Oasys
LS-DYNA Environment

Oasys Ltd SHELL Manual

Version 22.1

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SHELL 22.1

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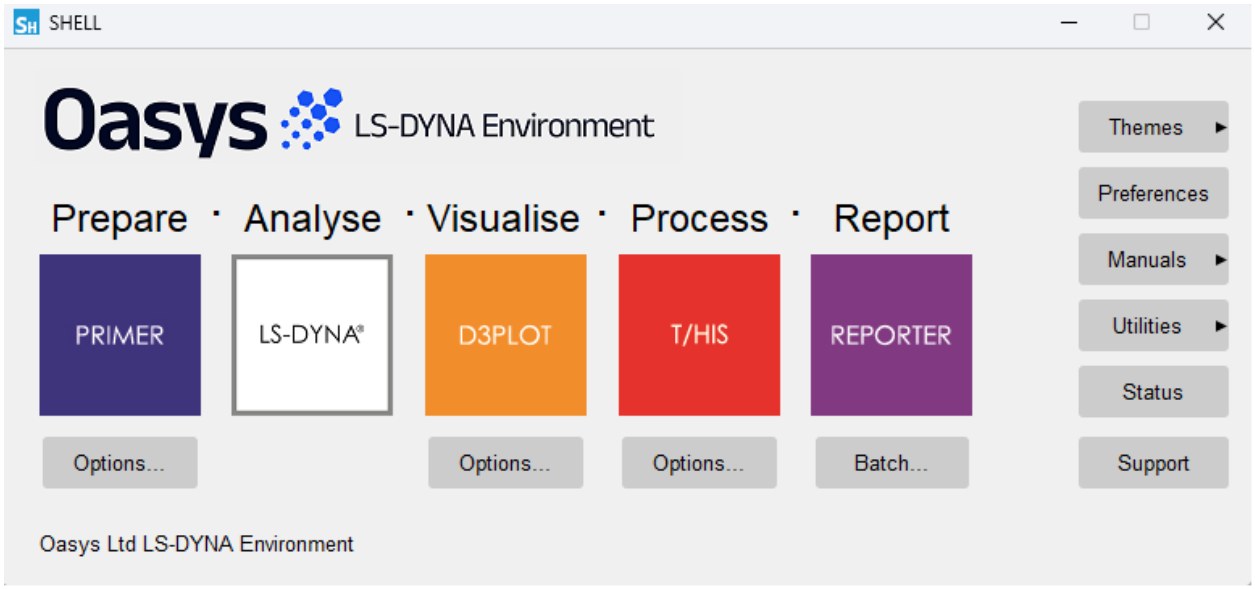
Oasys Ltd SHELL Manual

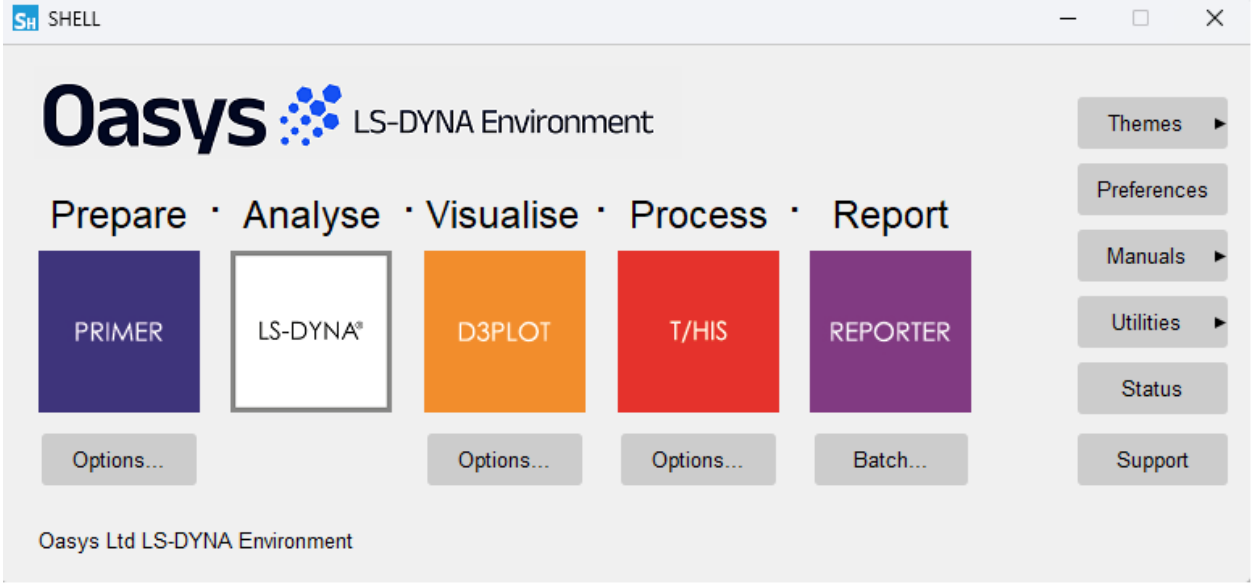


8 Fitzroy Street | London | W1T 4BJ

2. Oasys LS-DYNA Environment

2.1. Introduction

Introduction



LINUX

On LINUX the Oasys LS-DYNA Environment software is accessed by running the executables.

Windows

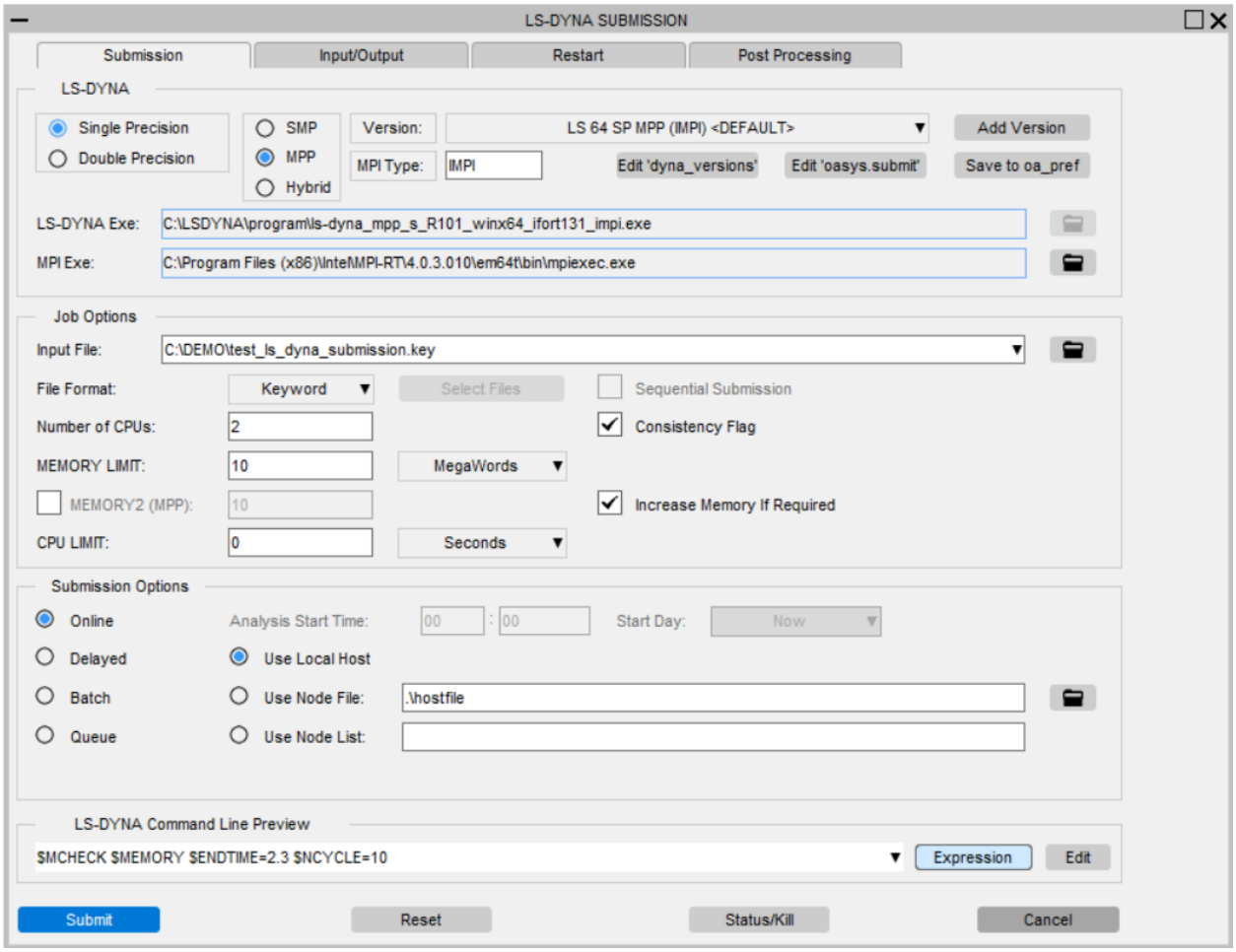
On Windows the software is accessed via the Start Menu, **All Programs ->Oasys LS-DYNA Environment 22.1**

2.2. Ansys LS-DYNA Submission Tab

Ansys LS-DYNA Submission Tab

The Ansys LS-DYNA button accesses the submission menu for Ansys LS-DYNA.

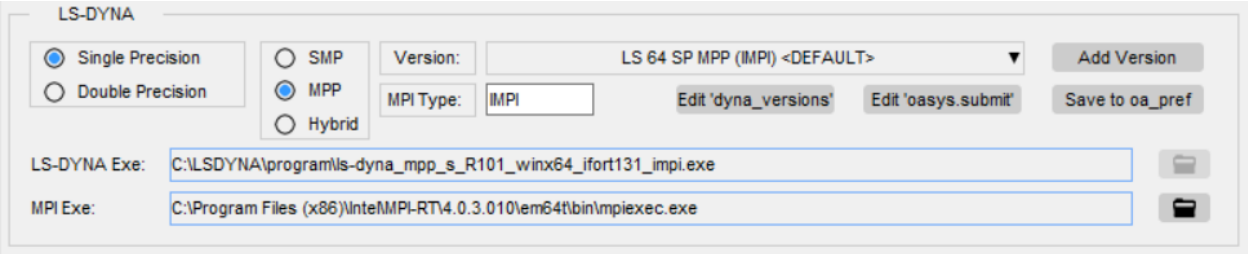
The first time this button is pressed the 'oa_pref' file will be read and any default values set (see Preferences for more details on the 'oa_pref' file). After the file has been read following menu will be displayed.



2.2.1. Ansys LS-DYNA Executable options

Ansys LS-DYNA Executable options

Types of Ansys LS-DYNA Executable



The radio options to the left of this section can be used to select the desired type of Ansys LS-DYNA executable to used for the analysis.

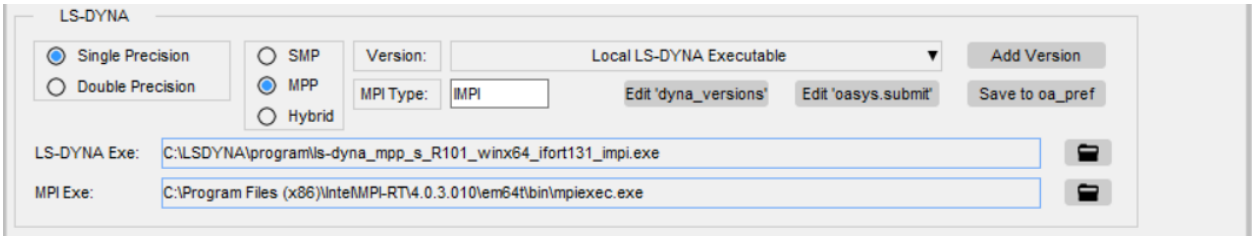
Precision: **Single Precision** (32 bit floating point) **Double Precision** (64 bit floating point)	**Code Type**: **SMP** (Shared memory parallel) **MPP** (Distributed memory parallel) **Hybrid**	**MPI Type**: Mentions the "MPI" type of the executable to be used for the MPP Ansys LS-DYNA submission.

Path to the Ansys LS-DYNA Executable

Clicking on these radio buttons will cause the Ansys LS-DYNA **Version** menu to be populated corresponding to the options specified to be selected.

The submission shell can be used to access more than one version of Ansys LS-DYNA.

Clicking on the menu labeled **'Version'** will bring up this drop down menu listing the versions of Ansys LS-DYNA present in the **dyna_versions** file.



Instead of selecting an executable from the list in the **dyna_versions** file an executable can be explicitly specified by selecting the '**Local Ansys LS-DYNA Executable**' option.

To browse for the executable select the folder icon.

The Precision-type and the Code-type (SMP, MPP or Hybrid) also need to be set to the correct values as it's not possible for the SHELL to know these from just the executable name.

If the code-type is MPP then you also need to set the correct MPI Type.

Default Ansys LS-DYNA Options

The user can also specify a "Default" Ansys LS-DYNA executable related the SHELL preferences.

The **"default_ls_dyna_executable"** preference assigns the given Ansys LS-DYNA executable path for a given values of the Ansys LS-DYNA type related preferences:

"default_code_type"
"default_precision"
"default_mpi_type"

The user can also specify the path to the MPI executable.

The default MPI executable can be given via the **"default_mpi_executable"** SHELL preference.

The current selection of the Ansys LS-DYNA executable and MPI executable type and path values can be set as a default into the HOME preference file by pressing the '**Save to oa_pref**' button

View/Edit SHELL files

You can also view and/or edit the **dyna_versions** file and the **Oasys.submit** file from this section.

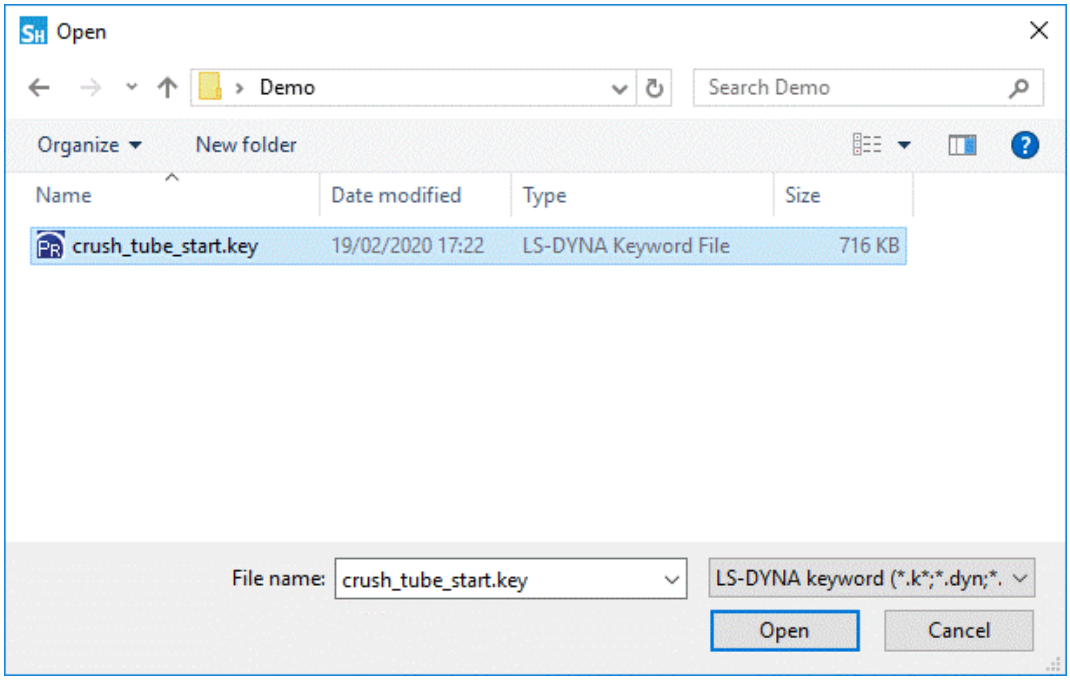
If you have the appropriate file permissions you can append the "Local" or the "Default" Ansys LS-DYNA executable related information to the **dyna_versions** file by pressing the '**Add Version**' button.

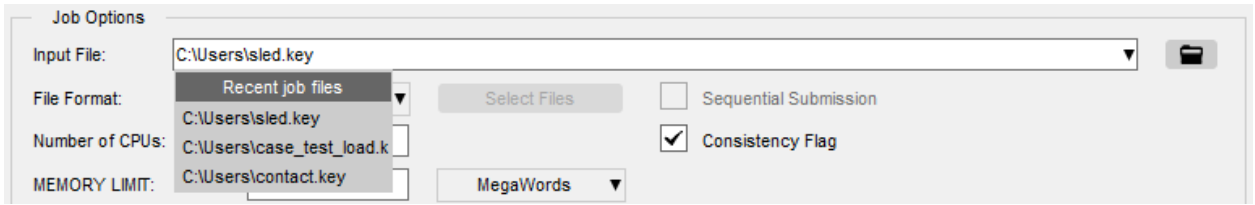
2.2.2. Job Options

Job options

Input File

Enter the name of the analysis file into the box provided. Jobs may be specified in any directory by entering either the full pathname of the input file or the pathname relative to the current directory. If the input file format is set to Keyword it will be assumed that the filename ends in '.key', otherwise it will be assumed that the filename ends in '.inf'. To search for the file, click on the icon to the left of the Jobname box. This will bring up a standard file selector box shown below.





The default search pattern will be set to '*.key' if the input file format is set to Keyword, '*.inf' if it is set to Fixed and '*.lst' if it is set to List.

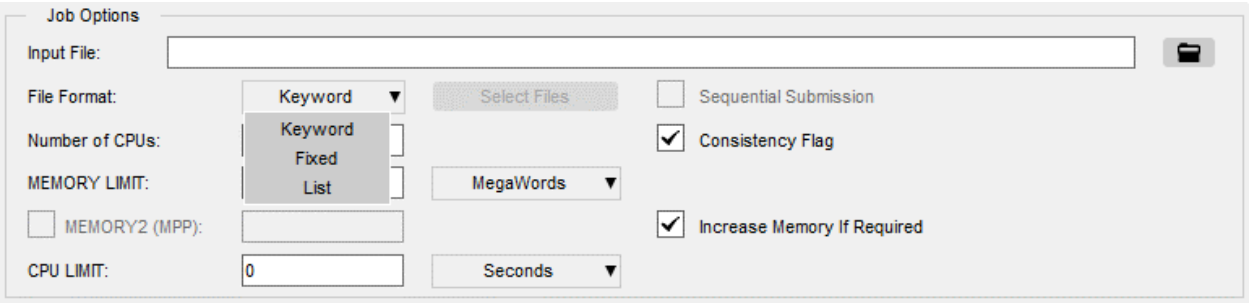
Files can also be selected using the dropdown to the input file field. It has a list of all the recent Ansys LS-DYNA jobs that were submitted.

Input File Format

The input file format may be altered between Keyword and Fixed and List.

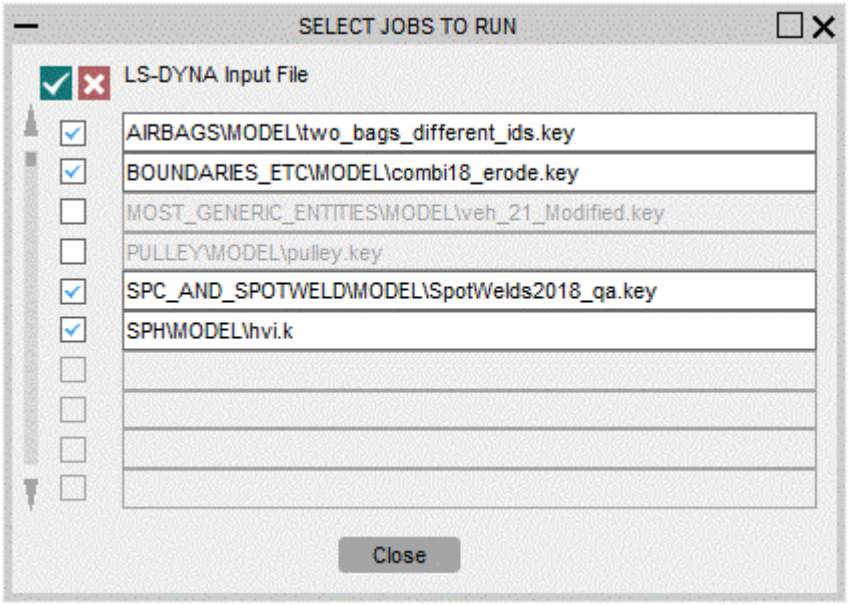
If the List option is chosen a file containing a list of Ansys LS-DYNA models can be selected for submitting to Ansys LS-DYNA. The List file can contain either just a list of LS-DYNA models or it can also contain additional information for running REPORTER automatically after the analysis terminates. (see LIST File Format for details on the List file format).

All of the jobs can be submitted either sequentially or simultaneously .



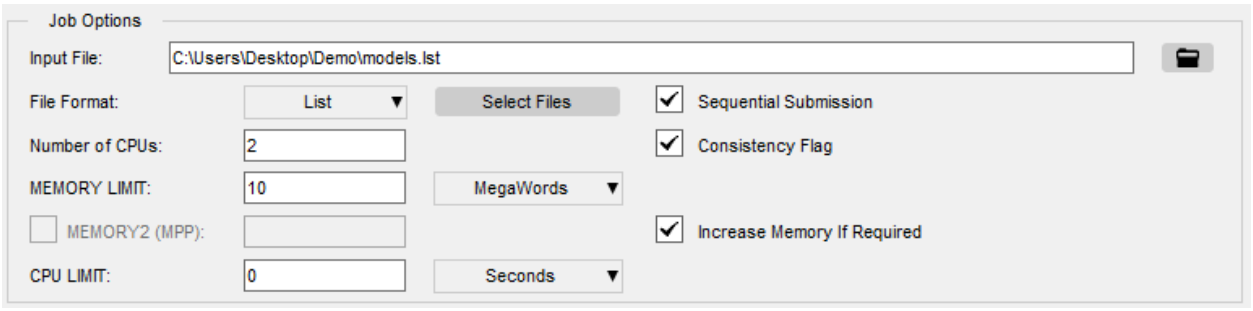
Select Files To Run

If the input file format is set to List then a subset of the models listed in the file can be selected to be run when the List file is submitted.



Sequential Job Submission

If a list of Ansys LS-DYNA jobs is submitted using the List option then they can either be submitted sequentially one after the other or they can all be submitted simultaneously.



Number of CPUs

This option will only be accessible if your system supports parallel versions of Ansys LS-DYNA. The required number of processors to run the job on can be selected using the arrow buttons. The maximum number of processors that can be selected is controlled through the 'oa_pref' file (see section 2.3)

The value selected will override the number of processors selected on the *CONTROL_PARALLEL card in the input deck.

MEMORY Limit

The Analysis Memory Limit can be entered directly in the space provided. The units used to define the Memory Limit can be switched between Words and Megawords and Automatic using the available toggle. The value entered is the size of the main array declared internally within Ansys LS-DYNA that is used to store data in.

A value of "0" means that the analysis will use the default value built into Ansys LS-DYNA. If a value is specified on the *KEYWORD card in a input deck then that value will override all other memory definitions.

MEMORY2 (MPP/HYBRID only)

This option is only available for the MPP/HYBRID version of Ansys LS-DYNA. With the MPP/HYBRID versions of Ansys LS-DYNA more memory is required for the first CPU that initialises the model than for the other processors. Generally if the first CPU requires X words of memory to initialise the job then the amount of memory required for each additional processor is X/n where n is the total number of CPU's.

Consistency Flag

This option controls whether parallel analyses are run with the accuracy option in Ansys LS-DYNA turned ON or OFF. The default is to turn the accuracy option ON which results in nearly identical results across different numbers of CPU's but a lower overall speedup in the job time.

The value selected will override that selected on the *CONTROL_PARALLEL card.

Automatically Increase Memory If Required

If this option is selected then Ansys LS-DYNA will automatically increase the amount of memory it uses if the amount specified by MEMORY LIMIT is insufficient.

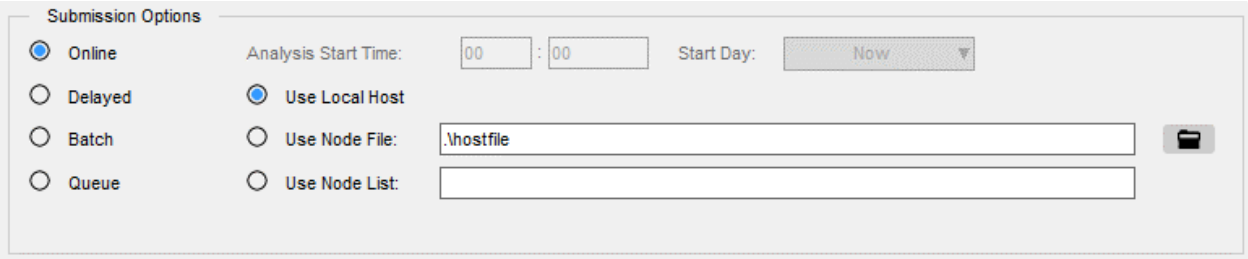
CPU limit

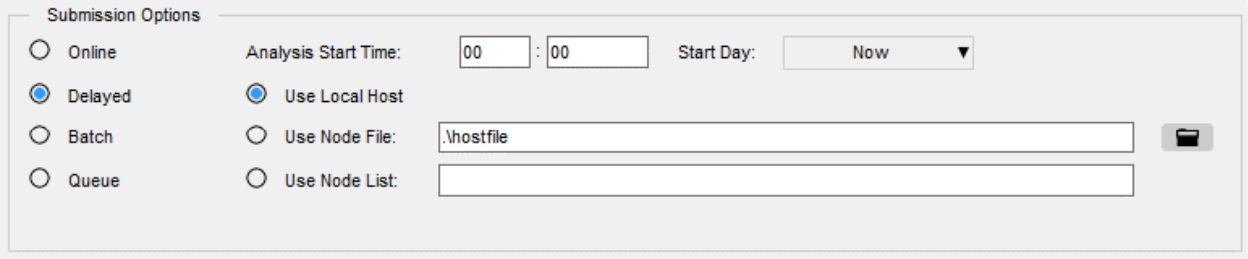
The Analysis CPU Limit can be entered directly in the space provided. The units used to define the CPU limit can be switched between Seconds, Minutes and Hours by using the toggle available. The value entered is the actual amount of CPU time that Ansys LS-DYNA will use for the analysis. When this limit is reached Ansys LS-DYNA will terminate the job. A value of "0" means that no limit has been set and the job will run to termination.

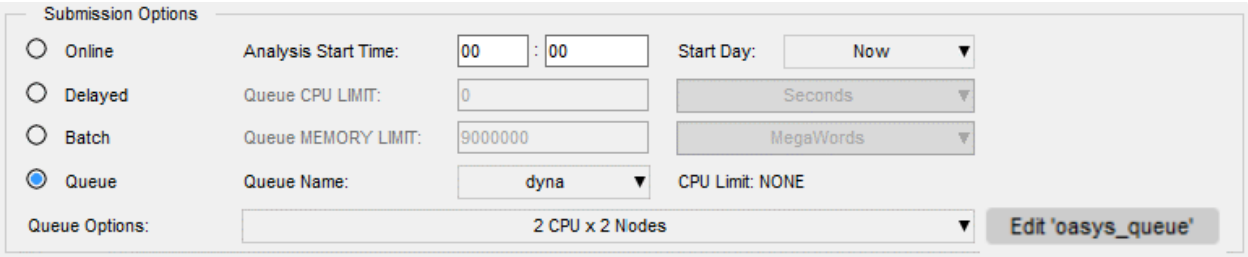
2.2.3. Submission Options

Submission Options

Submission Method







Jobs may be submitted using 4 different submission methods. If some of the options are not available on your system then the option will be greyed out in the submission menu and will be unselectable. The parameters that can be specified under each option are different and those available under the Queue option will vary from system to system.

The four different submission options are :

Online	Submit jobs interactively using an Xterm session. Delayed start times cannot be specified.
Background	Submit jobs in background. If a delayed start times is specified then the job will be submitted using the LINUX 'at' command.

Batch	Submit jobs into a batch queue using the LINUX 'batch' command. Delayed start times cannot be specified.
Queue	Submit jobs to NQE batch queues using 'qsub' or equivalent commands. Delayed start times, Queue CPU/Memory Limits may be specified.

You can also view and/or edit the **oasys_queue** file from here.

Local Host

This option will only be availble when submitting MPP jobs using either the Online, Background or Batch options.

When selected the MPP jobs will be submitted using only the machine that the shell is being run on.

Node File

This option will only be availble when submitting MPP jobs using either the Online, Background or Batch options.

This option can be used to select a file containing a list of Nodes and CPUS to use when submitting an MPP job. The format of the file will depend on the MPI library that the version of Ansys LS-DYNA has been built with.

MPICH2	**cluster1:2** **cluster2:2** **cluster3** **cluster4**
	Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"
HP MPI / PLATFORM MPI	**cluster1:2** **cluster2:2** **cluster3** **cluster4**
	Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"
INTEL MPI	**cluster1:2** **cluster2:2**

<table>
<tr><td></td><td colspan="3">cluster3
cluster4</td></tr>
<tr><td></td><td colspan="3">Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"</td></tr>
<tr><td rowspan="2">OPEN MPI</td><td>cluster1
cluster1
cluster2
cluster2
cluster3
cluster4</td><td>or</td><td>cluster1 slots=2
cluster2 slots=2
cluster3
cluster4</td></tr>
<tr><td colspan="3">Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"</td></tr>
</table>

Node List

This option can be used to specify a string containing the list of Nodes and CPUS to use when submitting an MPP job. The format of the sting will depend on the MPI library that the version of Ansys LS-DYNA has been built with.This option will only be availble when submitting MPP jobs using either the Online, Background or Batch options.

<table>
<tr><td rowspan="3">MPICH2</td><td>#hosts host1 cpus(1) host2 cpus(2) ..... hostn cpus(n)</td></tr>
<tr><td>4 cluster1 2 cluster2 2 cluster3 1 cluster4 1</td></tr>
<tr><td>Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"</td></tr>
<tr><td rowspan="3">HP MPI / PLATFORM MPI</td><td>host1:cpus(1),host2:cpus(2),.....,hostn:cpus(n)</td></tr>
<tr><td>cluster1:2,cluster2:2,cluster3,cluster4</td></tr>
<tr><td>Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"</td></tr>
<tr><td rowspan="3">INTEL MPI</td><td>#hosts host1 cpus(1) host2 cpus(2) ..... hostn cpus(n)</td></tr>
<tr><td>4 cluster1 2 cluster2 2 cluster3 1 cluster4 1</td></tr>
<tr><td>Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"</td></tr>
<tr><td rowspan="2">OPEN MPI</td><td>#hosts host1 cpus(1) host2 cpus(2) ..... hostn cpus(n)</td></tr>
<tr><td>cluster1,cluster1,cluster2,cluster2,cluster3,cluster4</td></tr>
</table>

	Submit a job using 4 hosts, use 2 CPU's on "cluster1" and "cluster2" and 1 CPU on "cluster3" and "cluster4"

Analysis Start Time

If a job is submitted using either the Background or Queue options it is possible to specify a time at which the job will execute. The required time should be entered in the form HH:MM using a 24 hour clock. If no time is specified then the job will executed as soon as possible. If the time specified has already been passed then the job will start immediately.

(This option will not be available if the Queue option is submitting the job to a **SGE** queuing system.

Analysis Start Day

If a job is submitted using either the Background or Queue options it is possible to specify a day on which the job will execute. Use the toggle to specify the day on which the job will be executed. If a day is specified and no analysis start time has been set, the job will be submitted with a start time of 00:01 on the required day.

(This option will not be available if the Queue option is submitting the job to a **LSF** or **SGE** queuing system).

Queue CPU Limit

This option will only be accessible when jobs are being submitted using the Queue option. If your system does not require CPU Limits to be specified for NQS style queues then your system manager will have disabled this option. The Queue CPU Limit can be entered directly into the space provided. The units used to define the CPU Limit can be switched between Seconds, Minutes and Hours using the toggle available. The value entered is the total Queue CPU Limit that include the time taken to run the Ansys LS-DYNA analysis and any system time required. The value entered should be larger than the Analysis CPU Limit so that when the analysis finishes there is enough time to write Ansys LS-DYNA restart and result files. If the extra time specified is unlikely to be sufficient a warning message will be generated when the job is actually submitted to the Queue.

A value of "0" means that the analysis will be submitted with an unlimited Queue CPU Limit.

Queue Memory Limit

This option will only be accessible when jobs are being submitted using the Queue option. If your system does not require Memory Limits to be specified for NQS style queues then your system manager will have disabled this option. The Queue Memory

Limit can be entered directly into the space provided. The units used to define the Memory Limit can be switched between Words and Megawords using the toggle available. The value entered defines the total amount of memory that the job will request from the system. In order to allow Ansys LS-DYNA to initialise this value should be set to a minimum of 5000000 words larger than the Analysis Memory Limit, (see section 2.3.1). If a smaller value is specified a warning message will be generated when the job is actually submitted to the Queue.

A value of "0" means that the analysis will we submitted with an unlimited Limit.

Queue Name

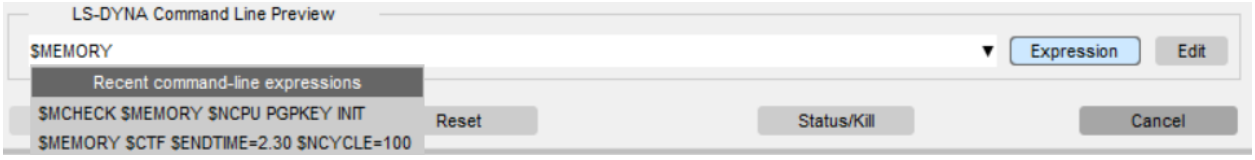
This option will only be accessible when jobs are being submitted using the Queue option. If the system has more than one NQS style queue then the required queue may be selected from a pull-down menu activated by the right hand mouse button. When a queue is selected the CPU limit for that queue will be displayed alongside the queue name. If the queue is a pipe queue the word PIPE will be displayed, if the queue has no CPU limit then the word NONE will be displayed. The default queue will be the first one listed in the 'oasys_queue' file.

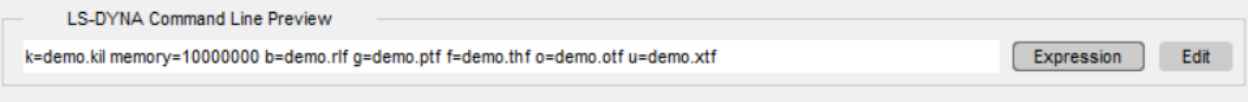
Queue Options

This option will only be accessible when jobs are being submitted using the Queue option. It is intended to be used so that user defined queue directives can be specified rather than using the ones produced by the shell (see pack_nodes)

The options available will depend on the queue and number of cpus chosen and the contents of the 'oasys_queue' file. Selecting an option will put the additional queue directives defined in this file into the submission script. If there are no options available for the selected number of cpus then the options for the next number of cpus up will be displayed, e.g. if the number of cpus chosen is 3, but no options are defined for 3 cpus, then if there are options defined for 4 cpus then the options for 4 cpus will be shown. If there are no options available then the default directives produced by the shell will be used.

