# Table of contents

List of figures ................................................................. 4
List of tables ................................................................. 5

## Chapter 1 - Simulation software system requirements
General requirements ..................................................... 7

## Chapter 2 - Simulation software installation
Disk organization .......................................................... 9
Installing PC software from disk .................................... 10
Directory structure ......................................................... 12
Installing Linux software from disk .............................. 13
Directory structure ......................................................... 23

## Chapter 3 - Licensing
Installing Schlumberger licensing ................................ 25

## Chapter 4 - Running the software
Running ECLIPSE in batch mode on a PC ....................... 27
Parallel ECLIPSE on Linux ............................................. 28

## Chapter 5 - Microsoft HPC installation
Installation ......................................................................... 33
Checking the InfiniBand driver firmware ......................... 34
Configuring cluster information on the head node ............. 35
Configuring nodes .......................................................... 37
Configuring the HPC web services interface on the head node 38
Using the license aware activation filter ......................... 39
Configuring client PCs .................................................... 50

## Appendix A - Legacy macros and scripts
About the macros and scripts ......................................... 51
Macros: command line flags ......................................... 54
Examples ........................................................................... 55

## Appendix B - Index

---

ECLIPSE Suite Installation Guide
List of figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>ssh setup</td>
<td>17</td>
</tr>
<tr>
<td>Figure 5.1</td>
<td>The filter configuration window</td>
<td>40</td>
</tr>
<tr>
<td>Figure 5.2</td>
<td>Filter configuration</td>
<td>41</td>
</tr>
<tr>
<td>Figure 5.3</td>
<td>License configuration panel</td>
<td>41</td>
</tr>
<tr>
<td>Figure 5.4</td>
<td>Filter settings</td>
<td>42</td>
</tr>
<tr>
<td>Figure 5.5</td>
<td>License reservation configuration</td>
<td>43</td>
</tr>
<tr>
<td>Figure 5.6</td>
<td>FLEXlm license checking by feature</td>
<td>45</td>
</tr>
<tr>
<td>Figure 5.7</td>
<td>FLEXlm license checking by user</td>
<td>46</td>
</tr>
<tr>
<td>Figure 5.8</td>
<td>License reservations checking</td>
<td>47</td>
</tr>
<tr>
<td>Figure 5.9</td>
<td>HPC filter log screen</td>
<td>48</td>
</tr>
<tr>
<td>Figure 5.10</td>
<td>License aware scheduler default options</td>
<td>49</td>
</tr>
</tbody>
</table>
## List of tables

<table>
<thead>
<tr>
<th>Table</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table 1.1</td>
<td>Supported operating systems and compilers</td>
<td>7</td>
</tr>
<tr>
<td>Table 1.2</td>
<td>Third party tools and applications</td>
<td>8</td>
</tr>
<tr>
<td>Table 2.1</td>
<td>Platform MPI interconnect search options</td>
<td>20</td>
</tr>
<tr>
<td>Table 2.2</td>
<td>Intel MPI interconnect settings</td>
<td>21</td>
</tr>
</tbody>
</table>
Chapter 1

Simulation software system requirements

General requirements

For information on the platform and product availability for this release, see the release overview in the "ECLIPSE Suite Release Notes".

Software products and supported platforms

These requirements are specific for the 2013.1 release of ECLIPSE suite. The suite is released on disk for the platforms and operating systems listed in Table 1.1 and with the third party products listed in Table 1.2.

Table 1.1  Supported operating systems and compilers

<table>
<thead>
<tr>
<th>Machine</th>
<th>Operating System</th>
<th>Required Software</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>PC</td>
<td>Window 7 Professional 64 SP1</td>
<td></td>
<td>Minimum screen resolution for PC systems is 1024x768.</td>
</tr>
<tr>
<td>Windows HPC</td>
<td>Windows Server 2008 R2 HPC x64 SP1</td>
<td>HPC SP3 Pack</td>
<td>Simulators only.</td>
</tr>
<tr>
<td></td>
<td>Windows Server 2012 HPC x64</td>
<td>HPC Pack</td>
<td>See &quot;Microsoft HPC installation&quot; on page 33 for full details. Simulators only.</td>
</tr>
<tr>
<td>Linux x86_64</td>
<td>Red Hat 5 update 5, or Red Hat 6 update 3</td>
<td></td>
<td>This is the 64-bit version for the AMD Opteron and Intel EM64T chips. Simulators only.</td>
</tr>
<tr>
<td>Linux PPC 64</td>
<td>Red Hat 5, update 5</td>
<td>POE</td>
<td>POE is required to run ECLIPSE 100 and ECLIPSE 300 in parallel. Note, POE is not supplied and must be purchased from IBM. Only ECLIPSE 100 and ECLIPSE 300 are available on this platform.</td>
</tr>
</tbody>
</table>
General requirements

Note
Third party security and anti-virus software such as Norton and McAfee can cause problems.

Notes

- The 2013.1 ECLIPSE suite is not supported on 32-bit operating systems.
- For more details on requirements for parallel ECLIPSE 100 and ECLIPSE 300, see "Parallel ECLIPSE on Linux" on page 28.
- The simulators are supported on Windows Server 2008 R2 SP1 and Windows Server 2012. Pre- and post-processing software is not supported.

Table 1.2  Third party tools and applications

<table>
<thead>
<tr>
<th>Software</th>
<th>Version</th>
<th>Notes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSF</td>
<td>LSF version 7.0, update 6 HPC, LSF 8.0.2.</td>
<td>Needs to be purchased separately. We strongly recommend that you install the HPC version.</td>
<td>Platform Computing can add an LSF SIS integration kit to augment resource checking in the simulator macros by including license checking. For further details contact Platform Computing <a href="http://www.platform.com">www.platform.com</a></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FLEXlm</td>
<td>11.8</td>
<td>Supplied on disk, installed automatically when Tools are selected.</td>
<td>Used for License Manager configuration.</td>
</tr>
<tr>
<td>Carnac</td>
<td>1.2b145</td>
<td>Supplied on disk, installed automatically.</td>
<td>Used by FloGrid.</td>
</tr>
<tr>
<td>Intel MPI</td>
<td>4, update 3</td>
<td>Supplied on disk. On Linux, it is installed automatically so long as tools are selected. See &quot;Configuring Intel MPI and Platform MPI for Linux&quot; on page 16. On Windows, this must be installed separately.</td>
<td>Intel MPI is required for using parallel ECLIPSE, ECLIPSE 300 and R2SL on PC Windows systems. See &quot;Installing Intel MPI&quot; on page 11 and <a href="http://software.intel.com/en-us/intel-mpi-library/">http://software.intel.com/en-us/intel-mpi-library/</a></td>
</tr>
<tr>
<td>Platform MPI</td>
<td>8.2</td>
<td>Supplied on disk for Linux installations.</td>
<td>Latest documentation is for version 8.1.</td>
</tr>
<tr>
<td>Web/HTML browser</td>
<td>Internet Explorer 7 or greater, Firefox 3.5 or greater, or equivalent.</td>
<td>Used by on-line help.</td>
<td></td>
</tr>
</tbody>
</table>
Disk organization

The 2013.1 software is distributed on a disk which contains:

- The 2013.1 installation with all documentation, data and tutorials for Windows
- Intel MPI Runtime installation
- Documentation in PDF (Portable Document Format)
- Dongle drivers
- The simulators for all x86 64-bit architectures compiled for Linux
- Utility resources which contains:
  - Benchmarks
  - PC resources
  - Full documentation (manuals and on-line help), data and tutorials for Linux
  - LINUX resources (LSF Integration Kit etc.).

For installation on a PC, see "Installing PC software from disk" on page 10.
For installation on Linux systems, see "Installing Linux software from disk" on page 13.

Note

A version of ECLIPSE is available for machines using the IBM PPC 64 architecture. This version is distributed on an additional disk. If you require this version, please request it from your Account Manager.

