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## Intended audience

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This document is written for the System Manager responsible for loading and maintaining the Oasys Ltd LS-DYNA 16.0 Environment software. No special (engineering) knowledge of the software is required.

Further information may be obtained from:

<b>UK</b>	The Arup Campus Blythe Valley Park Solihull B90 8AE United Kingdom Tel: +44 121 213 3399 Email: <a href="mailto:dyna.support@arup.com">dyna.support@arup.com</a>
<b>China</b>	Arup 39F-41/F Huaihai Plaza 1045 Huai Hai Road (M) Xuhui District Shanghai 200031 China Tel: +86 21 3118 8875 Email: <a href="mailto:china.support@arup.com">china.support@arup.com</a>
<b>India</b>	Arup Ananth Info Park Hi-Tec City Madhapur Phase-II Hyderabad 500 081, Telangana India Tel: +91 40 4436 9797/98 Email: <a href="mailto:india.support@arup.com">india.support@arup.com</a>
<b>Web</b>	<a href="http://www.arup.com/dyna">www.arup.com/dyna</a>

or contact your local Oasys Ltd distributor.

# IMPORTANT CHANGES FOR VERSION 16.0

---

## 1.1 Licensing

The version 16.0 software has been compiled using version 11.14.1 of FLEXlm.

The version 16.0 software requires a new license file and will not run with existing version 14.1 or earlier licenses.

The version 16.0 license file and license daemons are backwards compatible with both the 15.x, 14.x and 13.x software releases. This means that any existing 15.x, 14.x and 13.x software will continue to work with new license files and servers.

**We recommend that you update all of your Oasys license servers with the files shipped with the version 16.0 software.**

## 1.2 Changes to Installation Organisation

The installation directory structure and nomenclature uses the same organisation as version 13.x. Users of the 13.x release should find the description below familiar, users migrating directly from an earlier release will find that some file names have changed and should read this section carefully.

From version 14 onwards the software is only available for 64 bit architecture, however we have retained the “\_x64” suffix in the executable names both for backwards compatibility and to make it clear that these are 64 bit executables.

### 1.2.1 Executable filenames now contain minor version numbers

Prior to V14 the executable names only contained the major revision numbers, for example primer16\_x64.exe. Some users found that if a minor release, for example 16.1, was issued this caused confusion because the executable name did not change, making it hard to tell executables apart solely by their filenames; however other users preferred this system since it meant that the generic filename was always the most up to date version.

To try to solve this problem, and also to please both schools of thought, the file naming convention has now been changed to include the minor version number:

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

For example primer16\_0\_x64.exe is PRIMER major release 16, minor release 0, 64 bit.

In order to preserve backwards compatibility with previous naming conventions, and also to please those preferring the old generic naming convention, hard links defining the generic names are also created as part of the installation process. For example:

primer16\_x64.exe → primer16\_0\_x64.exe (where → is a hard link)

For example if a minor version (eg 16.*I*) of major release 16 is issued in the future, and the files are installed in the same directory then:

- The new executables (eg primer16\_*I*\_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: primer16\_x64.exe → primer16\_*I*\_x64.exe

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

(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.)

### 1.2.1.1 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 primer16\_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 16.0 to run PRIMER 16.0 and REPORTER 16.1 to run PRIMER 16.1, then it will be necessary to place the new minor release in a separate installation directory.

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

## 1.3 Supported architecture

From Version 14 onwards the Oasys LS-DYNA software suite is only available in 64 bit form for x86-64 hardware.

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

The Oasys 16.0 suite for Windows is suitable for and has been tested on Windows 7 and Windows 10.

It will not run on Windows XP. (Microsoft withdrew support for XP in April 2014 and we can no longer support it.)

## 2 INSTALLATION ORGANISATION

---

### 2.1 Version 16.0 Installation Organisation

In version 16.0 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.

Version 16.0 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 different 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.

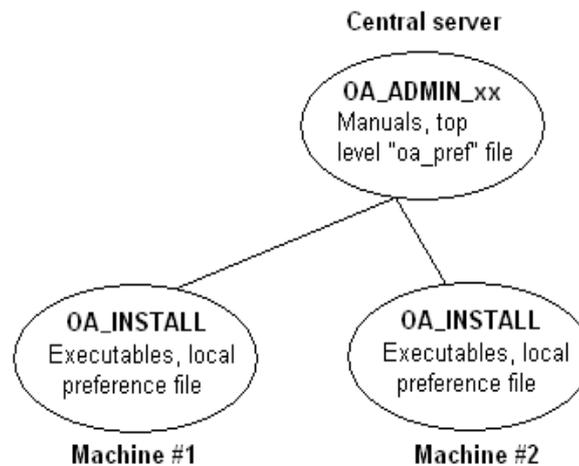


## b) A few machines on a small network, each user has his own machine

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" his 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.



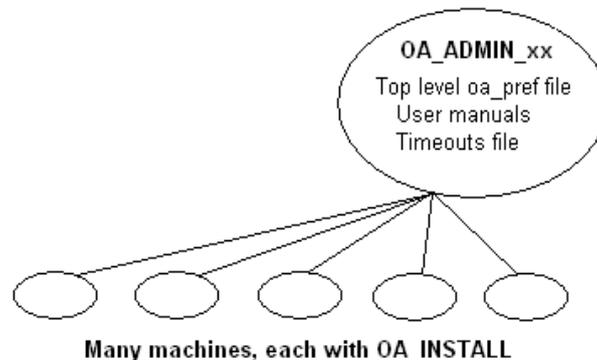
## c) Large corporate network

The top level oa\_pref file 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, ie OA\_ADMIN\_16 for this release 16.0. 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 directory names

Directory	Status	Directory Content and purpose	oa_pref file option
<b>OA_ADMIN_xx</b>  <i>or</i>  <b>OA_ADMIN</b>	<i>Optional</i>	Top level configuration files. (xx = 16 for release 16.0, thus <b>OA_ADMIN_16</b> )  Admin level oa_pref file Other configuration files Timeout configuration file  The generic version of this name, <b>OA_ADMIN</b> will be searched for if no release-specific version is set.	
<b>OA_INSTALL_xx</b>  <i>or</i>  <b>OA_INSTALL</b>	Required	All executables Installation level oa_pref file	<b>oasys*OA_INSTALL</b>
<b>OA_MANUALS</b>	<i>Optional</i>	Specific directory for user manuals. If not defined then will search in:  <b>OA_ADMIN_xx/manuals</b> (xx = major version number) <b>OA_INSTALL/manuals</b>	<b>oasys&gt;manuals_dir</b>
<b>OA_HOME</b>	<i>Optional</i>	Specific "home" directory for user. If not defined will use:  <b>\$HOME</b> (Unix/Linux) <b>%USERPROFILE%</b> (Windows)	<b>oasys*home_dir</b>
<b>OA_TEMP</b>	<i>Optional</i>	Specific "temporary" directory for user. If not defined will use:  <b>P_tmpdir</b> (Unix/Linux) <b>%TEMP%</b> (Windows)	<b>oasys*temp_dir</b>

## 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\_16** for release 16.0).

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.

### 2.1.2 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:

Release 16.0	Release 16.1
Top level directory <b>OA_ADMIN_16</b>	Top level directory <b>OA_ADMIN_161</b>
oa_pref file in <b>OA_ADMIN_16</b> contains:  <b>oasys*OA_INSTALL:</b> <pathname for 16.0 installation> <b>oasys*manuals_dir:</b> <pathname for 16.0 manuals>  <b>oasys*home_dir:</b> <pathname for home directory> <b>oasys*temp_dir:</b> <pathname for temporary files>	oa_pref file in <b>OA_ADMIN_161</b> contains:  <b>oasys*OA_INSTALL:</b> <pathname for 16.1 installation> <b>oasys*manuals_dir:</b> <pathname for 16.1 manuals>  would almost certainly be unchanged between major versions, although they could be different if desired

For example if the Oasys 16.0 software has been installed in **C:\oasys16**, then:

```
oasys*OA_INSTALL: C:\oasys16
```

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.

