DIMA

Decentral Intelligence for Modular Applications

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Industrial Ethernet

Awards

The first global concept for the automation of modular production plants

2015: 1. Place of ACHEMA Award Process Industry (Germany DECHEMA)

2015: 2. Place in the competition for the best Webinar (Germany Vogel Verlag)

2016: 2. Place in the competition for the best White Paper (Germany Vogel Verlag)

2016: 1. Place Food & Beverage Award Industry 4.0 (UK)

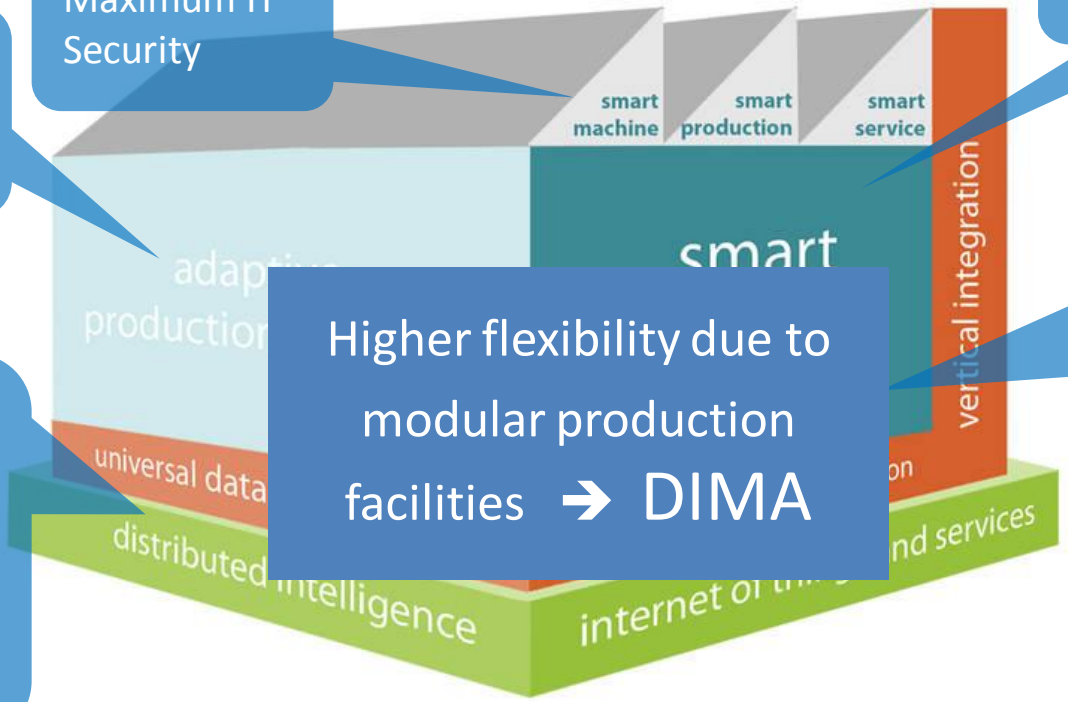
2016: 1. Place in the category most innovative Product for Industry 4.0 (Germany ZVEI, VDE)

Requirements of Industry 4.0

Networking of all components

Maximum IT Security

Internet connectivity



Higher flexibility due to modular production facilities ➔ DIMA

Sensors/ actors in all levels down to the product and into the product

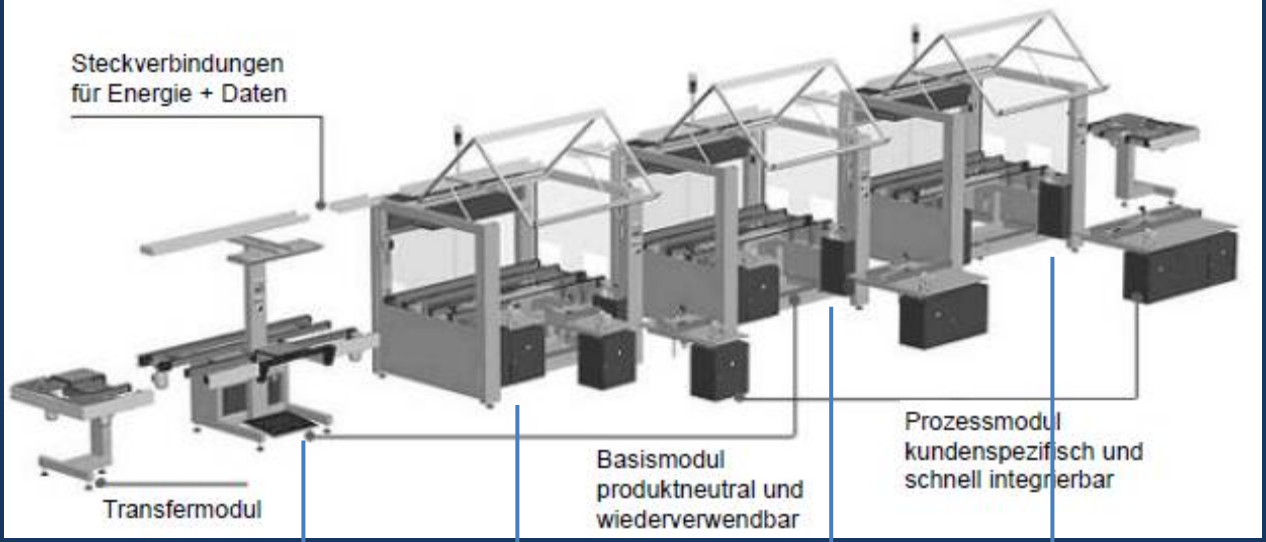
Higher flexibility through a modular production with modular automation