Ansys LS-DYNA Command Line Preview





Ansys LS-DYNA command line preview section lets the user view and edit the Ansys LS-DYNA **command line expression** and also the **detailed preview** for the actual LS_DYNA command-line.

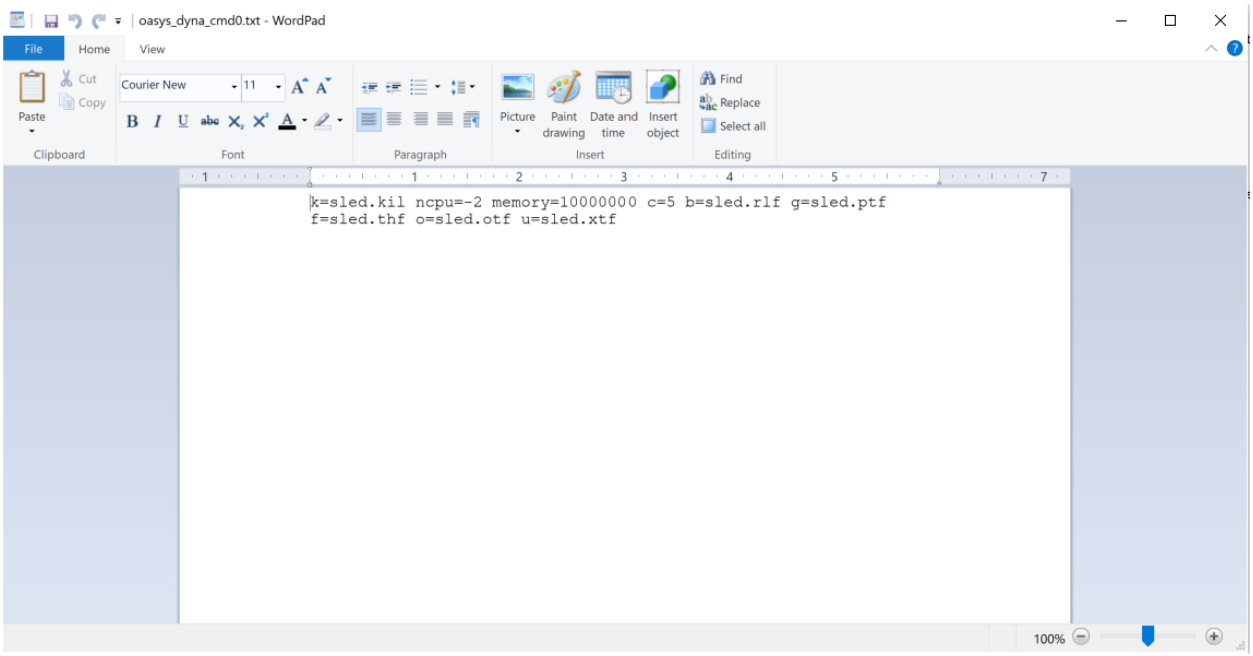
The detailed preview shows the commands with their appropriate Ansys LS-DYNA syntax.

It is possible to switch between the expression and the detailed preview using the '**Expression**' button.

The Ansys LS-DYNA expression allows the user to know all the Ansys LS-DYNA commands in a consise format.

The SHELL also saves the command-line expressions values from the previously completed Ansys LS-DYNA submissions.

This is for an easy and quick re-submission to Ansys LS-DYNA can be picked up using the '**Recent command-line expressions**' popup menu.



User can use the 'Edit' button to edit the deteiled preview, this haults the SHELL operation until the edit is complete. User can edit/add/delete input and output options in the Input/Output tab using Edit button. User can also add new commands into the command line that are currently under development.

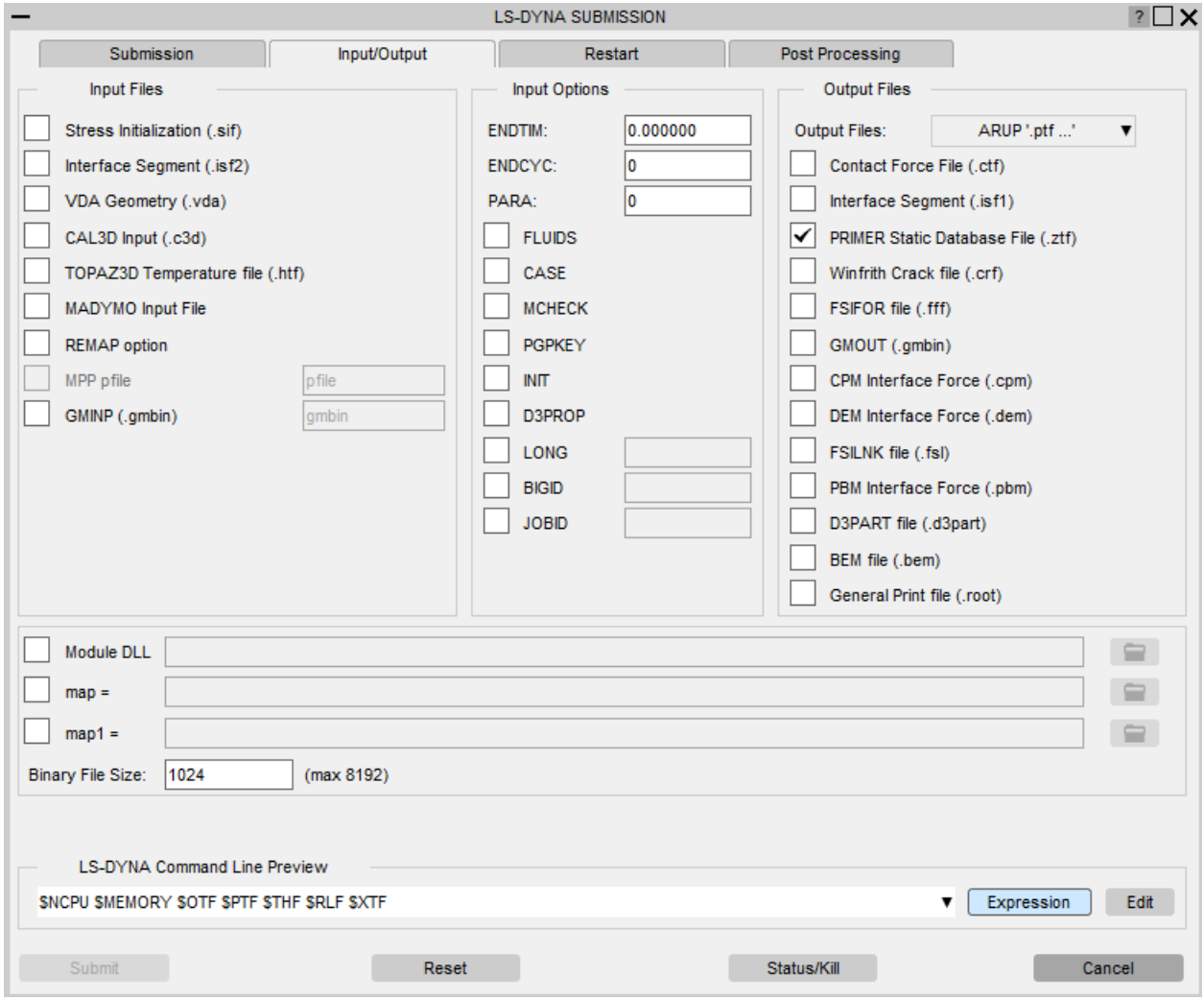
The text editor preference can be changed through 'Prefernces' button on the main window under SHELL=>System Settings=>text editor.

2.2.4. Input/Output Tab

Input/Output Tab

Clicking on the OPTIONS tab will display this menu of input and output options that can be used with Ansys LS-DYNA.

For more details on these options see the Ansys LS-DYNA User's manual.



Output Files

This option controls the names of the output files generated by Ansys LS-DYNA, either ARUP or LSTC can be selected. With Ansys LS-DYNA 970 onwards the names of the output files can also be specified using the *KEYWORD_ID option where a filename prefix for all of the output files is specified within the input file. If a filename prefix is specified in the input file then this option will be replaced with the prefix specified in the file.

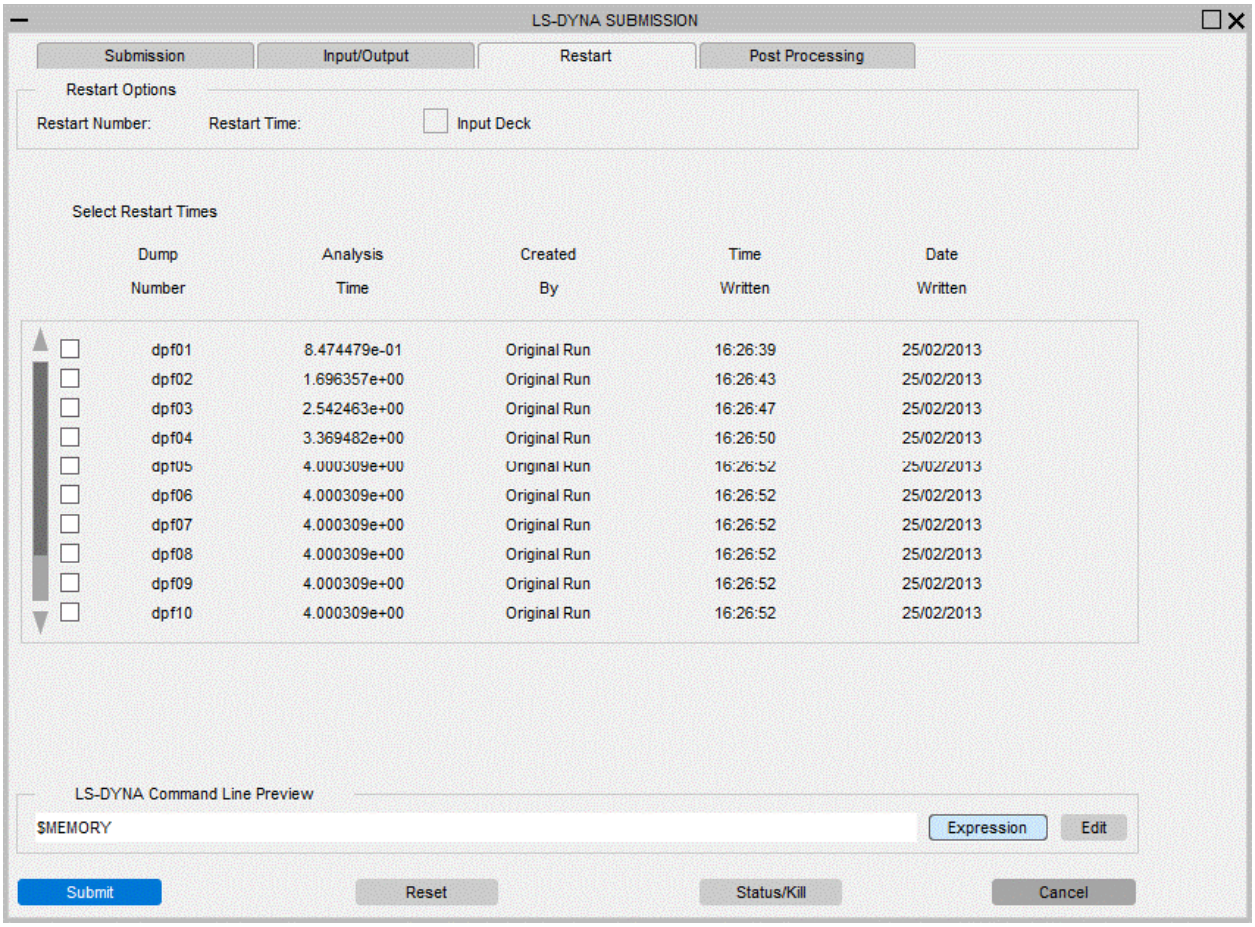
Output File	ARUP	LSTC	*KEYWORD_ID
Binary Complete State Database	'jobname'.ptf	D3PLOT	'prefix'.D3PLOT
Time History Database	'jobname'.thf	d3thdt	'prefix'.d3thdt
Extra Time History Database	'jobname'.xtf	xtfile	'prefix'.xtfile
Binary Output File	binout	binout	'prefix'.binout
Restart Dump File	'jobname'.dpf	d3dump	'prefix'.d3dump
PBM Interface Force	'jobname'.pbm	pbmfor	'prefix'.pbmfor
D3PART File	'jobname'.d3part	d3part	'prefix'.d3part
Running Restart Dump	'jobname'.adf	runrsf	'prefix'.runrsf

2.2.5. Restart Tab

Restart Tab

Select Restart Time

This option will only be available if the analysis is not a coupled Ansys LS-DYNA/ MADYMO3D analysis. When this button is selected all input to the Shell will be frozen while a search is carried out for any restart input files that exist for the specified job. When the search has been completed the window shown below with all of the available restart times will be displayed and the required time may be selected.

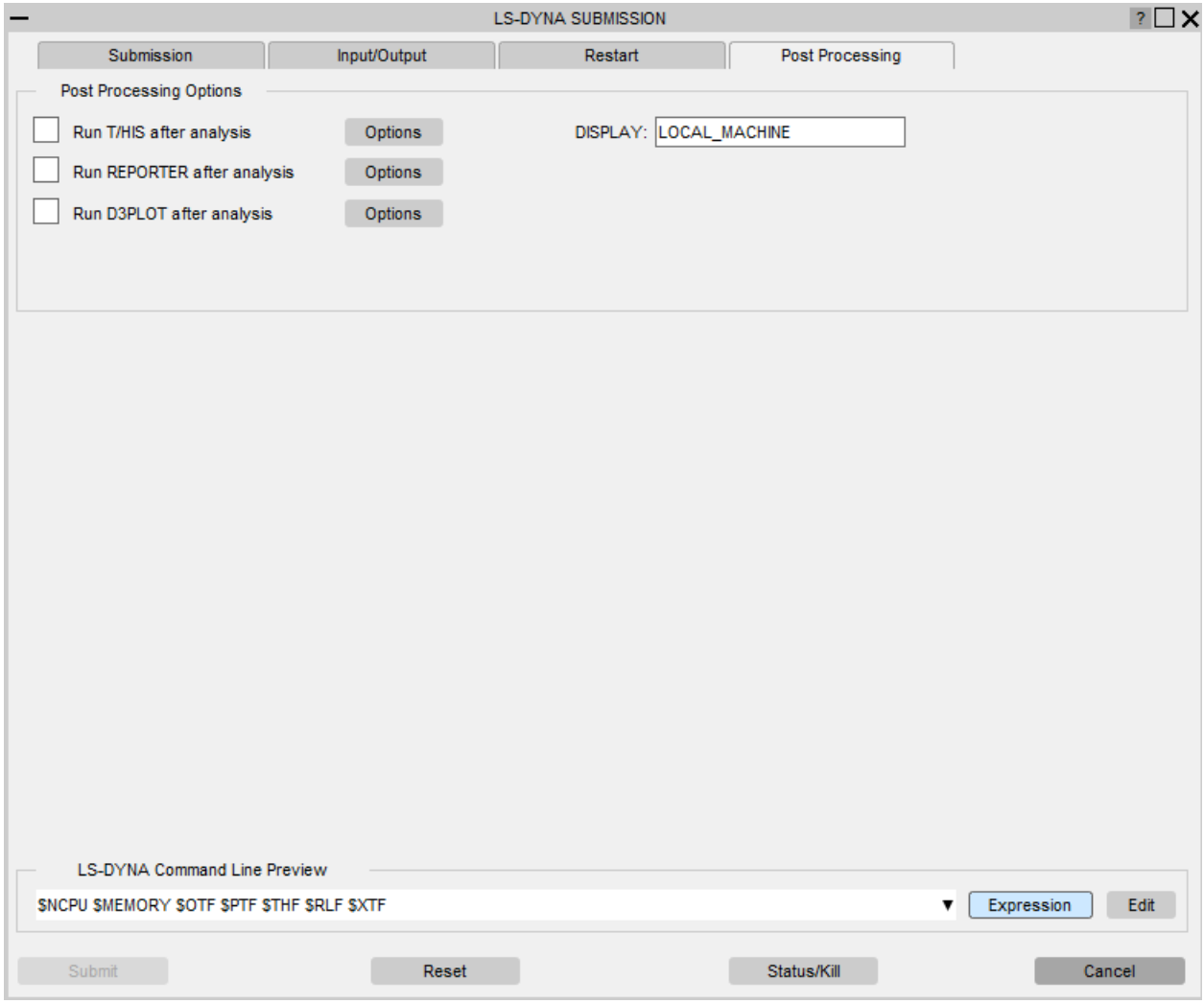


Select the desired restart file and press the OK button to return to the main submission window where the screen will be updated to reflect the details of the restart file selected. A check will also be carried out to see if a restart input deck exists and if one is found the user will be offered the opportunity to use it.

If, after a restart file has been selected, the user decides that they do not want to use it, the restart file selection menu should be re-displayed and the previously selected file should be deselected.

2.2.6. Post Processing Tab

Post Processing Tab



Run T/HIS after Analysis

Setting this option to ON will cause a fasttcf .inp script present in the job directory (the directory containing the analysis file) to be executed following termination of the job. Fast-tcf provides a fast, automated method of post-processing output data from Ansys LS-DYNA by producing a set of command files for T/HIS from an ASCII input file. This option will only be available if there is a jobname.inp file. Selecting OFF will disable this automatic post-processing

The Options button can be used to specify options which will affect how T/HIS operates when it is executed. This will open up the T/HIS Options window, which will allow T/HIS command line options to be explicitly defined.

Run REPORTER after Analysis

Setting this option to ON will cause REPORTER to automatically run following termination of the analysis. Selecting OFF will disable this automatic post-processing. The Options button can be used to set up input options for REPORTER when it runs, see REPORTER Options for more details on these options.

Run D3PLOT after Analysis

Setting this option to ON will cause D3PLOT to automatically run following termination of the analysis. Selecting OFF will disable this automatic post-processing. The Options button can be used to set up input options for D3PLOT when it runs, see D3PLOT Options for more details on these options.

Display

If you are running T/HIS, REPORTER or D3PLOT automatically at the end of an analysis then this option can be used to select the machine on which T/HIS, REPORTER or D3PLOT should be displayed when it runs. By default this will be set to the machine you submitted the job from and will not normally need to be changed.

2.2.7. Submit

Submit

Click on this button to submit the Ansys LS-DYNA job using all of the options previously set. Before the job is actually submitted the following checks will be carried out:

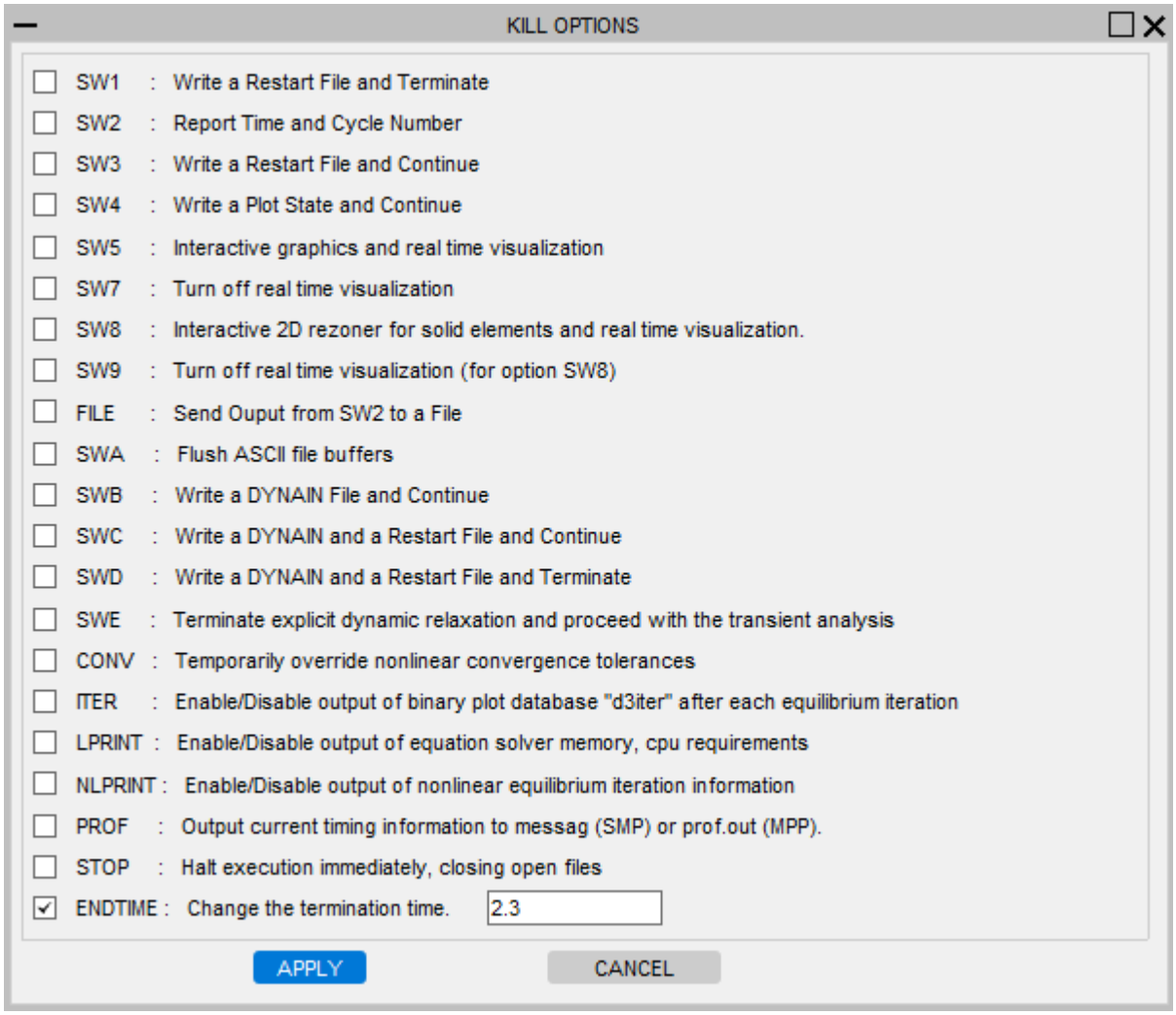
- The input file specified exits.
- The Queue CPU Limit, if specified, is larger than the Analysis CPU Limit.
- The Queue Memory Limit, if specified, is at least 6000000 words larger than the Analysis Memory Limit.
- An Account name , if required, has been specified.

Reset

Click on this button to reset all of the submission options to their default values.

Status Kill

This option can be used to either terminate an Ansys LS-DYNA analysis that is already running or to force the analysis to perform a range of tasks. Clicking on this button will bring up the menu shown below, displaying the possible options.

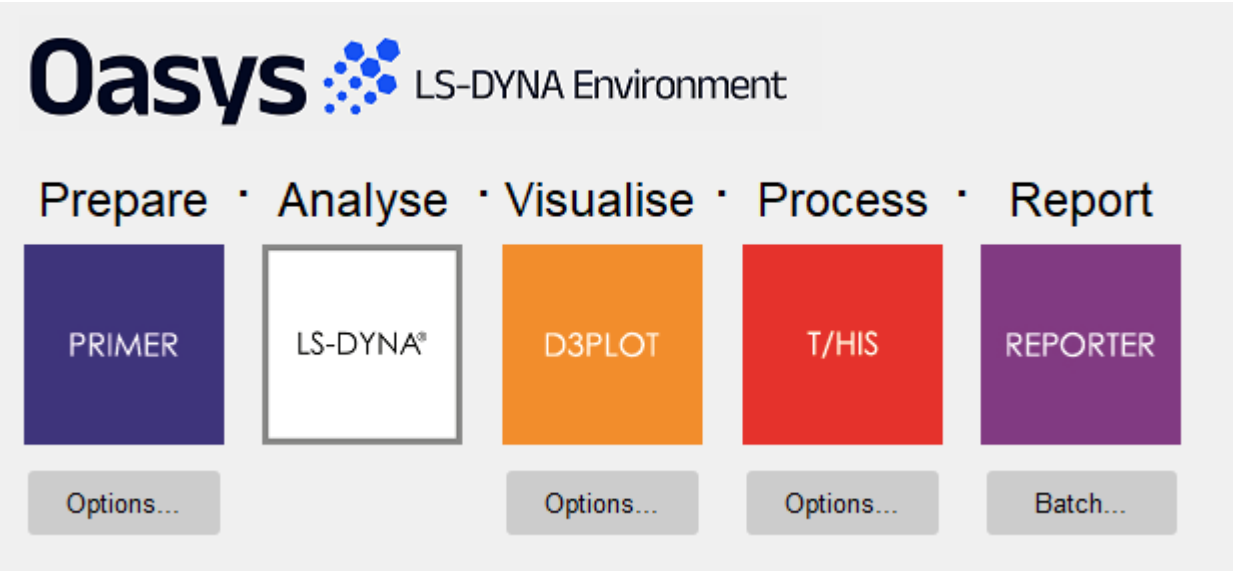


Cancel

Click on this button to close the submission menu and return to the main shell window without submitting an Ansys LS-DYNA job.

2.3. PRIMER

PRIMER



Select this option to access the PRIMER program. This program is a graphical model editor that will position occupant models, fold airbags and allow model parameters to be modified.

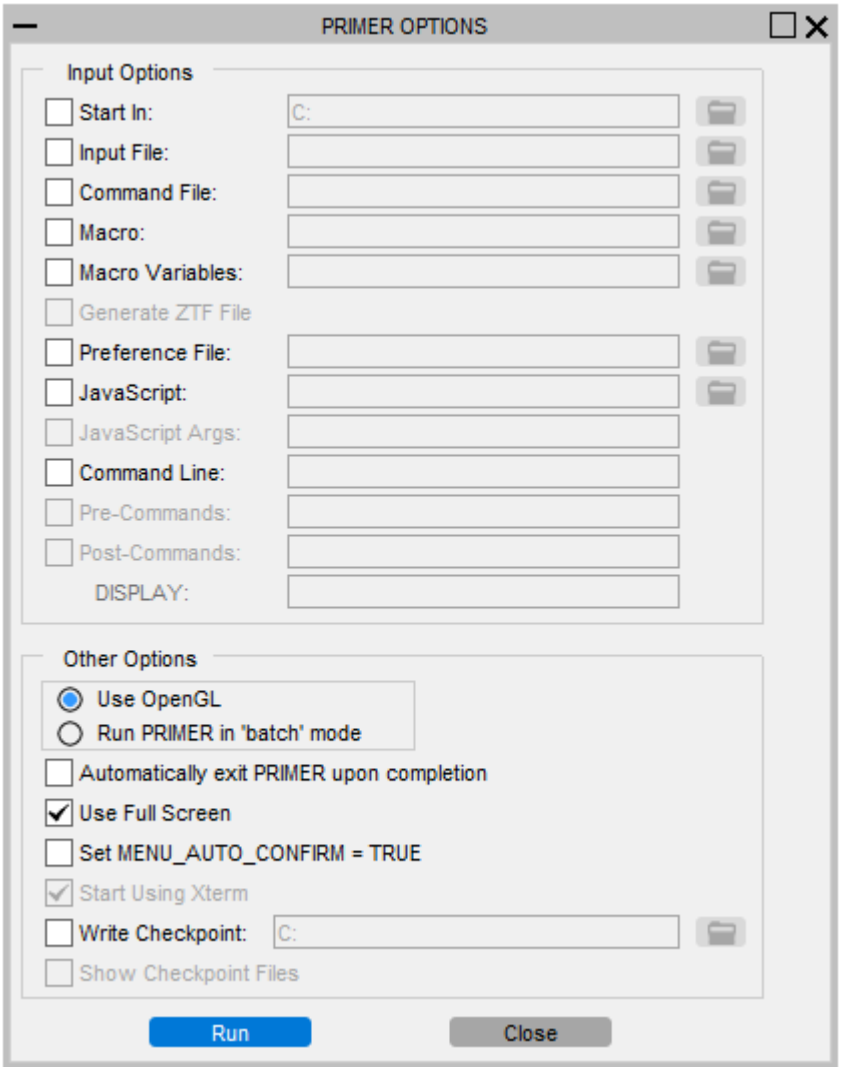
PRIMER Options

Press "Options" button below the PRIMER button to show the menu below.

This menu allows the user to specify an input keyword file and a PRIMER command file which will automatically run when opens.

It also allows the user to pre-select other options such as graphics options. Select/ deselect the options by clicking on the respective tag.

Click on the file divider icon in order to search for the respective files.



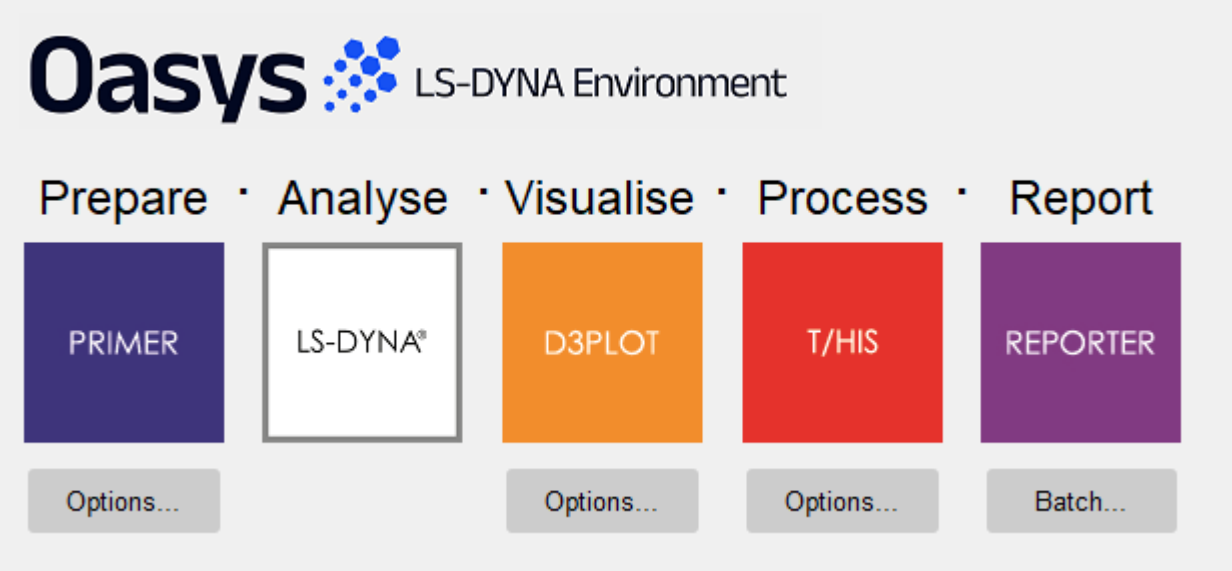
Input Options	
Input File	Specify the name of the keyword file you wish to be read into PRIMER
PRIMER Command File	Specify the name of a command file you wish to be executed on opening PRIMER
Macro	Specify the name of a macro file you wish to be executed on opening PRIMER
Macro variables	Specify the name of a macro variables file you wish to be used with the macro specified above
Generate ZTF File	Generate a ZTF file containing extra data for D3PLOT and T/HIS
Select preference file	Specify an oa_pref file to read from
Start in	Specify the directory where PRIMER will be fired up and where output files will be written to.

JavaScript	Specify a JavaScript file which can be executed on opening PRIMER
JavaScript arguments	Specify arguments which can be passed on to the JavaScript
Command line	Specify additional command line arguments which are appended to the PRIMER execution
Pre-Commands	Specify additional commands which are inserted before calling the PRIMER executable (Linux only)
Post-Commands	Specify addtional commands post PRIMER executable commands (Linux only)
DISPLAY	Specify the DISPLAY environment variable (Linux only)

Other Options	
Automatically EXIT ...	Causes PRIMER to close once the specified command file has finished running
Run PRIMER in 'batch' mode	Starts PRIMER in batch mode; a non-graphical mode, which accepts commands from a file specified in the Input options
Use OpenGL	Starts PRIMER using OpenGL graphics mode
Use X (24 bit)	Starts PRIMER using 24bit X Windows graphics mode
Use X (8 bit)	Starts PRIMER using 24bit X Windows graphics mode
Use Full Screen	Opens the PRIMER window to fill the whole screen
Set 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.) If this option is selected PRIMER will continue automatically using the default option.
Start using xterm	If multiple instances of PRIMER are opened from the Shell on Linux systems, LMX could count each of these as using a license. This is because if PRIMER is loaded from an xterm console, each instance is counted as using a license. This switch can be used to stop this behaviour.
Write Checkpoint	Enable the writing of the checkpoint files and set the folder path to write checkpoint files
Show checkpoint files	Switch this on to the show the checkpoint files menu when PRIMER is started.

2.4. D3PLOT

D3PLOT



Select this option to access D3PLOT. This program is a graphical post-processor designed to access the binary output files created by Ansys LS-DYNA. For more details see the D3PLOT Manual.

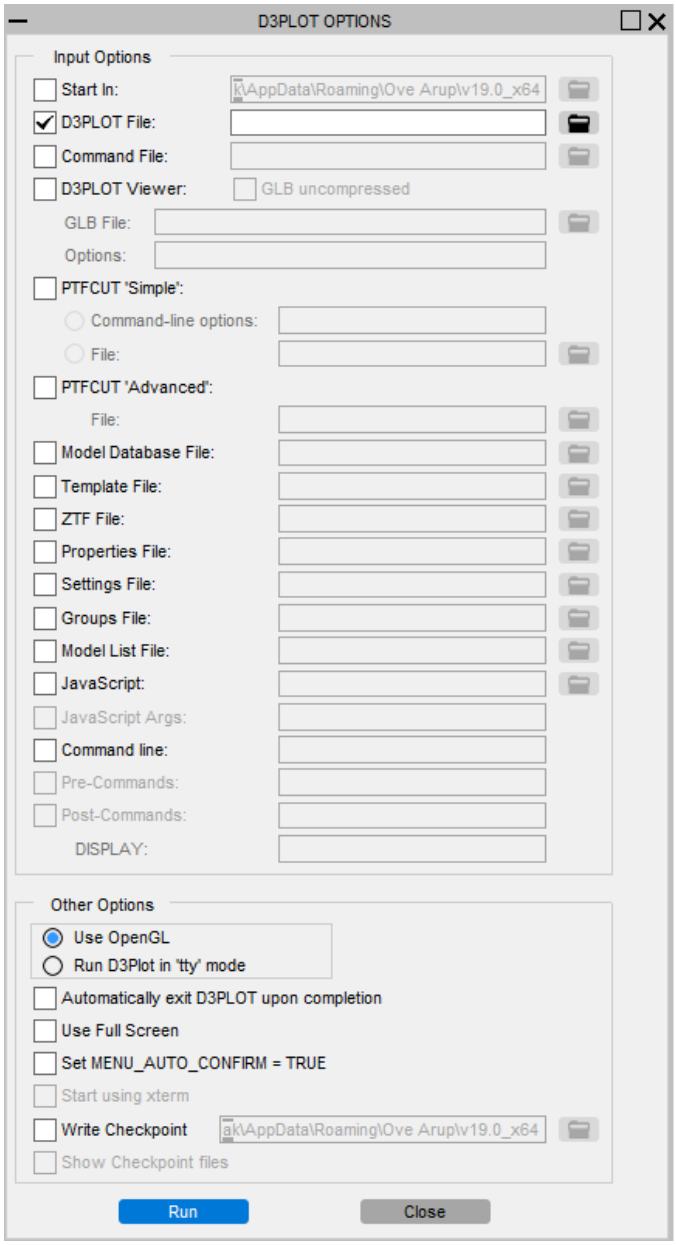
D3PLOT Options

Press "Options" button below the D3PLOT button to show the menu below.

