LSTC License Manager Installation Guide

August 2010

This installation manual is organized by specific tasks such as (a) initial installation (b) server upgrade (c) license file upgrade, etc. Each major division is self-contained so that users may quickly locate the desired task and follow the complete step-by-step instructions to complete that task.

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I. First Installation of LSTC License Manager Software for UNIX/LINUX

A. Choose an Installation Directory

Create a directory where you would like to install the license server. Extract all of the files from the license server software archive into the chosen installation directory

```
lstc_server
lstc_proxy
lstc_client
lstc_qrun
lstc_qkill
lstc_vrun
gmid
```

The installation directory must be writable by the user who will run the license server. (You can run the server as any user. Root permission is not required for the license server.)

B. Request a License from LSTC (LSTC_SERVER_INFO)

Next, you will need to create a license info file, add your company information to the file, and email a copy to keys@lstc.com. To do this, execute

```
./lstc_server info
```

You should see the following message printed on the terminal:

```
The hostid and other server information have been written to LSTC_SERVER_INFO.
Please contact LSTC with this information to obtain a valid network license
```

The LSTC_SERVER_INFO file is created in the current working directory. You will need to edit this file with a text editor before sending LSTC_SERVER_INFO to keys@lstc.com.

1. Modify the Customer Information section.

```
Your Company Name Here
    EMAIL: NONE
      FAX: NONE
TELEPHONE: NONE
```

2. Modify the IP address range.

You must specify a valid range of addresses in this section. This address range must be restricted to the local network where LS-DYNA may run. Multiple ALLOW_RANGE statements allowed, if required. For example

```
ALLOW_RANGE: 127.000.000.001-127.000.000.002
ALLOW_RANGE: 192.168.000.000-192.168.000.255
```

Only machines whose IP addresses are within the specified range will be allowed to request licenses from the license server.

3. Email your Request to LSTC

Once you have modified the required information, then please forward the LSTC_SERVER_INFO to LSTC at keys@lstc.com . MAKE SURE TO EXPLAIN YOUR LICENSE REQUEST. Is this a demo or a permanent license? How many CPU's do you want to

be able to run? What other special options do you require, such as USA, or other specialized options? Be sure to give information about who we may contact with any questions concerning your license request.

C. Install the License (server_data)

LSTC will return a file "server_data" as an attachment. Place this file in the chosen installation directory. Start the server while in the chosen installation directory:

```
./lstc_server -l log_file_name
```

Check that the server started

```
cat log_file_name
```

You should see a message such as this:

```
LSTC license server version 59932 started ...
Using configuration file '.../server_data'
```

If the server did not create a log file, then make sure that the server has write permission for the chosen installation directory.

If you do not see a message indicating that the license server has started, then you will need to correct any problem before continuing. The most common problems are:

1. The server could not find (or open) the server_data license file.

   ```
   ERROR: could not open configuration file
   ERROR: Cannot open license file '.../server_data'
   ```

   Make sure that permissions are set correctly so that the file can be read. And make sure that the "server_data" license file and the "lstc_server" executable are both located in the chosen installation directory.

2. Invalid license key file - if the license information has been modified, then you will see a message such as this in the log file

   ```
   ERROR: Invalid configuration file
   ERROR: bad keys in the license file '.../server_data'
   ```

   You will need to restore the original license file or obtain a new one. Contact LSTC for more information.

3. The server ID in the file does not match that of the machine.

   ```
   ERROR: the host id of this machine not found in the license file
     '.../server_data'
   ```

   You will need to contact LSTC for a new key.

If you cannot correct a start-up error, then please contact LSTC technical support.

D. Verify the License

Test that you have received the requested licenses:

```
./lstc_qrun -s locahost -r
```

You should see a table of licenses printed, along with expiration dates. If lstc_qrun is unable to connect to the server for some reason, then the server is probably not running. In that case, refer to (C) above. LS-DYNA will not be able to check out license if lstc_qrun cannot contact the server.

II. Upgrading LSTC License Manager Software for UNIX/LINUX

A. Check for Environment Variables

We recommend that you no longer use environment variables to specify the location of the security directory where the "server_data" license file and log files will be kept. So check for the environment variable

```
echo $LSTC_SECURITY_DIR
```

If this variable is set, then unset it. Instead place the LSTC License Manager software in the directory where the "server_data" license file is located. If the "server_data" license file is located in the same directory with the license server executable, then the server will automatically find and use this file. Optionally, create a new directory and copy ALL files from the directory $LSTC_SECURITY_DIR into the new directory. Then unpack the latest LSTC License Manager Software archive into this new directory.

If the previous server was configured to use a non-standard port using the environment variable LSTC_LICENSE_SERVER_PORT, then we recommend that you instead place the following line in "server_data"

```
PORT: N
```

where N is the port number on which lstc_server should listen for incoming requests. We recommend that you place this line directly beneath the "SERVER:" line in the "server_data" license file. You can safely add such a line without obtaining a new license file from LSTC.

B. Preserving Running Jobs

The previous 224 version of the license server uses a binary file format which is incompatible with all license servers built in the last 2+ years. If you stop a version 224 license server and upgrade to recent versions, then running jobs will be lost. Such jobs should be preserved if you upgrade from a server whose version number is at least 53227.