Typical Factory Production Plant

Versatile production plants

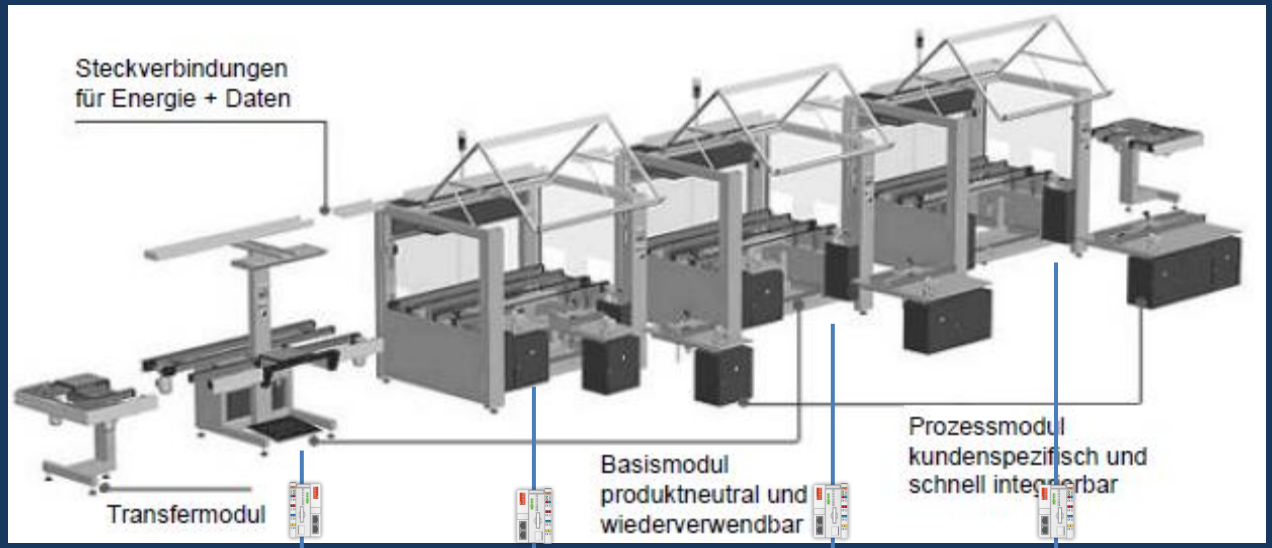
… are constructed modulary…

… the automation not.

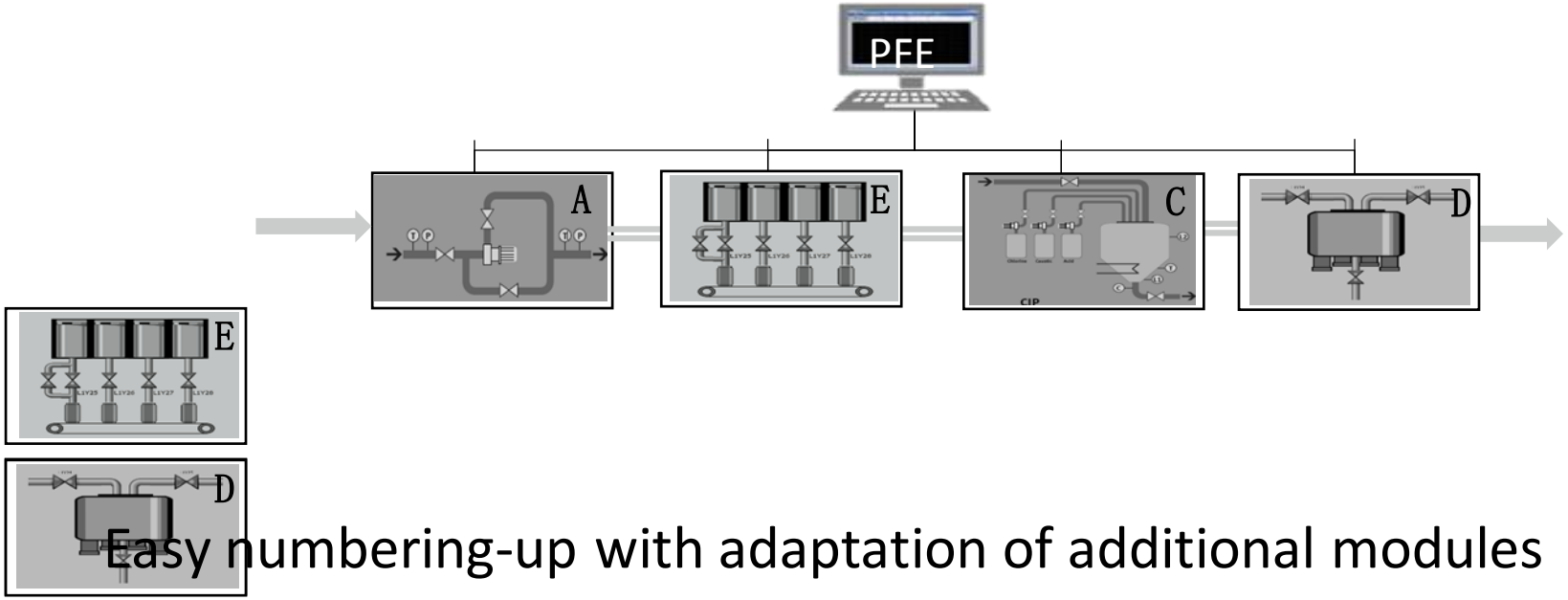


DIMA offers efficient adaption

Versatile production plants should consist of modules with *seperate, decentralised automation*. This is essential for an efficient and fast changing production plant.

