PMOD Windows Installation

INSTALLATION MANUAL
Version 4.4

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1   PMOD Installation on Windows

1.1   License Types

PMOD supports two license types: On-site (previously Standalone and Network) and Remote (previously Cloud) licenses.

Licensing, On-Site License

The PMOD On-site licensing mechanism consists of two components:

1. a **USB protection key** (WIBU-Box/RU, WIBU-SYSTEMS AG, *http://www.wibu.com*), and

2. a license file **pstarter.lcs** (in sub-directory *system/lcs* of the PMOD installation).

During PMOD startup the license information encoded in the USB key is read and compared to that in the license file. Only if the two informations match, startup proceeds. Next is a check whether the PMOD version purchased allows running the currently installed version. If all checks are successful, the PMOD ToolBox appears showing the purchased modules, and processing can start. Note that the USB protection key must remain connected to either the local machine or license server.

The PMOD on-site license may be operated as a single concurrent user local installation, or as a PMOD license server which manages a pool of purchased licenses, and an arbitrary number of PMOD clients which can check out unused licenses from the server. As soon as the PMOD program on a client is closed, the license is returned to the managed server pool. If the PMOD client crashes for some reason, the license is re-collected to the pool after about 15 minutes. On the other hand, if the license server is stopped, the clients show a warning message to the user and allow to continue work for a few minutes. Then, the clients will be stopped, unless the server has been started again.

On the license server PMOD is installed in the same way as for local operation with the USB key.

On the clients PMOD is also installed in the standard way, *except* that

*   installation of the drivers for the USB protection key is not required;

*   no license file is required.

Note the following:

*   In Server-Client mode, the license server PMOD installation is typically intended for server purposes and not for data processing.

*   The license server must be running and the USB key must be connected at all times.

*   The license server and the clients must run the same PMOD version.

*   It is not required that the license server and the clients have the same operating system.

Licensing, Remote License

The PMOD Remote licensing mechanism relies on a Remote License Server operated by PMOD Technologies. During startup of a local PMOD installation, the license server is contacted over the Internet and a Client ID provided. The license server returns information about the purchased configuration. If the currently installed version matches the license, the PMOD ToolBox appears showing the purchased modules and processing can start. Note that the Internet connection to the license server must be maintained while running PMOD.

1.2   Installation Overview

Java Runtime Environment (JRE)

The entire PMOD software is programmed in Java and therefore requires an appropriate Java Runtime Environment (JRE) to be executed. During PMOD installation, an appropriately configured JRE is extracted into the *java* sub-directory of the PMOD installation. This dedicated JRE will then be used to run PMOD. By this controlled environment, PMOD will remain unaffected by changes due to automatic OS upgrades.

Installation Steps

The installation of the PMOD software consists of the following steps which should be performed in the proposed sequence. They are explained in detail in the following installation sections.

1. Make sure you have access to the login information for your **Customer Account** on the PMOD website. The credentials are available on your Delivery Note.

2. Use the credentials to download the latest PMOD software package from the **Support/Download** page of the PMOD website.

3. Extract the PMOD program files, the JRE, and optionally example data to the *Pmod4.4* directory in a user-defined location of the file system.

4. Only for **On-site license Installation**: Installation of the protection USB key drivers for the WIBU-Box/RU plugged into the USB port. *Please do not connect the protection USB key before this installation has been completed.*

5. Only for **On-site license Installation**: Installation of the PMOD license file *pstarter.lcs*. The license file can be downloaded from the **Customer Account** area of the PMOD website.

1.3   PMOD Software Download

1. Download the setup zip file corresponding to the operating system of your target computer (pmod-44-setup-windows.zip).

2. Unzip the archive. Don't unzip any of the files in pmod.

3. In case PNEURO has been licensed, download the parcellation.zip file into the pmod directory.

4. To get example data for the different tools, download the data.zip also into the pmod directory.

1.4   PMOD Software Extraction

After the software download start the PMOD installer by starting the **RunSetup.bat** in the *Setup* directory. The following installation screen appears:

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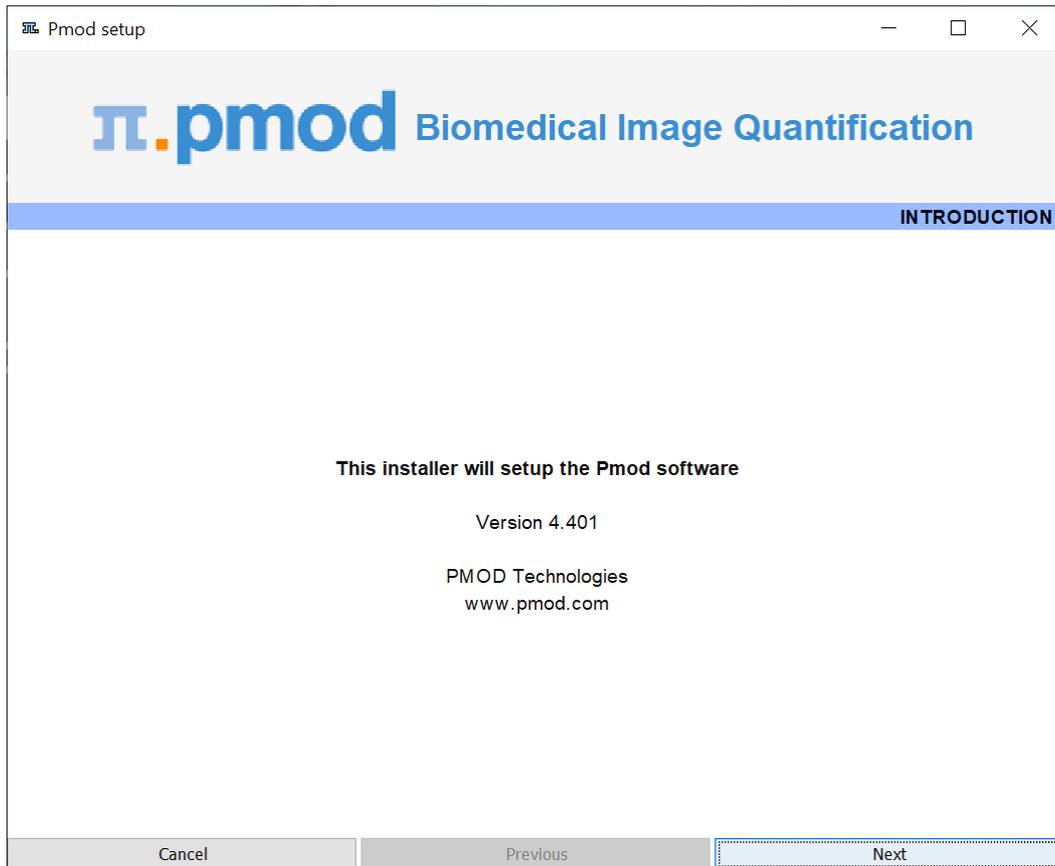
Please use **Next** to proceed and accept the license agreement. After activating **Next** the window for configuring the installation appears:
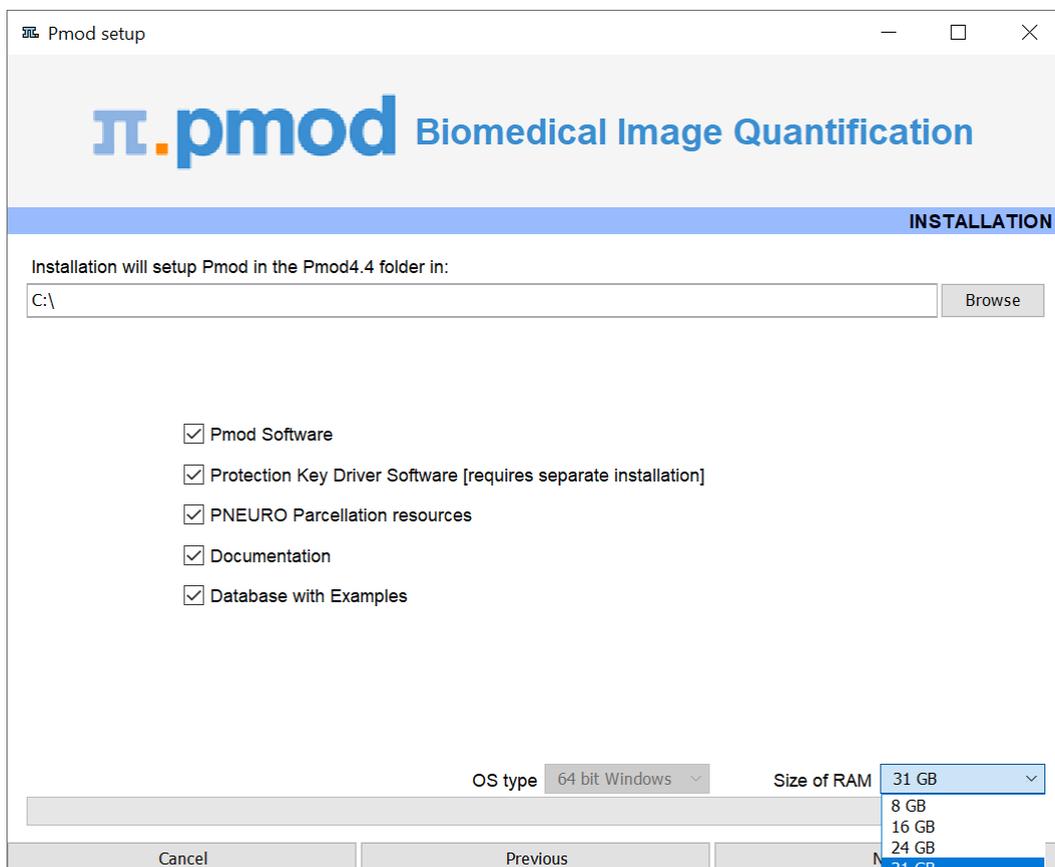
Please perform the following configurations:

Installation Path

Use the **Browse** button to select the parent directory for the installation. There, the installer will create a new directory **Pmod4.4** for the program files and the data. Please make sure that 5GB of free space is available for the full package.

