TITLE: Combining and Synchronizing SysML and Modelica using Linked Data Technology

Duration and period

6 Months

Context

Samares-Engineering delivers services in systems engineering and specially to support Model-Based Systems Engineering (MBSE). Samares-Engineering provides consulting and innovative solutions for design offices of different domains: avionics, space, energy, railway…

MBSE gets more and more importance in the industry, especially when consistent method is provided with tools. Indeed, modelling languages such as UML / SysML or Capella are not enough to master the complexity of nowadays and future systems. Within Samares-Engineering, we are developing a SysML method that enables system engineers to simulate their System-of-Interest at each step of the modelling process, from identification of boundaries to physical architecture.

In current practices, the SysML models are used to define system architecture, and this architecture is also needed in models done by system specialists, i.e. Modelica models, Simulink models, AMESIM, etc. Hence, there is often duplication of data between the SysML model and other models. In the best case, transformation can be performed to translate SysML models to Modelica models. This export/import way of aligning different models is heavy and requires strong synchronization milestones. With advent of new web technologies including the Linked Data technologies, there is a more agile way of synchronizing different models in a bidirectional way. Files do not need to be exchanged anymore and the data can be synchronised.

In this context, Samares-Engineering would like to use Linked Data technologies as an asset to combine and synchronize in a bidirectional way SysML models and Modelica models.

Goal and tasks

Goal: main goal is to provide a connector to synchronize SysML models made with Cameo System Modeler and Modelica models designed with Modelica. The semantic mapping between both language is already available and has been the topic of an OMG specification.

Tasks
1. Understanding of the State-of-the-Art about the integration of SysML and Modelica concepts.
2. Looking and understanding of open-source Linked Data standard, such as OSLC.
3. Implementation of a connector that synchronize in a bidirectional way, i.e. from SysML to Modelica and from Modelica to SysML, both languages.
4. Final report: synthesis, recommendations, and suggestions of new features to be implemented.

Note: time allocated to each task is not yet defined and will be established at the beginning of the internship according to the data already available to prepare each task. Some tasks might be updated during internship to be extended if needed or shorten if results are available before planned period. In addition, it may happen that a new task is requested if it can help improving topic. New task may come from intern, Samares-Engineering, or other partners.

Pedagogical goals

Intern will develop skills/knowledge in systems engineering and more especially in model based system engineering with focus on architecture modelling, model-driven engineering technologies, (distributed) simulation and co-simulation.

Technical and functional environment

For implementation, deep knowledge in Java language is required. Knowledge in C and C++ is also a strong asset.

Intern profile and expected skills

Engineering background and especially in Software Engineering, knowledge in model based engineering and system engineering (modelling and simulation).
Motivation and serious, you are curious about learning new methods and tools and have some autonomy to find by yourself a first level of answers to your main questions. Consider that Samares Engineering will bring vision, context, regular guidance and support.

Location
TOULOUSE / BLAGNAC

Internship compensation
825 € / month

Contact
Please send your candidature to: contact@samares-engineering.com or by mail to
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