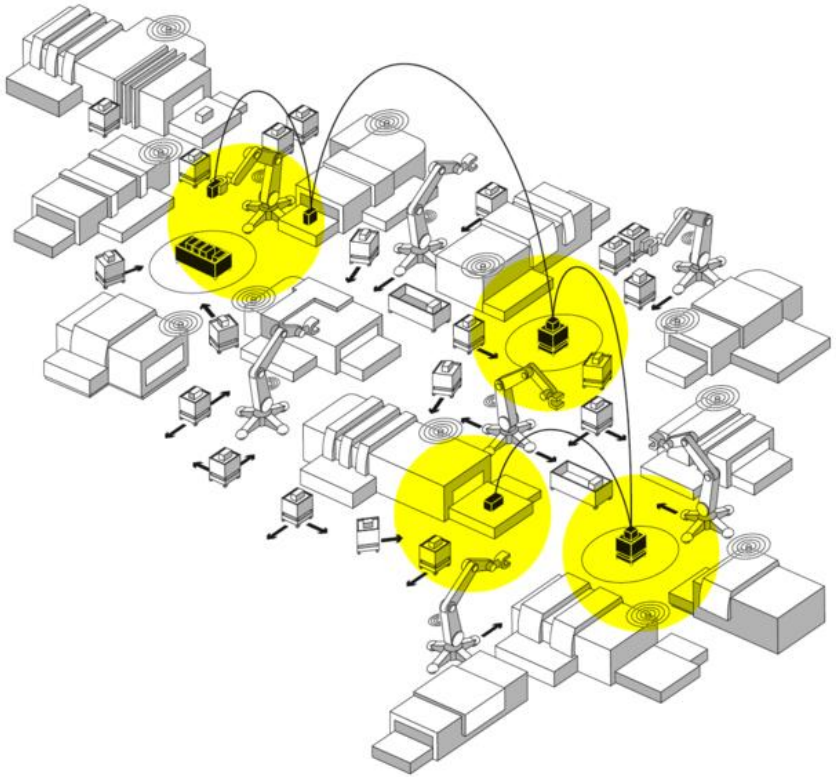


Numbering-Up as opposed to Scale-Up



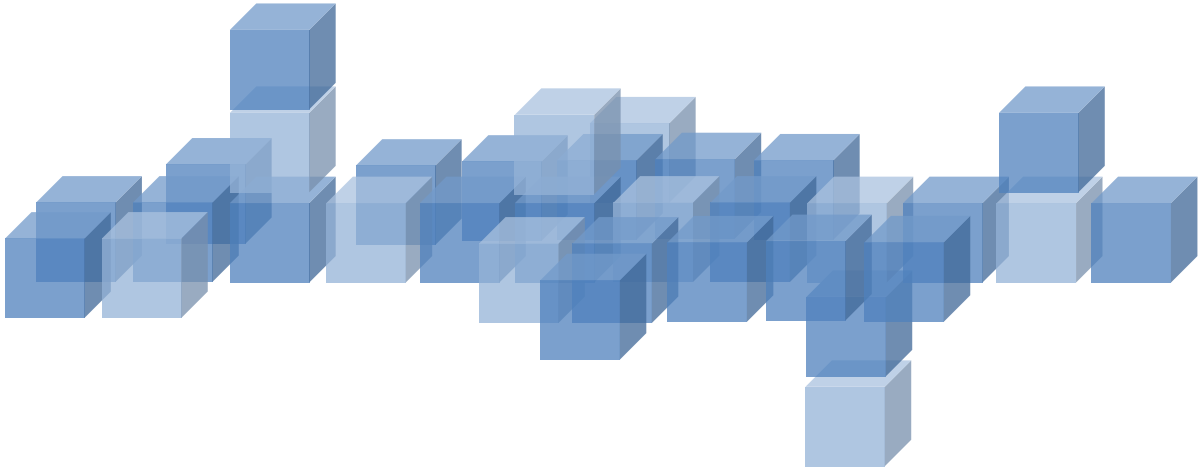
Easy numbering-up with adaptation of additional modules

Basic requirements for modular plants

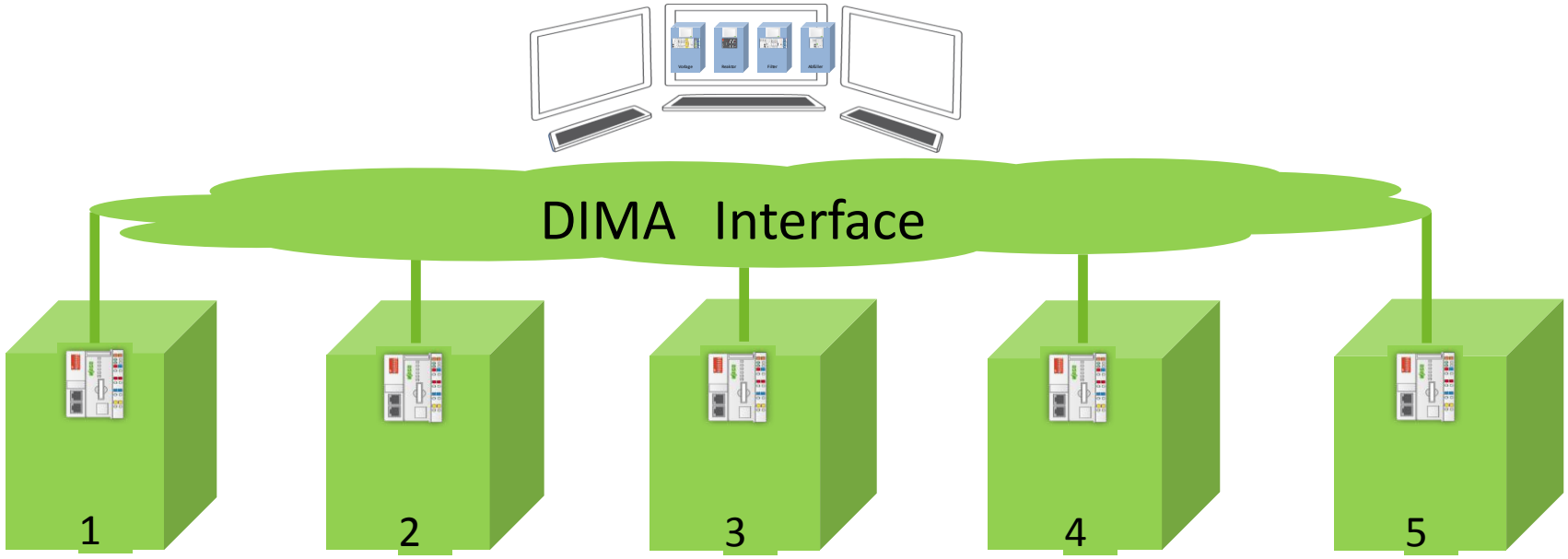


- Each production module needs ….
  - his own automation intelligence
  - an open manufacturer independent interface to the control level
  - his digital twin in the control level
  - a quick adaption to the control level

