

# Instructions to Download & Install FRANC3D Version 8.4

Apr 2024

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## Section 1: Downloading

This document assumes that you will download files to your "downloads" folder.

If you are not already at: <http://fracanalysis.com/software.html> in your web browser, go there now, and click on the **Download Files** button, Fig 1.

This will prompt you to enter a User name and Password, Fig 2, which you should have received already (via email). The username and password should be obtained from Process Optimization, or from the other distributors listed on the FAC home page.

Once you enter the username and password, click OK and you will see a list of folders, Fig 3.

**Fracture Analysis Consultants, Inc**

**Apr 29 2024**

FRANC3D 8.4.4 executable packages are available. Changes and bug fixes from Version 8.0 through 8.4.4 are listed here.

**FRANC3D Documentation**

- Download & Install Instructions
- Brochure
- Reference Manual
- Tutorial for ABAQUS Users
- Tutorial for ANSYS Users
- Tutorial for NASTRAN Users
- Tutorial for SIERRA Users
- Tutorials 2-14
- User's Guide
- Command Line & Python Interface
- Benchmark Reference
- Training Guides
- Download Files**

**Contact Process Optimization Corp for information regarding licensing or to obtain the FRANC3D software; send email to: [info@processopt.com](mailto:info@processopt.com)**

**For technical questions or information, send email to: [support@fracanalysis.com](mailto:support@fracanalysis.com)**

FRANC3D development started in the late 1980's at Cornell University. The FRANC3D/Classic (boundary element based) software is still available from the Cornell Fracture Group, but it has not been updated since 2007, it is restricted to 32bit, and it requires XWindows graphics.

An all new version of FRANC3D was started in 2005 by FAC, and commercial licensed copies have been shipping since 2010. The development history is shown here:

**FRANC3D Development History**

Year	Version / Feature
1988	FRANC3D v1 BEM only
1998	FRANC3D v2 BEM & Thin Shell FEM (STAGS)
2003	FRANC3D v3 BEM, Thin Shell & Solid FEM (ANSYS)
2005	FRANC3D/NG Solid FEM only (ANSYS & ABAQUS)
2010	Commercial Licenses
2010	FRANC3D Version 5
2012	FRANC3D Version 6
2014	FRANC3D Version 7
2016	FRANC3D Version 8

Figure 1 FAC software web page

The server fracanalysis.com is asking for your user name and password. The server reports that it is from restricted area.

Warning: Your user name and password will be sent using basic authentication on a connection that isn't secure.

User name

Password

OK Cancel

Figure 2 Download Files user name and password

# Index of /downloads

<u>Name</u>	<u>Last modified</u>
 <a href="#">Parent Directory</a>	
 <a href="#">pdfs/</a>	2024-01-30 09:19
 <a href="#">Tutorials/</a>	2023-06-21 16:54
 <a href="#">TestSuite/</a>	2023-06-21 09:01
 <a href="#">Executable/</a>	2024-02-14 14:37
 <a href="#">Benchmarks/</a>	2022-09-12 08:16

Figure 3 List of folders in downloads

Step 1: Click on the **Executable** folder. You can read the *readme.txt* file if you are not familiar with it; this file gives a summary of the operating systems that are supported, and it indicates which Linux archive to download for your Linux OS.

Click on the folder for the latest FRANC3D version, Fig 4. This will give you a list of *.zip* and *tar.gz* file names, Fig 5. We support only 64bit operating systems. The *.zip* file is for MS Windows, and the *tar.gz* files are for Linux.

Download the file for Windows or the Linux OS that you are running. If there are any doubts, send us email.

## Index of /downloads/Executable





<a href="#">Name</a>	<a href="#">Last modified</a>	<a href="#">Size</a>	<a href="#">Descripti</a>
 <a href="#">Parent Directory</a>		-	
 <a href="#">Rlm14/</a>	2023-06-20 08:26	-	
 <a href="#">Rlm15/</a>	2024-02-14 14:38	-	
 <a href="#">Version 7.5/</a>	2022-09-13 12:00	-	
 <a href="#">Version 8.0/</a>	2022-09-13 12:00	-	
 <a href="#">Version 8.1/</a>	2022-09-13 11:43	-	
 <a href="#">Version 8.2/</a>	2023-06-20 08:28	-	
 <a href="#">Version 8.3/</a>	2023-12-20 08:58	-	
 <a href="#">Version 8.4/</a>	2024-03-06 09:37	-	
 <a href="#">readme.txt</a>	2024-03-06 09:38	1.3K	

