Dymola
Dynamic Modeling Laboratory

Installation

Contents: Chapter 6 “Appendix – Installation” extracted from the manual “Dymola User Manual Volume 1”.

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1 Appendix — Installation

This chapter describes the installation of Dymola on Windows and Linux, and related topics. The content is the following:

In section 1.1 “Installation on Windows” starting on page 6 the installation on Windows is described, including installation of Dymola software, C compiler and license (sharable or node-locked). The sub-section “Additional setup” starting on page 19 treats specific issues as installing Dymola as administrator on a computer that should be used by non-administrators and remote installation of Dymola. Finally change of setup, removal of Dymola and installing updates are described.

In section 1.2 “Installation on Linux” starting on page 37 the installation on Linux is described, in a similar way as the previous section. The sub-section “Additional setup” starting on page 38 describes e.g. compilation of model code and simulation from the command line.

In section 1.3 “Dymola License Server on Windows” starting on page 40 the installation of a license server on Windows is described, as is the borrowing of licenses.

In section 1.4 “Dymola License Server on Linux” 50 the installation of a license server on Linux is described, as is the borrowing of licenses.

In section 1.5 “Utility programs” starting on page 52 a utility program for finding a host id on a computer is described.

In section 1.6 “System requirements” starting on page 53 the hardware and software requirements/recommendations are listed.
In section 1.7 “License requirements” starting on page 57 the license requirements for various features are listed.

In section 1.8 “Troubleshooting” starting on page 62 the solution to various problems are described. It might be license file problems, compiler problems, issues with Simulink, change of language etc.

1.1 Installation on Windows

This section refers only to the Windows version of Dymola.

To install Dymola the following tasks must be performed:

- Install the Dymola software and libraries.
- Install a C compiler (if it has not been done before).
  - Install the Dymola license file.
  - Install a license server (sharable license only).

Following installation the user may do additional setup. The installation of updates and removal of Dymola is also described below.

1.1.1 Dymola as 32-bit and 64-bit application

From Dymola 2018 FD01, the Dymola program is only available as a 64-bit application. The Dymola program (and its associated DLLs) is located in the folder Program Files\Dymola 2020\bin64 after installation.

1.1.2 Installing the Dymola software

Dymola and appropriate libraries is distributed on a single DVD or downloaded electronically. With electronic download, the DVD-image is provided as two separate .zip files. Note that both zip-files must be extracted to the same location before starting the installation.

Starting the installation

Please note that Administrator privileges are required for this installation. When Dymola has been installed, any user can run it.

The installation normally starts when you insert the distribution DVD. If autostart has been disabled, please start D:\setup.exe (assuming your DVD drive is labeled D) from Windows Explorer by double clicking on the file or use the Start button in Windows, select Run, enter D:\setup.exe and click OK.
Clicking **Next** will display license conditions that must be accepted in order to proceed. Accepting by selecting that alternative and then clicking **Next** will display the following:

**Location of installation directory**

The first choice in the installation procedure is the type of installation and the name of the Dymola installation directory. The default is: C:\Program Files\Dymola + the version number of Dymola.
This path is displayed under Install to:. If the path should be changed, click on the Change… button. Here the path can be changed; a change has to be acknowledged by clicking OK.

Selecting components

The second choice is to select optional components of the distribution. By unselecting components some space can be saved.
The first alternative **Dymola** is the default contents of the Dymola distribution, including the development environment and the Modelica standard library. This component should always be installed (except when only a license server should be installed).

The **Libraries** section contains several commercial libraries which require a license option to use. Install libraries according to your current options.

The last section, **License server**, makes it possible to install Dymola license server without having to install Dymola. Please note that the **Dymola** component should be unchecked in that case.

To add/remove a component from the installation, click on it and select the appropriate alternative in the menu.

When Dymola is successfully installed the following will appear:
1.1.3 Installing a C compiler

To translate models in Dymola you must also install a supported C compiler. The C compiler is not distributed with Dymola. The C compiler needs to be installed only once, even if you install multiple versions of Dymola. You can select a Microsoft compiler, an Intel compiler, or a GCC compiler.

Compilers

Microsoft compilers

Dymola supports Microsoft Visual Studio 2017, the following editions:

- Visual Studio Professional 2017
- Visual Studio Enterprise 2017
- Visual Studio 2017 Desktop Express **Note!** This compiler only supports compiling to Windows 32-bit executables
- Visual Studio Community 2017
- Microsoft Build Tools 2017 **Notes:**
  - The minimum required selection to run Dymola is:
    - VC++ 2017 version highest listed latest version-number tools
    - C++/CLI support
  - Installing this selection, no IDE (Integrated Development Environment) is installed, only command line features
This installation is not visible as specific selection when later selecting the compiler in Dymola, the alternative to select is the same as for any Visual Studio 2017 alternative: Visual Studio 2017/Visual C++ 2017 Express Edition (15).


To download the free Visual Studio Community 2017 compiler please visit http://www.Dymola.com/compiler where the latest links to Microsoft's website are available. Note that you need administrator rights to install the compiler.

The C compiler can be installed before or after you install the Dymola. You can run Dymola and browse models, but to translate any model you must install the C compiler.

Please note that earlier free versions of the Microsoft compiler are not supported; the reason is that they do not include a full set of Windows libraries. We recommend Visual C++ 2010 or later (see above).

To get a small improvement of the simulation performance, you can activate the global optimization in the compiler, by setting the flag

\[
\text{Advanced.Define.GlobalOptimizations} = 2;
\]

before generating code. (The default value of the flag is 0.)

This flag works the same for all Visual Studio compilers. Note that although the simulation performance is somewhat improved setting this flag, the compilation of the code might take substantially longer time for large models. The setting corresponds to the compiler command /Og.

Note. The following Visual Studio redistributable packages are automatically installed:

- Microsoft Visual C++ 2015
- Microsoft Visual C++ 2005 SP1

Intel compiler

Dymola supports the compilers Intel Parallel Studio XE 2016, XE 2017, and XE 2018.

To download this compiler please visit http://www.Dymola.com/compiler

where the latest links to downloading the compiler are available. Needed add-ons during installation etc are also specified here. Note that you need administrator rights to install the compiler.

Please note:
• You must also select a Visual Studio compiler when selecting the Intel compiler in Dymola (see below). Note that the Intel Parallel Studio XE 2018 only supports using any of Visual Studio 2013, 2015, or 2017 as underlying compiler.

• There are currently some limitations with the Intel compiler:
  o Embedded server (DDE or OPC) is not supported
  o Export DLL is not supported

**GCC compiler**

Dymola 2020 has limited support for the MinGW GCC compiler. The following GCC versions have been tested (hence, at least the versions in that range should work fine):

• 32-bit: MinGW GCC 4.8.1, 5.3, and 6.3
• 64-bit: MinGW GCC 4.9.2, 5.3, and 7.3

To download any of these free compilers, please visit


where the latest links to downloading the compilers are available. Needed add-ons during installation etc are also specified here. Note that you need administrator rights to install the compiler.

**Please note:**

• To be able to use other solvers than Lsodar and Dassl, you must also add support for C++ when installing the GCC compiler. Usually you can select this as an add-on when installing GCC.

• There are currently some limitations with GCC:
  o Embedded servers (DDE or OPC servers) are not supported.
  o Support for external library resources is implemented, but requires that the resources support GCC, which is not always the case.
  o No support for Dymola runtime concept. As a consequence, FMUs must be exported with the code export option enabled, to be useful. (The code export option means having any of the license features *Dymola Binary Model Export* or the *Dymola Source Code Generation*.)
  o For 32-bit simulation, parallelization (multi-core) is currently not supported for any of the following algorithms: Radau, Esdirk23a, Esdirk34a, Esdirk45a, and Sdirk34hw.

**Selecting a compiler**

To change the compiler Dymola uses to translate the model, use the command **Simulation > Setup...** and the **Compiler** tab, see also chapter “Simulating a model”, section “Editor command reference – Simulation mode”, sub-section “Main window: Simulation menu”, command “Simulation > Setup…”. (Below is an example of the **Compiler** tab).
If you select the Intel or GCC compiler, subchoices for the compiler are seen. For Intel:
For GCC:

The selected compiler is stored as a per user setting and for the future kept for new installations of Dymola. Switching compiler does not modify Dymola/bin.

Advanced users can enter custom options for compiler/linker using the last two input lines in the Simulation Setup dialog.

Note the importance of the **Verify compiler** button. As an example, you cannot see from the menu if you have a valid MinGW compiler available; you must use the **Verify compiler** button to see if this is the case.

During the startup of Dymola, the compiler setting is checked. If insufficient, the following message appears:
If you click **Yes**, the menu for the compiler setup is opened to let you complete the setup.

