



Using AutomationML in the Engineering Process: Start Implementing or Keep Waiting?

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Mercedes-Benz
Das Beste oder nichts.

Agenda

Retrospective

Engineering process today

Introducing AutomationML

Agenda

Retrospective

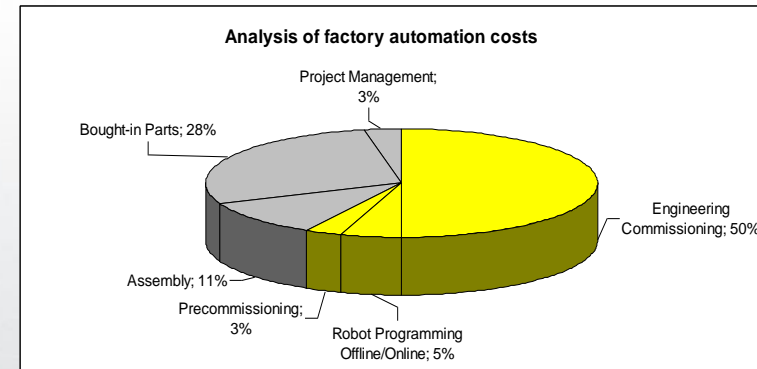
Engineering process today

Introducing AutomationML

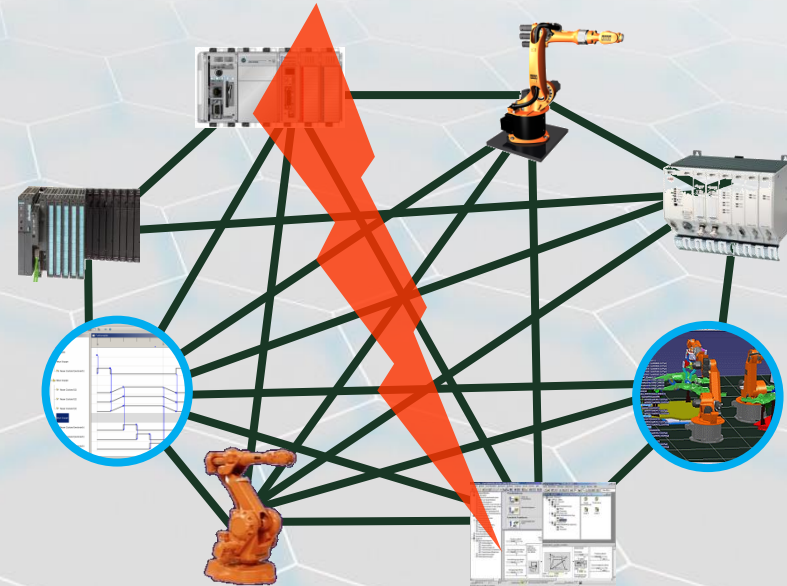
Problem Statement and Motivation

- In factory automation engineering is cost driver number one
- In a heterogeneous tool landscape data exchange between the corresponding tools is an important factor
- Data is stored in proprietary file formats, user has often no access to his own data.
- Proprietary and numerous interfaces between tools lead to gaps in passing over information and thus result in an engineering process with poor efficiency.

Retrospective



Source: Kostenstrukturanalyse von Robotik und Steuerungstechnik, AIDA 2005



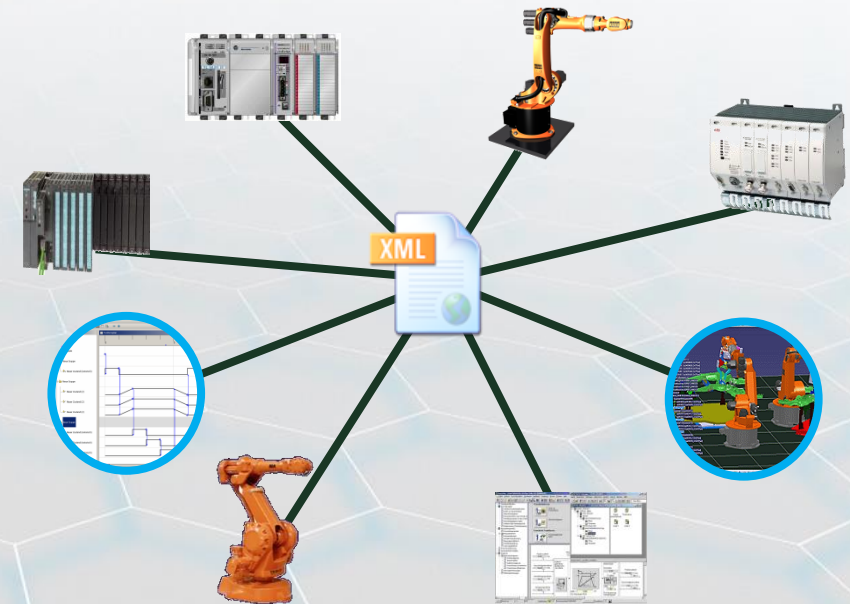
AutomationML Vision

Our vision is that:

- AutomationML will close the gaps between production design and shopfloor
- through interoperability between tools
- for all phases of the engineering process
- based on one lossless and scalable data format
- as open standard with high market acceptance
- not only for manufacturing industry, also for other industries

i.e. AutomationML will become the glue for seamless automation engineering.