Figure 4 List of franc3d version folders

## Index of /downloads/Executable/Version 8.4

<a href="#">Name</a>	<a href="#">Last modified</a>	<a href="#">Size</a>	<a href="#">Description</a>
 <a href="#">Parent Directory</a>		-	
 <a href="#">cs/</a>	2024-04-29 13:36	-	
 <a href="#">sandia-8.4.4-RH_8.9.tgz</a>	2024-04-29 13:32	26M	
 <a href="#">sandia-8.4.4-CentOS 7.9.tgz</a>	2024-04-29 13:35	27M	
 <a href="#">franc3d_8.4.4_win11_setup.exe</a>	2024-04-29 13:31	12M	
 <a href="#">franc3d-8.4.4-Ubuntu_22.04.tar.gz</a>	2024-04-29 13:35	36M	
 <a href="#">franc3d-8.4.4-Ubuntu_20.04.tar.gz</a>	2024-04-29 13:35	35M	
 <a href="#">franc3d-8.4.4-SUSE_15.5.tar.gz</a>	2024-04-29 13:34	32M	
 <a href="#">franc3d-8.4.4-SUSE 15.4.tar.gz</a>	2024-04-29 13:34	32M	
 <a href="#">franc3d-8.4.4-RH_9.3.tar.gz</a>	2024-04-29 13:33	35M	
 <a href="#">franc3d-8.4.4-RH_8.9.tar.gz</a>	2024-04-29 13:33	33M	
 <a href="#">franc3d-8.4.4-MSWin11.zip</a>	2024-04-29 13:32	18M	
 <a href="#">franc3d-8.4.4-CentOS 7.9.tar.gz</a>	2024-04-29 13:32	32M	
 <a href="#">chinese.mo</a>	2024-01-09 08:36	174K	

Figure 5 List of franc3d executable packages

Step 2: Select the *.zip* or *tar.gz* file for your OS, right-click on the file name, and select "Save link/target as..." to download and save the file to your "downloads" folder.


Note that if you download a *tar.gz* using a Windows PC, the extension (file type) might be changed automatically.

Use the sha512 checksum in the *cs* subfolder to verify the download file is OK. For example, to check the download for: *franc3d-8.4.4-MSWin11.zip*

➤ `sha512sum -c franc3d-8.4.4-MSWin11_CSUM.txt`

Step 3: If you will be using a floating license and a license server, you can download either the *rlm\_lnx64.tgz* file for a Linux server or the *rlm\_win64.zip* file for a MS Windows server, Fig 6, from the *Rlm14* folder (see Fig 4). The *.zip* and *tar.gz* files contain the RLM executable and the *fracanalys.set* files. We will refer to these files in Section 2.2. You can also retrieve the latest version (15.2) of the RLM server files directly from RLM: <https://reprisesoftware.com/support/admin/>

---

 [parent directory]




	<b>Name</b>	<b>Size</b>	<b>Date modified</b>
	<a href="#">fracanalys.set</a>	507 B	4/15/21, 11:09:45 AM
	<a href="#">rlm_lnx.tgz</a>	1.5 MB	11/11/21, 11:56:56 AM
	<a href="#">rlm_mswin.zip</a>	3.2 MB	11/11/21, 11:54:50 AM

Figure 6 RLM server software

## Section 2: License Installation

FRANC3D can be used with a node-locked license or with a server-based floating license.

A node-locked license is configured for a single client PC based on its MAC hardware or IP address.

A floating license is installed on a server that is running the RLM executable. Client PCs are configured to use the license server to check out a license. This allows multiple PCs to access a single license as opposed to a node-locked license where the license is tied to a single PC.

The license file (*franc3d.lic*) will be sent (via email) after you send us the relevant information as described below.

## ***Section 2.1: Node-lock License***

A node-lock license file can be placed in the same folder as the *franc3d* executable.

*Note that our temporary trial license files can serve as generic node-lock licenses.*

Step 1: Choose the client PC where *franc3d* will be installed and determine the MAC or IP address. One way to do this is to start a command or terminal window and execute "ipconfig /all" for MS Windows or "ifconfig -a" for Linux. Then send us the Physical Address (for MS Windows) or the HWaddr (for Linux) information.

You can also use the *rlmhostid* executable from the *rlm\_win64.zip* or *rlm\_lnx64.tgz* archive (see Step 3 in Section 1).

You run *rlmhostid* from a MS Windows command line using:

- `.\rlmhostid ether`
- `.\rlmhostid internet`

to obtain the MAC or ethernet address, respectively.