### 2.1.3 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:

<b>OA_ADMIN_xx / OA_ADMIN</b>	Top level configuration
<b>OA_INSTALL_xx / OA_INSTALL</b>	Installation level
<b>OA_HOME</b>	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, then 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, then 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.

### 2.1.4 Protection and ownership of installation directories.

Oasys software 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, then write protection will be required to prevent users from subverting these settings.

## 2.2 Pre Installation

The Windows installer files can be downloaded from the following website.

[www.arup.com/dyna](http://www.arup.com/dyna)

A 64bit installer file is provided: **oasys16\_x64\_setup.zip** (Windows 7/10 (64))

After you have downloaded the file you will need to extract the installer file from the zipped download. This can be done using either the built in options in Windows or a 3<sup>rd</sup> party tool like WinZip.

After extracting the installer you should be left with the following file:

**oasys16\_x64\_setup.exe** (Windows 7/10 (64))

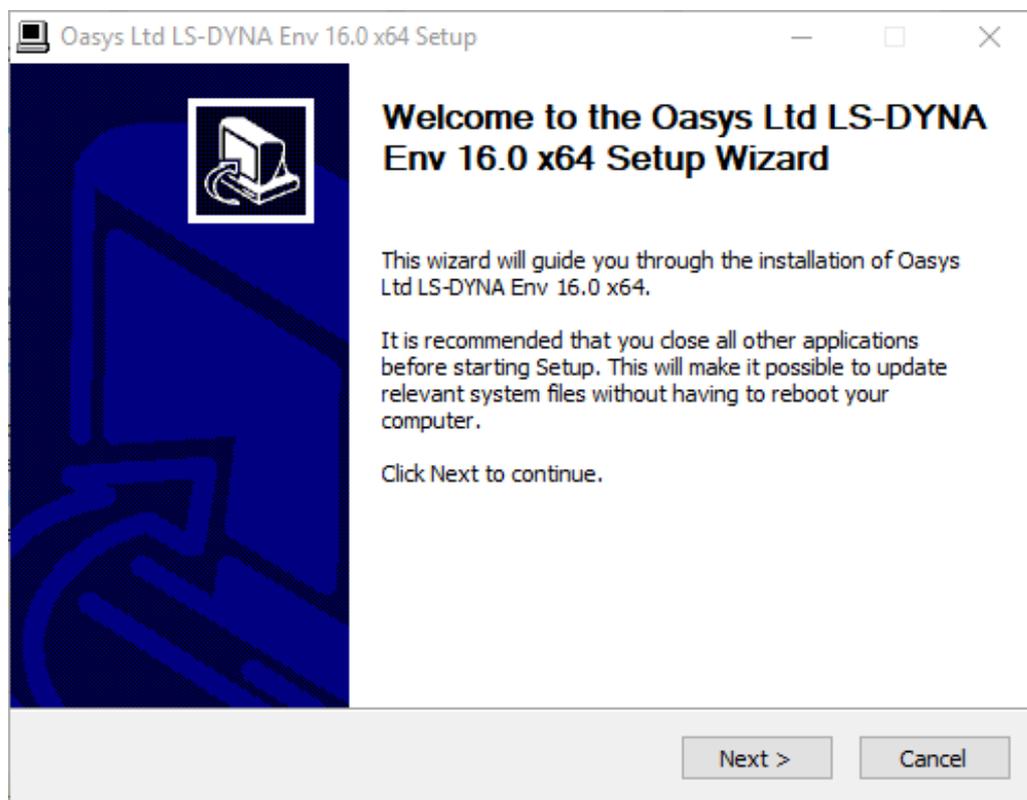
## 2.3 Single User / Single Machine Installation

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

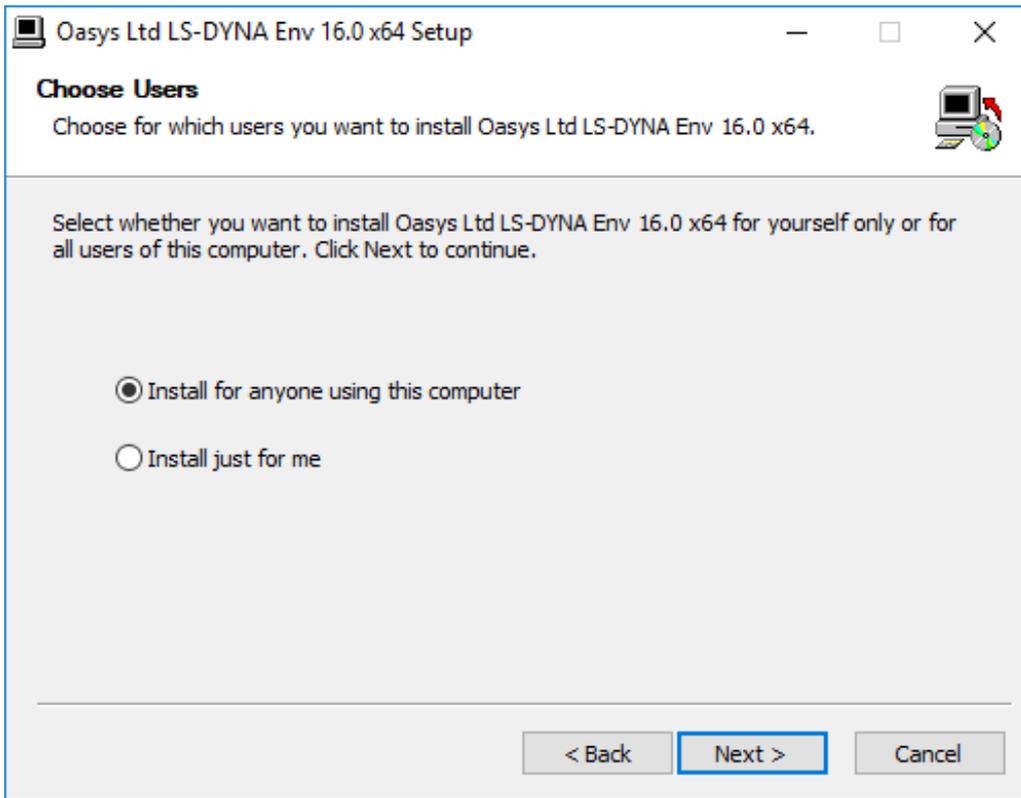
### 2.3.1 Installation

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.