To install ECLIPSE from this disk, follow the same procedures as described for standard installations. The IBM build of ECLIPSE requires IBM POE. This must be purchased from IBM and is not supplied with ECLIPSE.
Installing PC software from disk

Installation process

1. Insert the disk into the disk drive.
2. The Schlumberger installation panel should appear; if not, then using the File Browser to access the disk, run the script `D:\setup.exe`.
3. Click on Install Products.
4. Then click on ECLIPSE 2013.1.
   This will install the 2013.1 programs.
5. Once installation is complete, reboot the machine.

Notes

- You must install in a directory path that has no spaces in the path name, NOT for example in `C:\Program Files\ecl`.
- We assume `C:\ecl` as the root in the text that follows.
- Occasionally, for large disks, the installation program will calculate the space available incorrectly; as long as sufficient space is available, this should not cause any problems and the installation should go through correctly.
- If insufficient disk space is available to complete the installation a blank message box will appear. Also, the installation procedure assumes that the Windows directory is `C:\WINDOWS`.
- It is essential you disable your virus checker temporarily during the installation process.
- The disk contains directories `\3rdparty\pc\resource` and `/3rdparty/linux/resource`. The PC directory contains various third party applications.
- To view the on-line manuals you will need to install Acrobat Reader.

Hint
Selection of Include option for searching PDF files, is essential. See the Adobe Acrobat Reader On-Line Help for more information on the search function.
Please do not use Adobe Reader X. Instead, use versions up to 9.5, or version XI.

User manuals

For 2013.1 the user manuals in PDF format are installed by default.

From the Simulation Launcher, click on the ECLIPSE manual option in the left-hand panel and then select a product version from the drop-down menu. This displays the documentation bookshelf which is a PDF document.

You may access manuals from previous versions (2007.1, for example) from the Simulation Launcher, if they are installed.
Configuring PC software

Standalone installation on windows

Having installed the software from the disk, check the environment in
Start | Settings | Control Panel | System | Advanced | Environment Variables
The System path should include the ECL\HOME and ECL\MACROS directories, in that order.

Installing Intel MPI

You will need to install Intel MPI if you plan to run parallel ECLIPSE, ECLIPSE 300 or Avocet IAM.

**Note** If you are using Windows HPC, you do not normally have to install Intel MPI.

To install Intel MPI you need to:
1 Insert the installation disk into the disk drive. Then:
   - Select the ...\3rdparty\PC\resource\IntelMpi directory on the installation disk.
   - Double click on the file called w-mpi_rt-p-x.x.x.xxx.exe to start the installation.
   Alternatively:
   - Click on Install Products.
   - Select Intel MPI.
2 Follow the normal installation wizard procedures to install Intel MPI.
   Select Next or Continue to move between wizard screens and accept default values where prompted.

The PC simulation launcher

The installation process creates a program group containing the Simulation Launcher. A shortcut to this launcher is also placed on the desktop of the PC.
Directory structure

At the top level this looks like

ecl\home
  ecl\macros
  ecl\2013.1

The home directory contains:
  • the macro $eclrc.bat
  • additional resource files.

The macros directory:
  • macros for running the programs and utilities, for example eclrun
  • macros called by the program, and utility macros (see "Running the software" on page 27)
  • specific files used for configuration purposes; in particular eclrun.config and CONFIG.ECL

The tools directory contains a pc subdirectory which contains:
  • a number of subdirectories corresponding to various utilities such as convert and expand

The 2013.1 directory contains:
  • a bin directory containing executables.
  • a number of program directories corresponding to the various programs, such as eclipse, flogrid, etc.

A number of directories containing utilities and building blocks, for example:
  • manuals - contains the manuals bookshelf
  • rele_nt - contains the release notes
  • the resource directory that contains resources shared by several programs.

Each program directory (within the 2013.1 directory) contains some of the following:
  • a data directory containing sample datasets
  • one or more manual directories, such as eclipse\ecl_rm, flogrid\flog_ug, etc.
  • a tutorials directory containing data for one or more tutorials, for example flogrid\tutorials
  • a help directory containing on-line help.
Installing Linux software from disk

Preparing to install 2013.1 simulation software

2013.1 is an incremental release and can be installed independently of previous major or incremental releases. It can be installed over existing installations.

Installation notes

- Only use static mounts for any directories holding home directories, ECLIPSE data or ECLIPSE executables. Problems have been noted with auto-mounted file systems.
- When installing software, bear these requirements in mind:
  - It is imperative that the previous versions of reservoir simulation software are installed before installing the current version, that is, install versions in release order, starting with the earliest version. **Do not** install the current version followed by an older version.
  - If you are installing ECLIPSE and Intersect, always install a version of ECLIPSE before an equivalent version of Intersect, for example, install ECLIPSE 2013.1 and then Intersect 2013.1.
  - If for any reason you do install an earlier version of the software, be sure not to install the macros. To do this, deselect the macros in the installation options.
- It is assumed in this chapter that the software is installed on a default path `/ecl`.

Macros and tools directories

Users with existing ECLIPSE installations should always ensure that the macros directory is backed up before proceeding with the software installation.

1. Copy the macros directory to `macros.old`. This is because the macros directory contains vital information about the existing software installation (in `CONFIG.ECL`).
2. Move the tools directory to `tools.old`. The `tools.old` directory may later be removed when the new installation is working satisfactorily.

For all applications, the manuals are available in PDF (Portable Document Format) for browsing and printing.

ECLIPSE and Intel MPI

**Note**  Intel MPI is automatically installed when Tools are selected in the Installation. However further steps may be required for configuration. See the Intel MPI section. "Configuring Intel MPI and Platform MPI for Linux" on page 16.
Installation process

1. To install, insert the relevant disk into the disk drive.
2. Mount the installation disk as a file system.
   a. On Linux systems:
      In the default configuration of a Linux system the disk is automatically mounted as
      /mnt/cdrom or /media/cd.

Note Letting Linux auto-mount the disk may set default options that mean the install scripts
will not run. To correct this, we recommend that you unmount and the mount the
installation disk manually. To unmount the installation disk use the command:
   umount -k /dev/cdrom. To mount the installation disk use the command:
   mount /dev/cdrom /tmp/a. Please note that /tmp/a should be an existing directory.

Note The installation disk can be ejected using the eject command.

3. When the installation disk is successfully mounted run the install C-shell script which is
   supplied on the disk:
   /media/cdrom/ECLIPSE/UNIX/install/cdinst.csh

Schlumberger
The following versions were found for installation
0) [ ] Exit without installing
1) [ ] documentation_and_data 2013.1 week xxxx
2) [x] linux_x86_64 2013.1 week xxxx

4. Choose a version to install (default: Linux x86_64).
5. Check the correct version for your machine has been automatically detected.
6. Choose the option and press enter.
7. If you wish to install ECLIPSE for more than one type of machine, or would like to install
   the documentation and data, rerun the cdinst.csh script.

Available programs, data, tutorials and help for linux_x86_64 2013.1 week xxxx
1) ConvertGrid
2) E300
3) Eclipse
4) Expand
5) Extract
... ... ...
xx) Tools
Select A - Install all programs, data, tutorials and help
   N - Install none of these
   S - Select a subset
Enter A to install all applications.
Enter proposed location for installation (default /ecl) :
8 Select the install directory.

**Note** Always install ECLIPSE to the same location as any previous versions. There is an internal directory structure to prevent any old versions being overwritten.

**Note** ECLIPSE for different architectures should also be installed into the same location

The software then installs:

```
Installing ConvertGrid (size xxxxxxxx)
Installing E300 (size xxxxxxxxx)
Installing Eclipse (size xxxxxxxxxx)
Installing Expand (size xxxxxxxx)
Installing Extract (size xxxxxxxx)
... ... ...
Installing Tools (size xxxxxxxx)
Installing Resource
    (size xxxxxxxx)
    (size xxxxxx)
Resource installed (total size xxxxxxxxx)
```

Do you want to install the macros [default n]?y

9 Always answer yes to the “Install the Macros” question, unless installing an earlier version, in which case, do not install the macros.

The current macros directory, if any, will be backed up with a suffix consisting of the date and time of install, for example macros.backup.13:24:52.230209.

10 Finally migrate any custom settings from the old configuration files into the configuration files in the new macros directory. Settings may be stored in any of the following files:
   - CONFIG.ECL
   - eclrun.config
   - @eclrc

See the "ECLRUN User Guide" for details.

