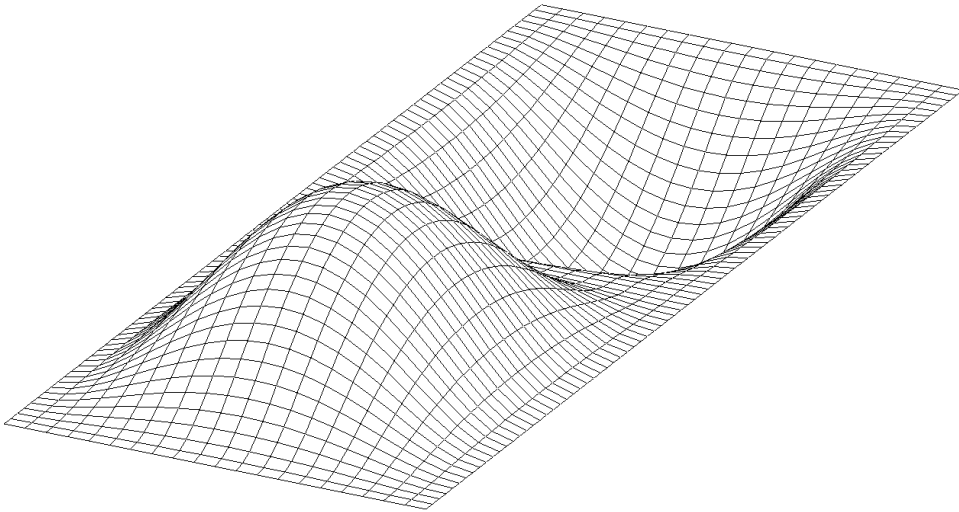


Autodesk Nastran 2021

Linux

Installation Guide



Installation Guide

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Autodesk® Nastran® 2021

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1. OVERVIEW

This document will help guide you through the set-up of Autodesk® Nastran® on your computer.

- The installer supports both superuser installation to system locations and a non-superuser installation to a location that the user has write privilege to.
- The installation supports RPM package installation and additionally supports compressed folder installation on non-RPM systems, or where the installation is not into a system location.
- The help and reference documents will require a pdf reader and a rich text format (RTF) file reader. Please see your Linux distributions provided documentation to determine the applications that support these formats.
- We recommend using either Red Hat Enterprise Linux or CentOS Linux distributions. The minimum release we support in these distributions is version 6.6. Earlier releases are not supported.
- It is possible to install on Linux distributions that are not Red Hat Enterprise Linux or CentOS Linux. In these cases the versions of particular core system components must be equal to greater than that provided on Red Hat Enterprise Linux 6.6. Details of this are discussed in section 4.

This Linux version is designed to be installed and executed from a system terminal. No graphical interfaces are included with this installation and it is anticipated that setup and post-processing of the computational models will be accomplished with external software. Potentially, this will be accomplished on systems running an alternate operating system, such as Microsoft Windows. This version is designed to be capable of being submitted to queues on Linux clusters and run on nodes which may not have attached graphics terminals.

A complete installation requires 2 items in addition to this installation document:

1. A package containing all the necessary files, which will have a file name similar to (but may not be exactly):
Autodesk_Nastran_2021.0.0.F-154.0.0.57884_Linux_64bit.tar
2. Licensing information. This will be the internet name of your Autodesk Nastran license server, either in the form of a numerical IP address, or machine.domain.com.

This package does not provide an Autodesk License server, which is provided independently by your reseller. It can be provided for a number of different operating systems.

2. DOCUMENT CONVENTIONS

Throughout the following document the following conventions will be used to denote specific sections of text:

- Where a command should be entered into a system terminal, the prompt will be denoted as a ">" and the command to be entered enclosed in a shaded box, for example:

```
> ls -lrt
```

- *<Italicized text>* indicates text that requires replacing with a user option.

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3. HARDWARE REQUIREMENTS

There are no special hardware requirements for Autodesk Nastran beyond those imposed by the Operating System. The table below shows the minimum requirements, along with our recommendations, to achieve maximum performance with Autodesk Nastran. The table also lists other supported hardware that you may want to consider depending on your analysis requirements and/or budget.

Minimum and Recommended Hardware:

	Minimum	Recommended
Computer, CPU	Intel or AMD 64-bit	Intel or AMD 64-bit
Memory, RAM	1_GB	4_GB+
Hard Disk	30_GB free space	300_GB+
Network Card	Required for network installation with Autodesk licensing.	Required for network installation with Autodesk licensing.

