LS-DYNA Installation Guide
Windows and Linux

Oasys Ltd

The Software House of ARUP

Contents

LS-DYNA INSTALLATION GUIDE

1   Introduction

The software and documentation mentioned in this guide can be downloaded from
http://www.oasys-software.com/dyna/en/

This installation guide aims to cover the most common installation scenarios. For bespoke
help and installation issues not covered by this guide please email **dyna.support@arup.com**

For a successful installation of LS-DYNA the following components are required:

- License server / file.

- Message Passing Interface (MPI) for the Massively Parallel Processing (MPP)
  versions of LS-DYNA.

- LS-DYNA executable.

This guide will cover the procedures for installation of these components on both Windows
and Linux architecture.

2   Linux

2.1   Licensing

LS-DYNA can be run over a network using a license server or on a single computer using a node locked license.

2.1.1   Server

The license server requires a license file which will be supplied by Arup. In order for Arup to generate the license file, machine and network information is required. To generate the required information:

1. Identify your server machine architecture and operating system and download the appropriate license file manager from. http://www.oasys-software.com/dyna/en/downloads/ls-dyna_server_licensing.shtml

2. On your server create the folder `/usr/local/lstc` as root and set read and execute permissions (`chmod 755 /usr/local/lstc`). Extract the downloaded files to this location.

3. Run the license server as follows:

        /usr/local/lstc/lstc_server info

4. The command issued in step 3 will generate a file `LSTC_SERVER_INFO`.

5. This file should be text edited where the file contains '`xx`' to fill in contact details and also the IP address range(s) of the client machines. For example:

        ALLOW_RANGE: 192.168.001.001 192.168.255.255

   Will allow for all possible combinations of IP addresses where the last two numbers vary from 1 to 255.

   Multiple `ALLOW_RANGE` lines are allowed.

   A single IP address can be included by entering the same number twice.

6. Please email the `LSTC_SERVER_INFO` file directly to Arup, together with a signed copy of our standard license agreement.

We will return the LS-DYNA license file 'server_data'. This file should be placed in the license server location (`/usr/local/lstc`)

Start the license server:

        nohup /usr/local/lstc /lstc_server –n –l lstc_server_log &

`lstc_server_log` will be a simple text log file that contains information regarding the LS-DYNA jobs started, queued and returned by the LS-DYNA application. Any name can be used for the filename, in this example the filename is `lstc_server_log`.

2.1.2   Node Locked

A node locked license is specific to a single machine. In order to obtain the node locked license:

1. Download and extract an SMP version of LS-DYNA (See Section 2.3)

2. Execute the command:

    ```
    dyna_exe info
    ```

    where `dyna_exe` is the full path to the LS-DYNA executable extracted in step 1.

3. This command should generate the file 'lstc.log'. Please text edit this file to include your contact details then return the lstc.log file directly to Arup along with a signed copy of the Standard License Agreement.

Once Arup have received both the lstc.log file and the signed agreement, Arup will issue the LS-DYNA license file (`LSTC_FILE`).

4. Save the file `LSTC_FILE` to the directory of your choice.

5. The environment needs to know the location of the license file so please set an environment variable `LSTC_FILE` to the full path of the LS-DYNA license file. For example if you are using a bash shell:

    ```
    export LSTC_FILE=/usr/local/lstc/LSTC_FILE
    ```

    where `/usr/local/lstc` is the path to where the LS-DYNA license file `LSTC_FILE` is located.

    If using Oasys SHELL, the license will be activated automatically, alternatively, please set this environment variable in your shell configuration file or as part of your bespoke LS-DYNA execution script.

2.2   Message Passing Interface (MPI)

If you wish to run the Massively Parallel Processing (MPP) versions of LS-DYNA then you require Message Passing Interface (MPI) libraries.

The preferred MPI library is Platform MPI. Please download the Linux software:

http://www.oasys-software.com/dyna/en/downloads/ls-dyna_mpi_libraries.shtml

To install please log in as root or '`sudo`' the command:

```
rpm –ivh <downloaded_mpi_file>.rpm
```

where `<downloaded_mpi_file>.rpm` is the mpi library package you downloaded from the Oasys website.

This will install the MPI libraries in `/opt/platform_mpi`

2.3   LS-DYNA executable

Please download the Linux LS-DYNA executable(s) of your choice from:

http://www.oasys-software.com/dyna/en/downloads/

2.4   Running DYNA

The Oasys 'LS-DYNA Environment' SHELL can make setting up and running LS-DYNA much easier, particularly in the case of MPP installations on clusters. Please contact **dyna.support@arup.com** for details. Alternatively the executables can be run directly as described below.

