

OPC DAY FINLAND 2019

6.-7.11.2019 @ EXPO AND CONVENTION CENTRE MESSUKESKUS HELSINKI
#OPCUA #OPCDAY #OPCDAYFINLAND #AUTOMAATIO

OPC Foundation

Mission, Organization and Collaboration

by Stefan Hoppe, President OPC Foundation

SPONSORS:



FINNISH SOCIETY OF AUTOMATION
SUOMEN AUTOMAATIOSEURA RY



BECKHOFF



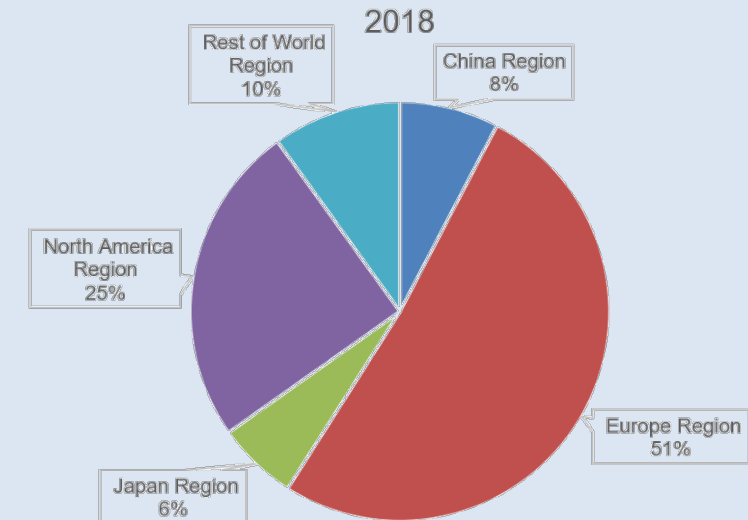
OPC Foundation <https://opcfoundation.org>

- ▶ Vision
 - Secure & reliable
 - Vendor, platform, and domain agnostic
 - interoperability from sensor to enterprise and beyond
- ▶ Global Profile
 - Non-profit organization (founded 1995)
 - Companies from Automation & IT
 - Internationally recognized: OPC UA is IEC62541
- ▶ Deliverables
 - Specifications: openly available
 - Tools and code examples for faster, easier adoption (AnsiC/C++, C# .NET Standard, Java)
 - Certification: OPC Labs open to everyone
- ▶ Ecosystem with toolkits and education
- ▶ Modern IPR policy



Organizational Overview

Membership: 734 (Nov 5th, 2019)



2019 Board of Directors

Microsoft	Honeywell	Rockwell,
SAP	Yokogawa	Schneider,
Siemens	Mitsubishi	ABB
Beckhoff	Ascolab	

OPC Foundation: Largest Eco System for Interoperability

734 members - Status Nov 5th, 2019 - ... plus 120 Logo members



OPC Foundation: Why to joint as member?

Volkswagen is the 600th member of OPC Foundation



Stefan Hoppe Michael Schweiger
OPC Foundation Volkswagen

“With OPC UA at the heart of Industrie4.0, adopting the OPC UA technology and using it to its full potential in our factories is a natural progression.

Being a member of the OPC Foundation guarantees early information to upcoming key technologies like the OPC UA Companion specifications which provide secured and standardized information and interfaces for assets.”

Michael Schweiger, Volkswagen

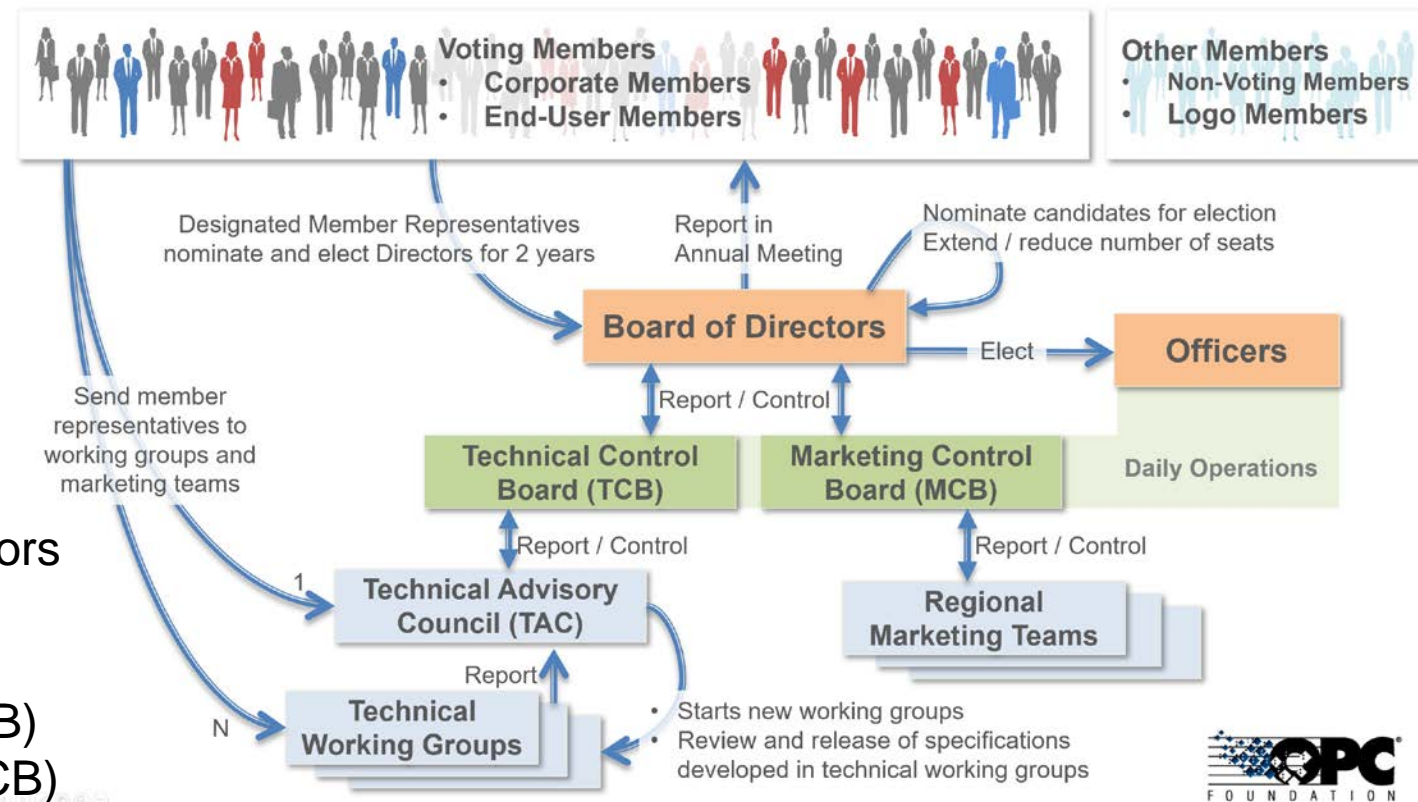


OPC Foundation: Organization

About ▾	Membership ▾	Products ▾	Cert ▾
What is OPC?			
OPC Technologies			
OPC Foundation	Mission Statement		
Working Groups	History		
Sponsoring / Advertising	Organization		
Contact Us	Experts		

Structure of organization

- Board of Director, Officers, Directors
- Control Boards
 - Technical Control Board (TCB)
 - Marketing Control Board (MCB)
- Technical Advisory Council (TAC)
- Markets Advisory Council (MAC)
- Local groups (countries..)



OPC Foundation: Experts Program

<https://opcfoundation.org/experts/>

- List of OPC UA experts willing to offer services to interested vendors or organizations
- Technical Control Board (TCB) defined criteria
- Types of skillsets clearly identified

IM = Information Modeling

AD = Application Design

SC = Security Consulting

TR = Training

IS = Implementation Support

Registered Experts: 26 (as of Nov 5th, 2019)

Experts

Expert Name (alph)	Contact	Language	IM	AD	SC	TR	IS
Armstrong, Randy	randy@sparhawksoftware.com Canada Phone +1 425 296 7731	English	Y	Y	Y	Y	Y
Aro, Jouni	jouni.aro@prosysopc.com Finland Phone +358 9 420 9007	Finnish English	Y	Y	Y	Y	Y
Condemine, Michel	michelc@4ce-industry.com Montpellier, France Phone +33 4 67 79 07 37	French English	Y	Y	Y	Y	Y
Damm, Matthias	info@unified-automation.com Kalchreuth, Germany Phone: +49 911 495 25000	German English	Y	Y	Y	Y	
Gappmeier, Gerhard	info@unified-automation.com Kalchreuth, Germany Phone: +49 911 495 25000	German English		Y	Y		
Hunkar, Paul	Paul.Hunkar@dsinteroperability.com Cleveland, Ohio Phone +1 (440)-337-4161	English	Y	Y	Y	Y	
Mahnke, Wolfgang	info@unified-automation.com Kalchreuth, Germany Phone: +49 911 495 25000	German English	Y	Y	Y	Y	

Note: The OPC Foundation does not assume liability for the quality and outcome of these services.

