

Part I

Installation, Licensing, and Utilities

INSTALLATION, LICENSING, AND CONFIGURATION

This chapter provides detailed instructions for installing *FLOW-3D*, configuring software licensing, and setting up the remote solving features. For any trouble during the installation, please contact our support department at support@flow3d.com or by calling (505) 982-0088 and we will be happy to assist.

1.1 Installation

1.1.1 Supported operating systems

There are certain operating systems on which *FLOW-3D* and FlowSight are tested. While it may be possible to install and run both of these programs on other operating systems, Flow Science supports and provides installation assistance for only the following **64 bit** operating systems:

- Microsoft **Windows 7** and greater
- Microsoft **Windows Server 2008** and greater
- **Red Hat Enterprise Linux 6** and greater

Note:

- 32 bit operating systems are not supported.
 - The **lmgrd** license server is not compatible with Red Hat Enterprise Linux 7. The new **lmadmin** license server has been included instead.
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1.1.2 Hardware requirements and recommendations

- **Processor:** An x86-64 compatible CPU is required. Multiple core CPUs, particularly **Intel Core i7** and **Intel Xeon** CPUs, are strongly recommended. AMD CPUs are not recommended.
- **Memory:** The software requires a minimum of 2GB RAM per processor core. Note that the amount of RAM required is highly problem dependent. For simulations with large domains, or with complex geometry requiring fine resolution, significantly more RAM than the required minimum will be necessary. Memory speed has a small effect on simulation time and typically 1333 or 1600 MHz memory is adequate.
- **Graphics:** The FlowSight postprocessor works best with a workstation card. **nVidia Quadro K series** cards or **AMD FirePro W series** cards are highly recommended. nVidia's **GTX series 660** and above have shown decent performance on desktop and notebook machines.
- **FLOW-3D for Windows** requires at least 1GB of free disk space. On **Linux** operating systems, at least 1.2GB of free disk space is necessary. Additional space is required for simulation results, which can be upwards of 100GB depending on the simulation.

- **Settings:** Machines that run *FLOW-3D* should be set to a high-performance power setting to prevent the machine from sleeping or otherwise powering-down during long-running simulations. Additionally, using automatic file compression utilities is not recommended.

1.1.3 Licensing Information

Licensing Requirements

Please ensure that you have a valid *FLOW-3D* license file or the name or IP address of your *FLOW-3D* license server before beginning the installation. If you do not have a license file or a license server please contact your sales associate or licenses@flow3d.com and provide the following information:

- The host name of the machine that will run the license server software
- Either the FlexID (if using a hardware dongle; the FlexID is printed on the side of the dongle) or the MAC address of the machine

If the MAC address is not known:

- On **Windows** operating systems, the host name and MAC address can be found by opening the command prompt and entering `ipconfig /all`. When multiple ethernet cards are present, multiple MAC addresses may be listed in the output. The connected ethernet device or the first in the series is preferable.
- On Linux operating systems, typing `/sbin/ifconfig` in a terminal window will provide the MAC address, under the heading `HWAddr`. The host name can be found by entering the `hostname` command in a terminal window. When multiple ethernet cards are present, multiple MAC addresses may be listed in the output. `eth0` is usually best, but if you are unsure which MAC address to use, please send a text file or attach a screen capture with the output of the command, and the License Administrator will determine the best option.

Once the host name and MAC address or FLEXID have been received, the License Administrator at Flow Science will send the license file (`flow3d.lic`) as an email attachment. It is an ASCII text file with encryption codes that allow it to be used only on the computer or dongle for which it was generated. Check the license file to be sure that it contains the host name and HOSTID that matches the license server. More information about licensing can be found in the following sections on *FlexNet License Administration Tools* and *Licensing Terminology*.

FlexNet License Administration Tools

FLOW-3D uses the licensing package FlexNet Publisher, by Flexera Software. FlexNet enables *FLOW-3D* licenses to be shared across a network.

Flexera Software provides utilities for users or local license administrators to manage FlexNet licensing activities. The FlexNet End User Manual is available in the `utilities` subdirectory of the *FLOW-3D* installation in both PDF and HTML formats. For Windows computers, the program `lmttools.exe` is provided with all installations. With **LMTTOOLS**, users can start, stop and configure FlexNet license servers, get system information, get server information, and more. For more information, please see Chapter 12 of FlexNet End User Manual.

On **Windows** computers, the license manager daemon `lmgrd` will restart automatically whenever the computer is rebooted. On Linux computers, however, the license manager must be started each time the computer is rebooted. To have the license manager start automatically on Linux requires editing the appropriate boot script and inserting the appropriate startup commands. See Section 6.2 of the FlexNet End User Manual for more information. A summary of commonly used administration tools on Linux is included here. Full descriptions of these and other available utilities can be found in Chapter 12 of the FlexNet manual.

- **lmdiag** - diagnoses license checkout problems Useful debugging command: `lmutil lmdiag -n -c "full_license_file_path"`
- **lmdown** - gracefully shuts down all license daemons on the license server node.

- **lmgrd** - the main daemon program for FlexNet
- **lmhostid** - reports the HOSTID of a system
- **lmreread** - causes the license daemon to reread the license file and start any new vendor daemons
- **lmstat** - helps monitor the status of all network licensing activities Useful debugging command: `lmutil lmstat -a -c "full_license_file_path"`
- **lmver** - reports the FlexNet version of a library or binary file

Note:

- Using `kill -9` to shut down the license server on Linux computers is not recommended. Instead, use either `lmdown` or use the `kill` command without the “-9” parameter.
- The **lmgrd** license server is not supported on Red Hat Enterprise Linux 7

Licensing Terminology

- **Definition of Client and License Server:** Any computer running *FLOW-3D* is referred to as a “client.” The computer on which the FlexNet license server is installed will be referred to as the “license server.” The client and server may be (and often are) the same machine.
- **Software Package and Software Distribution:** The terms “software package” and “software distribution” will be used to refer to the directory structure containing all of the data files and executables needed to run *FLOW-3D* on a particular computer.
- **License Files and Servers:** A valid license file from Flow Science is required to use *FLOW-3D*. This license file will be sent as an email attachment from Flow Science’s License Administrator at licenses@flow3d.com. This license file must be saved in the licenses directory of the *FLOW-3D* installation on the machine that will act as the license server. More detail about this is given in the *Windows Installation* and *Linux Installation* sections below.

As discussed in *Floating vs. Node-Locked Licenses*, *FLOW-3D* can be used on multiple computers, but one computer must be selected to be the license server. If the computer chosen to be the license server will not actually be used to run *FLOW-3D*, then only the FlexNet license server needs to be installed on that machine. Also, if the FlexNet license server will be installed on a Windows computer, a licensing dongle that attaches to the USB port of the computer will be provided by Flow Science. This key is enclosed in the *FLOW-3D* package.

Tokens

The total number of *FLOW-3D* solver processes that can be run concurrently is determined by the number of “tokens” contained in the license file. The number of tokens available depends on how many were purchased. The license server checks tokens out to client computers on the network, and then checks them back in when the application has completed. In this process, tokens are counted by the license server and when all of the tokens purchased have been checked out, no more tokens can be checked out until a token which is in use has been checked in.

There are several different types of solver tokens. The most important distinction is between “serial” solver tokens and “parallel” solver tokens. Flow Science offers multi-processor versions of *FLOW-3D* for both shared-memory (SMP) and distributed-memory (cluster) environments. A shared memory parallel solver token (shown in the license file as `hydr3dp`) enables *FLOW-3D* simulations using more than one processor on a multiprocessor computer. For the distributed-memory version, *FLOW-3D/MP*, a `hydr3d` or `hydr3dp` instance token is required as well as `hydr3dmpi` rank tokens. For example, to run a simulation on 16 processors using *FLOW-3D/MP*, the license file must have a `hydr3d` token and 15 `hydr3dmpi` tokens. In special cases one or more serial solver tokens `hydr3d` may be in the license file. These serial solver tokens will run the solver on a single processor and can be used on computers running any supported operating system.

There are essentially an unlimited number of tokens available to run *FLOW-3D*'s auxiliary programs such as the preprocessor, the postprocessor, and the various visualization options. The exception is for FlowSight, where two `flowsight` tokens are provided for each `hydr3d` or `hydr3dp` instance token.

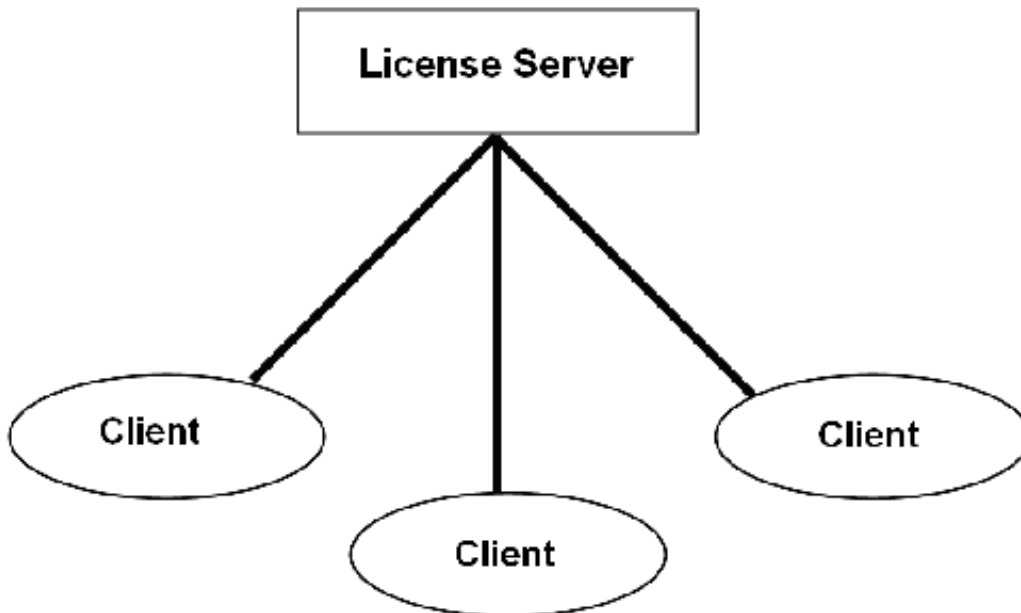
Floating vs. Node-Locked Licenses

There are two general types of licenses used to enable *FLOW-3D*: “floating” and “node-locked.” A floating license is the most common type of license and is available to any computer on the network. Flow Science can also provide a node-locked license. Node-locked licenses can only be used on the designated computer.

Both floating and node-locked licensing schemes require that one computer be designated as the license server.

- **Floating Licenses:** To use floating licenses, it is important that both the network and the computer intended for use as the license server are reliable. The TCP/IP protocol must be loaded and functional, and all intended clients must be able to access the license server. Floating licenses may also be accessed through a VPN tunnel. The computer that is acting as the license server may be any computer on the network, and does not need to have *FLOW-3D* installed. The license server may be a Windows or a Linux computer. Users may load *FLOW-3D* on any client running a supported Linux or Windows computer on the network. A hardware key is not needed on a client computer unless it uses a node-locked license.

To employ a floating license on a single computer, *FLOW-3D* should be installed with the client/server option. The license server and the clients may reside on the same local area network, over a WAN, or across VPN. *FLOW-3D* must be installed locally on each client. An example of a floating license configuration is shown below.



- **Node-Locked Licenses:** Users may choose to have their solver tokens locked to a particular computer so that only that computer can run the solver.

Both floating and node-locked licensing schemes have their advantages and disadvantages. A floating license is advised if several people are sharing a license, or it may be necessary to run *FLOW-3D* on a different computer if a particular computer is busy. With a floating license, a problem can be set up on one computer while using another to run the *FLOW-3D* solver on a second problem. If other machines or problems are using all available tokens, the solver

will not run until a token becomes available. The main advantage of a node-locked license is the ability to ensure that token(s) are always available to a specific machine and not available to others on the network.

Note: All licenses are floating licenses unless specifically requested as node-locked.

1.1.4 Procedure

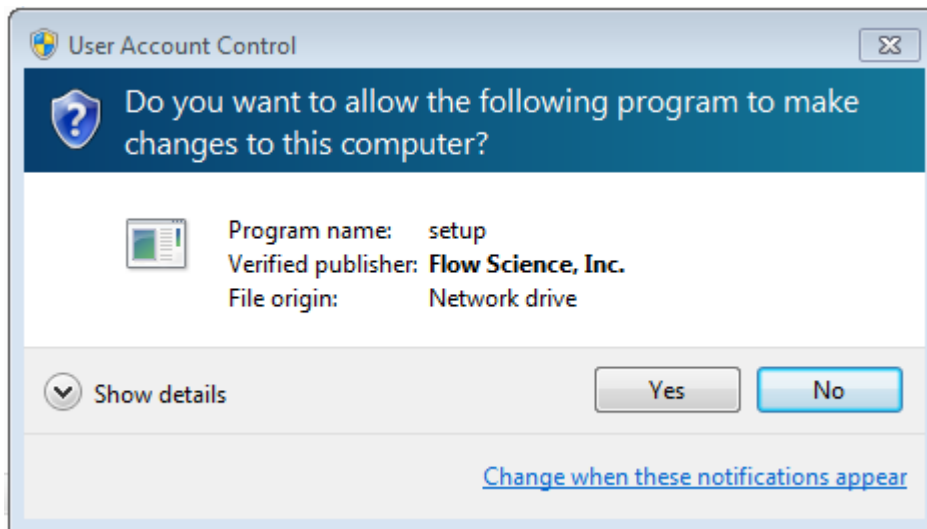
Windows Installation

Note:

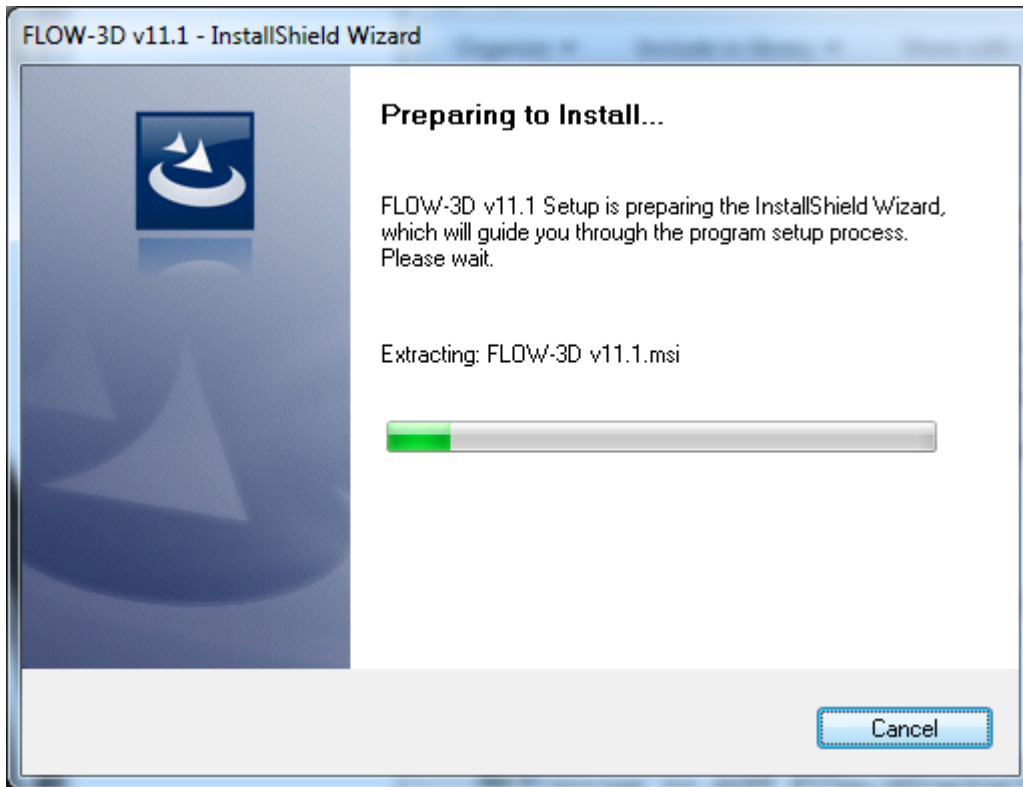
- Administrator privileges are necessary to install **FLOW-3D** on **Windows**. Before installing, please close all other running programs.
 - If installing on the **Windows 8** operating system, please consult the *Special Considerations for Windows 8 and 8.1*.
 - Please note that third-party security software that includes a firewall, such as Norton 360, may interfere with license checkout and remote server operation. Ports that needs to be opened for proper operation are listed in the licensing documentation below.
 - If installing on a machine that has an earlier **FLOW-3D** version installed, please close any running copies of **RunnerServer.exe**. This can be done by either:
 - Right-clicking the green “running person” icon in the system tray and choosing *Quit*.
 - Opening the **Windows Task Manager** and stopping any **RunnerServer.exe** processes shown in the *Processes* tab. It may be necessary to click the *Show Processes from All Users* button to find the **RunnerServer.exe** process.
-

The installation can be started by double clicking the downloaded **flow3d_v11.1.1.exe** file.

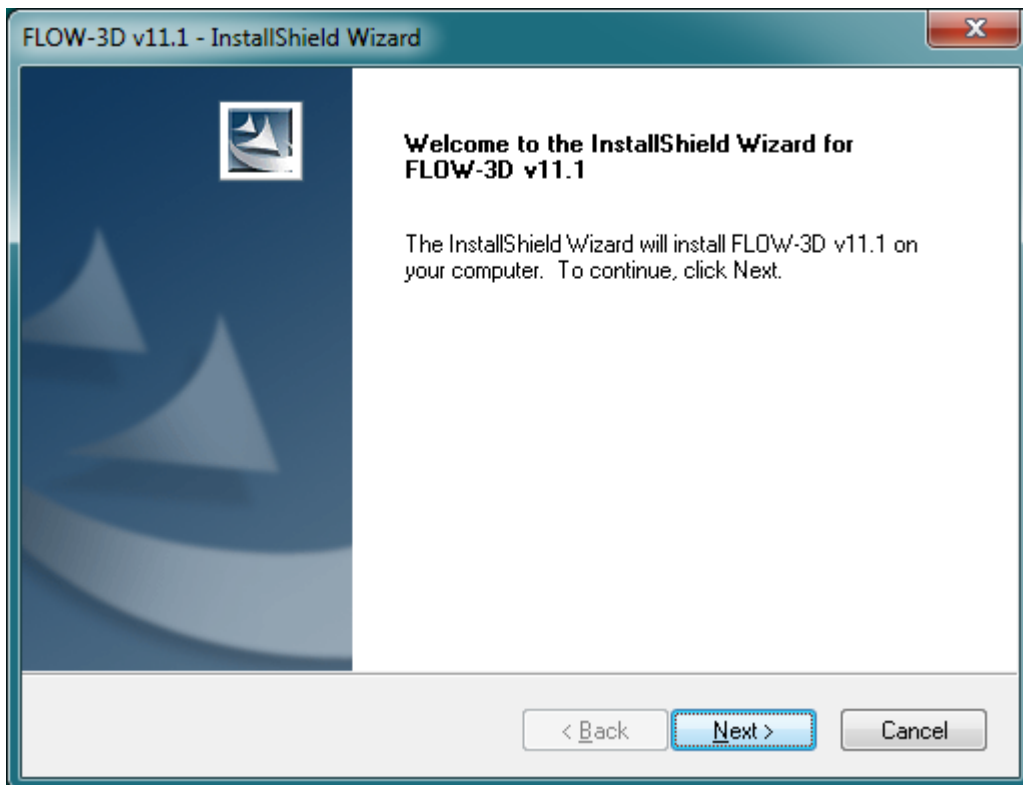
1. On **Windows** operating systems, a User Account Control dialog, similar to the one below, will appear. The “Verified publisher” entry should confirm that the executable has been digitally signed by Flow Science, Inc.



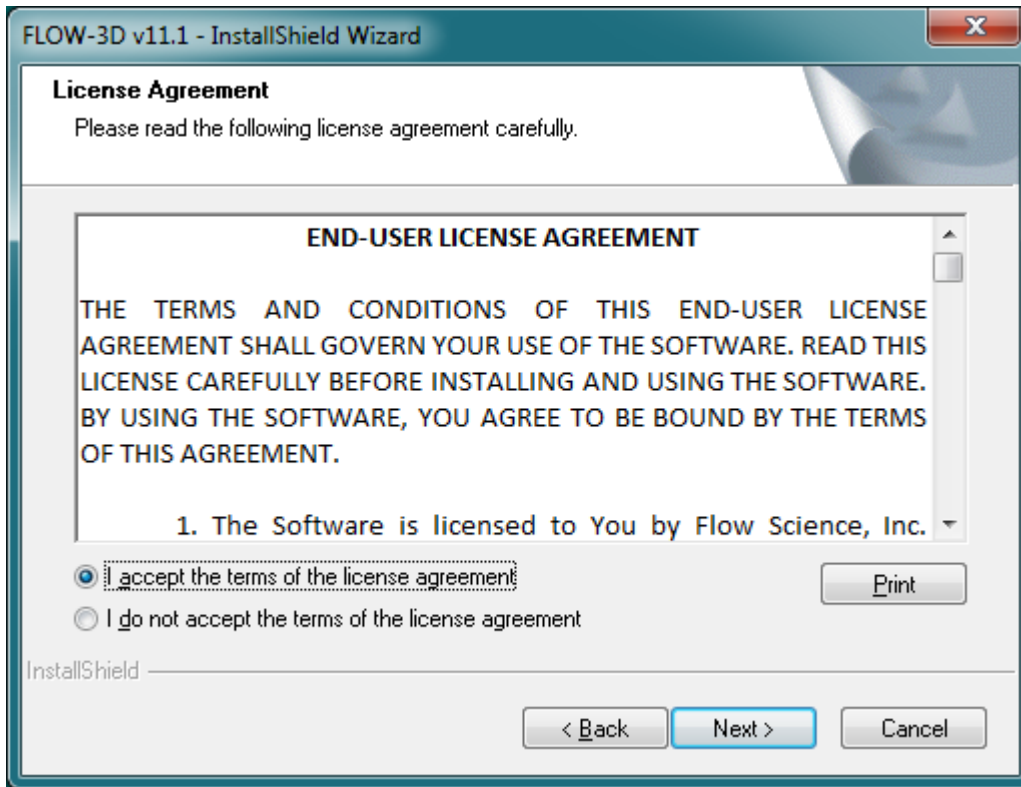
2. Next, the Preparing to Install dialog will be displayed. It requires no user input and will disappear after several seconds.



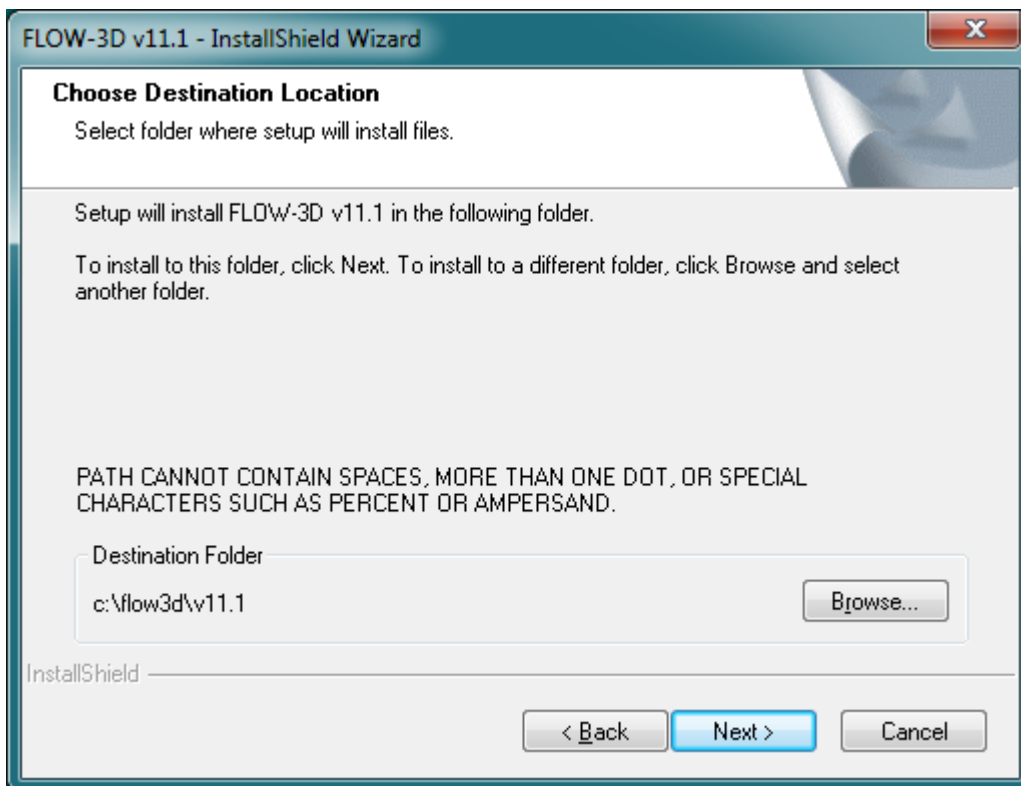
3. The next dialog to appear is the Welcome screen. Click *Next* to continue.



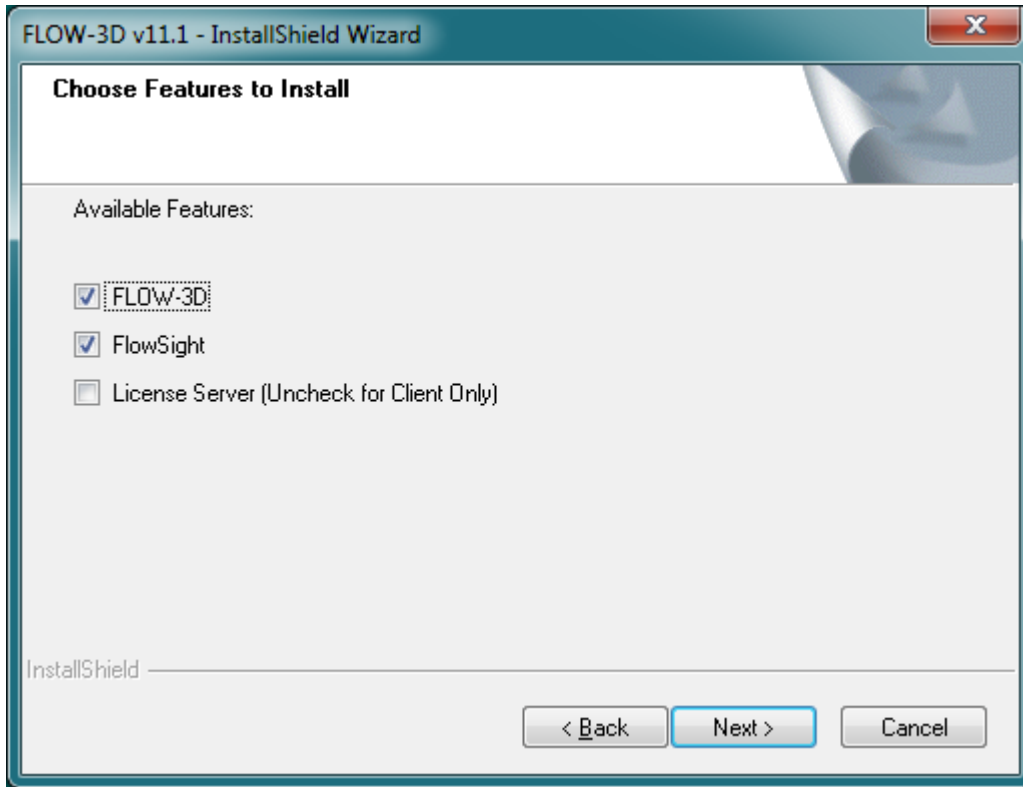
4. The next dialog is the *FLOW-3D* end user license agreement. Please read it carefully. If all the terms are acceptable, click the *Next* button to signify agreement and move to the next dialog.