Packages

It is highly recommended to install the four packages **Pmod Software**, **Protection Key Driver Software**, **Documentation**, and **Database with Examples**. The **Database with Examples** requires about 3GB and will show up as database called **Demo**. This database will allow getting acquainted with the programs because it contains examples for the different types of data analysis. Note, however, that it is recommended establishing an new database externally to PMOD for productive data processing.

Properties of Operating System and RAM

The operating system of your target computer needs to be 64-Bit. **Size of RAM** can be set to any size, up to 32 GB. However, if the specified size exceeds the physical RAM, the system will start swapping after RAM space is exhausted and will become very slow. Therefore we strongly recommend setting **Size of RAM** < physical RAM (e.g. 14 GB for 16 GB system). To assign more than 32 GB when it is available on your system, the start script **RunPmod.command** should be edited after installation.

Installation of the PMOD Environment

The installation is started by the **Install** button.

If a prior PMOD version has been used already, it is recommended importing its working environment. Use **Copy Configuration ...** and select the **properties** folder of your prior PMOD installation with the **Browse** button. Then use **Copy** to import the setting, and **Close** the window.
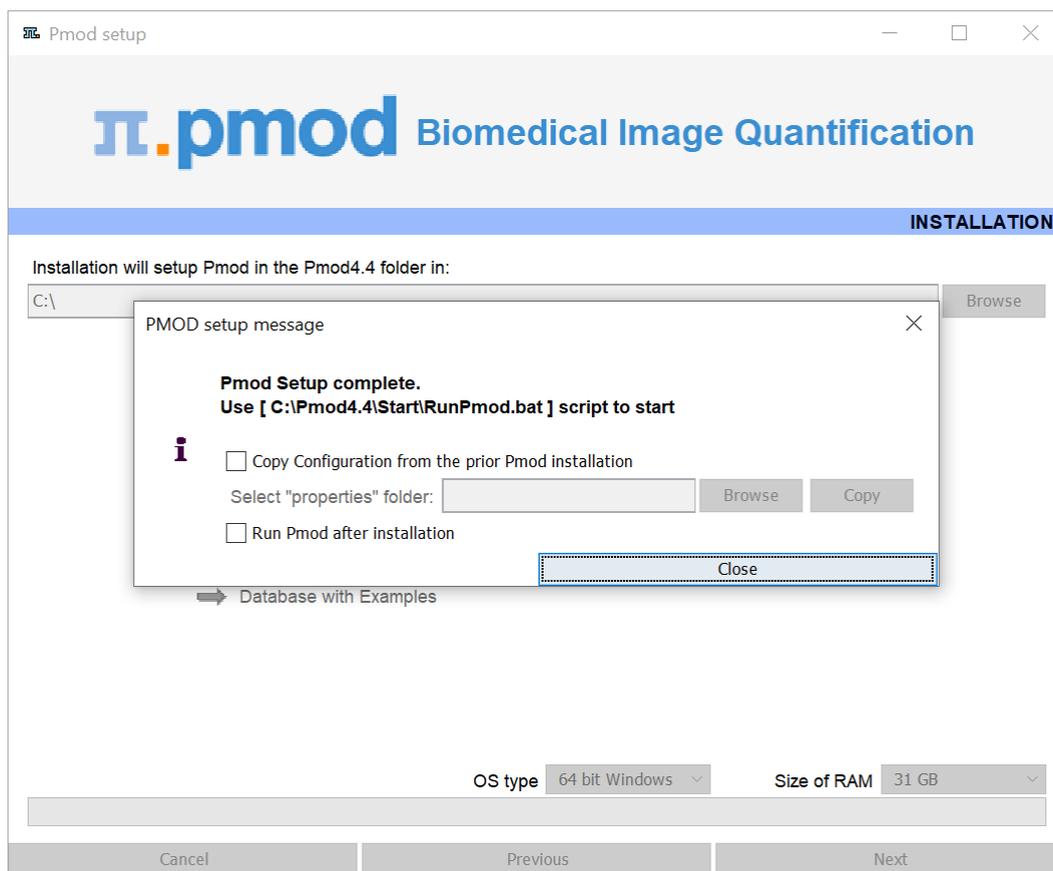
Installation without User Interface

There is a silent installation which doesn't bring up an interactive user interface. It can be started by opening a command window and typing the following commands in. *D:/tmp* the directory within which PMOD is installed

```
cd pmod
..\java\Windows\jre\bin\java -jar setup.jar -silent D:/tmp
```

The installation will use default settings, and edition of the starting script will be needed to adjust the RAM allocation.

> **Note:** Although no graphical user interface is shown, a graphical subsystem must still be supported as a graphic context is created.

1.5   PMOD On-site License Installation For Standalone Operation

Install USB Key Drivers

All the files required for the driver installation are extracted during the installation of the PMOD software and stored in the PMOD directory tree. The following two steps must be performed to install the USB protection key hardware drivers.

1. **Driver installation:** The purpose of this step is to install programs for reading the information from the WIBU-Box/RU plugged into the USB port. The driver installer is located in the directory *Pmod4.4/install/hk setup/Windows*.
   Please start the program **WkRuntime.exe** and perform a standard installation procedure. Note that the network components don't need do be installed and can be unchecked as illustrated

below,
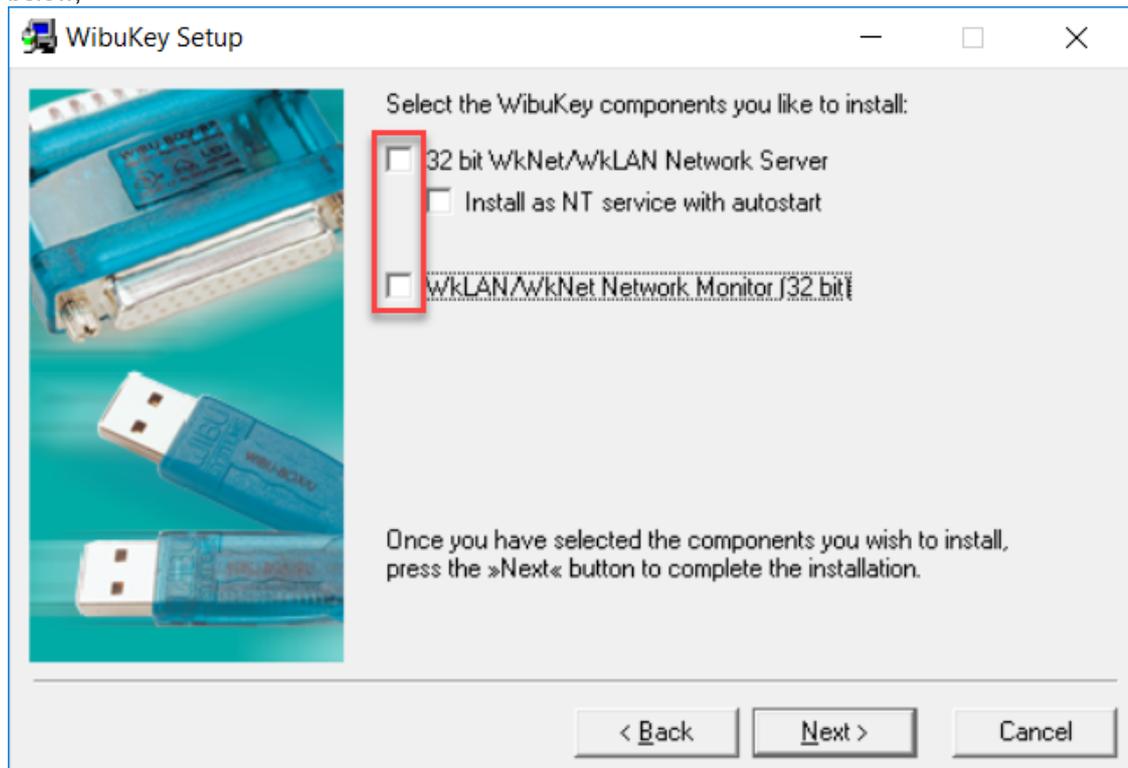
2. Now the USB key can be connected to any of the free USB ports.

