Oasys
LS-DYNA Environment

Installation and Maintenance Guide for the Oasys Ltd LS-DYNA Environment Software

Windows | Version 22.0

Contents

Intended audience

This document is written for the System Manager responsible for loading and maintaining the Oasys 22.0 software. No special (engineering) knowledge of the software is required.

Further information may be obtained from:

UK	Tel:	+44 121 213 3399
	Email:	dyna.support@arup.com
China	Tel:	+86 21 3118 8875
	Email:	china.support@arup.com
India	Tel:	+91 40 6901 9723 / 98
	Email:	india.support@arup.com
USA	Tel:	+1 415 940 0959
	Email:	us.support@arup.com
Web		https://www.oasys-software.com/dyna/

or contact your local Oasys Suite distributor.

1. IMPORTANT CHANGES FOR OASYS 22.0

1.1 Licensing

The Oasys 22.0 uses LM-X from X-Formation for licensing.

LM-X is a well-known provider of licensing solutions, and it is likely that many Oasys Ltd customers already have an LM-X license service running for other CAE tools.

The Oasys 22.0 software requires a new LM-X license server, which will be provided by Oasys Ltd or your Oasys Suite distributor. If you are using a floating license server, you will need to install the LM-X license server software, which can be done as part of the Oasys 22.0 installation.

The Oasys 22.0 LM-X license file and LM-X license daemons are backwards compatible with all Oasys Suite software releases from 15.x onwards. This means that any existing software back to and including 15.x will continue to work with new LM-X license files and servers.

We recommend that you update all your Oasys Suite license servers with the files shipped with the Oasys 22.0 software.

1.2 Filenames and version numbers

The filenames of the executables use the convention:

name {major version} {_minor version} {_size} .exe

For example: primer22***_0_x64***.exe is PRIMER major release ***22***, minor release ***0***, 64 bits.

A generic filename for the current version, omitting the minor version number, is also created for each executable.

For example: primer22_x64.exe ➔ primer22_0_x64.exe (where ➔ is a hard link)

If a minor version (e.g. 22.1) of major release 22 is issued in the future, and the files are installed in the same directory then:

The new executables (e.g. primer22***_1***_x64.exe) will be distinct.

The hard links will be updated so that the generic name points to the most recent minor release.

For example: primer22_x64.exe ➔ primer22***_1***_x64.exe

This updating of the hard links has consequences when one programme runs another, see the next section on usage of generic names.

Please Note:

A “hard link” on Windows is not quite the same as a “symbolic link” on *nix operating systems. On Windows a file exists as a collection of bytes with an address somewhere on a disk, and ***every*** reference to that file is a “hard link”. A file must have at least one hard link referring to it, which defines its name and location in a given folder. However, a file can have

any number of hard links, in any locations, pointing to it. All such links will look like the original file, sharing the same attributes, since they all point to the same location in disk. However, unlike usage on *nix operating systems there is no concept of “real file” and “pointers to that real file”, on Windows all such links are equal. For more information consult MSDN (search for “hard link” or “junction”) and see also the MS-DOS “mklink” command.

The software itself defaults to the generic names

Some pieces of Oasys software reference other programmes within the suite. For example:

- REPORTER can run PRIMER, D3PLOT and T/HIS,
- D3PLOT can run PRIMER and T/HIS
  and so on.

Within the software the default names used for running the other executables are the generic ones, i.e. no minor version suffix. For example, when REPORTER wishes to run PRIMER it will, by default, run the executable name primer22_x64.exe.

This means that when a minor release is installed the default will be for the most recent executable to run in this context. It is possible to override these defaults by using preferences, see section 4

If you wish to segregate minor versions, for example, you wish REPORTER 22.0 to run PRIMER 22.0 and REPORTER 22.0 to run PRIMER 22.0, it will be necessary to place the new minor release in a separate installation directory.

Please contact Support for further information if you need more advice about this.

1.3 Supported architecture and operating systems

From Oasys 14.0 onwards the Oasys Suite software is only available in 64-bit form for x86-64 hardware.

This means that all the executables, including the LM-X licensing software, will only run on x86-64 hardware running a 64-bit operating system.

Supported Windows operating systems

Oasys 22.0 for Windows is suitable for and has been tested on Windows 11.

The software may run on Windows 8.1 and 10, but this is untested. It will not run on Windows versions prior to that because of changes in the way Microsoft configure displays.

2. INSTALLATION ORGANISATION

2.1 Oasys 22.0 Installation Organisation

In Oasys 22.0, an option is provided to separate a top-level “administration” directory from the “installation” one where the executables are located.

For large installations on many machines this allows central configuration and administration files to exist in one place only, but executables to be installed locally on users’ machines to give better performance.

Oasys 22.0 also allows for the following items to be configured:

- The location for user manuals and other documentation.
- The definition of a user's home directory.
- The definition of the temporary directory for scratch files.

In addition, parsing of the "oa_pref" (preferences) file will now handle environment variables, so that a generic preference can be configured to give a user-specific result, and preferences may be "locked" so that those set at the administration level cannot be changed by users.

These changes are entirely optional, and users performing a simple installation on a single machine do not need to make any changes to their existing installation practice.

Here are some diagrams which illustrate how installation might be carried out in various scenarios.

a) Single user installation on one machine

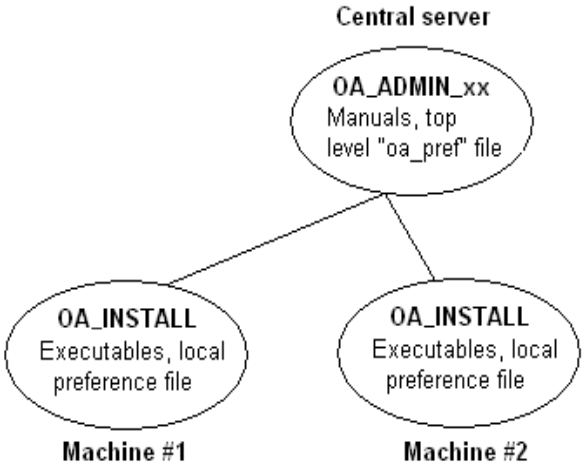
There is no need to worry about separating administration and installation directories, and the default installation of all files in and below the single installation directory will suffice.

b) A few machines on a small network, each user has their own machine

The top-level administration directory can be installed on a network server, possibly also locating the manuals centrally.

Each user's machine has its own "installation" directory to give good performance, but there is no need to manage home or temporary directories centrally since each user "owns" their machine.

If network performance is good an alternative would be to install executables on the central server, meaning that local OA_INSTALL directories are not required.



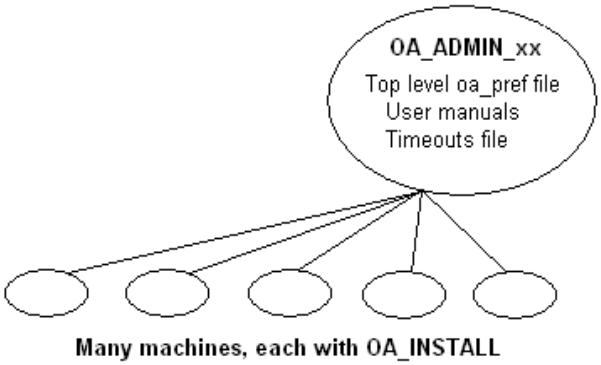
c) Large corporate network

The top level oa_pref tile will set the “home” directory for users so that their home directory is the same regardless of the machine they use.

Timing out of idle licenses is managed centrally via the “timeouts” file.

Corporate policies can also be enforced if required by “locking” preferences in the top level oa_pref file.

Depending on network size & performance executables and manuals could be located on each machine, or on local server hubs, or centrally.



These configurations are not mandatory and are simply examples, you should choose the one that suits your needs.

Note the “_xx” in OA_ADMIN_xx and OA_INSTALL_xx refers to a version number, i.e. OA_ADMIN_22 for Oasys 22.0. This suffix is not required, but it is recommended as it will provide an easy way of organising parallel installations of future releases on a single machine.

Note also that while the various directories (OA_ADMIN_xx, OA_INSTALL_xx, OA_MANUALS, etc) can be defined by environment variables this is not recommended because it is inflexible, and also it would not permit two different installations to have different directories on the same machine.

It is recommended that the options in the top level oa_pref file to define these directories are used instead, since this encapsulates the definitions in a single place, permits multiple installations to co-exist on the same machine, and makes administration easier. See “oa_pref file options” in the table below.

2.1.1 Details of director names

Directory	Status	Directory Content and purpose	oa_pref file option
OA_ADMIN_xx *or* **OA_ADMIN**	*Optional*	Top level configuration files. (**xx** = 22 for Oasys 22.0, thus **OA_ADMIN_22**) Admin level oa_pref file Other configuration files Timeout configuration file	

		The generic version of this name, **OA_ADMIN** will be searched for if no release-specific version is set.	
OA_INSTALL_xx *or* **OA_INSTALL**	Required	All executables Installation level oa_pref file	**oasys*OA_INSTALL**
OA_MANUALS	*Optional*	Specific directory for user manuals. If not defined, then will search in: **OA_ADMIN_xx/manuals** (xx = major version number) **OA_INSTALL/manuals**	**oasys*manuals_dir**
OA_HOME	*Optional*	Specific "home" directory for user. If not defined will use: **$HOME** (Unix/Linux) **%USERPROFILE%** (Windows)	**oasys*home_dir**
OA_TEMP	*Optional*	Specific "temporary" directory for user. If not defined will use: **P_tmpdir** (Unix/Linux) **%TEMP%** (Windows)	**oasys*temp_dir**

OA_INSTALL_xx

Previously the software used the **OA_INSTALL** (renamed from **OASYS**) environment variable to locate the directory the software was installed in.

On Windows this is no longer required as the software can work out its own installation directory. If this environment variable is already set, we recommend that it should be removed, as in some cases (where more than one version has been installed in different directories) it can cause problems.

OA_ADMIN_xx

Users wishing to separate configuration and installation directories will be able to do so by making use of the new top-level **OA_ADMIN_*xx*** directory (**OA_ADMIN_22** for Oasys 22.0).

If the **OA_ADMIN_xx** directory is used it will be necessary to set up an environment variable of this name to refer to it, however this should normally be the only environment variable required in the whole installation.

Dynamic configuration using the top level oa_pref file

While all the **OA_...** directories may be specified by environment variables of the same name it is recommended that you do not do this but instead use the facility to set non-standard directory names dynamically using preferences in the top level oa_pref file.

For example:

Oasys 22.0	**Oasys 22.1**
Top level directory **OA_ADMIN_22**	Top level directory **OA_ADMIN_221**
oa_pref file in **OA_ADMIN_22** contains: **oasys*OA_INSTALL:** *<pathname for **22.0** installation>* **oasys*manuals_dir:** *<pathname for **22.0** manuals>* **oasys*home_dir:** *<pathname for home directory>* **oasys*temp_dir:** *<pathname for temporary files>*	oa_pref file in **OA_ADMIN_221** contains: **oasys*OA_INSTALL:** *<pathname for **22.1** installation>* **oasys*manuals_dir:** *<pathname for **22.1** manuals>* would almost certainly be unchanged between major versions, although they could be different if desired

For example: If the Oasys 22.0 software has been installed in **C:\Oasys 22**, then:

```
oasys*OA_INSTALL: C:\Oasys 22
```

will enable all users' installations to find their locally stored executables.

Pathnames using environment variables will be deconstructed during oa_pref file reading, and this can be exploited to set user-specific paths using a generic definition. For example:
oasys*home_dir: H:\%USERNAME%

would set a Windows home directory for *<username>* to **H:\<***username***>**, superseding the default **%USERPROFILE%** directory normally used on Windows.

2.1.2 The hierarchy of oa_pref file reading

The oa_pref preference file contains code-specific preferences that can be used to modify the software behaviour.

This file can be located in multiple locations which are searched in following order:

OA_ADMIN_xx / OA_ADMIN	Top level configuration
OA_INSTALL_xx / OA_INSTALL	Installation level
OA_HOME	User's personal "home" file
Current working directory	File specific to the current directory (rarely used)

The rules for reading these files are:

- If a given directory does not exist, or no file is found in that directory, no action is taken. This is not an error.
- A more recently read definition supersedes one read earlier. Therefore, "local" definitions can supersede "global" ones (unless they are locked).
- If two or more of the directories in the table above are the same, that file is only read once from the first instance.

More information about preferences, including the ability to “lock” them, is given in section 4.

2.1.3 Protection and ownership of installation directories

Oasys Suite does not require Administrator / Root privileges for installation, however on Windows platforms authority to make registry entries will be required for installation.

It is recommended, but not required, that **`OA_ADMIN_xx`** and **`OA_INSTALL_xx`** directories be protected “read and execute only” for unprivileged users. If top level preferences are to be locked or idle time-outs configured, write protection will be required to prevent users from subverting these settings.

2.2 Pre-Installation

The Windows installer files can be downloaded from https://www.oasys-software.com/dyna/ under the downloads tab

A 64bit installer file is provided: **`oasys22_0_x64_setup.exe`** (Windows 10/11, 64-bit). Double click on the executable to start the installation

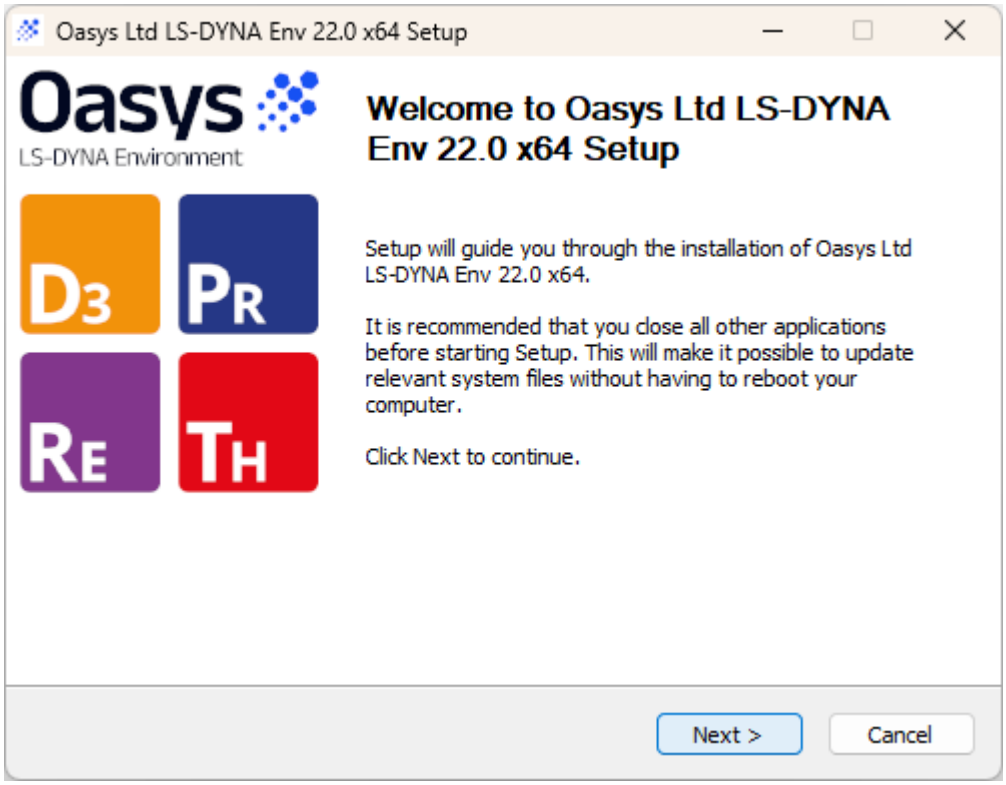
2.3 Single User / Single Machine Installation

If you are installing the software on a single machine, it is recommended that the software is installed on a local disk.

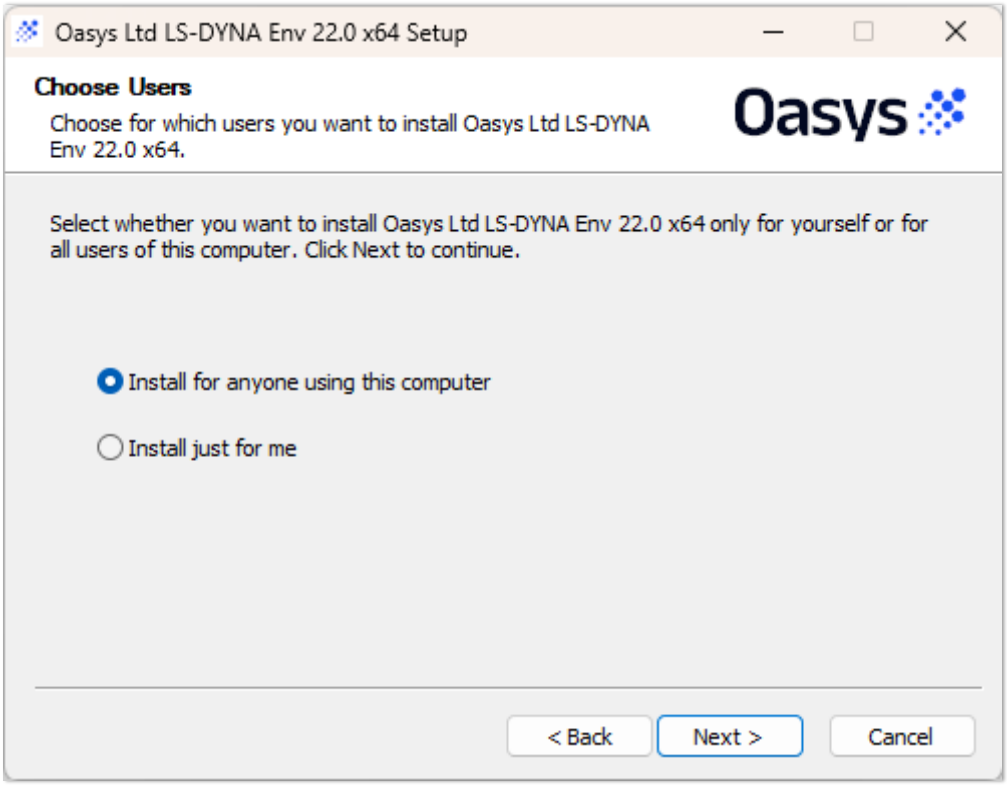
2.3.1 Installation

Installation can either be done interactively or by doing a ‘silent’ command line install. For more details on silent installs see section 2.5.1.

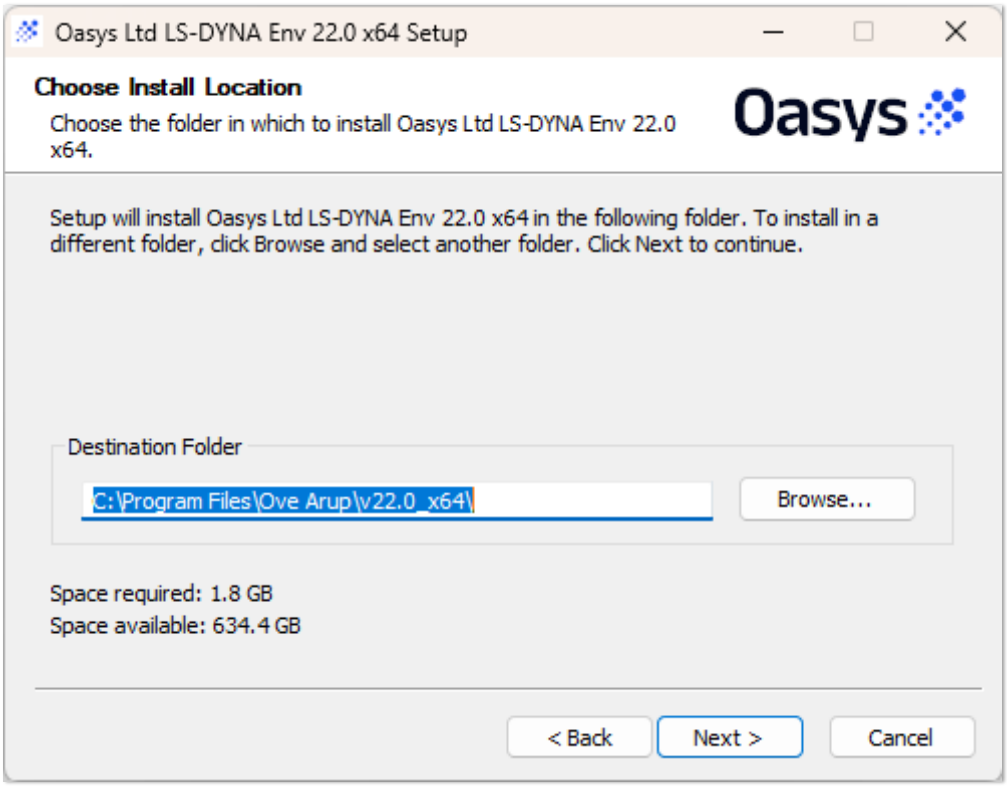
a) To start the installation process, double click on the installer file that you have downloaded and unzipped. The installer will start.



