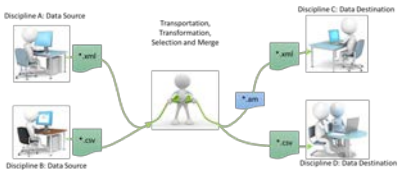
# Evolution of Engineering Networks by *AutomationML* based Data Exchange.



**How can we improve the design and usage of production systems in terms of improving speed, efficiency, correctness, and security?**

**TU Wien and Otto-v.-Guericke University Magdeburg have developed a methodology with focus on adapting existing engineering networks of technical systems incrementally to the needs of the 4th industrial revolution.**

## Goal

The life cycle of production systems strongly relies on information and data. Engineers generate information in all life cycle phases, which are used by other engineers in different disciplines. The generation and usage of Information has been widely optimize in defined contexts; however, data exchange and consistency of information is often limited. Therefore, organizations have to face various challenges.

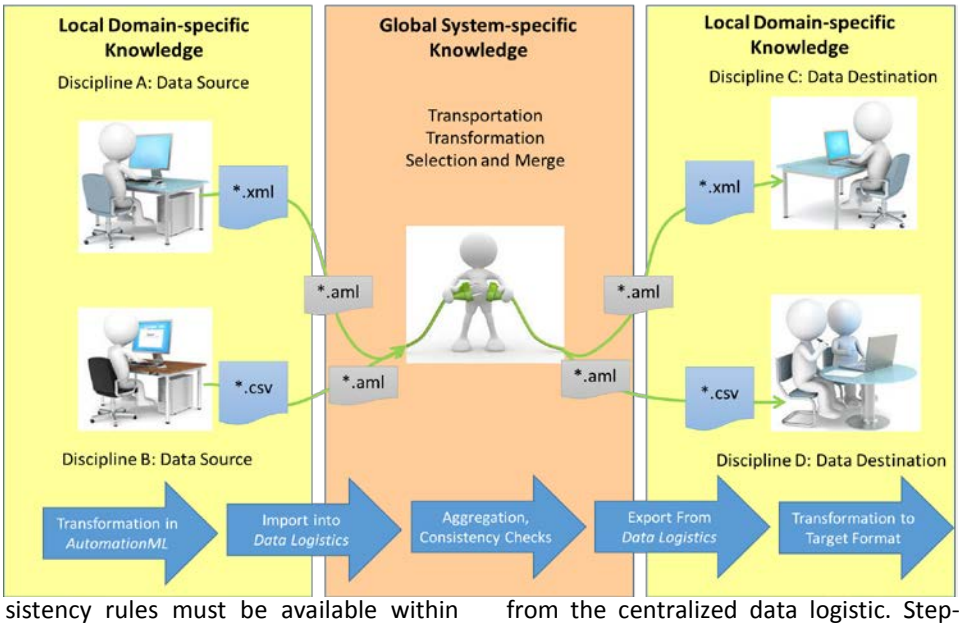
## Challenges

The Engineering habit often includes applied tools, information models and methods. Engineers are well trained and these approaches support engineering efficiency and quality. Changes in the engineering habit are often difficult to place, not well received, and can result in inefficient projects and quality losses.

However, engineering activities are carried out in an iterative way; engineers exchange intermediate results at different maturity levels. Engineers need to receive design data multiple times from different sources and they also need to identify changes.

Design activities typically require a defined set of information. To assure these information sets, engineers, who receive information, need (a) to identify missing data and (b) to clearly identify related data sources.

Design data from different data sources and data destinations need to be consistent to form a consistent information model at any point in time, (a) with respect to the production system under construction and (b) with focus on products to be built by the production system. To ensure the consistency of engineering data, related technical and physical consistency rules must be available within the data model for evaluation purposes.




Engineering networks are volatile to some extent; engineering activities and tools can be added, dismissed, or changed. Thus, data exchange approaches need to be flexible enough to allow these incremental changes. Furthermore, a stepwise evolution of production systems need to be supported to enable reconstruction of existing systems towards new technologies.

## Solution Approach

A selective combination of a centralized data logistics concept and a set of flexible adapters for tool interfaces is a promising solution approach. Goal is to provide a consistent and complete overall model of the production system along the life cycle and the implementation of efficient change, integrity, and consistency management systems.

The centralized data logistics concept provides capabilities for efficient data import, data management, analysis, and data export and supports various (discipline specific) views on the production system.

Flexible adapters aim at supporting data propagation between specific tools and the centralized data logistic. Adapters focus on the bidirectional transformation of different data models of related tools into the centralized data logistic.

Existing engineering habits are assured by decoupling related tools and methods from the centralized data logistic. Stepwise extensions and migrations become possible due to the incremental integration of additional adapters and their arrangements according to the application use case.

## Current Implementations

TU Wien and Otto-v.-Guericke University Magdeburg collaborate in a common project. The data exchange format *AutomationML* represents one important technology as foundation for the prototype implementations.

## Technical Specification

- Modular toolkit for the design of engineering networks.
- Flexible configuration of tool interfaces based on *AutomationML*.
- Integrated change, integrity, and consistency management in engineering networks.

### Your Benefits

- Improved design quality and design efficiency.
- Stepwise introduction of Industrie 4.0 scenarios.


**Contact:**

Prof. Dr. Stefan Biffl
TU Wien
stefan.biffl@tuwien.ac.at
qse.ifs.tuwien.ac.at

apl. Prof. Dr.- Ing. habil. Arndt Lüder
Otto-v.-Guericke Universität Magdeburg
arndt.lueder@ovgu.de
www.iaf-bg.ovgu.de


TU WIEN

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