Retrospective



Comprehensive Engineering Process

AutomationML current status

What we achieved ...

Standardization

Part 1 Architecture and Part 2 Role Libraries are international standard, Part 3 Geometry and Kinematics is near publication, Part 4 Logic is entering standardization process.

AutomationML is in use

More and more AutomationML interfaces go live and get into industrial use.

Additional documents and tools

Additional documents and tools are provided for those who get involved in AutomationML and to handle open questions.

What is missing ...

Few fields of technology covered

Only few fields of technology are defined in AutomationML, so many data exchange scenarios are not defined in the standard, e.g. pneumatics.

No structure in the meta standard

As AutomationML is based on a meta standard there is no structure given for the different use cases, this can cause different dialects.

Semantics

The semantics for attributes, objects and relations defined in AutomationML is not very wide.

**Can AutomationML already be used?
Or should we wait until ... ?**

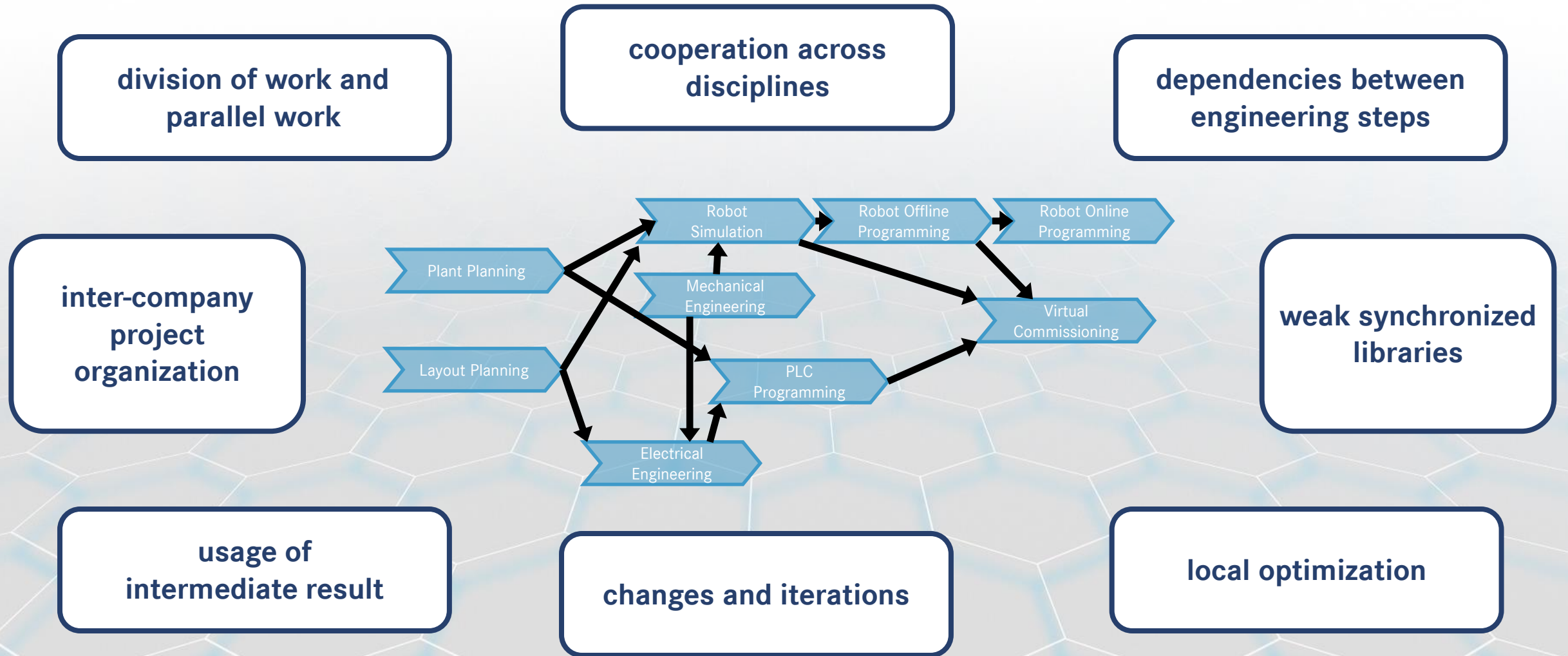
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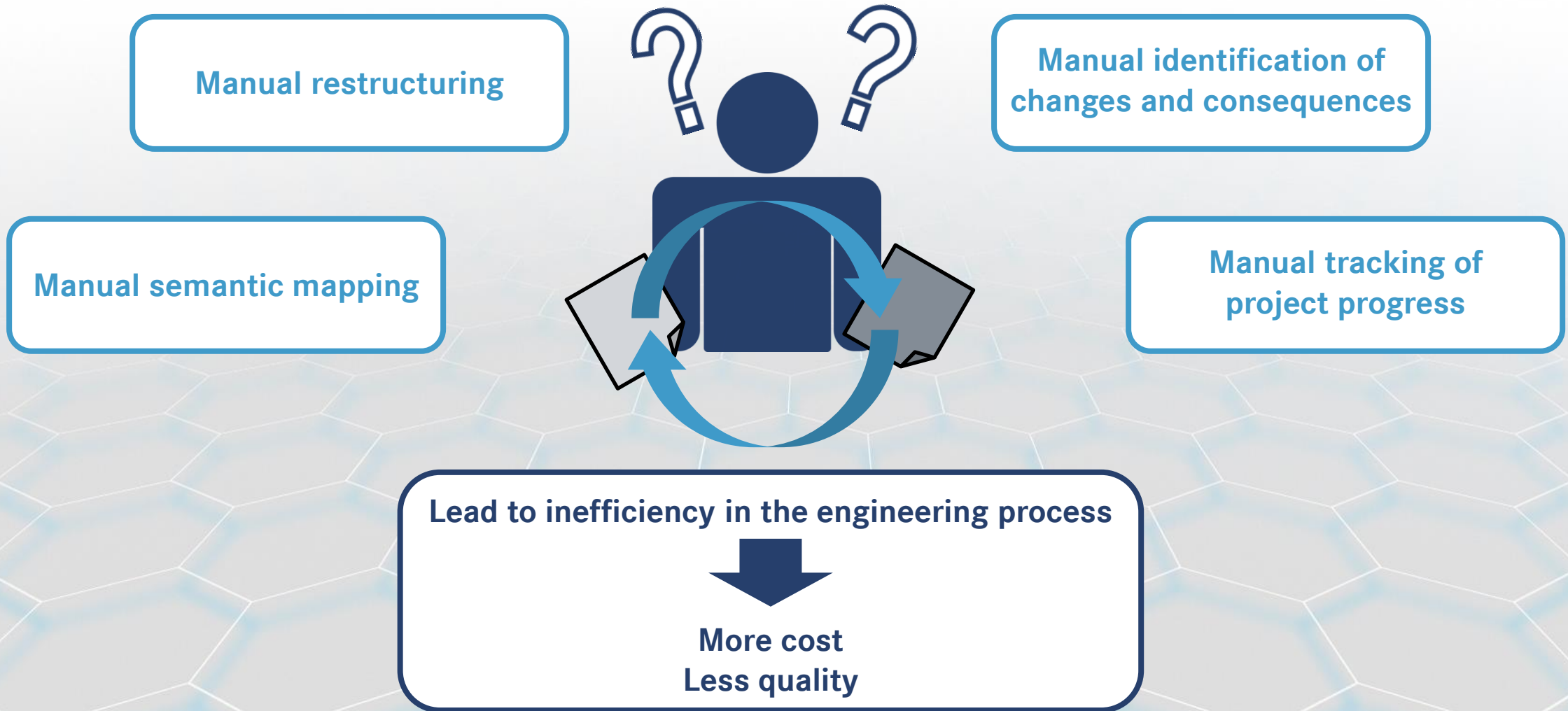
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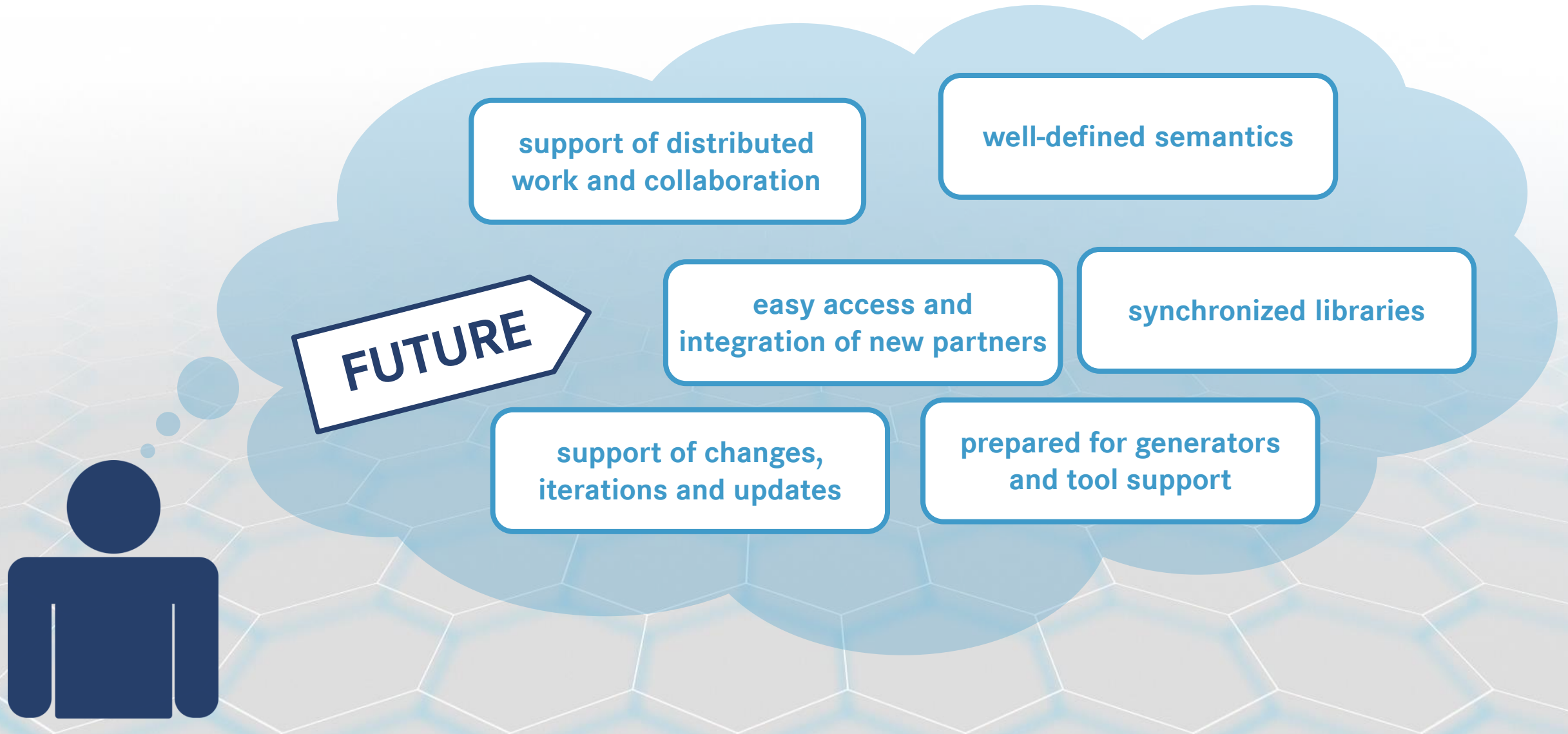
Engineering process today