C. Upgrade Procedure

You will need to locate the directory where the LSTC License Manager software is installed. Change to the directory where the software is installed. Kill the running server using

```
kill -TERM PID
```

where PID is the process id of the lstc_server process

```
ps -elf | grep lstc_server
```

Unzip the license archive into the installation directory, and restart the Server

```
./lstc_server -l log_file_name
```

Check the log for any start-up errors

```
cat log_file_name
```

III. Upgrading server_data Network License File for UNIX/LINUX

A. Upgrade the License Manager Software (**OPTIONAL**)

You will need to stop and restart the license server whenever you obtain a new license file. For this reason, we recommend that you upgrade the LSTC License Manager Software at the same time. (Refer to Section II above). Move the existing "server_data" to some other name, and copy the new "server_data" into place.

B. Updating the License Without Updating the License Manager Software

Locate the LSTC License Manager software installation directory. Move the existing license file "server_data" to some other name. Copy the new "server_data" file into the installation directory.

Stop the server using

```
kill -TERM PID
```

where PID is the process id of the lstc_server process

```
ps -elf | grep lstc_server
```

Restart the server

```
./lstc_server -l log_file_name
```

Check the log for any start-up errors

```
cat log_file_name
```

C. Preserving Running Jobs

Running jobs should be preserved if you simply replace the "server_data" license file, and then restart the existing server, or if you are upgrading from version 53227 or later of the LSTC License Manager Software.

IV. First Installation of LSTC License Manager Software for Microsoft Windows

A. Installation Archive

Be sure to obtain the latest archive of the LSTC License Manager software. This archive is an executable program which will install/upgrade the software under Windows XP and later versions. The current version of this archive is

```
LSTC_LicenseManager_60858_win.exe
```

This installation program is still being developed. So each time you download a new version, be sure to consult this LSTCLM_README.TXT file for any new instructions.

!!!WARNING!!! You will probably need to run the installation program with Administrator privileges. Otherwise, parts of the installation may fail.

When you run the installation program, you should see only two options

1. EXTRACT SELECTED FILES
2. CREATE A NEW INSTALLATION

If you see the "UPGRADE EXISTING INSTALLATION" option, then you should refer instead to the section UPGRADE THE LSTC LICENSE MANAGER SOFTWARE.

In order to create a new installation, you must specify a folder where you would
like to install the LSTC License Manager service. Use the browse button to create and select the desired folder. Press the "Install" button once you have selected the folder. A Popup should appear indicating that there are no errors. Press "OK" and a file browser will appear for the installation directory. You may now close the installation program. But leave the file browser open.

From the file browser window for the new installation directory, select and execute the LSTCLMUI.EXE program. Click "OK" to acknowledge the warning that no active server could be found. This warning should be ignored for now.

B. Request a License from LSTC

The LSTCLMUI.EXE program should now be running. If it is not, then locate this program in the installation directory and execute it.

Select the "Request a License" tab in the LSTCLMUI program. Fill in the the fields of the LICENSE INFORMATION section. (The FAX number is optional). Then hit the "GENERATE" button in order to generate the LSTC_SERVER_INFO file required for license requests.

Instructions will appear about how to complete your license request. Do not just send an empty email. Please explain your request. For example, tell us if this a demo request. How many CPUS do you require? Etc. And remember to attach the LSTC_SERVER_INFO file generated.

NOTE: You should email us the range of IP addresses for clients that must access the license server. Defaults are determined and written to the LSTC_SERVER_INFO file. However, you should clearly indicate in your request what IP addresses will be required for your installation.

C. Install the License

LSTC will send a server license file "server_data" to you. Save this attachment to the LSTC License Manager installation directory.

Start the LSTCLMUI.EXE program from the LSTC License Manager installation directory. Select the "LSTCLM Service for Windows" tab in the LSTCLMUI program. You should see that the service is already installed. All you need to do is start the service by pressing the "Start" button. If the start is successful, then you should see "SERVICE STATUS" change from "STOPPED" to "STARTED."

NOTE: If an error occurs, then select the "Open Windows Event Log" and find the log for the "LSTC License Manager" service in the "Applications" section of the log browser. Most errors at this point will have to do with invalid license files or options. However, there may be an error which you can correct. If you cannot correct the error, then please contact LSTC with the error log information.

D. Verify the License

Switch to the "LSTC Licenses" tab in the LSTCMUI.EXE program. You should see details about the running server in the "License Information" window. If you do not, then the service failed to start. In that case you should return to the "LSTCLM Service for Windows," and read the NOTE for (C) above.

Press the "License Summary" to obtain a list of licensed products, including expiration dates and numbers of CPUs. Please verify that the information is correct.

V. Upgrading LSTC License Manager Software for Microsoft Windows

A. Run the Installation Program

Be sure to obtain the latest archive of the LSTC License Manager software. This archive is an executable program which will install/upgrade the software under Windows XP and later versions. The current version of this archive is

```
LSTC_LicenseManager_60858_win.exe
```

This installation program is still being developed. So each time you download a new version, be sure to consult this LSTCLM_README.TXT file for any new instructions.

!!!WARNING!!! You will probably need to run the installation program with Administrator privileges. Otherwise, parts of the installation may fail.

If you already have the LSTC License Manager software installed on your machine, then you will see three available options when start the installation program:

1. EXTRACT SELECTED FILES
2. UPGRADE EXISTING INSTALLATION
3. CREATE A NEW INSTALLATION

If option (2) does not appear, then the server is not currently installed, and you should consult the previous section which describes the process for a FIRST-TIME INSTALLATION.