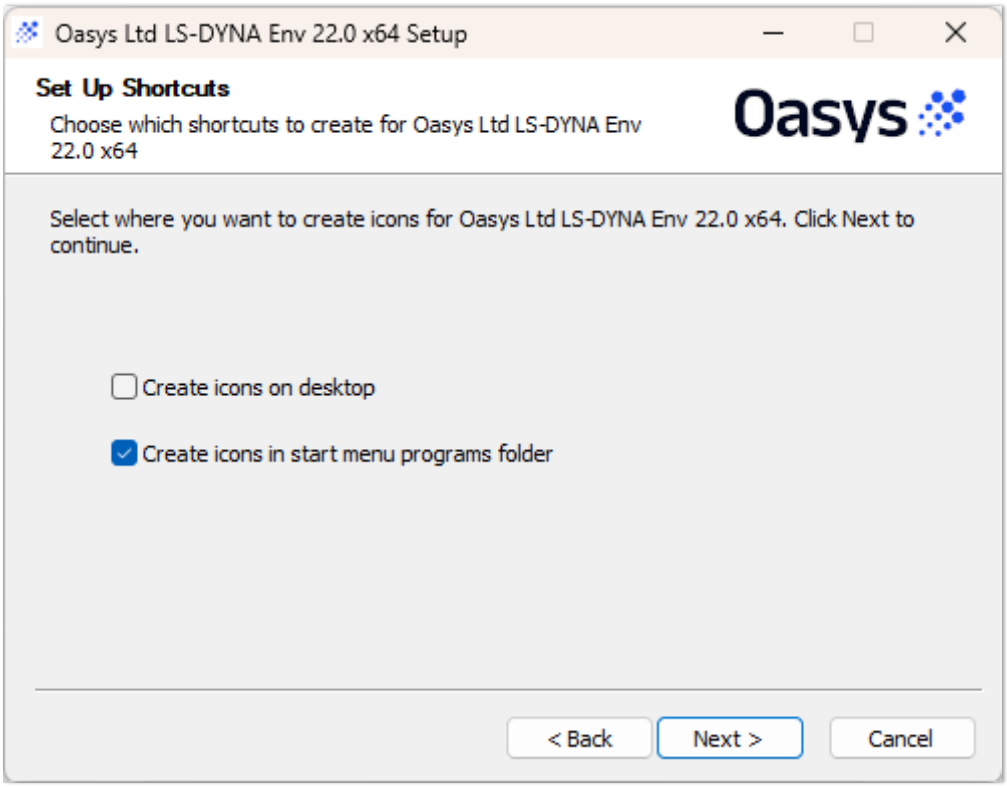
b) Choose whether to install the software for all users (if running with administrator privileges) or the current user.



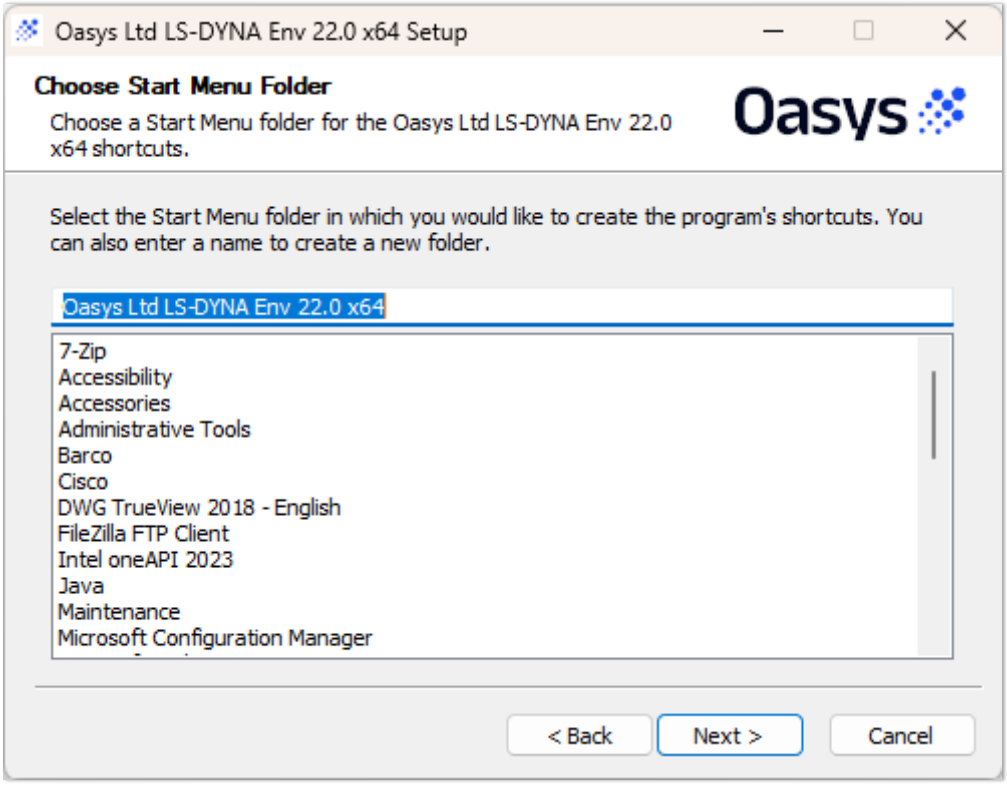
c) Select an installation directory.



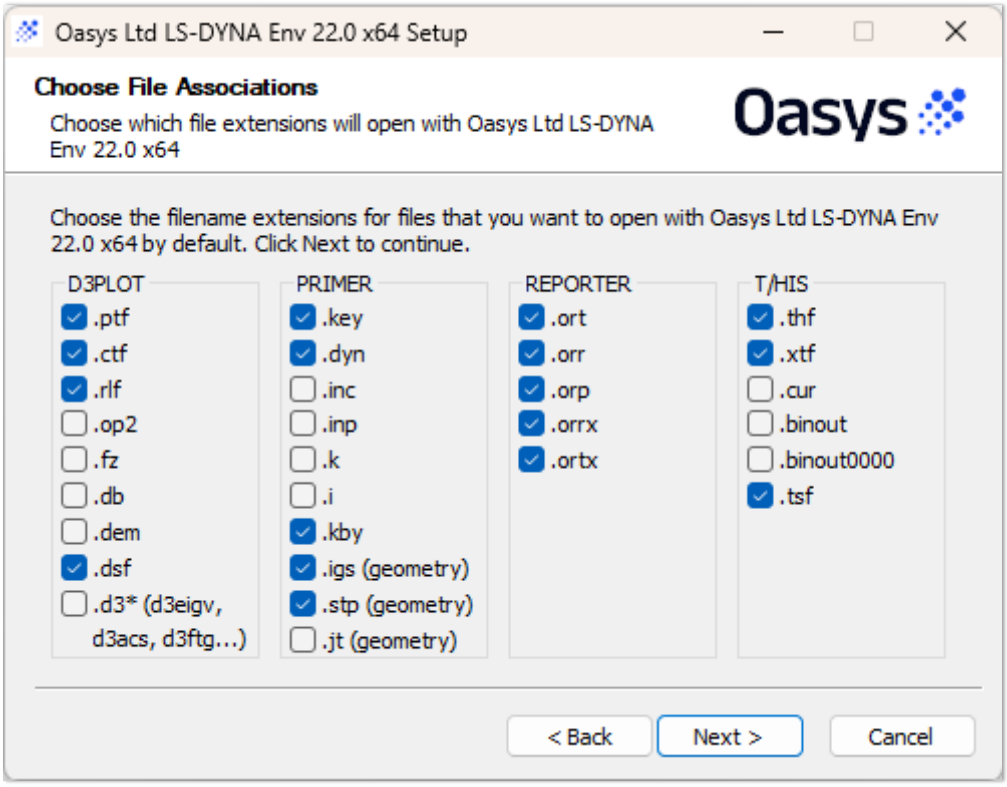
d) Choose if you want to create shortcut icons in the start menu and/or desktop.



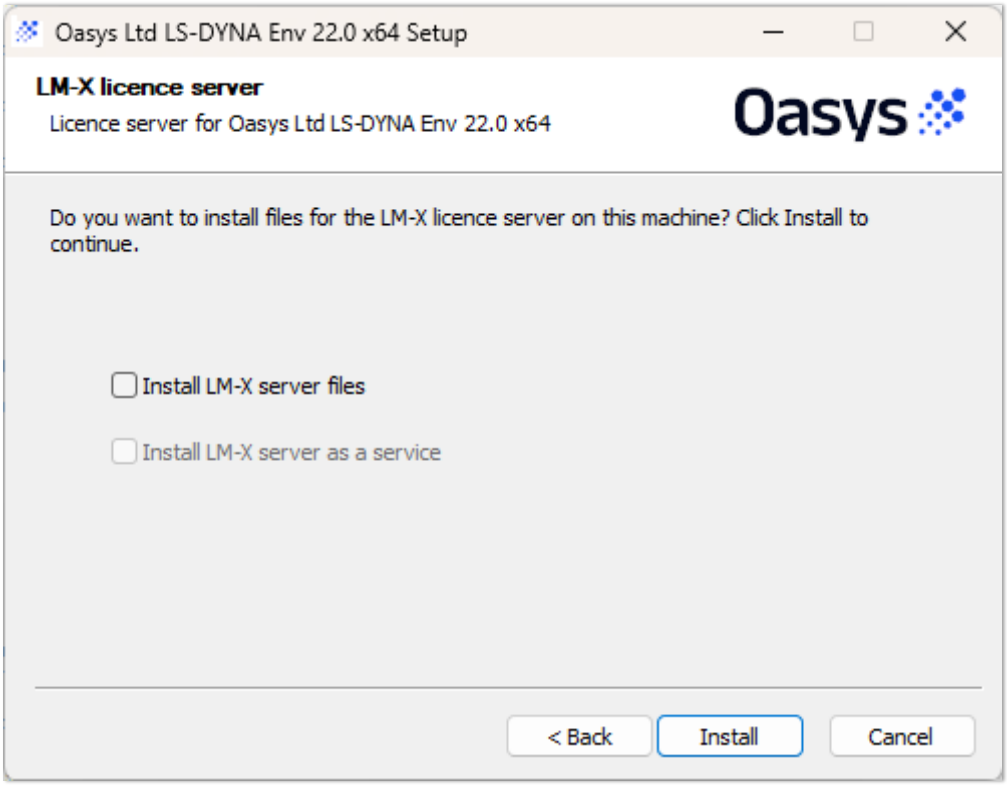
e) If the option to create a start menu folder is selected, choose the name of the folder to create. The default will be “Oasys Ltd LS-DYNA Env 22.0 x64” but a new name can be given, or an existing folder used by selecting it.



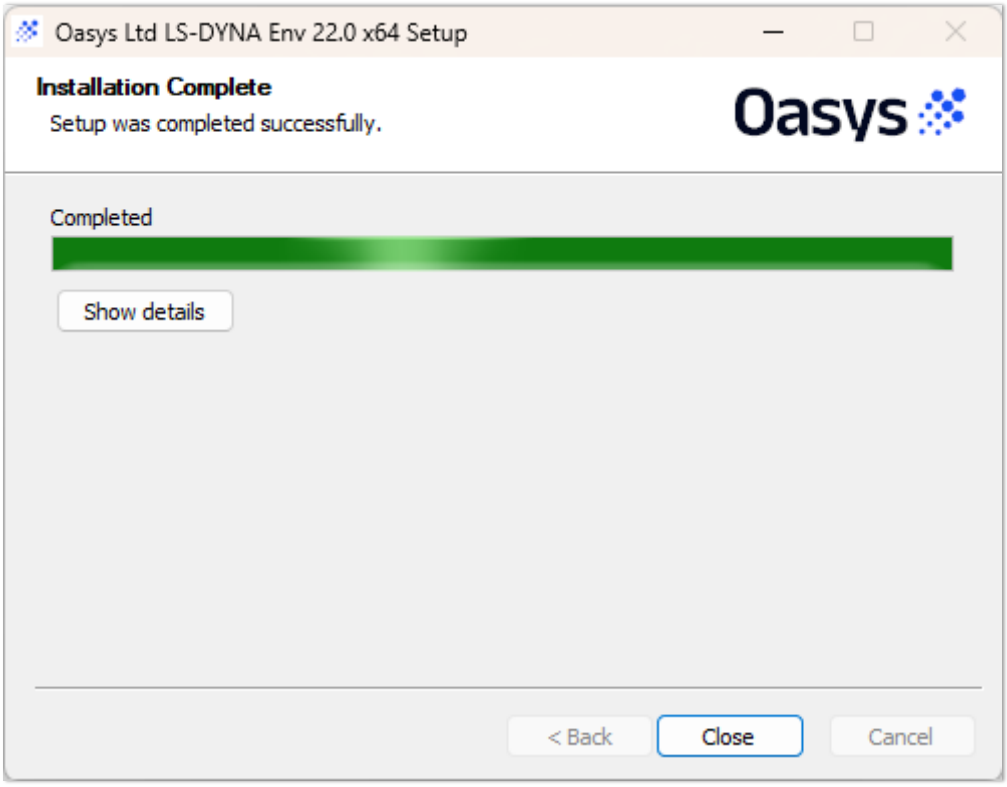
f) Choose with file extensions you want to associate with the software. The default extensions are shown (ticked) below.



g) If running with Administrator privileges, choose whether you want to install the LM-X server files. This is only required if you want this machine to be a license server.



h) The installer should then complete the installation without prompting for any more information. Once finished press Close to finish the installation.



2.3.2 Post Installation

a) Setup Environment Variables
Required – Configure the Environment Variables for licensing (see section 3.1). See section 3.2 for information on other optional Environment Variables.

b) Configure the preference file "oa_pref", (see section 4).

c) ***Optional*** – Configure Oasys SHELL for submitting Ansys LS-DYNA analysis (see section 7).

2.3.3 File Associations

By default, the PC installation will automatically set up associations for the following file extensions:

D3PLOT: .ptf, .ctf, .rlf, .dsf
PRIMER: .key, .dyn, .kby, igs, stp
REPORTER: .ort, .orr, .orp, .orrx, .ortx
T/HIS: .thf, .xtf, .tsf

Other extensions can be chosen as described in (f) above.

2.4 Multiple Machine Network Installation

Installing the software onto a network drive for access from multiple machines.

2.4.1 Installation

The easiest way to install onto a network is to:

1. Follow the same procedure as section 2.3 to install the software to a local directory (including the post-installation setup below).
2. Copy the local installation directory to the network location.
3. Uninstall the local copy.
4. Run the installer in 'network' mode to add shortcuts and file associations.

2.4.2 Post Installation

a) Setup Environment Variables
Required – Configure the Environment Variables for licensing (see section 3.1)
Optional – Configure **OA_ADMIN_xx** if you want to configure a central network directory containing preferences and license timeout information.
See section 3.2 for information on other optional Environment Variables.

b) Configure the preference file "oa_pref", (see section 4)

c) Configure license timeout information (see section 5)

d) ***Optional*** – Configure Oasys SHELL for submitting Ansys LS-DYNA analysis (see section 7).

2.4.3 File Associations

To set up the file associations and icons the installer can be run in a 'network' command line mode to add program shortcuts and file associations on all the machines that are going to access the software. For more details see section 2.6.

2.5 Multiple Machine Local Installation

If you are going to install the software on multiple machines, you can either:

a) Follow the interactive procedure outlined in section 2.3 for each machine.

b) Follow the 'Multiple Machine Network Installation' procedure outlined in section 2.4 for each machine.

c) Install the software in silent command line mode.

2.5.1 Silent Command line Installation

Instead of running the installer interactively it can be run in a silent command line mode by doing:

Oasys22_0_x64_setup.exe /S [any other args] /D=C:\path to install

The **/S** argument is required to do a silent install.

The **/D** argument specifies the installation directory. Note that if the installation directory contains spaces, it should **NOT** be quoted.
The /D argument must be the last argument.

Other command line options can be given. Please see the arguments marked with '#' in section 2.6 for more details. For example:

Oasys22_0_x64_setup.exe /S /desktop=y /ext_k=y /D=C:\Test\Oasys 22

2.5.2 Post Installation

a) Setup Environment Variables.
Required – Configure the Environment Variables for licensing (see section 3.1)
Optional – Configure **OA_ADMIN_xx** if you want to configure a central network directory containing preferences and license timeout information.
See section 3.2 for information on other optional Environment Variables.

b) Configure the preference file "oa_pref" (see section 4) – *If you have cloned an installation, you can skip this*.

c) Configure license timeout information (see section 5).

d) ***Optional*** – Configure Oasys SHELL for submitting Ansys LS-DYNA analysis (see section 7).

2.5.3 File Associations

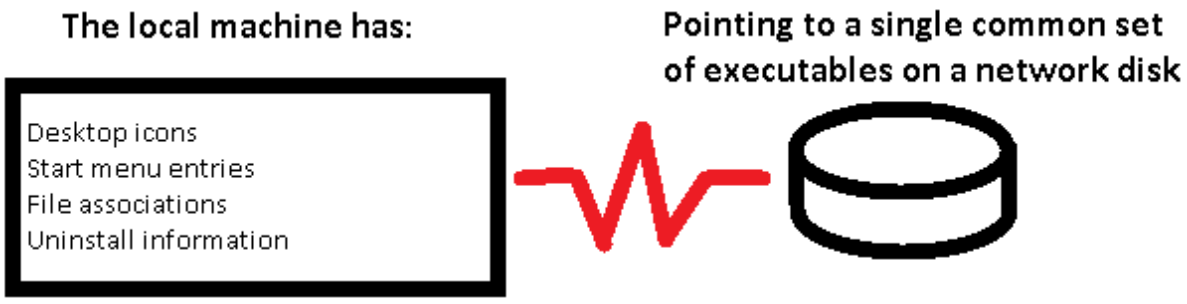
By default, the silent installation will automatically set up associations for the following file extensions:

D3PLOT: .ptf, .ctf, .rlf, .dsf
PRIMER: .key, .dyn, .kby, igs, stp
REPORTER: .ort, .orr, .orp, .orrx, .ortx
T/HIS: .thf, .xtf, .tsf

Other extensions can be chosen. Please see section 2.6 for more details.

2.6 Network command line Installation

The installer can be run in 'network' mode on the command line by using the **/network** argument. This is intended for the case of the local machine running executables that are installed on some network disk rather than locally.



It can be used to create icons and file associations on workstations without having to carry out a complete installation on each machine. In addition to creating shortcuts and file associations an entry can also be created in the Start Menu.

When the **/network** argument is used the Oasys software and manuals are **not** installed. Shortcuts and file associations are made. However, an uninstaller does need to be made (so the shortcuts etc. can be uninstalled if necessary in the future) so some things will still be installed on the machine.

If installing for all users, this location will default to
`C:\Program Files\Ove Arup\v22.0_x64`

If installing for the current user, it will default to
`C:\Users\<current.user>\AppData\Roaming\Ove Arup\v22.0_x64`

The installation folder on the local machine can be changed by giving the **/D** command line argument.

The available arguments are shown below. Those marked with '#' can also be given for silent installs. See section 2.5.1 for more details.

/network=X:\path\installed Network location that software is installed in.
If the network directory contains spaces the path should **NOT** be quoted.

/D=local install path Specifies the local installation directory where the uninstaller will be written (see above for default location). If the installation directory contains spaces, it

should **NOT** be quoted.
If used the /D argument must be the last argument

/all Install the software for all users #.
(requires administrator privileges)

/user Install the software for the current user #

/desktop=(yes|no|y|n|true|false) Whether to install icons for software on desktop #
Default is false.

/startmenu=(yes|no|y|n|true|false) Whether to install entry in start menu #
Default is true.

/startmenufolder=folder name Folder name in start menu #
Default is Oasys Ltd LS-DYNA Env 22.0 x64.
If the folder name contains spaces, it should **NOT** be quoted.

/server=(yes|no|y|n|true|false) Whether to install LM-X server files #.
Default is false.

/ext_xxx=(yes|no|y|n|true|false) Whether to associate extension with program #

The following extensions are valid for D3PLOT (Those marked with * are set by default):
/ext_ptf *
/ext_ctf *
/ext_rlf *
/ext_op2
/ext_fz
/ext_db
/ext_dem
/ext_d3 (for d3eigv, d3acs, d3ftg, …)
/ext_dsf *

The following extensions are valid for PRIMER (Those marked with * are set by default):
/ext_key *
/ext_dyn *
/ext_inc
/ext_inp
/ext_k
/ext_i
/ext_kby *
/ext_igs *
/ext_stp *

The following extensions are valid for REPORTER (Those marked with * are set by default):
/ext_ort *
/ext_orr *
/ext_orp *
/ext_orrx *
/ext_ortx *

The following extensions are valid for T/HIS (Those marked with * are set by default):
/ext_thf *
/ext_xtf *
/ext_cur
/ext_binout
/ext_binout0000
/ext_tsf *

For example, the command

```
Oasys22_0_x64_setup.exe  /network=P:\path\Oasys 22
                         /all
                         /desktop=y
                         /startmenu=y
                         /ext_k=y
                         /ext_dyn=n
```

will

- set up desktop and start menu shortcuts
- associate files with extension .k with PRIMER
- remove the association for files with extension '.dyn' from PRIMER
- for all users
- to software installed in remote location P:\path\Oasys 22

This will be a "proper" installation on the local machine, with all the normal registry entries, but the only files in the local directory will be the uninstaller. Any desktop icons and Start menu entries will point to the appropriate executables in the network location.

To uninstall it use Control Panel, Apps and Features in the normal way.

3. ENVIRONMENT VARIABLES

3.1 Environment Variables for licensing

This section describes the process of creating environment variables for licensing.

3.1.1 Oasys Suite License

Either ARUP_LICENSE_PATH (preferred) or LMX_LICENSE_PATH can be used to locate a valid license for the Oasys software. It is recommended that ARUP_LICENSE_PATH is used as this can speed up the checkout of licenses on systems where LMX_LICENSE_PATH is used to find other license servers as well.

3.1.1.1 Floating Network License

If the software will be run using a license server this variable should be set to point to the license server machine using the machine's hostname:

ARUP_LICENSE_PATH = @hostname

or if a non-default port (other than 6200) has been specified for the license server:

ARUP_LICENSE_PATH = port@hostname

If you are using a triad license server (known as High Availability Licensing or HAL for LM-X) then you should specify all three license servers:

ARUP_LICENSE_PATH = port@host1;port@host2;port@host3

(Note when installing on both Windows and Linux

*On **Windows,** shown above, multiple server names are separated by **semi-colons***
*On **Linux** multiple server names are separated by **colons***

Take care if copying environment variable strings between operating systems!)

3.1.1.2 Fixed Stand-alone (node-locked) License

If the software will be using a node locked license file this variable should be set to point to the location of the license file:

ARUP_LICENSE_PATH = <*OA_INSTALL*>\arup.lic

3.1.2 LSTC_FILE / LSTC_LICENSE_SERVER <option>

On Windows machines Ansys LS-DYNA can use either a node-locked license or a floating network license system:

3.1.2.1 Floating Network License

If a floating license system is to be used the variables **`LSTC_LICENSE_SERVER,`** and **`LSTC_LICENSE`** should be set as follows.

