

AutomationML at Daimler

Björn Grimm, PKL/AST, Böblingen, May 9th 2012



Mercedes-Benz

Agenda

Example 1: Pathfinder

Example 2: Production Monitoring and Control System

Example 3: Virtual Commissioning

Experiences

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Example 1: Pathfinder

Example 2: Production Monitoring and Control System

Example 3: Virtual Commissioning

Experiences

Pathfinder - Summary

Target application:

Automatic online generation of collision-free robot programs for alternating measuring purposes

Data-Exchange Scenario:

Export from Simulation Tool



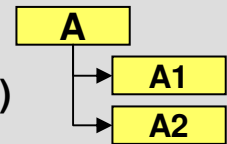
Import in Pathfinder

Status:

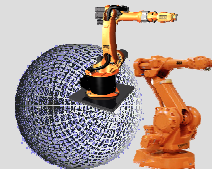
Preparation of Industrial Use

Usage of AutomationML

Top level format
IEC 62424 (CAEX)



Geometry and
kinematic format
COLLADA



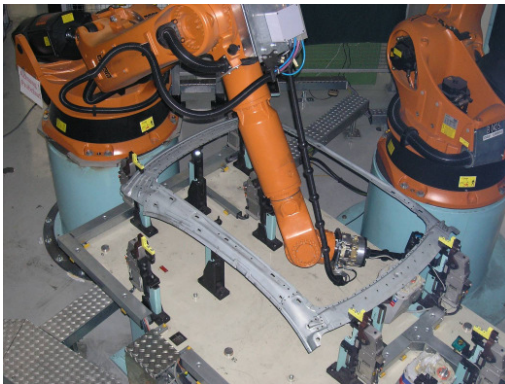
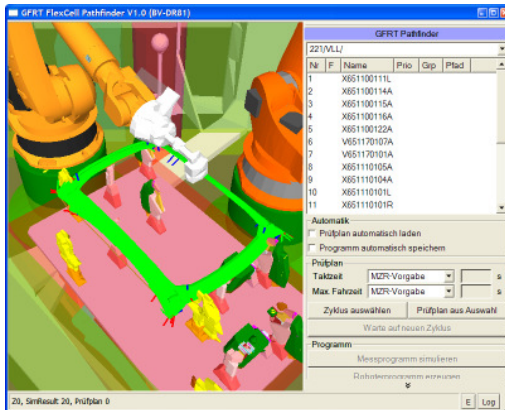
Logic format
PLCopen XML



Project specific
usage of
IEC 62424 (CAEX)



Pathfinder Application



Application

- Online generation of robot programs for altering measurement processes
- The program generator needs a 3D model of the cell

