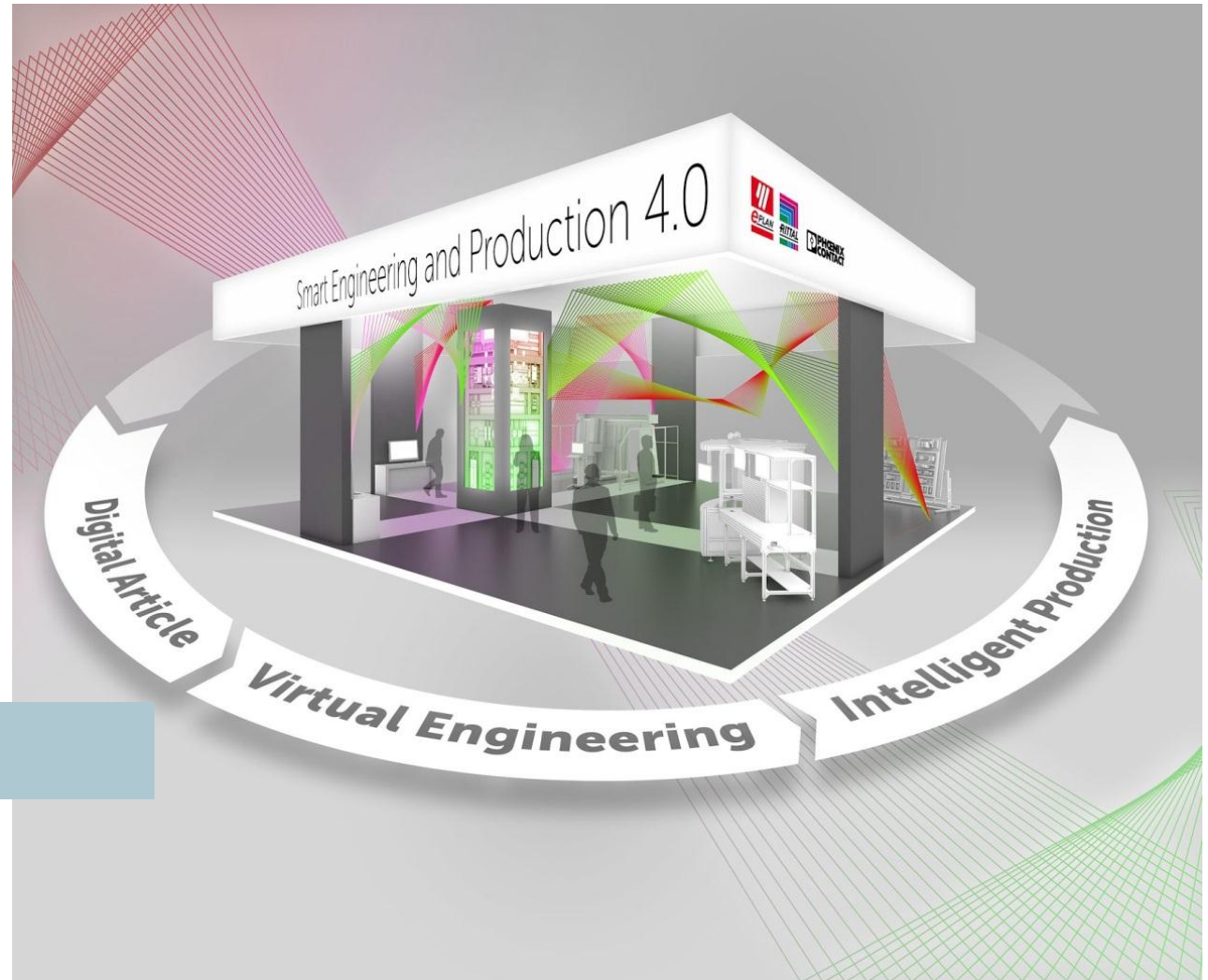


Smart Engineering and Production 4.0

AutomationML in use as digital product description



Olaf Graeser

Smart Engineering and Production 4.0

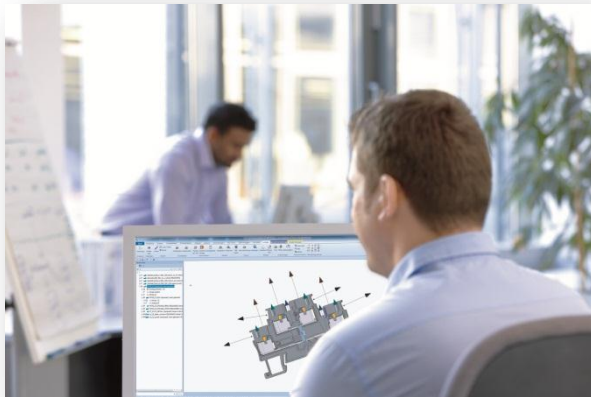
AutomationML in use as digital product description



Olaf Graeser

Goals of the *Smart Engineering and Production 4.0* cooperation

- Continuous Engineering
 - From the sketch of a terminal block to the planning of a switch cabinet and the automated assembly of the switch cabinet



Hanover Fair 2015

- Visitors
 - 322 memcons
 - 69 guided tours, 1302 persons

Stephan Weil
Ministerpräsident Niedersachsen



Prof. Dr. Johanna Wanka
Bundesministerin für Bildung und
Forschung



Challenge No. 1

- Providing engineering tools with digital models of components
- Providing digital models in several data formats
- Goal: one common data format for all engineering tools



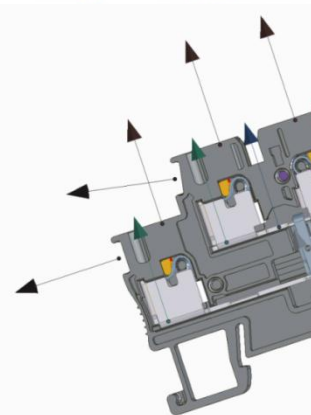
CLASSIFICATION AND PRODUCT DESCRIPTION

- 23 Machine element, fixing, mounting S
- 24 Office product, facility and technic, papeterie
- 25 General service
- 26 Energy, extraction product, secondary raw material and residue
- 27 **Electric engineering, automation, process control engineering S**