If the existing server is currently running, then you will see a checkbox option in the "UPGRADE EXISTING INSTALLATION" panel:

```
[ ] Stop, upgrade and restart the current server.
```

You must select this option, if available, or it will not be possible to upgrade the running server executable. This option is not available (or needed) if the server is not currently running. Finally, press the "Upgrade" button.

!!!BE PATIENT!!! It can take up to 30 seconds to stop the current server, upgrade, verify, and then start the new server.

Upon completion of the upgrade, you should see a pop-up indicating that there were no errors during installation or extraction. Click "OK" to acknowledge the message. A file browser window will appear for the upgraded installation directory.

B. Verify the Installation

Use the file browser to locate and execute the LSTCLMUI.EXE program in the LSTC License Manager installation folder.

If the server was running before the installation, then it should be running now. So you should see valid license server information in the "License Information" text area of the "LSTC Licenses" tab.

If the server was not running before the upgrade, then it will not be running now. So, in that case, you should start the server from the "LSTCLM Service for Windows" tab. Then switch back to "LSTC Licenses" tab in order to verify the server info in the "License Information" text area.

Examine the server info in the "License Information" in order to verify that the version of the running server matches the server version on the installation archive.

Finally, press the "License Summary" button in order to verify that the licenses you have are correct, including expiration dates.

VI. Upgrading "server_data" Network License File for Microsoft Windows

A. Move the New "server_data" License File into Place

Search for the current LSTC License Manager software installation directory. You should be able to find this directory by searching for the server executable named LSTCLM.EXE. Rename the existing "server_data" file to another name in the same folder. Copy the new "server_data" file into place.

B. STOP and START the License Server

Open the Windows Service Control Manager (SCM) from the Control Panel. Or, alternatively, execute "services.msc" in a Microsoft Windows Run Box. Search for the "LSTC License Manager" service. Select the option to stop the server, and then restart. The existing server will pick up the new "server_data" license file.

C. Upgrade the LSTC License Manager Software (**OPTIONAL**)

We recommend that you download the latest LSTC License Manager software and perform a software upgrade. Choose the option to stop, upgrade, and restart the license server.

D. Preserving Running Jobs

Running jobs should be preserved when you stop and restart the license server. If you are upgrading from version 53227 or later, then job information will also be preserved.

VII. Configuring LS-DYNA for UNIX/LINUX to Use a Network License

A. Using Environment Variables

In order for LS-DYNA to be able to access a network license, it must know what server(s) to contact. There are several options for specifying the servers to use. Environment variables override all other settings. For example, if you want to connect to a server whose host or ip address is 'host_or_ip', then you can set the environment variables

```
setenv LSTC_LICENSE network
setenv LSTC_LICENSE_SERVER host_or_ip
```

By default, LS-DYNA will attempt to connect to the server on port 31010. If you need to change that port to 57382, for example, then you should also set the variable

```
setenv LSTC_LICENSE_SERVER_PORT 57382
```

Starting with ls971 R5, you can specify the port number as part of the host

```
setenv LSTC_LICENSE_SERVER 57382@host_or_ip
```

If you use a redundant triad of license servers, then you must specify

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

WARNING: The single quotes are critical in order to keep the shell from trying to interpret the parentheses as a command which should be run. Do not use more white space than is absolutely necessary, or the results are undefined.

NOTE: Versions of LS-DYNA before 971 R5 were written before redundant license server capabilities existed. If you want to take advantage of redundant license server capabilities, then you must use the external "lstc_license" license client. (SEE SECTION (D) BELOW). Previous versions of LS-DYNA may still point to any ONE of the redundant servers, but will not be able to take advantage of redundant capabilities.

The environment variable settings shown above assume that you are using the C-shell 'csh' or 'tcsh'. If you are using 'sh', 'bash', or 'ksh', then the syntax is different.

```
csh or tcsh
    setenv VARNAME 'value'
sh, ksh or bash
    VARNAME='value'
    export VARNAME
```

B. Using **LSTC_FILE**

LS-DYNA looks for a file named "LSTC_FILE" in the following locations, and in the order list below:

(1) $LSTC_FILE
(2) /usr/local/lstc
(3) with the running executable

If LS-DYNA is able to find a security file named LSTC_FILE, then it can read license settings from this file. For example, putting these lines in LSTC_FILE

```
#LICENSE_TYPE: network
#LICENSE_SERVER: your server info here
```

has the same effect as setting these environment variables

```
setenv LSTC_LICENSE network
setenv LSTC_LICENSE_SERVER 'your server info here'
```

However, the settings in LSTC_FILE are always ignored if environment variables are set. This guarantees that an individual user can always override settings as required. Notice that there is no need for single quotes in the LSTC_FILE settings.

The advantage of using LSTC_FILE to enable network licensing is there is no need to set system-specific or user-specific environment variables (which can be quite tedious.)

RECOMMENDATION: Create a file named LSTC_FILE in the same directory with the LS-DYNA executable, and place the '#' lines mentioned above in this file. That way, all users who execute LS-DYNA will automatically access the network license if nothing else.

For this to work, however, you must ensure that

(a) there is no LSTC_FILE in /usr/local/lstc;
(b) the LSTC_FILE environment variable is not set;
(c) the environment variables LSTC_LICENSE and LSTC_LICENSE_SERVER are not set.

WARNING: There are cases when LS-DYNA cannot find the fully-qualified path name of the running executable. This normally occurs because of shell aliases, or because of path components which are hidden from the current user. If this happens, then you may need to set the environment variable LSTC_FILE to point the fully-qualified path name of the LSTC_FILE. Fortunately, this rarely occurs.

