



Industrial IoT, OPC UA und TSN: Revolution in der Automatisierungstechnik?

data analytics

**new business
models**

IaaS, PaaS, SaaS

security,
integrity, performance, availability

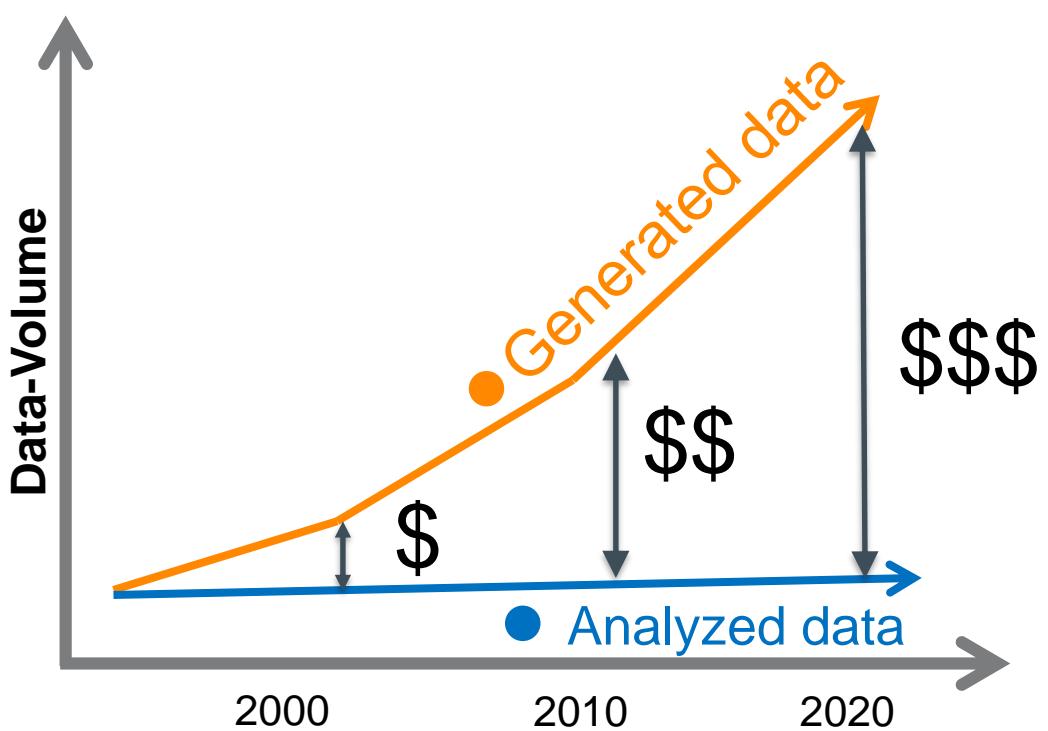


connectivity
from sensor to cloud

**IT-OT
convergence**

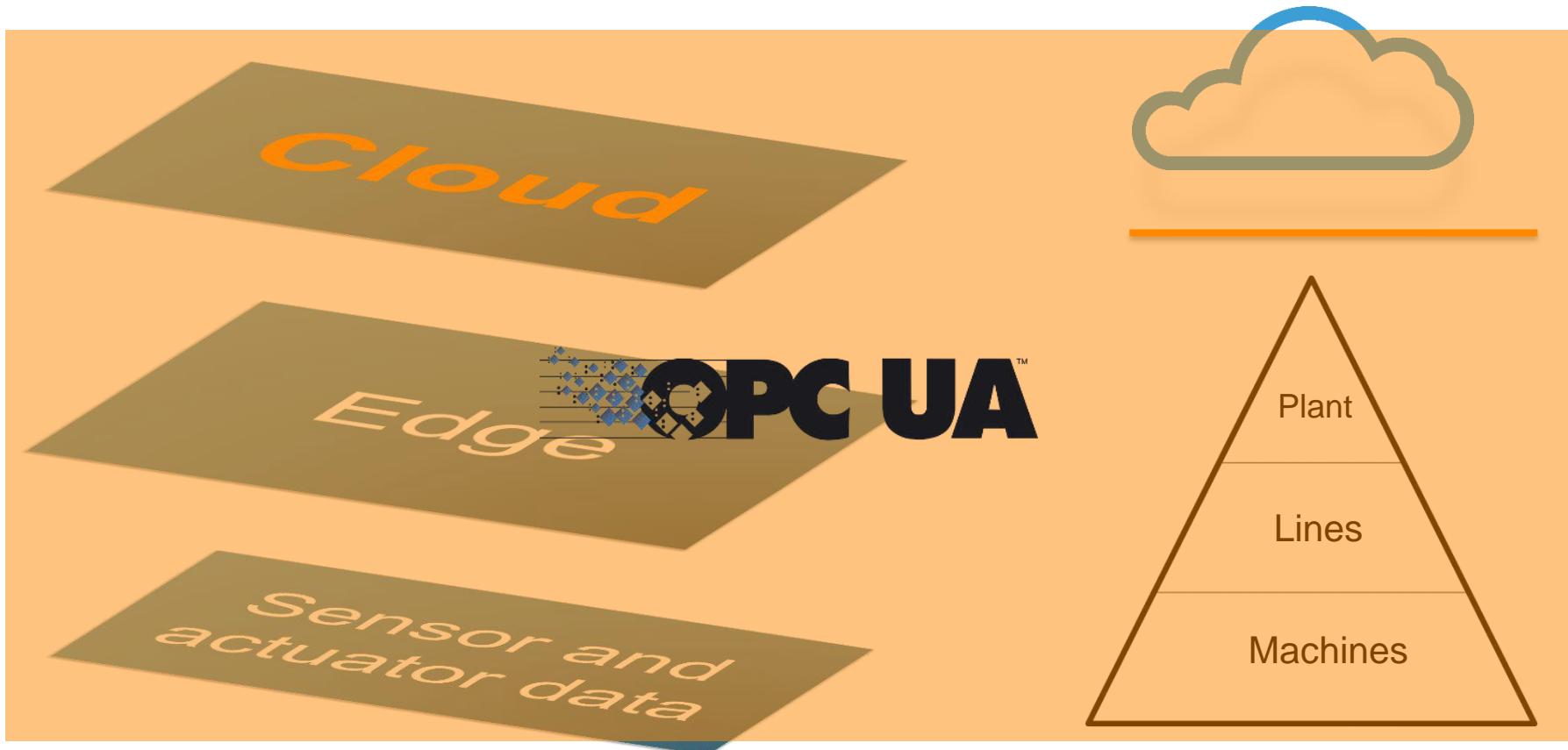
cloud computing
public, private, hybrid

The value of Industrial IoT

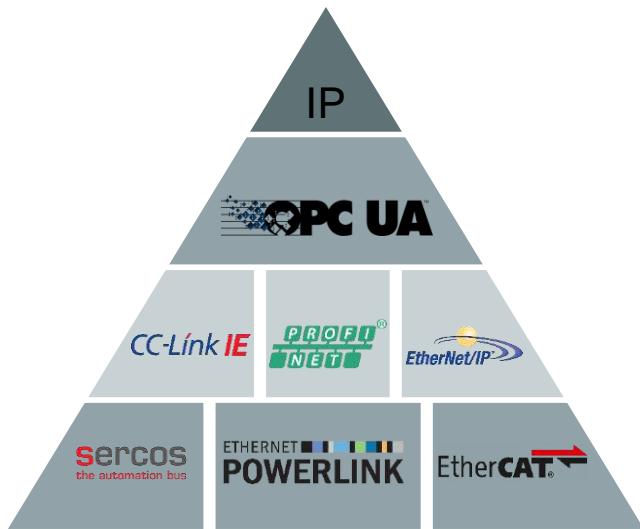


Industrial IoT Architecture

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP



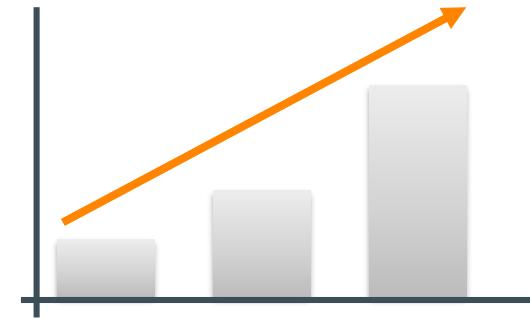
Marktsituation