**Note** Do not just copy the old files into the new macros directory. From 2009.1 onwards, eclrun.config uses an XML format which differs from that required in previous releases, see the ECLRUN User Guide for full details.

11 After installation the users environment needs to be set up to reflect the ECLIPSE installation. A sample .cshrc file is shown below. Edit the paths if required and copy to each users’ home directory.
Example .cshrc file

```bash
#!/bin/tcsh
#Edit the line below to reflect the location of the license server.
#LM_LICENSE_FILE was used by Eclipse pre 2007.2
setenv SLBSLS_LICENSE_FILE 1234@licenseserver.com

#Edit the line below to set the install location.
setenv ECLPATH /ecl

#Set Endian so Linux files line up with other OS's
if ( `uname` == "Linux" ) then
    setenv F_UFMTENDIAN big
endif

#Source eclrunsetup if it exists, so eclrun works
if ( -r $ECLPATH/macros/@eclrunsetup.csh ) then
    source $ECLPATH/macros/@eclrunsetup.csh
endif

#Source LSF environment script
if ( -r /lsf/conf/cshrc.lsf ) then
    source /lsf/conf/cshrc.lsf
endif
```

Configuring Intel MPI and Platform MPI for Linux

Intel MPI and Platform MPI are installed with the ECLIPSE installation. No separate installation is required.

Both of these MPis use ssh to setup the communication between nodes, so it is necessary to make sure that password less ssh is setup between any computers that may be used to run a parallel ECLIPSE or ECLIPSE 300 job.

The objective of the steps below is to make sure that the public and private keys exist for the user and that the authorized_keys file exists and has the correct keys inside.

**Hint** Additionally it is usually a good idea to set the ssh configuration to automatically accept connections to new machines. If this step is not completed then you would have to login to every machine in the cluster before you could guarantee that a MPI job would work correctly.

What you need to do depends on the current setup.

**Warning** If other applications rely on ssh to work, please talk to your system administrator to check the following procedure will not cause any problems with other applications.
1 First check if everything is already working, by trying to connect to other machines in the cluster. For example, from comp001 ssh to comp002, no password should be required.

```
comp001:/home/user>ssh comp002
Last login: Thu Apr 9 10:37:03 2009 from comp001.geoquest
comp002:/home/user>
```

2 If this works then skip to the "ssh configuration" on page 17.

3 If not then what to do next depends on the current setup. The flowchart in Figure 2.1 describes how to set up ssh.

**Figure 2.1 ssh setup**

```
// Flowchart details
```

**ssh configuration**

1 First check that ssh is setup to accept connections to new machines, as shown above.

2 Then either create the file called config in the user's .ssh directory, or add the line if it already exists.

```
comp002:/home/user>cd .ssh
comp002:/home/user/.ssh>cat config
StrictHostKeyChecking=no
```

3 The permissions for the config file should be 400. Change them if necessary.
4 The permissions for the authorized_keys file should be 600. Change them if necessary.
5 The permissions of $HOME and $HOME/.ssh must not allow other users to write to those directories.

**Configuring LSF**

If you are using LSF, you need to edit the lsf startup file `/etc/init.d/lsf` to add an entry for `ulimit` so that both Intel MPI and Platform MPI can run when under LSF control. To do this, open the file and add the **bold** entry for `ulimit` as shown here:

```bash
#!/bin/sh
# $Id: startup.svr4,v 1.10 2008/04/08 06:13:09 xltang Exp $
#
# Start and stop LSF daemons, System V / OSF version
# Make sure we're running a shell that understands functions
#
# The following is for the Linux chkconfig utility
# chkconfig: 35 99 01
# description: Load Sharing Facility
#
# The following is for the Linux insserv utility
### BEGIN INIT INFO
# Provides: lsf
# Required-Start: $remote_fs
# Required-Stop: $remote_fs
# Default-Start: 3 5
# Default-Stop: 0 1 2 6
# Description: Start LSF daemons
### END INIT INFO

# line added so ECLIPSE can run over Infiniband when under LSF control.
ulimit -l 1024000000

if test "$SH5" != "/bin/sh5" -a -r /bin/sh5 then
    SH5=/bin/sh5
    export SH5
    exec /bin/sh5 "$0" "$@
fi

check_env () {
    if [ x$LSF_ENVDIR = x ]; then
        # Using default path of lsf.conf...
        LSF_CONF=/lsftop/lsf/conf/lsf.conf
    fi
}
```

**Note**  See the "ECLRUN User Guide" for more configuration settings for LSF.
**Note**  LSF by default saves temporary files in a hidden directory called .lsbatch which is inside the user’s home directory. This can cause problems if the home directories don’t have much free space, or quotas are enabled. This can be avoided by adding the following setting in lsf.conf:

```
LSB_STDOUT_DIRECT=Y
```

You must restart LSF for this change to take effect.

If you are using LSF HPC and the Intel MPI, you may need to edit the MPI location in the wrapper script, e.g. wrapping the Intel MPI in the intelmpi_wrapper script. The following example assumes that ECLIPSE has been installed to /ecl and lsf has been installed to /lsf. It also assumes that you are using Intel MPI. If you have installed elsewhere, please use the appropriate path.

1. In the LSF installation directory (/lsf in our example), edit the file

   `/lsf/8.0/linux2.6-glibc2.3-x86_64/bin/intelmpi_wrapper`

2. Search for the line `MPI_TOPDIR="........"`

3. Replace with the correct location of the Intel MPI. If the default settings have been used this line should look like this

   `MPI_TOPDIR="/ecl/tools/linux_x86_64/intel/mpi/4.0/"`

4. Find all occurrences of "${MPI_TOPDIR}/bin" and replace them with "${MPI_TOPDIR}/bin64"

5. If you wish to use SSH to start the MPI daemons:
   a. Search for the line

      `MPDBOOT_CMD="${MPI_TOPDIR}/bin64/mpdboot"`

   b. Change it to

      `MPDBOOT_CMD="${MPI_TOPDIR}/bin64/mpdboot -r /usr/bin/ssh"`

6. With Intel MPI 4.0.3, some changes were made to the way jobs were launched by the introduction of the HYDRA loader from OpenMPI. This impacts the way jobs are launched under LSF as it will automatically select `blaunch` rather than the older `ssh` as the method of communication between mpi daemons.

   We have seen this give issues and to turn it off and go back to the old method of using `ssh` you need to set the environment variable `I_MPI_HYDRA_BOOTSTRAP` to `ssh`. This can be done by either:

   **under csh/tcsh using setenv**

   `I_MPI_HYDRA_BOOTSTRAP=ssh` in your `.cshrc` file, or

   **under bash using export**

   `I_MPI_HYDRA_BOOTSTRAP=ssh` in the `.profile` file

**PBS settings**

License scheduling is available with ECLIPSE and PBSPro. To install and configure PBSPro, see the instructions on the installation disk in the folder 3rdparty/PBSPro.

To switch on PBSPro, use the same settings as those for LSF and Windows HPC.

- In eclrun.config find the setting:

  `<LSFLicenses>False</LSFLicenses>`
• Change the setting to:

  <LSFLicenses>True</LSFLicenses>

The LSFLicenses setting is used by PBSPro.

**Note** Only ECLRUN is supported. The old scripts starting with the character @ are not able to schedule licenses under PBS.

**Intel MPI settings**

There are some tuning parameters which you can add to the `mpiexec.conf` file which can improve performance. You can find this file in the directory

`Ecl/tools/linux_x86_64/intel/mpi/4.0.3/etc`

or in the local work directory. Add the following tuning parameters to the file:

- `genv I_MPI_PIN_PROCESSOR_LIST allcores:map=scatter`
- `genv I_MPI_PIN_CELL core`

**Platform MPI settings**

The Platform MPI should automatically determine and use the best interface. If you wish to set the interface then it is possible by setting an environment variable. The search order for the interconnect is determined by the environment variable `MPI_IC_ORDER` (which is a colon-separated list of interconnect names). The most common options are shown in Table 2.1.