DIMA



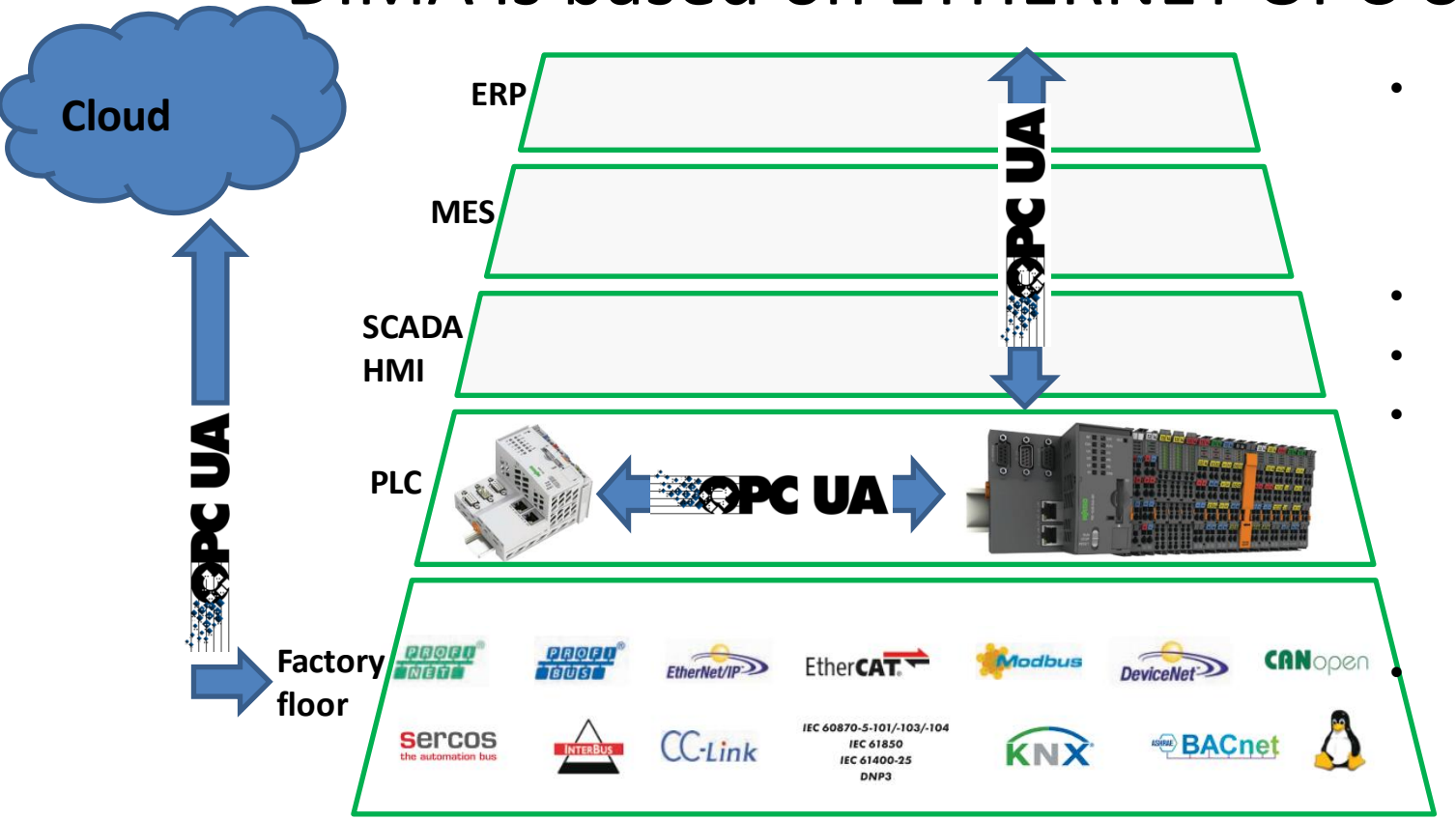
Open DIMA Interface



Services Oriented Architecture

opens the dynamic coupling of modules with little engineering

DIMA is based on ETHERNET OPC UA

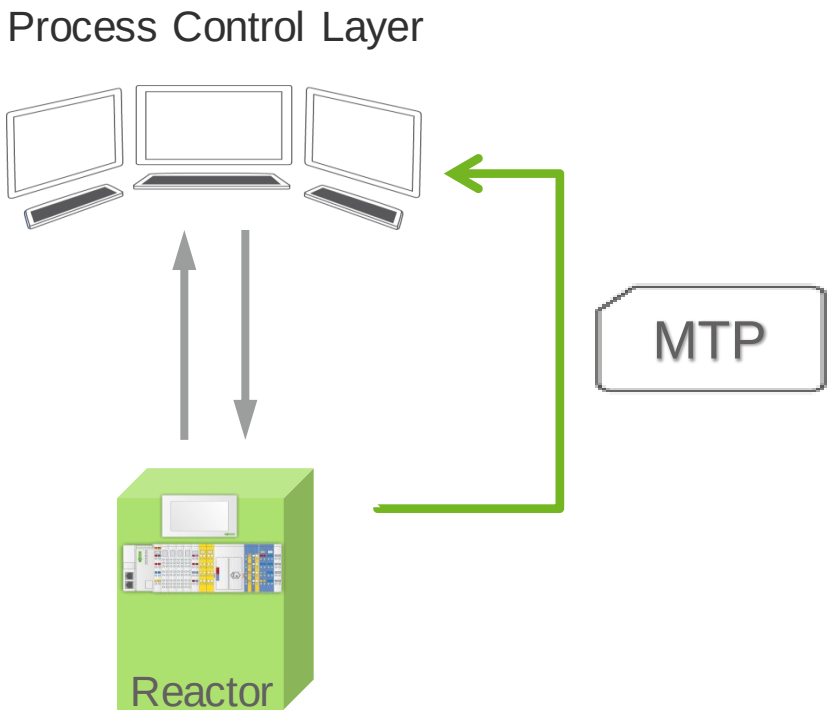


- OPC UA will be the upcoming standard for factory and process automation
- Based on TCP/IP
- Controller independent
- Consistent communication between different levels like Control, HMI, MES, Cloud, etc.
- Communication standard for Industry 4.0

