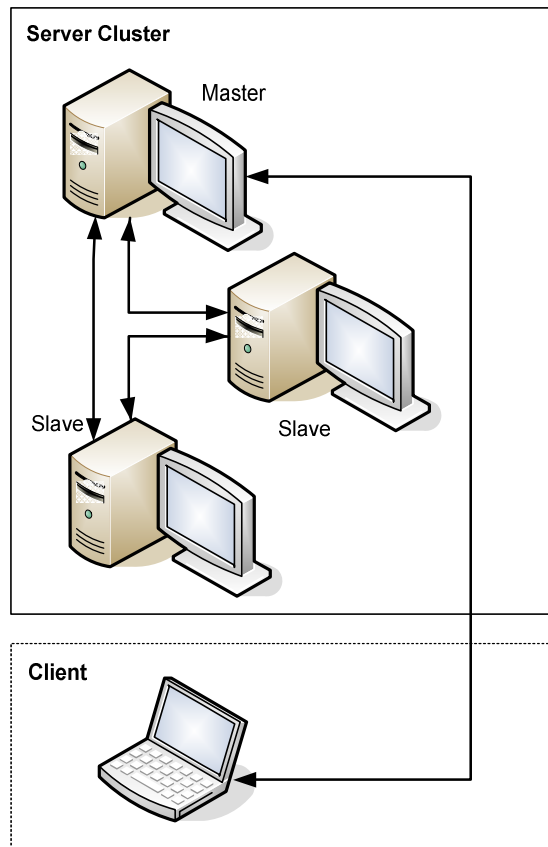
On a computer which is connected to the license server computer, launch the License Manager and click **Loan Return**. On the 'Early Return' dialog, click **Open Return Ticket** and browse to where you have stored the Return Ticket file.

The dialog will refresh to show you the details of the licenses and loan period, so that you can confirm that this is the correct Return Ticket. Click **Return Now** to return the loaned licenses to the license server. The number of available licenses on the server should then be updated, and the loan computer/user will disappear from the Connections screen on the server.

Chapter 8. Server Clustering

Overview

Server Clustering is a method of providing an increased level of 'robustness' in the operation of network licensing. Three or more servers work together as a co-operating set, allowing individual servers to be stopped or restarted without cutting off any clients in the meantime. As long as there are at least two servers in the cluster still running, clients can continue to book licenses in and out.



Within the cluster, one of the servers acts as the 'master' server, whilst the other servers in the cluster are known as 'slaves' and keep track of everything that happens on the master. If the master is closed down or becomes inaccessible due to network problems, one of the slave servers take over the master role.

Each client also knows the list of cluster members, and uses that to establish a connection to the one that is currently acting as the master.

46 Server Clustering

Choosing your cluster size

When deciding how many servers to use for your cluster, you will need to balance the need for 'robust' operation with the overhead of communicating with a list of servers. It is important not to make the cluster too large as this will simply increase the overheads of establishing communications between client and server without really increasing the robustness of your network.

For this reason it is recommended that you do not have more than three or four servers in your cluster. If your network is quite robust anyway and all you are seeking is to be able to stop and restart individual servers for maintenance purposes, then you can set up a cluster of just three servers which will allow each to be stopped in turn without imposing much of an overhead on communication with clients.

The minimum size for a cluster is three (so that you can stop one server whilst still having a 'quorum' of two servers to service client requests). The maximum size of a cluster is determined by settings in the license file but is generally five. The recommended cluster size is three.

Locating your cluster servers

The members of a cluster should also be able to communicate with each other very quickly, so they should not be in remote locations or joined over slow network links.

Every slave server is continually talking to the master to maintain a 'mirror image' of the current status of the master server, so that any of them can take over as the master at a moment's notice. For this reason, they should be able to communicate with each other quickly and reliably, otherwise each server could be spending a significant proportion of its time trying to communicate with the rest of the cluster.

Communication between cluster members

Cluster members communicate with each other using the same TCP/IP port number that is used between clients and servers. The default port number is 6140, but this setting can be over-ridden either on the command-line (see page 20) or the configuration file (see page 33).