OPC UA in the world



IIC



Industrie4.0



Made in China2025



Japan IVI



Manufacturing Renaissance
'Made in Korea'

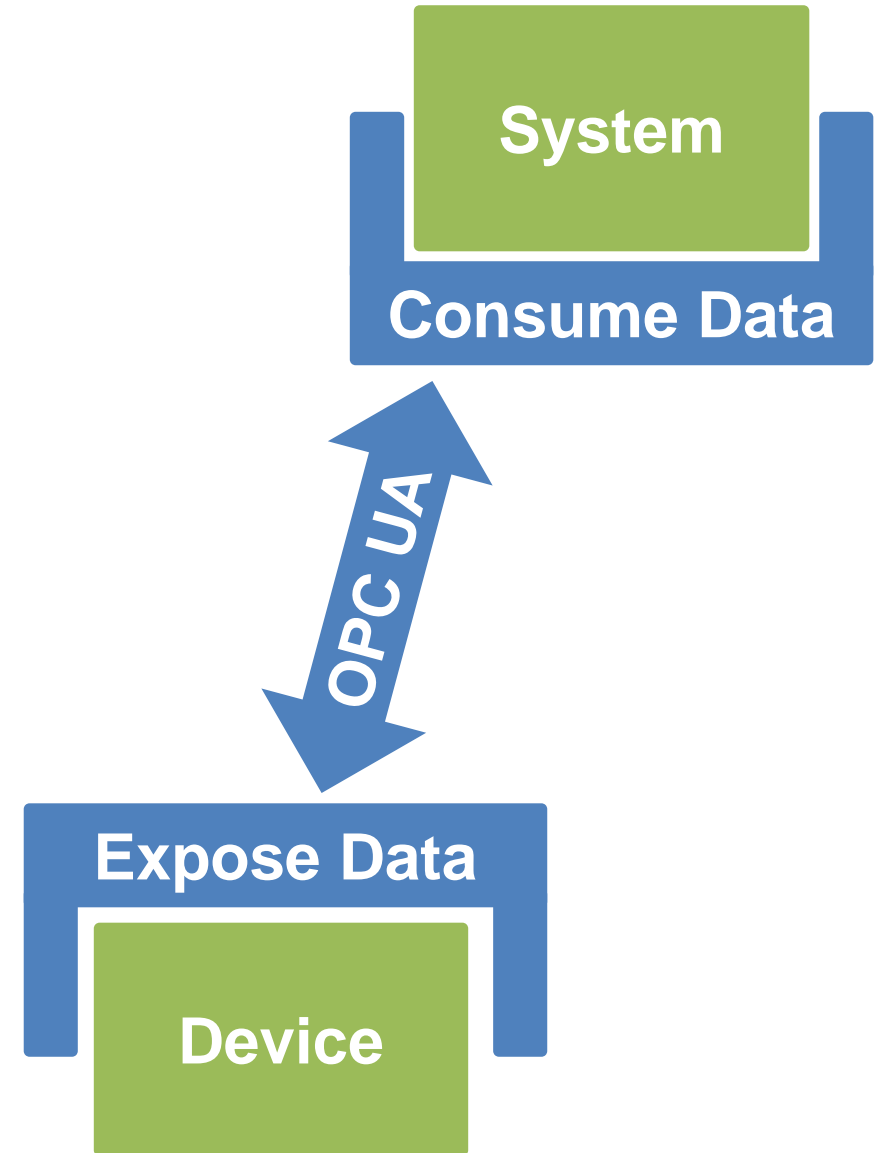


History – Use Case Driven

- ▶ Definition 2003 – 2006
- ▶ Verification and Implementation 2006 – 2008
- ▶ Final OPC Foundation Release 2009
- ▶ IEC 62541 Release 2010 – 2012
- ▶ **OPC UA = established OPC features**
 - + Platform independence
 - + Standard internet and IP based protocols
 - + Built in security features
 - + Generic object model
 - + Extensible type system
 - + Scalability through profiles
 - + Migration path from Classic OPC

Today

- Open source and toolkits available
- No membership required to adopt OPC UA
- Certification for members and non-members
- Strong IPR policy protection also for non members



The Industrial Interoperability Standard

OPC UA: The industrial framework enabling secured, standardized data and interfaces

Interoperable

Vendor, Platform, Market and OS
Independent

Scalable From Sensor to Cloud

**Discoverable Services Oriented
Architecture**

Independent of transport protocol

Non-Profit (OPC Foundation)

Widely Adopted: >50M install base

Open Source on GitHub

Data Modelling

Graph Support, preserves source context

Vendor **extendable** data model via
Companion Specifications

Relevant: Enables domain specific
information models

- Discrete: Robotics, Machine Vision, ...
- Process: FDI, FDT, PA-DIM, MDIS, NOA..
- Energy: IEC61850, ..

Secure

Secure Design from group up

Based on open security standards

Auditing, Authentication & Encryption

Future Proof: Evolves with security
technologies

**Vendors/Users can choose level of
security**

Accepted: Aligned with IT requirements

... today 50+ initiatives!

Vendors will differentiate on features not interfaces...

Commercial printers

- Different vendors
- Standardized connectors
USB / Ethernet
Support profiles “I am a printer”



- Differentiate by functionality
 - All-in-once scan/fax/print?
 - Double side printing?
 - Colour? Combined or separate?
 - Print speed, cost, etc.
 - Ease of use
 -

Industrial devices / machines

- Different vendors
- Standardized connector: OPC UA
Support profiles “I am an RFID reader”
- Built in security



- Differentiate by functionality
 - Reduce engineering costs
 - Support standards
 - Easy network integration
 - Costs
 - Throughput of machine
 -

Brownfield integration: Gateways!

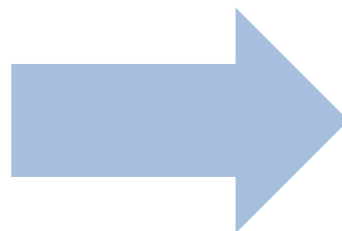
Before USB



DIN Keyboard / Centronics printer / PS2 mouse

Transition

Use adopters to connect old and new world



With USB



OPC UA Client



Benefit:

Consistent, compatible data model for all machines, plus security!

Market of gateways

- <\$500
- Connect to PLCs or fieldbus systems
- No changes to machines required!