Note: If you experience problems during driver installation, you are recommended to download the most recent drivers for the WIBU-KEY (**WibuKey Runtime**) and try the installation again.

Copy License File

The delivery note that you have received with the PMOD installation package contains account information for logging into the support area of **www.pmod.com**. There you will find a license report, and a button for downloading the license file (pstarter.lcs) for your purchased configuration. Please download pstarter.lcs and copy it to the directory *Pmod4.4/system/lcs.*

If the license file is missing when PMOD is started, the following dialog window is shown.
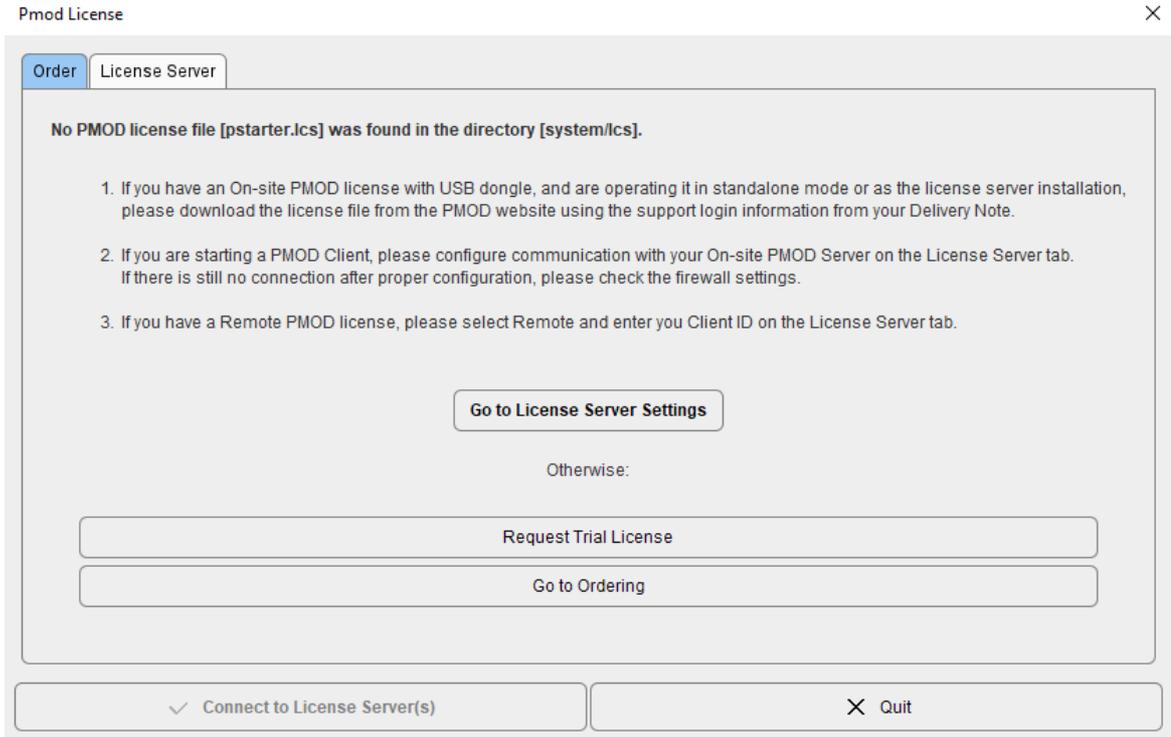
> **Important Note:** Please do not change pstarter.lcs in any way - a modified license file will not be accepted. Do not open pstarter.lcs in any program, do not rename it, and if you transfer it per FTP, use binary transfer.

Starting PMOD

PMOD can now be started with the command script **RunPmod.bat** in *Pmod4.4/Start.* It contains a script such as

```
C:
PATH %PATH%;C:/Program Files/R/R-4.2.1/bin/x64/
set R_HOME=C:/Program Files/R/R-4.2.1
cd "C:\Pmod\PmodReleases\Pmod4.4".\java\jre\bin\java  -
Dsun.java2d.uiScale=1 -Dfile.encoding=UTF-8 -Xmx31000M -jar pmod.jar
pause
```

> **Note:** The starting script has been tailored to the installation directory. Therefore, if the Pmod4.4 directory is moved to a different location, the path needs to be adjusted.

1.6   PMOD Remote License Activation

If a Remote License has been purchased, no driver installation is necessary after PMOD software extraction. Instead, registration of the **Client ID** with the PMOD Remote License Server is required. The **Client ID** is listed in the PMOD delivery note and also in your PMOD account.

Activation of Client ID

Please start PMOD with the command script **RunPmod.bat** in *Pmod4.4/Start.* The following dialog window appears:

Pmod License   ✕

| Order | License Server |

No PMOD license file [pstarter.lcs] was found in the directory [system/lcs].

1. If you have an On-site PMOD license with USB dongle, and are operating it in standalone mode or as the license server installation, please download the license file from the PMOD website using the support login information from your Delivery Note.

2. If you are starting a PMOD Client, please configure communication with your On-site PMOD Server on the License Server tab. If there is still no connection after proper configuration, please check the firewall settings.

3. If you have a Remote PMOD license, please select Remote and enter you Client ID on the License Server tab.

Go to License Server Settings

Otherwise:

Request Trial License

Go to Ordering

✓ Connect to License Server(s)   ✕ Quit

Activate **Go to License Server Settings**, to arrive on the **License Server** panel.

Pmod License   ✕

| Order | License Server |

Do you want to change any connection settings?
(Configuration for Remote License Server)

Type | Remote ▼ | Port | 6000 | ✔ Secure

Address | 0 . 0 . 0 . 0 | ◀ Set Local Host

HOST | cloudls.pmod.com

☐ License number

✔ Client ID

☐ License servers pooling:

Can not communicate with a Pmod License Server. Please check the configuration.

✓ **Connect to License Server(s)**   ✕ Quit
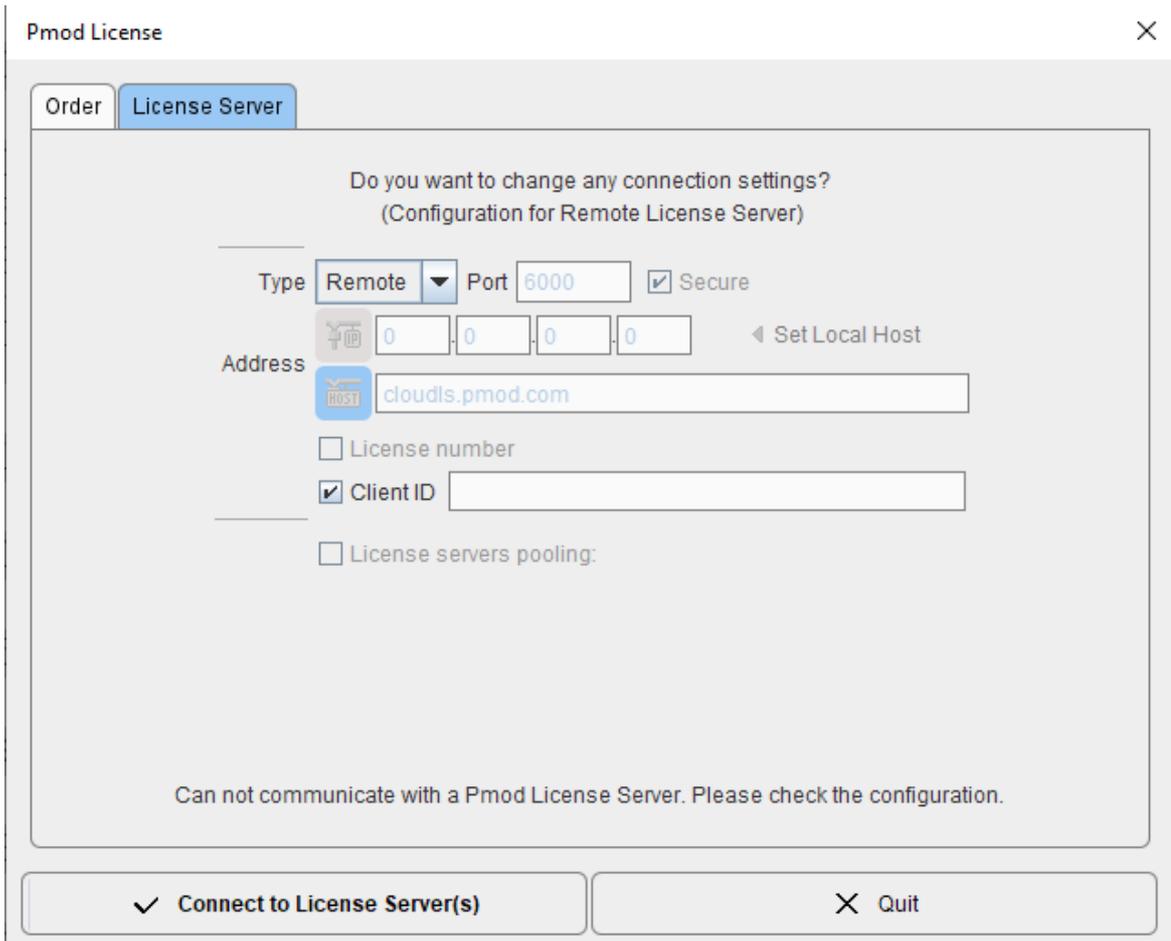
Switch **Type** to **Remote**, and enter the **Client ID** code, which you have copied from the delivery note or the PMOD account. Then click **Connect to License Server(s)**.