C. License Utilities for LS-DYNA Users

The network license utilities are not currently bundled with LS-DYNA. We suggest, however, that you obtain these utilities if you are going to be using the network license for LS-DYNA. The license utilities are:

```
lstc_qrun  - query running licenses and license allocation
lstc_vrun  - query available vendor-supplied licenses
lstc_qkill - kill a running job
```

Each of these allows a command line argument specifying the server. For example,

```
lstc_qrun -s server_host_name_or_ip
```

If you have LSTC_LICENSE_SERVER set, then these utilities do not require a command line argument specifying the name of the license server to contact. If you do not have this variable set, then the utilities will search for an LSTC_FILE in the same way and order that LS-DYNA searches:

(1) $LSTC_FILE
(2) /usr/local/lstc/LSTC_FILE
(3) with the running utility executable

Unfortunately, step (3) may not be the same for LS-DYNA as it is for the utility unless the utility is placed in the same directory right alongside LS-DYNA.

1. The "-help" Syntax Option

All of the utilities understand the "-help" command line option as a request to print full syntax information.

2. The "-v" Utility Option

All of the utilities understand the "-v" command line option. The "-v" option causes the utility to print its version number. For example:

```
./lstc_qrun -v
      LSTC Queue Run Version 60858
./lstc_vrun -v
      LSTC Vendor Query Version 60858
./lstc_qkill -v
      LSTC Queue Kill Version 60858
```

3. The "-i" Utility Option

All of the utilities understand the "-i" command line option. This "information" option will cause the utility to print information about the servers it knows about, based on the LSTC_LICENSE_SERVER environment variable and based on the contents of any LSTC_FILE that it can find.

```
./lstc_qrun -i (or ./lstc_vrun -i or ./lstc_qkill -i)
```

If license server information is found by reading $LSTC_LICENSE_SERVER, then you will see a message such as this:

```
CHECKING $LSTC_LICENSE_SERVER HOST INFORMATION
  found 1 server definition
SERVER LIST
  Server 1: (sun240a ham lclass2)
```

If LSTC_LICENSE_SERVER is not set, then the utility may find information in $LSTC_FILE:

```
USING #LICENSE_SERVER DIRECTIVE IN $LSTC_FILE
  /home/user/LSTC_FILE
SERVER LIST
  Server 1: sun240a
```

If neither LSTC_LICENSE_SERVER nor LSTC_FILE are set, then the utility may still find information in a file named LSTC_FILE which is located in the same directory with the running utility executable:

```
USING #LICENSE_SERVER DIRECTIVE IN LSTC_FILE LOCATED WITH EXECUTABLE
  /home/user/LSTC_FILE
SERVER LIST
  Server 1: sun240a
```

If the utilities cannot find a server definition from among these sources, then you will see a message printed indicating that it could not find a server definition.

4. The "-s" Utility Option

You can specify which server for a utility to query by using the "-s" option. For example, you can query the LSTC License Manager server running on "localhost" for current license use by executing

```
./lstc_qrun -s localhost
```

If the server is running on a non-standard port (i.e., not 31010), say 38720, then you would execute

```
./lstc_qrun -s 38720@localhost
```

There is an alternative way to reference a known server. For example, suppose that the "-i" option reports

```
Server 1: alpha7
Server 2: (sun240a ham lclass2)
```

Then you can specify any of the defined servers by executing one of these commands:

```
./lstc_qrun -s 1
./lstc_qrun -s 2
./lstc_qrun -s 2.1
./lstc_qrun -s 2.2
./lstc_qrun -s 2.3
```

If you specify server 2, then it will try to contact all subservers of the redundant server 2 asynchronously, and will read information from the first one which responds. Or, you can be specific about which server of the triad that you want to contact by specifying server 2.1, 2.2, or 2.3. This is useful in cases where one of the servers of the triad may be down, and you want to find out which one.

5. The lstc_qrun Query Utility

The lstc_qrun utility is used to determine the available pool of licenses, and to view specific information about licenses in use.

(a) The -r and -R options

You can display the license pool using the -r option. Use the -R option to list licenses in use beneath the individual categories of licenses. For example,

```
./lstc_qrun -s sun240a -r
```

might produce the following output:

```
LICENSE INFORMATION

PROGRAM          EXPIRATION CPUS  USED   FREE    MAX | QUEUE
---------------- ---------- ---- ----- ------ ------ | -----
LS-OPT           12/31/2030          0     19     50 |     0
LS-PREPOST       12/31/2030          0     19     50 |     0
LS-DYNA_971      12/31/2030         11     19     50 |     0
MPPDYNA_971      12/31/2030          7     19     50 |     0
                   LICENSE GROUP    31     19     50 |     0
```

The -R option will show detailed information about licenses in use.

