18th Annual OpenModelica Workshop
Feb 02, 2026

OpenModelica – Status and Directions

Francesco Casella – OSMC Director

Goals for the OpenModelica Effort

- Comprehensive **modeling, simulation and systems engineering** environment for research, teaching, and industrial usage

- **Open-source** for both **industrial** and **academic** usage

- Invitation for **open-source cooperation** around OpenModelica, tools, and applications

- **Increasing** emphasis on **industrial** usage

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OpenModelica Releases in 2025

- Version **1.24.4** released 04 Feb 2025

- Version **1.24.5** released 09 Mar 2025 (for RTE)

- Version **1.25.0** released 04 Apr 2025

- Version **1.25.1** released 15 Jun 2025

- Version **1.25.2** released 27 Aug 2025

- Version **1.25.3** released 04 Sep 2025

- Version **1.25.4** released 11 Sep 2025

- Version **1.25.5** released 17 Oct 2025

- Version **1.25.6** released 23 Nov 2025

- Version **1.25.7** released 25 Nov 2025

- Version **1.26.0** released 18 Dec 2025

- Version **1.26.1** released 13 Jan 2026

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OpenModelica Releases in 2025 - Highlights

- ➤ OMC:
  - ➤ Support break for removing modifiers
  - ➤ Support break for selective model extension
  - ➤ Implements Modelica 3.7 less restrictive rules for conditional component use

- ➤ OMEdit:
  - ➤ Loading and saving files with syntax errors
  - ➤ Hierarchical parameter editing
  - ➤ Reload package
  - ➤ Open class in text view
  - ➤ Improved handling of large result files

- ➤ Improved FMI export

- ➤ 300+ issues fixed

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Collaboration with LBL on Buildings/IBPSA

- Strategic partnership started in 2021 with LBL (US gov't laboratory in Berkeley)

- Goal: provide open-source support for Modelica libraries (Buildings, IBPSA) involved in the Spawn of Energy Plus project

- Unfortunately financially on hold since 31 Dec 2025 due to DoE cuts by the Trump administration – collaboration continues anyway

- **100% Build success on Buildings and IBPSA**

  (except a few cases with expandable connectors)

- **97% Simulation success on Buildings, 99% on IBPSA**

- **Provided input to LBL to improve several numerically problematic**

  models

- **37 Buildings-specific issues solved since the 2025 Workshop**

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Collaboration with RTE

- Four-year DFD contract signed Jul 2023 – June 2027
  - OMC maintenance and support
  - OMEdit enhancements
  - Efficient code generation for large-scale systems
  - Improved debugging

- **On-going work**
  - **Upgrading of Dynaωo production code to OMC 1.26.1**
  - **Support for standalone Dynaωo Modelica library in OMEdit**
  - **Generation of symbolic Jacobians in DAE-mode**
  - **Efficient generation of simulation code for large models with the new backend**

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Status of New Frontend

- OMC can now flatten **100% (*)** of the models in the following OS libraries:

  BoundaryInitBlocks, Buildings, BuildSysPro, BuildingSystems, BusinessSimulation, Chemical (1.4.1), ClaRa, DeltaRobot, Dynawo, EHPTLib, ExternalMedia, ExternData, HanserModelica, HelmholtzMedia, IBPSA, IDEAS, IndustrialControlSystesm, LEPSE, MEV, ModelicaByExample, Modelica (3.2.3 & 4.0.0), ModelicaByExample, ModelicaTest, Modelica_DeviceDrivers, OpenHydraulics, OpenIPSL, PNLib, PhotoVoltaics, PhotoVoltaics_TGM, PyhsioLibrary, PlanarMechanics, PowerGrids, PowerSysPro, PowerSystems, SOFCPolimi, ScalableTestGrids, ScalableTestSuite, SystemDynamics, StewartPlatform, ThermoPower, ThermoSysPro, ThermoFluidStream, TILMedia, VehicleInterfaces

  (*) excluding models with illegal Modelica code and a few cases using expandable connectors

