OPC UA in the World

Status and Roadmap

OPC Day Japan - 10th December 2020

Stefan Hoppe
President & Executive Director OPC Foundation
stefan.hoppe@opcfoundation.org

OPC Foundation https://opcfoundation.org

- Vision
  - Secure & reliable
  - Vendor, platform, and domain agnostic
  - interoperability from sensor to enterprise and beyond

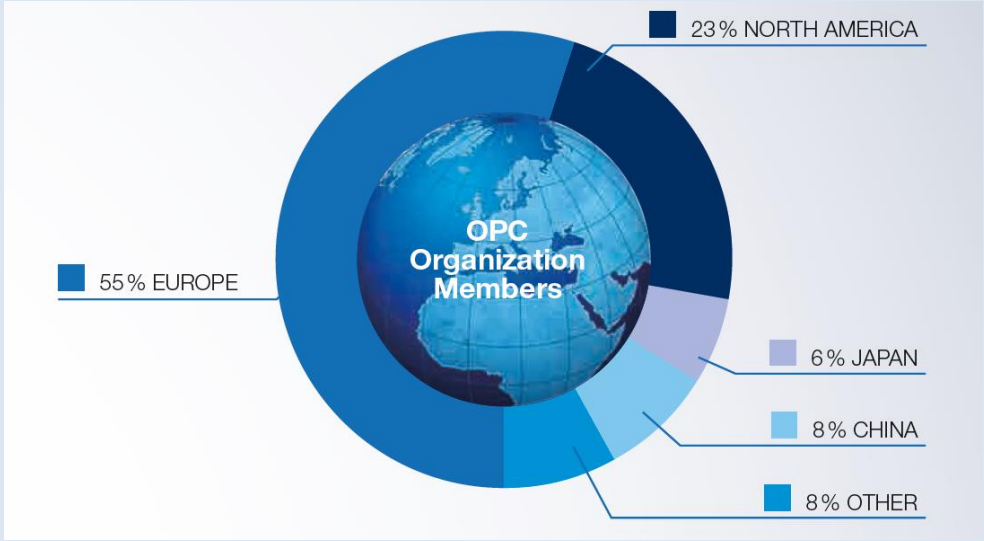
- Global Profile
  - Non-profit organization (founded 1995)
  - Companies from Automation & IT
  - Internationally recognized: OPC UA is IEC62541

- Deliverables
  - Specifications: openly available
  - Tools and code examples: open source for faster, easier adoption (AnsiC/C++, C# .NET Standard, Java)
  - Certification: OPC Labs open to everyone
  - Marketing: Evangelize solution in various markets

- Ecosystem with toolkits and education
- Modern IPR policy

Organizational Overview

Membership: 794 (Status: Nov 24th, 2020)



2019/2020: Board of Directors

Microsoft	Honeywell	Rockwell
SAP	Yokogawa	Schneider
Siemens	Mitsubishi	ABB
Beckhoff	Ascolab	Emerson (since 2020)

OPC Foundation:

Largest Eco System for Industrial Interoperability

634 members - Status Nov 27th, 2018
738 members - Status Nov 26th, 2019
794 members - Status Nov 24th, 2020

… plus 120 logo members

OPC FOUNDATION

OPC Foundation

- OPCF nominated Emerson (NYSE: EMR) to BoD
  Peter Zornio, CTO for Emerson Automation Solutions is representative
- Emerson Process Automation joint OPCF FLC Initiative
- PR https://opcfoundation.org/news/press-releases/opc-foundation-welcomes-emerson-to-its-board-of-directors/

OPC Foundation Welcomes Google Cloud as new OPC Member

Google Cloud

Google Cloud will offer OPC UA as a part of commitment to openness and industry collaboration

“We’re honored to join the OPC Foundation and our membership underscores Google Cloud’s commitment to openness and industry collaboration. OPC UA will be our way of incorporating machine data into our data analytics and AI capabilities, to ultimately drive new capability and performance within the factory. By driving AI across the value chain, our goal is to provide flexibility and choice at industrial scale.”

Dominik Wee, Managing Director Manufacturing, Industrial and Transportation
Google Cloud

GROUPE RENAULT

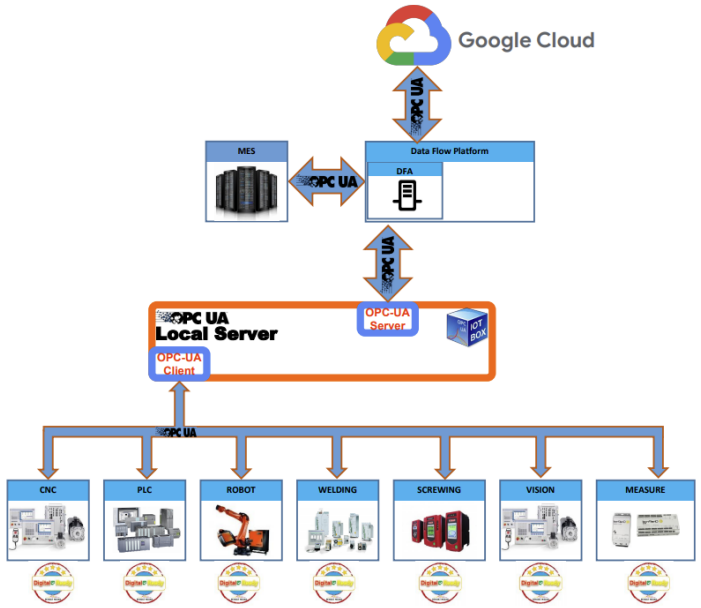
RENAULT VISION

Situation

- Full OPC-UA implementation on IS/IT level
- All components are Digital Ready
- Bidirectional OPC-UA communication
- No rework needed to capture any new data (*just configuration*)

Future

- Creation of an international standard for automaker to share data models
- Rapid deployment of standardised AI/ML models



OPC Foundation

New Class A Member 2020

DTS Corporation
Asia I Japan
February 2020

JUMO GmbH & Co. KG
Europe I Germany
February 2020

Syntegon Technology GmbH
Europe I Germany
March 2020

Google Cloud
North America I USA
April 2020

NTT Communications Corporation
Asia I Japan
April 2020

Cytiva
Europe I Sweden
May 2020

EMD Millipore Corporation
North America I USA
June 2020

Emerson Process Management LLLP
North America I USA
September 2020

Shenzhen Inovance Technology Co., Ltd
Asia I China
November 2020

OPC Foundation joins APL Project Group

APL critical important for OPC UA field level strategy in Process Automation

News Release

OPC Foundation joins the Advanced Physical Layer (APL) Project Group

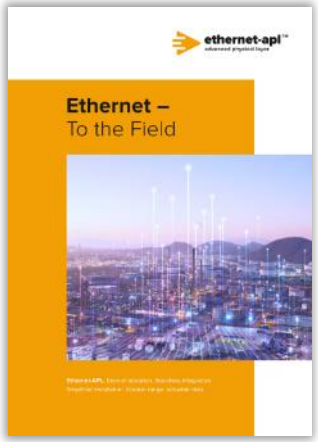
APL critically important for OPC UA field level strategy in Process Automation

Scottsdale, AZ – June 25th, 2020 OPC Foundation announces today that it has joined the APL project group in order to support the development and promotion of an advanced physical layer (APL) for Industrial Ethernet, suitable for use in demanding applications and hazardous locations in the process industry, named "Ethernet-APL". To date, the APL Project Group has consisted of 12

Closely related to OPCF strategy to extend OPC UA to the field level in discrete and continuous manufacturing.
For this, the OPC Foundation launched the Field Level Communications (FLC) initiative in November 2018, supported by an impressive list of major automation suppliers.

FLC-related technical work includes the following topics

- definition of an "Automation Component" with functions, interfaces and behaviors that are common to the different FLC-conformant devices used in various applications in process and factory automation
- definition of system behaviors and sequences for common functionalities e.g. bootstrapping, connection establishment, etc.
- harmonization and standardization of application profiles like IO, motion control, functional safety, system redundancy
- standardization of OPC UA information models for field level devices in online and offline scenarios e.g. device description and diagnostics
- mapping to subordinate communication protocols and transmission physics, such as TCP, UDP, Ethernet APL / SPE, deterministic Ethernet (TSN) with future mapping to 5G and Wi-Fi 6
- guarantee the best integration of OPC UA companion specifications like FDI, FDT, PA-DIM, ADI (Analyzer Device Integration), Module Type Package (MTP), and MDIS (Oil&Gas), VDMA pumps, UMATI, Spectaris, and so forth

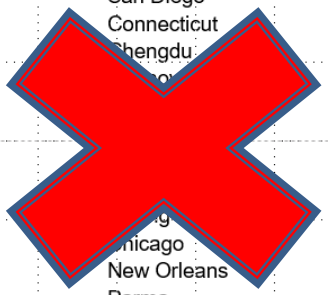


Download new brochure:
www.opcfoundation.org/apl

Marketing activities 2020 – Update Corona

OPC-F: Activities 2020

03.02.-06.02.2020	Orlando	ARC Advisory Forum
12.02.-14.02.2020	Beijing	INDUSTRIAL INTERNET SUMMIT 2020
25.02.-27.02.2020	Nuremberg	Embedded World
26.02.2020	Guangzhou	OPC Seminar Tour - Guangzhou Station
12.03.-13.02.2020	San Diego	INDUSTRY OF THINGS WORLD USA 2020
31.03.-03.04.2020	Connecticut	ICONICS world wide customer summit
04.07.2020	Chengdu	OPC Seminar Tour - Chengdu Station
20.04.-24.04.2020	[illegible]	Hannover Messe
27.04.-29.04.2020	[illegible]	Chengdu International Industry Fair
04.05.-07.05.2020	[illegible]	Offshore Technology Conference (OTC)
07.05.-13.05.2020	[illegible]	Interpack --> Components
13.05.-15.05.2020	[illegible]	Integrated Automation, Motion & Drives
14.05.2020	[illegible]	OPC Seminar Tour - Beijing Station
19.05.2020	[illegible]icago	Automation World Conference & Expo
19.05.-22.05.2020	New Orleans	CSIA Executive Conference
26.05.-28.05.2020	Parma	SPS Italia
02.06.2020	Shenzen	OPC Seminar Tour - Shenzhen Station
02.06.-05.06.2020	Shenzhen	South China International Industry Fair
08.06.-11.06.2020	Boston	PTC LiveWorx
09.06.-11.062020	San José	Sensors expo & conference
16.06.-19.06.2020	Munich	Automatica