proprietary



History: Humans had to learn how machines think and work

DATA TABLE 5

WORD0 = 0x5128
WORD1 = 1111000010101001
WORD2
WORD3
...
WORD255

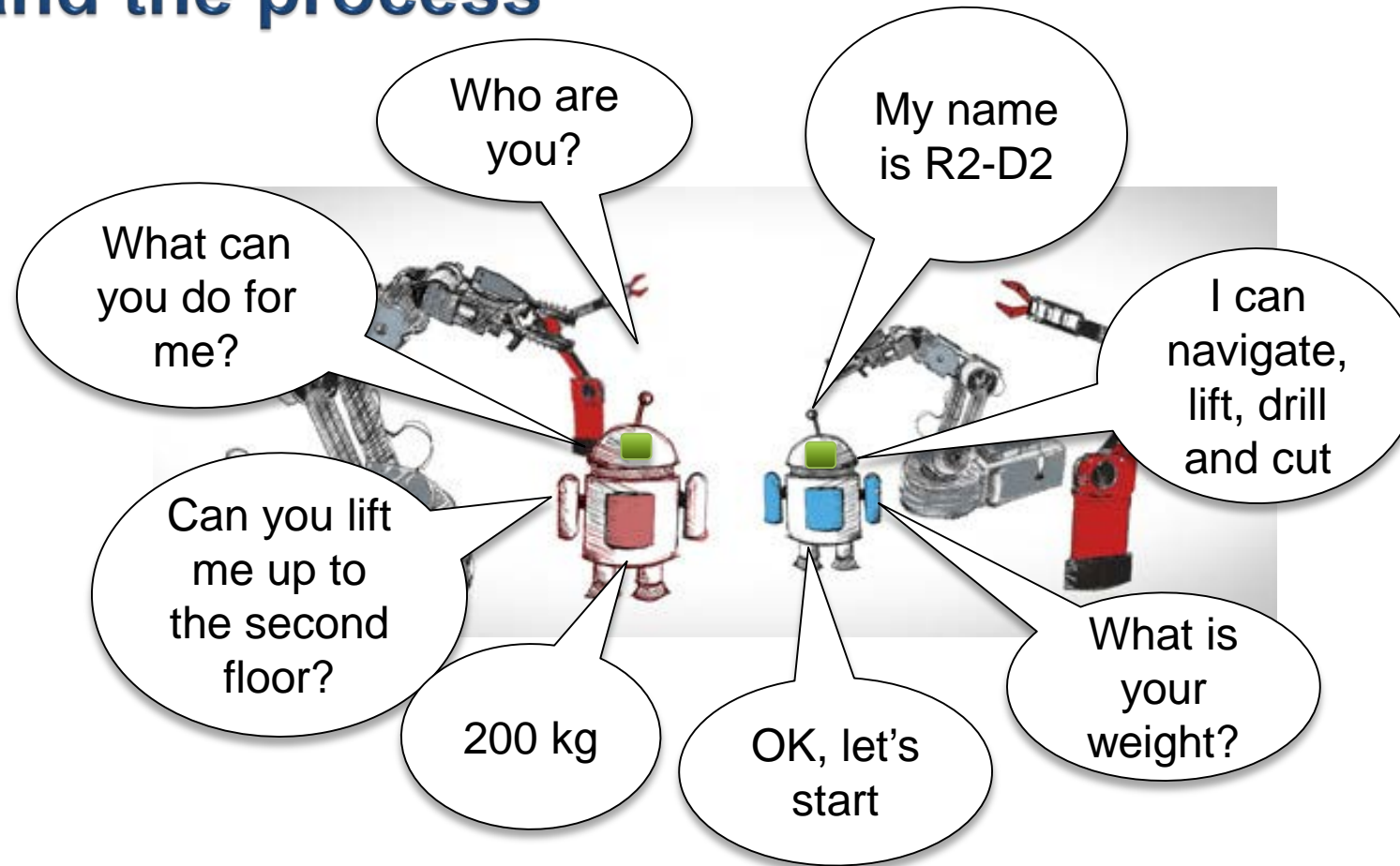


- Huge documentation efforts
- Different parameters for different vendors
- High efforts for humans to understand

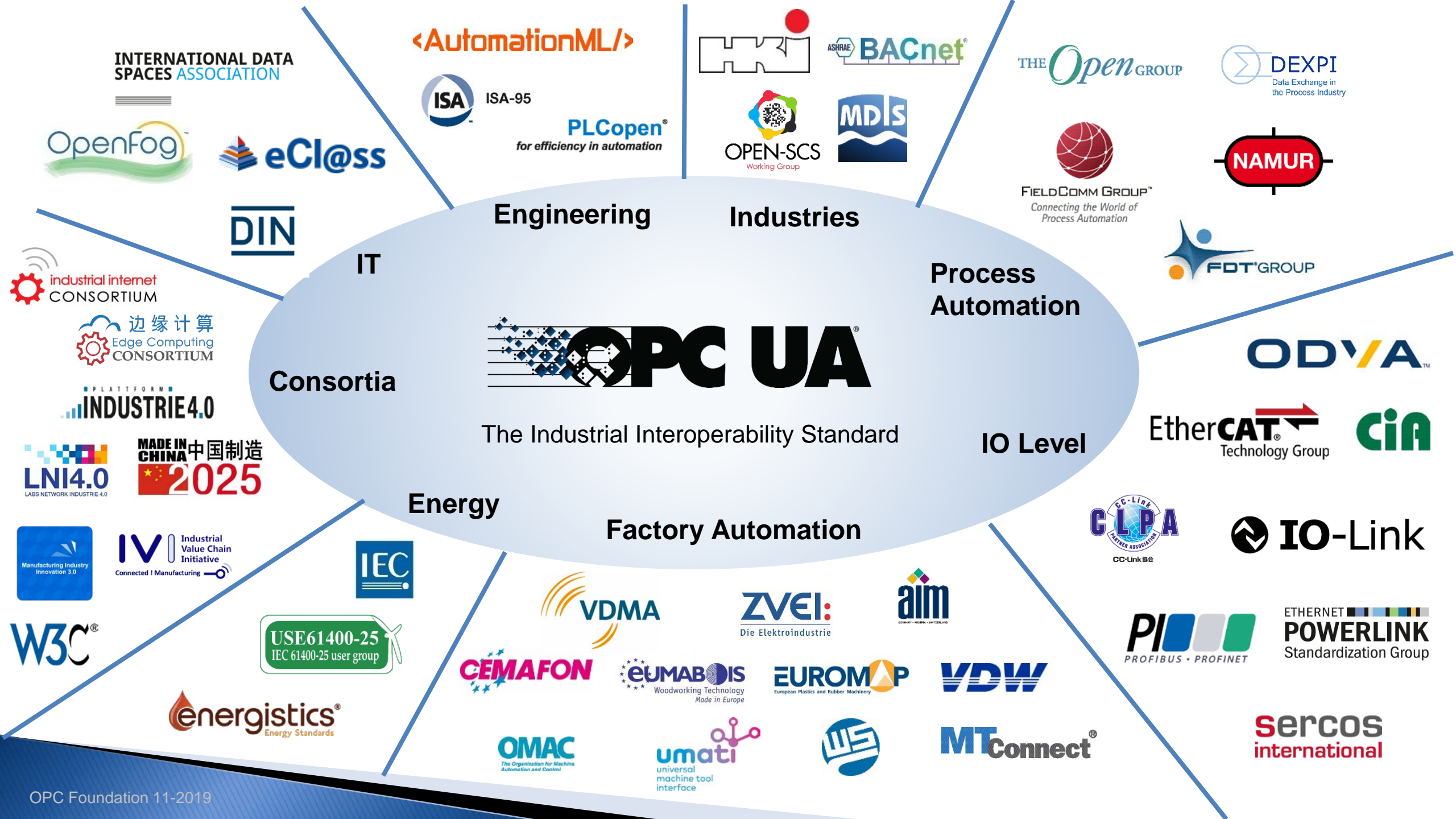


Instead:
Machines should help humans
in “their language”!
Self-description reduces
engineering

Today: Machines help humans to easier understand the process



The self-description reduces configuration effort and supports quick understanding of information.

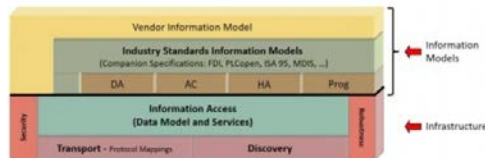


OPC Foundation: Difference between CS and JWG

UA Companion Specifications

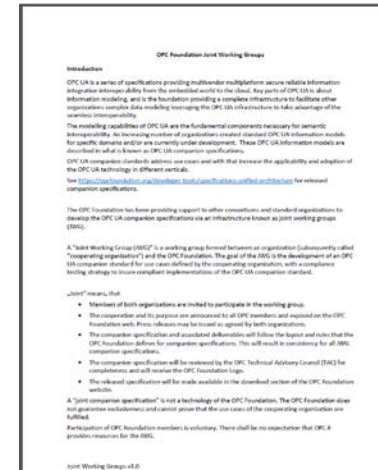
The Base: OPC UA Infrastructure

OPC UA has been designed for scalability and supports a wide range of application domains, ranging from field level (e.g. devices for measurement or identification, PLCs), to enterprise management support. To achieve these design goals, the OPC UA standard provides a multi-layered architecture as shown in the following figure:



OPC UA is built on the following Infrastructure:

- **Discovery** which allows Clients to find OPC UA Servers, their supported protocols, security policies and other capabilities.



UA Companion Specs

- Can be done by everybody
OPCF not involved - No OPCF logo
- 3 categories
 - Internal
 - Joint
 - External
- CS word templates available

Joint Working Groups

- In cooperation with OPCF
OPCF voting, review
- Definition / Criteria / How to create
- Rules for deliverables
- Levels of adoption
 - Specification
 - Adoption
 - Certification

OPCF joint working group (JWG) – Definition, Criteria, How-to



- gives an introduction and definition about OPC Foundation JWG

Public documentation for joint working groups

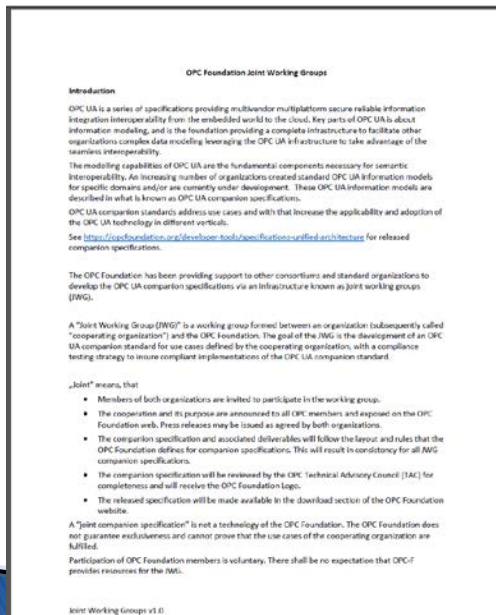
<https://opcfoundation.org/about/working-groups/joint-working-groups/>