LSTC_LICENSE_SERVER = hostname *(of license server)*

LSTC_LICENSE = network

Setting LSTC_INTERNAL_CLIENT to “off” forces Ansys LS-DYNA to use an external executable “lstc_client” to communicate with the license server rather than the dyna executable itself.

The use of the external program has two potential benefits firstly it allows the latest version of the licensing software to be used. Secondly licenses are returned quicker to the license pool if the Ansys LS-DYNA executable terminates abnormally. To use the external program set the environmental variable LSTC_INTERNAL_CLIENT to off and copy the program lstc_client.exe to the same directory that holds the Ansys LS-DYNA executable:

LSTC_INTERNAL_CLIENT = off

If you are using a triad license server then you should specify all three license servers:

LSTC_LICENSE_SERVER = ‘(host1 host2 host3)’

3.1.2.2 Node-locked License

If a node-locked license is to be used for Ansys LS-DYNA, the environment variable LSTC_LICENSE should be set to local, and the environmental variable LSTC_FILE should be set to the full pathname of the license file. By default, this file should be called 'LSTC_FILE’, and it should be located in the 'executables' directory.

LSTC_LICENSE = local

LSTC_FILE = <*OA_INSTALL*>\LSTC_FILE

3.2 Optional Environment Variables

After installing the software, the following optional environment variables can be set up:

OA_ADMIN_xx	(only required if OA_ADMIN_xx is used)
MENU_AUTO_CONFIRM	(optional)
FILE_EXIST_ACTION	(optional)
ECHO_PREFERENCE	(optional)
DISPLAY_WIDTH	(optional)
DISPLAY_HEIGHT	(optional)

We recommend that these variables are set up by a user with Administrator privileges to ensure they apply to all users on the system.

3.2.1 OA_ADMIN_xx

If a top-level administration directory is to be used **OA_ADMIN_22** (for Oasys 22.0) must be defined on all machines on which the software is to be run. This variable should be set to the full pathname of the administration directory.

This variable is often used when replaying command files which, when recorded, pause and ask the user to confirm things (e.g. warning messages). Possible options for this variable are

true, and **false**. If the variable is set **(true)** these will not pause and will behave as if the user had pressed "OK" – meaning command files can play back without user intervention.

3.2.2 MENU_AUTO_CONFIRM

This variable is often used when replaying command files which, when recorded, paused and asked the user to confirm things. (For example, HELP and Warning messages.) Possible options for this variable are, **true** and **false**.

If the variable is set **(true)** then these will not pause and will behave as if the user had pressed "OK" - meaning that command files can play back without user intervention. This variable should only be set if the installation is intended solely for batch usage.

3.2.3 FILE_EXIST_ACTION

This variable controls the action to be taken when opening a file for output when the file already exists. Possible options for this variable are **none**, **overwrite** and **append**.

Normally the user will be prompted for the action to be taken when a file selected for output already exists. However, if this variable is set to overwrite or append the relevant action will be taken automatically.

This is generally used when playing automatic post-processing batch scripts and should only be set if this installation is intended solely for batch usage.

3.2.4 ECHO_PREFERENCE

If this variable is set to "1" any command line arguments used to start PRIMER, D3PLOT or T/HIS will be echoed to the screen along with any settings read from preference files.

3.2.5 DISPLAY_HEIGHT / DISPLAY_WIDTH

The software uses system functions to obtain screen dimensions which are used to calculate font sizes. Oasys Ltd have noticed that on some systems, the screen dimensions are not reported correctly.

If fonts used by the Oasys software appear to be the wrong size these 2 variables can be used to override the system calls to define the correct screen dimensions:

set DISPLAY_HEIGHT = *(screen physical height in mm)*
set DISPLAY_WIDTH = *(screen physical width in mm)*

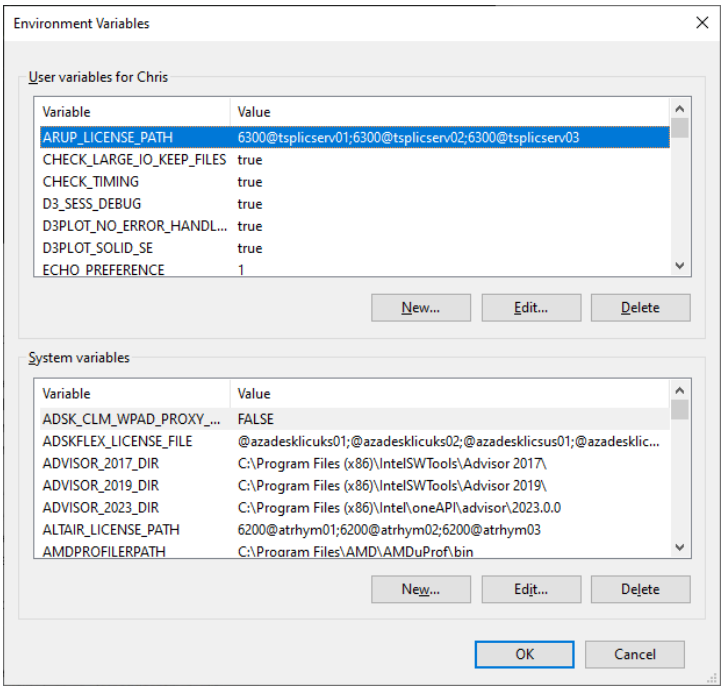
3.3 Setting Environment Variables

To set these system variables, activate the control panel, using:

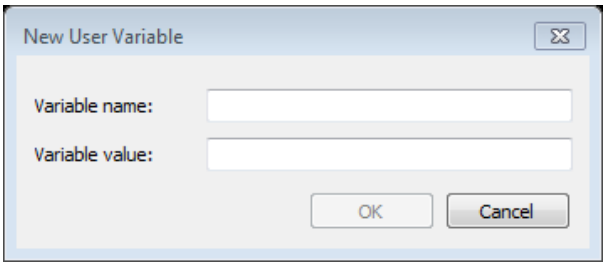
Windows 10 / 11
Cora search  button

Then type “env”

Choose “Edit environment variables for your account” which will produce the window on the right



To set up a new Environment Variable press ‘New’ and a new menu will appear.



In the New User Variable dialogue box enter the variable’s name in the ‘variable’ field followed by the value in the ‘value’ field then select OK to create the new variable.

Finally, after setting up all the new variables, select **Apply** followed by **OK** to dismiss the System Properties menu.

4. SETTING UP USER PREFERENCES

4.1 The ‘oa_pref’ file

This file contains code-specific preferences that can be used to modify the behaviour of the software suite. It is optional and, where entries (or the whole file) are omitted, programs will revert to their default settings.

4.1.1 ‘oa_pref’ naming convention and locations

The preferences are stored in a file called "oa_pref". This file can exist in multiple locations which are searched in the following order:

1. The optional administration directory defined by the environmental variable (**`$OA_ADMIN`** or **`$OA_ADMIN_xx`** - where xx is the release number).
2. The site-wide installation directory defined by the environment variable (**`$OA_INSTALL_xx`**).
3. The user's home directory **`$OA_HOME`** which defaults to **`%USERPROFILE%`** on Windows.
4. The current working directory

(see Section 2 for an explanation of the directory structure).

All four files are read (if they exist) with the last preference read being the one used; this means the file can be customised for a particular job or user if necessary.

Files do not have to exist in any of these locations; if none exists the programme defaults will be used.

`%USERPROFILE%` on Windows is usually:

`C:\users\<user_id>` on Windows

Issuing the "**`set`**" command from an MS-DOS prompt will show the value of this and other variables.

Typically, the following should be set:

- Organisation-wide options in the version in **`$OA_ADMIN_xx`** and/or **`$OA_INSTALL`**.
- User-specific options in **`$HOME`** / **`%USERPROFILE%`**.
- Project-specific options in the current working directory.

4.1.2 File Format

The file contains preferences for:

- All the software (lines commencing oasys*)
- SHELL (lines commencing shell*)
- THIS (lines commencing this*)
- D3PLOT (lines commencing d3plot*)
- PRIMER (lines commencing primer*)
- REPORTER (lines commencing reporter*)

All lines take the format:

<program name> * <preference name> : <preference value>.

The general copy of the preference file should be present in the **$OA_ADMIN_XX** and/or **$OA_INSTALL_XX** directory. This should contain the preferences most suitable for all software users on the system.

An individual's specific preferences file can be stored in the individual's home area or **$OA_HOME**. This can be used to personally customise the software to the individual's needs.

Whenever a program with preferences in the oa_pref file is fired up, the program will take preferences in the following order:

1. from the general preference file in the **$OA_ADMIN_XX** directory (if it exists)
2. then the **$OA_INSTALL_XX** directory
3. then from the file in the user's home area (**$OA_HOME**)
4. then from the current working directory

Preferences defined in the general oa_pref file can be superseded by an entry of the same name in the user's personal file, but they cannot be removed by it.

4.1.3 Locking preferences

Preferences can be locked, meaning that once read from an oa_pref file their value will not change if subsequently read from a different file. Since files are read in the hierarchy “admin => install => user” this means that a preference which is locked at the admin or install level cannot be changed locally by a user, which gives a way of enforcing organisation-wide settings.

To lock a preference, use the syntax **'program#'** rather than **'program*'**.

An example of the file is shown below to illustrate the content of the file

```
# Preferences file for software.
#
# Preferences for SHELL
shell*queue_cpu: 0
#
# Preferences for THIS
this*laser_paper_size: A4
#
# Preferences for D3PLOT
d3plot*overlay_colour: grey
#
# Preferences for PRIMER
primer*overlay_mode off
```

An example of a locked preference would be:

```
primer#background_colour: white
```

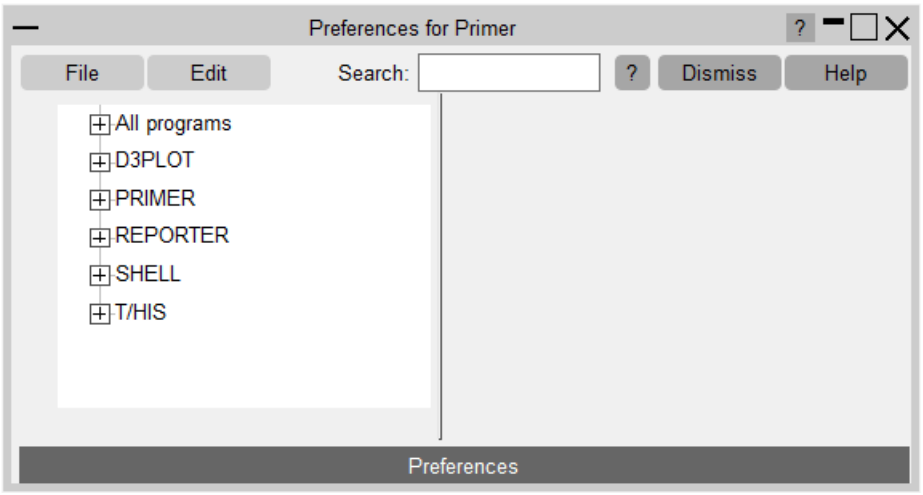
Note usage of “**#**” instead of “*****”.

4.2 The Preferences Editor

The editor can be accessed from within the SHELL or from within D3PLOT, T/HIS, PRIMER or REPORTER. The preference settings for each program are listed in the appropriate manual.

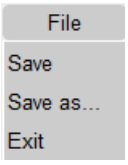
4.2.1 The Preferences Editor Layout

The preferences editor window is divided into two frames with a menu bar across the top.



4.2.2 Menu Bar

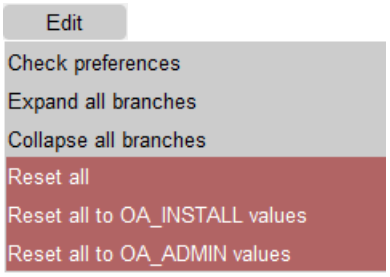
File options:



Save/Save as… : Save current preference settings. This will save the personal oa_pref file in the user's home directory. Only those preferences which differ from the preferences saved in the general oa_pref file will be saved.

Exit: Exit the preferences editor without saving.

Edit options:



Check Preferences: Checks the current preferences for any errors. These errors will be listed in a separate window detailing the preferences with the errors and the nature of those errors.

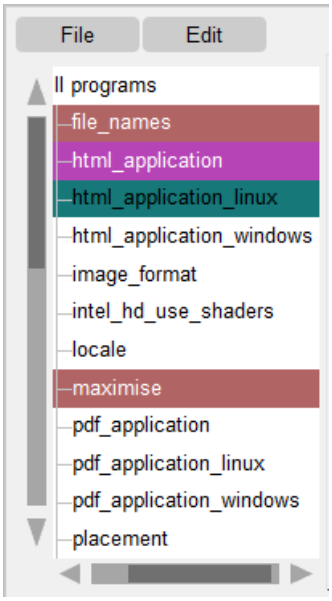
Expand all branches: Expands the categories in the left-hand-frame.

Collapse all branches: Collapses the categories in the left-hand-frame.

Reset all: Resets all values.

Reset all to OA_INSTALL values: Resets all values to the defaults stored in the main $OA_INSTALL preference file.

4.2.3 The Preferences Editor Left Hand Frame



The left-hand frame will contain the names of all preferences available to set. Preferences will be listed under the headings: PRIMER, D3PLOT, T/HIS, REPORTER and SHELL according to which program they are applicable to.

These categories can be expanded to reveal their respective preferences/contracted to hide their preferences by clicking on the box to the left of the respective category, alternatively, use the edit drop down menu and select Expand all branches or collapse all branches.

Green	Means that the option has been read from your $HOME/$USERPROFILE file.
Red	Means that the option has been read from the $OA_INSTALL file.
Magenta	Means that the option had been read from the $OA_ADMIN file.

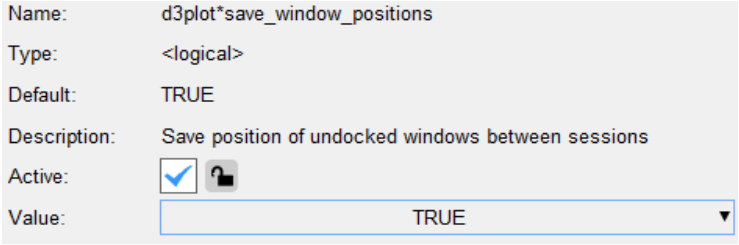
Preferences which are not highlighted indicate preferences that have not been set.

Preferences in **bold** type indicate preferences which have not been assigned the default value.

A list of all the preferences available and their default value can be found in any oa_pref file written by the preferences editor.

4.2.4 The Preferences Editor Right Hand Frame

The right-hand frame will contain information about the currently selected preference and provides the opportunity to edit this preference:



- **Name:** States the name of the currently selected preference.
- **Type:** Specifies the type of variable applicable to this preference.
- **Default:** States the default value of the preference.
- **Description:** Provides a brief description of the function performed by this preference.
- **Active tab:** Highlighted in Green when the preference has been assigned a value. Press this tab to activate/ deactivate the currently selected preference. If the currently selected preference was defined in the general oa_pref file, deselecting this will bring up an error message as it is not possible to deselect preferences stored in the general oa_pref file.
- **Value:** States the currently selected value for the preference. Clicking on the arrow to the left of this box brings up a drop-down menu which lists the possible values this preference can take and allows the user to select one of these values.

4.3 Locking Preferences

Preferences can be locked. Beside each option in the preference editor is a padlock symbol. If the symbol is green then the option is unlocked, if it is red then it is locked. If a preference option has been locked in a file that the user cannot modify then an error message will be generated if the user tries to edit that option.

If a user manually edits the "oa_pref" file to try and set an option that has been locked in another preference file, the option will be ignored in the user's preference file.

An unlocked preference is defined in the oa_pref file by:

```
<programme> * <preference> :   <value>
```

A locked preference replaces the "*" with a "#", thus:

```
<programme> # <preference> :   <value>
```

5. AUTOMATIC LICENSE TIMEOUTS

5.1 Configuring automatic timeouts

Each application can be setup to exit automatically if it remains idle for a specified time. When the application exits it will automatically release any licenses that are being used and return them to the pool of free licenses.

The automatic license timeouts are controlled by a file called '**`timeouts`**' located in the directory defined by the **`OA_ADMIN_xx`** or **`OA_INSTALL_xx`** environment variable.

The format of this file is:

<application name> <idle time> <grace period> (<%age in use>)

e.g.

```
#
primer      60   5   80
d3plot      60   5   50
this        60   5
#
```

The times are defined in minutes. The idle time should be > 0 and the grace period should be ≥ 0, both times are required.

The "%age in use" column is optional and may be omitted. If defined it should be a value in the range 1 to 100 which is a percentage of licenses in use for that product. The timeout process will only take effect if more than this percentage of licenses are in use, meaning that if usage is below this percentage a session will be allowed to remain open indefinitely.

If this column if omitted an implicit value of 0% is assumed, meaning that timeouts will occur regardless of the number of licenses checked out for that product.

Any line in the file starting with '#', '%' or '$' is counted as a comment line.

Blank lines are ignored.

Input is not case-sensitive.

Input is free format, but each programme's settings must be on a single line.

When the idle time is exceeded a warning message will be displayed within the application's master window. This message will be displayed for the grace period specified; the application will be terminated if no response is detected. Giving a response resets both <idle> and <grace> counters so that a further <idle time> must elapse before a further warning is issued.

Automatic timeouts are only active if this "timeouts" file is present, and then only for products with entries in the file. If it is not defined, or a product does not have an entry, no timeouts will take place, and sessions will be allowed to remain open indefinitely.

What happens to the program when it terminates.

If programs terminate due to a license timeout the following occurs:

- PRIMER: a copy of any models currently loaded will be saved in the user's home area or $OA_HOME if defined, then it will exit.
- D3PLOT: will just exit.
- T/HIS: will just exit.

In all cases, the controlling terminal window receives a message explaining what has happened and why, and this terminal window will remain mapped on Windows systems.

The warning notice is displayed within the master window of the application, not on the desktop. This is intentional to prevent users starting the application to grab a license then iconising/minimising it until they need it as the warning message will not be seen if the application is minimised.

Auto-Termination message in the LMX log file

A message will be written to the LMX log file when a process is auto-terminated. This will be of the typical form:

`Auto-termination of <code> (pid <ppp> on <host>) after <mm> minutes idle time...`

Where <*code*> is PRIMER, D3PLOT, etc
<*ppp*> is the process id
<*host*> is the machine hostname
<*mm*> is the number of idle minutes

This makes it possible to detect how often auto-timeout is happening, which can be particularly useful when trying to track down reasons for batch processes being terminated.

Protecting the timeouts file against tampering

The timeouts file must be write-protected against users either by protecting the file, or the directory in which it exists, otherwise users will be able to change the file content.

5.2 Interrogating LM-X license usage

The LM-X utility "lmxendutil" is shipped as part of the standard installation and will be installed in the same directory as the other executables.

The status of license usage can be listed at any time by using the command '**`$OA_INSTALL`**_*xx*`/lmxendutil -licstat`', which will list all licenses checked out from servers known to this machine.

Further commands are available: the command '**`$OA_INSTALL`**_*xx*`/lmxendutil -help`' will list all the available options.

5.2.1 Obtaining more information about LM-X licensing.

You will find a recent end user's guide to LM-X licensing in the document LMX-*date-version*.pdf which is in directory $OA_INSTALL_*xx*/manuals/lmxuser.

To get the most up to date documentation on LMX see https://docs.x-formation.com/display/LMX or search online for "lmx license manager documentation".

6. CONFIGURING THE CRASH HANDLER (optional)

6.1 Overview

When Oasys software crashes on Windows the default behaviour has historically been:

- Write a standard Windows "minidump" file
- Save data and work in progress where possible
- Terminate execution

The minidump file contains information about the state of the programme so if it is sent to Support, we can debug it and sometimes (it can be very opaque) tell what went wrong and give advice about how to avoid the problem. We can also fix the bug in future releases. The file does not contain any information about the model and cannot be used to reverse-engineer it in any way.

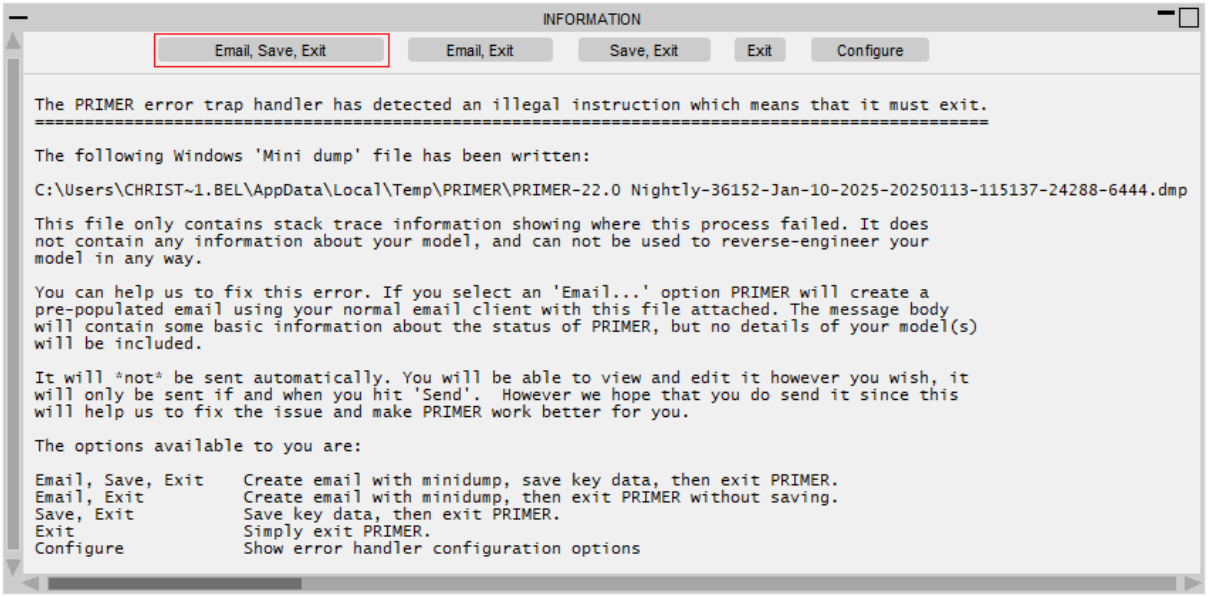
It is written in the "correct" Windows temporary directory, but this is in quite an obscure place, typically C:\users\<*username*>\Appdata\Local\Temp, which by default is configured as a "hidden" directory which can make it difficult for users to navigate to in Windows Explorer. This means that requires more effort to send it back to us so in Version 22.0 the ability to auto-compose an email with this file attached has now been added.

