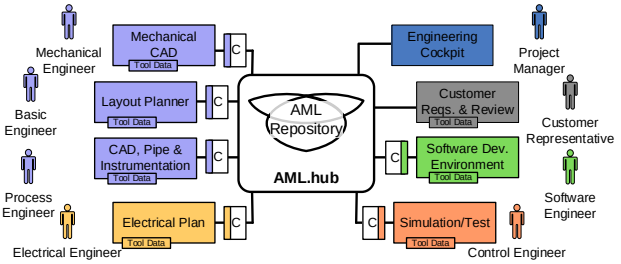
AML.hub – Round-Trip Engineering with AML and Non-AML Data Models



Exchanged engineering data will become easily accessible in tool networks using the open *AutomationML* (AML) data exchange format with the *AML.hub*. The *AML.hub* enables step-wise migration to *AML*-based engineering projects.

Goal

Software and systems engineering projects require the cooperation of several engineering disciplines, such as mechanical, electrical, and software engineering. However, in engineering tool networks the distributed engineering of automated systems often relies on point-to-point data exchange, which a) does not sufficiently enable quality and consistency management, b) complicates round-trip engineering, and c) hampers the traceability of changes across engineering disciplines.

The need for round-trip engineering arises when the same information is present and relevant in multiple engineering disciplines and therefore inconsistencies may occur if not all related system elements are consistently updated to reflect a given change. Engineering views on the plant model are not automatically synchronized and changes between engineering operations in cross-discipline context are not visible to the engineers.

Another characteristic of tool networks in multi-disciplinary engineering environments is the vast amount of various data formats and heterogeneous data models. While the emerging *AutomationML* (AML) standard supports structuring engineering data and modeling automation systems, project managers and system integrators may hesitate to migrate all data models of company specific services and tools to AML at once – preferring a step-wise migration of their settings to AML to mitigate risks.

Implementation

The *AML Hub* (AML.hub) concept developed by *logi.cals* and the *CDL-Flex* research laboratory at *TU Vienna*, systematically integrates tool networks regardless of the data model of participating engineering tools and enables the automation of engineering processes. While available software tools support individual engineering disciplines quite well, they only represent a discipline-specific view on the engineering plant. Therefore, the *AML.hub* deals with engineering information in two aspects.

On the one hand, the *AML.hub* reflects contributions of all involved disciplines on a so-called *integrated plant model* in a structured manner. This plant model captures and combines all different views into one *AML*-based representation in order to provide an overarching, discipline-independent view on the engineering plant.

On the other hand, the *AML.hub* analyzes the data format of exchanged engineering data and transforms the data into a discipline-specific *AML* representation in case of non-*AML* models with engineering information relevant across disciplines. The benefit of this approach is that common concepts covered in various heterogeneous local tool concepts of different engineering disciplines are described with a single, standardized, and query-able data model. After the transformation, the newly created *AML* representation is merged with the integrated plant model.

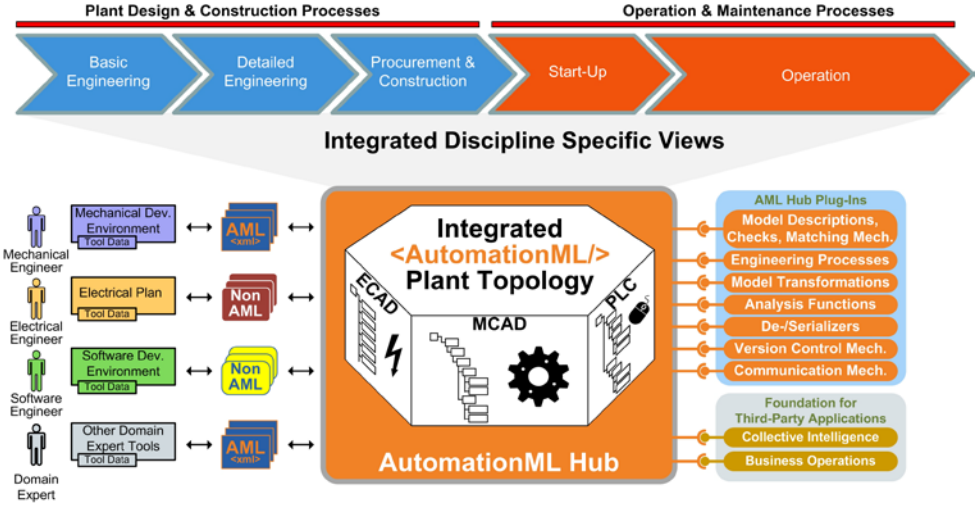
In representative standard examples, the *AML.hub* was evaluated in cooperation with a large hydro power plant builder and with the research partner *IAF* at the *Otto-von-Guericke University Magdeburg (Institute of ergonomics, Manufacturing Systems and Automation (IAF))*. The examples show the collaboration of three engineering disciplines using various non-*AML* models for exchanging information about signals across engineering disciplines in their tool network.

Technical Specification

- Versioning of exchanged engineering data at model and at file level.
- Support for tool networks with the open standard *AutomationML*.
- Provides model transformation capabilities to work with non-*AML* models.
- Service-oriented architecture.

Benefits for Customers

- Definition of **discipline-specific topology trees** and **tool-specific views**.
- Engineering projects are *AML*-ready even if the tools do not export *AML*.
- Definition of a migration strategy from non-AML to AML-based engineering tool networks



Contact:

Prof. Dr. Stefan Biffl
Head of CDL-Flex, TU Wien
stefan.biffl@tuwien.ac.at
cdl.ifs.tuwien.ac.at

Heinrich Steininger
CEO logi.cals Austria
heinrich.steininger@logicals.com
www.logicals.com