 - 27-01 Generator
 - 27-02 Electrical drive
 - 27-03 Transformer, converter, coil
 - 27-04 Power supply devices
 - 27-05 Accumulator, battery
 - 27-06 Cable, wire
 - 27-07 Medium voltage switchgear, system
 - 27-08 High voltage switchgear, system
 - 27-10 Network control technology
 - 27-11 Lighting installation, device
 - 27-13 Protection installation, device (electric)
 - 27-14 **Electrical installation, device**
 - 27-14-01 Electrical installation S
 - 27-14-02 Lightning protector (inner lightning protection) S
 - 27-14-03 Grounding installation
 - 27-14-05 Auxiliary heating (electr.) S
 - 27-14-07 Cable laying (not earth cable)
 - 27-14-09 Installation pipe/cable protection tube (electr. installation) S
 - 27-14-11 **Terminal (not overhead line) S**
 - SSP 27-14-11-03 Terminal for luminaire S
 - SSP 27-14-11-04 Screw less terminal S
 - SSP 27-14-11-05 Terminal (main, branch) S
 - SSP 27-14-11-06 Single- and multi-pole terminal strip S
 - SSP 27-14-11-10 Distribution terminal for transformer
 - SSP 27-14-11-16 Fuse terminal block S
 - SSP 27-14-11-20 **Feed-through terminal block S**
 - SSP 27-14-11-24 Distribution connector
 - SSP 27-14-11-25 Multi level installation terminal block S

