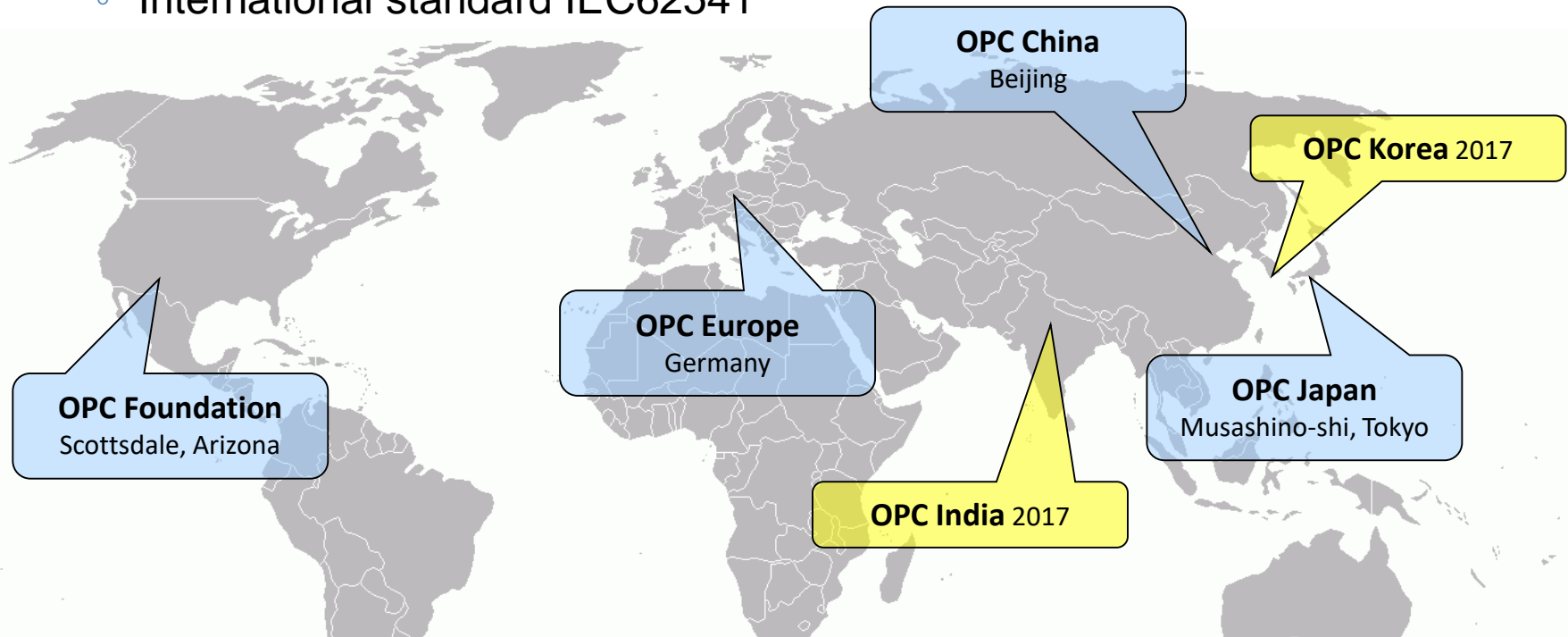
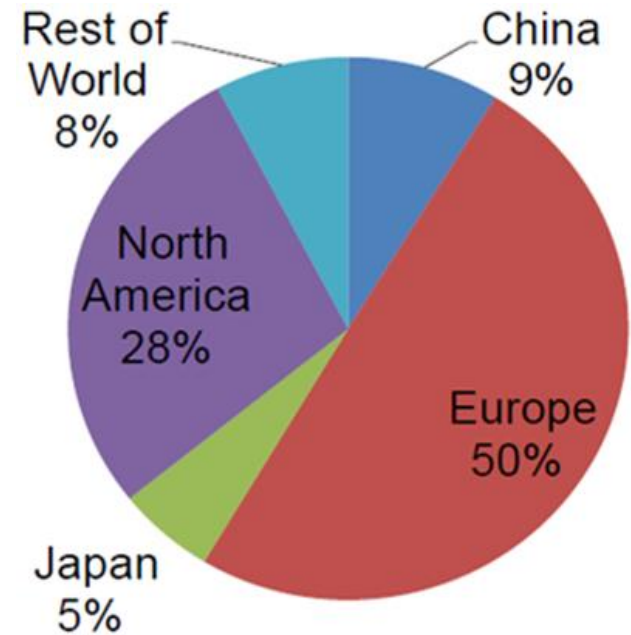


OPC Press Conference 22.11.2016

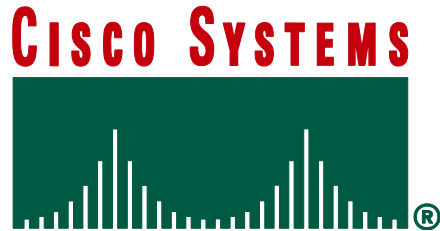
- ▶ **OPC in the World / Collaborations**
Thomas Burke (OPCF), Stefan Hoppe (OPCF)
- ▶ **Multidimensional Sensor Communication Through OPC UA**
Dr. Henning Grönzin, Leuze electronic
- ▶ **OPC UA meets SmartWire-DT**
Christian Zingg, EATON
- ▶ **Industrial Use of OPC UA**
Marco Holzer, TRUMPF, Chris Muench, C-LABS
- ▶ **OPC UA Embedded at the Chip Level**
Jamie Gallant, Hilscher

OPC Foundation

- ▶ Vision
secure, reliable, multi-vendor,
multi-platform, multi domain
interoperability from sensor to enterprise
- ▶ International
 - Companies from Automation & IT
 - International standard IEC62541



OPC Foundation: New class A members 2016



OPC Foundation: OPC Korea



Tom Burke (OPC), Byunghun Song, Soojin Ji (KETI), Stefan Hoppe (OPC)

New OPC Certification Program

- ▶ Announce new lab “OPC Foundation Europe Certification Lab” starting Jan 2nd
- ▶ Announce the new non-member test options
 - Operated by company Allmendinger, Germany
 - Certification of products
 - Script extensions of CTT for companion specs



Tom Burke (OPC), Jörg Allmendinger

New OPC “Logo Membership”

- OPCF create additional new member category “Logo member” on Jan 2nd
- “Logo Members” category companies get:
 - Lowest level membership - without member fees
 - Allowed to make use of OPC UA technology logo
 - Required: Formula with self description of OPC UA enabled product

No access:

- No access to OPC working groups
- No IP protection
- No right to use OPC code under RCL
- No use of the OPC Foundation member logo