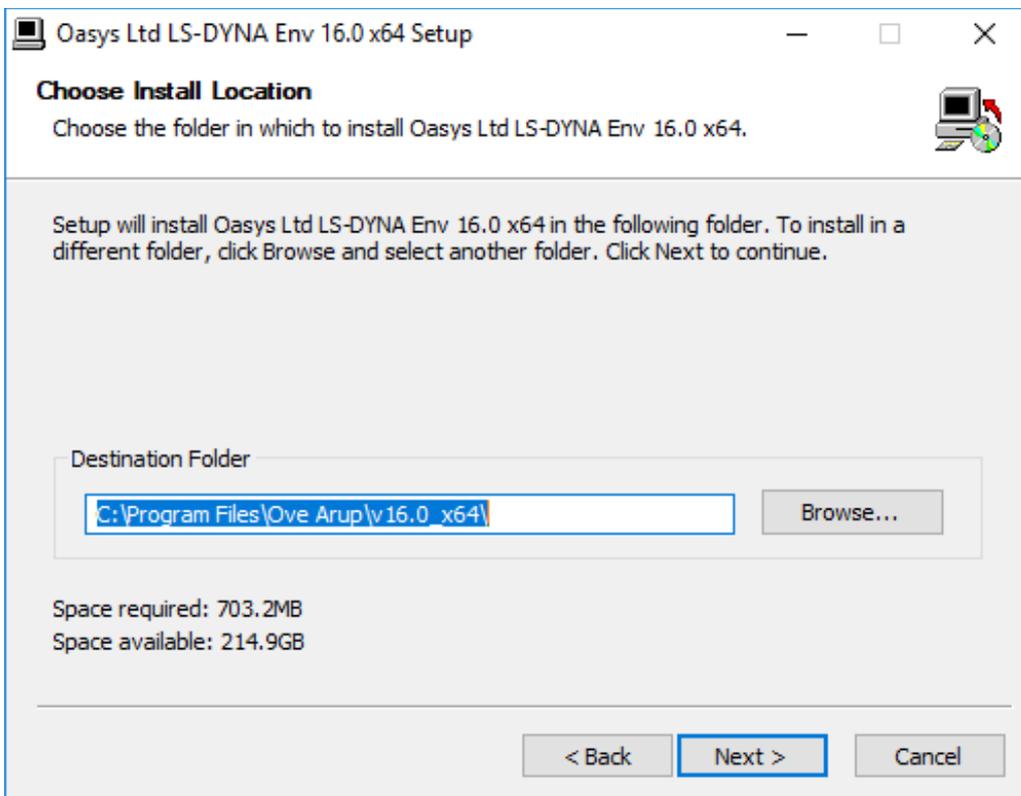
- a) To start the installation process, double click on the installer file that you have downloaded and unzipped. The installer will start.



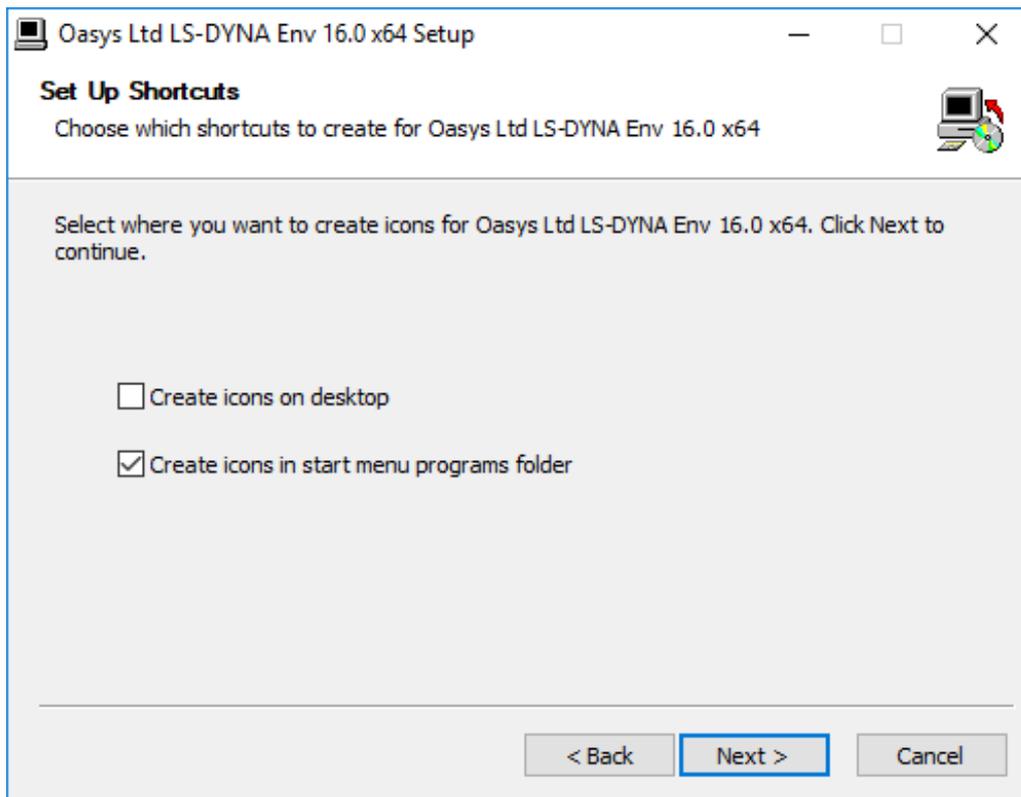
b) Choose whether to install the software for all users or the current user.



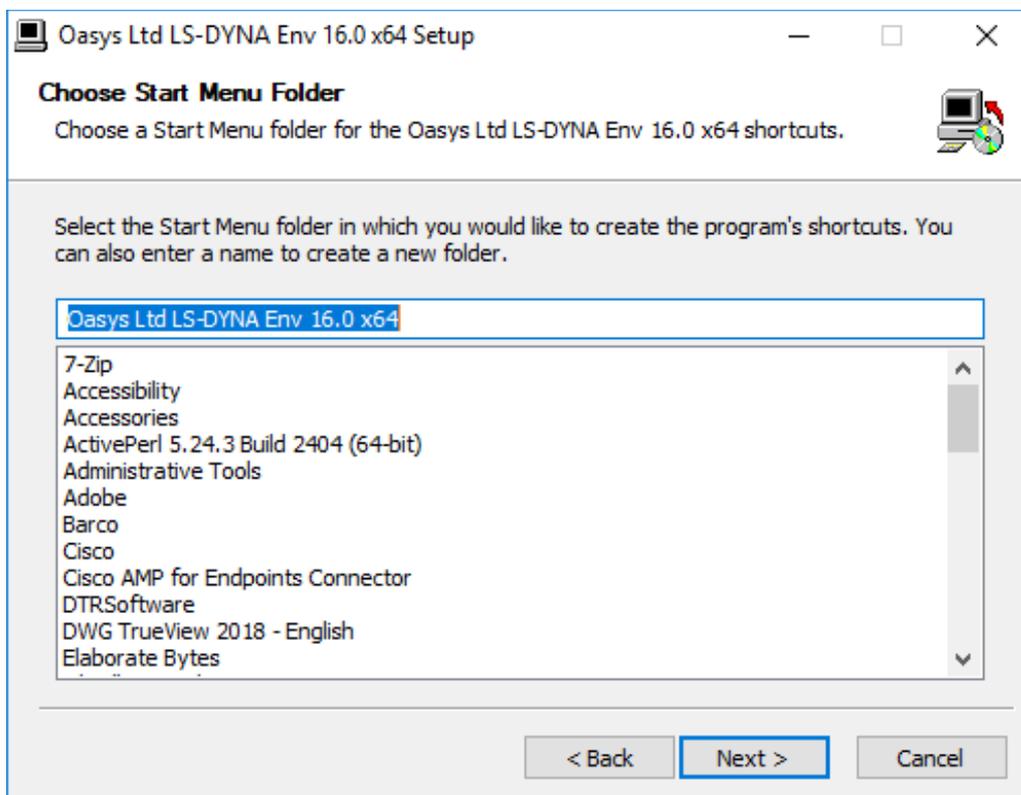
c) Select an installation directory.



