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Flexible and efficient automation using TwinCAT MTP and CoAgent

TwinCAT CoAgent
Module Type Package (MTP)

FIIF, 12.06.2025, Tampere

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Tuure Takala
Beckhoff Automation Oy

System overview
Building blocks for automation and machine builders

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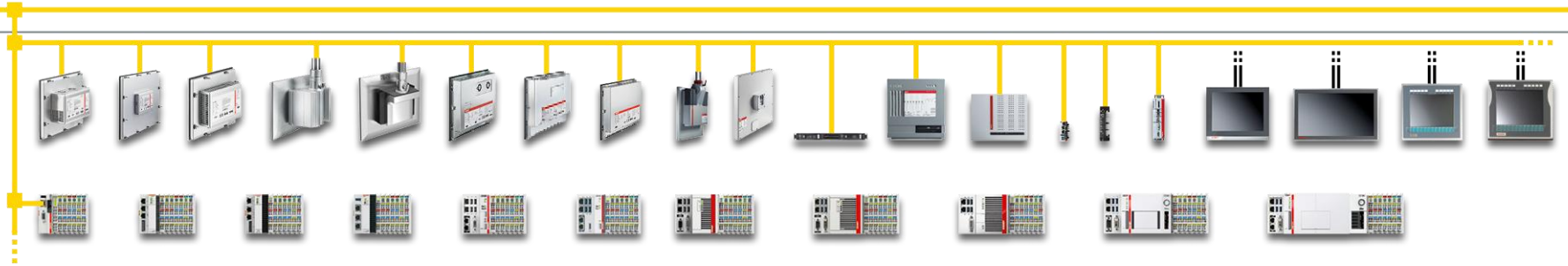
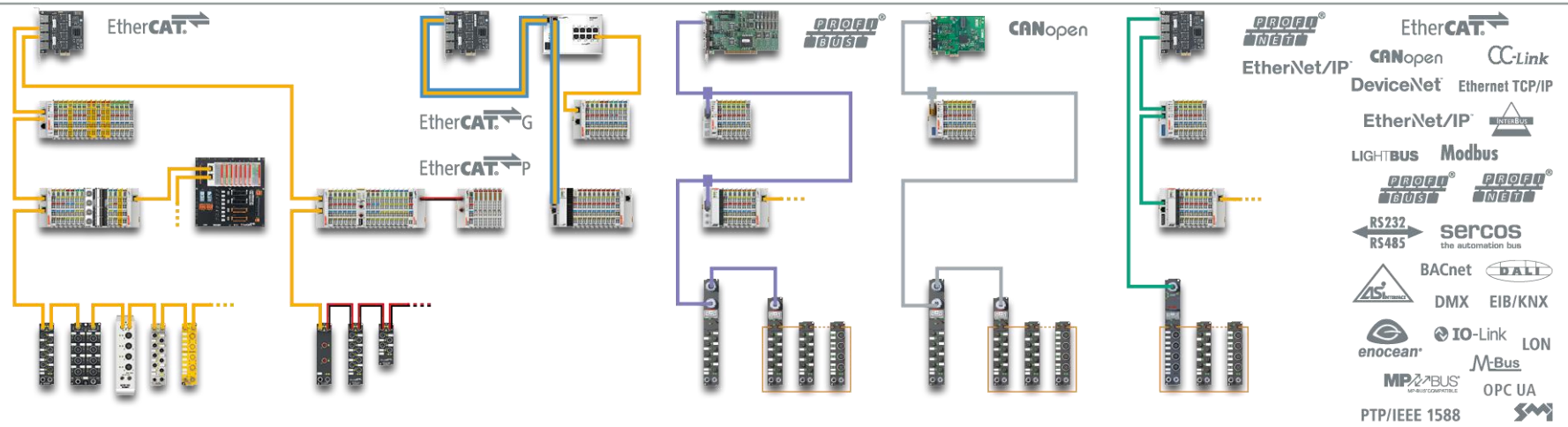
IPC



I/O



Motion

Automation

MX-System

Vision

TwinCAT

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TwinCAT Engineering

- PLC IEC 61131 editor
- PLC++ IEC 61131 editor
- C, C++ editor
- MATLAB®, Simulink®
- Safety editor
- HMI editor
- PLCopen Motion
- PLCopen Motion
- DIN 66025
- Robotics program-ming
- Scientific Automation
- Machine learning
- Connectivity config.
- Vision config.

TwinCAT Runtime

- PLC runtime
- PLC++ runtime
- C, C++ modules
- MATLAB®, Simulink® modules
- Safety runtime
- HMI Server
- NC2 Motion
- MC3 Motion
- CNC
- Robotic motion
- Measure-ment & Analysis
- Machine learning inference
- Communi-cation protocols
- Vision