Troubleshooting

If the dialog window below appears, registration of the Client ID was not successful.
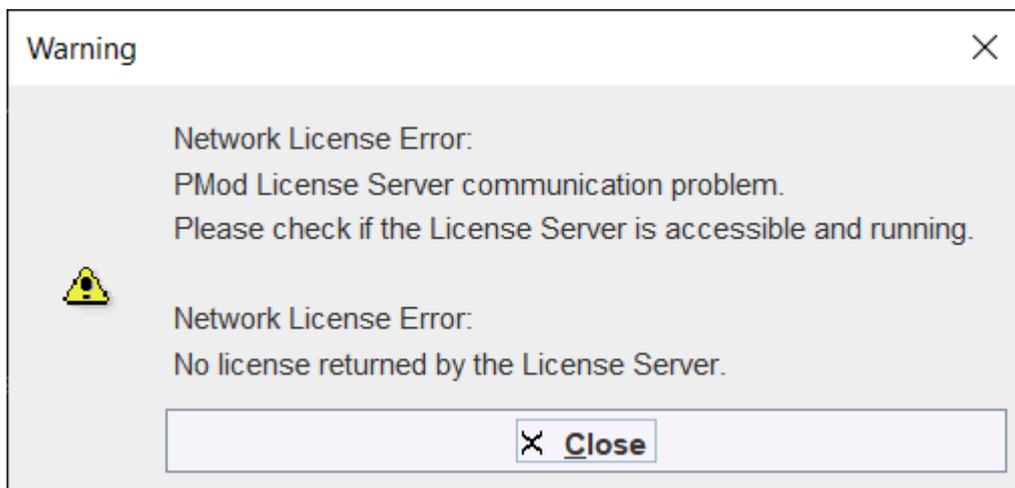
If the entered code was correct, the most likely issue is failed Internet connectivity with the Remote License Server. Please make sure that connection to port **6000** of **cloudls.pmod.com** is allowed. If you are working behind an institution firewall, please contact your IT department and ask them to grant you this connectivity.

To access the **License Server** configuration panel again later, e.g. to enter a new code, please remove the file *lcserver.ini* in the *system/lcs* directory.

Note that if PMOD is started more times than allowed in the license configuration, the first instances will be forced to quit.

1.7   PMOD On-site License Installation For Server Operation

1.7.1   PMOD License Server Installation

PMOD Software Installation

The computer for the PMOD license server doesn't require a high performance (e.g. 2GB RAM, 20GB free space on HDD, 64-bit OS), but needs to have access to the WIBU key USB dongle and run continually. Therefore, a robust vintage machine is sufficient as a PMOD license server. Preferably, it is dedicated to serving the PMOD license, because the license server is a standard process rather than a Windows service.

When using a Virtual Machine for PMOD license serving, the USB device from the host server needs to be mapped to the selected Virtual Machine. If there are no USB ports in a host server or the mapping is not possible, a Network USB Device Server can be used. USB hubs from Digi Network, **Silex**, and Belkin have been tested by Wibu-Systems. In such a setup, the WIBU key can be served over the network and mapped to the Virtual Machine. The standard WIBU drivers can be installed and used at the Virtual Machine.

To install the PMOD license server first perform the steps described in the **PMOD On-site License Installation For Standalone Operation** section including copying of the license file and plugging the USB key in.

Starting the License Server

The PMOD license server can then be started by executing the *Pmod4.4/Start/RunLcsSvr.bat* script containing the following lines

```
C:
cd "C:\Pmod4.4"
.\java\jre\bin\java -Xmx2G -jar pmtsvr.jar 5000 -ls
pause
```

The meaning of the command arguments is:

`-Xmx2G:` Size allocated to the license server

`5000:` IP port over which the license server communicates

`-ls:` license server only, no data sharing

`-d:` This option can be added for more verbose output

Note: The script has been tailored to the installation directory. Therefore, if the Pmod4.4 directory is moved to a different location, the path needs to be adjusted. The USB key needs to remain connected at all times during license server operation.

Log Output

The command window will show startup information and log the checking out/in events as illustrated below:


```
Java version: OpenJDK Runtime Environment 11.0.16.1+1-LTS
Java type: OpenJDK 64-Bit Server VM by Azul Systems, Inc.
Java path: D:\Test\Pmod4.4\java\jre
***
 Started on license [897]
--> License Server started [Fri Oct 28 13:18:47 CEST 2022] : on port
5000

***
 License Server [Version 4.401   24.11.2022]
 (c) 1996 - 2021 by PMOD Technologies
 Verbose: false, Secure: false
***
```

```
 Port: 5000
 Started on: NBWRS01-FVXP0F3/192.168.1.114
 License Server: [ ON ] STANDALONE (Use <Ctrl+C> to stop)
   License [0897], Number of Server Licenses: 10
 Memory Assigned: 8 GB of 16 GB
--> Database Server started [Fri Oct 28 13:18:47 CEST 2022] on port 5000

         Date    Command WAN     LAN      Stamp    Max     Used
Duration[sec]
         2022.10.28 13:18:49    ADD    127.0.0.1       192.168.1.114
1666955929927   10      1       0
         2022.10.28 13:18:52    ADD    127.0.0.1       192.168.1.114
1666955932464   10      2       0
         2022.10.28 13:18:54    ADD    127.0.0.1       192.168.1.114
1666955934234   10      3       0
         2022.10.28 13:18:56    ADD    127.0.0.1       192.168.1.114
1666955936110   10      4       0
         2022.10.28 13:18:59    ADD    127.0.0.1       192.168.1.114
1666955939023   10      5       0
         2022.10.28 13:19:01    ADD    127.0.0.1       192.168.1.114
1666955941344   10      6       0
         2022.10.28 13:19:03    ADD    127.0.0.1       192.168.1.114
1666955943153   10      7       0
         2022.10.28 13:19:05    ADD    127.0.0.1       192.168.1.114
1666955945380   10      8       0
         2022.10.28 13:19:09    REMOVE 127.0.0.1       192.168.1.114
1666955929927   10      7       19
         2022.10.28 13:19:13    REMOVE 127.0.0.1       192.168.1.114
1666955932464   10      6       20
```

Multiple Licenses Management

Multiple licenses can be served by a single PMOD installation. In order to use this feature please rename the different license files (*pstarter.lcs*) by appending the license numbers in square brackets (*pstarter[1324].lcs*, *pstarter[427].lcs*, ...) and copy them into the *Pmod4.4/system/lcs* folder.

In order to operate a dedicated server for each license please create a separate server script for each license with the "`-lic[<pattern>]`" option included, e.g.
```
java -Xmx2G -jar pmtsvr.jar 5000 -ls -lic[1324]
java -Xmx2G -jar pmtsvr.jar 5001 -ls -lic[427]
```
A specific license can then be defined in the *RunPmod.bat* script of the client by the command line option "`-lsn[<PORT_NO>@<IP_ADDRESS>]`" e.g.
```
.\java\jre\bin\java -Xmx16G -jar pmod.jar -lsn[5000@192.168.55.103]
```
 - to acquire license 1324
```
.\java\jre\bin\java -Xmx16G -jar pmod.jar -lsn[5001@192.168.55.103]
```
 - to acquire license 427

The advantage of separate servers is that the processes can be independently started, stopped and monitored.

Emergency Restart

In the case of connection or license management problems the following procedure is recommended for restoring clean license handling:

1. Stop the license server.

2. Delete the contents of the *Pmod4.4/system/lcs/lct/* directory.

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3. Start the license server again.