Classes which contain “Library” annotations to link with external libraries in C are supported for Microsoft Visual Studio compilers. If you link with your own C-libraries you have to recompile them as multi-threaded. The reason is that single-threaded compilation is phased out in Visual Studio 2005, and multi- and single-threaded libraries reading from files are not link-compatible. Thus Dymola only supports linking with multi-threaded libraries in Microsoft Visual Studio compilers. For GCC compilers, see the limitations above.

For information about possible compiler problems, please see the troubleshooting section “Compiler problems” on page 64.

### 1.1.4 Installing the Dymola license file

After installation Dymola will initially start in “trial” mode. While running in trial mode you can continue with installing the license file.

**Setting up a sharable license**

Sharable licenses are requested by Dymola from a license server. The information normally required on the client computer is just the name (or IP number) of the license server. (For handling of the license server itself, usually handled by IT administration, see dedicated sections later in the document.)

Start Dymola and select **Help > License…**, and then the **Setup** tab. Enter the name or IP number of the server. If so instructed by the system administrator, also enter the port number. By default leave this field empty.
License server setup.

If you want to use redundant servers, you can add three server names/IP numbers, separated by space. Note that one or three servers must be specified.

You have the option of installing the license file only for the currently logged in user, or for all users on this computer. The latter requires administrator rights.

Click on the OK button. Dymola will ask for confirmation before overwriting your old license information.

After changing the license server setup you must restart Dymola to use the new server.
Installing a node-locked license

Node-locked licenses are stored locally on the computer running Dymola and are not shared with other computers.

Obtaining a host id

To order a node-locked license key, the relevant host id of the computer where Dymola should run must be supplied to your Dymola distributor. The license that you will receive will contain this information.

There are two ways finding out this host id, depending on whether a Dymola trial version is installed before or not. The host id can always be found using the utility program hostid.exe. Please see section “Obtaining a host id” on page 52 for more information about this program.

If the Dymola trial version has already been installed, Dymola can be used to find the host id. Start Dymola and select Help > License…, and then the Details tab. Click on Copy to Clipboard to copy the local host id.

Please note that some laptops present different host id’s depending on whether they are connected to a docking station or not. In such a case, please copy all host id’s.

Compose an e-mail containing your local host id (host id’s) and send it to your Dymola distributor.

Installing the node-locked license

When you have received your license file, do save the license somewhere on your computer.
Start Dymola and select **Help > License...**, select the **Setup** tab. Click on the **Browse** button and open the license file you saved. The path of the license file is shown in the dialog.

You have the option of installing the license file only for the currently logged in user, or for all users on this computer. The latter requires administrator rights.

Click on the **OK** button. Dymola will ask for confirmation before overwriting your old license information.

After changing the license server setup you must restart Dymola to use the new server. You may delete the saved license file, Dymola has created a copy.

**Dymola runtime concept**

Models developed by users that lack export options can still be run at other computers using a runtime concept. Dymola runtime concept requires the user of the model to have a Dymola
license. The license file should be defined by the environment variable DYMOLA_RUNTIME_LICENSE, for example

    set DYMOLA_RUNTIME_LICENSE=C:\My Documents\dymola.lic

For information about license requirements in general, see section “License requirements” starting on page 57.

For more specific information about export options in particular, see the manual “Dymola User Manual Volume 2”, chapter 6 “Other Simulation Environments”, section “Code and Model Export”.

**Upgrading from Dymola 6.1 and earlier**

The license file format of Dymola has been upgraded to include the latest security technology. For that reason, license files for earlier versions of Dymola are not compatible with Dymola 7.0 and later, and license files for Dymola 7.0 and later are not compatible with older versions of Dymola.

If Dymola 7.0 and later finds an old license file at start-up, a diagnostic message about incorrect license file format is displayed. Dymola will then continue execution in trial mode.

**1.1.5 Additional setup**

**Language**

The selection of translation file for Dymola is by default based on the regional language setting.

Please note that currently only English and Japanese are available in Dymola.

If the regional language setting should not be used, there are two ways of overriding it.

The first is to use a command line setting of the language: `–translation <language>`. Two examples are important:

- A customer that wants to run Dymola in Japanese on a machine with regional language setting other than Japanese. This can be done by starting Dymola with the command “C:\Program Files\Dymola 2020\bin64\Dymola.exe” –translation ja (given using a 64-bit Dymola from the default location).

- A customer that wants to run Dymola in English on a machine with regional language setting Japanese. This can be done by starting Dymola with the command “C:\Program Files\Dymola 2020\bin64\Dymola.exe” –translation none (given using a 64-bit Dymola from the default location).
The second way to override the default selection of translation file is to specify what translation file to use, this can be done with the command line option –translationfile "<filename.qm>" when starting Dymola. One specific opportunity here is to use a translation file other than the one in the Dymola distribution. The file can be located anywhere on the machine, since the command line option demands the path of the file to be specified. An example could be to start Dymola with the command “C:\Program Files\Dymola 2020\bin64\Dymola.exe” –translationfile "E:\Extra\NewJapaneseTranslationFile.qm” (given using a 64-bit Dymola from the default location, and a translation file NewJapaneseTranslationFile located in E:\Extra).

Note that command line options can be included in shortcuts to Dymola, see section “Creating shortcuts to Dymola” below.

Location of startup directory

The startup directory is the directory that is defined as the current working directory when starting Dymola. The current working directory is used as default location for opening files and for saving simulation results.

Having started Dymola, you can change both the startup directory and the current working directory (they do not necessarily have to be the same). For more information, refer to the index entry “directory : startup directory” and “directory : current working directory” in the index in the end of this manual.

When installing Dymola, an environment variable DYMOLAWORK is automatically defined. It is set internally to the startup directory. If this directory is not set, the variable is set to …Documents\Dymola. That subdirectory will be created if it doesn’t exist.

Note. The environment variable DYMOLAWORK can only be changed internally from Dymola and cannot be used to change the startup directory.

Using high resolution (4K) screens

In general, it is recommended to use Windows 10 when using 4K screens. To work with DPI scaling in Dymola, start Dymola.exe with –highdpi from the command prompt of Windows.

Creating shortcuts to Dymola

Sometimes it is convenient to create shortcuts to the Dymola program, typically to make Dymola use a startup script to, for example, open specific packages and set flags.

A shortcut is created as follows:

1. Click the right mouse button on the desktop.
2. Select New > Shortcut from the popup menu.
3. Browse for the Dymola program Program Files\Dymola 2020\bin64\dymola.exe.
4. Enter a suitable name and finish the creation of the shortcut.

5. Right-click on the newly created shortcut.

6. Select **Properties** from the popup menu.

7. Select the **Shortcut** tab of the dialog window.

8. If wanted, add command line options in the **Target** field. In our example, to add a startup script **Dymola_startup.mos** that is located in `E:\MyExperiments\MySettings\` as command line option, the full line after adding this option will be:

```
"E:\Program Files\Dymola 2020\bin64\dymola.exe" "E:\MyExperiments\MySettings\Dymola_startup.mos"
```
(Note that there must be a space between the two paths.)

9. Note that from Dymola 2017 FD01, the working directory can be handled automatically in the settings file; it is not needed to change anything in the **Start in** field. See index entry “directory:startup directory” in this manual for finding more information.

10. Click **OK** to create the shortcut.

**Remote installation of Dymola**

Dymola (whether downloaded as a zip file or on DVD) consists of a number of files. Remote installation of Dymola is possible. For example, the following command makes a quiet installation of Dymola and all libraries with Modelica version 3:

```
setup.exe /s /v"INSTALLLEVEL=201 /qn"
```

The value of the **INSTALLLEVEL** property controls which components are installed, presently only 201 and unspecified is used. Unspecified means omitting the commercial libraries, and the command is:

```
setup.exe /s /v" /qn"
```

Note that you need to run any of these commands as administrator, one way is to start the command shell as administrator.

**Working with a Modelica version that is newer than the one in the distribution.**

To work with a Modelica Standard Library (MSL) version that is newer than the one in the Dymola distribution, you must:

- Download and install the new MSL version. You can use on-demand installation; see “On-demand installation of downloaded libraries” on page 27.

- Set the global flag **Advanced.PlaceDymolaSourceFirst=2**. For more information of the flag, see below.

- If you want to use the new version as default version, do the following:
  - Apply the command **Edit > Options...**, select the **Versions** tab, select the MSL version you want, and tick **Force upgrade of models to this version**.
Click OK to save the new default version.

Note! The libraries in the Dymola distribution may not support the new MSL version.

The reason why you must set this flag is that there are links in Modelica Standard libraries to internal libraries that are used when compiling models. If dymola/source and dymola/bin/lib are loaded before MSL, they will be used instead of the corresponding newer internal libraries, and this will not work. The Advanced.PlaceDymolaSourceFirst controls in what order files are loaded. The possible values are:

- 0 place dymola/source first for compilation
- 1 (default) presently this value works the same as the value 0
- 2….always place dymola/source last

Installing earlier Modelica versions including compatible libraries

If you want to install older Modelica versions than the one in the distribution, please contact support at https://www.3ds.com/support.