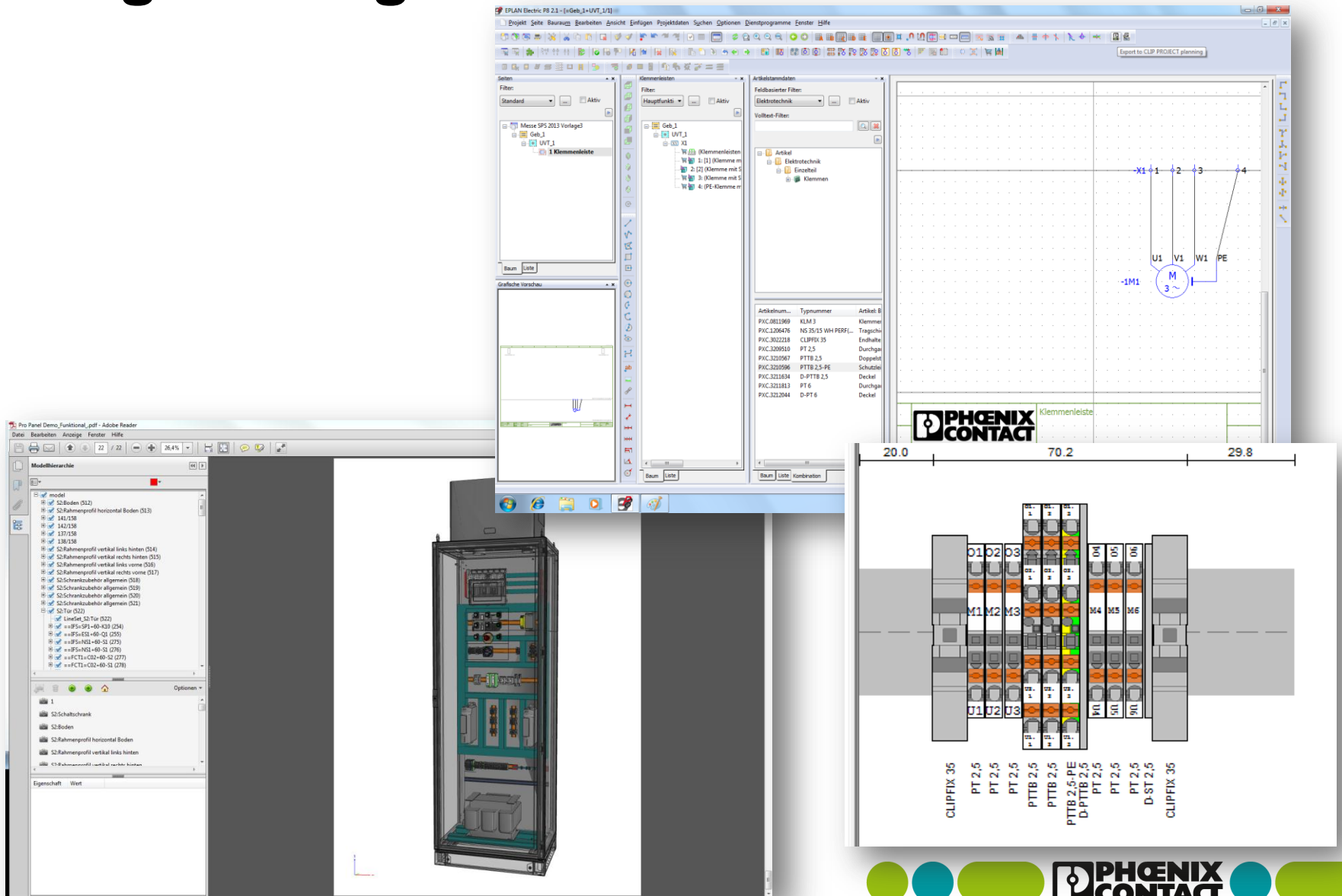
Properties:

- [0173-1#02-AAQ326#001](#) - additional link address
- [0173-1#02-AAD931#004](#) - customs tariff number (TARIC)
- [0173-1#02-AAO663#002](#) - GTIN
- [0173-1#02-AAO677#001](#) - Manufacturer name
- [0173-1#02-AAO676#002](#) - Manufacturer product number
- [0173-1#02-AAP805#002](#) - Product name
- [0173-1#02-AAO847#002](#) - Product type description
- [0173-1#02-AAO735#002](#) - Supplier name
- [0173-1#02-AAO736#003](#) - Supplier product number
- [0173-1#02-BAD774#008](#) - Closing plate required
- [0173-1#02-BAG640#006](#) - Assembly type
- [0173-1#02-BAA351#011](#) - Color
- [0173-1#02-BAC140#008](#) - Combustibility class
- [0173-1#02-BAC034#009](#) - Connection type
- [0173-1#02-BAC375#009](#) - Connection type 2
- [0173-1#02-BAC476#006](#) - height at lowest possible mounting
- [0173-1#02-BAD124#010](#) - Explosion tested design (EEx e)
- [0173-1#02-BAA018#005](#) - Length
- [0173-1#02-AAB787#006](#) - max. connectable conductor cross-section fine wire with conductor
- [0173-1#02-BAC487#009](#) - material of insulation
- [0173-1#02-BAD123#008](#) - Levels internally bridged
- [0173-1#02-AAB789#006](#) - max. connectable conductor cross-section multiple wire
- [0173-1#02-BAC676#006](#) - Max. line cross section, flexible
- [0173-1#02-BAC677#006](#) - Max. line cross section, rigid
- [0173-1#02-BAC821#005](#) - Max. operating temperature