### Table 2.1 Platform MPI interconnect search options

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>InfiniBand (IB)</td>
<td>InfiniBand can be SDR, DDR or QDR.</td>
<td>IBV</td>
</tr>
<tr>
<td>Infinipath</td>
<td>Infinipath made by QLogic</td>
<td>PSM</td>
</tr>
<tr>
<td>uDAPL (10g iWarp Ethernet and InfiniBand)</td>
<td>uDAPL interface is used by 10G iWarp network cards. Additionally it can also be used by most types of InfiniBand &amp; Infinipath.</td>
<td>UDAPL</td>
</tr>
<tr>
<td>Standard Ethernet</td>
<td>Standard 100Mbs, 1Gbs and 10Gbs network cards.</td>
<td>TCP</td>
</tr>
<tr>
<td>Myrinet</td>
<td>GM based Myrinet cards.</td>
<td>GM</td>
</tr>
</tbody>
</table>

**Example**

To set the MPI to use the DAPL device, add the following line to the user’s `.cshrc` file.

```bash
setenv MPI_IC_ORDER UDAPL
```

or

```bash
setenv MPI_IC_ORDER udapl:tcp
```

Using upper case for `UDAPL` sets the instruction to use that device or exit. Using lower case sets the instruction to try the device and, if it doesn’t work, try another. Shared memory is always implemented if possible. The standard ECLIPSE scripts will add a few extra lines into the top of the output files and these will display the interconnects used.
The following extract from the FILENAME.OUT file uses TCP to communicate between nodes.

```
host | 0    1
======|===========
 0 : SHM  TCP
 1 : TCP  SHM
```

Alternatively it can be overridden by using command line arguments to the eclrun script. The following will force the Platform MPI to use the IBV setting regardless of the environment variable setting.

```
eclrun -c plmpi --mpi-args="-IBV" eclipse DATASETNAME
```

**Intel MPI settings**

The Intel MPI detects and uses the correct interface. As for the Platform MPI, setting an environment variable will force an interconnect to be chosen. See Table 2.1.

<table>
<thead>
<tr>
<th>Device Type</th>
<th>Description</th>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>uDAPL</td>
<td>uDAPL interface is used by 10G iWarp, InfiniBand and Infinipath cards.</td>
<td>dapl</td>
</tr>
<tr>
<td>Standard Ethernet</td>
<td>Standard 100Mbs, 1Gbs and 10Gbs network cards.</td>
<td>tcp</td>
</tr>
<tr>
<td>Infinipath</td>
<td>Infinipath cards from QLogic.</td>
<td>tmi</td>
</tr>
</tbody>
</table>

Set the I_MPI_FABRICS_LIST environment variable as follows:

```
setenv I_MPI_FABRICS_LIST dapl,tcp
```

This sets Intel MPI to try the chosen devices in order.

I_MPI_FALLBACK and I_MPI_DEVICE are no longer required and should be removed if set.

To print out the connection or interface type used set the following environment variable:

```
setenv I_MPI_DEBUG 2
```


**Note** The latest Intel MPI HYDRA launch mechanism is a 32-bit application that starts the ECLIPSE processes. This means 32-bit libraries must be installed for this to work. On Redhat 6 the required rpm is called `glibc-2.12-1.47.el6.i686.rpm`. Depending on your installation choices, this may have some prerequisites that must also be installed.

**IBM POE (MPI on IBM POWER machines)**

Please refer to IBM for more information about POE.

**Installing InfiniBand drivers**

It is essential that you install the OFED drivers if you want to use InfiniBand. See [www.openfabrics.org](http://www.openfabrics.org) for more information.
Simulation Software installation ECLIPSE Suite e Installation Guide

Installing Linux software from disk

**Note** The drivers can also be installed from the Redhat installation disk. Depending on the type of hardware in your system, you may need to download and install a later driver from www.openfabrics.org.

**General InfiniBand notes**

To use InfiniBand (IB) cards, you must assign an IP address to the card. This allows you to "ping" the other computers via the IB interface. If the ping succeeds then you know all the hardware is physically connected properly.

In addition see the specific Voltaire and Silverstorm sections that follow.

**InfiniBand drivers**

Follow the install instructions from the InfiniBand supplier.

However, the following additional steps may be necessary. A good indication is when IP over IB is working properly, but ECLIPSE is not.

- For Red Hat 5 or later, edit the file `/etc/security/limits.conf` and add the following two lines:
  ```
  * soft memlock 100000000
  * hard memlock 100000000
  ```

  The value denotes the number of kilobytes that may be locked by a process. The file above contains further documentation.

**Note** The steps described above will allow any user in the system to lock as much as the whole memory set in the configuration files.

**Infinipath drivers**

To obtain drivers and instructions, visit this site: www.qlogic.com.

**User manuals and on-line help**

User manuals are provided in PDF format. On-line help is provided in HTML 3.2.

For 2013.1 the user manuals are installed by default as part of the installation on PC, and from the installation disk for Linux. (See "Disk organization" on page 9 for more information.) The on-line help is provided by default as part of the installation with the associated program, on each platform. Since the manuals form part of the on-line help in many instances, they are also provided in HTML format.

To print a manual or part of a manual, open the PDF in a PDF reader and print the pages that you require.
Directory structure

At the top level this looks like

```
ecl/macros
  ecl/tools
  ecl/2013.1
```

The `macros` directory contains:
- macros for running the programs and utilities, for example `@eclipse`, `@e300`... (see "Running the software" on page 27)
- macros called by the program, and utility macros, for example `@check_chip` which returns the chip type
- specific files used for configuration purposes; in particular `@eclrc` and `CONFIG.ECL`
- files used for monitoring license usage, for example `flex.log`.

The `tools` directory contains subdirectories for each machine type; each subdirectory contains:
- a number of subdirectories corresponding to various utilities such as `convert` and `expand`.

The 2013.1 directory contains:
- a `bin` directory containing subdirectories for each machine type; each subdirectory contains executables.
- a `lib` directory containing subdirectories for each machine type; each subdirectory contains shared objects.
- a number of directories corresponding to the various programs, such as `eclipse`, `e300`, etc., containing data, tutorials and documentation.
- a number of directories containing utilities and building blocks, for example
  - `manuals` contains the manuals bookshelf
  - `rele_nt` contains the release notes

The `resource` directory which contains resources shared by several programs.
Chapter 3

Licensing

Installing Schlumberger licensing

To run ECLIPSE Suite you need a valid license configured. You can either connect to an already existing license server, or you can configure the license on your local machine either as a Standalone solution or as a license server. This section describes how you install FLEXnet and configure your license.

1. First launch Schlumberger Licensing installer from the ECLIPSE installation disk.
2. Click on Install Products then Install SLB Licensing.
   
   The Schlumberger FLEXlm installer starts. This installs all necessary utilities to configure licensing with FLEXnet, including standard FLEXnet utilities and the Schlumberger licensing tool.

3. Click Next to proceed.
4. Click Change to choose another destination than the default.
   
   If you have multiple license files that you need to run using the Schlumberger Licensing tool you should be aware of that there is a limitation in the length of the combined path to the license files. You should use a shorter installation path for example C:\SLBLicensing

5. Click Next and then Install to proceed

For further information on the licensing utility please see the Installing Schlumberger Licensing user guide.
Running ECLIPSE in batch mode on a PC

The ECLIPSE simulators are batch programs, and for many users it is desirable to use a batch queuing system to submit jobs. The following describes how batch queues may be invoked using the macros.

There are no provisions within the ECLIPSE launcher or the macros to set ECLIPSE 100 or ECLIPSE 300 to run in batch mode on a PC.

You can a batch file on a PC. To do this, create a file called RUN.BAT containing commands like those in the example:

```
cd \data\dir1
eclrun -v 2011.1 eclipse DATASET1

cd \data\dir2
eclrun -v 2011.2 eclipse DATASET2

cd \data\dir3
eclrun -v 2012.1 e300    DATASET3

cd \data\dir4
eclrun -v 2013.1 e300    DATASET4
```

To start the runs, double-click on the file RUN.BAT in Windows Explorer.
Parallel ECLIPSE on Linux

Linux systems - macros and scripts

It is recommended that ECLRUN is used to run most of the simulators and other programs. Please refer to the "ECLRUN User Guide" for more details.