Customizing the File > Libraries menu

You can customize the File > Libraries menu by the command File > Library Management, the Libraries tab:
Notes!

- The content of this tab depends on the MODELICAPATH environment variable, which can be changed by for example the Modelica Path tab – if you make changes in the Modelica Path tab, for example, adding directories, and click OK in that tab, the content of the Libraries tab may change. See below for more information about MODELICAPATH.

- When you want to install downloaded libraries, you can also select if they should appear in the File > Libraries menu when installing, if you use on-demand installation. See “On-demand installation of downloaded libraries” on page 27.

In the Libraries tab you can:

- Include or exclude all libraries by using the checkbox in the heading
• Include or exclude any library in the list by the checkbox in front of it
• Move the selected library upwards or downwards using the arrow buttons

Any action is immediately implemented when clicking OK.

The setup is saved between sessions.

To restore the default library configuration, you can click Reset in the menu above.

Managing library locations

The environment variable MODELICAPATH and how to manage it

Dymola will find libraries by searching all directories in the environment variable MODELICAPATH. If not set by the user, MODELICAPATH contains only dymola/Modelica/Library.

Note the option to use enclosing package paths in addition to MODELICAPATH in the search, see next section.

It is possible to manage the MODELICAPATH from within Dymola. The most convenient way is to use the command File > Library Management, the Modelica Path tab. This opens a dialog that makes it possible to change, add, or delete directories in the environment variable. An example of the dialog is:
Note that the default path `dymola\Modelica\Library` is not displayed.
You can use the buttons in the dialog to sort, delete, edit, and add paths.
Keys can be used for the actions as well:

- Move up: **Ctrl**+**Up**
- Move down: **Ctrl**+**Down**
- Edit: **Space**
- Add: **Plus**

If you only want to add or delete a directory, you can also use the built-in function

```
AddModelicaPath(path, erase=false);
```
The function appends a directory, specified by the string variable path, to the Modelica path (if erase=false (default). If erase=true the specified directory is instead erased from MODELICAPATH).

An alternative is to use

```modelica
```

Notes:

- The menus File > Libraries and File > Demos are rebuilt after a change of MODELICAPATH.

- To keep the change of MODELICAPATH between sessions, it must be saved. This can be done by ticking the setting Save Modelica path in settings file in the menu above. This checkbox corresponds to the checkbox Modelica path in Edit > Options..., the Settings tab.

Option to also use enclosing package paths in addition to MODELICAPATH

To make it easier to, for example, automatically find multiple libraries that are stored in the same directory, there is an option to also use directories enclosing packages in addition to MODELICAPATH.

This option is available as Directories enclosing packages are used in the Version tab reached by the command Edit > Options...:
• **After ModelicaPath** (default) means that the enclosed directories are searched after having searched the paths in MODELICAPATH.

• **Before ModelicaPath** means that the enclosed directories are searched before searching the paths in MODELICAPATH.

• **Not at all** means that only the paths in MODELICAPATH.

The option is also available as a flag `Advanced.EnclosingDirectoryModelicaPath`. The value of the flag can be 0 ("Not at all"), 1 ("Before"), or 2 ("After"). The default value is 2.

Note that the content of MODELICAPATH is not changed; the option specifies additional locations to use.

**On-demand installation of downloaded libraries**

To use on-demand installation of downloaded libraries, you can use the command **File > Library Management**, the **Install** tab. Here you can as source select a mo/moe file or a zip file and install from this source. When loaded, the file content is presented for review before installation. As zip files may contain several packages, checkboxes are provided to enable partial installations.
Only reasonable combinations of packages within zip files are considered. In particular, once a package.mo or package.moe is found on a certain folder level, deeper searches for other packages are truncated.

As an example, consider using the file ModelicaStandardLibrary-master.zip as a source:

![Library Management](image)

Here we have chosen to omit the ModelicaTest library and to use a folder from MODELICAPATH as destination. Note that some destinations may require running Dymola as Administrator (Windows) or root (Linux).

---

1 For more information about MODELICAPATH, see previous section.
You may also choose whether to replace any existing library or whether to add the library in the File > Libraries menu or not. If Add to Libraries menu is checked, the file libraryinfo.mos\(^2\) is copied\(^3\) or created, else it is omitted. In the former case, the MODELICAPATH environment variable is updated if necessary.

**More about libraries and the building of menus of libraries and demos**

**General information**

Dymola can automatically recognize different libraries in order to e.g. build the File > Libraries and File > Demos menus. It is easy to add new libraries and to add new versions of existing libraries.

All information about a library exists in a local file, so it is possible to just “unzip” a subdirectory containing a package, and it will automatically be recognized by Dymola.

No update of a common file is needed, hence no need for special installation scripts. It also makes it easy to delete libraries, just delete the directory.

**Using library information**

Associated with each package is a Modelica script which is automatically located by Dymola at program start. This script can contain a set of commands that describes the package and builds e.g. File > Libraries.

The script is called libraryinfo.mos and can be stored in three alternative locations. Assuming the package XYZ is stored as dymola/Modelica/Library/XYZ, the script can be stored as any of:

- dymola/Modelica/Library/XYZ/libraryinfo.mos
- dymola/Modelica/Library/XYZ/Scripts/libraryinfo.mos
- dymola/Modelica/Library/XYZ/Resources/Scripts/Dymola/libraryinfo.mos

(The above is also the order of searching for this file.)

Note that you must yourself create the scripts for your own libraries if you e.g. want to add them in menus. It is wise to look both below, and at the already present libraryinfo.mos files for libraries already in the File > Libraries menu when doing this.

**Building menus**

There is currently a low-level script command to build libraries and demos menus, e.g.:

For a library (please also compare the section “Customizing the File > Libraries menu” above):

\(^2\) For more information about libraryinfo.mos, see next section.

\(^3\) Any existing libraryinfo.mos is copied without validation. If it is incorrect, the library may not show up in the File > Libraries menu.
LibraryInfoMenuCommand(
    category="libraries",
    text="Cooling",
    reference="Cooling",
    version="1.2",
    isModel=true,
    description="Cooling Library (1.2) by Dassault Systèmes",
    ModelicaVersion=">=3.2.2"
    pos=525);

For a demo:

LibraryInfoMenuCommand(category="demos",
    text="My Demo",
    reference="MyDemo.MyDemoModel",
    isModel=true,
    description="My demo, basic",
    pos=9999);

The attributes have the following meaning:

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>category</td>
<td>Primary menu category (&quot;libraries&quot;, &quot;demos&quot;, or &quot;persistent&quot;)</td>
</tr>
<tr>
<td>subCategory[]</td>
<td>Optional sub-categories</td>
</tr>
<tr>
<td>text</td>
<td>Text shown in menu</td>
</tr>
<tr>
<td>reference</td>
<td>Model path or command string</td>
</tr>
<tr>
<td>isModel</td>
<td>If true, the text is a model path, otherwise a command.</td>
</tr>
<tr>
<td>description</td>
<td>Longer description, for example shown in status bar</td>
</tr>
<tr>
<td>version</td>
<td>Version of library (does not apply to demos). See Important below.</td>
</tr>
<tr>
<td>ModelicaVersion</td>
<td>Required version of Modelica Standard Library, e.g. “&gt; 2”. The value “2” means “&gt;=2”.</td>
</tr>
<tr>
<td>pos</td>
<td>Position in the menu. The menu alternatives are sorted according to this attribute, lowest numbered at the top.</td>
</tr>
</tbody>
</table>

To handle different libraries and groups of libraries, and to make sure Dymola has a consistent ordering of Libraries, Dassault Systèmes allocates ranges of positions to different library vendors. For example, 0 to 999 could be reserved for Dassault Systèmes, 1000 to 1999 for DLR, etc.

Important: For libraries, the version must be specified in the libraryinfo.mos file, and in the corresponding library file (package.mo). The latter is done by the version annotation. The version specified must be the same in both files.

Adding a menu separator

It is possible to add a separator (horizontal line) in the menus. For example,

LibraryInfoMenuSeparator(
    category="libraries",
    pos=101);

The arguments have the meaning described in the table above.
Loading a package with user-defined menus and toolbars that should not be deleted by File > Clear All

A package with user-defined menus and toolbars where the menus and toolbars should not be deleted by the command File > Clear All can be automatically loaded by a libraryinfo.mos file with category="persistent" (see also above section).

```mos
LibraryInfoMenuCommand(
  category="persistent",
  reference="<Class to preload>",
  text="dummy")
```

For more information about creating such menus, see the manual “Dymola User Manual Volume 2”, chapter 7 “User-defined GUI”, section “Extendable user interface – menus, toolbars and favorites”.