5. Now the install location can be chosen. The default directory can be used, or *FLOW-3D* can be installed to a specific directory. Once the location is chosen, click *Next*. When installing to a different location, it is important that the directory name not contain spaces, ampersand characters, or multiple dots.

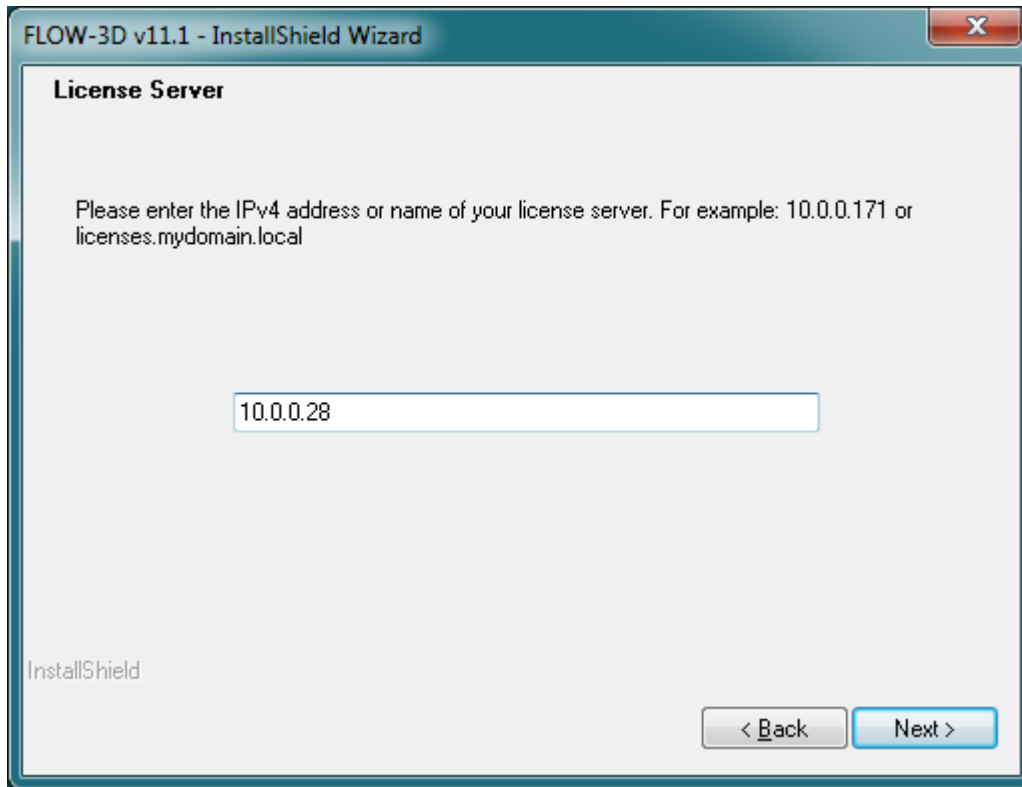


- The available features are shown. Individual features may be selected for installation by checking the appropriate box. If this machine will connect to a remote license server, *License Server* should be left unchecked. This is equivalent to the Client Only installation in older *FLOW-3D* versions.

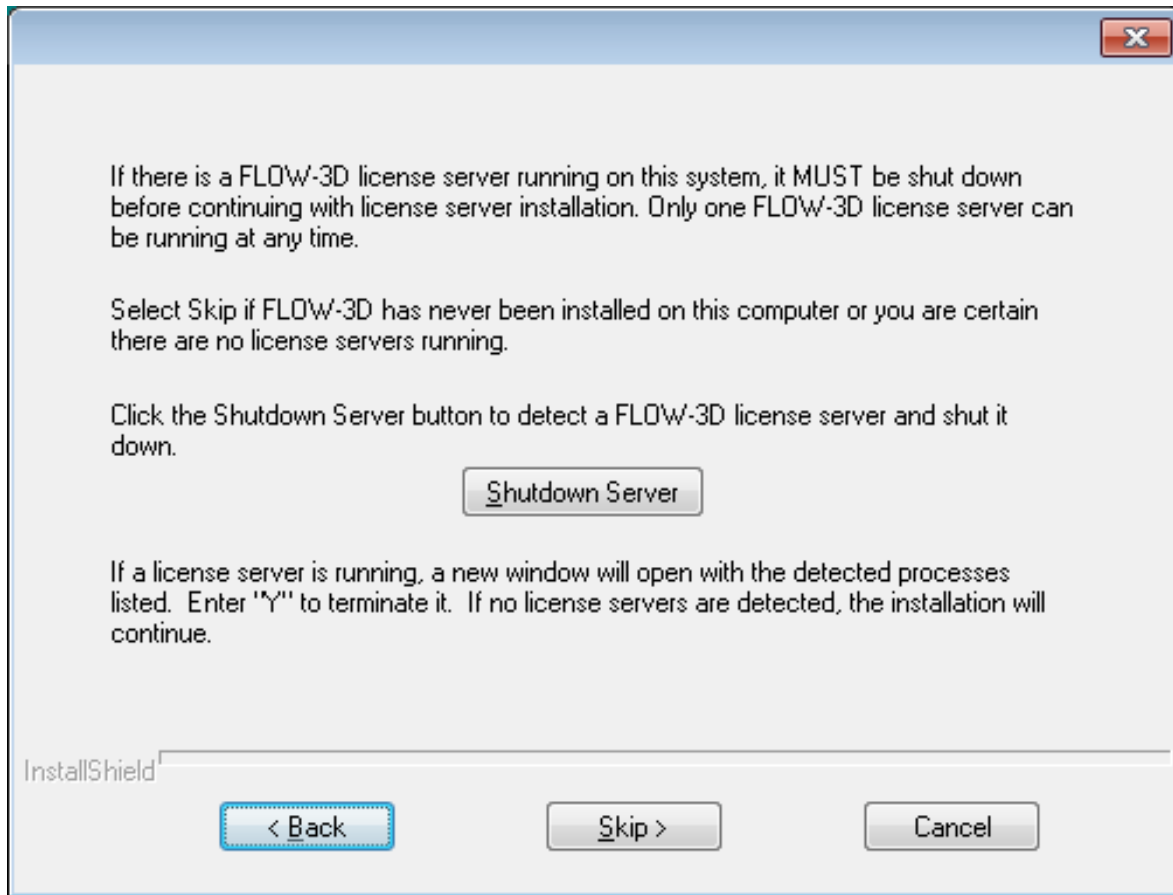


Note: If this machine is intended to act as a remote server with the Remote Solving feature (see *Remote Solving Setup*), *FLOW-3D* should be checked.

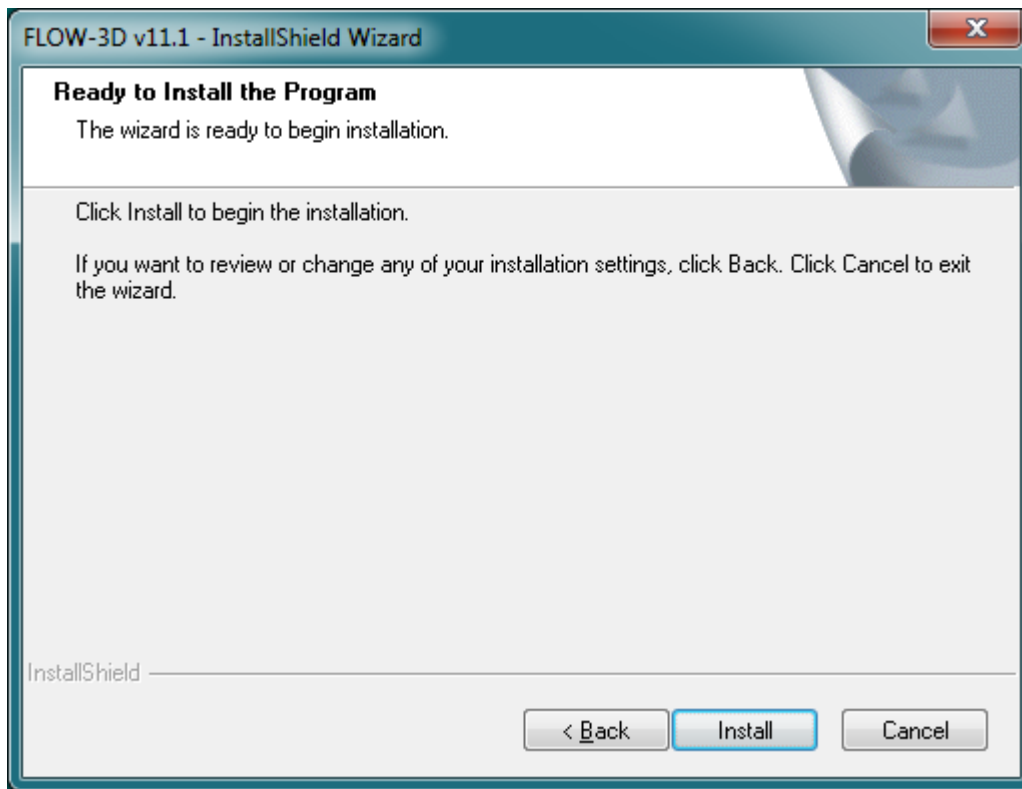
- If the *License Server* option was not selected, this dialog will be shown instead. It allows an IPv4 address or a server name to be specified for the license server. If unknown, the IP address can be found by opening the command prompt and entering `ipconfig /all` on the license server machine. The name can be determined by opening a command prompt or terminal window and issuing the command `hostname`. When using a hostname, the server should respond to ping requests. The name required may differ based on the network. For example, a machine may respond to `ping host.company.com` but not to `ping host`. If this is the case, the full name must be used. If the hostname entered is not reachable, the client will not function.



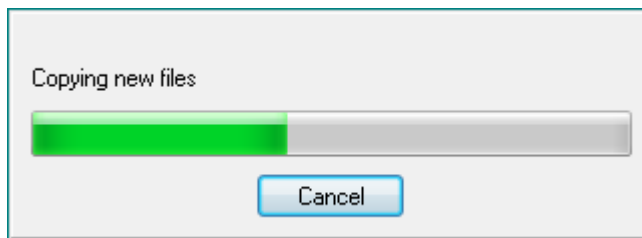
8. If the license server is being installed, *FLOW-3D* will ask to temporarily shut down any existing license servers. This allows the *FLOW-3D* license as well as **FlexLM** licenses from other vendors to be served. This can only be skipped safely when no other software that uses **FlexLM** licensing is installed, including older versions of *FLOW-3D*.



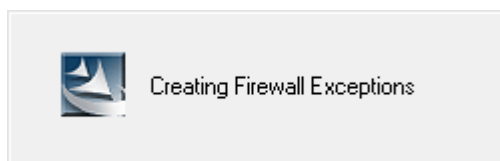
9. **FLOW-3D** is now ready to install.



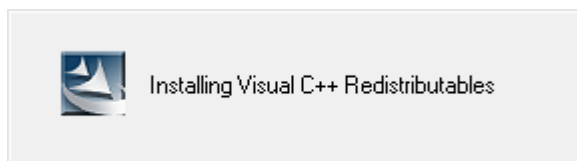
10. The *FLOW-3D* installer will copy the necessary files.



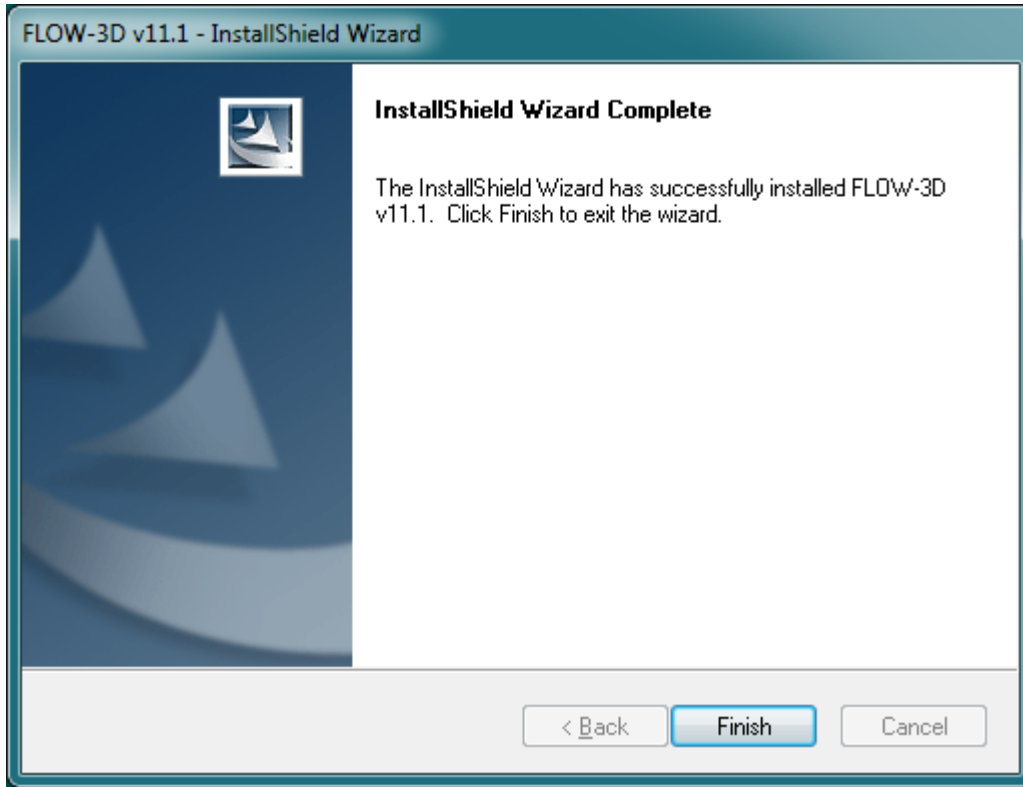
11. Next, the installer will create firewall exceptions to allow communication to remote license servers and for remote solving.



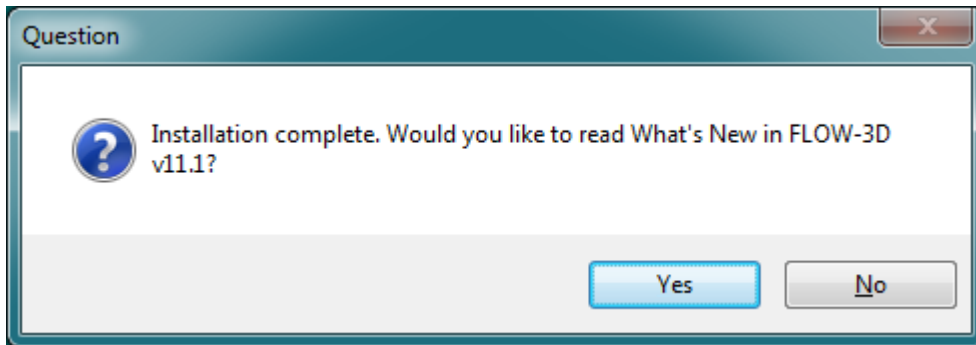
12. Finally, the Microsoft Visual C++ redistributables will be installed.



13. The installation is now complete.



14. After installation, an opportunity is presented to learn about new features.

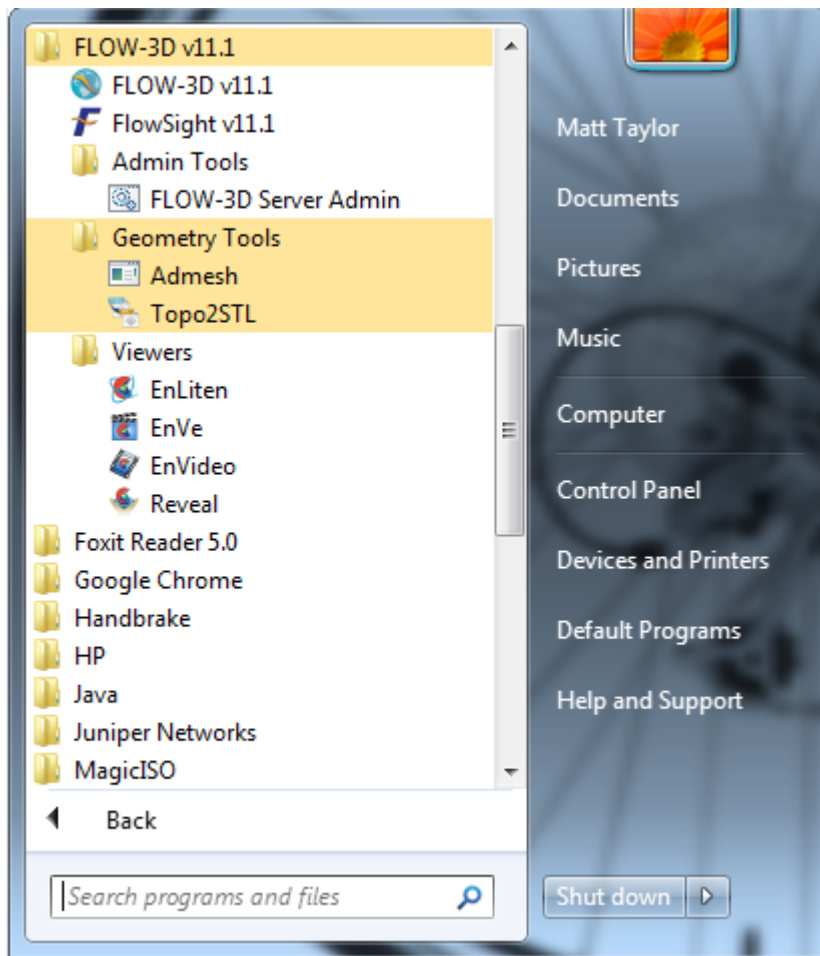


15. The *FLOW-3D* and FlowSight icons (if installed) will now appear on the desktop.



16. Also, there will be a new *Program Group* in the **Windows Start Menu**. It includes tools and viewers appropriate

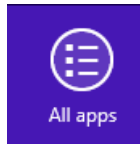
to the features that were installed.



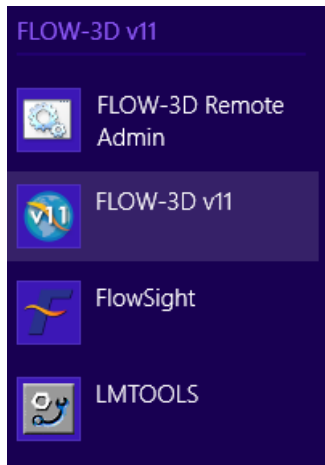
Special Considerations for Windows 8 and 8.1

Flow Science highly recommends updating **Windows 8** to **version 8.1 Update 1** (or the newest version available) before installing **FLOW-3D**.

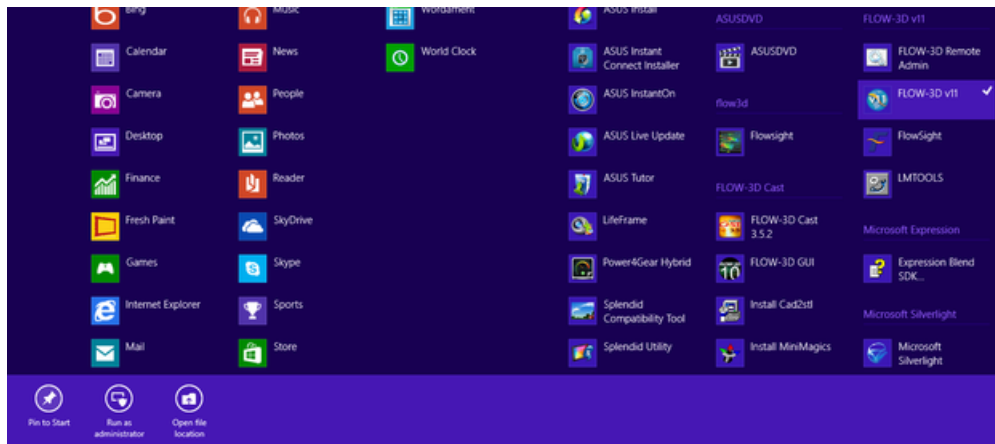
- On all versions of the **Windows 8** operating system, including those which have been updated, the following considerations apply:
 - Secure boot must be disabled for the **Sentinel HASP USB drivers** to install. Please see <http://technet.microsoft.com/en-us/library/dn481258.aspx> for the procedure.
 - The “Creating Firewall Exceptions” dialog may not be shown. However, the firewall exceptions are created.
- When the **Windows 8** operating system has not been updated, the desktop icons are not created by the installer automatically.
 - One potential solution is to install a third-party Start Menu replacement, such as **Classic Shell** or **Start8**. If a Start Menu replacement is installed prior to installing **FLOW-3D**, the icons will be created correctly.
 - Another option is to use the Modern interface *All Apps* view. This can be done by right-clicking the Start Screen, then clicking *All Apps* at the lower right.



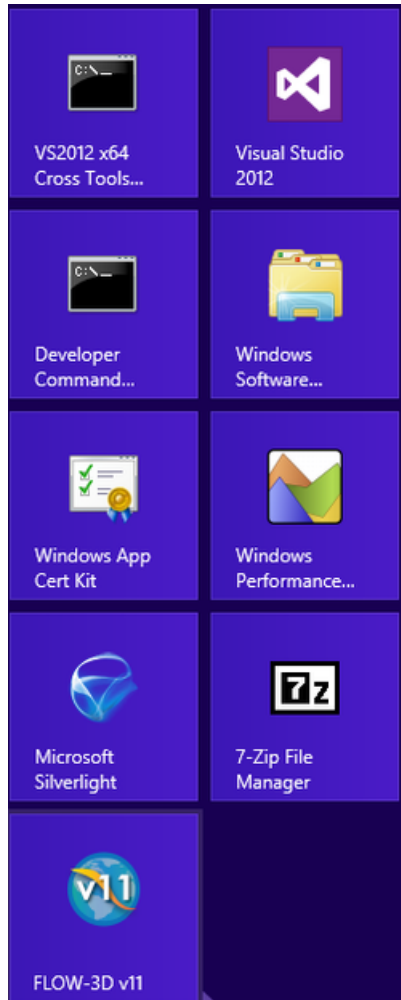
There will be a Program Group for *FLOW-3D*.



Right-click one of the icons and choose *Pin to Start* at the lower left to place the icon on the main Start Screen.



The icon should now appear on the main Start Screen and can be used to launch the program.



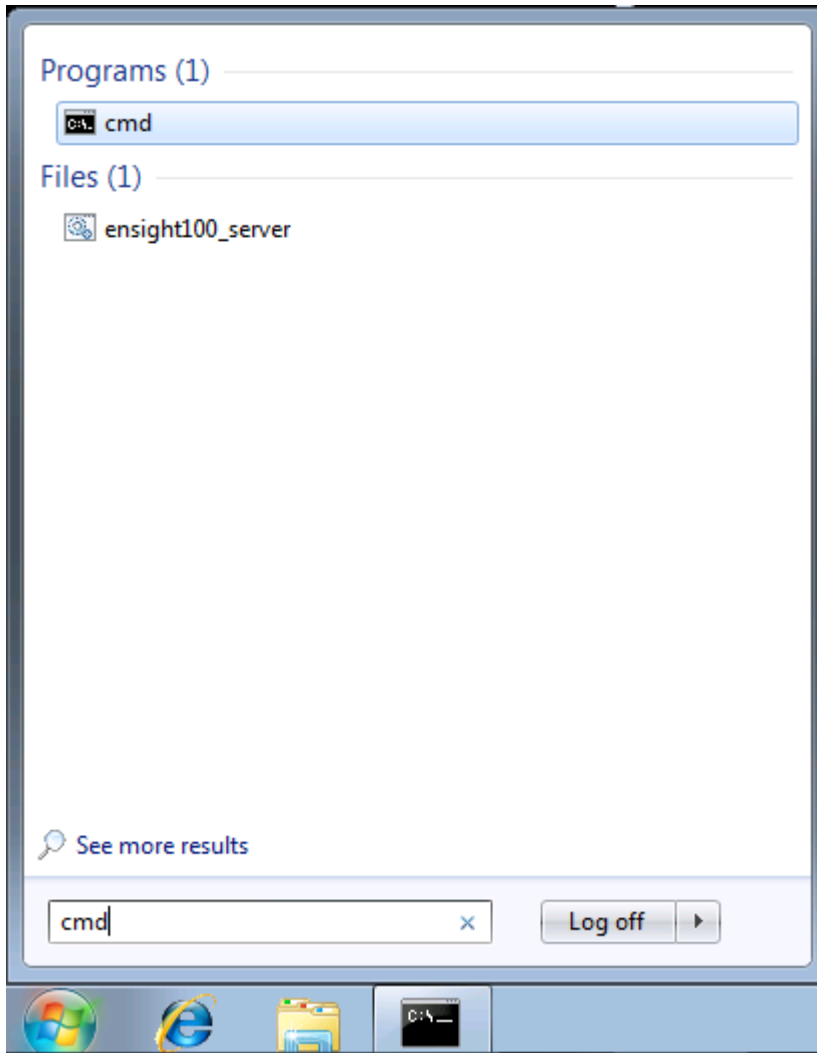
Special Considerations for Remote Desktop

When connecting to a remote desktop session, Windows uses software rendering by default. This impacts performance negatively for both *FLOW-3D* and FlowSight. To determine whether *FLOW-3D* is using software rendering, choose *About* from the *FLOW-3D Help* menu. The entry for *GL_RENDERER* will show *GDI Generic* if software rendering is being used.