OPC UA in the world

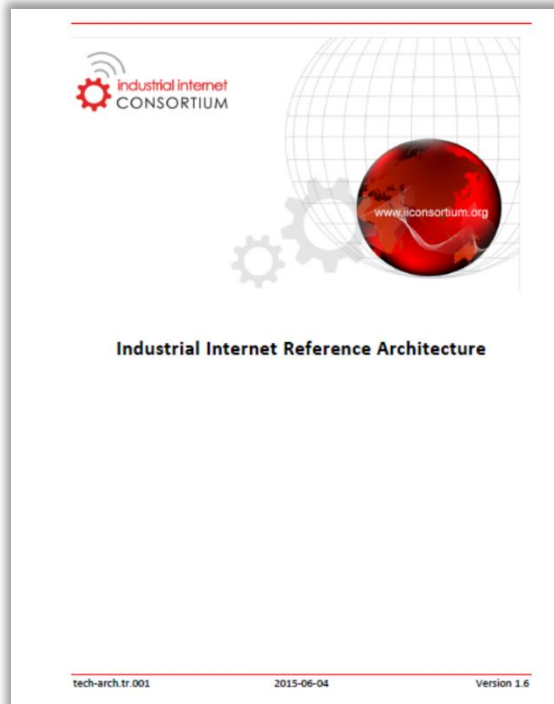
IIC

Industry4.0

China2025



North America: Industrial Internet Consortium Listing OPC UA and other protocols



- OPC UA listed

9.2.2 SECURITY IN REQUEST-RESPONSE AND PUBLISH-SUBSCRIBE COMMUNICATIONS

Two common patterns in IIS communications are request-response and publish-subscribe. The request-response pattern is common in industrial systems. Examples of the implementation of this pattern include Java Remote Method Invocation (Java RMI) [6], Web Services/SOAP [7],
405 RPC-over-DDS [8], RESTful Servers, OPC [9], Global Platform Secure Channel Protocol and Modbus [10]. As the protocols of this pattern vary in degrees of support for security, they should be independently and carefully evaluated with regard to confidentiality, integrity and availability requirements. As an example, Modbus, a popular application-level fieldbus protocol within industrial systems, lacks support for authentication and encryption, and does not
410 provide message checksums, and lacks support for suppressing broadcast messages.

- Today 3 testbeds with integrated OPC UA

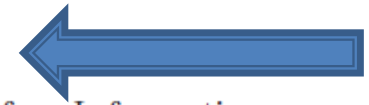
- OPC UA + TSN in Manufacturing
- OPC UA Sensor in Brownfield environment
- OPC UA and AutomationML for factory

German Industrie 4.0 recommends OPC UA

[http://www.zvei.org/Downloads/Automation/5305 Publikation GMA Status Report ZVEI Reference Architecture Model.pdf](http://www.zvei.org/Downloads/Automation/5305_Publikation_GMA_Status_Report_ZVEI_Reference_Architecture_Model.pdf)



- Approach for implementation of a Communication Layer
 - OPC UA: Basis IEC 62541
- Approach for implementation of an Information Layer
 - IEC Common Data Dictionary (IEC 61360 Series/ISO13584-42)
 - Characteristics, classification and tools to eCl@ss
 - Electronic Device Description (EDD)
 - Field Device Tool (FDT)
- Approach for implementation of a Functional and Information Layer
 - Field Device Integration (FDI) as integration technology
- Approach for end-to-end engineering
 - AutomationML
 - ProSTEP iViP
 - eCl@ss (characteristics)



OPC UA: Security analyzed

Who: Federal Office for Information Security (German Government BSI)

Why: Because of relevance of OPC UA for German Industry

What: Security Evaluation of OPC-UA – finalized March 2016

- Analysis of specification / Analysis of Reference Implementation

Result: Available on BSI web and OPC web



China National Standard

- ▶ TC124 has held first OPC UA GB certification working group meeting in October 2016
- ▶ The first OPC UA related standard will be released:
 - 20090699-T-60 Part 1: Overview and Concepts
 - 20090700-T-60 Part 2: Security Model
 - 20090701-T-60 Part 3: Address Space Model
 - 20090702-T-604 Part 4: Services
- ▶ OPC China will fully cooperate with TC124 and drive to release this standard before the end of 2016.

Adoption

Siemens support OPC UA

11 Siemens products with integrated OPC UA

- SIMATIC S7-1500 PLC Family <https://opcfoundation.org/products/view/434>
- SIMATIC S7-400 with OPC UA CP (CP 443-1 OPC UA) <https://opcfoundation.org/products/view/444>
- RFID Reader SIMATIC RF600 <https://opcfoundation.org/products/view/449>
- SINUMERIK CNC control systems <https://opcfoundation.org/products/view/450>
- SIMOTION IT <https://opcfoundation.org/products/view/199>
- SINEMA Server <https://opcfoundation.org/products/view/446>
- SIMATIC NET OPC Server <https://opcfoundation.org/products/view/202>
- SCADA system SIMATIC WinCC Open Architecture <https://opcfoundation.org/products/view/436>
- SIMATIC B.Data <https://opcfoundation.org/products/view/437>
- SIMATIC HMI Comfort Panels <https://opcfoundation.org/products/view/432>
- SIMOCODE pro Motor Management System <https://opcfoundation.org/products/view/247>

Emerson & OPC UA

► Emerson Process Management

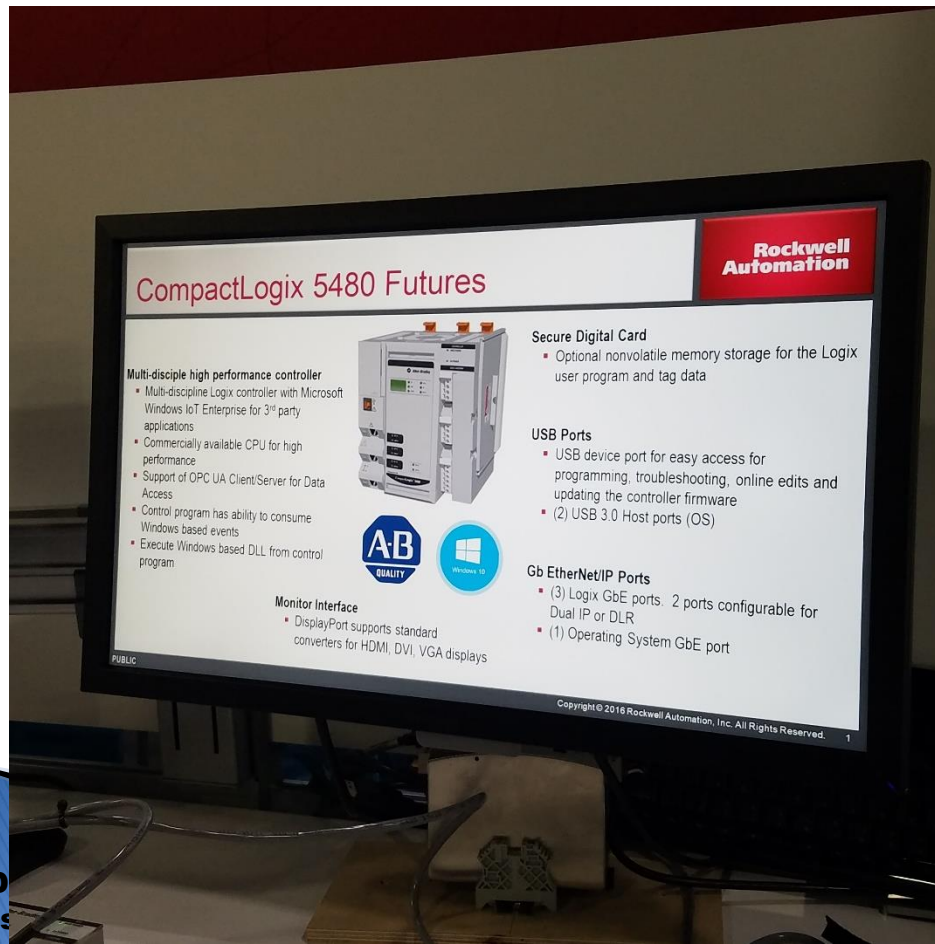
- **Machinery Health™** Protection System (CSI 6500 ATG)
native OPC UA Support integrated