- Definition
- Criteria
- How to create
- Levels of adoption (specification / adoption / certification)

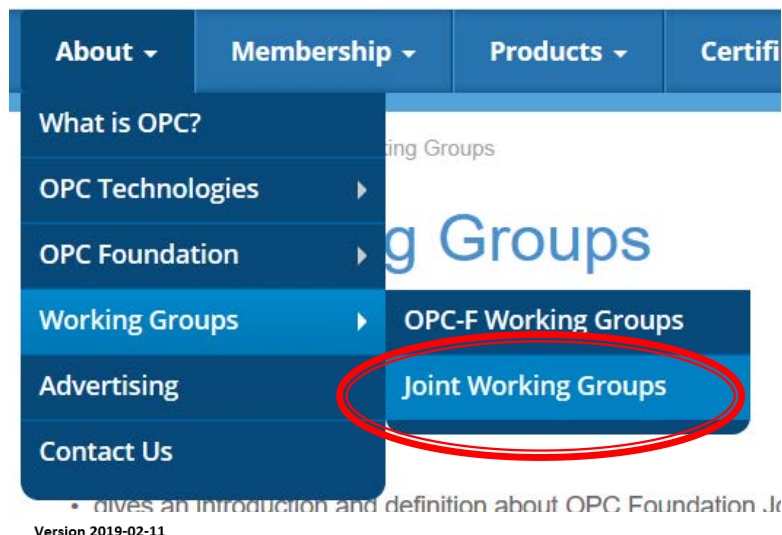
A “joint companion specification” is not a technology of the OPC Foundation.

The OPC Foundation does not guarantee exclusiveness and cannot prove that the use cases of the cooperating organization are fulfilled.

Participation of OPC Foundation members is voluntary. There shall be no expectation that OPC-F provides resources for the JWG.



OPCF joint working group (JWG) – Overview groups



Public documentation for joint working groups

<https://opcfoundation.org/wp-content/uploads/2019/02/Overview-UA-InformationModels.pdf>

- List of existing groups: What / Who / Contact / Version
- Link to Release
- Traffic lamp for : Implemented / IP tested / Certified

Title	Active	Abstract	Contacts	Version	Status	Status Date	Implemented	IOP tested	Certification	Key Words
Generic Device Models (Controller, Field Device, Process Device)										
OPC Foundation: UA for Devices (DI)	Y	generic representation of devices, e.g. Field devices, controllers, robots, machine tools	Matthias Damm, chair	V1.00	Released	Dec-09				physical device,software component, functional grouping
				V1.01	Released	Jul-12				
				V1.02	Release Candidate	Jan-19				
OPC Foundation: Analyzer Devices (ADI)		A unified view of analysers irrespective of the underlying device protocols. Analyzer devices are comprised of one or more analyser channels with a single address space which has its own configuration, status and control. Examples: Particle Size Monitor, Acoustic Spectrometer, Gas Chromatograph	<AskOPC>	V1.00	Released	Oct-09				
				V1.00	Released	Jan-15				
UA for 61131-3 (PLCopen)	Y	Control program, tasks, controller variables, structured data, function blocks	Stefan Hoppe, chair	V1.00	Released	March-10				PLC, Controller, Automation
				V1.01	In work					
UA Client FunctionBlocks (PLCopen)	Y	PLC controller initiates UA communication. Controller-Controller, Controller-MES, ...		V1.00	Released	Apr-14				
			V1.01	Released	Sep-16					
UA for Autoid Devices (Autoid)		Identificaton device executing a scan, read or write process. Comprises barcode, OCR, 2D code, RFID, NFC, RTLS, sensors and mobile computing	info@AIM-D.de	V1.00	Released	Apr-16				
UA for Process Devices (FCG PA-DIM)	Y	Specify and maintain OPC UA Information Models for Process Automation Devices initially based on NAMUR Core Parameters according to NE 131 including assignment of semantic identifiers according to the IEC Common Data dictionary and/or eCI@ss.	Achim Laubenstein	V1.00	In work					Process Devices

Open Process Automation Forum



- ▶ Open Process Automation Forum (is part of The Open Group)
www.opengroup.org
- ▶ The Open Group is a non-profit, global consortium for IT standards
- ▶ ExxonMobil selected The Open Group
- ▶ <https://www.opengroup.org/open-group-open-process-automation-forum-launches-o-pas-standard-1>

~ New reference architecture Standard developed to ensure the security, interoperability and scalability of process control systems ~

San Francisco, California – February 5th, 2019: Today at the ARC Industry Forum event in Florida, [The Open Group](#), the vendor-neutral technology consortium, has announced the launch of its new [O-PAS™ Standard, Version 1.0](#), a preliminary standard of The Open Group. Developed by [The Open Group Open Process Automation™ Forum \(OPAF\)](#), the standard will provide a vendor-neutral reference architecture to enable the construction of scalable, reliable, interoperable and secure process automation systems.

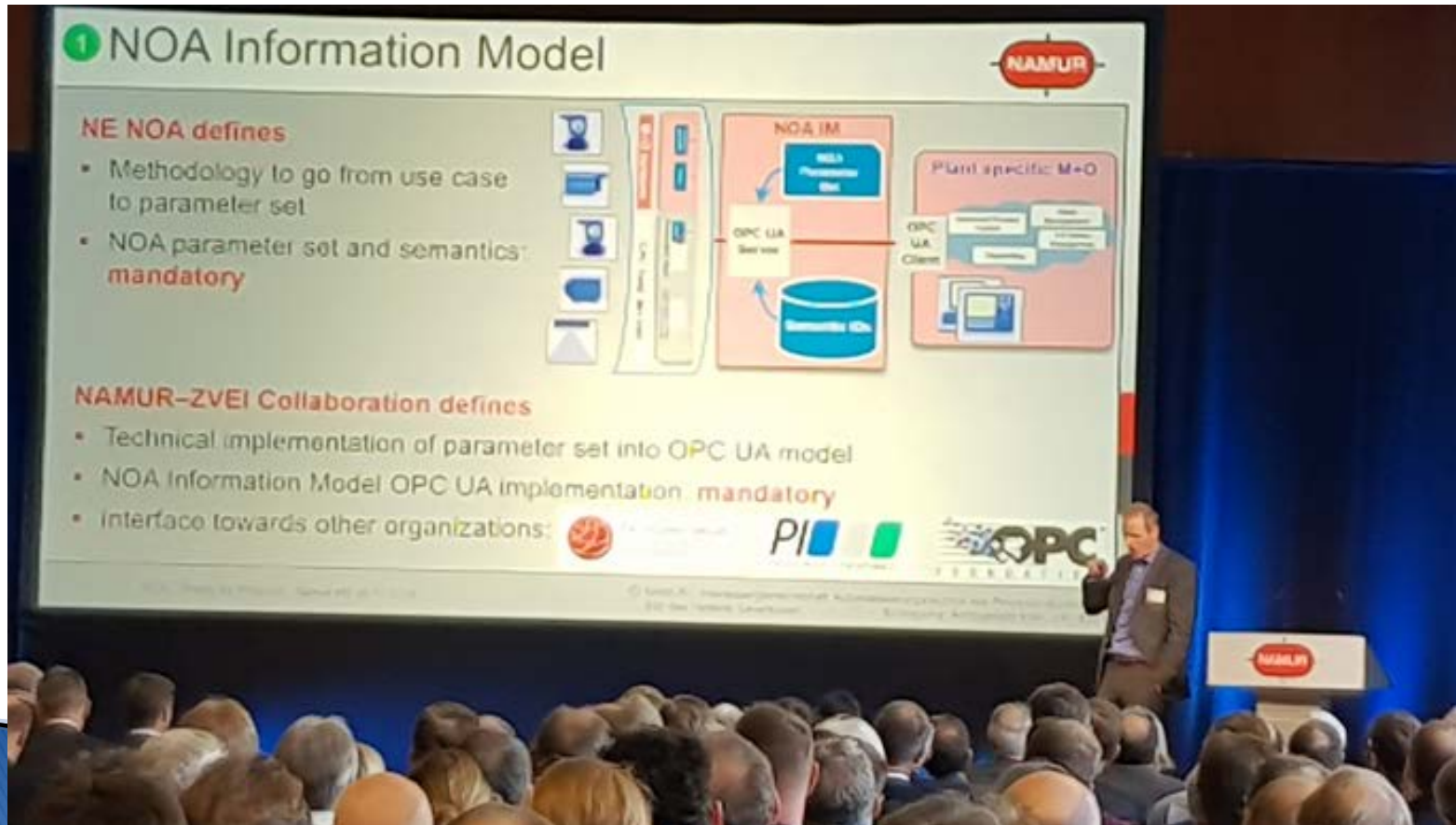
The O-PAS Standard, Version 1.0, is focused on meeting the minimum standard and specification requirements for federated process automation systems, using an open and interoperable reference architecture. A key tenet of the Standard is to adopt 'fit-for-purpose' industry standards that exist in the marketplace today. As a result, the Standard will incorporate a variety of functional elements that are already provided by multiple vendors, including:

- Security: ANSI/ISA 62443 (adopted by IEC as IEC 62443)
- Connectivity: OPC UA
- Systems Management: DMTF Redfish



Process Automation: OPC UA mandatory for NOA

- ▶ NAMUR is an international user association of automation technology in process industries
<https://www.namur.net/en.html>
- ▶ The NAMUR Open Architecture (NOA) concept offers possibilities to enable innovative solutions for new and existing plants: **“NOA Information Model OPC UA implementation mandatory”**



More information about NOA:
<https://www.namur.net/en/focus-topics/namur-open-architecture/>



INTERNATIONAL DATA SPACES ASSOCIATION

AutomationM



PL for efficiency in

VDMA represents the breadth of the manufacturing industry
VDMA has more than 3200 member companies

- » Agricultural Machinery
- » Air Conditioning and Ventilation
- » Air Pollution Control
- » Air-handling Technology
- » Building Control and Management
- » Cleaning Systems
- » Compressors, Compressed Air and Vacuum Technology
- » Construction Equipment and Building Material Machines
- » Drying Technology
- » Electrical Automation
- » Electronics, Micro and Nano Technologies
- » Engine Systems for Power and Heat Generation
- » Engines and Systems

- » Fire Fighting Equipment
- » Fluid Power
- » Food Processing Machinery and Packaging Machinery
- » Foundry Machinery
- » Gas Welding
- » Hydro Power
- » Integrated Assembly Solutions
- » Large Industrial Plant Manufacturing
- » Lifts and Escalators
- » Machine Tools and Manufacturing Systems
- » Machine Vision
- » Materials Handling and Intralogistics
- » Measuring and Testing Technology

- » Metallurgical Plants and Rolling Mills
- » Metallurgy
- » Micro Technologies
- » Mining
- » Plastics and Rubber Machinery
- » Power Systems
- » Power Transmission Engineering
- » Precision Tools
- » Printing and Paper Technology
- » Process Plant and Equipment
- » Productronic
- » Pumps + Systems
- » Refrigeration and Heat Pump Technology
- » Robotics

- » Robotic + Automation
- » Security Systems
- » Software and Digitization
- » Surface Treatment Technology
- » Textile Care, Fabric and Leather Technology
- » Textile Machinery
- » Thermal Turbines and Power Plants
- » Thermo Process Technology
- » Valves
- » Waste Treatment and Recycling
- » Wind Energy
- » Woodworking Machinery
- » OPC UA CS Release (Candidate)
- » OPC UA CS under development
- » Awareness existent

Consortia

Engineer

IT

The Indust

Energy

Factory Automation

VDMA (17!)

ZVEI:
Die Elektroindustrie

aim

EUROMAP
European Plastics and Rubber Machinery

VDW

MT Connect®

sercos international

PI PROFIBUS • PROFINET

ETHERNET POWERLINK
Standardization Group

IO-Link

CC-Link
CC-Link 協会

CEMAFON

EUMABOIS
Woodworking Technology
Made in Europe

OMAC
The Organisation for Machine
Automation and Control

umati
universal machine tool
interface

WS

energistics®
Energy Standards

USE61400-25
IEC 61400-25 user group

IEC

IV Industrial Value Chain Initiative
Connected | Manufacturing

Manufacturing Industry Innovation 3.0

W3C®

LNI4.0
LABS NETWORK INDUSTRIE 4.0

MADE IN CHINA 中国制造
2025

INDUSTRIE4.0

边缘计算
Edge Computing
CONSORTIUM

industrial internet
CONSORTIUM

DIN

eCl@ss

Openfog™

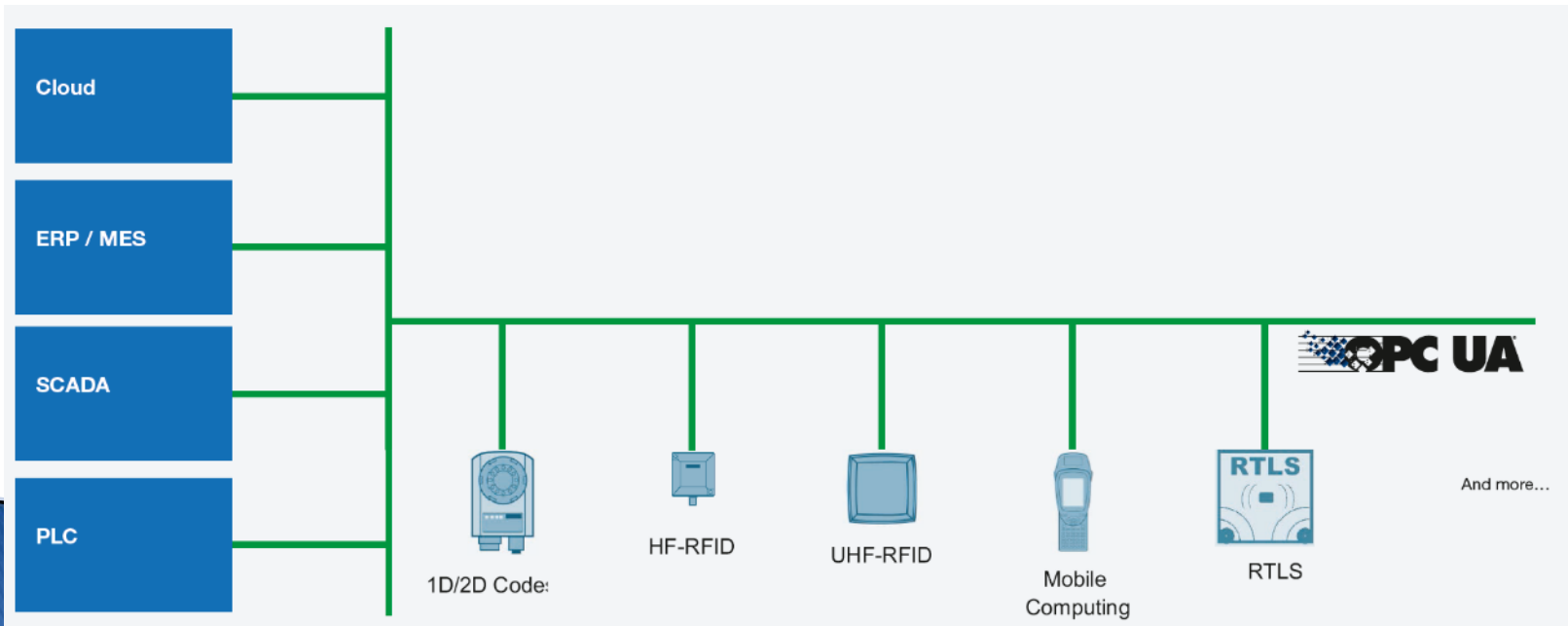
OPC UA for AutoID

One communication standard for the whole AutoID world

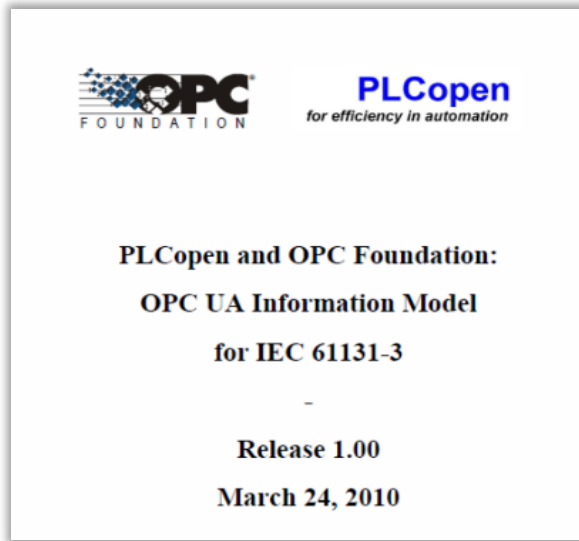
- ▶ Standardized, secured data and interfaces
- ▶ Different devices like
HF/UHF-RFID, OCR, Optical (1D/2D barcode), RTLS

Adaption

- Harting, Siemens (4 types)
- Balluff, Leuze (2 types), Sick, Turck, (P+F 2019)



Adoption: PLC controller



Supporting “OPC UA for IEC61131-3”

- 3S
- BECKHOFF
- Bosch-Rexroth
- B&R
- Honeywell
- Phoenix Contact
- WAGO

OPC UA: Protocol agnostic – extendable

Client/Server: TCP/HTTPS for peer-to-peer communication
Pub/Sub: UDP/MQTT/AMQP for broadcast messaging