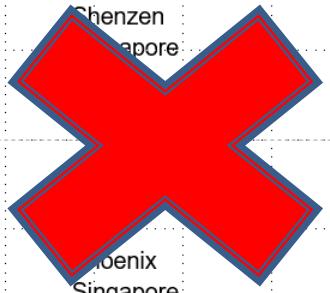


2020: Most events canceled

2021: No shows expected for H1-2021

OPC-F: Activities 2020

16.06.-26.06.2020	Düsseldorf	Drupa
18.06.2020	Munich	OPC Day Europe - hosted by Automatica
21.06-25.06.2020	Orlando	Honeywell Users Group
09.07-10.07.2020	Shanghai	OPC Day hosted by Huawei
16.07.2020	[illegible]henzen	OPC Day hosted by Fii
20.07.-21.07.2020	[illegible]apore	INDUSTRY OF THINGS WORLD ASIA
02.09.2020		OPC Seminar Tour - Wuhan Station
14.09.-19.09.2020		IMTS 2020 - INTERNATIONAL MANUFACTURING TECHNOLOGY SHOW
15.09.-19.09.2020		China International Industry fair
16.09.2020		OPC Seminar Tour - Shanghai Station
21.09.-22.09.2020		INDUSTRY OF THINGS WORLD
05.10-09.10.2020	[illegible]oenix	Emerson Exchange
20.10.-22.10.2020	Singapore	ITAP
08.11.-11.11.2020	Chicago	PACK EXPO International
18.11-19.11.2020	Anaheim	Rockwell Automation Fair
19.11.-20.11.2020	Boston	INDUSTRY OF THINGS WORLD USA EAST
24.11.-26.11.2020	Nuremberg	SPS
xx.12.2020	Tokyo	OPC Day Japan



Virtual conferences

- „OPC Day 2020 – International“ - material available
  PDF https://opcfoundation.org/marcom-presentations
  Recordings https://www.youtube.com/user/TheOPCFoundation

OPC Foundation Webinars

- OPCF webinars to share knowhow worldwide first-hand experts
  https://opcfoundation.org/webinars/

Webinars

The OPC Foundation is hosting a series of webinars to share information about different topics including technology, markets or collaboration.

Participation is free of charge.

Date	Time	Content	Registration
Nov 17-19, 2020	daily 08:00h – 10:00h CET	OPC Day ASEAN 2020 hosted by OPC Hub ASEAN	Agenda Registration
Dec 1th, 2020	8:00am – 11:00am CET (Session Europe/Asia)	FLC Initiative Webinar Status and results of 2 year FLC efforts by chairman of technical working groups	Agenda Registration
Dec 1th, 2020	8:00am – 11:00am PST 5:00pm – 8:00 CET (Session America/Europe)	FLC Initiative Webinar Status and results of 2 year FLC efforts by chairman of technical working groups	Agenda Registration
Dec 3rd, 2020	2:00pm – 3:00pm CET	OPC UA Security deep dive by Randy Armstrong, Director IT Operations OPC Foundation	Registration
Dec 9th, 2020	4:00pm – 5pm CET	OPC Foundation General Assembly Meeting Webinar	Registration
Dec 10-11th, 2020	3:00pm – 5:00pm JST	OPC Day Japan 2020 by OPC Foundation Japan	Registration

OPCF Podcast: Content

https://opcfoundation.org/podcast/
on your computer

iTunes https://apple.co/2CzTGsL
Spotify https://spoti.fi/2Kax46k
Google: http://bit.ly/2PKsY7O

- **Published / in prep already**
  - What is OPC?
  - OPC UA Technology
  - OPC UA Security
  - Getting started
  - Use cases
  - Companion Specs
  - VDMA Companion Specs
  - Business Software by SAP
  - AutoID Companion Spec
  - Commercial Kitchen Equipment
  - Industrial IoT by Microsoft
  - OPEN-SCS
  - Smart Factory Web
  - Field Level Communications
  - OPC UA Safety
  - OPC Certification & Labs
  - PA-DIM (publication delayed)
  - IBM point of view
  - Jim Luth, CTO

- **Confirmed**
  - CS Harmonization: UA for machinery
  - Mapping CS into Asset Administration shell

- **Further ideas**
  - Google
  - CS: UA for Cloud Library & CESMII
  - MQTT vs OPC UA over MQTT
  - UAcademics
  - Devices provisioning / GDS
  - Value add for process: onboarding, …
  - Technical practice
  - CS: MDIS /
  - Success stories by end users with direct financi
    e.g. Equinor

Invitation for 2021:
Podcast from OPC Japan
about OPC in Japan

OPCF Podcast to eBook-articles

- Podcast get transcribed, optimized and published in eBook
  Version-1 available for download

Proposal 2021

Translated eBook for Japan

Including OPC-J podcast article

OPC Foundation: Promise for OPC UA based Industrial Interoperability

Interoperability Robustness & Security

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

Security Design from Ground up

OPC UA

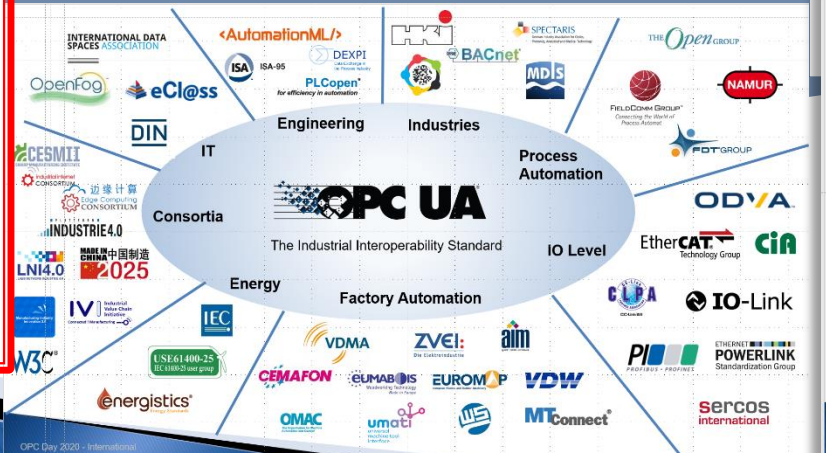
55+ Joint Working Groups Data Modelling/Harmonization

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, ..

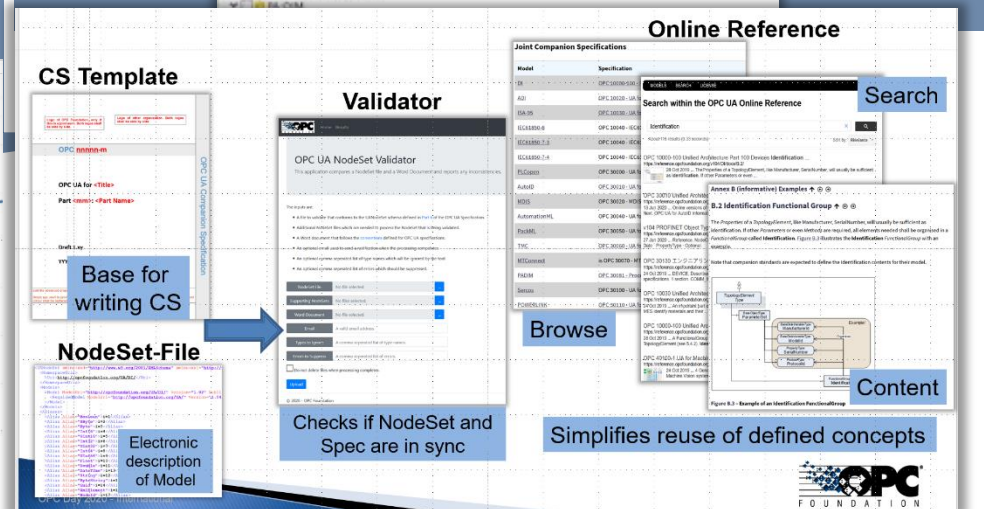


Validating / Certification Online Reference

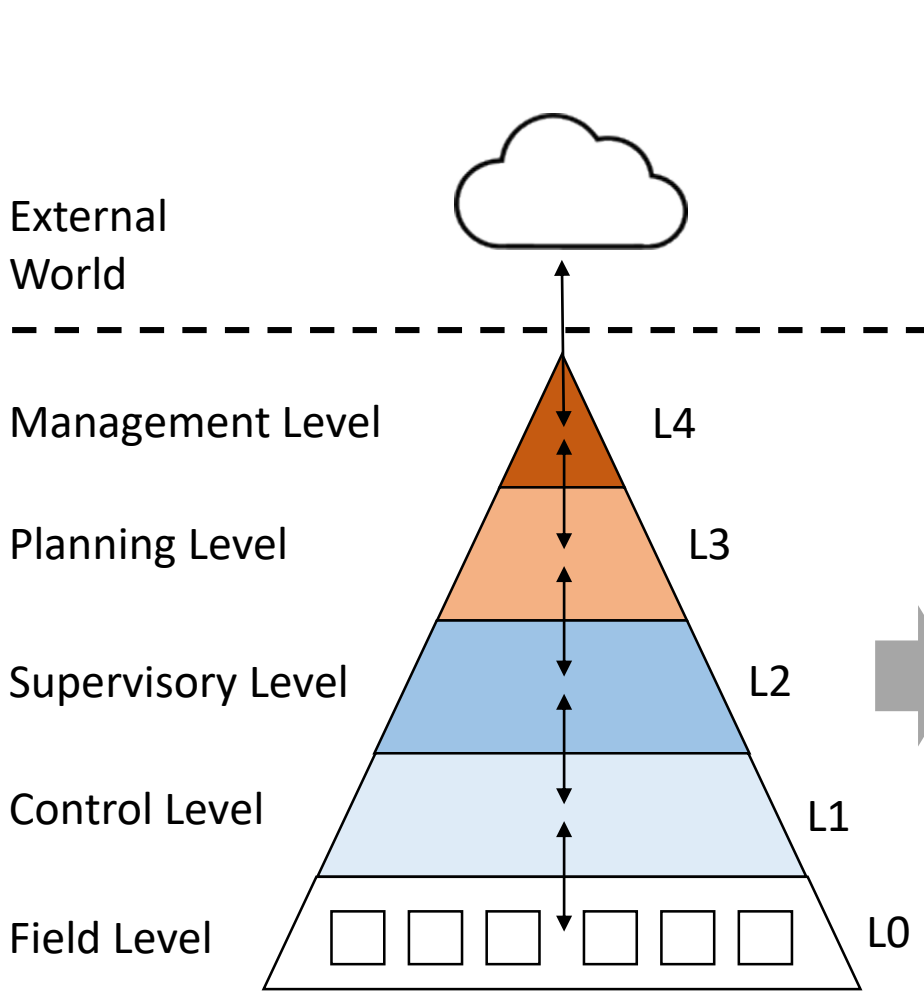
Validation of Companion Specs

Compliance Test Tool (CTT): Open available 1800 test scripts for the OPC UA core functionality and for the Companion Specifications available now for PA-DIM / PLCopen / MDIS

