PetroMod

PETROLEUM SYSTEMS MODELING SOFTWARE

PetroMod 2021
Version 2021.1

Installation Guide

Schlumberger

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About Schlumberger

Schlumberger is the leading oilfield services provider, trusted to deliver superior results and improved E&P performance for oil and gas companies around the world. Through our well site operations and in our research and engineering facilities, we develop products, services, and solutions that optimize customer performance in a safe and environmentally sound manner.

Documentation

Documentation is provided in the following electronic formats via the listed location:

- *PetroMod 2021.1 Installation Guide* (Adobe® Acrobat® PDF file): software.slb.com/support

- *PetroMod 2021.1 Release Notes* (Adobe® Acrobat® PDF file): software.slb.com/support

- *PetroMod 2021 User Guides* (Adobe® Acrobat® PDF files): software.slb.com/support

- Online help for some applications: **PetroMod** -> **Help**

You must have Adobe® Reader® installed to read the PDF files. Adobe Reader installation programs for common operating systems are available for a free download from the Adobe Web site at *www.adobe.com*.

Typestyle Conventions

The following conventions are observed throughout this guide:

- **Bold** text is used to designate file and folder names, dialog titles, names of buttons, icons, and menus, and terms that are objects of a user selection.

- *Italic* text is used for word emphasis, defined terms, and manual titles.

- Monospace text (`Courier`) is used to show literal text as you would enter it, or as it would appear on screen.

Alert Statements

The alerting statements are Notes, Cautions, and Warnings. These statements are formatted in the following style:

• • • • • •
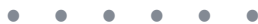
Note: *Information that is incidental to the main text flow, or to an important point or tip provided in addition to the previous statement or instruction.*

• • • • • •

Caution: *Advises of machine or data error that could occur should the user fail to take or avoid a specified action.*

•   •   •   •   •   •

Warning: *Requires immediate action by the user to prevent actual loss of data or where an action is irreversible, or when physical damage to the machine or devices is possible.*

Contacting Schlumberger

Technical Support   Schlumberger has sales and support offices around the world. For information on contacting Schlumberger, please refer to the information below.

For Technical Support for PetroMod software please contact the Customer Care Center via the Schlumberger Software website at http://support.software.slb.com

Internet	www.slb.com
Postal Mail	Schlumberger
	Aachen Technology Center (AaTC)
	Ritterstr. 23
	52072 Aachen - Germany

2 System Overview

Introduction

This document describes the steps necessary to install PetroMod* 2021.1. The installer includes a full PetroMod installation.

- Installing on a workstation using a local license
- Installing on a workstation using a license on a central license server

This guide also explains the procedures required after installation:

- Defining your license environment

This module has been designed by the Schlumberger Aachen Technology Center (AaTC), Germany.

Audience

This guide is useful for the following people:

- PetroMod users who install PetroMod on their workstations.
- System Administrator who installs PetroMod on a network shared disk.

System Requirements

Before you install PetroMod 2021.1 your machine must meet the following requirements:

Hardware Requirements

Table 2-1   Hardware requirements for workstations

Resource	Recommended Requirements
Processor	Dual 4 to 8 core processor (fast clock speed)
Memory	64 GB RAM
Primary storage	HDD (10K, 15K RPM) or SSD
Graphic Card	Nvidia Quadro P5000

Table 2-2   Hardware requirements for laptops

Resource	Recommended Requirements
Processor	Quad-core processor (fast clock speed)
Memory	32 GB RAM
Primary storage	HDD (10K, 15K RPM) or SSD
Graphic Card	Nvidia Quadro P3000

Table 2-3 Hardware requirements for Linux clusters

Resource	Recommended Requirements
Processor	Dual 8 to 16 core processor (fast clock speed)
Memory	256 GB RAM
Network Card	10 GBit NIC
Primary storage	HDD (10K, 15K RPM) or SSD
Infiniband (optional)	Mellanox Connect X3 Pro - FDR

• • • • • •

Caution: It is possible that graphics do not display correctly when using older graphics cards and drivers. We recommend installing the latest graphics drivers to avoid OpenGL graphic display errors. The driver version that comes with the OS in most cases is quite old or even generic drivers are used if the graphics hardware is not recognized correctly during the installation of the OS. These drivers only support basic functionalities and do not offer the OpenGL features required by PetroMod. Please be aware that most onboard graphics hardware does not support OpenGL at all. A dedicated graphics card is required for PetroMod. We recommend disabling the onboard graphics unit in the BIOS. This will help you to avoid performance problems and visualization errors.

Warning: **Linux users:** Due to known issues concerning the instability of OpenGL graphics, PetroMod only supports local rendering on 3D graphic cards with stable graphic drivers. Rendering via a network could cause stability issues.

Warning: **Linux users**: Do not change the GUI style of your window manager (for example via qtconfig) while PetroMod is running. If you do, PetroMod could crash.

Software Requirements

Table 2-4 Software Requirements

Resource	Requirements
Microsoft Windows 10	64-bit
RedHat Enterprise Linux 7.5	64 bit
Microsoft.NET Framework	4.8
Microsoft Visual Studio 2019 runtime environment	2019

PetroMod Open Simulator

You have to install the Python scripting language to your system to use the Open Simulator published with PetroMod 2021.