For Linux, you run *rlmutil* from a terminal/bash window using:

- `./rlmutil rlmhostid ether`
- `./rlmutil rlmhostid internet`

Step 2: Send the information from Step 1 to us so that we can generate a *franc3d.lic* file that is locked to the client PC.

Step 3: Place the *franc3d.lic* file that we send into the folder that contains the *franc3d* executable (see Section 3).

## ***Section 2.2: Floating License***

In Step 3 of Section 1, you should have downloaded the RLM server software. The *.zip* or *.tgz* file contains:

```
fracanalys.set  
rlm.exe (rlm for Linux)  
rlmhostid.exe (rlmutil for Linux)  
rlmutil.exe (rlmutil for Linux)
```

If you obtain the RLM server software from RLM directly, you will just need to download the *fracanalys.set* file. Note that most servers will have dedicated folders for licensing software. If not, you can create a folder for the RLM executable. You will need to place the *fracanalys.set* file with *rlm.exe*, or you can configure RLM to find the *.set* file.

You should review the RLM End User license administration guide: [https://reprisesoftware.com/wp-content/uploads/2023/v15-1/RLM\\_License\\_Administration.pdf](https://reprisesoftware.com/wp-content/uploads/2023/v15-1/RLM_License_Administration.pdf) as this document describes how to run RLM as a service (that will run in the background and automatically start on reboot) and how to configure log files.

Step 1: Choose the server where RLM will be installed and determine the server's name, the MAC or IP address, and the tcp/ip port. Review the **License File** portion of the **RLM** guide. You can use the same commands as described in Step 1 of Section 2.1.

Step 2: Send us the server's name, id and tcp/ip port #. Note that we will use the default port 5053 if none is specified. We will generate a *franc3d.lic*, which is required for Step 3.

We will also need to know if the server is virtual and if a roll-over server is required.

A separate port # for the ISV *fracanalys* line in the *.lic* file might also be required.

Step 3: Place the *rlm.exe*, *fracanalys.set* and *franc3d.lic* file (that we will send via email) in a folder and start RLM.

For MS Windows, from a CMD line:

```
➤ rlm.exe -c franc3d.lic
```

For Linux, from a terminal/bash window:

```
➤ rlm -c franc3d.lic
```

This starts RLM interactively. RLM reads the *franc3d.lic* and *fracanalys.set* files, and should start the service, Fig 7.

```
09/21 14:57 (rlm) RLM License Server Version 13.0BL2

    Copyright (C) 2006-2019, Reprise Software, Inc. All rights reserved.

09/21 14:57 (rlm) License server started on renoir
09/21 14:57 (rlm) Server architecture: x64_w3
09/21 14:57 (rlm) License files:
09/21 14:57 (rlm)     franc3d.lic
09/21 14:57 (rlm)
09/21 14:57 (rlm) Web server starting on port 5054
09/21 14:57 (rlm) Using TCP/IP port 5053
09/21 14:57 (rlm) ... adding UDP/IP port 5053
09/21 14:57 (rlm) Starting ISV server fracanalys on port 33257
09/21 14:57 (rlm) New thread created to watch ISV fracanalys
09/21 14:57 (fracanalys) RLM License Server Version 13.0BL2 for ISV "fracanalys"
09/21 14:57 (fracanalys) Settings from RLM Version 13.0BL2 for ISV "fracanalys"
09/21 14:57 (fracanalys) Server architecture: x64_w3

    Copyright (C) 2006-2019, Reprise Software, Inc. All rights reserved.

    RLM contains software developed by the OpenSSL Project
    for use in the OpenSSL Toolkit (http://www.openssl.org)
    Copyright (c) 1998-2008 The OpenSSL Project. All rights reserved.
    Copyright (c) 1995-1998 Eric Young (eay@cryptsoft.com) All rights reserved.

09/21 14:57 (fracanalys)
09/21 14:57 (fracanalys) Server started on renoir (hostid: 00d861464157) for:
09/21 14:57 (fracanalys)     franc3d
09/21 14:57 (fracanalys)
09/21 14:57 (fracanalys) License files:
09/21 14:57 (fracanalys)     franc3d.lic
09/21 14:57 (fracanalys)
```

Figure 7 RLM service started for FRANC3D

Step 4: Test the RLM server by starting a web browser and entering your "server\_name":5054 in the URL. Fig 8 shows the webpage with the license status displayed. Note that 5054 is the default port, but this can be changed also.



Step 5: Set up RLM to start automatically on restart/reboot.  
 Read **The License Server** portion of the **RLM** guide.