If this procedure is completed within 5 minutes, no shutdown of running PMOD clients is required.

Client Processing on License Server Machine

Although it is not recommended, client processing can be done on the same machine. To do so, a second PMOD installation has to be prepared as follows:

1. Copy Pmod4.4 to Pmod4.4LS. Pmod4.4 will be used for client processing, Pmod4.4LS for license serving.

2. Ensure that the license file (pstarter.lcs) is copied to Pmod4.4LS/system/lcs.

3. Remove the license file from Pmod4.4/system/lcs.

4. Modify Pmod4.4LS/Start/RunLcsSvr.bat to use the new path (Pmod4.4LS). Remove the other .bat files from this Start directory.

5. Remove RunLcsSvr.bat from Pmod4.4/Start.

6. Use Windows Switch User to login as different user (dedicated to run the License Server) e.g.: admin.pmod.

7. Start Pmod4.4LS/Start/RunLcsSvr.bat as admin.pmod user.

8. Switch back to the standard user and run Pmod4.4/Start/RunPmod.bat. Provide the computer name or the local IP to access the license server.

Please note that you need to provide proper read/write privileges:

- admin.pmod - RW access to Pmod4.4LS
- other Pmod users - RW access to Pmod4.4
- all other non-Pmod users - no access to Pmod4.4 nor Pmod4.4LS

In this way the License Server will be running for all users, as long as the computer is not shut down.

1.7.2 PMOD Client Installation and Configuration

PMOD Software Installation

For a PMOD client only the software extraction of the **PMOD On-site License Installation for Standalone Operation** is required. *The license file should not be copied.*

Configuration of the License Server

The PMOD client can then be started by the command script **RunPmod.bat** in the *Pmod4.4/Start* directory. Because no license file is found, the following dialog window is shown.
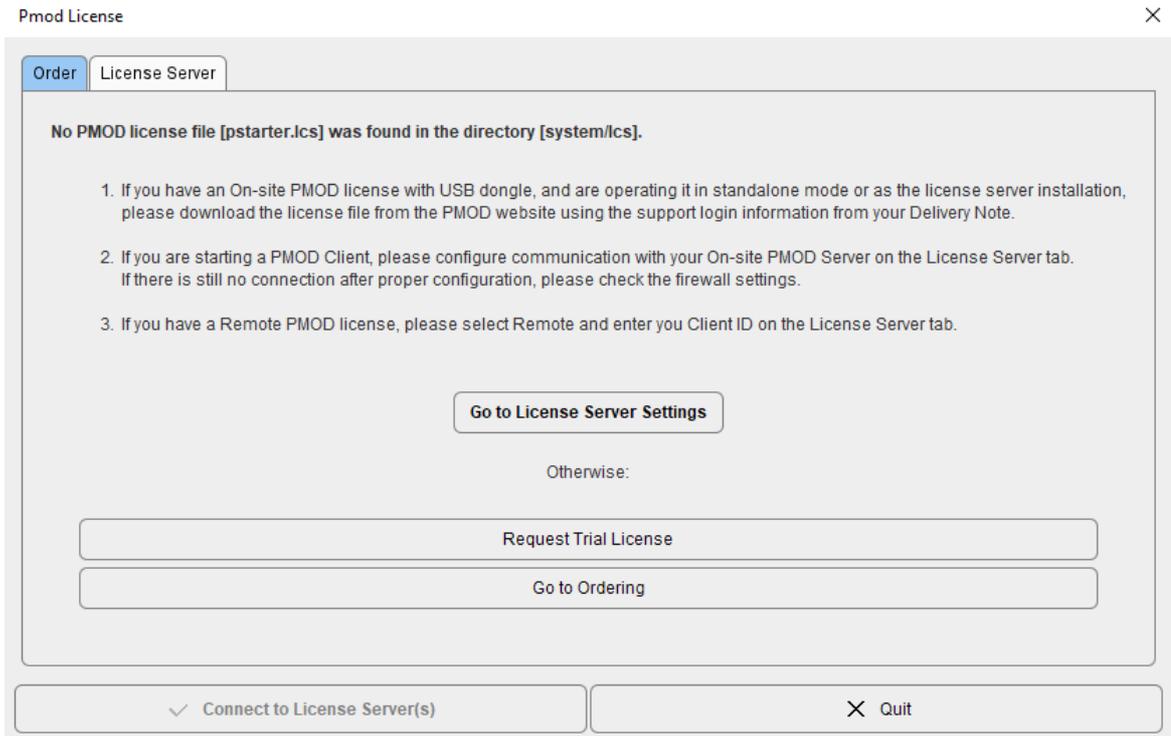
Please select **Go to License Server Settings** to open the **License server** panel illustrated below and switch **Type** to **Custom**.
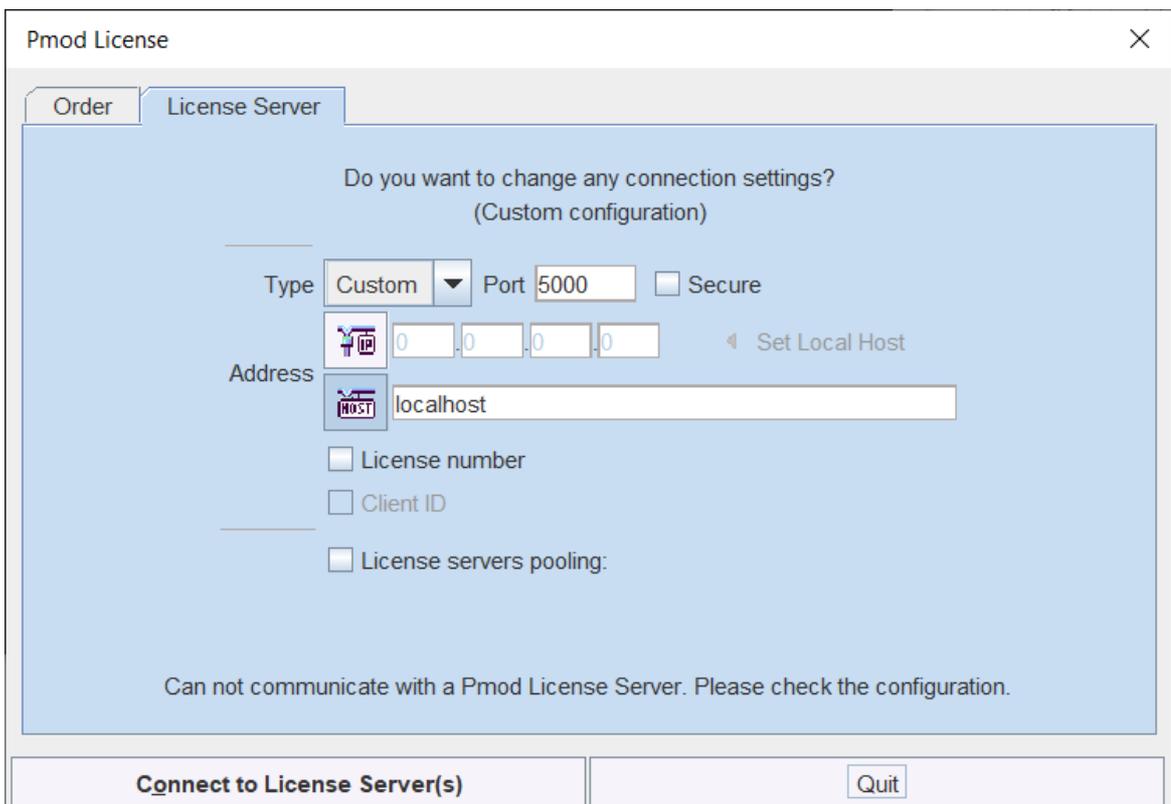
There configure the same **Port** that was configured for the license server (or transaction server), and specify the server **Address** either by entering its IP address, or by entering its host name. If the process employed for license serving uses encryption, please check the **Secure** box. If the license server manages several licenses at the same time, enable the **License number** box and enter the number of the license to which you want to connect.

Then activate **Connect to License Server(s)**. If the connection succeeds, the dialog window disappears and PMOD starts up. Otherwise the dialog window

> Network License Error:
> PMod License Server not found.
> Please check if the License Server is accessible and running.
>
> ⚠
>
> ✕ Close

is shown. In this case, please check the configuration of the license server and try again.

> **Note**: The definition is saved in a file `system/lcs/lcserver.ini`. To provoke display of the License Server dialog window, this file may be deleted.

Multiple License Servers

If a customer has multiple license servers, the proper license server can also directly be specified in **RunPmod.bat** as a client command line option "`-lsn[<PORT_NO>.<OPTIONAL_LICENSE_NO>@<IP_ADDRESS>]`", e.g.
`.\java\jre\bin\java -Xmx16G -jar pmod.jar -lsn[5000.1324@192.168.55.103]`

Alternatively muliple license servers can be added in the **License servers pooling** configuration by entering their definition in the upper area and then using the **+** button. Each time the client is started it will connect to the first license server in the list which responds.

| Order | License Server |

Specified Server is not a valid Pmod License Server.
Do you want to change any connection settings?