This menu offers the user the opportunity to specify a .ptf file that will be automatically read into D3PLOT on opening, a D3PLOT command file that will automatically be executed by D3PLOT on opening as well as other options.

Select/ deselect the options by clicking on the respective tag.

Click on the file divider icon in order to search for the respective files



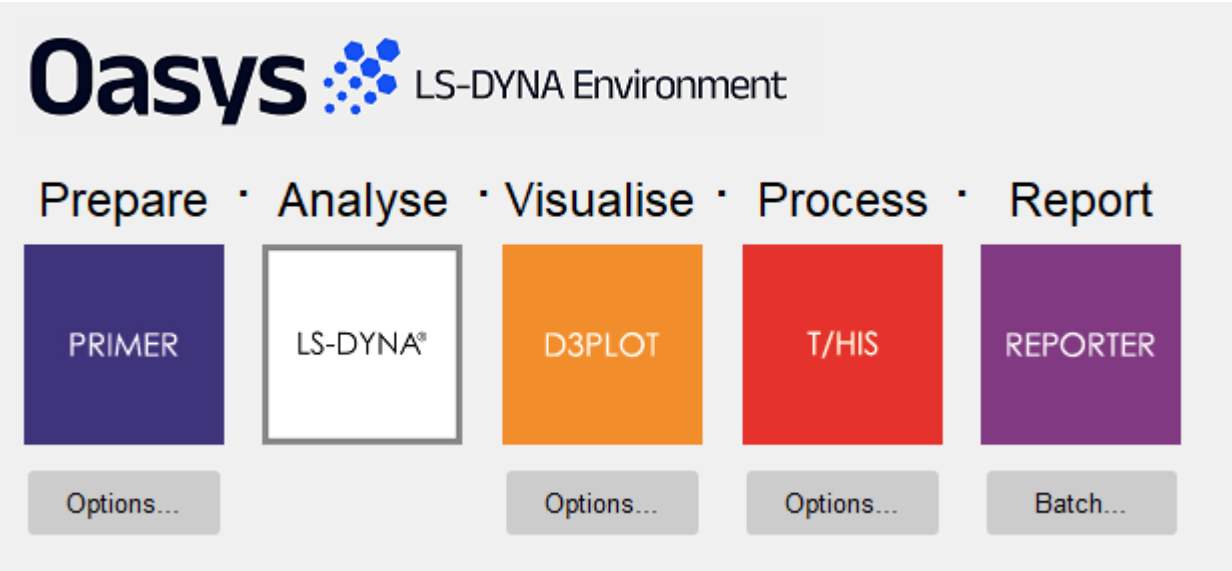
Input Options	
D3PLOT File	Specify the name of the .ptf file you wish to be read into D3PLOT
D3PLOT Command File	Specify the name of a D3PLOT command file you wish to be executed on opening D3PLOT
D3PLOT Viewer	Export for 3D Viewer Format 1. GLB Uncompressed: D3PLOT will write uncompressed GLB files (5-10 times larger in size) compatible with Microsoft PowerPoint and other 3D viewers. 2. GLB File: Output file path 3. Options: 3D Export Options

Start in	Specify the directory where D3PLOT will be fired up and where output files will be written to.
PTFCUT 'simple'	Create one or more cutdown models using easily readable/editable options. 1. Command-line options: Specify one or more supported options in the relevant textbox. 2. File: Specify the name of a file containing supported options in the relevant textbox.
PTFCUT 'advanced'	Specify the name of a file to create a cutdown database using a file can be created in D3PLOT in the Utilities->Compress menu).
Model Database File	Specify the name of a model database file you wish to be read on opening D3PLOT
Template File	Specify the name of a template file you wish to be read on opening the model in D3PLOT
ZTF File	Specify the name of a ZTF file you wish to be read on opening the model in D3PLOT
Properties File	Specify the name of a properties file you wish to be read on opening the model in D3PLOT
Settings File	Specify the name of a settings file you wish to be read on opening the model in D3PLOT
Groups File	Specify the name of a groups file you wish to be read on opening the model in D3PLOT
Model List File	Specify a file containing a list of models for D3PLOT to automatically open.
JavaScript	Specify a JavaScript file which can be executed on opening D3PLOT
JavaScript arguments	Specify arguments which can be passed on to the JavaScript
Command line	Specify additional command line options which are appended to the D3PLOT execution
Pre-Commands	Specify additional commands which are inserted before calling the D3PLOT executable (Linux only)
Post-Commands	Specify addtional commands post D3PLOT executable commands (Linux only)
DISPLAY	Specify the DISPLAY environment variable (Linux only)

Other Options	
Automatically EXIT ...	Causes D3PLOT to close once the specified command file has finished running
Use OpenGL	Open D3PLOT using OpenGL graphics mode
Run D3PLOT in 'tty' mode	Opens up D3PLOT in batch mode; a non-graphical mode, which accepts commands from a file specified in the Input options
Use Full Screen	Opens the D3PLOT window to fill the whole screen
Set 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.) If this option is selected D3PLOT will continue automatically using the default option.
Start using xterm	If multiple instances of D3PLOT are opened from the Shell on Linux systems, LMX could count each of these as using a license. This is because if D3PLOT is loaded from an xterm console, each instance is counted as using a license. This switch can be used to stop this behaviour.
Write Checkpoint	Enable the writing of the checkpoint files and set the folder path to write checkpoint files
Show checkpoint files	Switch this on to the show the checkpoint files menu when D3PLOT is started.

2.5. T/HIS

T/HIS



Left click on this option to access T/HIS. This program is a time history processing and graph plotting package designed to access the binary output files created by Ansys LS-DYNA. For more details see the T/HIS Manual.

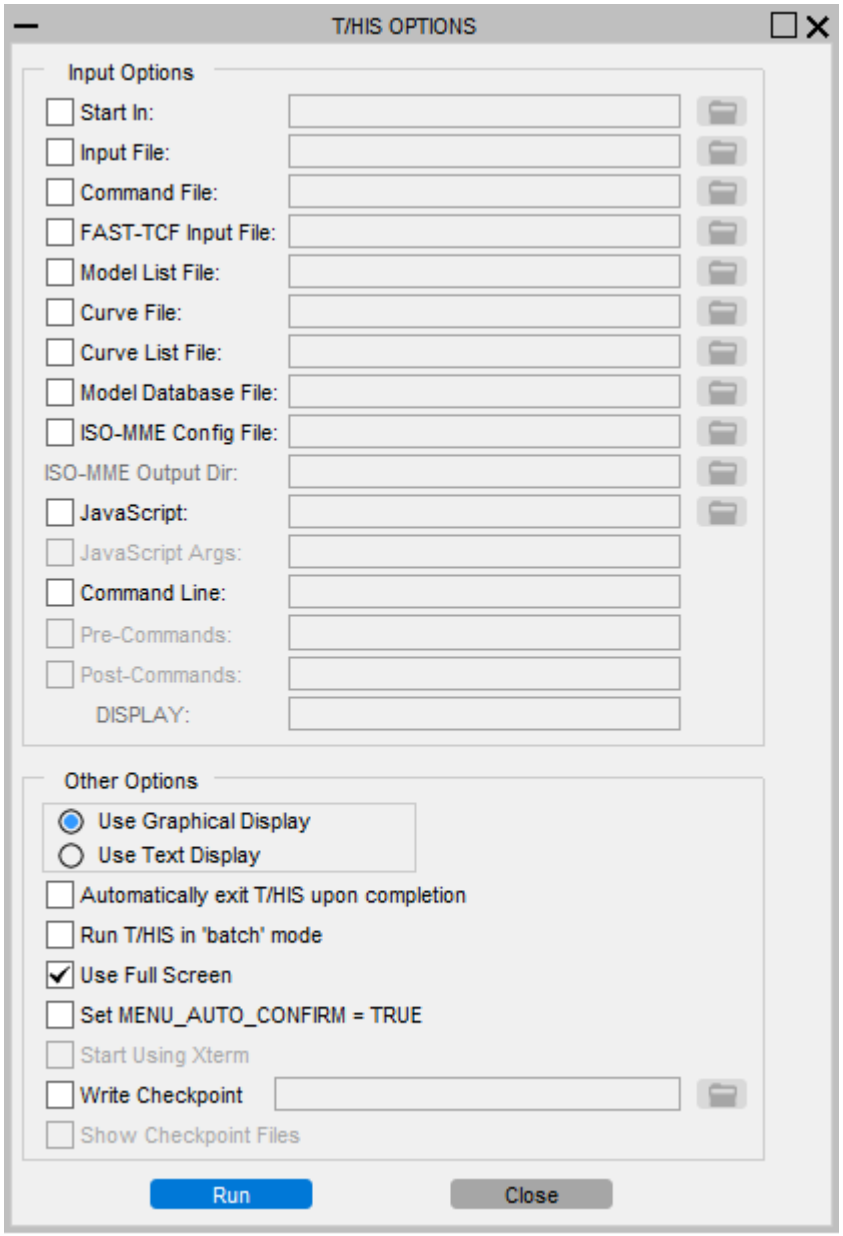
T/HIS Options

Press "Options" button below the T/HIS button to show the menu below.

This menu allows the user to specify a fasttcf .inp file or a T/HIS command file that will be automatically run when T/HIS is opened, along with other T/HIS options.

Select/ deselect the options by clicking on the respective tag.

Click on the file divider icon in order to search for the respective files.



Input Options	
Input File	Specify the name of the .thf file for the analysis whose data you wish to process
Model List File	Specify the name of a file containing a list of models to be opened. Each model should be specifed on a seperate line in the file by giving the full pathname to one of the output files that T/HIS can read.
Curve File	Specify the name of the T/HIS curve file to read

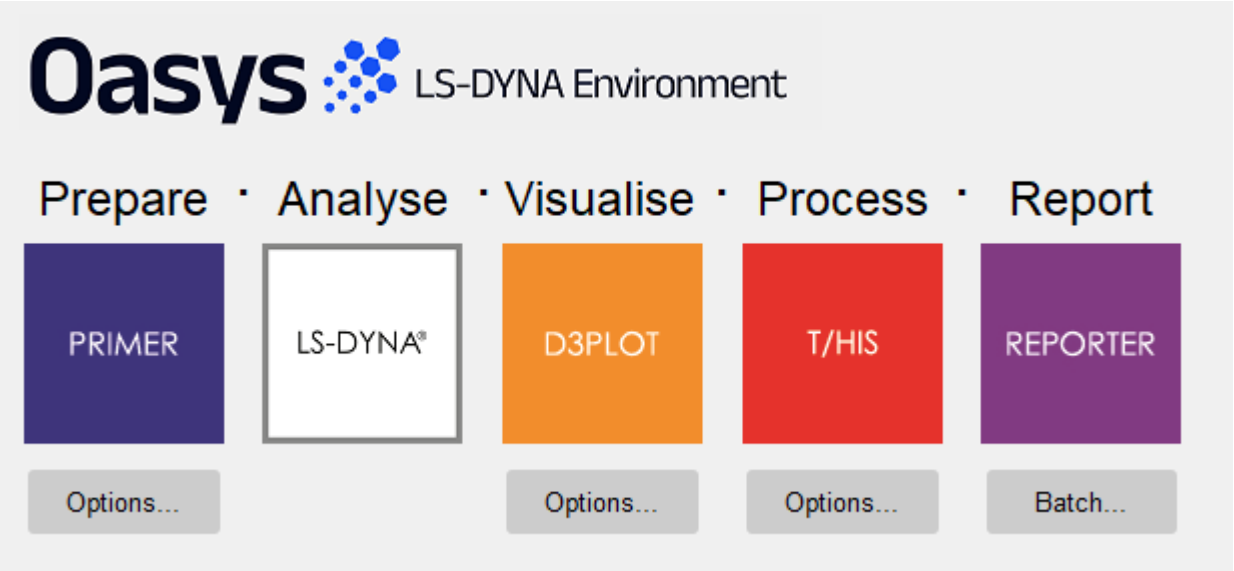
Curve List File	Specify the name of a file containing a list of all the T/HIS curve files to be opened. Each curve file should be specifed on a seperate line in the file by giving the full pathname of the file.
FAST-TCF Input file	Specify the name of a fast-tcf .inp file for post-processing desired data output
T/HIS Command File	Specify the name of a T/HIS command file which collects and processes the desired data
Start in	Specify the directory where T/HIS will be fired up and where output files will be written to.
Model Database File	Specify the name of a model database file you wish to be read on opening T/HIS
ISO-MME Config File	Specify the configuration file to use to output ISO-MME format data
ISO-MME Output Dir	Specify the output directory to write ISO-MME format data
JavaScript	Specify a JavaScript file which can be executed on opening T/HIS
JavaScript arguments	Specify arguments which can be passed on to the JavaScript
Command line	Specify additional command line options which are appended to the T/HIS execution
Pre-Commands	Specify additional commands which are inserted before calling the T/HIS executable (Linux only)
Post-Commands	Specify addtional commands post T/HIS executable commands (Linux only)
DISPLAY	Specify the DISPLAY environment variable (Linux only)

Other Options	
Automatically EXIT ...	Causes T/HIS to close once the specified command file has finished
Run T/HIS in 'batch' mode	Opens up T/HIS in batch mode; a non-graphical mode, which accepts commands from a file specified in the Input options
Use Graphical Display	Opens up T/HIS in graphical mode. OpenGL graphics will be used by default
Use Text (TTY) Display	Opens up T/HIS in text only mode, which allows the user to specify commands in the terminal window
Use Full Screen	Opens the T/HIS window to fill the whole screen
Set 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.) If this

	option is selected T/HIS will continue automatically using the default option.
Start using xterm	If multiple instances of T/HIS are opened from the Shell on Linux systems, LMX could count each of these as using a license. This is because if T/HIS is loaded from an xterm console, each instance is counted as using a license. This switch can be used to stop this behaviour.
Write Checkpoint	Enable the writing of the checkpoint files and set the folder path to write checkpoint files
Show checkpoint files	Switch this on to the show the checkpoint files menu when T/HIS is started.

2.6. REPORTER

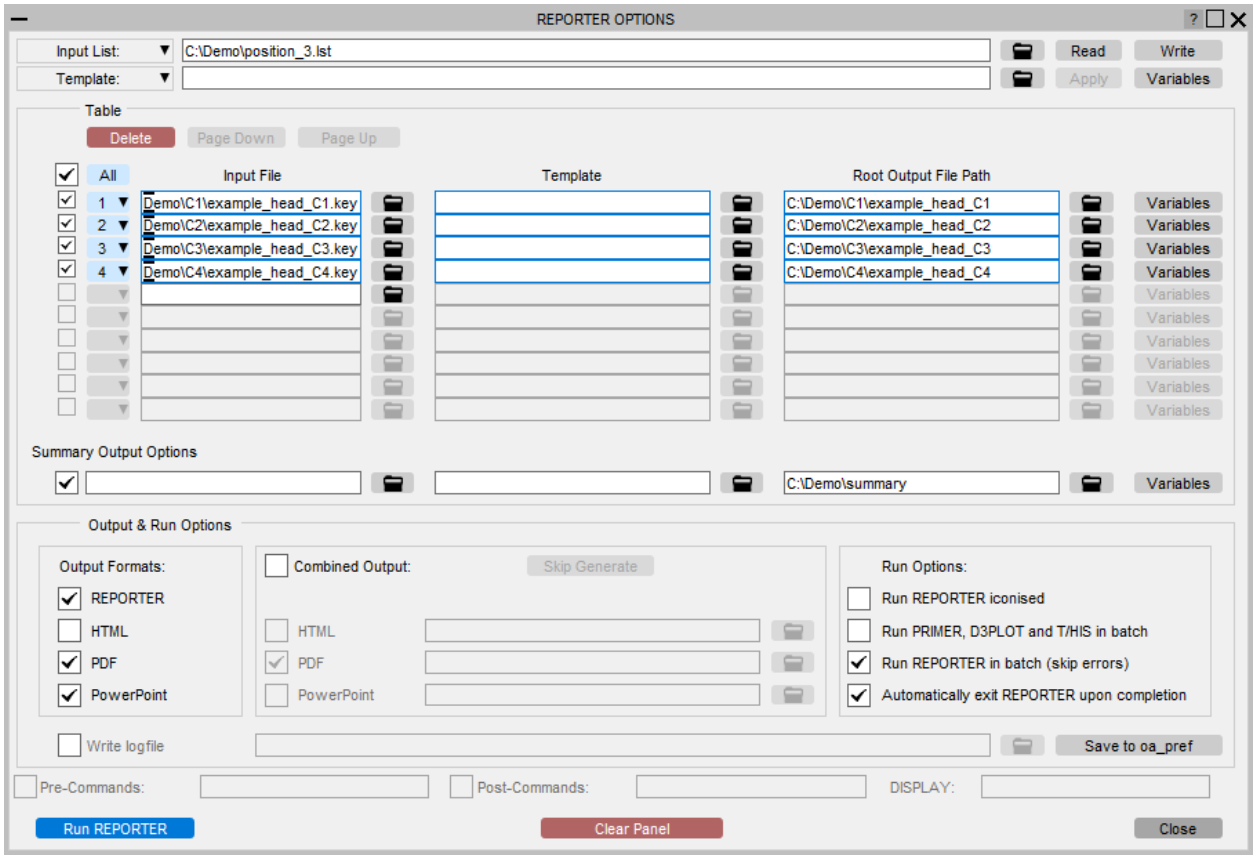
REPORTER



Left click on this option to access REPORTER. This program is an automatic report generator for use with Ansys LS-DYNA, D3PLOT and T/HIS.

REPORTER Options

Press "Batch" button below the REPORTER button to show the menu below. Selecting this option tab will cause the following window to appear.



This menu allows the user to define multiple sets of input options for REPORTER. These options can either be entered manually of they can be read from a file, see LIST File Format for details on the LIST file format.

In addition to being accessed from the REPORTER Options menu this panel can also be selected from the Ansys LS-DYNA Submit menu.

Input List

This option can be used to select a predefined LIST file containing multiple sets of inputs for REPORTER. The list file can be read by clicking on **Read** button. This option can not be modified if this panel was accessed from the Ansys LS-DYNA Submit menu.

Note: An attempt is made to determine a sensible name for the summary output directory based on the inputs in this file. If a summary input file is given, then the pathname to this is used. If not, then if all the individual input files have the same pathname, then this is used.

Input Directory

This option can be accessed by clicking on 'Input List' popup and can be used to read keyword files from the sub-directories of the selected directory. Users can click on **Read** button to read keyword files. This populates 'Input file' and 'Root Output File Path' in the REPORTER Options panel.

Table

Users can manipulate entries in the table section using 'Insert above', 'Insert below', 'Delete'.

Insert above: inserts empty row above the selected row.

Insert below: inserts empty row below the selected row.

Delete: deletes the selected row.

Rows can be brought into selection by clicking on the row header buttons (buttons with row indices). Initially all the rows are under selection.

If REPORTER Options panel has multiple entries in the table section (more than 10), then users can use **'Page Up'** and **'Page Down'** buttons to quickly navigate the table section. In case of large number of jobs, users can drag the bottom edge of the REPORTER Options panel to increase the number of visible entries in the table section.

Input Options

Each Ansys LS-DYNA job can have the following options set.

Input File	Name of the Ansys LS-DYNA input file for post processing. This option cannot be modified if this panel was accessed from the Ansys LS-DYNA Submit menu.
Template	Defines a REPORTER template file for the job
Root Output File Path	By default, the output directory for any files generated by REPORTER will be set to the directory containing the input file and the root of the input filename will be used as the default filename for any output files generated by REPORTER, i.e. rootname.pdf, rootname.html etc. The root output file path includes output directory and root output filename. For example, in C:\Demo\C1\example_head_C1, C:\Demo\C1 is the output directory and example_head_C1 is the root output filename.
Variables	This option can be used to setup variables for use within REPORTER, see Variables
Pre-Commands	Specify additional commands which are inserted before calling the REPORTER executable (Linux only)
Post-Commands	Specify addtional commands post REPORTER executable commands (Linux only)
DISPLAY	Specify the DISPLAY environment variable (Linux only)

In addition to setting up options for individual Ansys LS-DYNA jobs this panel can also be used to generate a summary report. The options for the summary report are the same as for individual Ansys LS-DYNA jobs except that the Input file is optional.

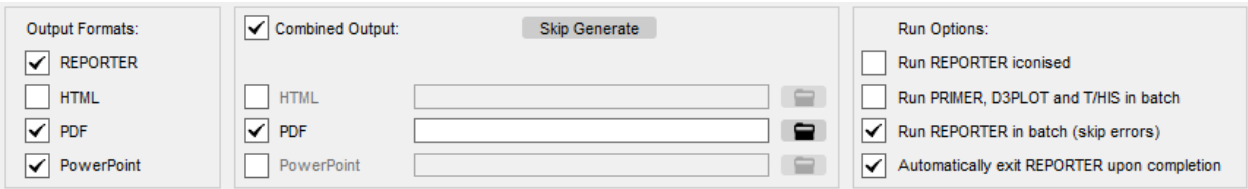
If this panel was accessed from the REPORTER Options

Output Formats

REPORTER	Write a REPORTER report (orrx/orr) file after REPORTER has finished generating a report
HTML	Write an HTML file after REPORTER has finished generating a report
PDF	Write a PDF file after REPORTER has finished generating a report
PowerPoint	Causes REPORTER to write a Powerpoint file once it has finished generating a report

Combined Output Options

The normal Output formats allow REPORTER to write a PDF, HTML, or PowerPoint file for each analysis. However if you are doing lots of analyses it might be useful to combine all of the output together into a single PDF file or single PowerPoint file. The **Combined Output Options** section allows you to do this.



To do this REPORTER saves each analysis as a REPORTER report (orrx/orr) file after generating each file. Then it does an extra step, reading all of the report files and combining the outout. In the above example a combined PDF file is going to be created.

If the report files already exist and so the reports do not need to be generated you can use **Skip generate** and the shell will only do the combining step.

Run REPORTER

This option starts REPORTER once for each Ansys LS-DYNA job that has been defined and passes any input options that have been defined for that job to REPORTER. If a set of summary report options have been defined then an additional instance of REPORTER will be started to generate the summary report.

This option is not available if this panel was accessed from the Ansys LS-DYNA Submit menu as REPORTER will be started automatically after each Ansys LS-DYNA job has finished.

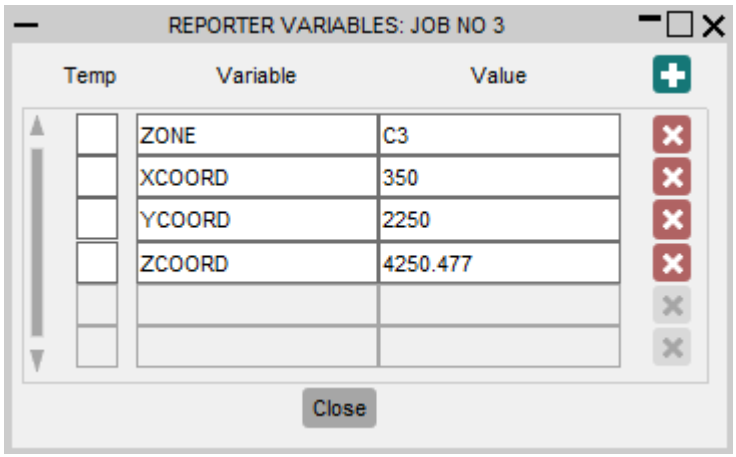
Clear Panel

This option can be used to quickly clear any options that have been set. This option is not available if this panel was accessed from the Ansys LS-DYNA Submit menu.

Write

This option can be used to save the currently defined set of REPORTER options to a new LIST file. By default this option will overwrite the Input List.

Variables



This window allows the user to define variables for individual REPORTER job. Click on **'+'** button to add new variables and click on **'x'** button to remove existing variables. Variables can be declared temporary by clicking on tick box adjacent to the variable under **Temp** column. Users can dismiss this panel by clicking on **Close** button.

LIST File Format

The LIST file can be used to set up multiple inputs for REPORTER. The LIST file format consists of lines containing either Job information or Keywords.

Keyword	
$VARIABLES	Defines a new list of comma seperated Variable names for any following Job Lines. Any Variables defined before this Keyword are deleted.

	$VARIABLES, 1st Variable, 2nd Variable, 3rd Variable
$VARIABLES_ADD	Adds new Variables to the existing list of Variables $VARIABLES_ADD, 1st Variable, 2nd Variable, 3rd Variable
$REPORTER_SUMMARY	Defines a set of inputs used to generate a summary report after a set of jobs have been run in Ansys LS-DYNA. $REPORTER_SUMMARY, Input file, REPORTER Template, 1st Variable, 2nd Variable, 3rd Variable
$REPORTER_SUMMARY_DIR	Defines the directory used for summary output files $REPORTER_SUMMARY_DIR, Directory
$REPORTER_OUTPUT	Defines a list of output formats, possible options are REPORTER, HTML, PDF, POSTSCRIPT, POWERPOINT $REPORTER_OUTPUT, format, format, format...
$REPORTER_ICONISE	Turns on/off the switch to iconise REPORTER when running $REPORTER_ICONISE,true or false
$REPORTER_OA_BATCH	Turns on/off the switch to run D3PLOT and T/HIS in batch $REPORTER_OA_BATCH,true or false
$REPORTER_STOP_ON_ERROR	Turns on/off the switch to stop REPORTER if an error occurs. $REPORTER_ON_ERROR,true or false

$RUN_REPORTER_IN_BATCH	Opposite to REPORTER_STOP_ON_ERROR. When $RUN_REPORTER_IN_BATCH is true, it skips errors. $RUN_REPORTER_IN_BATCH,true or false
$REPORTER_EXIT	Turns on/off the switch to exit REPORTER after running $REPORTER_EXIT,true or false
$	Comment Line
	All other lines are assumed to contain Job information in the following format. `Input file, REPORTER Template, 1st Variable, 2nd Variable, 3rd Variable`

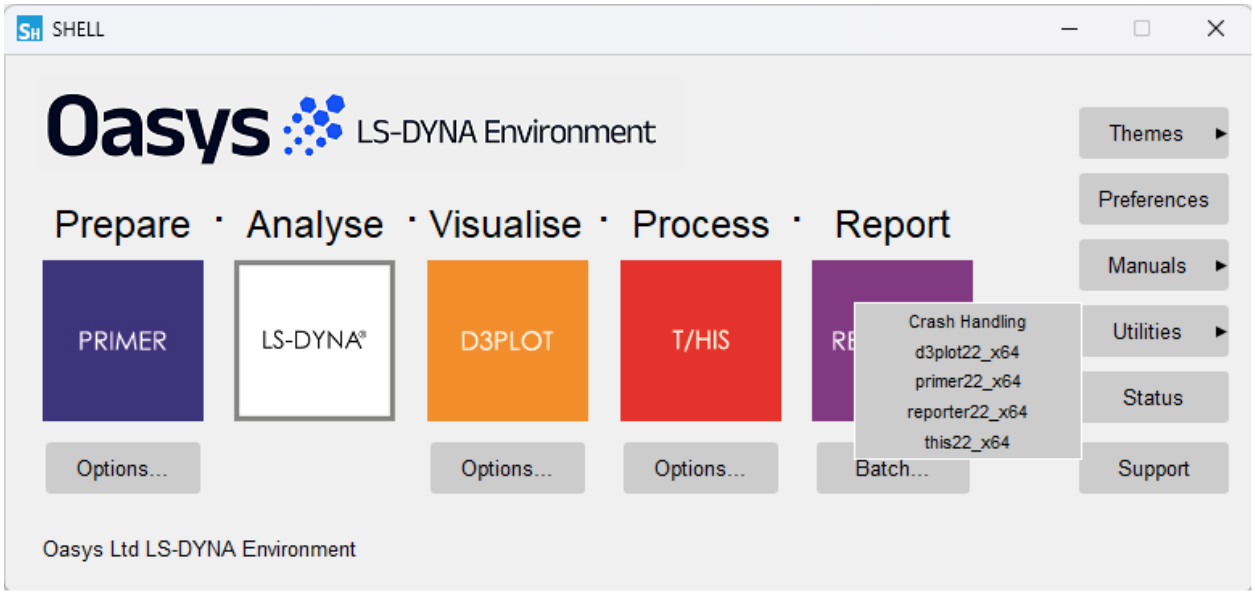
e.g.

```
$ Define 4 variables for the following jobs
$
$VARIABLES,ID,X-COOD,Y-COORD,Z-COORD
$
$ Setup 4 jobs using the "head_impact.ort" template, with 4 variable
values
$
C:\head_impact
1\head.key,c:\templates\head_impact.ort, RUN 1, 0.03, 0.050, 0.06
C:\head_impact
2\head.key,c:\templates\head_impact.ort, RUN 2, 0.03, 0.075, 0.06
C:\head_impact
3\head.key,c:\templates\head_impact.ort, RUN 3, 0.03, 0.100, 0.06
C:\head_impact
4\head.key,c:\templates\head_impact.ort, RUN 4, 0.03, 0.125, 0.06
$
$ Define a new set of variables
$
$VARIABLES,SUMMARY_ID
$
$ Add another variable
$
$VARIABLES_ADD,
$
$ Set up a summary report
$
$REPORTER_SUMMARY, , c:\templates\head_summary.ort
$REPORTER_SUMMARY_DIR,c:\head_impact\summary
$
$ Specify output file formats
```

```
$
$REPORTER_OUTPUT,REPORTER,HTML,PDF
```

2.7. Utilities

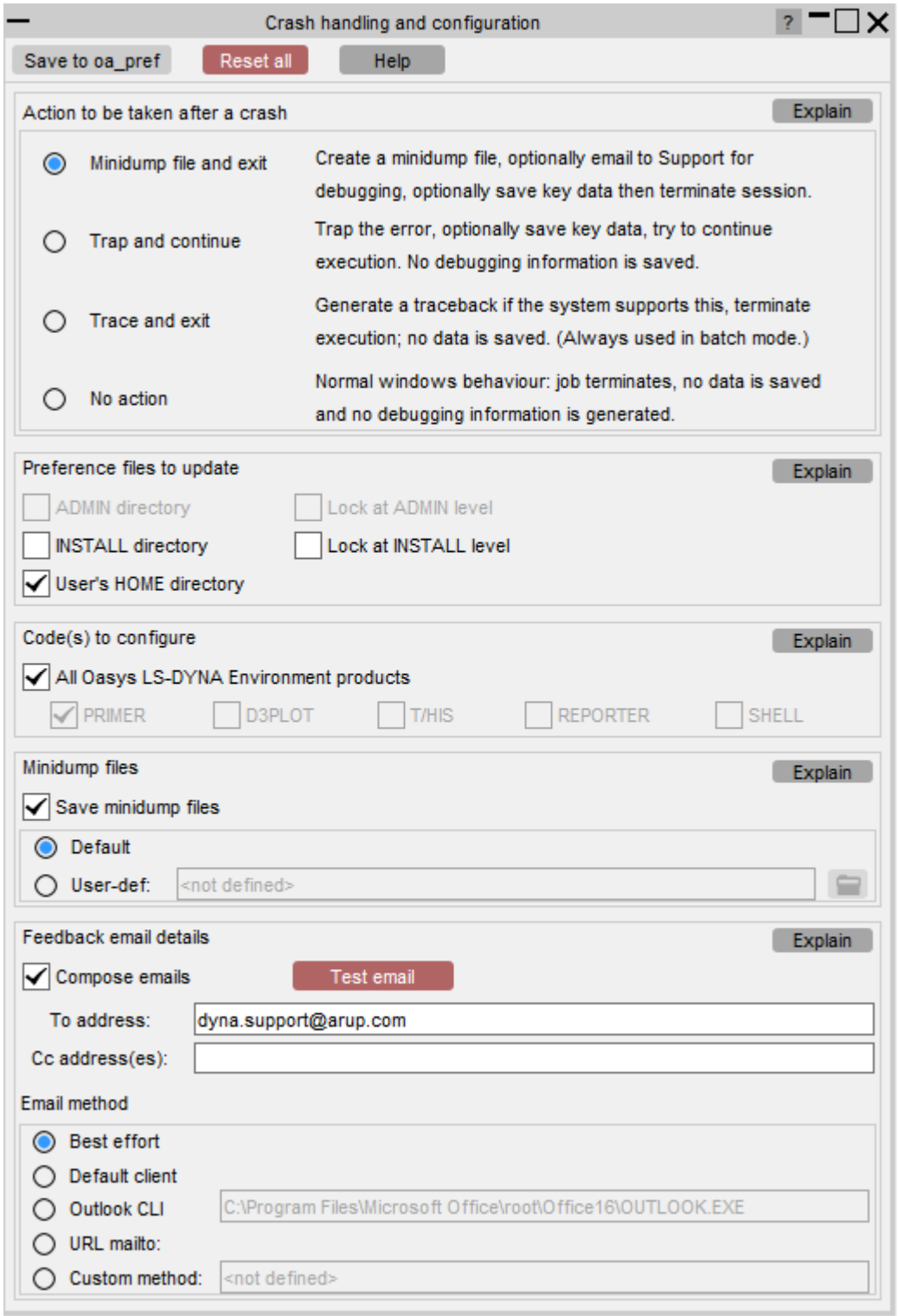
Utilities



This option will display an optional menu of additional utility programs. The exact list of programs given will depend on the options set up by the system administrator, see Adding items to the "Utilities" menu for more information.

Crash Handling

This is only available on Windows platforms. It maps the GUI which can be used to configure how crashes are handled, also allowing you to configure whether and how emails containing crash dump files are sent back to Oasys Ltd Support.



This feature is present in Oasys SHELL mainly so that the installer of the software can configure crash handling and emails centrally, it is an optional part of the installation process on Windows. There is no reason for a user not to use it to make local configuration changes but in some Enterprise installations some settings (set via preferences) may be locked at the Admin or Install levels.

For a full description of this see the section on Emailing Crash Dumps to Support.