Operating System

- Windows
- Linux®
- TwinCAT/BSD
- TwinCAT/RTOS

Beckhoff and OPC Foundation history

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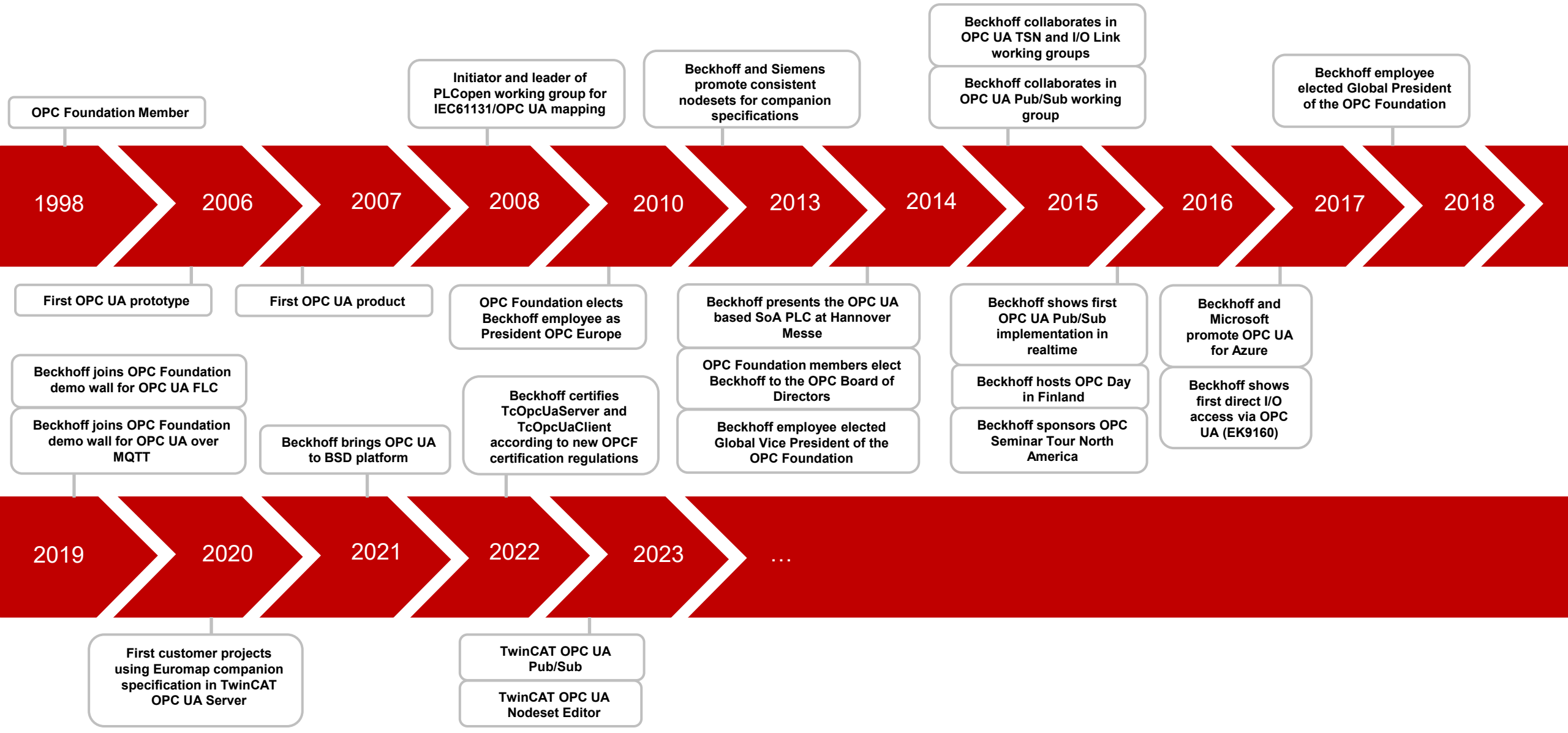

OPC UA enabled products for every use case (since 2006)

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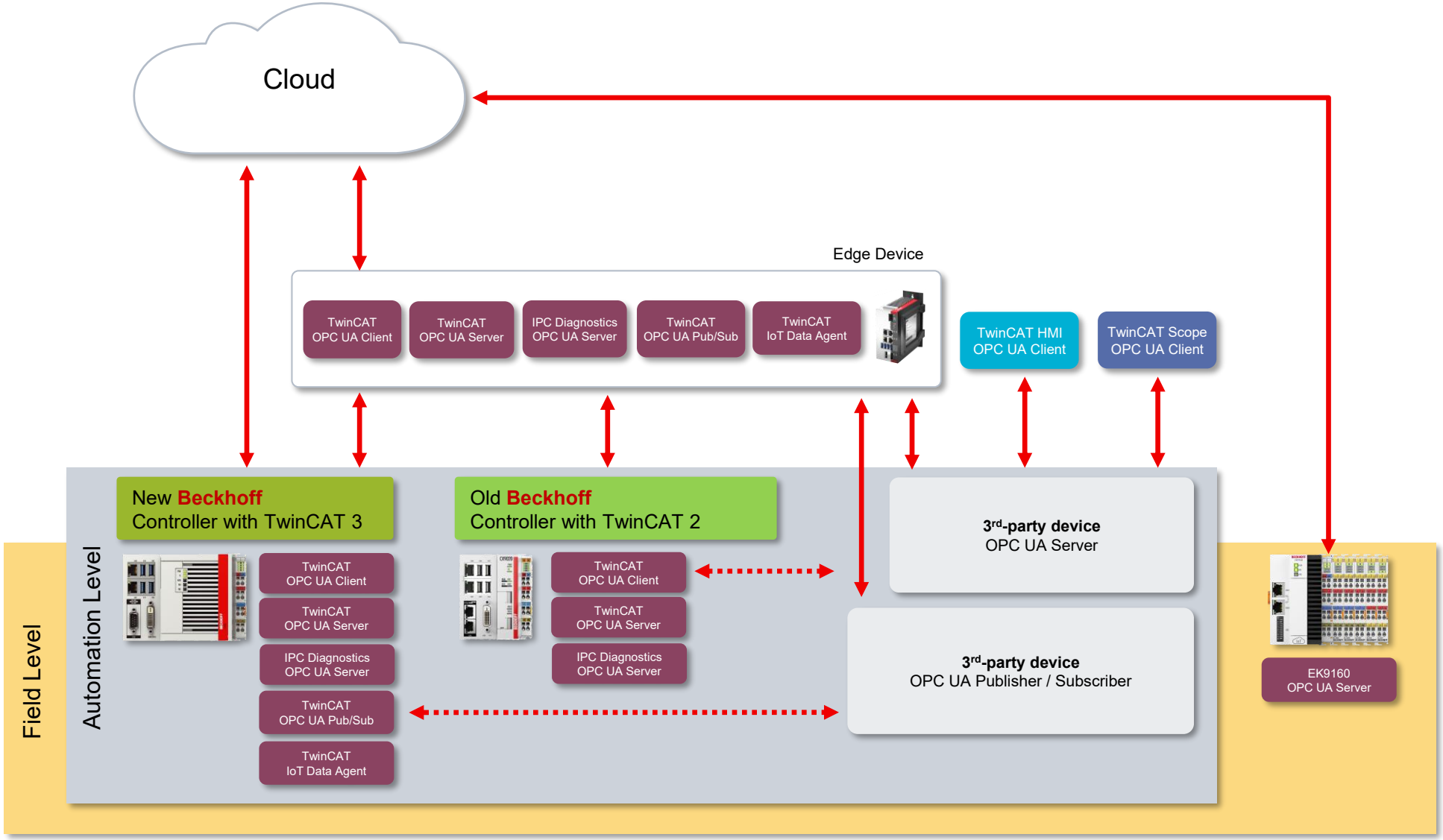

