

# AIMMS

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*The Network License Server*

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# Chapter 1

## The AIMMS Network License Server

The AIMMS 3 modeling software comes with built-in capabilities to acquire its license from a floating network license server. Before you can make use of this facility, an AIMMS Network License Server must be installed on a server PC somewhere on your local area network. This chapter discusses the installation and basic setup of the AIMMS Network License Server, as well as the setup of client AIMMS installations.

*This chapter*

In a number of situations, using a floating network license server to obtain an AIMMS license may be more convenient than using a single-user license. The latter always requires that the computer be protected by a nodelocked AIMMS license, or by an AIMMS hardware dongle be connected to your computer. Using a network license server could be convenient, for instance, in the following situations:

*Why network licenses?*

- if, at any time, only a small part of a (potentially) large group of users needs to make use of AIMMS concurrently, or
- if you do not want to distribute single-user AIMMS licenses among your users.

Acquiring a license from a network license server is typically not a good idea for AIMMS users who are running AIMMS on their notebook computer and travel a substantial part of their time.

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### 1.1 Software requirements

You can install the AIMMS Network License Server on machines running either

*Operating system requirements*

- Windows 2000,
- Windows XP,
- Windows Server 2003.

As the AIMMS Network License Server is run as a service, you need administrative privileges to install and activate the AIMMS Network License Server.

The AIMMS Network License Server uses the TCP/IP protocol to communicate with its clients. Hence, TCP/IP support must be installed on both the server and client computers.

*Networking requirements*

Floating network licenses can be configured to allow access outside of a true LAN. By default, for academic licenses, the maximum distance between between the AIMMS Network License Server and the AIMMS clients in terms of number of hops (i.e. the number of routers in between server and client) is set to 5. There is no such restriction for commercial network licenses.

*Network configuration*

In case of any firewalls between the AIMMS Network License Server and the AIMMS clients, the firewall must be configured to accept incoming traffic to IP port 3400 (or any other port number you have configured) of the Network License Server, and ICMP *ping* packets from the AIMMS Network License Server to its clients. A diagnostic program (with source code) is available at [ftp.aimms.com](http://ftp.aimms.com) in case you are experiencing problems in making a connection to an AIMMS license server.

*Firewalls*

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## 1.2 Installing and deploying the AIMMS Network License Server

To install the AIMMS Network License Server on your computer, run the setup program contained on the AIMMS installation CD-ROM, or run the Network License Server setup executable after downloading it from the AIMMS web site [www.aimms.com](http://www.aimms.com). The installation will automatically start the AIMMS License Service, which issue licenses to AIMMS client PCs. However, after installing the Network License Server, it is not yet ready for use. First you must configure any AIMMS network licenses that you have ordered.

*Installing the Network License Server*

To configure your AIMMS network licenses, you must first start the AIMMS Network License Manager. To perform this step, execute the **AIMMS 3 License Manager** item from the **Start** menu of your computer. To configure a network license you should

*Configuring AIMMS licenses*

- ▶ switch the License Manager into *maintenance mode*, by checking the **Maintenance-Maintenance Mode** menu item of the License Manager, and
- ▶ select the **Maintenance-License-License Configuration...** menu, which will start the **License Configuration** wizard.

This will open the **License Configuration** wizard which will guide you through all the necessary steps to configure your AIMMS network license.

The AIMMS License Manager is a separate program which just connects to the AIMMS License Server for displaying the currently active clients. When you put the License Manager in maintenance mode, the server will not stop serving AIMMS clients, but rather the License Manager will just disconnect itself from the License Server.

*Maintenance mode*

If your network license is protected by a dongle, you should have received a set of license files along with the dongle. In this case, the **License Configuration** wizard will install these license files at the correct location. The AIMMS Network License Server will only distribute dongle-protected network licenses to AIMMS clients when the dongle is attached to the parallel (or USB) port of the server on which the License Server is installed.