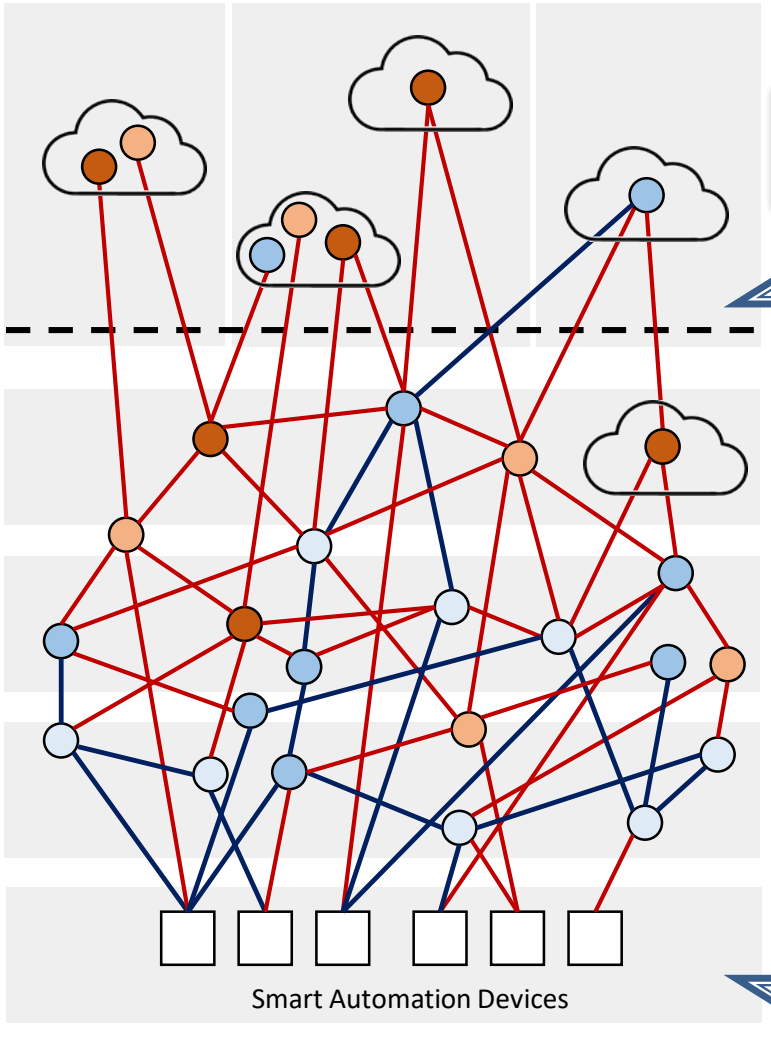
Online Reference: Public reference with all models



From Automation Pyramid to Automation Network



Source: VDI (2013), MDPI (2019)



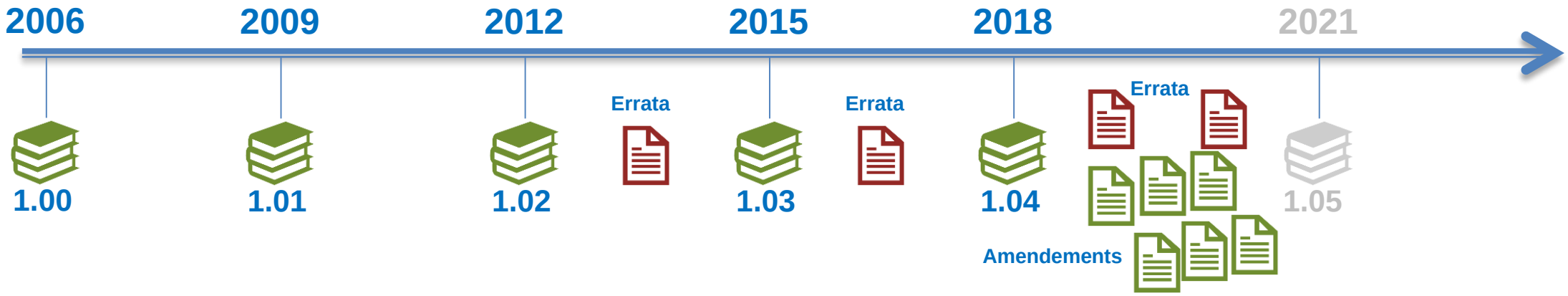
Universal Industrial Network

OPC UA

OPC UA is not a protocol!

Instead it is a collection of technologies to ensure a secure exchange of standardized information from the sensor to the cloud (and back).

Transition to Agile UA Specification Development



- OPC UA (OPC 10000) Specification Release Cycle is three years
- Errata handled as additional document since 1.02
- Minor enhancements are often requested short term
  - Companion working harmonization (common information model types)
  - TSN / 5G
  - Security
- OPC UA WG released Amendments to OPC UA 1.04
  - Enhancements as feature releases between major spec releases
  - Dedicated Amendment per feature

OPC Foundation: Promise for OPC UA based Industrial Interoperability

Interoperability Robustness & Security

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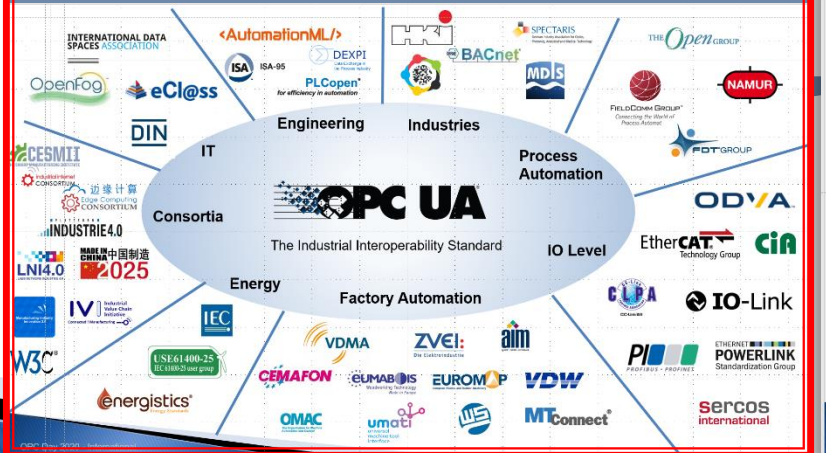

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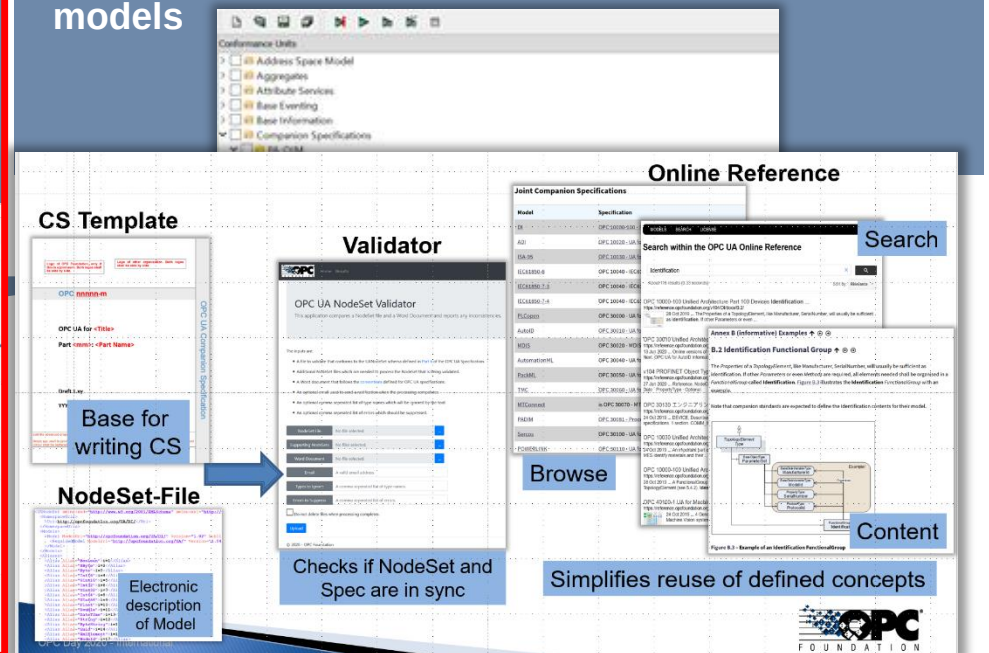


OPC UA in the world

Manufacturing USA®

CESMII
THE SMART MANUFACTURING INSTITUTE

Plattform INDUSTRIE 4.0

Industrie4.0

Criterias “Industrie 4.0 Basic”
→ OPC UA mandatory

MADE IN CHINA 中国制造 2025

Made in China2025
National Standard
OPC UA GB/T 33863

IVI Industrial Value Chain Initiative

Japan IVI

smart manufacturing korea 4.0

Manufacturing Renaissance
‘Made in Korea’

