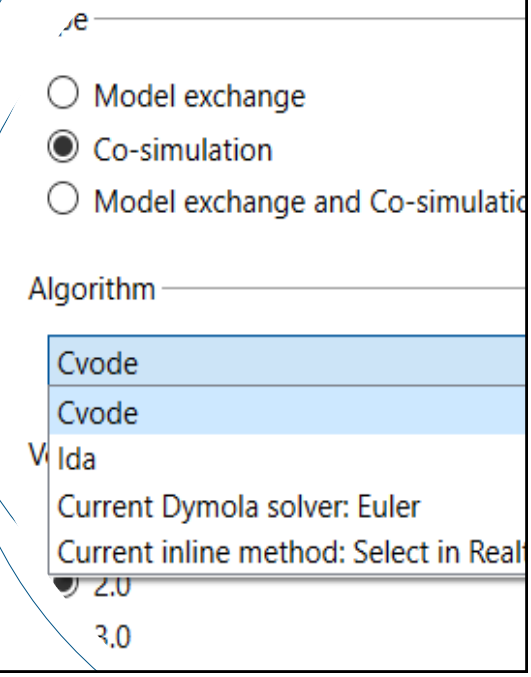
DYMOLA 2024X REFRESH 1 HIGHLIGHTS

April 19, 2024



EXECUTIVE SUMMARY

Model development

- Support for Standardized Modelica library encryption (proposed)
- Improved version management with **3D**EXPERIENCE

Simulation

- Ida solver from SUNDIALS
- Simplified FMI export setup – selection of FMI type and algorithm
- SSP support for multiple system definitions in one SSP file

eFMI

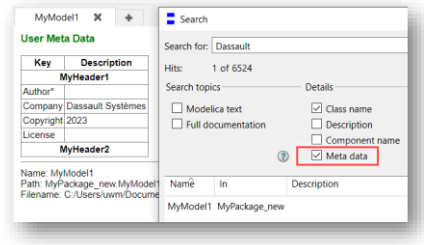
- Software Production Engineering – new cloud-based code generator

MODEL DEVELOPMENT

DASSAULT SYSTEMES

MODEL DEVELOPMENT

- Class naming changed – UnnamedA
  - The naming of Unnamed-classes now uses letters, not digits.
  - Reduces the possible confusion between classes and components
- Change package constants using the parameter dialog
- Easier checking of models
  - Directly check models by a new Check button in the File>Search dialog
- Meta data is searchable
  - Meta data in the model is now searchable
- Saving images as Enhanced Meta File
  - Tools>Image can save to EMF file (a scalable format)
  - Rendering of EMF has been improved



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DASSAULT SYSTEMES

STANDARDIZED MODELICA LIBRARY ENCRYPTION

- Being standardized by Modelica Association
  - As defined in Modelica Change Proposal MCP-0039 Licensing and encryption
  - See https://github.com/modelica/Encryption-and-Licensing
- How it works
  - Library vendor encrypts the library and provides a licensing mechanism
  - Library vendor provides a "library vendor executable" (LVE) that handles license checking and decryption
  - Approved Modelica tools, such as Dymola, can communicate with the LVE to read the library contents
  - Filename should end in `.mol`
- Dymola supports reading only
  - Not provided: encryption, licensing or packaging of .mol files
  - Dymola library encryption (.moe) is of course supported in the future

VERSION MANAGEMENT WITH 3DEXPERIENCE

- Customize the working directory for libraries opened from 3DEXPERIENCE
  - `Advanced.File.PowerBy.Directory`
- Use an external tool for compare and merge of Modelica files
  - WinMerge, KDiff3, etc.
- New and improved version commands
  - Merging of changes during Update
  - External diff tool, diff of complete packages
  - Branches: create, switch, merge
  - Smart renaming: renaming in Dymola moves file in repository
- On the cloud: System Simulation Designer

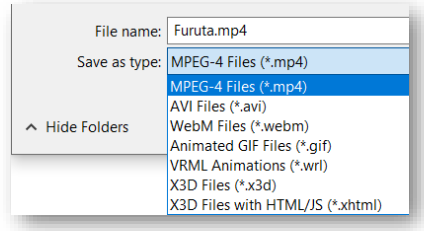
New command	Updated command
Diff	Update
Query Update	Log
Checkout	Create Branch
Merge Branch	Switch Branch