Rockwell & OPC UA

► Rockwell Automation Show Nov 2016

- Compact Logix 5480 with integrated OPC UA Server

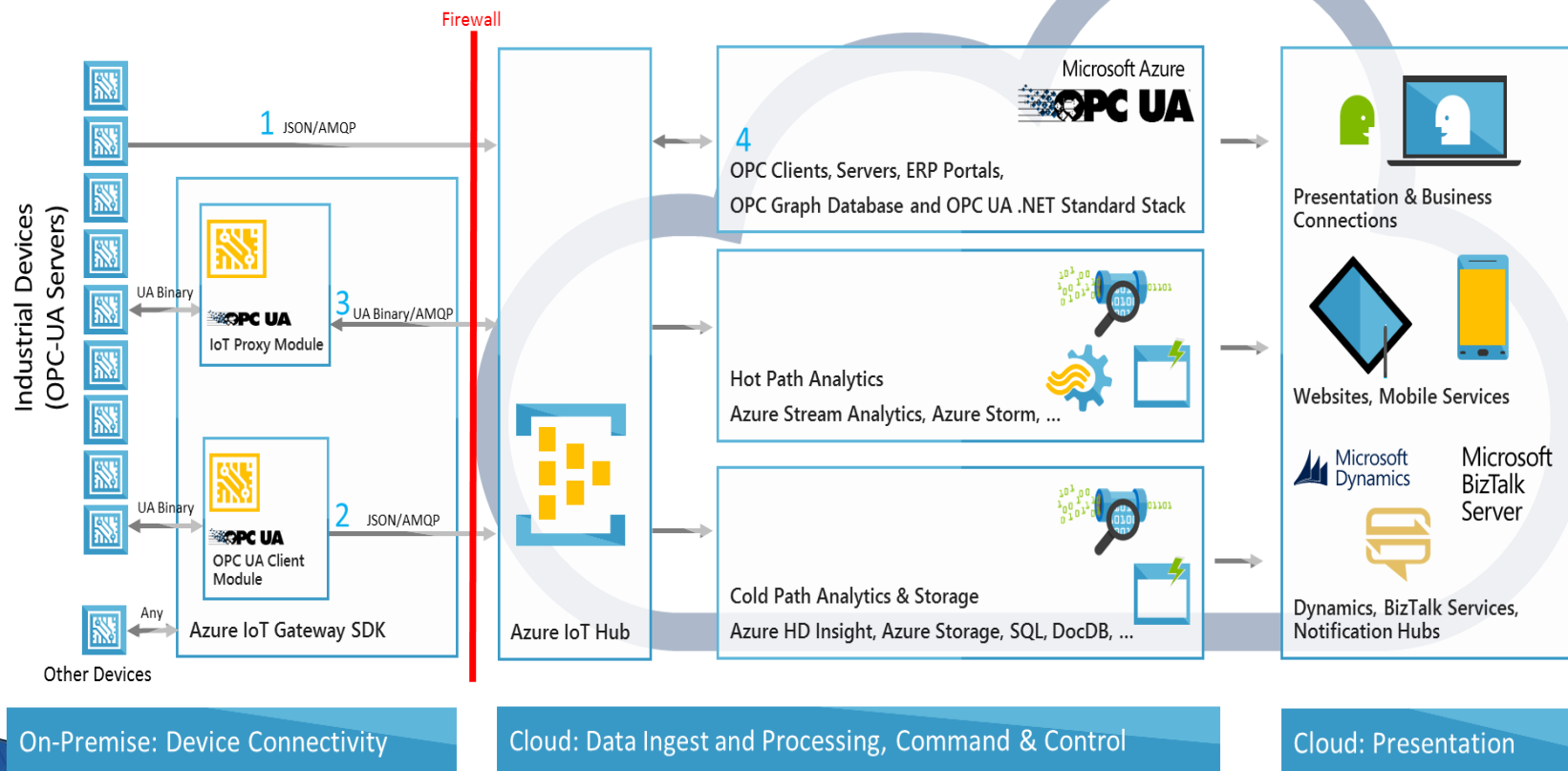


OPC UA integration into Azure IoT

Download flyer here

<https://opcfoundation.org/wp-content/uploads/2016/10/Microsoft-OPC-UA-5-Clicks-To-Digital-Factory.pdf>

Azure IoT Gateway with integrated OPC UA RELEASED ! (OPC Classic on road)



Azure IoT Gateway SDK integrated HPE EL20 IoT Gateway



**Hewlett Pack
Enterprise**





Microsoft Windows 10 listing OPC UA

Microsoft Windows 10 Anniversary slide deck:

CONNECTED THINGS


Open platform that seamlessly connects things, endpoints and the cloud





Open Standards & Interface

- Standards based approach to IoT and interoperability
 - ALLJOYN/OCF Integration for consumer IoT
 - OPC UA for Industrial IoT
- Ubiquitous connectivity
 - USB, Wi-Fi, BLE, Cellular
- Low level BUS and hardware support



Azure Cloud Integration

- Secure Azure connection with TPM
- Best in-class connectivity with Azure

“Connected – Windows 10 IoT takes a standards based approach. Interoperability is key in IoT solutions. Windows 10 IoT has ubiquitous connectivity, and we have Alljoyn/OCF integration for consumer IoT and OPC UA for Industrial”

SAP: SoA Reshape Automation Pyramid

SAP MES orchestration via OPC UA the factory floor



Collaborations

The OPC Foundation closely cooperates with organizations and associations from various branches. Specific information models of other standardization organizations are mapped onto OPC-UA and thus become portable.








- Markets

- Automation
- Building Automation
- Energy
- Engineering
- Measurement
- Oil & Gas
- Transportation



Web - „Markets & Collaborations“

Logo	Vertical market	Teaser
 for efficiency in automation	Automation	More... PLCopen , as an organization active in Industrial Control, is creating a higher efficiency in your application software development and lowering your life-cycle costs.
 Verband für Automatische Datenfassung, Identifikation und Mobilität	Automation AutoID Supply Chain	More... RFID, but also other AutoID processes, are key technologies for the implementation of the philosophy of industry 4.0. The more important it becomes to integrate these technologies as simple as possible into total solutions. Therefore AIM-D e.V. (Association for Automatic Data Capture, Identification and Mobility), responsible for Germany, Austria and Switzerland, defined standards on the basis of an OPC UA.
	Automation CNC	More... An OPC UA information model has been developed within the cooperation of the German Machine Tool Builders' Association (VDW) and the OPC Foundation, in order to interface and exchange data with CNC systems.
	Automation	More coming soon MTConnect mapped their information model into OPC UA and thus became portable.
 European Plastics and Rubber Machinery	Automation Plastics and	More... EUROMAP is the European umbrella association of plastics and rubber machinery manufacturers. It provides technical recommendations for this