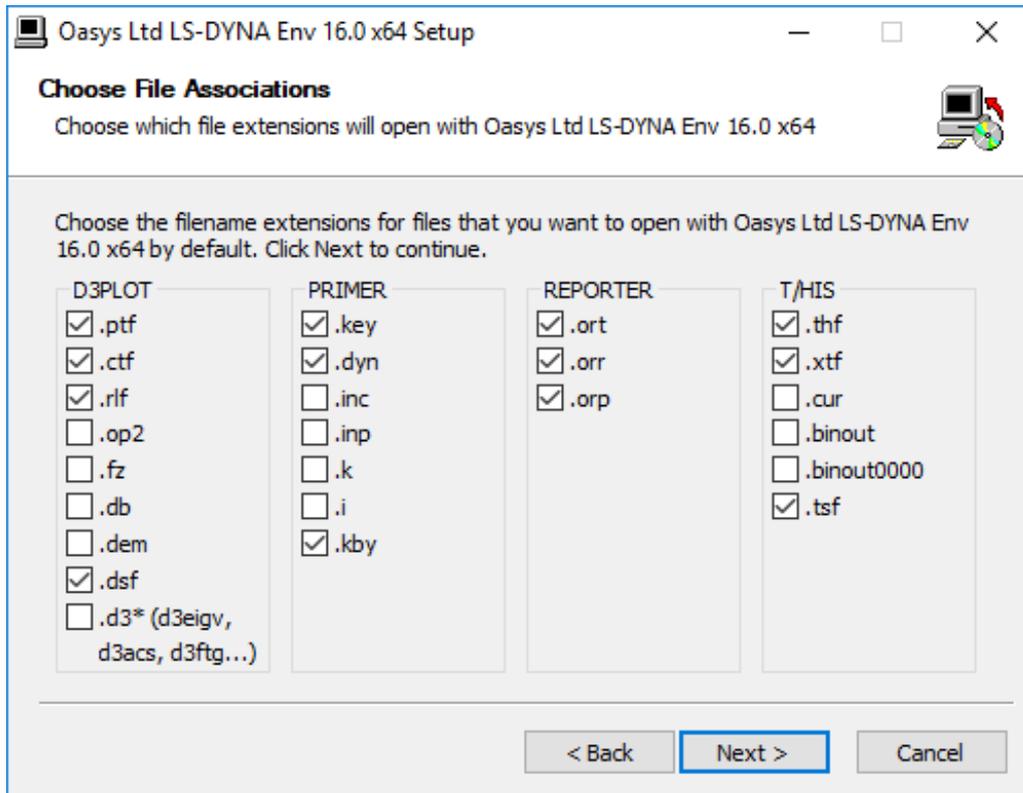
- d) Choose if you want to create shortcut icons in the start menu and/or desktop



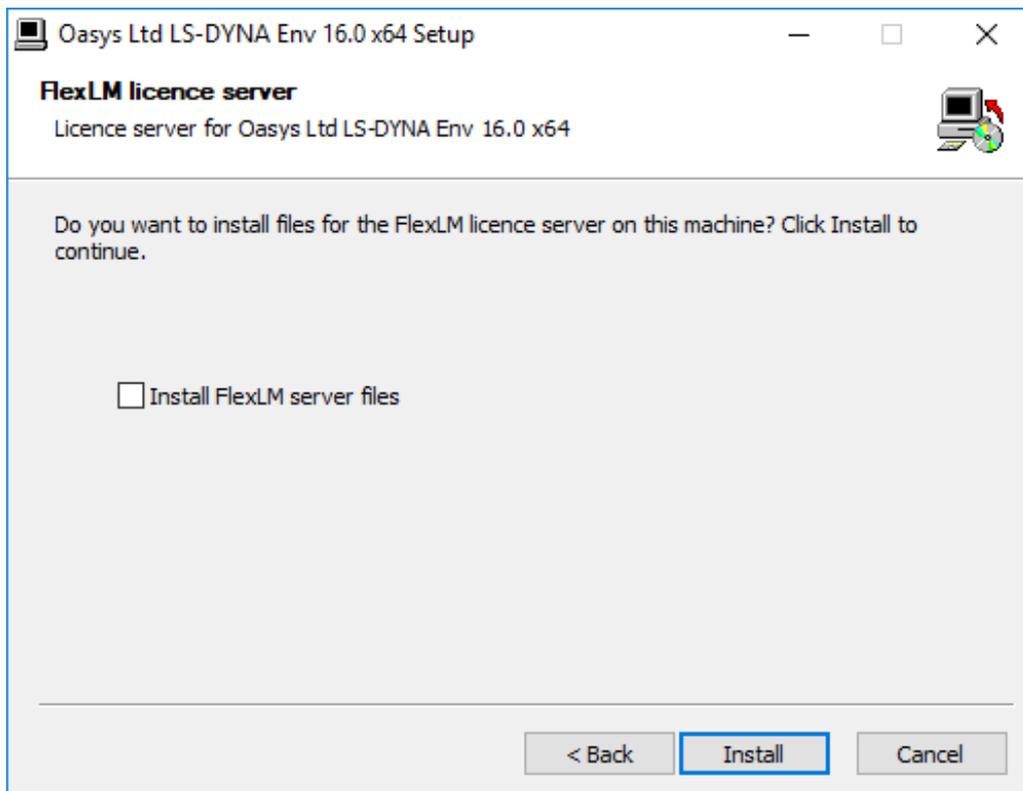
- e) If the option to create a start menu folder is selected then choose the name of the folder to create. The default will be “Oasys Ltd LS-DYNA Env 16.0 x64” but a new name can be given or an existing folder used by selecting it.



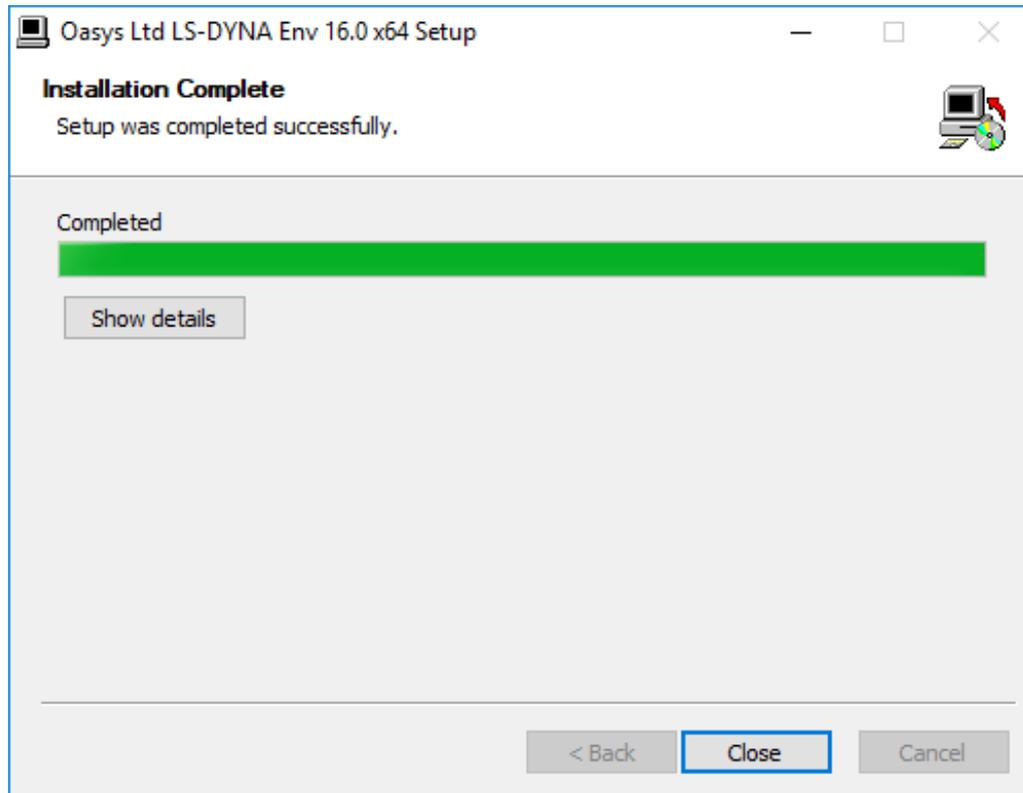
- f) Choose with file extensions you want to associate with the software. The default extensions are shown (ticked) below



- g) Choose whether you want to install the FLEXlm 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 the SHELL for submitting LS-DYNA analysis (see section 6).