TwinCAT CoAgent

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Agentic Automation
Democratization of AI though natural language

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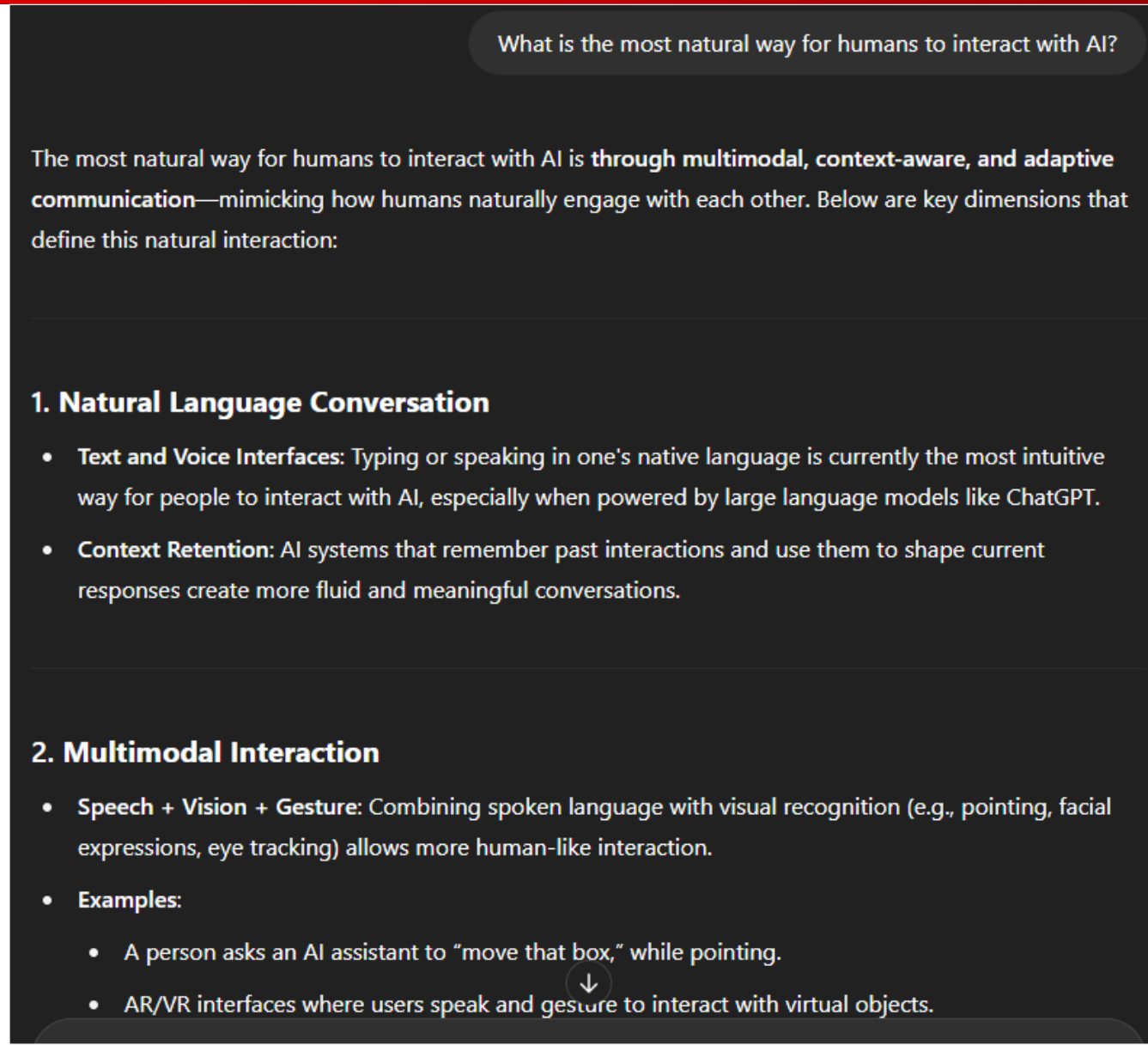
- LLMs are the most fundamental democratization process of AI
- Everybody can use LLMs without being an AI expert

- Use cases in Automation
  - Code generation
  - Documentation
  - …
  - Human-centric interface to software