(b) No options

If no option is specified (other than an optional "-s" option), then lstc_qrun displays a table of licenses in use containing the user name, host name, program name, start date, and number of processors. For example,

```
                    Running Programs

    User             Host          Program              Started       # procs
--------------------------------------------------------------------------------
   zhang     3616@2008srv1.pc.lstc MPPDYNA_971      Fri Jun  4 16:09     4
 dailyqa    17530@colfax8.lstc.com LS-DYNA_971      Wed Jun 23 10:02     3
 dailyqa    17861@bullns0.lstc.com MPPDYNA_971      Wed Jun 23 10:44     3
 fdelpin    32421@hpdual1.lstc.com LS-DYNA_971      Wed Jun 23 11:05     1
   jason  8311661@origin2.lstc.com LS-DYNA_971      Wed Jun 23 11:18     1
     whu    30927@turnip.lstc.com  LS-DYNA_971      Wed Jun 23 11:19     6
  willem     2526@dellwr2.lstc.com LS-DYNA_971      Wed Jun 23 11:22     1
```

6. The lstc_qkill Job Kill Utility

If you want to kill a job, then you must first run the lstc_qrun utility with no arguments, or with the "-R" command line argument. Once you have the job id, then you can kill the job with this utility. For example,

```
./lstc_qrun -s sun240a 3618@2008srv1.pc.lstc
```

The job host name may have been truncated, but you must use the exact job name which is reported, truncated or not.

The output from the lstc_qrun command will tell you whether or not the kill was successful:

```
SUCCESS
    Program Queued for termination
JOB NOT FOUND
    License server cannot find '3618@2008srv1.pc.lstc
REFUSED
    You are not authorized to terminate this job
```

The most likely cause of the "JOB NOT FOUND" case is that you have mistyped the job name. But it is also possible that the job terminated during the time between when you listed the jobs, and the time when the server received the kill request from lstc_qkill.

The cause of the "REFUSED" case is that you are trying to kill another user's job, or your own job on a machine different from where you issued the kill command. Your user (and the root user) can kill your job on a given machine. Your user (and the root user) can also kill your job if you issue the kill command from the machine running the license server.

7. The lstc_vrun Query Utility

The lstc_vrun utility will display a list of the available vendor licenses. We do not track the individual use of vendor licenses, and LSTC does not issue such licenses. These licenses are issued by outside vendors. Vendor License files must be placed in the a VENDOR subdirectory of the license server installation directory. All Vendor License Files contain

```
VENDOR: Name of Vendor
CUSTOMER: Name of Licensee
```

Each Vendor-Licensed Product contains further information

```
PRODUCT: vendor_product_name
DESCRIPTION: Text Description of Product Name
BEGIN: Activation Date
END: Expiration Date
KEY: License Key
```

You can display a table of Vendor Licenses installed on a particular server using the lstc_vrun command with no arguments (other than an optional "-s" option). For example

```
./lstc_vrun -s sun240a
```

might produce the following output

```
VENDOR LICENSES

Denton 'LSTC' (VENDOR/denton/model)
    dummy_model         12/04/2010  Dummy Models
    another_model 12/04/2010  Test Model
Denton 'LSTC' (VENDOR/denton/dummy_model)
    dummy_model         12/04/2020  New Models
```

The Vendor in all cases above is 'Denton'. The customer is 'LSTC'. The products are 'dummy_model' and 'another_model' with expiration dates shown above. The

information came from two different license files located in the 'VENDOR/denton' subdirectory of server installation directory. These two files are 'model' and 'dummy_model'. The 'dummy_model' feature appears in two different files. One license has expired and the other has not.

To obtain further information about a particular Vendor AND Feature, you can specify both on the command line

```
./lstc_vrun -s sun240a Denton dummy_model
```

The vendor names of products are case insensitive in the search, as well as at runtime. In this case, the search returns

```
VENDOR:Denton PRODUCT:dummy_model

FILE=VENDOR/denton/dummy_model
COMPANY=LSTC
DESCRIPTION=Dummy Models
EXPIRES=12/04/2020
```

Any search will return the 'best match,' which is the one that will be accessed by LS-DYNA. If the license key for this feature is invalid, then you will see a message such as this:

```
VENDODR:Denton PRODUCT:dummy_model

FILE=VENDOR/denton/dummy_model
ERROR=Invalid or corrupted key
```

If a Vendor License was installed on a license server machine for which it is not licensed, then this is a typical message:

```
VENDOR:Denton PRODUCT:dummy_model

FILE=VENDOR/denton/dummy_model
ERROR=Product not licensed for this machine
```

These are the common types of errors which may be returned by a Vendor License query using lstc_vrun:

```
ERROR=Product license not valid until 12/04/2010
ERROR=Product license expired on 12/04/2008
ERROR=Product not licensed for this machine
ERROR=Invalid or corrupted key
ERROR=Product not found
```

If you need to obtained a Vendor License, then do not contact LSTC. LSTC does not issue vendor licenses.

D. External "lstc_client" License Client

1. Why Use "lstc_client"

Every UNIX/Linux version of LS-DYNA which is capable of accessing a network license server has the ability to use an external "lstc_client" program for its licensing. And all versions of LS-DYNA which can access the "lstc_client" are compatible with the latest version of the client. Updating this client is an effective way to update the licensing code for LS-DYNA without obtaining a new LS-DYNA executable. By using the latest lstc_client, you can take advantage of redundant server configuration, and the latest protocol revisions which use TCP instead of UDP. This is particularly important for LS-DYNA versions running on internal compute nodes of clusters, where UDP replies from the server are not easily routed, but TCP replies are.

The "lstc_client" program provides a fix for a problem with previous versions of LS-DYNA which could result in license timeout failures during extended solver loops where LS-DYNA cannot be interrupted. Such timeouts are nearly impossible for explicit simulations, but they can occur during implicit simulations. Using the "lstc_client" also solves problems where licenses are not immediately released if LS-DYNA unexpectedly terminates.