There are many types of hardware that will allow you to use Autodesk Nastran. Proper choice of hardware however, can often make the difference between frustration and productivity. Here are a few suggestions:

1. Add more memory (RAM) above the minimum configuration. This will allow you to specify more memory for Autodesk Nastran and reduce the likelihood of memory thrashing (excessive paging of virtual memory to disk).
2. Required hard disk space is difficult to estimate, but in general you will never have enough. This is especially true when running large models. If you are continuously running out of disk space, you may want to invest in a larger and faster hard disk. Disk compression software may also help, but may also degrade performance.
3. Solid State Drive's (SSD's) offer greatly improved read and write speeds. Autodesk Nastran can read and write large amounts of data in the form of temporary and final output files to disk during the course of its execution. Using a SSD for the temporary and final output locations can result in significant performance gains.

4. OPERATING SYSTEM REQUIREMENTS

The Linux version of Autodesk Nastran is built on [CentOS 7](#). We recommend you use version [7](#) or newer of this Linux distribution. This release will also work on Red Hat Enterprise Linux 7 versions. Support for Red Hat Enterprise Linux 5 [and 6](#) has been discontinued.

Autodesk Nastran may work on other Linux distributions which are not officially supported. On other Linux distributions, binary compatibility of Autodesk Nastran requires that a specific version, or greater, of two core system components be installed. These system components are the glibc library and the libstdc++ library. The version of the libstdc++ library is usually tied to the version of gcc on your system. Additionally, newer Linux distributions may have moved the required libstdc++ libraries to a “compat-libstdc++” package. Please consult your distributions documentation to learn how to determine the versions you have installed. Alternatively websites, such as <http://www.distrowatch.org>, maintain databases of the versions of components available with specific distributions. The table below summarizes the requirements.

	Minimum	Recommended
Operating System	RedHat or CentOS 76.6	RedHat or CentOS 76.6 +
glibc	2.172	2.172 +
libstdc++ / compat-libstdc++	5.3.14.4.7	5.3.14.4.7 +

We recommend you upgrade to the latest stable version of Linux. The improvements in performance, security and reliability may be beneficial - even if you only use Autodesk Nastran occasionally. Installation requires a number of standard system utilities such as gzip, tar, sed, grep and bash which are most likely installed by default on your system. If you find these are missing, please ask your system administrator to install.

5. INSTALLATION

This section details how to install Autodesk Nastran onto your system. Autodesk Nastran is supplied as a single Linux archive file which can be expanded into a set of install packages and an installation script that supports both workstation installs and thin client installs. In order to provide compatibility with broadest range of Linux distributions possible, both RPM packages and simple compressed folder installation methods are supported. Additionally, installation into standard user locations is now supported.

5.1. Files Required for Installation

A complete installation requires 2 items in addition to this installation document:

1. A package containing all the necessary files, which will have a file name similar to that shown below. Exact version numbers may vary from that shown here.
Autodesk_Nastran_2021.0.0.F-15.0.0.578~~84~~_Linux_64bit.tar
2. Licensing information. This will be the internet name of your Autodesk Nastran license server, either in the form of a numerical IP address, or machine.domain.com.

This package does not provide an Autodesk License server. Autodesk provides license servers for a number of operating systems and your retailer can provide the appropriate license server for your requirements.

5.2. Installation

This section provides the steps required to install Autodesk Nastran. The following package names are provided as examples and may vary from that shown. Please adjust the following commands and packages based on the packages you have been provided.

1. Unpack the provided package using the following command. This command will create a sub-directory in your current location that contains the files necessary to install Autodesk Nastran 2021 (The package version numbers may be slightly greater than shown below).

```
> tar xf Autodesk_Nastran_2020.0.0.F-11.0.0.84Autodesk_Nastran_2021.0.0.F-15.0.0.578_Linux_64bit.tar
```

2. Change your working folder to the created folder:

```
> cd ./Autodesk_Nastran_2021.0.0.F
```

3. Start the installer by entering the following command. If you wish to do a system install you will need to start the installer from a terminal prompt as the superuser or using the 'sudo' option. If the installer detects insufficient privileges to perform a system install, it will reduce the install options presented to performing only a Thin-client or custom install. On a terminal in which a standard user or superuser is logged in, start the installer like so:

```
> ./install.sh
```


Or, using sudo, from a terminal that a user is logged into:

```
> sudo ./install.sh
```