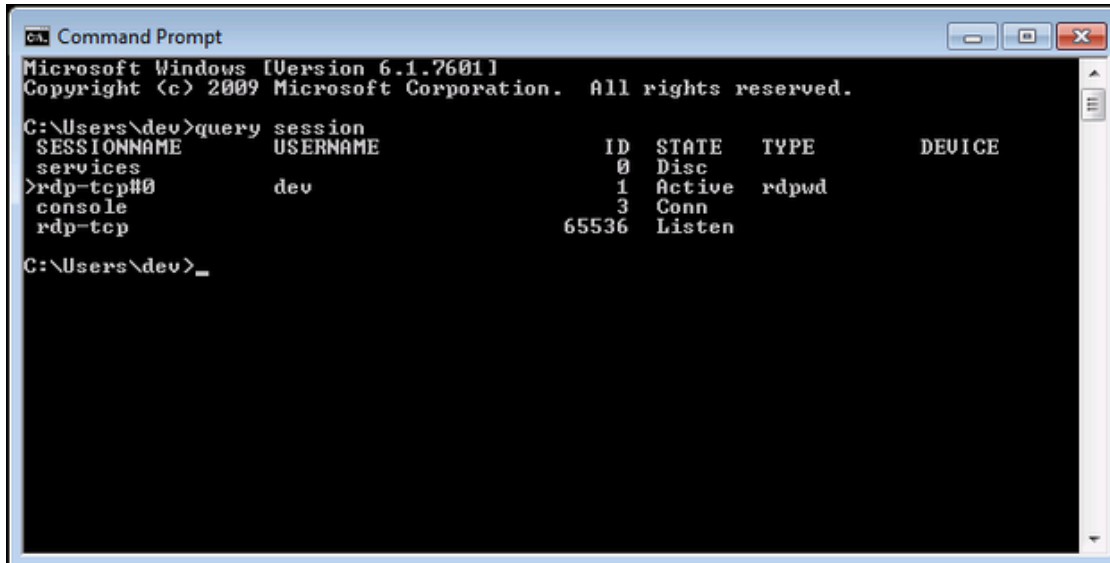
Interface version	11.0.2.0 09/11
Solver version	hydr3d versic
Host Name	cast-test
Operating System	Microsoft Win
Number of Processors	2
Total Physical Memory (RAM)	2.04688 GB
F3D_HOME	C:\flow3d\w11
User F3D Home	C:\Users\dev\
f3dtknux_license_file	@10.0.0.28
GL_RENDERER	GDI Generic

If software rendering is being used, there are several options to enable hardware rendering. One easy option is to start *FLOW-3D* from the physical console, then connect the remote desktop session. Some VNC software uses hardware rendering by default. Finally, the **TSCON** command can be added to the batch file used to launch *FLOW-3D* to temporarily pass control back to the console session. This option will be discussed.

To use **TSCON**, determine which session is connected. This can be determined using a query. Click the Start button and type **cmd** in the box labeled **Search programs and files**. Click **cmd.exe** when it appears at the top of this window to open a **command prompt**.



At the prompt, type **query session** to receive a list of sessions. The relevant remote desktop session will be listed with a greater than symbol to its left and show the username with which you logged in. In this example, user dev is connected with a session ID of 1.



```

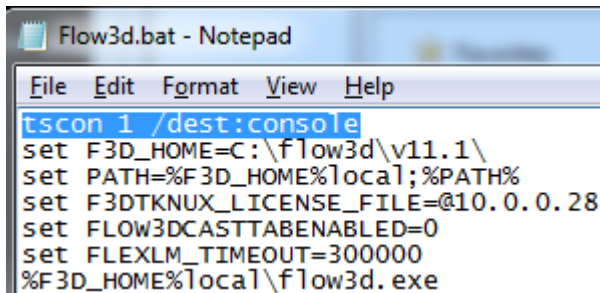
ca. Command Prompt
Microsoft Windows [Version 6.1.7601]
Copyright (c) 2009 Microsoft Corporation. All rights reserved.

C:\Users\dev>query session
SESSIONNAME      USERNAME              ID  STATE  TYPE  DEVICE
services         dev                   0   Disc
>rdp-tcp#0       dev                   1   Active rdpwd
console          dev                   3   Conn
rdp-tcp          dev                   65536 Listen

C:\Users\dev>_

```

To connect session 1 (for example) to the console, add `tscon 1 /dest:console` to the beginning of the *FLOW-3D* launch batch file (replace 1 with your session ID). To edit the batch file, right-click the *FLOW-3D* desktop icon and choose **Edit** or navigate to %F3D_HOME%\local, right-click flow3d.bat and choose **Edit**. In the resulting notepad window, the line can be added. It should be placed before all other lines in the file.



```

Flow3d.bat - Notepad
File Edit Format View Help
tscon 1 /dest:console
set F3D_HOME=C:\flow3d\v11.1\
set PATH=%F3D_HOME%\local;%PATH%
set F3DTKNUX_LICENSE_FILE=@10.0.0.28
set FLOW3DCASTTABENABLED=0
set FLEXLM_TIMEOUT=300000
%F3D_HOME%\local\flow3d.exe

```

After editing the file, save it and launch *FLOW-3D*. The remote desktop session will be ended, and when reconnected, the hardware renderer should now be shown in the *About* menu.

```

GL_RENDERER      GeForce 6800 GS/PCI/SSE2
GL_VENDOR        NVIDIA Corporation
GL_VERSION        2.1.2

```

Some caveats:

1. The **TSCON** command must be run as administrator. If Error 5 occurs, right-click the *FLOW-3D* desktop icon and choose Run as Administrator.
2. The host machine must have an OpenGL-capable graphics card.
3. Due to the graphics requirement, this will not work for virtual machines.
4. The user must have a console session. This may not work after a reboot and is known not to work when another user is logged into the console session.

Special Considerations for Multi-User Machines

When not using **Windows Server**, *FLOW-3D* cannot be simultaneously run by more than one user. This is due to inherent limitations of the **Fast User Switching** functionality of the operating system. For example, on a **Windows 7** or **Windows 8** operating system, if User A starts a *FLOW-3D* simulation, and switches to User B or the Administrator account, another *FLOW-3D* simulation cannot be run by that user until the simulation launched by User A is complete.

As such, **Windows Server** or Linux operating systems are recommended if it is desired that multiple users be able to run *FLOW-3D* simulations simultaneously.

Linux Installation

FLOW-3D for Linux is distributed as a gzip-compressed tar archive, often called a tarball. The installation files can be extracted from `flow3d_v11.1.tar.gz` in a terminal window, using the command `tar -xzvf flow3d_v11.1.tar.gz`. The tarball can be unpacked into any directory on the filesystem using the `-C` flag. For example, to extract the tarball to `/home/user`, use `tar -xzvf flow3d_v11.1.tar.gz -C /home/user`.

Once in the directory where the installation files exist, or to which they have been unpacked, the script `install-flow3d.sh` can be run. A preceding dot slash may be necessary depending on whether the current directory is on the system PATH (i.e., `./install-flow3d.sh`). By default, this file is executable. *FLOW-3D* is only supported on **64-bit** Red Hat Enterprise Linux 6 or greater. It may be possible to install on other distributions, but due to potential library and package differences, Flow Science does not provide technical assistance on these distributions.

Note:

- The FlowSight visualization software requires `libstdc++.so.5`. This may be installed on RHEL6 or RHEL7 using the command

```
yum install compat-libstdc++-33
```
- The installation script must be run as **root**
- The default installation directory is `/opt/flow3d/v11.1`

-
1. Having the Linux Standard Base package installed allows the script to work best. This can be done using the commands below.

```
RHEL6: yum install lsb
```

```
RHEL7: yum install redhat-lsb
```

2. Execute the install script in the directory where the tarball was unpacked. For example, if viewing that directory, use the command `./install-flow3d.sh`. The license agreement can be read prior to installing the software.

```

flow3d@v111_BUILD_LIN/raid6/flow3d/v11.1_linux_dist
[root@v111_BUILD_LIN v11.1_linux_dist]# ls -l
total 373272
-rwxrwxrwx. 1 flow3d flow3d 101546576 Jul  9 14:24 flow3d-11.1-2.x86_64.rpm
-rwxrwxrwx. 1 flow3d flow3d 280230672 Jun 30 16:58 FlowSight-11.1-1.x86_64.rpm
-rwxr-xr-x. 1 flow3d flow3d  36064 Jul 10 10:10 install-flow3d.sh
-rw-r--r--. 1 flow3d flow3d  15314 Jun 10 14:12 LICENSE_AGREEMENT
drwxrwxr-x. 2 flow3d flow3d   4096 Jun 12 16:04 license_server
-rw-rw-r--. 1 flow3d flow3d   6833 Jun 25 13:14 README
[root@v111_BUILD_LIN v11.1_linux_dist]# ./install-flow3d.sh

Would you like to read the LICENSE AGREEMENT? (Please respond with 'yes' or 'no')
yes

```

3. If all the terms are acceptable, typing `y` or `yes` and pressing Enter will continue the installation.

```

flow3d@v111_BUILD_LIN/raid6/flow3d/v11.1_linux_dist
maintaining, using and storing such information and data (including, without limitation, personal
information, if any) for such purposes. Without limitation of the generality of the foregoing, You
acknowledge and agree that: (a) Licensor may from time to time provide information and data,
including, without limitation, information and data about Licensee's use of the Software, to Licensor's
affiliated and unaffiliated distributors; and (b) Licensor may make cross-border transfers of such
information and data, including to jurisdictions with privacy or data protection laws that are less
protective of You than the jurisdiction in which You are domiciled. You acknowledge and agree that such
policies may be changed from time to time by Licensor.
d) Licensor reserves the right, without limitation, and without obtaining prior approval from or noti
ce to
You, to make changes in and to the Software.
e) This Agreement shall be governed by and construed in accordance with the laws of the United States
and the State of New Mexico, as applied to agreements entered into and to be performed entirely
within New Mexico between New Mexico residents without reference to conflict of laws. This
Agreement and the performance of the Parties required hereunder shall not be governed by or
otherwise subject to the United Nations Convention for the International Sale of Goods. Any civil suit or
proceeding relating to this agreement shall be brought only in U.S. Federal District Court or State Distri
ct
Court within the State of New Mexico, and each of the Parties consent to the personal jurisdiction and
venue of such courts. Judgment upon any award made in such proceeding may be entered and
enforced in any court of competent jurisdiction.
f) In the event of any conflict between the terms of this Agreement and the applicable Acquisition
Agreement, the terms of the Acquisition Agreement shall prevail. If there are any terms in either
agreement which are different from, but not inconsistent or in conflict with the other agreement, then
such terms shall bind the parties.

YOU MUST ACCEPT THE LICENSE AGREEMENT TO CONTINUE. IF YOU DO NOT ACCEPT, THE INSTALLATION WILL ABORT.

DO YOU ACCEPT ALL OF THE TERMS OF THE PRECEDING LICENSE AGREEMENT?
(Please respond with 'yes' or 'no')
yes

```

4. *FLOW-3D* can be installed to a directory of your choosing. The default is `/opt/flow3d/v11.1`. Press Enter to use the default. To change the installation directory, enter a prefix `PATH` here and press Enter.

```

flow3d@v111_BUILD_LIN/raid6/flow3d/v11.1_linux_dist
ce to
You, to make changes in and to the Software.
e) This Agreement shall be governed by and construed in accordance with the laws of the United States
and the State of New Mexico, as applied to agreements entered into and to be performed entirely
within New Mexico between New Mexico residents without reference to conflict of laws. This
Agreement and the performance of the Parties required hereunder shall not be governed by or
otherwise subject to the United Nations Convention for the International Sale of Goods. Any civil suit or
proceeding relating to this agreement shall be brought only in U.S. Federal District Court or State Distri
ct
Court within the State of New Mexico, and each of the Parties consent to the personal jurisdiction and
venue of such courts. Judgment upon any award made in such proceeding may be entered and
enforced in any court of competent jurisdiction.
f) In the event of any conflict between the terms of this Agreement and the applicable Acquisition
Agreement, the terms of the Acquisition Agreement shall prevail. If there are any terms in either
agreement which are different from, but not inconsistent or in conflict with the other agreement, then
such terms shall bind the parties.

YOU MUST ACCEPT THE LICENSE AGREEMENT TO CONTINUE. IF YOU DO NOT ACCEPT, THE INSTALLATION WILL ABORT.

DO YOU ACCEPT ALL OF THE TERMS OF THE PRECEDING LICENSE AGREEMENT?
(Please respond with 'yes' or 'no')
yes

The default installation prefix for this software is
/opt
Which will create the directory /opt/flow3d/v11.1

Press 'ENTER' to install using the default prefix
OR
Enter the prefix where the flow3d directory should be installed:

```

Note: A /flow3d/v11.1 suffix will be added to this prefix PATH. So, for example, if the desired full PATH is /usr/local/flow3d/v11.1 the prefix PATH would be entered as /usr/local

5. After the directory has been determined, an installation type may be chosen.

```

flow3d@v111_BUILD_LIN/raid6/flow3d/v11.1_linux_dist

YOU MUST ACCEPT THE LICENSE AGREEMENT TO CONTINUE. IF YOU DO NOT ACCEPT, THE INSTALLATION WILL ABORT.

DO YOU ACCEPT ALL OF THE TERMS OF THE PRECEDING LICENSE AGREEMENT?
(Please respond with 'yes' or 'no')
yes

The default installation prefix for this software is
/opt
Which will create the directory /opt/flow3d/v11.1

Press 'ENTER' to install using the default prefix
OR
Enter the prefix where the flow3d directory should be installed:

Creating default directory

FLOW-3D v11.1 will be installed in /opt/flow3d/v11.1

Choose the type of installation:

1. FLOW-3D v11.1 and FlowSight
2. FLOW-3D v11.1 only
3. FlowSight only

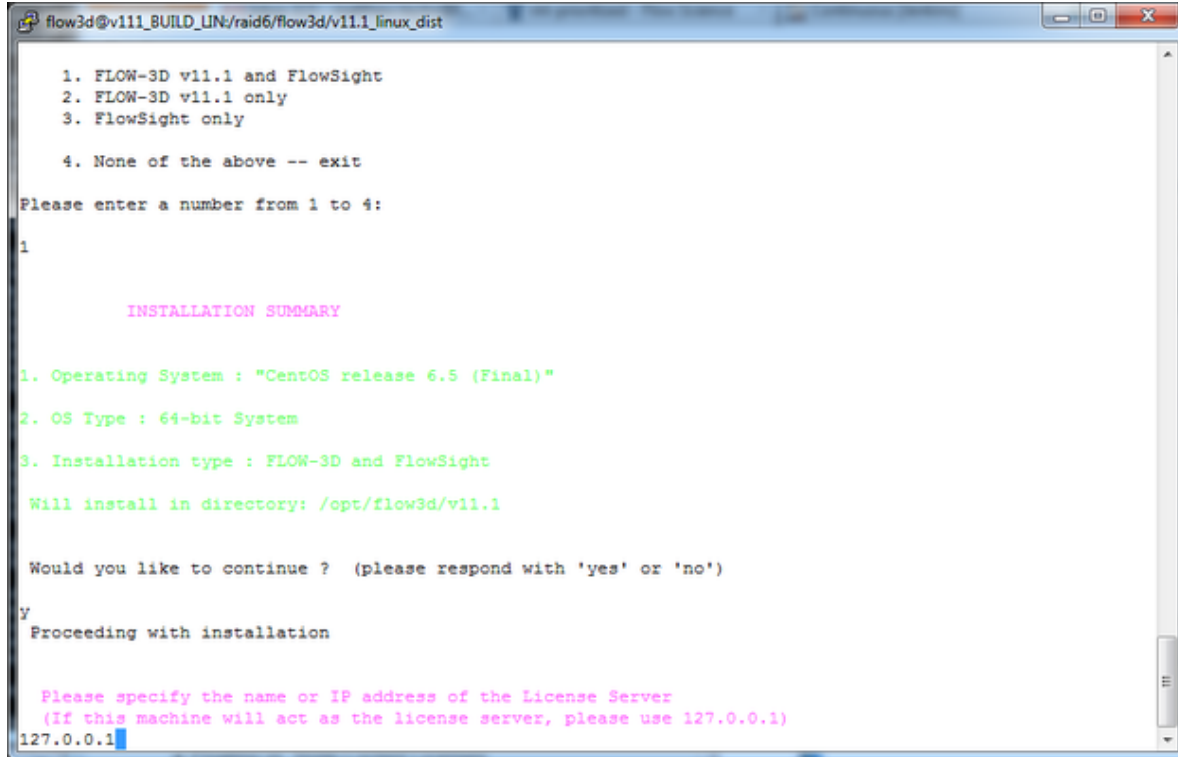
4. None of the above -- exit

Please enter a number from 1 to 4:
1

```

Note: If this machine is intended to act as a remote server with the Remote Solving feature (see *Remote Solving Setup*), an installation type that includes **FLOW-3D** should be chosen.

- Next, the script will display an installation summary, and request the name or IPv4 address of the license server. This server machine must be accessible by the client. Unless networking is configured otherwise, `ping hostname` or `ping (ip_address)` will verify whether the machine can be reached.



```
flow3d@v111_BUILD_UN/raid6/flow3d/v11.1_linux_dist
1. FLOW-3D v11.1 and FlowSight
2. FLOW-3D v11.1 only
3. FlowSight only
4. None of the above -- exit

Please enter a number from 1 to 4:
1

      INSTALLATION SUMMARY

1. Operating System : "CentOS release 6.5 (Final)"
2. OS Type : 64-bit System
3. Installation type : FLOW-3D and FlowSight
Will install in directory: /opt/flow3d/v11.1

Would you like to continue ? (please respond with 'yes' or 'no')
y
Proceeding with installation

Please specify the name or IP address of the License Server
(If this machine will act as the license server, please use 127.0.0.1)
127.0.0.1
```

Note: If a license server will be installed locally on this machine use `127.0.0.1`

- The installation script will now install the RPMs that are needed for the selected Installation Type. It will also write all the scripts needed to run the installed software.

```

flow3d@v111_BUILD_LIN/raid6/flow3d/v11.1_linux_dist
Y
Proceeding with installation

Please specify the name or IP address of the License Server
(If this machine will act as the license server, please use 127.0.0.1)
127.0.0.1

Name or IP address for the license server will be set to 127.0.0.1

Installing FLOW-3D v11.1 and FlowSight

Preparing... ##### [100%]
 1:flow3d ##### [100%]
Preparing... ##### [100%]
 1:FlowSight ##### [100%]
FLOW-3D RPM installed successfully.
FlowSight RPM installed successfully.
Writing initial flow3dvars.sh
Writing initial flow3dvars.csh
Completing flow3dvars.sh and flow3dvars.csh
Writing ServerAdmin.sh
Writing ServerAdmin.csh
Writing guiRunBatch

Writing FlowSight.sh
Writing ensight101_server.sh
Writing FlowSight.csh
Writing FlowSight viewer scripts

Would you like to create desktop icons for root? ('yes' or 'no')

```

8. Finally, the install script allows the creation of desktop icons for root and/or users. Icons may be created for a list of users. List the users with a space between each username, as in the example.

```

flow3d@v111_BUILD_LIN/raid6/flow3d/v11.1_linux_dist
Installing FLOW-3D v11.1 and FlowSight

Preparing... ##### [100%]
 1:flow3d ##### [100%]
Preparing... ##### [100%]
 1:FlowSight ##### [100%]
FLOW-3D RPM installed successfully.
FlowSight RPM installed successfully.
Writing initial flow3dvars.sh
Writing initial flow3dvars.csh
Completing flow3dvars.sh and flow3dvars.csh
Writing ServerAdmin.sh
Writing ServerAdmin.csh
Writing guiRunBatch

Writing FlowSight.sh
Writing ensight101_server.sh
Writing FlowSight.csh
Writing FlowSight viewer scripts

Would you like to create desktop icons for root? ('yes' or 'no')
no
Would you like to create desktop icons for some users? (please respond with 'yes' or 'no')
yes

List of possible FLOW-3D users:
nfsnobody
flow3d
rpmbuild

Please enter a space-separated list of the users who should receive desktop icons
For example: user1 user2 user3
flow3d

```

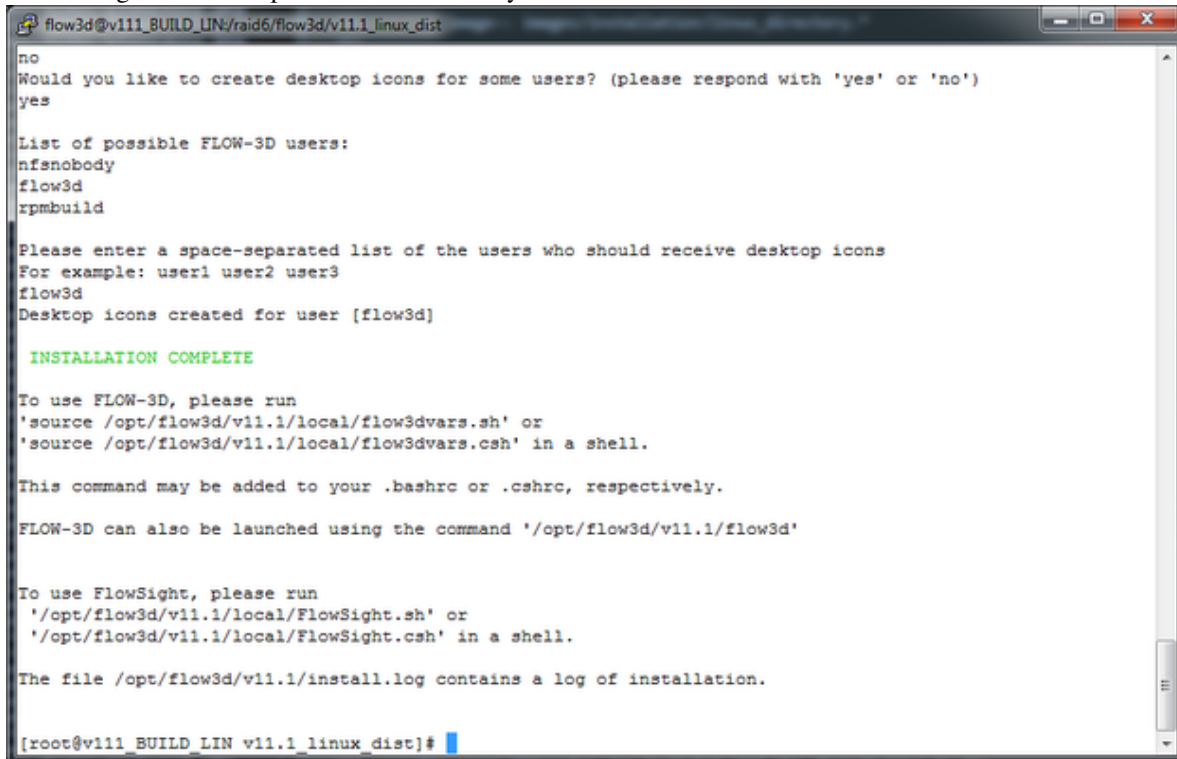
9. The installation will now complete.

Shell scripts named `flow3dvars.sh` and `flow3dvars.csh`, have been written into the *local* directory of

the installation path. The install script will write the full path to these files to both stdout and the `install.log` file. If FlowSight was chosen, `FlowSight.sh` and `FlowSight.csh` have also been written in that directory. Again, the script will give full information.

Necessary libraries are included with the distribution in the `$F3D_HOME/gui/lib` directory. The `LD_LIBRARY_PATH` environment variable is set in the `flow3dvars` scripts so any libraries not found on the system will be accessible.

The install script also gives the `source` command that can be used to set up an environment to run **FLOW-3D**. The command may be added to the user's `.bashrc` or `.cshrc` file, if desired. **FLOW-3D** can then be run from a terminal prompt using the command `flow3d` or `flow3d&`. Alternately, **FLOW-3D** may be launched using the shell script in the `local` directory.



```

flow3d@v111_BUILD_LIN/raid6/flow3d/v11.1_linux_dist
no
Would you like to create desktop icons for some users? (please respond with 'yes' or 'no')
yes

List of possible FLOW-3D users:
nfsnobody
flow3d
rpmbuild

Please enter a space-separated list of the users who should receive desktop icons
For example: user1 user2 user3
flow3d
Desktop icons created for user [flow3d]

INSTALLATION COMPLETE

To use FLOW-3D, please run
'source /opt/flow3d/v11.1/local/flow3dvars.sh' or
'source /opt/flow3d/v11.1/local/flow3dvars.csh' in a shell.

This command may be added to your .bashrc or .cshrc, respectively.

FLOW-3D can also be launched using the command '/opt/flow3d/v11.1/flow3d'

To use FlowSight, please run
'/opt/flow3d/v11.1/local/FlowSight.sh' or
'/opt/flow3d/v11.1/local/FlowSight.csh' in a shell.

The file /opt/flow3d/v11.1/install.log contains a log of installation.

[root@v111_BUILD_LIN v11.1_linux_dist]#

```

- After installation, the installation directory will contain a directory structure similar to the one shown. A log of the installation, named `install.log` will be at the top level, and the scripts created by the installer will be in the `local` directory.

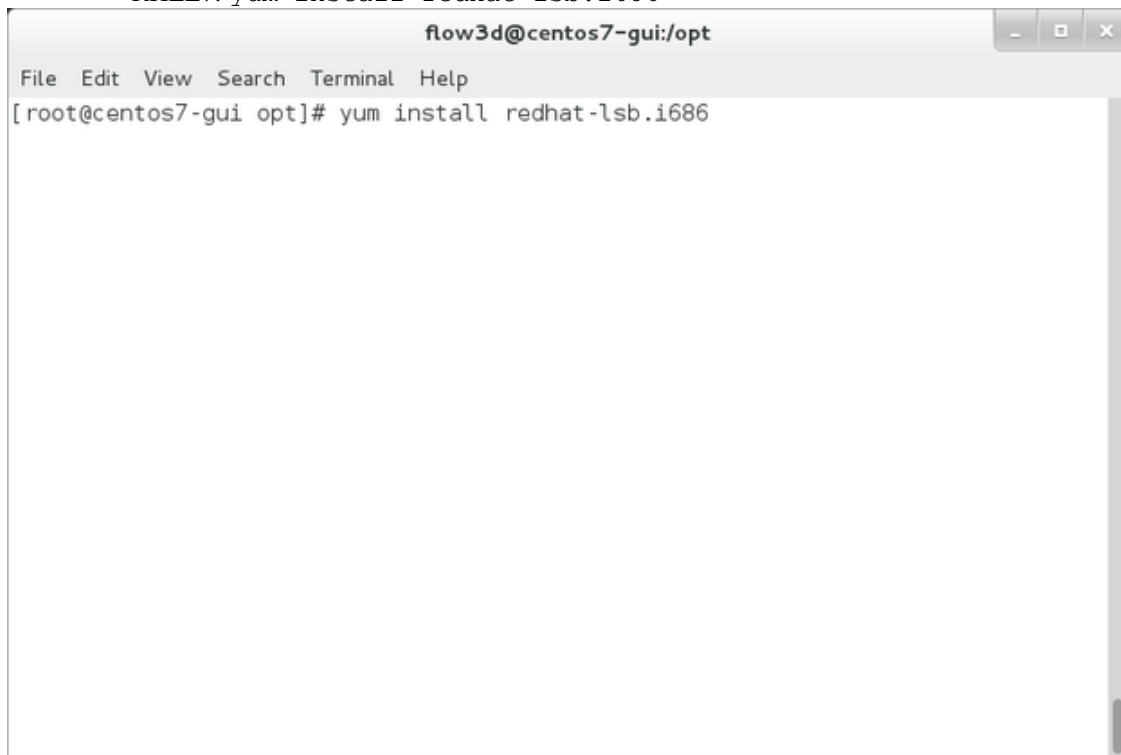
Installation For *FLOW-3D* v11.1.0, the **lmgrd** license server has been replaced with **lmadmin**. This new license server has two main benefits. First, it is compatible with both Red Hat Enterprise Linux 6 and 7 (**lmgrd** was not compatible with Consistent Network Device Naming, which was introduced with RHEL7). Second, it has a web-based interface. This interface is easy to use and may be configured to allow users to view detailed information directly in a web browser.