2. Obtaining "lstc_client"

The "lstc_client" program is a platform-specific executable which is bundled with the LSTC License Manager Software. You must obtain this executable from the appropriate LSTC License Manager Software archive. If you want to use this executable, then you must place in the LS-DYNA user's path.

Execute "lstc_client" with no arguments in order to determine the current version of this client

```
./lstc_client
```

You should see a message such as

```
lstc_client revision 60926 with protocol 1.1
```

3. Configuring LS-DYNA to Use "lstc_client"

In order to use the "lstc_client", one must set an environment variable in order to instruct LS-DYNA to disable the internal client:

```
setenv LSTC_INTERNAL_CLIENT off
```

For ksh and sh, use

```
LSTC_INTERNAL_CLIENT=off
export LSTC_INTERNAL_CLIENT
```

When LS-DYNA runs, then it will attempt to execute and access the "lstc_client" program.

!!!WARNING!!! The "lstc_client" must be in the path of the user executing LS-DYNA because LS-DYNA executes "lstc_client" with no path prefix. If LS-DYNA fails to properly execute "lstc_client", then the error message may or may not be accurate. Recent versions do print a meaningful message. So it is particularly important that the PATH environment variable be properly set.

If you are using LS-DYNA Version 971 R5 or later, and you want to use the LSTC_FILE file to set this option instead of using an environment variable, then you may add the following directive to LSTC_FILE

```
#LICENSE_CLIENT: external
```

The options for this directive are: internal, external, and forked. Consult section (B) above for more information about using the LSTC_FILE.

NOTE: Versions of LS-DYNA before 971 R5 require the use of the environment variable LSTC_INTERNAL_CLIENT.

VIII. Configuring LS-DYNA for Microsoft Windows to Use a Network License

A. Specify License Server in the LS-DYNA Program Manager

You cannot directly set environment variables for LS-DYNA running under Microsoft Windows because the DYNA Manager program resets these variables internally each time that it runs LS-DYNA, according to the user preferences. So it is critical that you use the DYNA Manager to set all relevant licensing parameters.

After you run the DYNA Manager, then select "Help" option off of the "Network License" menu. This will explain how configuration procedures for LS-DYNA under Microsoft Windows.

B. License Utilities for LS-DYNA Users

The DYNA manager comes with its own utilities for listing licenses, for killing licenses, and for configuring the LSTC License Manager service for Microsoft Windows. These utilities automatically use the server(s) determined by the DYNA Manager configuration.

Alternatively, you can use the LSTCLMUI.EXE program included with the LSTC License Manager software. This utility has a few additional options, and it provides an easy way to change the server to which you connect. So it offers an alternative way to query servers other than the one being used by LS-DYNA on the local machine, without changing the settings used by LS-DYNA.

1. LSTCLMUI Server Menu Configuration

When you first open the LSTCLMUI program, it will try to connect to localhost by default. You can manually enter a server name in the LSTCLMUI program. However, if you want LSTCLMUI to display additional servers in the server selection menu, then you can create a file in the LSTC License Manager installation directory by the name of LSTC_FILE. Place the following line in this file

```
#LICENSE_SERVER: server_host1 server_host2 server_host3 ...
```

Any of these servers "sever_hostN" can be a redundant server configuration. For example, 'server_host2' can be (host1 host2 host3), indicating a redundant triad of three servers. All of the servers you list in this file will appear in the server selection menu of LSTCLMUI. For example, if you specify

```
#LICENSE_SERVER: host1 (host2 host3 host3)
```

then 2 servers and localhost will appear in the server selection menu for LSTCLMUI. The first server will be 'host1', and the second will be a redundant triad (host2 host3 host3).

2. LSTCLMUI Server Information Query

Select a server or manually enter a server name in the "LSTC Licenses" tab of LSTCLMUI. If you manually enter a name, then press the "Server Info" button. If the server is running, then you should see a server information summary;

```
LSTC SERVER INFORMATION
          TYPE: Non-Redundant
      HOSTNAME: server_host_name
          PORT: 31010
       VERSION: 60858
      PROTOCOL: 1.22
    RUNNING AS: system
SERVER FILES
     DIRECTORY: C:\LSTCLM
  LICENSE FILE: C:\LSTCLM\server_data
   LICENSED TO: Customer Name Here
     DUMP FILE: server_status
      LOG FILE: C:\LSTCLM\lstclm.log
    DEBUG FILE: (none)
```

3. LSTCLMUI License Resource Query

Select a server or manually enter a server name in the "LSTC Licenses" tab of LSTCLMUI. Press the "License Summary" button. If the server is running then you should see a server license resource summary:

```
PROGRAM          EXPIRATION CPUS  USED   FREE    MAX   | QUEUE
---------------- ----------       ----- ------ ------  | -----
LS-DYNA_971      12/25/2010          0      8      8   |     0
MPPDYNA_971      12/25/2010          0      8      8   |     0
                   LICENSE GROUP     0      8      8   |     0

PROGRAM          EXPIRATION CPUS  USED   FREE    MAX   | QUEUE
---------------- ----------       ----- ------ ------  | -----
LS-OPT           12/25/2010          0      8      8   |     0
                   LICENSE GROUP     0      8      8   |     0
```

4. LSTCLMUI License Use Query

Select a server or manually enter a server name in the "LSTC Licenses" tab of LSTCLMUI. Press the "Licenses In Use" button. If the server is running then you should see a server license use table:

```
RUNNING
    2152@laptop          user_name  LS-DYNA_971     Thu Jun 24 20:59
WAITING
   No entries.
```

5. LSTCLMUI Program Kill Option

You must first Display the licenses in use (item (iv) above). Select any license entry and hit the "Delete Item" button. If you have permission to kill the license, then the kill will succeed. Otherwise, a Popup will appear with further information about why the operation is not permitted.