Please use Python 3 to write your own scripts. A Python 3.9.x (Windows) or 3.6.x (Linux) installation is required on your computer. Because PetroMod supported Python 2 up to PetroMod 2019 you might need to upgrade your Open Simulator

scripts to the new Python version. For details see the Python installation section below.

Licensing

PetroMod 2021.1 requires the **Schlumberger license server version 2021.1**. If you have been working on PetroMod versions prior to 2021.1, you must upgrade your Schlumberger license server before you install PetroMod 2021.1.

For information on upgrading the license server, see the *Schlumberger Licensing User Guide*.

Maintenance contracts are usually yearly contracts, renewed at any time during the year. Prior to PetroMod 2012, PetroMod licenses allowed you to step up to a new PetroMod version based on the PetroMod license expiration date without having a valid maintenance contract. Beginning with PetroMod 2012, upgrades are based on your maintenance contract expiration date. This is how you read the licensing format in the license file:

FEATURE petrobuilder3D slbsls <yyyy.mm> <dd-mmm-yyyy> <#>

Where

• <yyyy.mm> is the maintenance expiration year and month

• <dd-mmm-yyyy> is the license expiration day, month, year

• <#> is the number of licenses

Maintenance renewal is required to run any PetroMod version released after your maintenance expiration date. You will be contacted by Schlumberger before your maintenance expires.

3 Installation (Windows)

Downloading the Installation Package

To install PetroMod, you need the installation package. If you have a DVD, you can use it. Otherwise, download PetroMod from the Software Download Center.

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Note: *If you are a new user of the Software Download Center, you must register before you can download PetroMod.*

▶ *To download PetroMod 2021 from the Software Download Center*

1 Go to www.sdc.oilfield.slb.com.

2 Click **SIS Software download center**.

3 Log in to the site.

4 On the **Welcome Message** page, click **Continue**.

5 In the **Product Group Name** list (in the upper-left corner), click **Geology & Geophysics**.

6 In the table on the right, click **PetroMod**.

7 In the table of PetroMod downloads, click the **Download** icon for the PetroMod 2021.1 file you need.

You are ready to install PetroMod 2021.

Installing PetroMod

Perform the following tasks prior to beginning the installation:

• Ensure that you have admin privileges on the machine on which you are installing PetroMod and/or install the software together with your systems administrator since superuser passwords are required. If you try to install PetroMod without admin rights, start the installer with a right mouse-click and the context menu option **Run as administrator** to avoid problems related to admin privileges.

• Ensure that the "System Requirements" on page 2-1 are met.

PetroMod 2021 is a full installation. If you are already using an earlier PetroMod release, copy the new release into a new directory! Do not install the new version 'over' the old version to ensure that all programs and files can be updated and will then be compatible.

Installing PetroMod

The installation ensures that the files required to run PetroMod are installed on your computer.

▶ *To Install PetroMod 2021*

1 Insert the DVD or navigate to the location where you downloaded the installation files.

2 Double-click **PetroMod2021.1.exe** to start the installation. The folder PetroMod2021.1.msi will be unpacked, then the **InstallShield Wizard** will open with the **License Agreement** (Fig. 3-1). Accept the terms and click **Next**.
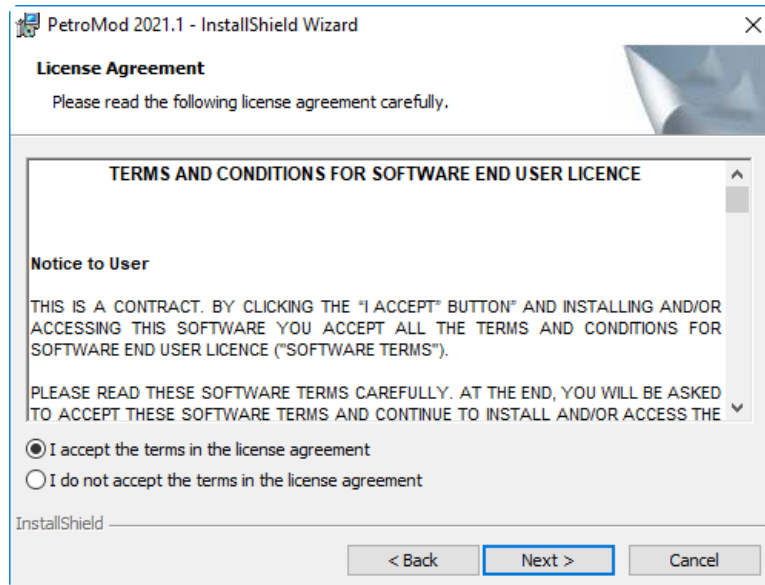
Fig. 3-1 PetroMod InstallShield Wizard