Exemplary representation



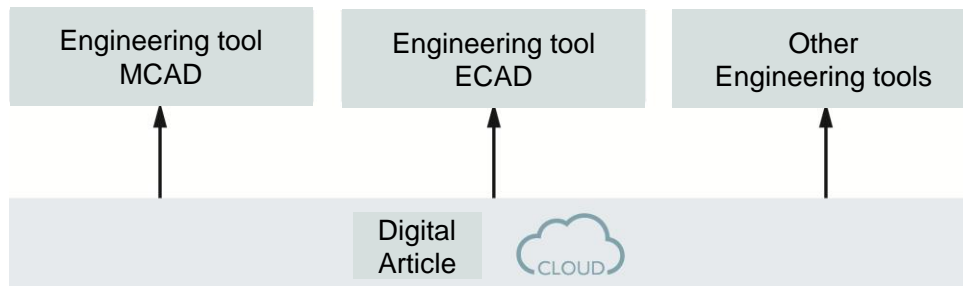
Engineering



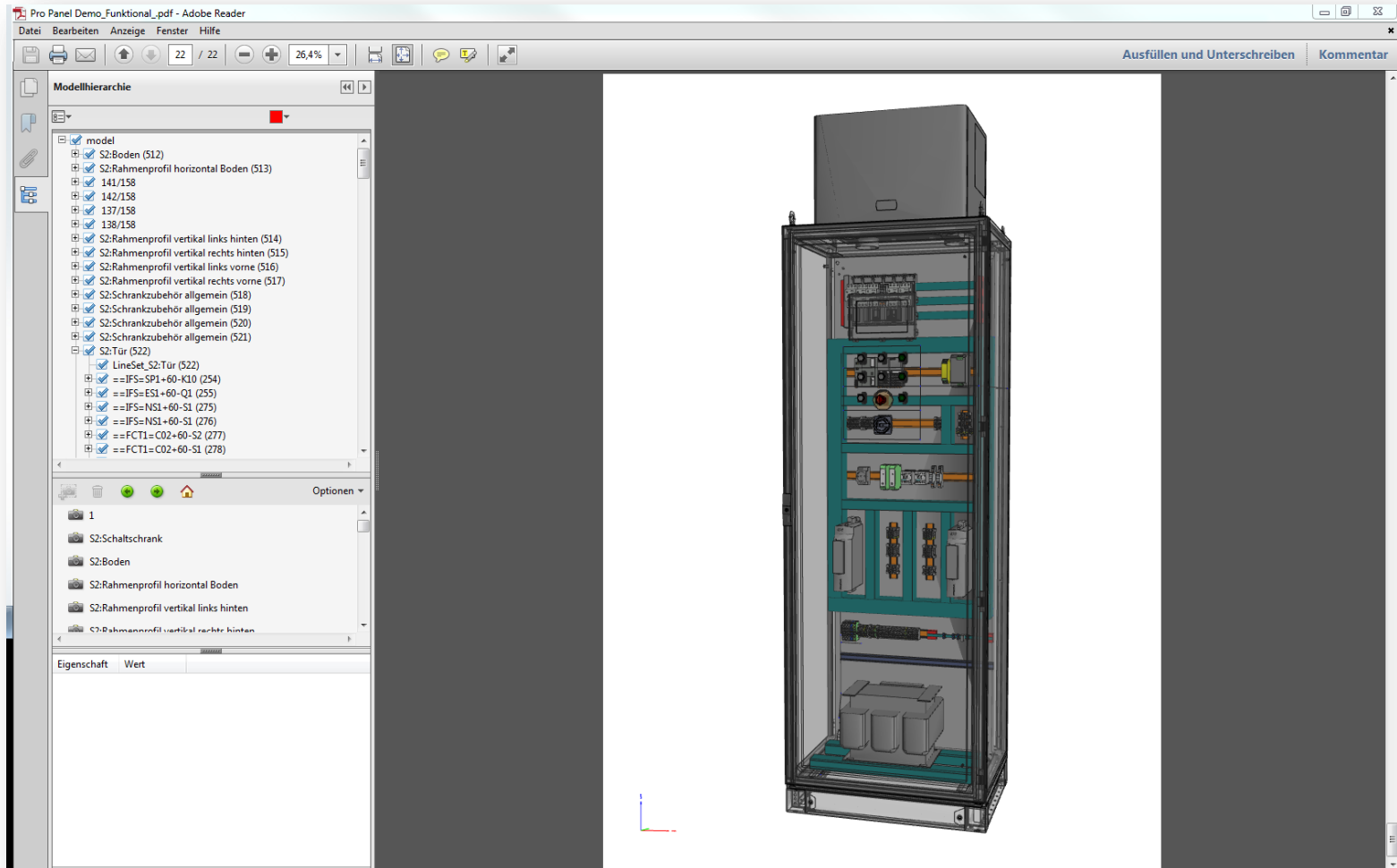
Engineering

- Component manufacturer provide digital models of their components
- Engineering tools import these digital articles

common semantics!



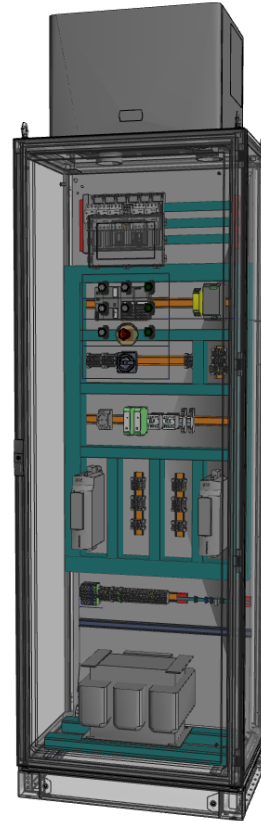
Engineering – ECAD, MCAD and other



Challenge No. 2

- Goal:
The virtual prototype

How can we describe one virtual prototype, so that it can be used by different engineering tools?