The default procedure when a job crash is:

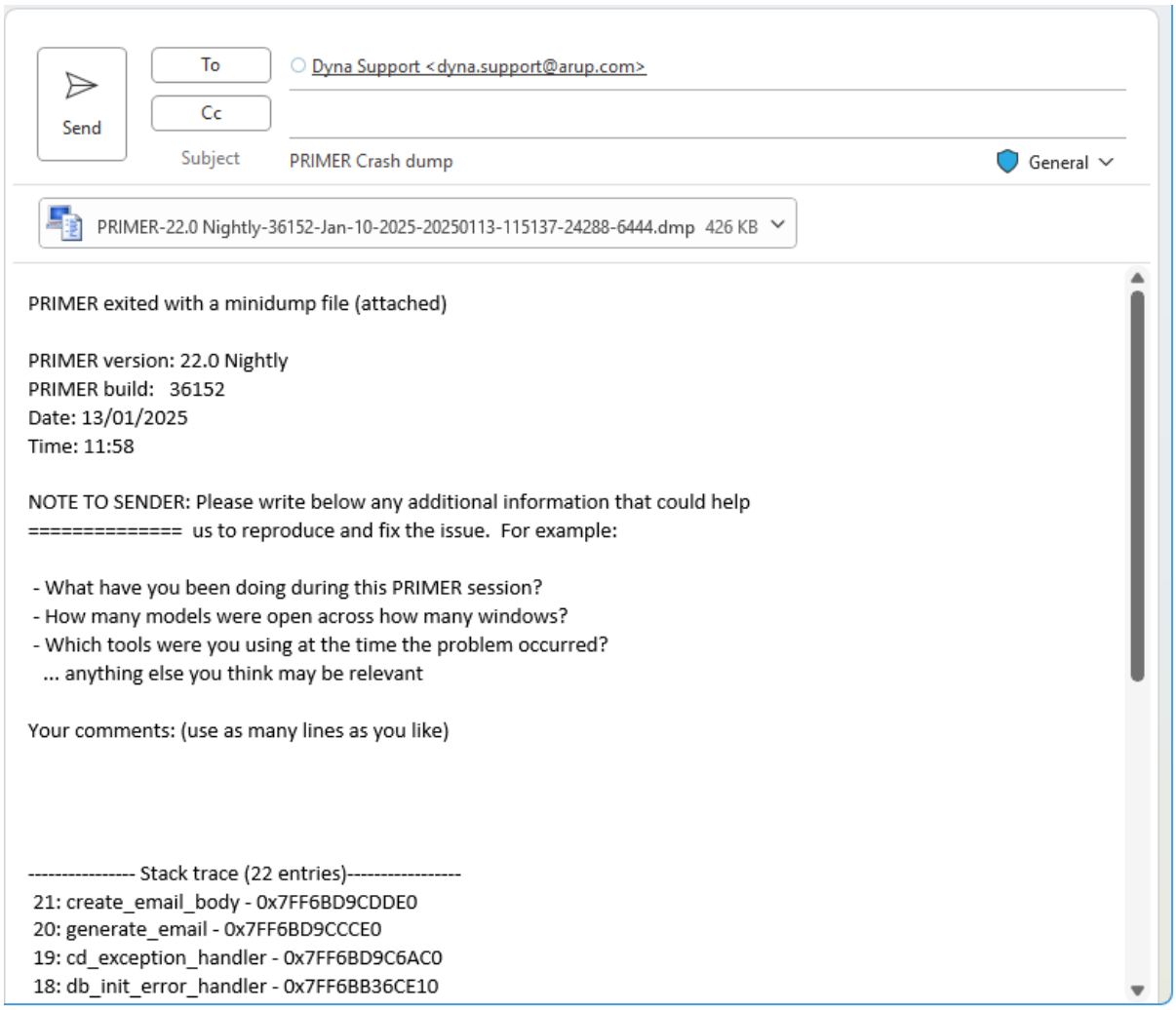
- The user is given the choice of sending an email.
- If they select this the email is auto-created, giving the programme version and the data and time of the crash. If possible, a crash dump is added and the minidump file is added as an attachment.
- The default email client on the system is launched so that this appears as a pre-configured email on the desktop. The body of the email also contains an invitation to the user to add extra information that may help to diagnose the crash.
- Finally, the user must press "send", it is ***never*** sent automatically.

Here is an example of this default behaviour using PRIMER, the behaviour of the other codes is the same.

Following a crash the user will get this message:



If they choose one of the “email” options an email like the following will be created in their default email client. This example uses Outlook but if different software is installed that will be used instead.



If you are happy with this default behaviour no further action is required during installation. However, if you want to change it you can do so. It is possible to:

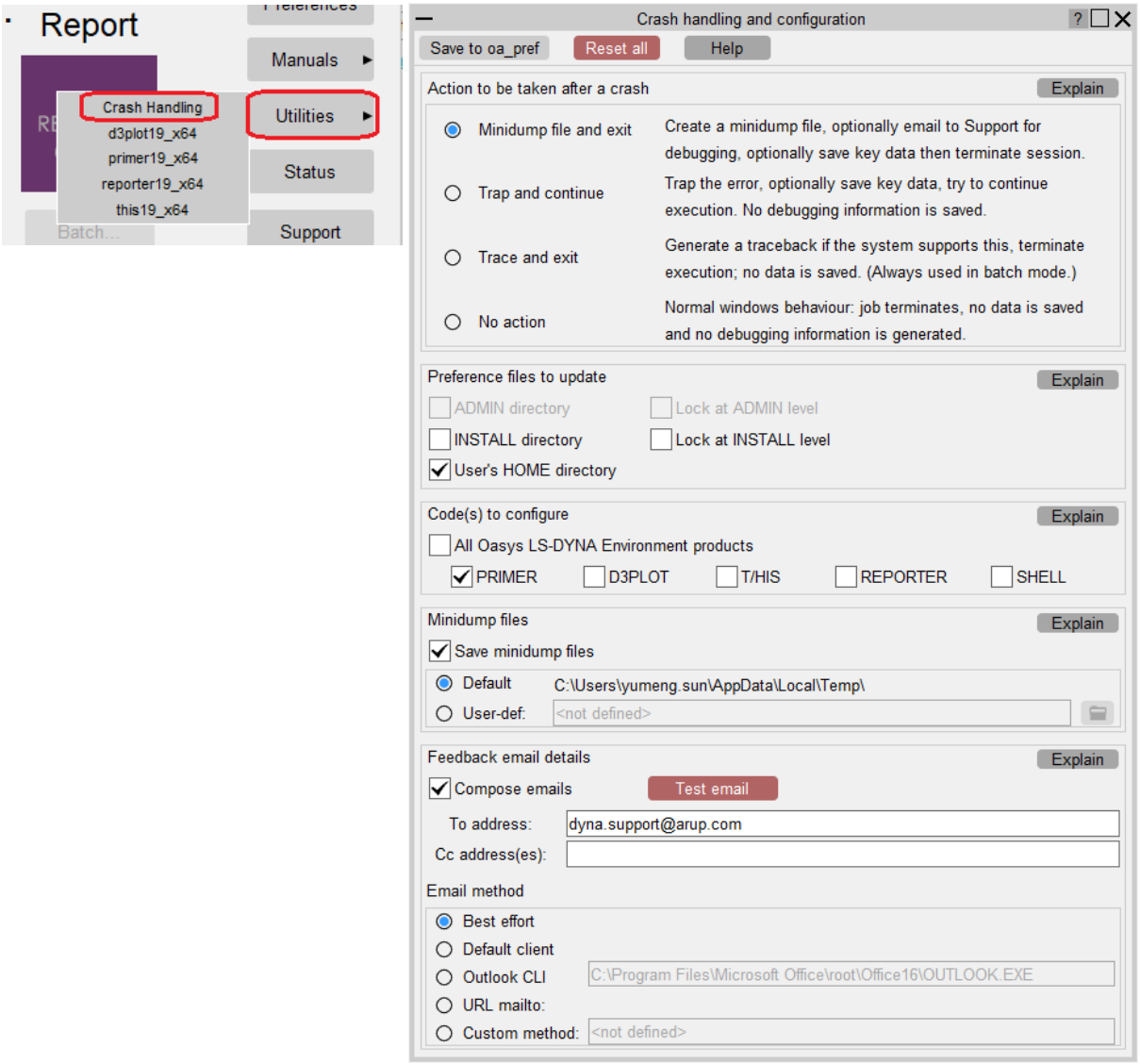
- Configure different behaviour following a crash.
- Change the directory in which minidump files are saved.
- Turn off the option to auto-generate emails.
- Change the destination of the emails, or add further recipients.

These changes are configured via preferences, saved in the “oa_pref” file. By saving these at OA_ADMIN or OA_INSTALL levels you can make them apply to all users, and if you choose to lock them at these levels you can enforce these configuration options.

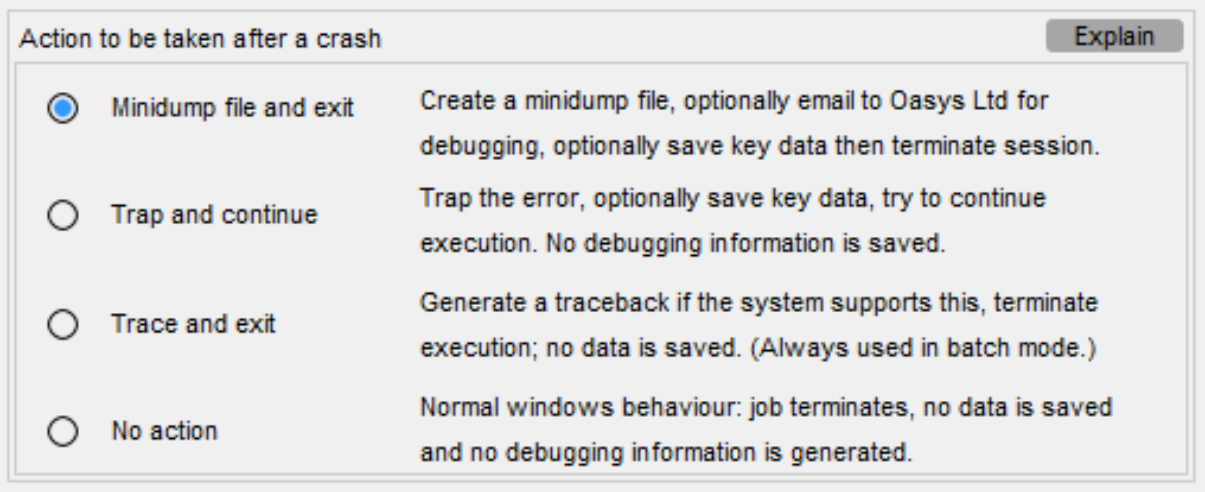
6.2 Configuring Crash Handling using the Oasys SHELL

To make configuration easier there is a GUI built into the Oasys SHELL.

Run the SHELL, click on **Utilities**, and choose **Crash Handing** from the popup menu. This will show the Crash Handling and Configuration panel:



Action to be taken after a crash.



For interactive usage:

- The first option, “Minidump file and exit”, is usually the best option. If the user chooses to save their data, they have a reasonable chance of recovering some of their work, and the minidump file may provide evidence for Oasys Ltd to debug the problem and suggest workarounds.

- “Trap and continue” is a possible alternative, especially if you do not want to save debugging information, but it may not work if the cause of the crash was mangled data, and a subsequent crash may be terminal.

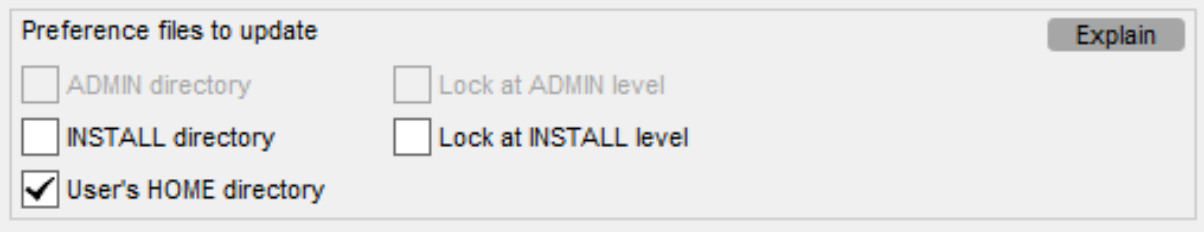
- “Trace and exit” and “No action” are not usually good choices for interactive use on the desktop. Tracebacks on Windows (unlike Linux) do not usually give much information.

For batch usage, where there is no interactive user:

- “Trace and exit” is usually the best choice since it will leave some evidence in the log file. If the software is run with the “-batch” command-line argument it will use this method regardless of the option set here.

The default if no explicit setting is defined is “Minidump file and exit”. The next pages will show how the minidump file’s configuration can be set when this option is used.

Preference files to update



As explained in section 4 above preferences can be stored in oa_pref files at three levels:

OA_ADMIN	Administration level, optional. (Not used in this example)
OA_INSTALL	Installation level, where the software is installed
HOME	The user's home directory

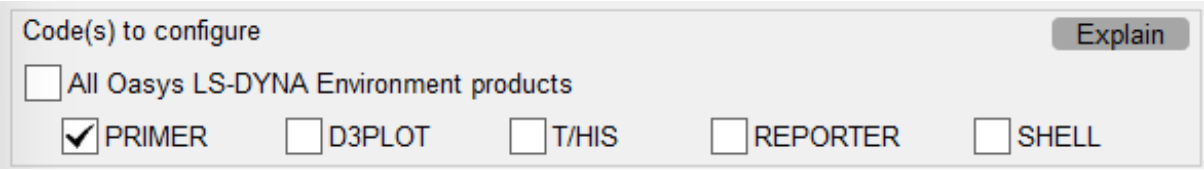
If you wish to configure options for all users, it is best to put them in the OA_INSTALL or OA_ADMIN levels since this will ensure uniformity. If these directories are write-protected users will not be able to change them, and if you choose to "lock" the preferences stored within them users will not be able to override these with locally set preferences in the HOME directory.

Unlocked preferences use a "*" between code name and preference, locked preferences use a "#". For example:

oasys*some_preference: value is an unlocked preference

oasys#something_else: value is a locked preference

Codes to configure



It is likely that you will want the same crash handling behaviour for all codes. This is achieved using the "oasys" prefix, for example:

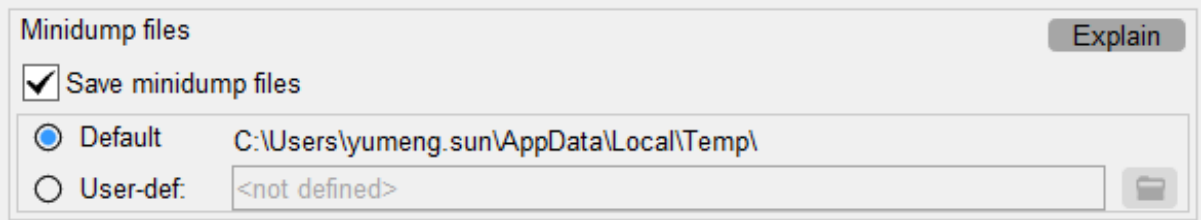
oasys*some_preference: value

You can set preferences for individual codes, for example:

primer*some_preference: value

by unticking "All Oasys LS-DYNA Environment products" and ticking only those codes you wish to configure.

Minidump files

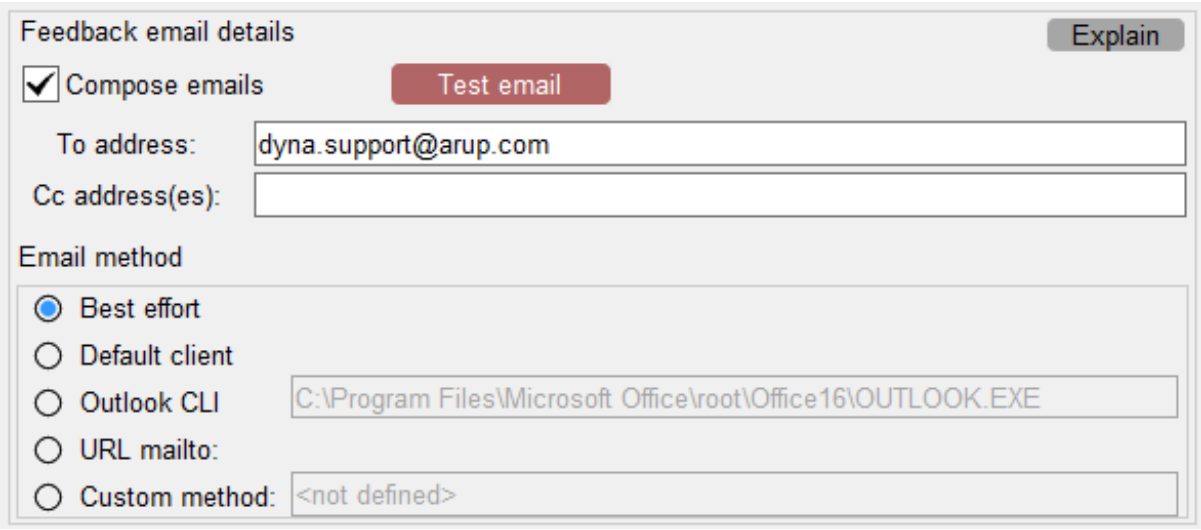


Minidump files contain debug information about the code when it crashed, they do not contain any information about the model and cannot be used to reverse-engineer models in any way. If you send them to Support, we may be able to tell what caused the crash, but this is not guaranteed, sometimes they are very opaque. However, any information is useful when trying to debug crashes so if you send them to us, it helps us to help you.

You can choose whether or not to save them, also where to save them. The default location is the standard Windows temporary directory, typically C:\users*username*\Appdata\local\temp. By default, Windows Explorer treats this as a "hidden" directory which can make it hard for users to find so if you want to collect these files you can choose somewhere else.

If you do choose an alternative location, remember that it must be writeable by an unprivileged user. If you want to use a generic location for many different users you can use environment variables, for example %USERPROFILE%\crash_dumps defines location c:*username*\crash_dumps.

Feedback email details



Firstly, you need to decide whether or not you want to compose emails automatically.

It may be corporate policy not to permit users to send emails containing sensitive information, in which case if you untick "Compose emails", they will not be created and you can ignore the rest of this section. Following a crash, the user will not be shown the option to send an email.

If you do choose to send emails you can configure the following:

- The “To:” address. This is required.

  By default this will be dyna.support@arup.com but if you would rather collect emails internally you can replace this with some other address. You can only have a single address in this data field.

- “Cc” address(es). These are optional.

  If you want to send copies of the email to other addresses enter them here. Multiple addresses should be separated by semi-colons, for example mary.doe@wood.com; an.other@somewhere.com.

- The email sending method.

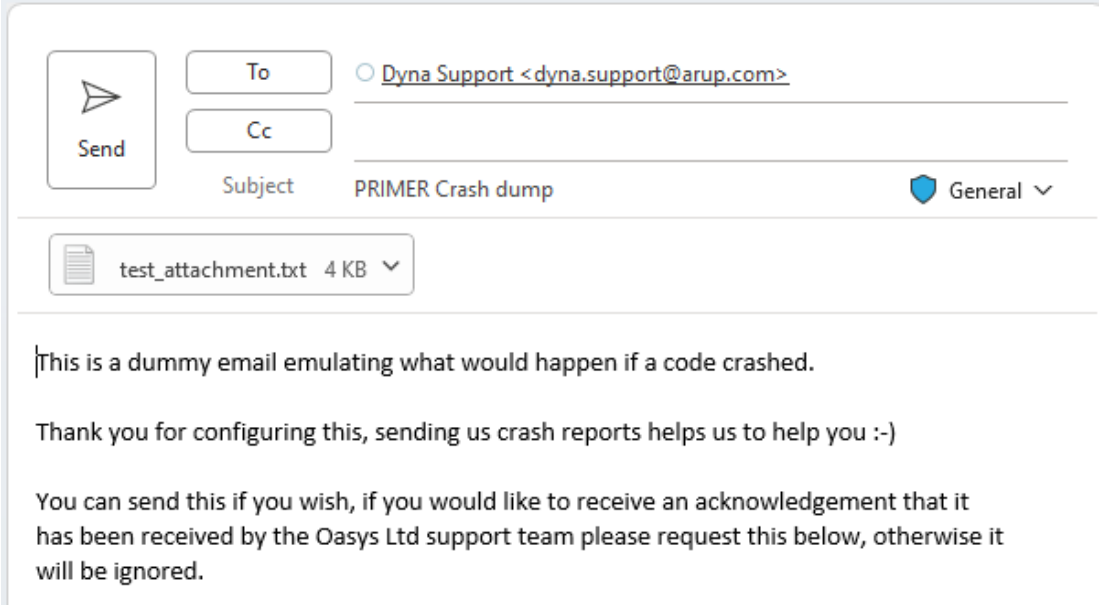
  In order to give users the choice whether or not to send an email, complete control over its contents and also the ability to add further information Oasys software attempts to use the default email client on the user’s system. It does not send emails (or any other data) automatically.