Enabling server clustering

The ability to cluster servers is initially controlled by settings in the license file. These are set up when your license file is generated by the Pulsonix team and sent to you. If a server license file does not have clustering enabled at all, it will not have access to the clustering features described in this chapter.

Assuming clustering is enabled in the license file, access to the clustering features are then controlled by settings in the Configuration file. Conversely, the license files for your cluster cannot be used to run several independent 'single' license servers, they only grant servers the ability to operate as a cluster.

Installation

Each server in the cluster should be installed as you would normally do for a single license server (see “Chapter 2. Network Licensing Installation”). Each server will need its own license file keyed to its own security device (USB key or network card), so you will need to specify the number of servers in your cluster when ordering your Pulsonix software.

Once you have installed each server with its own license file and checked that they can each run as a server without problems, you can configure them as a cluster.

Note however that cluster servers cannot accept connections from clients or issue any licenses until at least two members of the cluster are up-and-running. Until then, the first server will issue ‘connection refused’ in response to any request to connect from a client application.

Cluster configuration

Locating your configuration files

Each server will need its own configuration file, which should be located on the actual server itself. Although it might be tempting to place a master file in one location and access that over the network from all the servers, this is introducing a single point of failure into your server setup. Failure of that one server (or the network connection to the server) holding the configuration file will prevent all license servers in the cluster from reading the configuration.

However, there is nothing to stop you holding a single master copy of the configuration file, and using operating system services such as Replication to place an up-to-date copy of that file in the appropriate location on each of the cluster servers.

Specifying cluster members on the server

Cluster setup on the server end is done using the configuration file. In the configuration file for each server, you will need to add SERVER commands to name each of the servers in the cluster.

For example, you could specify some server names with the following commands:

```
SERVER matrix
SERVER artisan
SERVER transept
```

You can also specify the names together on a single line if you prefer:

```
SERVER matrix artisan transept
```

If you list all the server names in the cluster (including the name of the ‘current’ server itself) this makes it easy to keep a consistent configuration on all the servers simply by copying the file around.

The name of the computer on which this instance of the license server is actually running will be included in the list of computers in the cluster even if it is not explicitly named in the configuration file.

Server startup

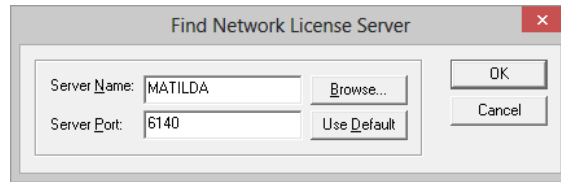
The servers can be started up in any order. The first one to come fully online will become the initial master server, then the others as they start will check to see if other servers in the cluster are already running. As they discover that the master server is already running, they will become slave servers to that master.

However, because there may be some delay in communication between the servers as they are starting up, it is suggested that if possible you allow time (perhaps a minute or so) for the first one to establish itself as the master before starting the others. If you cannot do this, the servers will sort out between themselves which one is to be the master even if they manage to start at the same time.

Connecting clients to servers

Specifying cluster members on the client

Each client will also need to know how to find the members of the server cluster, so it too will need a list of server names. This is specified in the License Manager by entering all the cluster member names separated by semi-colon, in the edit box where you would normally enter the name of the single license server:



When the client starts up, it will attempt to contact each of these servers in turn until it can establish a connection with the master server.

Opening connection from client to server

When attempting to connect to a license server, the servers will be contacted in the order specified in the License Manager dialog. If the first server that can be contacted is the current master server, the connection is ready. If that first server is not the current master server but is instead a slave, the name of the master server is retrieved from the slave and the connection is switched over to that server instead.

The establishment of the connection to the correct server is automatic, but as you can imagine if you had a long list of possible server names it could take quite a while to attempt to contact each one in turn if most of them are not running. For that reason you should keep the size of your cluster quite small, and not leave cluster members 'offline' for too long.

After successfully connecting to the master server, the name of that server is moved to the front of the list on the client system as the 'preferred' server. This server is then contacted first when next establishing client-to-server communications. This avoids wasting time on repeated attempts to contact servers that are not online, although those servers are not removed from the list so will still be contacted if there is no response from servers that were previously alive.