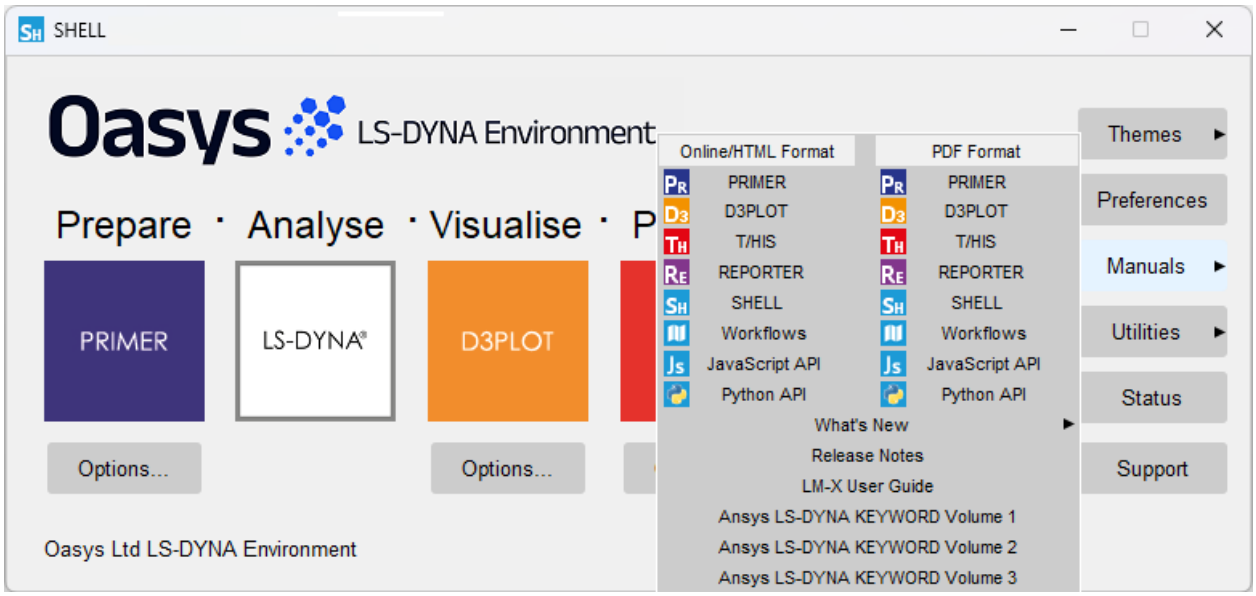
2.8. Preferences

Preferences

Selecting this tab will open up the **Preferences editor** . This is a graphical interface which allows for manual editing of the **oa_pref** file. For more information on the Preferences editor, see The Preferences Editor

2.9. Manuals

Manuals



This option will only be available if the shell has been able to find a copy of the Adobe Acrobat software to use to display the on-line manuals. If the Acrobat software is available then this button will display a menu listing the manuals that are available for reading and printing.

The location of the Ansys LS-DYNA keyword and theory manuals are set with the preferences shell*dyna_keyword_manual and shell*dyna_theory_manual, see Customising the GUI Shell. If they are not set they will not be listed in the popup menu.

2.10. Status

Status

This option will display information on the programs that have been licensed.

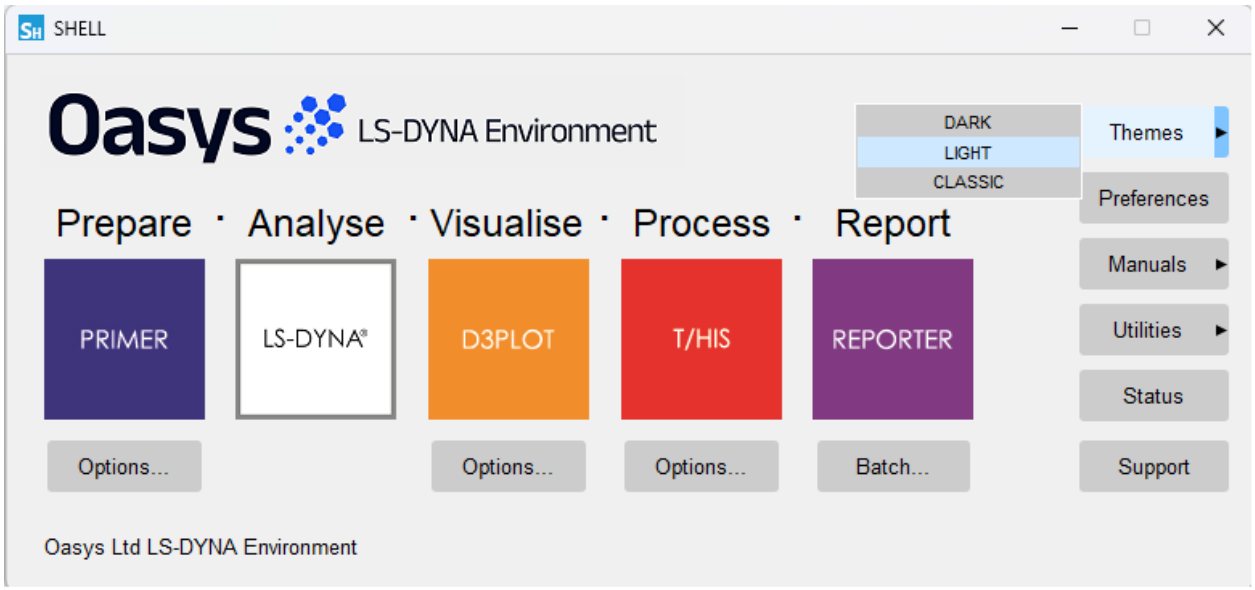
2.11. Support

Support

This option will display Support contact information.

2.12. Themes

Themes



The Themes button can be used to select the Theme to use for the User Interface. The selected Theme is saved to the oa_pref file and will also be applied to PRIMER, D3PLOT, T/HIS and REPORTER.

2.13. Command Line Options

Command Line Options

These options can be used to automatically start up programs and set default values.

Command	[Options]	Action
su	jobname	Open Submit window for job 'jobname'
pr	NONE	Start PRIMER
pl	NONE	Start D3PLOT
th	NONE	Start T/HIS

2.14. Command Line Submission SHELL

Command Line Submission SHELL

When starting the SHELL on a LINUX system a command line version of the submission SHELL is available. It will start automatically if an X-connection cannot be established, or manually by putting 'cmd' as a command line option, i.e. 'oasys_22 cmd'. The following screen will be displayed in the terminal: (Note that it may differ slightly depending on preference settings)

```
-------------------- SHELL 22.1 (build xxxx) ----------------------------
------

    Options                         Current selection

-------------------- Ansys LS-DYNA --------------------------------------
------

(1) Code Version                    LS970 (v6763)


-------------------- Job Options ----------------------------------------
------


(2) Input File                      *** Nothing Selected ***

(3) Format                          Keyword
(4) CPU Limit                       0.00 Seconds
(5) Memory Limit                    Memory1 40.00 MWords
(6) Memory2 Limit (OFF)             Memory1 40.00 MWords
```


```
(7) Increase Memory If Required   On
(8) Filename Format               Arup '.ptf...'
(9) Optional Files


-------------------- Parallel Options ----------------------------------
------

(10) CPUs                         2 CPUs, Consistency Flag On


-------------------- Submission Options --------------------------------
------

(12) Submission Type              Queue, Now 00:00
(13) Queue CPU Limit              0.00 Seconds
(14) Queue Memory Limit           Memory 150.00 MWords
(15) Queue Name                   DYNA, CPU Limit: 0
(16) Queue Options                2 CPU x 1 Node

(99)  Submit      (88)  Reset       (77)  Status/Kill    (-1)    Quit
```

The terminal window may have to be expanded for the contents to fit.

How To Use The Command Line Submission SHELL

All the options available on the graphical version of the SHELL are available, except Restart, T/HIS and REPORTER options. The defaults are the same as the graphical version. The menu is set out with the options on the lefts and the current selection on the right. The options are accessed by typing the number at the prompt and pressing return. This will bring up a menu with further options to make your selection. To return to the main menu, type in '-1' and press return. To quit from the program type in '-1' and press return in the main menu.

Code Version

At the main menu type in '1' and press return. A menu will be displayed with options for the code type:

```
Select the code type
(1) SMP (2) MPP (-1) Main menu
```

Select the required code type to bring up a menu with options for the precision:

```
Select the precision
(1) Single (2) Double (-1) Main Menu
```

Depending on the options chosen a menu will be displayed with the available Ansys LS-DYNA code versions (will differ depending on contents of dyna_versions file):

```
Select the code version
(1) LS970 (v6763) SP SMP RHE 3.0
(2) LS970 (v5434a) SP SMP RHE 3.0
(3) LS971 (R2 v7600_1224) SP SMP RHE 4.0
(4) LS971 R3_1 SP SMP
(-1) Main Menu
(-2) Local LS-DYNA Exe
```

Select the required code version. The main menu will be displayed with the selected code version shown on the right hand side.

Input File

At the main menu type in '2' and press return. A menu will be displayed asking for the file name for the job:

```
Current directory: /u/mid/test
Enter the file name for the job (*.k*). (-1) Main menu
```

The directory the SHELL was started in is shown at the top of the menu. File names can be entered relative to this directory. For example, if the current directory is /u/mid/test and the job to run is in /u/mid/test/job/to_run.key then you can enter 'job/to_run.key' and press return. If the job to run is in /u/mid/to_run.key you can enter '../to_run.key'. Alternatively, the full path name can be entered.

If the file does not exist or is an invalid type, i.e. doesn't end in *.k* for keyword files, *.inf* for fixed format files or *.lst* for list files, you will be propmpted to enter a file again.

Once a valid file has been chosen the main menu will be displayed with the full path name of the file selected shown on the right hand side.

File Format

At the main menu type in '3' and press return. A menu will be displayed asking for the file format for the job:

```
Select the job format
(1) Keyword (2) Fixed (3) List (-1) Main menu
```

Select the required format. If List was selected and the submission type is not Queue a further menu will be displayed asking whether the jobs should be sequential or not:

```
Turn sequential submission on or off
(1) Off (2) On (-1) Main menu
```

Select the required option. The main menu will be displayed with the selected format shown on the right hand side.

Note: Selecting a different job format to the current selection will clear the Input File selection.

CPU Limit

At the main menu type in '4' and press return. A menu will be displayed asking for the job CPU limit units:

```
Select the job cpu limit units
(1) Seconds (2) Minutes (3) Hours (-1) Main menu
```

Select the required units to bring up a menu asking for the job CPU limit:

```
Enter the job cpu limit. (-1) Main menu
```

Enter the required limit (can be an integer, decimal, or in the form 1.5E4). The main menu will be displayed with the selected job CPU limit on the right hand side.

Memory Limit

At the main menu type in '5' and press return. A menu will be displayed asking for the job memory limit units:

```
Select the job mem limit units
(1) Words (2) M Words (-1) Main menu
```

Select the required units to bring up a menu asking for the job memory limit:

```
Enter the job memory limit. (-1) Main menu (Current Selection: 40)
```

Enter the required limit (can be an integer, decimal, or in the form 1.5E4).

The main menu will be displayed with the selected job memory limit on the right hand side.

Memory2 Limit

At the main menu type in '6' and press return. Please note that the units for MEMORY2 is the same as that entered for MEMORY, also this option is only valid for MPP and HYBRID versions of Ansys LS-DYNA.

In Ansys LS-DYNA the MEMORY2 input is optional (uses the value set for MEMORY if this option is not set) so the user is first displayed with a menu to switch this option ON/OFF.

```
Turn on the value for memory2? (Current Selection: 0)
(1) Off (2) On (-1) Main Menu
```

If turned On, the user is displayed with a second menu to enter the required limit (can be an integer, decimal, or in the form 1.5E4).


```
Enter the job memory2 limit. (-1) Main menu (Current Selection: 40)
```

The main menu will be displayed with the selected job memory2 limit on the right hand side.

Increase Memory If Required

At the main menu type in '7' and press return. A menu will be displayed asking if the job memory limit should be increase if required:

```
Increase the memory if required
(1) Off (2) On (-1) Main menu
```

Select the required option. The main menu will be displayed with the selected option on the right hand side.

Filename Format

At the main menu type in '8' and press return. A menu will be displayed asking for the filename format:

```
Select the filename format
(1) ARUP '.ptf ...' (2) LSTC '.D3PLOT ...' (-1) Main menu
```

Select the required option. The main menu will be displayed with the selected option on the right hand side.

Optional Files

```
    Options                          Current selection

-------------------------- Input Files ----------------------------

(1) Stress Initialization (.sif)  Off
(2) Interface Segment (.isf2)     Off
(3) VDA Geometry (.vda)           Off
(4) CAL3D Input (.c3d)            Off
(5) TOPAZ3D Temperature File
    (.htf)                        Off
(6) MADYMO Input File             Off
(7) REMAP Option                  Off
(8) MPP pfile                     Off
(9) GMINP (.gm)                   Off


-------------------------- Output Files -------------------------

(10) Contact Force File (.ctf)     Off
```

```
(11) Interface Segment (.isf1)     Off
(12) Static Database File (.ztf)   On
(13) Winfrith Crack File (.crf)    Off
(14) FSIFOR File                   Off
(15) GMOUT (.gm)                   Off
(16) CPM Interface Force File      Off
(17) DEM Interface Force File      Off
(18) FSILNK file (.fsl)            Off
(19) PBM Interface Force File
     (.pbm)                        Off
(20) D3PART File (.d3part)         Off
(21) BEM File (.bem)               Off
(22) General Print File (.root)    Off


-------------------------- Input Options ------------------------

(31) ENDTIM                        0.000000
(32) ENDCYC                        0
(33) PARA                          0
(34) NCSP                          0
(35) CASE                          Off
(36) MCHECK                        Off
(37) LONG                          Off
(38) BIGID                         Off
(39) JOBID                         Off
(40) PGPKEY                        Off
(41) INIT                          Off
(42) D3PROP                        Off


------------------------- Binary File Size ---------------------

(50) Binary File Size              1024


(-1)  Main menu
```

Options 1 - 50 can be toggled on and off simply by selecting them.

The analysis end time can be specified by selecting option 31. The following menu will be displayed:

```
Enter the end time. (-1) Optional files menu
```

Enter the required end time (can be an integer, decimal, or in the form 1.5E4). The optional files menu will be shown with the selected end time on the right hand side.

The analysis end cycle can be specified by selecting option 32. The following menu will be displayed:

```
Enter the end cycle. (-1) Optional files menu
```

Enter the required end cycle (an integer). The optional files menu will be shown with the selected end cycle on the right-hand side.

The analysis para value can be specified by selecting option 33. The following menu will be displayed:

```
Para value
(1) Zero (2) One (-1) Optional files menu
```

Select the required option. The optional files menu will be shown with the selected para value on the right hand side.

Options 34 - 41 require a user input name (if the option is turned ON). The following menu will be displayed:

```
Current option name:
Enter the new option name: (-1) Main menu (keep the current option name)
```

The analysis ncsp value can be specified by selecting option 42. the following menu will be displayed:

```
Enter the ncsp value. (-1) Optional files menu
```

Enter the required ncsp value (an integer). The optional files menu will be shown with the selected ncsp value on the right-hand side.

To go back to the main menu type in '-1' and press return.

CPUs

At the main menu type in '10' and press return. A menu will be displayed asking for the number of CPUs:

```
Enter the number of cpus. (-1) Main menu
```

Enter the required number of CPUs (an integer). If the number of CPUs is too high for the code type (limit is defined in oa_pref) then you will be asked to enter again. Once a valid number has been entered a menu will be displayed asking if the consistency flag should be on or off:

```
Turn the consistency flag on or off
(1) Off (2) On (-1) Main menu
```

Select the required option. The main menu will be shown with the selected number of CPUs and the consistency flag status on the right hand side.

Node Options

This option will only be available if the submission type is not queue and the code type is MPP.

If it is available then at the main menu type in '11' and press return. A menu will be displayed asking for the node option:

```
Select the node option
(1) Local Host (2) Node File (3) Node List (-1) Main menu
```

Select the required option. If Local Host was selected the main menu will be displayed. If Node File was selected a further menu will be displayed asking for the location of the file:

```
Current directory: /u/mid/test
Enter the node file name. (-1) Main menu
```

The directory the shell was started in is shown at the top of the menu. In the same way as input files, node files can be specified relative to this directory or a full path name can be entered. No check is made to see if the file exists.

If Node List was selected a further menu will be displayed asking for a string:

```
Enter the node list string. (-1) Main menu
```

Enter the text and press return. The main menu will be shown with the selected option and file or node list string on the right hand side.

Submission Type

At the main menu type in '12' and press return. A menu will be displayed asking for the submission type:

```
Select the submission type
(1) Online
(2) Background
(3) Batch (unavailable)
(4) Queue (unavailable)
(-1) Main menu
```

Some submission types may be unavailable depending on the settings in the oa_pref file. If an unavailable option is chosen you will be asked to select again.

If Background or Queue are chosen a further menu will be displayed asking for the submission day:

```
Select the submission day
(1) Now (2) Monday (3) Tuesday (4) Wednesday
(5) Thursday (6) Friday (7) Saturday (8) Sunday (-1) Main menu
```

Select the required option to bring up a menu for the start time hour:

```
Enter the start time hour (0 - 23) (-1) Main menu
```

Enter the required hour to bring up a menu for the start time minute:

```
Enter the start time minute (0 - 59) (-1) Main menu
```

Enter the required minute. The main menu will be displayed with the selected submission type and start time, if applicable, on the right hand side.

Note: If you do not want a delay choose a submission time of Now 00:00.

Queue CPU Limit

If the submission type is Queue then an option to set the queue cpu limit will be available. At the main menu type in '13' and press return. A menu will be displayed asking for the queue CPU limit units:

```
Select the queue cpu limit units
(1) Seconds (2) Minutes (3) Hours (-1) Main menu
```

Select the required units to bring up a menu asking for the queue CPU limit:

```
Enter the job cpu limit. (-1) Main menu
```

Enter the required limit (can be an integer, decimal, or in the form 1.5E4). The main menu will be displayed with the selected queue CPU limit on the right hand side.

Queue Memory Limit

If the submission type is Queue then an option to set the queue memory limit will be available. At the main menu type in '14' and press return. A menu will be displayed asking for the queue memory limit units:

```
Select the queue mem limit units
(1) Words (2) M Words (-1) Main menu
```

Select the required units to bring up a menu asking for the queue memory limit:

```
Enter the queue memory limit. (-1) Main menu
```

Enter the required limit (can be an integer, decimal, or in the form 1.5E4). The main menu will be displayed with the selected queue memory limit on the right hand side.

Queue Name

If the submission type is Queue then an option to choose the queue name will be available. At the main menu type in '15' and press return. A menu will be displayed asking for the queue name:

```
Select the queue name
(1) DYNA
(2) Nastran
(3) Other
(-1) Main Menu
```

The options available will depend on the contents of the 'oasys_queue' file.

Select the required option. The main menu will be displayed with the selected queue shown on the right hand side.

Queue Options

If the submission type is Queue then an option to specify some queue options will be available. At the main menu type in '16' and press return. A menu will be displayed with the available commands, depending on the queue and number of cpus chosen (will differ depending on the contents of the 'oasys_queue' file):

```
Select the queue command
(1) 2 CPUs x 1 Node
(2) 1CPUs x 2 Nodes
(-1) Main Menu
```

Select the required option. The main menu will be shown with the selected queue command.

Submit

Once you are happy with the options chosen, at the main menu type in '99' and press enter to submit the job.

If output files already exist a menu asking whether to overwrite or delete them will be displayed:

```
Some output files already exist
(1) Overwrite (2) Delete (3) Cancel
```

Select the required option and if cancel was not selected the job will be submitted.

Reset

To reset the selected options to defaults at the main menu type in '88' and press enter.

Status / Kill

The status of a run can be queried or killed by typing in '77' and enter at the main menu. The following menu will be displayed:

Options		Current Selection
(1) SW1 :	Write a Restart File and Terminate	Off
(2) SW2 :	Report Time and Cycle Number	Off
(3) SW3 :	Write a Restart File and Continue	Off
(4) SW4 :	Write a Plot State and Continue	Off
(5) SW5 :	Interactive graphics and real time visualization	Off
(6) SW7 :	Turn off real time visualization	On
(7) SW8 :	Interactive 2D rezoner for solid elements and real time visualization.	Off
(8) SW9 :	Turn off real time visualization (for option SW8)	Off
(9) FILE :	Send Ouput from SW2 to a File	Off
(10) SWA :	Flush ASCII file buffers	Off
(11) SWB :	Write a DYNAIN File and Continue	Off
(12) SWC :	Write a DYNAIN and a Restart File and Continue	Off
(13) SWD :	Write a DYNAIN and a Restart File and Terminate	Off
(14) SWE :	Terminate explicit dynamic relaxation and proceed with the transient analysis	Off
(15) CONV :	Temporarily override nonlinear convergence tolerances	Off
(16) ITER :	Enable/Disable output of binary plot database "d3iter" after each equilibrium iteration	Off
(17) LPRINT:	Enable/Disable output of equation solver memory, cpu requirements	Off
(18) NLPRINT:	Enable/Disable output of nonlinear equilibrium iteration information	Off
(19) PROF :	Output current timing information to messag (SMP) or prof.out (MPP).	Off
(20) STOP :	Halt execution immediately, closing open files	Off
(21) ENDTIME :	Change the termination time to	Off

(99) Apply (-1) Main menu

Select the required option to toggle what to do. Select Apply to carry out the option selected.

Note: A job must be selected before this menu can be displayed.

3. Customising the SHELL

Customising the Shell

This section is relevant to those responsible for installing the software suite.

3.1. LINUX Installation

LINUX Installation

On LINUX systems the SHELL is accessed via the "oasys_22" command. If you have installed the software using the install script then the oasys_22 command file (in the /executables directory) will automatically be updated to contain the correct path for the directory the software was installed in and the name of the license server for the software installation. .

In addition to specifying the installation directory and the license server the "oasys_22" command file can also be set a number of other options on LINUX systems.

After installing the software the "oasys_22" command file should contain the following. (This assumes the software was loaded in a directory called **/prg** and that the license server in a machine called **atghps50** .

```
#!/bin/csh -f
onintr start_flush
#
# Set OA_INSTALL to point to the directory containing the software
#
setenv OA_INSTALL "/prg/oasys20/executables"
#
# Set OA_ADMIN directory
#
# setenv OA_ADMIN
#
# Set ARUP_LICENSE_PATH to either the Oasys LM-X license file or
# the license server
#
# e.g setenv ARUP_LICENSE_PATH $OA_INSTALL/arup.lic
# or setenv ARUP_LICENSE_PATH @hostname
#
setenv ARUP_LICENSE_PATH @atghp02
#
# Set LSTC_FILE to either the lstc license file or the server
#
# e.g. setenv LSTC_LICENSE local
# setenv LSTC_FILE $OA_INSTALL/LSTC_FILE
#
# e.g. setenv LSTC_LICENSE_SERVER hostname
# setenv LSTC_INTERNAL_CLIENT OFF
# setenv LSTC_LICENSE network
#
setenv LSTC_FILE $OA_INSTALL/LSTC_FILE
#
# Other environment variables
#
setenv USERID `whoami`
set noglob
#
# This environment variable gives a more stable animation frame rate on
```


```
# machines equipped with NVidia graphics cards
#
setenv __GL_CONSTANT_FRAME_RATE_HINT 1
#
#
# Set EDITOR (if not set) to the command to invoke an external editor.
This
# EDITOR is currently used for editing comment lines in Oasys Ltd.
PRIMER.
#
# if(! $?EDITOR) then
#setenv EDITOR /usr/bin/kedit # LINUX
# endif
#
# Environment variables for post processors
#
# If FILE_SKIP has not been set then set it to 5
#
if(! $?FILESKIP) then
setenv FILE_SKIP 5
endif
#
# MACHINE SPECIFIC LINES
# ======================
#
# extra line needed for some IBM machines
# setenv LANG En_US
#
# Extra line needed for SUN Solaris Machines
# setenv LD_LIBRARY_PATH /usr/openwin/lib
#
#
# Now start the main shell executable
#
set cwd = `pwd`
setenv PWD $cwd
$OA_INSTALL/xshell_20 $*
#
# exit
#
exit:
exit
```

The following parameters will require modifying in accordance with your system layout

setenv OA_INSTALL<option> setenv OA_ADMIN / OA_ADMIN_22<option> *(optional)* setenv ARUP_LICENSE_PATH / LMX_LICENSE_PATH <option> setenv LSTC_FILE / LSTC_LICENSE_SERVER <option> setenv MENU_AUTO_CONFIRM <option> *(optional)* setenv FILE_EXIST_ACTION <option> *(optional)* setenv ECHO_PREFERENCE <option> *(optional)*

setenv OA_INSTALL <option>

The 'OA_INSTALL' SHELL variable must be modified so that it references the directory in which the SHELL is loaded. i.e if the software has been loaded in:

/prg/oasys22/executables

set this line to:

setenv OA_INSTALL"/prg/oasys22/executables"

This line should be set automatically by the installation script.

setenv OA_ADMIN / OA_ADMIN_22<option>

If a top level administration directory is to be used then OA_ADMIN_22 (for release 22.1) must be defined for all machines on which the software is to be run. This variable should be set to the full pathname of the administration directory.

A description of the installation organisation is given in the Appendix.

setenv ARUP_LICENSE_PATH / LMX_LICENSE_PATH <option>

Either ARUP_LICENSE_PATH or LMX_LICENSE_PATH can be used to locate a valid license for the Oasys LS-DYNA Environment 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.

Floating Network License

If you are running the software using a license server then this variable should be set to point to the license server machine using the machine's hostname.

i.e **setenv ARUP_LICENSE_PATH hostname**
or **setenv ARUP_LICENSE_PATH port@hostname** if you have specified a non default port for the server.

Fixed Stand-alone Licenses

If you are using a node locked license file then this variable should be set to point to the location of the license file.

i.e **setenv ARUP_LICENSE_PATH<INSTALL_DIR>/arup.lic**

Multiple LMX license files

If you have other software that uses LMX then this Environment variable may already be set to point to a license file or a license server. If this variable is already set then you may add the license server or file for this software by specifying a colon separated list of values.

i.e **setenv ARUP_LICENSE_PATHport@hostname1: @hostname2**

setenv LSTC_FILE / LSTC_LICENSE_SERVER <option>

On LINUX machines Ansys LS-DYNA can use either a nodelocked license or a floating license system.

If you are using a nodelocked license then 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. The variable LSTC_LICENSE should also be set to "local"

i.e **setenv LSTC_FILE$OA_INSTALL/LSTC_FILE**
setenv LSTC_LICENSE local

If you are using the floating license system then the variables LSTC_LICENSE_SERVER, LSTC_INTERNAL_CLIENT and LSTC_LICENSE should be set as follows.

i.e **setenv LSTC_LICENSE_SERVER hostname** where hostname is the LSTC license server
setenv LSTC_INTERNAL_CLIENT OFF
setenv LSTC_LICENSE network

setenv MENU_AUTO_CONFIRM <option>

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.

setenv FILE_EXIST_ACTION <option>

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

Normally you 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 then the relevant action will be taken automatically.

This is generally used when playing automatic post-processing batch scripts

setenv ECHO_PREFERENCE <option>

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

3.2. Windows Installation

Windows Installation

When the software is installed a set of icons will automatically be added to:

Start -> All Programs ->Oasys LS-DYNA Environment 22.1 x64

After loading the software the following system variables should be set up.

ARUP_LICENSE_PATH / LMX_LICENSE_PATH OA_ADMIN / OA_ADMIN_22 (optional)
LSTC_FILE / LSTC_LICENSE_SERVER <option> HOME MENU_AUTO_CONFIRM *(optional)*
FILE_EXIST_ACTION *(optional)* ECHO_PREFERENCE *(optional)* DISPLAY_HEIGHT / DISPLAY_WIDTH *(optional)*
We recommend that these variables are set up by a user with Administrator privileges so that they then apply to all users on the system.

ARUP_LICENSE_PATH / LMX_LICENSE_PATH

Either ARUP_LICENSE_PATH or LMX_LICENSE_PATH can be used to locate a valid license for the Oasys LS-DYNA Environment 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.

Floating Network License

If you are running the software using a license server then this variable should be set to point to the license server machine using the machine's hostname.

i.e **ARUP_LICENSE_PATH=hostname**
or **ARUP_LICENSE_PATH=port@hostname** if you have specified a non default port for the server.

Fixed Stand-alone Licenses

If you are using a node locked license file then this variable should be set to point to the location of the license file.

i.e **ARUP_LICENSE_PATH=<INSTALL_DIR>/arup.lic**

Multiple LMX license files

If you have other software that uses LMX then this Environment variable may already be set to point to a license file or a license server. If this variable is already set then you may add the license server or file for this software by specifying a colon separated list of values.

i.e **ARUP_LICENSE_PATH=port@hostname1;@hostname2**

OA_ADMIN / OA_ADMIN_22<option>

If a top level administration directory is to be used then OA_ADMIN_22 (for release 22.1) must be defined for all machines on which the software is to be run. This variable should be set to the full pathname of the administration directory.

A description of the installation organisation is given in the Appendix .

LSTC_FILE / LSTC_LICENSE_SERVER <option>

On Windows machines Ansys LS-DYNA can use either a nodelocked license or a floating license system.

If you are using a nodelocked license then 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. The variable LSTC_LICENSE should also be set to "local"

i.e **LSTC_FILE= <INSTALL_DIR>\LSTC_FILE**
LSTC_LICENSE = local

If you are using the floating license system then the variables LSTC_LICENSE_SERVER, LSTC_INTERNAL_CLIENT and LSTC_LICENSE should be set as follows.

i.e **LSTC_LICENSE_SERVER =hostname** where hostname is the LSTC license server
LSTC_INTERNAL_CLIENT = ON
LSTC_LICENSE = network

HOME

The software suite uses a preference file to control a number of settings. By default the software will look for the preference file in 4 locations, the OA_ADMIN_xx directory (if set), the installation directory, $HOME and the current working directory. The global preference files located in the OA_ADMIN_xx directory and installation directory are read first and then any user specific options are read from the preference file located in $HOME.

If this variable is not set the user will not be able to set up there own user preferences.

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 **"none"** , **overwrite** and **append** .

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.

FILE_EXIST_ACTION

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

Normally you 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 then the relevant action will be taken automatically.

This is generally used when playing automatic post-processing batch scripts

ECHO_PREFERENCE

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

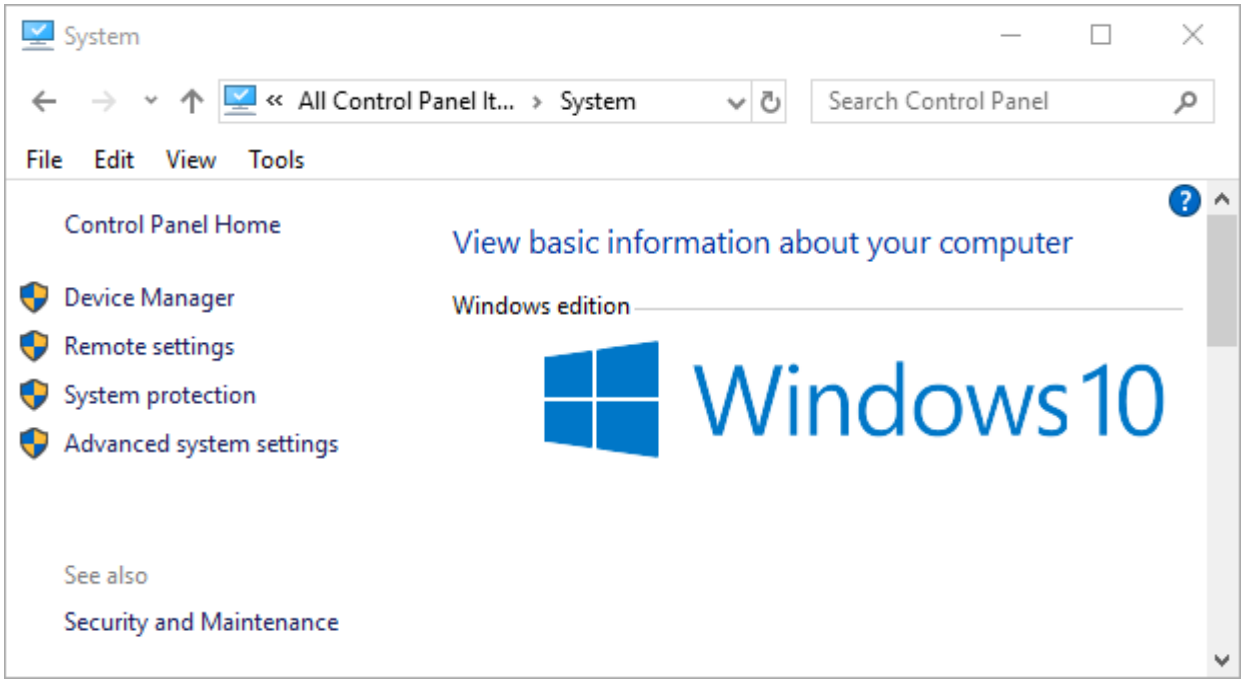
DISPLAY_HEIGHT / DISPLAY_WIDTH

The software uses system functions to obtain screen dimensions which are used to calculate font sizes. Oasys Ltd Support have noticed that on some systems, the screen dimensions are not reported correctly (on identical systems Windows XP returned the correct dimensions while Windows Vista returned sizes approximately 20% larger).