2.4.1   SMP

To run an SMP LS-DYNA executable the basic syntax is:

`dyna_exe i=job_file <further options>`

where:

`dyna_exe`	is the full path to the SMP LS-DYNA executable.
`job_file`	is the full path to the LS-DYNA keyword deck
`<further options>`	are optional, additional options to control the behaviour and output of the analysis. Please see 'Getting Started' -> 'Execution Syntax' in the LS-DYNA Keyword Manual Volume I for details.

2.4.2   MPP

To run an MPP LS-DYNA executable the basic syntax is:

`mpirun –np x dyna_exe i=job_file memory=100m memory2=25m <further options>`

where:

`mpirun`	is the full path to the MPI executable e.g. for Platform MPI `/opt/platform_mpi/bin/mpirun`
`-np x`	is the number of cores to run LS-DYNA on
`dyna_exe`	is the full path to the MPP LS-DYNA executable.
`job_file`	is the full path to the LS-DYNA keyword deck
`memory`	is the number of words for processor 0
`memory2`	is the number of words used by all other processors
`<further options>`	are all other arguments to give to LS-DYNA. Please see 'Getting Started' -> 'Execution Syntax' in the LS-DYNA Keyword Manual, Volume I, for details.

To run over a cluster of machines and for advanced setting of Platform MPI please refer to the Platform MPI documentation that is supplied with the Platform installation.
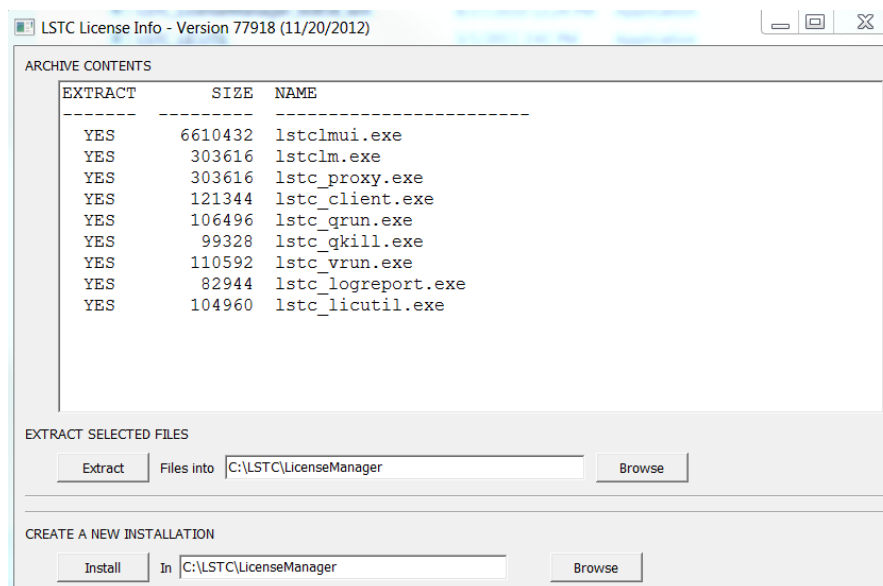
3   Windows

3.1   Licensing

LS-DYNA can be run over a network using a license server or on a single computer using a node locked license.

3.1.1   Server

The license server requires a license file which will be supplied by Arup. In order for Arup to generate the license file, machine and network information is required. To generate the required information:

1. Please download the windows license file manager from http://www.oasys-software.com/dyna/en/downloads/ls-dyna_server_licensing.shtml

2. On your server create a folder where you would like to install the LSTC License Manager, for example `C:\LSTC\LicenseManager` and place the download in this location

3. Unzip, then run the installation program as Administrator. You will see the contents of the archive and the option to create a new installation. Browse to the desired installation folder and the click the 'Install' button.

```
LSTC License Info - Version 77918 (11/20/2012)

ARCHIVE CONTENTS

   EXTRACT        SIZE   NAME
   -------   ---------   -----------------------
      YES     6610432    lstclmui.exe
      YES      303616    lstclm.exe
      YES      303616    lstc_proxy.exe
      YES      121344    lstc_client.exe
      YES      106496    lstc_qrun.exe
      YES       99328    lstc_qkill.exe
      YES      110592    lstc_vrun.exe
      YES       82944    lstc_logreport.exe
      YES      104960    lstc_licutil.exe


EXTRACT SELECTED FILES

   Extract    Files into  C:\LSTC\LicenseManager          Browse


CREATE A NEW INSTALLATION

   Install    In  C:\LSTC\LicenseManager                  Browse
```

4. A successful installation should be reported and a browser window open at the location of the License server files

5. Close the installation program

6. Run the LSTCLMUI program and ignore any warning messages. Select the 'Request a License' tab. Enter your license information and then press the 'Generate' button. A browse window will appear allowing you to choose a location to save the file `LSTC_SERVER_INFO`. After you have saved this file, please close the LSTCLMUI program.