License expiration settings

The default behavior of Dymola is:

- To start to warn the user that a license is to expire, 30 days before expiration.
- To continue in trial mode if a license has expired or is faulty.

The behavior can be configured with a command line argument

Consider a user wanting to have the first warning 5 days before the license is expiring, and wanting to terminate Dymola if the license is not found or invalid. Assuming a 32-bit Dymola with default location on MS Widows on a 64-bit computer, Dymola could be started with the following command line using the Command Prompt in Windows:

```
"C:\Program Files\Dymola 2020\bin64\Dymola.exe" /days -5
```

The value (5) controls how many days that should be left to expiration when warning, and the minus before the value is added if Dymola should terminate if the license is not found or invalid.

"-" can be used instead of ""/""; the example above will then be:

```
"C:\Program Files\Dymola 2020\bin64\Dymola.exe" -days -5
```

1 day is the minimum start time for warning of license expiration; the warning cannot be completely disabled.

Preventing checking out license options from a license server

It is possible to prevent Dymola from checking out certain license options from the license server, if a sharable license is used. (It is also possible using a node-locked license, e.g. if a user wants to test if a certain model still works without a certain library.)

Using the command Help > License… and then looking in the Details tab reveals license options currently checked out.
If the user wants to prevent some option from being checked out, it can be done in a number of ways:

- By ticking any of the options in the **Disabling of license options** group in the menu above. In the figure above, the setting will prevent both BinaryModelExport and SourceCodeGeneration to be checked out. The setting will be remembered between Dymola sessions. The setting can also be accomplished using the flag `Advanced.EnableCodeExport=false;` For more information concerning code export, please see the manual “Dymola User Manual Volume 2”, chapter “Other Simulation Environments”.
- By modifying the shortcut to Dymola.
- By starting Dymola with a certain command line option using the Command Prompt in Windows.

Modifying the shortcut will result in prevention of check out of specified options each time Dymola is started using that shortcut, as. Starting Dymola using a modified command from the command prompt in Windows will only result in prevention of check out of specified options in that session.

Since the command for prevention of checking out license options is generic, it is very important to use the correct name of the option, including correct use of captitals. The best way is to look at the checked out options using the command above, and mark and copy the
name (for example, RealtimeSim) of the option that should not be checked out, to insert that name when using any command.

**Modification of the shortcut to Dymola**

If a new shortcut is needed, please look at the section “Creating shortcuts to Dymola” above. To modify the shortcut to prevent checking out a certain option, right-click the shortcut and modify the **Start in**: by adding `<space>/No<optionname>` in the end of the command. If the option Optimization should not be checked out, the shortcut should be modified like in the figure below. (We prevent check-out of the Optimization option.)

![Modified shortcut.](image)

Closing Dymola and starting it again, the following information will be found in the license tab:
Now the Optimization license option will not be possible to check out. As long as the shortcut is not modified, Optimization will not be possible to check out from Dymola started by that shortcut.

To enable check out of Optimization, Dymola must be closed and then restarted using a shortcut without the command line option for Optimization.

More than one option can be prevented from check out – just add more strings like the one used. Do not forget the space.

**Starting Dymola using a modified command in Command Prompt of Windows**

A Windows command prompt can be activated using *Help > All Programs > Accessories > Command Prompt* in Windows.

To start one session in Dymola where the license option Optimization cannot be checked out like in the example above, the command in the command prompt will look like:
1.1.6 Changing the setup of Dymola

Under Windows, you can change the setup of Dymola, for example to install additional libraries. Click on the Start button in the Taskbar, select Control Panel and open Programs and Features. Select the relevant version of Dymola and click on the Change button.

Selecting Next will display

To change the setup, choose Modify. The rest of the procedure will be the same as when installing Dymola from scratch. Please see previous sections. To restore files in the Dymola...
distribution that have been deleted by mistake, choose **Repair**. **Remove** will remove the installation.

### 1.1.7 Removing Dymola

Please see previous section. Do not delete or rename the Dymola directory. Microsoft Windows Installer keeps track of all installed directories and will try to repair if altered. The installation will by default use a directory name that reflects the version of Dymola, but this can of course be changed during setup.

Note that files that you have created in the Dymola distribution directory, for example by running the demo examples, are not deleted when removing Dymola. The remaining files and directories (if any) may be deleted through the Explorer.

### 1.1.8 Installing updates

Updated versions of Dymola are either distributed on CD, or can be downloaded from a location provided by your sales channel.

Multiple versions of Dymola can be installed, but you cannot install into an existing Dymola directory. Configuration settings and the license file are shared by all installed versions of Dymola.
### 1.2 Installation on Linux

This section covers Linux-specific parts of the installation. For general items, e.g. how to handle the Dymola installation wizard; please see corresponding section on Windows installation, in particular section “Installing the Dymola license file” on page 15.

The default directory for installation on Linux is `/opt/dymola-<version>-x86_64`. As an example, the default directory for installation of Dymola 2020 on Linux is `/opt/dymola-2020-x86_64` (the package manager on the target system however typically allows choosing another default location).

Dymola 2020 runs on openSUSE 42.2 Linux, 64-bit, with gcc version 4.8.5, and compatible systems (see [http://doc.qt.io/qt-5/supported-platforms.html](http://doc.qt.io/qt-5/supported-platforms.html)). Any later version of gcc is typically compatible.

In addition to gcc, the model C code can also be compiled by clang. To change compiler, change the variable `CC` in

```
/opt/dymola-<version>-x86_64/insert/dsbuild.sh
```

Dymola 2020 is supported as a 64-bit application on Linux. Corresponding support for 32-bit and 64-bit export and import of FMUs is included.

For Dymola 2020, the default setting is to use 64-bit Dymola when translating models.

**Notes**

- 32-bit compilation for simulation might require explicit installation of 32-bit libc. E.g. on Ubuntu: `sudo apt-get install g++-multilib libc6-dev-i386`
- Dymola is built with Qt 5.9.0 and thereby inherits the system requirements from Qt. However, several xcb helper libraries are bundled with Qt (in detail, QT was built with the flag `-qt-xcb`) in order to reduce the system dependencies as much as possible. However, some libraries might still require explicit installation: libglu1-mesa and libpng12-0.
- For rendering of jpg files, libjpeg62 must be installed.
- For FMU export/import to work, zip/unzip must be installed.

Please also note that you have to use the Optimization library version 2.x or higher to use multi-criteria design optimization on Linux; the older Design.Optimization package does not support multi-criteria design optimization on Linux.

The library UserInteraction is not supported on Linux.

More Linux-specific notes are available using the command

```
man dymola
```

### 1.2.1 Installing Dymola

Dymola for Linux is distributed as an RPM package. The package is installed using the command

```
# rpm -i name-of-distribution.rpm
```
Optional libraries are installed through separate RPM files.

For installation on e.g. Debian or Kubuntu systems conversion to the deb format is required using the alien command:

```
# alien -k name-of-distribution.rpm
```

**Setup and environment variables**

The shell script `/usr/local/bin/dymola-<version>-x86_64` (see above concerning “-<version>”) contains commands to set environment variables before starting Dymola, but will need editing if Dymola is installed in a non-standard location; then the following environment variables must be defined in order to run Dymola:

**DYMOLA** Directory root of the distribution (`/opt/dymola-<version>-x86_64`).

**DYMOLAPATH** Search path for additional Dymola libraries and the license file. The directories of the path may be separated by blanks or colon. **DYMOLAPATH** is optional if the license file is in `$DYMOLA/insert`.

**MODELICAPATH** Search path for libraries. Concerning the use of **MODELICAPATH**, please see section “Managing library locations” starting on page 24.

(Dymola defines an environment variable **DYMOLAWORK** which value is the Dymola startup directory. For more info, see section “Location of startup directory” on page 20. Note that the startup directory/current working directory cannot be an UNC path in Linux.)

**1.2.2 Additional setup**

Subjects in the corresponding section on Windows are not applicable unless explicitly referenced from here.

**Compilation of model code**

Dymola produces C code which must be compiled in order to generate a simulation model. On Linux systems we rely on an ANSI/ISO C compiler already installed on the computer.

On Linux systems the compilation of the generated C code is performed by a shell script, `/opt/dymola-<version>-x86_64/insert/dsbuild.sh` (see above concerning “-<version>”). If necessary this script can be modified to provide special options to the compiler, add application-specific libraries etc. Simulation performance can be improved by tuning the compilations options in this script, however note that the compiler time may increase significantly by doing so.

Dymola supports external C libraries on Linux. Classes which contain “Library” annotations to link with external libraries in C are supported.