Note: **lmadmin** is a 32-bit executable and requires a number of 32-bit libraries. These are as follows:

- Linux Standard Base
- libstdc++
- glibc
- libgcc

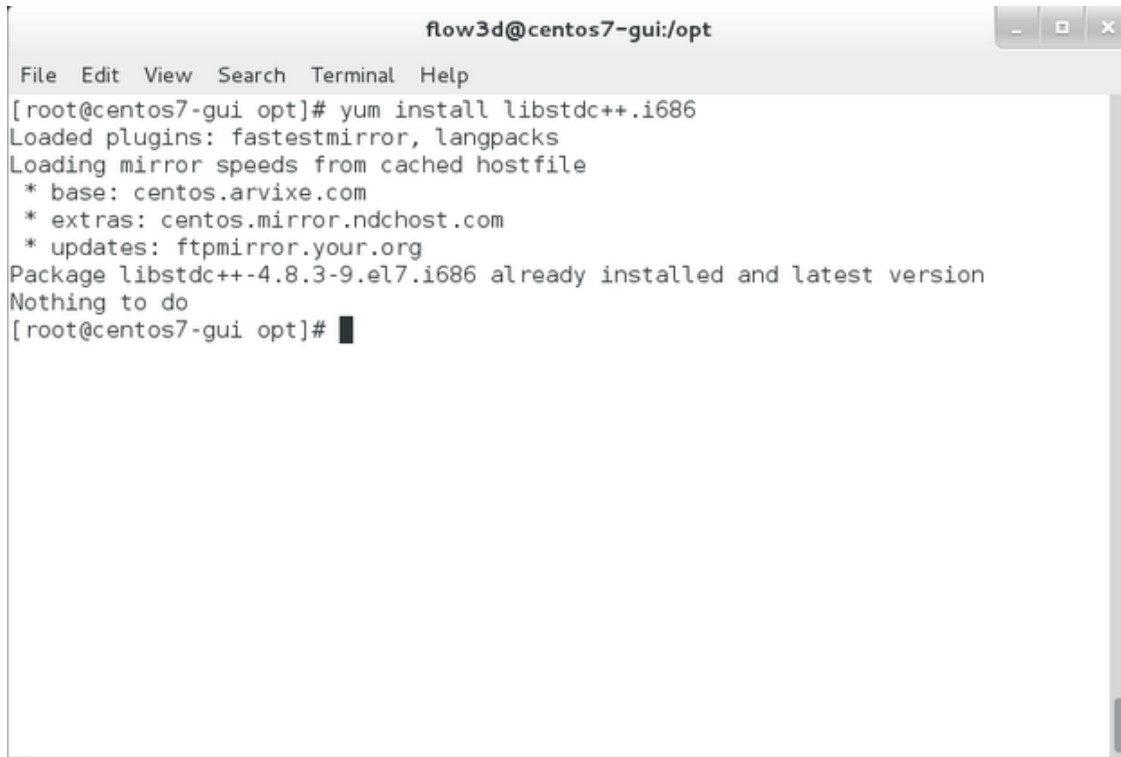
1. Install 32-bit LSB; the commands differ between Red Hat versions. In this example, the operating system is Red Hat Enterprise Linux 7. These commands must be run as `root`:

- RHEL6: `yum install lsb.i686`
- RHEL7: `yum install redhat-libs.i686`

A screenshot of a terminal window titled "flow3d@centos7-gui/opt". The window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal prompt is "[root@centos7-gui opt]#" and the command "yum install redhat-libs.i686" has been entered. The rest of the terminal is empty, indicating the command is still running or has just finished.

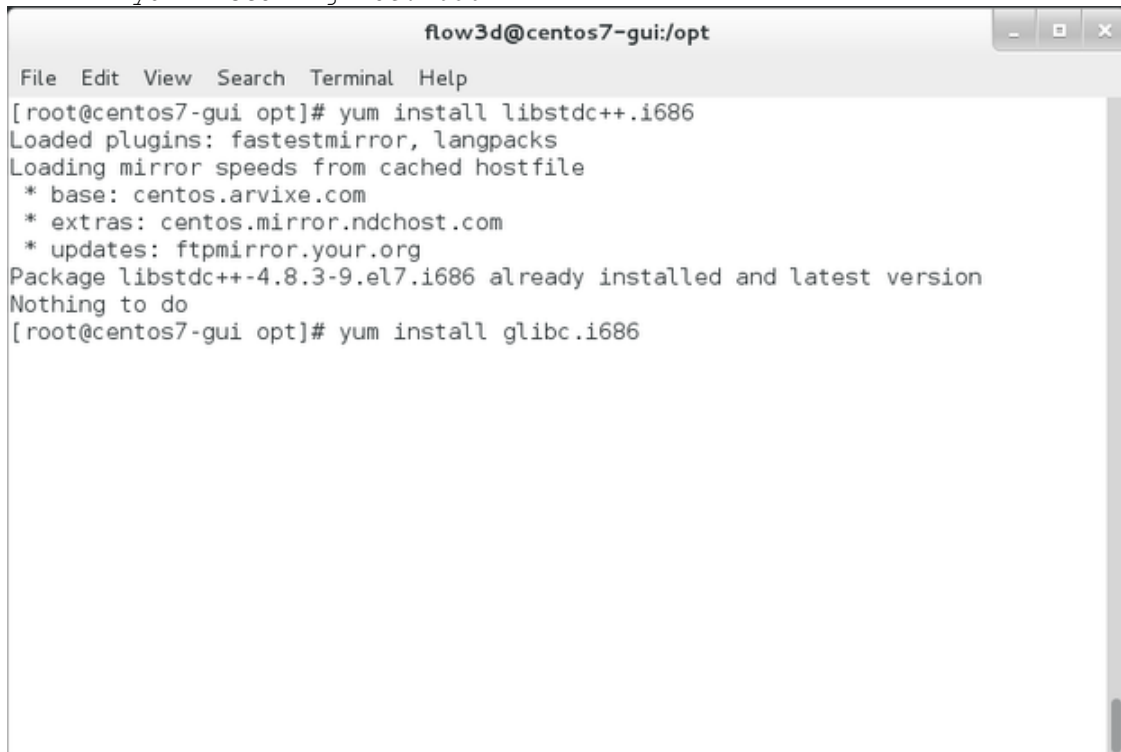
2. Install the other needed 32-bit libraries.

- `yum install libstdc++.i686`



```
flow3d@centos7-gui/opt
File Edit View Search Terminal Help
[root@centos7-gui opt]# yum install libstdc++.i686
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: centos.arvixe.com
* extras: centos.mirror.ndchost.com
* updates: ftpmirror.your.org
Package libstdc++-4.8.3-9.el7.i686 already installed and latest version
Nothing to do
[root@centos7-gui opt]#
```

- `yum install glibc.i686`



```
flow3d@centos7-gui/opt
File Edit View Search Terminal Help
[root@centos7-gui opt]# yum install libstdc++.i686
Loaded plugins: fastestmirror, langpacks
Loading mirror speeds from cached hostfile
* base: centos.arvixe.com
* extras: centos.mirror.ndchost.com
* updates: ftpmirror.your.org
Package libstdc++-4.8.3-9.el7.i686 already installed and latest version
Nothing to do
[root@centos7-gui opt]# yum install glibc.i686
```

- `yum install libgcc.i686`

```

flow3d@centos7-gui:/opt
File Edit View Search Terminal Help
Cleanup      : glibc-2.17-55.el7_0.1                12/12
Verifying    : glibc-devel-2.17-78.el7.x86_64    1/12
Verifying    : glibc-2.17-78.el7.x86_64         2/12
Verifying    : glibc-common-2.17-78.el7.x86_64   3/12
Verifying    : glibc-headers-2.17-78.el7.x86_64  4/12
Verifying    : glibc-devel-2.17-78.el7.i686     5/12
Verifying    : glibc-2.17-78.el7.i686          6/12
Verifying    : glibc-devel-2.17-55.el7_0.1.i686  7/12
Verifying    : glibc-devel-2.17-55.el7_0.1.x86_64 8/12
Verifying    : glibc-common-2.17-55.el7_0.1.x86_64 9/12
Verifying    : glibc-headers-2.17-55.el7_0.1.x86_64 10/12
Verifying    : glibc-2.17-55.el7_0.1.i686       11/12
Verifying    : glibc-2.17-55.el7_0.1.x86_64    12/12

Updated:
  glibc.i686 0:2.17-78.el7

Dependency Updated:
  glibc.x86_64 0:2.17-78.el7          glibc-common.x86_64 0:2.17-78.el7
  glibc-devel.i686 0:2.17-78.el7     glibc-devel.x86_64 0:2.17-78.el7
  glibc-headers.x86_64 0:2.17-78.el7

Complete!
[root@centos7-gui opt]# yum install libgcc.i686

```

3. Navigate to the `license_server` directory of the unpacked installation tarball.

```

flow3d@centos7-gui:/raid6/flow3d/v11.1_linux_dist/unix/license_server
File Edit View Search Terminal Help
[root@centos7-gui unix]# ls -l
total 360696
-rwxrwxrwx. 1 500 500 88666464 Jul 16 11:02 flow3d-11.1-3.x86_64.rpm
-rwxrwxrwx. 1 500 500 280242440 Jul 16 11:03 FlowSight-11.1-3.x86_64.rpm
-rwxr-xr-x. 1 500 500 36788 Jul 16 10:52 install-flow3d.sh
-rw-r--r--. 1 500 500 15314 Jun 10 14:12 LICENSE_AGREEMENT
drwxrwxr-x. 2 500 500 4096 Jun 12 16:04 license_server
-rw-rw-r--. 1 500 500 6833 Jun 25 13:14 README
[root@centos7-gui unix]# pwd
/raid6/flow3d/v11.1_linux_dist/unix
[root@centos7-gui unix]# exit
logout
[flow3d@centos7-gui ~]$ cd /raid6/flow3d/v11.1_linux_dist/unix/license_server/
[flow3d@centos7-gui license_server]$ ls -l
total 97308
-rwxr-xr-x. 1 500 500 2338512 Jun 12 15:10 F3DTKNUX
-rwxr-xr-x. 1 500 500 97195405 Jun 12 15:08 lmadmin-i86_lsb-11_11_0_0.bin
[flow3d@centos7-gui license_server]$

```

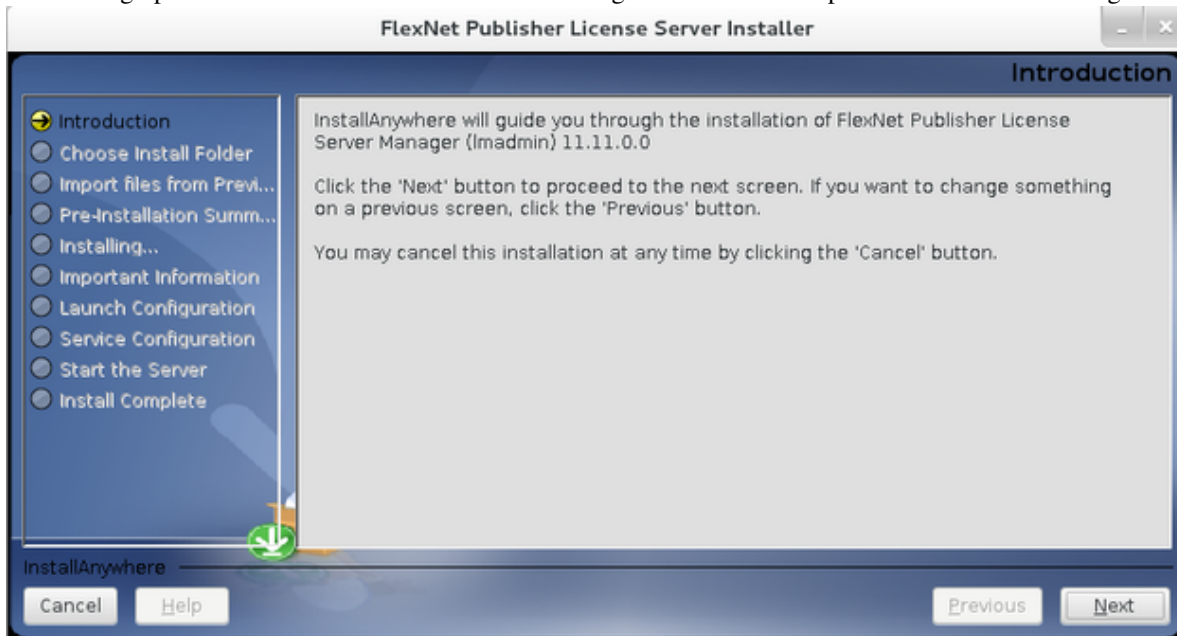
Note: The following steps should be performed as a user, *not* as root. Here, **su** was used to change to root, so **exit** is used to return to the user account.

- Execute `lmadmin-i86_lsb-11_11_0_0.bin` – if the directory is not on the `$PATH`, a preceding dot slash will be necessary.

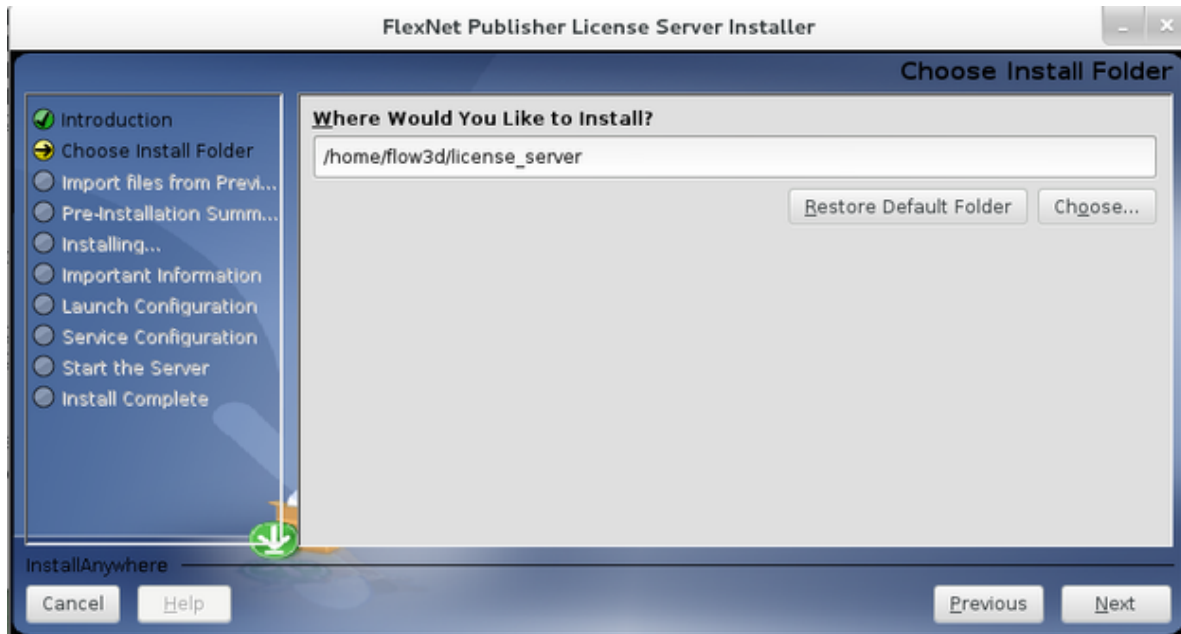
```

flow3d@centos7-gui:/raid6/flow3d/v11.1_linux_dist/unix/license_server
File Edit View Search Terminal Help
[root@centos7-gui unix]# ls -l
total 360696
-rwxrwxrwx. 1 500 500 88666464 Jul 16 11:02 flow3d-11.1-3.x86_64.rpm
-rwxrwxrwx. 1 500 500 280242440 Jul 16 11:03 FlowSight-11.1-3.x86_64.rpm
-rwxr-xr-x. 1 500 500 36788 Jul 16 10:52 install-flow3d.sh
-rw-r--r--. 1 500 500 15314 Jun 10 14:12 LICENSE_AGREEMENT
drwxrwxr-x. 2 500 500 4096 Jun 12 16:04 license_server
-rw-rw-r--. 1 500 500 6833 Jun 25 13:14 README
[root@centos7-gui unix]# pwd
/raid6/flow3d/v11.1_linux_dist/unix
[root@centos7-gui unix]# exit
logout
[flow3d@centos7-gui ~]$ cd /raid6/flow3d/v11.1_linux_dist/unix/license_server/
[flow3d@centos7-gui license_server]$ ls -l
total 97308
-rwxr-xr-x. 1 500 500 2338512 Jun 12 15:10 F3DTKNUX
-rwxr-xr-x. 1 500 500 97195405 Jun 12 15:08 lmadmin-i86_lsb-11_11_0_0.bin
[flow3d@centos7-gui license_server]$ ./lmadmin-i86_lsb-11_11_0_0.bin
    
```

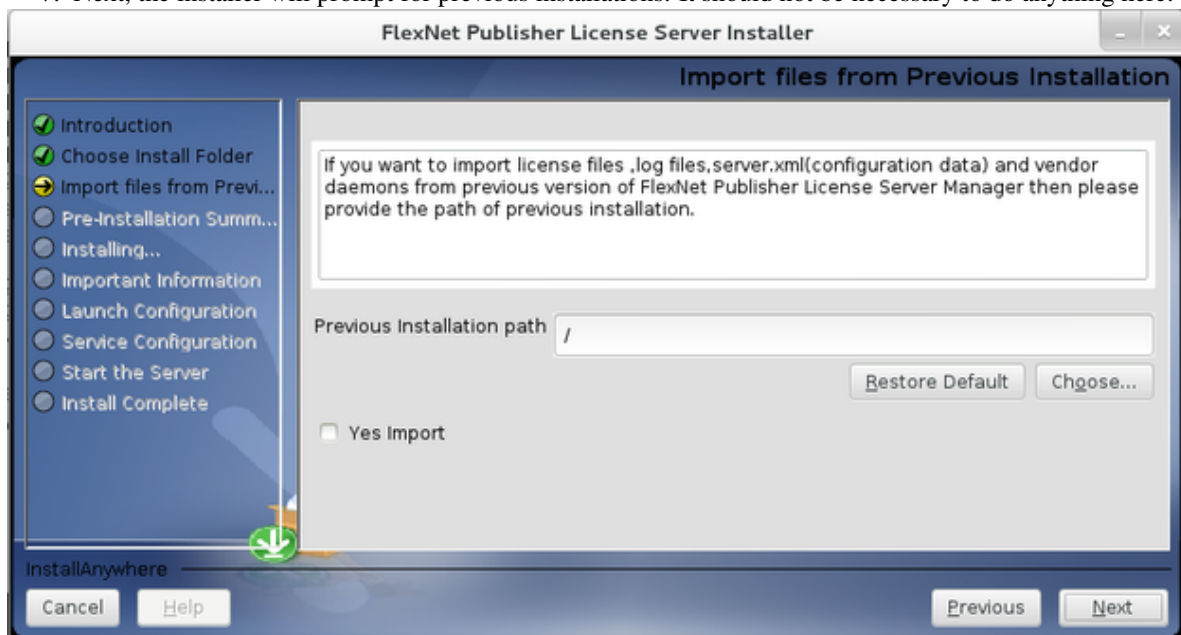
- The graphical installer should then launch. Clicking *Next* will advance past the Introduction dialog.



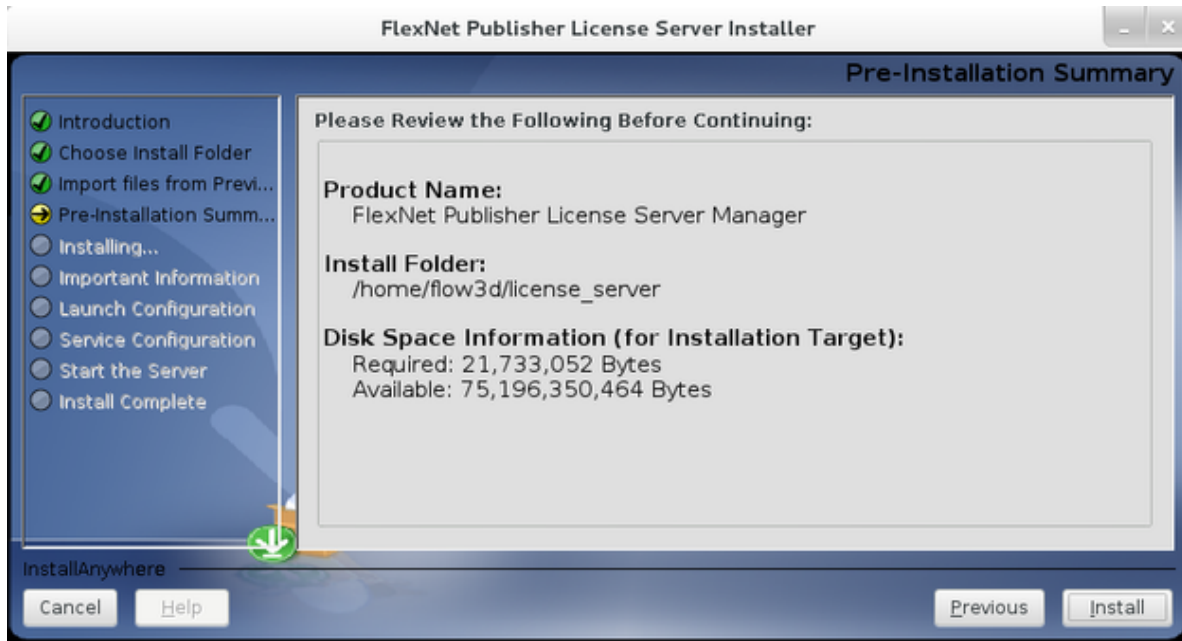
- The installation directory is set here. For this example, the default will not work. Instead, the software will be installed to `/home/flow3d/license_server`



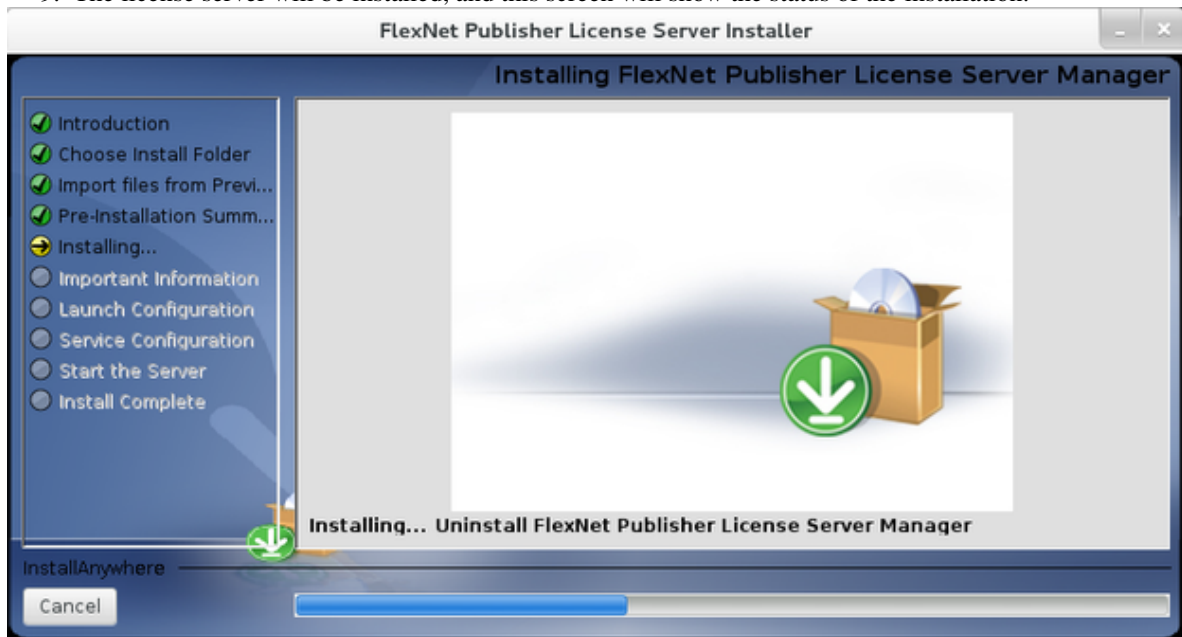
7. Next, the installer will prompt for previous installations. It should not be necessary to do anything here.



8. A pre-installation summary will be displayed with the choices made in the earlier screens. Use *Previous* to correct any unintended choices, or *Install* to continue.