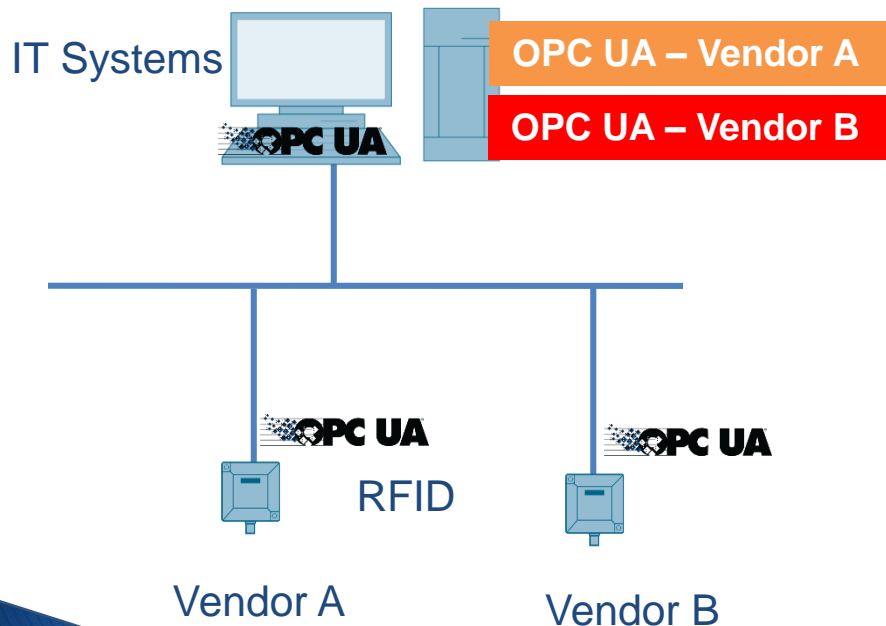
OPC UA companion specifications

- OPC UA & AutomationML: released
- PLCopen OPC UA Client for IEC61131-3: released
- OPC UA for AutoID: released
- MDIS (Oil&Gas): First interoperability workshop for companion spec
- PackML: Release candidate
- (VDMA) Injection molding machine: Release candidate
- (VDMA) Machine Vision: started
- (VDMA) Robotic: under preparation
- VDMA: Preparing an „VDMA Leitfaden OPC UA“ for Hanover Messe 2017

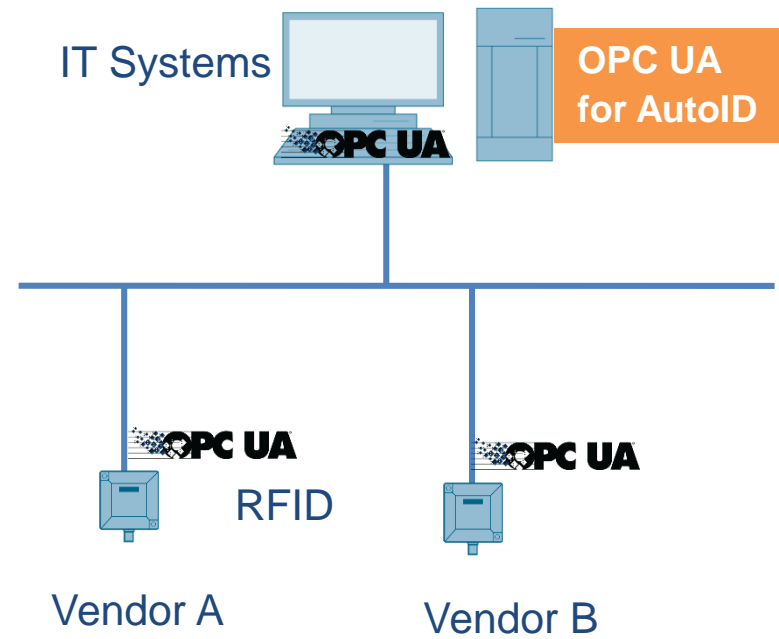


Benefits of OPC UA companion spec

- With OPC UA
- Without OPC UA Companion Spec
- → every device provides own modelling
- → extra effort for engineering



- With OPC UA
- With OPC UA AutoID Companion Spec
- → each device provides same modelling
- → reduce efforts for engineering



Multidimensional Sensor Communication Through OPC UA

Press conference, 22.11.2016



 **Leuze electronic**

Introduction

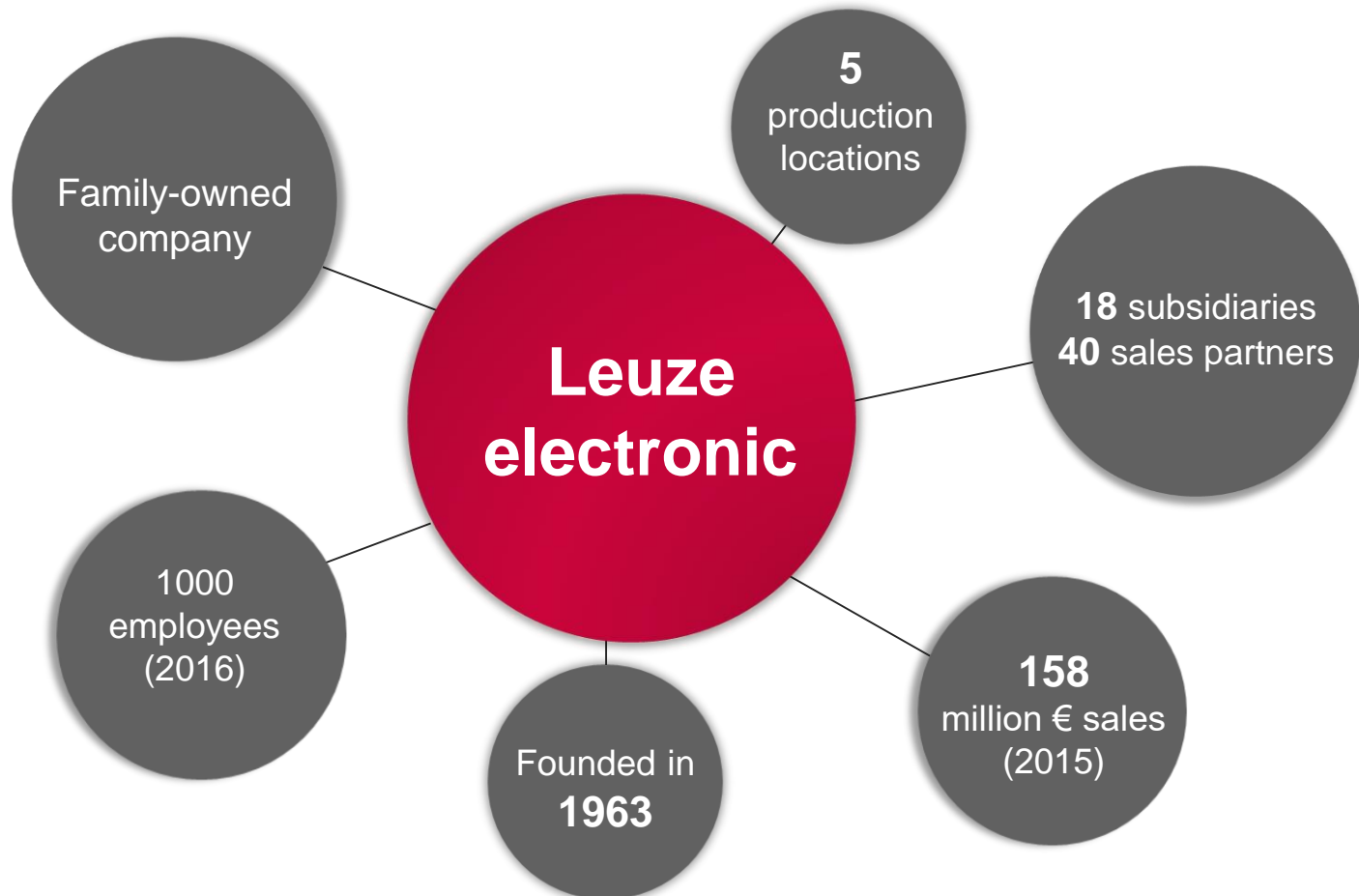


Dr. Henning Grönzin
Director Research & Development

2 years at Leuze electronic GmbH + Co. KG,
Owen/Teck



The company



What makes us **stand out**



SMARTER **PRODUCT USABILITY**

SMARTER **APPLICATION KNOW-HOW**

SMARTER **CUSTOMER SERVICE**

Who **we** are

"We are the specialists for **switching** and **measuring sensors**, sensors for **safety at work** and **identification** as well as for solutions for **data transmission** and **image processing**."



