



# fmi.LAB

# About fmi.LAB

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- Development environment for creating MATLAB®/Simulink®-based real-time applications for Test-bed.CONNECT™ and FMUs (Functional Mock-up Units) for execution on Windows systems. AVL fmi.LAB contains all the tools required to develop MATLAB®/Simulink® -based real-time applications (RTAs) for Testbed.CONNECT™. For office simulations, it is possible to create FMUs based on the FMI 2.0 (Functional Mock-up Interface) standard.
- This allows you to integrate MATLAB®/Simulink® models, e.g. your own vehicle and transmission models, driver and road simulation models, etc. on the testbed or in office simulation environments.

# Requirements

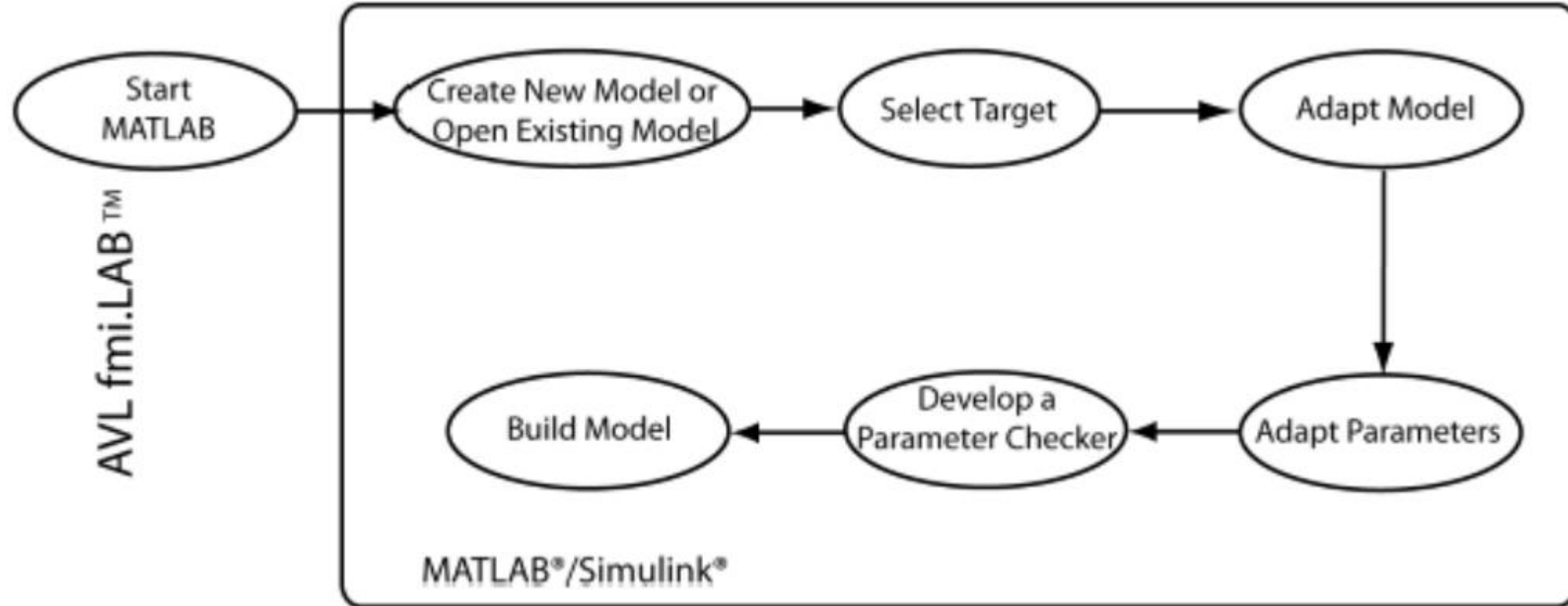
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For model development with AVL fmi.LAB the following additional components are required:

- MATLAB®/Simulink® development PC.
- MATLAB®/Simulink® Real Time Workshop® or Simulink® Coder with MATLAB® Coder
- MATLAB® Compiler (optional)
- Microsoft® Visual Studio Professional Edition or Microsoft® Windows SDK 7.1

The development of real-time applications and FMUs on 64-bit Windows 7 systems and 64-bit Windows 10 systems is supported. 64-bit versions of MATLAB® are supported.

