# **FMU** import

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## What is FMI?

FMI, also known as a Functional Mock-up Interface, is a tool independent open-source standard that supports both model exchange and co-simulation of dynamic models in a standardized format. The modeling tool supports FMI versions 1.0 and 2.0.

### What is FMU?

A component that implements FMI is called FMU (Functional Mock-up Unit). It stores a simulation model that adheres to the FMI standard. To be more specific, the FMU file contains an XML description file and implementation in a binary form.

## **FMU** import

The FMU Import Options dialog enables users to customize the FMU file import into the model. For instance, you can specify whether parameters from the FMU file should be imported as ports or value properties. Additionally, you can change the name of the Block (the FMU model name is used by default) and automatically attach the file to the project on import.

The FMU Import Options dialog has the following options:

Option name	Description						
Direction	The direction of the port: In or Out. Inputs and Outputs are selected to be imported as ports by default.						
Name	The name of the property/parameter.						
Туре	The type of the property, for example, value property.						
Description	The textual description of the property.						
As Port	If the checkbox under As Port is selected, the property is imported into the model as a Flow port.						
Redefine	The <b>Redefine</b> option allows redefining inherited value and part properties.						
C Select All	Click to select all listed properties at once.						
C Select None	Click to deselect all listed properties at once.						
Attach file to the project	If the checkbox next to <b>Attach file to the project</b> is selected, the imported FMU file is automatically attached to the model.						
Block name: WaterTank.Control	The name of the Block created in the model on import. By default, the name of the FMU model is used, but you can set the one you like.						