  The majority of Windows email clients conform to Microsoft’s internal protocols meaning that the default method should work, but this is not guaranteed. Therefore the software carries out the following process when using its default “Best effort” option:

  (1) It tries using the standard Microsoft protocol to run the default email client.
  if that fails
  (2) It tries to use Microsoft Outlook if that is present on the system
  if that fails
  (3) It tries to use URL mailto: (the way email links are processed from web pages).

  The best approach is to the use the **Test Email** button to try the currently selected method. If after a few seconds delay you see the test email shown below, then it is working correctly and configuration is complete.

  You can send the test email if you wish. If you want acknowledgement from Support that it has been received, please request this in the email body. Otherwise, it will be ignored.



If you see this email but takes about one minute to appear, and you are using the default “Best effort” method, this suggests that the default email client has failed to work. The delay is because this has a time-out period of about one minute and it will have fallen back to one of the Outlook or URL mailto: methods. You can tell which by inspecting whether or not it has the file test_attachment.txt attached: if it has then it has used Outlook, if not it has used URL mailto. (The latter does not permit attachments.) To avoid similar delays for users please select the method it has actually used so that it will go directly to this.

If none of these methods work, please try to find out as much as possible about the email client installed on the machine and then contact Support for help.

Finally: save this configuration

Save to oa_pref will save your selected configuration as preferences to the oa_pref files selected in the second step above.

If you are building a standard installation which will be pushed out to individual users’ machines it is recommended that you save to the OA_INSTALL level since each user will then get the same configuration.

6.3 Configuring Crash Handling manually using preferences.

The GUI-based process in the previous section works by configuring and saving preferences, you can achieve the same results by setting the following preferences manually:

Preference	**Purpose**	**Possible values (bold = default)**
cd_compose_email	Whether or not to auto-compose and email	**true** or *false*
cd_email_address	The email "To" destination	**dyna.support@arup.com** *name@address*
cd_cc_addresses	Optional "Cc" addresses for the email.	One or more *name@address* values, separated by ";"
cd_email_method	The mechanism used to send the email	**best_effort** *system_default* *outlook_cli* *url_mailto*
cd_minidump_file	Whether or not to create a minidump file, and how it is processed.	*not_used* *saved_only* *emailed_only* **saved_and_emailed**
cd_dump_directory	Where to write the minidump file instead of the default.	Folder to which the user has write access

Preferences take the form <*code_name*> <* or #> <*preference_name*> : <*value*> where

code_name	Is oasys for all products primer, this, d3plot, shell, reporter for individual products
* or #	* is an unlocked preference # is a locked preference
preference_name	One of the names in the left-hand column of the table above
value	One of the values in the right-hand column of the table above

Preferences are stored in oa_pref files in any combination of the following locations

OA_ADMIN	Administration level
OA_INSTALL	Installation level, where the software is installed
HOME	The user's home directory

They are read in the order OA_ADMIN, OA_INSTALL, HOME .

A preference that is locked at one of these levels cannot be superseded by a different one at a lower level. For example, locking a preference at the OA_INSTALL level (and write protecting that directory) means that a user cannot supersede it by defining it differently at the HOME level.

If, for example, you wanted to turn off and lock the composition of minidump emails for all users and all software you would define the preference

oasys#cd_compose_email: false

and save this in the OA_ADMIN and/or OA_INSTALL oa_pref files.

6.4 Special configuration in some geographies

The default configuration of crash handling depends on the geography as determined by the computer's "locale". In particular email composition is turned off by default on computers with the Japanese "jp-JP" locale.

These defaults can be over-ridden by setting a different value, there is no restriction upon what can be set in a given locale.

7. CUSTOMISING SHELL FOR ANSYS LS-DYNA JOB SUBMISSION

In addition to accessing the Oasys Suite software, the Oasys SHELL can be used to submit Ansys LS-DYNA jobs. To use the SHELL to submit Ansys LS-DYNA the following should be configured:

1. General Submission Options
2. The versions of Ansys LS-DYNA available
3. Queuing Options
4. MPI commands for MPP submission

For more details on how to perform all of these please see the Oasys SHELL manual.

8. TUNING THE GRAPHICS DRIVER

Oasys Suite software makes intensive use of 3D graphics, putting a lot of stress on the graphics card. High-performance workstations and PCs tend to have one of the following cards installed:

- NVIDIA Quadro series, or sometimes GeForce (really a gaming card)
- AMD/ATI FirePRO series, or sometimes Radeon (really a gaming card)

It is our experience that as of late 2015 the up-to-date drivers for these cards will work satisfactorily with Oasys Suite software without further tuning.

If you experience problems the first step should be to install the most recent graphics driver for your card, which can be found at:

NVIDIA	http://www.nvidia.com	(Choose “Drivers”)
AMD/ATI	http://www.amd.com	(Choose “Drivers + support”)

If you still experience problems, typically visual artefacts and/or “stuttery” animation performance, the diagnostic process below may help. However, the advice below is only relevant for older (say pre-2013) cards and drivers and it is recommended that you contact Support for help and advice.

8.1 Finding out what graphics card and driver are installed

It is recommended that if your graphics driver is significantly out of date that you consider upgrading it to a more recent version. This is not mandatory, and if the machine is working well there is a strong case for “if it isn’t broken, don’t fix it”; but certainly, the first step to be taken if graphics problems arise is to upgrade an out-of-date driver.

Windows 10:

- Right-click on the desktop background, select Display Settings.
- Click on Display Adapter Properties, or if this is not present, on Advanced display settings, followed by Display Adapter Properties.

8.2 Tuning an NVIDIA graphics card driver

From Oasys 12.1 onwards, Oasys software installs application-specific settings in NVIDIA graphics drivers, meaning that these are used instead of the default settings. This process happens automatically, and no user intervention should be required.

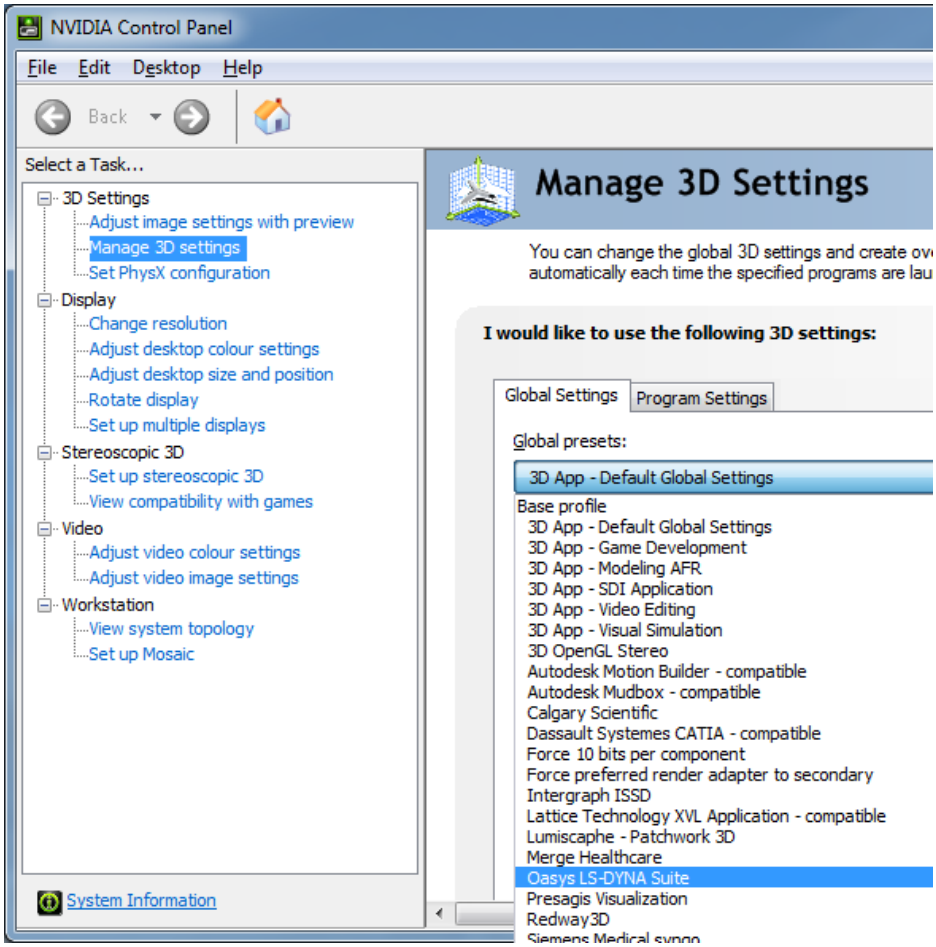
If you experience problems your first step should be to update your graphics driver, and you should only go through the process below if that is not possible, or if your card is old (say pre-2013).

Right click anywhere on the desktop background and select **NVIDIA Control Panel**.

From the "**Select a task**" tree on the left-hand side of this panel select:

3D Settings, Manage 3D settings.

You should then see a figure like that shown below.



The default setting for NVIDIA drivers is "**3D App – Default Global Settings**" as shown here, which works well for benchmark tests but is normally not satisfactory for real world engineering applications.

By using the pop down button to the right of this you will see a list of possible settings, which are predefined configurations for a range of software.

In the example, the option "Oasys Suite" is available as shown here, but this may not be available in older driver software, in which case we would recommend the use of "Dassault Systems Catia – compatible" instead.

You need to choose whether to configure the driver for all applications on this machine (**Global settings**) or for just selected applications (**Program settings**).

It is our experience that on a machine used for CAE work the best and simplest approach is to use **Global settings**, since the Oasys (or Catia) settings will work satisfactorily for most CAE programmes. Any applications which already have specific settings defined for them, see the list under **Program settings**, will use those anyway, so by defining global settings you are simply setting the default for any applications that do not have a specific entry.

However, if you wish to make the setting application-specific you will need to use **Program settings**, add the specific Oasys software to the list, and select the correct settings.

8.3 Tuning an AMD / ATI graphics card driver

No application specific tuning options are available for Oasys software on AMD/ATI graphics drivers.

If you experience problems your first step should be to upgrade your graphics driver, and if that does not work contact Support for advice.

9. THE LM-X LICENSING SYSTEM

For Oasys 22.0, the software has been compiled using version 5.6.4 of LM-X.

Oasys Suite's LM-X licensing is also backwards-compatible with Oasys Suite versions from 15.x onwards, meaning that these earlier versions will continue to work when you update your licence server to the latest version.

The following details show how to configure the LM-X license manager for Oasys 22.0.

9.1 Introduction

If you are using a node-locked license that does not require a floating license server, please refer to section 9.2.6 directly.

If you are using LM-X floating license server, please start from the Installation-Preparation section and follow the guide.

Useful cross-references of terminologies between LM-X and the previous FLEXlm system are included in

Appendices.

9.2 Installation

This section details the installation process of the LM-X Licensing System.

9.2.1 Preparation

This section summarises the preparatory steps to install and run the LM-X license server on Windows:

- Determine the OS platform for the license server.
- Check the system requirements for the license server.
- Check the system requirements for the license server.
- Obtain a valid floating license file for the license server HostID.
- Download, install and configure the LM-X license server software to serve the floating license.

9.2.2 Supported Platforms

Oasys Suite's LM-X license server software is available for 64-bit Windows and Linux systems. All the files needed to install LM-X license server can be obtained from the Oasys Suite website. By default, a floating server license will be provided for a physical machine.

The operating system on which the licence server runs does not have to be the same as the machine requesting the licence. For example, a desktop PC running Windows can obtain a licence from a server running on Linux.

9.2.2.1 Support for the LMX licence server on RHEL 7 Linux

RedHat Enterprise 7 Linux reached “End of life” on June 30th 2024, therefore we will not release a RHEL 7 version of the Oasys 22 software suite.
However, we appreciate that some users maintain licence servers on legacy systems therefore a RHEL 7 version of the LMX licence server only will continue to be available for the life of Oasys 22. This can be downloaded from

https://www.oasys-software.com/dyna/wp-content/uploads/2025/04/oasys_lmx_server22_0_rhel7.tar.gz

This legacy server version will be withdrawn at next major release of the Oasys Suite, version 23 expected in Spring 2026. If this will cause you problems, please contact Support to discuss solutions.

9.2.2.2 Compatibility with other license server software

Besides running Oasys Suite's LM-X license server, you can also run multiple other LM-X license servers (for other software) on the same physical machine. You just need to specify different unique TCP ports for each LM-X server, in the configuration (.cfg) files.

LM-X license server also does not interfere with FLEXlm-based license server, if they have different unique server TCP ports specified.

9.2.3 System Requirements

This section details the system requirements for running LM-X License Server.

9.2.3.1 System Requirements for LM-X License Server

- **CPU**

Generally, the LM-X license server will use very little CPU resource.

- **Disk Storage Space**

The LM-X license server software requires about 50 MB of disk storage space to install. Generally, a minimum of 500 MB of storage space should be sufficient to store license server log files.

- **Memory**

The system RAM used by LM-X license server varies, with typical memory usage in the order of 100s of MB.

- **Network**

Modern networks running via Ethernet or high-speed WiFi should be sufficient. The license server uses TCP/IP for server-client communications and only uses one specified TCP port for these purposes. The default port is 6200 and can be changed in the configuration file.

- **Multiple Server and High Availability Licensing (HAL)**

LM-X supports both HAL and multiple-server lists. HAL requires three configured servers, with a quorum of two active servers needed to serve up the pool of floating licenses. This allows one of the three machines to go down without affecting license availability.

Multiple license servers can also be used to divide up the total floating license pool, and Oasys Suite clients can access the licenses via a server list specified in the client machine's environment variable.

9.2.4 Obtaining HostID

For floating server license, this will be the computer that will act as the LM-X license server. For node-locked license, this will be the computer(s) where the Oasys Suite software will be used.

To generate this information, run `lmxendutil.exe -hostid` from a command prompt.

(The lmxendutil.exe utility is part of the install bundle, you will find it in the directory in which you installed the software. If you have not installed the software yet, please contact Support to obtain an executable.)

Example

```
D:\Oasys_22_0>lmxendutil.exe -hostid

LM-X End-user Utility v5.6.4

Copyright (C) 2002-2024 X-Formation. All rights reserved.


ETHERNET: Intel(R) Ethernet Connection (2) I218-LM

HostID: C8D3FFBEA666
```

```
HOSTNAME: MCCDTCZC73683B0
HostID: MCCDTCZC73683B0

USERNAME: Chris
HostID: Chris

IPADDRESS: 10.112.201.129
HostID: 10.112.201.129

IPADDRESS: 10.112.201.*
HostID: 10.112.201.*

IPADDRESS: 10.112.*.*
HostID: 10.112.*.*

HARDDISK: SAMSUNG MZVKW512HMJP-000H1
HostID: 0025_38C6_71B0_BFBE.

HARDDISK: ST2000DM001-1ER164
HostID: Z4Z8TKYG

BIOS: Hewlett-Packard - HPQOEM - 0
HostID: CZC73683B0

WIN_PRODUCT_ID: Windows Product ID
HostID: 00329-00000-00003-AA261
```

An alternative method is to run lmxconfigtool.exe GUI tool (also in the installation directory), and check the HostID tab, where the HostID info can be saved to file.

Send the full text output generated (like the example above) to your Oasys Suite distributor with your license request, noting whether it is for node-locked license or for floating server license.

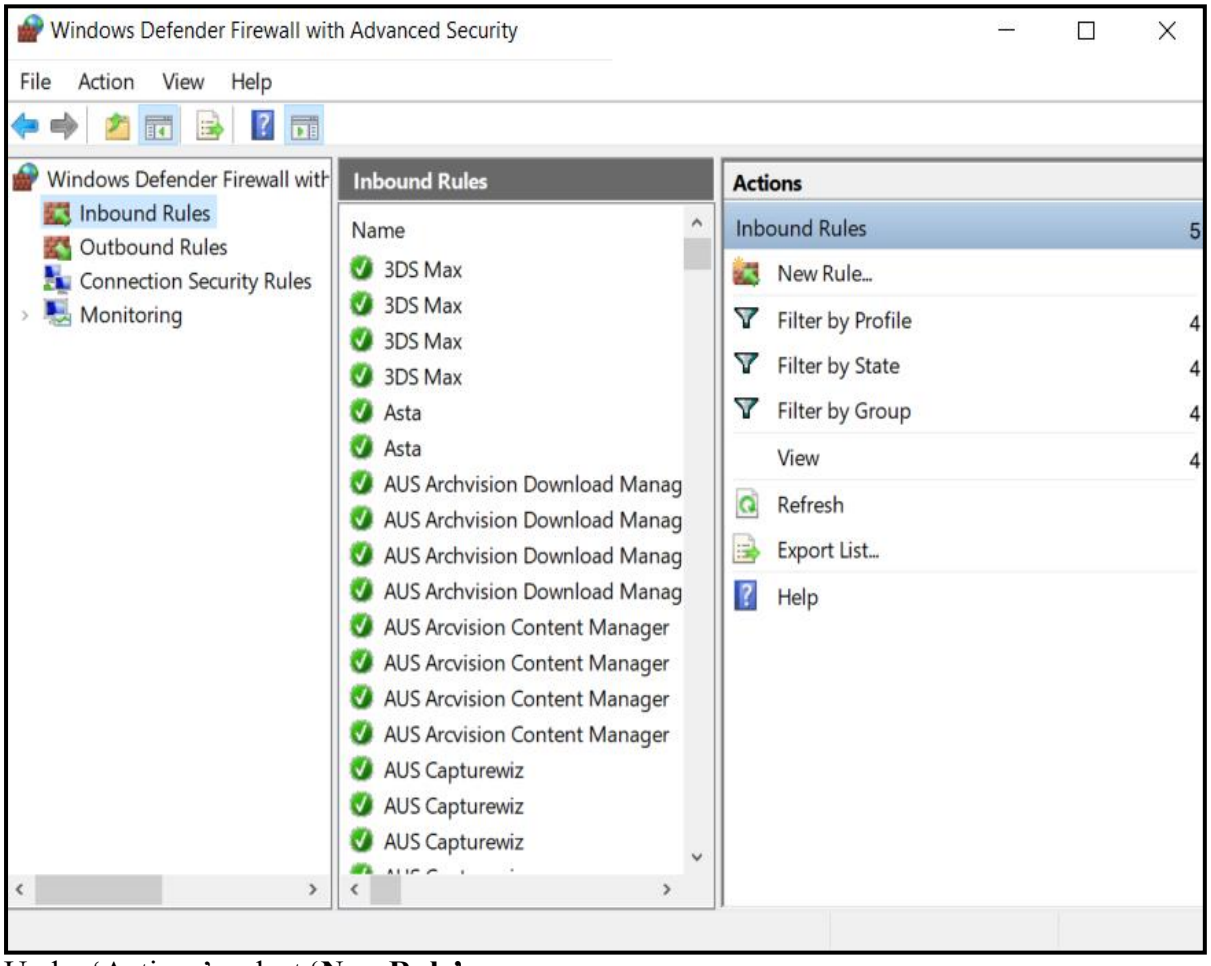
9.2.5 Installing LM-X License Server on Windows

On Windows, you will need admin rights to install and setup the LM-X license server software as a Windows Service to auto-start during server reboot. If you do not have such rights, or do not want to setup LM-X license server auto-start, you can choose to skip the relevant steps during the installation process.

Network traffic on the port used by the LM-X license server (defaults to TCP port 6200) will need to be allowed. You may need to enable such network traffic on both the license server and the Oasys Suite client machines if you have any firewall or security software running.