3 Enter your **User Name** and **Organization** (Fig. 3-2), then click **Next**.
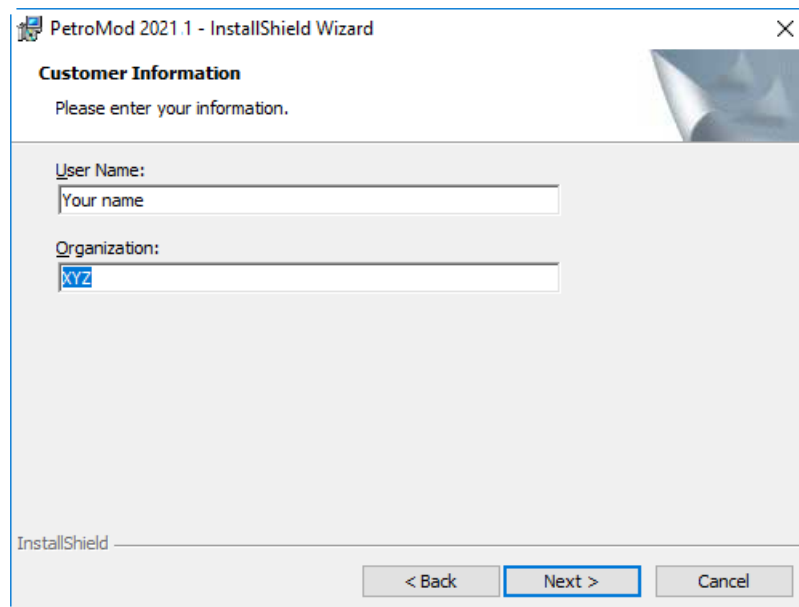
Fig. 3-2   Filling in user name and organization

4   Determine the location of the files (Fig. 3-3). The default is a folder called **Schlumberger** in your **Program Files** folder. If this is not what you want, you must change it manually by clicking the **Change** button.

When you are content with the location, click **Next.**
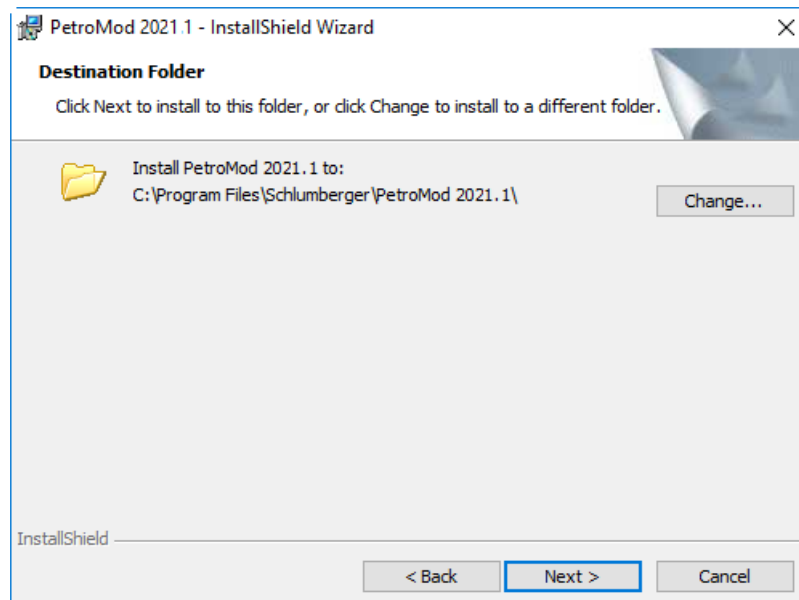
Fig. 3-3   Determining the location of the files

5   A summary of the settings will be displayed (Fig. 3-4). Click **Install**.
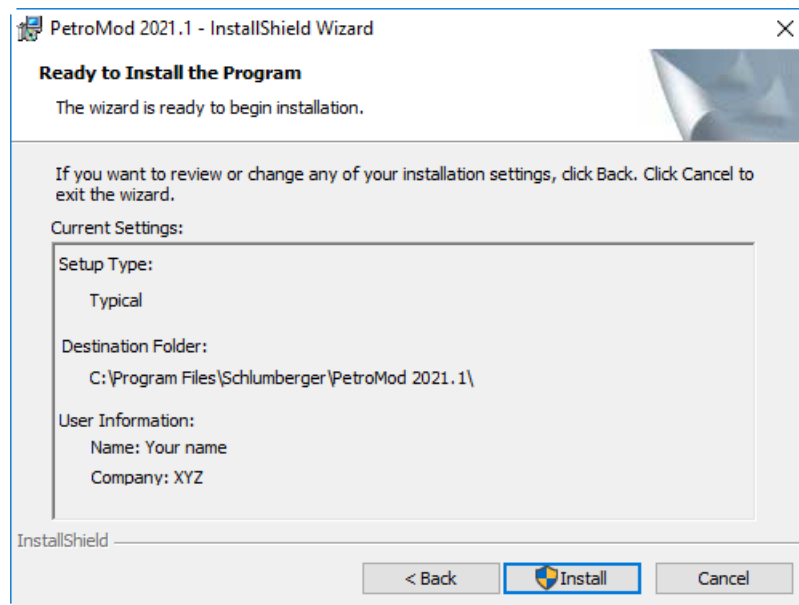
Fig. 3-4   Summary of settings