OPC UA National Standard

SIAA

Singapore
OPC UA National Standard

OPC FOUNDATION

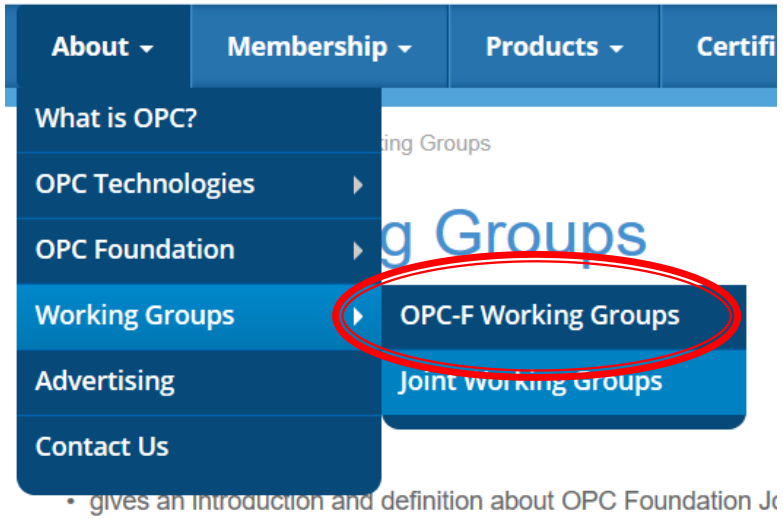
Potential Collaboration Partners

Manufacturing USA

AFFOA Advanced Functional Fabrics of America	**AIM Photonics** American Institute for Manufacturing Integrated Photonics	**America Makes**
ARM Advanced Robotics for Manufacturing	**BioFab USA**	**CESMII** Clean Energy Smart Manufacturing Innovation Institute
IACMI Institute for Advanced Composites Manufacturing Innovation	**Lift** Lightweight Innovations for Tomorrow	**MxD** Manufacturing times Digital
NextFlex	**NIIMBL** National Institute for Innovation in Manufacturing Biopharmaceuticals	**Power America**
RAPID Rapid Advancement in Process Intensification Deployment Institute	**REMADE** Reducing Embodied-energy And Decreasing Emissions	

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

55+ joint groups defined semantics



Public documentation for joint working groups
https://opcfoundation.org/about/working-groups/joint-working-groups/

- Definition / Criteria / How to create

- List of existing groups: What / Who / Contact / Version
- Link to Release

A "joint companion specification" is not a technology of the OPC Foundation. It's joint efforts – jointly owned !

OPC Foundation Joint Working Groups

Introduction

OPC UA is a series of specifications providing multivendor multiplatform secure reliable information integration interoperability from the embedded world to the cloud. Key parts of OPC UA is about information modeling, and is the foundation providing a complete infrastructure to facilitate other organizations complex data modeling leveraging the OPC UA infrastructure to take advantage of the seamless interoperability.

The modelling capabilities of OPC UA are the fundamental components necessary for semantic interoperability. An increasing number of organizations created standard OPC UA information models for specific domains and/or are currently under development. These OPC UA information models are described in what is known as OPC UA companion specifications.

OPC UA companion standards address use cases and with that increase the applicability and adoption of the OPC UA technology in different verticals.

See https://opcfoundation.org/developer-tools/specifications-unified-architecture for released companion specifications.

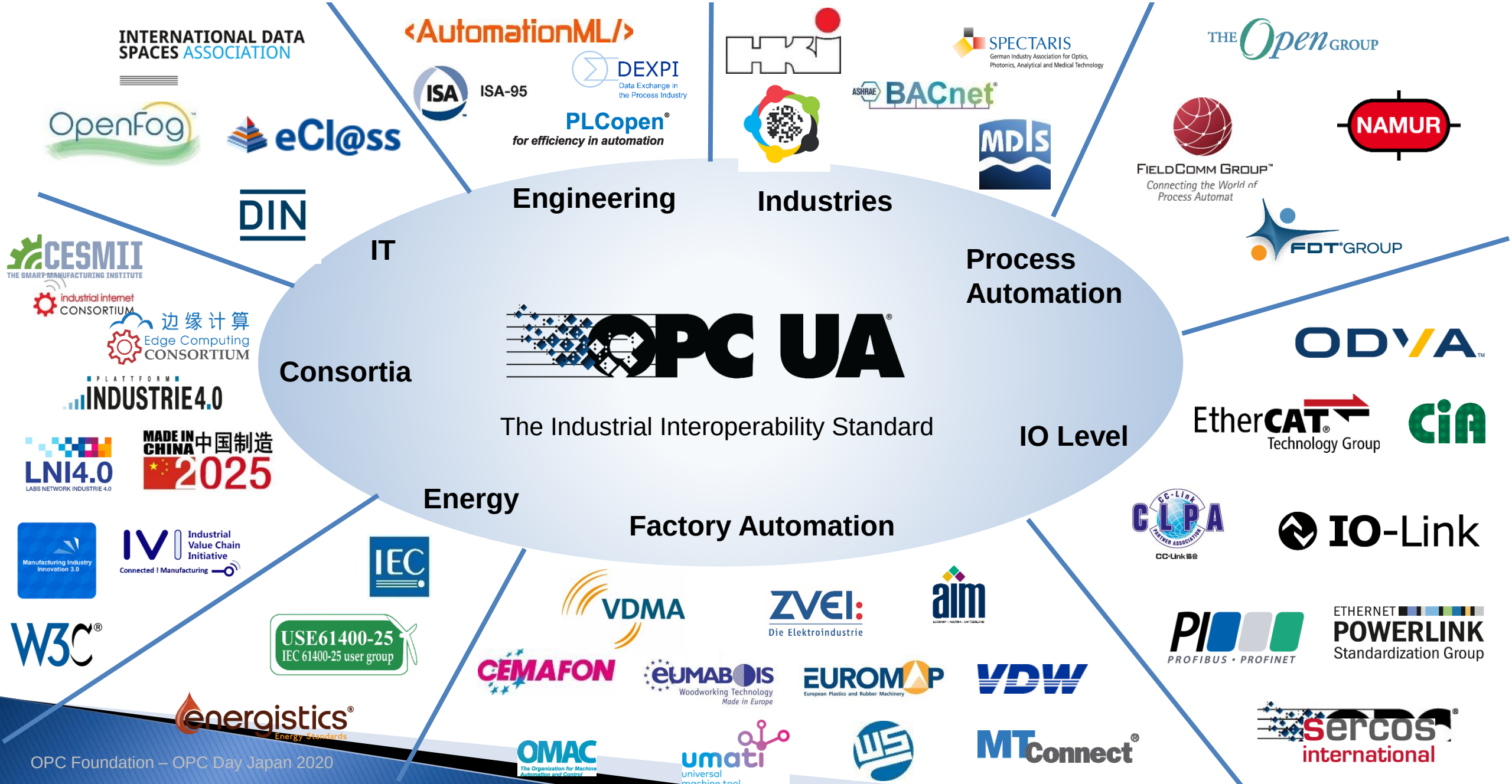
The OPC Foundation has been providing support to other consortiums and standard organizations to develop the OPC UA companion specifications via an infrastructure known as joint working groups (JWG).

A "Joint Working Group (JWG)" is a working group formed between an organization (subsequently called "cooperating organization") and the OPC Foundation. The goal of the JWG is the development of an OPC UA companion standard for use cases defined by the cooperating organization, with a compliance testing strategy to insure compliant implementations of the OPC UA companion standard.