TwinCAT CoAgent
Smart Agents for Automation Engineering

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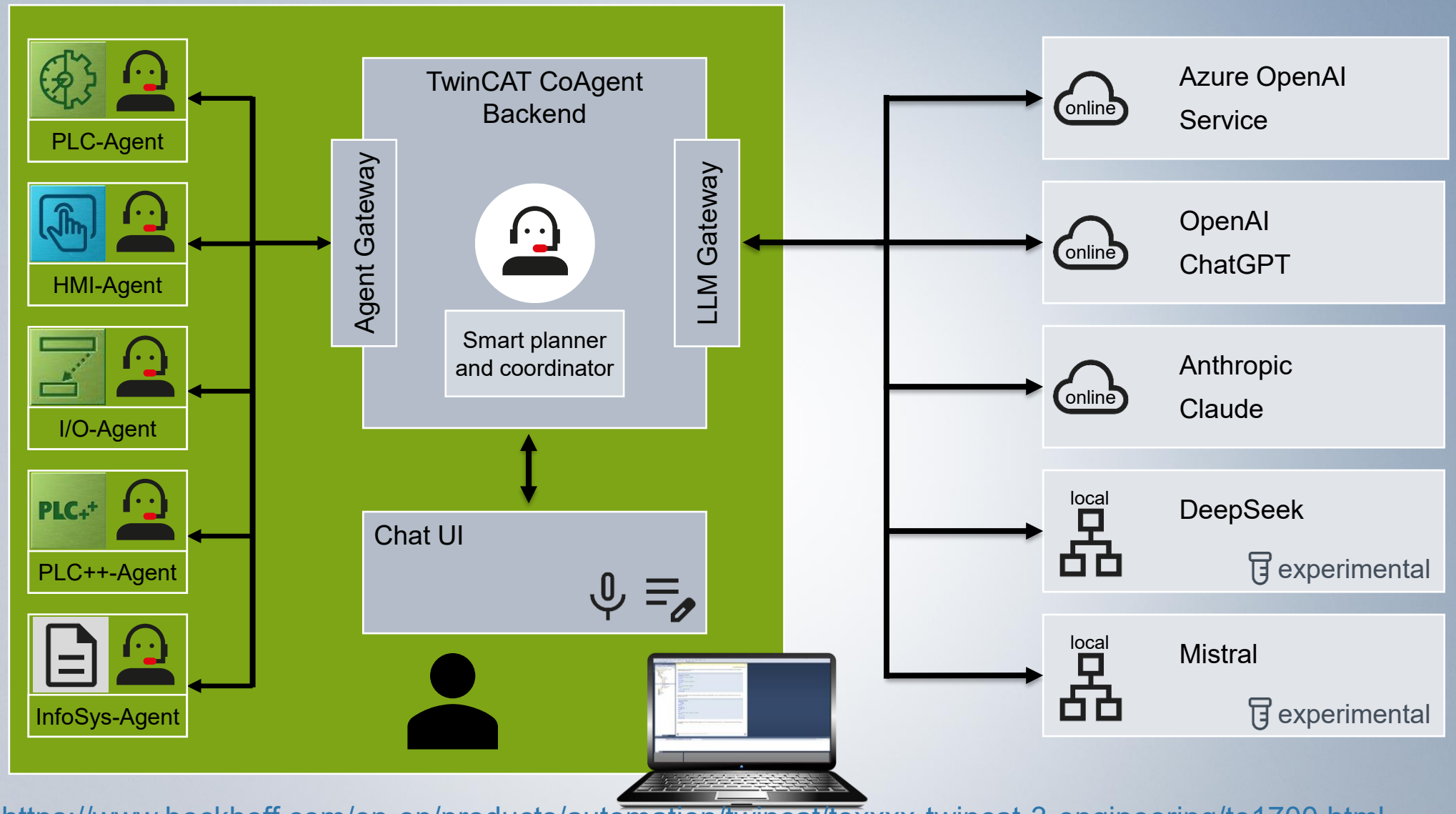

https://www.beckhoff.com/en-en/products/automation/twincat/texxxx-twincat-3-engineering/te1700.html

About MTP (Module Type Package)

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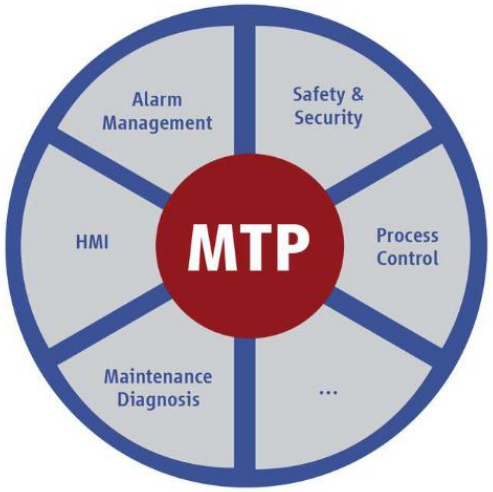
- A modularization concept for development of a modular plants
- Addressing primarily the segment of process industry



- Standardization initially in VDI/VDE/NAMUR 2658 (since 2014)
- Ongoing development of the international standard IEC 63280 (MTP 2.0 specification, soon to be published)
- Current standardization is driven by PROFIBUS User Organization (PNO) part of PI

➢ Enables <u>vendor-independent integration and control of plant functional modules</u>

➢ Standardized interfaces and communication from a higher-level control system (DCS, SCADA)

- NAMUR = The User Association of Automation Technology in Process Industries
- ZVEI = The (Manufacturers) Association of the Electrical and Digital Industry

NAMUR ZVEI: Die Elektroindustrie MTP

Architecture and components

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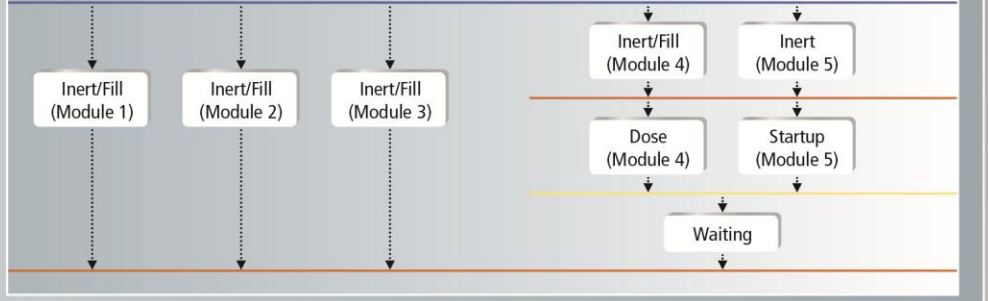
Process Orchestration Layer (POL)

Plant Engineering

Distributed Control System

Visualization

Orchestration



Process Equipment Assembly (PEA)