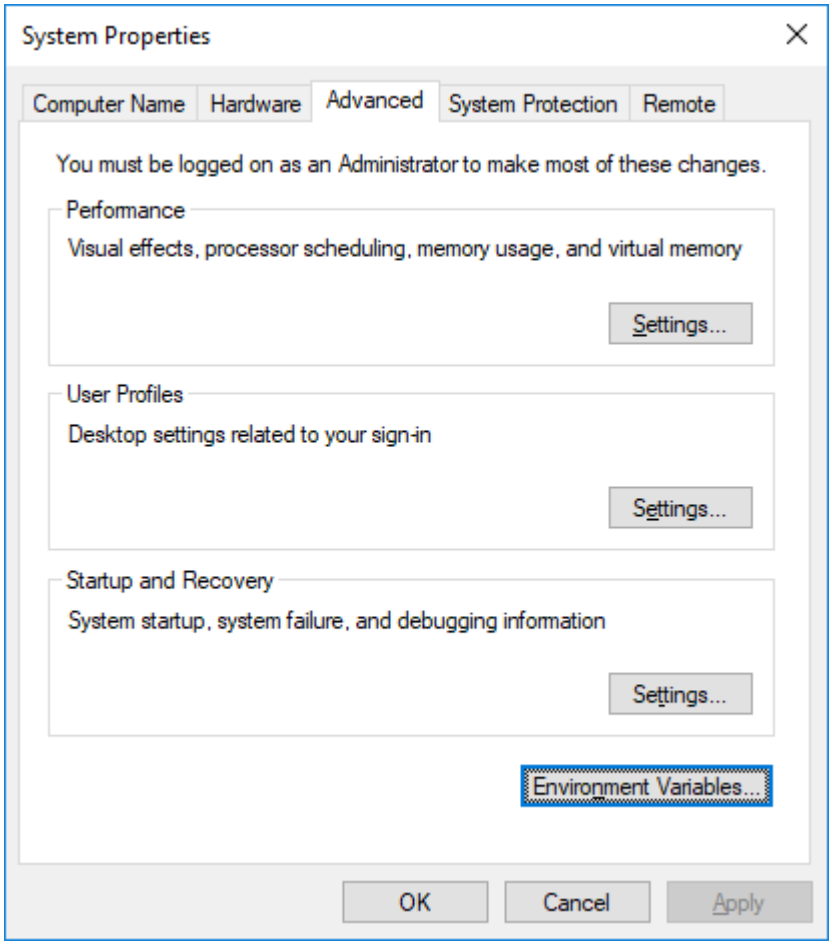
If fonts used by the Oasys LS-DYNA Environment software appear to be the wrong size these 2 variables can be used to override the system calls to define the correct screen dimensions:

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

Setting Environment Variables



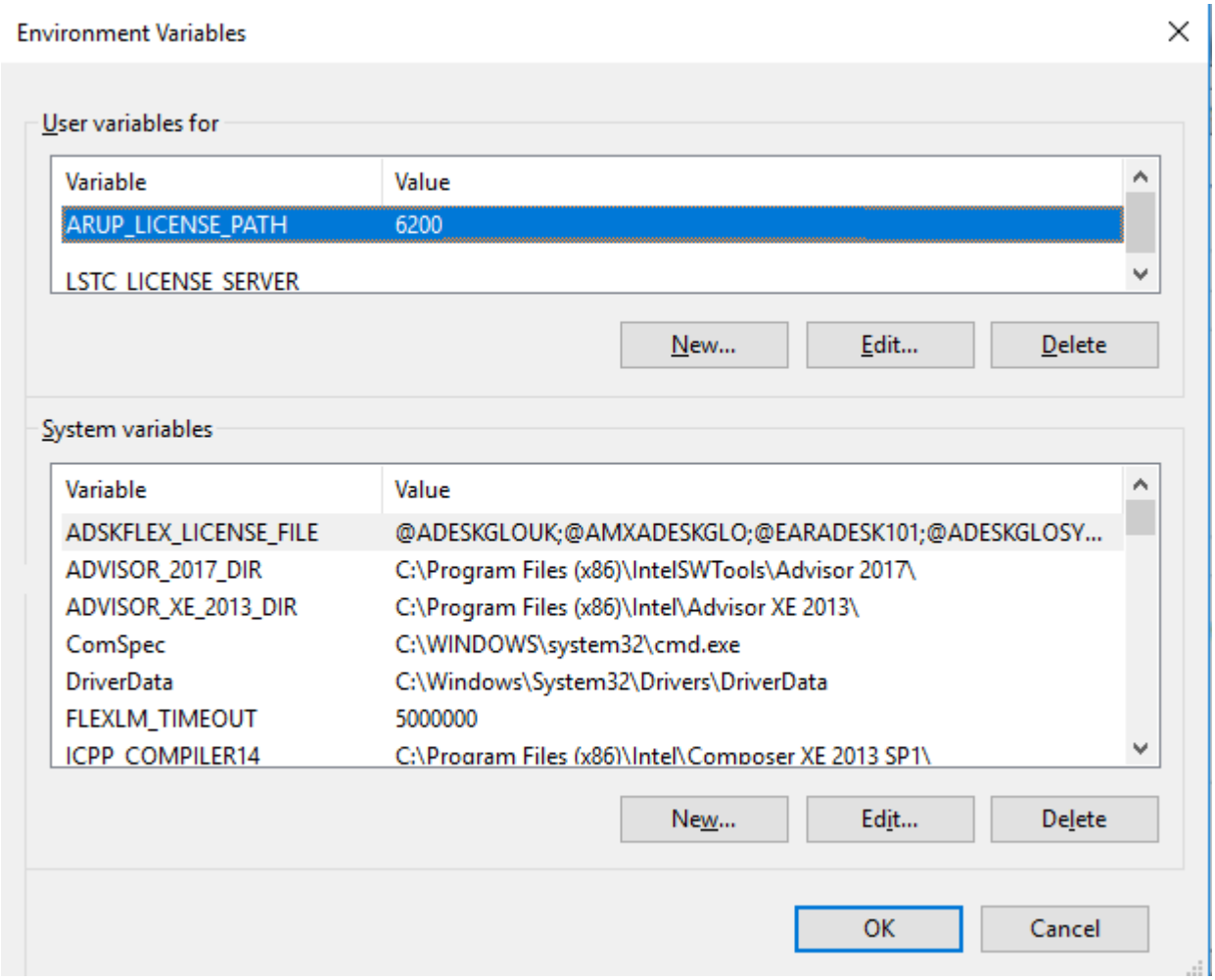
In the "System Properties" window that is displayed select the **Advanced** Tab and then the **Environment Variables** button



To set up a new Environment Variable select **New...**

Enter the variable's name in the Variable box followed by the variable's Value in the Value Box and then select **OK** .

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



3.3. Customising the GUI SHELL

Customising the GUI SHELL

The 'oa_pref' file controls the setup of a number of the programs in the software suite. Most of the programs will look for this file in the following 4 locations in the order given to allow individual users to customise the programs for their own needs :

- The OA_ADMIN_xx directory
- The directory containing the executables (OA_INSTALL directory)
- The user's login directory
- The current working directory

The **'xshell_22'** SHELL will look for this file in all four directories. However to stop users trying to override the system settings, it will only read a seletion of the SHELL preferences from the home and current working directory (those that do not affect system settings). This section only deals with the options for setting up the GUI SHELL, the options for the other programs are covered in the relevant manuals.

From v94 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 **'shell#'** rather than **'shell*'** .

From v94 Environment variables can be used and they will be expanded by the SHELL. For example on Windows you could specify the temp folder with shell*temp_folder: %USERPROFILE%/my_temp_folder.

Any line in the 'oa_pref' file that does not start with the string **'shell*'** or **'shell#'** is ignored, normally comment lines will be prefixed with a # for clarity. The relevant sections of this file follows below.

```
# Preferences file for software.
#
# SHELL stuff:
#
# Definition            Type    Valid arguments     Default
# online                logical TRUE or FALSE       TRUE
# background            logical TRUE or FALSE       TRUE
# batch                 logical TRUE or FALSE       TRUE
# queue                 logical TRUE or FALSE       TRUE
# default               string  ONLINE or BACKGROUND or BATCH ONLINE
                                or QUEUE
```

# display_factor	real	Factor on display size (0.5-2.0)	1.0
# button_gradation	real	Button shade gradation (0.0-1.0)	0.5
# dyna_keyword_manual	string	Pathnames of up to 4 Dyna keyword manuals, separated by commas	
# dyna_theory_manual	string	Pathname of Dyna theory manual	
# batch_type	string	NQS,LSF,SGE,PBS,PBSPRO7 or PBSPRO71	NQS
# queue_output_file	logical	Add output file directive to job script	TRUE
# queue_error_file	logical	Add error file directive to job script	TRUE
# queue_error_path	logical	Add job path to output/error directive in job script	TRUE
# queue_memory	real	Batch Queue Memory Size	15000000
# queue_memory_units	string	WORDS or MWORDS	WORDS
# queue_cpu	real	Batch Queue CPU Limit	0
# queue_cpu_units	string	SECONDS, MINUTES or HOURS	SECONDS
# queue_space	real	Batch Queue File Space Limit 1024	1024
# queue_machine	string	Name of LSF queuing machine	
# request_cpu_limit	logical	TRUE or FALSE	TRUE
# request_memory_limit	logical	TRUE or FALSE	TRUE
# request_space_limit	logical	TRUE or FALSE	FALSE
# system_cpu	real	Minimum System Time (seconds)	90
# job_format	string	KEYWORD or FIXED	KEYWORD
# file_names	string	ARUP or LSTC	ARUP
# job_memory	real	Job Memory Size	9000000
# job_memory_units	string	WORDS or MWORDS	WORDS

# job_cpu	real	Job CPU Limit	0
# job_cpu_units	string	SECONDS, MINUTES or HOURS	SECONDS
# allow_mem_change	logical	TRUE or FALSE	TRUE
# file_size	integer	Binary File Size	1024
# write_ctf	logical	TRUE or FALSE	FALSE
# write_ztf	logical	TRUE or FALSE	TRUE
# batch_display	string	TRUE or FALSE	
# keep_files	logical	TRUE or FALSE	FALSE
# d3plot64_version	string	name of 64 bit D3PLOT executable	d3plot<ch:var name="version"/>_64.exe
# this64_version	string	name of 64 bit T/HIS executable	this<ch:var name="version"/>_64.exe
# primer64_version	string	name of 64 bit PRIMER executable	primer<ch:var name="version"/>_64.exe
# reporter64_version	string	name of 64 bit REPORTER executable	reporter<ch:var name="version"/>_64.exe
# shell_release	string	version # displayed for shell	<ch:var name="version"/>.0
# max_cpus	integer	Maximum number of CPUS	4
# max_mpp_cpus	integer	Maximum number of CPUs for MPP	4
# default_cpus	integer	Default number of CPUs for SMP	1
# default_mpp_cpus	integer	Default Number of CPUs for MPP	1
# max_node_cpus	integer	Maximum number of CPUs per node for MPP jobs	2
# pack_nodes	logical	Pack MPP jobs on the minimum number of nodes	TRUE
# submit_shell	string	CSHELL or BSHELL	CSHELL
# unix_type	string	SYSTEM5 or BSD	SYSTEM5
# manual_reader	string	location of ADOBE ACROBAT reader	acroread

# enable_job_monitoring	logical	TRUE or FALSE	TRUE
# temp_folder	string	Location to write .bat file to on a PC	C:\TEMP
# max_hybrid_mpp_threads	integer	Maximum number of MPP threads for Hybrid Dyna	4
# max_hybrid_smp_threads	integer	Maximum number of SMP threads for Hybrid Dyna	4
# default_hybrid_mpp_threads	integer	Default number of MPP threads for Hybrid Dyna	1
# default_hybrid_smp_threads	integer	Default number of SMP threads for Hybrid Dyna	1
# case_option	logical	case option	FALSE
# mcheck_option	logical	mcheck option	FALSE
# xterm_start	logical	Start programs from an xterm console	TRUE
# default_code_type	string	SMP, MPP or HYBRID	MPP
# default_precision	string	SINGLE or DOUBLE	SINGLE
# default_mpi_type	string		PMPI
# default_ls_dyna_executable	string		
# default_mpi_executable	string		
# reporter_format	string	ORR,ORRX	ORRX
# write_reporter	logical	TRUE,FALSE	FALSE
# write_html	logical	TRUE,FALSE	FALSE
# write_pdf	logical	TRUE,FALSE	TRUE
# write_ppt	logical	TRUE,FALSE	FALSE
# combine_reporter	logical	TRUE,FALSE	TRUE
# skip_generate	logical	TRUE,FALSE	TRUE

# combine_reporter_pdf	logical	TRUE,FALSE	TRUE
# combine_reporter_pptx	logical	TRUE,FALSE	TRUE
# combine_reporter_html	logical	TRUE,FALSE	TRUE
# run_reporter_iconised	logical	TRUE,FALSE	TRUE
# oasys_batch	logical	TRUE,FALSE	TRUE
# run_reporter_in_batch	logical	TRUE,FALSE	TRUE
# automatically_exit_reporter	logical	TRUE,FALSE	TRUE
# write_reporter_logfile	logical	TRUE,FALSE	TRUE
# create_names_file	string	PRE-V20,ALWAYS,NEVER	PRE-V20

Preferences marked with a '*' can be read from all four directories. If desired they can still be locked in the OA_ADMIN_xx or OA_INSTALL directories using the **'shell#'** syntax:

shell*online: TRUE
shell*background: TRUE
shell*batch: TRUE
shell*queue: TRUE
shell*default: ONLINE
shell*dyna_keyword_manual: (*)
shell*dyna_theory_manual: (*)
shell*batch_type: NQS
shell*queue_output_file: TRUE
shell*queue_error_file:TRUE
shell*queue_error_path:TRUE
shell*queue_memory: 15000000
shell*queue_memory_units:WORDS
shell*queue_cpu: 0
shell*queue_cpu_units: SECONDS
shell*batch_type: NQS
shell*queue_space: 1024
shell*queue_machine:
shell*request_cpu_limit: TRUE
shell*request_memory_limit: TRUE
shell*request_space_limit: FALSE
shell*system_cpu: 90

shell*job_format: KEYWORD
shell*file_names: ARUP (*)
shell*job_memory: 9000000
shell*job_memory_units: WORDS
shell*job_cpu: 0
shell*job_cpu_units: SECONDS
shell*allow_mem_change: TRUE
shell*file_size: 1024 (*)
shell*write_ctf: FALSE (*)
shell*write_ztf: TRUE (*)
shell*batch_display: (*)
shell*keep_files: FALSE (*)
shell*d3plot64_version: d3plot22_64.exe (*)
shell*this64_version: this22_64.exe (*)
shell*primer64_version: primer22_64.exe (*)
shell*reporter64_version: reporter22_64.exe (*)
shell*shell_release: 22.1
shell*max_cpus: 1
shell*max_mpp_cpus: 1
shell*default_cpus: 1 (*)
shell*default_mpp_cpus: 1 (*)
shell*max_node_cpus: 2
shell*pack_nodes: TRUE
shell*submit_shell: CSHELL
shell*unix_type: SYSTEM5
shell*manual_reader: acroread (*)
shell*temp_folder: C:\TEMP (*)
shell*max_hybrid_mpp_threads: 1
shell*max_hybrid_smp_threads: 1
shell*default_hybrid_mpp_threads: 1
shell*default_hybrid_smp_threads: 1
shell*case_option: FALSE
shell*mcheck_option: FALSE
shell*xterm_start: TRUE
shell*default_code_type: MPP (*)
shell*default_precision: SINGLE (*)
shell*write_reporter: FALSE (*)
shell*write_html: FALSE (*)
shell*write_pdf: TRUE (*)
shell*write_ppt: FALSE (*)

shell*combine_reporter: TRUE (*)
shell*skip_generate: TRUE (*)
shell*combine_reporter_pdf: TRUE (*)
shell*combine_reporter_pptx: TRUE (*)

shell*combine_reporter_html: TRUE (*)
shell*run_reporter_iconised: TRUE (*)
shell*oasys_batch: TRUE (*)
shell*run_reporter_in_batch: TRUE (*)

shell*automatically_exit_reporter: TRUE (*)
shell*write_reporter_logfile: TRUE (*)
shell*create_names_file: PRE-V20 (*)

shell*online / shell*background / shell*batch / shell*queue

The XSHELL can submit Ansys LS-DYNA jobs using four different options. Any of these methods can be made inaccessible by setting the relevant variable to **FALSE** . If an option is not available on a machine then the variable should also be set to **FALSE** .

shell*online - Allows jobs to be submitted interactively. Delayed start times cannot be specified. **shell*background** - Allows jobs to be submitted to background. If a delayed start times is specified then the job will be submitted using the LINUX 'at' command. **shell*batch** - Allows jobs to be submitted using the LINUX 'batch' command. Delayed start times cannot be specified. **shell*queue** - Allows jobs to be submitted to NQE style batch queues using 'qsub' or equivalent commands. Delayed start times,CPU/Memory limits and accounts may be specified.

If **shell*queue** is set to **FALSE** then sections 2.3.3 to 2.3.10 can be ignored.

shell*default

This variable controls the default option that will be used to submit Ansys LS-DYNA jobs. It should be set to either **ONLINE** , **BACKGROUND** , **BATCH** , or **QUEUE** to select the required default.

shell*dyna_keyword_manual

This variable should be set to the location of the Dyna keyword PDF manuals. Set the full pathname. Up to four PDFs can be specified (e.g. if there are separate volumes) by separating the pathnames with a comma.

shell*dyna_theory_manual

This variable should be set to the location of the Dyna theory PDF manual. Set the full pathname.

shell*batch_type

This variable controls the type of queue the **QUEUE** command (see shell*online / shell*background / shell*batch / shell*queue) submits the job to. At present this variable may be set to **NQS** , **LSF, SGE** (SUN GRID ENGINE), **PBS, PBSPRO7** and **PBSPRO71** . Due to the limitations of some of the queuing systems not all options are available with all queue types, see table below.

Function	NQS	PBS / PBSPRO7 / PBSPRO71	LSF	SGE
Analysis Start Time	Available	Available	Available	Unavailable
Analysis Start Day	Available	Available	Unavailable	Unavailable

shell*queue_output_file

This variable controls if the SHELL writes a queue directive to specify a file for output when a job is submitted to a queueing system. If this option is set to **TRUE** then the queue will add the following line to the top of the job submission script.

Queue Type	**Command**
NQS	#QSUB -o *"job_directory"/"jobname".log*
PBS / PBSPRO7/ PBSPRO71	#PBS -o *"job_directory"/"jobname".log*
SGE	#QSUB -o *"job_directory"/"jobname".log*
LSF	#BSUB -o *"job_directory"/"jobname".log*

shell*queue_error_file

These variable controls if the Shell writes a queue directive to specify a file for errors when a job is submitted to a queueing system. If this option is set to **TRUE** then the queue will add the following line to the top of the job submission script.

Queue Type	**Command**
NQS	#QSUB -eo #QSUB -o *"job_directory"/"jobname".err*
PBS / PBSPRO7/ PBSPRO71	#PBS -e *"job_directory"/"jobname".err*
SGE	#QSUB -e *"job_directory"/"jobname".err*

LSF	#BSUB -e *"job_directory"/"jobname".err*

shell*queue_error_path

This option can be used to specify if the queue directives for the output and error files should contain the job path or not. By default this option is set to **TRUE.**

shell*queue_memory

This variable controls the value used for the default Queue Memory limit. The required value should be specified using the units defined by the **shell*queue_memory_units** variable (see Queue Memory Units). A value of 0 means that the job will be submitted with a unlimited Queue Memory.

shell*queue_memory_units

This variable controls whether the default Queue Memory limit is specified in words or megawords. It should be set to either **WORDS** or **MWORDS** respectively.

shell*queue_cpu

This variable controls the value used for the default Queue CPU Limit. The required value should be specified using the units defined by the **shell*queue_cpu_units** variable (see Queue Cpu Units). A value of 0 means that the job will be submitted with a unlimited Queue CPU.

shell*queue_cpu_units

This variable controls whether the default Queue CPU Limit is specified in seconds, minutes or hours. It should be set to either **SECONDS** , **MINUTES** or **HOURS** respectively.

shell*queue_space

This variable controls the value used for the default File Space limit. The required value should be specified in Mbytes. A value of 0 means that the job will be submitted with an unlimited File Space Limit.

shell*queue_machine

This variable may be used to specify the name of the queuing machine used by **LSF** batch queues. This option is passed as the **-m** parameter to the LSF **bsub** command.

e.g. **bsub -m** queue_machine

shell*request_cpu/memory_limit

These variables control whether Queue CPU and Memory limits have to be specified when jobs are submitted to NQS style queues. If they do have to be specified then set the relevant variable to **TRUE** , otherwise set them to **FALSE.**

shell*request_space_limit

This variable controls whether a Per-request File Space limit has to be specified when jobs are submitted to NQS style queues. If they do have to be specified then set this variable to **TRUE** , otherwise set it to **FALSE** .

shell*system_cpu

This variable controls the minimum amount of 'system' time, in seconds, that a job submitted to a NQS style queue will require if the queue has been set up using a Queue CPU Limit, (see Request CPU Limit/ Request Memory Limit . When a job is submitted to such a queue a 'system' CPU time will be calculated as either 2.5% of the Analysis CPU time or the value of this variable. If the difference between the Queue CPU limit and the Analysis CPU limit is smaller than this value the Queue CPU limit will automatically be increased to allow enough system time for the job to terminate normally when the Analysis CPU limit has been reached.

shell*job_format

This variable controls the default file format that will be expected by Ansys LS-DYNA. It can be set to either KEYWORD or FIXED.

shell*file_names

This variable controls the names of the output files generated by Ansys LS-DYNA. This variable can be set to either ARUP or LSTC.

With Ansys LS-DYNA 970 onwards the names of the output files can also be specified using the *KEYWORD_ID option where a filename prefix for all of the output files is specified within the input file.

Output File	**ARUP**	**LSTC**	***KEYWORD_ID**
Binary Complete State Database	'jobname'.ptf	d3plot	'prefix'.d3plot
Time History Database	'jobname'.thf	d3thdt	'prefix'.d3thdt

Extra Time History Database	'jobname'.xtf	xtfile	'prefix'.xtfile
Binary Output File	binout	binout	'prefix'.binout
Restart Dump File	'jobname'.dpf	d3dump	'prefix'.d3dump
Running Restart Dump File	'jobname'.adf	runrsf	'prefix'.runrsf

shell*job_memory

This variable controls the value used for the default Analysis Memory limit, the amount of **CORE** memory that Ansys LS-DYNA will use to store data. The required value should be specified using the units defined by the shell*job_memory_units variable (see Job Memory Units). A value of 0 means that the job will be submitted with a the default amount of **CORE** memory built into that Ansys LS-DYNA. The default value of 9000000 should be enough for models of up to 60000 elements.

shell*job_memory_units

This variable controls whether the default Analysis Memory limit is specified in words or megawords. It should be set to either **WORDS** or **MWORDS** respectively.

shell*job_cpu

This variable controls the value used for the default Analysis CPU limit. The required value should be specified using the units defined by the **shell*job_cpu_units** variable (see Job Cpu Units). A value of 0 means that the job will be submitted with no Analysis CPU limit.

shell*job_cpu_units

This variable controls whether the default Analysis CPU limit is specified in seconds, minutes or hours. It should be set to either **SECONDS** , **MINUTES** or **HOURS** respectively.

shell*allow_mem_change

This variable controls whether users can change the amount of **CORE** memory used by Ansys LS-DYNA. If this variable is set to **FALSE** then users will not be able to modify the Analysis Memory Limit and will be forced to use the default value built into Ansys LS-DYNA.

shell*file_size

This variable controls the default binary file size produced by Ansys LS-DYNA. The value specified gives the required file size in Mbytes.

shell*write_ctf

By default the **'xshell_22'** is set up so that the default is for Ansys LS-DYNA to write out CTF binary files when a jobs is submitted (see the Job Options menu). If this variable is set to **FALSE** then this option will be turned off by default.

shell*write_ztf

By default the **'xshell_22'** is set up so that after an Ansys LS-DYNA run PRIMER is automatically run to generate a .ZTF file for D3PLOT to read (see the Job Options menu). If this variable is set to **FALSE** then this option will be turned off by default.

shell*batch_display

This variable can be used to specify a LINUX DISPLAY that can be used for batch processing commands.

shell*keep_files

This variable controls whether temporary files created during the submission process and any **CORE** files created if a job terminates abnormally are deleted automatically. If this variable is set to **TRUE** the files will not be deleted.

shell*<*****>_version

By default the **'xshell_22'** is set up to access and run software that uses the default program names. This option allows the name of any executable to be modified as required and for the **'xshell_22'** to be notified of this name change.

e.g. **shell*d3plot64_version** : **d3plot90.exe**

would force the version 22 Shell to run the version 9.0 copy of d3plot, (**d3plot90.exe** would have to be in the directory containing the version 22 executables).

32 bit versions of D3PLOT, T/HIS, PRIMER and REPORTER are no longer released. The names for the 64 bit versions can be modified using

shell*this64_version:
shell*d3plot64_version:
shell*primer64_version:
shell*reporter64_version:

shell*shell_release

By default the **'xshell_22'** is set up to display 22.1 as the version. This option allows the version number displayed to be changed if a customised installation is set up

shell*max_cpus/shell*max_mpp_cpus

These variable controls the maximum number of CPU's that can be selected for SMP and MPP parallel jobs.

shell*default_cpus/shell*default_mpp_cpus

These variable controls the default number of CPU's for SMP and MPP parallel jobs.

shell*max_node_cpus

This variable should be set to the number of CPUS each node has in a cluster. When a MPP job is submitted to a PBS queue this variable will be used to calculate the required number of nodes that will be requested from the PBS queuing system.

shell*pack_nodes

This variable is used along with shell*max_node_cpus to calculate the number of nodes required when submitting a MPP job to a PBS queuing system. If this is set to TRUE then the minimum number of nodes will be requested.

Note that if commands are specified in the "oasys_queue" file then the following defaults will be overidden.

# Job CPU's	max_node_cpus	pack_nodes	PBS node request	PBSPro 7.0 node request	PBSPro 7.1 node request
2	2	TRUE	nodes=1:ppn=2 ***(1x2)***	nodes=1:ppn=1:ncpus=2	select=1:ncpus=2
2	2	FALSE	nodes=2:ppn=1 ***(2x1)***	nodes=2:ppn=1:ncpus=1	select=2:ncpus=1
8	2	TRUE	nodes=4:ppn=2 ***(4x2)***	nodes=4:ppn=1:ncpus=2	select=4:ncpus=2
8	2	FALSE	nodes=8:ppn=1 ***(8x1)***	nodes=8:ppn=1:ncpus=1	select=8:ncpus=8
7	4	TRUE	nodes=1:ppn=4+1:ppn=3 ***(1x4 + 1x3)***	nodes=1:ppn=1:ncpus=4 +1:ppn=1:ncpus=3	select=1:ncpus=4 +1:ncpus=3

7	4	FALSE	nodes=7:ppn=1 ***(7x1)***	nodes=7:ppn=1:ncpus=1	select=7:ncpus=1

shell*submit_shell (LINUX only)

Ansys LS-DYNA jobs are submitted on LINUX systems using script files. This variable can be set to either **CSHELL** or **BSHELL** to create either CSHELL or BOURNE shell scripts.

shell*unix_type

This variable controls the default binary file size produced by Ansys LS-DYNA. The value specified gives the required file size in Mbytes.

shell*manual_reader (LINUX only)

This option should be set to point to where a copy of the Adobe Acrobat reader software can be found on the system.

shell*temp_folder (Windows only)

This option can be used to specify a folder that the SHELL can use to create temporary files while submitting Ansys LS-DYNA jobs. The directory should be on a local system disk not a networked disk as some Anti-Virus programs block running DOS batch files from Network Drives. The default folder is **C:\TEMP**

shell*max_hybrid_mpp_threads

This option controls the maximum number of MPP threads that can be selected for Hybrid jobs.

shell*max_hybrid_smp_threads

This option controls the maximum number of SMP threads that can be selected for Hybrid jobs.

shell*default_hybrid_mpp_threads

This option controls the default number of MPP threads that can be selected for Hybrid jobs.

shell*default_hybrid_smp_threads

This option controls the default number of SMP threads that can be selected for Hybrid jobs.

shell*case_option

This option can be used to specify whether the -case option is used in the command line when submitting a job.

shell*mcheck_option

This option can be used to specify whether the -mcheck option is used in the command line when submitting a job.

shell*xterm_start (LINUX only)

This option can be used to specify whether the programs are started from an xterm console or not.

shell*default_code_type

This option can be used to specify the default program code type.

shell*default_precision

This option can be used to specify the default program precision

shell*write_reporter

This option can be used to specify whether to output a file from

shell*write_html

This option can be used to specify whether to output an HTML file from

shell*write_pdf

This option can be used to specify whether to output a PDF file from

shell*write_ppt

This option can be used to specify whether to output a PPT file from

shell*combine_reporter

This option can be used to combine the output results of all the jobs currently running into single html/pdf/ppt files.

shell*skip_generate

This option can be used to skip the generation of individual report files if they already exist.

shell*combine_reporter_pdf

This option can be used to activate path to combined pdf file.

shell*combine_reporter_pptx

This option can be used to activate path to combined pptx file.

shell*combine_reporter_html

This option can be used to activate path to combined html file.

shell*run_reporter_iconised

This option can be used to runs REPORTER iconised.

shell*oasys_batch

This option can be used on windows runs PRIMER, D3PLOT and THIS without any windows being shown.

shell*run_reporter_in_batch

This option can be used when we want REPORTER to not prompt the user whenever an error is encountered while generating an item in template.

shell*automatically_exit_reporter

This option can be used to close REPORTER automaically after generating the output files.

shell*write_reporter_logfile

This option can be used to save REPORTER logfile.

shell*create_names_file

This option can be used to create a 'names' or .bat/.ctl file for Ansys LS-DYNA submission.

3.4. Adding Ansys LS-DYNA Versions to the SHELL

Adding Ansys LS-DYNA Versions to the SHELL

The list of Ansys LS-DYNA versions that can be accessed through the SHELL is controlled through an ASCII file called "dyna_versions".

Note the format of this file was changed in version 9.3 and an additional column has been inserted before the label field for MPP codes which identifies which MPI library the version has been compiled with.

The format for SMP versions of Ansys LS-DYNA is :

<Code Type> <precision> <executable> <label>

The format for MPP or HYBRID versions of Ansys LS-DYNA is :

<Code Type> F **<precision>** **<executable>** **<MPP Type>** **<label>**

Where:

<Code Type>	Is either **SMP** (shared memory parallel), **SERIAL** (single threaded non parallel), **MPP** (distributed memory parallel) or **HYBRID.**
<precision>	Is either **Single** (32 bit floating point) or **Double** (64 bit floating point).
<executable>	Is the full path of the executable. If the full path name of the executables includes any spaces then the path must be enclosed in "s.
<MPP Type>	This is a string that can be used to identify the MPP library a MPP version of Ansys LS-DYNA has been compiled with. This column is not defined for **SMP** or **SERIAL** codes.
<label>	Is the label shown in the list of Ansys LS-DYNA versions displayed in the submission SHELL.

LINUX

Code Type	precision	executable	MPP Type	label
SMP	**Single**	**/dyna/ls971_s_R3_1_xeon64_redhat40.exe**		**LS971 R3.1 SP SMP**

SMP	**Double**	**/dyna/ls971_d_R3_1_xeon64_redhat40.exe**		**LS971 R3.1 DP SMP**
MPP	**Single**	**/dyna/mpp971_s_R3.1_..._hpmpi.exe**	**HP-MPI**	**LS971 R3.1 SP MPP HP-MPI**
MPP	**Double**	**/dyna/mpp971_d_R3.1_Intel_..._hpmpi.exe**	**HP-MPI**	**LS971 R3.1 DP MPP HP-MPI**
MPP	**Single**	**/dyna/mpp971_s_R3.1_Intel_..._lam659.exe**	**LAM659**	**LS971 R3.1 SP MPP LAM 6.5.9**
MPP	**Double**	**/dyna/mpp971_d_R3.1_Intel_..._lam659.exe**	**LAM659**	**LS971 R3.1 DP MPP LAM 6.5.9**
HYBRID	**Single**	**/dyna/mpp971_s_R5.1.1_65550_..._hybrid.exe**	**HP-MPI**	**LS971 R5.1.1 SP HYBRID HP-MPI**
HYBRID	**Double**	**/dyna/mpp971_d_R5.1.1_65550_..._hybrid.exe**	**HP-MPI**	**LS971 R5.1.1 DP HYBRID HP-MPI**

Would display a menu containing 8 versions of Ansys LS-DYNA.

WINDOWS

Code Type	precision	executable	MPP Type	label
SMP	Single	"C:\LS-DYNA\ls971_s_R3_1_win32_p.exe"		Win32 SP LS971vR3.1
SMP	Double	"C:\LS-DYNA\ls971_d_R3_1_win32_p.exe"		Win32 DP LS971vR3.1
MPP	Single	"C:\LS-DYNA\mpp971_s_R3.1_win32_mpich125.exe"	MPICH	Win32 SP LS971vR3.1 (MPICH)
MPP	Double	"C:\LS-DYNA\mpp971_d_R3.1_win32_mpich125.exe"	MPICH	Win32 DP LS971vR3.1 (MPICH)
MPP	Single	"C:\LS-DYNA\mpp971_s_R3.1_win64_hpmpi.exe"	HPMPI	Win64 SP LS971vR3.1 (HPMPI)
MPP	Double	"C:\LS-DYNA\mpp971_d_R3.1_win64_hpmpi.exe"	HPMPI	Win64 SP LS971vR3.1 (HPMPI)

If MPP jobs are going to be run across multiple machines and the Ansys LS-DYNA executables are located on a network disk then the full UNC path should be specified instead of the local drive letter.

Code Type	precision	executable	MPP Type	label
MPP	Single	"\\SERVER\LS-DYNA\mpp971_s_R3.1_win64_hpmpi.exe"	HPMPI	Win64 SP LS971vR3.1 (HPMPI)
MPP	Double	"\\SERVER\LS-DYNA\mpp971_d_R3.1_win64_hpmpi.exe"	HPMPI	Win64 SP LS971vR3.1 (HPMPI)

3.5. Customising the Ansys LS-DYNA Submission Script

Customising the Ansys LS-DYNA Submission Script

The SHELL generates either a LINUX CShell/Bourne Shell script (**jobname.ctl**) or a DOS batch file (**jobname.bat**) that contains all of the selected Ansys LS-DYNA job options. On LINUX systems the choice of either CShell or Bourne Shell is controlled by the shell*submit_shell option in the oa_pref file.

In version 22.1 of the SHELL the contents of these batch files can be modified by editing the "oasys.submit" file located in the installation directory.

The batch file created by the submission SHELL is split into 4 sections

	Contents	
Queuing Commands	Queue commands for NQS, SGE, LSF and PBS queuing systems. If the job is not submitted to a queue then this section of the batch file will be empty.	Automatically generated by the SHELL
Environment Variables	This section of the batch file sets up a number of Environment variables. The first group contain information relating to license systems while the second set contain information relating to the selected version of Ansys LS-DYNA and the job.	Automatically generated by the SHELL
Ansys LS-DYNA submission	This section of the batch file contains the commands that are actually used to run Ansys LS-DYNA. The contents of this section are included from a file in the installations directory.	User configurable
Post Processing Options	Commands for running T/HIS and automatically after the Ansys LS-DYNA job terminates.	Automatically generated by the SHELL

The following sections include examples taken from the batch file created for a job submitted to a PBS queuing system on a LINUX machine

Queuing Commands

The SHELL will automatically add queuing commands to the start of the batch file. The options supported for the different queuing systems are as follows.

Option	**NQS**	**PBS**	**SGE**	**LSF**
log file	-o *"logfile"*	-o *"logfile"*	-o *"logfile"*	-o *"logfile"*

error file	-eo	-e *"errorfile"*	-e *"errorfile"*	-e *"errorfile"*
queue name	-q *"queuename"*	-q *"queuename"*	-l g= *"queuename"*	-q *"queuename"*
start time	-a *"start time"*	-a *"start time"*		-b *"start time"*
Memory Limit	-lM *"limit"*			-M *"limit"*
CPU Limit	-lT *"limit"*		-l h_cpu= *"limit"*	-c *"limit"*
File Limit	-lF *"limit"*			

The log and error file output options can be disabled by setting the preference options shell*queue_output_file and shell*queue_error_file to **FALSE** .

Environment Variables

The following environment variables are automatically set up in the batch file by the SHELL.