Consequences



Expectations of a future engineering process



How to reach this?



Organization has to support the change

- Migration of the interfaces and processes
- New models of collaboration



Engineering-Tools have to support the mechanisms

- Stable IDs, mapping of tool-IDs and AutomationML-IDs
- Provide version and change information
- (configurable) mapping of internal semantics to standard semantics
- Support of merge, update and synchronization

<AutomationML/>

AutomationML offers the necessary basis

- Strong ID concept
- Versioning and change information
- Semantics for objects, attributes and relations

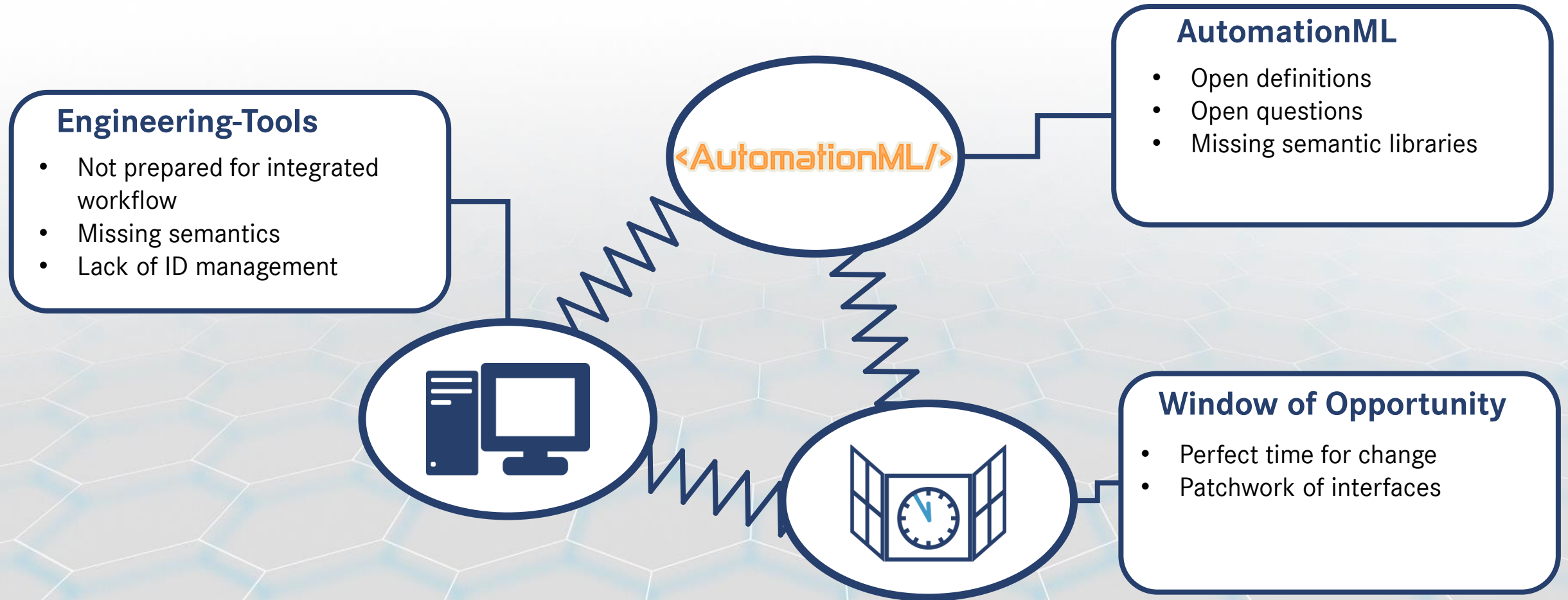
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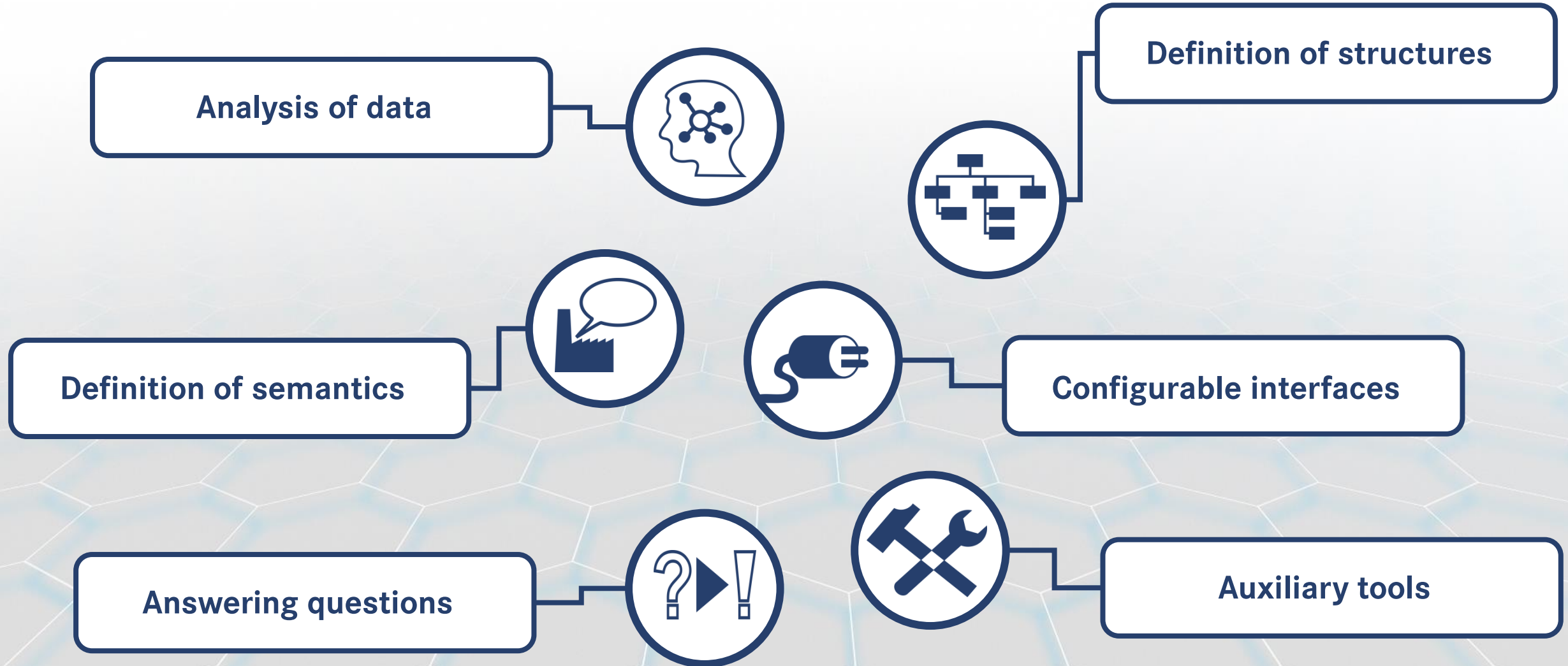
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Challenges



Approach to the implementation of AutomationML





Have the whole possible process chain in mind

Split subjects

Do not mix different subjects e.g. fluidics, electrics, geometry in one concept, but use the same approach on a high level.