6   You can follow the progress of the installation in the InstallShield Wizard (Fig. 3-5).
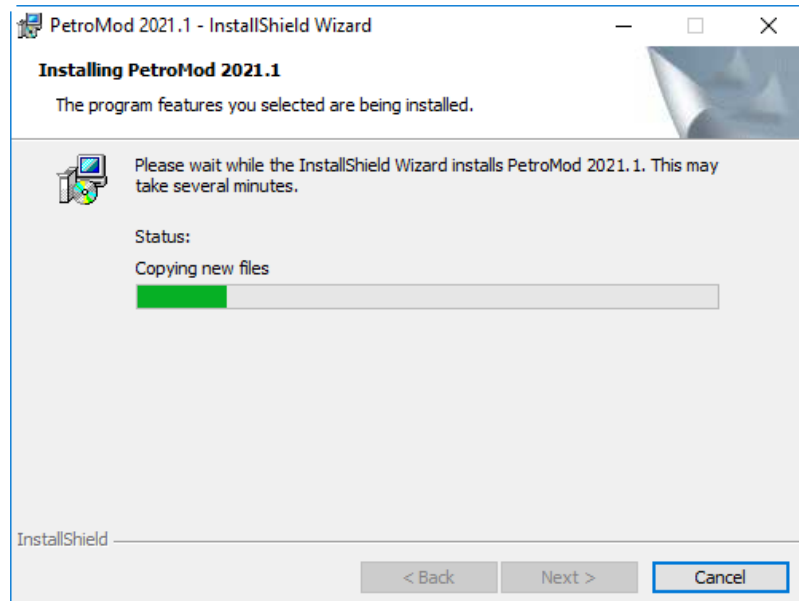
Fig. 3-5   Installation progress

7   Once the installation is complete the InstallShield Wizard will display the final dialog (Fig. 3-6). Click **Finish**.
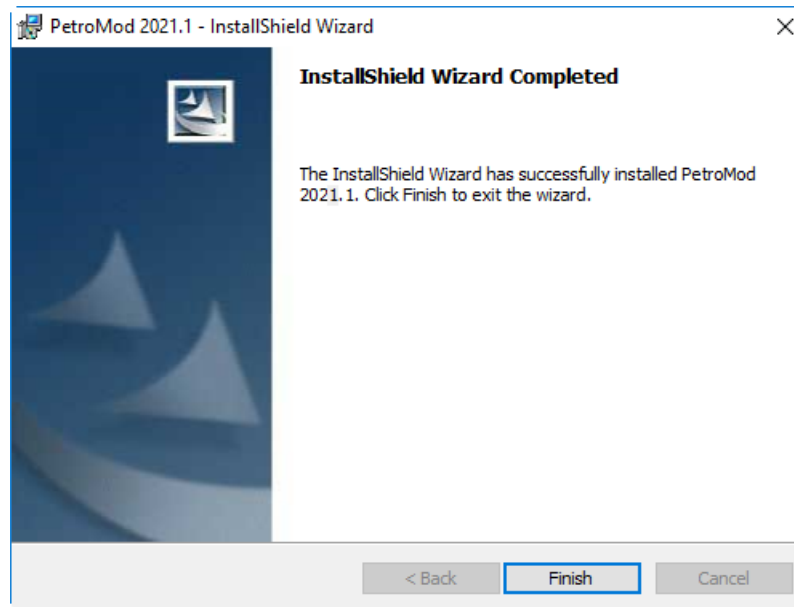
Fig. 3-6   Installation complete

8   The **PetroMod 2021.1** icon will appear on your desktop. PetroMod 2021.1 will also be added to the **Schlumberger** folder in the **Progams** list of your **Start** menu.

Proceed with the installation of the .NET runtime environment, the MS MPI runtime for parallel processing and / or with installing Flexnet.

Files Installed During Installation

The following files / folders are installed during the installation of PetroMod:

• one folder: **PetroMod 2021.1**:

  - **doc** folder including sub folders/files

  - **scripts** folder including Python files

  - **WIN64** folder including sub folders/files

Installing Runtime Environment for Single and Parallel Processing

The PetroMod 2021.1 Simulator requires an MPI runtime environment for both single and parallel processing.

PetroMod 2021.1 supports parallel processing on Windows platforms using Microsoft MPI v9.0.1.

You must also install the Visual Studio 2019 runtime environment.

Installing Runtime Environment

You can find the files in the installation package in the RuntimeEnvironment/Windows folder:

• MSMpiSetup.exe - MS MPI runtime

• vcredist_vs2019_x64.exe

Note: *Before you install the latest MPI runtime environment, you must first uninstall the previous version.*

Note: *If you want to use PetroMod 2014 or earlier, you must set the system variable PM_MPI_RUN to "%MSMPI_BIN%..\\"*

Activating Parallel Processing in the PetroMod Simulation Interface

1 After the licenses have been activated open the **PetroMod Simulation Interface** and select **Processors for Parallel Run**, see Fig. 3-7.
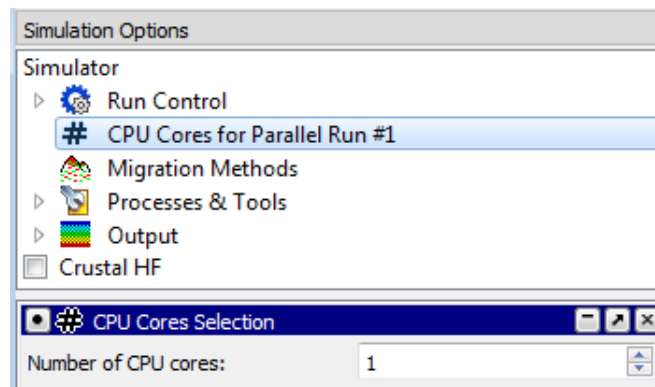
Fig. 3-7   Activating parallel processing in the PetroMod Simulation Interface

2 Increase the number of processors in the **Processors Selection** dialog.

• • • • • •

Caution: *Parallel processing is only supported on your local machine. You cannot run a simulation on several nodes (as you could on Linux clusters).*

4 Uninstalling PetroMod (Windows)

Before You Begin

Before you begin, make sure you have exited out of the PetroMod application.