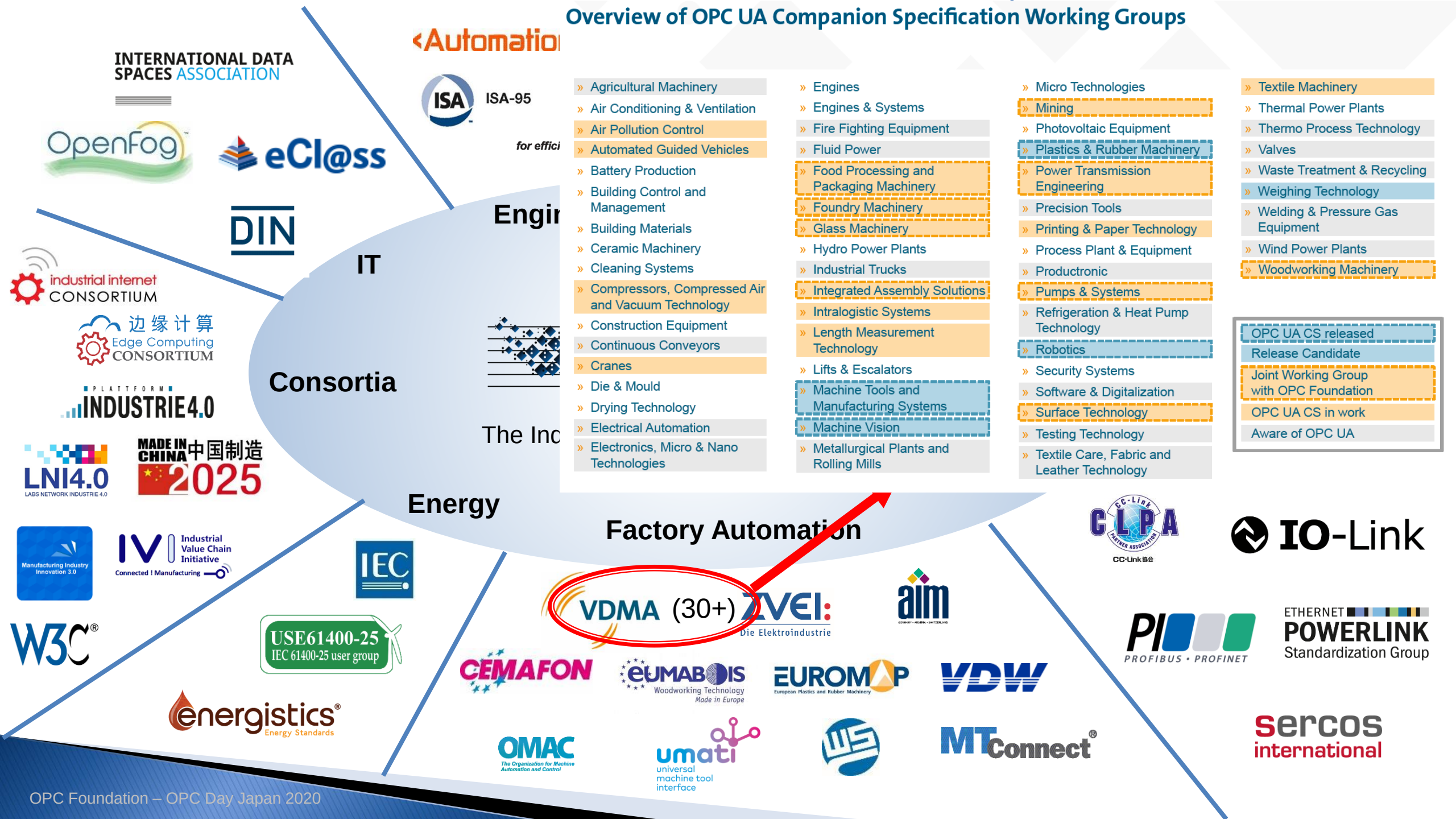
Version 2019-02-11

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,	info@AIM-D.de	V1.00	Released	Apr-16				

Overview and details : https://opcfoundation.org/markets-collaboration/



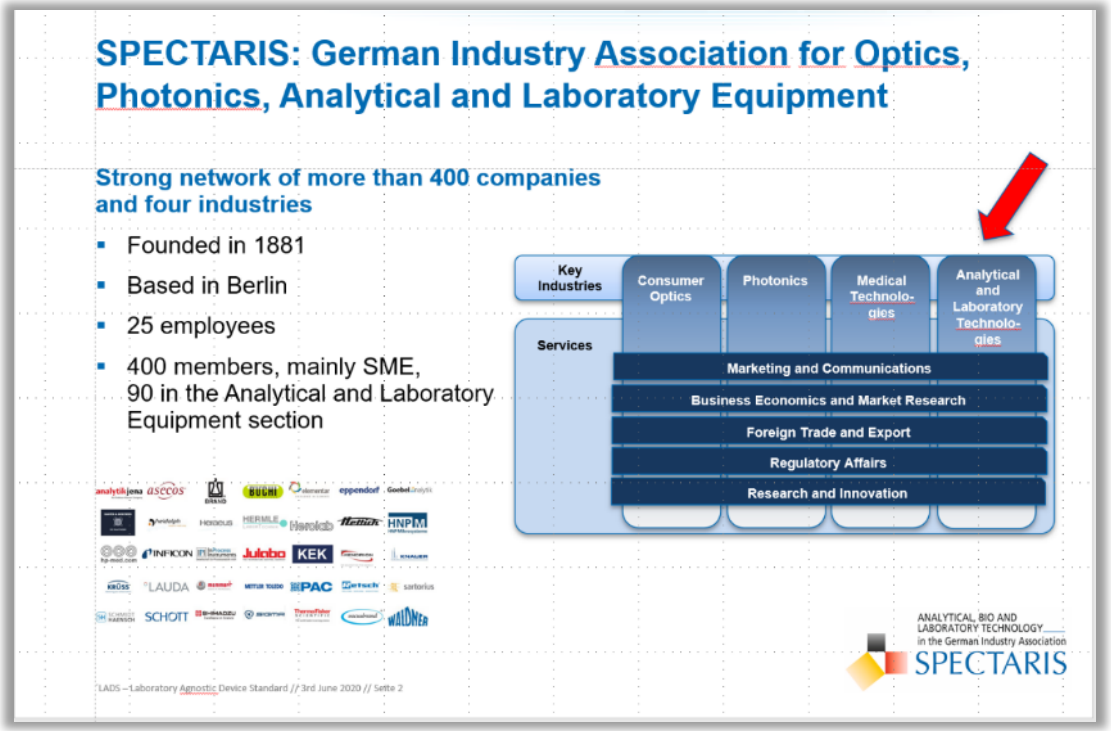
Overview of OPC UA Companion Specification Working Groups

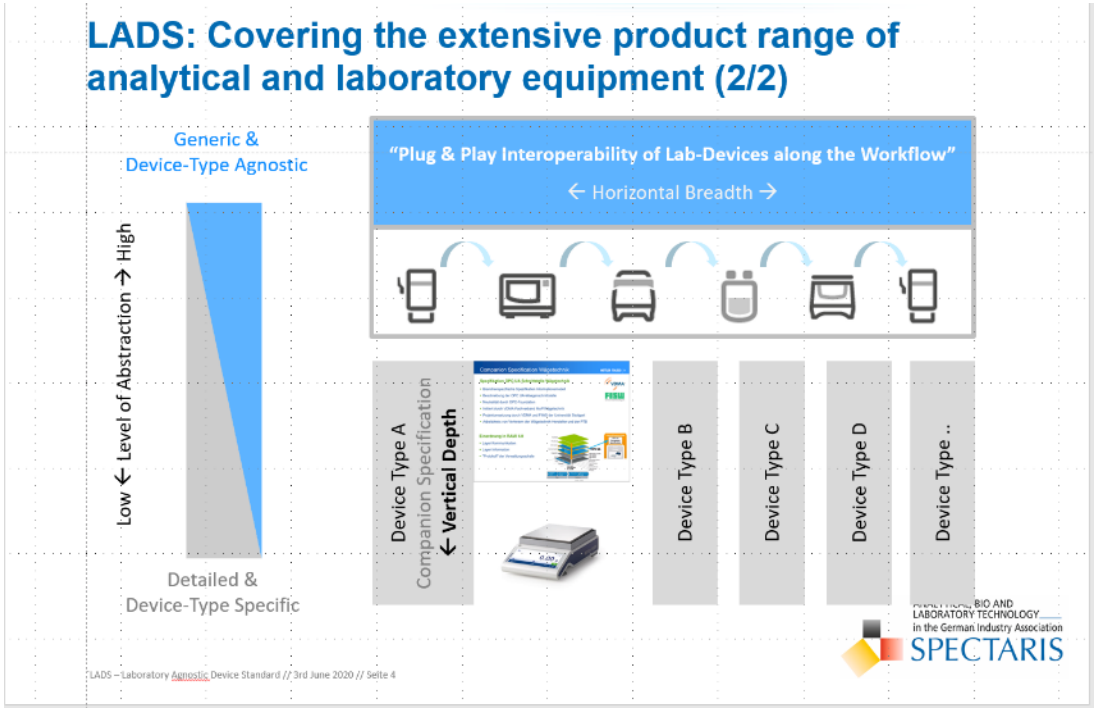


- Agricultural Machinery
- Air Conditioning & Ventilation
- Air Pollution Control
- Automated Guided Vehicles
- Battery Production
- Building Control and Management
- Building Materials
- Ceramic Machinery
- Cleaning Systems
- Compressors, Compressed Air and Vacuum Technology
- Construction Equipment
- Continuous Conveyors
- Cranes
- Die & Mould
- Drying Technology
- Electrical Automation
- Electronics, Micro & Nano Technologies
- Engines
- Engines & Systems
- Fire Fighting Equipment
- Fluid Power
- Food Processing and Packaging Machinery
- Foundry Machinery
- Glass Machinery
- Hydro Power Plants
- Industrial Trucks
- Integrated Assembly Solutions
- Intralogistic Systems
- Length Measurement Technology
- Lifts & Escalators
- Machine Tools and Manufacturing Systems
- Machine Vision
- Metallurgical Plants and Rolling Mills
- Micro Technologies
- Mining
- Photovoltaic Equipment
- Plastics & Rubber Machinery
- Power Transmission Engineering
- Precision Tools
- Printing & Paper Technology
- Process Plant & Equipment
- Productronic
- Pumps & Systems
- Refrigeration & Heat Pump Technology
- Robotics
- Security Systems
- Software & Digitalization
- Surface Technology
- Testing Technology
- Textile Care, Fabric and Leather Technology
- Textile Machinery
- Thermal Power Plants
- Thermo Process Technology
- Valves
- Waste Treatment & Recycling
- Weighing Technology
- Welding & Pressure Gas Equipment
- Wind Power Plants
- Woodworking Machinery

OPC UA CS released
Release Candidate
Joint Working Group with OPC Foundation
OPC UA CS in work
Aware of OPC UA

Announcement: LADS Joint Working Group





The joint SPECTARIS, VDMA and OPC Foundation LADS OPC UA Working Group will develop an OPC UA Information Model for analytical and laboratory equipment.