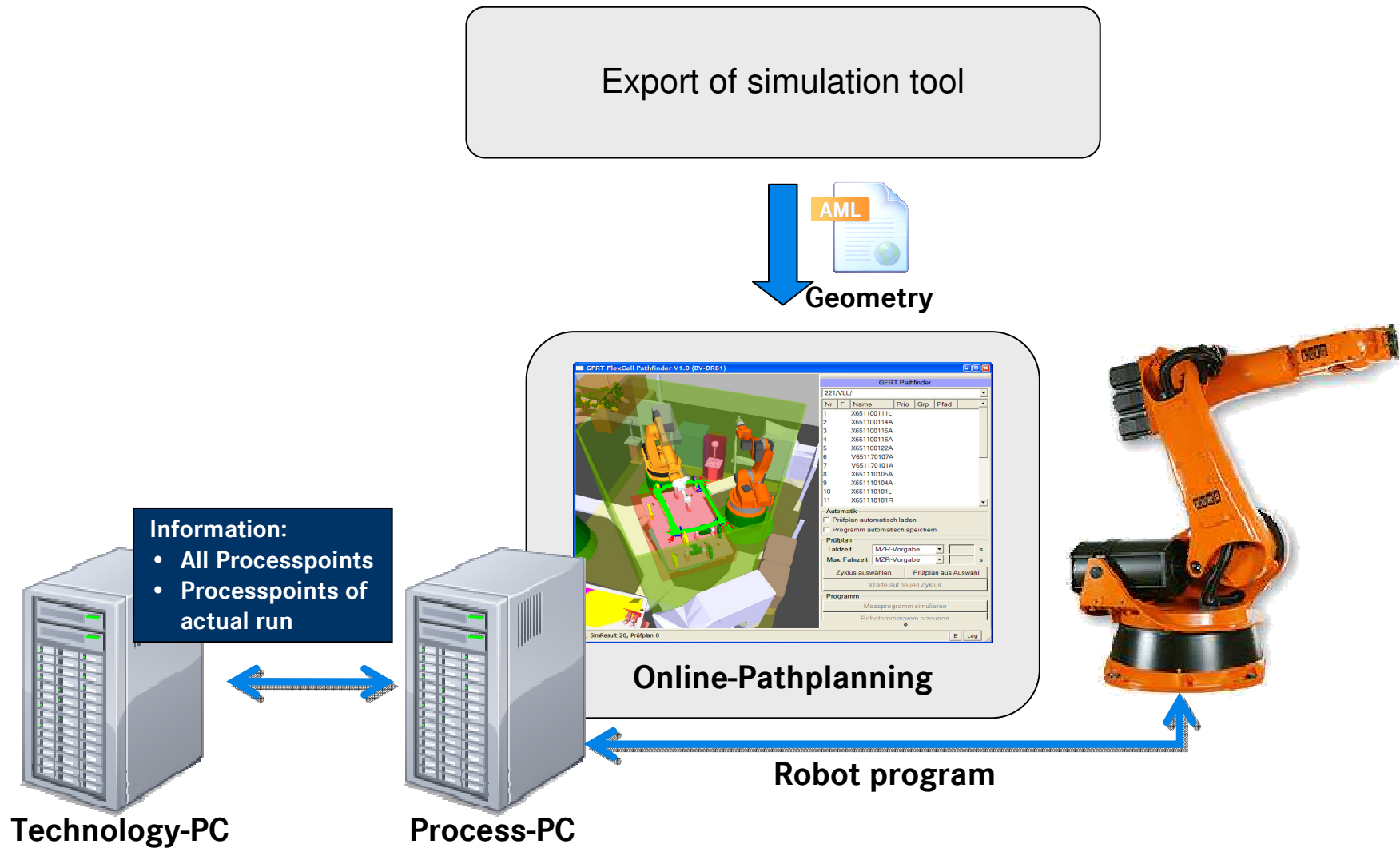
Benefits

- Variable measurement tasks without complex robot teaching

Benefits of AutomationML

- Quick and easy configuration of the 3D model

Pathfinder System architecture



Agenda

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Experiences

Production Monitoring and Control System - Summary

Target application:

**Visualization and
production control of plants**

Data-Exchange Scenarios:

**Export from Simulation Tool &
Control System**



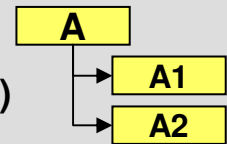
**Import in Production Monitoring and
Control System**

Status:

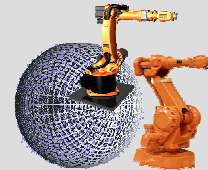
Proof of concept

Usage of AutomationML

**Top level format
IEC 62424 (CAEX)**



**Geometry and
kinematic format
COLLADA**



**Logic format
PLCopen XML**

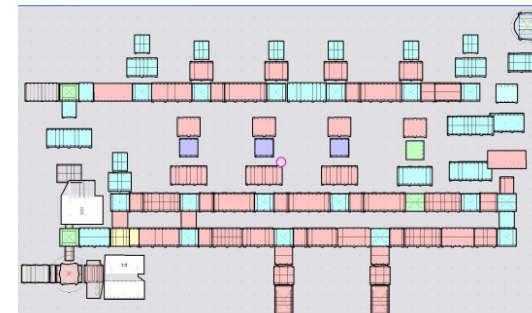
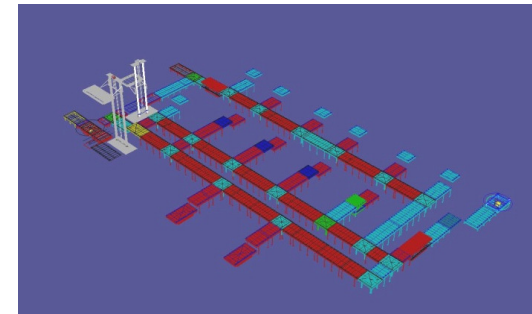
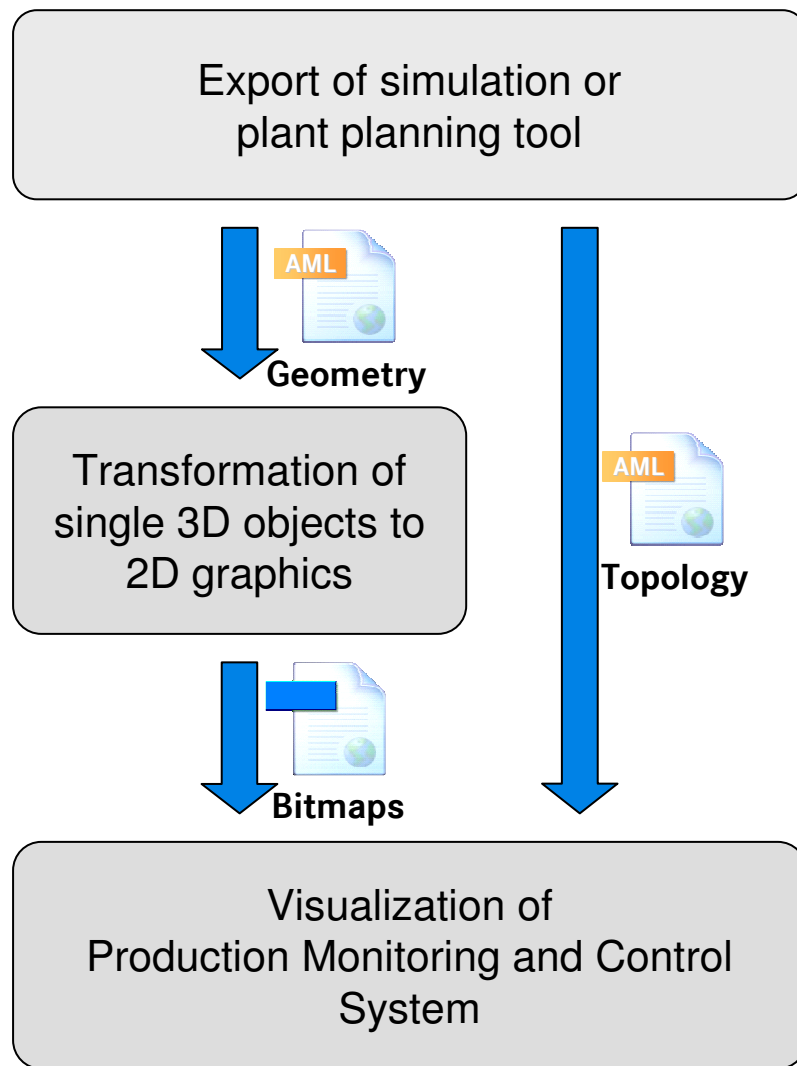