Installing and configuring parallel ECLIPSE

MPI versions of parallel ECLIPSE 100 and ECLIPSE 300 are supplied for Linux, and Windows.

Software requirements for Linux

You must use a supported version of Linux. For information, see "Software products and supported platforms" on page 7.

Intel MPI software is supplied with the ECLIPSE installation.

Installation procedure

See "Installing Linux software from disk" on page 13.

Notes on setting up the OS for parallel ECLIPSE

Increasing the size of MPI memory buffers

Occasionally ECLIPSE or ECLIPSE 300 can exceed the size of the default memory set in the MPI messaging, particularly with large problems. In order to increase this it is possible to use the PARAOPTS keyword in ECLIPSE, which should be set to:

```
PARAOPTS
2* 100 /
```

The NSTACK parameter should also be set to a reasonable number (DEFAULT: 10).

Fast restarts with parallel ECLIPSE 100

ECLIPSE 100 supports fast restarts for parallel runs with the following precautions:

1. The restart run must use the same number of processors and the same domain split as the base run.
2. The `eclrun` macro requires that the number of processors be specified explicitly on the command line using the `--np` flag, for example:

   `eclrun --np 2 RESTARTFILENAME`

ECLIPSE 300 does not support fast restarts in parallel.
Running parallel ECLIPSE with queueing systems

It is generally advised to run both ECLIPSE and parallel ECLIPSE using a commercial queueing system. Only where one user is using a machine is it possible to adequately use the machine in a profitable way. The main advantage of using parallel ECLIPSE, which is speed, is lost if a machine is overloaded, as all parallel tasks will slow down. This usually results in run times longer than for serial ECLIPSE. Queueing systems will allow greater throughput of jobs by using the available resources more efficiently.

Support for a commercial queueing system is available in the eclrun macros. The queueing systems is:

• LSF from Platform Computing - http://www.platform.com

The support in the macro provides for a limited number of the total available options for this platform, allowing queuing for jobs that specify only the number of processors for each job submitted. Additional support is provided in this queuing system for supporting memory requirements, later start dates, specifying groups of machines to execute on, etc. However, the macros provide a common route to queuing on these systems.

Running ECLIPSE software with LSF

ECLIPSE 100, ECLIPSE 300, parallel ECLIPSE, parallel ECLIPSE 300, ECLIPSE Office and FrontSim may all be run with LSF, using the standard simulator macros.

LSF SIS integration kit

Note Before installing the LSF integration kit, please read the documentation supplied with it.

This kit:

• requires on-site configuration of LSF - refer to the integration kit documentation.
• provides a dynamic method of license checking against the Resource requirement. FLEXlm is queried for licenses using an elim (External Load Information Manager), provided by Platform.
• The integration kit and instructions can be found on the installation disk under the 3rdparty\LSF\resources directory.

Note If you are updating a version of LSF already installed, do not edit the scripts other than where documented.

If the resources can be met, the job runs; otherwise, LSF monitors the resources until they are met.
Setup

The following environmental variables can be set to control LSF functionality within the macros:

ECL_LSFHPC

This switches on the LSF HPC extensions. If you have the HPC version of LSF we recommend that you set this variable. For information see "Configuring LSF" on page 18.

ECL_MR_SCHEDULING

set this variable to correctly queue multiple realization jobs. Follow the instructions in the LSF-SIS integration kit.

Ensure that you add the following to the user's .cshrc file:

```csh
if (-d /lsf/conf) then
    source /lsf/conf/cshrc.lsf
endif
```

This assumes that LSF has been installed in directory /lsf; otherwise, amend as appropriate. See "Example .cshrc file" on page 16.

**Note** If you are using ECLRUN, then, to turn on License Aware Scheduling, set LSFLICENSES to TRUE in the eclrun.config file. See the "ECLRUN User Guide" for more information.

Using LSF with the simulator macros

**Note** See the "ECLRUN User Guide" for details of how to set up this command.

The use of LSF is triggered by adding the flag `-lsf`. This is ignored if ECL_LSF is true.

**Examples**

- for serial jobs:
  
  ```
eclrun -s localhost -q QNAME eclipse SPE9
  eclrun -s localhost -q QNAME e300 CASE1
  eclrun -s localhost -q QNAME frontsim ECL_SAMPLE01
  ```

- for parallel jobs
  
  ```
eclrun -s localhost -q QNAME eclipse 50X50X6
  eclrun -s localhost -q QNAME e300 20X20X6
  ```

The macros create a temporary job file `ecl.tmp.<datestamp>` that is used by LSF's `bsub`. The appropriate "resources" are generated by LSF.

**How to choose the parallel executable**

On Linux, the parallel executables for Intel MPI may be used. Intel MPI is available from 2009.1. See the examples below:
eclrun -s localhost -q QNAME -c ilmpi eclipse 50X50X6
eclrun -s localhost -q QNAME -c ilmpi e300 20X20X6

Note  ilmpi means that Intel MPI executable will be used.
plmpi means that the Platform MPI executable will be used.
ibmmpi means that the IBM POE MPI will be used (POWER)

Checking a job's progress with bjoms

The command bjoms can be used to show the status of all the user's jobs.

• bjoms <jobID> shows the status of a specific job, for example: PEND, RUN, SUSPENDED, FAILED, DONE
• bjoms communicates with the LSF daemons, so if it is overused it can slow the system down.

It is better to use
    bhist -l <jobID>
as it reports from the event queue.

Checking a job’s progress

<table>
<thead>
<tr>
<th>JOBID</th>
<th>USER</th>
<th>STAT</th>
<th>QUEUE</th>
<th>FROM_HOST</th>
<th>EXEC_HOST</th>
<th>JOB_NAME</th>
<th>SUBMIT_TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>3408</td>
<td>saf</td>
<td>RUN</td>
<td>normal</td>
<td>linux-clust</td>
<td>comp00.geoq</td>
<td>*K2.175640</td>
<td>May 22 08:59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>comp05.geoquest</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>comp00.geoq</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>comp05.geoquest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>comp06.geoquest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>comp02.geoquest</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>comp01.geoquest</td>
<td></td>
</tr>
</tbody>
</table>

Checking a job's progress with bpeek

You can also use bpeek <jobID> to see output about a job while it is running. The command shows stdout and stderr.

Notes

A host file can be used in place of a queuing system. If you do not specify a name for the host file, a host file containing the name of the current host is auto-generated. This file can then be updated using the relevant formats:

• The standard hostfile format is of the form
  
  Node01
  Node02
  Node03
Node04
This will run a process on each node in turn.

• In the case of nodes with twin CPUs, to specify that a process is to be run on each CPU, use a hostfile of the form
  Node01
  Node01
  Node02
  Node02
This guide is designed to take you through how to install and configure Microsoft Windows Server 2012 HPC on the cluster side and on the laptop/PC side. This allows users to run simulation jobs from a laptop/PC and submit to a Windows cluster. This would normally be done through ECLIPSE Office or Petrel using the `eclrun` command. It can also be done using the `eclrun` command directly from the command line and indeed that would be the preferred option when testing a connection and/or debugging the system. Refer to the "ECLRUN User Guide" for the full definition of all the switches.

**Note** The Microsoft C routine libraries must be installed on all nodes in the cluster. Install both 32-bit and 64-bit runtimes from the `vcredist_vs9` and `vcredist_vs10` directories which can be found on the DVD in the `\3rdparty\PC` directory.