To import the FMU file into the model

1. In the top-left corner of the modeling tool, click **File** > **Import From** > **FMU File**.

rile			
ß	New Project	Ctrl+Shift+N	
ß	Open Project	Ctrl+O	
E	Save Project	Ctrl+S	
8	Save Project As		
Ë	Close Project		
ġ	Close All Projects		
	Migrate Legacy DDL Models		
	Open Element from URL		
	Model Execution & Integration		
	Use Project	>	
	Import From	>	Another Project
	Export To	>	CSV File
	Convert To	>	UML 2.1/2.5 XMI File
	Share Packages		MagicDraw Native XML File
	Save as Image		MOF XMI File
B	Print	Ctrl+P	CA ERwin Data Modeler v7.x
4	Print Preview		Requirements Interchange Format (ReqIF) File
<u>Þ</u>	Print Options		OWL Ontology File Alt+Shif
	Project Properties		Eclipse UML2 XMI File
	Switch Projects	>	XPDL File
~~~			FMU File
			Enterprise Architect UML 2.1 XMI 2.1 File

2. Select the FMU file on your file system and click **Open**.

🔀 Import		×
Look in:	🗄 Documents 🗸 🤌 📂 🖽 🗸	
Recent Items	Custom Office Templates OneNote Notebooks Outlook Files WaterTank_SingleWaterTank.fmu	
Desktop		
Documents		
This PC		
Network	File name:  WaterTank_SingleWaterTank.fmu  Open    Files of type:  *.fmu  ✓	2

3. In the FMU Import Options dialog, specify which properties from the FMU file should be imported into your model as values and ports. Click OK.

	Direction	Name	Type	Description	As Port	
🔽 ou	ut	level	V Real		✓ true	
🗹 in		valvecontrol	V Real		✓ true	valvecontrol : Real (ev
N/	/A	valve_outflow_int	🔽 Real		🗌 false	→ «fmu»
🗹 N/		volume	🔽 Real		🔄 false	WaterTank.SingleWaterTank
V N/	/A	der(valve_outflow_int)	V Real		🗌 false	values volume : Real
N/	/A	der(volume)	V Real		🗌 false	der(valve_outflow_int) : Real
N/	/A	drain_p_e	V Real		🗌 false	
N/	/A	fs_inflow	V Real		🗌 false	
						>

#### Dragging and dropping FMU on diagram

Alternatively, you can import the FMU model by dragging and dropping the selected FMU file directly onto the Block Definition (BDD) and/or Internal Block (IBD) diagrams.

To import the FMU file into the model using BDD/IBD

- 1. Locate the FMU file on your file system.
- 2. Do either:
  - Drag and drop the file from your file system onto the BDD diagram. A Block with the applied «FMU» stereotype is created in the model after customizing FMU import via the **FMU Import Options** dialog.



• Drag and drop the file from your file system onto the IBD diagram. A Part property is created in the model after customizing FMU import via the **FMU Import Options** dialog.



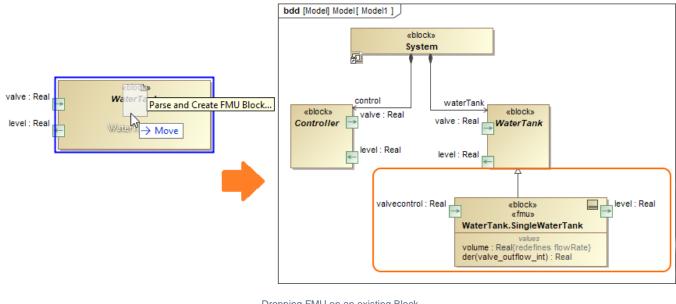
#### Dragging and dropping FMU on existing Block

You can drag and drop the FMU file directly onto the Block as implementation as well. Once the FMU file is dropped, the FMU Import Options dialog that allows redefining value and part properties of the Block opens.

	Dire	ection Name	Туре	Description	As Port	Rede	
	🗸 out	level	🔽 Real		🗹 true		
	🗹 in	valvecontrol	V Real		🗹 true		
	N/A	valve_outflow_int	🔽 Real		🗌 false		
	🗹 N/A	volume	🛛 Real		🗌 false	<unspecif:< td=""><td></td></unspecif:<>	
	✓ N/A	der(valve_outflow	_int) 🔽 Real		🗌 false	Q-Search by	Name
	N/A	der(volume)	🔽 Real		🗌 false		1 match fou
	N/A	drain_p_e	V Real		🗌 false	<unspecifie< td=""><td></td></unspecifie<>	
	N/A	fs_inflow	V Real		🗌 false	I flowRate	
						*	13
Att	ach file to	the project					
						-	
					OK		
						-	

Redefining properties using FMU Import Options dialog

In this case, a new Block is created as a subtype of the existing Block together with the Generalization relationship.



Dropping FMU on an existing Block

In/Out properties in the FMU Import Options dialog are selected by default to be imported in the model as ports of a Flow type.

#### Updating existing FMU Block

An existing FMU Block can be updated by dragging and dropping a FMU file directly on it. This is useful in those cases when there is a need to quickly import properties that were, initially, left out.

To update a FMU Block

- 1. Locate the FMU file on your file system.
- 2. Drag and drop it on the shape of your FMU Block.
- 3. In the opened FMU Import Options dialog, select the properties to update the FMU Block with.
- 4. Click OK.

			SingleWaterT 🕞 Se		lone		
	#	Direction	Name	Type	Description	As Port	Redefine
	20	N/A	volume_initial	🔽 Real		false	
	21	N/A	drain p f	🔽 Real		🗌 false	
	22	N/A	fs_p_p	🔽 Real		false	
valve : Real	23	N/A	fs_p_phi	🔽 Real		false	
Parse and Create FMU Block	24	N/A	tank_p_e	🔽 Real		false	
level : Real	25	N/A	tank_p_phi	🔽 Real		false	
Water™ → Move	26	N/A	valve_powerOut_e	🔽 Real		false	
	27	🗹 out	level	🔍 Real		🗹 true	
	28	🗹 in	valvecontrol	🔽 Real		🗹 true	
	<						>
	🗌 At	tach file to the pro	ject				
						OK	Cancel

Dragging and dropping FMU on the existing FMU Block

Already imported properties are grayed out and cannot be edited in the FMU Import Options dialog.

the Attach file to the project is checked in the FMU Import Options dialog, a previous version of the attached file is replaced with a new one on import.

#### **Co-Simulation**

The FMU file can be simulated using Cameo Simulation Toolkit (CST). To learn more, please click here.

#### Related pages

• Simulation of SysML models