**Project specific
usage of
IEC 62424 (CAEX)**



Production Monitoring and Control System

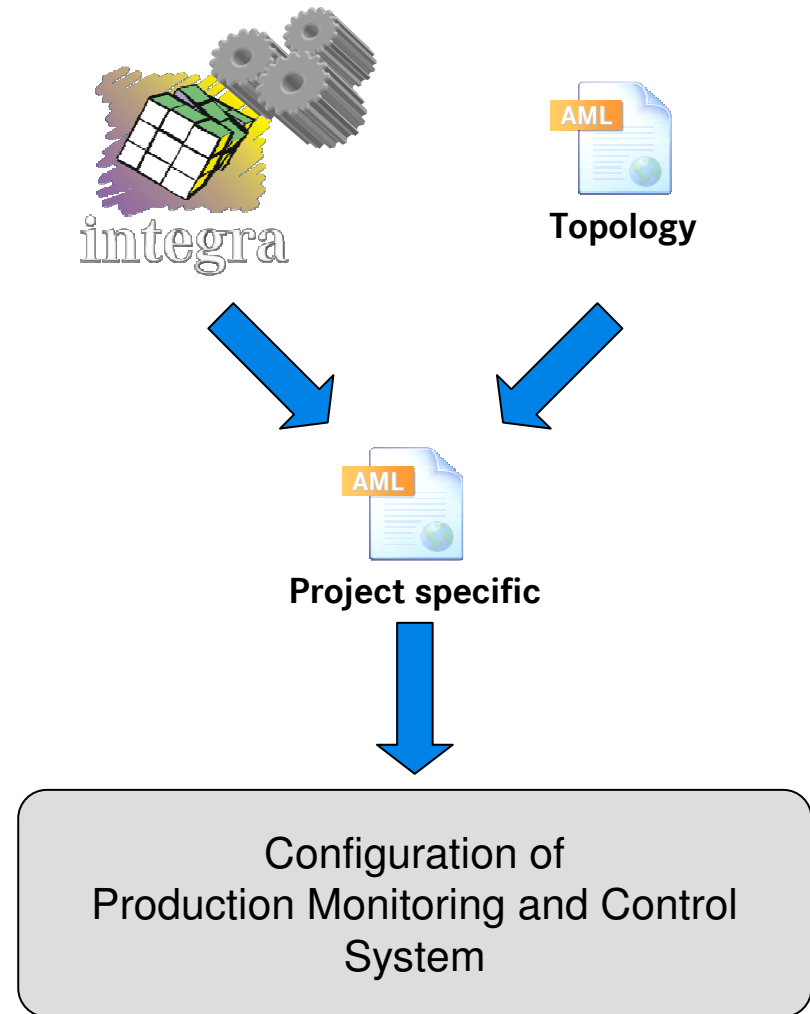
Geometry conversion for visualization



Production Monitoring and Control System

Transfer of signal interfaces

- Generation of signal interface list via integra tools
- Conversion of integra list to AutomationML, enrichment with topology information from geometry conversion process
- Configuration of signal interfaces and dynamic visualization aspects of production monitoring and control system



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Experiences

Virtual Commissioning - Summary

Target application:

**Validation of PLC and robot programs
in virtual commissioning**

Data-Exchange Scenario:

Export from Simulation Tool



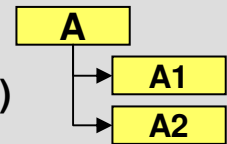
Import in Invision

Status:

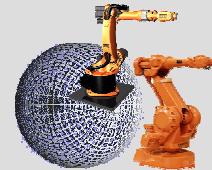
Industrial Use

Usage of AutomationML

Top level format
IEC 62424 (CAEX)



Geometry and
kinematic format
COLLADA



Logic format
PLCopen XML

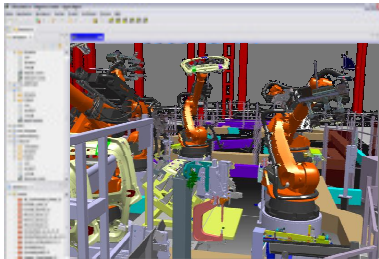


Project specific
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Virtual Commissioning

Topology, Geometry and Kinematics



- Export of topology, geometry and kinematics from simulation tool to AutomationML
 - Import of AutomationML in Invision
 - Allocation of internal object categories with the help of AutomationML roles
 - Preparation of automatic signal assignment
 - Automatic substitution of components with the help of roles and frames
- ➔ Speed-up of time to build models for the virtual commissioning

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Example 2: Production Monitoring and Control System

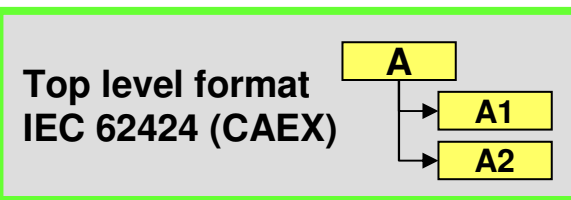
Example 3: Virtual Commissioning

Experiences

Experiences

Quality of the Data Format

- Data exchange with AutomationML was implemented and tested.
 - Topology with RoleClasses and Libraries
 - Geometry and Kinematics
 - User specific data
- The usage of the logic part is in preparation.
- The data exchange with AutomationML works well.
- Problems with the data format like specification lacks were reported and fixed in the standard.



Experiences

Efforts for AutomationML-Exporters and -Importers

Problems to be solved to implement the AutomationML exporter or -importer

- Mapping of tool specific data structures to AutomationML data structures
- Mapping of the tool specific object types to AutomationML role classes
- Specification of the hierarchical level of detail
- The usage of complex tools should follow design rules for content to get a defined data representation.