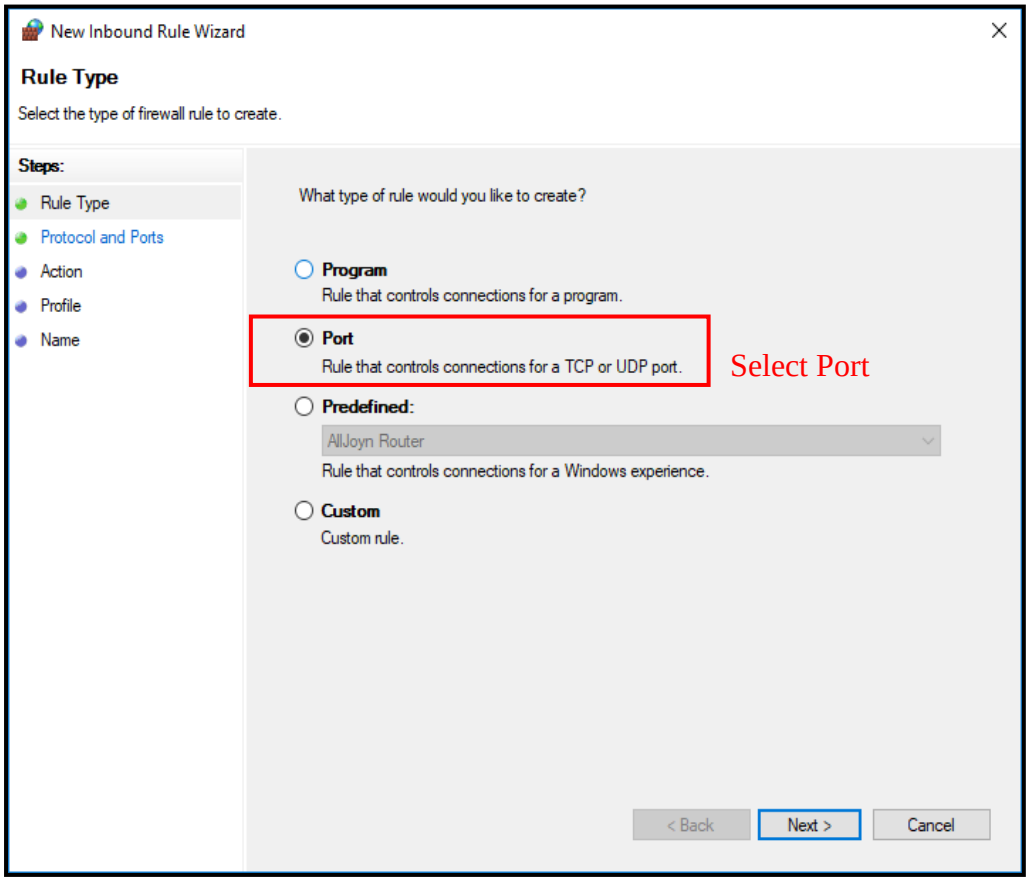
To allow TCP port 6200: Select the **Start** button > **Settings** > **Update & Security** >**Windows Security** and then **Firewall & network protection** > **Advanced Settings**

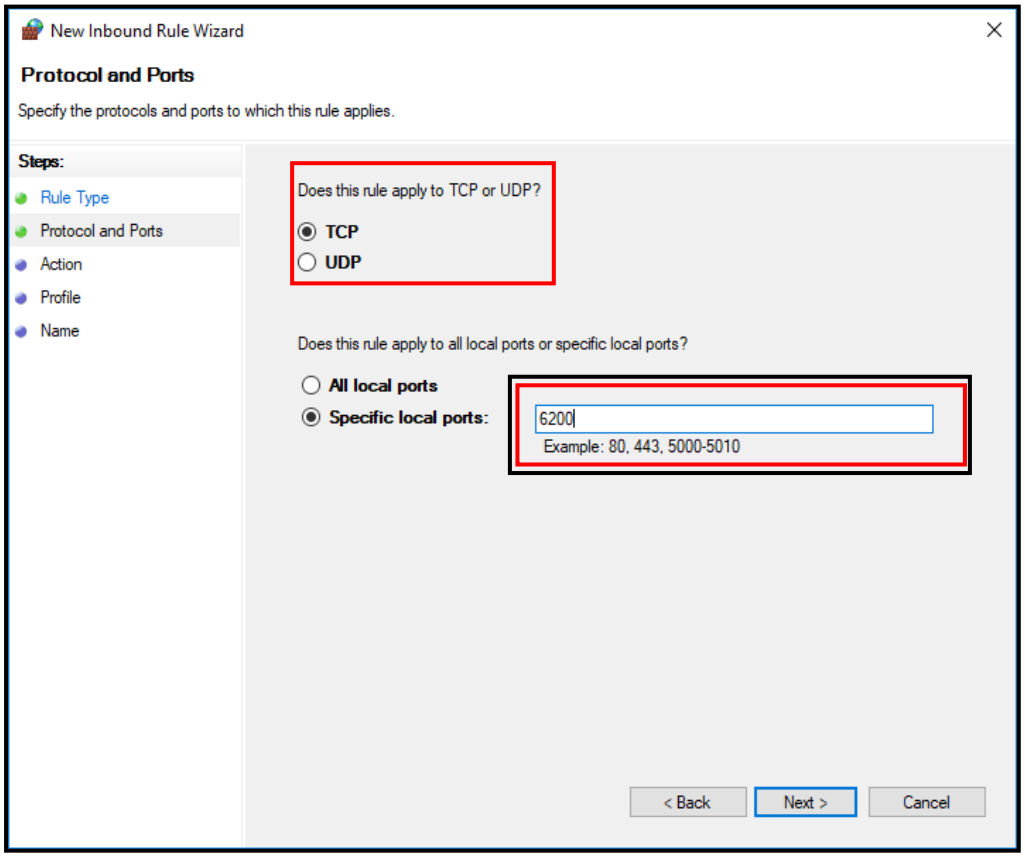
- Select **'Inbound Rules'** (on the license server machine).



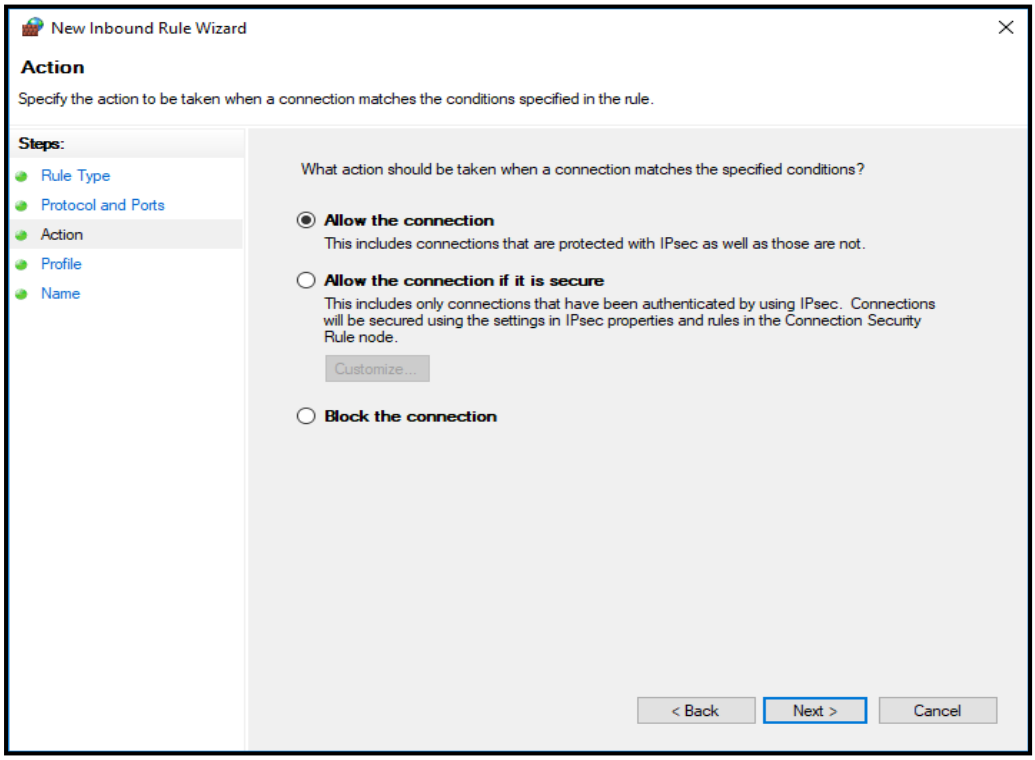
Under 'Actions', select **'New Rule'**.

Allow port **‘6200’**

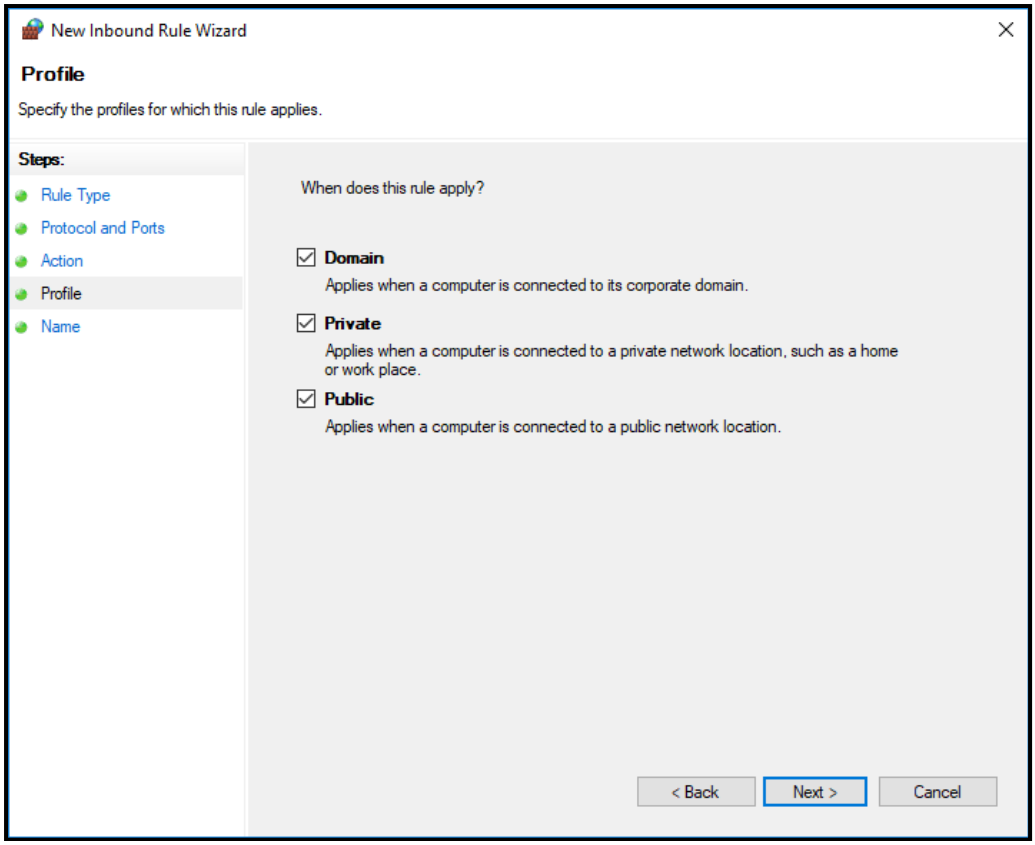




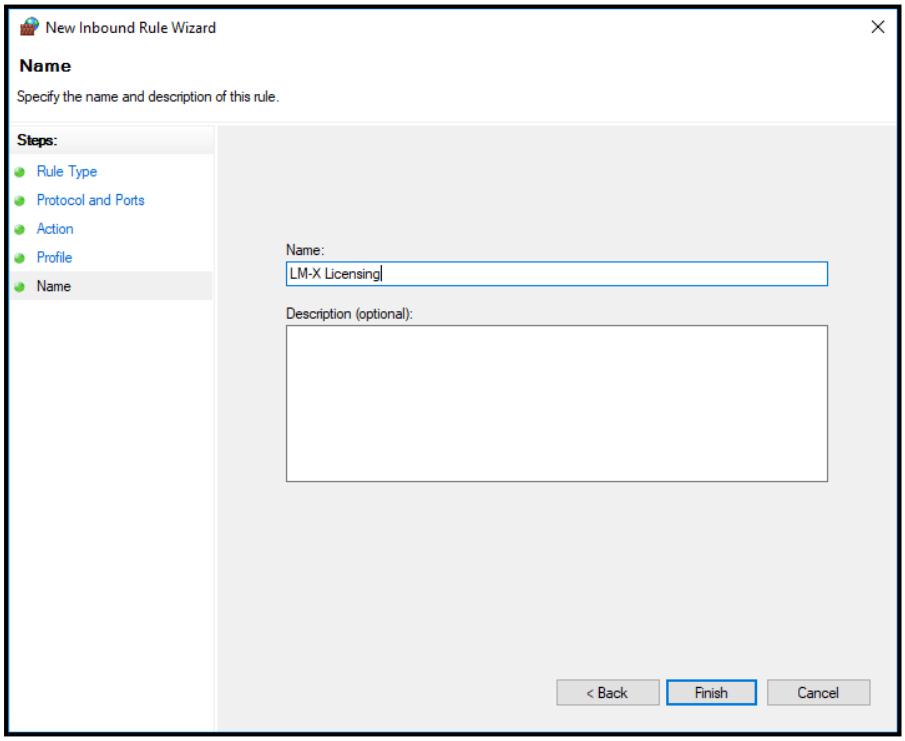
Allow the connection



Apply rule to all options



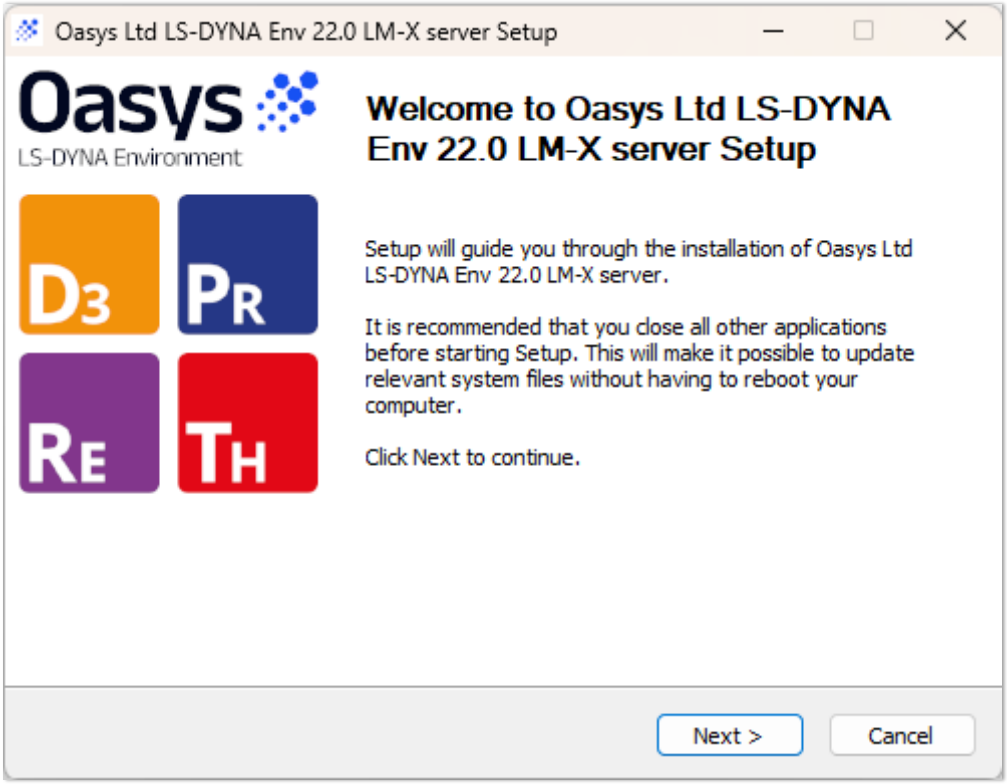
Give rule a name and click **'Finish'**



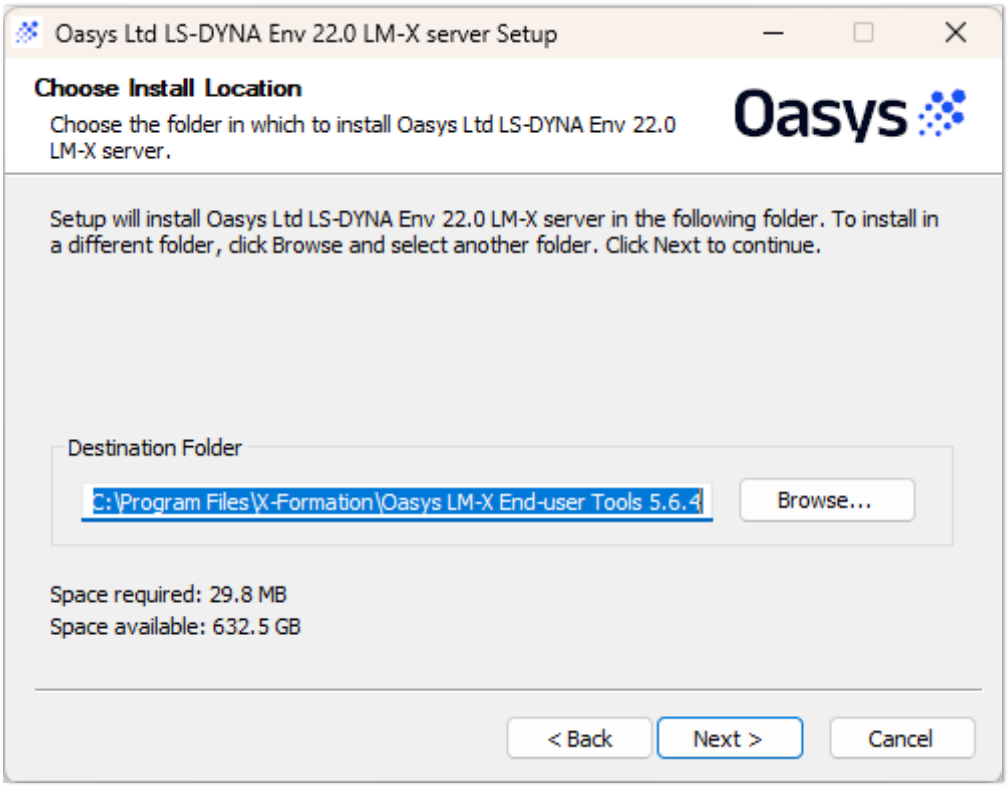
9.2.5.1 Install the LM-X License Server Software

When installing the Oasys 22.0 software, the installation process will have given the option to install LM-X license server. Alternatively, the LM-X license server can be installed by downloading the relevant installer from the website and running it as shown below.

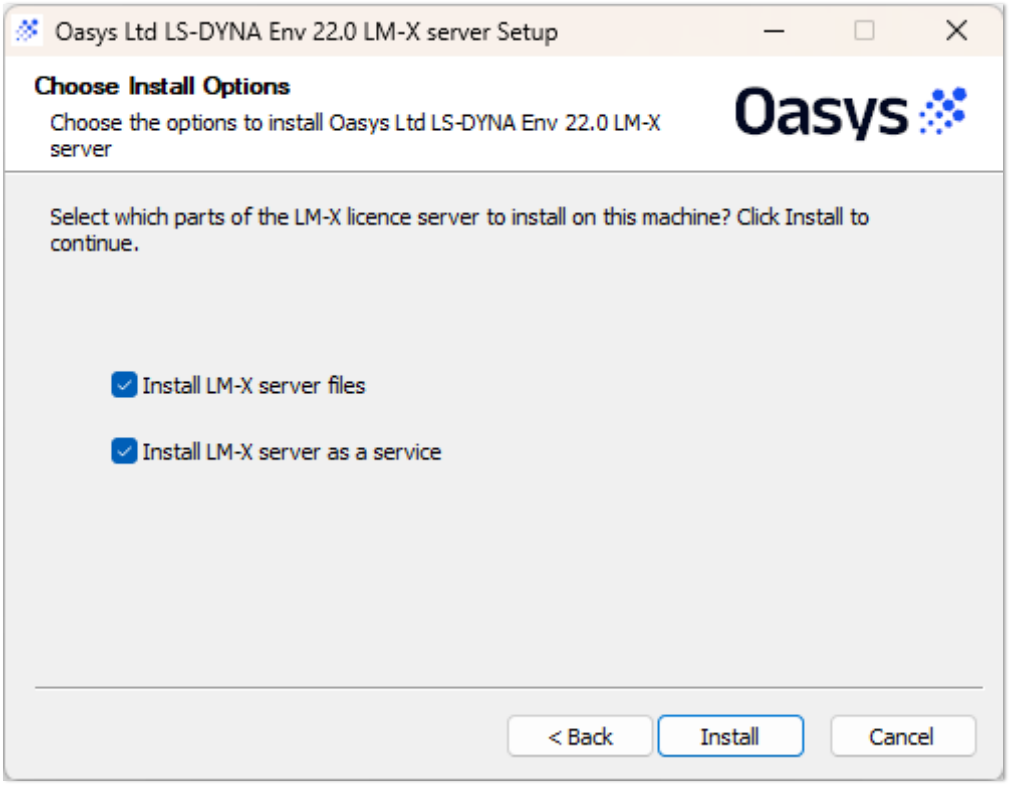
1. Run the installer with Administrator privileges



2. Choose where to install the server

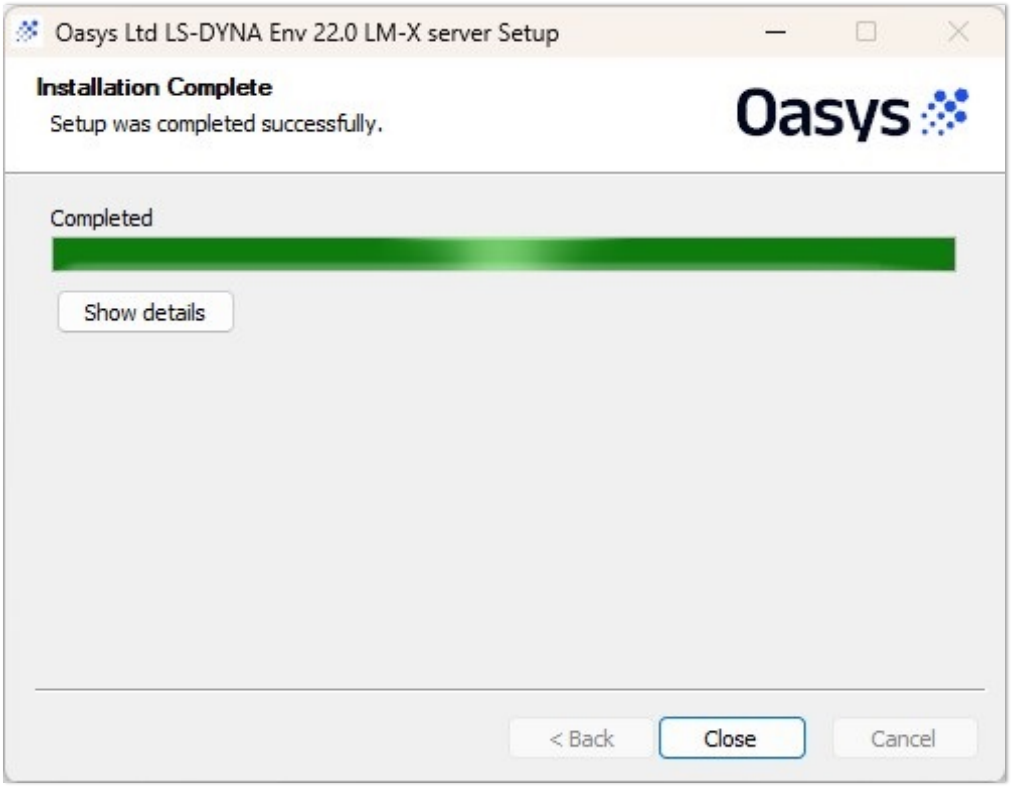


3. Follow the steps, responding to the question prompts.

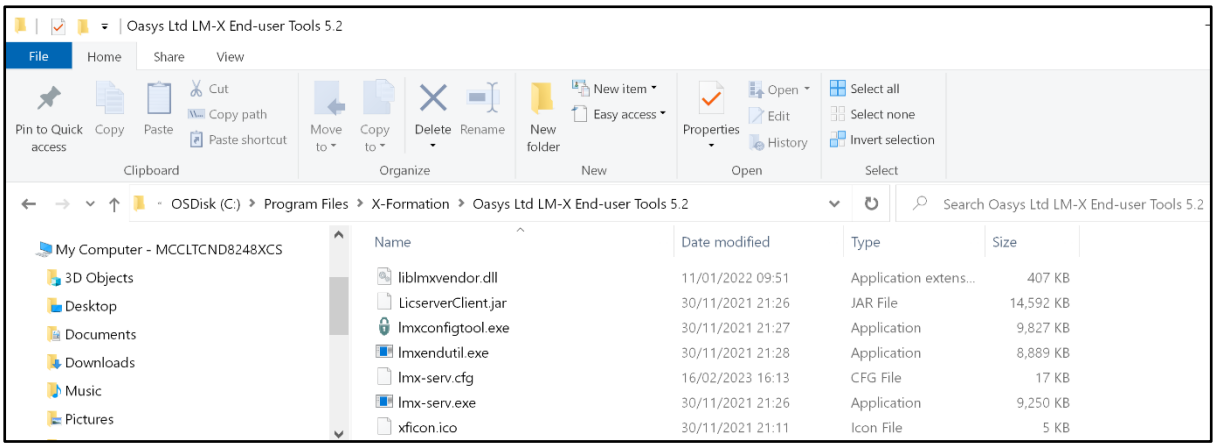


This will launch a separate installer to install the LM-X server files.
The installer should then complete the installation without prompting for any more information.