Port `Custom ▼` `5002` ☐ Secure

Address
`192` `.168` `.55` `.104` ◀ Set Local Host
`localhost`

☐ License number

☑ License servers pooling: **+** **−**

Address	Port	Secure	License
localhost	5001	false	211
localhost	5001	false	212
192.168.55.104	5002	false	

| Connect to License Server(s) | Quit |

License Server Change and Statistics

The license server setting is available on the **On Start** panel of the **Configuration** tool. The **Change License Server** button opens a dialog window for changing the license server address. If a license server handles multiple network licenses, the **License number** field can be used to address a specific license.
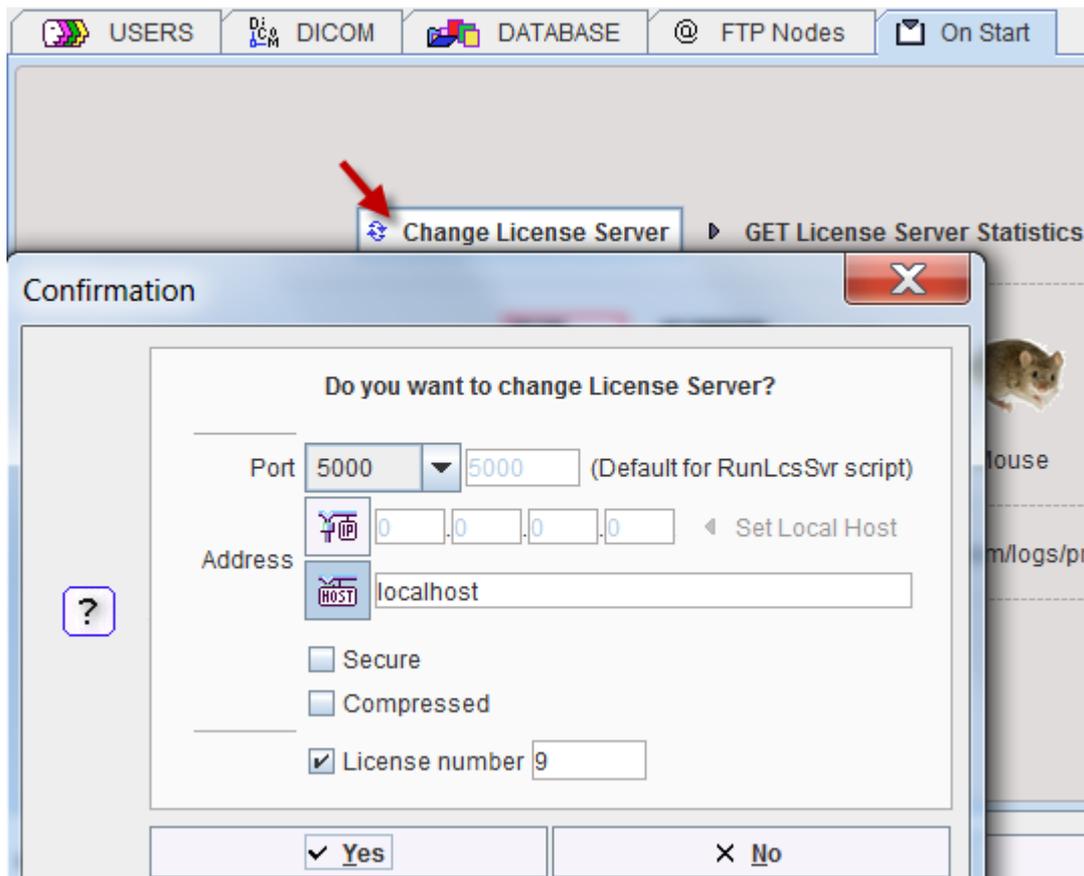
The **GET License Server Statistics** button allows finding out whether there are free licenses left.

Starting and Stopping a PMOD Client

After the license server has been properly configured, PMOD can be started in exactly the same way as with local operation. However, for stopping PMOD the main **Quit** button of the ToolBox should always be used. This will initiate a proper shutdown procedure which returns the license to the license server. Otherwise, when simply killing the client, it will take about 15 minutes until the license server diagnoses loss of connection and reclaims the lost license.

Connection Problems

If at client startup no more licenses are available from the license server because all are in use, the **License Server** connection dialog window is shown again to give the user a chance for connecting to a different license server. In case the connection is repeated with the same server following message is shown.

If a connection problem with the license server occurs while working, the **License Server** connection dialog window is shown. If it is not possible to re-establish the connection (for instance by restarting the license server) the following warning is displayed

and after five more minutes the PMOD client is finally stopped.

1.7.3 Combination of License and Database Server

Please note that the license server process is based on the transaction server mechanism used for publishing a database. Therefore, if the user is already running a transaction server process on the server system (RunDbSvr.bat, see our documentation for PMOD Database Functionality), it is *not* necessary to start a dedicated process (RunLcsSvr.bat) just for the license management. The clients can use the same port for requesting a license as for requesting data from the transaction server.

In this context the transaction server option
`-noLS`: database server only
is relevant. This option should be used when running multiple transaction servers. In this case, only one of the transaction servers should started without `-noLS`, namely the one used for license serving.

1.8 Assigning more RAM to PMOD

The amount of RAM that PMOD tries to allocate has been specified and is used for the starting script. To change it, please open the script **RunPmod.bat** in *Pmod4.4/Start* in a text editor. It contains lines similar to

```
D:
cd "D:\Pmod4.4"
.\java\jre\bin\java -Xmx16000M -jar pmod.jar
pause
```

The -Xmx16000M option specifies the maximum heap memory (16000 MB) that PMOD can allocate. If needed, change the amount and save the modified script.

Note that for processing large data sets it may be necessary to install additional RAM and adjust the starting script accordingly. The assigned memory should be somewhat below the physical RAM of the system.

1.9 Shortcut Creation

To create a PMOD Starter Shortcut on your Windows desktop:

1. Start a Windows explorer and drag the file *Pmod4.4/Start/RunPmod.bat* to the Desktop while pressing `CTRL+SHIFT` simultaneously.

2. Then rename the shortcut to *PMOD*.

3. Change its icon by pressing the right mouse button on the shortcut, select **Properties**, and then in **Change Icon** point to *Pmod4.4/resources/icons/Pmod.ico.*

1.10 Version Upgrade in a Complex PMOD Environment

Upgrading an On-site license setup for standalone operation of PMOD is straightforward. When using absolute paths for the databases the new PMOD version should be immediately functional after copying the properties folder as the last installation step.

In a more complex environment with clients and servers the following rules should be observed:

1. Absolute paths outside the PMOD installation directory should be used for the databases. If this is not the case they should be moved and the paths adjusted in the configuration.

2. The databases should be backed up before the migration.

3. Server and clients should preferably run the same PMOD version. (To some extent, newer server versions can support older client versions, but not the reverse.)

4. The PMOD version on the server should be updated first, followed by the clients.

Server Update

Please perform the following tasks sequentially:

1. Stop all PMOD servers in the order DICOM servers (DS), transaction servers (TS), license servers (LS).

2. Install the new PMOD version and import the properties from the old installation.

3. In **Config**/**DATABASE** switch each database to **Use Direct Connection**, verify it with **Echo DB**, and run **Update & Optimize**. Then switch back to **Use Transaction Server** and generate new starting scripts for the transaction and license servers.

4. In **Config**/**DICOM**/**DICOM SERVER** generate new scripts for the DICOM Servers.

5. Save the configuration and exit PMOD.

6. Start the DICOM, transaction and license servers using the new scripts.

7. Start PMOD and verify with the **Configuration** utility, that the TS and DS are working properly. To this end use **Echo TS** and **C-Echo**.

8. In case of a network license: Exit PMOD and restart the license server (otherwise a license is blocked).

Client Update

1. Install the new PMOD version and import the properties from the old installation. For ATL installations the old properties are not required, as the configuration is centrally stored.

2. Start PMOD, provide the license server details when using a network license, and verify the connections with the transaction and DICOM servers.

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1.11   Troubleshooting

Display Issues due to Scaling

On displays with a high resolution, users may have enabled display scaling in the Windows Operating System to have a large enough appearance of their programs. If the scaling is not a multiple of 100%, unpleasant blurring effects can occur when running PMOD due to poor interaction of Java and Windows.