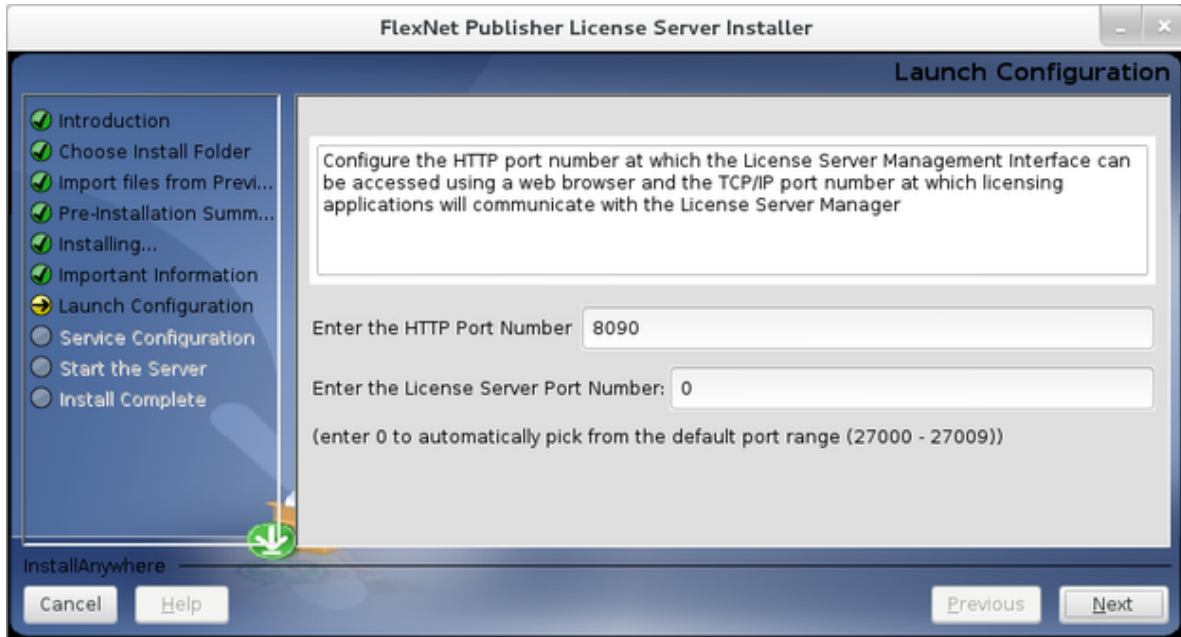


9. The license server will be installed, and this screen will show the status of the installation.

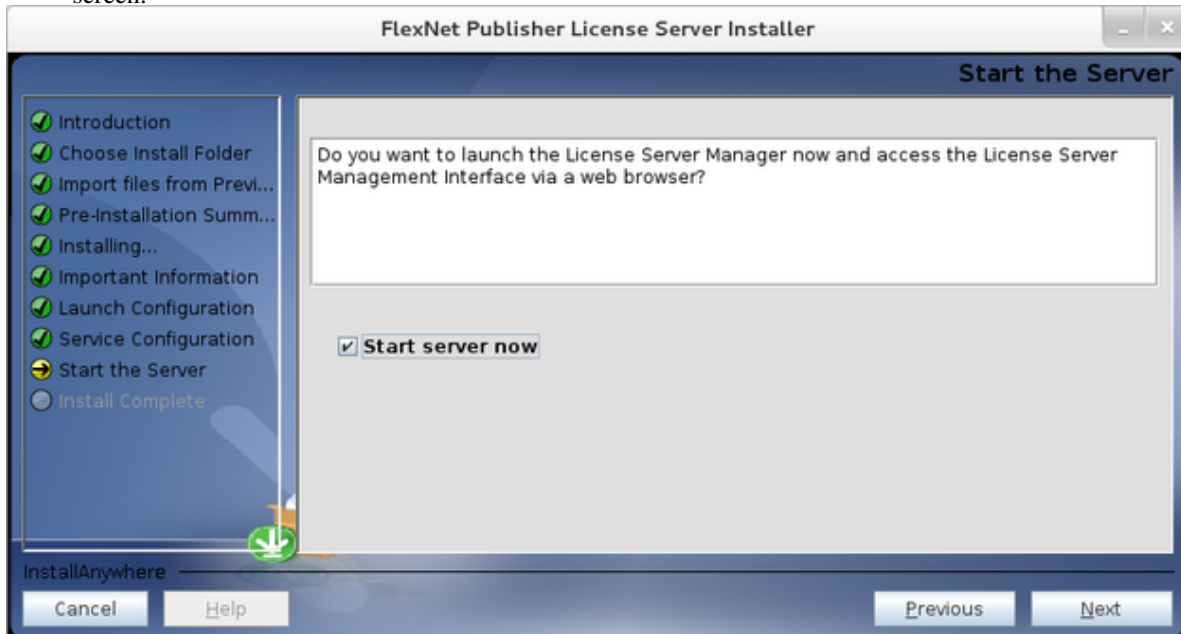


10. Next, the installer will prompt for ports. The HTTP port is where the web interface will be served. License Server Port is where licenses will be served. In most cases, the defaults should be fine. However, the default license server port of 27000-27009 can sometimes conflict with other license servers. These may be either consolidated, or the port may be changed here.

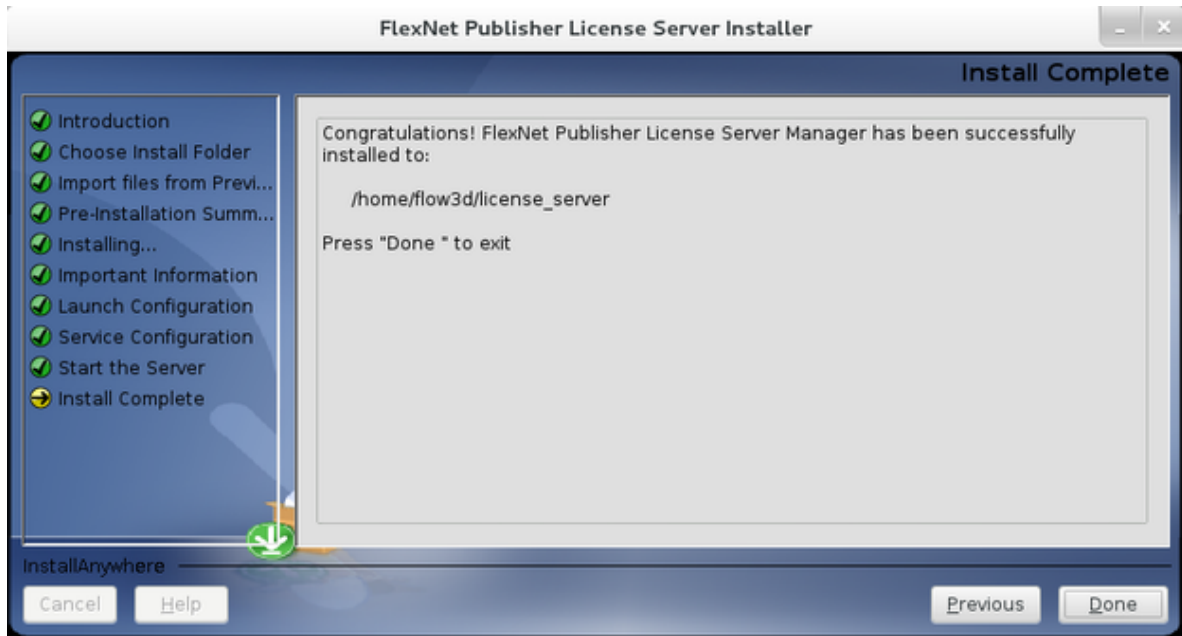
The License Server Port can also be changed later using the web interface.



11. It is convenient to start the server now, so this box should be checked. Clicking *Next* continues to the final screen.



12. The final screen provides congratulations, and reiterates the install \$PATH. When *Done* is clicked, the installation is complete.



Configuration After **lmadmin** has been installed, there is configuration needed to use a **FLOW-3D** license file. The necessary steps are as follows:

1. Copy F3DTKNUX vendor daemon executable to the **lmadmin** installation directory. F3DTKNUX is found in the `license_server` directory referenced in the previous section. The installation PATH is `/home/flow3d/license_server` in this example.

```

flow3d@centos7-gui:/raid6/flow3d/v11.1_linux_dist/unix/license_server
File Edit View Search Terminal Help
[root@centos7-gui unix]# pwd
/raid6/flow3d/v11.1_linux_dist/unix
[root@centos7-gui unix]# exit
logout
[flow3d@centos7-gui ~]$ cd /raid6/flow3d/v11.1_linux_dist/unix/license_server/
[flow3d@centos7-gui license_server]$ ls -l
total 97308
-rwxr-xr-x. 1 500 500 2338512 Jun 12 15:10 F3DTKNUX
-rwxr-xr-x. 1 500 500 97195405 Jun 12 15:08 lmadmin-i86_lsb-11_11_0_0.bin
[flow3d@centos7-gui license_server]$ ./lmadmin-i86_lsb-11_11_0_0.bin
Preparing to install...
Extracting the installation resources from the installer archive...
Configuring the installer for this system's environment...

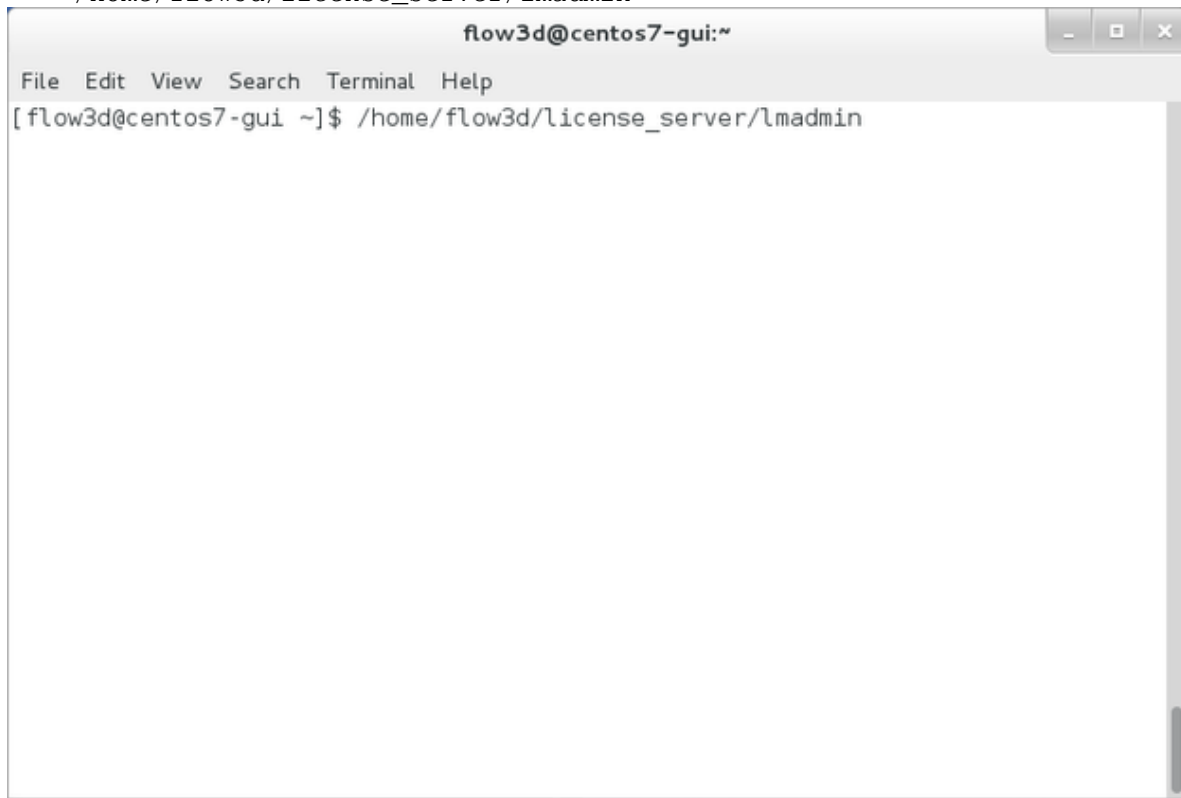
Launching installer...

[flow3d@centos7-gui license_server]$
[flow3d@centos7-gui license_server]$ ls -l
total 97308
-rwxr-xr-x. 1 500 500 2338512 Jun 12 15:10 F3DTKNUX
-rwxr-xr-x. 1 500 500 97195405 Jun 12 15:08 lmadmin-i86_lsb-11_11_0_0.bin
[flow3d@centos7-gui license_server]$ cp F3DTKNUX /home/flow3d/license_server/
[flow3d@centos7-gui license_server]$

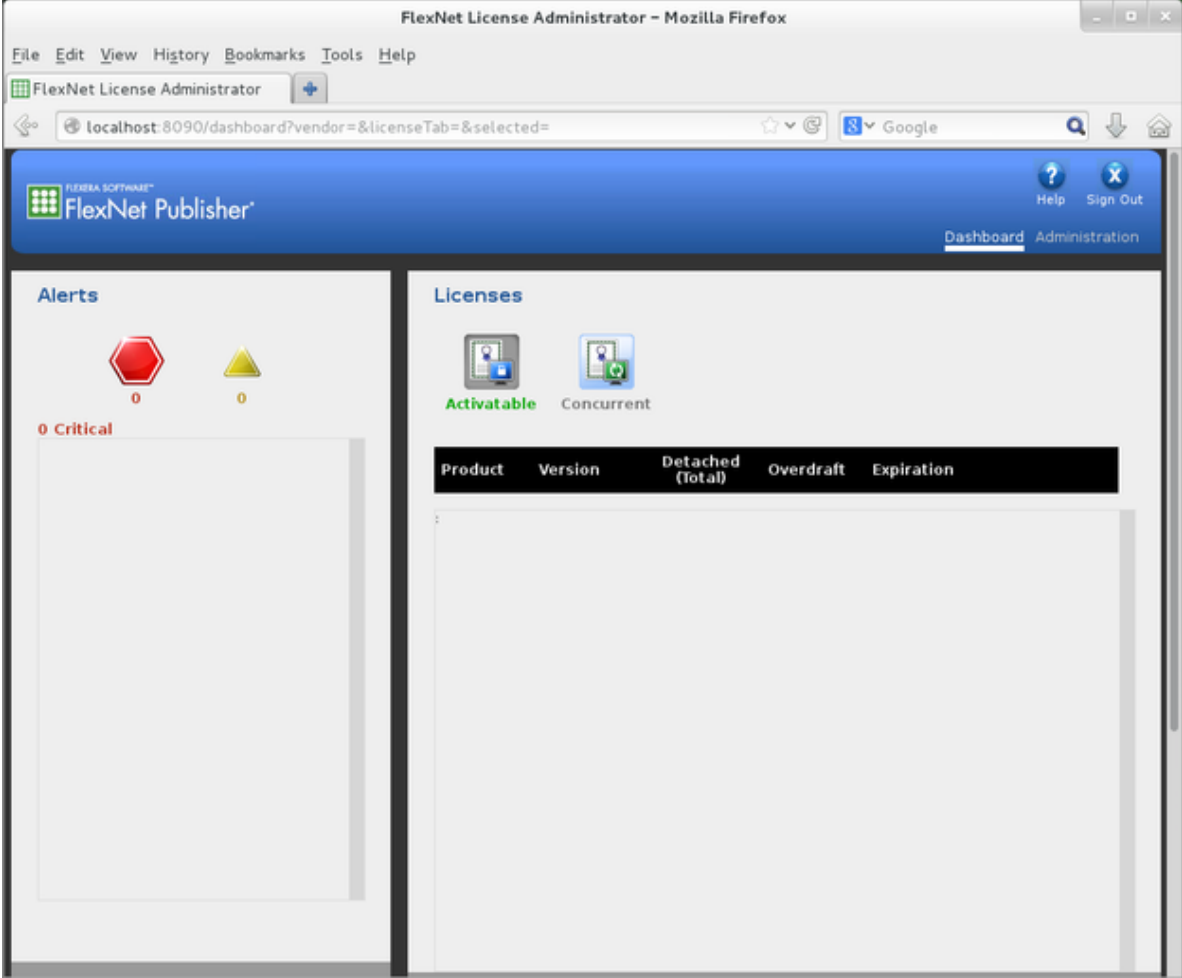
```

2. Once the vendor daemon has been copied, **lmadmin** may be started. If it was started during installa-

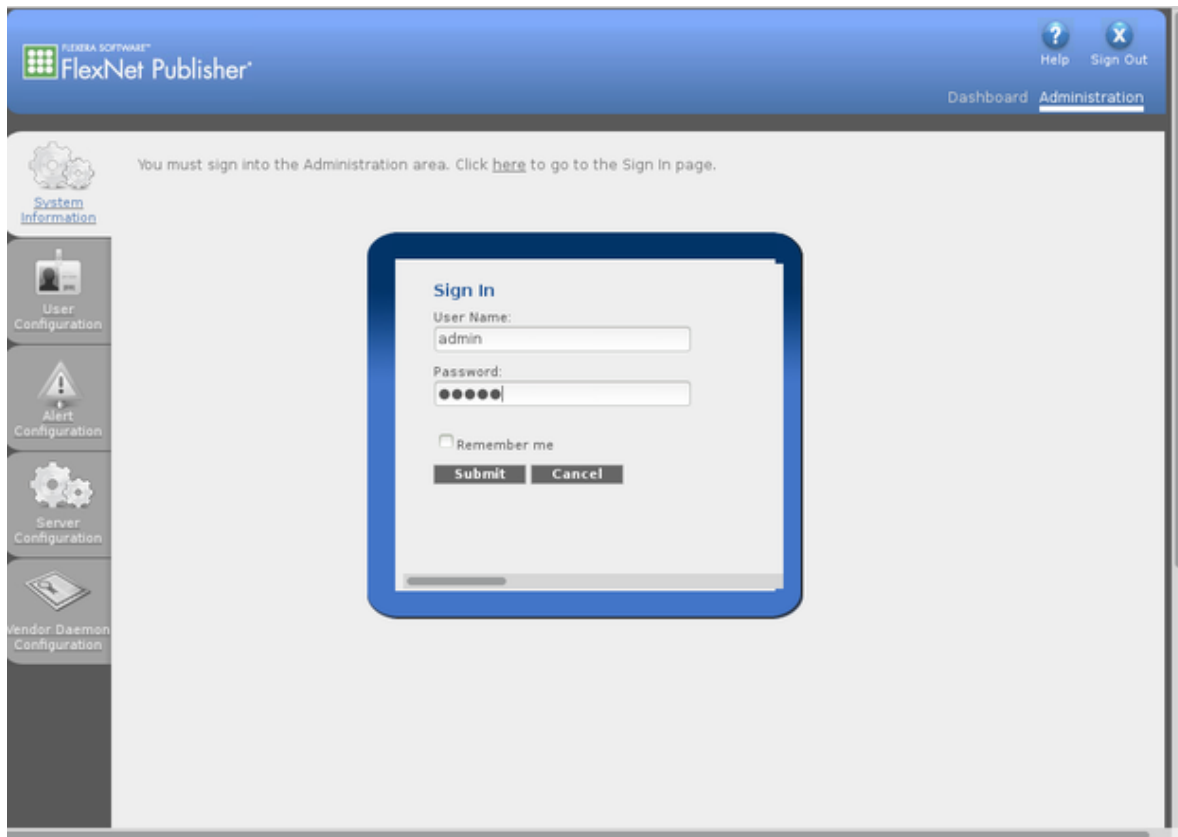
tion, a browser should have opened with the web interface displayed – continue to the next step. Otherwise, start the server at a command prompt. The executable is in the directory that was chosen during installation, in this case `/home/flow3d/license_server` which would make the command `/home/flow3d/license_server/lmadmin`

A screenshot of a terminal window titled "flow3d@centos7-gui:~". The window has a menu bar with "File", "Edit", "View", "Search", "Terminal", and "Help". The terminal content shows the prompt "[flow3d@centos7-gui ~]" followed by the command "/home/flow3d/license_server/lmadmin" being entered. The terminal is otherwise empty.

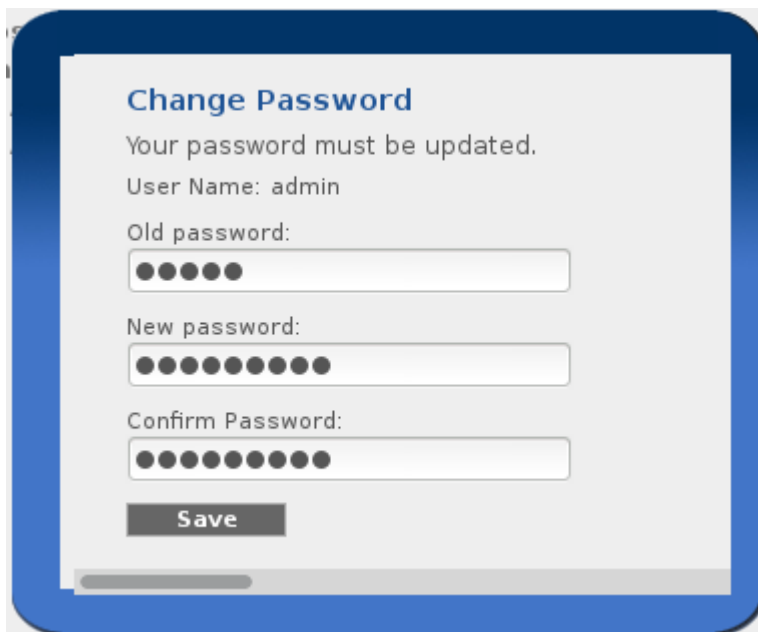
3. Now the web interface may be used for configuration. Open a browser and enter `localhost:8090` or `127.0.0.1:8090` in the address bar. The web interface should open.

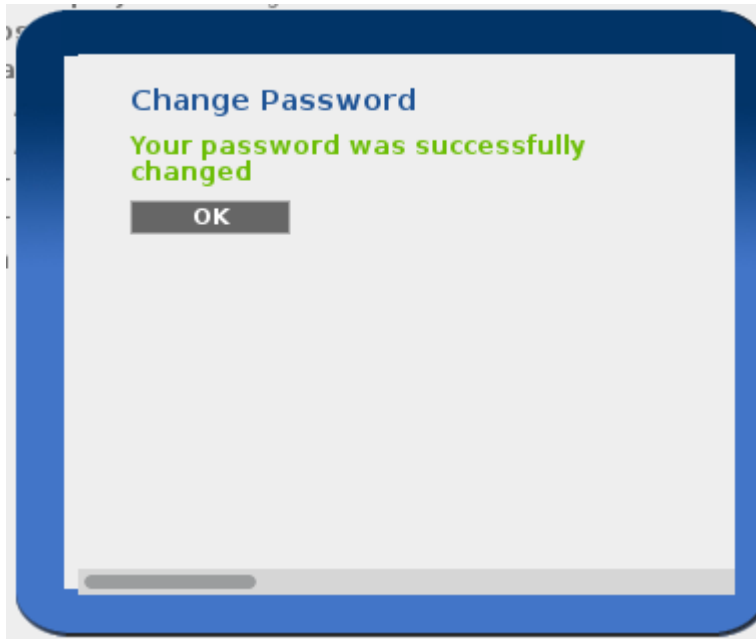


- 4. Click the *Administration* tab at the upper right. The default username is admin and the default password is admin – click the *Submit* button to log in.

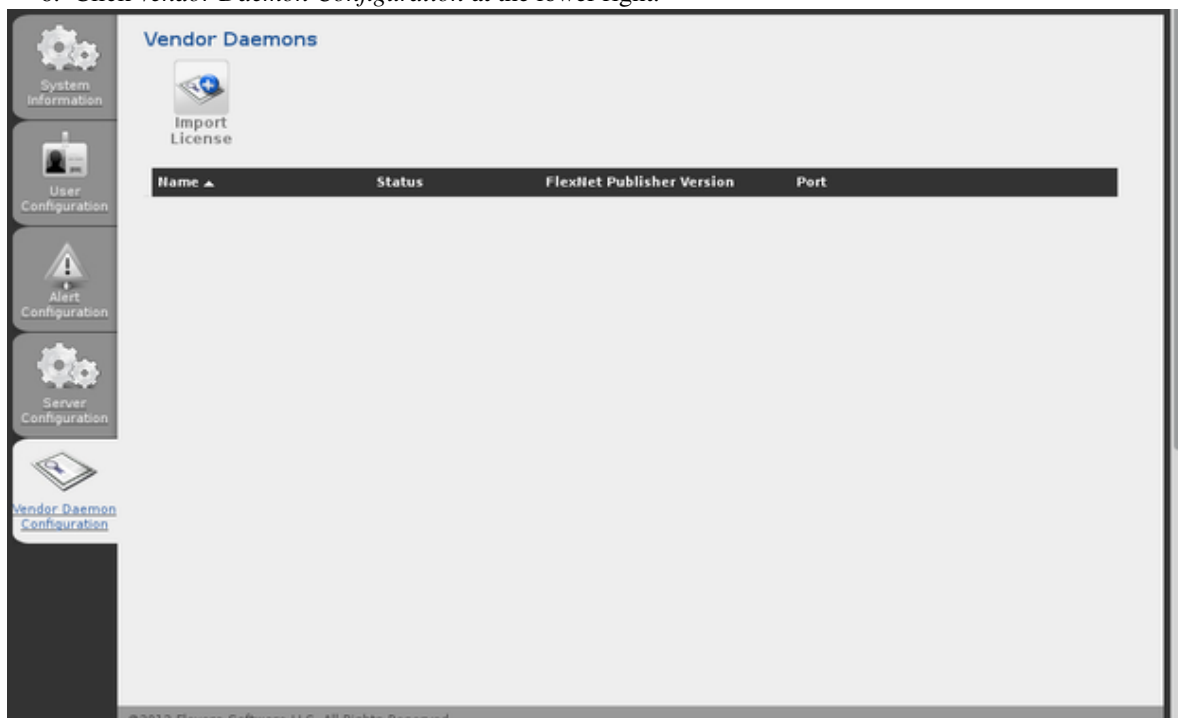


5. After the initial login, the admin password must be changed to continue. The new password created here will be used to administer the server from this point forward.

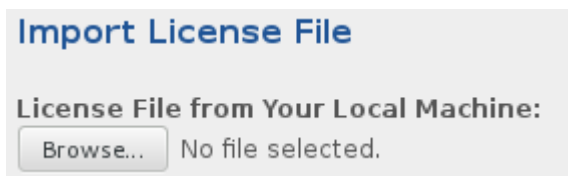


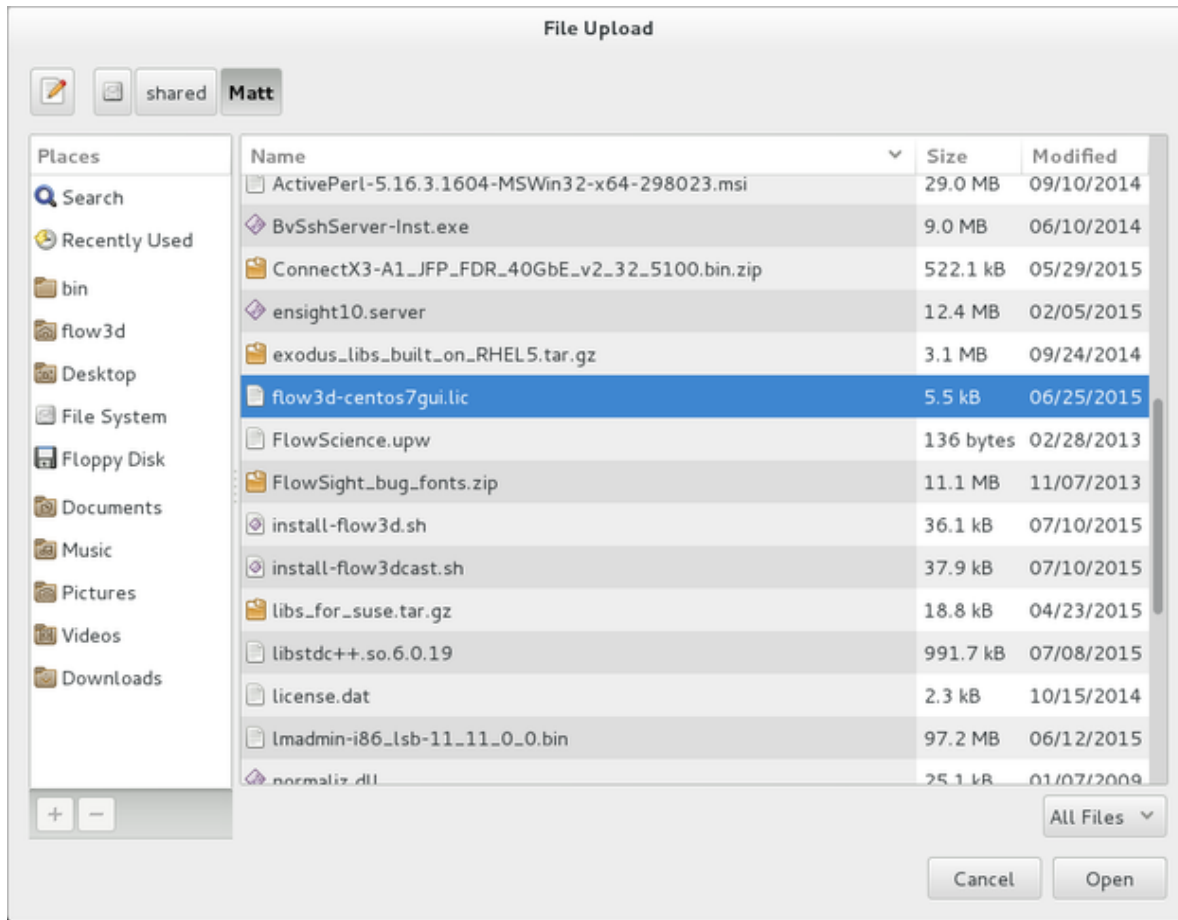


6. Click *Vendor Daemon Configuration* at the lower right.

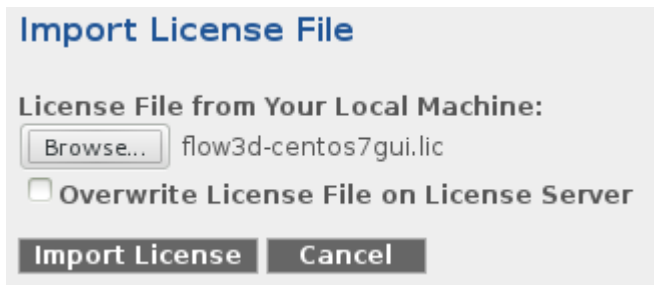


7. Click the *Import License* button at the top left and click *Browse* to locate your `flow3d.lic` license file. Once the file is selected, click the *Open* button at the lower right.