Module Engineering

OPC UA

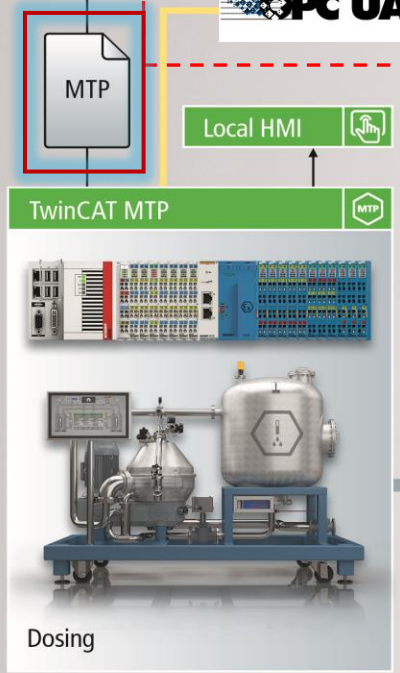
OPC UA

OPC UA

MTP

Local HMI

TwinCAT MTP

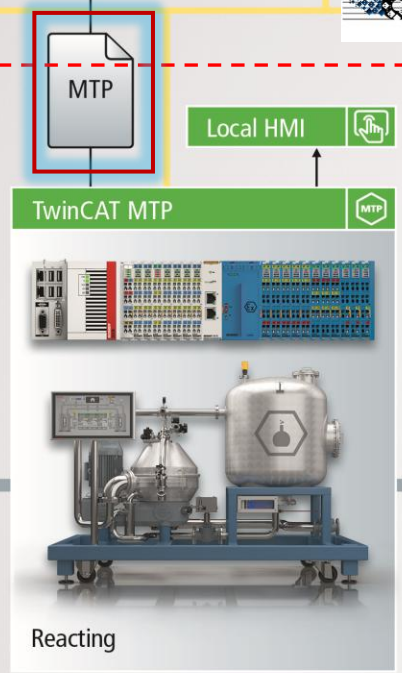


Dosing

MTP

Local HMI

TwinCAT MTP

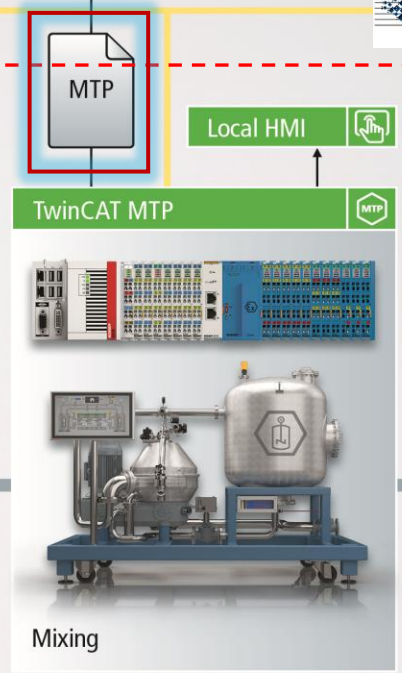


Reacting

MTP

Local HMI

TwinCAT MTP

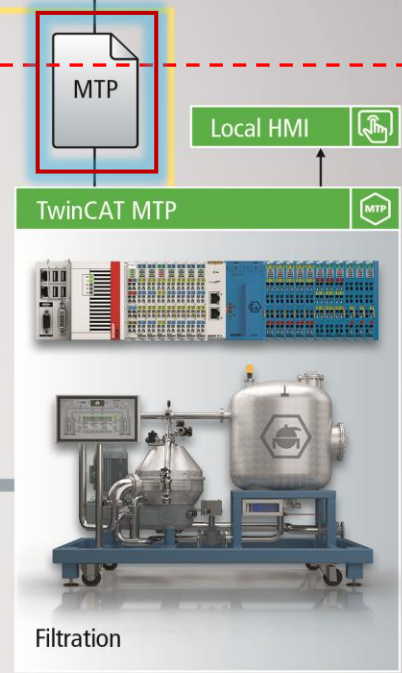


Mixing

MTP

Local HMI

TwinCAT MTP



Filtration

Development phases

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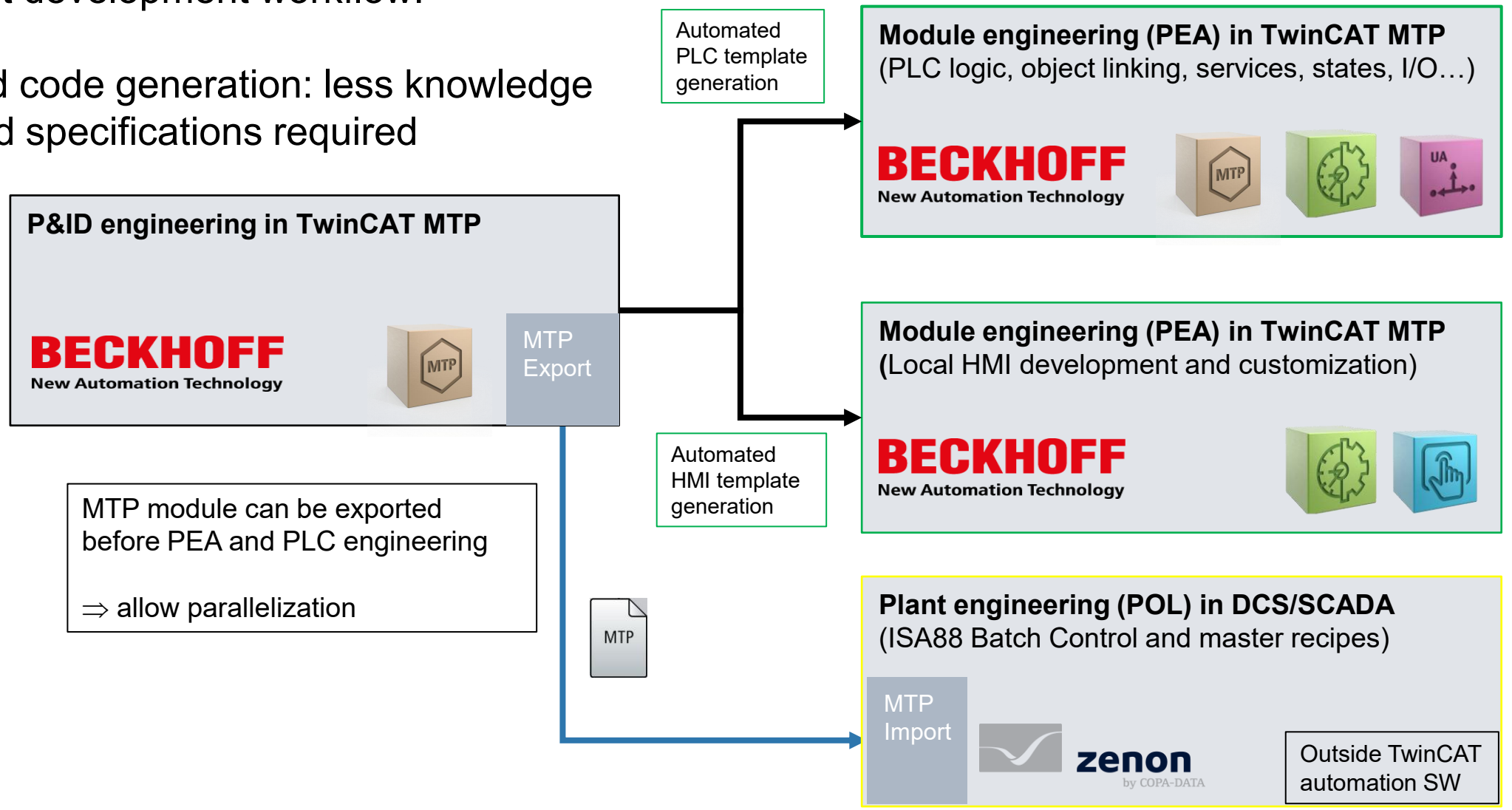
- An efficient development workflow!
- Automated code generation: less knowledge of standard specifications required



What are the benefits of MTP?