Install the Windows cluster following the instructions from Microsoft. After installation, run all of the diagnostics and ensure that everything is working properly before making the following changes specifically for ECLIPSE:

- "Checking the InfiniBand driver firmware" on page 34
- "Configuring cluster information on the head node" on page 35
- "Configuring nodes" on page 37
- "Configuring the HPC web services interface on the head node" on page 38
- "Using the license aware activation filter" on page 39
- "Configuring client PCs" on page 50

**Installation notes**

- **Installing Intel MPI** on the cluster is not recommended.
- There is a caveat when selecting passwords for the cluster user because ECLRUN cannot pass passwords with certain restricted characters in them. See the "ECLRUN User Guide" for more information.
Checking the InfiniBand driver firmware

We have found that the current InfiniBand (IB) drivers released from Mellanox require the firmware on the cards to be at the latest level in order to work with HPC. In most cases you can download the firmware from the Mellanox website www.mellanox.com but you may need to determine what type of card you have. To do this:

- Download the Mellanox Firmware Tools (MFT) from http://www.mellanox.com/content/pages.php?pg=management_tools&menu_section=34
- Follow the instructions to get your card type.
- Then download the correct firmware for your card.

It is important that you do download the correct firmware or you can risk damaging your card. The firmware needs to be installed before the IB drivers. The current generation of IB drivers (2.2.1) can be obtained from www.openfabrics.org for the generic drivers. There may be specialist drivers for certain modern IB cards that you will need to obtain directly from the Host Channel Adapter (HCA) manufacturers. You need to check on this with your card manufacturer.

Once the drivers are installed check that you can see the IB HCAs in the device manager. If you cannot see them, the HPC installation will not see them.
Configuring cluster information on the head node

- In order to use the ECLIPSE software with the cluster a certain number of environment variables need to be set. These need to be set as administrator on the cluster head node.

For Windows Server 2008 R2, you do this by running:

```
cluscfg setenvs SLBSLS_LICENSE_FILE=7321@licenseserver
cluscfg setenvs ECLPATH=\139.10.10.1\ecl
cluscfg setenvs MPIEXEC_AFFINITY=1
cluscfg setparams AffinityType=NoJobs
cluscfg setenvs MPICH_ND_EAGER_LIMIT=2000000000
cluscfg setenvs MPICH_SHM_EAGER_LIMIT=2000000000
```

However, for Windows Server 2012 some of these variables have been deprecated and you run:

```
cluscfg setenvs SLBSLS_LICENSE_FILE=7321@licenseserver
cluscfg setenvs ECLPATH=\139.10.10.1\ecl
cluscfg setenvs MPIEXEC_AFFINITY=1
cluscfg setparams AffinityType=NoJobs
cluscfg setenvs MSMPI_CONNECTIVITY_TABLE=1
cluscfg setenvs MSMPI_ND_EAGER_LIMIT=2000000000
cluscfg setenvs MSMPI_SHM_EAGER_LIMIT=2000000000
```

- If you intend to submit Multiple Realization (MR) jobs to the cluster, you need to set the MR scheduling environment variable:

  ```
  cluscfg setenvs ECL_MR_SCHEDULING=true
  ```

  This has to be done in conjunction with adding the following line to the `eclrun.config` file on each client machine:

  `<LsfLicenses>True</LsfLicenses>`

- The `DefaultHoldDuration` parameter specifies the time between license checks. By default, if no licenses are available, the scheduler will wait 900 seconds before checking again. Setting this to 90 is recommended:

  ```
  cluscfg setparams DefaultHoldDuration=90
  ```

- To check the environment variables settings, use

  ```
  cluscfg listenvs
  ```

  This sets the variable for all users and all compute nodes. If these are not set, ECLRUN will return an error. These settings require HPC Service Pack 3 to work.

**Note** Note the use of UNC paths. This is vital to the current implementation of HPC as we do not install ECLIPSE on the compute nodes but only on a file system that must be visible to all the compute nodes and the head node. For ECLIPSE 2013.1 all the required DLLs are installed not only in the lib directory as previously but also in the bin directory. This means you do not have to install any ECLIPSE software on the compute nodes.
• If you want to alter any of the system parameters you can find those that are available using the command:

  mpiexec –help, mpiexec –help2 or mpiexec –help3

  Do not reset too many of these options.

• Set the license server by IP address rather than name, although both should work.

• We also require that wherever the data is stored it must also be visible to the compute nodes for both read and write. The ECLRUN program will check this before it submits a job.

  For HPC the eclrun command takes the form:

  eclrun -s localhost -q <cluster name> -u <user on cluster> eclipse <datafile>

  It can also be useful to set the debug option when testing the connection:

  eclrun -s localhost -q <cluster name> -u <user on cluster> -debug=both eclipse <datafile>

*Note*  The server for submitting to HPC is always localhost. This option can only be used on systems where the HPC client pack has been installed (at the very least).
Configuring nodes

Compute nodes and head node file system definition

If you are using normal storage, that is the SMB2 file system, then you need to run PowerShell as an admin user and run this command (a single command line):

```
Set-ItemProperty -Path "HKLM:\SYSTEM\CurrentControlSet\Services\LanmanWorkstation\Parameters" RequireSecureNegotiate -Value 0 -Force
```

You must run this command on all compute nodes and the head node. If you don't you will not be able to access storage that uses SMB2 file systems, which is the most used file system currently. This is because Windows Server 2012 (and Windows 8) use the new SMB3 file system.

VCC library installation on compute nodes

You need to make sure that all the required VCC libraries are installed on all compute nodes. These can be found on the ECLIPSE DVD in the following locations:

```
3rdparty\PC\resource\vcredist_vs9
3rdparty\PC\resource\vcredist_vs10
```

Windows power configuration

On Windows HPC it is necessary to set the power configuration to high performance. Not setting this correctly can have a 15% performance impact on simulation runs.

To perform this configuration, you must have admin rights on the head node and all of the cluster nodes.

To see what configuration you have type `powercfg -l` in a DOS prompt on the head node.

It should return:

```
Existing Power Schemes (* Active)
-----------------------------------
Power Scheme GUID: 381b4222-f694-41f0-9685-ff5bb260df2e (Balanced)
Power Scheme GUID: 8c5e7fda-e8bf-4a96-9a85-a6e23a8c635c (High performance) *
Power Scheme GUID: a1841308-3541-4fab-bc81-f71556f20b4a (Power saver)
```

If you do not have high performance set, you will not see the entry marked with an asterisk (*).

To add this setting, use the `clusrun` command in node management to run the command on all cluster nodes:

```
clusrun /all powercfg -s 8c5e7fda-e8bf-4a96-9a85-a6e23a8c635c
```
Configuring the HPC web services interface on the head node

The Web services or REST interface allows users to monitor their jobs through a remote interface as well as monitoring cluster load. Monitoring the cluster load through the basic Job Manager interface. It is also possible to set up a job submission web page for ECLIPSE that is similar to that provided by EnginFrame. The web interface may provide useful functionality, subject to some limitations. To install the web interface:

1. Install Web services components from
   
   Program files\Microsoft HPC Pack 2012\Bin\HpcWebComponents

2. Run a Powershell Window as administrator
   
   Note that Powershell scripts and arguments are case sensitive

3. To set unrestricted policy executions so that you can run scripts:
   a. To check the current execution policy settings, run the command
      
      Get-ExecutionPolicy -List
   b. If the execution policy is restricted, run the following command to set it to unrestricted:
      
      Set-ExecutionPolicy -ExecutionPolicy unrestricted

4. Change to the \bin directory:
   
   Cd program files\Microsoft HPC Pack 2012\bin

5. Enable the service portal.
   
   If you want to use the default port number of 443, type:
   
   .\Set-HpcWebComponents.ps1 -Service Portal -enable
   
   If you want to use a different port, type:
   
   .\Set-HpcWebComponents.ps1 -Service Portal -enable -Port <Port number of Web port>

6. When prompted for the certificate, enter 0 (zero) for a self-signed certificate.

7. Then enable the REST interface making sure that you use the same port number as step 5:
   
   .\Set-HpcWebComponents.ps1 -Service REST -enable
   
   or
   
   .\Set-HpcWebComponents.ps1 -Service REST -enable -Port <Port number of Web port>

8. To restart the scheduler, type:
   
   Net stop hpcscheduler
   Net start hpcscheduler

9. To test access to the web interface, go to another machine and type
   
   https://<machine name >/HpcPortal
   
   If you cannot access the web service, repeat the setup procedure.

10. After setting up web access you should restrict execution policy again by running the command:

    Set-ExecutionPolicy -ExecutionPolicy restricted
Using the license aware activation filter

Introduction

The License-Aware Activation Filter is a program that prevents jobs from being run without the correct amount of required licenses.

