

AIMMS

The Network License Server

Contents

Contents	ii
1 The AIMMS Network License Server	1
1.1 Software requirements	1
1.2 Installing and deploying the AIMMS Network License Server	2
1.3 Sharing single-user licenses	5
2 The Network License Manager	7
2.1 The Network License Manager	7
2.2 Configuring the Network License Server	11
2.3 The License Server Monitor API	13
3 Release Notes	14
3.1 Build 4.0, release date 2014-06-15	14
3.2 Build 3.14, release date 2013-08-28	14
3.3 Build 24068, release date 2012-06-20	14
3.4 Build 18483, release date 2011-01-13	15

Chapter 1

The AIMMS Network License Server

The AIMMS 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. 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.

1.1 Software requirements

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

Operating system requirements

- Windows 7,
- Windows 8.1,
- Windows 10,
- Windows Server 2008,
- Windows Server 2012,
- Windows Server 2016.

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 or disallow access to your Network License Server by either

Network configuration

- allowing access to the server only if the AIMMS client is in the same subnet as the server, or
- by restricting 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).

For academic network licenses, one of these restrictions applies. By default, there is no such restriction for commercial network licenses.

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. If a distance restriction applies to your license, ICMP *ping* packets from the AIMMS Network License Server to its clients should also be allowed by your firewall. A diagnostic program (with source code) is available at <ftp.aimms.com> in case you are experiencing problems in making a connection to an AIMMS license server.

Firewalls

1.2 Installing and deploying the AIMMS Network License Server

To install the AIMMS Network License Server on your computer, run the Network License Server setup executable after downloading it from the AIMMS web site 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 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

For any network license you ordered, 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 a 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*

When trying to open an AIMMS application that has been encrypted using a public key (as described in Section 19.1 of the AIMMS User's Guide) using a license that is provided by the License Server, the License Server can also provide the private key that is needed to successfully open the application. Instead of copying the private key to the AIMMS\ApplicationKeys folder of every computer on which you want to run the application, just copy the private key to the AIMMS\ApplicationKeys folder of the computer that is running the License Server, and all users that are granted access to a license through the License Server will have access to the private key. On a typical Windows 7 or Windows 8 system, the AIMMS\ApplicationKeys folder is located at C:\ProgramData\AIMMS\ApplicationKeys.

*Running an
encrypted
AIMMS
application*

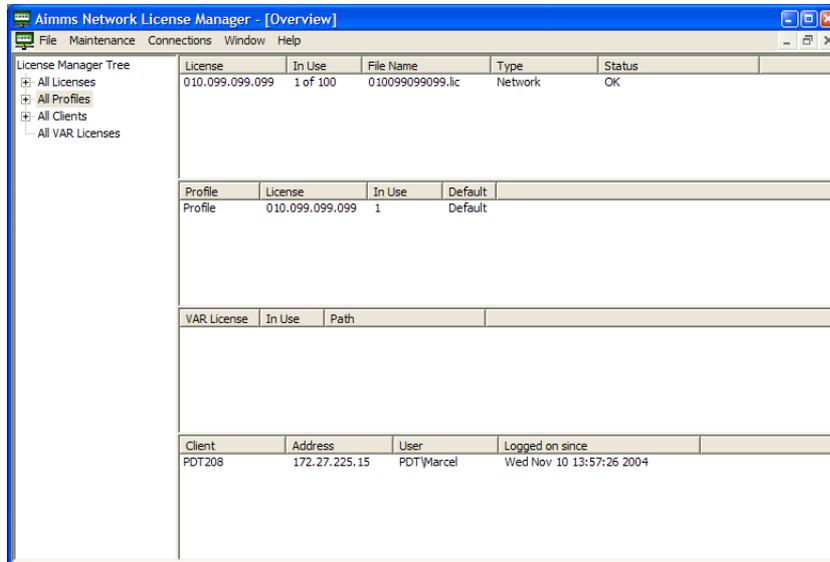


Figure 1.1: The AIMMS Network License Manager with one license and user

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

Advanced License Manager functionality

1.3 Sharing single-user licenses

Besides running a dedicated network license server, AIMMS also allows you to share your single-user licenses with a running network license server. Whenever you are not using your single-user license, 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 license 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

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 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.