6. LSTCLMUI Vendor License Query

Select a server or manually enter a server name in the "Vendor Licenses" tab of LSTCLMUI. Press the "Vendor License Summary" button to see a summary of the installed Vendor Licenses:

```
Denton 'Customer Name' (VENDOR/denton)
   Dummy_Model_Feature_1.0              10/27/2010  Test Feature Only
   Dummy_Model_Feature_2.0              10/27/2010  Second Test Feature Only
```

In the sample output above, the licensed products are from one Vendor 'Denton'. The customer name is 'Customer Name'. The license file is 'denton' in the VENDOR subdirectory of the LSTC License Manager installation directory. If you click on the first entry, then you will see more verbose information about the current status of this license.

```
VENDOR:Denton PRODUCT:Dummy_Model_Feature_1.0

FILE=VENDOR/denton
COMPANY=Customer Name
DESCRIPTION=Test Feature Only
EXPIRES=10/27/2010

<-- BACK
```

Click on the line "<-- BACK" to return to the summary table. The detailed summary information is particularly helpful in cases where there is a problem with the currently installed product Any one of the following errors may appear in the detailed Vendor Product information:

```
ERROR=Invalid or corrupted key
ERROR=Product not licensed for this machine
ERROR=Product license not valid until 12/04/2010
ERROR=Product license expired on 12/04/2008
ERROR=Product not licensed for this machine
ERROR=Invalid or corrupted key
ERROR=Product not found
```

7. LSTCLMUI License Service Controls

If the LSTC License Manager service is currently installed on the local machine, then should see information about the current status of that service when you select the "LSTCLM Service for Windows" tab of LSTCLMUI.

```
SERVICE STATUS
    RUNNING
INSTALLED IN
    C:\LSTCLM
SERVICE EXECUTABLE
    LSTCLM.EXE
```

(a) Install

If you select this option, then LSTCLMUI will attempt to create a Microsoft Windows service which points to LSTCLM.EXE in the same directory with the currently running LSTCLMUI.EXE. This will fail if you do not run LSTCLMUI with Administrator privileges, or if the "LSTC License Manager" service already exists. The service will fail to start if the LSTCLM.EXE cannot be found in the same directory with LSTCLMUI.EXE.

(b) Uninstall

If you select this option, then LSTCLMUI will attempt to remove any Microsoft Windows service named "LSTC License Manager". This will fail if you do run LSLTCLMUI with Administrator privileges, or if the "LSTC License Manager" service does not exist.

(c) Stop

If you select this option, then LSTCLMUI will attempt to stop any Microsoft Windows service named "LSTC License Manager". This will fail if the LSTCLMUI program does not have sufficient permission to stop a service, or if the "LSTC License Manager" service does not exist.

(d) Start

If you select this option, then LSTCLMUI will attempt to start any Microsoft Windows service named "LSTC License Manager". This will fail if

(a) The LSTCLMUI program does not have sufficient permission to start a service, or
(b) The "LSTC License Manager" service does not exist, or
(c) The LSTCLM.EXE program referenced by the service cannot be found (check the status window for the current SERVICE EXECUTABLE).

8. LSTCLMUI License Request

This option is described in section (IV) of this README file.

9. Open Windows SCM

If you select this option, then LSTCLMUI will attempt to start the Windows Service Control Manager applet for viewing all services. This is done by executing "services.msc". This is useful for viewing the current configuration of the "LSTC License Manager" service and stopping/starting the service. You can also specify a user that should be used for running this service. And you can specify one-time command line parameters for start-up.

10. Open Windows Event Log

If you select this option, then LSTCLMUI will attempt to start the Microsoft Windows Event Viewer applet. This is done by executing "eventvwr.msc". All messages logged by the "LSTC License Manager" service will appear in the "Applications" section of the Microsoft Windows Event Viewer interface. This is the best way to locate and view error messages logged by the LSTC License Manager.

IX. Redundant Server Configuration

A. Overview of Redundant LSTC License Servers

LS-DYNA may terminate prematurely if a license server is down. A redundant server configuration can keep this from happening.

A redundant server configuration requires the use of three different LSTC License Servers running in tandem. These servers must run on different machines. If one of the three servers is down, then LS-DYNA licenses will still be served, and currently running LS-DYNA programs are permitted to run to completion.

All of the redundant servers must be able to communicate with all the other servers using TCP and UDP packets, and that communication should be reasonably efficient. Unusually large latencies in network communication between servers may result in licensing delays or even denied license requests due to connection resets. Problems should not arise if all three servers are on the same local network, which is the intended configuration.

B. Obtaining a Redundant Server "server_data" License File

You will need to follow the FIRST INSTALLATION procedures for creating an LSTC_SERVER_INFO file on each of the three machines where you want to run a redundant server. You must send these three LSTC_SERVER_INFO files to LSTC when requesting a license for a redundant server triad. You will receive a single "server_data" license file which must be placed on each of the three designated machines. It will be necessary to add HOST[123] lines to your "server_data" license file. For example, if "server_data" contains

```
SERVER1: B8283222
SERVER2: C8DE87DF
SERVER3: 9FAE9877
```

then you must modified this file to include the host name information for each of the three servers

```
SERVER1: B8283222
HOST1: server1_host_or_ip
SERVER2: C8DE87DF
HOST2: server2_host_or_ip
SERVER3: 9FAE9877
HOST3: server3_host_or_ip
```

This is how the three servers know how to communicate with each other.