*Licenses protected by a dongle*

If your network license is nodelocked, you should have received a license number with an associated activation code. Using the activation code, the **License Configuration** wizard will either try to activate the nodelocked license online if the server is connected to the internet directly, or allow you to activate the nodelock through our website if the server has no connection to the internet. In both cases, the activation procedure will obtain the license files from our Internet License Database, and install at the appropriate location on your server. A nodelocked network license can only be deployed from the server on which it has been activated.

*Nodelocked licenses*

For any license you install through the **License Configuration** wizard, a default profile will be created through which AIMMS clients can access the network license. If there is only a single network license, this profile will also become the default profile, to which AIMMS clients will connect if no specific profile has been specified. If you want to change the profile settings, or create multiple profiles, you can change the profile configuration through the **Maintenance** menu, as explained in Section 2.2.

*Default profile*

If your network license is a named users license, you should enter the registered users for both the license and any profiles that have been created for the license. You can add the user names of registered users through the

*Entering named users*

- **Maintenance-License-Registered Users**, and
- **Maintenance-Profile-Registered Users**

menus. The registered users of a profile must be a subset of the registered users of the corresponding license. If you have defined multiple profiles, the registered users of the corresponding license can be specified for multiple profiles. Only users with the user names that you have entered in these dialogs have access to profile through which to connect with the network license.

By default, the AIMMS Network License Server listens on TCP port 3400 for client connections. If this port number conflicts with other applications installed in your network, you can change this setting through the **Maintenance-Port Number...** menu.

*Default port number*

Once you have completed the license configuration, you can leave maintenance mode. Consequently the License Manager will save its configuration files and reconnect to the server, which, in turn, will disconnect all clients and re-read the configuration files. Disconnected AIMMS clients will immediately try to reconnect, allowing you to make changes to the server configuration virtually without consequences to the connected AIMMS clients.

*Leaving maintenance mode*

To AIMMS users wanting to set up an AIMMS client PC to use a floating network license, you should provide the following information:

*Installing network AIMMS clients*

- the host name of the license server
- the port number on which the server listens for client connections (default 3400), and
- optionally, the name of a (non-default) profile through which you want the user to connect to the license server.

To set up the use of a network license, you should

- ▶ select the **Tools-License-License Configuration** menu, and
- ▶ in the **License Configuration** dialog box that pops up as a result, press the **Install License** button.

This will start the **AIMMS License Installation** wizard, which will guide you through all necessary steps to install the network license, using the information specified above.

Whenever the AIMMS Network License Server is running on a computer, you can get an overview of the AIMMS clients currently connected to it through the **Clients** area of Network License Manager window illustrated in Figure 1.1

*Viewing connected users*

Through the **Connections** menu of the License Manager, you can, at any time, disconnect AIMMS clients that are not entitled to make use of the Network License Server. A system administrator might use it, for example, to remove student AIMMS sessions from a faculty Network License Server at times when they are not allowed to make use of the system.

*Disconnecting network users*

Besides the capability to disconnect AIMMS clients, the Network License Manager offers advanced functionality that allows a system administrator to manage and use multiple sets of AIMMS network licenses and set up license profiles which combine one or more of such licenses. However, when a Network License Server is supplied with only a single AIMMS network license, the basic functionality explained so far will suffice, and you can stop reading now.