7. Please ignore the 'Instructions' to send to keys@lstc.com

8. Please email the `LSTC_SERVER_INFO` file directly to Arup together with a signed copy of our standard license agreement. Please be sure to include the details of all IP address ranges that will be allowed to access the License server.

We will return the LS-DYNA license file '`server_data`'. **This file should be saved in the license server installation location**.

9. Start the license server: Run the LSTCLMUI program as Administrator again and select the 'LSTCLM service for windows tab' The Service should be shown as installed but not yet started. Press the 'Start' button. It may take up to a minute for the service to start and for LSTCLMUI to verify it has started. The 'SERVICE STATUS' should be updated to running if there are no errors.

3.1.1.1   Client Setup

The term 'Client' refers to any machine on the network that will be running LS-DYNA.

The Client setup consists of setting several environment variables:

Please set `LSTC_LICENSE` to a value of '`network`'

Please set `LSTC_INTERNAL_CLIENT` to a value of '`off`'

Please set `LSTC_LICENSE_SERVER` to a value that is the hostname or IP address of the license server machine

3.1.2   Node Locked

A node locked license is specific to a single machine. In order to obtain the node locked license:

1. Download and extract an SMP version of LS-DYNA (See Section 3.3)

2. Execute the command:

    ```
    dyna_exe info
    ```

    where `dyna_exe` is the full path to the LS-DYNA executable extracted in step 1.

3. This command should generate the file 'lstc.log'. Please text edit this file to include your contact details then return the lstc.log file directly to Arup along with a signed copy of the Standard License Agreement.

Once Arup have received both the lstc.log file and the signed agreement, Arup will issue the LS-DYNA license file (`LSTC_FILE`).

4. Save the file `LSTC_FILE` to the directory of your choice.

5. The environment needs to know the location of the license file so please set an environment variable `LSTC_FILE` to a value of the full path of the LS-DYNA license file.

6. Please set an environment variable `LSTC_LICENSE` to a value of '`local`'.

3.2   Message Passing Interface (MPI)

If you wish to run the Massively Parallel Processing (MPP) versions of LS-DYNA then you require Message Passing Interface (MPI) libraries.

The preferred MPI library is Platform MPI. Please download the Windows software:

http://www.oasys-software.com/dyna/en/downloads/ls-dyna/mpi_libraries/Platform-MPI-V8.01.01-20110421r.exe

Run the executable to install Platform MPI. Please accept the default install location which is:

C:\Program Files (x86)\Platform Computing\Platform-MPI

Please add the location: `C:\Program Files (x86)\Platform Computing\Platform-MPI\bin` to your '`path`' environment variable.

3.3   LS-DYNA executable

Please download the Windows LS-DYNA executable(s) of your choice from:

http://www.oasys-software.com/dyna/en/downloads/

Each zip file contains the LS-DYNA executable, l2a.exe (a binout to ASCII conversion utility – generally not required) and lstc_client.exe (a client executable used with network licensing)

Please extract the zip file(s) content to a location of your choice.

3.4   Running DYNA

The Oasys 'LS-DYNA Environment' SHELL can make setting up and running LS-DYNA much easier, particularly in the case of MPP installations on clusters. Please contact dyna.support@arup.com for details. Alternatively the executables can be run directly as described below.

3.4.1   SMP

To run an SMP LS-DYNA executable the basic syntax is:

```
dyna_exe i=job_file <further options>
```

where:

`dyna_exe`	is the full path to the SMP LS-DYNA executable.
`job_file`	is the full path to the LS-DYNA keyword deck
`<further options>`	are optional, additional options to control the behaviour and output of the analysis. Please see 'Getting Started' -> 'Execution Syntax' in the LS-DYNA Keyword Manual Volume I for details.

3.4.2   MPP

To run an MPP LS-DYNA executable the basic syntax is:

```
mpirun -np x dyna_exe i=job_file memory=100m memory2=25m <further options>
```

where:

`mpirun`	is the full path to the MPI executable, e.g. for Platform MPI: `C:\Program Files (x86)\Platform Computing\Platform-MPI\bin`
`-np x`	is the number of cores to run LS-DYNA on
`dyna_exe`	is the full path to the MPP LS-DYNA executable.
`job_file`	is the full path to the LS-DYNA keyword deck
`memory`	is the number of words for processor 0

`memory2`   is the number of words used by all other processors

`<further options>` are all other arguments to give to LS-DYNA. Please see 'Getting Started' -> 'Execution Syntax' in the LS-DYNA Keyword Manual, Volume I, for details.

To run over a cluster of machines and for advanced setting of Platform MPI please refer to the Platform MPI documentation that is supplied with the Platform installation.