**Reprise License Server Administration**  
 Copyright (c) 2006-2015, Reprise Software, Inc. All Rights Reserved.

Status for "rlm" on pilsner (port 5053)

RLM software version	v12.1 (build:2)
RLM comm version	v1.2
debug log file	_stdout_
license files	franc3d.lic

rlm Statistics	Since Start	Since Midnight	Recent
Start time	04/17 17:21:57	04/17 17:21:59	04/17 17:21:59
Messages	1 (0/sec)	1 (0/sec)	1 (0/sec)
Connections	1 (0/sec)	1 (0/sec)	1 (0/sec)

EDIT rlm Options  
 SHOW rlm Debug Log

ISV Servers		Name	port	Running	Restarts	Server Status	License Usage	Debug Log	REREAD	OPTIONS	TRANSFER	SHUTDOWN
		fracanalys	65496	Yes	0	fracanalys	fracanalys	fracanalys	fracanalys	fracanalys	fracanalys	fracanalys

Figure 8 RLM server web page

### Section 3: FRANC3D Installation

You should have already downloaded the appropriate file for the client PC where FRANC3D will be installed (see Section 1). If you have not already, unzip the files into a folder. The folder location will depend on the installation process at your site.

For this document, we have created a folder on the C: drive for MS Windows called "C:\f3d". The folder should contain the files shown in Fig 9. If you use the Windows installer, the default folder location is "C:\Program Files (x86)\franc3d".

Note that for MS Windows, you can create a shortcut for the *franc3d.exe* file and pin it to the taskbar or desktop. If you use the Windows installer, this can be done during the installation.

Name	Type
CrackData.pyd	Python Extension Module
CrackView.exe	Application
Fcl2Py.exe	Application
franc3d.exe	Application
freetype.dll	Application extension
Maximize.pyd	Python Extension Module
PyF3D.pyd	Python Extension Module
python39.dll	Application extension
rlm1511.dll	Application extension
vcruntime140.dll	Application extension
vcruntime140_1.dll	Application extension
Vec3D.pyd	Python Extension Module

Figure 9 List of files for MS Windows.

For Linux, we have created a folder in the user's home folder called "/home/bruce/f3d". The folder should contain the files shown in Fig 10.

Name	Size
CrackData.so	299 176
CrackView	17 182 800
Fcl2Py	77 704
franc3d	26 112 600
libFOX-1.6.so.0	5 231 504
libpython3.9.so.1.0	21 028 440
Maximize.so	16 616
PyF3D.so	28 998 264
Vec3D.so	27 640

Figure 10 List of files for Linux.

### ***Section 3.1: FRANC3D with a Node-lock License***

Step 1: Define the environment variable: **FRANC3D\_PATH**  
This must point to the folder that contains the franc3d executable.

- For MS Windows, this must be defined as a system-wide environment variable. Right-click on MyComputer (or ThisPC), select Properties, select the Advanced tab, and then select the Environment Variables button. Select the New button under System Variables and fill in the dialog, Fig 11.

Replace the folder in Variable value: with your folder name.

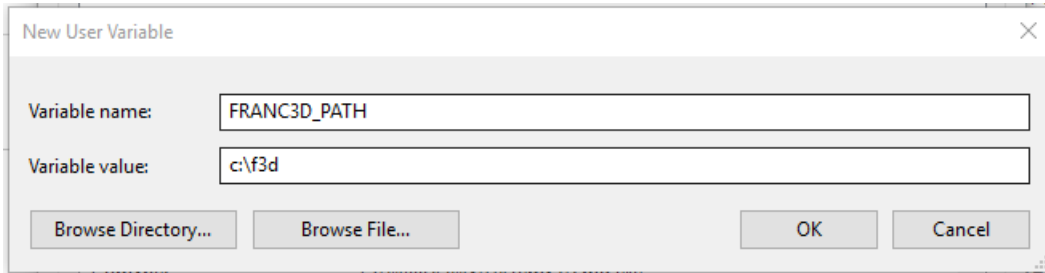


Figure 11 MS Windows FRANC3D\_PATH environment variable

- For Linux, the environment variable can be defined in a system-wide or user-specific resource/profile file (i.e., /etc/bash.bashrc or \$HOME/.bashrc). You can also define this from the command line from a terminal window; using the bash shell, this would be:  
`export FRANC3D_PATH=/home/user/f3d`  
For persistence, it should be added to your .profile or .bashrc file.

Step 2: Start the franc3d executable to verify that the license is checked out and that FRANC3D starts.