*Advanced License Manager functionality*

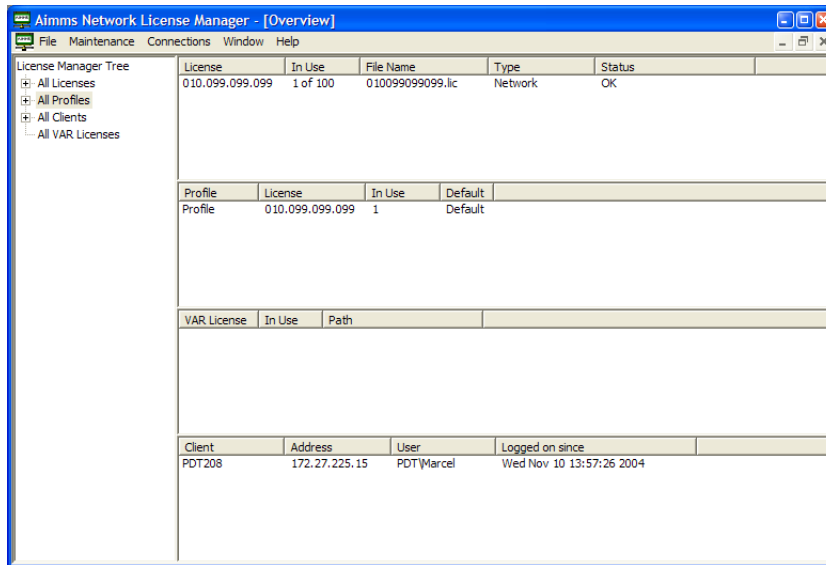


Figure 1.1: The AIMMS Network License Manager with one license and user

The advanced capabilities of the Network License Manager are explained in full detail in Chapter 2.

### 1.3 Sharing single-user licenses

With the introduction of AIMMS 3.4 it is possible to share single-user licenses with a running network license server. If you are not using your single-user license you can share your license with a network license server. It will then become available as half a floating license to all users that will connect to this license server when requesting a license. So only if more than one user is sharing his single-user license, one or more new licenses will become available to the network license server.

*Sharing unused single-user licenses*

To be able to share your local single-user license you should also have a license server running on your *local* machine. When starting up your local AIMMS you should make sure that AIMMS connects to the license server on your computer, by installing a network license in the **License Configuration** dialog box, following the instructions above.

*Configuring the local AIMMS application*

For the local license server to be able to actually share the unused license with the network license server, you should select the **Maintenance-License-Share Local License** menu, and enter the hostname and port number of the license server with which you want to share your local license.

*Configuring the local license server*

At regular time intervals, the local license server will check whether its local license is being used by an AIMMS client. If not, it will automatically share it with the specified network license server.

*Automatic sharing*

An AIMMS client that logs on through a network license server does not know whether the license server uses shared licenses or not. If all network licenses are in use and somehow the network license server loses one of its shared licenses (e.g. by a sharing computer that disconnects from the network), the client that logged on most recently will receive a popup dialog box stating that the server has disconnected and that the user should exit AIMMS.

*License distributing policy*

A computer that shares a license will not connect to the network license server to obtain an AIMMS license but to the local license server instead. If the shared single-user license is not in use by the network license server, the sharing will be stopped and the local license server will be able to provide the license again. In case the shared license is in use by the network license server, a user can force that its local license is regained via a **Undo Sharing** menu command in the **Connections** menu of the License Manager. As a result, the most recently connected AIMMS client of the network license server will then be disconnected.

*Claiming your own shared license*

A local license can only be shared with an existing network license if

*Sharing rules*

- the local license and the network license have a similar type,
- the two licenses have the same size (i.e. small, medium or large), and
- the local license allows the use of at least all the solvers available in the network license.

## Chapter 2

# The Network License Manager

Besides the basic setup and deployment of the AIMMS Network License Server for a single network license discussed in the previous chapter, a single AIMMS Network License Server is capable of dealing with multiple network licenses with possibly varying capabilities. When there are multiple licenses with varying capabilities, you, as the system administrator, probably need much more control as to determine which users can make use of which AIMMS license. You can obtain such control through the Network License Manager, which allows you to define one or more *license profiles* that provide a coherent combination of AIMMS licenses to your end-users.

*This chapter*

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### 2.1 The Network License Manager

The Network License Manager program is a utility program connecting to the Network License Server. The Network License Manager can be started through the **AIMMS 3 License Manager** item from the **Start** menu of your computer.