Process Control Level needs to know the Module Functions

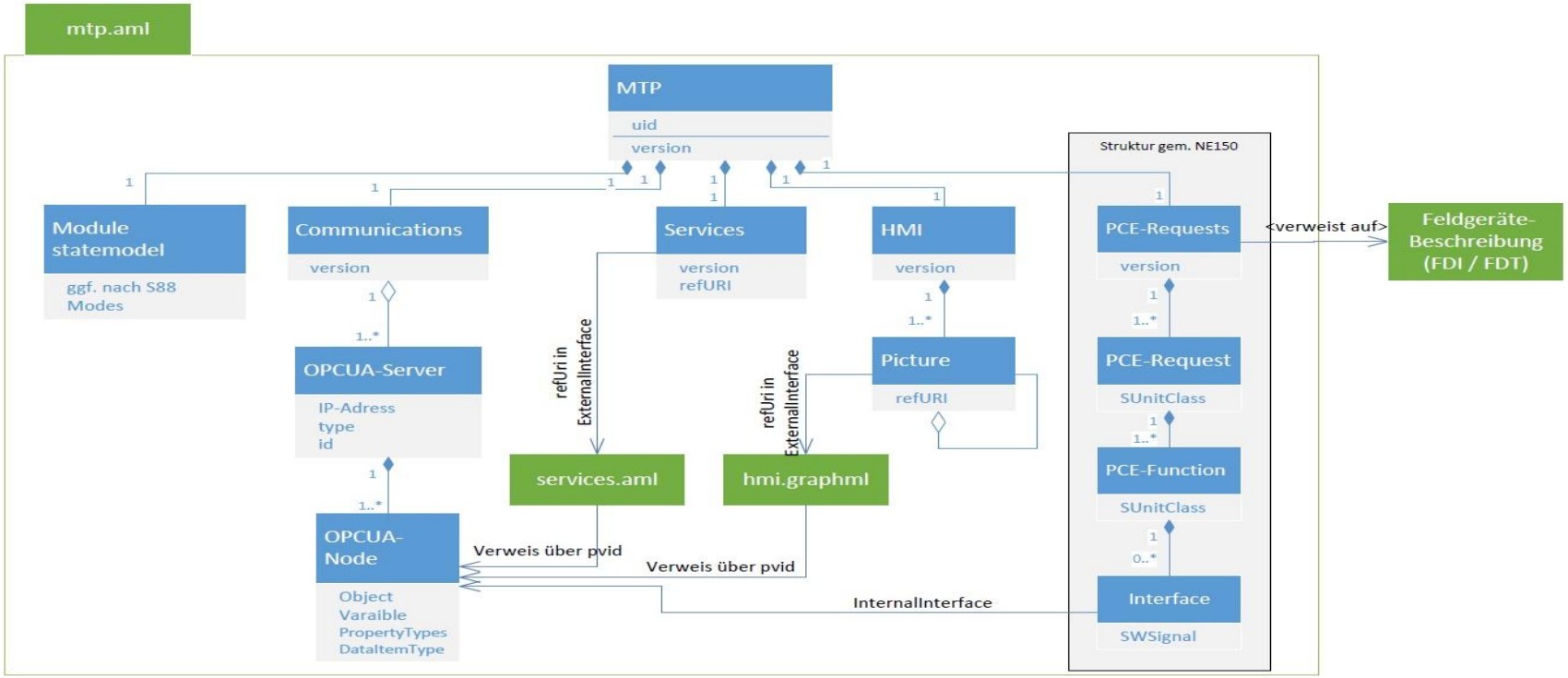
Compulsory skill descriptions of a module:

- Description of the service which the module offers
- information for visualizing the HMI of a module
- enabling the communication between PCL and modules
- providing a module documentation
- device information to parameterize