This issue can be solved by adding the following command line option `-Dsun.java2d.uiScale=1` to the script **RunPmod.bat** in *Pmod4.4/Start*.

```
.\java\jre\bin\java  -Dfile.encoding=UTF-8    -Dsun.java2d.uiScale=1  -Xmx28000M -jar pmod.jar
```

Error reporting

Internal errors typically leave messages of the form
```
java.lang.NullPointerException
at
pmclass.applications.pmgateway.PMgatewayDefaults.getConvertionSettings(P
MgatewayDefaults.java:143)
at
pmclass.applications.pmgateway.PMgatewayFrame.convert(PMgatewayFrame.jav
a:854)
at
pmclass.applications.pmgateway.PMgatewayFrame.run(PMgatewayFrame.java:91
1)
at java.lang.Thread.run(Thread.java:484)
```
in the command window or the log file.

To allow PMOD Technologies to track and resolve the problem please report the error using the in-built reporting mechanism as described in the problem reporting section. If this is not possible due to a firewall problem please open the **Support Request** section on the www.pmod.com website and fill the error message together with a description into the problem report form.

License Errors

Some of the most likely license errors are:

▪ The following error message might appear when restarting PMOD after a crash or after killing the program rather than quitting regularly

> ⚠️ License Error:
> Too many users or license expired. PMOD is provided as a limited-user license.
>
> Please refer to the installation description available at:
>
> http://doc.pmod.com/pbas/installation.main.htm   ⮂ WWW
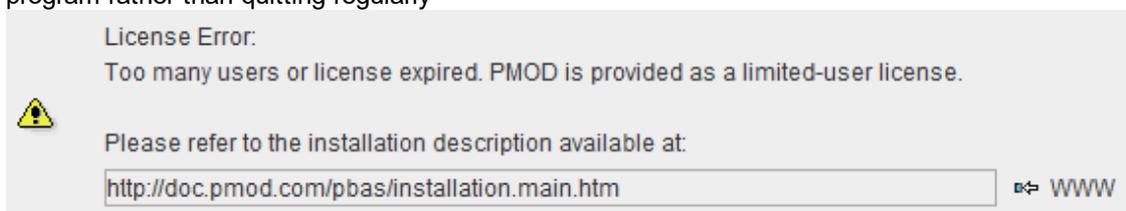
In order to be able to restart without waiting time please remove the folder *Pmod4.4/system/lcs/lct* which contains outdated information.

▪ If the license file has not been copied to the right directory, you will see a message dialog
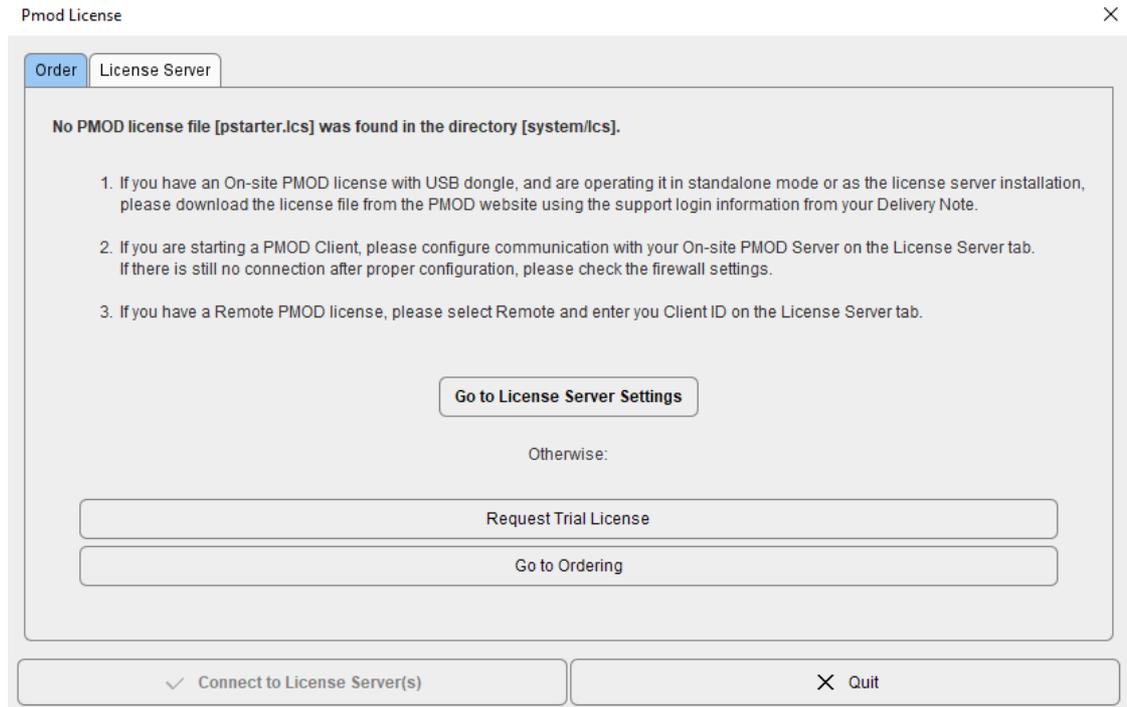
Please make sure you copy *pstarter.lcs* to *Pmod4.4/system/lcs*.

▪ If the license file has been modified somehow, you will see a message
License Error. Invalid license file (2)
Please try extracting *pstarter.lcs* again from your e-mail without any modifications.

▪ If the USB key cannot be interrogated, because it is not connected or because the driver installation is not up to date, you will see an error message *Hardware license key not accessible*, with additional details. Please make sure that the USB key is connected and the installation was done as described. The driver installation may have to be repeated after an operating system upgrade.

1.12 PMOD Server Processes as Windows Services

The PMOD software offers various server processes such as

▪ DICOM servers for receiving image data over the network;

▪ transaction servers for organizing the access to central databases;

▪ license servers for managing the processing clients for a network license.

These processes should be running reliably and at all times. The following sections describe, how they can be implemented as Windows Services, improving their manageability and minimizing the administrative overhead. The advantages of such a setup include:

▪ no need for open console or terminal sessions;

▪ automatic process restart after system restart or a process termination;

▪ service events are stored to the Windows log;

▪ information about service starting/rebooting can be mailed to the administrator;

▪ PMOD Server output can be redirected to a file;

▪ user friendly management tool for checking the server state;

▪ remote administration via web browser.

Two solutions are described. One is based on the affordable 3rd party software AlwaysUp from Core Technologies Consulting, LLC. Alternatively, there is a free service manager software available at https://nssm.cc/ which also works.

1.12.1 Environment and Prerequisites

Test environment includes following components:

1. PMOD software

2. NSSM (https://nssm.cc/)

3. Microsoft Windows Server

There should be a dedicated Windows account to start services:

- Account name: pmod.services
- Account type: Local Administrator

1.12.2 Services Administration

1.12.2.1 Configuration Backup/Restore

AlwaysUp supports exporting/importing of the services configuration (without stored passwords). It is highly recommended saving a working configuration as a backup. This can also be useful during reconfiguration or migration to a new server.
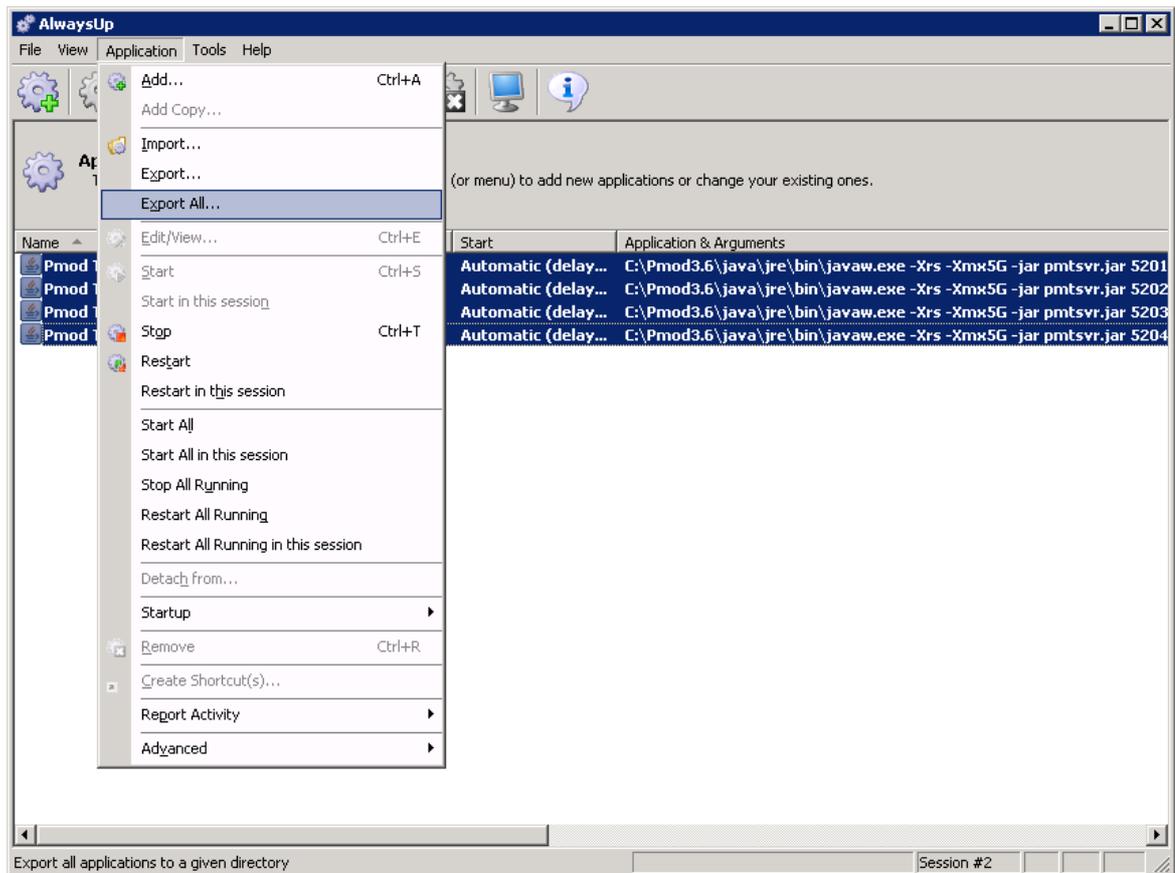
1.12.2.2 Server Starting/Stopping