*The Network License Manager*

The License Manager window is used for two basic tasks:

- tracing which clients are currently logged on to the License Server, and
- modifying the current configuration of licenses, profiles, and VAR licenses available to the License Server.

*The License Manager window*

An example of the License Manager window is illustrated in Figure 2.1. The License Manager window is divided into five sub-areas:

- The window at the left shows a tree structure in which all the currently installed AIMMS network licenses, license profiles, VAR licenses, and the currently connected clients are contained.
- At the right, there are four windows that contain from top to bottom:
  - a list of network licenses,
  - a list of license profiles,
  - a list of VAR licenses, and
  - a list of connected clients.

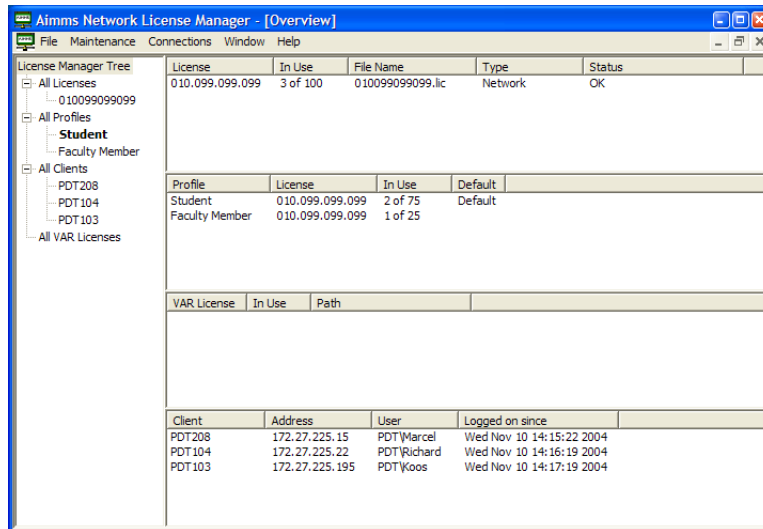


Figure 2.1: The Network License Manager window

A license in the License Manager window refers to an AIMMS network license that you purchase from Paragon Decision Technology. Such a network license can only be used with the AIMMS Network License Server and is uniquely coupled to an associated nodelock or hardware dongle. In addition to the standard licensing information associated with a single-user license, a network license contains extra information about the number of concurrent users that can make use of the license. The License Manager allows you to associate multiple network licenses with a single Network License Server, so that different clients can use different AIMMS licenses.

### Licenses

A license *profile* in the License Manager is a subclass of a particular AIMMS network license, and is therefore uniquely coupled to that license. In addition, a license profile can be associated with one or more network VAR licenses (see below) to form a coherent group licenses required to run a particular AIMMS project. When an AIMMS client connects to the License Server, it does not connect directly to one of the available network licenses, but rather to one of the available license profile. Therefore, for each installed network license you should at least create one license profile.

### License profiles

The License Manager allows you to associate multiple license profile with the same AIMMS network license, and, for each profile, to limit the number of concurrent uses of its associated network license. As an example, the License Manager window of Figure 2.1 illustrates two license profiles **Student** and **Faculty Member** which occupy 75 and 25 of the available 100 licenses in the network license **010099099099**. Creating multiple profiles with a single network license may be convenient

### Multiple profiles

- if you have different groups of users, and want to limit the maximum number of concurrent users within each group, or
- if you have VAR licenses that are only relevant for certain users.

When logging on to an AIMMS Network License Server, an AIMMS client can indicate (through the `--license` command line argument, see also Section 20.1 of the AIMMS User's Guide) which license of all the licenses configured in the AIMMS **License Configuration** dialog box should be used for this session. The license names you can specify for the `--license` command line argument may refer to the different profiles of the same network license. You, as the system administrator, can specify a *default* license profile, which will be used in the absence of an explicit license command line argument. In the License Manager window the default license profile is displayed in bold (as the **Light** profile in the example window of Figure 2.1).