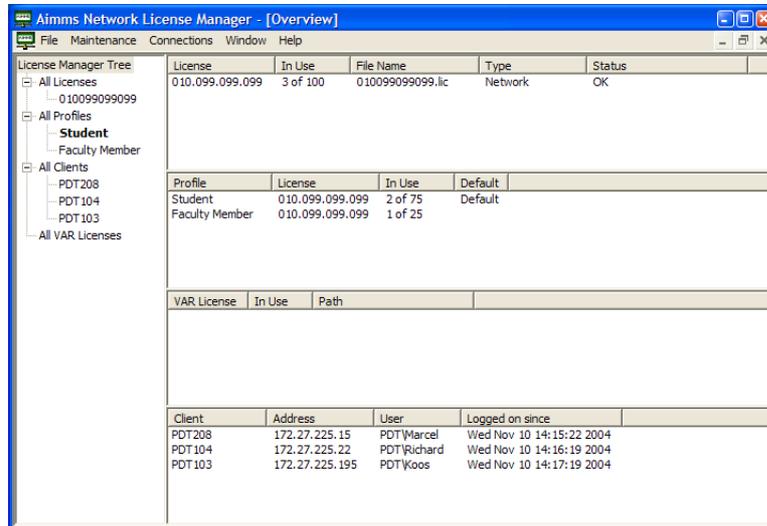


Figure 2.1: The Network License Manager window

A license in the License Manager window refers to an AIMMS network license that you purchase from AIMMS. Such a network license can only be used with the AIMMS Network License Server and is uniquely coupled to an associated nodelock. 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 in the AIMMS **License Configuration** dialog box which profile should be used for this session. You, as the system administrator, can specify one or more *default* license profiles, which will be used in the absence of an explicitly specified profile. When multiple default profiles are available, AIMMS will assign a license from the first default profile that is not fully in use. If none of the default profiles have licenses left, the license request will fail.

Default profiles

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 the *Project Security* chapter 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

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 AIMMS has a unique license number, and that the

Adding and deleting licenses and profiles

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.

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. You can change a profile to be a default profile by applying the **Maintenance-Profile-Toggle Default** menu after selecting a profile node in the tree.

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

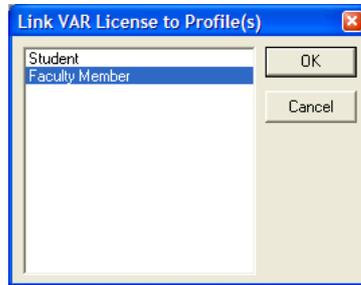
uniquely coupled, and you can optionally limit the number of concurrent users allowed for this profile (which, obviously, must be smaller than or equal to the number of concurrent users of the specified network license). You can modify the properties of an existing profile through the **Maintenance-Profile-Properties**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

Linking VAR licenses

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

2.3 The License Server Monitor API

Besides the Network License Manager program there is also a Java API available that you can use to monitor the state of the License Server from within your own external program. Through this API you can retrieve most of the information that is also displayed in the Network License Manager window.

Java API

The Java API only offers a set of methods to get monitoring information, it is not possible to change the configuration of licenses and/or profiles through this API. For that you still need the Network License Manager.

No managing tasks

Some examples of how this API can be used are:

Usage examples

- Regularly check whether the server is still running.
- Check whether the installed licenses are still valid and, for example, not expired.
- Get insight in how many users are (simultaneously) logged on to a specific license or profile during a certain period.
- Retrieve the latest logging messages.

The License Server Monitor API is provided via the file `licsrv-monitor.jar`, which can be found in the sub folder API of the Network License Server installation. Usually this is `C:\Program Files (x86)\AIMMS\AIMMS License Server\API`.

licsrv-monitor.jar

For an explanation of all methods available in this API, you can refer to the accompanying html style help. The entry point for this help is the file `index.html` in the folder `C:\Program Files (x86)\AIMMS\AIMMS License Server\API\doc`.

Help files

Chapter 3

Release Notes

3.1 Build 4.0, release date 2014-06-15

- The AIMMS Network License Server is enhanced with the capability to support the public-private key encryption scheme employed by AIMMS 4.
- The default storage location in c:\ProgramData is changed from Paragon Decision Technology to AIMMS.

3.2 Build 3.14, release date 2013-08-28

The AIMMS Network License Server is enhanced with a Java API, which offers monitoring functionality to administrators. It allows you to get the following information from the License Server:

*Build 485
2013-08-28*

- The licenses that are installed on the License Server, whether they are valid, and how they are used during the current session.
- The number of profiles created on the License Server and how they are used.
- The clients currently logged on.
- The total number of logon/logoff requests.
- The last number of logging messages that have been generated on the License Server.

After installing the AIMMS Network License Server, the documentation can be found in the API\Doc folder of the installation.

3.3 Build 24068, release date 2012-06-20

In this release of the AIMMS Network License Manager, the following issues have been fixed or improved.

*Build 24068
2012-06-20*

- When using an AIMMS PRO License, the information about this license is now correctly reflected in the license configuration overview. *Issues ...*
- The menu items **Start Service** and **Stop Service** are now disabled when in maintenance mode.
- The License Manager window now refreshes correctly after the service is restarted.

3.4 Build 18483, release date 2011-01-13

In this release of the AIMMS Network License Manager, the following issues have been fixed or improved. *Build 18483
2011-01-13*

- On Windows Vista and Windows 7, the AIMMS **Network License Manager** gave errors when starting and stopping the License Service or when leaving Maintenance Mode. The Network License Manager now requires that it is started with administrator rights. *Issues ...*
- The AIMMS **Network License Manager** could not restart the service correctly, when one or more clients were connected. This problem also appeared when leaving Maintenance Mode, since then the service is also restarted.
- The License Service could not be stopped in situations where connection requests kept coming in.
- After a restart of the License Service, the log window was not cleared.