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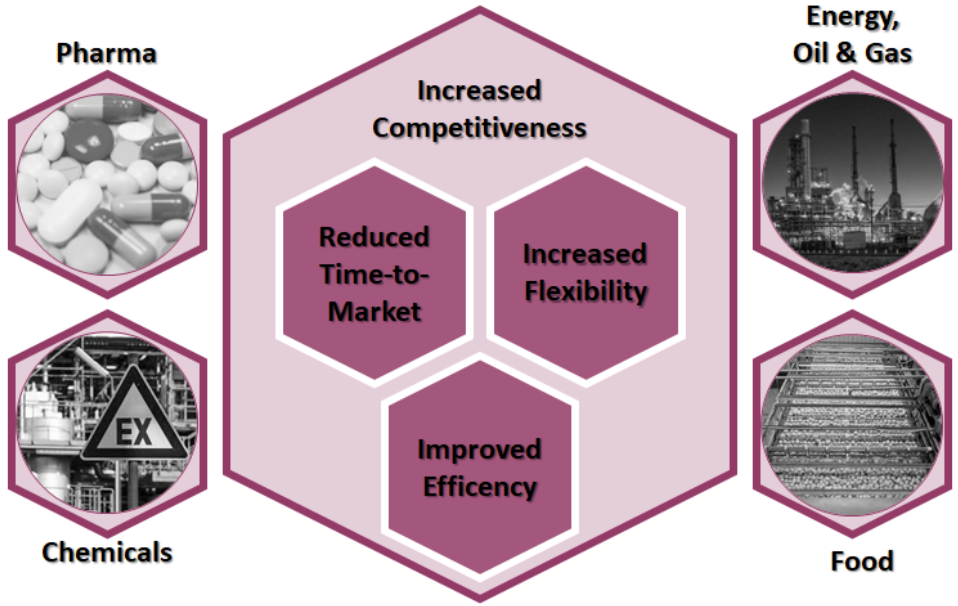
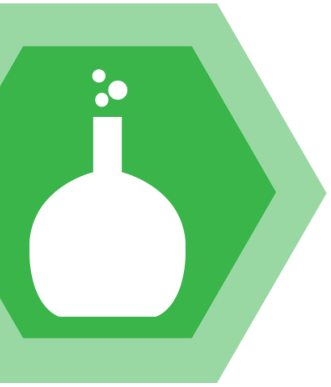
- Shorter Time-to-Market (50% reduction)
- Reduced engineering effort by 70%
- Increased flexibility by 80%

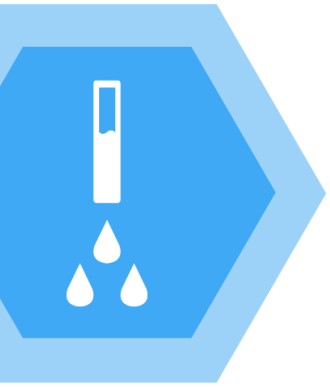
- Modularization also improves:
  - Module expandability and reusability

    => Improved support for small batch production (e.g. pharmaceutical industry)
  - Maintenance (e.g. faster time-to-repair)

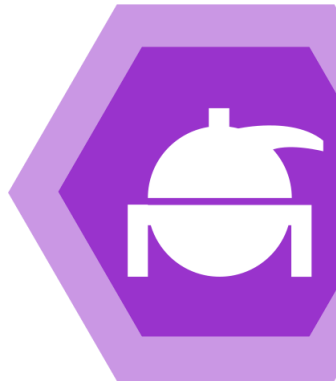


=> Overall, higher development efficiency and lower production costs!





So with TwinCAT MTP and
with the help of OPC UA,
we can quickly get from ...