# General Workflow



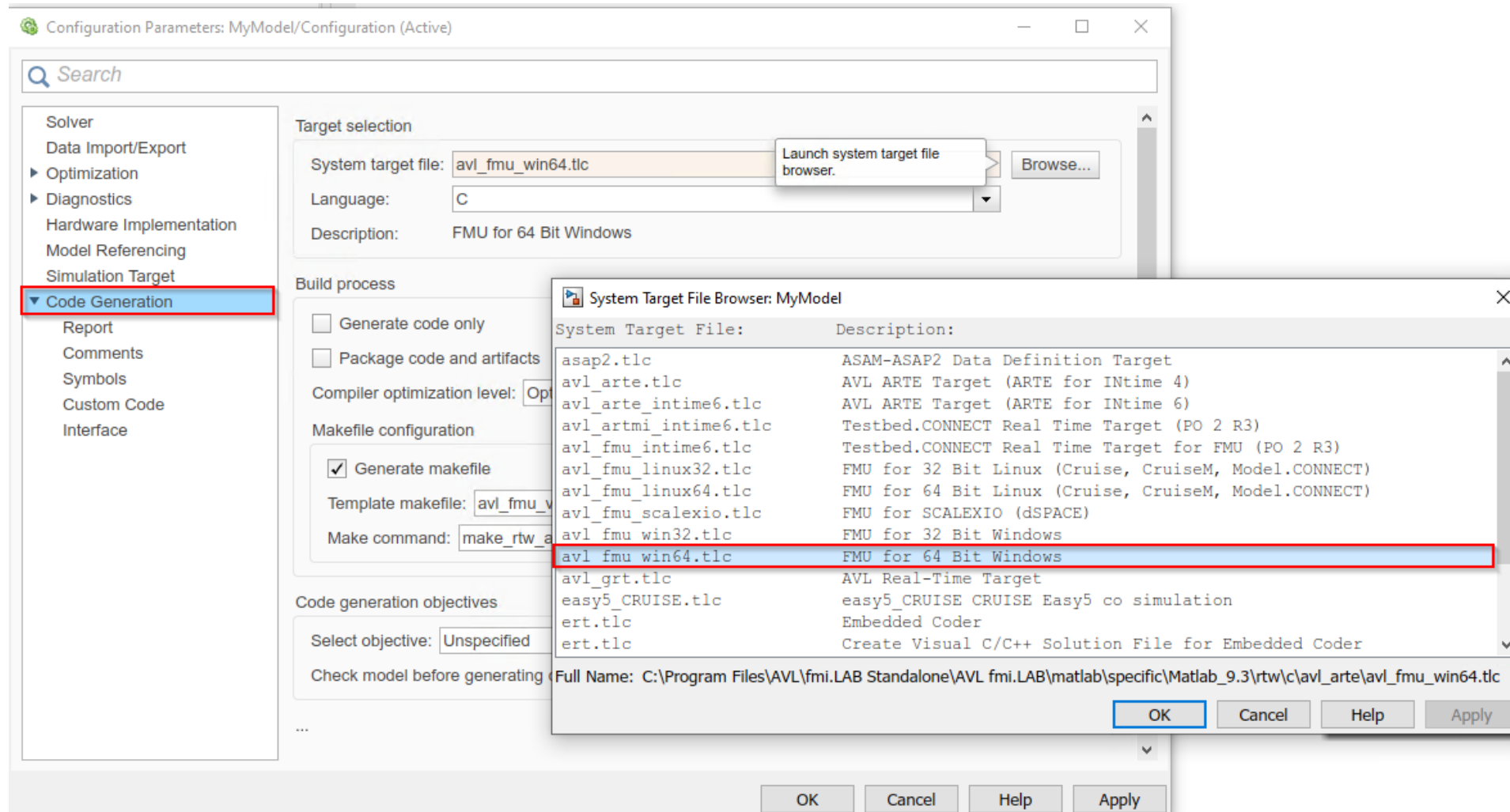
# Create a new fmi.LAB project

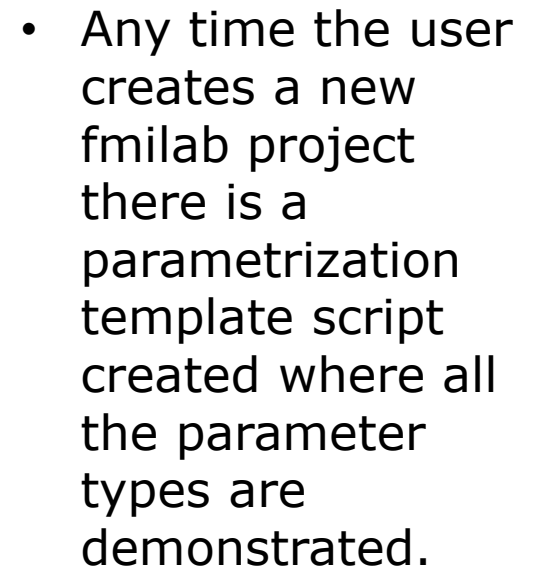
The screenshot displays the MATLAB R2021a environment. The 'Current Folder' pane on the left shows the project files: 'MyModel.ini', 'MyModel.slx' (highlighted with a red box), 'MyModel\_00.mat', 'MyModel\_Configuration.m', 'MyModel\_Param\_V1\_0.m', and 'MyModel\_ParamCheck.m'. The 'Command Window' in the center shows the execution of the command `>> new_fmilib_proj(MyModel)`, which successfully creates the project 'MyModel v1.0' and prepares it for compilation for AVL fmi.LAB targets. The 'Workspace' pane on the right lists various variables and their values.

The 'MyModel - Simulink' window is open, showing a block diagram of the model. The diagram includes an 'AVL' block, a '1-D T(u)' block (labeled 'Look-Up Table'), and two output blocks: 'MyModel\_Output1' and 'MyModel\_Output2'. The diagram is titled 'AVL fmi.LAB - Model MyModel'. The status bar at the bottom indicates 'Ready' and 'View diagnostics'.

Name	Value
ACL_channel_list	1x2 cell
ans	0
AnteLabModelInstallerOptions	2x1 cell
AnteLabModelMemorySettings	1x1 cell
AnteLabModelStartupArguments	-
buildScaleio	0
checkfiles	1x1 cell
deleteMatFileOnBuild	0
err	0
idx	1
matfile	'MyModel_00.mat'
MDL	1x1 struct
modelfile	'MyModel'
node	'NodeB'
s	'MyModel_ParamCheck(matfile);'
Ts	0.0100

# Select the export target

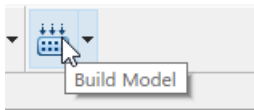






# Compilation of the model

- Once the correct target is selected and the model is ready for compilation, build command can be called in order to compile the model to the corresponding target.
- Model export is available in the folder „build” in the project root folder structure.



```
Diagnostic Viewer
MyModel