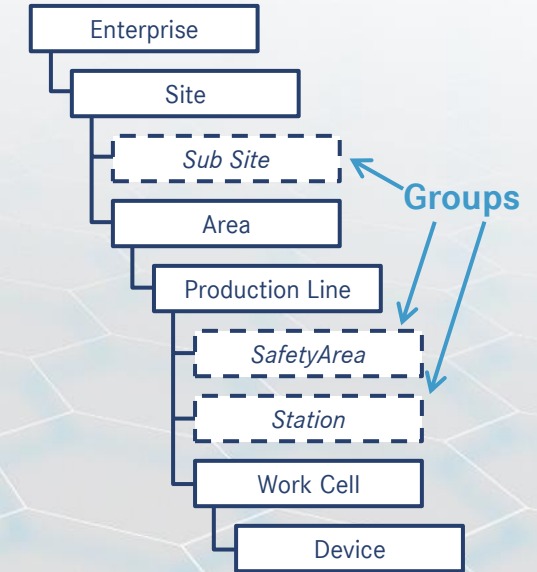
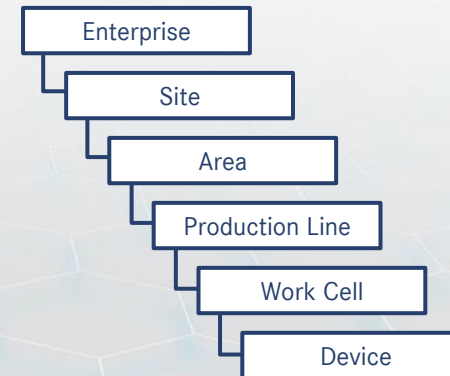
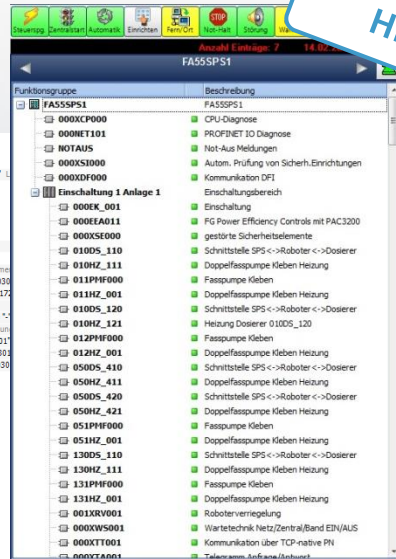
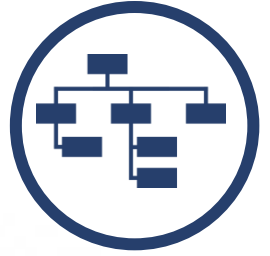
Consider levels of detail

Consider all level of details along the whole engineering process.
Engineering process adds more and more details, the concept should consider all the steps.

Split semantic & functionality

The concept should work without any semantic. The semantic of the objects and attributes should be defined in a second process, so that is easy to refine it.

Definition of structures

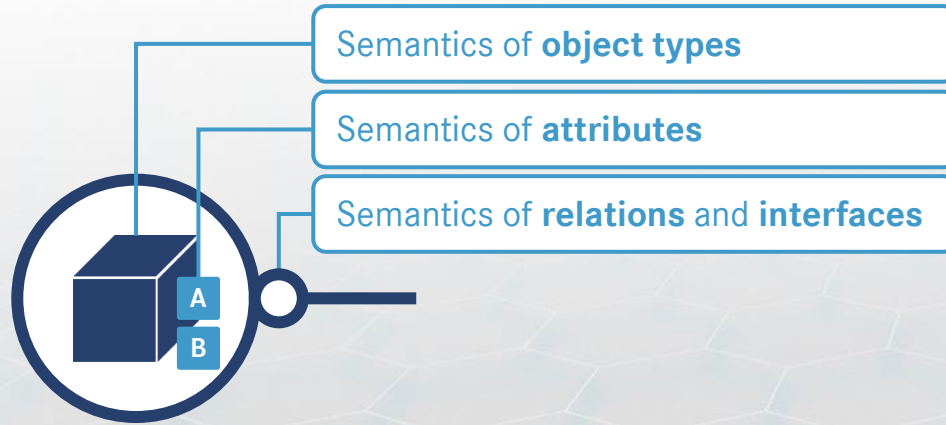


Line Documentation

- Different topologies lead to mapping effort.
- Relations between objects has to be rearranged
- Identification of objects hindered

- Usage of Structure, e.g. according IEC62264-1 as topology for all engineering disciplines, as well as for processes and products
- Complementation of topology with engineering discipline specific topology information using the AML group concept

Definition of semantics



- In every data exchange scenario define the object types, attributes, relations and interfaces.
- Define the characteristics of these as exactly as possible, like units, cardinality, ...
- Check, if the exchanged data entities are already defined in a standard and reference to this standard if appropriate
- Share your definitions



- Stepwise standardization of semantics from data exchange scenario up to cross company standardization (e.g. eCl@ss, IEC, ...)
 - Refinement during use and standardization
 - Reconfigure interface semantic after standardization
- ➔ Growing semantic library

Configurable interfaces and demands on tools



- Semantics develops at the time
- New classifications rise with new data exchange scenarios
- Lack of ID management

- Configurable interfaces to develop the semantics on attributes, interfaces and objects
- Internal Ident mechanisms has to be mapped on tools
- Tools must provide an ID management

Answering questions



- New requirements for new data exchange scenarios – how to solve?
- Questions on interpretation of AutomationML
- New ideas for usage of AutomationML

- AutomationML e.V. answers questions and provides one common interpretation of the standard
- New Scenarios and ideas are standardized and published as BPR
- ➔ One interpretation and solution for the same tasks