Fehlende Konnektivität
Fragmentiertes Ökosystem



IoT-
Herausforderungen



Steigende Anforderungen

OPC UA over TSN

OPC UA ermöglicht sichere Kommunikation und semantische Selbstbeschreibung

TSN garantiert deterministische Kommunikation

Data vs. Information



...vs. Semantic Information

Data

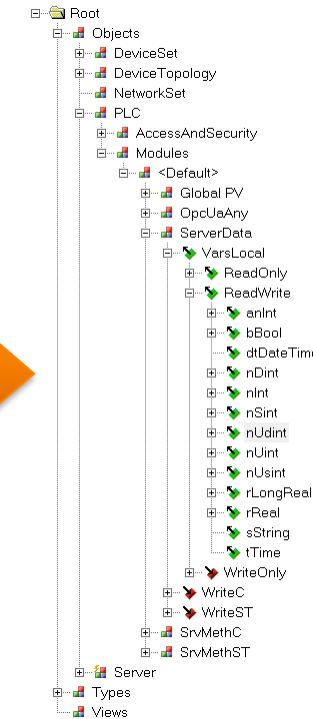
only machine readable

Information

human readable

Nominal value speed axis 1
Nominal value speed axis 2
Nominal value speed axis 3
ACTUAL value Speed axis 1
ACTUAL value Speed axis 2
ACTUAL value Speed axis 3
Asset status
Status axis 1
Status axis 2