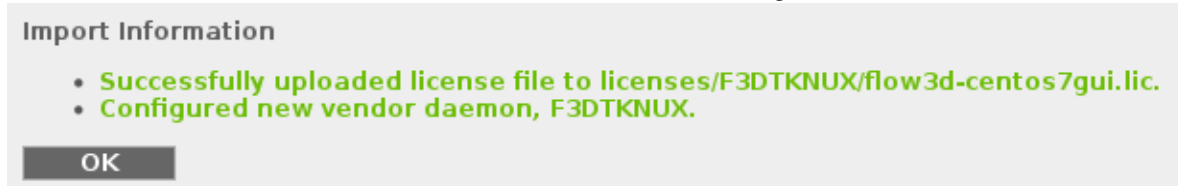




8. The filename should now appear to the right of the *Browse* button. Click *Import License* below it.



9. Import information should appear. One message shows where the uploaded file was placed. Another message should indicate that the F3DTKNUX vendor daemon is now configured. Click the *OK* button to continue.



10. The *Vendor Daemons* screen should now show F3DTKNUX with status and port information.

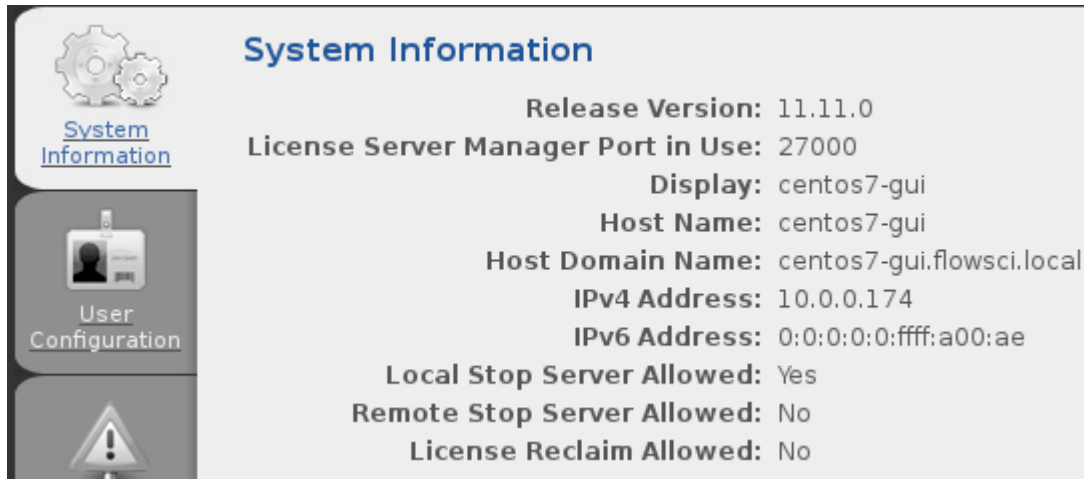


Note: Both the **lmadmin** ports (default 27000-27009) *and* this Vendor Daemon port must be opened in the firewall.

- If the *Status* shows *Down*, the most common problem is that the **lmadmin** server name does not match the one in the license file.

Please compare the name shown on the *System Information* tab with the name on the *SERVER* line of the `flow3d.lic` license file.

If the names do not match, edit the *SERVER* line in the license file.



```
SERVER centos7-gui 000c29353f11
VENDOR F3DTKNUX
USE_SERVER
INCREMENT prep3d F3DTKNUX 11.1 21-
VENDOR_STRING=290825144891
START=21-jan-2015 SIGN="19
55C8 F4CF 256D 8A8A 773D 7
51A7 9C8F 6BDE DD99 B534 1
SIGN2=BEDD98F40E2A
```


- Configuration is now complete.

The status of the server and individual features in the license file can be viewed by clicking *Dashboard* at the upper right, then clicking the *Concurrent* button under *Licenses*


[Dashboard](#) [Administration](#)

Licenses

Vendor Daemon: F3DTKNUX



Activatable



Concurrent

Feature	Version	In Use (Available)	Expiration
▼ flowsight	11.1	0 (50)	21-JAN-2016
▼ flowvu	11.1	0 (999)	21-JAN-2016
▼ fiscon	7.7	0 (999)	21-JAN-2016
▼ hvd3d	11.1	0 (30)	21-JAN-2016
▼ hvd3dccb	11.1	0 (2)	21-JAN-2016
▼ hvd3dccb	11.1	0 (2)	21-JAN-2016
▼ hvd3dcci	11.1	0 (5)	21-JAN-2016
▼ hvd3dcccip	11.1	0 (5)	21-JAN-2016

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1.2 Configuration

1.2.1 Comments

There are a few basic configuration settings that should be followed with *FLOW-3D*:

- It is **strongly** recommended that all input files be stored in a local directory on the machine instead of a network location. The solver will run faster, the GUI will be more responsive, and it eliminates the possibility of a network problem interfering with a running simulation.
- Make sure that the power settings for the machine are set so that it does not sleep, hibernate, or turn off after some period of inactivity. Failure to do this can result in the computer sleeping (or hibernating, etc.) during long simulations.

- It is recommended that **Windows** updates be configured to be installed after checking with the user. This will prevent update-related reboots while simulations are running.

1.2.2 Preferences

The *Preferences* drop-down menu allows users to control default settings for file locations, remote simulation, etc. A brief description of the options is given below:

- *Sub-tab Color*: This option allows sub-tabs, e.g. *Meshing & Geometry* to be colored differently from the main tabs for easy identification.
- *Default Workspace Location*: This allows the user to choose the default location where workspaces will be created.
- *Master Materials Database Location*: This allows users to change where the *Materials Database* is stored. This is useful if a group of users want to share a *Materials Database* that is stored at a network location.
- *Default Version Options*: This allows the user to choose the default *Version Options* for the local machine and all remote machines.
- *Simulation Pre-Check Tolerance*: This is the default tolerance for the *Material Properties* in the *Simulation Pre-check*.
- *Local Queue Communications Settings*: This allows for the configuration of the local queue settings, including the port number.
- *Autosave Options*: Controls how frequently the simulation setup is saved automatically.
- *Add Existing Simulation starts in Workspace*: This determines whether the *Add Existing Simulation* dialog opens in the folder containing the currently selected workspace or not.
- *Use default screen resolution for snapshots*: Allows for user-defined screenshot resolutions.
- *Load Simulations When Opening Workspace*: Option to automatically load simulations into memory when a workspace is opened.
- *Show Simulation Information in Simulation Manager*: Shows/hides the diagnostic text at the bottom of the *Simulation Manager*.
- *set Font for Simulation Output Text and General/Notes*: Choose the display font for the output text and the notes.
- *Auto-raise Project/Results File Dialog*: Prompt user to load a new results file if the simulation that is selected on the *Simulation Manager* does not match the results file that is open on the *Analyze* tab.
- *Remote Simulation Preferences*: This gives access to the *Remote Solving Setup* controls.
- *Project Creation/Copy Options*: This controls the file system structure for simulations and what is copied between simulations.

1.2.3 Remote Solving Setup

FLOW-3D can connect remote machines (called remote servers) to a primary workstation (referred to as the client) and submit simulations from the primary workstation to run on these remote computers. In addition to running remote simulations, these remote computers retain their ability to run **FLOW-3D** as a client. The following sections will discuss how to set up *Remote Servers* and *Clients*.

Terminology and Requirements

The remote solving setup uses several programs on multiple machines, so it helps to define what each program is and the terminology that will be used beforehand. A list of the programs and terms is given below:

- **Server:** The remote machine where the simulation will be run.
- **Client:** The local machine where the setup is done. Simulations can also be run on this machine.
- **FLOW-3D Server Admin:** This is a configuration program that is run on the server to configure **RunnerServer** for remote solving.
- **RunnerServer:** This program interfaces between the **FLOW-3D** user interface and **SolverRunner**. An instance of this runs on both the client (for running local simulations) and the server (for running remote simulations).
- **SolverRunner:** This program interfaces between **RunnerServer** and the solver, **hydr3d**.

Additionally, there are two main requirements for the remote solving feature:

1. All of the clients and servers must have a working installation of **FLOW-3D** before the remote setup can begin (see *Procedure* for more information on installing **FLOW-3D**).
2. **SolverRunner**, **RunnerServer**, and **FLOW-3D** all communicate using sockets, so certain ports will need to be opened in the firewall.

Remote Servers

1. Login as `root` user if using Linux. On Windows, **FLOW-3D Server Admin** will automatically elevate its privileges.
 - **FLOW-3D Server Admin** needs to update environment variables, so use `su -` to switch to the `root` user when using the tool on Linux.
 - **FLOW-3D Server Admin** must be run as `root` on Linux. Failure to do so will result in an error.
 - There is only one database file so **FLOW-3D Server Admin** must be run by only one user.
2. **Start the remote server:** **FLOW-3D Server Admin** is an executable that configures and controls the **RunnerServer** for use as a remote server. It is accessed differently depending on the OS:
 - *Windows:* Use the **FLOW-3D Server Admin** icon in the **FLOW-3D v11.1.0** Program Group in the Windows Start Menu. This is a shortcut to a batch file in the `local` folder of the **FLOW-3D** installation directory (e.g., `c:\flow3d\v11.1\local\ServerAdmin.bat`)
A User Account Control dialog will be displayed asking for these privileges. The executable is digitally signed by Flow Science.
 - *Linux:* Run the script `ServerAdmin.sh` (or `ServerAdmin.csh`) located in the `local` folder of the **FLOW-3D** installation directory (e.g., `/opt/flow3d/v11.1/local/ServerAdmin.sh`)
3. **Server configuration :** Define how the server will communicate with clients.
 - The server configuration settings for **RunnerServer** are accessed on *File*→*Server Configuration* menu.
 - *Server Name:* The *Server Name* field. provides a way for the server administrator to name the server for tracking purposes.
 - *IP address:* The IP address specified here is the IP address of the server machine. This field will automatically be populated with possible entries; select the one that is appropriate for your network.
 - *Server Port Number:* This is the port through which **FLOW-3D** on the client will communicate with **RunnerServer** on the remote machine. *This port must be accessible through the firewall.*

- *SolverRunner Minimum / Maximum Port Number*: Each time **RunnerServer** receives a job to run, it will spawn a new instance of **SolverRunner** to run the solver. Each instance of **SolverRunner** communicates simulation status information with the **FLOW-3D** user interface using a different port, so these fields specify the range of ports that may be used for communication between **FLOW-3D** and each **SolverRunner**. *This range of ports must be open for communication through the firewall.* The number of open ports is recommended to be equal to or greater than the number of solver tokens that are available. On Linux, when using the **iptables** firewall, a command similar to `iptables -A INPUT -p tcp --dport 59150:59200 -j ACCEPT` may be used to open the ports.

4. **Configure user authentication settings**: Give users access to run simulations on this server.

- User authentication settings are accessed on the *File→User Registration* menu.
- *Add*: Adds a new user to the authenticated user list.
 - *Full Name*: The name of the user (for the administrator’s tracking purposes)
 - *User ID*: This is the username that will be used to authenticate the user when a client attempts to connect to the server.
 - *Password*: The password associated with the user ID for authentication
 - *Confirm Password*: Re-enter the password to avoid typographical errors
 - *Email Address*: The email address of the user. The administrator can send setup information to this address.
 - *Phone Number*: The phone number of the user (for the administrator’s tracking purposes)
 - *Home Directory*: The directory on the server where the user’s files are to be written before being transferred to the client.
- *Edit*: Edits the selected user’s account settings.
- *Delete*: Deletes the selected user’s account.
- *Email*: Provided for the administrator to send an email to one or more of the registered clients for disk management, maintenance issues, etc. When the administrator adds a new user during the remote server setup, the software automatically generates an email message with the user ID, password, IP address and server port number to the user. The administrator is given the chance to modify the message if desired and then send it. The same also occurs if any of those fields are modified when the Edit button is selected where the email message specifically references the change.

Note: The first time **FLOW-3D Server Admin** is run it will search for any existing user settings (from a previous version of **FLOW-3D**) and give an option to import them.

5. **Start the remote server**: Choose *File→Start Server* to start **RunnerServer**, allowing client machines to connect and submit jobs. When the server is running, this automatically changes to *Stop Server*. The server can also be activated and deactivated by toggling the icon of a running person.

Once **RunnerServer** is configured and running on the server, clients may begin submitting jobs to the server. When a job completes, the results files are compressed, encrypted, and copied back to the client machine where they are decrypted and uncompressed. The results files are then automatically deleted from the server.

If necessary, the server administrator can also kill running jobs by selecting one or more simulations and choosing the *Kill Selected Job* button. If the administrator kills a running job from the server, the simulation is aborted and **the results files are not saved**. This is intended as a **last resort** option for stopping a running simulation; terminating from the client is preferred as the results will be saved and transferred to the client.

Note:

- One instance of **FLOW-3D Server Admin** supports multiple **client** users.

- Any changes made to the server settings in **FLOW-3D Server Admin** do not take effect until **RunnerServer** is restarted.
- The remote server is not intended to run remote simulations and local simulations simultaneously.
- The remote server cannot be stopped while simulations are running.
- It is not possible to remove a paused simulation from the server.
- The client and server will only communicate if they have the same GUI and solver version.
- Results files can take a significant amount of time to transfer from the remote server to the client machine.
- The GUI on the client machine may slow down while a results file is being transferred from the remote server.



Clients

Once the remote server setup is complete (see *Remote Servers*), client machines can be configured to use this server for remote solving. When adding a new remote server on a client machine, the relevant setup information is entered in the *Preferences*→*Remote Simulation Preferences*→*Remote Server Registration* dialog:

- *Server name*: the name of the server machine
- *IP address*: the IP address of the server machine
- *Port Number*: the port on the server machine through which **RunnerServer** communicates with external programs.
- *User ID*: the user ID (for authentication purposes)
- *Password*: the password associated with the user ID (for authentication purposes)

Existing remote servers can be edited or deleted using the respective buttons. After registration, the available remote servers will be listed in the queue and in the menu when submitting jobs to preprocess or run. As with any program running on a network, there are some potential issues that may occur:

- If a remote server disconnects it may be reconnected by right-clicking on the disconnected remote server in the queue (shown in red) and choosing *Try reconnecting to remote server*.
- If the file upload fails when submitting a job, a simulation can be removed from the queue by right-clicking on the simulation and choosing *Remove from queue*.
- If the results file fails to transmit (e.g., due to a connectivity problem) the results file must be manually retrieved from the server.

The *Preferences*→*Remote Simulation Preferences*→*Automatically download results* preference controls whether the results are automatically or manually downloaded from the server when the simulation completes. If this preference is unchecked, the simulation will remain in the queue until the user clicks on the download button () or removes the simulation from the queue using the right-click menu. The results can only be downloaded after the download status icon () is shown next to the simulation in the queue.

Note:

- The client and server will only communicate if they have the same GUI and solver version.
- Results files can take a significant amount of time to transfer from the remote server to the client machine.
- The GUI on the client machine may slow down while a results file is being transferred from the remote server.

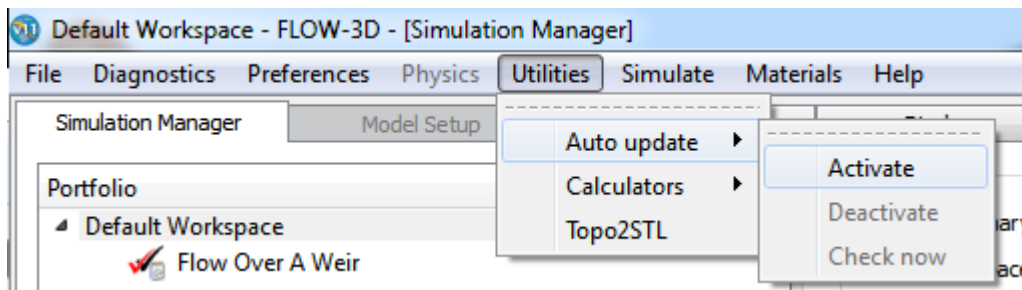
1.3 Maintenance

1.3.1 Installing Updates

Flow Science occasionally releases updated versions of the software to customers with active maintenance contracts. These updates can be applied automatically or manually; the instructions for doing this are detailed in *Automatic updates* and *Manual updates*.

Automatic updates

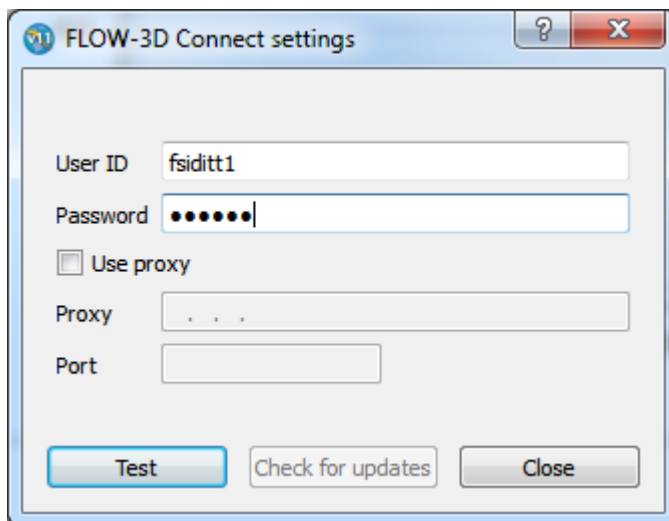
To use the automatic update functionality, open *FLOW-3D* and place the mouse on *Auto update* in the *Utilities* menu. Click the *Activate* button in the submenu that appears.



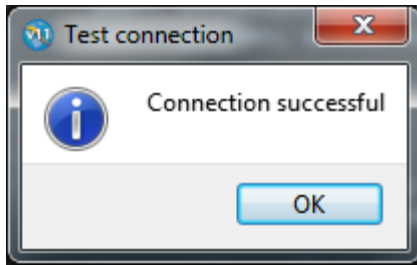
Note:

- A Users' Site account is required for automatic updates.
- On **Linux**, this menu item is only available when running as `root`. Also, `root` needs an environment, including an X session. This can be accomplished by adding a hyphen to the `su` command, like so: `su -`

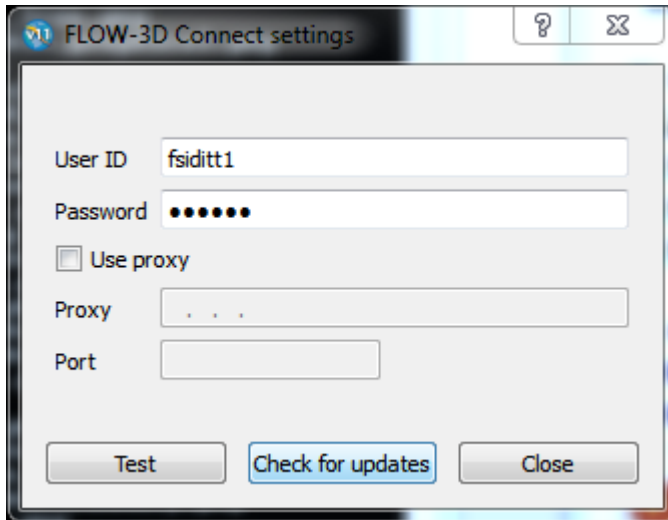
The *FLOW-3D* Connect settings dialog will appear. Enter the User ID and Password provided by the License Administrator and click the *Test* button.



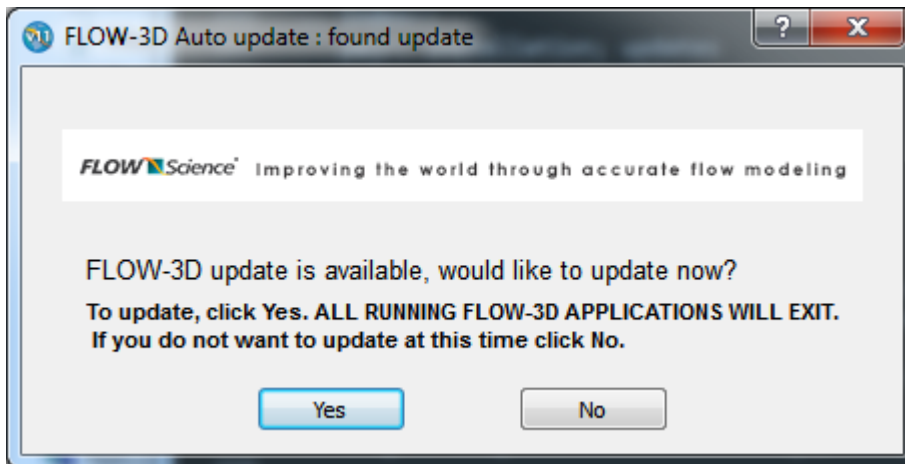
The test should display a success message. If the connection is not successful, ensure that the username and password are correct and that the machine has an active Internet connection. For further troubleshooting, please contact Flow Science support.



Now the *Check for updates* button is available. To check now, click it. Otherwise, click *Close* and **FLOW-3D** will check for updates each time it is started.



Whether the check is done now or later, when an update is available, a dialog will be shown. If **FLOW-3D Server Admin** is active, please ensure all remote jobs are complete and close and exit the server.

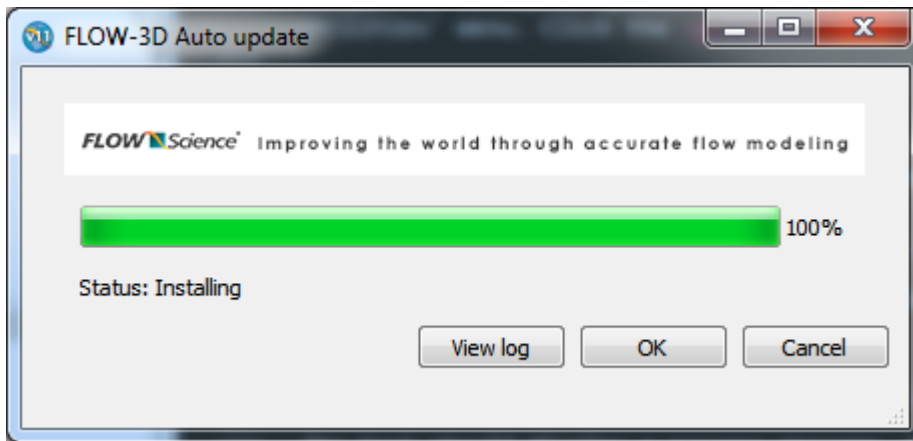


Note:

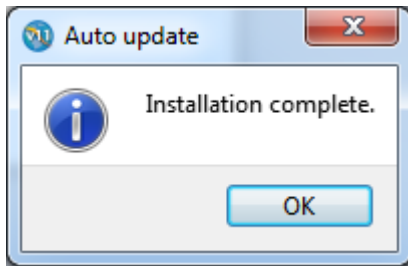
- Before clicking *Yes*, please ensure that *all running FLOW-3D applications have been closed*. Open files cannot be updated. So, please close the **FLOW-3D** graphical user interface first. Also, ensure that **ServerAdmin.exe**, **RunnerServer.exe**, **SolverRunner.exe**, and **RunnerServerService.exe** are not running. On Linux, the processes that must be stopped (in addition to **FLOW-3D**) are named **ServerAdmin**, **RunnerServer**, **SolverRunner**, and **RunnerServerd**.

- Please ensure there are no active simulations, on the local machine or any remote servers.
-

The auto update program will display the status of the download and installation.



Once the update process is complete, an *Installation complete* message will be shown.



Please contact Flow Science support with any questions or problems related to the automatic update process.

Manual updates

Software updates can be downloaded manually from the *FLOW-3D User's site*. Before proceeding with the installation of the updates, please ensure that both *FLOW-3D* and FlowSight are closed, and that **Server Admin** is stopped and closed. To apply the updates:

- *Windows*: Select "Save" and then browse to place the file in your %F3D_HOME% directory. Then unzip the file to update the appropriate files.
- *Linux*: Select "Save" and then browse to place the file in your \$F3D_HOME directory. Use the command "tar -xzvf filename.gz". This will update the appropriate files.