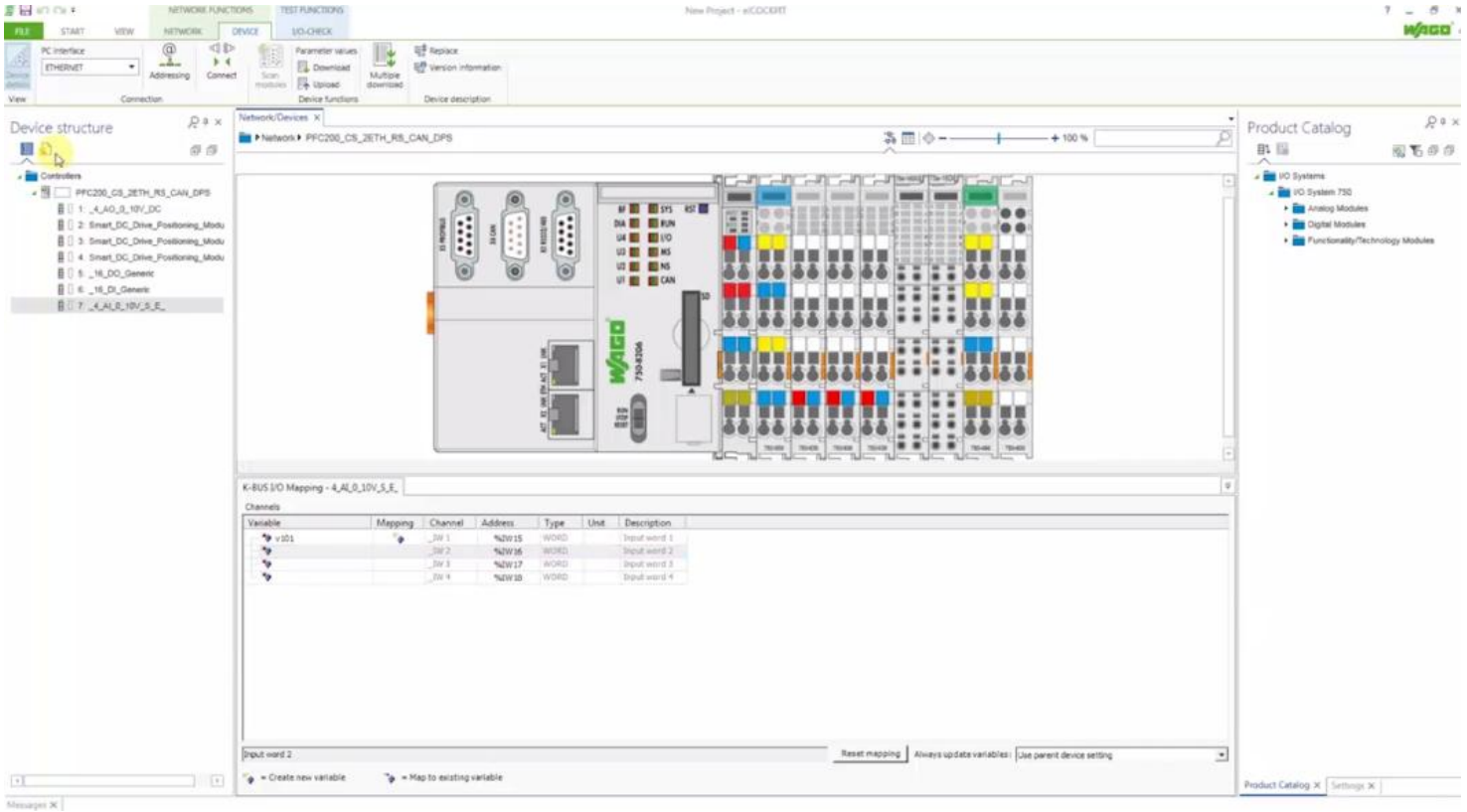


Digital Description of the Module – MTP

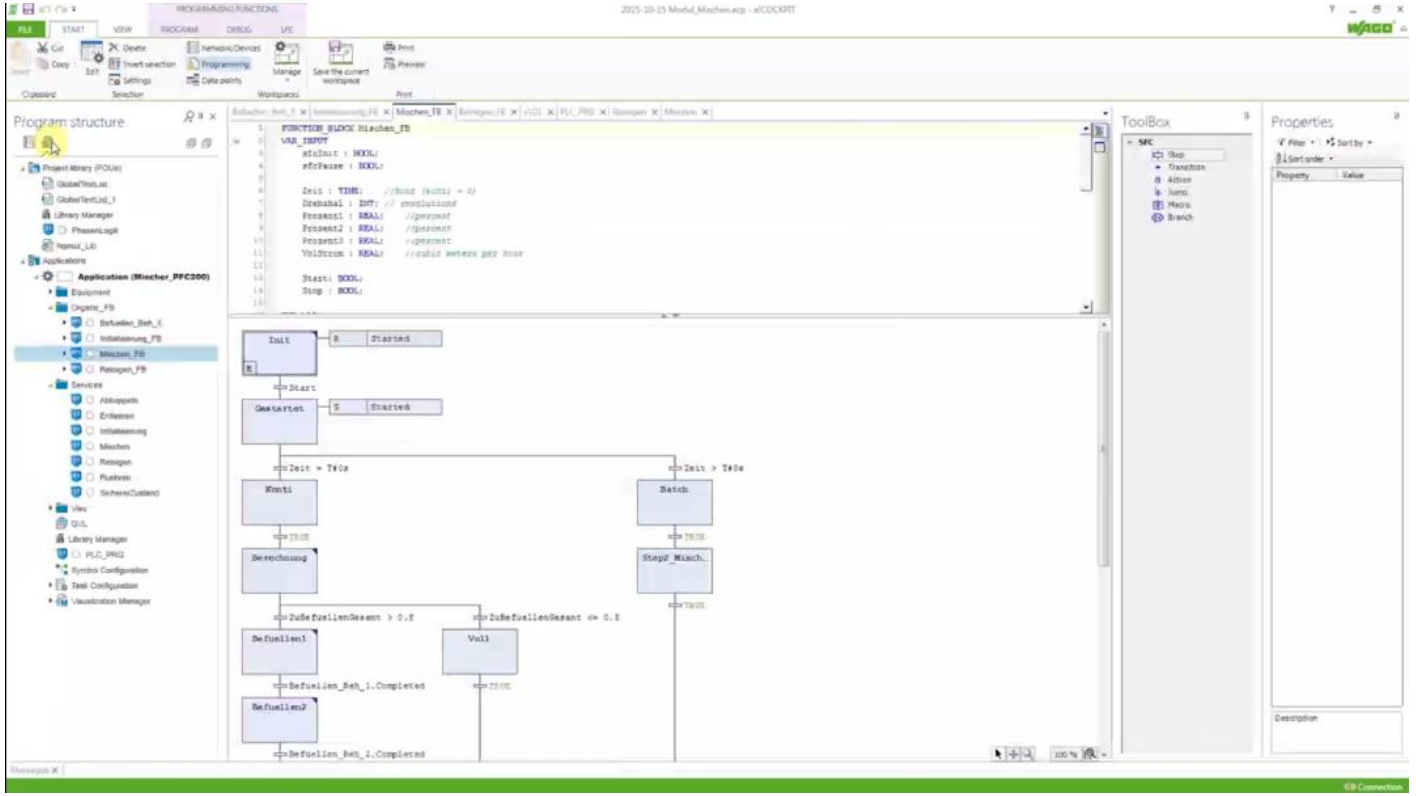
(Module Type Package)