Status axis 3
Temperature axis 1
Temperature axis 2
Temperature axis 3
Status door switch 1
Status door switch 2
Status door switch 3
Limit switch 1
Limit switch 2

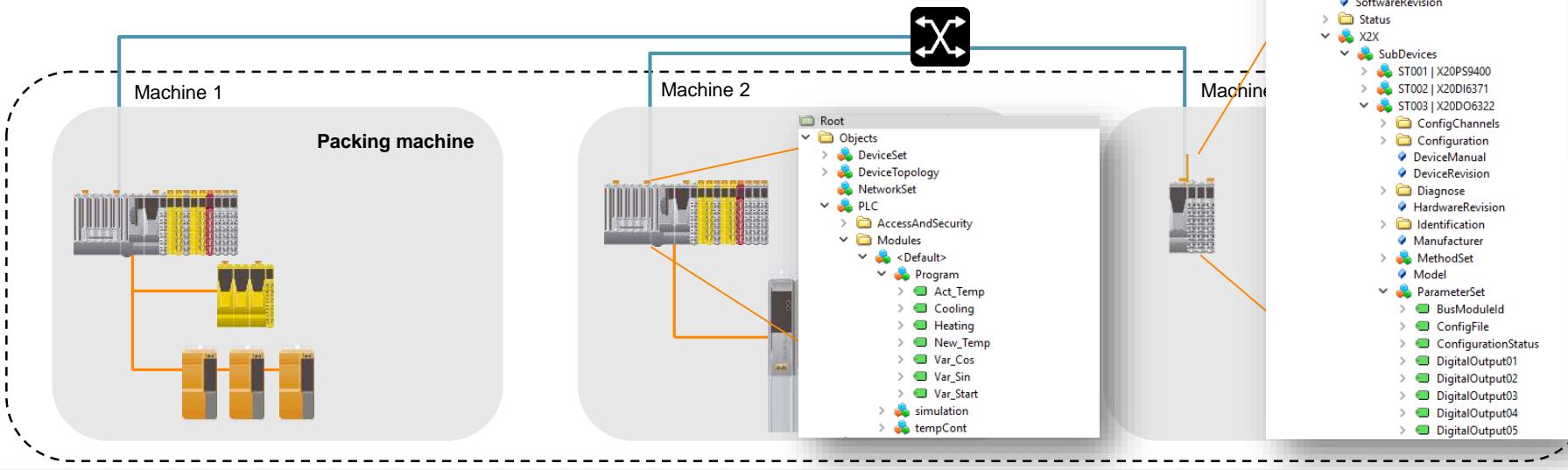
Semantic Information (OPC UA Information Model) Human + machine interpretable



Information Model



- ...is a standardized structure for information of assets
 - Variables, methods, events
 - ...used for description of assets
 - ...accessed online and offline
 - representation in the network (browsing the information model)
 - Importing and manipulation via NODESET-file