### 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**  
REPORTER:   **.ort, .orr, .orp**  
THIS:       **.thf, .xtf, .tsf**

Other extensions can be chosen as described 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:

- a) Follow the same procedure as section 2.3 to install the software to a local directory (including the post-installation setup below).
- b) Copy the local installation directory to the network location
- c) Uninstall the local copy
- d) 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 the SHELL for submitting LS-DYNA analysis (see section 6).

### 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 then 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

```
oasys16_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

```
oasys16_setup.exe /S /desktop=y /ext_k=y /D=C:\Test\oasys 16
```

## 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 the SHELL for submitting LS-DYNA analysis (see section 6).

## 2.5.3 File Associations

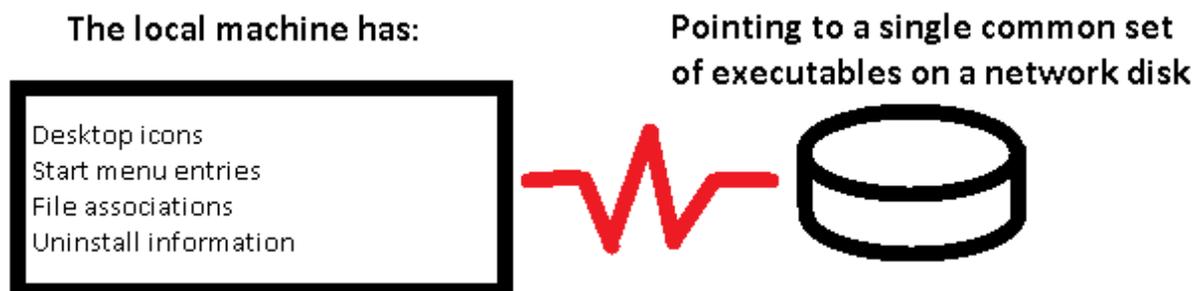
By default the silent installation will automatically set up associations for the following file extensions;

```
D3PLOT:    .ptf, .ctf, .rlf
PRIMER:    .key, .dyn
REPORTER:  .ort, .orr, .orp
T/HIS:     .thf, .xtf
```

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 LS-DYNA 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\v16.0\_x64\.

If installing for the current user it will default to C:\Users\current.user\AppData\Roaming\Ove Arup\v16.0\_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.

<b>/network=X:\path\installed</b>	Network location that software is installed in. If the network directory contains spaces the path should <b>NOT</b> be quoted.
<b>/D=local install path</b>	Specifies the local installation directory where the uninstaller will be written (see above for default location). If the installation directory contains spaces it should <b>NOT</b> be quoted. <b>If used the /D argument must be the last argument</b>
<b>/all</b>	Install the software for all users #. (requires administrator privileges)
<b>/user</b>	Install the software for the current user #
<b>/desktop=(yes no y n true false)</b>	Whether to install icons for software on desktop # Default is false.
<b>/startmenu=(yes no y n true false)</b>	Whether to install entry in start menu # Default is true.
<b>/startmenufolder=folder name</b>	Folder name in start menu # Default is Oasys Ltd LS-DYNA Env 16.0 x64. If the folder name contains spaces it should <b>NOT</b> be quoted.
<b>/server=(yes no y n true false)</b>	Whether to install FLEXlm server files #. Default is false.
<b>/ext_xxx=(yes no y n true false)</b>	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      *
```

The following extensions are valid for REPORTER (Those marked with \* are set by default):

```
/ext_ort      *
/ext_orr      *
/ext_orp      *
```

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

```
oasys16_0_x64_setup.exe /network=P:\path\oasys 16
                        /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 16

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 a Visual C 2013 runtime file and 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, Programs and Features in the normal way.

## 3 ENVIRONMENT VARIABLES

---

### 3.1 Environment Variables for licensing

#### 3.1.1 Floating Network License

Either `OASYS_LICENSE_FILE` or `LM_LICENSE_FILE` can be used to locate a valid license for the Oasys software. It is recommended that `OASYS_LICENSE_FILE` is used as this can speed up the checkout of licenses on systems where `LM_LICENSE_FILE` 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:

```
OASYS_LICENSE_FILE = @hostname
```

or if a non-default port has been specified for the license server:

```
OASYS_LICENSE_FILE = port@hostname
```

If you are using a triad license server then you should specify all 3 license servers:

```
OASYS_LICENSE_FILE = port@host1;port@host2;port@host3
```

##### 3.1.1.2 Fixed Stand-alone (nodelocked) 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:

```
OASYS_LICENSE_FILE = <OA_INSTALL>\oasys_flexlm.dat
```

##### 3.1.1.3 Multiple FLEXlm license files

If other software programs on the system are using FLEXlm this variable may already be set to point to a license file or a license server. If this variable is already set the Oasys license server or file can be added by specifying a colon separated list of values:

```
OASYS_LICENSE_FILE = port@hostname1;@hostname2
```

### 3.1.2 LSTC\_FILE/LSTC\_LICENSE\_SERVER<option>

On Windows machines 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
```

If you are using a triad license server then you should specify all 3 license servers:

```
LSTC_LICENSE_SERVER = '(host1 host2 host3)'
```

Setting `LSTC_INTERNAL_CLIENT` to “off” forces 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 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 LS-DYNA executable:

```
LSTC_INTERNAL_CLIENT = off
```

### 3.1.2.2 Node-locked License

If a node-locked license is to be used for LS-DYNA then 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
```

### 3.1.2.3 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
```

If you are using a triad license server then you should specify all 3 license servers:

```
LSTC_LICENSE_SERVER = '(host1 host2 host3)'
```

Setting `LSTC_INTERNAL_CLIENT` to “off” forces 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 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 LS-DYNA executable:

```
LSTC_INTERNAL_CLIENT = off
```

## 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\_16** (for release 16.0) 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 7

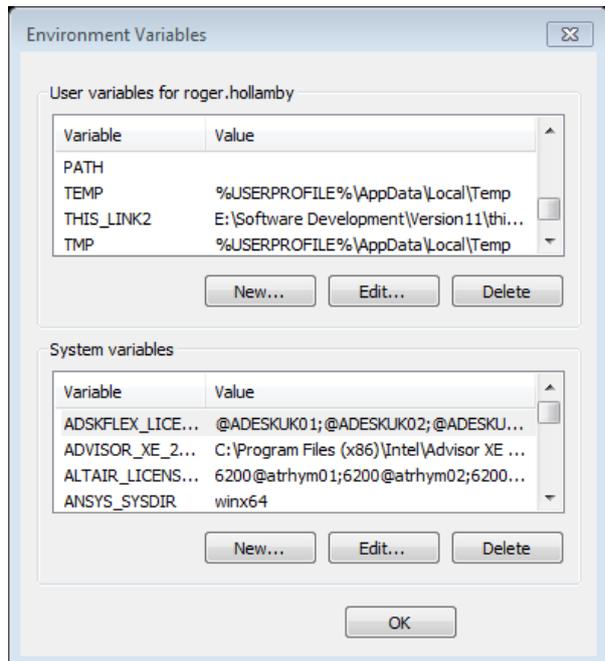
Start -> Control Panel

then select the System Icon:

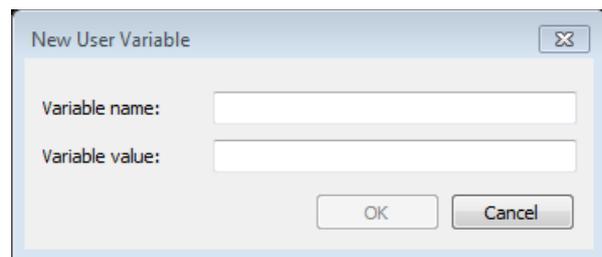


followed by the ‘Advanced System Settings’. In the window that appears then select the ‘Advanced’ tab followed by the ‘Environment Variables’ button.