Variable	Description
OA_INSTALL	Full pathname of the software installation directory
LSTC_FILE	Full pathname of the LSTC license file. If a LSTC license server is being used then this variable will replaced with the LSTC_LICENSE_SERVER, LSTC_INTERNAL_CLIENT and LSTC_LICENSE variables.
LSTC_MEMORY	Set to auto if the automatic memory option has been selected
LMX_LICENSE_PATH	LMX license information for software suite
LSDYNA_VERSION	Full pathname of the selected Ansys LS-DYNA version
LSDYNA_MPP	Set to TRUE if a MPP version of Ansys LS-DYNA had been selected
LSDYNA_HYBRID	Set to TRUE if a HYBRID version of Ansys LS-DYNA had been selected
LSDYNA_HYBRID_MPP_THREADS	Number of HYBRID MPP threads selected
LSDYNA_HYBRID_SMP_THREADS	Number of HYBRID SMP threads selected
LSDYNA_MPI_TYPE	MPI version from "dyna_versions" file

LSDYNA_DOUBLE	Set to TRUE if a double precision version of Ansys LS-DYNA had been selected
LSDYNA_ONLINE	Set to TRUE if the job has been submitted using the Online option.
LSDYNA_BACKGROUND	Set to TRUE if the job has been submitted using the Background option.
LSDYNA_BATCH	Set to TRUE if the job has been submitted using the Batch option.
LSDYNA_QUEUE	Set to TRUE if the job has been submitted using the Queue option.
LSDYNA_QUEUE_NAME	Name of the QUEUE selected
LSDYNA_QUEUE_COMMAND_<n>	Queue commands used (where <n> = 1-20)
LSDYNA_JOB_DIR	Full pathname of the directory containing the Ansys LS-DYNA job
LSDYNA_JOB_FILE	Name of the file containing the Ansys LS-DYNA job information
LSDYNA_JOB_NAME	Name of the Ansys LS-DYNA job
LSDYNA_JOB_CPUS	Number of CPU's selected for parallel jobs
LSDYNA_USER_ID	Username
LSDYNA_LOCAL_HOST	TRUE if submitting MPP jobs to the local machine
LSDYNA_NODE_FILE	Set to TRUE if submitting MPP jobs using a file containing the list of nodes to use
NODE_FILE	Filename containing the list of nodes to use.
LSDYNA_NODE_LIST	Set to TRUE if submitting MPP jobs using a string containing the list of nodes to use
NODE_LIST	String containing the list of nodes to use.
LSDYNA_RESTART_FILE	Filename of Ansys LS-DYNA restart dump file if the analysis is a restart.
LSDYNA_RESTART_INPUT_FILE	Filename of Ansys LS-DYNA restart input file if the analysis is a restart and a input file has been selected.

LSDYNA_CL_ARGS	List of command line arguments used. This will only be set if the CASE or MCHECK options have been selected.

```
#
# License file variables
#
setenv OASYS            /data/dyna10/linux_executables
setenv LSTC_FILE        /prg/LSTC_FILE
setenv LSTC_MEMORY      auto
setenv ARUP_LICENSE_PATH @atuhp022:@atghps03
#
# Job variables
#
setenv LSDYNA_VERSION
/data/dyna10/linux_executables/ls970_s_5434_ia64_sgi_p.exe
setenv LSDYNA_MPP           FALSE
setenv LSDYNA_DOUBLE        FALSE
setenv LSDYNA_ONLINE        TRUE
setenv LSDYNA_BACKGROUND    FALSE
setenv LSDYNA_BATCH         FALSE
setenv LSDYNA_QUEUE         FALSE
setenv LSDYNA_JOB_DIR       /local/test
setenv LSDYNA_JOB_FILE      shell_test.temp
setenv LSDYNA_JOB_CPUS      2
setenv LSDYNA_USER_ID       rogerh
setenv LSDYNA_LOCAL_HOST    FALSE
setenv LSDYNA_NODE_FILE     TRUE
setenv NODE_FILE            /local/test/nodelist
setenv LSDYNA_NODE_LIST     FALSE
#
```

Ansys LS-DYNA Submission

The commands to run Ansys LS-DYNA are included from a user configurable file called "oasys.submit" located in the software installation directory.

As the file is included after the Environment Variable section of the batch file all of the variables that are set up can be used within the include file. This means that a single include file "oasys.submit" can be configured if required which contains separate sections for SMP / MPP jobs.

Example of a LINUX "oasys.submit" File

The following example shows the default "oasys.submit" file that is included with the version 22.1 software on LINUX platforms. The default script is setup to submit jobs on a LINUX machine using the PBS queueing system but it should be easy to reconfigure to other machines and queueing systems.

As MPP jobs can use a number of different MPI libraries on LINUX systems this script shows how to submit jobs using HP-MPI, INTEL MPIand MPICH. The default script is

setup assuming that the different MPI libaries have been installed in the following directories:

MPI	Directory
HP-MPI	**/opt/hpmpi**
INTEL MPI	**/opt/intel**
OPEN MPI	**/opt/openmpi**

```
#
# The following Environment Variables are available for this script
#
# $LSDYNA_VERSION : full pathname of selected LS-DYNA executable
# $LSDYNA_MPP : TRUE if MPP version selected
# $LSDYNA_MPI_TYPE : MPI version
# $LSDYNA_DOUBLE : TRUE if double precision version selected
# $LSDYNA_ONLINE : TRUE if the job has been submitted ONLINE
# $LSDYNA_BACKGROUND : TRUE if the job has been submitted to BACKGROUND
# $LSDYNA_BATCH : TRUE if the job has been submitted using BATCH
# $LSDYNA_QUEUE : TRUE if the job has been submitted to a QUEUE
# $LSDYNA_JOB_DIR : full path of LS-DYNA job_directory
# $LSDYNA_JOB_FILE : filename containing LS-DYNA job options
# $LSDYNA_JOB_CPUS : number of CPU's selected
# $LSDYNA_USER_ID : username
# $LSDYNA_LOCAL_HOST : TRUE if submitting MPP jobs to the local machine
# $LSDYNA_NODE_FILE : TRUE if submitting MPP jobs using a Node File
# $NODE_FILE : filename containing node list for MPP jobs
# $LSDYNA_LOCAL_HOST : TRUE if submitting MPP jobs using a Node List
# $NODE_LIST : string containing node list for MPP jobs
# $LSDYNA_CL_ARGS : string containing command line arguments
# $LSDYNA_HYBRID : TRUE if HYBRID version selected
# $LSDYNA_MPP_THREADS : Number of MPP threads selected for the HYBRID
version
# $LSDYNA_SMP_THREADS : Number of SMP threads selected for the HYBRID
version
#
#
#
================================================================================
=======
#
#
# THE REST OF THIS SCRIPT HAS BEEN CONFIGURED FOR SUBMITING LS-DYNA
JOBS TO A LINUX SYSTEM USING
# THE PBS QUEUEING SYSTEM. YOU WILL HAVE TO MODIFY THE FOLLOWING IF YOU
ARE USING A DIFFERENT
# QUEUEING STSTEM OR MACHINE TYPE.
#
#
================================================================================
=======
```


```
#
# Uncomment the following commands if you want to create sub-
directories for your analyses.
# This will only work if you are using the PBS queueing system, as the
folders are named
# after the PBS job id.
#
# Make a new directory for the results - only uncomment one of these
lines
# The first one will give the full job id, the second just the job id
number
#
#set RESULTS_DIR = $PBS_JOBID
#set RESULTS_DIR = `echo $PBS_JOBID | awk '{split($0,a,"."); print
a[1]}'`
#
#mkdir $LSDYNA_JOB_DIR/$RESULTS_DIR
#
# Get the root name of the job
#
#set ROOT = $LSDYNA_JOB_FILE:r
#
# Copy the .temp, names and key file to the results directory
#
#set KEY = ".key"
#set NAMES = "names"
#
#cp $LSDYNA_JOB_DIR/$ROOT$KEY $RESULTS_DIR/.
#cp $LSDYNA_JOB_DIR/$LSDYNA_JOB_FILE $RESULTS_DIR/.
#cp $LSDYNA_JOB_DIR/$NAMES $RESULTS_DIR/.
#
# Change job directory to the results directory
#
#set LSDYNA_JOB_DIR = $RESULTS_DIR
#cd $LSDYNA_JOB_DIR
#

#
if ($LSDYNA_MPP != "TRUE" && $LSDYNA_HYBRID != "TRUE") then
#
#
=========================================================================
=======
# SMP LS-DYNA submission
#
=========================================================================
=======
#
$LSDYNA_VERSION $LSDYNA_CL_ARGS
#
else if ($LSDYNA_MPP == "TRUE") then
#
#
=========================================================================
=======
# MPP LS-DYNA submission
#
=========================================================================
```


```
=======
#
# HP-MPI
#
 if ($LSDYNA_MPI_TYPE == "HP-MPI") then
#
 setenv HPMPI_DIR /opt/hpmpi/bin
#
# Submit a job to a PBS queueing system
#
    if ($LSDYNA_QUEUE == "TRUE") then
#
      if (-e $PBS_NODEFILE) then
        rm -rf $LSDYNA_JOB_DIR/appfile >& /dev/null
        if (-f $PBS_NODEFILE) then
          foreach roger ( `cat $PBS_NODEFILE` )
            echo "-h $roger -np 1 $LSDYNA_VERSION $LSDYNA_CL_ARGS" >>
$LSDYNA_JOB_DIR/appfile
            set LSDYNA_CL_ARGS = ""
          end
        endif
      endif
      $HPMPI_DIR/mpirun -prot -e MPI_WORKDIR=$LSDYNA_JOB_DIR -f appfile
      rm -rf $LSDYNA_JOB_DIR/appfile >& /dev/null
#
# Submit a job online
#
    else if ($LSDYNA_ONLINE == "TRUE") then
#
      if ($LSDYNA_LOCAL_HOST == "TRUE") then
#
        $HPMPI_DIR/mpirun -prot -np $LSDYNA_JOB_CPUS $LSDYNA_VERSION
$LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_FILE == "TRUE") then
#
        $HPMPI_DIR/mpirun -prot -np $LSDYNA_JOB_CPUS -hostfile
$NODE_FILE -e LSTC_LICENSE_SERVER=$LSTC_LICENSE_SERVER -e
LSTC_LICENSE=$LSTC_LICENSE $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_LIST == "TRUE") then
#
        $HPMPI_DIR/mpirun -prot -np $LSDYNA_JOB_CPUS -hostlist
$NODE_LIST -e LSTC_LICENSE_SERVER=$LSTC_LICENSE_SERVER -e
LSTC_LICENSE=$LSTC_LICENSE $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      endif
#
    endif
#
# INTEL MPI
#
  else if ($LSDYNA_MPI_TYPE == "INTEL") then
#
    setenv INTEL_DIR /opt/intel/impi/4.0.3/bin64
    set mpi_dir=$INTEL_DIR
    source $mpi_dir/mpivars.csh
#
```


```
    if ($LSDYNA_QUEUE == "TRUE") then
#
      $INTEL_DIR/mpirun -n $LSDYNA_JOB_CPUS -wdir $LSDYNA_JOB_DIR
$LSDYNA_VERSION $LSDYNA_CL_ARGS
#
    else if ($LSDYNA_ONLINE == "TRUE") then
#
      if ($LSDYNA_LOCAL_HOST == "TRUE") then
#
        $INTEL_DIR/mpirun -n $LSDYNA_JOB_CPUS -wdir $LSDYNA_JOB_DIR
$LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_FILE == "TRUE") then
#
        $INTEL_DIR/mpirun -n $LSDYNA_JOB_CPUS -machinefile $NODE_FILE -
wdir $LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_LIST == "TRUE") then
#
        $INTEL_DIR/mpirun -n $LSDYNA_JOB_CPUS -hosts $NODE_LIST -wdir
$LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      endif
#
    endif
#
# OPEN MPI
#
  else if ($LSDYNA_MPI_TYPE == "OPENMPI") then
#
    setenv MPI_ROOT /opt/openmpi
    setenv OPENMPI_DIR $MPI_ROOT/bin
#
    if !($?PATH) then
      setenv PATH $MPI_ROOT/bin
    else
      setenv PATH $MPI_ROOT/bin:$PATH
    endif
    if !($?LD_LIBRARY_PATH) then
      setenv LD_LIBRARY_PATH $MPI_ROOT/lib
    else
      setenv LD_LIBRARY_PATH $MPI_ROOT/lib:$LD_LIBRARY_PATH
    endif
#
    if ($LSDYNA_QUEUE == "TRUE") then
#
      if (-e $PBS_NODEFILE) then
        rm -rf $LSDYNA_JOB_DIR/appfile >& /dev/null
        if (-f $PBS_NODEFILE) then
          foreach host ( `cat $PBS_NODEFILE` )
            echo "$host" >> $LSDYNA_JOB_DIR/appfile
          end
        endif
      endif
      $OPENMPI_DIR/mpirun -machinefile appfile -wdir $LSDYNA_JOB_DIR
$LSDYNA_VERSION $LSDYNA_CL_ARGS
#
    else if ($LSDYNA_ONLINE == "TRUE") then
```


```
#
      if ($LSDYNA_LOCAL_HOST == "TRUE") then
#
        $OPENMPI_DIR/mpirun -n $LSDYNA_JOB_CPUS -wdir $LSDYNA_JOB_DIR
$LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_FILE == "TRUE") then
#
        $OPENMPI_DIR/mpirun -n $LSDYNA_JOB_CPUS -machinefile $NODE_FILE
-x PATH -x LD_LIBRARY_PATH -x LSTC_LICENSE_SERVER -x LSTC_LICENSE -wdir
$LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_LIST == "TRUE") then
#
        $OPENMPI_DIR/mpirun -n $LSDYNA_JOB_CPUS -host $NODE_LIST -x
PATH -x LD_LIBRARY_PATH -x LSTC_LICENSE_SERVER -x LSTC_LICENSE -wdir
$LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      endif
#
    endif
#
  endif
#
else if ($LSDYNA_HYBRID == "TRUE") then
#
#
================================================================================
=======
# HYBRID LS-DYNA submission
#
================================================================================
=======
#
# HP-MPI
#
  if ($LSDYNA_MPI_TYPE == "HP-MPI") then
#
    setenv HPMPI_DIR /opt/hpmpi/bin
#
    if ($LSDYNA_QUEUE == "TRUE") then
#
      if (-e $PBS_NODEFILE) then
        rm -rf $LSDYNA_JOB_DIR/appfile >& /dev/null
        if (-f $PBS_NODEFILE) then
          set last_host = ""
          foreach host ( `sort $PBS_NODEFILE` )
            if ( $host != $last_host) then
              set count = 0
            endif
            @ count = $count + 1
            if ( $count == 1) then
              echo "-h $host -np 1 $LSDYNA_VERSION" $LSDYNA_CL_ARGS >>
$LSDYNA_JOB_DIR/appfile
              set LSDYNA_CL_ARGS = ""
            endif
            if ($count == $LSDYNA_HYBRID_SMP_THREADS) then
              set count = 0
```


```
            endif
            set last_host = $host
          end
        endif
      endif
      $HPMPI_DIR/mpirun -cpu_bind -prot -e MPI_WORKDIR=$LSDYNA_JOB_DIR
-f appfile
      rm -rf $LSDYNA_JOB_DIR/appfile >& /dev/null
#
    else if ($LSDYNA_ONLINE == "TRUE") then
#
      if ($LSDYNA_LOCAL_HOST == "TRUE") then
#
        $HPMPI_DIR/mpirun -prot -np $LSDYNA_HYBRID_MPP_THREADS
$LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_FILE == "TRUE") then
#
        $HPMPI_DIR/mpirun -prot -np $LSDYNA_HYBRID_MPP_THREADS -
hostfile $NODE_FILE -e LSTC_LICENSE_SERVER=$LSTC_LICENSE_SERVER -e
LSTC_LICENSE=$LSTC_LICENSE $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_LIST == "TRUE") then
#
        $HPMPI_DIR/mpirun -prot -np $LSDYNA_HYBRID_MPP_THREADS -
hostlist $NODE_LIST -e LSTC_LICENSE_SERVER=$LSTC_LICENSE_SERVER -e
LSTC_LICENSE=$LSTC_LICENSE $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      endif
#
    endif
#
# INTEL MPI
#
  else if ($LSDYNA_MPI_TYPE == "INTEL") then
#
    setenv INTEL_DIR /opt/intel/impi/4.0.3/bin64
    set mpi_dir=$INTEL_DIR
    source $mpi_dir/mpivars.csh
#
    if ($LSDYNA_QUEUE == "TRUE") then
#
      if (-e $PBS_NODEFILE) then
        rm -rf $LSDYNA_JOB_DIR/appfile >& /dev/null
        if (-f $PBS_NODEFILE) then
          set last_host = ""
          foreach host ( `sort $PBS_NODEFILE` )
            if ( $host != $last_host) then
             set count = 0
            endif
            @ count = $count + 1
            if ( $count == 1) then
              echo "$host" >> $LSDYNA_JOB_DIR/appfile
             set LSDYNA_CL_ARGS = ""
           endif
            if ($count == $LSDYNA_HYBRID_SMP_THREADS) then
              set count = 0
            endif
```


```
            set last_host = $host
          end
        endif
      endif
      $INTEL_DIR/mpirun -n $LSDYNA_HYBRID_MPP_THREADS -machinefile
appfile -wdir $LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
    else if ($LSDYNA_ONLINE == "TRUE") then
#
      if ($LSDYNA_LOCAL_HOST == "TRUE") then
#
        $INTEL_DIR/mpirun -n $LSDYNA_HYBRID_MPP_THREADS -wdir
$LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_FILE == "TRUE") then
#
        $INTEL_DIR/mpirun -n $LSDYNA_HYBRID_MPP_THREADS -machinefile
$NODE_FILE -wdir $LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_LIST == "TRUE") then
#
        $INTEL_DIR/mpirun -n $LSDYNA_HYDIRD_MPP_THREADS -hosts
$NODE_LIST -wdir $LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      endif
#
    endif

#
# OPEN MPI
#
  else if ($LSDYNA_MPI_TYPE == "OPENMPI") then
#
    setenv MPI_ROOT /opt/openmpi
    setenv OPENMPI_DIR $MPI_ROOT/bin
#
    if !($?PATH) then
      setenv PATH $MPI_ROOT/bin
    else       setenv PATH $MPI_ROOT/bin:$PATH
    endif
    if !($?LD_LIBRARY_PATH) then
      setenv LD_LIBRARY_PATH $MPI_ROOT/lib
    else
      setenv LD_LIBRARY_PATH $MPI_ROOT/lib:$LD_LIBRARY_PATH
    endif
#
    if ($LSDYNA_QUEUE == "TRUE") then
#
      if (-e $PBS_NODEFILE) then
        rm -rf $LSDYNA_JOB_DIR/appfile >& /dev/null
        if (-f $PBS_NODEFILE) then
          set last_host = ""
          foreach host ( `sort $PBS_NODEFILE` )
            if ( $host != $last_host) then
              set count = 0
            endif
            @ count = $count + 1
            if ( $count == 1) then
```

```
              echo "$host" >> $LSDYNA_JOB_DIR/appfile
              set LSDYNA_CL_ARGS = ""
            endif
            if ($count == $LSDYNA_HYBRID_SMP_THREADS) then
              set count = 0
            endif
            set last_host = $host
          end
        endif
      endif
      $OPENMPI_DIR/mpirun -machinefile appfile -wdir $LSDYNA_JOB_DIR
$LSDYNA_VERSION $LSDYNA_CL_ARGS
#
    else if ($LSDYNA_ONLINE == "TRUE") then
#
      if ($LSDYNA_LOCAL_HOST == "TRUE") then
#
        $OPENMPI_DIR/mpirun -n $LSDYNA_HYBRID_MPP_THREADS -wdir
$LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_FILE == "TRUE") then
#
        $OPENMPI_DIR/mpirun -n $LSDYNA_HYBRID_MPP_THREADS -machinefile
$NODE_FILE -x PATH -x LD_LIBRARY_PATH -x LSTC_LICENSE_SERVER -x
LSTC_LICENSE -wdir $LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      else if ($LSDYNA_NODE_LIST == "TRUE") then
#
        $OPENMPI_DIR/mpirun -n $LSDYNA_HYBRID_MPP_THREADS -host
$NODE_LIST -x PATH -x LD_LIBRARY_PATH -x LSTC_LICENSE_SERVER -x
LSTC_LICENSE -wdir $LSDYNA_JOB_DIR $LSDYNA_VERSION $LSDYNA_CL_ARGS
#
      endif
#
    endif
#
  endif
#
endif
#
```

Example of a Windows "oasys.submit" File

The following example shows the default "oasys.submit" file that is included with the version 22.1 software on PC platforms.

As MPP jobs can use either the HP-MPI or MPICH MPI libraries this script shows how to submit jobs using both of them. The default script is setup assuming that the different MPI libaries have been installed in the following directories.

MPI	Directory
HP-MPI	**C:\Program Files (x86)\Hewlett-Packard\HP-MPI**

SHELL

PLATFORM MPI	**C:\Program Files (x86)\Platform Computing\Platform-MPI**
MPICH 2	**C:\Program Files\MPICH2**
INTEL MPI	**C:\Program Files (x86)\Intel**

This script also shows

1. How to submit MPP jobs to either the local machine or to multiple machines using either a file containing a list of hostnames or a string containing the hostnames.
2. How to pass environment variables for license options to the remote hosts via the mpirun command.

```
REM The following Environment Variables are available for this script
REM
REM LSDYNA_VERSION : full pathname of selected LS-DYNA executable
REM LSDYNA_MPP : TRUE if MPP version selected
REM LSDYNA_MPI_TYPE : MPI version
REM LSDYNA_DOUBLE : TRUE if double precision version selected
REM LSDYNA_ONLINE : TRUE if the job has been submitted ONLINE
REM LSDYNA_BACKGROUND : TRUE if the job has been submitted to
BACKGROUND
REM LSDYNA_BATCH : TRUE if the job has been submitted using BATCH
REM LSDYNA_QUEUE : TRUE if the job has been submitted to a QUEUE
REM LSDYNA_JOB_DIR : full path of LS-DYNA job_directory
REM LSDYNA_JOB_FILE : filename containing LS-DYNA job options
REM LSDYNA_JOB_CPUS : numbert of CPU's selected
REM LSDYNA_USER_ID : username
REM LSDYNA_LOCAL_HOST : TRUE if submitting MPP jobs to the local
machine
REM LSDYNA_NODE_FILE : TRUE if submitting MPP jobs using a Node File
REM NODE_FILE : filename containing node list for MPP jobs
REM LSDYNA_LOCAL_HOST : TRUE if submitting MPP jobs using a Node List
REM NODE_LIST : string containing node list for MPP jobs
REM LSDYNA_CL_ARGS : string containing command line arguments
REM
REM Set windows operating system to determine the path to the MPI
executable
REM Uncomment if you want to run the 64bit version
REM
REM set WINOS=WIN32
  set WINOS=WIN64
REM
REM Set LSTC variables if not already set via system (uncomment if
needed)
REM
REM Set LSTC variables if not already set via system
REM - Local licenses
REM set LSTC_LICENSE=local
REM LSTC_FILE=C:\Licenses\lstc_file
```


```
REM Network licenses
  set LSTC_LICENSE=network
  set LSTC_LICENSE_SERVER=vdgcls01
  set LSTC_INTERNAL_CLIENT off
REM
REM SMP LS-DYNA submission
REM ======================
REM
  IF %LSDYNA_MPP% == TRUE GOTO :MPP
  %LSDYNA_VERSION% %LSDYNA_CL_ARGS%
  GOTO :DONE
REM
REM MPP LS-DYNA submission
REM ======================
REM
:MPP
REM
REM SETUP MPI RUN COMMANDS
REM
REM - HP MPI
REM
  IF NOT %LSDYNA_MPI_TYPE% == HPMPI GOTO :PLATFORM
  IF %WINOS% == WIN32 set MPI_ROOT=C:\Program Files\Hewlett-Packard\HP-
MPI
  IF %WINOS% == WIN32 set MPIRUN="C:\Program Files\Hewlett-Packard\HP-
MPI\bin\mpirun"
  IF %WINOS% == WIN64 set MPI_ROOT=C:\Program Files (x86)\Hewlett-
Packard\HP-MPI
  IF %WINOS% == WIN64 set MPIRUN="C:\Program Files (x86)\Hewlett-
Packard\HP-MPI\bin\mpirun"
  GOTO :RUN_MPP
REM
REM - PLATFORM MPI
REM
:PLATFORM
  IF NOT %LSDYNA_MPI_TYPE% == PMPI GOTO :INTEL
  IF %WINOS% == WIN32 set MPI_ROOT=C:\Program Files\Platform
Computing\Platform-MPI
  IF %WINOS% == WIN32 set MPIRUN="C:\Program Files\Platform
Computing\Platform-MPI\bin\mpirun"
  IF %WINOS% == WIN64 set MPI_ROOT=C:\Program Files (x86)\Platform
Computing\Platform-MPI
  IF %WINOS% == WIN64 set MPIRUN="C:\Program Files (x86)\Platform
Computing\Platform-MPI\bin\mpirun"
  IF %LSDYNA_MPI_TYPE% == PMPI set LSDYNA_MPI_TYPE=HPMPI
  GOTO :RUN_MP
REM
REM - INTEL MPI
REM
:INTEL
  IF NOT %LSDYNA_MPI_TYPE% == IMPI GOTO :MPICH
  IF %WINOS% == WIN32 set MPIRUN="C:\Program Files\Intel\MPI-
RT\4.1.0.028\ia32\bin\mpiexec.exe"
  IF %WINOS% == WIN64 set MPIRUN="C:\Program Files (x86)\Intel\MPI-
RT\4.1.0.028\em64t\bin\mpiexec.exe"
  GOTO :RUN_MPP
REM
REM - MPICH2
```


```
REM
:MPICH
  IF NOT %LSDYNA_MPI_TYPE% == MPICH2 GOTO :NO_MATCH
  IF %WINOS% == WIN32 set MPIRUN="C:\Program
Files\MPICH2\bin\mpiexec.exe"
  IF %WINOS% == WIN64 set MPIRUN="C:\Program
Files\MPICH2\bin\mpiexec.exe"
  GOTO :RUN_MPP
REM
REM
:NO_MATCH
  ECHO MPI TYPE NOT RECOGNISED
  exit
REM
:RUN_MPP
  cd %LSDYNA_JOB_DIR%
REM
REM RUN ANALYSIS
REM
REM HP-MPI or PLATFORM MPI using local machine
REM
  IF %LSDYNA_MPI_TYPE% == HPMPI (
    IF %LSDYNA_LOCAL_HOST% == TRUE (
      %MPIRUN% -prot -np %LSDYNA_JOB_CPUS% %LSDYNA_VERSION%
%LSDYNA_CL_ARGS%
      GOTO :DONE
    )
    IF %LSDYNA_NODE_FILE% == TRUE (
      %MPIRUN% -prot -cache -np %LSDYNA_JOB_CPUS% -hostfile %NODE_FILE%
-e LSTC_LICENSE_SERVER=%LSTC_LICENSE_SERVER% -e
LSTC_LICENSE=%LSTC_LICENSE% %LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
    IF %LSDYNA_NODE_LIST% == TRUE (
      %MPIRUN% -prot -cache -np %LSDYNA_JOB_CPUS% -hostlist %NODE_LIST%
-e LSTC_LICENSE_SERVER=%LSTC_LICENSE_SERVER% -e
LSTC_LICENSE=%LSTC_LICENSE% %LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
  )
REM
REM INTEL-MPI using local machine
REM
  IF %LSDYNA_MPI_TYPE% == IMPI (
    IF %LSDYNA_LOCAL_HOST% == TRUE (
      %MPIRUN% -n %LSDYNA_JOB_CPUS% -wdir %LSDYNA_JOB_DIR% -localonly
%LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
    IF %LSDYNA_NODE_FILE% == TRUE (
      %MPIRUN% -n %LSDYNA_JOB_CPUS% -machinefile %NODE_FILE% -wdir
%LSDYNA_JOB_DIR% -mapall -genv LSTC_LICENSE_SERVER
%LSTC_LICENSE_SERVER% -genv LSTC_LICENSE %LSTC_LICENSE%
%LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
    IF %LSDYNA_NODE_LIST% == TRUE (
      %MPIRUN% -hosts %NODE_LIST% -wdir %LSDYNA_JOB_DIR% -mapall -genv
```


```
LSTC_LICENSE_SERVER %LSTC_LICENSE_SERVER% -genv LSTC_LICENSE
%LSTC_LICENSE% %LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
  )
REM
REM MPICH2
REM
  IF %LSDYNA_MPI_TYPE% == MPICH2 (
    IF %LSDYNA_LOCAL_HOST% == TRUE (
      %MPIRUN% -n %LSDYNA_JOB_CPUS% -wdir %LSDYNA_JOB_DIR% -localonly
%LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
     IF %LSDYNA_NODE_FILE% == TRUE (
      %MPIRUN% -n %LSDYNA_JOB_CPUS% -machinefile %NODE_FILE% -wdir
%LSDYNA_JOB_DIR% -mapall -genv LSTC_LICENSE_SERVER
%LSTC_LICENSE_SERVER% -genv LSTC_LICENSE %LSTC_LICENSE%
%LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
    IF %LSDYNA_NODE_LIST% == TRUE (
      %MPIRUN% -hosts %NODE_LIST% -wdir %LSDYNA_JOB_DIR% -mapall -genv
LSTC_LICENSE_SERVER %LSTC_LICENSE_SERVER% -genv LSTC_LICENSE
%LSTC_LICENSE% %LSDYNA_VERSION% %LSDYNA_CL_ARGS%
      GOTO :DONE
    )
  )
REM
REM
:DONE
```

Post Processing Options

When a Ansys LS-DYNA job is submitted using the SHELL automatic post processing options for and T/HIS can be selected. This section of the batch file contains any commands required to carry out the selected post processing options.

```
#
# PRIMER 'ztf' file creation
#
/data/dyna11/linux_executables/primer20_64.exe -d=batch -
ztf=/local/test/shell_test.key > \
shell_test.ztf_log
#
# T/HIS batch processing
#
setenv MENU_AUTO_CONFIRM true
/data/dyna10/linux_executables/this20_64.exe -d=x -tcf=shell_test.tcf -
maximise shell_test.thf
```

3.6. Creating an "oasys_queue" File

Creating an "oasys_queue" File

This file lists alternative batch queues and queue directives. It only needs to be created for systems on which jobs can be submitted to a NQS style queue.

The file is in xml format, with tags to define data blocks. It contains three distinct blocks, defining queue directives which are written for: specific queues; specific queue and cpu combinations and; all queues. There can be no blank lines in data blocks.

The first block defines the queue names, their cpu limit and any queue directives specific to the queue. This block is required.

```
<queue_names>
            <name1>
                        cpu_limit="300"
                        command="#PBS -m abe"
            </name1>
            <name2>
                        cpu_limit="pipe"
            <name2>
            <name3>
                        cpu_limit="none"
            </name3>
</queue_names>
```

Where:

<queue_names> and </queue_names>	are tags to indicate the start and end of the block of data
<name1> and </name1>	are the names of the queues and tags to indicate the start and end of the data for that queue (up to 20 can be defined)
cpu_limit	is the cpu limit for the queue (in seconds) or "pipe" or "none"
command	is an optional queue directive specific for the queue (up to 20 for each queue can be defined)

The second block defines what queue options will be available to the user (see Queue Options), depending on the queue and number of cpus chosen. It is intended to be used to define queue directives which define the number of nodes and cpus to use. This block is optional.

```
<queue_commands>
            <name1>
                    <1>
                        display_string="1 CPU x 1 Node"
                        command="#PBS -l nodes=1:ppn=1:name1
```

```
                    </1>
                    <2>
                        display_string="2 CPU x 1 Node"
                        command="#PBS -l nodes=1:ppn=2:name1
                    </2>
                    <2>
                        display_string="1 CPU x 2 Node"
                        command="#PBS -l nodes=2:ppn=1:name1
                    </2>
                </name1>
                <name2>
                    <4>
                        mpp_only
                        display_string="2 CPU x 2 Node"
                        command="#PBS -l nodes=2:ppn=2:name2
                    </4>
                </name2>
                <name3>
                    <1>
                        display_string="1 CPU x 1 Node"
                        command="#PBS -l nodes=1:ppn=1:name3
                    </1>
                </name3>
</queue_commands>
```

Where:

<queue_commands> and </queue_commands>	are tags to indicate the start and end of the block of data
<name1> and </name1>	are the names of the queues and tags to indicate the start and end of the data for that queue (note that they must be the same as the names defined in the first block)
<1> and </1>	are the number of cpus and tags to indicate the start and end of the data for that number of cpus
mpp_only	if this is included then the option will only be available if an MPP version of Dyna is selected
display_string	is the text that is displayed to the user in the popup menu on the SHELL (see Section 1.2.4.7)
command	is a queue directive specific to the queue and number of cpus (up to 20 can be defined for the queue and cpu combination)

Up to 100 queue and cpu combinations can be defined. If this block is not included in the file then the queue options popup will be greyed out and the default directives produced by the SHELL will be used.

The third block defines queue directives that apply to all queues. This block is optional.

```
<all_queue_commands>
        command="#PBS -m abe"
</all_queue_commands>
```

Where:

<all_queue_commands> and </all_queue_commands>	are tags to indicate the start and end of the block of data
command	is a queue directive (up to 20 can be defined)

Example :

```
$
<queue_names>
            <dyna>
                    cpu_limit="none"
            </dyna>
            <fast>
                    cpu_limit="3600"
            </fast>
</queue_names>
$
<queue_commands>
            <dyna>
                    <1>
                        display_string="1 CPU x 1 Node"
                        command="#PBS -l nodes=1:ppn=1:dyna"
                    </1>
                    <2>
                        display_string="2 CPU x 1 Node"
                        command="#PBS -l nodes=1:ppn=2:dyna"
                    </2>
                    <2>
                        mpp_only
                        display_string="1 CPU x 2 Nodes"
                        command="#PBS -l nodes=1:ppn=2:dyna"
                    </2>
                    <4>
                        mpp_only
                        display_string="2 CPU x 2 Nodes"
                        command="#PBS -l nodes=2:ppn=2:dyna"
                    </4>
                    <4>
                        display_string="4 CPU x 1 Node"
                        command="#PBS -l nodes=1:ppn=4:dyna"
                    </4>
                    <4>
                        mpp_only
                        display_string="1 CPU x 4 Nodes"
                        command="#PBS -l nodes=4:ppn=1:dyna"
```


```
                </4>
        </dyna>
        <fast>
                <2>
                    display_string="2 CPU x 1 Node"
                    command="#PBS -l nodes=1:ppn=2:dyna"
                </2>
                <2>
                    mpp_only
                    display_string="1 CPU x 2 Nodes"
                    command="#PBS -l nodes=1:ppn=2:dyna"
                </2>
        </fast>
</queue_commands>
$
<all_queue_commands>
        command="#PBS -m abe"
</all_queue_commands>
$
```

3.7. Adding Items to the "Utilities" Menu

Adding Items to the "Utilities" Menu

The "Utilities" menu within the Xshell may be customised to contain upto 20 items. The contents of this menu is controlled by a file called "oasys_utilities" that is located in the directory containing the version 22 executables. The format of this file is:

<Menu Name> <Program> <Xterm>

Where:

Menu Name : Name to be given to the program in the menu.
Action : The name of the program to execute.
Xterm : Does the program require an xterm window define as **YES** or **NO**

4. Additional Windows Setup

4.1. Setting File Associations

Setting File Associations

Under windows on PC it is possible to set up file associations so that double clicking on files automatically loads the file into the associated program. As part of the PC installation the following file associations will be set up automatically

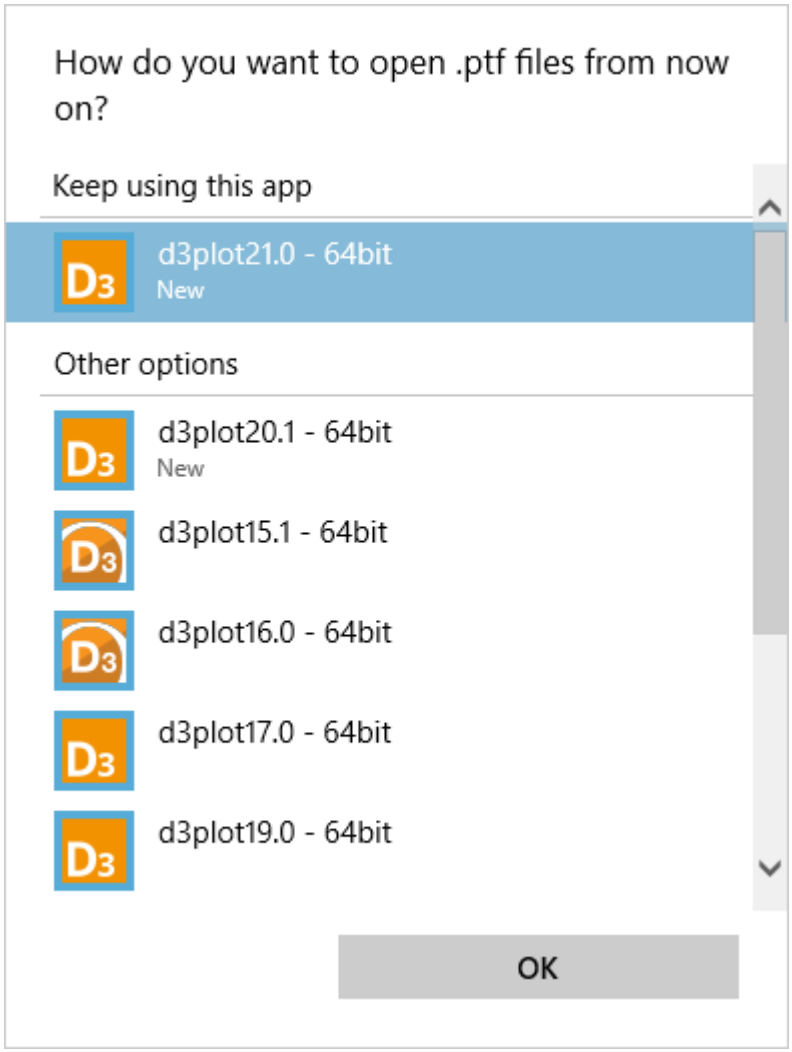
File Extension	Program
.ptf	D3PLOT
.ctf	D3PLOT
.rlf	D3PLOT
.dsf	D3PLOT
.thf	T/HIS
.xtf	T/HIS
.tsf	T/HIS
.key	PRIMER
.dyn	PRIMER
.kby	PRIMER
.orr	REPORTER
.ort	REPORTER
.orp	REPORTER

The following sections describe in detail how these file associations can be manually set up if required.