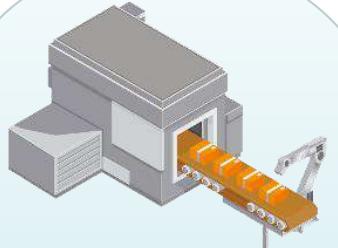


Companion Specification for Machines

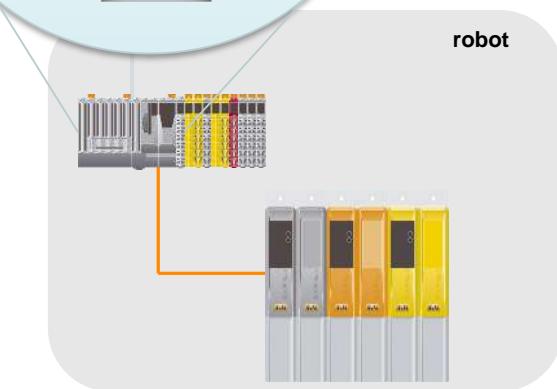
PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP



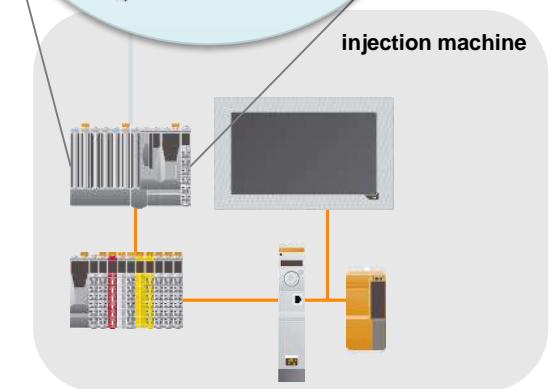
OMAC
PackML



VDMA
Robotics



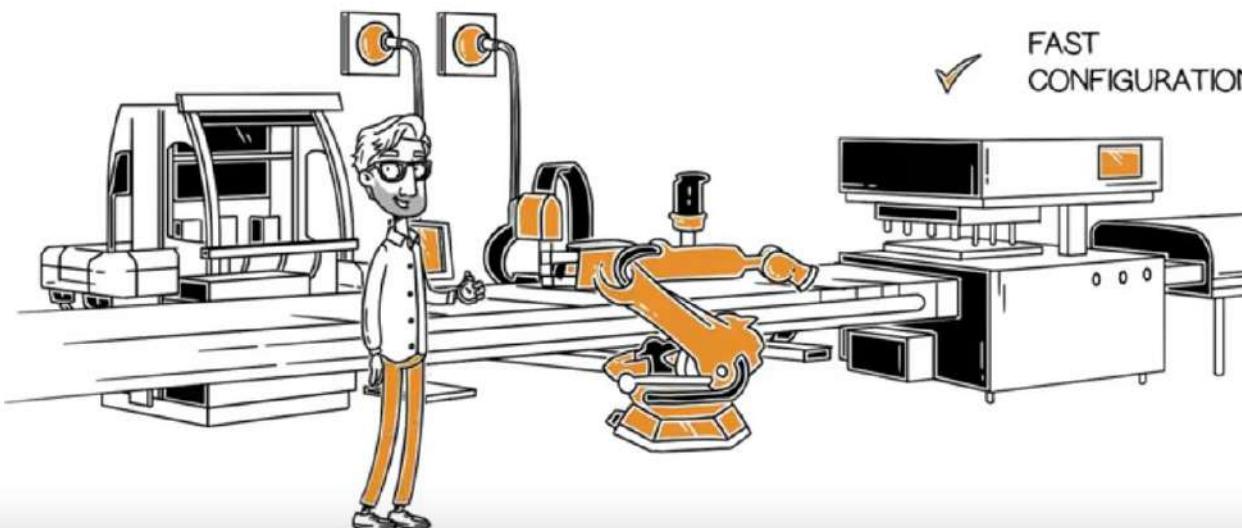
EUROMAP
European Plastics and Rubber Machinery