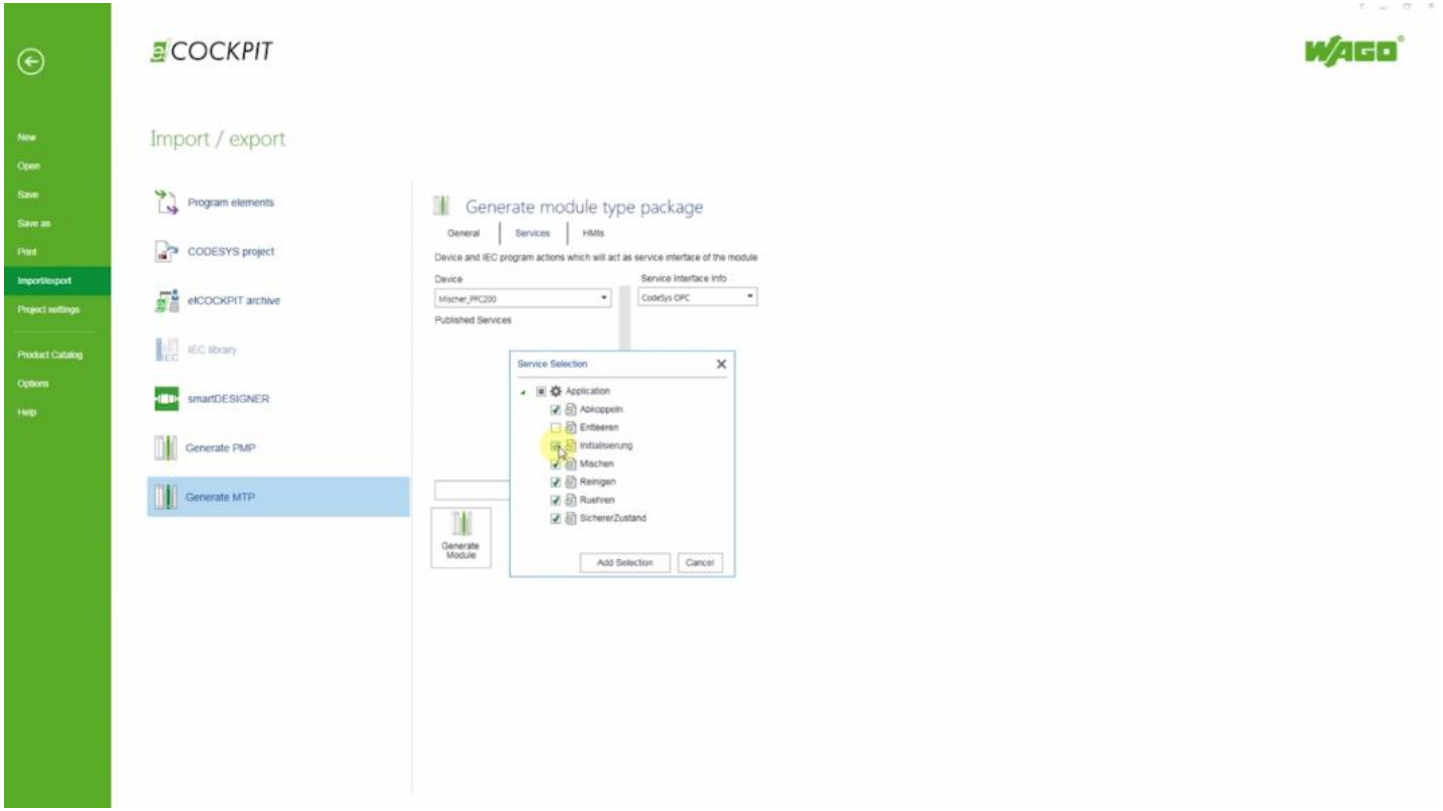
Engineering: Module Programming



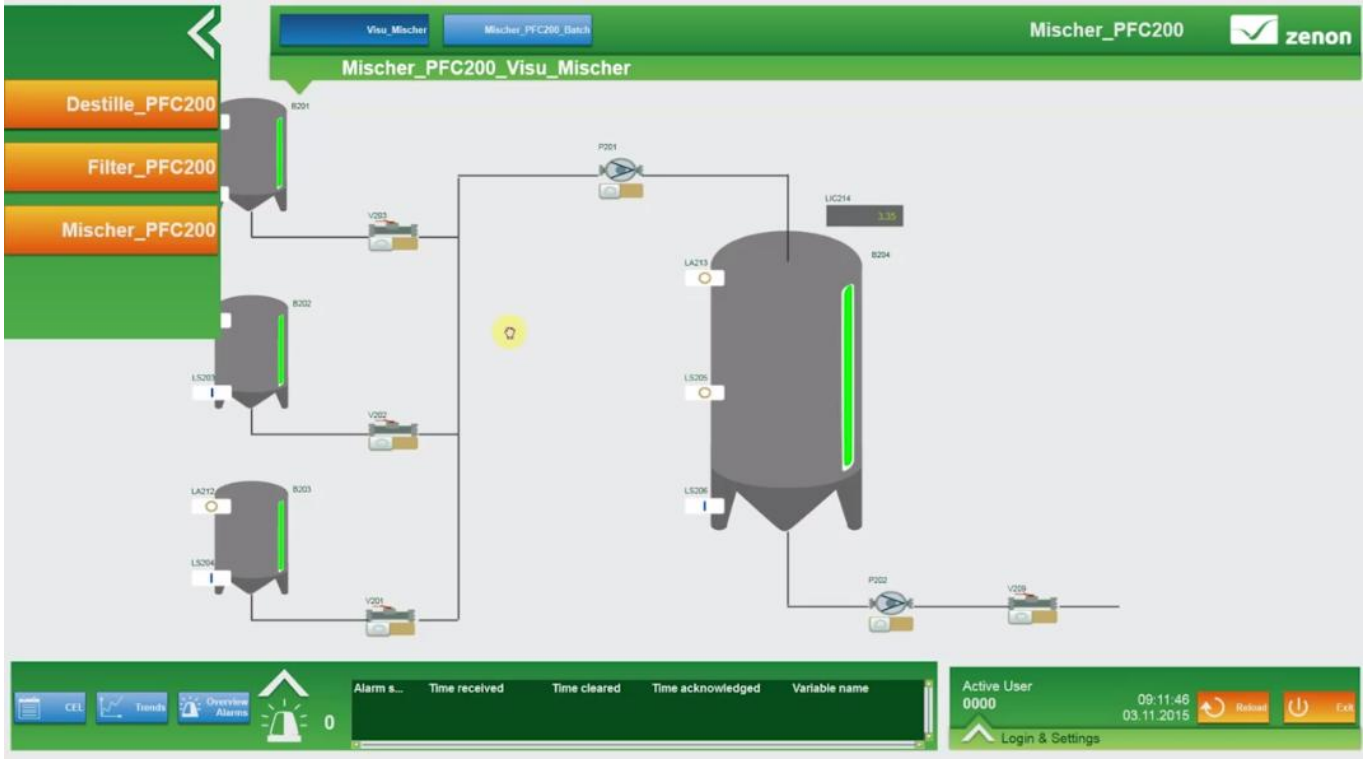
Engineering: Definition of Module Services