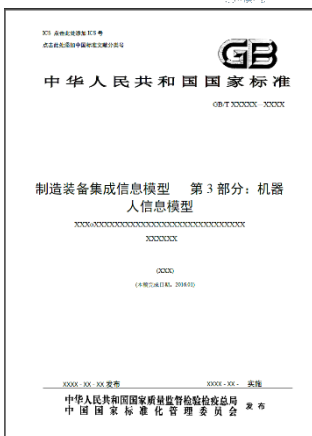


PLC controllers with OPC UA

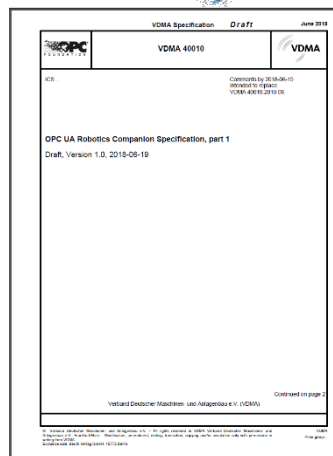
- ABB
- BECKHOFF
- Bosch-Rexroth
- B&R
- FESTO
- Honeywell
- Lenze
- Mitsubishi Electric
- National Instruments
- Siemens
- Schneider
- Phoenix Contact
- Rockwell
- Omron
- WAGO

The VDMA is Developing International Standards

- VDMA OPC Machine Vision Initiative leverages its international network



OPC UA Machine Vision
by China



OPC UA Machine Vision
by VDMA

Machine Vision

- » 60 Involved companies world wide
- » over 100 participants

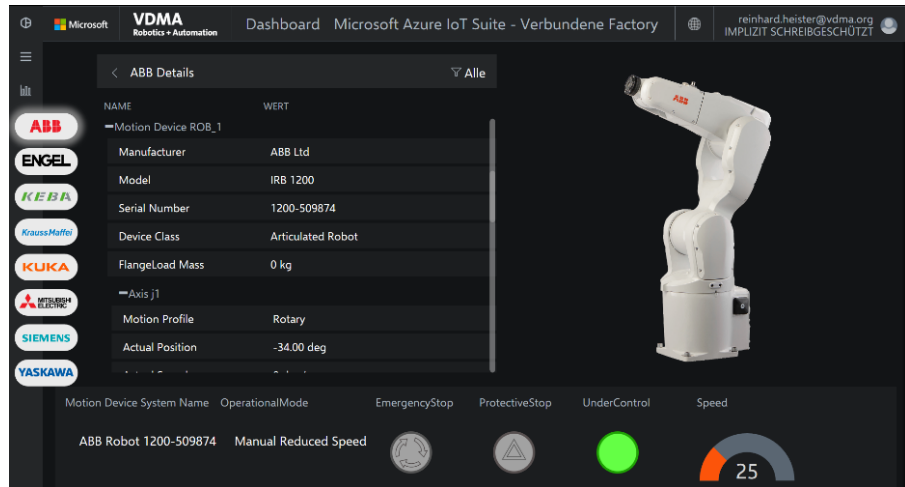
OPC Vision is an accepted G3 Standard -
the group of leading machine vision associations:

- » AIA (USA) EMVA (EUROPA)
- » JIJA (JAPAN) VDMA (EUROPA)
- » CMVU (CHINA)

- » OPC Machine Vision has been invited to chinese Machine Vision standardization meeting (CVSM) in Beijing on 26. and 27.10.2018 as OPC Machine Vision was core topic of meeting.

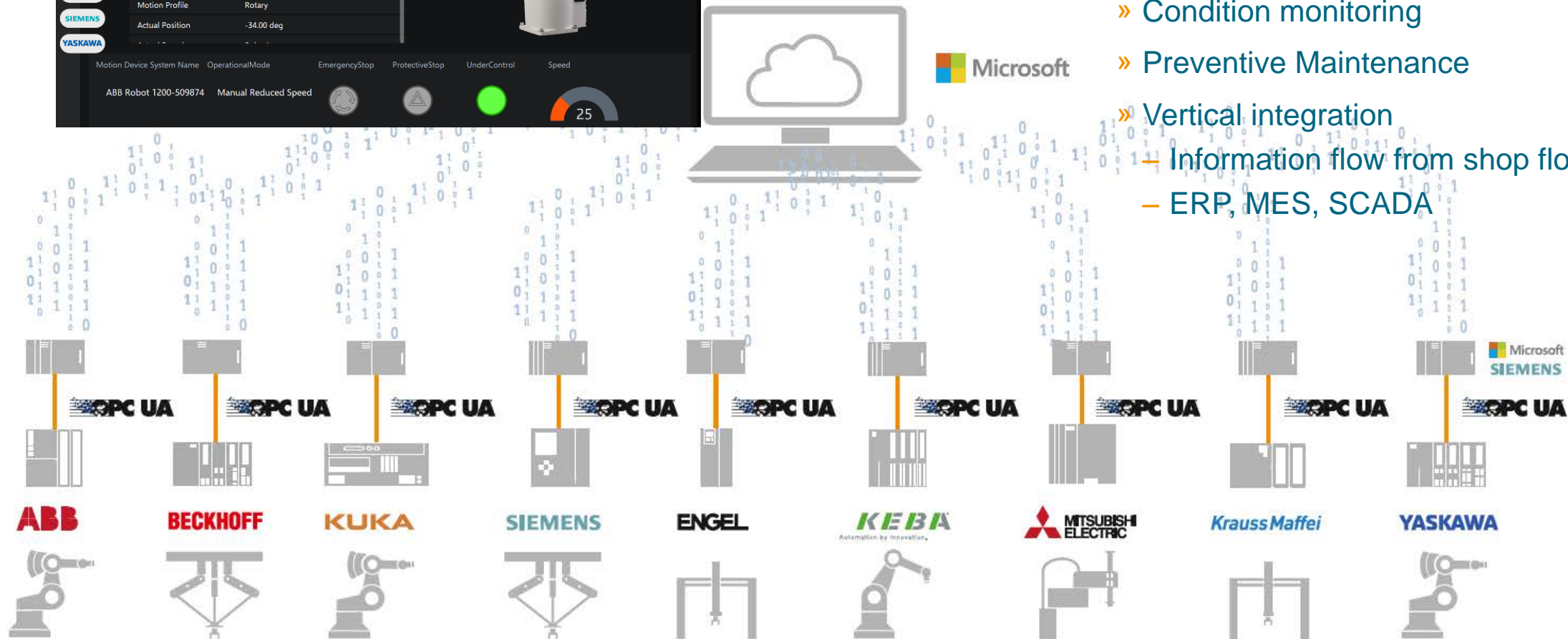
Agenda was also listing chinese standardization council SAC and also Prof. Zhang.