Benefits of OPC UA

OPC UA is platform-independent, secure, interoperable, vendor-independent

Unified self-description of assets - accessed securely online / offline



- ✓ FAST INTEGRATION
- ✓ FAST CONFIGURATION

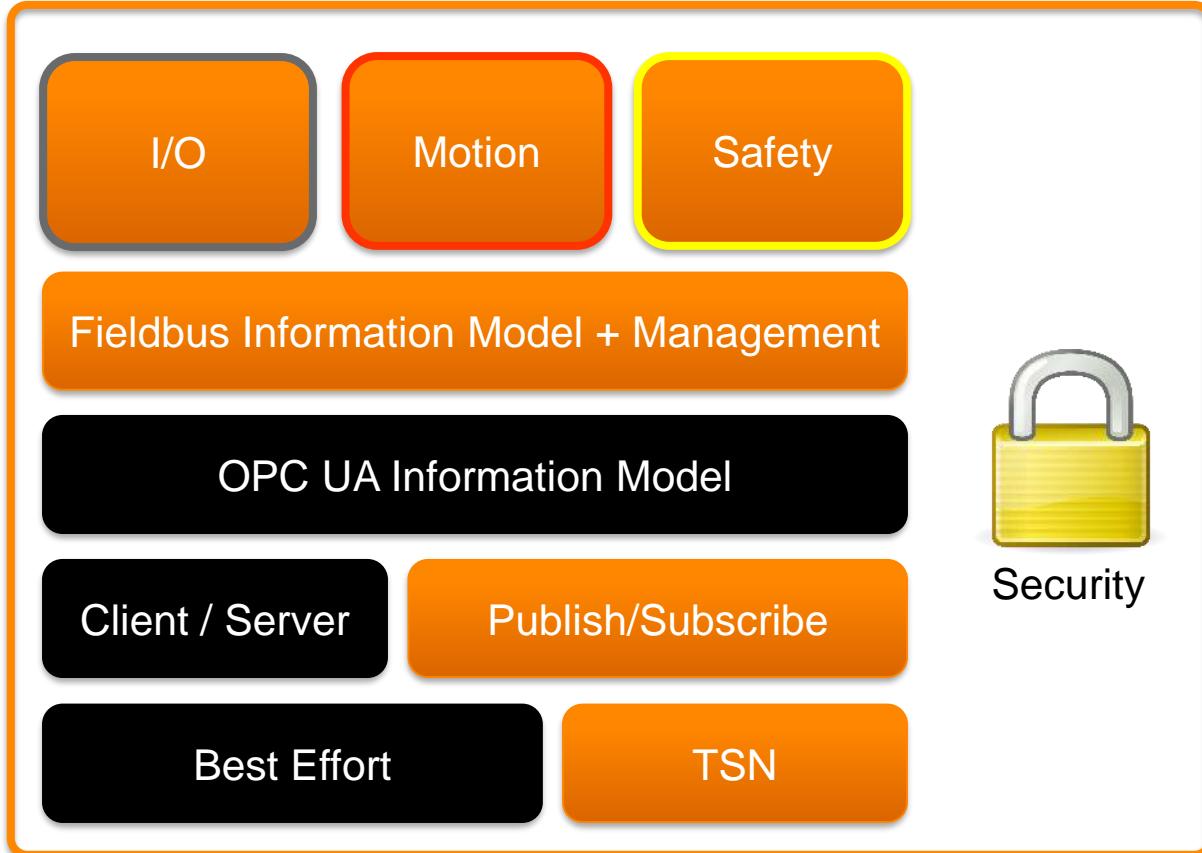
- ✓ PLUG & WORK
- ✓ CONDITION MONITORING
- ✓ PREDICTIVE MAINTENANCE
- ✓ OEE IMPROVEMENT