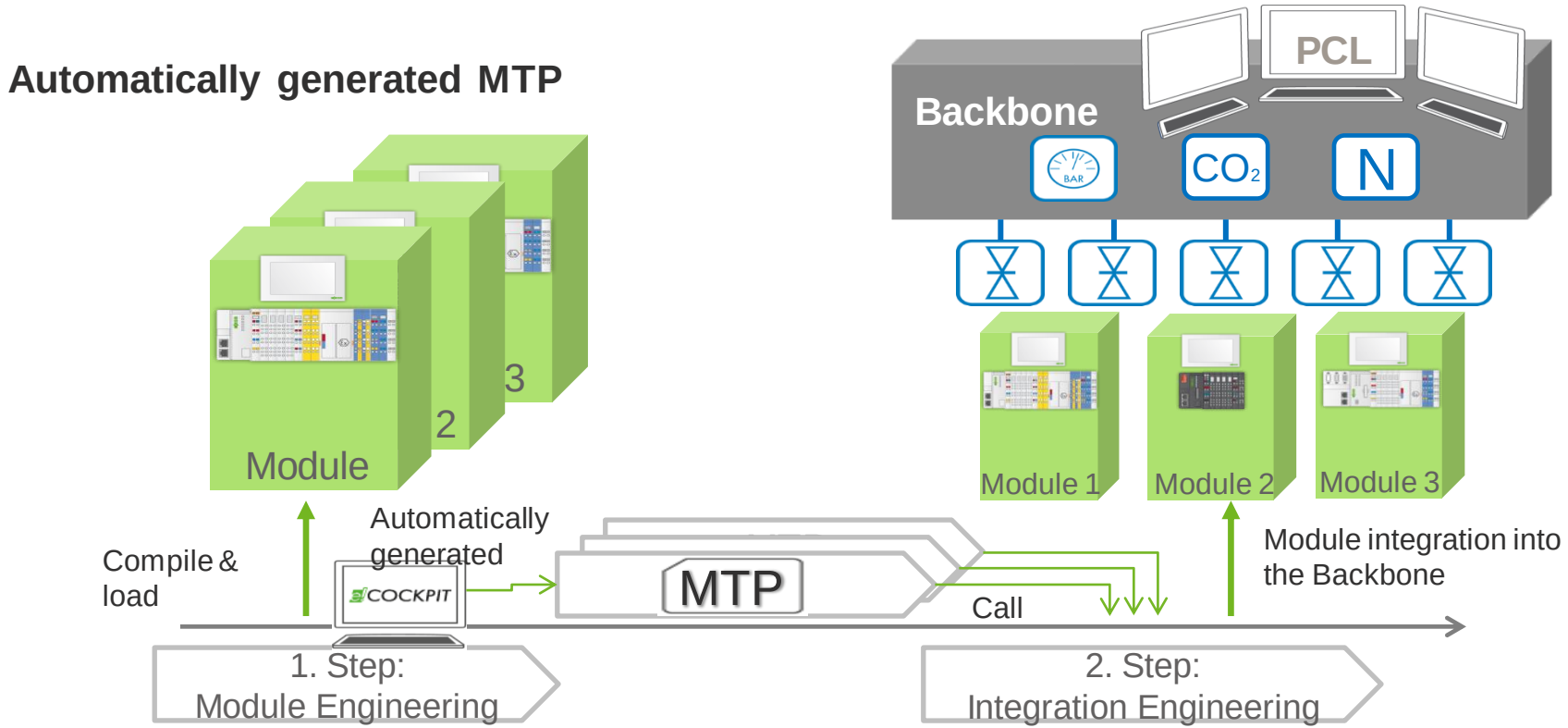
Engineering: Generation of MTP



Automatic Generation of HMI



Engineering Workflow



Benefits

- Little engineering for adaptation of modular production plants
- Open interface between module and control level
- Automatic generation of visualization for HMI
- Know-How protection for module manufacturer

Standardization Group

PLS Manufacturer	Sensor / Actuator Manufacturer	User	Decentralised Automation	Universities
ABB Emerson HIMA Safety Honeywell Rockwell Automation Schneider Electric Siemens Yokogawa	Endress + Hauser Festo Krohne Samson	BASF Bayer Bilfinger Boehringer Ingelheim Clariant Evonik Invite Merck Novartis Sanofi Spiratec	Pepperl + Fuchs Phoenix Contact Stahl Wago	Helmut-Schmidt-University Hamburg RWTH Aachen Technical University Dresden

High Efficiency

November 2016:
DIMA in action at the SPS-IPC-Drives exhibition

- Fully automated generation of the MTP out of the WAGO e!Cockpit software
- MTP modelled in AutomationML
- Communication with OPC/UA
- MTP read in DCS zenon from Copa-Data
- Plug and produce of modules right after reading the MTP
- Orchestration and parameterization of the module services in the batch-tool

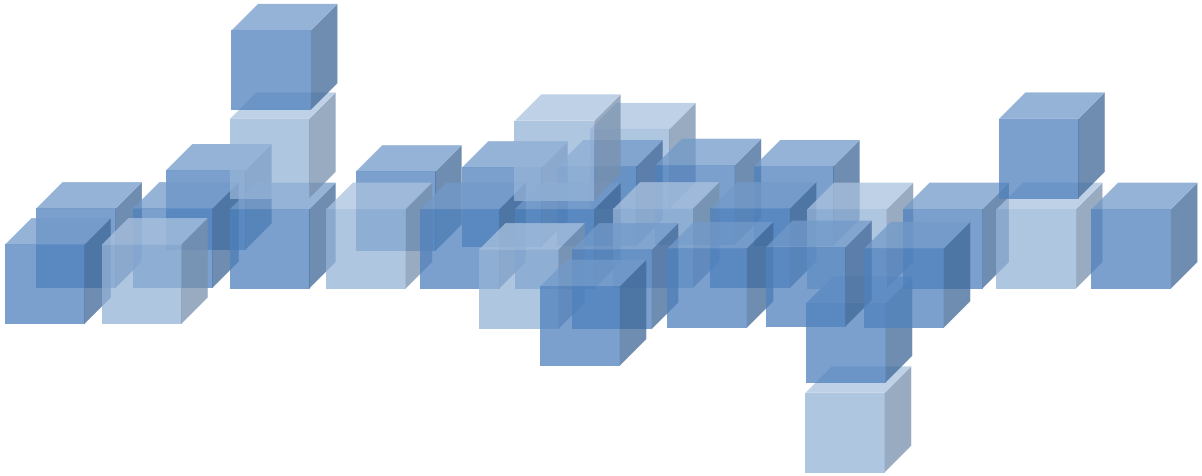
➢ **Changing one module** (physically and logically) in **less than 2:30 min!**

Summary

- MTP will be the world wide first standard for digital description of production modules
- MTP standardization will be finished in 2017 with more than 30 companies and suggested as IEC international standard
- Communication model of MTP is based on ETHERNET OPC UA
- First implementation of MTP-interfaces in DCSs and Engineering-tools, e.g. ABB, Siemens, Yokogawa, Copa-Data „Zeton“
- With DIMA Method including the MTP Specification a „Plug-and-Produce“ for production plants moves closer
- WAGO is ready to realize first projects based on DIMA concept

DIMA

The first global concept for the automation of modular production plants



First partner of DIMA in 2017: Statoil, BASF, EVONIK, Linde, Klüber, ZF