- Array-preserving flattening
- Instance-based support for advanced OMEdit graphical model editing
- Provides Base Modelica flat output output (`--BaseModelica`)
- Very stable and fast.
- On-going work to improve support of expandable connectors (Q1 2026?)
- Support of state machines still missing

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Status of Backend, Code Generation & Runtime

New Backend (see also talk later today)

- Increasing success ratio on the library testuite, currently around 30%
- Currently testing models up to 3.2 M equations, a few minutes compile& run time
- Initial support for index reduction
- On-going work on resizable array support
- On-going work on array-based sparse Jacobian generation

Runtime

- On-going work on efficient array handling in the runtime
- Successful prototype of efficient RHS computation for multi-rate solvers (see also talk later today)
- Performance improvements on GBODE – almost on a par with IDA/DASSL (see also talk later today)
- SVD analysis of singular Jacobians with sparse algorithms (`-lv=LOG_NLS_SVD`)

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Improvements to OMEdit GUI

- Further improved usability
- New features:
  - Loading and saving files with syntax errors
  - Hierarchical parameter editing and class/component redeclare (1.25.0)
  - Reload package
  - Right-click open class in text view
  - Copy&paste of multiple selected components
  - Better sizing of parameter input dialogs
  - Improved loading of large result files
  - Automatic handling of each modifiers for array parameters
- Many bug fixes
- **85** issues resolved on the master branch since Feb 3 2025
- Version 1.26.1 just released contains all the new features

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FMI, Optimization, Julia, Python

FMI (see also talk later today)

- FMI-CS now uses correctly the CVODE solver -> co-simulation of stiff
- CMAKE-based FMU export
- 20+ bugs fixed
- On-going work on FMI 3.0 features

Optimization

- Work re-started in 2025 on optimization support (Linus Langenkamp)
- Not yet released, probably something available in 2026

Julia implementation of OpenModelica

- John Tinnerholm defended his PhD thesis Dec 2025
- Currently refactoring and packaging his work on a stable version that it is usable by others

Python

- New OMPython versions 3.6.0 and 4.0.0 released in 2025

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OSMC Plan of Operations for 2026 (1 of 2)

- Further increased library coverage, performance, and quality with special focus on the Buildings library in collaboration with LBL
  - Achieve 100% successful simulation of the latest version of Buildings
  - Further FMI export reliability on Buildings models
  - Assess quality of simulation results and improve simulation performance

- Improved handling of expandable connectors in the New Frontend

- New Backend enabling fast compilation of large-scale power system models & other large models (significant support by RTE)
  - Improve coverage of libraries by the New Backend (now about 30% of the library testsuite)
  - Fast code generation with array-preserving methods
  - Efficient run-time handling of (resizable) arrays and sparse Jacobians
  - Support event handling and improve efficiency compared to old backend
  - Support efficient multi-rate integration by selective evaluation of the ODEs RHS

- OMEdit new features:
  - Improved handling of modifiers in the GUI
  - Further improvements in speed of response when editing large models
  - Rename function with refactoring
  - Re-designed Simulation Setup interface

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OSMC Plan of Operations for 2026 (2 of 2)

- Improvements in simulation speed for large systems via multi-rate and implicit/explicit integration, including hybrid systems
- Integration of runtime data in the OMEdit debugger
- Improved support for commercial libraries
  (Including libraries from Bosch-Rexroth, XRG, DLR, TLK-Thermo, etc.)
- Improved FMI export, including FMI 3.0.x features
- Partial FMI 3.x and SSP 2.x support in OMSimulator
- Participate to the development of Base Modelica standard
- Final assessment of the Julia-based OMC implementation
- Balancedness detection in the frontend, according to Modelica 3.x rules
- Improved support for data reconciliation
- Improved support of CRML extensions for requirement specification
- Support for the integration of the latest version of OMC into production-level Dynaωo tool

Planned releases:
- 1.27.0 April/May 2026
- 1.28.0 Nov/Dec 2026
- Patch releases if critical bugs are found in released versions

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The Open Source Modelica Consortium

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Purpose of the Consortium

- The Open Source Modelica Consortium, created the 4th of December 2007 in Linköping, Sweden, in the following called OSMC, is a non-profit, non-governmental organization with the aim of developing and promoting the development and usage of the **OpenModelica open source implementation of the Modelica computer language** (also named Modelica modeling language) and OpenModelica **associated open-source tools and libraries**, collectively named the OpenModelica Environment, in the following referred to as OpenModelica.