Katrin Rieker,
Sales Methods,
Processes, Tools

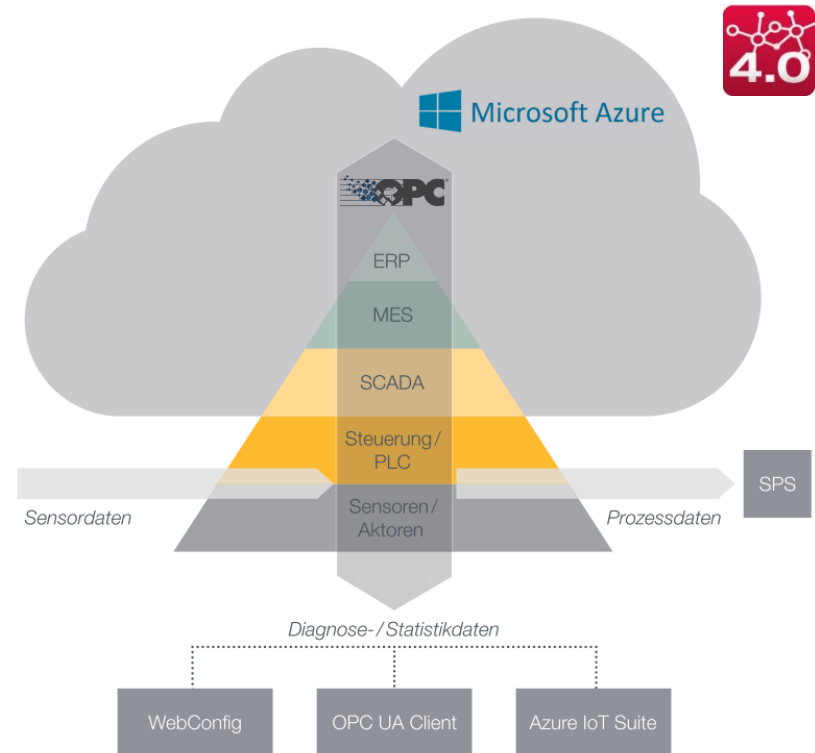


Mitglied der OPC Foundation

Leuze electronic member of the OPC Foundation since September 2016

Why?

- I4.0: Exchange of data across different levels and in different directions
- Leuze electronic sensors provide data for I4.0
- Standardized model of communication is required
- OPC UA Key Enabler for I4.0
- OPC Foundation driving at a standardized communication (I4.0 context)
- Participation in Companion Standards



Leuze electronic auf der SPS



- Sensor capable of communicating through different channels
- Connectivity of a Leuze sensor directly to the Azure Cloud
- **No Gateway!**
- Data transmission is realized by implementation of OPC UA
 - Usage of the Client/Server Communication Model
 - Usage of the Publisher/Subscriber Communication Model (in parallel)
 - Data transmission using AMQP (safe data connection into the cloud)
- Sensor data in the cloud
 - Data collection in the IOT-Hub
 - Data analysis and visualization of data by usage of Cloud Services
- Bidirectional data exchange between sensor and cloud

Leuze electronic GmbH + Co. KG
In der Braike 1, 73277 Owen
www.leuze.de



 **Leuze electronic**

the **sensor** people

New Membership



OPC UA meets SmartWire-DT

Preparing machines and
systems for connection to
the Internet of Things (IoT)
Build it in.

Christian Zingg

Director Innovation & MOEM Solution
Industrial Control & Protection Division
Electrical Sector EMEA



Facts & Figures

Net sales	US\$ 20bn
Employees	97'000
Headquarter	Dublin, Ireland
Foundation	1911 by J.O. Eaton
CEO	Craig Arnold
Business	Electrical, Hydraulics, Aerospace, Truck, Automotive
Vision	To be the most admired company in our markets.



Organizational Structure



Powering Business Worldwide

Craig Arnold, CEO

Electrical Sector
US\$13bn sales

Industrial Sector
US\$7bn sales

Americas

EMEA

APAC

Aerospace

Hydraulics

Truck

Automotive

4
0



Product offering

Electrical Sector Europe, Middle East & Africa

Electrical Solution & Services



Power Distribution Components



Industrial Control Protection



Power Quality



Safety



IoT ready with SmartWire

IoT readiness with Intelligent Devices



Intelligent Device

- Open for 3rd Party with OPC UA
- Decentralize Intelligence & control
- True Data's direct available
- Predictive maintenance
- Life Cycle Management



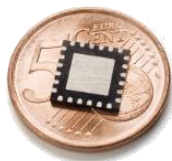
Connectivity Concept

- OPC UA
- Eaton PLC's and 3rd Party PLC's
- 99 Devices and up to 600m
- Wiring solution for IP20 & 67



Devices Integration

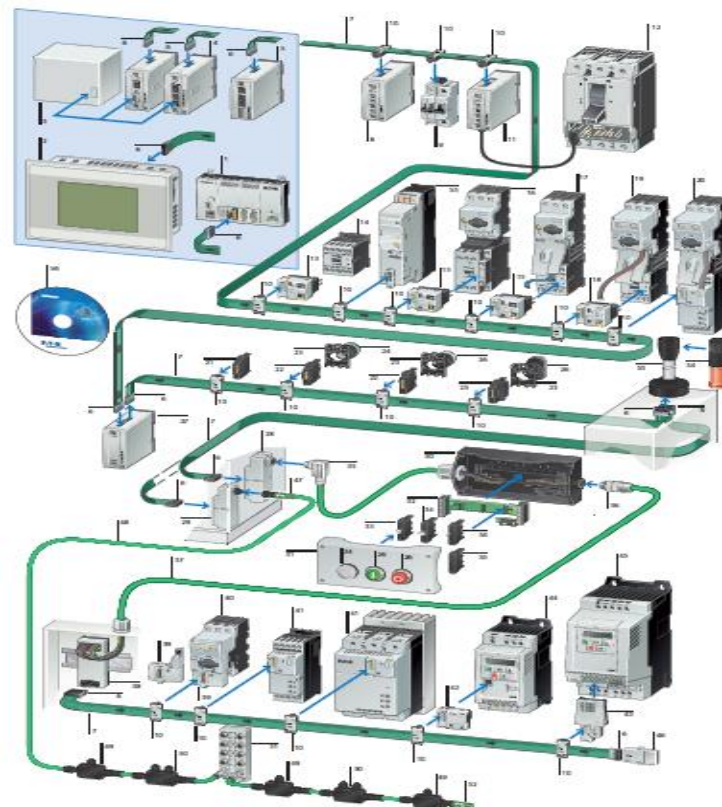
- Wide Range of Devices
- IP20 and IP67 Application
- Open Solution for 3rd Party
- Open for Partnership