In the **AlwaysUp** interface, the servers can be selected and started/stopped/restarted with one mouse click.
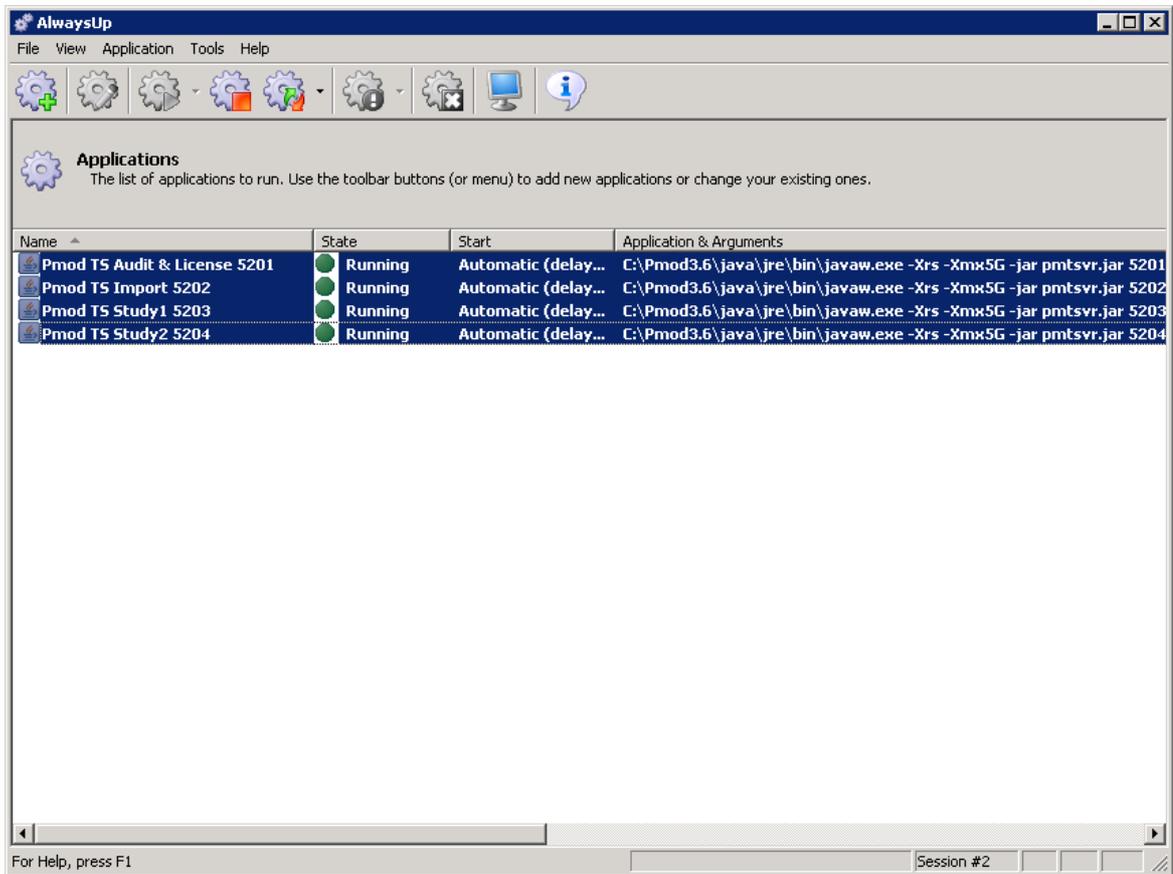
1.12.2.3 Access to Console Output

If the console output has been redirected to a file, it can easily be inspected using standard text viewers.

1.12.2.4 Management using AlwaysUp Web Service

Web management is useful for remote administration of the services. It shows the following interface.
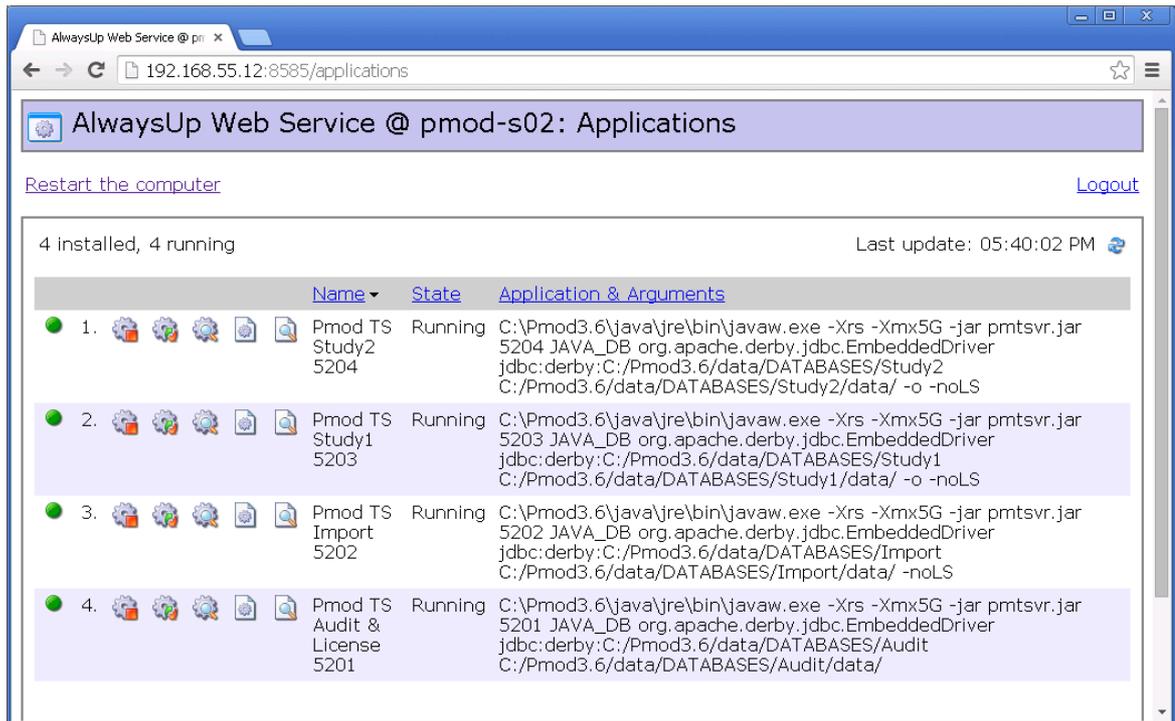
It offers:

- service start/stop/restart,

- service configuration overview, service report (daily usage, memory usage, events),

Summary

	Tuesday 10/21/14	Monday 10/20/14	Sunday 10/19/14	Saturday 10/18/14	Friday 10/17/14	Thursday 10/16/14	Wednesday 10/15/14
Number of times run	1	0	0	0	1	1	1
Number of restarts	0	0	0	0	0	0	0
Memory: Average / Peak	78.0 / 80.0 MB	78.0 / 80.0 MB	78.0 / 80.0 MB	78.0 / 80.0 MB	77.2 / 80.0 MB	72.8 / 80.0 MB	72.0 / 80.0 MB
CPU: Average / Peak	0 / 1 %	0 / 0 %	0 / 0 %	0 / 1 %	0 / 12 %	0 / 9 %	0 / 10 %
Time running	17.0 hours	24.0 hours	24.0 hours	24.0 hours	23.9 hours	23.8 hours	23.9 hours
Availability	71 %	100 %	100 %	100 %	100 %	99 %	100 %

- quick output view,
- **Windows Server** restart (this option can be disabled).