Uninstalling PetroMod

Complete the following steps to uninstall PetroMod 2021.1.

▶ *Uninstalling via the Start menu*

1 Select **Start** > **Control Panel**.

2 In the **Control Panel**, click **Uninstall a program.** This opens the **Uninstall or change a program** dialog.
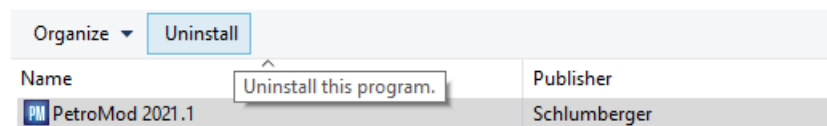
Fig. 4-8 Add or Remove Programs dialog in Windows

3 Scroll through the list of installed programs and select **PetroMod 2021.1** (Fig. 4-8).

4 Click **Uninstall**.

5 Select **Yes** to remove the application from your computer.

Results of the Uninstallation Process

The following files / folders are removed during the uninstallation of PetroMod:

• The entire folder: **PetroMod 2021.1** including subfolders and files.

5 Installation (Unix)

Downloading the Installation Package

To install PetroMod, you need the installation package. If you have a DVD, you can use it. Otherwise, download PetroMod from the Software Download Center.

•   •   •   •   •   •

> **Note:** *If you are a new user of the Software Download Center, you must register before you can download PetroMod.*

▶ *To download PetroMod 2021 from the Software Download Center*

1   Go to www.sdc.oilfield.slb.com.

2   Click **SIS Software download center**.

3   Log in to the site.

4   On the **Welcome Message** page, click **Continue**.

5   In the **Product Group Name** list (in the upper-left corner), click **Geology & Geophysics**.

6   In the table on the right, click **PetroMod**.

7   In the table of PetroMod downloads, click the **Download** icon for the PetroMod 2021.1 file you need.

You are ready to install PetroMod 2021.

Installing PetroMod

The installation ensures that the files required to run PetroMod are installed on your computer.

Perform the following tasks prior to beginning the installation:

• Ensure that you have admin privileges on the machine on which you are installing PetroMod and/or install the software together with your systems administrator since superuser passwords are required.

• Ensure that the "System Requirements" on page 2-1 are met.

PetroMod 2021 is a full installation. If you are already using an earlier PetroMod release, copy the new release into a new directory! Do not install the new version 'over' the old version to ensure that all programs and files can be updated and will then be compatible.

•   •   •   •   •   •

> **Warning:** *Due to known issues concerning the instability of OpenGL graphics, PetroMod only supports local rendering on 3D graphic cards with stable graphic drivers. Rendering via a network could cause stability issues. In particular, we observed problems with the Mesa OpenGL*

> *package that is delivered with RHEL7 and works as a fall-back when no other driver is installed.*

● ● ● ● ● ●

Warning: *If you are already using an earlier PetroMod release, copy the new release into a new directory! Do not install the new version 'over' the old version to ensure that all programs and files can be updated and will then be compatible.*

Installing PetroMod

The installation ensures that the files required to run PetroMod are installed on your computer.

▶ *To Install PetroMod 2021*

1 Extract the UNIX Setup file (includes RedHat Enterprise Linux 7.5 64 bit) into the destination folder (e.g. /tmp/PetroMod/), where you want to save the download. You will see a file with the name: **petroinstall.sh.** The **petroinstall.sh** installation routine will prompt you through the installation procedure.

2 Then (or after logging in as SUPERUSER and starting Petroinstall again), select **option 1 'Set release device'** by pressing **Return** for **[1]**. You will be prompted to enter the name of the CD-ROM drive, for example:

```
.../pm2021_1/Linux.
```

● ● ● ● ● ●

Caution: *Default selections are shown in square parentheses, so in most cases you will only have to press the **Return** key to make a selection and continue. If necessary, you can exit the Petroinstall utility and interrupt the installation process by selecting item **[9]**, which is on most menus or by pressing **Control-C**.*

Caution: *Superuser. After starting petroinstall - if you are not already logged in as superuser - you will be reminded to log in as **SUPERUSER**. If you want to exit Petroinstall (and then log in as superuser, and start Petroinstall again), press **Return** to accept the default option **n** (no). Alternatively type **y** (yes) and press **Return** to continue with the installation.*

3 Start the installation routine by entering:

```
./petroinstall.sh.
```

4 Select **option 2 'Set PetroMod home directory'** by pressing **Return** for **[2]**. You will be prompted to enter the destination directory name for the *PetroMod* installation, for example:

```
/usr/local/pm2021_1.
```

Press **Return** and Petroinstall will check whether the directory exists (if not, it will be created), and whether sufficient space is available in the directory.