### Note: Model inputs and outputs are treated as 'SystemVariables' of data type 'float' and
dimension = 1
### but they are converted to signals of type 'double' in the model!!!
### Checking for ARTE Channel Interface v1.0/v1.1 blocks...
### Checking for ARTE Channel Interface v1.1 blocks...
### Checking for ARTE Channel Interface v1.2 blocks...
### Successfully passed checks for ARTE Channel Interface library.
MDL: 100.000000%

Creating Functional Mock-Up Unit : MyModel.fmu...### MyModel.fmu created.### Moving files..
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\MyModel.dll
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\modelDescription.xml
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\MyModel.fmu
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\MyModel.lib
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\MyModel.exp
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\MyModel_dio.txt
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### Copying files..
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\MyModel.ini
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\rtt.ini
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### HandlingC:\Users\u20k06\Documents\temp\MyModel_V1_0\MyModel_00.mat
toC:\Users\u20k06\Documents\temp\MyModel_V1_0\build\avl_fmu_win64
### ArteChannelInterface_extractChannelInfo_V1_2: Checking and extracting info...
### Note: Model inputs and outputs are treated as 'SystemVariables' of data type 'float' and
dimension = 1
### but they are converted to signals of type 'double' in the model!!!
### Checking for ARTE Channel Interface v1.0/v1.1 blocks...
### Checking for ARTE Channel Interface v1.1 blocks...
### Checking for ARTE Channel Interface v1.2 blocks...
### Successfully passed checks for ARTE Channel Interface library.
MDL: 100.000000%
```



# Export location