- For MS Windows, double click on the *franc3d.exe* icon (or start it from the command line in a CMD window).
- For Linux, start franc3d from a terminal window; in the folder where franc3d is located, type `./franc3d`.

### ***Section 3.2: FRANC3D with a Floating License***

Step 1: Define the environment variable: **fracanalys\_LICENSE**.

- For MS Windows, this must be defined as a system-wide environment variable. Right-click on MyComputer (or

ThisPC), select Properties, select the Advanced tab, and then select the Environment Variables button. Select the New button under System Variables and fill in the dialog, Fig 12.

Replace the server\_name and port # with your server information (see Section 2.2).

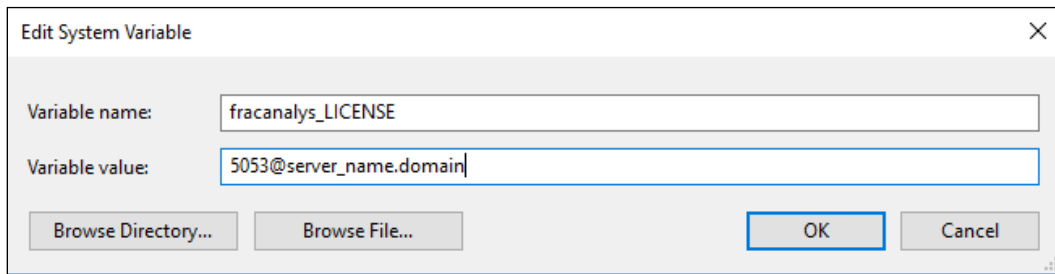


Figure 12 MS Windows fracanalys\_LICENSE environment variable

- For Linux, the environment variable can be defined in a system-wide or user-specific resource/profile file (i.e., /etc/bash.bashrc or \$HOME/.bashrc). You can also define this from the command line from a terminal window; using the bash shell, this would be:  

```
export fracanalys_LICENSE=5053@server_name.domain
```

For persistence, it should be added to your .profile or .bashrc (or similar resource settings) file.

Step 2: Define the environment variable: **FRANC3D\_PATH**  
This must point to the folder that contains the franc3d executable.

- For MS Windows, you need to create the environment variable in the Advanced System Properties (see Step 1 of Section 3.1); this should point to C:\f3d.
- For Linux, you can add the environment variable to your .profile or .bashrc file (see Step 1 of Section 3.1); this should point to /home/user/f3d.

Step 3: Start the franc3d executable to verify that the license is checked out and that FRANC3D starts.

- For MS Windows, double click on the *franc3d.exe* icon (or start it from the command line in a CMD window).
- For Linux, start franc3d from a terminal window; in the folder where franc3d is located, type `./franc3d`.

### **Special Note for Linux installation:**

You can move the FOX (and any other) `.so` file, which is included in the packaged `.tar.gz` file, from the `/home/user/f3d` folder to a system folder, such as `/usr/local/lib`.

You might need to export the `LD_LIBRARY_PATH` to include the folder location of the FOX `.so` file.

You will need to have Python 3.6 (or later) if you use the PyF3D module or the Python user-extensions.

FRANC3D is built using many "system" libraries, in addition to Python. You will need to install any packages that are required but missing from your system. You can determine which libraries are required by running the `ldd` command, type `ldd ./franc3d`.

## **Section 4: Extra Downloads**

The FRANC3D documentation is available from:

<http://fracanalysis.com/software.html>

You can click on the menu buttons on the left side (see Fig 1) to view the pdf file; the pdf file can be saved to your PC. The files can also be downloaded from the "pdfs" folder (see Fig 3).

Tutorial and Benchmark example files are available from the "downloads" folder also.

You can click on the **Tutorials** or **Benchmarks** folder (see Fig 3) to get to the sub-folders for each Tutorial or Benchmark example. Inside the various subfolders, you can right-click and select "Save link (or target) as..." to download a file; choose the files corresponding to the FE analysis code that you will be using. You can also download all files as a single `.zip` file.

The **TestSuite** folder contains a `readme.txt` file that describes the folder contents. There are Windows `.bat` files that will extract all the Tutorial and Benchmark models from the `.zip` and run the franc3d simulations.

## **Section 5: Switching From Version 7**

There are differences in the GUI preferences between Version 7 and Version 8. One should check (and set) the preferences when first starting FRANC3D (or when switching Versions). The Preference tabs are described in Section 5 of the Reference document.

One of the main differences is the crack insertion/meshing settings. Version 8.1 (or later) uses different Advanced Meshing parameters compared with prior versions.