VDMA Robotics Companion spec based on OPC UA



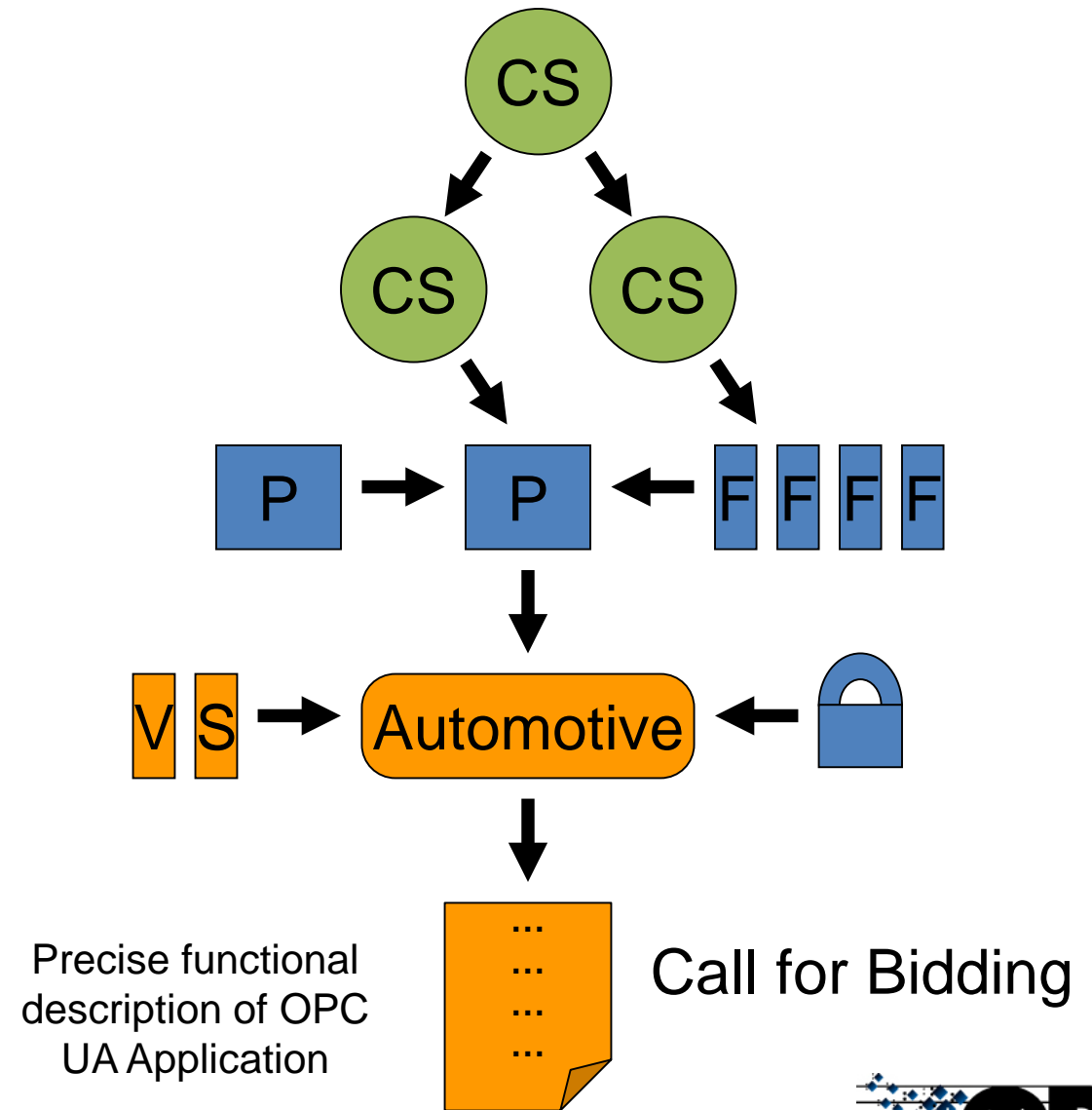
Applications of this demonstrator

- » Asset management
- » Condition monitoring
- » Preventive Maintenance
- » Vertical integration
 - Information flow from shop floor to cloud
 - ERP, MES, SCADA



Requirements – Call for Bidding

- ▶ Companion Specification
 - ▶ VDMA Robotics Specification
 - ▶ AIM RFID Specification
 - ▶ PLCopen UA Functions Blocks
- ▶ OPC UA Core Specification
 - ▶ Full Featured Profiles
 - ▶ Additional Facets
 - ▶ Security Profiles
- ▶ Quantity Measures
 - ▶ Data Volume
 - ▶ Speed



Certified Information



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CERTIFIED



FOR COMPLIANCE



OPC
FOUNDATION

UCS Server

Member: Technip FMC

Product website: fmcenergysystems.com/en/AutomationControl/Products...

This product enables TechnipFMC's UCOS control system to interface with OPC UA clients by acting as a Data Gateway on the UCOS side, and as UA Server for external network devices. It's certified to support the MDIS profile v1.01.

shops

dded UA Server		Certificate Number:	1812CE00B2
3d Server Facet		Certification Date:	12/10/2018
Access Server Facet		Expiration:	12/31/2021
ntlyPolicy - Basic256Sha256		CTT Version:	1.03.341.380
ntlyPolicy - Basic256			
Token - Anonymous Facet			
Token - Username			
word Server Facet			
Token - X509 Certificate			
r Facet			
Solution Server Profile			
Instrument Out Model			
r Facet			
Discrete Out Model Server			
.			
Digital Out Model Facet			
Redundancy			
ExtensionObject			

Newest Members

- Hireawiz
- KEB Automation KG
- Monokot
- XISOM Inc.
- Soldenader Maschinenbau GmbH

Certified Products

- Technip FMC: UCS Server
- SCADA system SIMATIC WinCC
- Open Architecture
- ua Toolkit Embedded
- DeviceGateway

Twitter Timeline

Opening ceremony for the new IoT and AI Lab from @Microsoft in Shanghai - Sam Dekey from @OPCFoundation China Intro... <https://t.co/Zn8t1NLxd>

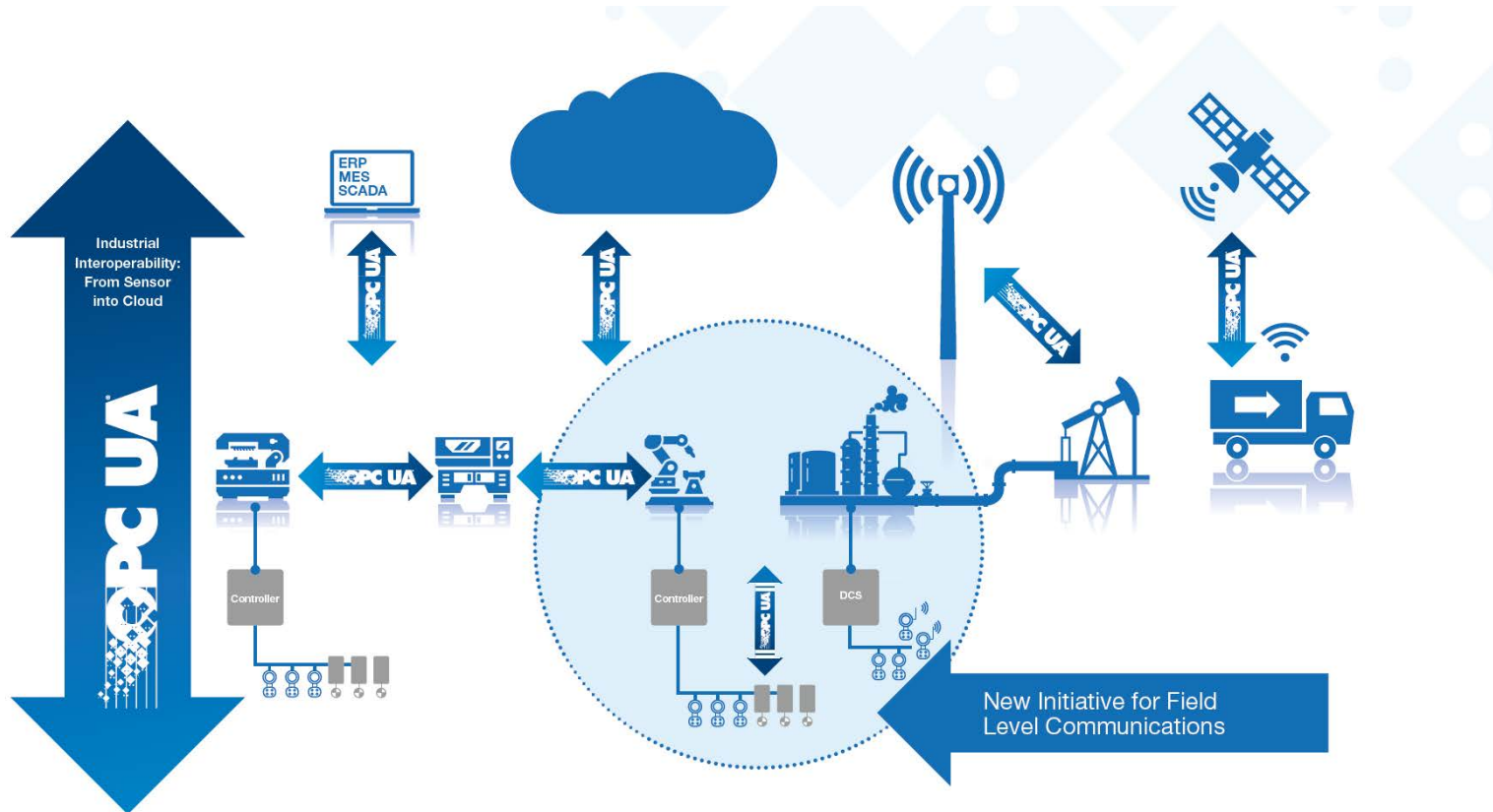
Chicago @automationworld: Bryan Griffin from @PMMIorg preaches operational excellence leveraging open standards inc... <https://t.co/Jx2Jl5nJ8>

meeting of @N40 tested for @VDMAonline #opcua based companion specs at University Ravensburg-Weingarten in hist... <https://t.co/WenK9rcXc9>

Future

Presentation on afternoon

OPC Foundation “Field Level Communications Initiative”: Extending OPC UA including Deterministic, Safety & Motion down to field level



Separate presentation by
Peter Lutz, Director FLC

OPCF Press Conference SPS 2018
ABB, Beckhoff, Mitsubishi,
Rockwell, Siemens, Schneider



OPCF Press Conference SPS 2018
Overcrowded!