ASIC – Device Platform

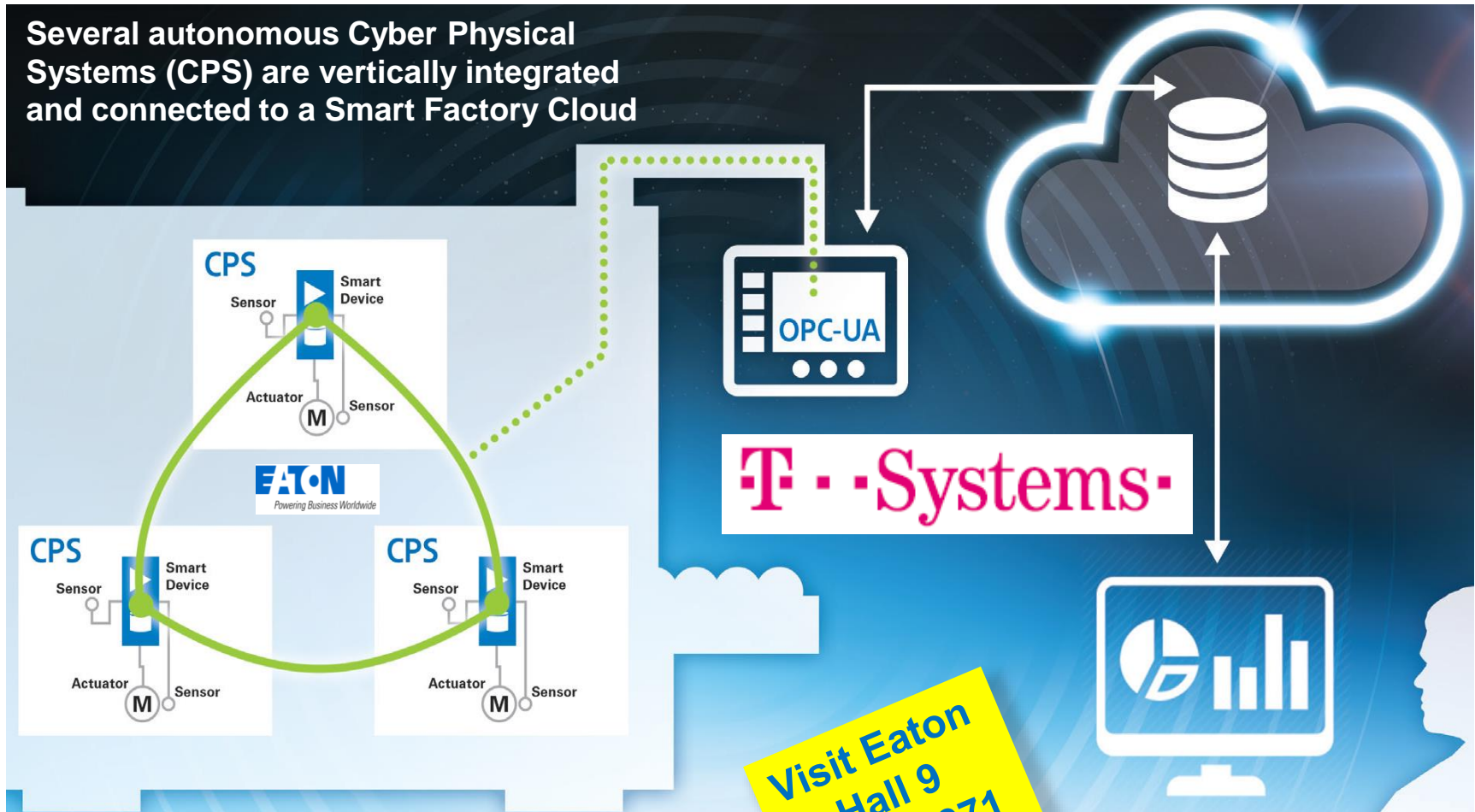
- Baudrate up to 10MB
- Dual core μ 32Bit μ C, 32 MHz
- Flash and Ram
- Analog I/O, 48 GPIO
- JTAG interface
- 7-31 VDC power supply

SmartWire DT Solution available today



OPC UA Solution

Several autonomous Cyber Physical Systems (CPS) are vertically integrated and connected to a Smart Factory Cloud



4
3

OPC UA Solution

New Whitepaper's

Connection to Internet of Things (IoT) White Paper

Preparing machines and systems for connection to the Internet of Things (IoT)
Build it in.

IoT
Ready

Energy Efficiency White Paper

Planning and operating hydraulic power units to provide greater energy efficiency
Build it in.

Potential solution for reducing energy consumption and digitalization of data for smart power management