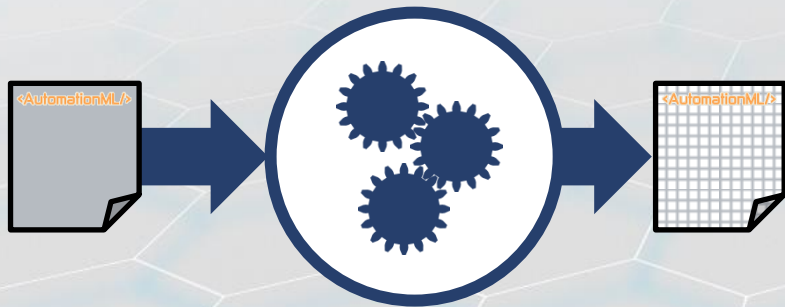
Auxiliary tools



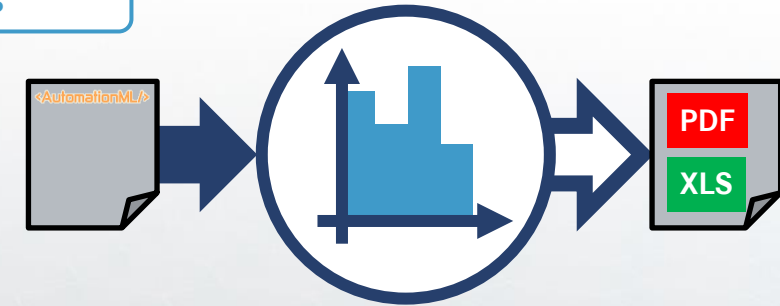
Validation



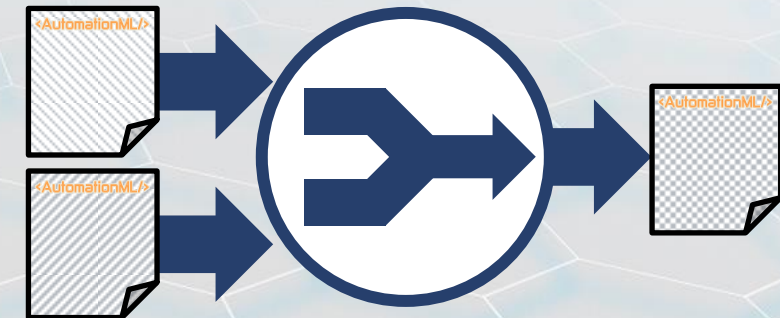
Rework / Preparation



Reporting

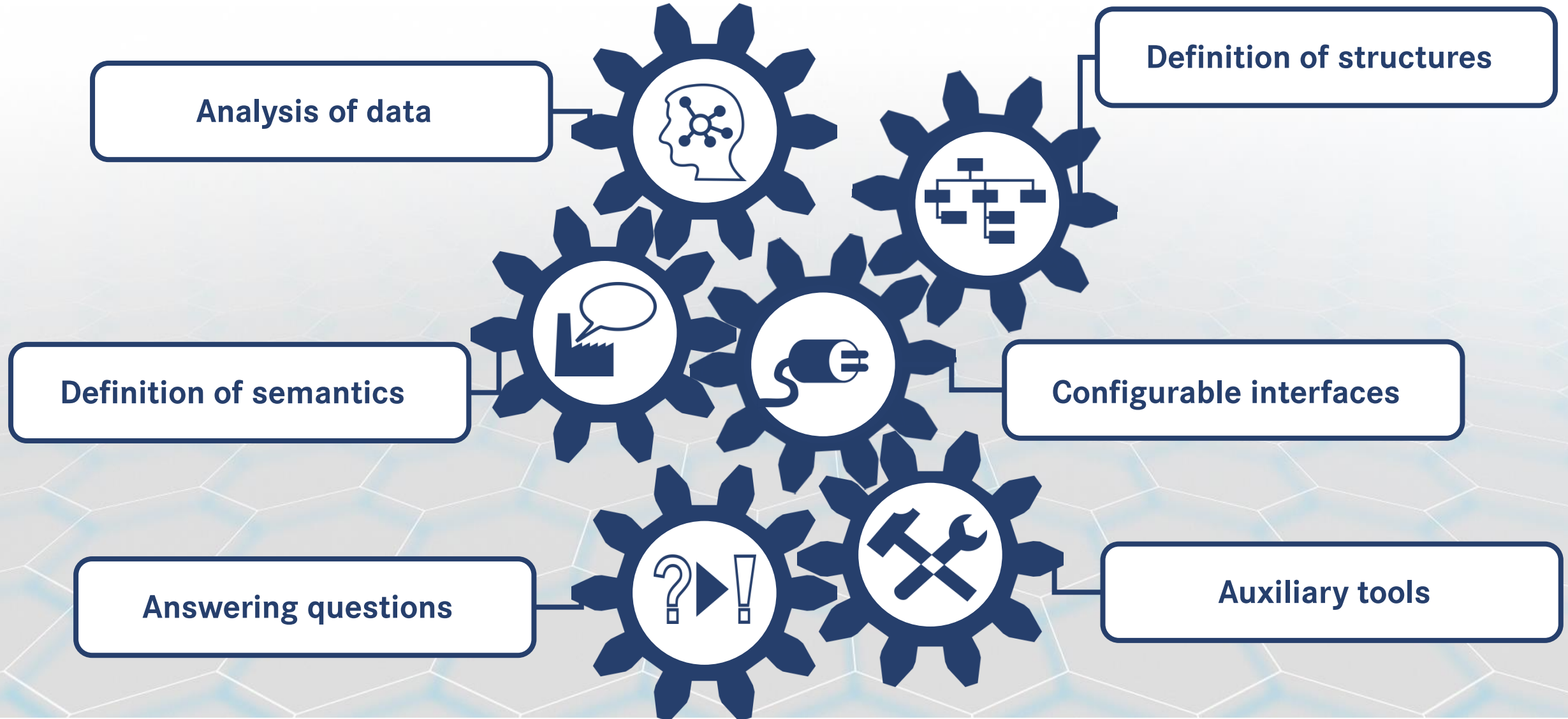


Merge

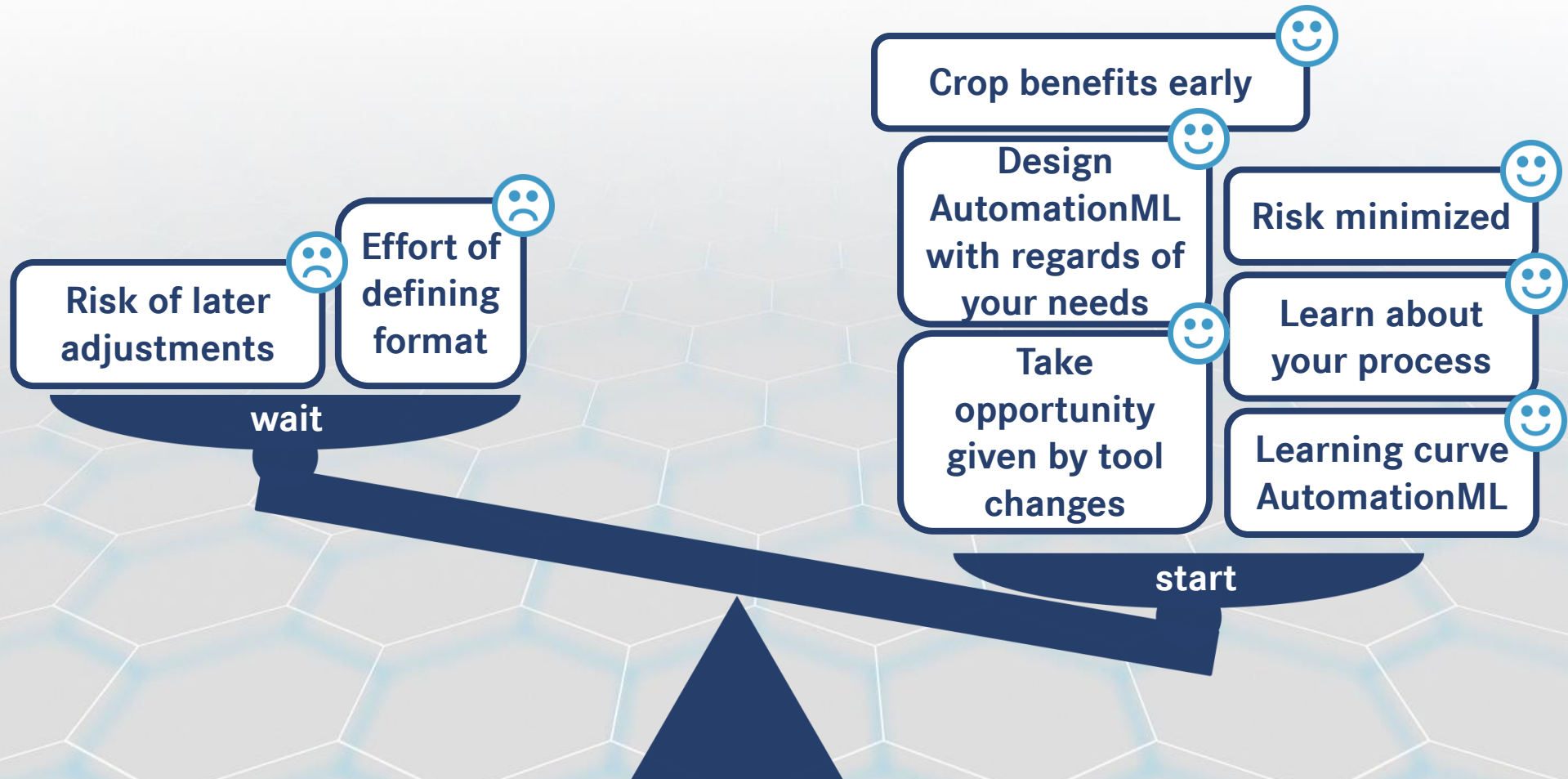


- Small tools help closing the gap by providing additional functionality the big tools have not implemented yet.
- The tools can be used for validation, merging, reporting, rework or prepare files, library management,

Overall picture of the approach



Don't wait using AutomationML





Start now!