**Simulation from the command line**

The simulator executable **dymosim** can be executed from the shell. To do so the environment variable **LD_LIBRARY_PATH** must be set:

```
# export LD_LIBRARY_PATH=/opt/dymola-<version>-x86_64/bin/lib
```
Security-Enhanced Linux (SELinux) might display the message (below example for 64-bit application):

```
dymosim: error while loading shared libraries: /opt/dymola-2020-x86_64/bin/lib/libds.so: cannot restore segment prot after reloc: Permission denied
```

If this message is displayed the following commands must be executed (for this 64-bit example):

```
# chcon -t textrel_shlib_t /opt/dymola-2020-x86_64/bin/lib/libds.so
# chcon -t textrel_shlib_t /opt/dymola-2020-x86_64/bin/lib/libGodessMain.so
```

Note that running simulations in the Dymola environment do not require these changes.

**Adding libraries and demos to the File menu**

Please see corresponding sections for Windows installation.

**Preventing checking out options from a license server**

In the corresponding section on Windows the alternative of starting Dymola using a modified command is applicable also for Linux (with relevant changes for Linux). Please see page 34.

**1.2.3 Removing Dymola**

Remove the Dymola distribution by using the `rpm -u` command.
1.3  Dymola License Server on Windows

1.3.1  Background

These are instructions for manually installing a FLEXnet Publisher license server for Dymola on Windows. They only apply to users with a sharable license. For non-sharable licenses (the common case), installation of the license file is automatic.

All files needed to set up and run a Dymola license server on Windows, except the license file, are available in the Dymola distribution, in `Program Files\Dymola 2020\bin`.

Dymola is installed on all machines which will run the software. On the designated machine, the license server is then installed as described below.

The license server consists of two daemon processes:

- The vendor daemon (called `dynasim.exe`) dispenses licenses for the requested features of Dymola (the ability to run Dymola and various options). This program is specific for Dymola.

- The license daemon (called `lmgrd.exe`) sends requests from application programs to the right vendor daemon on the right machine. The same license daemon can be used by all applications from all vendors, as this daemon processes no requests on its own, but forwards these requests to the right vendor daemon.

If you are already running an application that uses FLEXnet Publisher, you most likely already have a running license daemon. In this case only the vendor daemon (`dynasim.exe`) is required.

Flexera Software recommends that you use the latest version of the FLEXnet Publisher `lmgrd.exe` at all times as it includes bug fixes, enhancements, and assures the greatest level of compatibility with all of your FLEXnet Publisher licensed applications. Flexera Software guarantees that it will work correctly with all earlier versions of FLEXnet Publisher.

Dymola requires support of FLEXnet Publisher version 11.14. A recent version of `lmgrd.exe` is part of the Dymola distribution.

Installing the license server

This section describes the simple case where we assume there are no other FLEXnet Publisher license daemons. We also assume that the Dymola program itself should not be installed on the server. For updating of a present license server, see separate section below.

To purchase a license server, the relevant host id of the computer where the license server should run must be supplied to your Dymola distributor before purchasing the license. The license that you will receive will contain this information. To find out the host id of that computer, the utility program `hostid.exe` can be used. Please see section “Obtaining a host id” on page 52 for more information.
1. Before installation of the license server, the Dymola license file (filename.lic) may have to be updated with the actual name (or IP-number) of the server, if the license file contains a line identifying the server:

```
SERVER server.name.here 000102DE37CD
```

The part `server.name.here` must be changed to the name of the actual server before installing the license file. It should be noted that the last part (the hostid) cannot be edited by the user.

2. Install only the Dymola software component License server (see beginning of this chapter). A folder will be created containing all needed files, default `C:\Program Files\Dymola 2020\bin`.

3. Start the utility program `lmtools.exe` (one of the above files).

4. In the Service/License File tab:
   a. Select the radio button Configuration using Services.
   b. Activate LMTOOLS ignores license file path environment variables.

5. In the Config Services tab (please see figure on next page):
   a. Enter a new service name, e.g. “Dynasim License Server”.
   b. Enter the path to the license daemon, `Dymola 2020\bin\lmgrd.exe`.
   c. Enter the path to your server license file.
   d. Enter the path to a debug log file (anywhere you want).
   e. Enable Use Services and then Start Server at Power Up.
   f. Click on Save Service. Click on Yes to confirm.
6. In the **Start/Stop/Reread** tab:
   a. Select the Dynasim license server.
   b. Click on **Start Server**.

7. In the **Server Status** tab:
   a. Click on **Perform Server Enquiry** and check the output of the log window. You should see lines identifying the server processes and what features are available.
b. Also check the log file to verify that the server has started and that Dymola features can be checked out. The following is an example of the FLEXnet Publisher logfile:

```
12:30:48 (lmgrd) pid 2728
12:30:48 (lmgrd) Detecting other license server manager (lmgrd) processes...
12:30:48 (lmgrd) Done rereading
12:30:48 (lmgrd) FLEXnet Licensing (v11.4.100.0 build 50818 i86_n3) started on 194.103.53.51 (IBM PC) (2/11/2008)
12:30:48 (lmgrd) Copyright (c) 1988-2007 Macrovision Europe Ltd. and/or Macrovision Corporation. All Rights Reserved.
12:30:48 (lmgrd) License file(s): C:\Ulf\Dymola\99-wistrom-dynasimab2.lic
12:30:48 (lmgrd) lmgrd tcp-port 27000
12:30:48 (lmgrd) Starting vendor daemons ...
12:30:48 (lmgrd) Started dynasim (pid 4180)
12:30:48 (dynasim) FLEXnet Licensing version v11.4.100.0 build 50818 i86_n3
12:30:48 (dynasim) Server started on 194.103.53.51 for: DymolaStandard
12:30:48 (dynasim) DymolaAnimation DymolaModelCalibration
12:30:48 (dynasim) DymolaFlexibleBodiesLib DymolaHydraulicsLib
12:30:48 (dynasim) DymolaPowertrainLib
12:30:48 (dynasim) DymolaSmartElectricDrivesLib
12:30:48 (dynasim) EXTERNAL FILTERS are OFF
12:30:48 (lmgrd) dynasim using TCP-port 2606
12:30:56 (dynasim) TCP_NODELAY NOT enabled
10:39:20 (lmgrd) Detecting other lmgrd processes...
10:39:35 (lmgrd) FLEXlm (v7.2c) started on x.x.x.x (3/27/2001)
10:39:35 (lmgrd) FLEXlm Copyright 1988-2000, Globetrotter Software
```

Checking the operation of the license server.
The license server should now be correctly configured. Please start Dymola to verify correct operation. The FLEXnet Publisher log file (see above) should contain additional lines showing what features were checked out. You can also do **Perform Status Enquiry** to check how many licenses are currently checked out.

Note. The license server by default uses the ports 27000-27009. They can be configured if needed, e.g. if there are issues with firewalls.

### Updating the license server with new license file

When receiving a new Dymola license file (`filename.lic`), first perform step 1 in previous section.

Now you can replace the old license file with the new (it might be good to temporarily keep the old one by adding e.g. `_previous` to the name of the old file, in case you must go back to that one).

Now you can start the utility program `lmtools.exe`. In the Start/Stop/Reread tab, click the button **ReRead License File**.

The license server is now updated.

### 1.3.2 License borrowing

#### Overview

Dymola on Windows can support "borrowing", the possibility to transfer a license from a license server to laptop for a limited period of time. If Dymola is used on a computer that is intermittently disconnected from a license server, that license can be issued as a sharable license with borrowing facility. Such a license can be borrowed from a license server via a special checkout and used later to run an application on a computer that is no longer connected to the license server.

For license borrowing, an end user initiates borrowing and specifies the expiration date a borrowed license is to be returned to the sharable license pool. While still connected to the network, the application is run from the client computer. This writes licensing information locally onto the client computer. The client computer can now be disconnected from the network.

The license server keeps the borrowed license checked out. The client application automatically uses the local secured data file to do checkouts during the borrowing period. Upon the expiration of the borrowing period or the early return of a borrowed license, the
local data file no longer authorizes checkouts and the license server returns the borrowed license to the pool of available licenses. No synchronization is required between the license server machine and the client machine when the borrowing period expires.

**License borrowing**

License borrowing and early returns are performed from Dymola.

In order to borrow, do the following:

1. While Dymola is connected to the server, use the command **Help > License…**, and select the **Borrow tab**.

![Dymola License Setup](image)

2. Select an end date, either by changing the date in the input field for **Last date borrowed** or by clicking on the arrow to display a calendar for selection of date. Clicking the arrow will display:
Here the possible selection of dates is clearly visible. Clicking on a date will change the input field to that date.

3. Click on **Start to Borrow**. The following message will appear:

4. Click **OK** and **OK** and restart Dymola (while still connected to the server); now the basic borrowing is performed. (Borrowing will be indicated in several ways, please see next section.)