- OpenModelica is **available for commercial and non-commercial usage under the conditions of the OSMC Public License**. It is the aim of OSMC, within the limitations of its available resources, to provide **support and maintenance of OpenModelica**, to support its publication on the web, and to **coordinate** contributions to OpenModelica.

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Open Source Modelica Consortium
Originally Created Dec 4, 2007

7 Founding Organizational Members

- Bosch-Rexroth AG, Germany

- Equa Simulation AB, Sweden

- TLK Thermo, Germany

- VTT, Finland

- Linköping University, Sweden

- Hamburg University of Technology/TuTech, Institute of Thermo-Fluid Dynamics, Germany

- Technical University of Braunschweig, Institute of Thermodynamics, Germany

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OSMC 50 Organizational Members, Jan 2026
(initially 7 members, 2007)

Companies and Institutes

- ABB AB, Germany
- Berkeley Lab, California, USA
- Bosch Rexroth AG, Germany
- Creative Connections, Prague
- DHI, Aarhus, Denmark
- Dynamica s.r.l., Cremona, Italy
- EDF, Paris, France
- Fraunhofer IWES, Bremerhaven, Germany
- Fraunhofer FCC, Gothenburg, Sweden
- GSIMX Beijing Technology, China
- HOERBIGER Wien GmbH, Vienna, Austria
- INRIA, Rennes, France
- ISID Dentsu, Tokyo, Japan
- Maplesoft, Canada
- Orthogonal Supersystems, Germany
- RTE France, Paris, France
- Saab AB, Linköping, Sweden
- Shanghai Duanyan Information Techn., China
- SIL3X, Paris, France
- SmartFluidPower, Modena, Italy
- Swegon AB, Gothenburg, Sweden
- TLK Thermo, Braunschweig, Germany
- Volvo Cars AB, Sweden
- VTI, Linköping, Sweden
- XRG Simulation GmbH, Hamburg, Germany

Universities

- Augsburg University, Germany
- Australian National University, Australia
- Hochschule Bielefeld, Bielefeld, Germany
- University of Bolivar, Colombia
- University of Buenos Aires, Discrete Sim. Lab, Argentina
- TU Braunschweig, Germany
- Univ Catalunya, Spain
- Chalmers Univ, Control,Sweden
- Chalmers Univ, Machine, Sweden
- TU Delft, Netherlands
- TU Dresden, Germany
- Université Laval, Canada
- TU Hamburg/Harburg Germany
- IIT Bombay, Mumbai, India
- K.U. Leuven, Belgium
- Univ Linnaeus, Sweden
- Linköping University, Sweden
- Univ of Maryland, Syst Eng USA
- Univ of Maryland, CEEE, USA
- Politecnico di Milano, Italy
- Mälardalen University, Sweden
- Univ. Pisa, Italy
- Rennslaer Polytechnic Institute, Troy, USA
- Univ SouthEast Norway
- Vanderbilt Univ, Nashville, USA

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Open Source Modelica Consortium
Individual Members (102 individual members)