Note:

- On Linux, the update must be applied by `root`.
-

1.3.2 Moving License Servers

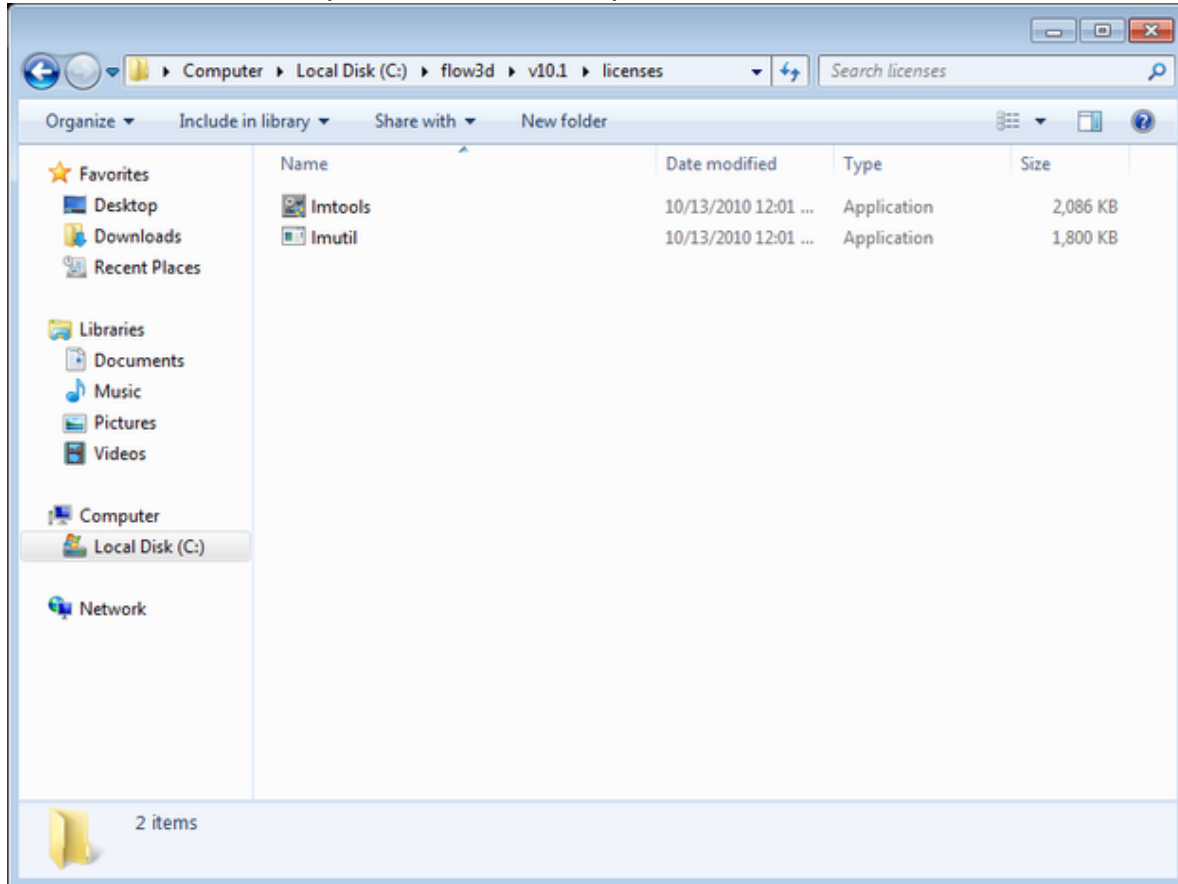
When a floating license is locked to a fixed host ID, such as an Ethernet address or host ID, it is recommended that users choose a server which is likely to be used for the duration of the license. Changing license servers can be done once a year without incurring a re-licensing fee. Re-licensing fees are not necessary (maximum one change per year) when users use a USB or parallel port hardware key (dongle) as their host ID. To move the dongle (and hence license server) to a different computer, the user may change the first line in the license file to reflect the computer

name change. For example, if the license server was previously running on a server named Celsius and will be moved to Kelvin, the first line in the license file would be changed from `SERVER Celsius FLEXID= "your ID"` to `SERVER Kelvin FLEXID= "your ID"`.

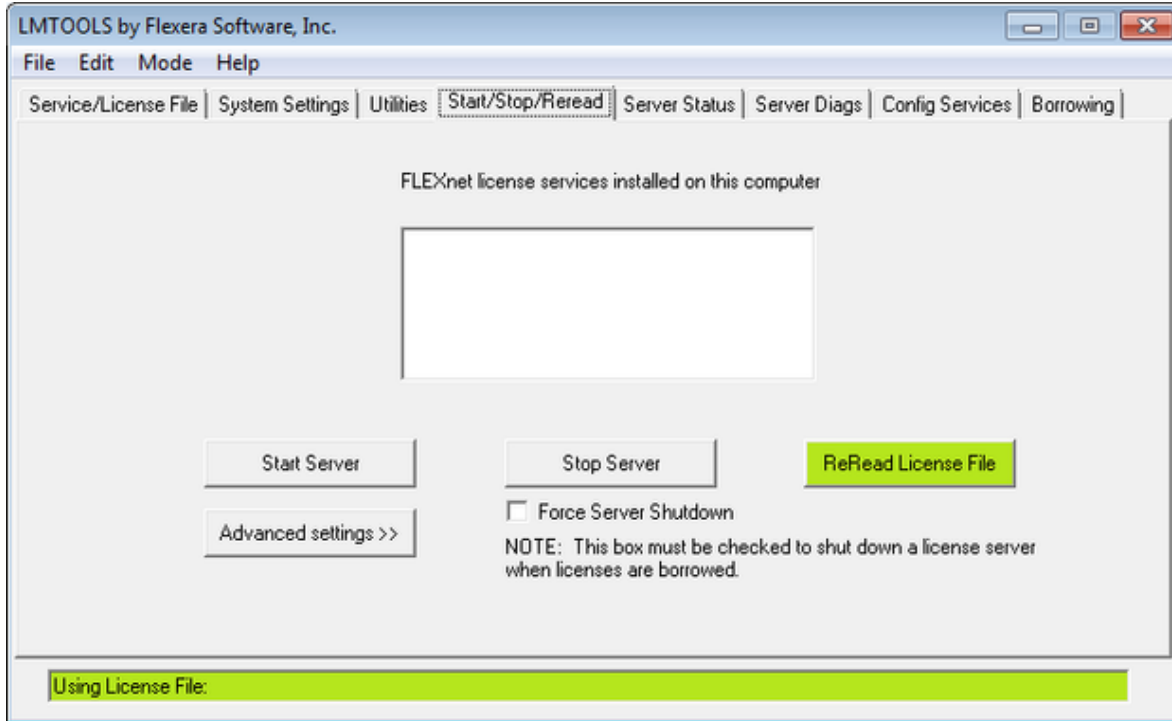
1.3.3 Installing a New/Replacement License File

Windows

1. When a new or replacement `flow3d.lic` is received from the License Administrator, place it into the `licenses` subdirectory found within the directory where **FLOW-3D** or the license server were installed.



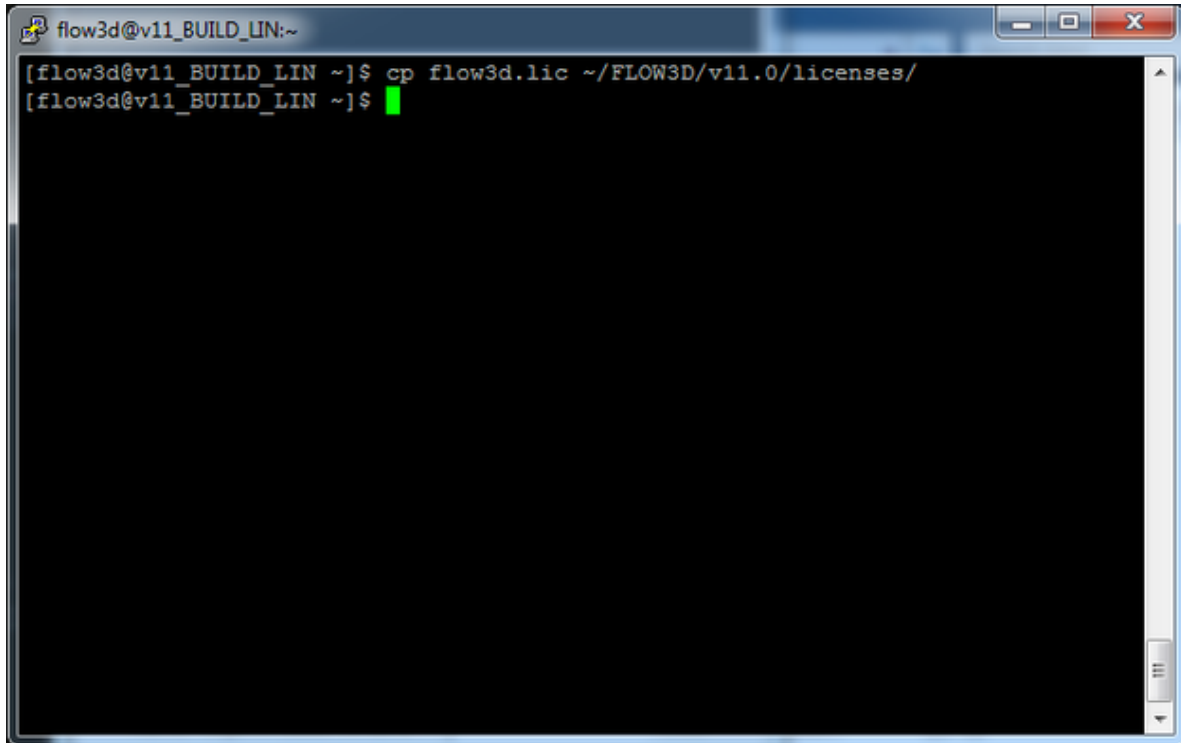
2. Start the **LMTOOLS** utility, from either this directory, the shortcut on the desktop, or the icon in the *Start Menu*. Click the *Start/Stop/Reread* tab. Verify that the license file is in the correct location by checking the directory shown (highlighted in the figure below). If correct, click the *ReRead License File* button (also highlighted).



Linux

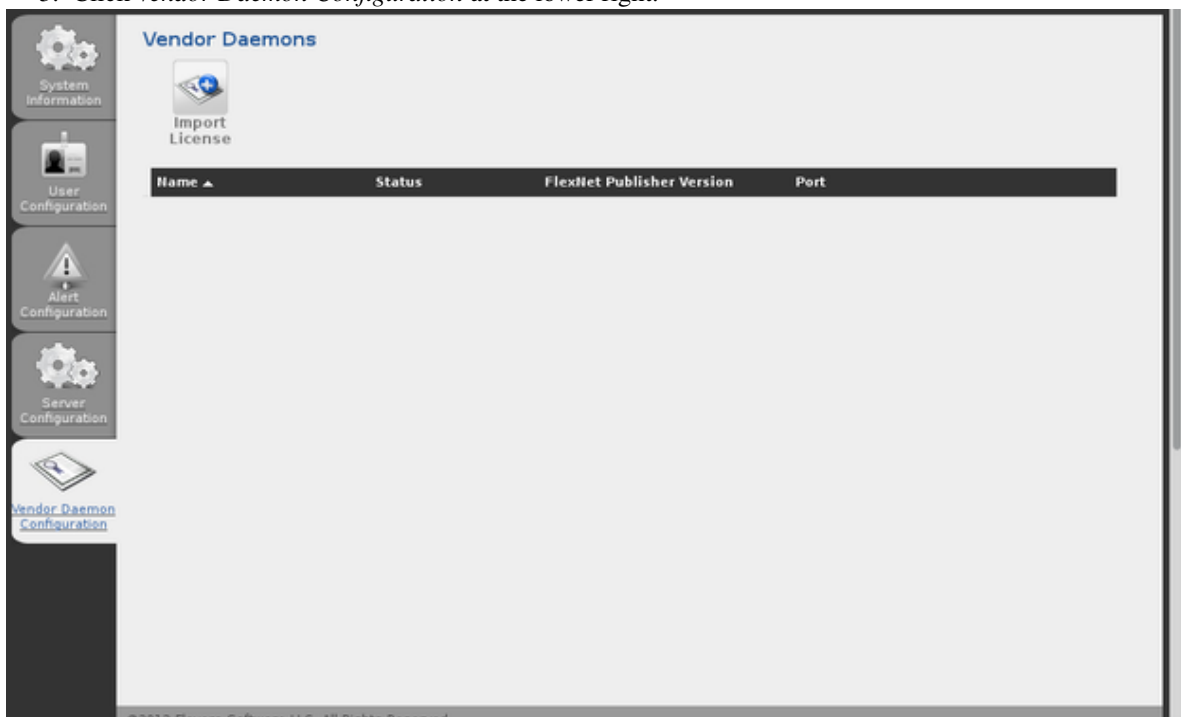
License Servers Using Imadmin

1. When a new or replacement `flow3d.lic` is received from the License Administrator, place it into the `licenses` subdirectory found within the directory where **FLOW-3D** was installed.

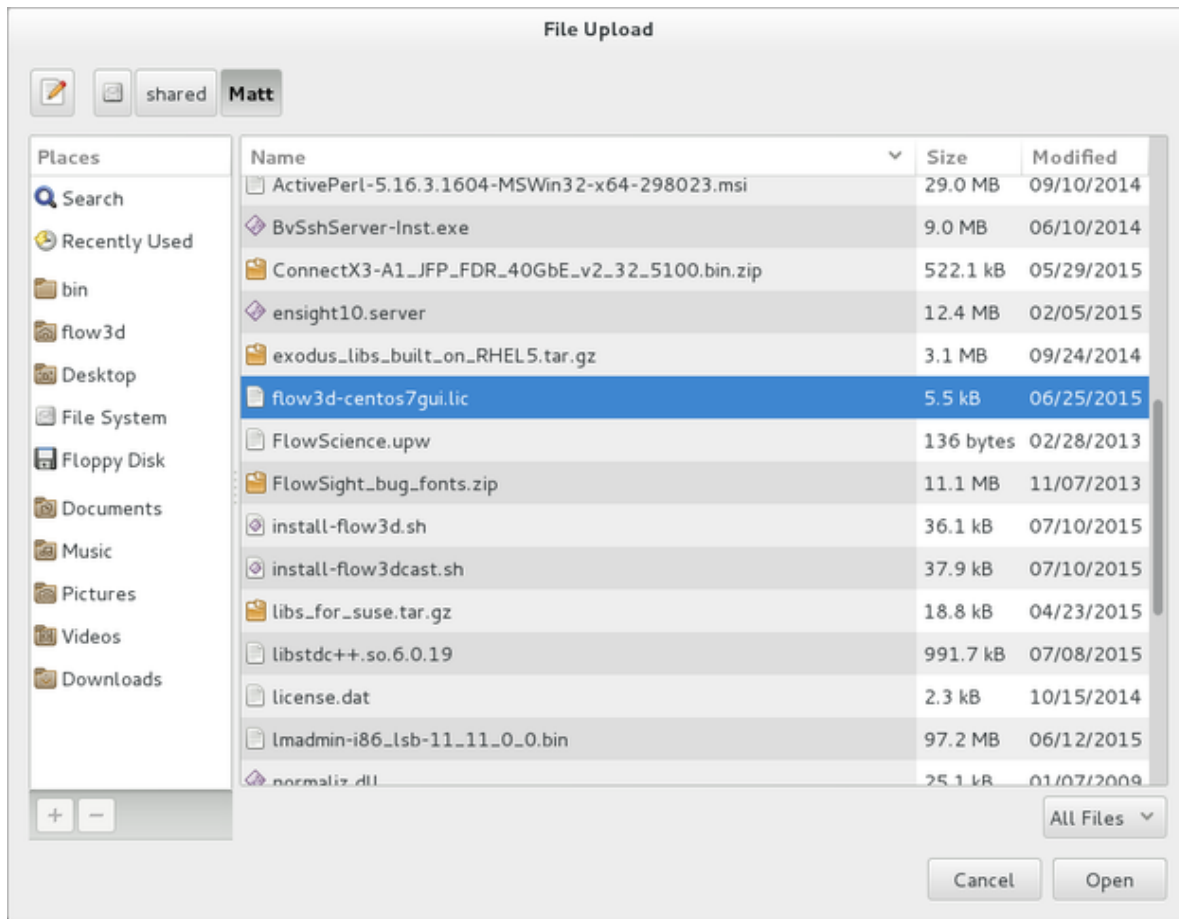
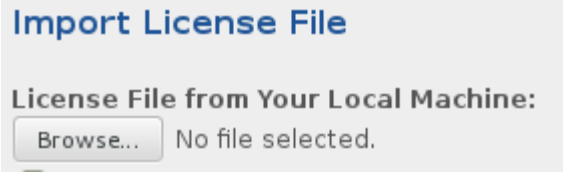


```
flow3d@v11_BUILD_LIN:~  
[flow3d@v11_BUILD_LIN ~]$ cp flow3d.lic ~/FLOW3D/v11.0/licenses/  
[flow3d@v11_BUILD_LIN ~]$
```

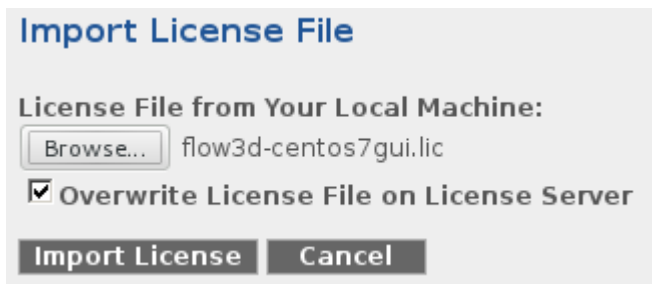
2. Open the web interface for **ladmin**, choose *Administration*, and login.
3. Click *Vendor Daemon Configuration* at the lower right.



4. Click the *Import License* button at the top left and click *Browse* to locate your `flow3d.lic` license file. Once the file is selected click the *Open* button at the lower right.



- The filename should now appear to the right of the *Browse* button. Check the *Overwrite License File on License Server* box and click *Import License* below it.



- Import information should appear. One message shows where the uploaded file was placed. Another message should indicate that the F3DTKNUX vendor daemon is now configured. Click the *OK* button to continue.

Import Information

- Successfully uploaded license file to licenses/F3DTKNUX/flow3d-centos7gui.lic.
- Configured new vendor daemon, F3DTKNUX.

OK

7. The *Vendor Daemons* screen should now show F3DTKNUX with status and port information.

Vendor Daemons




Import License

Name ▲	Status	FlexNet Publisher Version	Port		
F3DTKNUX	Up	11.12	40035	Administer	Delete

8. If the *Status* shows Down, the most common problem is that the **lmadmin** server name does not match the one in the license file.

Please compare the name shown on the *System Information* tab with the name on the `SERVER` line of the `flow3d.lic` license file. If the names do not match, edit the `SERVER` line in the license file.

System Information



[System Information](#)



User Configuration

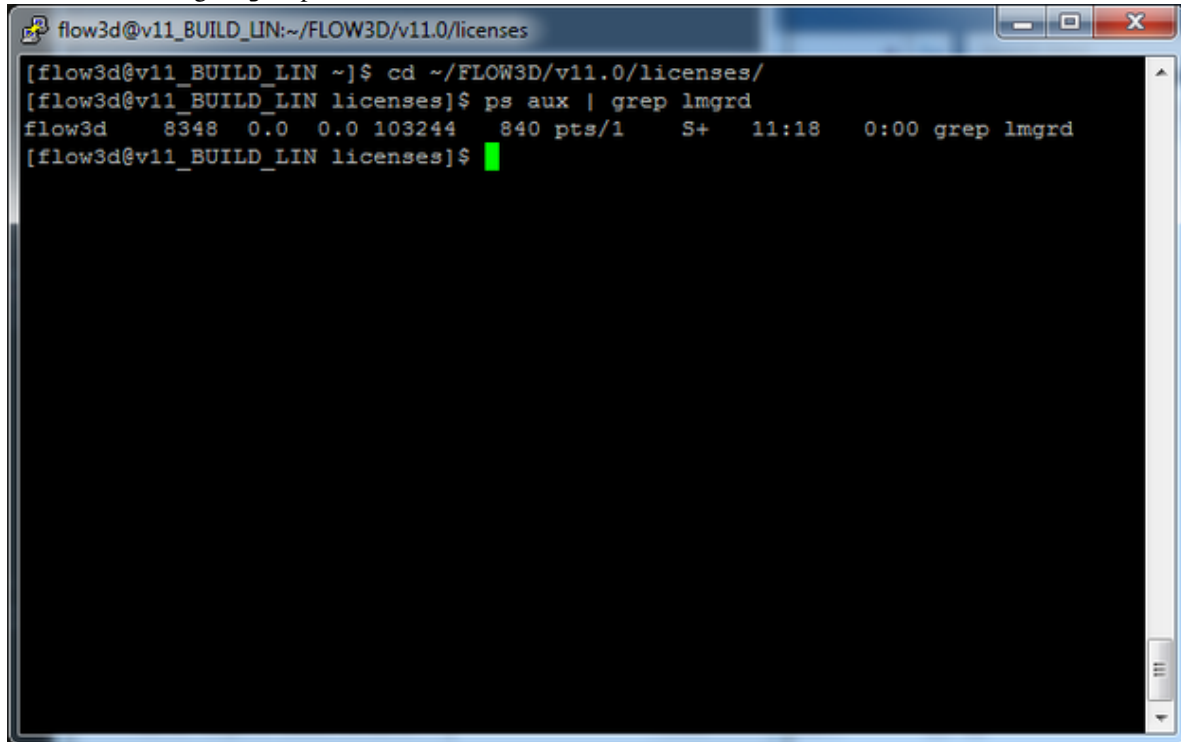


Release Version: 11.11.0
License Server Manager Port in Use: 27000
Display: centos7-gui
Host Name: centos7-gui
Host Domain Name: centos7-gui.flowsci.local
IPv4 Address: 10.0.0.174
IPv6 Address: 0:0:0:0:ffff:a00:ae
Local Stop Server Allowed: Yes
Remote Stop Server Allowed: No
License Reclaim Allowed: No

```
SERVER centos7-gui 000c29353f11
VENDOR F3DTKNUX
USE_SERVER
INCREMENT prep3d F3DTKNUX 11.1 21-
  VENDOR_STRING=290825144891
  START=21-jan-2015 SIGN="19
  55C8 F4CF 256D 8A8A 773D 7
  51A7 9C8F 6BDE DD99 B534 1
  SIGN2=BEDD98F40E2A
```

License Servers Using lmgrd

1. Check whether the license server is running using `ps aux | grep lmgrd`. This will provide the PID of any running license servers. They can be killed using `kill (PID)`. It is not recommended to use `kill -9` on a running **lmgrd** process.

A terminal window titled 'flow3d@v11_BUILD_LIN:~/FLOW3D/v11.0/licenses'. The prompt is '[flow3d@v11_BUILD_LIN ~]\$'. The user enters 'cd ~/FLOW3D/v11.0/licenses/'. The prompt changes to '[flow3d@v11_BUILD_LIN licenses]\$'. The user enters 'ps aux | grep lmgrd'. The output is 'flow3d 8348 0.0 0.0 103244 840 pts/1 S+ 11:18 0:00 grep lmgrd'. The prompt returns to '[flow3d@v11_BUILD_LIN licenses]\$' with a green cursor.

```
flow3d@v11_BUILD_LIN:~/FLOW3D/v11.0/licenses
[flow3d@v11_BUILD_LIN ~]$ cd ~/FLOW3D/v11.0/licenses/
[flow3d@v11_BUILD_LIN licenses]$ ps aux | grep lmgrd
flow3d 8348 0.0 0.0 103244 840 pts/1 S+ 11:18 0:00 grep lmgrd
[flow3d@v11_BUILD_LIN licenses]$
```

2. It is recommended to run the license server as a user, not as root. The command to start the new lmgrd process is `lmgrd -c flow3d.lic -l logfile.log`, where the logfile name may be changed as needed. `flow3d.log` is often used.

```

flow3d@v11_BUILD_LIN:~/FLOW3D/v11.0/licenses
[flow3d@v11_BUILD_LIN ~]$ cd ~/FLOW3D/v11.0/licenses/
[flow3d@v11_BUILD_LIN licenses]$ ps aux | grep lmgrd
flow3d      8348  0.0  0.0 103244   840 pts/1    S+   11:18   0:00 grep lmgrd
[flow3d@v11_BUILD_LIN licenses]$ ./lmgrd -c flow3d.lic -l flow3d.log
[flow3d@v11_BUILD_LIN licenses]$ █

```

1.3.4 Troubleshooting License Problems

Windows

This guide provides a series of steps that can be used to diagnose and resolve licensing issues with **FLOW-3D**. Feel free to contact our support staff at support@flow3d.com or at (505) 982-0088 if you have trouble at any point.

1. Close any open instances of **FLOW-3D** and close *RunnerServer.exe* (an application running in the task tray). After closing **FLOW-3D**, confirm that there are no instances of *flow3d.exe*, *hydr3d.exe*, *RunnerServer.exe*, *guiobs.exe*, or *flscon.exe* running by looking at the processes tab of the task manager. If there are, terminate the process.
2. Verify that the correct install option was chosen.
 - (a) **Client:** You intend to run **FLOW-3D** on this computer but will install the license server on another computer.
 - (b) **Server / Client:** You intend to run both **FLOW-3D** and the license server on this computer.
 - (c) **Server:** You are only installing the license server on this computer.

If the *Server or Server/Client* installation was not selected for the machine running the license server you will need to run the *Server* installation on this computer. You can check if the necessary software was installed by looking for the files *F3DTKINUX.exe* and *lmgrd.exe* in the licenses folder of the installation directory on the server machine. If they are in this folder then the server software was installed.

3. Verify that the license file (*flow3d.lic*) is in the correct location. It should be in the licenses subfolder of the installation directory on the server machine (e.g. C:\flow3d\v1103\licenses).
4. Make sure you are using the correct license file for your server machine. You will need to open the license file (*flow3d.lic*) in a text editor on the server machine.

- (a) Make sure the server machine computer name (or IP address) matches what is in the license file. This parameter may be edited in the license file to match the computer.
 - i. The first line of the license file will read `SERVER <name> . . .`
 - ii. The computer name, `<name>`, can be found from *My Computer* → *Properties*. Alternatively, the IP address can be found by opening a command prompt and typing `ipconfig -all`. The IP address looks like: `xx.x.x.xxx`.
 - (b) If you were sent a USB dongle:
 - i. Verify that the dongle is plugged into the server machine and that the red light on the dongle is lit.
 - ii. Make sure that the dongle matches the license file
 - A. Compare the flexID marked on the dongle with the one at the top of the license file (open in a text editor). The first line of the license file should look like: `SERVER <name> FLEXID=<flexID> <port>`, where `<flexID>` is a string of numbers and characters and cannot be modified. The dongle flexID must match what is specified in the license file.
 - B. This can also be checked by opening LMTOOLS, located in the licenses folder of the install directory, and viewing the FLEXID box on the system settings tab.
 - (c) If your license is locked to an Ethernet (MAC) address:
 - i. Make sure the server network card physical address matches what is specified in the license file. The value in the license file cannot be changed.
 - A. The first line of the license file will read `SERVER <name> <physical address> <port>`
 - B. The server network card physical address, `<physical address>`, can be found by opening a command prompt and typing `ipconfig -all`. The server network card physical address looks like: `xx-xx-xx-xx-xx-xx`
5. Check that the necessary environment variables are set on the client machines.
 - (a) Right-click on the **FLOW-3D** icon and choose *Edit*.
 - (b) Verify that the following variables have the correct values. Note that the values below are based on the default install location.
 - i. `F3D_HOME = C:\flow3d\v1103` (the **FLOW-3D** installation directory)
 - ii. `PATH = C:\flow3d\v1103\local`
 - iii. `F3DTKNUX_LICENSE_FILE = @xx.x.x.xxx` (this should point to the server IP address preceded by the @ symbol)
 6. Verify that the firewall on the server machine has exceptions for the license daemons.
 - (a) Go to *Start* → *Control Panel* → *Windows Firewall*.
 - (b) Click *Allow a program or feature through Windows Firewall*.
 - (c) Verify that `FLOW-3D_v11_license_daemon` and `FLOW-3D_v11_vendor_daemon` are in the list and checked for the appropriate networks. If not, choose *Allow another program...* and browse to the licenses folder of the installation directory and add exceptions for `lmgrd.exe` and `F3DTKNUX.exe`.
 7. Now restart the license server and reread the license file on the server machine.
 - (a) Open a command prompt and change to the licenses folder in the install directory (e.g. `cd c:\flow3d\v1103\licenses`)
 - (b) Type `lmutil lmdown -c flow3d.lic` to shut down any running license daemons

- (c) Type `lmgrd -c flow3d.lic -l flow3d.log` to restart the server. You may be notified that the firewall is blocking the license daemons. If this is the case, allow exceptions for *F3DTKINUX.exe* and *lmgrd.exe*
- (d) Perform a status check by typing `lmutil lmstat -c flow3d.lic`. This will display the server status. It should now report:

```
[Detecting lmgrd processes...]
License server status: <port>@<name>
License file(s) on <name>: @<IPaddress>
License file(s) on <name>: <licensepath>: <name>: license server UP (MASTER) v11.9
Vendor daemon status (on <name>): F3DTKINUX: UP v11.9
```

Where `<port>` is the port number being used by the server, `<name>` is the name of the computer running the server (as it appears on the network), `<IPaddress>` is the IP address of the server, and `<licensepath>` is the full directory location of the license file (*flow3d.lic*). Note that running multiple license servers on the same machine may result in conflicts in port usage. If there is a conflict, change (or add) the port number, `<port>`, in the license file and repeat step 6. The default port number is 27000.