To make .ptf files open in D3PLOT by double-clicking on them

If no application is currently associated with .ptf files, a "double-click" won't work, and some non-specific, usually "windows", icon will be displayed with the file.

Right click on any **.ptf** file, and select **properties** then press the Change... tab next to Opens with: from the popup menu.



1. This will bring up the **"Open with"** panel.
2. Ensure the **Always use...** box is ticked
3. Use the directory browsing window to find the correct D3PLOT executable. You are looking for file **d3plot22.exe** or **d3plot22_x64.exe** .
4. Select the executable and click on **OK** to close the "Open With" window.

D3PLOT should now open and read in the selected file and you should now find that:

1. All **.ptf** files on your system show the D3PLOT icon.
2. Double-clicking on any such file starts D3PLOT and opens that file.

It is not possible to set up the filename "d3plot" for double-clicking in this way since Windows requires filename extensions when assigning applications to files.)

To make .thf, .xtf, .cur and .bdf files open in T/HIS by double-clicking on them

The procedure is exactly the same as for D3PLOT, and must be carried out for each of the file types that you wish to process by double-clicking:

.thf : Ansys LS-DYNA Time History file **.xtf** : Ansys LS-DYNA Extra Time History file **.cur** : T/HIS Curve file **.bdf** : T/HIS Bulk Data file

The only difference is:

1. The application to use should be **this22.exe** or **this22_x64.exe** .

Note that:

1. File types **.thf** and **.xtf** are opened in this way, but no contents are read in.
2. File types **.cur** and **.bdf** are opened and their complete contents read in.

Ansys LS-DYNA default filenames **"d3thdt"** and **"xtfile"** cannot be set up for double-click access in this way because Windows requires filenames to have extensions when assigning applications to them.

To make .key files open in PRIMER by double-clicking on them

The procedure is exactly the same as for D3PLOT, and must be carried out for each of the file types that you wish to process by double-clicking:

.key : Ansys LS-DYNA Keyword Input File

The only difference is:

1. The application to use should be **primer22.exe** .

5. Preferences

Preferences

The Preferences editor provides a graphical interface for viewing, checking and editing your user preferences stored in your oa_pref file

5.1. The "oa_pref" File

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.

"oa_pref" Naming Convention and Locations

The file is called "oa_pref".

It is looked for in the following places in the order given:

- 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 (**`$OA_INSTALL`**)
- The user's home directory: **`$HOME`** (Linux) or **`%USERPROFILE%`** (Windows)
- The current working directory

See Installation Organisation for an explanation of the directory structure.

All four files are read (if they exist) and the last preference read will be the one used, so the file can be customised for a particular job or user at will.
Files do not have to exist in any of these locations, and if none exists the programme defaults will be used.

On Linux:

> **`$HOME`** on Linux is usually the home directory specified for each user in the system password file.
> The shell command " **`printenv`** " (or on some systems " **`setenv`** ") will show the value of this variable if set.
> If not set then it is defined as the " **`~`** " directory for the user. The command " **`cd; pwd`** " will show this.

On Windows:

> **`%USERPROFILE%`** on Windows is usually **`C:\Documents and Settings\`** ***`<user id>`*** **`\`**
> Issuing the " **`set`** " command from an MS-DOS prompt will show the value of this and other variables.

Generally speaking you should put

- 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.

The file contains preferences for the SHELL (lines commencing shell*), THIS (lines commencing this*), D3PLOT (lines commencing d3plot*), PRIMER (lines commencing primer*)and REPORTER (lines commencing reporter*). All lines take the format <preference name> <preference value>.

The general copy of the preference file should be present in the $OA_ADMIN_xx and/or $OA_INSTALL 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. This can be used to personally customise the software to the individual's needs.

Whenever one of the programs whose preferences can be stored in the oa_pref file is fired up, the program will take preferences first from the general preference file in the $OA_ADMIN_xx directory (if it exists) then the $OA_INSTALL directory, then from the file in the user's home area, then from the current working directory.

Preferences defined in the general oa_pref file can be modified in the user's personal file but they can't be removed by it.

From version 9.4 onwards 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 **'shell#'** rather than **'shell*'** .

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
```

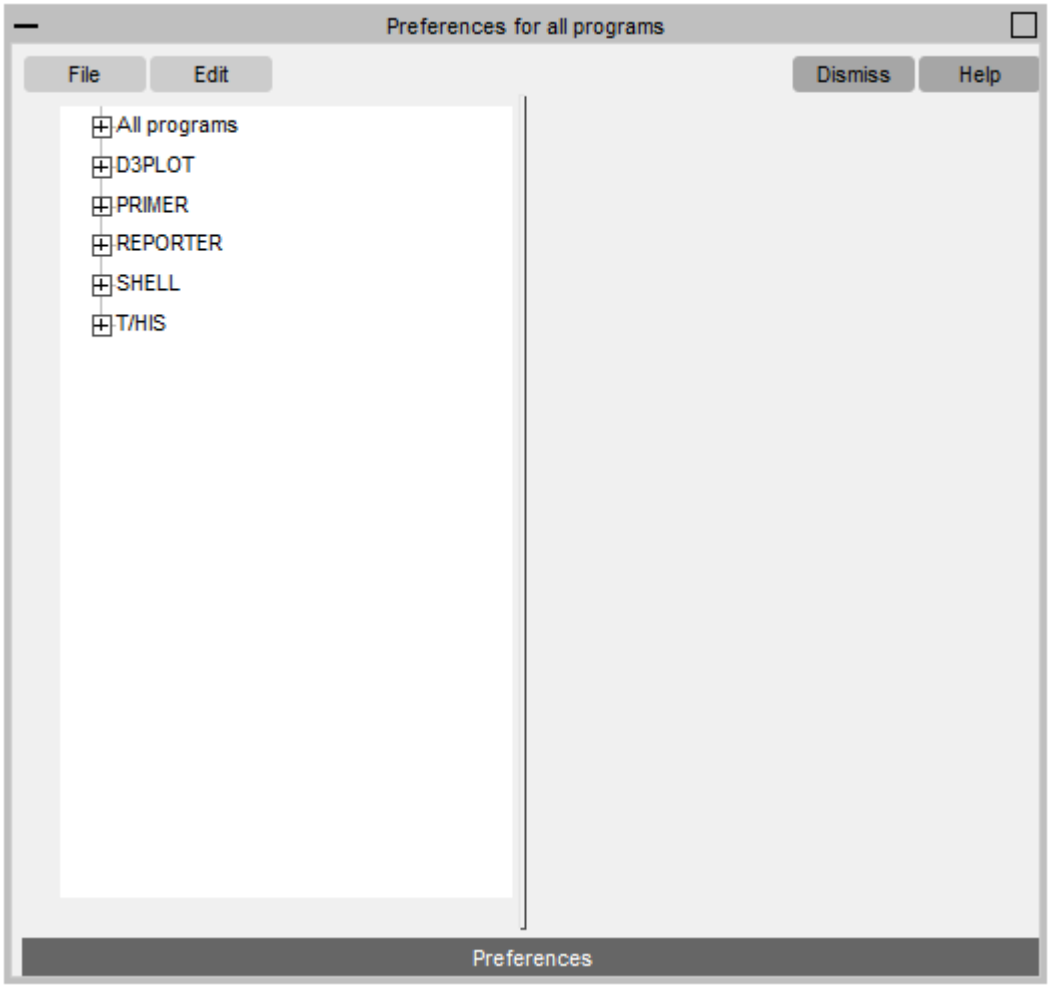
5.2. The Preferences Editor

The Preferences Editor

The editor can be accessed from within the SHELL or from within D3PLOT, T/HIS, PRIMER and REPORTER.

The Preferences Editor Layout

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

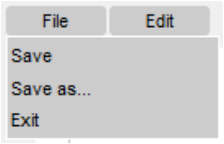


Menu Bar

File options:

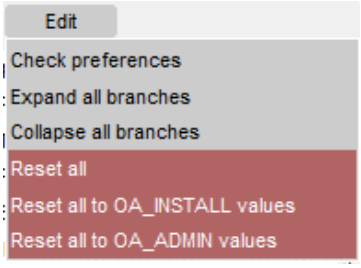
Save preferences : Save current preference settings. This will save the personal oa_pref file in the user's home

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:

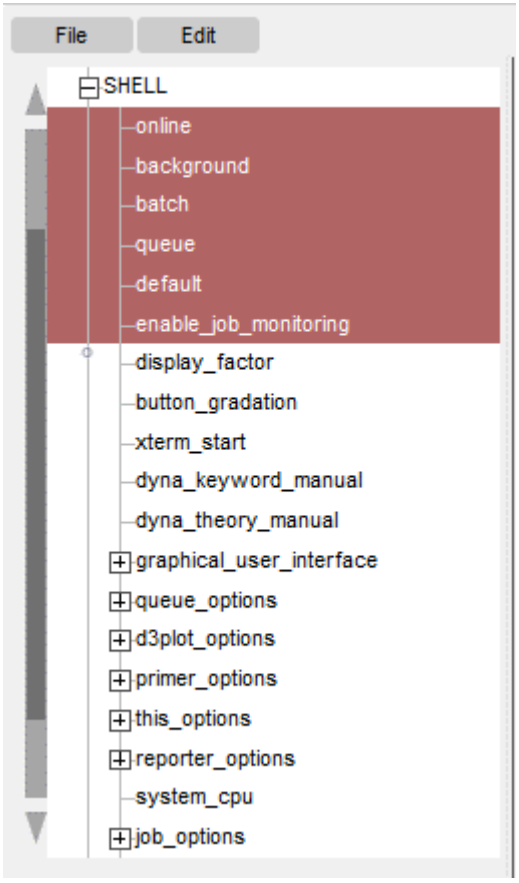
Check Preferences : Checks the current preferences for any errors. These errors will be listed in a seperate window detailing the preferences with the errors and the nature of those errors.
Expand all branches : Expands the categories in the Left Hand Frame.
Collapse all branches : Collapses the categories 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.



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.



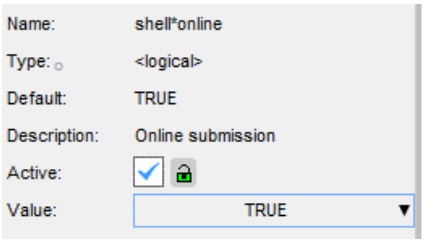
Green	Means that the option has been read from your $HOME/$USERPROFILE file.
Red	Means that the option has been read from the $OA_INSTALL file.
Magenta	Means that the option had been read from the $OA_ADMIN file.

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.

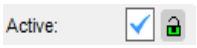
The Preferences Editor Right Hand Frame



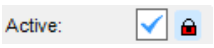
The right hand frame will contain information about the currently selected preference and provides the opportunity to edit this preference.

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.

Locking Preferences

From version 9.4 onwards 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 

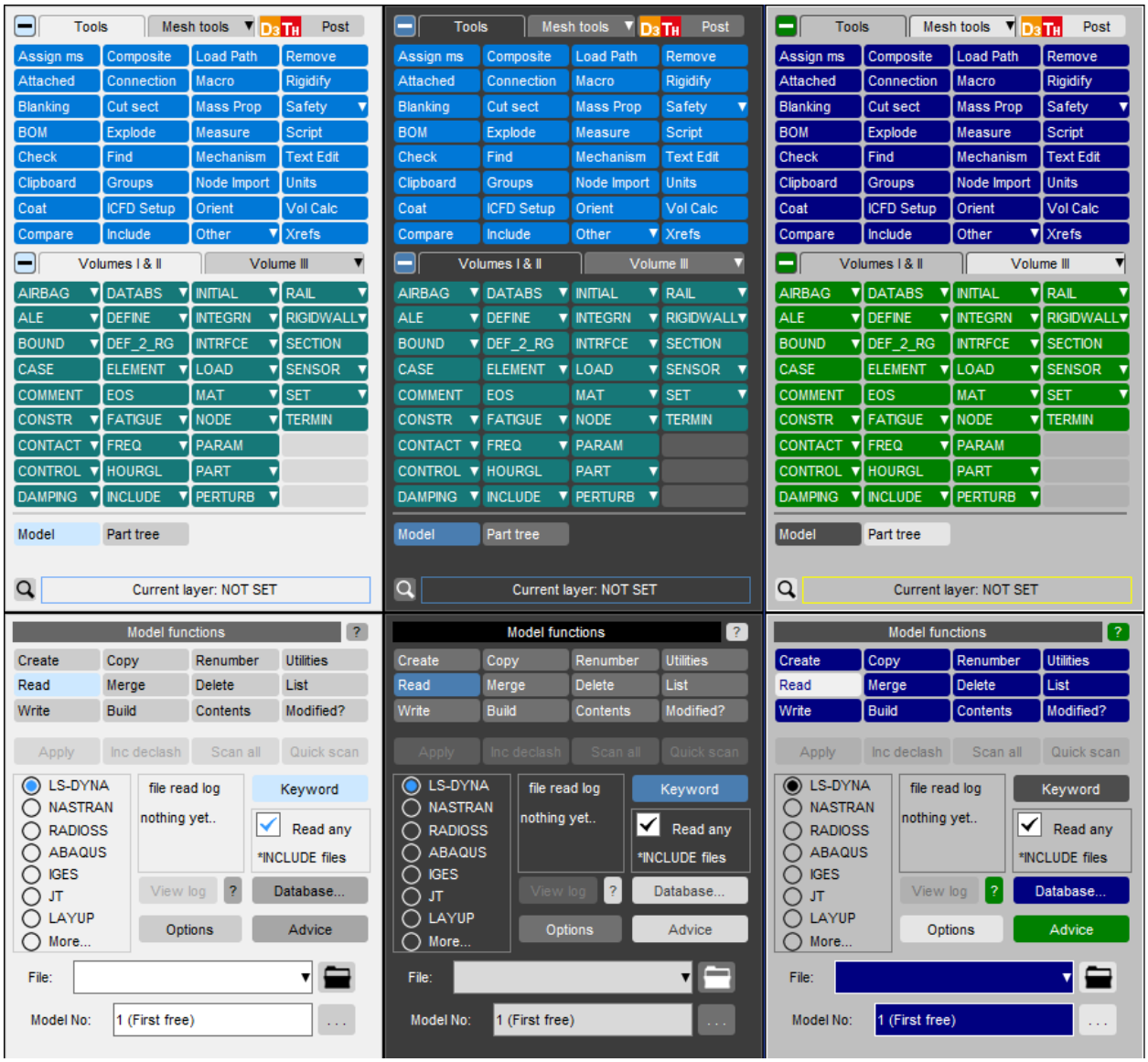
has been locked in another preference file then the option will be ignored in the users preference file.

6. Themes for the Graphical User Interface

Themes for the Graphical User Interface

3 themes are available for Oasys LS-DYNA Environment software. Users can select a **Light**, a **Dark** or a **Classic** theme. The latter uses the colours of the old user interface (used prior to version 17 of the software).

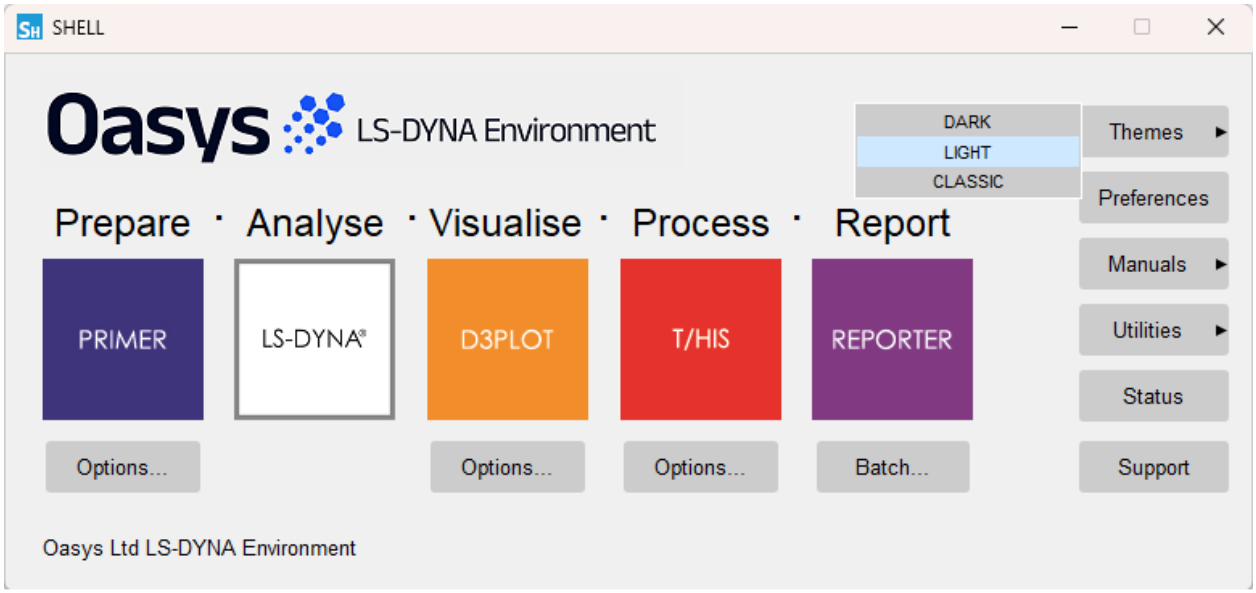
The themes offer different colour and contrast options for comfort and accessibility.



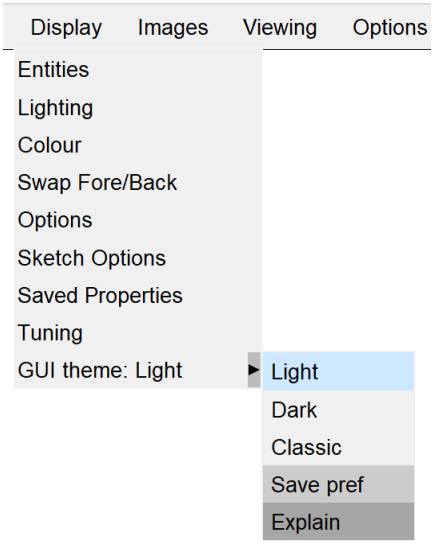
6.1. Setting the Theme

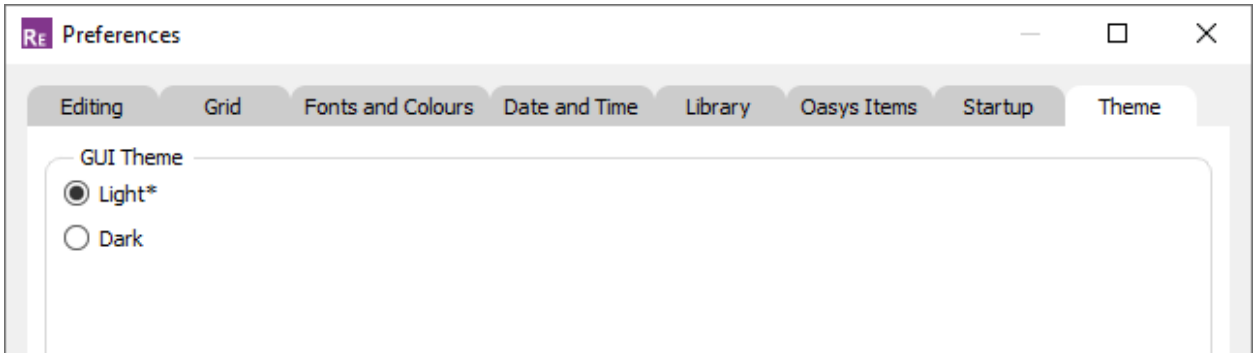
Setting the theme

The default software theme in Oasys 22.1 is **Light**. This can be changed from the Oasys SHELL by choosing from the **Themes** pop-up. This automatically saves the selected theme as your preference for all programs.



The theme can also be set for individual programs from the **Display** menu in PRIMER, D3PLOT and T/HIS or the **Preferences** menu (**File**->**Preferences...**) in REPORTER. This choice is not automatically retained after exiting the program, so you must select a theme, then select **Save pref** to ensure a theme is used for all future sessions.



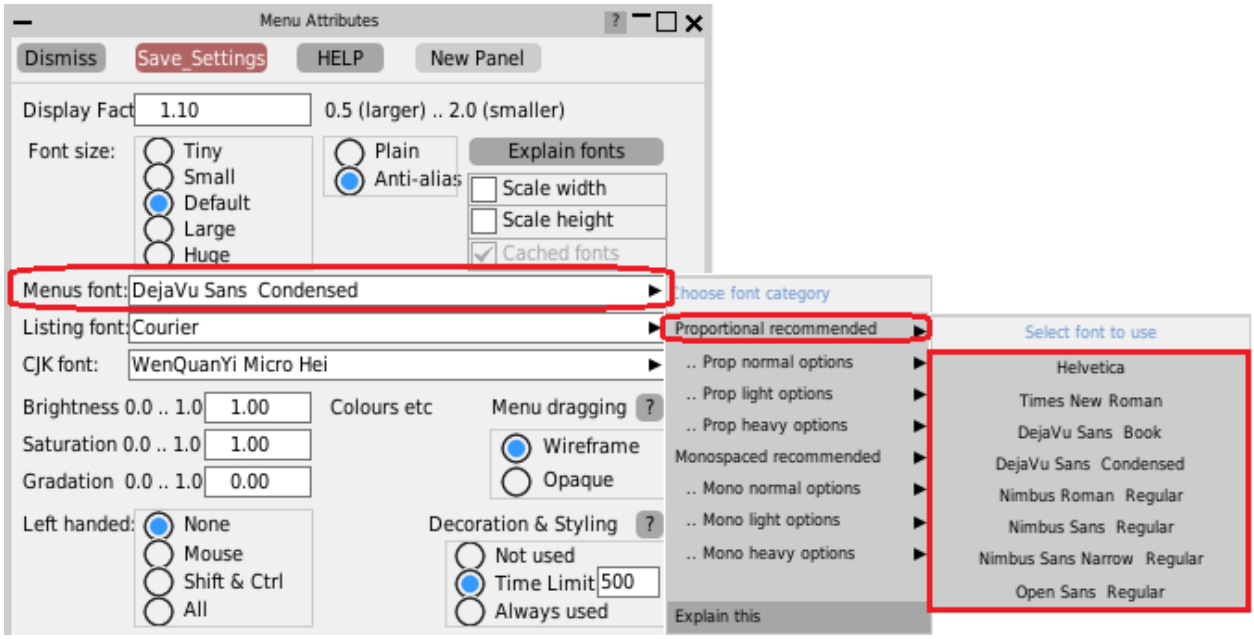

Preferences
Editing
Grid
Fonts and Colours
Date and Time
Library
Oasys Items
Startup
Theme
GUI Theme
Light*
Dark

7. Fonts on Linux

Fonts on Linux

Prior to version 17.0, the software used "legacy" X11 fixed fonts on Linux, from version 17.0 onwards, it uses Freetype fonts, which give improved appearance and a wider range of typefaces.

The recommended proportional font for menu panels is "DejaVu Sans Condensed" which is widely available on Linux, but you can change this using **Options, Menu attributes** where a different font can be selected from those available on your system. For example on the author's CentOS 7 system the choice of fonts is:



7.1. The Range of Fonts Available

The range of fonts available

The range of fonts you see on your system will depend on the version of Linux you are using and what fonts you have installed; the image above was captured from a CentOS 7 machine.

Oasys LS-DYNA Environment software interrogates the font server to extract all available fonts, then sorts them for presentation purposes by spacing (proportional or monospaced) and weight (normal, light, bold). The "recommended" fonts, as shown in the right hand popup menu above, are simply those which have been found by trial and error to give the best appearance. However this is a very subjective matter, and you may prefer something different: choose something that you like then use **Save Settings** to save it. If you change your mind later you can always come back to this panel to select something else.

Helvetica is provided as an option for backwards compatibility with the older user interface; it is not natively available on Linux so a different font is substituted, which tends not to look very good in Freetype.

Monospaced font selection problems

We have observed that while proportional font selection works correctly on Linux, the selection of monospaced fonts seems to have some bugs:

- The default "courier" font works, but tends to produce a font that is too small in some situations and probably is not exactly courier, although it looks very similar.
- The "recommended" monospaced font on some systems comes out as "Courier 10 Pt Regular", which is a genuine courier font, however if you select that it will produce something completely different. Experiment shows that if you ask for "Courier 10 Pt" then you get what you expect, but appending "Regular" breaks the font selection somehow

This appears to be a "fontconfig" problem: the system's font server simply gets it wrong. This can be demonstrated by the command

`fc-match` "*font of your choice*"

for example **`fc-match "courier"`** on a RHEL 7 machine produces the result **`"Nimbus Mono PS" "Regular"`**

If you are happy with the monospaced font used for help texts and the like you don't need to take any action, however if you want to change it you may need to experiment a bit to find something that looks good on your system by typing different variations of

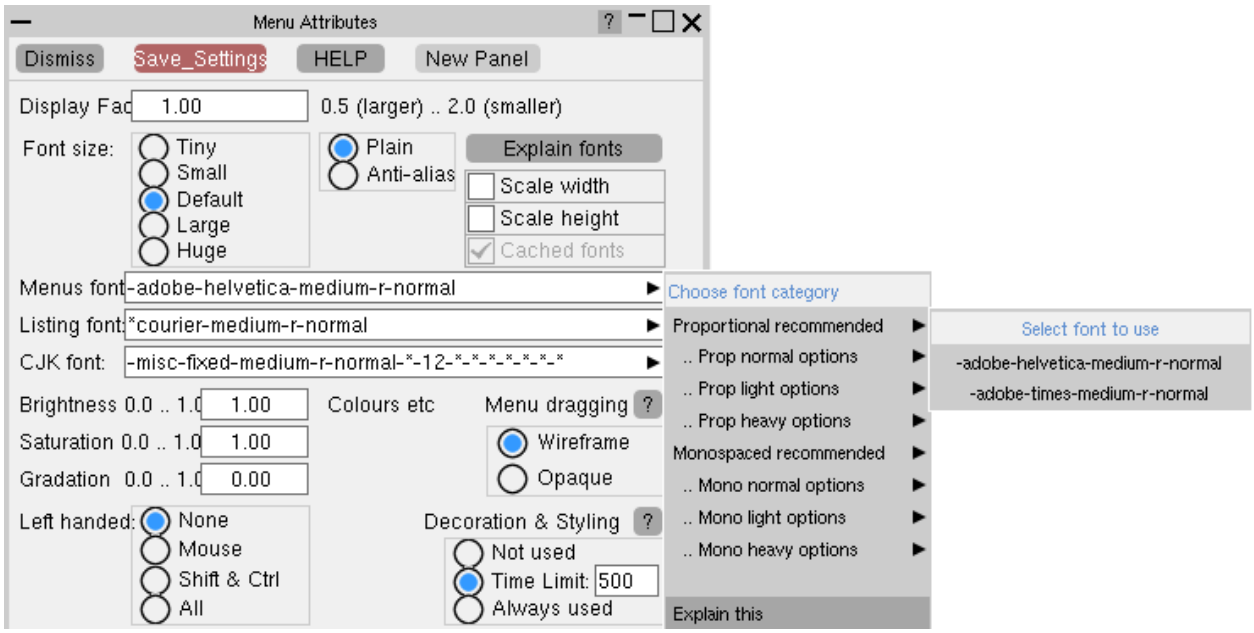
names into the "Listing font: [.....]" text entry box. You can use the "fc-match" command in conjunction with this to see what the font server will map your request onto. Once you have found something satisfactory use **Save Settings** to save it in your oa_pref file and it will be remembered for future use.

7.2. Plain Versus Anti-aliased Fonts

Plain versus Anti-aliased fonts

On some monitors, especially relatively low resolution ones, the anti-aliasing of fonts can result in quite fuzzy text. The quality of this will depend on the version of Freetype installed, and more recent Linuxes will tend to look better since they are more likely to use sub-pixel sampling.

Some users may prefer the cruder but sharper appearance of the original "core X11" legacy fonts, and these can be used by changing to **Plain** so long as you actually have these fonts loaded on your machine. On the CentOS 7 machine being used to create this manual page the equivalent "plain" font image of the above is:



If you try this on your machine and it doesn't work then it means that you need to load the legacy font package(s), see below.

Loading legacy Core X11 fonts

You don't need to load these, it is only necessary if you want the old-style "plain" appearance described in the section above.

You will need root privileges to install these, so unless you are familiar with working as root and using commands such as "rpm", "yum" or "yast" please seek help from your IT department, or alternatively contact Oasys Ltd for help.

The best fonts to install are the 75 dots per inch (dpi) ones, which can be obtained online for a range of common Linux operating systems from https://pkgs.org/download/xorg-x11-fonts-75dpi

If that fails you may already have the relevant packages in your installation files, you should look for (in order)

RedHat/CentOS

```
xorg-x11-fonts-75dpi
xorg-x11-fonts-ISO8859-1-75dpi
xorg-x11-fonts-Type1
xorg-x11-fonts-misc
xorg-x11-fonts-100dpi
xorg-x11-fonts-ISO8859-1-100dpi
```

You don't have to install all of these.

The 75dpi and 100dpi font packages are the same typefaces at different resolutions. You should choose the one which gives the best looking results on your display, but in the author's experience the 75dpi one looks fine but the 100dpi one looks as if a spider was let loose with a leaky pen! Always try the 75dpi one first.

To manage fonts on RHEL/CentOS do the following:

- Log in as root
- To see the X11 fonts currently installed type "**`yum list installed | grep xorg | grep font`**"
- To see X11 fonts available but not installed "**`yum list available | grep xorg | grep font`**"
- To install something "**`yum install`** *package*", for example "**`yum install xorg-x11-fonts-75dpi`**"

You can list the range of "yum" commands available with "man yum".

SUSE