5   Select **option 3 'Set Owner / Group of the PetroMod files'** by pressing **Return** for **[3]**. You will be prompted to enter the owner and group names for the files, or whether you want to leave the default, which will be root, if you are logged in as root.

6   **Option 4 'Select PetroMod Products'** shows the default which includes RedHat Enterprise Linux 7.5 64 bit.

7   Select **option 5 'Start installation'** by pressing **Return** for **[5]**. The installation process will start. All required files will be extracted from the compressed tar files (using **gunzip**) and copied into the appropriate subdirectories.

8   After the files have been copied, the message **Installation of PetroMod completed** will appear.

Petroinstall automatically sets the program environment by defining the environment variable **PM_HOME** in the **runpetro** script and export it. Thus, there is no need to reset the program environment when other users are working with PetroMod.

9   PetroMod can now be started from the **$PM_HOME/bin** directory by entering,

`./runpetro` (in case you are in the `$PM_HOME/bin` directory), or

`$PM_HOME/bin/runpetro` (e.g. `/usr/local/pm2021_1/bin/runpetro`) from any other directory.

Files Installed During Installation

The following files / folders are installed during the installation of PetroMod:

• one folder: **pm2021_1**:

   - **bin** folder including scripts for PetroMod

   - **doc** folder containing pdf user guides

   - **scripts** folder including Python files

   - **RHEL7_x86_64** folder

Installing Runtime Environment for Single and Parallel Processing (Systems Admin)

The PetroMod 2021.1 Simulator requires an MPI runtime environment for both single and parallel processing. PetroMod 2021.1 uses **Intel MPI 2018.2.199**.

Some steps are required prior to running parallel processing on a workstation or cluster. Parallel processing requires an additional PetroMod add-on license.

Intel MPI runtime

▶ *How to configure PetroMod to use the Intel MPI runtime*

PetroMod 2021.1 requires Intel MPI runtime.

You need to install the runtime version globally and change the **PM_MPI_RUN** variable:

1   Part of the PetroMod 2021.1 download package for Linux is a file called l_mpi-rt_2018.2.199.tgz which includes the required Intel MPI runtime files and documentation. It can be found in the **Runtime Environment/Linux** folder.

2   Edit the script **$PM_HOME/bin/runpetro.**

3   Change the value for the variable **PM_MPI_RUN** to fit the path used for the Intel MPI runtime environment.

•   •   •   •   •   •

Note: *The default path (/usr/local/intel/compilers_and_libraries_2018.2.199/ linux/mpi/bin64/mpirun) provides a good approach to what the value must be changed to.*

•   •   •   •   •   •

Caution: *Install the runtime environment on all machines that will be used for parallel processing - otherwise the distribution of the simulation job will fail.*

PetroMod Machine Files

▶ *How to set up PetroMod machine files*

•   •   •   •   •   •

Note: *$PM_HOME refers to the directory, where you installed PetroMod. The suggestion of this tutorial was /usr/local/pm2021_1, see step 3.1.3.*

1   Create a list of the computers, which will be used for parallel processing.

2   Label this list file **machines** and store it in the **$HOME/petromod/** directory.

•   •   •   •   •   •

Note: *$HOME refers to the user's home directory.*

It can be created and edited by entering for example,

`vi $HOME/petromod/machines`

Below, you will find an example for the machines list:

```
host1
host2
host3
host4
```

Configuring users for ssh

To enable users to distribute jobs to a cluster the ssh service must be configured on the machine and for the users. Set up ssh keys so that users are able to login to the machines without requiring to provide their passwords. This can be done by creating a ssh keys pair and setting up the authorized_keys file. It is a common procedure that is more secure than the formerly used 'rsh/rlogin' service. Your systems administrator should be familiar with the setup of ssh. The Linux manpages provide additional help.

Below is a list of common commands that are used to prepare the user's environment.

- `ssh-keygen-t dsa`: Creates a public/private key pair in $HOME/.ssh/id_dsa (id_dsa.pub)

- `cat $HOME/.ssh/id_dsa.pub $HOME/.ssh/authorized_keys`: Copies the public key to the 'authorized_keys' list

- `chmod 700.ssh/`: Restricts permissions on the.ssh folder to avoid security issues

- `cat $HOME/.ssh/known_hosts`: List of machines that are known and trusted by 'ssh'

Configuring users for rsh

Create an additional list to define the computers that can be accessed remotely and selected for parallel processing. This file (.rhosts) exists already and is stored in the **$HOME/** directory itself.

It can be edited for example by entering

> **vi $HOME/.rhosts**

Below, you will find an example for the .rhosts list:

```
host1
host2
host3
host4

+
```

Except for the **+** symbol at the end, the **.rhost** list is identical with the **machines** lists. The permissions for the **.rhosts** file should be set as follows in order to work properly: **chmod 640 .rhosts**

• • • • • •

> ***Important:*** *rsh/rlogin service must be enabled on all machines used for parallel processing. This is normally set up by the system administrator.*

Activating Parallel Processing in PetroMod

Once you have set up parallel processing you need to obtain and activate the necessary licenses before you can use this feature.

1   After the licenses have been activated open the **PetroMod Simulation Interface** and select the number of processors on the different nodes (Fig. 5-9).