*Default profile*

In addition to AIMMS network licenses, the Network License Server can also serve network VAR licenses issued by the developer of an AIMMS application to protect and license the use of his application. Creating VAR licenses is discussed in Section 21.2 of the AIMMS User's Guide. You can create a network VAR license by simply checking the **Network License** check box in the **VAR License** dialog box of AIMMS and indicating the appropriate number of concurrent users. By creating a network VAR license you can achieve that only a limited number of users can work with the same project concurrently.

*VAR Licenses*

A VAR license in the License Manager can be linked to one (or more) license profiles. Only users who log on to such a license profile have access to the VAR licenses associated with the profile, thus allowing you, as the system administrator, to limit the use of particular AIMMS applications to specific license profiles. Note, however, that the usage count of a VAR license will only increment when the connected client runs an AIMMS application which requires this VAR license.

*Linked to profiles*

To track the use of individual licenses and profiles, the contents of the four windows at the right of the License Manager window illustrated in Figure 2.1 depends on the currently selected item in the tree at the left.

*Contents of License Manager window*

- When the root node of the tree or of any of the three sub-trees is selected, the four lists will display all of the installed network licenses, profiles, VAR license as well as all connected clients.
- When a network license node is selected, the four lists will contain respectively:
  - only the selected license,
  - only the profiles linked to that license,
  - only the VAR licenses linked to these profiles, and

- only the clients that use the selected license (through one of the displayed profiles).
- When a profile node is selected, the four lists will contain respectively:
  - only the license to which the selected profile is linked,
  - only the selected profile,
  - the VAR licenses linked to the profile, and
  - only the clients that use the selected profile.
- When a VAR license node is selected, the four lists will contain respectively:
  - only the license belonging to the profile to which the VAR license is linked,
  - only the profile to which the VAR license is linked,
  - only the selected VAR license, and
  - all clients that use the VAR license (through one of the displayed profiles)
- When a client node is selected, the four lists will contain respectively:
  - the license that the client is using,
  - the profile that the client is using,
  - the VAR licenses the client is using, and
  - the selected client.

These dependencies between the tree at the left, and the four lists at the right allow you to get a quick overview of how network licenses, profiles, and VAR licenses are related, and which clients are using them.

In the License Manager window you can view which users are currently connected and which licenses, profiles and/or VAR licenses they are using. If for some reason, you want to disconnect a specific client (or all clients), you can do so via the commands in the Connections menu.

*Tracing the connected users*

To disconnect one specific AIMMS client:

- ▶ select the client in either the tree or the list of clients, and
- ▶ select **Disconnect Client** from the **Connections** menu.

*Disconnect single or multiple clients*

To disconnect all clients currently visible in the **Clients** area on the right of the License Manager window:

- ▶ select **Disconnect All** from the **Connections** menu.

As a result of either of these commands, the disconnected users will be notified that they have been logged off from the Network License Server through a dialog box within their AIMMS application. Upon notification, they have one minute to save their work and to terminate their session, after which AIMMS will terminate without any further notice.

*Result of disconnect*

Client users of an AIMMS Network License Server will get a similar logoff notification when the AIMMS Network License Service has been terminated by the system administrator, or when the server shuts down.

*Server termination*

Through the **Window-Log** menu you can open the log window of the AIMMS License Server. In this log window you can get a more detailed overview of the last 1000 server events (e.g. client connects and disconnects).

*The log window*

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## 2.2 Configuring the Network License Server

Before you can make any modifications to the current configuration of network licenses, profiles and VAR licenses within the License Manager, you must switch the License Manager to *maintenance mode*. This will cause the License Manager to disconnect from the Network License Server. Switching the License Manager in maintenance mode will not stop the Network License Server or stop it to accept client connections.

*Maintenance Mode*

To switch the License Manager to maintenance mode:

- ▶ in the License Manager window, select **Maintenance Mode** from the **Maintenance** menu.

