State of SSP 2023
A Short Update

Modelica Conference 2023 – Aachen
2023-10-10
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What is the System Structure and Parametrization (SSP) Standard?

System Structure and Parametrization

„is a Tool Independent Standard for the description, packaging, and exchange of system structures and their parametrization.“

Source: SSP Standard 1.0
Main Purposes of SSP – Based on FMI standard

- Define a standardized format for the connection structure of a network of components (FMUs in particular).

- Define a standardized way to store and apply parameters to these components.

- The developed standard / APIs should be usable in all stages of development process (architecture definition, integration, simulation, test in MiL, SiL, HiL).

- The work in this project shall be coordinated with other standards and organizations (FMI, ASAM, OMG).
Some Major Use Cases of SSP

- Exchange of pre-configured simulation (sub-)systems
  - Exchange of pre-configured driving dynamics model, including vECUs, dynamics and parametrization for multiple vehicles/vehicle variants across simulation platforms (incl. MiL/SiL/HiL)

- Exchange of partial systems with component developers
  - Creation of system architecture-based SSP to exchange pre-defined component interfaces
  - Exchange of (rest-)system simulation configurations for component development

- Standardized exchange of parameter sets, solo and system level
  - Exchange of FMUs together with their relevant parameter sets
  - Exchange of (sub-)systems together with their composed parameter sets
Current Status of SSP

- Release 1.0 of standard in 03/2019
- Current Implementations:
  - AVL ModelConnect
  - dSPACE Synect
  - PMSF FMI Bench
  - eXXcellent EasySSP
  - 3ds Dymola
  - OpenModelica
  - Siemens Simcenter
- Initial support of SSP in FMPy (Open Source)
- Many in-house development projects using SSP
- MAP SSP work restarted 01/2020
- Minor Bugfix Release 1.0.1 07/2022
- SSP 2.0 release anticipated in Q4/2023 – Q1/2024
  - Update for FMI 3.0 (arrays/clocks/SE/…)
  - Enhanced support for systems engineering, meta-data
  - Improvements/clarifications
- SSP Traceability Layered Standard for meta data specification in 2023
SSP 2.0

Updates for FMI 3.0

- Data type support
  - (u)int8/16/32/64, float32/64
  - Binary already supported in 1.0
- Array support
  - Dimensional connectors
  - Array connections (1:1, n:n, ...)
  - Array support in SSV/SSB/...
- Clocks
  - Clock connectors
  - Clock connections
- Scheduled Execution
  - New implementation type

Other Features

- Enhanced systems engineering
  - Pure interface components (no source attribute)
  - Enhancements in graphical representation
  - Integrated meta-data support
  - Modelica models as components
- Other potential features
  - Support for time-series data (e.g. stimuli/results)
- Various improvements/clarifications
Development of SSP 2.0 happens in public on GitHub:

https://github.com/modelica/ssp-standard/

Join us!
Thank You for Your Attention!