Once finished press Close to finish the installation.



4. Once the installer has completed, you should be able to navigate to the <install_directory> and check the installed files.



5. Please note that the license server configuration is stored in plain text in the lmx-serv.cfg file, including the LM-X license server remote access password. It is your (or your system administrator's) responsibility to limit access to this file, to prevent problems caused by misconfiguration.

9.2.5.2 Install your floating license file

1. Your floating license file (arup.lic file) is provided by Oasys Ltd or your Oasys Suite distributor.

2. If you do not have a license file, please contact your Oasys Suite distributor. You will need to provide the hostname and Ethernet HostID of your license server, as described in section 9.2.4.

3. Please place your floating license .lic file in the LM-X server <install_directory>.

4. When the LM-X license server (lmx-serv executable) is started, it should be able to automatically find the license .lic file(s) in the <install_directory>. If necessary, use the relevant line `LICENSE_FILE = <licensefilepath>` in the lmx-serv.cfg file to point to the correct license file.

9.2.5.3 Configure the LM-X license server

1. The LM-X license server configurations are in the lmx-serv.cfg file.

2. If necessary (e.g. if you are running multiple LM-X license servers for software other than Oasys Suite), change the default port number from 6200 to an available TCP port by editing the TCP_LISTEN_PORT = <port> line in lmx-serv.cfg.

3. Change the REMOTE_ACCESS_PASSWORD in the `REMOTE_ACCESS_PASSWORD = <password>` line in lmx-serv.cfg, which is used with the lmxendutil tool to remotely stop/restart the license server and remove licensed users. Please see the section 9.3 of this guide.

9.2.6 Using LM-X Node-Locked License on Windows

To obtain a node-locked license, you will need to provide the hostname and Ethernet HostID of the client machine(s) that will be running Oasys Suite.

1. To obtain the HostID, please refer to section 9.2.4.
2. Send the resulting HostID text output to your Oasys Suite distributor.
3. Upon receiving both the machine HostID information file and a signed copy of our Standard License Agreement, we will issue your Oasys Suite license file, arup.lic, to you directly via email.
4. Save the node-locked license **arup.lic** file in a local directory on the machine.
5. Set an environment variable called ARUP_LICENSE_PATH to point to arup.lic file. Please refer to section 3.
6. Start-up Oasys Suite and the software should automatically find the node-locked license.

9.3 Operations

This section describes the operation and maintenance of Oasys Suite's LM-X license server.

9.3.1 License Server Operations

This section details the operation of Oasys Suite’s LM-X license server.

9.3.1.1 LM-X Programs

X-Formation provides the LM-X license server tools and programs, including **lmx-serv** and **lmxendutil**. Executables in Windows will have file extension .exe.

Tool	File Name	Description
LM-X End-user utility	lmxendutil(.exe)	Command line tool that lets you get the HostID values for the computer system and run operations on an LM-X license server.
LM-X End-user Configuration Tool (Windows only)	lmxconfigtool.exe	LM-X End-user Configuration Tool, which performs similar functions as lmxendutil but uses a Windows GUI.
LM-X License Server	lmx-serv(.exe)	Running this application starts the LM-X license server. It reads the associated configuration .cfg file (if one exists) to determine user settings such as the log file output path, whether certain users should be denied checkout of licenses, etc.
LM-X License Server Client (Windows only)	LicserverClient.jar	An independent Windows application that helps you to monitor and manage your LM-X License Server. Requires Java Runtime Environment (JRE) to use.

9.3.1.2 lmx-serv(.exe)

Running this application starts the LM-X license server. At a minimum, a valid configuration file must reside in the installation directory and a valid license file must be obtained to run the license server. All user settings can be specified in a valid .cfg file.

```
lmx-serv [options]
```

Execution options for lmx-serv
`-b` = Run license server in background `-c <config_file>` = Specify which config file to use `-l <license_path>` = Specify license file or path to license file(s) `-lf <logfile>` = Specify path to logfile `-port <port_num>` = Specify TCP port number to use `-h` = Show help info for lmx-serv

9.3.1.3 lmxendutil(.exe)

Command line tool that lets you get the HostID values for the computer system, display license statistics, restart and stop license server, remove users, etc.

```
lmxendutil [options]
```

Execution options for **`lmxendutil`**
`-hostid` = Display HostIDs for this system `-licstat [-host <host> -port <port> etc.]` = Display license statistics (run `lmxendutil -help` for full list of options) `-restartserver [-host <host> -port <port> -password <password>]`= Restart license server `-shutdownserver [-host <host> -port <port> -password <password>]` = Stop a license server `-removeuser -clientusername <user> -clienthostname <clienthost> [-host <host> -port <port> -password <password>]` = Remove a specific user at a specific host from a license server `-help` = Show help info for `lmxendutil`

9.3.1.4 LM-X Configuration File (.cfg)

The .cfg file is also known as the Options file and allows the license administrator to control various operating parameters of LM-X license server. A complete listing of the options is listed in the Windows sample below for reference:

```
# LM-X License server sample configuration file
#
# Copyright (C) X-Formation. All rights reserved.
#
# https://www.x-formation.com
#

#************************************************
# lmx-serv.cfg notes:
#
# 1) Any line beginning with a '#' is a comment.
# 2) User and host names are case-insensitive, but you're advised to
#    use those present in the log file to avoid typos.
# 3) License clients can be specified by user name (USER),
#    or computer name (HOST), or IP address (IPADDR).
#************************************************

#************************************************
# TCP/UDP port number the license server will listen on.
# TCP port is used for data traffic protocol.
# UDP port is used for automatic server discovery protocol.
#
# The default TCP port is 6200.
# The UDP port is fixed to 6200 and cannot be changed.
# See http://www.iana.org/assignments/port-numbers
#************************************************
TCP_LISTEN_PORT = 6200

#************************************************
# Limit which networks the license server allows for client
# connections.
# When this setting is specified, the license server will only
# accept clients that connect from a network that uses the
# specified IP addresses. You can specify only one address
# for each IP version (one for IPV4 and one for IPV6), separated
# by a space.
# This setting is useful when the license server is connected to
# more than one network (has more than one IP address) and you
# want to limit allowed connections based on which network the
# client is on.
# When this setting is unspecified, the license server accepts
# clients from all available networks.
#
# Syntax:
# TCP_BIND_ADDRESS = <IP_address_1 IP_address_2>
#
#************************************************
# Example:
# TCP_BIND_ADDRESS = 192.168.21.321 8000:8000:8000:8000:abcd:1234:12df:fd54

#************************************************
# Specify High Availability Licensing (HAL) servers.
# HAL enables redundant servers, so if one server
# goes down, two others will still work.
#
```

```
# HAL consists of 3 specified servers, at least 2 of which
# must be up and running at all times.
#
# Each HAL_SERVER line indicates a license server
# that has HAL enabled by its license(s). Each HAL server
# has a specific role, and should be specified in terms of how
# many resources each server has:
#
# HAL_SERVER1 is your master server, which
# allows both CHECKOUT and BORROW.
# HAL_SERVER1 should be your most powerful server.
#
# HAL_SERVER2 is your first slave server,
# which allows CHECKOUT but denies BORROW
# in the event that your master server goes down.
# HAL_SERVER2 should be your second most powerful server.
#
# HAL_SERVER3 is part of your configuration to ensure
# that everything works as expected, and does not
# allow any CHECKOUT or BORROW requests.
# HAL_SERVER3 should be your least powerful server.
#
# Syntax:
#
# HAL_SERVER<server_number> = [port]@hostname
# or
# HAL_SERVER<server_number> = [port]@IP_address
#
# Port is optional.
#
# Important: The HAL_SERVER list must be identical
# on all your servers for HAL to function properly.
#
# See the LM-X End Users Guide for further information
# about setting up HAL servers.
#
#************************************************
# Examples:
# HAL_SERVER1 = 6200@server1
# HAL_SERVER2 = 6200@server2
# HAL_SERVER3 = 6200@server3

#************************************************
# Set the log file path:
# It is preferred to write out the full path.
#
#************************************************
# Examples:
# LOG_FILE = c:\program files\lmx-server.log
# LOG_FILE = /home/user1/lmx-serv.log
LOG_FILE = C:\path\to\license\server\lmx-serv.log

#************************************************
# Set the log file format.
# The following formats are valid:
# NORMAL, EXTENDED
# Setting the log file format to EXTENDED causes
# additional information to be included in the log
# file, such as license server HostIDs, whether the
# license server is a virtual machine, etc., which
# is useful for debugging purposes.
```

```
#
#************************************************
# Examples:
LOG_FORMAT = NORMAL

#************************************************
# Exclude messages from the log.
# The following messages can be excluded:
# CHECKOUT, CHECKIN, STATUS, BORROW, BORROW_RETURN,
# REMOVE_USER, REMOTE_RESTART, REMOTE_SHUTDOWN or
# AUTOMATIC_DISCOVERY.
#
# Syntax:
# LOG_EXCLUDE = <message1, message2, etc.>
#
#************************************************
# Example:
# LOG_EXCLUDE = CHECKOUT, CHECKIN, STATUS

#************************************************
# Set the minimum elapsed time for user removal.
# This will set a minimum time that must elapse from the connection
# before a user can be removed using lmxendutil.
# This time is entered in seconds, and must be equal to or greater than
# the number of seconds specified by your application vendor.
# Default minimum time is 120 seconds.
# If the time is set to -1, user removals will not be allowed.
#
#************************************************
# Example:
# MIN_USER_REMOVE_TIME = 120

#************************************************
# Set a license file path:
#
# On Windows: If no file is set, the license server
# will look for <vendor>.lic in the same directory as the license server.
# On Unix: If no file is set, the license server will look for
# /usr/x-formation/<vendor>.lic
#
# In both cases, the filenames must be lowercase.
#
# You can specify one or multiple paths as needed.
#
#************************************************
# Examples:
# LICENSE_FILE = d:\server\network.lic
# LICENSE_FILE = c:\extra_file.lic
# LICENSE_FILE = /home/user1/floating_license.lic
# LICENSE_FILE = /home/user1/floating_license2.lic
LICENSE_FILE = C:\path\to\license\server\arup.lic

#************************************************
# Specify a pay-per-use usage database, which can be used for billing
# purposes.
#
# The format of this database and an example of data printout is
# described in the LM-X end user documentation.
#
#************************************************
# Examples:
```

```
# USAGE_DATABASE = d:\server\usage.db
# USAGE_DATABASE = /home/user1/usage.db

#************************************************
# Specify pay-per-use detail level.
# NORMAL includes basic usage information.
# EXTENDED includes user information in addition
# to the basic usage information.

# USAGE_LEVEL = NORMAL

#************************************************
# Specify the number of actions after which
# pay-per-use database records will be committed
# to the pay-per-use database file.

# USAGE_WRITE_INTERVAL = 1000

#************************************************
# Enable pay-per-use username anonymization. Usernames
# will be hashed and stored in database anonymously.
# By default, anonymization is disabled.

# USAGE_ANONYMIZATION = TRUE

#************************************************
# Specify the remote administration password that is used when remotely
# stopping and restarting the license server and removing users from it.
#
# The password is case-sensitive.

REMOTE_ACCESS_PASSWORD = H@rdT0GuessPassword

#************************************************
# Enable fast queuing when license queuing is enabled.
#
# Fast queuing allows requests that can be fulfilled immediately to
# be fulfilled. For example, if a client is waiting for two
# licenses, and only one license is immediately available,
# another client that needs only one license can bypass the
# queue and take the single license without waiting.
# Default behavior of license queuing is to put the
# client at the end of the queue regardless whether
# the license request could be satisfied.
#
# Syntax:
# FAST_QUEUE = <feature1, feature2, etc.>
# or
# FAST_QUEUE = ALL
#
#************************************************
# Example:
# FAST_QUEUE = f2, d5, app2

#************************************************
# Group user names, host names or IP addresses
# to reduce redundancy in configuration file.
#
# Syntax:
# GROUP_<group name> = <list of members>
#
```

```
#************************************************
# Example:
# GROUP_admins = joe bob
# GROUP_users = admins harry
# GROUP_hosts = host1 host2

#************************************************
# Allow/deny specific clients the ability to use the license server.
# The allow/deny rules work as follows:
#   - Rules are attempted to be matched in the order they are written.
#   - If no rule matches the specific client, then that client is allowed.
#   - For ALLOW_IPADDR_* and DENY_HOST_* rules, you can specify addresses
using IPv4 and IPv6.
#     If you are using both protocols, ensure that you have set rules for
both of them.
#
# Syntax:
# ALLOW_IPADDR_ALL = <one or more IP addresses>
# ALLOW_IPADDR_<feature name> = <one or more IP addresses>
# (For IPv4 must be either specific A.B.C.D or with wildcards A.*.B.*)
# (For IPv6 must be either specific A:B:C:D:E:F:G:H or with wildcards
A:*:C:*:E:*:G:*)
# DENY_IPADDR_ALL = <one or more IP addresses>
# DENY_IPADDR_<feature name> = <one or more IP addresses>
# (For IPv4 must be either specific A.B.C.D or with wildcards A.*.B.*)
# (For IPv6 must be either specific A:B:C:D:E:F:G:H or with wildcards
A:*:C:*:E:*:G:*)
# ALLOW_HOST_ALL = <one or more hostnames or "localhost" for current
machine>
# ALLOW_HOST_<feature name> = <one or more hostnames or "localhost" for
current machine>
# DENY_HOST_ALL = <one or more hostnames or "localhost" for current
machine>
# DENY_HOST_<feature name> = <one or more hostnames or "localhost" for
current machine>
# ALLOW_USER_ALL = <one or more users>
# ALLOW_USER_<feature name> = <one or more users>
# DENY_USER_ALL = <one or more users>
# DENY_USER_<feature name> = <one or more users>
#
#************************************************
# Example 1:
# ALLOW_IPADDR_ALL = 192.168.1.* 192.168.2.*
# ALLOW_USER_ALL = Administrator root
# DENY_IPADDR_ALL = *.*.*.*
# This will allow only clients on 2 subnets, user Administrator and
# root from any host and deny everyone else. This applies
# to all features.
#
# Example 2:
# DENY_HOST_f2 = localhost untrusted crackerjack
# ALLOW_IPADDR_f2 = 192.168.*.*
# DENY_IPADDR_f2 = *.*.*.*
# This will deny clients on localhost, deny the machines with
# hostname 'untrusted' and 'crackerjack', allow clients on the internal
# network, and deny everyone else. This applies to the feature f2.
#
# Example 3:
# ALLOW_IPADDR_ALL = 2001:0db8:85a3:0000:0000:8a2e:0370:*
2001:0db8:85a3::8a2e:a460:* 1:5567::12c5:*
# DENY_IPADDR_ALL = *:*:*:*:*:*:*:*
```

```
# DENY_IPADDR_ALL = *.*.*.*
# This will allow only clients on 3 IPv6 subnets.
# This applies to all features and users.
#
# Example 4:
# DENY_USER_ALL = admins
# ALLOW_HOST_f1 = hosts
# This will deny all members of group admins and allow all
# host names from group hosts to get feature f1.

#*********************************************
# Allow/deny specific clients from borrowing licenses.
#
# Syntax:
# ALLOW_BORROW_IPADDR_ALL = <one or more hosts>
# ALLOW_BORROW_IPADDR_<feature name> = <one or more hosts>
# (Must be either specific A.B.C.D or with wildcards A.*.B.*)
# DENY_BORROW_IPADDR_ALL = <one or more hosts>
# DENY_BORROW_IPADDR_<feature name> = <one or more hosts>
# (Must be either specific A.B.C.D or with wildcards A.*.B.*)
# ALLOW_BORROW_HOST_ALL = <one or more hosts>
# ALLOW_BORROW_HOST_<feature name> = <one or more hosts>
# DENY_BORROW_HOST_ALL = <one or more hosts>
# DENY_BORROW_HOST_<feature name> = <one or more hosts>
# ALLOW_BORROW_USER_ALL = <one or more users>
# ALLOW_BORROW_USER_<feature name> = <one or more users>
# DENY_BORROW_USER_ALL = <one or more users>
# DENY_BORROW_USER_<feature name> = <one or more users>
#
#*********************************************
# Example 1:
# ALLOW_BORROW_USER_ALL = daisy harry tom
# DENY_BORROW_HOST_ALL = server1 machine5
# DENY_BORROW_IPADDR_ALL = 192.168.3.* 192.168.4.*
# This will allow the specific users, and deny host and
# IP addresses on the list from borrowing any feature.
# Everyone else will be allowed.
#
# Example 2:
# ALLOW_BORROW_USER_f2 = lazyjack rabbit joeuser
# DENY_BORROW_IPADDR_f2 = *.*.*.*
# This will allow the specific users and deny everyone
# else from borrowing f2.
#
# Example 3:
# DENY_BORROW_USER_f2 = users
# This will deny all members of group users from borrowing
# feature f2.

#*********************************************
# Limit the number of licenses that can be used by individual users
# or groups to implement fair/desired distribution of licenses.
#
# Syntax:
# LIMIT_USER_<feature name>_<limit count> = <one or more users>
# LIMIT_HOST_<feature name>_<limit count> = <one or more hosts>
# LIMIT_IPADDR_<feature name>_<limit count> = <one or more hosts>
# (Host must be specified completely A.B.C.D or with wildcards A.*.B.*)
#
# Limiting of users is done by a first match rule, so if a user
# belongs to more than one group specified in restrictions, the first
```

```
# restriction will apply to that user.
#
#************************************************
# Example 1:
# LIMIT_USER_f2_5 = harry joe sam
# LIMIT_IPADDR_f3_3 = 192.168.2.* 192.168.4.*
#
# Example 2:
# LIMIT_USER_ALL_1 = users


#************************************************
# Reserve a number of licenses that can be used by individual users
# or groups to implement fair/desired distribution of licenses.
#
# Syntax:
# RESERVE_USER_<feature name>_<reserve count> = <one or more users>
# RESERVE_HOST_<feature name>_<reserve count> = <one or more hosts>
# RESERVE_IPADDR_<feature name>_<reserve count> = <one or more hosts>
# (Host must be specified completely A.B.C.D or with wildcards A.*.B.*)
#
# Reservation of users is done by a first match rule, so if a user
# belongs to more than one group specified in the rules, the first
# rule will apply to that user.
#
#************************************************
# Example 1:
# RESERVE_USER_f2_5 = harry joe sam
# RESERVE_IPADDR_f3_3 = 192.168.2.* 192.168.4.*
#
# Example 2:
# RESERVE_USER_f1_5 = users admins
# RESERVE_HOST_f2_3 = hosts

#************************************************
# Limit the number of licenses that can be borrowed to prevent
# all licenses from being borrowed at the same time.
#
# Syntax:
# BORROW_LIMIT_COUNT_ALL = <limit count>
# BORROW_LIMIT_COUNT_<feature name> = <limit count>
#
#************************************************
# Example 1:
# BORROW_LIMIT_COUNT_f2 = 1
# BORROW_LIMIT_COUNT_ABCDEF = 5

#************************************************
# Limit the number of hours licenses can be borrowed
# to prevent licenses from being borrowed for too long.
#
# Syntax:
# BORROW_LIMIT_HOURS_ALL = <limit hours>
# BORROW_LIMIT_HOURS_<feature name> = <limit hours>
#
#************************************************
# Example:
# BORROW_LIMIT_HOURS_f2 = 1
# BORROW_LIMIT_HOURS_ABCDEF = 5

#************************************************
```

```
# Specify how often to rotate the log file.
# Valid values are "day," "week," or "month."
# The log file rotation occurs at midnight for any of these settings.
# Setting this to any value other than those given above disables log file
rotation.
#
# Syntax:
# LOGFILE_ROTATE_INTERVAL = <rotation_interval>
#
#************************************************
# Example:
# LOGFILE_ROTATE_INTERVAL = day

#************************************************
# Specify licenses directly within the configuration file.
#
# Specify any features from one or more license files
# to eliminate the need for both a license file and
# configuration file for the license server.
# The content must be specified within the __START_LICENSE__
# and __END_LICENSE__ clauses.

__START_LICENSE__

# Example:
#
# FEATURE f1
# {
#   VENDOR = XYZ
#   ...
# }

__END_LICENSE__

#************************************************
```

9.3.1.5 Stopping the LM-X License Server

1. Click on Windows Start menu or press the Win logo shortcut key on your keyboard.
2. Type services to search for and select the "Services" app.
3. Right click on "Oasys Ltd LM-X License Server X.X" and select Stop.

9.3.1.6 Environment Variables for Licensing

The ARUP_LICENSE_PATH environment variable is set to point to the license file/server.

Variable	Description
ARUP_LICENSE_PATH	Sets the path to the node-locked license file or address of the LM-X license server. Multiple input can be combined using ; (semicolon character) on Windows. (*Note that on Linux a : (colon character) is used instead of ; as the separator. Take care if copying licence strings between the two operating systems.*)

9.3.1.7 Floating Network Server License

Either ARUP_LICENSE_PATH (preferred) or LMX_LICENSE_PATH can be set to locate a valid license for the Oasys Suite software. ARUP_LICENSE_PATH is recommended for faster checkout of licenses.