P&ID model and engineering

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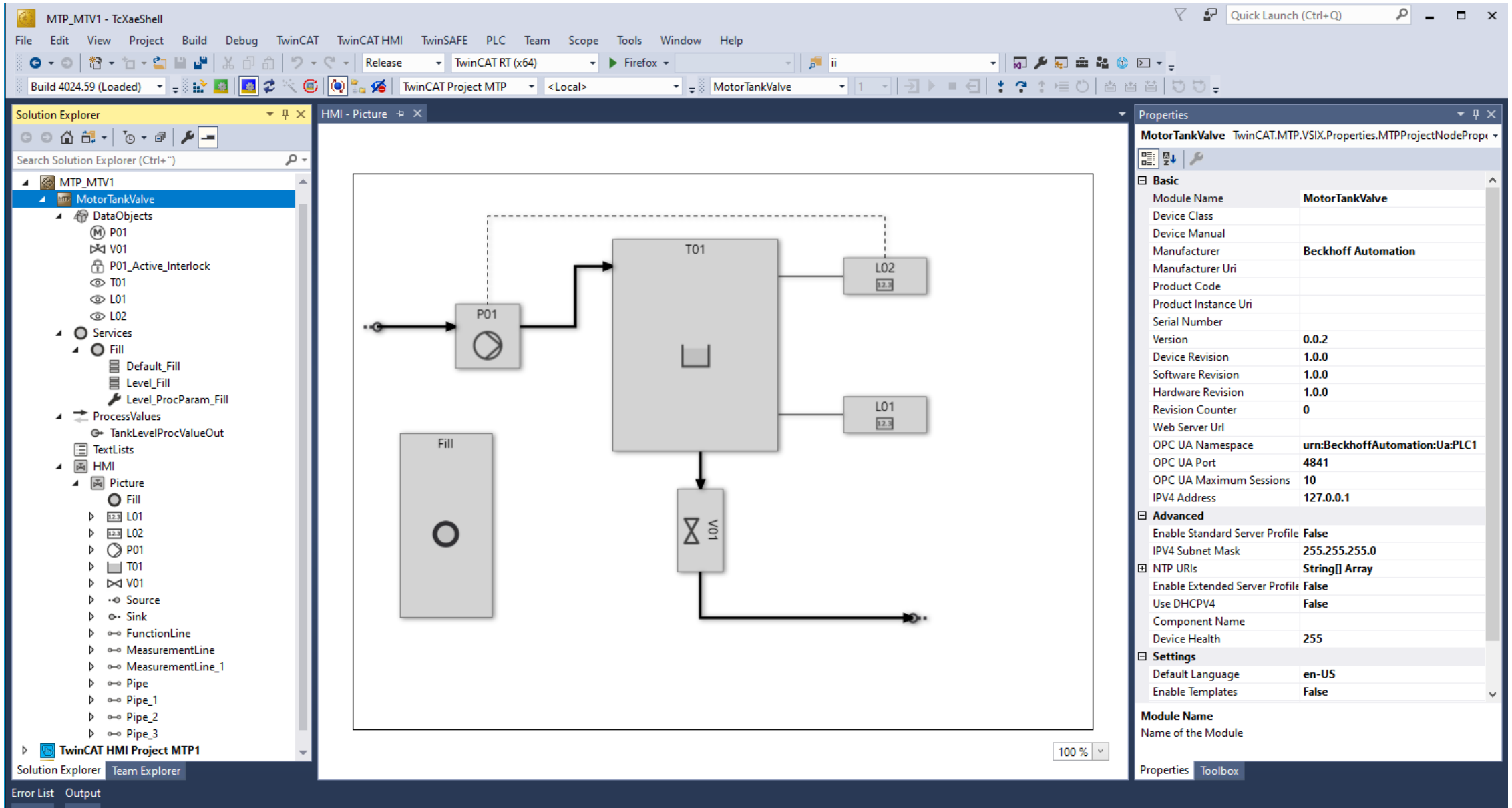

Module engineering (PEA): Local HMI

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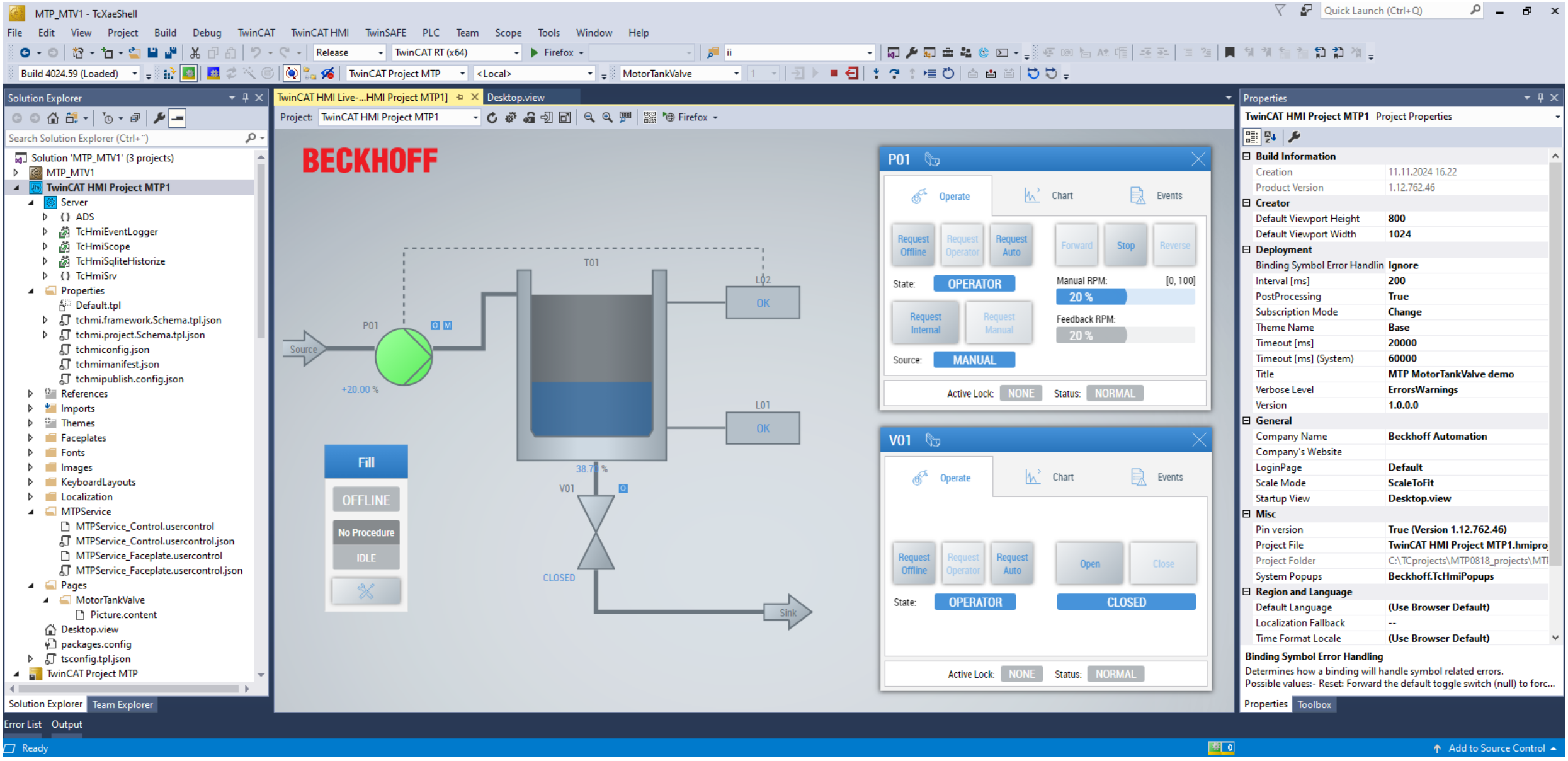