5. Open all libraries/options that you will need during your borrowing time. This will ensure that the appropriate license features are stored locally. The list in the lower half of the dialog displays currently borrowed licenses and when they will be automatically returned to the server.
In this example the Hydraulics library was opened; DymolaStandard indicates borrowing of Dymola without any options.

Please be careful not to open libraries/options that might be needed for others unless you really intend to do so. (Borrowing an option only available for one user only might not be appreciated by others.)

6. Finally disconnect from the license server while Dymola is still running. This step will create the local license file with the borrowed license. After disconnecting Dymola can be stopped.

**Running Dymola**

During the borrowing period Dymola can be started and stopped as often as needed. When license borrowing is used, Dymola displays it on the splash screen shown when starting Dymola and when using the command **Help > About Dymola**:

Most information is given using the command **Help > License…**, in the **Borrow** tab.
Returning a license before expiration of borrowing (early return)

Currently borrowed licenses can be returned early when the computer is connected to the license server again.

In order to do an early return, do the following:

While Dymola is connected to the server, use the command Help > License..., and select the Borrow tab.

Now click on Return Early. The license (including all listed options) is returned to the server. Next time Dymola is restarted, the license is checked out the usual way.

It is a good idea to check e.g. the splash screen when starting up to convince oneself that the return was successful (in that case borrowing will not be mentioned in the splash screen).
A license returned to the license server cannot be checked out again until after approximately 2 minutes. If licenses are returned by e.g. exiting Dymola, but Dymola is restarted within approximately 2 minutes, the return is never performed.

License server options file

FLEXnet include tools for the local administrator. The options file allows the license administrator to control various operating parameters of the Dymola license server. For example, it allows the administrator to

- Allow or deny the use of options by users.
- Reserve licenses for specified users.
- Control how many licenses can be borrowed and for how long.

The options file shall be called dynasim.opt and placed in the same directory as the Dymola license file of the license server.

An example of an options file that reserves a Dymola + Hydraulics library license for the user Bob is

```
RESERVE 1 DymolaStandard USER Bob
RESERVE 1 DymolaHydraulics USER Bob
```

Applicable “feature” and user names can be found in the license server log file. The details of the options file are described in Chapter 5 of “FLEXnet Licensing End User Guide”, which is available on request.
1.4 Dymola License Server on Linux

This section covers Linux-specific parts of the Dymola license server. For general items, e.g. background and how to set up the server using lmtools.exe, please see corresponding section on Dymola License Server on Windows.

Note! Dymola requires support of FLEXnet Publisher version 11.14. This version is part of the Dymola distribution for Linux.

The Linux license server for Dymola is located in a separate tar file.

To start the server the dynasim and the lm* files need to be installed, for example in /usr/local/bin. The server is started with the command

    lmgrd -c <path to license file> -l <path to logfile>

A check with pg aguxf should show two new processes, lmgrd and dynasim. The server status can be checked with lmutil lmstat -a. In case of problems the log file should be examined.

To start the license server automatically when the system is rebooted, please update e.g. /etc/rc.d/rc.local accordingly. Note that the license server needs not to run as “root”.

Note. The license server by default uses the ports 27000-27009. They can be configured if needed, e.g. if there are issues with firewalls.

Full details of FLEXnet license server installation can be found in the FLEXnet User’s Manual, which can be downloaded from www.flexera.com.

License borrowing on Linux

License borrowing is enabled by setting the environment variable LM_BORROW. The value must specify beginning and end dates of the borrowing period, as well as the vendor name “dynasim”. The general format is:

    LM_BORROW=<start date>:dynasim:<end date>

An example (using bash) which specifies the start date 10 November 2009 and the end date 12 November 2009 is:


After setting the environment variable LM_BORROW, Dymola must be restarted and the appropriate license options checked out before disconnecting from the license server.

The status of borrowing can be displayed in the Linux server using a status command. An example, for Dymola 2020, is:

    /opt/dymola-2020-x86_64/bin/lmutil lmborrow -status

The command displays the names of borrowed features and the expiration dates.
**Returning a license before expiration of borrowing (early return)**

Currently borrowed licenses can be returned early when the computer is connected to the license server again.

The names of the features that are currently borrowed can be seen using the status command in the previous section. When returning, any of these names must be used in the return command below.

In order to do an early return, give a return command while Dymola is connected to the server. An example returning the license for Pneumatics Library, for Dymola 2020, is:

```
/opt/dymola-2020-x86_64/bin/lmutil lmborrow -return -c ~/.dynasim/
dymola.lic DymolaPneumaticsLib
```

Whether the return was made can be seen using the status command in previous section.

A license returned to the license server cannot be checked out again until after approximately 2 minutes. If licenses are returned by e.g. exiting Dymola, but Dymola is restarted within approximately 2 minutes, the return is never performed.
1.5 Utility programs

1.5.1 Obtaining a host id

To be able to easily find out the host id of a computer without having Dymola installed, a small file `hostid.exe` can be obtained from your Dymola distributor. (If Dymola trial version is installed, the host id can also be found using Dymola, please see section “Obtaining a host id” on page 17.)

Executing this file (by double-clicking it or opening it) the following menu will be displayed:

Selecting **Setup** will display the following:

Clicking in the upper left corner and selecting **Edit > Mark** makes it possible to selecting the host id by dragging the cursor over it. Once selected, **Edit > Copy** will place the host id in the clipboard, from where it should be pasted into a mail to your Dymola distributor.
1.6 System requirements

1.6.1 Hardware requirements

- At least 1 GB RAM
- At least 400 MB disc space

1.6.2 Hardware recommendations

At present, it is recommended to have a system with an Intel Core 2 Duo processor or better, with at least 2 MB of L2 cache. Memory speed and cache size are key parameters to achieve maximum simulation performance.

A dual processor will be enough if not using multi-core support; the simulation itself, by default, uses only one execution thread so there is no need for a “quad” processor. If using multi-core support, you might want to use more processors/cores.

Memory size may be significant for translating big models and plotting large result files, but the simulation itself does not require so much memory. Recommended memory size is 6 GB of RAM.

1.6.3 Software requirements

Microsoft Windows

Dymola versions on Windows and Windows operating systems versions

Dymola 2020 is supported, as a 64 bit application, on Microsoft Windows 7, Windows 8.1, and Windows 10. Since Dymola does not use any features supported only by specific editions of Windows (“Home”, “Professional”, “Enterprise” etc.); all such editions are thus supported if the main version is supported.

Compilers

Please note that for the Windows platform, a Microsoft C/C++ compiler, or a GCC compiler, must be installed separately. The following compilers are supported for Dymola 2020 on Windows:

Visual Studio - Free editions:

- Visual Studio 2008 Express Edition (9.0)
- Visual C++ 2010 Express (10.0)
- Visual Studio 2012 Express Edition (11.0)
- Visual Studio 2013 Express for Windows Desktop Edition (12.0)
- Visual Studio 2015 Express for Windows Desktop Edition (14.0)
- Visual Studio 2017 Desktop Express Note! This compiler only supports compiling to Windows 32-bit executables
- Visual Studio Community 2017
Microsoft Build Tools 2017 Notes:

- The minimum required selection to run Dymola is:
  - VC++ 2017 version highest listed latest version-number tools
  - C++/CLI support
- Installing this selection, no IDE (Integrated Development Environment) is installed, only command line features
- This installation is not visible as specific selection when later selecting the compiler in Dymola, the alternative to select is the same as for any Visual Studio 2017 alternative: Visual Studio 2017/Visual C++ 2017 Express Edition (15).

Visual Studio - Professional editions:

- Visual Studio 2005 (8.0)
- Visual Studio 2008 (9.0)
- Visual Studio 2010 (10.0)
- Visual Studio 2012 (11.0)
- Visual Studio 2013 (12.0)
- Visual Studio 2015 (14.0)
- Visual Studio Professional 2017 (15)
- Visual Studio Enterprise 2017 (15)

Intel compilers

- Intel Parallel Studio XE 2016, XE 2017, and XE 2018

Note – the Intel compilers also demand a Visual Studio compiler, and have some limitations; please see section “Intel compiler” on page 11.

GCC compilers; the following versions have been tested (hence, at least the versions in that range should work fine):

- 32-bit MinGW, with GCC version 4.8.1, 5.3, and 6.3
- 64-bit MinGW, with GCC version 4.9.2, 5.3, and 7.3

Note – the GCC compilers have some limitations, and demand for add-ons during installation etc, please see section “GCC compiler” on page 12.

Linux

Supported Linux versions and compilers

Dymola 2020 is supported on openSUSE 42.2 Linux, 64-bit, with gcc version 4.8.5, and compatible systems (see [http://doc.qt.io/qt-5/supported-platforms.html](http://doc.qt.io/qt-5/supported-platforms.html)). Any later version of gcc is typically compatible.

In addition to gcc, the model C code can also be compiled by clang. To change compiler, change the variable CC in
Dymola 2020 is supported as a 64 bit application on Linux.