4. Please read and accept the licensing agreement provided. A copy of the licensing agreement can be found after the install at:
`/opt/Autodesk/Nastran_2021/adlm/EULA.txt`
5. Depending on the privilege level of the user starting the installer, three possible installation mechanisms will be presented to the user.
 - The first mechanism provides system installation using RPM packages. Autodesk Nastran installs into the location `/opt/Autodesk/Nastran_2021` which complies with the Linux Standard Base (LSB) specifications.
 - [The second option provides a system installation for thin client server using RPM packages. This option only installs licensing components that will be used by a thin client installed using the third option.](#)
 - The third option permits an install into a user defined location. Upon selecting this option the user will be prompted to specify a location to install into. This option is useful for users installing for thin-client scenarios and for individual users installing into their own home folders. This option will be presented to users installing without superuser privileges.

Please select the installation mechanism that is suitable for your purposes.

Helper Utility

Helper utility is available in a location similar to this:

```
/opt/Autodesk/AdskLicensing/9.0.0.1462/helper/AdskLicensingInstHelper
```

This provides various helper functions:

[Help Documentation:](#)

[Example usages](#)

```
sudo /opt/Autodesk/AdskLicensing/9.0.0.1462/helper/AdskLicensingInstHelper -- help
```

```
sudo /opt/Autodesk/AdskLicensing/9.0.0.1462/helper/AdskLicensingInstHelper register -- help
```

Registering product:

Example usage:

```
sudo /opt/Autodesk/AdskLicensing/9.0.0.1462/helper/AdskLicensingInstHelper register --pk 987L1 --pv 2021.0.0.F --cf /opt/Autodesk/Nastran_2021/clicV2SDK/InventorNastranConfig.pit --el "US" --ls 25738@10.35.232.138 --lm NETWORK
```

List the registered components:

Example usage:

```
/opt/Autodesk/AdskLicensing/9.0.0.1462/helper/AdskLicensingInstHelper list
```

De-register product components

Example usage:

```
sudo /opt/Autodesk/AdskLicensing/9.0.0.1462/helper/AdskLicensingInstHelper deregister --pk 987L1 --pv 2021.0.0.F
```

RPM Based Installation

Installs ClicV3 licensing components and registers the product.

Provides a utility shell script at `/opt/Autodesk/Nastran_2021/bin/nastran_lic_reg.sh`

This script can be run to register the product

Provide the license server with ip address and port (eg: `port@hostname`)

Troubleshooting:

Run the utility above to list the registered component and ensure that the product, license server, etc are correctly registered.

Ensure that the variables defined in the `nastran_lic_reg.sh` point to the desired values.

Run the script to register the product.

Sometimes, the license checkout fails on [machines](#) minimal installations. Install `libGL`.

Thin Client Installation

Thin client installation consists of two parts as described below.

Thin Client Server Installation

This needs to be installed on a server (not necessarily the license server on which NLM is installed).

Requires super user privileges.

Use helper utility to register the license server.

The purpose of this server is to connect with the NLM server and checkout license as needed.

Once the ClicV2 licenses are installed, [be sure](#) to register the product with the helper utility.

Configure the server so that it can connect with client:

Look up the file : `/var/opt/Autodesk/AdskLicensingService/AdskLicensingService.data`

Look for string like this: "Addr": "127.0.0.1:4321"

Change the IP to the IP of this server machine.

Open the port [so that the thin clients can connect to this server via that port](#).

Thin Client Installation

This [is](#) installed on a user defined location.

Does not require super user privileges.

Configure the client so that it can connect with the server:

Find out the IP address and the port on the server.

Look up the Custom XML file located here:

```
<user_defined_path>/Nastran_2021/bin/AdlmCustomEnv.xml
```

Ensure that the port and IP are correctly setup in the XML as shown below:

```
<KEY ID="ADSK_SERVICE_ADDRESS">
  <!--Licensing service address-->
  <STRING>IPADDRESS:PORT</STRING>
</KEY>
```

Make sure that AUTODESK_ADLM_THINCLINT_ENV environment variable points to this AdlmCustomEnv.xml

Log Files Generation

The log level configurations below are for documentation purposes.

The log level configurations below are for documentation purposes.

Verbose: In order to enable verbose logging manually, please refer to the following for each component.

Default: The default mode for CLM V3 only logs limited levels of messages.

Important: After configuration updated, make sure Service is restarted and running.

Environment Variables

The environment variable, **ADLSDK_LOG_LEVEL**, controls the SDK's log level. If not set, default SDK log level will be "E". To increase verbosity, create a SYSTEM or USER environment variable, and set to level T (Trace).