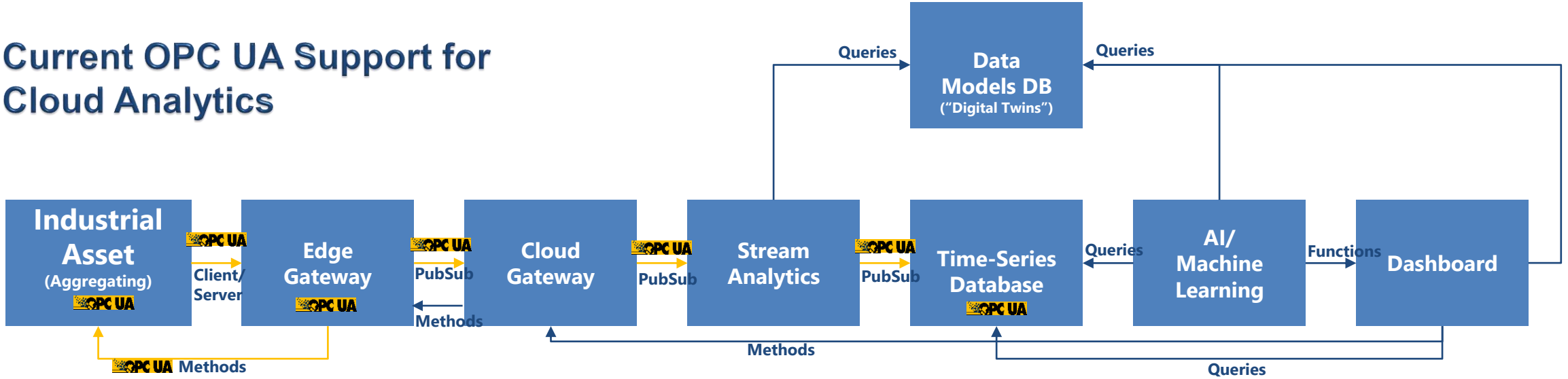
January 2021: Call for participation
February 2021: Kick off

White Paper

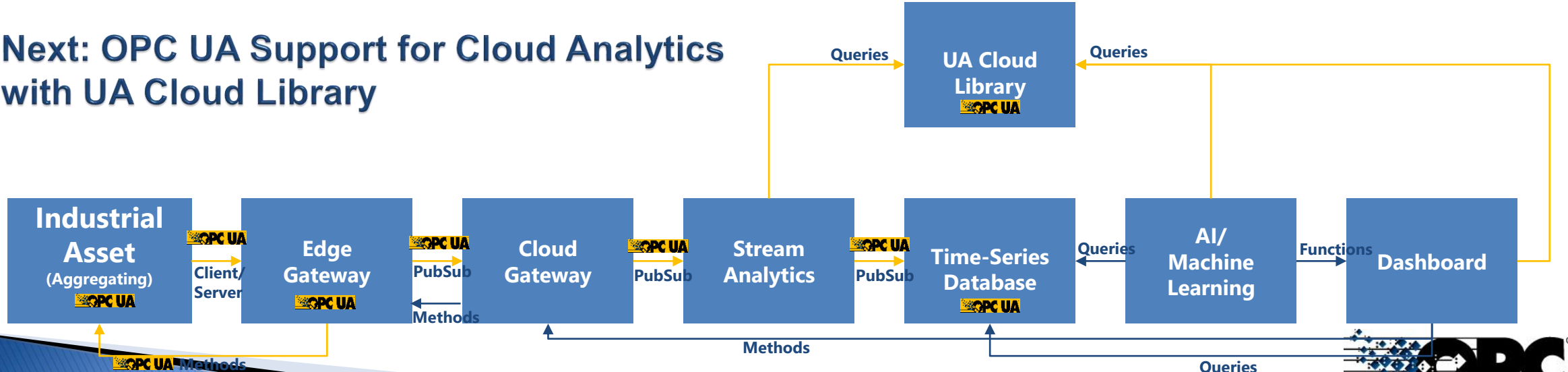
https://www.spectaris.de/en/association/thespectarisindustries/networked-laboratory-equipment/

OPCF Joint working Group "UA for Cloud Library"

Current OPC UA Support for Cloud Analytics



Next: OPC UA Support for Cloud Analytics with UA Cloud Library



OPC Foundation: Promise for OPC UA based Industrial Interoperability

Interoperability Robustness & Security

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

Security Design from Ground up

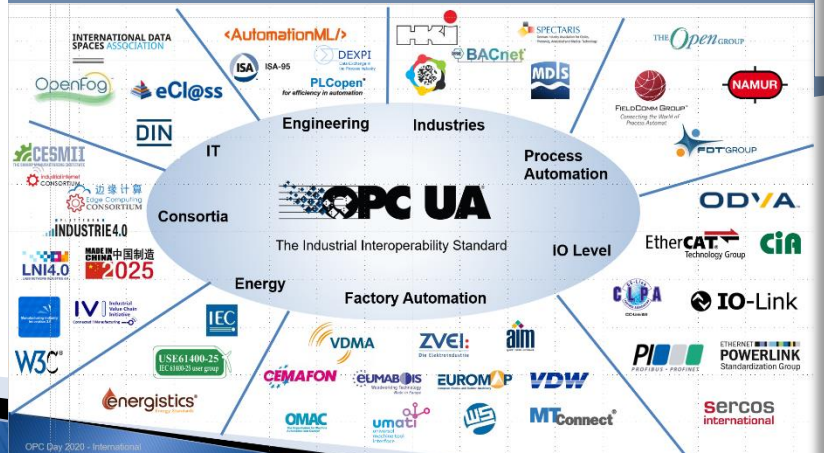
55+ Joint Working Groups Data Modelling/Harmonization

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, ..

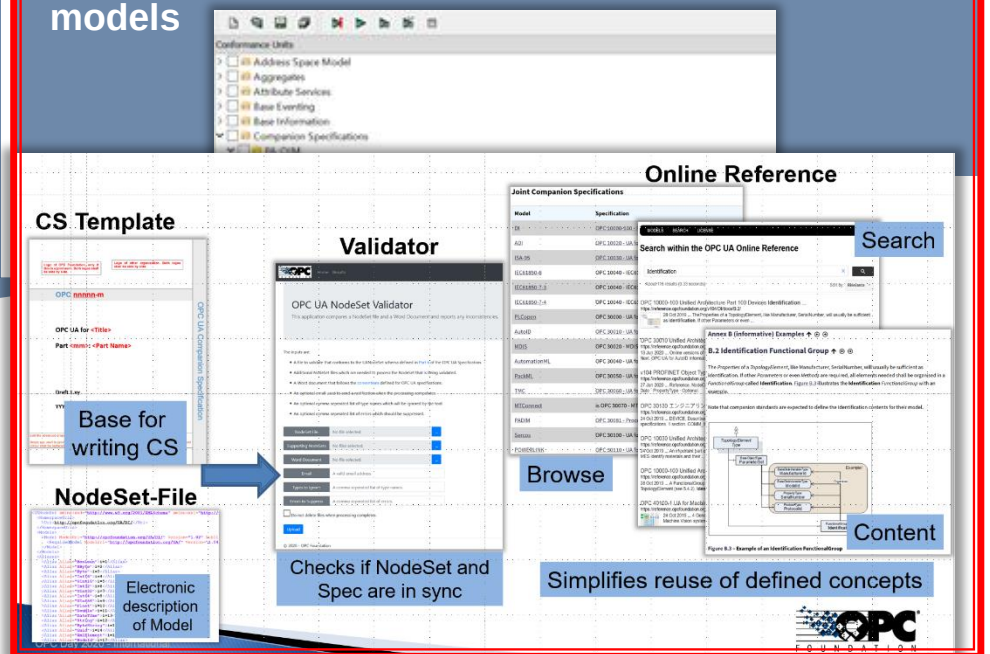


Validating / Certification Online Reference

Validation of Companion Specs

Compliance Test Tool (CTT): Open available 1800 test scripts for the OPC UA core functionality and for the Companion Specifications available now for PA-DIM / PLCopen / MDIS

Online Reference: Public reference with all models



End Users to request Certified Information

Today:

- **OPCF offer "one-stop-shop" certification**
  OPC Labs able to certify package
  - **OPC UA**
  - **Information models like MDIS, kitchen equipment, ..**

  - **Future:**
    - **OPC UA Safety, OPC UA Motion**
    - **OPC UA over APL, TSN, 5G, ..**

- **Two OPC Labs:**
  - **Europe (Stuttgart, Germany)**
  - **China, ITEI**

Grouping set of functionalities

https://www.opcfoundation.org/profilereporting

OPC UA Profiles

Following are the currently defined profiles, arranged according to their application category.

- Server Category
  - Facets
    - Core Characteristics
    - Data Access
    - Event Access
    - Alarm & Condition
    - Generic Features
    - Redundancy
    - Historical Access
    - Aggregates
    - Programs Model
    - Query
  - FullFeatured
    - Nano Embedded Device 2017 Server Profile
    - Micro Embedded Device 2017 Server Profile
    - Embedded 2017 UA Server Profile
    - **Standard 2017 UA Server Profile**
      - Enhanced DataChange Subscription 201
      - User Token – X509 Certificate Server Fac
      - Embedded 2017 UA Server Profile
    - Global Discovery Server 2017 Profile
    - Global Discovery and Certificate Mgmt 2017
- Client Category
  - Facets
    - Core Characteristics
    - Data Access

"Standard 2017 UA Server Profile" Profile

Description	This Profile is a FullFeatured Profile that defines a minimum set of functionality required for PC based OPC UA servers. Compared to the embedded profiles, the Profile requires higher limits for Sessions, Subscriptions and Monitored Items. It also requires support of diagnostic information. This profile supersedes the "Standard UA Server Profile".
URI	http://opcfoundation.org/UA-Profile/Server/StandardUA2017

This page lists the conformance units of the selected profile with their name and description.
Conformance units that are inherited via included Profiles are not listed by default. Use the following radio buttons to change this default behaviour.

- ○ Show only explicitly included conformance units
- ◉ Show also conformance units from included profiles
- ○ Show all existing conformance units
- ○ Show relationship of Conformance Units with Units and Profiles for Clients / Servers

Address Space Model

Include	Name	Opt.	Description	From Profile	Test Cases
☑	Address Space Base	☐	Support the NodeClasses with their Attributes and References as defined in Part 3. This includes for instance: Object, ObjectType, Variable, VariableType, References and DataType.	Core 2017 Server Facet	Open
☑	Address Space Dictionary Entries	☑	Support external dictionaries by relating OPC UA Nodes to dictionary entries using the HasDictionaryEntry ReferenceType.	Core 2017 Server Facet	Open
☑	Address Space Atomicity	☐	Support setting the NonatomicRead and NonatomicWrite flags in the AccessLevelEx Attribute for Variable Nodes to indicate whether Read or Write operations can be performed in atomic manner. If the flags are set to '1', atomicity cannot be assured.	Core 2017 Server Facet	Open
☑	Address Space Full Array Only	☐	Support setting the WriteFullArrayOnly flag in the AccessLevelEx Attribute for Variable Nodes of non-scalar data types to indicate whether write operations for an array can be performed with an IndexRange	Core 2017 Server Facet	Open

OPC Foundation: Library of Description of Industrial Things

- Description of a thing
  data, interfaces, features, behavior, …

  OPC UA Companion Spec
  .. has 2 components
  - Human readable spec
  - Machine readable spec

- Collection of OPC UA Companion Specifications:

  "The OPC Foundation will become the world library for descriptions of industrial things."