Notes

- 32-bit compilation might require explicit installation of 32-bit libc. E.g. on Ubuntu:
  ```bash
  sudo apt-get install g++-multilib libc6-dev-i386
  ```

- Dymola is built with Qt 5.9.0 and thereby inherits the system requirements from Qt. However, several xcb helper libraries are bundled with Qt (in detail, QT was built with the flag `--qt-xcb`) in order to reduce the system dependencies as much as possible. However, some libraries might still need explicit installation: libglu1-mesa and libpng12-0.

- For rendering of jpg files, libjpeg62 must be installed.

Note on libraries

- Please note that you have to use the Optimization library version 2.x or higher to use multi-criteria design optimization on Linux; the older Design.Optimization package does not support multi-criteria design optimization on Linux.

- The library UserInteraction is not supported on Linux.

### 1.6.4 Dymola license server

For a Dymola license server on Windows or Linux, all files needed to set up and run a Dymola license server on Windows or Linux, except the license file, are available in the Dymola distribution. (This includes also the license daemon, where Dymola presently supports FLEXnet Publisher version 11.14. This version is part of the Dymola distribution.)

Dymola 2018 and later use FLEXnet Publisher version 11.14.0.2 which supports the following operating systems:

**Microsoft Windows 32-bit:**

- Windows 10
- Windows Server 2008, including SP1 and SP2
- Windows 8.1
- Windows 8
- Windows 7, including SP1
- Windows Server 2012 R2
- Window Server 2012
**Microsoft Windows 64-bit**
- Windows 10
- Windows Server 2008, including SP1, SP2, and R2
- Windows 8.1
- Windows 8
- Windows 7, including SP1
- Windows Server 2012 R2
- Windows Server 2012

**Linux 32-bit:**
- RedHat Enterprise Linux 6 and 7
- SUSE Linux Enterprise 10, 11, and 12

**Linux 64-bit:**
- RedHat Enterprise Linux 6 and 7
- SUSE Linux Enterprise 10, 11, and 12
1.7 License requirements

1.7.1 General

This description covers the license requirements for different features; for description of the features themselves, please see relevant documentation in “Dymola User Manual Volume 2”, chapter “Other simulation environments”, and the documentation for the libraries.

This description assumes that machines having Dymola installed, have the Dymola Standard Configuration license.

Apart from the Standard Configuration license, there are other licenses for different categories of users:

- Trial license. This license has some limitations compared with the Standard Configuration license.
- Licenses for academia (Academic Learn/Innovate, Student Learn/Innovate) The Student licenses have some limitations compared to the Academic ones, for example, it is not possible using a Student license to run dymosim.m from Matlab/Simulink or dymosim.exe from a command window. You need any of the Academic licenses to do that.

Licenses can be node-locked (to a certain machine) or sharable (accessible from a license server). Note that node-locked and sharable licenses cannot be mixed.

1.7.2 License for Dymola – Simulink interface

To use the traditional connection between Dymola and Simulink (Dymola-on-Windows Mode), you need a Simulink Interface license in Dymola.

Note that this mode is not available for Linux. For Linux, see section “Import to Simulink”; the second part.

1.7.3 License for real-time simulation

In Dymola

To be able to enable inline integration, needed for real-time simulation, you must have the Real-Time Simulation license. (The Source Code Generation license includes this functionality as well.) The Real-Time Simulation license is available for free and by default. You can however select to not check it out.

On dSPACE and xPC Target platforms

To be able to use real-time simulation on dSPACE or xPC Target platforms, you must have

- The Simulink Interface license in Dymola to use the Dymola-Simulink interface.
• Any of the licenses **Real-Time Simulation** or **Source Code Generation**, depending on what you want to do:
  
  o If you only want to use models that use inline integration, the **Real-Time Simulation** license is sufficient. This license is available for free and by default.
  
  o If you want to use other models as well, you need the **Source Code Generation** license.

### 1.7.4 Licenses for exporting code

The assumption is that the model is to be imported/executed on another machine than the one where it was created.

**Exporting a Dymola model to a machine without a Dymola license**

See the corresponding import section below, that also explains the export.

**Exporting a model to Simulink**

In Windows you can use the “Dymola-on-Windows” mode of the Dymola-Simulink interface (using DDE communication between Dymola and Simulink). In this mode, you can export a compiled model and execute it on another Windows computer. You don’t need any license to export the compiled model, but there might be requirements depending on how you want to use it – see the section about importing a model to Simulink below.

For other platforms (for example Linux) – but also optionally in Windows – you can use the “Import” mode of the Dymola-Simulink interface. You can export models to be imported in this mode. To do this, you must use the ExternalInterfaces library, the `ExternalInterfaces.Export.toSimulink` function. You need the **Simulink Interface** license to do this. Depending on how the model should be used, there are additional requirements, see section “Importing a model to Simulink” below.

**Exporting a model for integration with Real-Time Workshop (dSPACE and xPC)**

You can do this by using the `ExternalInterfaces.Export.toSimulink` function. You need to have both the **Simulink Interface** license, and the **Real-Time Simulation** license to do such an export. (If you have a **Source Code Generation** license, that one includes **Real-Time Simulation** as well.) The **Real-Time Simulation** license is available for free and by default.

**Exporting a model to FMU format**

See the section “Importing an FMU” below; this section also explains the export.
Exporting a model to Binary

You can export a model to binary. This requires the license Binary Model Export. (The Source Code Generation license includes this functionality as well.) Such an exported model can be executed on a machine without having any Dymola license.

Exporting a model to Source Code (C code)

You can export a model to source code. This requires the license Source Code Generation. Such an exported model can be executed on a machine without having any Dymola license. Additional features are available, see the chapter “Other simulation environments”.

1.7.5 Licenses for executing/importing/using code

Executing a Dymola model on another computer

There are two cases:

- The model has been generated by a machine having a Binary Model Export license (or Source Code Generation license). In this case no Dymola license is required to execute the model.

- The model has been generated without any of the two licenses above. You can execute the model if the machine has a Dymola Standard Configuration license, and the environment variable DYMOLA_RUNTIME_LICENSE is set to the path where the license is located. (This is needed for the executable model to find the license file.) Note. This alternative is not supported for the GCC compiler; see limitations in section “GCC compiler” starting on page 12.

Import to Simulink

If you have used the “Dymola-On-Windows” mode to export a compiled model, you can use it in a number of ways:

- You can execute the model on a Windows computer without Dymola installation in two cases:

  - The model has been generated by a machine having a Binary Model Export license (or Source Code Generation license). In this case no Dymola license is required to execute the model.

  - The model has been generated without any of the two licenses above. You can execute the model if the machine has a Dymola Standard Configuration license, and the environment variable DYMOLA_RUNTIME_LICENSE is set to the path where the license is located. Note. This alternative is not supported for the GCC compiler; see limitations in section “GCC compiler” starting on page 12.

- You can import it in Simulink using the “Import” mode of the Dymola-Simulink interface. This requires that the model has been generated by a machine having a Binary Model Export license (or Source Code Generation license).
If you have exported a model using the using the ExternalInterfaces library, the `ExternalInterfaces.Export.toSimulink` function, you can import it using the “Import” mode of the Dymola-Simulink interface. Such an imported model can be compiled, simulated, and also downloaded to real-time platforms (the last option requires that it has been exported from a machine having the Real-Time Simulation license, or the Source Code Generation license). The Real-Time Simulation license is available for free and by default.

**Importing an FMU**

You have three cases:

- The FMU is a Dymola FMU, and generated by a machine having a Binary Model Export license (or Source Code Generation license); in this case you can import it and execute it on a computer without a Dymola license.

- The FMU is a Dymola FMU, and generated by a machine without any of the licenses above; in this case you must fulfill two conditions to be able to execute the FMU: *(Note. This alternative is not supported for the GCC compiler; see limitations in section “GCC compiler” starting on page 12.)*
  - The machine you import to must have a Dymola Standard Configuration license.
  - The environment variable DYMOLA_RUNTIME_LICENSE must be set to the path where the license is located. (This is needed for the dll of the FMU to find the license file.)

- The FMU is from another vendor. For this case, please see the documentation for that vendor; there are no additional requirements from Dymola.

**1.7.6 Licenses for libraries in the Dymola library menu**

A number of libraries in the Dymola library menu can be used in Dymola without any additional licenses, a number of libraries require additional licenses when working with more advanced features, and a number of libraries always require additional licenses.

**Note:**

- If you want to export code, the above requirements for export licenses apply as well.