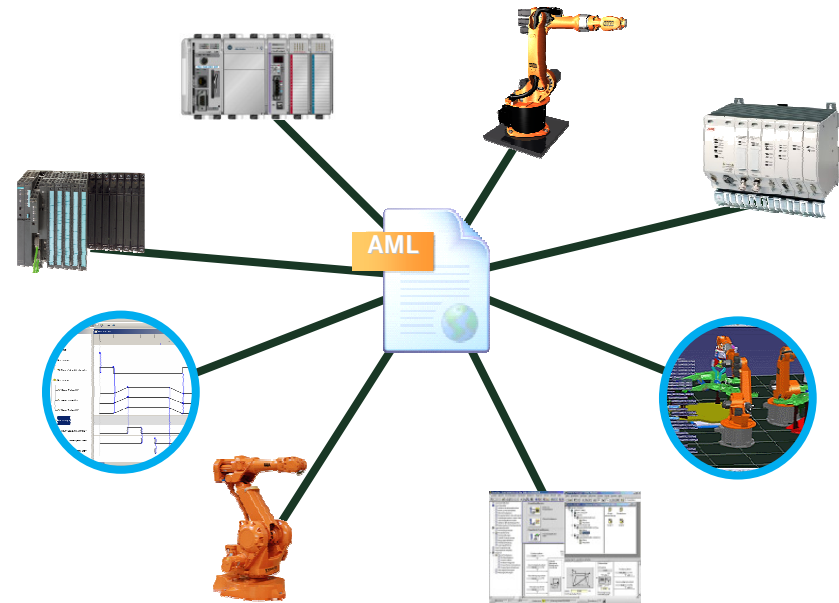


All the efforts are necessary for every interface or the usage of tools in engineering environment.

Experiences

Benefits of the usage of AutomationML

- No multiple manual input of data.
- Consistency check of the exported data is easier.
- Usage of XSLT and simple XML-tools possible.
- Diagnostic of data interfaces becomes easier.
- New tools and processes become feasible.



Summary and Outlook

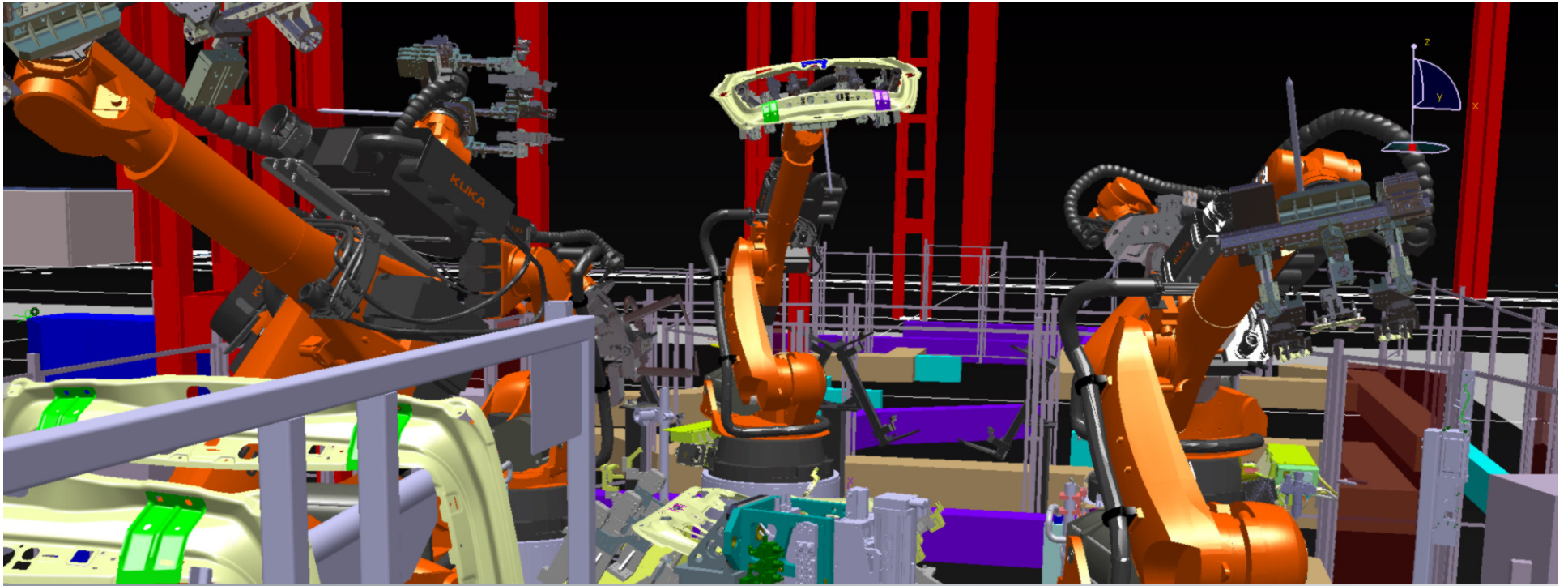
The first realized use cases showed, that AutomationML is able to become the glue for seamless automation engineering.

Using the data format shows the next tasks:

- Definition of data structures
- Linking of libraries
- Definition of semantics for objects and attributes

The data format is only the first step ...





Thank you



Mercedes-Benz