8. You should now be able to launch and run **FLOW-3D**.

Linux

License Servers Using Imadmin

This guide provides a series of steps that can be used to diagnose and resolve licensing issues with **FLOW-3D**. Feel free to contact our support staff at support@flow3d.com or at (505) 982-0088 if you have trouble at any point.

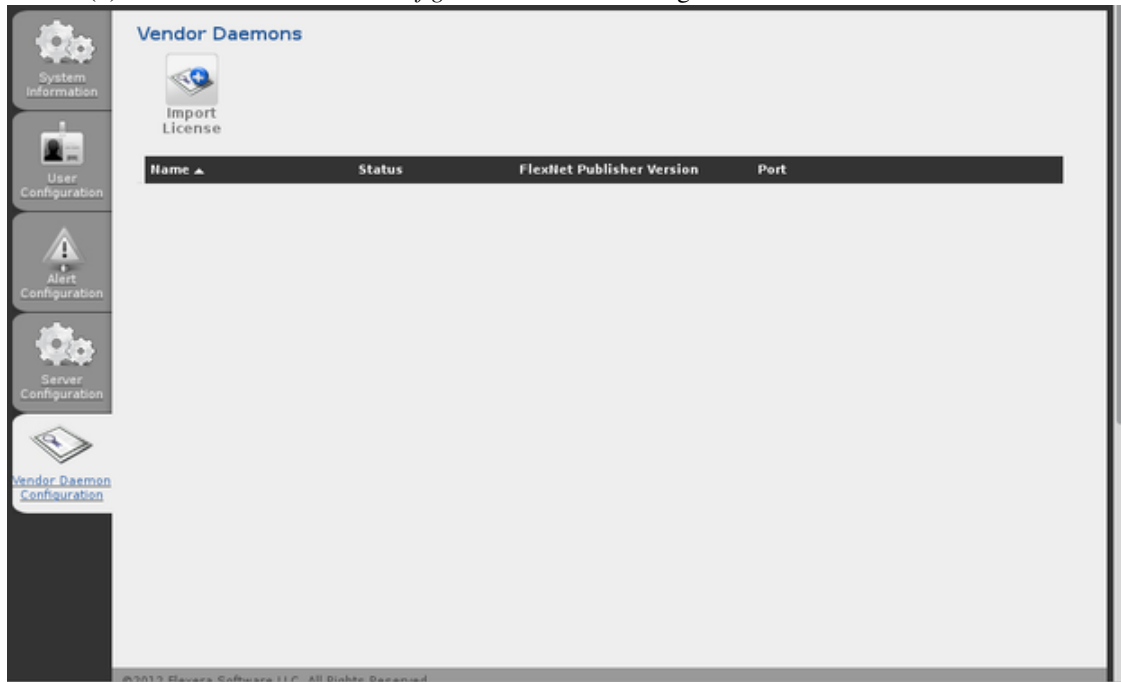
1. Close any open instances of **FLOW-3D** and close *RunnerServer.exe*. It is worth verifying that there are no instances of *flow3d.exe*, *RunnerServer.exe*, *hydr3d.exe*, *guiobs.exe*, or *flscon.exe* running by typing `ps -A | grep flow3d`, `ps -A | grep hydr3d`, etc. If something is running it can be stopped using the kill command.
2. Verify that the correct install option was chosen.
 - (a) **Client**: You intend to run **FLOW-3D** on this computer but will install the license server on another computer.
 - (b) **Server / Client**: You intend to run both **FLOW-3D** and the license server on this computer.
 - (c) **Server**: You are only installing the license server on this computer.

If the *Server* or *Server/Client* installation was not run on the machine running the license server you will need to run the Server installation on this computer. You can check if the server software was installed by looking in the licenses folder of the installation directory on the server machine for the files *F3DTKINUX.exe* and *lmgrd.exe*. If they are in this folder then the server software was installed.

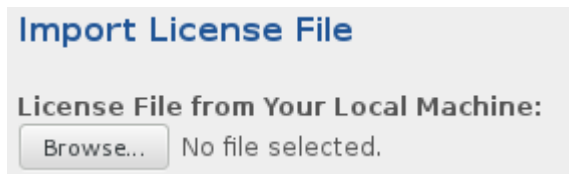
3. Verify that the license file (*flow3d.lic*) is in the correct location. It should be in the licenses subfolder of the installation directory on the server machine (e.g. `/opt/flow3d/v11.1/licenses`).
4. Make sure you are using the correct license file for your server machine. You will need to open the license file (*flow3d.lic*) in a text editor (or using `more`) on the server machine.
 - (a) Make sure the server machine computer name (or IP address) matches what is in the license file. This parameter may be edited in the license file to match the computer.
 - i. The first line of the license file will read `SERVER <name> ...`
 - ii. The IP address, `<name>`, can be found by entering `/sbin/ifconfig` in to a terminal. The `eth0` section will contain the information. The IP address is called `inet addr` and looks like: `xx.x.x.xxx`

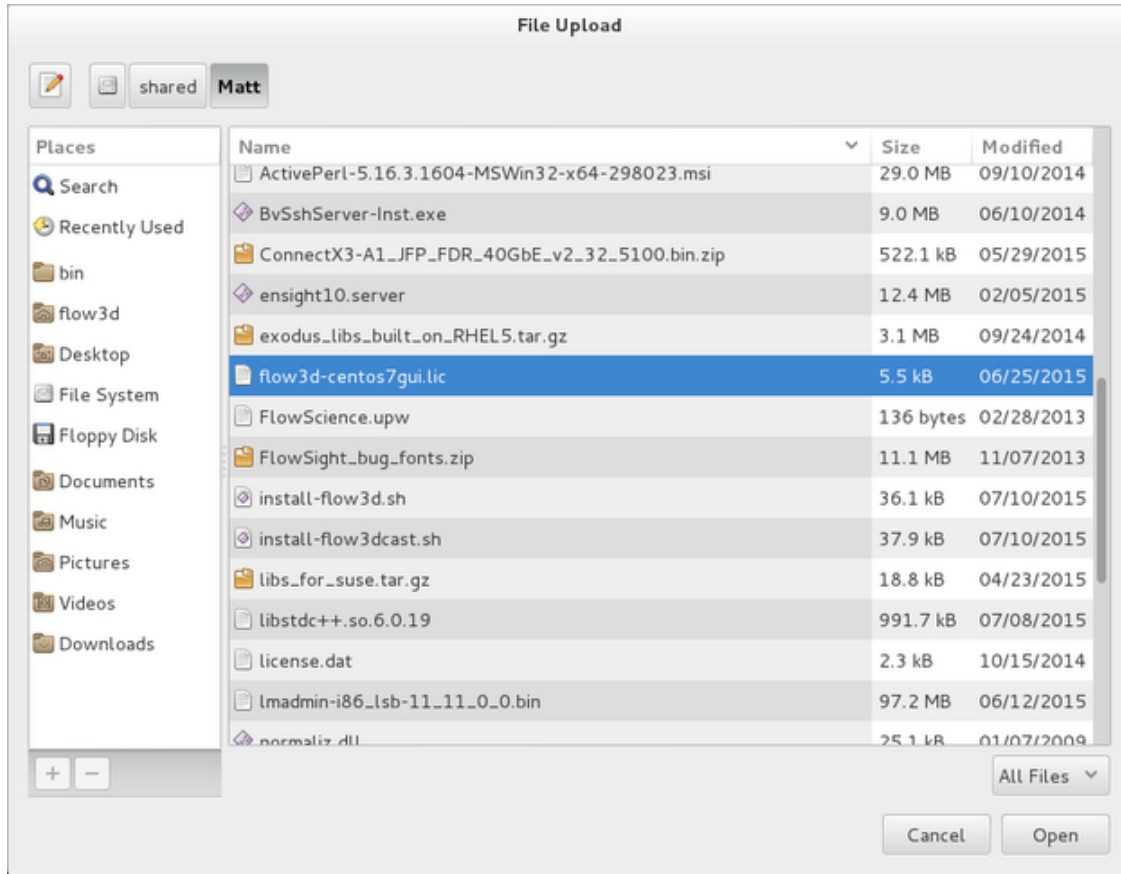
- (b) If you were sent a USB dongle (RHEL only):
 - i. Verify that the dongle is plugged into the server machine and the red light on the dongle is lit.
 - ii. Make sure that the dongle matches the license file
 - A. The first line of the license file should look like: `SERVER <name> FLEXID=<flexID> <port>`, where `<flexID>` is a string of numbers and characters.
 - B. The flexID is marked on the dongle and at the top of the license file (open in a text editor). The dongle flexID must match what is specified in the license file and the value in the license file cannot be modified.
 - C. This can also be checked by opening LMTOOLS, located in the licenses folder of the install directory, and viewing the FLEXID box on the system settings tab
 - (c) If your license is locked to an Ethernet (MAC) address:
 - i. Make sure the server network card physical address matches what is specified in the license file. The value in the license file cannot be changed.
 - A. The first line of the license file will read `SERVER <name> <physical address> <port>`.
 - B. The server network card physical address, `<physical address>`, can be found by entering `/sbin/ifconfig` into a terminal. The eth0 section will contain the information. The server network card physical address is called HWaddr and looks like: `xx-xx-xx-xx-xx-xx`
5. Check that the necessary environment variables are set on the client machines. The easiest way to do this is to run one of the included shell or c-shell files.
- (a) Open a terminal and change to the local directory in the install directory (e.g. `cd /opt/flow3d/v11.1/local`)
 - (b) Type `more flow3dvars.sh` (or `more flow3dvars.csh`) and verify that the environment variables are correct. The variables and example definitions are shown below. If the definitions are incorrect they can be fixed using a text editor like `vi`.
 - i. `export F3D_HOME = /opt/flow3d/v11.1`: This should point to the **FLOW-3D** installation directory.
 - ii. `export F3D_VERSION=double`: Sets the default solver type to double-precision.
 - iii. `export PATH=$F3D_HOME/local:$PATH`: Tells the file system where to find the **FLOW-3D** executable
 - iv. `ulimit -s unlimited`: This unlimits the stack size. Not doing this is a common cause of segmentation faults.
 - v. `export F3D_HELP=/usr/bin/firefox` (default browser for help files)
 - vi. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib`
 - vii. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib/qt`
 - viii. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib/fort`
 - ix. `export F3DTKNUX_LICENSE_FILE = @xx.xx.xx.xxx`: This variable is used on client machines and should point to the server name or IP address.
 - (c) Type `source flow3dvars.sh` (or `source flow3dvars.csh`) to set the variables defined in the shell (or c-shell). This command will need to be called every time a new terminal is opened to launch **FLOW-3D**. Alternatively, this command can be added to the `.bashrc` file to make this an automatic process.
6. Now restart the license server and reread the license file on the server machine

- (a) Open the web interface for **ladmin**, choose *Administration*, and login.
- (b) Click *Vendor Daemon Configuration* at the lower right.

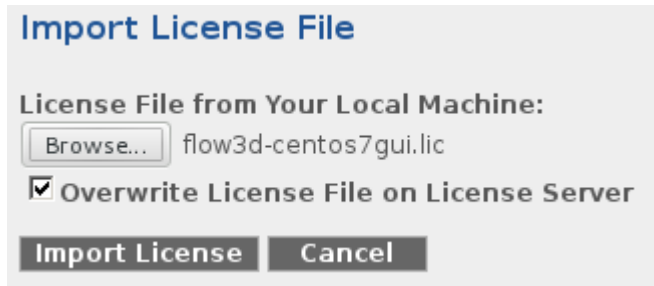


- (c) Click the *Import License* button at the top left and click *Browse* to locate your `flow3d.lic` license file. Once the file is selected click the *Open* button at the lower right.

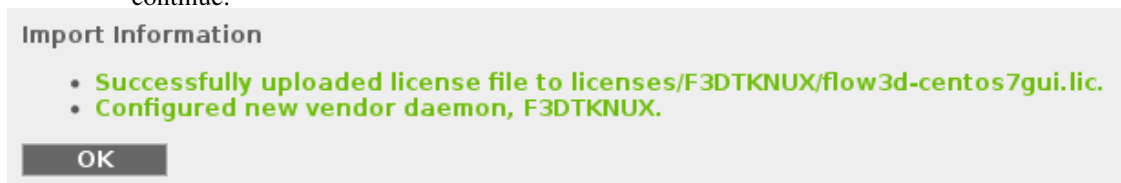




(d) The filename should now appear to the right of the *Browse* button. Check the *Overwrite License File on License Server* box and click *Import License* below it.



(e) Import information should appear. One message shows where the uploaded file was placed. Another message should indicate that the F3DTKNUX vendor daemon is now configured. Click the *OK* button to continue.

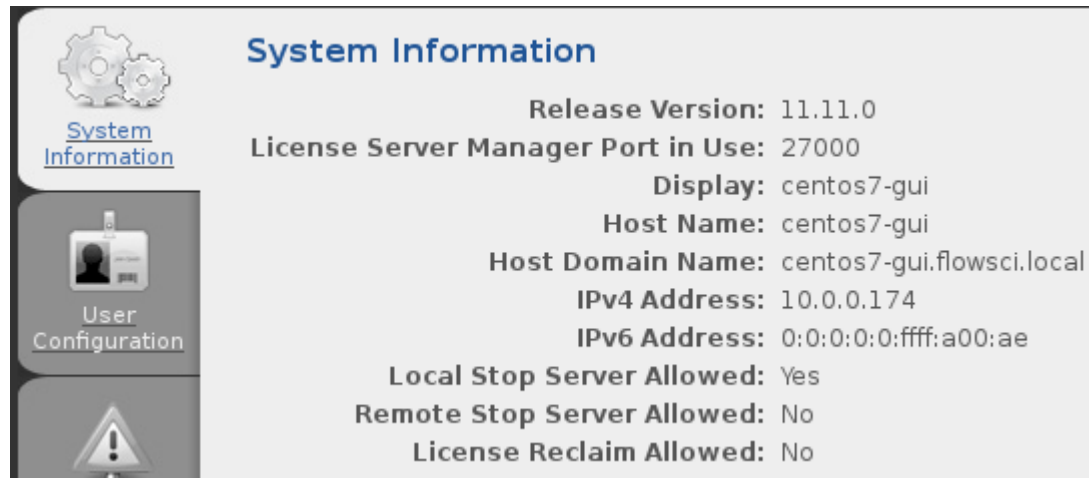


(f) The *Vendor Daemons* screen should now show F3DTKNUX with status and port information.



- (g) If the *Status* shows *Down*, the most common problem is that the **ladmin** server name does not match the one in the license file.

Please compare the name shown on the *System Information* tab with the name on the *SERVER* line of the `flow3d.lic` license file. If the names do not match, edit the *SERVER* line in the license file.



```
SERVER centos7-gui 000c29353f11
VENDOR F3DTKNUX
USE_SERVER
INCREMENT prep3d F3DTKNUX 11.1 21-
VENDOR_STRING=290825144891
START=21-jan-2015 SIGN="19
55C8 F4CF 256D 8A8A 773D 7
51A7 9C8F 6BDE DD99 B534 1
SIGN2=BEDD98F40E2A
```

7. You should now be able to launch and run **FLOW-3D**.

License Servers Using Imgrd

This guide provides a series of steps that can be used to diagnose and resolve licensing issues with **FLOW-3D**. Feel free to contact our support staff at support@flow3d.com or at (505) 982-0088 if you have trouble at any point.

1. Close any open instances of **FLOW-3D** and close *RunnerServer.exe*. It is worth verifying that there are no instances of *flow3d.exe*, *RunnerServer.exe*, *hydr3d.exe*, *guiobs.exe*, or *flscon.exe* running by typing `ps -A | grep flow3d`, `ps -A | grep hydr3d`, etc. If something is running it can be stopped using the `kill` command.

2. Verify that the correct install option was chosen.
 - (a) **Client:** You intend to run *FLOW-3D* on this computer but will install the license server on another computer.
 - (b) **Server / Client:** You intend to run both *FLOW-3D* and the license server on this computer.
 - (c) **Server:** You are only installing the license server on this computer.

If the *Server* or *Server/Client* installation was not run on the machine running the license server you will need to run the *Server* installation on this computer. You can check if the server software was installed by looking in the licenses folder of the installation directory on the server machine for the files *F3DTKINUX.exe* and *lmgrd.exe*. If they are in this folder then the server software was installed.

3. Verify that the license file (*flow3d.lic*) is in the correct location. It should be in the licenses subfolder of the installation directory on the server machine (e.g. `/opt/flow3d/v11.1/licenses`).
4. Make sure you are using the correct license file for your server machine. You will need to open the license file (*flow3d.lic*) in a text editor (or using `more`) on the server machine.

- (a) Make sure the server machine computer name (or IP address) matches what is in the license file. This parameter may be edited in the license file to match the computer.
 - i. The first line of the license file will read `SERVER <name> ...`
 - ii. The IP address, `<name>`, can be found by entering `/sbin/ifconfig` in to a terminal. The `eth0` section will contain the information. The IP address is called `inet addr` and looks like: `xx.x.x.xxx`

- (b) If you were sent a USB dongle (RHEL only):
 - i. Verify that the dongle is plugged into the server machine and the red light on the dongle is lit.
 - ii. Make sure that the dongle matches the license file
 - A. The first line of the license file should look like: `SERVER <name> FLEXID=<flexID> <port>`, where `<flexID>` is a string of numbers and characters.
 - B. The flexID is marked on the dongle and at the top of the license file (open in a text editor). The dongle flexID must match what is specified in the license file and the value in the license file cannot be modified.
 - C. This can also be checked by opening `LMTOOLS`, located in the licenses folder of the install directory, and viewing the FLEXID box on the system settings tab

- (c) If your license is locked to an Ethernet (MAC) address:
 - i. Make sure the server network card physical address matches what is specified in the license file. The value in the license file cannot be changed.
 - A. The first line of the license file will read `SERVER <name> <physical address> <port>`.
 - B. The server network card physical address, `<physical address>`, can be found by entering `/sbin/ifconfig` into a terminal. The `eth0` section will contain the information. The server network card physical address is called `HWaddr` and looks like: `xx-xx-xx-xx-xx-xx`

5. Check that the necessary environment variables are set on the client machines. The easiest way to do this is to run one of the included shell or c-shell files.
 - (a) Open a terminal and change to the local directory in the install directory (e.g. `cd /opt/flow3d/v11.1/local`)
 - (b) Type `more flow3dvars.sh` (or `more flow3dvars.csh`) and verify that the environment variables are correct. The variables and example definitions are shown below. If the definitions are incorrect they can be fixed using a text editor like `vi`.

- i. `export F3D_HOME = /opt/flow3d/v11.1`: This should point to the **FLOW-3D** installation directory.
 - ii. `export F3D_VERSION=double`: Sets the default solver type to double-precision.
 - iii. `export PATH=$F3D_HOME/local:$PATH`: Tells the file system where to find the **FLOW-3D** executable
 - iv. `ulimit -s unlimited`: This unlimits the stack size. Not doing this is a common cause of segmentation faults.
 - v. `export F3D_HELP=/usr/bin/firefox` (default browser for help files)
 - vi. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib`
 - vii. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib/qt`
 - viii. `export LD_LIBRARY_PATH=$LD_LIBRARY_PATH:$F3D_HOME/gui/lib/ifort`
 - ix. `export F3DTKNUX_LICENSE_FILE = @xx.xx.xx.xxx`: This variable is used on client machines and should point to the server name or IP address.
- (c) Type `source flow3dvars.sh` (or `source flow3dvars.csh`) to set the variables defined in the shell (or c-shell). This command will need to be called every time a new terminal is opened to launch **FLOW-3D**. Alternatively, this command can be added to the `.bashrc` file to make this an automatic process.
6. Now restart the license server and reread the license file on the server machine
- (a) Open a terminal and change to the licenses directory in the install directory (e.g. `cd /opt/flow3d/v11.1/licenses`)
 - (b) Type `./lmdown -c flow3d.lic` to shut down the running license daemons
 - (c) Type `./lmgrd -c flow3d.lic -l flow3d.log &` to restart the server
 - i. The `&` is to run the daemons in the background
 - ii. You may need to allow firewall exceptions for `F3DTKNUX.exe` and `lmgrd.exe`
 - (d) Type `./lmreread -c flow3d.lic` to reread the license file
 - (e) Perform a status check by typing `./lmstat -c flow3d.lic`. This will display the server status. It should now report:

```
[Detecting lmgrd processes...]
License server status: <port>@<name>
License file(s) on <name>: @<IPaddress>
License file(s) on <name>: <licensepath>: <name>: license server UP (MASTER) v11.9
Vendor daemon status (on <name>): F3DTKNUX: UP v11.9
```

Where `<port>` is the port number being used by the server, `<name>` is the name of the computer running the server (as it appears on the network), `<IPaddress>` is the IP address of the server, and `<licensepath>` is the full directory location of the license file (`flow3d.lic`).

- (f) Note that running multiple license servers on the same machine may result in conflicts in port usage. If there is a conflict, change (or add) the port number, `<port>`, in the license file and repeat step 6. The default port number is 27000.
7. You should now be able to launch and run **FLOW-3D**.

1.4 License Agreements and Copyright Information

1.4.1 FLOW-3D End User License Agreement

THE TERMS AND CONDITIONS OF THIS END-USER LICENSE AGREEMENT SHALL GOVERN YOUR USE OF THE SOFTWARE. READ THIS LICENSE CAREFULLY BEFORE INSTALLING AND USING THE SOFTWARE. BY USING THE SOFTWARE, YOU AGREE TO BE BOUND BY THE TERMS OF THIS AGREEMENT.

1. The Software is licensed to You by Flow Science, Inc. (“Licensor”) on a nonexclusive and nontransferable basis, subject to the commercial terms specified in the Acquisition Agreement and subject to the terms and conditions set forth herein.

IF YOU ARE AN ACADEMIC USER, YOU UNDERSTAND THAT YOU ARE OBLIGATED TO RESTRICT YOUR USE OF THE SOFTWARE TO TEACHING, ACADEMIC AND/OR UNSPONSORED RESEARCH, OR SPONSORED RESEARCH THAT CAN AND WILL BE FREELY PUBLISHED WITH NO PROPRIETARY RESTRICTIONS.

2. **Definitions:**

- (a) “Acquisition Agreement” means a separate executed agreement between You (or the entity under whose authorization You are using the Software) and Licensor or one of its authorized distributors. Such agreement governs, among other things, the specific *FLOW-3D* Product that is licensed to you, the number of allowed concurrent instances, price, license duration, and rights to technical support and upgrades.
- (b) “Agreement” means this End-User License Agreement
- (c) “Documentation” means manuals, release or installation notes related to *FLOW-3D* Products and/or FlowSight, including electronic versions thereof.
- (d) “*FLOW-3D* Product” means those computational fluid dynamics software programs, sold and distributed individually as *FLOW-3D*, *FLOW-3D/MP*, or *FLOW-3D* Cast, and any other similar product which is now available or may become available from Licensor under the same family name.
- (e) “FlowSight” means the post-processing and visualization tool packaged with the *FLOW-3D* Product. FlowSight is a custom version of EnSight[®], limited to use in conjunction with *FLOW-3D* Products only, which is distributed by Licensor under license from Computational Engineering International, Inc. (CEI).
- (f) “Software” means such computer program from among the *FLOW-3D* Products that is licensed to You hereunder, FlowSight, the Documentation, and any backups or other copies.

3. **License Management:** In connection with the License granted herein, Licensor will issue one or more electronic license files which shall be tied to either a FLEXlm[®] hardware dongle or to the Ethernet address of a designated server. Such license file(s) will enable the running of the Software’s preprocessor and postprocessor and control the number of concurrent instances of the Software’s solver module and FlowSight in use. You agree not to take any steps to avoid or defeat the purpose of such licensing measures. Use of the Software without a license file, or in excess of the number of authorized concurrent instances is expressly prohibited. Upon request, You agree to submit log files to Licensor for verification. Use of the Software on a network is restricted to a fifty-mile radius around one geographic location, unless otherwise authorized by Licensor.

4. **Maintenance:** If arrangements for technical support have been made, only the person designated by You as the “Registered User”, or persons who have attended a *FLOW-3D* Training Class, will be entitled to contact Licensor or its authorized distributor to seek technical support. Technical support will be provided via telephone, e-mail, web-based meetings, fax, and/or mail during normal business hours.

In order to enable Licensor to provide timely and beneficial technical support for the Software, You agree to install updates, fixes, circumventions, and corrective code to the Software in a reasonable time after receipt thereof and to be responsible for the installation and administration of the Software on platforms officially

supported by Licensor. Licensor shall not be obligated to provide technical support unless You are using the current version of the *FLOW-3D* Product You are licensed to use or the previous major release thereof.

If You are an academic user and have purchased maintenance service, such service is limited to the following: (a) Licensor will provide User with software upgrades when they become available; (b) Licensor will assist in installation of the code and will answer questions about how to use the input variables to implement the various models in *FLOW-3D*; (c) at its option, Licensor will analyze results that appear obviously incorrect because they don't seem to reproduce simple analytical results or expected conservation laws; (d) Licensor will also provide access to a number of subroutines to allow users to implement small changes to *FLOW-3D*, including boundary conditions and material properties; (e) Licensor will not assist in the making of revisions or customizations to the Software.

5. Use and Limitations:

- (a) The Software is the property of Licensor, or with respect to FlowSight, of CEI. You recognize that the Software is copyrighted under the laws of the United States of America and international treaty provisions. Notwithstanding the copyrights, the Software contains trade secrets and proprietary information of Licensor and CEI, and You agree not to act in contravention of any of Licensor's or CEI's intellectual property rights. You acknowledge that Licensor and CEI own the aforementioned rights and have the following exclusive rights with regard to the applicable portions of the Software: to reproduce it; to adapt, transform or rearrange it; to prepare derivative works from it; and to control its distribution.
- (b) The Software is licensed, not sold. No title to or ownership of the Software or any part thereof is hereby transferred to You, and all rights not specifically granted to You shall remain with Licensor and CEI, as appropriate. You acknowledge that, by virtue of this Agreement, You acquire only the right to use the Software pursuant to the terms of this Agreement.
- (c) You agree to take all necessary action to protect the confidential and proprietary information in the Software to avoid the disclosure of the contents of the Software to any other person, firm, or corporation, and to treat the Software with the same degree of care that You provide Your own confidential information. You agree to credit Licensor and the Software in any written or verbal presentation where results obtained using the Software are discussed.
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