This will bring up the window displayed 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:

- The optional administration directory defined by the environmental variable (**\$OA\_ADMIN** or **\$OA\_ADMIN\_xx** - where xx is the release number).
- The site-wide installation directory defined by the environment variable (**\$OA\_INSTALL\_xx**)
- The user's home directory **\$OA\_HOME** which defaults to **%USERPROFILE%** on Windows.
- 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\** on Windows 7/10

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 can't be removed by it.

Preferences can be locked. If a preference is locked it cannot be changed in an oa\_pref file in a more junior directory. 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 is:

```
primer#maximise : true
```

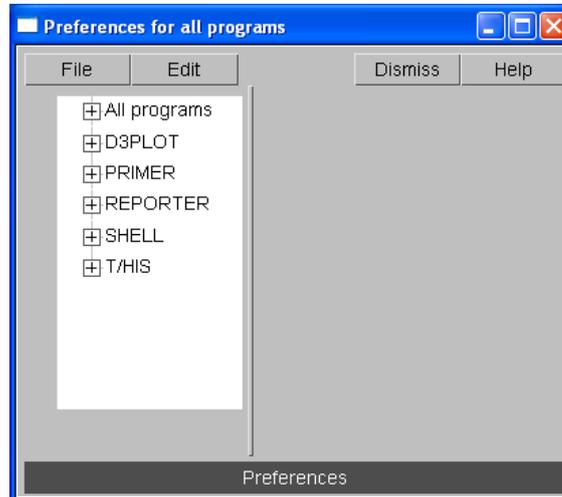
Note usage of “#” instead of “\*”.

## 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.

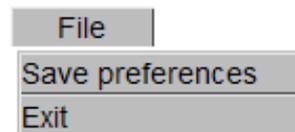


### 4.2.2 Menu Bar



#### File options:

**Save preferences:** 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:

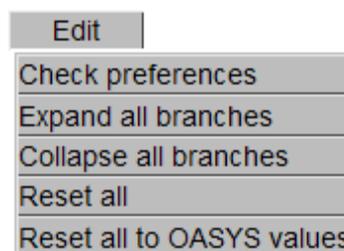
**Check Preferences:** Checks the current preferences for any errors. These errors will be listed in a separate window detailing the preferences with the errors and the nature of those errors

**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.

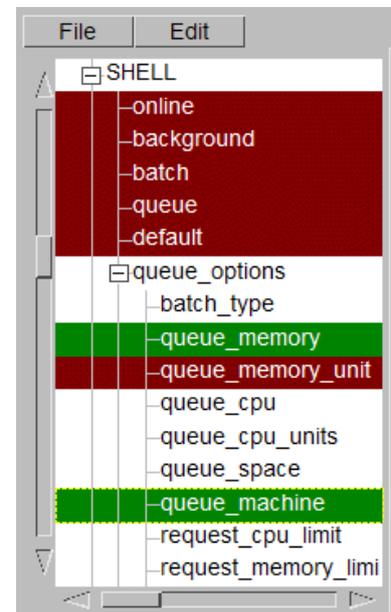
**Reset all to OA\_INSTALL values:** Resets all values to the defaults stored in the main \$OA\_INSTALL preference file



### 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 aren't highlighted indicate preferences that haven't been set.

Preferences in **bold** type indicate preferences which haven't 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.

Name:	d3plot*maximise
Type:	<logical>
Default:	FALSE
Description:	Maximise window when D3PLOT starte
Active:	<input checked="" type="checkbox"/>
Value:	FALSE

**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 can not 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 then the option will be ignored in the users 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

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 directory **OA\_ADMIN\_XX** or **OA\_INSTALL\_XX**.

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 is 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.

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

- PRIMER: a copy of any models currently loaded will be saved in the users home area or \$OA\_HOME if defined.
- 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.

Note that the `timeouts` file must be write-protected against users either by protecting the file or the `OA_ADMIN_XX` directory otherwise users will be able to change the file content.

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.

## 6 CUSTOMISING THE SHELL FOR SUBMITTING LS-DYNA JOBS

---

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

- 1) General Submission Options
- 2) The versions of 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.

## 7 TUNING THE GRAPHICS DRIVER

---

Oasys software makes intensive use of 3D graphics, putting a lot of stress on the graphics card. High-performance workstations 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 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”)

We have also seen some recent Dell laptops that have two graphics cards installed:

- Intel HD graphics (low performance) for 2d applications and when running on battery
- NVidia Quadro or AMD FirePRO for 3d applications when running on mains power

Earlier versions of this setup seem to have had configuration problems leading to applications running on the 2d Intel card instead of the 3d one. We are still learning about these so, at the time of writing, it is hard to give guidance. If you have problems with one of these machines please contact Oasys Ltd for help and advice.

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 Oasys Ltd for help and advice.

### 7.1 Finding out what graphics card and driver you have installed.

Windows 7 and Vista:

- Right click anywhere on the desktop background and select Screen Resolution
- Select Advanced Settings
- This maps the Adapter window, listing card name and manufacturer
- Select Properties within this section
- This will list the graphics driver date and version.

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 not present on Advanced display settings, followed by Display Adapter Properties.

## 7.2 Tuning an NVidia graphics driver

From V12.1 onwards Oasys Ltd 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:

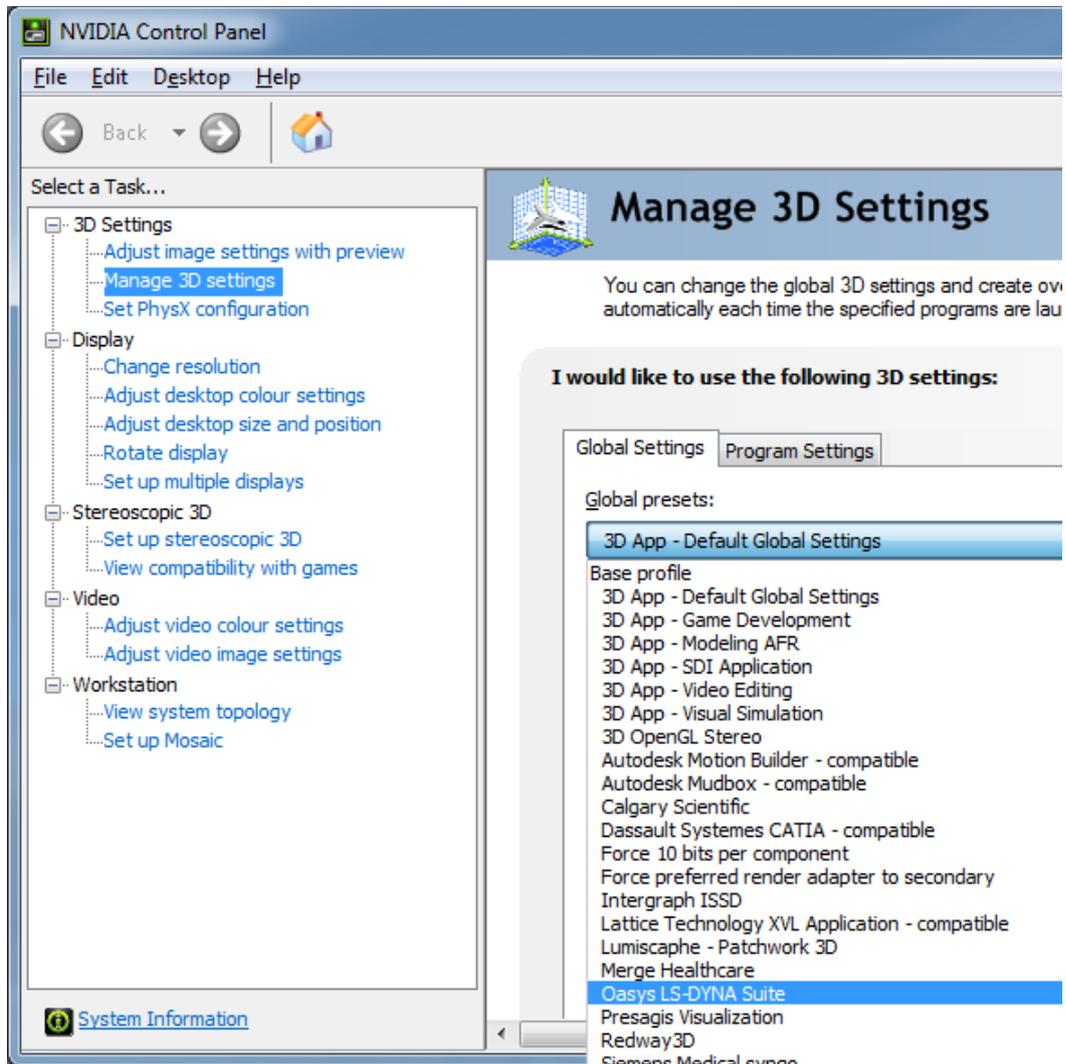
3D Settings, Manage 3D settings

You should then see a figure similar to 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 below the option “Oasys LS-DYNA 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.

## 7.3 Tuning an AMD / ATI driver

From approximately 2014 onwards AMD/ATI graphics drivers no longer use the `atiogl.xml` file as described below, so any changes made to it will be ignored.

If you experience problems on AMD/ATI graphics your first step should be to upgrade your graphics driver, preferably to one dated December 2015 or later as testing has shown this to be the most stable. Only if this is not possible and you have an old driver or card should you go through the process below.

While ATI do have an interactive configuration panel it does not provide application-specific tuning. Instead they use an XML file:

### C:\Windows\atiogl.xml

In which configuration settings for individual applications are stored. This file needs to be edited to include settings for the Oasys software suite. Here is the top of a typical file:

```
<PROFILES>
<!-- ===== -->
<!-- Workstation Applications -->
<!-- ===== -->
<!-- 3ds max -->
  <_3dsmax>
    <OpenGLCaps>0x00008040</OpenGLCaps>
    <OpenGLCapsEx>0x00000000</OpenGLCapsEx>
    <CrossFireCaps>0x00000010</CrossFireCaps>
  </_3dsmax>
```

The following lines need to be added. They can go anywhere in the file, but you might wish to insert them in the correct alphabetical location:

```
<!-- D3PLOT -->
  <d3plot16_x64>
    <OpenGLCaps>0x00008000</OpenGLCaps>
  </d3plot16_x64>
<!-- PRIMER -->
  <primer16_x64>
    <OpenGLCaps>0x00008000</OpenGLCaps>
  </primer16_x64>
<!-- THIS -->
  <this16_x64>
    <OpenGLCaps>0x00008000</OpenGLCaps>
  </this16_x64>
```

Once edited simply save the file in its current location.

## 8 THE FLEXLM LICENSING SYSTEM

---

The LS-DYNA Environment software (PRIMER, D3PLOT, T/HIS and REPORTER) use the FLEXlm licensing system.

### 8.1 Installing FLEXlm

All of the files needed to install FLEXlm on the system will have been copied into the installation directory when the software was installed. The Oasys software is designed to be used with either 'floating' or 'node locked' licenses.

### 8.2 Obtaining Oasys FLEXlm Licenses

**For floating (server) licenses:** the hostname and FLEXlm host ID of the server machine only are required (although this does not have to be a machine that the Oasys software is installed on it is recommended to be).

**For node locked licenses:** the hostname and FLEXlm host ID of each machine upon which the software will run are required.

To generate this information go to:

START->PROGRAMS->Oasys Ltd LS-DYNA Environment 16.0 and run `lmtools`.

Please send the output generated by the **Hostid** button to Oasys Ltd by email: [dyna.support@arup.com](mailto:dyna.support@arup.com).

### 8.3 Entering Oasys FLEXlm licenses

The Oasys FLEXlm license codes are contained in a file called '**oasys\_flexlm.dat**' which should be placed in the **OA\_INSTALL\_xx** directory. Typically Oasys Ltd will send license codes by e-mail.

#### 8.3.1 Node locked license

On Windows set the environmental variable as described in section 4.

#### 8.3.2 Floating (server) license

If a floating (server) license is to be used the Oasys FLEXlm license daemon should be started.

### 8.4 Starting the Oasys FLEXlm license daemon

The FLEXlm license daemon can be started manually through the command line or through a graphical user interface called `lmtools`.

### 8.4.1 Manually from the Command Line

Start `lmgrd` as an application from a Windows command shell using the following syntax:

```
C:\flexlm> lmgrd -c license_file_list -L [+]debug_log_path
```

where:

- `license_file_list` is one or more of the following:
  - the full path to a single license file
  - a directory, where all files named `*.lic` in that directory are used
- `debug_log_path` is the full path to the debug log file

Prepending `debug_log_path` with the `+` character appends logging entries.

Spaces in pathnames require double quotes around the path.

### 8.4.2 LMTOOLS for Windows

Some of the functions `lmtools` performs include:

- starting, stopping, and configuring FLEXlm licenses
- getting system information, including hostids
- getting server status

#### 8.4.2.1 Configuring the license server with LMTOOLS

`lmtools` has two modes in which to configure a license server:

##### Configuring using a license file

Operations are performed on a particular license file. The file can be either local or remote. In this mode the `lmgrd` process cannot be started but everything else can be carried out. To configure this mode, perform the following:

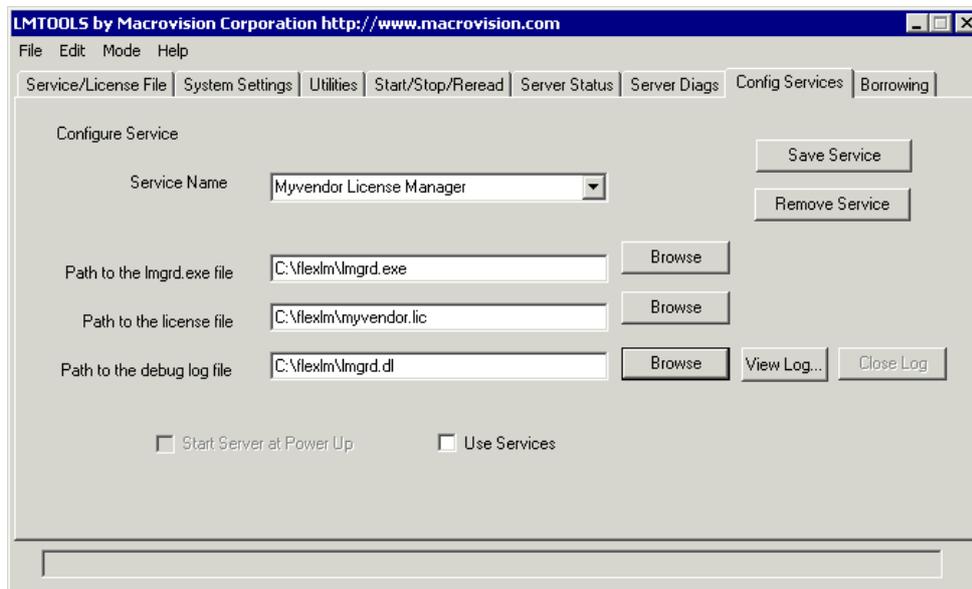
- 1) Run `lmtools`.
- 2) Click the Configuration using License File radio button.
- 3) Enter one or more license file names or `port@host`.