SIMULATION

DASSAULT SYSTEMES

RUNNING A SIMULATION

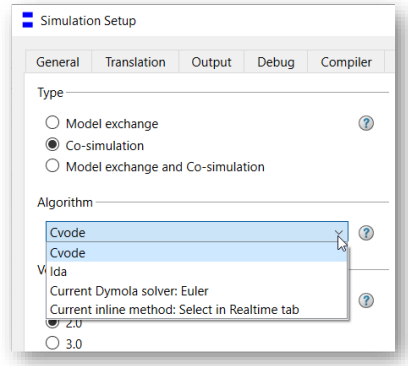
- Support for the Ida solver from SUNDIALS
  - A modern variable-step size, variable-order solver of hybrid DAEs
  - In the core, it implements a BDF integrator and is most similar to Dassl and Cvode
  - Allows integration of DAEs; this is a benefit over Cvode, which is a pure hybrid ODE solver
  - Sparse linear solver for large systems
- Improved handling of minor time events
  - Dassl, Lsodar, Cvode, and Ida handle minor time events more efficiently to take larger integration steps
- Export of animation files in MPEG4 format
  - Selection of compression quality (none to very high)
  - Removed some video formats no longer supported
- Compiler setup function improved
  - Better diagnostics, also supported on Linux



DASSAULT SYSTEMES

FMI (FUNCTIONAL MOCKUP INTERFACE)

- FMI 3 support
  - Co-simulation event mode, early return and intermediate update
  - Variable step communication interval (model programmable)
- Simplified export setup
  - Easier to select the right combination of type and algorithm
- SUNDIALS Ida solver
  - Available for export of co-simulation FMUs
- Re-import updated FMUs
  - Checks if FMU file has been updated and re-imports if needed



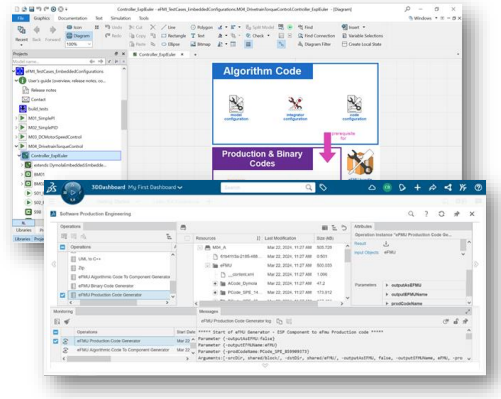
SSP (SYSTEM STRUCTURE AND PARAMETERIZATION)

- Support for multiple System Structure Descriptions (SSDs) in an SSP file
  - Each SSD becomes a model in the created package
- Imported FMUs are stored in a sub-package
  - Name can be changed by setting a variable
- SSP parameter and variable representation
  - Parameters are represented by connectors with `kind="parameter"`
  - Public local variable declarations are represented by connectors with `kind="local"`
- Storing the start value of a Modelica parameter
  - Can convert to parameter value (`Advanced.SSP.StoreStartAsValue=true`)
- Importing parameter sets
  - Parameter units supported (unit conversions applied)
  - Can store parameters as CSV files (in addition to SSV)
    `<ssd:ParameterBinding source="parset.csv" type="text/csv">`

```
J1.J, 1.0
J2.J, 0.8, , "Medium light (default unit)"
T2, 600, "ms", "Use of a scaled SI unit"
```

EFMI (FMI FOR EMBEDDED SYSTEMS)

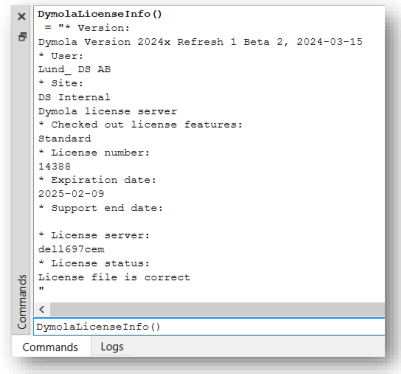
- Seamless integration of Software Production Engineering
  - eFMI Production and Binary Code container generation
  - SIL test of generated production code in Dymola
  - Test 32-Bit and 64-Bit floating point precision, recalibration & reinitialization throughout simulation
- Software Production Engineering – SOP
  - Commercial cloud-based code generator from Dassault Systèmes
  - High quality code generation facilities (MISRA C:2012 compliant)
  - Also backend for CATIA Magic code generation
  - Requires a separate license (not managed by any Dymola license)
  - Contact Michael.Seibt@3ds.com for more information



ENVIRONMENT

ENVIRONMENT AND SETUP

- Simplified setup of nodelocked license
  - Automatically detects what type of license key you try to install (DSLS or FLEXnet)
  - Diagnostic if you try to install a server license key
- `DymolaLicenseInfo()` returns license information
  - Helps with reporting issues related to the license management
- Git version management – diff tool
  - Uses the git diff tool by default
  - Can select another external tool if you want
- SCILAB interface
  - Scripts to process Dymola result files
- Python interface uses Python 3.7



DISCONTINUED SUPPORT

- Compiler support discontinued now
  - Microsoft Visual Studio 2012 compiler (end-of-life)
- Compiler support discontinued in a future release
  - MinGW GCC compiler (use WSL and gcc/clang instead)
  - 32-bit compilation on Linux
- Support for FMI 1 discontinued in a future release
  - FMI 1 has severe technical limitations and should be replaced by FMI 2 or FMI 3