- Online ***Searchable*** specification reference
  https://reference.opcfoundation.org

- Type dictionary
  - All OPC UA specifications
  - All joint Information models

Published Information Models

OPC UA Specifications

Model	Specification
Core	OPC 10000-1 - Part 1: Overview and Concepts
Core	OPC 10000-2 - Part 2: Security Model
Core	
Core	
Core	

Joint Companion Specifications

Model	Specification
DI	OPC 10000-100 - Part 100: Device Information Mod
ADI	OPC 10020 - UA for Analyzer Devices
ISA-95	OPC 10030 - UA for ISA-S95
PLCopen	OPC 30000 - UA for Programmable Logic Controller
AutoID	OPC 30010 - UA for AutoId Devices
AutomationML	OPC 30040 - UA for AutomationML
PackML	OPC 30050 - UA for PackML (OMAC)
TMC	OPC 30060 - UA for Tobacco machinery (TMC)

Future

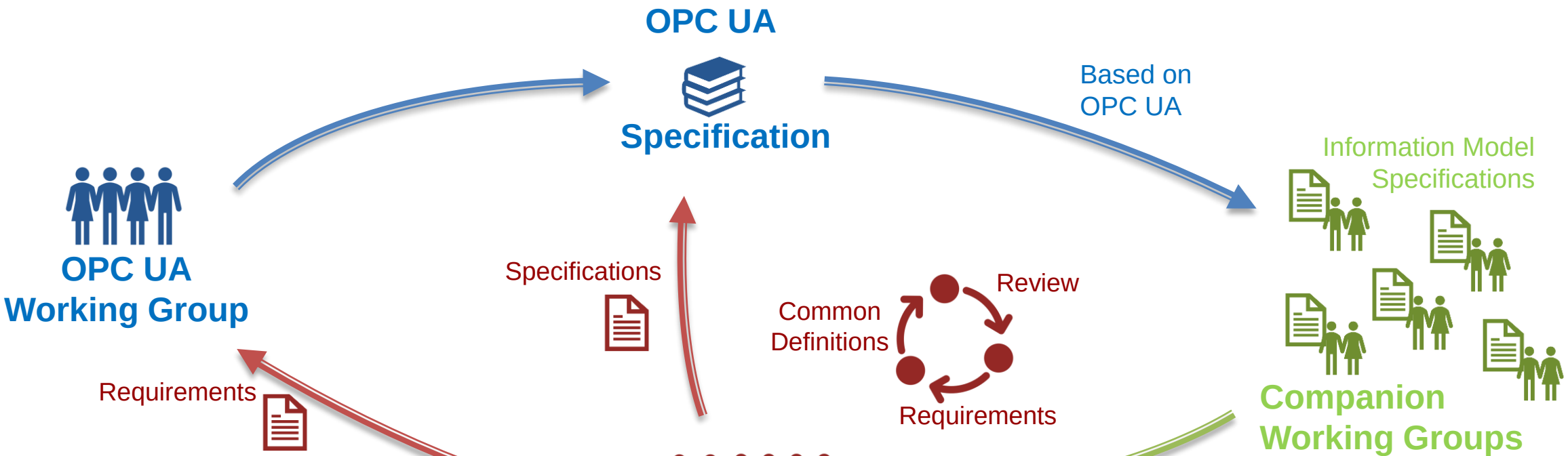
OPC Foundation: Roadmap

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

Recent innovations in v1.04	2019/2020 – Features worked on	2021 and beyond – Vision
2019: Relate with established semantic models (Dictionary Reference) ▪ An infrastructure to reference from an OPC UA Information Model to external dictionaries like IEC Common Data Dictionary or eCl@ss. **2019: Interfaces and AddIns** ▪ *Interfaces* and *AddIns* complement the type model and can be used when subtyping is not suitable for a required extension. **PubSub** ▪ New communication schema to enable and optimize OPC UA for one-to-many, many-to-one, or many-to-many configurations. **JSON Web Token, OAuth2** ▪ User identification using the authorization service well-established in modern cloud applications (Azure, Google, Facebook, …) **Reverse Connectivity** ▪ Servers behind firewalls can use reverse connectivity. **SessionLess Services** ▪ Avoids session establishment for use cases where Servers are called infrequently. **Security**	**Deterministic UA: Mappings to TSN** ▪ 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. **Field-Level Communication (FLC)** ▪ 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. **Alias names** ▪ 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 *Clients*. **Harmonization of companion standards** ▪ 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	The following features are under consideration. No concrete specification work has been initiated. **Transactions** ▪ 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. **MetaData in the Cloud** ▪ 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. **Cloud-Relay** ▪ The cloud-relay capability allows for connectivity between UA applications even when both Client and Server are behind separate firewalls. **Deterministic communication using 5G** ▪ The 5th generation wireless systems will provide better performance and determinism. Similar to the TSN mapping a mapping of PubSub to 5G protocols

OPC FOUNDATION

Harmonization Working Group fully operational



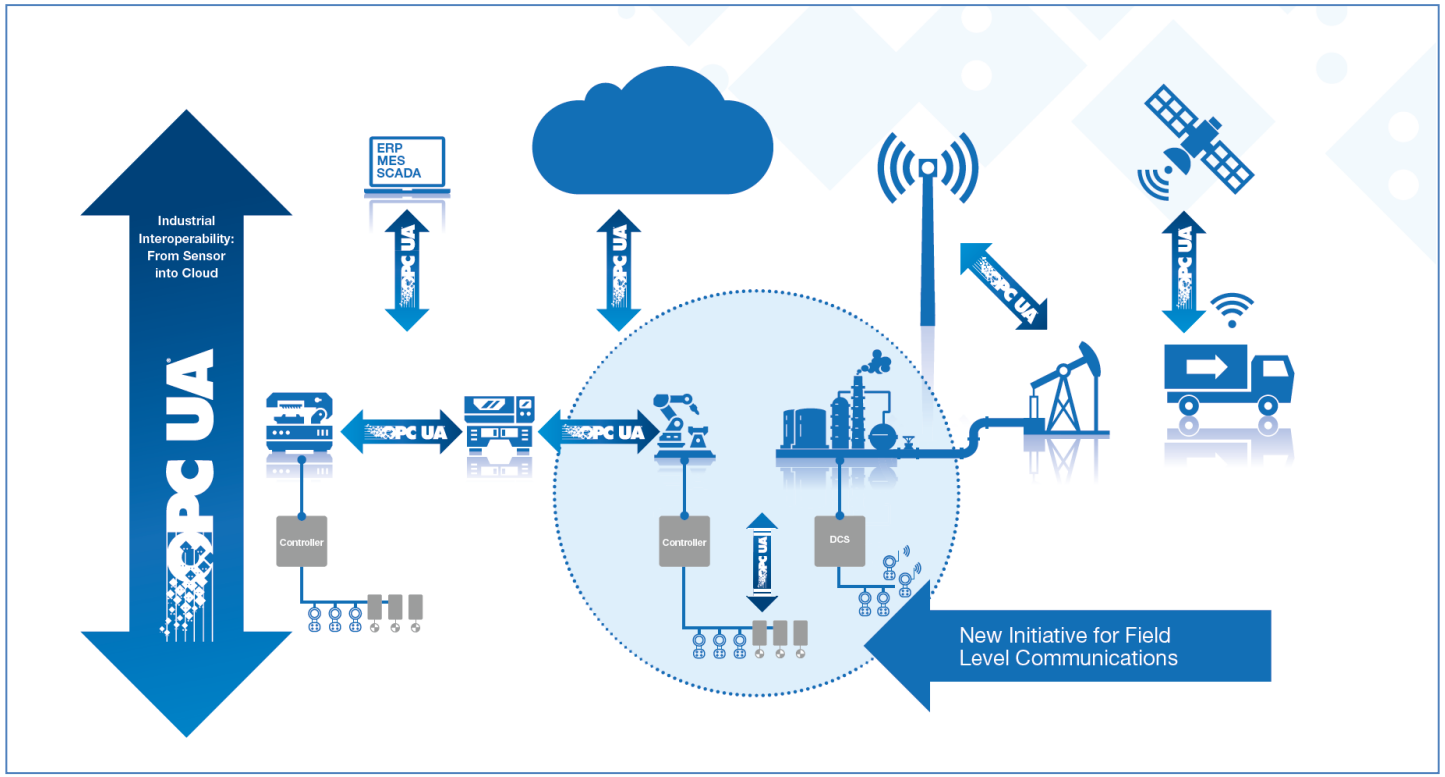
Tasks

- Review companion specifications
- Manage template for companion specifications
- Collect common features and feature requests
- Prepare information model drafts for common features
- Coordination integration of drafts in existing or new specifications

Membership

- OPC UA experts from OPC UA working group
- Representatives from all companion working groups