Challenge No. 2

<AutomationML/>

Data formats for a digital product description

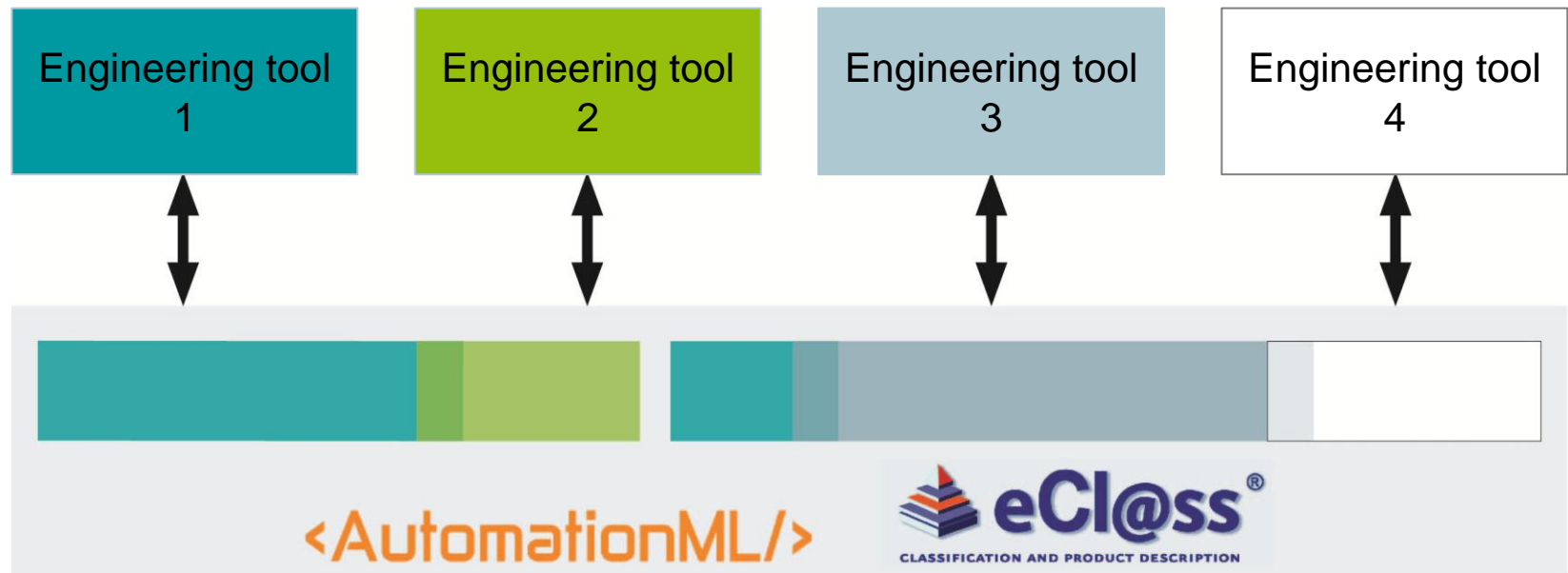
- Description of relations
 - plug on terminal block
 - Din rail mounted in switch cabinet

<AutomationML/>

- Definition of semantics
 - What kind of devices?
 - What are the typical and comparable attributes?



A common data format for data exchange



Industrie 4.0 example – ClipX

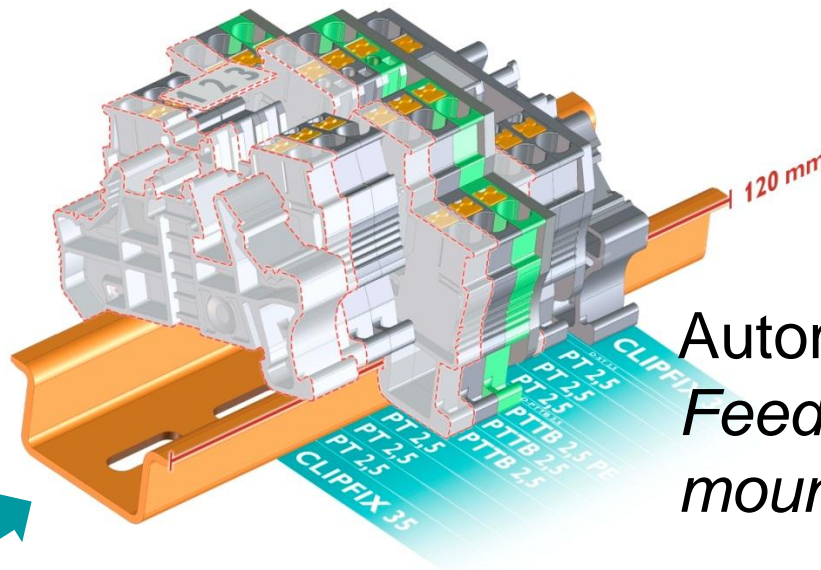


Industrie 4.0 example – ClipX

- Virtual prototype with AutomationML and eCI@ss

27-14-11-20

Feed through terminal block



AutomationML:

Feed through terminal block mounted on a DIN rail

27-40-06-02 DIN rail

Terminal Block mounting device necessary

Industrie 4.0 example – ClipX



Next steps

- AutomationML and eCI@ss as recommended data formats by the Plattform Industrie 4.0
- Modelling of a complete switch cabinet