Windows command line: **set** ADLSDK_LOG_LEVEL=T

MacOS/Linux command line: **export** ADLSDK_LOG_LEVEL=T

Valid settings are as follows:

```
T = ADLSDK_LOG_TRACE
D = ADLSDK_LOG_DEBUG
I = ADLSDK_LOG_INFO
W = ADLSDK_LOG_WARN
E = ADLSDK_LOG_ERROR
C = ADLSDK_LOG_CRITICAL
O = ADLSDK_LOG_OFF
```

Service

To enable Service verbose logging, open "AdskLicensingService.data" in text editor. Add key-value pair "Dev":true to AdskLicensingService.data

Note: you may need administrator privileges to save the AdskLicensingService.data file

```
{
  "Addr": "127.0.0.1:12345",
  "Dev" : true, // Developer (Dev) mode, default false
  "AutoPickFreePort": true
}
```

Service generates the configuration data file in the following location:

[/var/opt/Autodesk/AdskLicensingService/AdskLicensingService.data](#)

Agent

Platform	file name	Location
Linux	..AdskLicensingAgent-log.conf	/var/opt/Autodesk/AdskLicensingService/.AdskLicensingAgent-log.conf

Paste the following content to .AdskLicensingAgent-log.conf file:

Linux

```
{
  "message_pattern": "%{appname}[%{pid}] | %{time yyyy-MM-dd h:mm:ss.zzz} | %{type} |
  %{category}: %{message}",
  "filter_rules": "*.debug=true",
  "log_path": "/var/opt/Autodesk/AdskLicensingService/Log",
  "console_output": true,
  "file_output": true
}
```

For convenience this [Zip File](#) contains each of the above examples. If you add international characters to the file, you may need to adjust the encoding.

The Linux version of Autodesk Nastran requires a network license. The installer will display a screen requesting the details of your license server. This needs to be provided in the format [port]@1.2.3.4 or [port]@machine.domain.com, where [port] is optional and only required if a non-standard port was used in the license server setup. If you do not know your license server details, or wish to change it at a later date, please enter a temporary value of @127.0.0.1. The network server in use can be changed later by directly editing the text file:

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```
/opt/Autodesk/Nastran_2021/bin/nastran_vars.sh
```

Autodesk Nastran requires particular environment variables to be set prior to execution. An option will be presented during the install which enables all users to have their environment variables adjusted automatically when they first create a terminal. This option creates a link in the system settings folder to enable automatic setting of the required environment variables. It is highly recommended that you enable this option. Alternatively, two other methods are described if this mechanism is unsuitable for your intended usage.

6. CONFIGURING THE INSTALLATION

In general, no additional configuration should be required after the installation program has been executed. However, in the event of non-standard modifications, it may be helpful to be aware of the environment variables used and the locations of the shell script file that sets these correctly. Autodesk Nastran provides a shell script file to set the required environment variables and add the Autodesk binaries to the system search paths. This shell script file needs to be 'sourced' prior to execution or when a terminal is created. The file is located here:

```
/opt/Autodesk/Nastran_2021/bin/nastran_vars.sh
```

NOTE: On a Linux machine to 'source' a file means to perform either of the following two operations:

- > ./opt/Autodesk/Nastran_2021/bin/nastran_vars.sh
 - > source /opt/Autodesk/Nastran_2021/bin/nastran_vars.sh
-

6.1. Environment Variables

Autodesk Nastran interacts with a number of existing system and created environment variables as listed below. The appropriate modifications to these environment variables occur in the script mentioned above.

PATH

This system environment variable lists the directories that the Linux system searches for executables. After modification, it will contain an entry similar to

```
"/opt/Autodesk/Nastran_2021/bin"
```

ADSK_NASTRAN_HOME

This points to the base of the Autodesk Nastran 2021 installation. Setting this value enables Nastran to locate the default configuration files. A standard installation will set it to the value: /opt/Autodesk/Nastran_2021.

ADSKFLEX_LICENSE_FILE

This variable sets the location of the license system or file. Its format is an IP address or host name of a license server. This will be shown in the following format, where [port] is optional and depends on whether your system administrator has customized the install of the license server. It must contain the '@' symbol.

```
[port]@10.4.206.99
```

Or
[port]@myhost.mydomain.com

NOTE: Using the host name format of the license server requires the DNS service to be correctly setup on your client machine.

To permit Autodesk Nastran to work, you need to source the appropriate shell script file. This can be done by default by the superuser, or by adding lines to your personal shell configuration files as explained below. This shell script file sets the environment variables described in the previous section and adds the Autodesk Nastran executable (nastran.x) to the default search path.

6.3.1.6.2.1. Enabling for All Users

Simply link the shell script file into the location /etc/profile.d as follows. When you log on, these files are automatically read. An option is presented during the install process to automatically do this.