What happens when the master server stops

Each slave server maintains regular contact with the master server, to keep its own cached copy of the current status of the master. This includes details of connected clients and any licenses that are booked out.

When the master server stops or is no longer contactable, the slave servers will detect this fact and elect one of their number to take over as the new master server.

Any clients which were connected to the original master server will of course no longer be able to communicate with that server. Instead they will attempt to 'mend' their connection by contacting each of the known cluster members in turn until they get an answer, in the same way as they would when establishing the initial connection.

This is one of the reasons why you should not make your cluster size too large, or at least you should ensure that almost all of your cluster servers are running at any one time, to avoid delays in clients attempting to contact servers that are not there.

Chapter 9. Remote Network Licensing

Overview

The Pulsonix “floating network licensing” scheme allows you to run any number of licenses from one central server without the need for a dongle on each machine machine that will run the product.

The usual configuration for network licensing is to run the Pulsonix Network License Server on a computer on your LAN (Local Area Network), and connect the Pulsonix ‘client’ applications to this server.

This Chapter explains how this can be extended to allow remote (off-site) users to access the License Server, and hence use network licensing from almost any location.

Basic requirements

The basic requirements and the technology used for the Network License Server are unchanged:

- Windows-based computer (does not need to be a Windows ‘Server’)
- A TCP/IP network connection
- TCP/IP “sockets” (should be standard with all Windows later than ‘95)

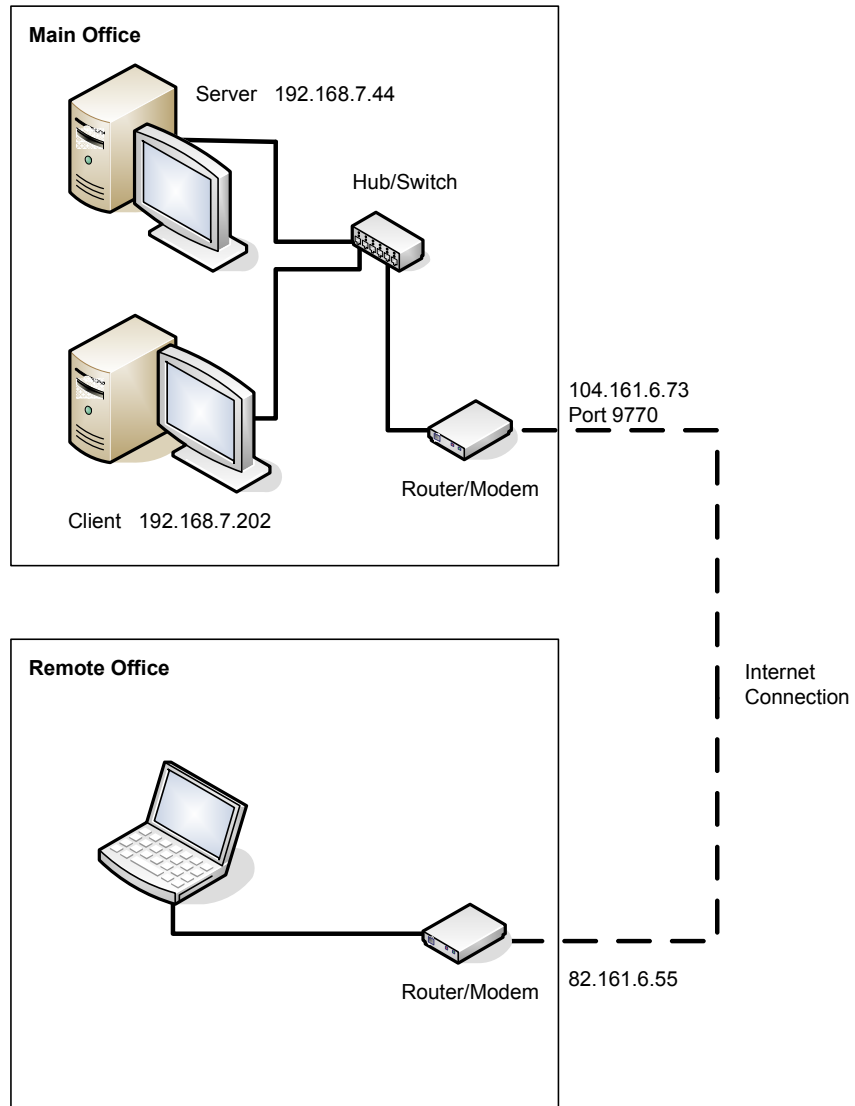
To allow remote access to your License Server, you will also need:

- A permanent Internet connection at the remote location
- A static IP address at your ‘office’ location
- A router or gateway that allows ‘inbound’ connections to be set up

The diagram on the next page gives you an example of how this configuration might look.

Example network diagram

Shown below is an example of how a simple network might be configured. Note that the addresses and ports shown here are only examples.



Installing the network license server

The Network License Server should be installed in the same way as for normal (LAN) operation. The procedure for this is described in “Installing the Network License Server” on page 10.

Once you have test that the server is working properly within the LAN, you can move on to setting up for remote access.

Opening a port for remote access

The procedure described here assumes that you have a router or similar network device at the ‘point of entry’ into your network from the Internet. If you use a gateway computer or other device, the procedure will be different, but the basic principles will be the same.

The key element to enabling remote access is to allow the network licensing code on your remote system to establish a connection through your router to the license server running on your office LAN.

This is generally done with a procedure called “port forwarding”. You may need to consult the documentation for your router to find the specific means of doing this, but the basic principle is described below.

Decide on a port number

Decide on a port number to use. The default one for Pulsonix network licensing is 8083, and it is probably easiest to use this because it means less to change at the remote (client) end.

In our example network diagram above, we have decided to open port 9770 on the router, but there is nothing wrong with using the default port.

Set up port forwarding

Add an entry in the port forwarding table on the router, to forward TCP port 8083 (or whatever port number you have chosen) to port 8083 on the computer on which the License Server is running.

Some routers can look up your computer by name, others need you to specify the IP address so you may need to look that up yourself.

In our example, we would need to forward incoming port 9770 to the default license server port 8083 on the computer with IP address 192.168.7.44 on our LAN.

Update your firewalls

Update your hardware or software firewalls to allow inbound connections on the designated port, otherwise your remote client will not be able to connect.

If your remote location uses a static IP address for its Internet connection, you may be able to restrict inbound connections on your open port to only be accepted from that IP address, which will clearly be more secure than a ‘fully open’ port.

In our example network, we would be able to do this because we have a static IP address at the remote office. This would allow us to specify that we would only accept incoming connections on the designated port from IP address 82.161.6.55.

54 Remote Network Licensing

Making it secure

As with any connection to or from the ‘outside world’, you should take steps to ensure that the security of your network is not compromised, or at least be aware of the possible security implications.

If you are not already using hardware and/or software firewalls, we strongly suggest you consider doing so.

If you are in any doubt about security issues, we suggest you contact a network security expert for advice.

Installing the remote client

Installation of Pulsonix on the remote ‘client’ system is done in the usual way, as described in the Startup Notes under “Installing a network client machine”.

Configuring main office access

Connecting to the server

When you reach the point in the client installation where you need to enter the name of the computer on which the Network License Server is running, you will need to specify something other than just the machine name.

This is because your remote system is not part of the same network as your main office computers, so will not know how to locate them.

Specifying the server computer

Instead, you need to enter the ‘external’ (WAN) IP address of the ‘access point’. In our example above, this is 104.161.6.73, the address of the Internet connection at the main office.

If your office is accessible using a ‘published’ domain name, you may be able to access it using that domain name instead of the explicit IP address, but in most situations it is the actual IP address of your office Internet connection you need to use. That is why you need a static IP address at the office, otherwise the client will not be able to find it.

Specifying the server port

As well as the server address, you also need to specify the port number on which you need to connect. This is the ‘incoming’ port number you specified when setting up the port mapping on your office router.

In our example, this is port 9770.

Testing the connection

The connection can be tested by starting the Pulsonix License Manager. This should then establish a connection through your various network and Internet devices to the license server, and display a list of the available licenses.

Once this is working correctly, you are ready to start work with Pulsonix itself.

