

State of SSP 2023

A Short Update

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Who am I?



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- MAP SSP Deputy Project Leader
- MAP FMI Steering Committee Member

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- ASAM OSI & OpenSCENARIO 2.0 CCB Member
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WG Lead OpenSCENARIO 2.0 Language

What is the System Structure and Parametrization (SSP) Standard?

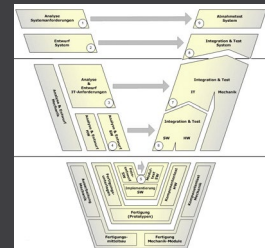
*System Structure and Parametrization
„is a Tool Independent Standard for the
description, packaging, and exchange of
system structures and their
parametrization.“*

Source: SSP Standard 1.0



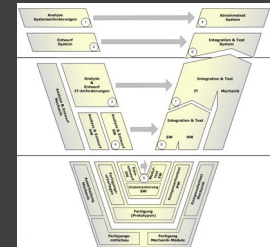
Main Purposes of SSP – Based on FMI standard

- 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



- 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

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!

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