Digitalized machine EL & HYD connected to the cloud with OPC UA

Visit Eaton
Hall 9
Stand 371

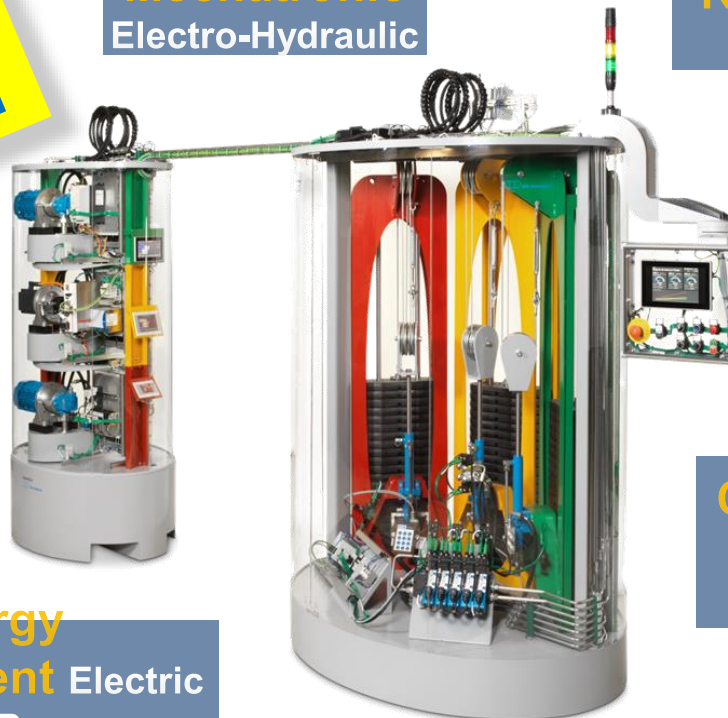
Mechatronic
Electro-Hydraulic

Remote Service
Cloud Solutions

Interface
Human-Machine

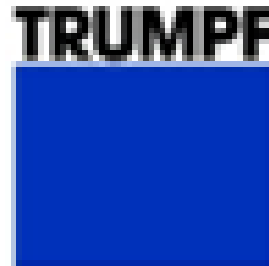
Connectivity
Decentralized
Digitization

Energy
Management Electric
& Fluid-Power






Industrial Use of OPC UA

Chris Münch
CEO & founder
C-Labs Corporation



Marco Holzer
Head of product management &
logistics services
TRUMPF Laser GmbH

Project Partners

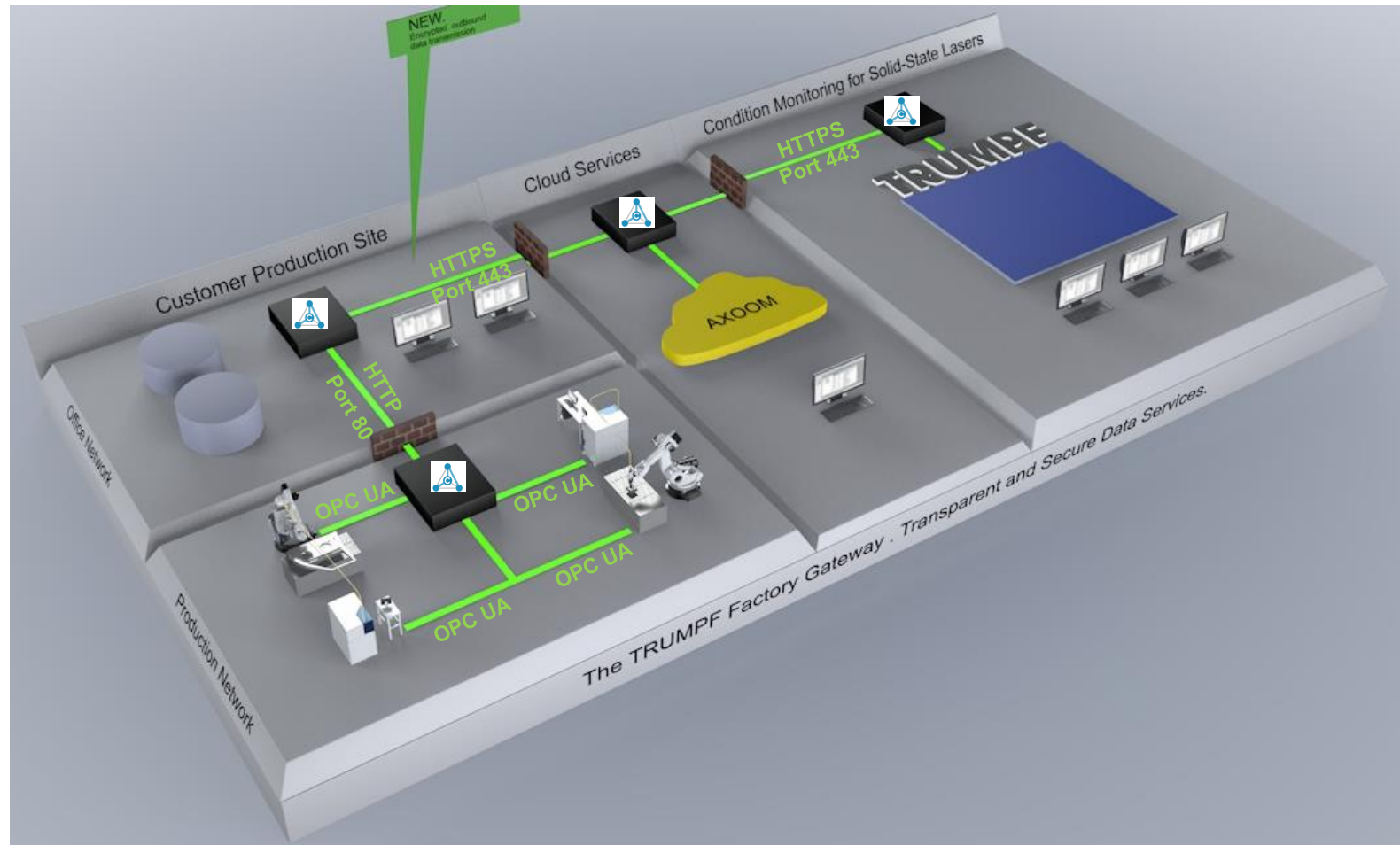
Automotive industry			
Automotive OEM / Automotive Supplier	TRUMPF Laser GmbH	C-Labs	Axoom GmbH
Manufacturing plants Contact TRUMPF	Machine Builder TRUMPF Laser Marco.holzer@de.trumpf.com	Factory Gate Secure OT/IT Infrastructure Chris.Muench@C-Labs.com	Cloud Provider Info@Axiom.com

Project Description

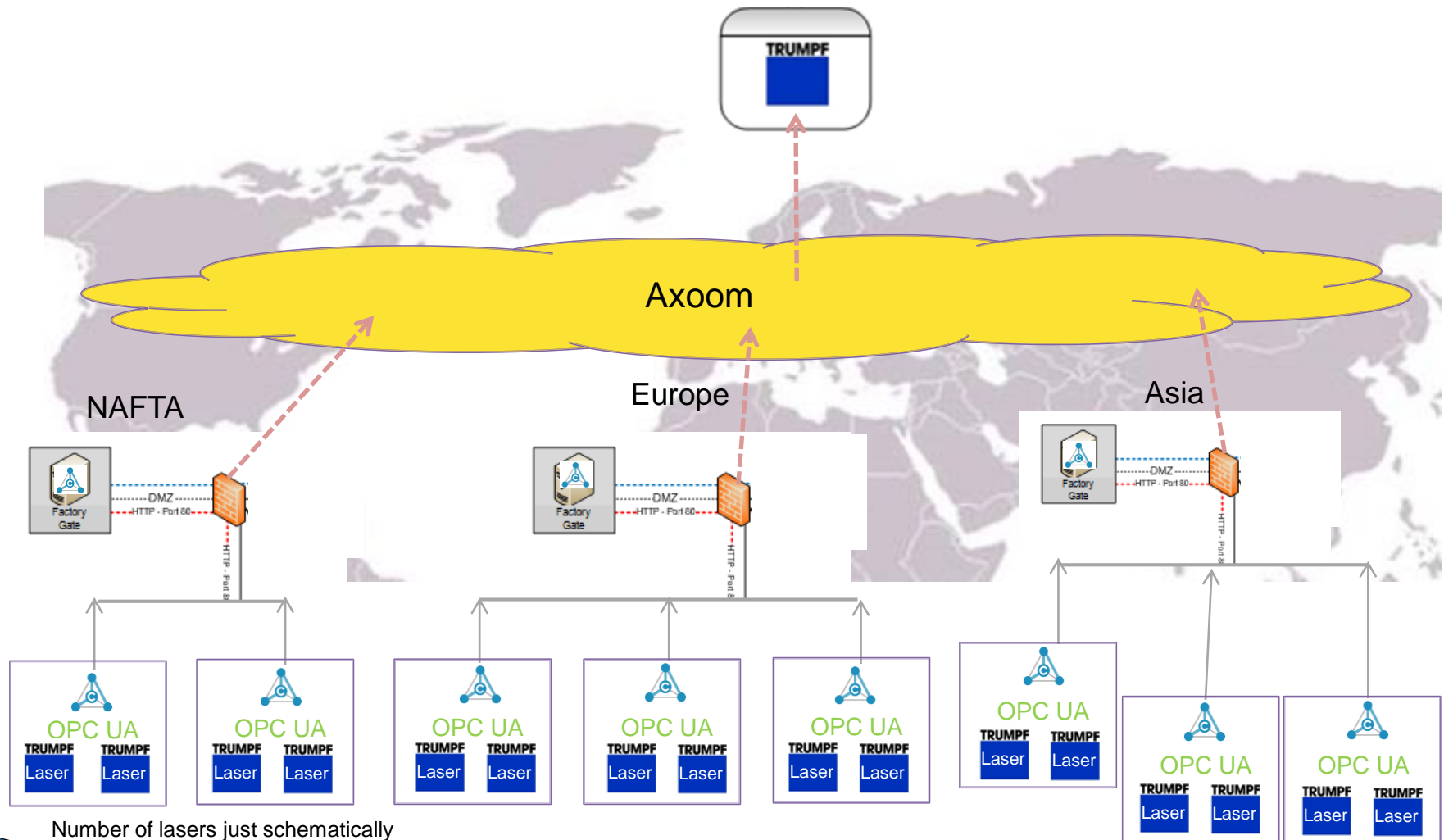
- TRUMPF delivers since many years laser devices with OPC UA interfaces.
- For the automotive industry more than 100 lasers worldwide are connected via OPC UA to the C-Labs Factory Gate.
- Data are transmitted from the laser device via the C-Labs Factory Gate and the Axoom Cloud to TRUMPF
- The automotive supplier can now access the laser data from anywhere around the world.
- In addition TRUMPF optimizes the laser systems and detects trends with algorithms (predictive maintenance) based on the transferred data