Set the environment variable ARUP_LICENSE_PATH and point it to the license server host along with an optional port (defaults to port 6200). The following formats are both legal:

```
ARUP_LICENSE_PATH = hostname%tcpport
ARUP_LICENSE_PATH = [tcpport]@hostname
```

If you are using a HAL license server then you should specify all three license servers, as described in section 9.3.2.

9.3.1.8 Fixed stand-alone (node-locked) license

If the Oasys Suite software will be using a node-locked license file, this variable should be set to point to the location of the license file, for example:

```
ARUP_LICENSE_PATH = <install_directory>/arup.lic
```

9.3.2 High Availability Licensing (HAL)

Activating HAL introduces fault tolerance, because the licensed applications no longer depend on a single point of failure on a single license server.

9.3.2.1 How HAL works

HAL uses three license servers, each assigned a specific role. The first license server is the primary server and allows clients to both checkout and borrow licenses. The second license server can allow clients to checkout licenses only, in the event the first license server is down. The third license server denies all requests but is required as part of the configuration to ensure high availability. To use HAL, your license must be HAL-enabled by your Oasys Suite distributor.

Note
1. HAL requires three license server machines capable of serving the licenses and having stable network connection between the servers. Network problems will make the system unstable and license checkouts unreliable. HAL also requires the connecting clients to be able to connect to all three servers. 2. HAL does not increase the number of available licenses or features or provide any load-balancing of the three license servers. It is meant to only provide a fault-tolerant license management solution in case of hardware failure.

9.3.2.2 How to install HAL license servers

1. Decide the primary, secondary, and tertiary servers, with the following roles:

HAL server Number	Role
1 - Primary	This HAL server can allow clients to both checkout and borrow licenses, just like a normal license server.
2 - Secondary	If the primary HAL server is down, this secondary server can allow clients to checkout licenses.
3 - Tertiary	This tertiary HAL server will deny all requests, but is required as a part of the "quorum of two" configuration to ensure high availability.

2. Edit the config file (lmx-serv.cfg) to add the lines below to specify the three servers that will be used in your HAL configuration.

```
HAL_SERVER1 = port@primaryServer
HAL_SERVER2 = port@secondaryrServer
HAL_SERVER3 = port@tertiaryServer
```

3. Install the same HAL-enabled license arup.lic file on all three servers.

4. Start all three license servers.

5. Open the log file to verify that the HAL license servers are started and working normally, indicated by the line "Ready to serve..." as shown in the following example:

```
[2019-11-29 11:03:50] License server using TCP IPv4 port 6200.
[2019-11-29 11:03:50] License server using TCP IPv6 port 6200.
[2019-11-29 11:03:50] License server using UDP IPv4 port 6200.
[2019-11-29 11:03:50] Reading licenses...
[2019-11-29 11:03:50] License file(s):
[2019-11-29 11:03:50] ./arup.lic
[2019-11-29 11:03:50] Log file path: /path/to/license/server/lmx-serv.log
[2019-11-29 11:03:50] Log to stdout: No
[2019-11-29 11:03:50] Log format: Normal
[2019-11-29 11:03:50] Configuration file path: /path/to/license/server/lmx-
serv.cfg
[2019-11-29 11:03:50] Serving following features:
[2019-11-29 11:03:50] arup (v2022.0231) (2 license(s)) shared on: HOST USER
CUSTOM license type: exclusive
[2019-11-29 11:03:50] d3plot (v2022.0231) (2 license(s)) shared on: HOST
USER CUSTOM license type: exclusive
[2019-11-29 11:03:50] primer (v2022.0231) (2 license(s)) shared on: HOST
USER CUSTOM license type: exclusive
[2019-11-29 11:03:50]
[2019-11-29 11:03:50] HAL: Peer server: 6200@secondaryserver
[2019-11-29 11:03:50] HAL: Peer server: 6200@tertiaryserver
[2019-11-29 11:03:50] HAL: This license server is configured as a HAL
MASTER.
[2019-11-29 11:03:50] HAL: CHECKOUT requests on this license server are not
allowed!
```

```
[2019-11-29 11:03:50] HAL: BORROW requests on this license server are not
allowed!
[2019-11-29 11:03:50] To administrate the license server go to your enduser
directory and run the License Server Client.
[2019-11-29 11:03:50] Ready to serve...
[2019-11-29 11:03:55] HAL: Connection with HAL peer 6200@secondaryserver is
up!
[2019-11-29 11:03:55] HAL: CHECKOUT requests on this license server are
allowed!
[2019-11-29 11:03:55] HAL: BORROW requests on this license server are
allowed!
[2019-11-29 11:04:15] CHECKOUT by user@domain [192.168.1.2]: arup
[2019-11-29 11:04:15] CHECKOUT by user@domain [192.168.1.2]: primer
[2019-11-29 11:04:22] CHECKIN by user@domain [192.168.1.2]: primer
[2019-11-29 11:04:22] CHECKIN by user@domain [192.168.1.2]: arup
```

It may take up to 30 seconds, when the connection between the servers is detected, for the log file to report that requests on the server are allowed.

Note: you must disable or configure your firewall on each HAL server to allow the necessary network traffic for HAL to function properly.

9.3.2.3 Setting up client machines to use HAL

The proper Windows environment variable format for a HAL license setup is shown below, with the servers listed in order of their roles of primary, secondary, and tertiary server.

Example:

```
ARUP_LICENSE_PATH=6200@primaryServer;6200@secondaryServer;6200
@tertiaryServer
```

(Note for those setting up licences on both Windows and Linux. The syntax is near identical on both except that on Windows multiple entries on a line are separated by semi-colons ';', whereas on Linux they are separated by colons ':'. Take care if copying and pasting licence environment variable strings between operating systems!)

9.3.3 Usage Logs

The LM-X license server can produce a log file that details activity such as client connections or disconnections, license checkout/checkin, and another server activity

In the configuration .cfg file, you can control the following settings for the license server log:

- Specify normal or extended logging. When using extended logging note that:
  - Extended logging results in greater detail in the log file.
  - Extended logs can be imported into License Statistics to obtain denied request statistic
- Specify the interval for log file rotation. Generally, data written to the log file is useful only for a limited time, so log rotation is recommended for removing old log data and reducing the storage requirements of the log file.
- Specify the desired output location for the log.

Over time, the log file can grow to a substantial size depending on licensing activity, so it is best to write the log to a local file system rather than across a network.

If the log file is deleted, the license server will create a new log file on the next write.

9.3.4 Usage data in the log file

From V20 onwards some very simple usage data is recorded in the LM-X log file. A typical example is

```
[2023-02-16 16:55:43] Clicked Tools: Safety by John.Doe@machine_xyz_123: primer 0.0 [33984]
[2023-02-16 16:55:44] Clicked Dummies by Jane.Doe@machine_pqr_789: primer 0.0 [33985]
```

This information is not transmitted to Oasys Ltd in any way, it remains private on your system.

The purpose of this logging is to provide clients with a more granular view of product usage which can optionally be shared with Oasys Ltd in a cut-down form that will inform our development and optimisation efforts and support improvements to the product and to the user experience.

We will provide analysis tools which allow you to extract this information from the log file and view it through defined reports which will enhance understanding of usage via a number of views, providing rich insight over and above what can be gained from license management systems. Provision of data collected from these tools to Oasys Ltd will be entirely under the control of the client, with only non-sensitive, user-anonymous and visible information being generated for this purpose.

9.4 Appendices

9.4.1 License File Format

The basic format of the license file is described here. The example below shows one typical FEATURE block — there may be many of these in a license file.

```
FEATURE primer
{
VENDOR=ARUP COUNT=2 VERSION=2021.1231 END=2021-12-31 SHARE=HOST|USER|CUSTOM
LICENSEE="Oasys Suite customer"
OPTIONS="UNLIMITED"
KEY=Qb0yo]tpFa[6b12rjU7JXXQljy8I47XD6kMPlFNuroJP2R9pzbI7JpCaSlOrSCGrv9cekuZ
w7ykYjRwY3nWrn0p1xMXRSTlWmuMR \

BRJhWI3CG0XQ15anuHUHszCmFeiO2[YA0]5bSnuNypPWtUzqKNQUlBF8lrj0AnNe6WfyORsLxxN
92HJv7yfpmbAFKXXzPOXL3z6Q \

ftoaOUBJsAo2K3ABG3HI7krIt0OFXDlI[XgGnh2zTqsXASFeLMBrLLJnob3K6vlckoTCzUsEEGx
uNDu]VX8ucecmNg[m]NBiYNMp \

bbbfoXBXaEB5UL8NI2FtlxKG4woyvdwfGlb66iP57DLylTfAtI4TfHVfF]nFfF[285RIJKXvYQJ
PDAYjchvM7HLM2QImJI1lY8gD \

PUi52D]UGvDzSvsksjpl62JDLABkqtTV3rznwZuOQJIkKP45EaqMXs0IQu]ffCWA4zGsBidDGRc
igEPW6hfpskBXSknNfWqX81jy \
    Y7RNiwl]v4aXTuaQ8X6UTq]gd6iiZhuUJvEotyKdaA**
}
```

9.4.2 Extended Licenses for Multiple Programs

A PRIMER floating server license can be extended to be used by the Oasys post-processing software (D3PLOT and T/HIS). Short-term trial licenses for the Oasys post-processing software are also available. Please contact your local distributor for more information.

Situation	License details
Extend PRIMER floating server licenses to work with D3PLOT and T/HIS.	primer + primer_post floating server license An individual using PRIMER and D3PLOT on their machine will use two PRIMER licenses. An individual using PRIMER, D3PLOT and T/HIS will also use two PRIMER licenses. In this instance, D3PLOT and T/HIS share a PRIMER license. D3PLOT and T/HIS can be prevented from using PRIMER licenses by setting the following preference in the oa_pref file. oasys*post_uses_primer = FALSE
PRIMER customer with trial access to D3PLOT and T/HIS for floating server licenses.	primer + post_trial floating server license An individual can use PRIMER, D3PLOT and T/HIS simultaneously on their machine. Doing so will use one ‘primer’ server license and one ‘post_trial’ server license. Once the trial license expires, only PRIMER can be accessed.
PRIMER customer with trial access to D3PLOT and T/HIS for node-locked licenses.	primer + post_trial node-locked license An individual can use PRIMER, D3PLOT and T/HIS simultaneously on the machine with the node-locked license. Once the trial license expires, only PRIMER can be accessed.

D3PLOT customer with trial access to T/HIS. This will enable the use of the D3PLOT-T/HIS link.	d3plot + post_trial An individual can use D3PLOT and T/HIS simultaneously, utilising the features enabled by D3PLOT-T/HIS link. Once the trial license expires, only D3PLOT can be accessed.

9.4.3 Licenses for Single or Multiple Programs

You can buy floating server or node-locked licenses which allow access to all programs in the Oasys Suite software.

It is also possible to buy floating server or node-locked licenses for individual programs.

Program	License required
PRIMER	primer
D3PLOT	d3plot
T/HIS	this
D3PLOT and T/HIS link	d3plot + this
REPORTER	reporter*
All programs in the Oasys Suite	primer, d3plot, this + reporter

*REPORTER is also able to run without the reporter license. In this situation the software checks for any available Oasys license and then releases it again.

9.4.4 Restricted-use Licenses for All Programs

We provide restricted-use licenses free of charge through our website for certain domain names, for example for students at UK Universities.

These licenses can also be sold commercially by a local distributor.

Similar licenses are available, restricted to a different number of nodes or curves.

Program	License
All programs in the Oasys Suite, restricted to models with less than 10,000 nodes (PRIMER and D3PLOT) and 12 curves (T/HIS).	primer, d3plot and this licenses restricted

9.4.5 Oasys REPORTER and SHELL Licensing

REPORTER:

If you have licenses for any of our programs, you are licensed to use REPORTER to interact with that program.

For example, if you have a “primer” license, you can use PRIMER, or use REPORTER to create reports with PRIMER objects in them.

SHELL:

The Oasys SHELL can be used without a license.

9.4.6 Using the Extended PRIMER License – FAQ's

1. License check-out priority – When customer has both the extended PRIMER license (primer + primer_post) and D3PLOT license (d3plot), which license will be checked out first when running D3PLOT?

   D3PLOT will always look for a D3PLOT license first. If no D3PLOT licenses are available, it will then try and use a PRIMER license. If D3PLOT uses a PRIMER license, then by default, a window is displayed warning the user about this.

2. Can a user on one machine have an unlimited number of PRIMER sessions with one primer license (as was previously the case)?

   This has not changed if they are running versions 17, 16, or 15 – if a user runs multiple copies of PRIMER on the same machine, they all share a single license.

3. Can you let me know how to prevent D3PLOT and T/HIS using a PRIMER license?

   To disable license sharing the following preference can be set:

   d3plot*post_uses_primer: FALSE (disables D3PLOT from using a PRIMER license)

   this*post_uses_primer: FALSE (disables T/HIS from using a PRIMER license)

   oasys*post_uses_primer: FALSE (disables D3PLOT & T/HIS from using a PRIMER license)

4. How many extended PRIMER licenses does an individual use?

   D3PLOT (or T/HIS) using a PRIMER license is counted separately to a user running PRIMER so an individual on one terminal, running the following combinations of program uses these licenses:

1 x PRIMER only	1 primer license
2 x PRIMER	1 primer license
PRIMER + D3PLOT	2 primer licenses
2 x PRIMER + 2 x D3PLOT	2 primer licenses
PRIMER + T/HIS	2 primer licenses
PRIMER + T/HIS + D3PLOT	2 primer licenses (D3PLOT and T/HIS share one)

9.4.7 LM-X Error Codes

The following table lists the possible error codes that are returned upon any failure:

Return Code #	Return Code	Description
0	LMX_SUCCESS	Operation successful.
1	LMX_UNKNOWN_ERROR	Unknown error occurred.
2	LMX_INVALID_PARAMETER	Invalid input parameter.

Return Code #	Return Code	Description
3	LMX_NO_NETWORK	Unable to initialize network subsystem.
4	LMX_BAD_LICFILE	License file is using unknown/invalid syntax.
5	LMX_NO_MEMORY	No more available memory.
6	LMX_FILE_READ_ERROR	Unable to read file.
7	LMX_BAD_DATE	Invalid date.
8	LMX_BAD_KEY	Invalid license key.
9	LMX_FEATURE_NOT_FOUND	Feature not found.
10	LMX_BAD_HOSTID	HostID does not match license.
11	LMX_TOO_EARLY_DATE	Software activation date is not yet reached.
12	LMX_TOO_LATE_DATE	Software expired.
13	LMX_BAD_VERSION	Software version does not match license.
14	LMX_NETWORK_ERROR	Unexpected network-related error occurred.
15	LMX_NO_NETWORK_HOST	Unable to connect to license server.
16	LMX_NETWORK_DENY	Rejected actively from license server.
17	LMX_NOT_ENOUGH_LICENSES	Request for more licenses than available on license server
18	LMX_BAD_SYSTEMCLOCK	System clock has been set back.
19	LMX_TS_DENY	Feature not allowed to run on terminal server clients.
20	LMX_VIRTUAL_DENY	Feature not allowed to run on a virtual machine.

Return Code #	Return Code	Description
21	LMX_BORROW_TOO_LONG	The specified borrow period is too long.
22	LMX_FILE_SAVE_ERROR	Unable to save file.
23	LMX_ALREADY_BORROWED	Feature already borrowed.
24	LMX_BORROW_RETURN_ERROR	Unable to return borrowed feature.
25	LMX_SERVER_BORROW_ERROR	Deprecated. License server returned borrow error.
26	LMX_BORROW_NOT_ENABLED	Borrow functionality not enabled on client side.
27	LMX_NOT_BORROWED	The feature that was attempted to be returned was not borrowed.
28	LMX_DONGLE_ERROR	Dongle is not attached or does not function correctly.
29	LMX_SOFTLIMIT	Request exceeds the number of softlimit licenses available.
30	LMX_BAD_PLATFORM	Platform not permitted by license.
31	LMX_RESET_SYSTEMCLOCK_EXCEEDED	Deprecated. Number of allowed reset system clock attempts exceeded.
32	LMX_TOKEN_LOOP	Infinite token loop detected.
33	LMX_BLACKLIST	Feature is blacklisted.
34	LMX_VENDOR_DENY	Feature checkout rejected by vendor-defined rules.
35	LMX_NOT_NETWORK_FEATURE	Unable to use local license as a network license.
36	LMX_BAD_TIMEZONE	Checkout is not permitted in the client time zone.
37	LMX_SERVER_NOT_IN_USE	License server is not currently in use.

Return Code #	Return Code	Description
38	LMX_LICSERVICE_ERROR	Deprecated. Problem with License Distribution Service.
40	LMX_NOT_IMPLEMENTED	Functionality not implemented.
41	LMX_BORROW_LIMIT_EXCEEDED	License server limitation on number of borrowed features exceeded.
42	LMX_SERVER_FUNC_ERROR	License server function error occurred.
43	LMX_HEARTBEAT_LOST_LICENSE	License is lost due to heartbeat failure.
44	LMX_SINGLE_LOCK	Unable to obtain single-usage lock.
45	LMX_AUTH_ERROR	Cannot authenticate user on license server.
46	LMX_NETWORK_SEND_ERROR	Error sending message over network.
47	LMX_NETWORK_RECEIVE_ERROR	Error receiving message over network.
48	LMX_QUEUE	Feature has been queued.
49	LMX_BAD_SECURITY_CONFIG	LM-X security configuration file mismatch.
50	LMX_FEATURE_HAL_MISMATCH	Feature has different HAL settings than other features on the same license server.
51	LMX_NOT_LOCAL_FEATURE	Unable to use network license as a local license.
52	LMX_FEATURE_NOT_REPLACEABLE	Unable to replace missing feature.
53	LMX_HOSTID_NOT_AVAILABLE	HostID is not available on the current machine.
54	LMX_FEATURE_ALREADY_RESERVED	Feature is already reserved.
55	LMX_FEATURE_ALREADY_CHECKED_OUT	Feature is already checked out.

Return Code #	Return Code	Description
56	LMX_RESERVATION_NOT_FOUND	Reservation not found.
57	LMX_API_NOT_REENTRANT	Calling an API function from a callback function is not allowed.
58	LMX_LICENSE_UPLOAD_ERROR	Problem with license file upload.
59	LMX_INTERNAL_LICENSE_NOT_EMBEDDED	Internal LM-X license file is not embedded.
60	LMX_SYSTEM_INTERPROCESS	Interprocess resource locking error.
61	LMX_CANNOT_LOAD_SHARED_LIBRARY	Cannot load LM-X library. (We recommend that you check the permissions for the C:\Users\USERNAME\AppData\Local\Temp folder.)
62	LMX_SERVER_VERSION_TOO_LOW	License server version is lower than the client.
63	LMX_VENDOR_NAME_MISMATCH	License vendor names do not match.
64	LMX_SECURITY_CONFIG_NOT_EMBEDDED	LM-X security configuration file is not embedded.

9.4.8 Uninstall LM-X License Server

1. Stop the License Manager.
2. Open the Windows Control Panel and select "Programs and Features" control panel icon.
3. Locate and highlight the "LM-X End-user Tools <Version> Package" and click the Uninstall button.
4. Click Finish to complete the process.

9.4.9 Cross-references between LM-X and FLEXlm

This section provides some basic cross-reference information for customers familiar with FlexNet/FLEXlm.

9.4.9.1 License File

LM-X and FLEXlm license files are similar — they are both plain text files containing `feature` blocks. Unlike for FLEXlm, you should not need to edit the LM-X license file that you receive from your Oasys Suite distributor.

9.4.9.2 License Paths

Both LM-X and FLEXlm use environment variables to define the license paths. For HAL or multiple-server setup, define a list separated by ; (semicolon character) on Windows.

License Type	FLEXlm Values	LM-X Values
Floating server	OASYS_LICENSE_FILE=port@host	ARUP_LICENSE_PATH=port@host
Node-locked	OASYS_LICENSE_FILE=<PATH>/oasys_flexlm.dat	ARUP_LICENSE_PATH=<PATH>/arup.lic

9.4.9.3 Comparison of license server setup

When setting up a floating network license, you must set up a license server. The table below specifies the files required for a floating network license setup and how they relate to FlexNet/FLEXlm files.

FlexNet/FLEXlm	LM-X
License server Windows: lmgrd.exe Linux: lmgrd	License server Windows: lmx-serv.exe Linux: lmx-serv
Vendor daemon Windows: vendord.exe Linux: vendord	Vendor daemon Windows: lmx-serv.exe Linux: lmx-serv
License file: oasys_flexlm.dat	License file: arup.lic
Option file: vendord.opt	Configuration file: lmx-serv.cfg

For LM-X, instead of specifying port numbers, SERVER lines and optional information in the license file and option file (for FLEXlm), you specify this information in the license server configuration file, lmx-serv.cfg. Some settings, such as license file and log file paths and port number, may also be specified at the command line when running the license server.

When you want to set up your network license server, make sure that you have the `lmx-serv` executable, lmx-serv.cfg, and your network license arup.lic.

9.4.9.4 Comparison of license server parameters

Action to perform	FlexNet/FLEXlm	LM-X
See if the license server is up or who is using the license server	`lmutil lmstat` `lmutil lmdiag`	`lmxendutil -licstat -host <host> -port <port>`
See the hostid of the client or server machine	`lmutil lmhostid`	`lmxendutil -hostid`
Remotely shutdown the license server	`lmutil lmdown`	`lmxendutil -shutdownserver -host <host> -port <port> -password <password>`
Remotely restart the license server	`lmutil lmreread`	`lmxendutil -restartserver -host <host> -port <port> -password <password>`
Remove a user from the license server	`lmutil lmremove`	`lmxendutil -removeuser -clientusername <username> -clienthostname <clienthost> -host <host> -port <port> -password <password>`