“Companion Specifications“ for field-devices

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP



OPC UA Information Model for field level devices

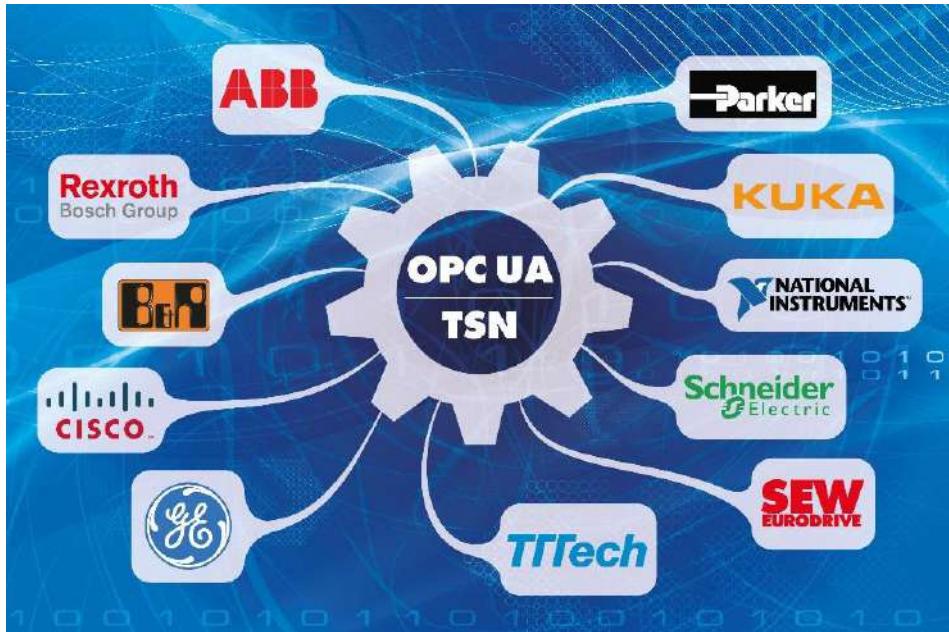


B&R initiiert die Shapers-Gruppe

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP

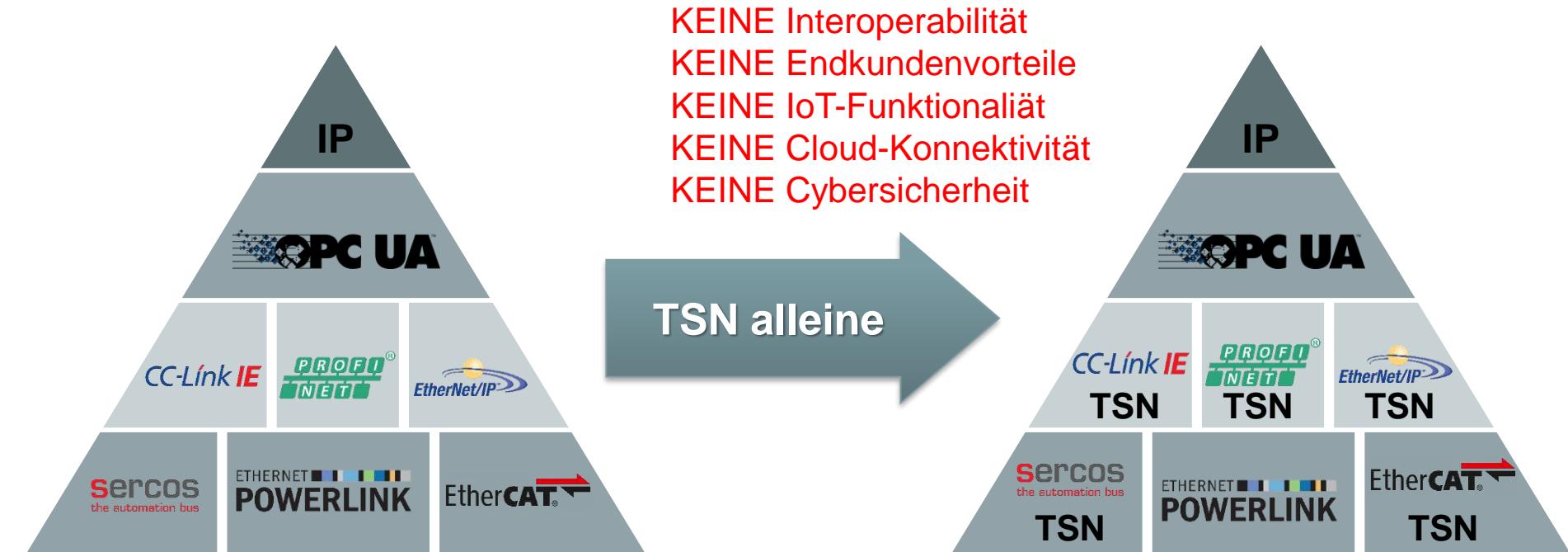


Erstes Treffen 12./13. September 2016 in Wien, Gastgeber B&R und TTTech



Eine offene, **hersteller-übergreifende**, auf Standards basierende **Industrial-IoT-Kommunikationslösung** zwischen **Sensoren, Aktoren, Controllern** und der **Cloud**, mit der alle Anforderungen der industriellen Automation adressiert werden.