*Switching to maintenance mode*

As long as the License Manager is in maintenance mode, the **Maintenance-Maintenance Mode** menu is checked.

Once you have completed the license configuration, you can leave maintenance mode by de-selecting the **Maintenance-Maintenance Mode** menu. Consequently the License Manager will save its configuration files and reconnect to the server, which, in turn, will disconnect all clients and re-read the configuration files. Disconnected AIMMS clients will immediately try to reconnect, allowing you to make changes to the server configuration virtually without consequences to the connected AIMMS clients.

*Leaving maintenance mode*

Might the need arise, you can manually start and stop the Network License Server through the **Maintenance-Start Server** and **Maintenance-Stop Server** menu items. During normal operation, however, starting and stopping the Network License Server should not be necessary.

*Starting and stopping the server*

While in maintenance mode you can make all modifications to existing configuration of network licenses, license profiles and VAR licenses employed by the AIMMS Network License Server. These modifications are automatically saved when you exit maintenance mode. When you close the License Manager, any changes will to the server configuration will be lost.

*Maintaining the server configuration*

Through the **Maintenance-License** menu you can add and delete network licenses to the Network License Server. To add a new network license to the Network License Server, simply select its associated license file. Note that every network license issued by Paragon Decision Technology has a unique license number, and that the License Server accepts every license number only once. Similarly, you can add and delete profiles to the Network License Server through the **Maintenance-Profile** menu, and VAR licenses through the **Maintenance-VAR License** menu.

*Adding and deleting licenses and profiles*

You can modify the name of network license, profile or VAR license by modifying the name of the corresponding node in the tree on the left of the Network License Manager. The names of the license profiles specified here are exactly the names that AIMMS clients can specify through the **-P** command line argument. You can set the default profile by applying the **Maintenance-Profile-Set Default** menu after selecting a profile node in the tree. The current default profile will be displayed in bold.

*Modifying license and profile names*

When creating a new license profile you must specify the properties of the newly created profile through the **Profile Properties** dialog box displayed in Figure 2.2. In it, you can specify the network license to which the profile is

*Modifying profile properties*

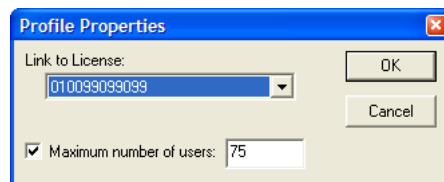


Figure 2.2: The **Profile Properties** dialog box

uniquely coupled, and you can optionally limit the number of concurrent users allowed for this profile (which, obviously, must be smaller than or equal to the number of concurrent users of the specified network license). You can modify the properties of an existing profile through the **Maintenance-Profile-Properties** menu.

If your network license is a named user license, the License Server will only accept connections from users whose user names have been registered with the license. You can register named users for a network license through the **Maintenance-License-Registered Users** menu. You can exactly register as many user names as the number of concurrent users allowed by the license. Through the **Maintenance-Profile-Registered Users** menu, you can register a subset of the registered users of the corresponding license for every profile you have created for the license. Only named users registered for a profile can connect to it.

*Named user licenses*

You can link VAR licenses to one or more license profiles by selecting a VAR license in the tree on the left of the Network License Manager window, and by choosing the **Maintenance-VAR License-Linked Profiles** menu. This will pop up the **Linked Profiles** dialog box illustrated in Figure 2.3. In it, you can select

*Linking VAR licenses*

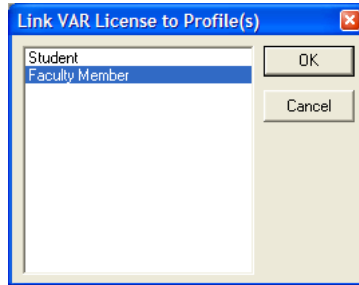


Figure 2.3: The **Linked Profiles** dialog box

the license profiles to which you want the current VAR license to be linked from the list of all available license profiles.