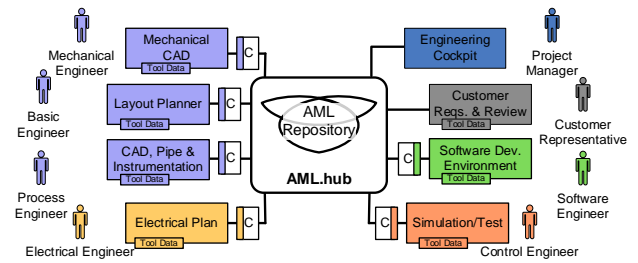


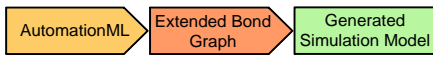
From AutomationML to Generated Simulations



Virtual commissioning of industrial plants and the fine-tuning control systems require appropriate Simulations. Using *AutomationML* for designing simulations can reduce the time needed by up to 40%.

Goal

Simulation models are used in various engineering disciplines. However, their design phase poses a time- and cost-consuming task, which limits simulation benefits in practice.



The goal is to make the design phase of simulation models efficient and fast. The main idea is to assemble a simulation model from simulation components semi-automatically according to an existing CAD description. The CAD schema is imported in the *AutomationML* format. Measurable criteria for a good solution are reductions of time and effort needed for the simulation design as well as reductions of design-time errors.

Solution Approach

The designed and implemented solution adopts the following process:

1. The CAE/CAD data are represented in the *AutomationML*, a generic input file for the method.
2. The *AutomationML* file is processed by the AML Analyzer, developed at the CDL-Flex research laboratory.
3. Engineering data are combined with the description of available simulation components, their interfaces, and parameters.
4. The well-proven Bond-Graph theory was extended to better reflect the current needs for computer-assisted design of component-based simulations.
5. The executable simulation model is generated in a process simulator.

When the real plant is changed, the simulation can be re-generated easily. The use of *AutomationML* improves flexibility and reuse. Version control on all levels of the aforementioned workflow brings traceability and efficiency.

Implementation

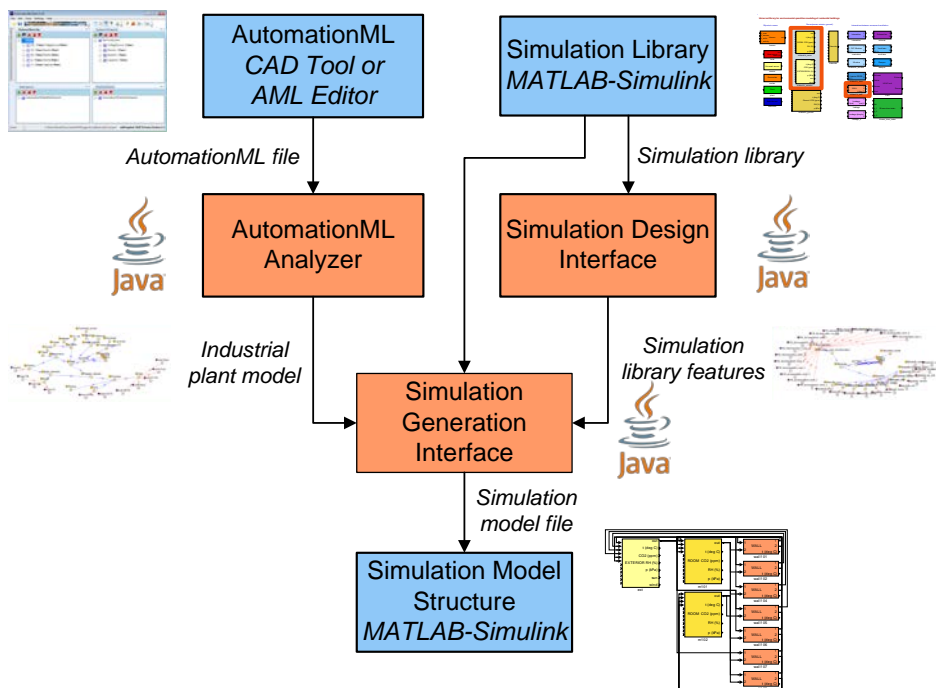
The prototype of the simulation generator was developed at the CDL-Flex research laboratory at TU Vienna. It was implemented in cooperation with the industrial partner *CertiCon*.

The implemented prototype proved that the time and effort needed for the design of simulation models can be reduced up to 40%. The approach also mitigates up to 50% of design-time errors.

The current version of the prototype focuses on the simulation model structure, but can be easily extended to support simulation configuration.

Technical Specification

- Modular service-oriented architecture implemented in *Java*.
- *AutomationML Hub*.
- *Bond-Graph* method and *Matlab*.
- *AML Analyzer* and *Apache Jena*.



Benefits for Customers

- Simulation experts, control engineers, or quality assurance experts are expected to use the *AutomationML* for describing the structure of a real system and its simulation model.
- **Simulation model** is semi-automatically generated from simulation components.
- **Effort and cost reduction** for development and testing of simulation models and simulation execution.



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