Alternative Ansätze verschiedener Unternehmen



Alle bedeutenden Branchenführer sind Teil der Initiative OPC UA over TSN

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP



Pressekonferenz der OPC Foundation @ SPS IPC Drives 2018

> 85% Globaler Marktanteil



ABB

BECKHOFF

rexroth
A Bosch Company



cisco

hitscher
COMPETENCE IN
COMMUNICATION

MITSUBISHI
ELECTRIC

molex

MOXA

OMRON

PHOENIX CONTACT

PILZ
THE SAFETY COMPANY

HIRSCHMANN
A SELDEN BRAND

HUAWEI

intel

kalycito
CREATING A BETTER WORLD

KUKA

Rockwell
Automation

Schneider
Electric

SIEMENS
Ingenuity for life

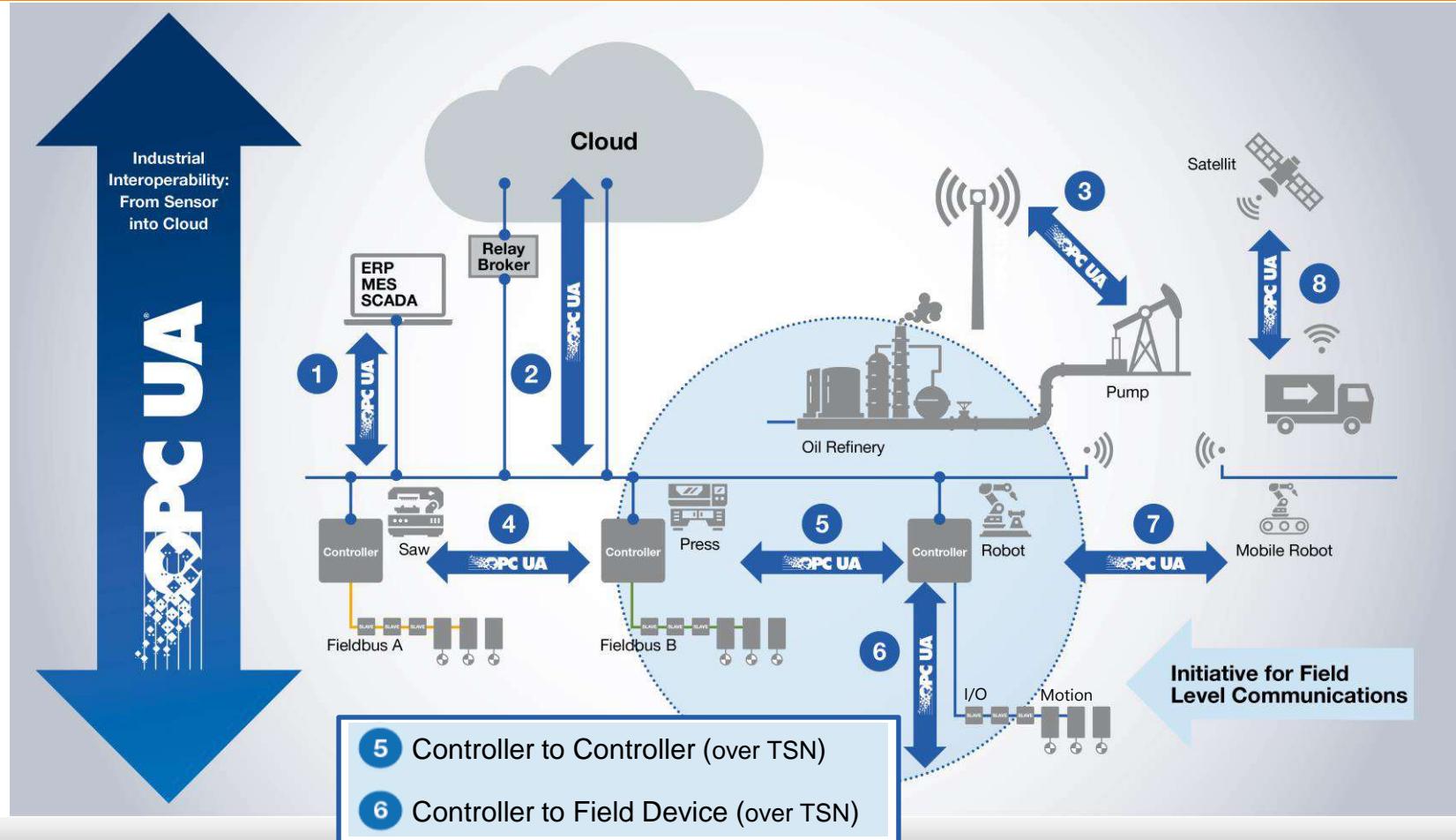
TIFtech
Ensuring Reliable Networks

WAGO

YOKOGAWA

OPC UA – Industrielle Interoperabilität vom Sensor bis in die Cloud

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP



Performance

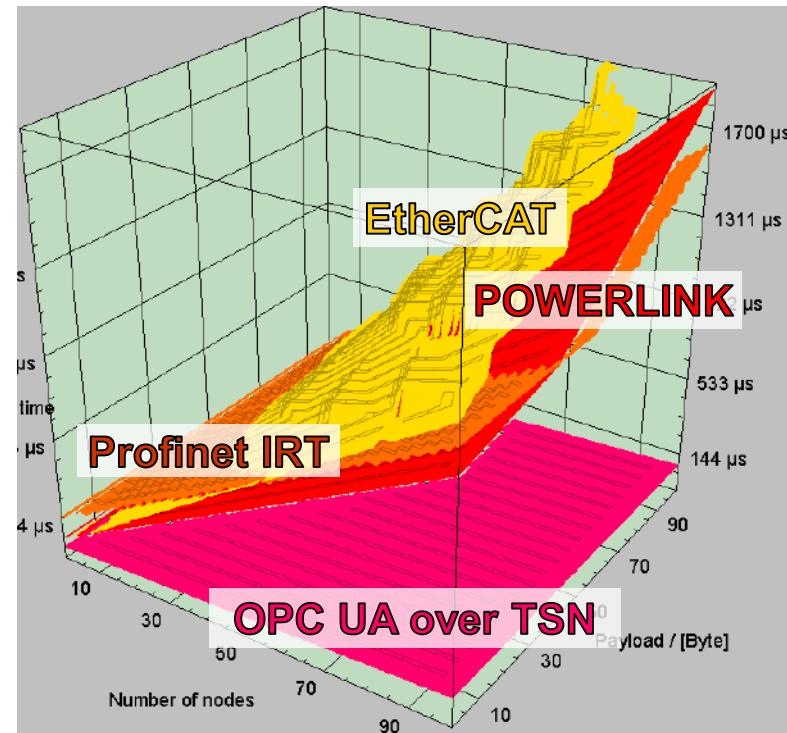
OPC UA over TSN @ 1 Gbit/s vs. aktuelle Marktlösungen

Performance-Steigerung

Bis zu **18x schneller** als
heutige Lösungen

Performance-Steigerung