- Andersson Anders, Asghar Adeel, Axin Mikael, Bachmann Bernhard, Baras John, Bartolini Andrea, Beaude Francois, Ben Gaid Mongi, Bouskela Daniel, Braun Robert, Braun Willi, Broman David, Buffoni Lena, Campillo Javier, Casella Francesco, Castro Rodrigo, Ceraolo Massimo, Combel Sebastien, Dahlquist Erik, Elsheikh Atiyah, Eriksson Björn, Eriksson Henrik, Fernström Anders, Ferretti Gianni, Franke Rüdiger, Frenkel Jens, Fritzson Dag, Fritzson Peter, Gebremedhin Mahder, Grozman Pavel, Gubsch Ines, Hao Hong , Heuveline Vincent, Horkeby Sune, Hossain Muhammed Zoheb, Isaksson Alf, Jacobson Bengt, Jansson Jonas, Jardin Audrey, Jonströmer Ulf, Kanth Daniel, Karhela Tommi, Kiel Henning, Klinghed Joel, Kofranek Jiri, Kortelainen Juha, Krus Petter, Lebedev Alexey, Leksell Magnus, Lennartsson Bengt, Lenord Oliver, Leva Alberto, Lie Bernt, Liebman Ariel, Lindberg Rickard, Link Kilian, Lundvall Håkan, Lv Hong , Magnusson Henrik, Mavris Dimitri, Metkar Abhir Raj, Meyers Eric, Moudgalya Kannan, Nemer Maroun, Niemistö Hannu, Nordin Peter, Norling Kristoffer, Novack Jim, Ochel Lennart, Östlund Per, Padubidri Pavan, Palanisamy Arunkumar, Paredis Chris, Pettersson Karl, Pop Adrian, Privitzer Pavol, Ruge Vitalij, Ruusu Reino, Sahlin Per, Samlaus Roland, Schamai Wladimir, Schmitz Gerhard, Shah Sunil, Sjölund Martin, Staack Ingo, Stavåker Kristian, Tariq Sonia, Täuber Patrick, Thiele Bernhard, Thieriot Hubert, Thorslund Gustaf, Torabzadeh-Tari Mohsen, Valsalam Rominus, Vanfretti Luigi, Vanrolleghem Peter, Villa Jose, Watson Bruce, Waurich Volker, Winkler Dietmar, Worschech Niklas, Wotzlaw Robert, Zia Asam

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Open Source Modelica Consortium – OSMC Board of Directors 2025

- **Rüdiger Franke**, OSMC Chairman; Manager, ABB AG, Germany
- **Oliver Lenord**, OSMC Vice Chairman; Project manager, Germany
- **Francesco Casella**, OSMC Director; Prof, Politecnico di Milano, Italy
- **Peter Fritzson**, OSMC Vice Director; Prof, Linköping Univ, Sweden
- **Juha Kortelainen**, Manager, VTT, Finland
- **Arne Speerforck**, Prof, TU Hamburg-Harburg, Germany
- **Adrien Guironnet**, Manager, RTE, France
- **Niklas Worschech**, Techn. Specialist, Bosch-Rexroth, Germany.
- **Audrey Jardin**, Techn. Manager, EDF, France
- **Bernhard Bachmann**, Prof, Hochschule Bielefeld, Germany
- **Adrian Pop**, adjoined to the Board, Tech coordinator, OSMC

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OSMC Board – 2 Meetings During 2025

Meeting dates

- 16/06/2025
- 06/11/2025

Board Work

- Planning and prioritizing the OSMC work
- OSMC Business models
- Licensing issues
- Admitting new members
- Planning the workshop
- Budget
- etc.

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Supporting Research Projects 2025

- Swedish project ELLIIT Cloud Tooling for Large-Scale Cyber-Physical System Model-Based Development (one 5-yrs PhD)

- ITEA4 project OpenSCALING, "Open standards for Scalable Virtual Engineering and Operation", 2023-2026

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Special Thanks

- The developers who worked very hard during 2025 and all users who tested OpenModelica and gave important feedback

- The OSMC organizational members for their support

- RTE, LBL, EDF for their extra support during 2025 through DFD contracts

- Master's and PhD students who made important contributions.

- Online contributors to the code base that we never had a chance to meet in real life.

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Conclusions and Summary 2025

- Apr 04, 2025. OpenModelica **1.25.0**

- Dec 18, 2025. OpenModelica **1.26.0**

- Jan 13, 2026. OpenModelica **1.26.1**

- Towards a standard **high performance**, **quality, compliant open source** Modelica implementation

- **Expected OpenModelica 1.27.0 and 1.28.0/2.0.0** in 2026

Questions?

openmodelica.org

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