2   Make sure you enable / disable the **use local processor** option depending on your needs:

  - If a local machine has been selected, enable the option;

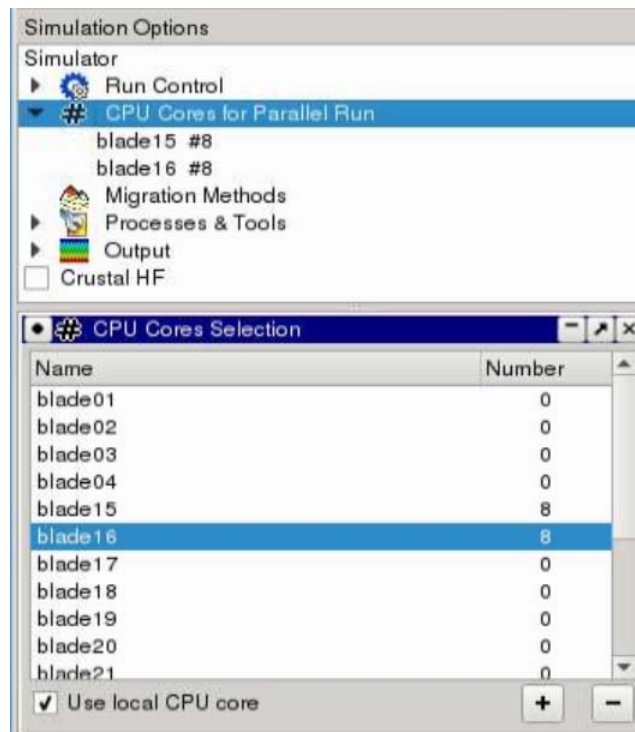 - If only remote machines are selected disable the option (head node).

Fig. 5-9   Activating parallel processing in the PetroMod Simulation Interface

Load Sharing Facility (LSF) in Conjunction with Parallel PetroMod

Editing the MPI location

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 PetroMod 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.

▶ *To edit the MPI location*

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

`/lsf/7.0/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="/usr/local/intel/impi/5.0.3.048/”`

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”`

Intel MPI Settings

The Intel MPI detects and uses the correct interface. Setting an environment variable will force an interconnect to be chosen.

Device Type	Description	Setting
uDAPL	uDAPL interface is used by 10G IWarp, Infiniband and Infinipath cards.	dapl
Std Ethernet	Standard 100Mbs, 1Gbs and 10Gbs network cards.	tcp
Shared memory + Ethernet	Shared memory + Ethernet network cards	ssm

▶ *Setting the environment variable*

1 Set the I_MPI_FALLBACK_LIST environment variable as follows:

`setenv I_MPI_FALLBACK_LIST dapl, tcp, ssm`

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

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

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

`setenv I_MPI_DEBUG 2`

For more information, see

http://software.intel.com/sites/products/documentation/hpc/mpi/linux/reference_manual.pdf

Running Parallel PetroMod with Queuing Systems

It is generally advised to run both PetroMod and Parallel PetroMod using a commercial queuing 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 PetroMod, 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 PetroMod. Queuing systems will allow greater throughput of jobs by using the available resources more efficiently.

Support for a commercial queuing system is available in PetroMod 2021.1. The queuing system is LSF from Platform Computing.

The support in the GUI interface and **lsfrun** script provides for a limited number of total available options for this platform, allowing queuing jobs that specify only the number of processors for each job submitted.

Running PetroMod Software with LSF

You can run PetroMod 2021 with LSF, using the standard simulator macros.

LSF SIS Integration kit

The LSF SIS integration kit requires on-site configuration of LSF - refer to the integration kit documentation. The integration kit and instructions can be found on the DVD under the `RuntimeEnvironment\LSF` directory.

The kit provides a dynamic method of license checking against the resource requirements. FLEXlm is queried for licenses using an `elim` (external load information manager), provided by Platform.

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

Check the **PetroMod_LSF_README.txt** file in the `RuntimeEnvironment\LSF` directory for further information about using and submitting jobs to the LSF.

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

```
if (-d /lsf/conf) then

source /lsf/conf/cshrc.lsf

endif
```

This assumes that LSF has been installed in the /lsf directory, otherwise amend as appropriate.

Configuring the License

Setting the Environment

The environment should be set by the systems administrator.

▶ *Floating Licenses Only!*

1 Make sure your company has a global license server running, which also manages the PetroMod licenses.

2 To set up a connection to this server, you have to set a new environment variable called

SLBSLS_LICENSE_FILE

3 Enter the value for SLBSLS_LICENSE_FILE in the format

`port@hostname`

where `port` is the port-number and `hostname` either the name or the IP-address of your license server. (e.g. **"765@150.10.170.1"**)

4 You (= systems administrator) should set all users globally on that machine.

Examples:

bash: **export SLBSLS_LICENSE_FILE=765@150.10.170.1**

sh: **set SLBSLS_LICENSE_FILE=765@150.10.170.1; export SLBSLS_LICENSE_FILE**

tcsh: **setenv SLBSLS_LICENSE_FILE 765@150.10.170.1**

Obtaining a License Key

PetroMod software installations are protected by a **license manager** which utilizes company, product, and machine codes.

1 PetroMod uses the **FLEXnet 11.17** license manager. Since most license protected Unix applications use this license manager, systems support staff should be well acquainted with its usage. For additional information, please refer to the *SLB Licensing User Guide*.

