



FMI User meeting

Modelica Conference 2023

Christian Bertsch, Project Leader
Torsten Sommer, Deputy Project Leader

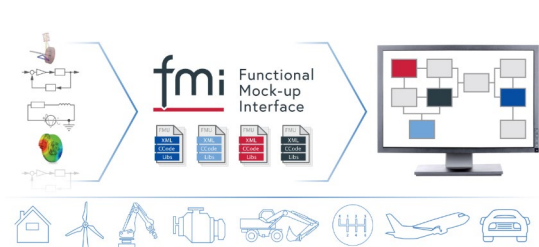


Christian Bertsch
(FMI project leader)

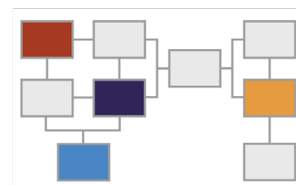


Torsten Sommer
(Deputy FMI project leader)

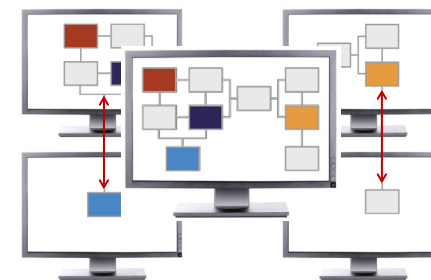
FMI - DCP - SSP - eFMI : a Coordinated Set of Standards



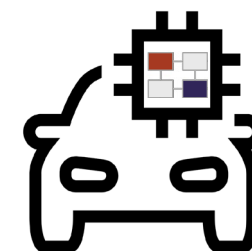
Semantics, API and XML format for exchange of simulation models and co-simulation



File format and XML schemas for description of architectures and sets of parameters



Semantics, protocol and XML schema for network based co-simulation



Container architecture for the step-wise refinement of a high-level algorithmic solution to an embedded implementation

Agenda

Welcome (5 Min., Christian Bertsch)

Status and outlook FMI Standard (10 Min, Christian Bertsch)

Status and outlook SSP Standard (5 Min, Pierre Mai)

Industrial user talks:


Building Blocks for Simulation based Cooperation between Partners (15min, Hans-Martin Heinkel)

Linking Design Requirements to FMUs to create LOTAR compliant mBSE models (15min, Clément Coïc et. al)

Status and Outlook eFMI Standard (10 Min., Christoff Bürger)

General Q&A, Feedback and Ideas (15 Min.)

Compatibility Information

- FMI compatibility information on [FMI tools page](#)
- Tools providing it are listed on top and are marked with  [Examples & Compatibility](#)
- Replaces FMI Cross Check
- Important quality measure during the current fast adoption of FMI 3.0




The screenshot shows two tool entries on the FMI tools page. The first entry is for Altair Activate, which includes a yellow gear icon, the text 'Altair Activate by Altair', a row of compatibility tags (1.0, 2.0, 3.0, CS, ME, CS, ME, a triangle, a square, and a dollar sign), a yellow star icon followed by 'Examples & Compatibility', and the description 'Software environment for modeling, simulation and analysis of multi-disciplinary systems'. The second entry is for Maplesoft, which includes the Maplesoft logo, the text 'Maplesoft by Maplesoft', a row of compatibility tags (1.0, 2.0, CS, ME, CS, ME, a triangle, a square, and a dollar sign), a yellow star icon followed by 'Examples & Compatibility', and the description 'Modelica-based modeling and simulation tool from Maplesoft'.

Compatibility information on <https://fmi-standard.org/tools/>

Validation of FMUs

- The FMI Project provides and endorses several tools to validate FMUs on <https://fmi-standard.org/validation/>
- FMU Check (online)
- FMPy (GUI and command line)
- fmusim executable from the Reference FMUs
- FMI-VDM-Model checker



Validate your FMUs

Whether you're exporting FMUs or troubleshooting a third party FMU - the following free tools help you to validate, test and debug your FMUs.

FMU Check
A free web app to validate FMUs online. It's based on FMPy and hosted by the Modelica Association.
[Validate your FMU →](#)

FMPy
A Python package to simulate and validate FMUs that has a graphical and a command line interface and

- » supports FMI 1.0, 2.0, and 3.0
- » supports Co-Simulation and Model Exchange
- » runs on Windows, Linux and macOS
- » compiles C code FMUs and generates CMake projects for debugging

[FMPy on GitHub →](#)

Reference FMUs
The Reference FMUs are a set of test models and the 'fmusim' application to simulate FMUs. It supports

- » validation of the modelDescription.xml against the XML schema
- » FMI versions 1.0, 2.0 and 3.0
- » Co-Simulation and Model Exchange
- » Windows, Linux, and Mac

[Reference FMUs on GitHub →](#)

FMI-VDM-Model
A Java library that validates FMUs against a formal model of the FMI specification. It supports FMI versions 2.0 and 3.0, and all interface types.
[FMI-VDM-Model on GitHub →](#)

Implementers' Guide

- Provide non-normative recommendations and guidance to implementers of FMI (3.0)
- Rolling release
- Joint publication between MÀP FMI and ProSTEP IVIP
- First Released in 03/2023

The image shows the cover of the 'FMI 3.0 Implementers' Guide' document. At the top, it features the logos for the Modelica Association, the fmi Functional Mock-up Interface, and the prostep ivip project. The title 'FMI 3.0 Implementers' Guide' is prominently displayed in the center. Below the title, the version information 'Version Main-3a676c17f19ba4f5524391302e9a731419857136, 2023-07-21' is provided. A paragraph of text describes the guide as a free resource for non-normative recommendations and guidance, noting it is a joint publication by the Modelica Association Project FMI and the prostep ivip SmartSE project. It also mentions that the content is continually revised and that releases and issues can be found on the GitHub repository github.com/modelica/fmi-guides.

Layered Standards

Layered Standards in development by the FMI Project:

- FMI Layered Standard for XCP (FMI-LS-XCP)
- FMI Layered Standard for Network Communication (FMI-LS-BUS)
- FMI Layered Standard for Structuring of Variables, Maps and Curves (FMI-LS-STRUCT)

FMI Releases and Outlook

- **FMI 3.0** released in 05/2022,
- **FMI 3.0.1** in 07/2023
 - fast adoption by tool vendors (already 25⁺)
- Currently **work on FMI 3.1 starts**
Idee: **Focus on efficiency**, especially when handling large binary or array data
 - Avoid copying of data
 - *Will be the focus of FMI Design Meeting in Nov at Sindelfingen*
- **FMI Development is driven by the community:
You can contribute!**



Questions?

Comments?

Ideas?

Feedback?