This program installs a “filter program” in the Windows HPC 2008 Cluster Manager Job Scheduler.

Installation

The program files are in a zipped file called LicenseAware.zip in the 3rd party applications directory (3rdparty\PC\resources\). You simply drag the zip file from this directory to a directory of your choosing on the cluster head node. Unzip the file to install the individual program components, which are:

- User Windows Interface (HPCLicFilterUI.exe)
- The Filter program that will being installed on Windows HPC 2008 (HPCLicFilter.exe)
- Special configuration file (HPCLicFilterUI.exe.config)

Make sure that you put all of these components into the same directory.

Filter configuration

The filter configuration window

The filter configuration window provides a user interface to the filter configuration settings.

To use the window, double click on the HPCLicFilterUI.exe program. This displays the MSHPC:License Aware Activation Filter window.
The main areas on the window are:

- The top part of the window is for FLEXlm configuration
  The lmstat argument string is hardcoded, but is displayed by the window for information.
- The area below the Windows HPC Activation Filter heading is for the filter.

The main window controls are

- **File | Save Config**: This saves your current configuration for future use. Only one configuration will be allowed.
- **File | Exit**: This exits from the tool.
- **Help | About…**: Provides information about the version of the program.
- **Apply**: This button must be used each time you modify any configuration in order to validate the new configuration. This button also will save your configuration.
- **Exit**: This button has the same effect as **File | Exit**. Note that this does not save the configuration.

There is also a status bar at the bottom of the window which provides information on the what the program is doing.

**Configuring FLEXlm**

1. Open the Filter Configuration tab in the MSHPC:License Aware Activation Filter window.
2 Click on the Browse button and use it to find the `lmutil.exe` program.

3 Click on Apply.

This applies the default command `lmstat -a -c` using the executable that you located.

### Configuring a license

1 Open the Filter Configuration tab in the MSHPC:License Aware Activation Filter window.

2 Enter the service port and the machine on which the license is working.

When a valid license or service port is given, the rest of the controls will become available:

- **Confirm/Test**: This allows you to test your configuration.
  - If the connection to the license server was successful, the Check Log button is green, indicating a positive response.
  - If the connection with the license server was unsuccessful, the window displays a warning message and the Check Log button is red. You need to check the logs and correct the issue.

If the license server details are not valid, the Enable Filter on Windows HPC option on the window is disabled.

- **Check Log**: Clicking on this opens a new window with the output text from running the command `lmutil lmstat`.

### Setting up the activation filter

In this section, you can enable or disable the activation filter, determine the level of information provided, where to output the log (debug) file and what to do if there are not enough licenses.

The settings in this window automatically configure the Windows HPC 2008 Filter program.
Using the license aware activation filter

Figure 5.4 Filter settings

- **Enable filter on Windows HPC**
  Setting this checkbox on attempts to activate the filter executable (HPCLicFilter.exe) in the Windows HPC Filter configuration. If that is successful, the bottom of the window shows the successful activation, but no other messages are displayed. If you see error messages, this indicates that the activation was not successful. Please see "Dealing with errors" on page 48 for information on how you might correct the issue(s).

- **Info Level** - This defines the level of information to be provided by the filter messages:
  - **ALL**: Show all types of messages.
  - **INFO**: Shows only information messages about the behavior of the filter.
  - **WARNING**: Shows only warning messages.
  - **ERROR**: Shows only fatal error messages.
  - **DEBUG**: Shows useful messages to trace the program procedures and get information about jobs and parameters.

  The default is **INFO**
  This parameter can be changed anytime.

- **Debug file name**
  You need to supply the name of a filter log in order to get all messages from the activation filter. You can use the browse button to define an existing file, or you can define a new one in the prompt window.
  
  To set this parameter you must uncheck the **Enable filter on Windows HPC** option. After changing the log file information, you can set the option back on.

- **If the job have not enough licenses**
  Use this field to set what happens if there are not enough licenses.
  You can change this parameter at anytime, but you need to press **APPLY** to make a change.

  - **Run the job do not check license**
    The scheduler will attempt to run the job even if no license is available. It has the same effect as disabling the filter.

  - **Stop the queue until a license is available**
    Do not run the job. Keep the resources and do not run anything else until the current job starts.

    **Note**: This status will block the queue, and will not allow any other job to run until the current one can run.
- **Hold the job and Keep Resources allocated**
  Do not run the job. Keep the resources allocated for this job, but other jobs may be started on other resources.

- **Hold the job and do not reserve any resources**
  Do not run the job and do not reserve any resources. The job is put on hold for a period of time and the scheduler will not attempt to schedule the job again until the hold time has passed. (By default, the hold time is two minutes, but you can change this at the HPC Manager configuration console.)

- **Fail the job**
  The filter will cancel the current job. In this way the queue will not be blocked, but the job will be canceled.

- **Enable license reservations and Hold reservation only for**
  
*Figure 5.5 License reservation configuration*

You can use these setting to help to avoid racing conditions with license allocation. Without these settings, the filtering sequence is:

1. The ECLIPSE job is submitted.
2. HPC calls to the installed custom filter
3. The filter checks for all licenses needed for this job.
   - The filter can only check for licenses but cannot reserve any.
4. The filter decides what to do according to the number of available licenses.
   - It can release or run the job (give a “green light” to current job to run)
5. HPC gets the return code from the filter
   - It submits, holds or cancels the job depending on the filter return code.
6. HPC then goes to the next job and repeats the cycle.

It is not clear how long a job will take for initialization. In this phase, a job (ECLIPSE submission job) is not getting any licenses and it is during initialization that racing conditions can arise. For example, a new job may get a “green light” for licenses while the first job is still initializing. If this new job has a faster initialization phase than the first one, it takes over any licenses that the previous job did not take because it is still initializing. Alternatively the second job could fail if the first job is initialized first and takes the licenses, in which case there will not be any available for the second job.
Using the reservation buttons, you can instruct the filter to “reserve” a license for the job that is being submitted and for how long to hold the reservation. This way the license is “waiting” until the job can take it. This reservation is taken into account by the activation filter (there’s no real reservation done using FLEXlm). The filter keeps these reservations until the allotted time has passed and then deletes the reservation automatically.

- Enable MR Checking
  
  You can use this filter to check for MR (Multiple Realization) licenses and make appropriate adjustments. If this is set on, the filter determines whether or not the simulation is a MR simulation and assigns the appropriate licenses.
  
  For MR checking "Configuring cluster information on the head node" on page 35 specifies the MR environment variable that needs to be set on the head node. In addition, the eclrun.config file must contain the entry:
  
  `<LsfLicenses>True</LsfLicenses>`

---

### Checking FLEXlm license details

#### Checking details by feature

Use this option to see all of the features in your current license.

1. Open the MSHPC:License Aware Activation Filter window.
2. Click on the Flexlm License Details tab.
3. Click on the By Feature tab.
Clicking on Refresh polls the license server and brings back all the current features available. For example:

**Eclipse (56/1000/944)**

Taking this example, each part means:

- the used license amount (56)
- the total license amount (1000)
- the available license amount (944)

If you select any feature in this list, you get a list of all current users using this feature, including:

- the user alias
- the workstation requesting the feature
- the version of the feature that is being used
- which server is serving the feature
- the time at which the service was requested

**Checking details by user**

Use this option to see all of the current users using the licenses.

1. Open the MSHPC:License Aware Activation Filter window.
2. Click on the Flexlm License Details tab.
3 Click on the **By User** tab.

**Figure 5.7** FLEXlm license checking by user

![FLEXlm window](image)

Clicking on **Refresh** button polls the license server and brings back a fresh list of users.

After that, you can select any user, and you can then see which features this user is using and the number of licenses used for each feature.

### Checking FLEXlm license reservations

Use this option to see the license reservations made by the License Aware Scheduler. The information is updated automatically once you have set it up using the **Attach to log** setting described in "Checking filter logs" on page 47.

Use this option to see all of the current license reservations.