```
xorg-x11-fonts-core
xorg-x11-fonts
```

8. Installation Organisation

Installation organisation

Oasys LS-DYNA Environment 22.1 installation can be customised to try and avoid a number of issues that often occur in large organisations with many users.

- Large organisations generally imply large networks, and it is often the case that the performance of these networks can be intermittent or poor, therefore it is common practice to perform an installation of the software on the local disk of each machine, rather then having a single installation on a remote disk.

  This avoids the pauses and glitches that can occur when running executable files over a network, but it also means that all the configuration files in, or depending upon, the top level "Admin" directory have to be copied to all machines and, more to the point, any changes or additions to such files also have to be copied to all machines.

- In larger organisations the "one person per computer" philosophy may not apply, with the consequence that users will tend to have a floating home area on a network drive and may not use the same machine every day.

  This is not usually a problem on Linux where the "home" directory is tied to the login name not the machine. However on Windows platforms it means that %USERPROFILE%, which is typically on the local C drive of a machine, is not a good place to consider as "home" since it will be tied to a given computer, therefore a user who saves a file in their home directory on machine A may not be able to access it from machine B.

- In a similar vein placing large temporary files on the /tmp partition (Linux) or the C: drive (Windows) may result in local disks becoming too full, or quotas exceeded.

This section gives only a brief summary of the installation organisation, and you should refer to the separate Installation Guide if you want to find out more about the details of installation, licensing, and other related issues.

8.1. Oasys Suite 22.1 Installation Structure

Oasys Suite 22.1 Installation structure

In Oasys Suite 22.1 the 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 Suite 22.1 also allows 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.

Directory	Status	Directory Content and purpose	oa_pref file option
OA_ADMIN_xx	*Optional*	Top level configuration files. (**xx** =22 for Oasys Suite 22.1, thus **OA_ADMIN_22**) Admin level oa_pref file Other configuration files Timeout configuration file	
OA_ADMIN	*Optional*	Same as **OA_ADMIN_22**, provided for backwards compatibility with earlier releases. It is recommended that plain **OA_ADMIN**, without the **_xx** version suffix, is not used since otherwise there is no easy way of distinguishing between parallel installations of different releases of Oasys LS-DYNA Environment in an	

		installation. *If **OA_ADMIN_22** is not defined then this non-release specific version is checked.*	
OA_INSTALL_xx	*Optional*	(**xx** =22 for release 22.1, thus **OA_ADMIN_22** All executables Installation level oa_pref file	**oasys*install_dir: <pathname>**
OA_INSTALL	*Optional*	Same as **OA_INSTALL_22**. If no "**OA_ADMIN_xx**" directory is used and all software is simply placed in this "install" directory, which would be typical of a single-user installation, then it is recommended that the **_xx** version suffix is used in order to keep parallel installations of different releases of the Oasts Ltd software separate on the machine. *If **OA_INSTALL_22** is not defined then this non-release specific version is checked*	**oasys*install_dir: <pathname>**
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: <pathname>**
OA_HOME	*Optional*	Specific "home" directory for user when using Oasys LS-DYNA Environment. If not defined will use: **$HOME** (Linux) **%USERPROFILE%** (Windows)	**oasys*home_dir: <pathname>**
OA_TEMP	*Optional*	Specific "temporary" directory for user when using Oasys LS-DYNA Environment. If not defined will use: **P_tmpdir** (Linux, typically /tmp) **%TEMP%** (Windows, typically C:\temp)	**oasys*temp_dir: <pathname>**

It will be clear from the table above that no Environment variables have to be set, and that all defaults will revert to pre-version 9.4 behaviour. In other words users wishing to keep the status quo will find behaviour and layout unchanged if they do nothing.

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. As this environment variable is no longer required it is recommended that it is removed from machines it is currently set on as in some cases where more than one version has been installed in different directories it can cause problems.

- On LINUX systems the "oasys_22" script that starts the SHELL automatically sets this Environment Variable and passes it to any application started from the SHELL. If you run applications directly from the command line and bypass the SHELL then you should set **OA_INSTALL_XX** so that the software can locate manuals and other required files.

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.

8.1.1. Installation Examples

Installation Examples

The following diagrams illustrate how the installation might be organised 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.

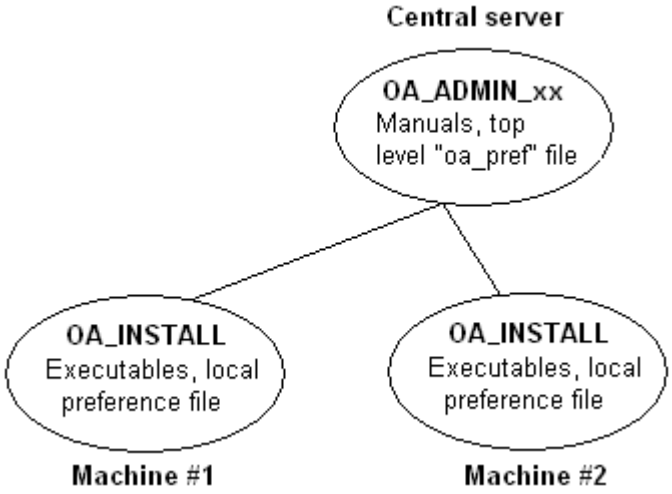
It is suggested that the **_xx** version suffix of **OA_INSTALL_xx** is used in order to keep parallel installations of different releases of the Oassys Ltd software separate on the machine.

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.

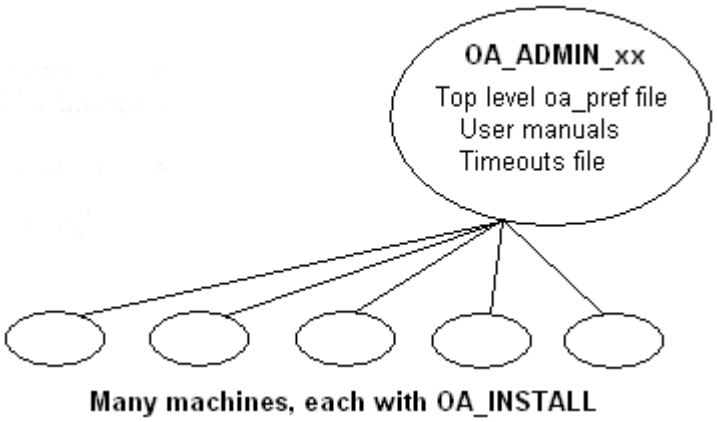
Each user's machine has its own 'installation' directory to give good performance, but there is no need to manage home or temporary directories centrally since each user 'owns' their machine.

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

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.



8.1.2. Dynamic Configuration Using the Top Level oa_pref File

Dynamic configuration using the top level oa_pref file.

A further improvement is that all environment variables below **`OA_ADMIN_xx`** may either be set explicitly, or dynamically using the options in the oa_pref file at the top **`OA_ADMIN_xx`** level. This permits parallel installations of different versions of the software to co-exist, with only the top level administration directory names being distinct. For example:

Oasys Suite 22.0	**Oasys Suite 22.1**
Top level directory **`OA_ADMIN_22`**	Top level directory **`OA_ADMIN_221`**
oa_pref file in **`OA_ADMIN_22`** contains: **`oasys*install_dir:`** <*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*install_dir:`** <*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
Pathnames in the oa_pref file may contain environment variables which will be resolved before being applied.	

8.1.3. The Hierarchy of oa_pref File Reading

The hierarchy of oa_pref file reading

It will be clear from the above that in a large installation the "oa_pref" files have a significant role. Each piece of software reads them in the following order:

`OA_ADMIN_xx`	Top level configuration
`OA_INSTALL_xx`	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, 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 it was locked).
- If two of more of the directories in the table above are the same then that file is only read once from the first instance.

8.1.4. Locking Preference Options

Locking Preference Options

From version 9.4 onwards, preference options can be locked. If a preference option is locked in a file then that preference option will be ignored in any of the subsequent preference files that are read.

Therefore by locking a preference in a top-level file in the hierarchy above, eg in **`OA_ADMIN_xx`**, and then protecting that file to be read-only, an administrator can set preferences that cannot be altered by users since any definitions of that preference in their private oa_pref files will be ignored.

Preferences are locked by using a hash (#) rather than an asterisk (*) between the code name and the preference string. For example:

`*maximise: true`	Normal case using "*", means an unlocked preference
`#maximise: true`	Locked case using "#"

These changes may be made either by editing the file manually, or by using the preferences editor.

9. Emailing Crash dumps to Support

Emailing Crash Dumps to Support

This feature is only available on Windows platforms

Obviously we prefer our software not to crash, but if it does we want to know why, so that we can fix it in the future and – if possible – suggest workarounds for users. On Windows platforms, a crash will usually produce a small dump file which, if sent to Oasys Ltd Support, can sometimes be deconstructed to work out what went wrong.

Historically this relied on the user finding the dump file on their system, then sending it manually with a covering email. This was difficult and time-consuming, so Oasys LS-DYNA Environment software can now be configured to collect that file and create the email automatically. It must be stressed that this email is ***never*** sent automatically – that is always under the control of the user – and this feature can be turned off. This section describes the process in more detail and also explains how to customise the handling of crashes.

What is a dump (.dmp) file?

This is a small file (usually around 50 kB), which contains information about the "stack frame" of the software at the time of the crash. It is produced by standard Windows utilities – in fact this is the file that would normally be sent to Microsoft following a crash if their standard crash post-mortem process were used.

It contains:

- A stack trace: the hierarchical list of "what function called what" i.e. where in the software the crash occurred.
- Very limited information about variables in use at the time of the crash.

It does ***not*** contain:

- Any significant information about the model being processed.
- Any information about historical operations – it is "instantaneous", containing only what was happening at the time of the crash.

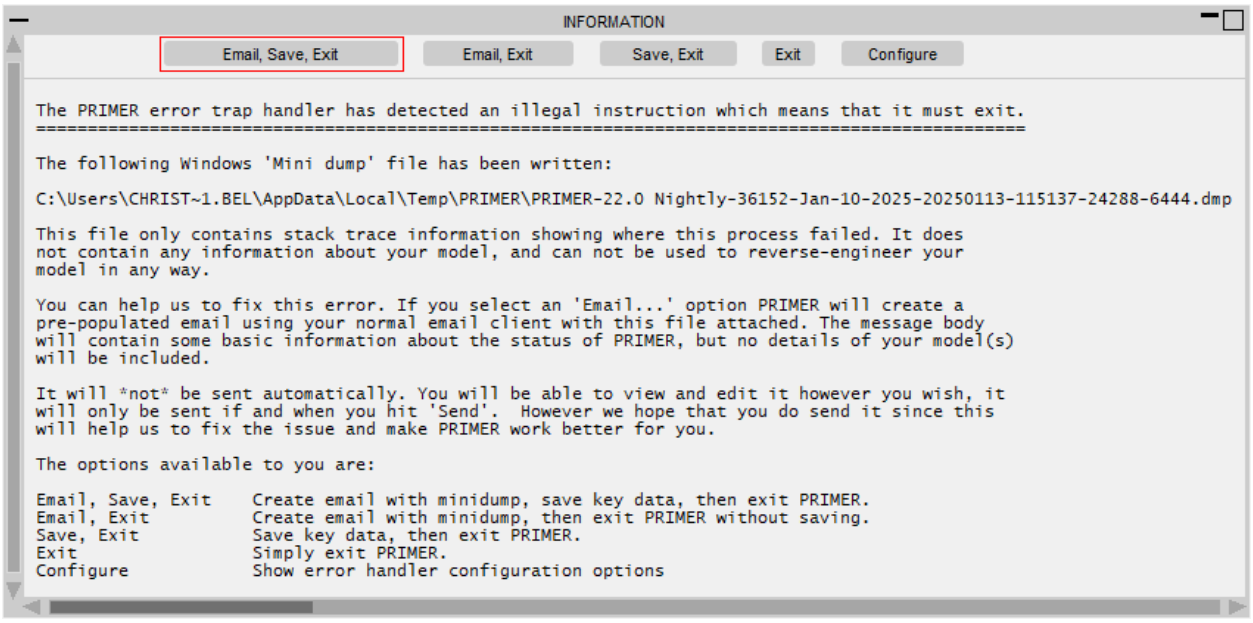
There is absolutely no way that Oasys Ltd or anyone else could use it to reverse-engineer your model data in anything other than the most general terms. For example, we might be able to deduce that you were using a spot-weld tool at the time of the crash and therefore that your model contained connections, but we could not learn anything about its size, content, geometry, material properties or any quantitative information.

If you send us these files it helps us to help you. Sometimes we can diagnose the reason for a crash and suggest ways around it, this also allows us to fix problems in future releases. This isn't always possible, they can be very opaque at times, but they are by far the best tool we have for diagnosing problems.

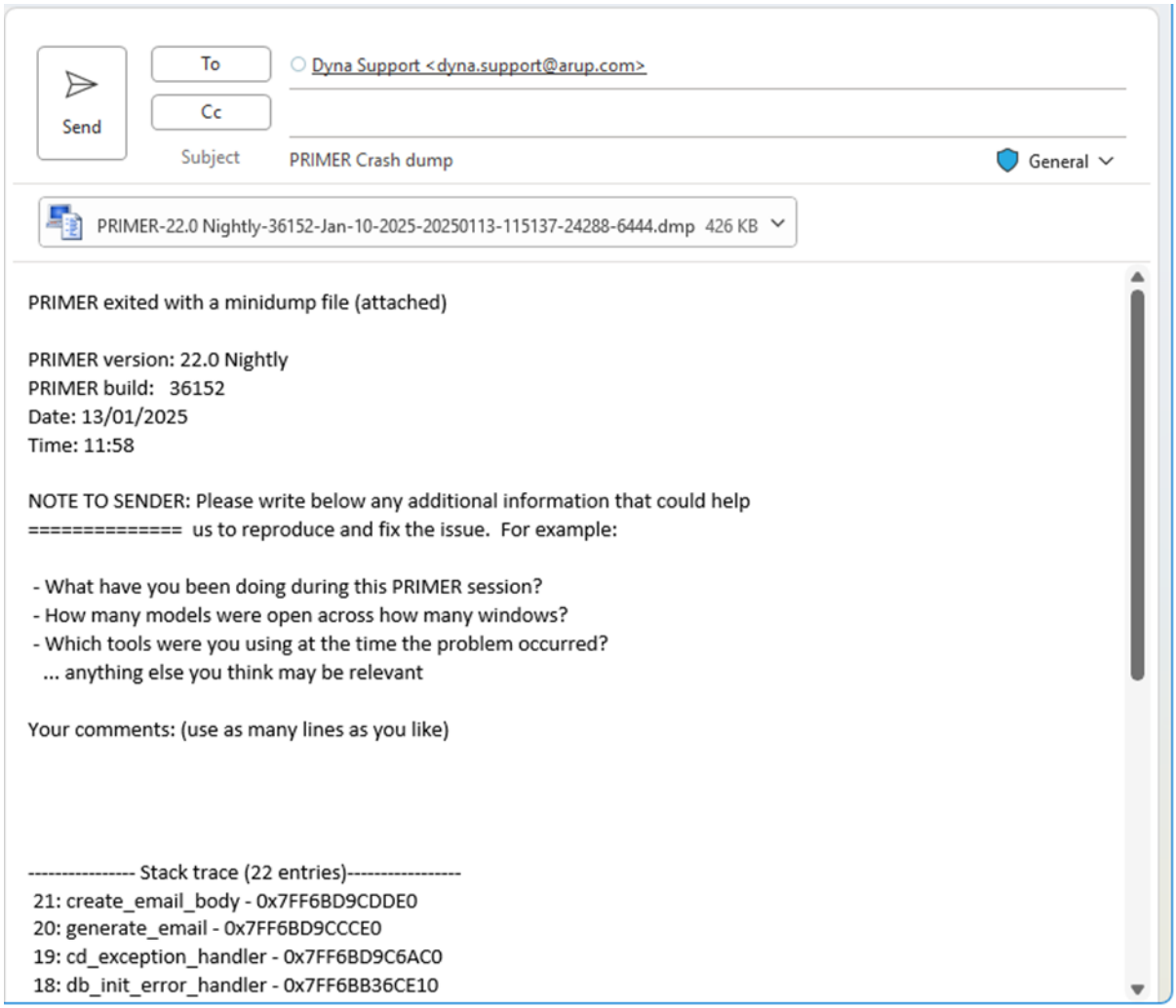
The default process for handling a crash in an interactive session

This is not the default behaviour for users in Japan, see "Special configuration in some geographies" below.

Following a crash, you will see this message (*this example shows PRIMER; the behaviour is the same for all Oasys LS-DYNA Environment products*).



If you choose one of the **Email** options an email like the following will be created in your default email client. This example uses Microsoft Outlook but if different software is installed that will be used instead.



Note that the dump file is attached automatically to the email, and it may also contain a Stack trace containing information about the stack frame.

You can add any comments you like to the email, possibly add other attachments, then send it in the normal way using **Send**. This will send it to the normal dyna.support@arup.com email address we use to handle support requests.

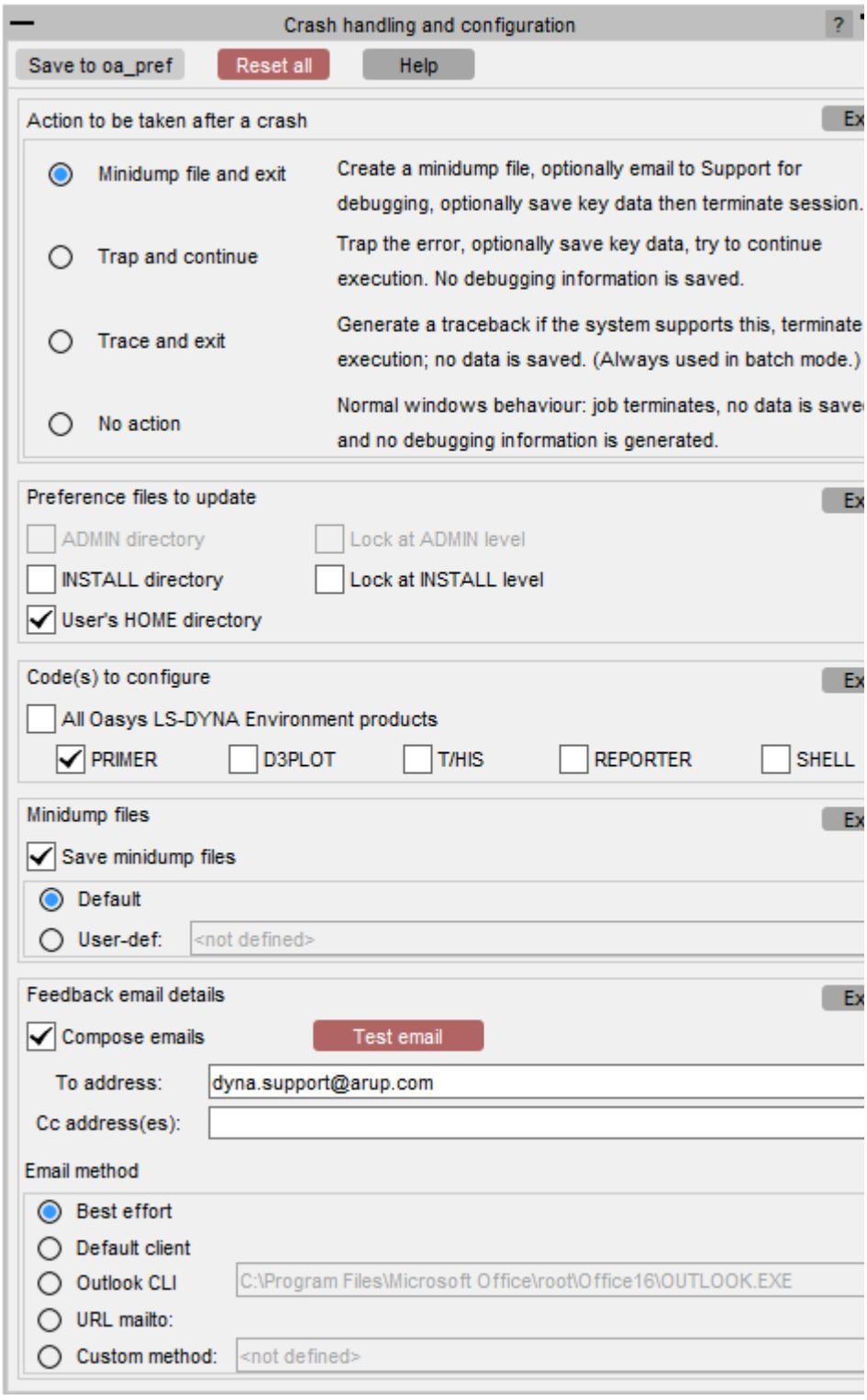
The email will never be sent automatically. If you close the email without sending it, it will remain in your drafts folder until deleted.

Configuring the crash handler

All aspects of the crash handler can be configured via preferences stored in the oa_pref file, but much the easiest way to do this is to use the interactive configuration GUI built into the software.

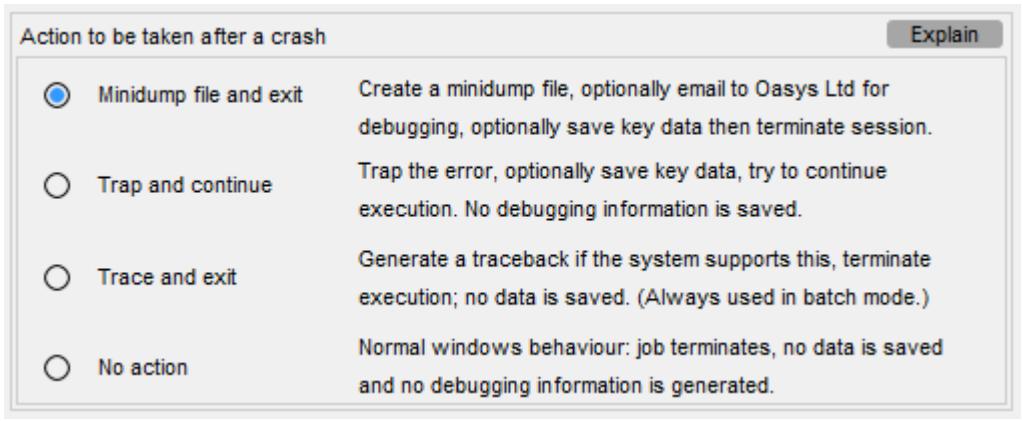
In all programmes other than Oasys SHELL, selecting Help → Crash handler will launch the configuration panel:

In Oasys SHELL, this is launched from Utilities → Crash Handling:



Taking each section of this panel in turn:

Action to be taken after a crash



For interactive usage:

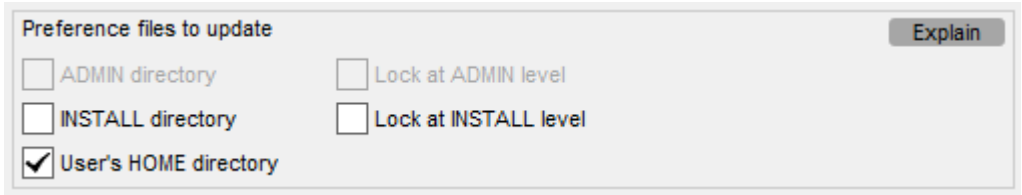
- The first option, “Minidump file and exit”, is usually the best option. If you choose to save your data then you have a reasonable chance of recovering some of your work, and the minidump file may provide evidence for Oasys Ltd Support to debug the problem and suggest workarounds.
- “Trap and continue” is a possible alternative, especially if you don’t 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 sections will show how the minidump file’s configuration can be set when this option is used.

Preference files to update



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 possible that you will want the same crash handling behaviour for all programs. This is achieved using the "oasys" prefix – for example:

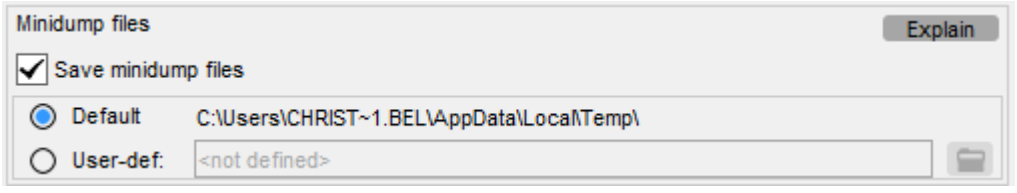
```
oasys*some_preference:    value
```

You can set preferences for individual programs – for example:

```
primer*some_preference:   value
```

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

Minidump files



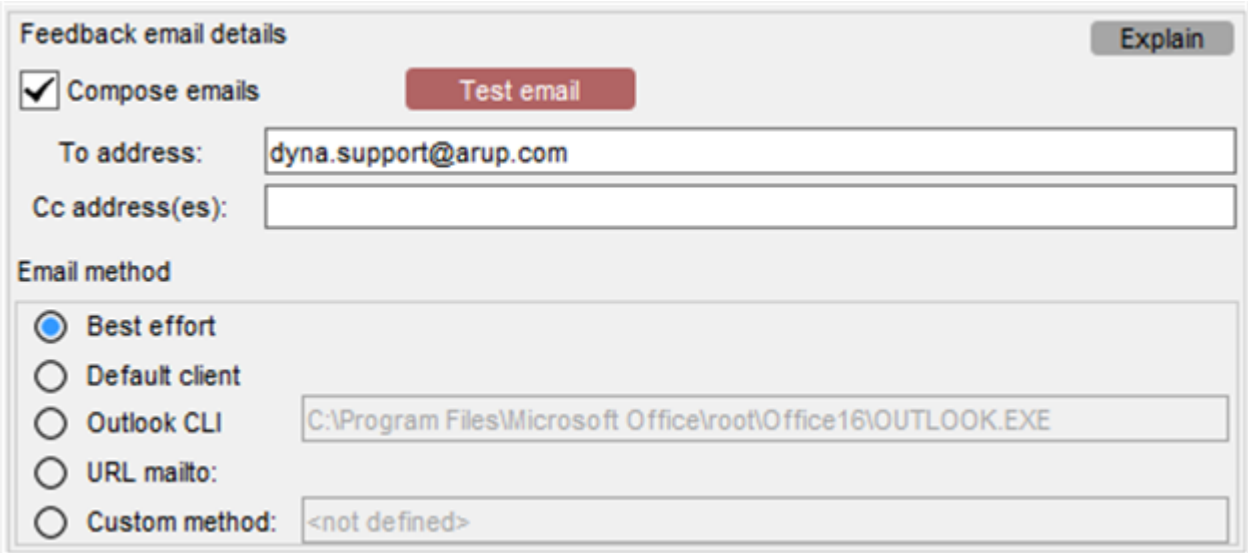
Minidump files contain debug information about the code when it crashed. They do not contain any information about the model and cannot be used to reverse-engineer models in any way. If you send them to Oasys Ltd Support they may be able to tell what

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.

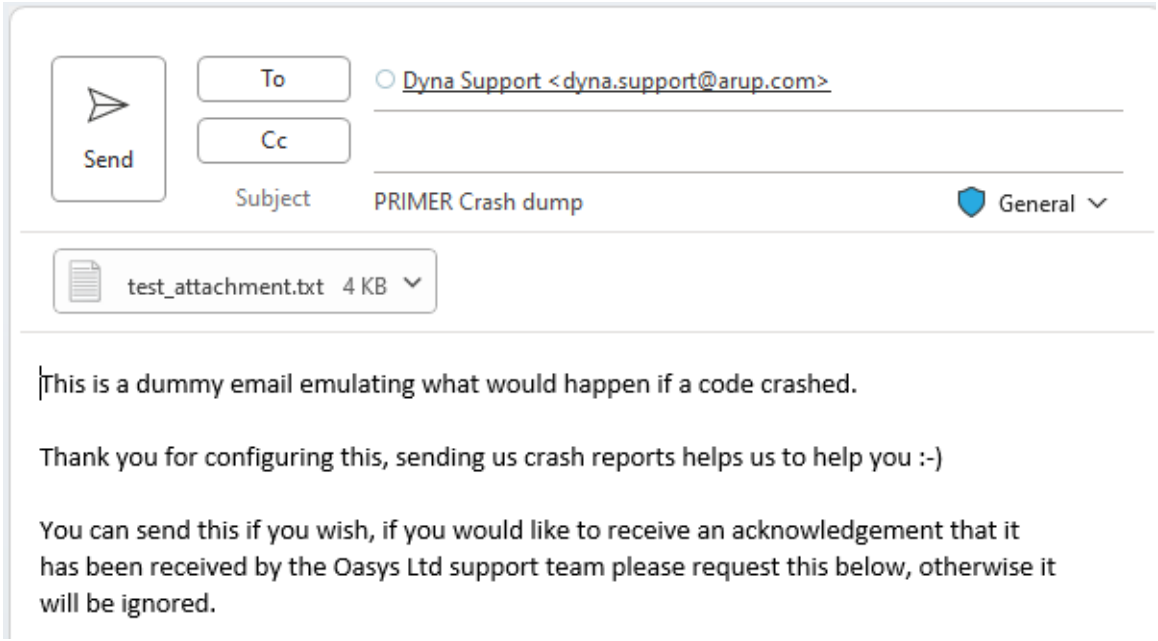
  In order to give users the choice about whether or not to send an email, complete control over its contents and also the ability to add further information, Oasys LS-DYNA Environment software attempts to use the default email client on the user’s system. It does not send emails (or any other data) automatically.

  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 Oasys Ltd that it has been received, please request this in the email body, otherwise it will be ignored.



If you see this email but it 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 method 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 Oasys Ltd for help.

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.

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.

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.

10. Licences Used in Software

Licences used in software

Oasys LS-DYNA Environment uses several third party libraries and executables. The licences for them are given below

10.1. Open source

10.1.1. Apple public Source

Apple Public Source

```
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```

Note: the URL http://www.apple.com/publicsource cited above no longer exists, see instead https://spdx.org/licenses/APSL-1.1.html

10.1.2. Draco

Draco

google/draco is licensed under the Apache License:

```
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limitations under the License.
```

10.1.3. Expat

Expat

```
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                               and Clark Cooper
Copyright (c) 2001, 2002, 2003, 2004, 2005, 2006 Expat maintainers.

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SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE
```

10.1.4. FreeType

FreeType


```
                    The FreeType Project LICENSE
                    ----------------------------

                            2006-Jan-27

                    Copyright 1996-2002, 2006 by
          David Turner, Robert Wilhelm, and Werner Lemberg



Introduction
============

  The FreeType  Project is distributed in  several archive packages;
  some of them may contain, in addition to the FreeType font engine,
  various tools and  contributions which rely on, or  relate to, the
  FreeType Project.

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  which do not  fall under their own explicit  license.  The license
  affects  thus  the  FreeType   font  engine,  the  test  programs,
  documentation and makefiles, at the very least.

  This  license   was  inspired  by  the  BSD,   Artistic,  and  IJG
  (Independent JPEG  Group) licenses, which  all encourage inclusion
  and  use of  free  software in  commercial  and freeware  products
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  We  disclaim  all warranties  covering  The  FreeType Project  and
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```

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 """
```

Please replace <year> with the value from the FreeType version you actually use.

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4. Contacts

There are two mailing lists related to FreeType:

- freetype@nongnu.org

  Discusses general use and applications of FreeType, as well as future and wanted additions to the library and distribution. If you are looking for support, start in this list if you


```
      haven't found anything to help you in the documentation.

    o freetype-devel@nongnu.org

      Discusses bugs,  as well  as engine internals,  design issues,
      specific licenses, porting, etc.

  Our home page can be found at

    http://www.freetype.org


--- end of FTL.TXT ---
```

10.1.5. FFmpeg

FFmpeg

```
FFmpeg is licensed under the LGPL v2.1+. The exception to this is
the x264
library used by FFmpeg, for which Arup have obtained a commercial
license (see
here).

# License

Most files in FFmpeg are under the GNU Lesser General Public License
version 2.1
or later (LGPL v2.1+). Read the file `COPYING.LGPLv2.1` for details.
Some other
files have MIT/X11/BSD-style licenses. In combination the LGPL v2.1+
applies to
FFmpeg.

Some optional parts of FFmpeg are licensed under the GNU General
Public License
version 2 or later (GPL v2+). See the file `COPYING.GPLv2` for
details. None of
these parts are used by default, you have to explicitly pass `--
enable-gpl` to
configure to activate them. In this case, FFmpeg's license changes
to GPL v2+.

Specifically, the GPL parts of FFmpeg are:

- libpostproc
- optional x86 optimization in the files
    - `libavcodec/x86/flac_dsp_gpl.asm`
    - `libavcodec/x86/idct_mmx.c`
    - `libavfilter/x86/vf_removegrain.asm`
- the following building and testing tools
    - `compat/solaris/make_sunver.pl`
    - `doc/t2h.pm`
    - `doc/texi2pod.pl`
    - `libswresample/tests/swresample.c`
    - `tests/checkasm/*`
    - `tests/tiny_ssim.c`
- the following filters in libavfilter:
    - `signature_lookup.c`
    - `vf_blackframe.c`
    - `vf_boxblur.c`
    - `vf_colormatrix.c`
    - `vf_cover_rect.c`
    - `vf_cropdetect.c`
    - `vf_delogo.c`
    - `vf_eq.c`
    - `vf_find_rect.c`
```


```
    - `vf_fspp.c`
    - `vf_histeq.c`
    - `vf_hqdn3d.c`
    - `vf_kerndeint.c`
    - `vf_lensfun.c` (GPL version 3 or later)
    - `vf_mcdeint.c`
    - `vf_mpdecimate.c`
    - `vf_nnedi.c`
    - `vf_owdenoise.c`
    - `vf_perspective.c`
    - `vf_phase.c`
    - `vf_pp.c`
    - `vf_pp7.c`
    - `vf_pullup.c`
    - `vf_repeatfields.c`
    - `vf_sab.c`
    - `vf_signature.c`
    - `vf_smartblur.c`
    - `vf_spp.c`
    - `vf_stereo3d.c`
    - `vf_super2xsai.c`
    - `vf_tinterlace.c`
    - `vf_uspp.c`
    - `vf_vaguedenoiser.c`
    - `vsrc_mptestsrc.c`

Should you, for whatever reason, prefer to use version 3 of the
(L)GPL, then
the configure parameter `--enable-version3` will activate this
licensing option
for you. Read the file `COPYING.LGPLv3` or, if you have enabled GPL
parts,
`COPYING.GPLv3` to learn the exact legal terms that apply in this
case.

There are a handful of files under other licensing terms, namely:

* The files `libavcodec/jfdctfst.c`,
`libavcodec/jfdctint_template.c` and
  `libavcodec/jrevdct.c` are taken from libjpeg, see the top of the
files for
  licensing details. Specifically note that you must credit the IJG
in the
  documentation accompanying your program if you only distribute
executables.
  You must also indicate any changes including additions and
deletions to
  those three files in the documentation.
* `tests/reference.pnm` is under the expat license.


## External libraries

FFmpeg can be combined with a number of external libraries, which
sometimes
```

```
affect the licensing of binaries resulting from the combination.

### Compatible libraries

The following libraries are under GPL version 2:
- avisynth
- frei0r
- libcdio
- libdavs2
- librubberband
- libvidstab
- libx264
- libx265
- libxavs
- libxavs2
- libxvid

When combining them with FFmpeg, FFmpeg needs to be licensed as GPL
as well by
passing `--enable-gpl` to configure.

The following libraries are under LGPL version 3:
- gmp
- libaribb24
- liblensfun

When combining them with FFmpeg, use the configure option `--enable-
version3` to
upgrade FFmpeg to the LGPL v3.

The VMAF, mbedTLS, RK MPI, OpenCORE and VisualOn libraries are under
the Apache License
2.0. That license is incompatible with the LGPL v2.1 and the GPL v2,
but not with
version 3 of those licenses. So to combine these libraries with
FFmpeg, the
license version needs to be upgraded by passing `--enable-version3`
to configure.

The smbclient library is under the GPL v3, to combine it with
FFmpeg,
the options `--enable-gpl` and `--enable-version3` have to be passed
to
configure to upgrade FFmpeg to the GPL v3.

### Incompatible libraries

There are certain libraries you can combine with FFmpeg whose
licenses are not
compatible with the GPL and/or the LGPL. If you wish to enable these
libraries, even in circumstances that their license may be
incompatible, pass
`--enable-nonfree` to configure. This will cause the resulting
binary to be
unredistributable.
```

The Fraunhofer FDK AAC and OpenSSL libraries are under licenses which are
incompatible with the GPLv2 and v3. To the best of our knowledge, they are
compatible with the LGPL.

10.1.6. HDF5

HDF5

```
Copyright Notice and License Terms for
HDF5 (Hierarchical Data Format 5) Software Library and Utilities
-----------------------------------------------------------------------
---------

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patches, or
```

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(netCDF), The Independent JPEG Group (JPEG), Jean-loup Gailly and Mark Adler
(gzip), and Digital Equipment Corporation (DEC).

Portions of HDF5 were developed with support from the Lawrence Berkeley
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10.1.7. Jpeg

Jpeg

```
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Libchardet

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Version 1.1

---

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10.1.14. Openssl

Openssl

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Also
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THE BASIC LIBRARY FUNCTIONS
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Written by:       Philip Hazel
Email local part: ph10
Email domain:     cam.ac.uk

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10.1.19. SmoothSort

SmoothSort

10.1.20. Spidermonkey

Spidermonkey

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10.1.22. TOML Parser for C

TOML Parser for C

10.1.23. Treeview

Treeview

10.1.24. Turf

Turf

```
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```

10.1.25. Win-iconv

Win-iconv

```
win_iconv is a iconv implementation using Win32 API to convert.

win_iconv is placed in the public domain.

Yukihiro Nakadaira <yukihiro.nakadaira@gmail.com>
```

10.1.26. Zlib

Zlib

```
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    Jean-loup Gailly        Mark Adler
    jloup@gzip.org          madler@alumni.caltech.edu
```

10.2. Other

10.2.1. MPEG-LA

MPEG-LA

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x264

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