Limitations

Other than the requirements listed above, there are no particular limitations to using network licensing in this configuration. You may find that the performance (the time taken to establish the initial connection, and to book out/release licenses) may be longer than would be the case when operating in a LAN environment, but as long as your Internet connection is solid then any additional delays should be small.

Disconnection and reconnection

The issues around disconnection and reconnection are the same as those for 'in-house' operation, and are described in "Chapter 10." on page 57.

The only difference when working remotely is that any loss of communication is likely to be longer and perhaps require more direct action to resolve.

Chapter 10. Trouble-Shooting

Issues with running the server

Application crashes

If you find that Windows is stopping any of the licensing applications from running, or causing them to quit with an exception rather than run properly, please refer to the section 'Data Execution Prevention (DEP)' on page 12.

Unable to change settings

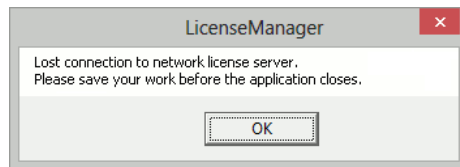
If you find you are changing settings and the changes are not being saved, then you may need to elevate your application permissions as described in section 'Run As Administrator' on page 12.

Connectivity problems

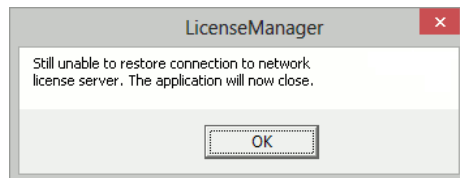
Disconnection Issues

Pulsonix network licensing uses TCP/IP “sockets” as the underlying communication mechanism. If for any reason you should lose the connection between client and server, for example if your Internet connection goes down, this will limit what you can do with Pulsonix at the client end.

If Pulsonix is already running when the connection is lost, you should be able to continue working for a short time with the licenses already “booked out”. You will receive a warning message about the connection being lost, prompting you to save your work.

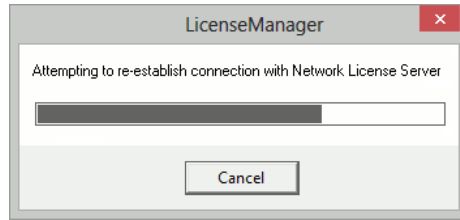


So, if you have a PCB design open for example, and are already holding a license to save PCB files, then you will be able to save your work before closing the program. A short while later if the connection is still down, you will receive a second warning message that the application is about to close down.



Recovering From Disconnection

If the disconnection is only temporary, you may see the first warning about losing the connection to the server, or a brief message telling you that the program is attempting to re-establish connection to the server.



If you should find that the loss of connection to the server is more than just temporary, then you should save the work you are doing, close down Pulsonix, sort out the connection problem and then restart Pulsonix.

Error Messages

The table below lists some of the error messages you might see while setting up or using network licensing, together with some suggestions for how the issues might be resolved.

Message/Problem	Usual Reason	Action
Cannot monitor License Server on server XX on port NN	Either there is no license server running on the stated computer and/or port, or network issues prevent you from accessing it.	Use the error description shown at the end of this message to resolve the issue.
Monitor failed to open connection to server	The license server is running, but it refused to allow the monitor to connect.	Check the permissions on the license server.
Network License Server is already running, cannot start another copy	There is already a license server running using the specified server name.	None. Only one instance of the Network License Server can be run on a computer. Note that this message can appear even if no server process is actually running, as Windows can sometimes hold ports in a 'waiting close' state for some time after the program has quit.
	Another application is using the same port number as the License Server is trying to use.	Use a command-line switch or a configuration file command to change the port number for the server.
Unable to find a valid license to start the Network License Server	The license file to which the server is 'pointing' does not contain an auth code to run as a floating license server.	If you are certain that you should be enabled for network licensing, contact Pulsonix for assistance. Note that a normal node-locked license file cannot be used for floating licensing and will give this message if you try to use that file with the Network License Server.
Attempt to start Network License Service gives message "path not found".	Network License Service (NLSS) cannot be run from a subst'd drive.	Install and run NLSS from a 'real' drive.