Bis zu **+80%** als
potentielle zukünftige Gigabit-
Feldbusse



Bessere Maschinen und geringe TCO – bestes Investment

OT-Anwendungen mit erweiterten IT-Fähigkeiten

- Nahtlose Kommunikation
- Herstellerübergreifende Semantik vom Sensor bis in die Cloud
- Plug-and-produce
- Bis zu 10.000 Netzwerkknoten in einem Netzwerk
- Cyber Security bis hinunter zum Sensor
- Größtes Ökosystem in der Geschichte



Erster Product-Ready-Demonstrator von B&R @ SPS 2018

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP



1 Controller

200 Buscontroller

1 Display

5 HD-Kameras (5 HD-Videostreams)



Garantierter Echtzeitverkehr &
ruckelfreier Videotransfer

100 ns Zeitsynchronisation (Jitter)

100 µs Zykluszeit

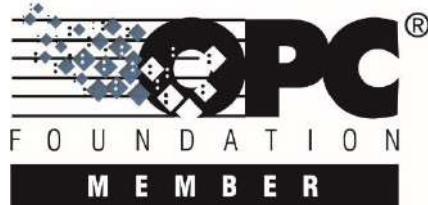
50 µs Querverkehr



over TSN

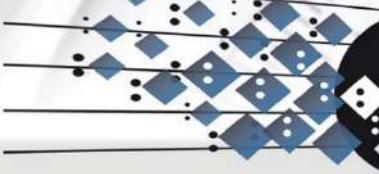
Einsatz auf allen Ebenen

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP





B&R'S HEARTBEAT TECHNOLOGY

 **OPC UA**
Time Sensitive Networking

PERFECTION IN AUTOMATION
A MEMBER OF THE ABB GROUP