2 Request the license file by going to the PetroMod sections of the Customer Care Center on the SIS Support Portal (http://support.software.slb.com).

Include the following information:

- **Hostname** of the floating license server: To retrieve the hostname of your computer, it is often sufficient to enter the command **hostname** in a command line.

- DongleID of the floating license server: To retrieve the dongleID of your computer, please refer to the SLB Licensing User Guide.

- **HostID** of the floating license server: To retrieve the hostID of your computer, ask the system administrator or use "lmhostid" from the FLEXnet package for Unix (available at the SIS Support Portal).

- Your **contact information**, including email, fax and phone numbers, and alternative contact names, addresses

The FLEXnet license will be sent to you by email.

Setting up the License Server (Systems Administrator)

This set-up needs to be completed by a systems administrator.

• If a license server for Schlumberger software packages is already installed, there is no need to install an additional server for PetroMod.

• If no license server for Schlumberger software packages is installed, please use the files in the **Licensing** folder in the PetroMod installation package.This folder contains the Schlumberger license server. Please refer to the *PetroMod 2021.1 Release Notes* for more information.

1 Install the latest CodeMeter dongle driver from Wibu.

2 Install the license server package **SchlumbergerLicensingTool_2021.1_3114408_release_RH_x64_lsb.tar.gz** at a desired location.

3 Store the PetroMod license file at a desired location and rename it to `license.lic`

4 Start the license server via the command

`lmgrd -c license.lic.`

If you have a more complex environment (e.g. redundant server setup), we can assist you in setting up FLEXnet.

6 Uninstalling PetroMod (Unix)

Before You Begin

Before you begin, make sure you have exited out of the PetroMod application.

Uninstalling PetroMod

To uninstall PetroMod 2021.1 (not license or parallel processing tools) you simply need to delete the entire PetroMod folder:

`/usr/local/pm2021_1.`

Files Removed During Uninstallation

The following files / folders are removed during the uninstallation of PetroMod:

• the entire folder: `pm2021_1` including subfolders and files.

7   Open Simulator Requirements

Open Simulator   The Open Simulator has been released with PetroMod since version 2017.1. With the Open Simulator you can write your own scripts to output specific data and parameters from PetroMod data. For more information see the *Simulator User Guide* and the *Open Simulator User Guide*.

Python Installation   To utilize the Open Simulator a 64-bit Python 3.9.x (Windows) or 3.6.x (Linux) installation is required on your computer.

> **Note:** *To check whether the installation was successful, you can use the demo_opensim_python_version.py script, please refer to the Open Simulator User Guide.*

Windows
- We recommend Python 3.9.4 or newer version. If Python 3.9.x is not installed on your computer, download the necessary version from

  https://www.python.org/downloads/

- Be aware that PetroMod requires the installation of the 64-bit version, whereas the 1-click-download for Windows automatically installs the 32-bit version!

To point PetroMod to the correct Python version on your computer, you need to set the following environment variables:

PM_PYTHON_LIBPATH_2021_1 (path to the python39.dll library)

PM_PYTHON_HOME_2021_1 (value of the PYTHONHOME variable for the specific Python version)

In most cases both variables should point to the Python installation directory, which is usually

C:\Python39 or %USERPROFILE%\AppData\Local\Programs\Python\Python39

Linux   For RHEL7.5 a Python 3.6 package is available from RedHat's 'Software Collections' and can be installed under /opt/rh/rh-python36. This path is automatically checked by the Open Simulator.

Please follow these instructions:

- Login as **root**.
- Enable the **rhscl** and **optional** software repositories using **subscription manager**.
- Use **yum** to install **rh-python36**.

Command line steps:

1   su -

2 `subscription-manager repos --enable rhel-7-server-optional-rpms --enable rhel-server-rhscl-7-rpms`

3 `yum -y install rh-python36`

For RHEL8 Python 3.6 is the standard Python version released with the operating system. It is automatically detected by PetroMod.

If Python 3.6.x is not provided by your operating system, you can download a 3.6.x version from https://www.python.org/downloads/ and build it from scratch. We recommend to use the most recent version (which is currently 3.6.13). After successful installation you have to set the environment variables

PM_PYTHON_LIBPATH_2021_1 (path to the libpython3.6m.so library)

PM_PYTHON_HOME_2021_1 (value of the PYTHONHOME variable for the specific Python version)

Installation of additional Python modules

The **Nested model** functionality for 3D petroleum system models utilizes the Open Simulator. In addition to the standard Python modules it requires the numpy Python module.

This module (like many other modules for your own scripts) can be installed via the pip3 command.

Windows

1 Open the command line and switch to the directory with the Python executable.

For example, if you installed Python under C:\Python39 use the commands

`C:`

`cd \Python39`

2 Switch to the Scripts subdirectory by executing `cd Scripts`

3 To install the module

- For the current user run `pip3 install --user numpy`
- For all users run `pip3 install numpy`

An installation for all users might require administrator rights.

Linux

1 Open the command line and switch to the directory with the Python executable.
Use the command

`cd /opt/rh/rh-python36/root/usr/bin`

2 To install the module

- For the current user run `pip3 install --user numpy`
- For all users run `pip3 install numpy`

The installation for all users might require administrator rights.