C. Configuring LS-DYNA to use a Redundant Server Triad

Versions of LS-DYNA before LS971 R4.2.1 cannot communicate with a redundant server in a way that takes advantage of the redundant capabilities. This is done by setting the LSTC_LICENSE_SERVER environment variable to

```
'(server1_host_or_ip server2_host_or_ip server3_host_or_ip)'
```

Or, in the case of LS-DYNA for Microsoft Windows, this string should be set (without single quotes) within the DYNA Manager.

Any version of LS-DYNA currently available for download can communicate directly with one of the redundant servers by setting the LSTC_LICENSE_SERVER environment variable to one of the host names

```
setenv LSTC_LICENSE_SERVER server2_host_or_ip
```

Or, in the case of LS-DYNA for Microsoft Windows, this string should be set within the DYNA Manager. However, if the server specified goes down, then the LS-DYNA license may terminate prematurely.

D. Retrofitting Older Versions of LS-DYNA to use Redundant Servers

Linux/UNIX versions of LS-DYNA dating back many years have the ability to use a separate LSTC License Client program "lstc_client" to handle license requests on behalf of LS-DYNA. And all of these versions of LS-DYNA can work with the latest "lstc_client" programs. The latest "lstc_client" programs can, in turn, deal with redundant servers. There is one exception to this rule: MPP LS-DYNA versions which use Infiniband drivers cannot safely spawn a separate process.

In order to enable older Linux/UNIX to use the "lstc_client" program, you must place the correct platform-specific "lstc_client" program in the user's path, and you must set an environment variable

```
      setenv LSTC_INTERNAL_CLIENT off
```

If the "lstc_client" program cannot be found in the user's path, then LS-DYNA will fail to run.

X. Upgrading Redundant Server Executables

You can safely stop any one of the servers in a redundant server triad. So you can upgrade the executables by following the upgrade instructions for a single server. We recommend that you upgrade server 3, then server 2, and finally server 1. This will keep renegotiations to a minimum.

XI. Upgrading "server_data" License File for a Redundant Server Triad

---

The only reliably safe way to upgrade the "server_data" license file for a redundant server triad is to stop all three servers, and then restart once the "server_data" file has been replaced. We recommend that you restart server1 first, server2 next, and server3 last. Consult the sections for UPGRADING "server_data" for individual servers.

XII. LSTC License Server Proxy for Clusters

A. When is a Proxy Needed?

Depending on how a cluster is configured, it may not be possible for compute nodes to communicate directly with an LSTC License Manager. If you wish to run LS-DYNA jobs directly on individual compute nodes, then licensing may fail, unless the "lstc_proxy" program is installed on the head node of the cluster.

B. Installing the Proxy Server

The "lstc_proxy" server executable is included in every LSTC License Manager software archive. So, create a directory on the head node of the cluster where you want to store the LSTC License Manager Proxy and its configuration/license files. Obtain the LSTC License Manager software archive which is suited to your platform, and unpack the archive into the chosen installation directory.

C. Obtaining a "server_data" License File for the Proxy

Execute the proxy server with the 'info' option

```
./lstc_proxy info
```

This will create an LSTC_SERVER_INFO file. Modified the file so that the allow range includes the IP addresses of all cluster nodes. Fill in the Company Information, telphone number, email address, and fax number (optional). Send your request to keys@lstc.com in order to obtain "server_data" from LSTC. Your request should have a subject line such as "PROXY SERVER REQUEST FOR <Your Company Name>".

Once you have received the "server_data" license file for the proxy, place the file in the proxy server installation directory. Add the host name or ip address of the license server into this file directly beneath the line which starts with "PROXY:". The line should be

```
HOST1: license_server_host_or_ip
```

If your server is a redundant server triad, then you will need to add three lines instead:

```
HOST1: server1_host_or_ip
HOST2: server2_host_or_ip
HOST3: server3_host_or_ip
```

D. Starting the Proxy Server

Change to the LSTC License Manager Proxy installation directory and start the server with

```
./lstc_proxy -l log_file_name
```

Check for any start-up errors

```
cat log_file
```

Test this installation

```
./lstc_qrun -s localhost
```

This information request should be forwarded to the license server specified by the HOST[123] entries in the "server_data" proxy license file.

E. Configuring LS-DYNA to use the Proxy Server

Whether the LSTC License Manager Proxy server points to a single server or to a redundant server triad, LS-DYNA must be configured to point to the proxy server for its license, as though the proxy server were the actual license server.

Consult the sections for how to CONFIGURE LS-DYNA TO USE A NETWORK LICENSE.
Use the same methods outlined there for verifying the installation.

F. Upgrading a Proxy Server

You can safely stop the proxy server for few minutes in order to upgrade the proxy server executables. Make sure to kill the proxy server using

```
kill -TERM PID
```

where PID is the process ID of the running "lstc_proxy" executable. Any other signal may result in a loss of information about the running jobs. After this, replace the LSTC License Manager software in the proxy installation directory. Then, restart

```
./lstc_proxy -l log_file_name
```

Check for start-up errors:

```
cat log_file_name
```

G. Upgrading the Proxy "server_data" License File

Proxy server license files do not expire, and do not directly reference LSTC products. You should not need to replace the "server_data".