1 Open the **MSHPC:License Aware Activation Filter** window.
2 Click on the **Flexlm License Details** tab.
3 Click on the **License Reservations** tab.
These reservations displayed are read-only, so you cannot modify them. They are managed automatically by the License Aware Scheduling Filter.

### Checking filter logs

To look at the License Aware Scheduling Filter messages:

1. Open the MSHPC:License Aware Activation Filter window.
2. Click on the Filter Logs tab.
The messages are displayed in the HPC Filter Log pane. You can use the window buttons to determine what to do with the messages:

- **Clear:** This option clears the log window, but not the log file.
- **Attach to log:** This allows you to see “real time” messages from the Filter.

  Using this setting, every time the filter is activated (by a submitted job), the information about license reservations is automatically updated. See "Checking FLEXlm license details" on page 44. If you do not check on this setting, you have to use the refresh button to update the license reservation information.

- **Deattach:** This button detaches from “real time” log gathering.

  The tool clears the scroll bar history when it reaches 1000 lines in length to reduce the amount of memory used to bring the information on line. This means that the tool brings in the last 1000 lines from the log file.

---

**Dealing with errors**

**Setting the default failure status**

To set the default failure status:

1. Open the MSHPC:License Aware Activation Filter window.
2. Click on Help and select Default return failure status.
This displays the License Aware Scheduler default options window:

**Figure 5.10** License aware scheduler default options

![License Aware Scheduler default options](image)

3 Select the required action and click on **Ok** to set it.

**Error conditions**

The program errors are self explanatory, and the messages include a possible solution for each case. Some recommendations on operating the filter are to:

- Install all the Filter software (**HPCLicFilter** components) into the same directory.
- Run the **MSHPC: License Aware Activation Filter** application at the cluster head node as Administrator, in order to configure it correctly.
- Monitor the size of the log file. You could leave the log information level as INFO to avoid generating a long log file. See "Setting up the activation filter" on page 41.
Configuring client PCs

After installing the HPC client pack, you have to add an environment variable on client PCs that are running Petrel and the Simulation Launcher. On each client PC, add:

CPP_SCHEDULER=<name of head node>

If you don't set the `CPP_SCHEDULER` environment variable, you get an error of the form:

D:\>cluscfg listenvs
No connection could be made because the target machine actively refused it 127.0.0.1:5800

If you don’t set the scheduler, ECLRUN and remote job submission will not work.
Legacy macros and scripts

About the macros and scripts

Note  It is recommended that ECLRUN is used to run most of the simulators and other programs. Please refer to the "ECLRUN User Guide" for more details. The legacy macros are still released but may have limited capabilities compared to ECLRUN.

For Linux systems, the software can be run using scripts supplied in the macros directory in place of ECLRUN. The following scripts are available to run the License Manager:

- @flexstart: Start up the License Manager
- @lmdown: Shut down the License Manager
- @lmhostid: Get FLEXlm hostid for the machine
- @lmreread: Reinitialize License Manager
- @lmstat: Check license status

The default location for the following files for use with the License Manager is the `ecl/macros` directory:

- `license.dat`: License file
- `flex.log`: Activity log for License Manager

The following macros are available to run the principal simulator software programs:

- @e300: Compositional simulator
- @eclipse: Black oil simulator
- @frontsim: Streamline simulator
- @graf: Post processor
- @grid: Gridding and mapping
- @mpiellipse: Run ECLIPSE 100 simulator in parallel mode
- @mpie300: Run ECLIPSE 300 simulator in parallel mode
The following macros are available to run the utility programs (those marked * are no longer released):

- **Batch operations:**

  @fill  
  Corner point geometry generation

- **File format conversions:**

  @convert  
  Converts formatted / unformatted ECLIPSE output

  @convertgrid  
  Converts between .GRID and .EGRID formats

  @dos2unix  
  Converts ASCII from MS-DOS to UNIX format

  @rescueconvert  
  Converts from older versions to RESCUE Version 19 format

  @unix2dos  
  Convert ASCII from UNIX to MS-DOS format

- **File manipulation:**

  @expand  
  Merge INCLUDE files into master file

  @extract  
  Extract subset of data from ECLIPSE output

  @glkread  
  Checks the contents of a Stratamodel binary .glk file

- **File name changes:**

  @change_prefix  
  Changes prefix of file name

  @change_suffix  
  Changes suffix of file name

  @lower  
  Lowercase file name

  @rename  
  Change ECLIPSE filename case and extensions

  @upper  
  Uppercase file name

- **Viewing:**

  @manuals  
  Launches Manuals bookshelf

  @pdf  
  Launches Adobe Acrobat

---

**Note**  Not all programs are supplied with the 2013.1 release; some older applications have been retired. The scripts have been left so they can be used to run older versions.

---

- The following environmental variables can be set to control LSF functionality within the macros:

  **ECL_LSF**  
  set true if LSF is installed

  **ECL_LSF_DEFAULT**  
  If this and ECL_LSF are set to TRUE then jobs are submitted using LSF without the need for the -lsf flag. For compatibility with ECLIPSE Office the -nolsf flag has been added as a new option to stop nested bsub commands.

  **ECL_LSFHPC**  
  This switches on the LSF HPC extensions. If you have the HPC version of LSF we recommend that you set this variable. For information see "Configuring LSF" on page 18.

  **ECL_LSF_PARALLELQ**  
  defines the default queues for parallel jobs
ECL_LSF_SERIALQ

defines the default queues for serial jobs

ECL_LSF_LICCHECK

set if LSF is to control FLEXlm licensing and the LSF-SIS integration kit has been installed (contact Platform Computing www.platform.com for details).

ECL_MR_SCHEDULING

set this variable to correctly queue multiple realization jobs. Follow the instructions in the LSF-SIS integration kit.
Macros: command line flags

The Linux macros are written using c-shell scripts. It is essential that the macros directory is placed on the user’s path; this is not necessary, however, to ensure their successful execution. The macros will automatically detect all versions of software installed, and will invoke questions as necessary to launch the program required.

The macros require little or no configuration to launch interactive products. However, it is possible to configure the macros using command line flags; this is especially useful for running the ECLIPSE simulators. The main command line flags for running the ECLIPSE 100 and ECLIPSE 300 simulators are listed below:

- **-data /home/user/workarea** to set default working directory, or other directory.
- **-file <filename>** to define a dataset file name.
- **-help** to obtain a list of available flags with brief description.
- **-second <Title>** to define a secondary run title. 

For parallel ECLIPSE, namely @mpieclipse, @mpie300 the following special options are available:

- **-hostfile hosts.txt** Configuration file for Parallel run (same as -machinefile)
- **-machinefile hosts.txt** Configuration file for Parallel run (same as -hostfile)
- **-lsf** For runs using LSF.

**See "Using LSF with the simulator macros" on page 30.**

- **-ilmip** Option for processing parallel jobs using Intel MPI
- **-plmpi** Option for processing parallel jobs using Platform MPI
- **-ibmmpi** Option for processing parallel jobs using IBM POE MPI

If **-procs** is not set, the macro will attempt to read the PARALLEL keyword in the dataset to get the number of processors.

- **-nolocal** Do not run on front end when a parallel job is run.
@eclipse -version 2013.1 -local -lsf TESTCASE
@mpie300 -lsf -lsfqueue normal -version 2013.1 -local TESTCASE
Appendix B

Index

B
Batch mode
  PC . . . . . . . . . . . . . . 27

C
Configuring PC software . . 11
cshrc . . . . . . . . . . . . . . 16

I
Installing
  Parallel ECLIPSE . . . . 28
  PC software . . . . . . . . 10
  Intel MPI . . . . . . . . . 11, 16

L
Linux . . . . . . . . . . . . . . 13
Linux systems
  macros and scripts . . . . 28
LSF SIS integration kit . . . 29

M
Macros
  command line flags, Linux . . 54
Linux systems . . . . . . . 28
Microsoft HPC . . . . . . . 33

P
Parallel ECLIPSE

S
Scripts
  Linux systems . . . . . . . 28
Software products . . . . . 7
Software requirements
  Linux . . . . . . . . . . . . 28
Standalone installation . . . . 11
  Windows XP . . . . . . . . 11
Supported platforms . . . . 7