OPC Foundation: Roadmap

<https://opcfoundation.org/about/opc-technologies/opc-ua/opcua-roadmap/>

Recent innovations in v1.04	2019/2020 – Features worked on	2021 and beyond – Vision
<p>2019: Relate with established semantic models (Dictionary Reference)</p> <ul style="list-style-type: none"> An infrastructure to reference from an OPC UA Information Model to external dictionaries like IEC Common Data Dictionary or eCl@ss. <p>2019: Interfaces and AddIns</p> <ul style="list-style-type: none"> Interfaces and AddIns complement the type model and can be used when subtyping is not suitable for a required extension. <p>PubSub</p> <ul style="list-style-type: none"> New communication schema to enable and optimize OPC UA for one-to-many, many-to-one, or many-to-many configurations. <p>JSON Web Token, OAuth2</p> <ul style="list-style-type: none"> User identification using the authorization service well-established in modern cloud applications (Azure, Google, Facebook, ...) <p>Reverse Connectivity</p> <ul style="list-style-type: none"> Servers behind firewalls can use reverse connectivity. <p>SessionLess Services</p> <ul style="list-style-type: none"> Avoids session establishment for use cases where Servers are called infrequently. <p>Security</p>	<p>Deterministic UA: Mappings to TSN</p> <ul style="list-style-type: none"> This project will add a transport mapping of OPC UA PubSub to Time Sensitive Networking (TSN). Based on this mapping, deterministic data exchange between UA applications is possible. <p>Field-Level Communication (FLC)</p> <ul style="list-style-type: none"> The goal of this initiative is to extend OPC UA to the field by addressing all relevant use-cases for Process- and Factory Automation including for instance determinism, safety and motion. <p>Alias names</p> <ul style="list-style-type: none"> This feature will enable locating Nodes (Objects, Methods, or Variables) on a global level (e.g. in an entire system). An AliasName is an alternate well defined name. Global OPC UA discovery services maybe constructed that aggregate all AliasNames on OPC UA Servers in a system and then serve as a system-wide lookup service for <i>Clients</i>. <p>Harmonization of companion standards</p> <ul style="list-style-type: none"> Many organizations use OPC UA to model and expose their existing information. Sometimes, however, the definitions overlap or are identical. This project supports companion working groups to harmonize their models. 	<p>The following features are under consideration. No concrete specification work has been initiated.</p> <p>Transactions</p> <ul style="list-style-type: none"> With the increasing popularity of OPC UA in various industries, we also see more and more scenarios where OPC UA is used for configuration. Simple configuration tasks can be solved with Methods, for more complex scenarios, transactions will be needed. <p>MetaData in the Cloud</p> <ul style="list-style-type: none"> When data are published to cloud applications, most of the meta information that is in the Server's AddressSpace is not part of these data. The "MetaData in the Cloud" project targets this deficiency. <p>Cloud-Relay</p> <ul style="list-style-type: none"> The cloud-relay capability allows for connectivity between UA applications even when both Client and Server are behind separate firewalls. <p>Deterministic communication using 5G</p> <ul style="list-style-type: none"> The 5th generation wireless systems will provide better performance and determinism. Similar to the TSN mapping a mapping of PubSub to 5G protocols may be considered.

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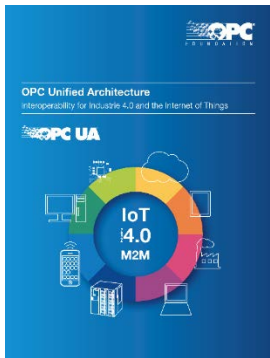
Independent / Neutral ground to work together / No company, no country can dominate OPC Foundation
Standards can only developed together



Information: Brochures Updated (v9a) -> v10 official for 2020

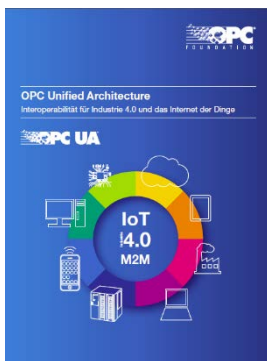
- ▶ “Interoperability for Industrie 4.0 and the Internet of Things”
- ▶ Edition „2020“: Extended with
 - ▶ New: OPC History
 - ▶ Updated: UA Technology article like PubSub integrated into OPC UA
 - ▶ New: FLC (2 pages)
 - ▶ New: Collaborations (released once)
- ▶ <https://opcfoundation.org/resources/brochures/>

English



Updated

German



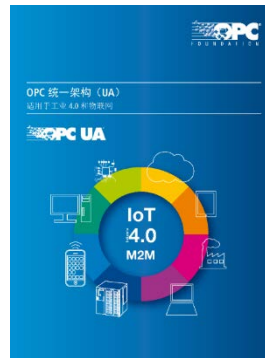
To be translated

Japan



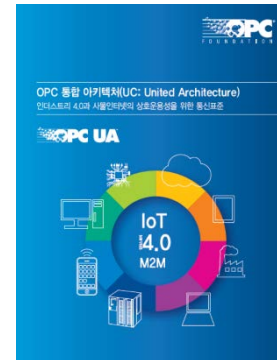
To be translated

China



To be translated

Korea



To be translated

OPC UA Videos



- Landing page <https://opcfoundation.org/resources/multimedia/>
- OPC UA Vision, Thomas Burke <https://youtu.be/7mUmfq0M29U>
- Learn about OPC UA technology – video series by Uwe Steinkrauss
 - 1: "OPC UA Concepts" (06-2019), 9:30 min - <https://youtu.be/E2XJfmAEdqw>
 - 2: "OPC UA Transport" (06-2019), 17min - <https://youtu.be/VCQnLly0cDY>
 - 3: "OPC UA Security" (06-2019), 11min - <https://youtu.be/z4zNgNdauLY>
 - 4: "OPC UA Profiles" (06-2019), 8min - <https://youtu.be/CCvILASACjE>
 - 5: "OPC UA Discovery" (06-2019), 6min - <https://youtu.be/1NIbUAlOdcA>
- Learn about certification - video by Alexander Allmendinger - <https://youtu.be/LoYLqvRIyYk>
- OPC UA Security, Darek Kominek <https://youtu.be/NFQfZeU90Kw>

► Collaboration

VDMA Overview	VDMA Overview 3min, https://youtu.be/5roRSuNIEF0 VDMA Overview in detail 9min https://youtu.be/LhOIC7GNcml
VDMA Plastics and rubber machinery	VDMA Plastics and rubber machinery - 6min https://youtu.be/jSvSRjFX_RI VDMA EuroMAP 12min, https://youtu.be/wwAl2D_fyMw
VDMA Machine Vision	VDMA Machine Vision Overview - 4min, https://youtu.be/BUywlZ1oong VDMA Machine Vision Overview in details - 12min, https://youtu.be/zK8yhyugGNI
VDMA Robotics	VDMA Robotics - Overview - 2min, https://youtu.be/-xgFKg1hXTg VDMA Robotics - Overview in details - 8min, https://youtu.be/ZdLVFI_1S54

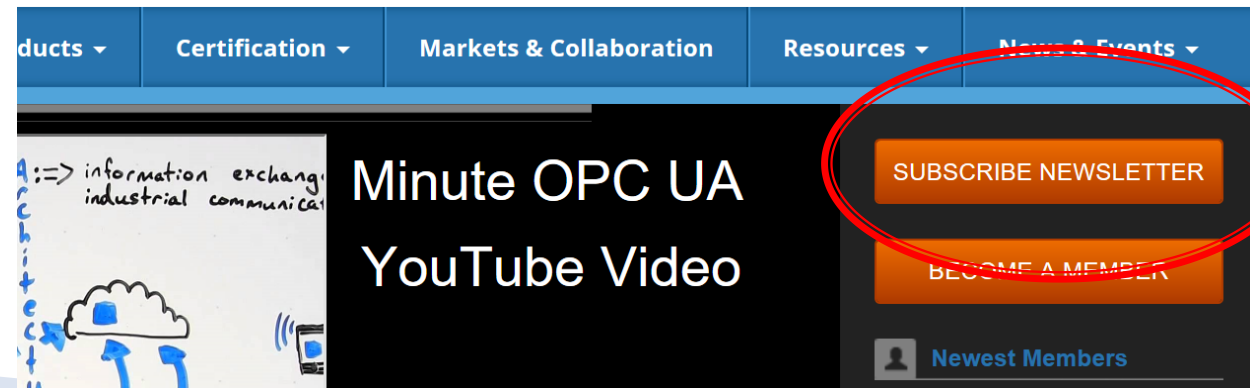
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Thank you! - Questions?



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Looking for more information?
<https://opcfoundation.org/>



OPC DAY FINLAND 2019

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FINNISH SOCIETY OF AUTOMATION
SUOMEN AUTOMAATIOSEURA RY

OPC Day Seminar: 13:00-17:30 Meeting room 203, 2nd floor



BECKHOFF