Plant engineering (POL) and orchestration

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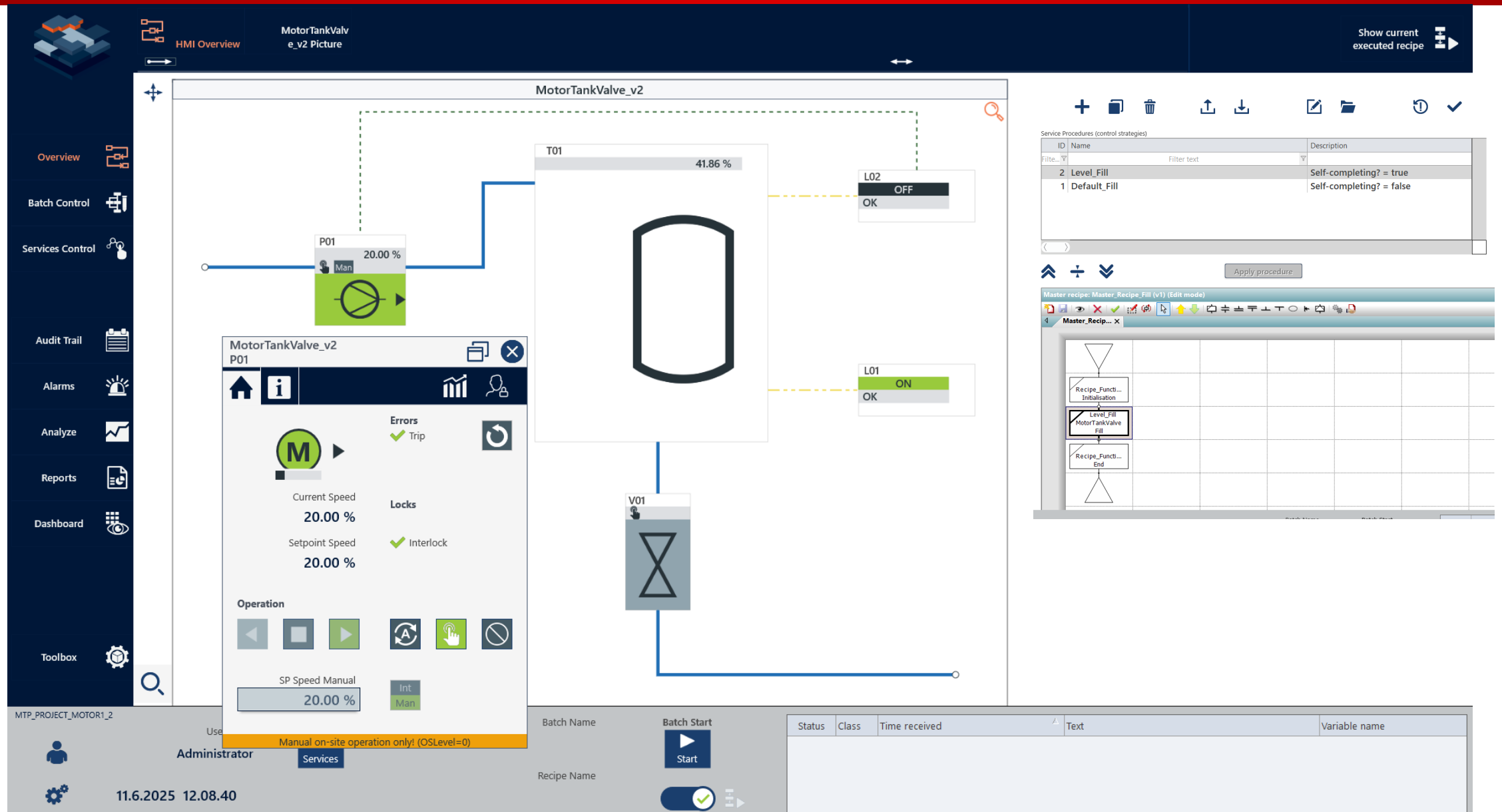

Thank you for your attention!

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- TwinCAT MTP beta available for Twincat 3.1 Build 4026 and support MTP 2.0 standard specification
- Other beta versions and further information also available: processindustry@beckhoff.com