Architecture

- ▶ Network topology in each global region



Architecture



Benefits

- Increased availability due to reduction of unplanned downtime
- Optimized planning and preparation of service missions
- Reduction of risks (esp. in 24 x 7 production)
- Status of lasers at a glance – time and cost savings for maintenance employees
- Worldwide overview of all laser devices

OPC UA Embedded at the Chip Level

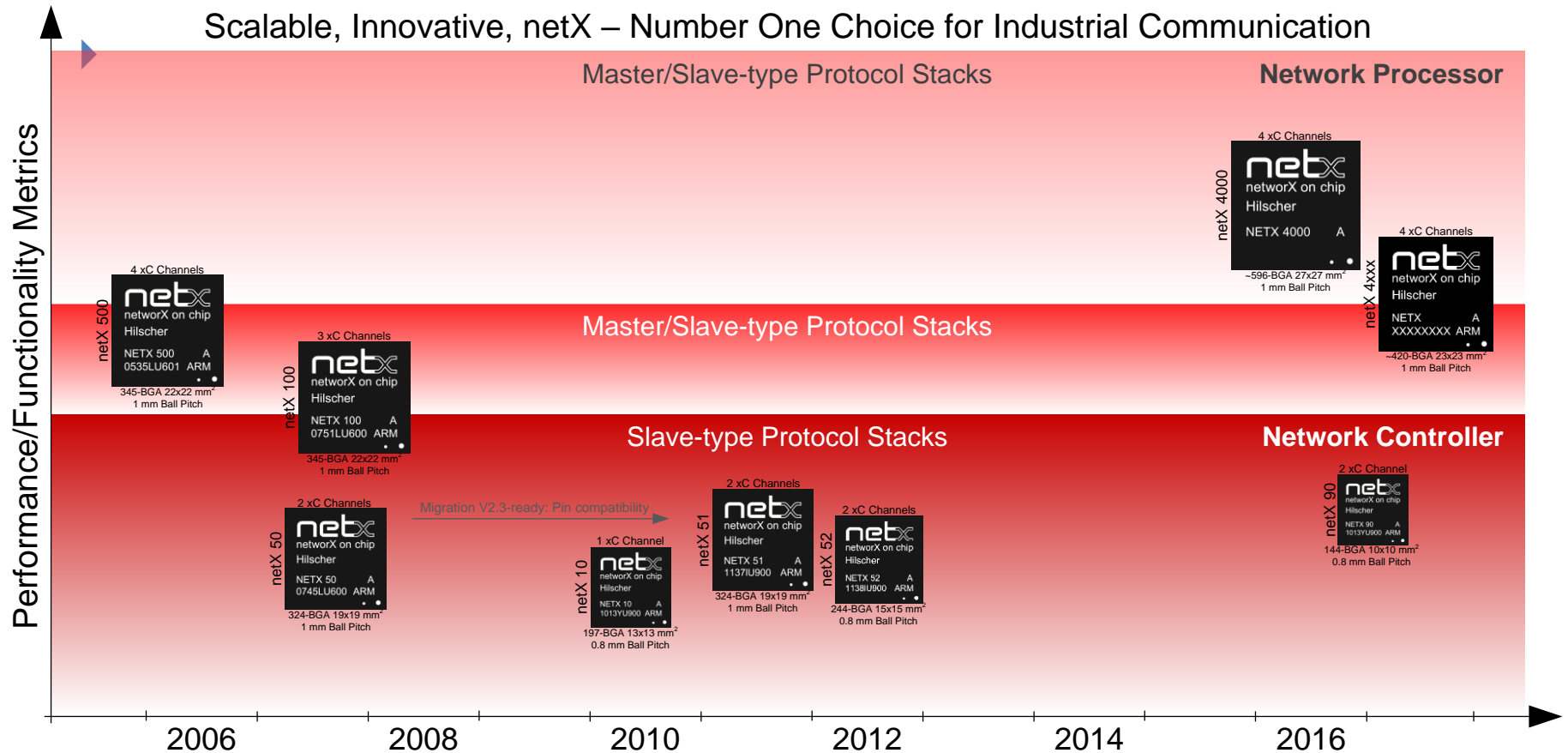
Jamie Gallant
OEM Solutions Manager
Hilscher North America, Inc.



netX Chip Family



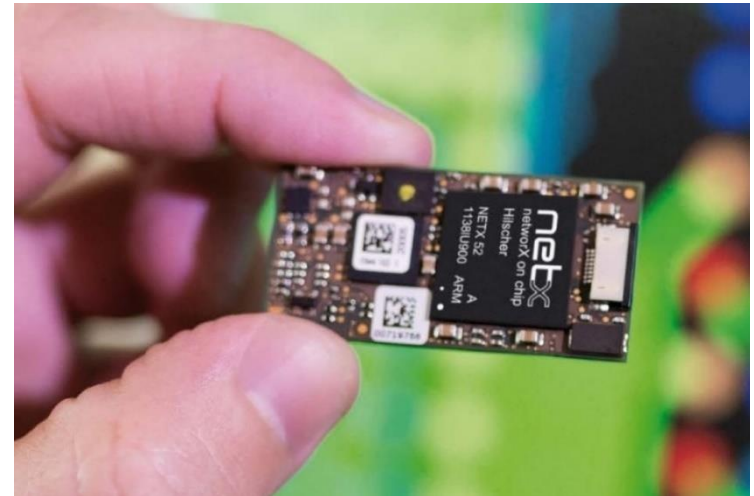
Scalable, Innovative, netX – Number One Choice for Industrial Communication



OPC UA on Hilscher netX Chips



- ▶ Easy device integration into the Industrial Internet of Things
- ▶ Based on the OPC Foundation OPC UA stack
 - C code basis
 - Reciprocal Community License (RCL 1.0)
- ▶ Hilscher's own Server implementation
- ▶ Fulfills OPC UA specification 1.02, Parts 1 – 7 and most of 8
- ▶ Nano Embedded Server Profile *Available now*
- ▶ Micro Embedded Server Profile *Available as beta*



OPC UA Embedded Server

	Nano Footprint	Micro Footprint (prelim)
Code + static data (Server + jansson + meta + stat. web pages)	~ 340 kB	~ 400 kB
Task stack + heap (With standard netPROXY objects; No customer objects used)	~ 75 kB	~ 100 kB
Each session needs additional heap	~ 1 kB	~ 1 kB
CPU usage	~ 1 % for each open session	~ 3% for one session with two subscriptions + two monitored items

OPC UA Outlook

Today:
netX Chips
IIoT-Ready
with OPC
UA

Ongoing:
TLS
Security in
HW/SW

Q1 2017:
lwIP-based
TCP Stack

2017:
OPC UA
for Next-
Gen netX
Chips

When Avail
by OPC-F:
Pub/Sub
and TSN

On
Request:
Add'l
Information
Models
such as DI

OPC Foundation: Transition



OPC Foundation in the transition...

From “Interoperability Standard for Industrial Automation”

To “The Industrial Interoperability Standard”

... on the way to additional markets



Join OPC Booth Hall 7 – 180

Thank you