**Free libraries and packages in the Dymola library menu**

- DataFiles
- Design.Calibration
- Design.Experimentation
- Design.Validation
• DymolaCommands
• Fluid Dissipation Library
• FTire Interface Library
• Modelica Reference
• Modelica Standard Library
• Modelica_DeviceDrivers
• Modelica_LinearSystems2
• Modelica_StateGraph2
• Modelica_Synchronous
• ModelManagement
• Plot 3D
• Thermal Management Demos (in the menu File > Demos; note that commercial libraries are needed to run the demo)
• Testing Library
• UserInteraction
• Vehicle Demos (in the menu File > Demos; note that commercial libraries are needed to run the demo)
• VehicleInterfaces

Libraries in Dymola library menu that require additional licenses when for example running more advanced examples

• Design.Optimization – requires Design Optimization license when running more advanced examples. Note that there is a newer library available for optimization, the license condition being the same.

Libraries in Dymola library menu always requiring additional licenses

Libraries in the Dymola library menu not listed above always require additional licenses.

1.7.7 Licenses for libraries not in Dymola library menu

There are a number of libraries not in Dymola library menu, for example:

• Libraries can be downloaded from the homepage of Modelica Association (www.Modelica.org) – some are free, some require license.
• Third party vendors can use the license handling in Modelica to add license requirements on their libraries.
1.8 Troubleshooting

This is a common section for both Windows and Linux. If a problem only is applicable for e.g. Linux, it is stated.

Occasionally the installation will not succeed, or the program will not operate as intended after installation. This section will outline some of the problems that have been detected in the past.

1.8.1 License file

The license file used is not the one wanted

There are a number of standard paths where Dymola searches for a valid license. In an old invalid license is stored by mistake in one of those locations, that license might be tried instead of the correct one. Information about which license is currently in use by Dymola is given using the command Help > License > Setup. The path to that license is specified by Filename in that tab.

License file is not authentic

The error message “License file not authentic” indicates either an error in the license file, or a mismatch between your computer system and your license file.

- The license file is locked to your computer system, which means that you cannot execute Dymola from another computer.
- The license file format has been changed in Dymola 7.0 and later versions. If you also have older versions of Dymola installed, please check that you have a new license file as well.

Additional information

If there is some error in the license file or with the license server, Dymola presents a short error message by default. A more detailed description, including FLEXnet Publisher error codes, is produced if Dymola is started with the command line option /FLEXlmDiag. On Windows, start a command (DOS) window (using the command Start > All Programs > Accessories > Command Prompt in Windows) and issue the following commands (assuming Dymola 2020 64-bit is used on a 64-bit computer):

```cmd
cd \Program Files\Dymola 2020\bin64
dymola.exe /FLEXlmDiag
```

On Linux the command will be:

```bash
dymola /FLEXlmDiag
```

The additional information will in many cases be helpful in correspondence with support.
**License server**

Correct operation of the license server should be verified with `lmtools.exe`, see “Installing the license server” on page 40. The FLEXnet Publisher logfile provides additional information about the day-to-day operation of the server.

Always using the latest version of the FLEXnet Publisher license daemon `lmgrd.exe` is strongly recommended. It is guaranteed to be compatible with all earlier versions of FLEXnet Publisher.

**License borrowing**

**Different versions of Dymola**

There are limitations regarding license borrowing when borrowing is done in one version of Dymola, and using the borrowed license is used in another version of Dymola on the same PC.

For Windows, a license borrowed using Dymola 7.4 FD01 or older cannot be used by Dymola 2012 or newer without being connected to the license server.

For Linux, a license borrowed using Dymola 2012 FD01 or older cannot be used by Dymola 2013 or newer without being connected to the license server.

If access to e. g. both Dymola 7.4 FD01 and Dymola 2012 is required on a Windows PC, both versions must be used to borrow, by the following procedure:

- Initiate borrowing with any Dymola version.
- Open Dymola 7.4 FD01 (or older) and check out the required features.
- Open Dymola 2012 (or newer) and check out the required features.
- Validate by checking that there are two entries of all the required features in the Details tab, using the command Help > License....
- Disconnect from the network and validate that both versions can be run as expected.

**License borrowing of 32/64-bit Dymola**

When borrowing license, only the license of the Dymola version you run will be borrowed: and 64-bit and 32-bit Dymola are seen as different versions. For the few cases when you want to

- Borrow a license, AND
- run Dymosim.exe outside of Dymola, AND
- do not have export option;

we advice that you in 64-bit Dymola generate a 64-bit Dymosim.exe using the flag `Advanced.CompileWith64=2`. For more information about this flag, see chapter “Simulating a model”, section “Dynamic Model Simulator”.

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Sharable licenses

Please note that if a new session is started in Windows by using Log Off > Switch User the original user is still logged on and any Dymola program occupies a sharable license.

1.8.2 Compiler problems

Verify compiler button and error messages

In Windows, the compiler used to compile the C code generated by Dymola into executable code for simulation is set in the Compiler tab using the command Simulation > Setup…, see section “Selecting a compiler” on page 12.

Some potential problems can be found by pressing the Verify compiler button in that tab. Any warning messages indicate problems that need to be resolved before translating a model. Pressing the button performs a number of tests:

- Validates the DOS environment.
- Check the Dymola installation for runtime libraries.
- Verifies that the selected compiler directory contains a valid compiler.
- Validates that the compiler can compile by executing a small test model.

The compiler is tested for both 32-bit and 64-bit mode.

Error messages with information how to proceed (including a link to the web page described below) will be displayed, e.g. when no compiler is selected:

If no compiler has been selected (or installed), the corresponding information will also be displayed in the command log, in the Translation tab:
And also in the **Simulation** tab:

![Dymola Messages](image)

**Dymola webpage for compiler issues**

A web page is available for Dymola compiler issues: [www.Dymola.com/compiler](http://www.Dymola.com/compiler). This page contains the following information:

- Links to download compilers.
- Extract from the documentation concerning installation and troubleshooting of compilers.

A link to this page is presented when detecting any error using the **Verify compiler** button and in the build log when no compiler is installed/selected.
Dymola on Windows 7

Note that Visual Studio performs parts of its installation the first time it is run. This must be performed in order to use Visual Studio with Dymola, a step that requires administrator privileges. The rights can be elevated by running Dymola as administrator the first time. This is done by right-clicking the Dymola icon in the Windows Start menu and selecting **Run as administrator**.

To validate this, any model (e.g. a demo) should be opened and translated in Dymola.

1.8.3 Simulink

If the Dymola-Simulink interface does not work, please check the following (some of which may sound elementary):

- You have a Dymola license that supports the Simulink interface. Note that Simulink support is a separate option.

- You have included the three directories `Dymola 2020\mfiles`, `Dymola 2020\mfiles\traj` and `Dymola 2020\mfiles\dymtools` in the Matlab path. These have to be included every time you want to use the Dymola-Simulink interface and it is a good idea to store the included paths in Matlab.

- You can find the interface in Simulink's browser as `Dymola Block/DymolaBlock` (if not, you have probably not included the directories, mentioned above, into the Matlab path).

- Make sure that you have a Visual Studio C++ compiler installed on your computer. Make sure that the Matlab mex utility has been configured to use that compiler (type `mex -setup` in Matlab to configure). Finally, test by trying to...
compile and link an example mex file, e.g. \matlab\extern\examples\mex\yprime.c.

- You have created external inputs to the Dymola Block, and outputs from the Dymola Block, in a correct way. See also the manual “Dymola User Manual Volume 2”, chapter “Other Simulation Environments”, section “Dymola – Matlab interface”, subsection “Using the Dymola-Simulink interface”.
- You have compiled all Dymola models used in the model; otherwise you will get an error message.
- If “Allow multiple copies of block” is unchecked you should not copy the block. Unchecking it should only be done if you have a dSPACE system.

Also note that the parameterizations differ between blocks in the Modelica Standard Library and in Simulink. For example, the frequency of Simulink’s Sine-block is measured in rad/s, which is commonly known as angular frequency and should thus be $2\pi$ times the frequency in the corresponding source in Modelica.

Only Visual Studio C++ compilers are supported to generate the DymolaBlock S-function. The LCC compiler is not supported.

### 1.8.4 Change of language

Dymola is available in Japanese. Sometimes the user wants to change the language after installation. Please see section “Language” on page 19 on how to do this.

### 1.8.5 Other Windows-related problems

#### Starting the installation

The installation normally starts automatically when you insert the distribution DVD. If auto start has been disabled, please start `D:\setup.exe` (assuming your DVD drive is labeled D) from Windows Explorer by double-clicking on the file or use the **Start** button in Windows, select **Run**, enter `D:\setup.exe` and click **OK**.

#### Deep directory hierarchies

Compilation and simulation of the model may fail in a very deep directory hierarchy, if the length of the directory path exceeds 250 characters. This is caused by a bug in Microsoft software, and we are investigating ways to work around it.

#### Writable root directory

Due to a bug in some versions of the Microsoft runtime library, the root directory C:\ should be writable in order to store temporary files. If that is not the case, Dymola will create working files in the current directory, which are not automatically deleted.
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