##### Configuring the License Manager as a Windows Service

To configure a license server as a service, you must have Administrator privileges:

- 1) Run `lmtools`
- 2) Click the Configuration using Services radio button then click the Config Services tab
- 3) In the Service Name field type the name of the service to be defined (e.g. 'Myvendor License Manager')
- 4) In the Path to the `lmgrd.exe` file field enter or browse to `lmgrd.exe` for this license server.
- 5) In the Path to the license file field enter or browse to the license file for this license server
- 6) In the Path to the debug log file field enter or browse to the debug log file that this license server writes. Prepending the debug log file name with the `+` character appends logging entries.

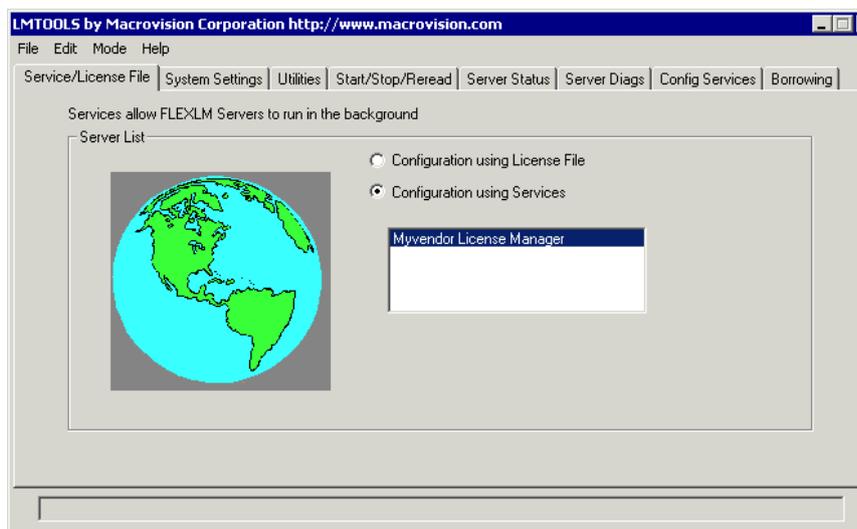
- 7) To save the new 'Myvendor License Manager' service, click the **Save Service** button.



### 8.4.2.2 Starting the license daemon

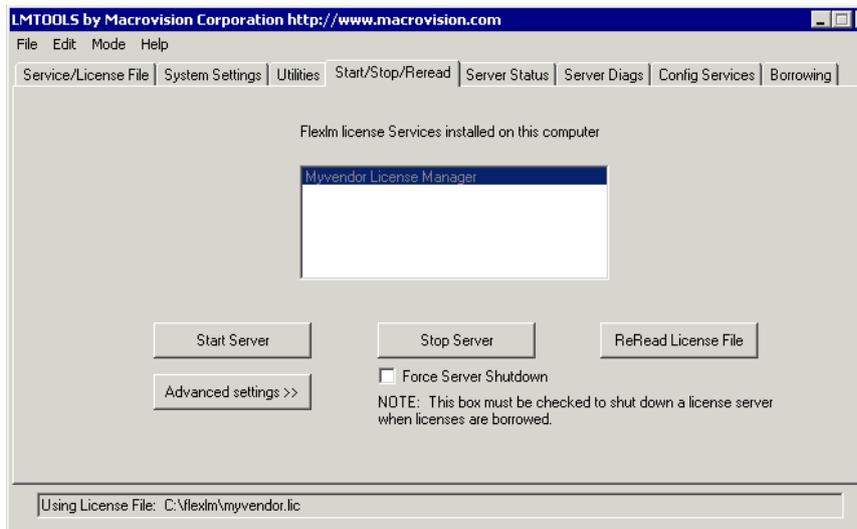
Once the license manager service is configured, `lmgrd` is started by starting the service from the `lmtools` interface:

- 1) Start `lmtools`. `lmtools` appears with the **Service/License File** tab open:



- 2) Click the **Configuration using Services** radio button.
- 3) Select the service name from the list presented in the selection box. In this example, the service name is 'Myvendor License Manager'.

4) Click the Start/Stop/Reread tab:



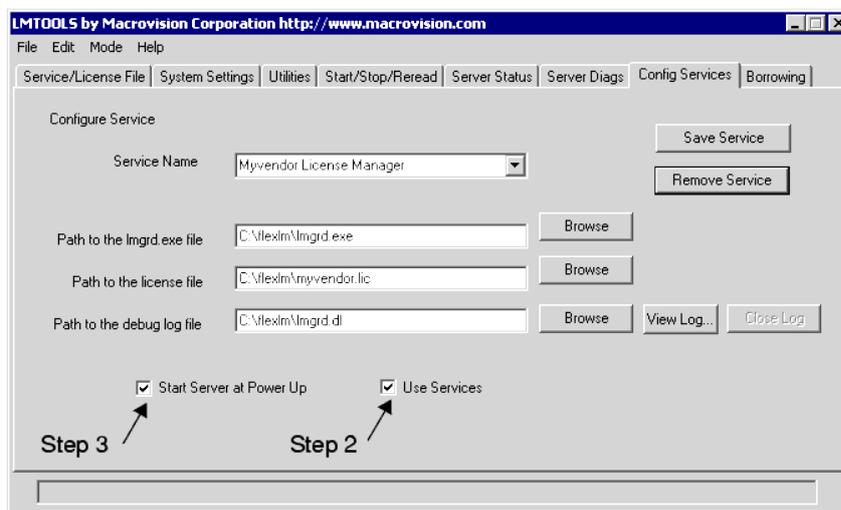
5) Start 'Myvendor License Manager' by clicking the Start Server button

'Myvendor License Manager' license server starts and writes its debug log output to `c:\flexlm\lmgrd.dl`.

### 8.4.2.3 Automatically at System Start Up

In order for `lmgrd`, and hence the license server, to start up automatically at system start up time it must be configured as a license manager service (see section 4.5.2.1).

- 1) With `lmttools` started and the desired service name selected, click the **Config Services** tab.
- 2) Make this license manager a Windows service: check the **Use Services** check box (otherwise it becomes a `FLEXlm` service)
- 3) Configure it to start at system startup time by checking the **Start Server at Power Up** check box.



From now on, when the machine is rebooted, this license manager starts automatically as a Windows service.

## 8.5 Redundant License Servers

If planning to use redundant servers it is advisable to select stable systems as server machines; do not pick systems that are frequently rebooted or shut down. Redundant license server machines are any supported server machines.

FLEXlm supports two methods of redundancy:

- via a license-file list in the `LM_LICENSE_FILE` environment variable
- via a set of three redundant license servers

With `LM_LICENSE_FILE` list redundancy, each one of a group of license servers serves a subset of the total licenses. The end user sets `LM_LICENSE_FILE` to a list of license files, where each license file refers to one of the license servers. The application then tries each server in the list in order until it succeeds or gets to the end of the list.

With three-server redundancy, if any two of the three license servers are up and running (two out of three license servers is referred to as a quorum), the system is functional and serves its total complement of licenses.

### 8.5.1 Three-Server Redundancy

The machines that comprise a three-server redundant configuration should

- Run the same operating system
- Have excellent communications
- Reside on the same subnet

The three servers must be located physically close to each other. This form of redundancy requires that the servers exchange heartbeats periodically and poor communications can cause poor performance. Avoid configuring redundant servers with slow communications or dial-up links.

Three-server redundancy is designed to provide hardware failure protection only and does not provide load-balancing (if load-balancing is desired use the `LM_LICENSE_FILE` list option).

With three-server redundancy only one of the three servers is “master,” capable of issuing licenses. If the “master” machine fails one of the remaining machines takes over the “master” role and continues to serve licenses. Since all clients must contact the “master” all clients must have reliable networking to a single machine.