```
> ln -s /opt/Autodesk/Nastran_2021/bin/nastran_vars.sh /etc/profile.d/nastran_vars.sh
```

6.3.2.6.2.2. Enabling for a Single User

In the users .bashrc file add the following line:

```
. /opt/Autodesk/Nastran_2021/bin/nastran_vars.sh
```

NOTE: There is a space required between the . and the /opt/... in the above command.

During the creation of a new terminal, these files are read in and the environment variables are adjusted appropriately to enable execution of Autodesk Nastran.

6.4.6.3. Configuration of the Default Nastran.INI

The file /opt/Autodesk/Nastran_2021/ini/Nastran.INI is the default initialization file for all users. Directions for customization of its values are given in the main Initialization section of the *Nastran Solver Reference Guide*. However, it should be noted that, where required, paths should be specified in absolute form i.e. with a '/' at the front of the path. This is required for variables such as the location of the temporary paths. See Section 9.3 for further details.

Configuration of Autodesk Nastran is now complete.

A license is an authorization to run Autodesk Nastran or any of its related software modules. Possession of a license indicates that the software has been obtained legally and is an authorized copy which may be executed.

The software can be run as a client-server model where the license server is possibly on a different machine. Autodesk provides license servers for a number of operating systems and your retailer can provide the appropriate license server for your requirements. This package does not provide an Autodesk License server.

We strongly recommend that you have installed and activated your license server before installing Autodesk Nastran.

8.1.7.1. Enabling the License

Once you have received your license information you will need to do the following:

1. Install the required license onto the license server and ensure that is operational. Documentation on this process is supplied with the license server. You will need to know the network name or IP address, and possibly the license server port of the license server, in order to configure the environment variables discussed in Section 6.1 correctly.
2. Run the Autodesk Nastran install process to correctly set the license server settings for the package.

You should be aware that licensing may require specific ports open on the client and server machine and that your firewalls may need to be adjusted accordingly. Please see your system documentation to accomplish this if required. Details of what ports are required are contained in the documentation for the license server.

8. RUNNING AUTODESK NASTRAN

Having reached this section, you now have a fully operational Autodesk Nastran installation. If not, please review the previous sections before proceeding.

Autodesk Nastran is run from the command line by typing the name of the program (nastran.x) and then the name of the initialization file and the name of the nastran model file you wish to execute. The order of the nastran model file and initialization file is not important. e.g.

```
> nastran.x Nastran.INI sample.nas
```

and the following is equally valid

```
> nastran.x simple.nas Nastran.INI
```

Additionally, other options can be specified on the command line as referenced in the NASTRAN Command Line section of the *Nastran Solver Reference Guide*. These options should be placed before the initialization or model files on the command line. e.g.

```
> nastran.x [OPTIONS] Nastran.INI sample.nas
```

e.g. an example with multiple options:

```
> nastran.x NPROCESSORS=1 SYSTEMSTATUS=ON Nastran.INI sample.nas
```

A simple example is used to illustrate the execution of Autodesk Nastran. With the following commands, we create a folder to work in and then copy a test file and a Nastran.INI into the newly created folder. Then we illustrate how to execute Autodesk Nastran. The command sequence is shown below:

```
> mkdir nas_test  
> cd nas_test  
> cp /opt/Autodesk/Nastran_2021/Example\ Files/en-us/Test.nas .  
> cp /opt/Autodesk/Nastran_2021/ini/Nastran.INI .  
> nastran.x Nastran.INI Test.nas
```

NOTE: In the example shown a space was present in the name of the folder and a backslash was required on the command line to 'escape' this and allow the command to work. This will be required for other 'special' characters when they are used on the command line. The ' .' (space + period) is also required at the end of the 3rd and 4th lines. The period represents the current working directory.

This should result in a working simulation. If this fails, please check your license settings or contact Technical Support.

9. LINUX USAGE MODIFICATIONS

The Linux version of Autodesk Nastran has a number of small changes associated with some aspects of the execution when compared with the Windows version. These variations are documented here.

9.1 Initialization File Redundancy

In the event that an initialization file is not found on the command line, the Linux version of Autodesk Nastran will examine, in order, each of the following locations for an initialization file. This will trigger a series of Linux specific warnings to inform you that this is occurring and the initialization file it detects and uses. Used correctly, this mechanism allows you to set default parameters on a per-user basis, or simply the default system initialization file. Autodesk Nastran will use the first initialization file it finds in the following ordered sequence:

1. **<command line>**

An initialization file found on the command line takes precedence.

2. **./Nastran.INI**

Nastran will look in the current working directory for this specific initialization file.

3. **~/.Nastran.INI**

Nastran will look for a “hidden” initialization file placed in the users home directory. The extra ‘.’ before the filename means it will not be visible to an ‘ls’ command unless you use the ‘-a’ option to the ‘ls’ command. Place this file here if you always use the same options for your simulations.

4. **/opt/Autodesk/Inventor_Nastran_2021/ini/Nastran.INI**

This is the default initialization file configured at the time of installation. It will most likely not be editable by a standard user.

9.2 Supported Filename and Directory Naming Conventions

Support for spaces or other punctuation marks in the filenames and folder names has been enabled. However, it should be noted that it requires additional levels of precaution to escape, or quote, the filenames and folder names on the terminal command line when executing Autodesk Nastran. This has the potential to lead to an error and it is considered safer to avoid this possibility by avoiding the use of spaces and other punctuation marks in the names of files and folder names (underscores and dashes can be used without additional effort.

Additionally, we recommend using absolute pathnames, which start with a leading ‘/’, instead of the abbreviations ‘.’, ‘..’, or ‘~’. However, support for these options is enabled, although you are advised to test this before using extensively.

9.3 Temporary Directories

The Linux Autodesk Nastran version is intended to be used on cluster systems where there may be multiple users running Autodesk Nastran or a user running multiple simulations simultaneously. To ensure that each running instance of Autodesk Nastran on a Linux system does not interfere with another running instance, the Linux version of Autodesk Nastran will create a unique directory within the location specified by the FILESPEC(x) directives. The name of this unique directory will have the format "*nastmp_XXXXXX*", where the *XXXXXX* will be replaced at the time of execution by a sequence of system generated characters to ensure uniqueness.

Upon successful completion this folder will be removed. Should a Autodesk Nastran simulation be interrupted, this folder will not be automatically removed. In that case, it may be necessary to manually remove this folder.

UNINSTALLATION

The used to uninstall Autodesk Nastran depends on the mechanism used to install it.

11.110.1 RPM Package removal

If Autodesk Nastran was installed using RPM packages then it can be removed using either of the following mechanisms:

1. Your systems graphical uninstallation tools.
2. By entering the following commands in a terminal (with superuser permission):

```
> rpm -e autodesk-nastran-2021-*  
> rpm -e adsklicensing9.*  
> rpm -e adlmapps17-*  
> rpm -e adlmflexnetclient-17.*
```

Note: you can substitute the command “*rpm -e*” with the command “*yum remove*” or “*dnf remove*” on more recent Linux distributions that have these commands available. If these are available, it is the preferred mechanism of package removal.

If you have more than one Autodesk product installed then the *clm** and *adlm** rpm's may fail to uninstall as they are required by the other Autodesk products. If this occurs, please do not try and force the uninstall of these items.

11.210.2 Removing a [Thin-client server install](#)

Removal of a non-RPM system install requires access to a terminal or filesystem browser with superuser permissions. The following assumes you are using a terminal to remove the software. To remove the core Autodesk Nastran files please run the following commands:

```
> rpm -e adsklicensing9.*  
> rpm -e adlmapps17-*  
> rpm -e adlmflexnetclient-17.*  
> rm -rf /var/opt/Autodesk/Nastran 2021/
```

11.310.3 Removing a Custom or Thin-client install

The Autodesk Nastran Custom or Thin-client install is self-contained within the folder you installed it into. Removal is accomplished by deleting this folder.

TECHNICAL SUPPORT

Visit the Autodesk Account portal (<https://accounts.autodesk.com>) if you need technical support for Autodesk Nastran.

To assist us in resolving an issue, please provide the following information to help us locate the problem and solve it faster:

1. A detailed description of the problem (error messages, problem size, directive, command, and entry types used).
2. Details of the computer system the problem occurred on. In particular, the amount of memory (physical and virtual) available at the time of execution and the free disk space at program execution.
3. If applicable, include a copy of your Model Initialization (*Nastran.INI*), Model Input (*filename.NAS*), Model Results Output (*filename.OUT*), and System Log (*filename.LOG*) files.
4. Any other information you think might be useful.