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



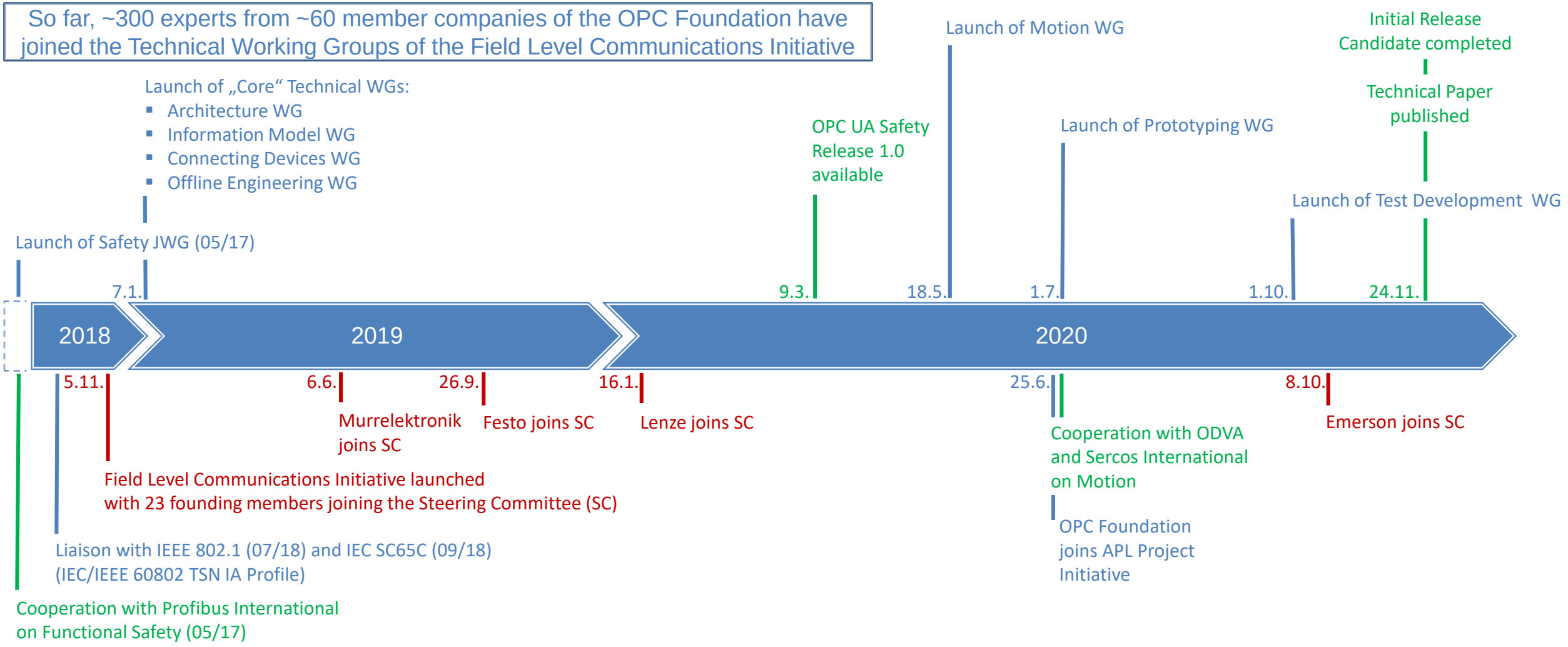
OPC-F Press Conference SPS 2018

OPC-F’s Field Level Communications Initiative with 27 supporting companies

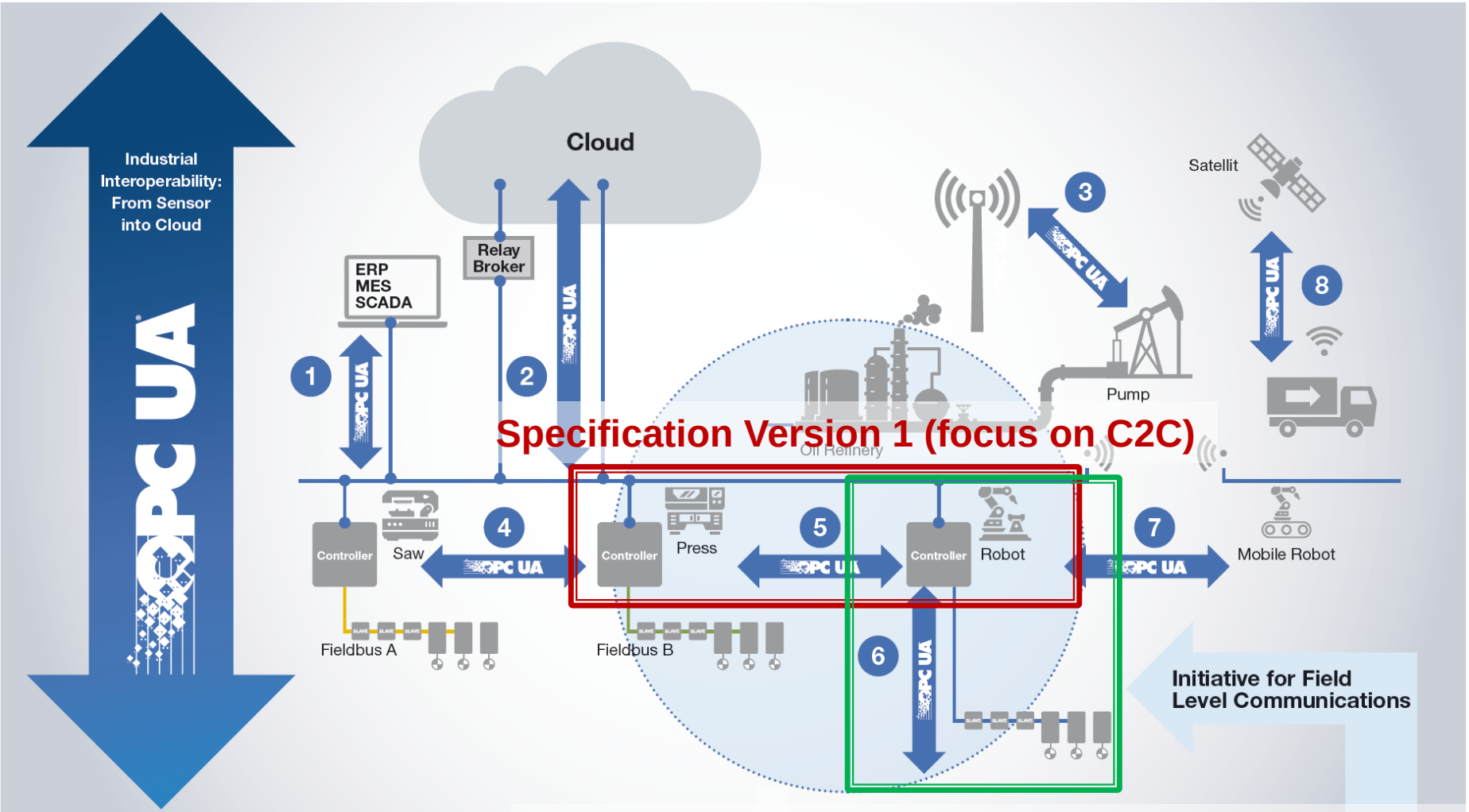
- extra contribution for joining steering committee
- working groups open to all OPC-F members

Field Level Communications Initiative - Milestones

So far, ~300 experts from ~60 member companies of the OPC Foundation have joined the Technical Working Groups of the Field Level Communications Initiative



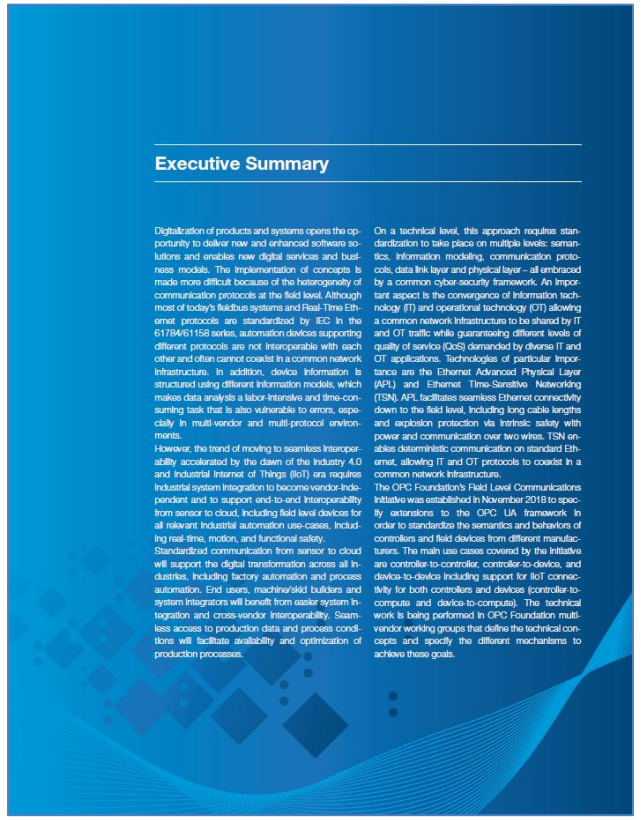
Roadmap for OPC UA Field Level Communications Specifications

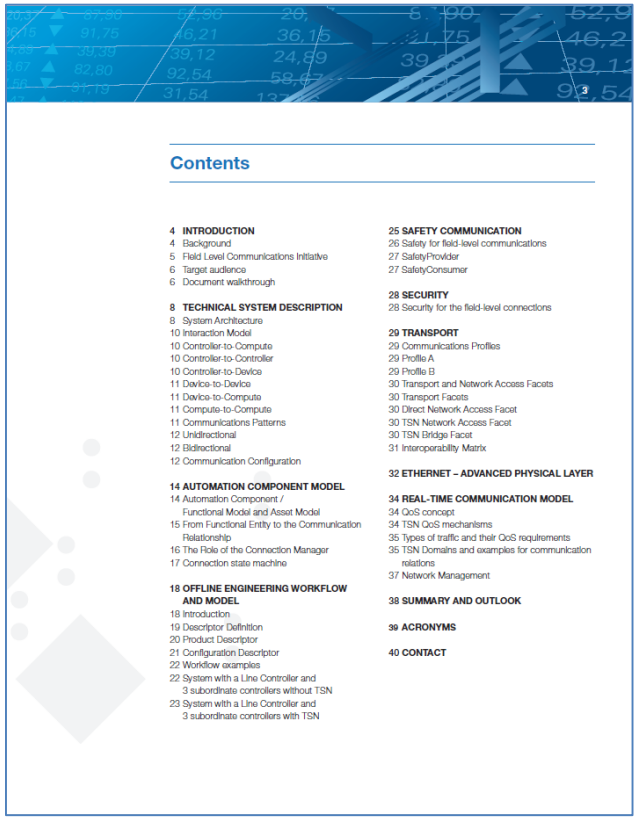


1. IT / OT Communication
2. Cloud Integration
3. Secure Remote Access
4. Local OT Communication
5. Controller to Controller
6. Controller to Field Device
7. Wireless Integration (5G)
8. Future Ready

Technical Paper published

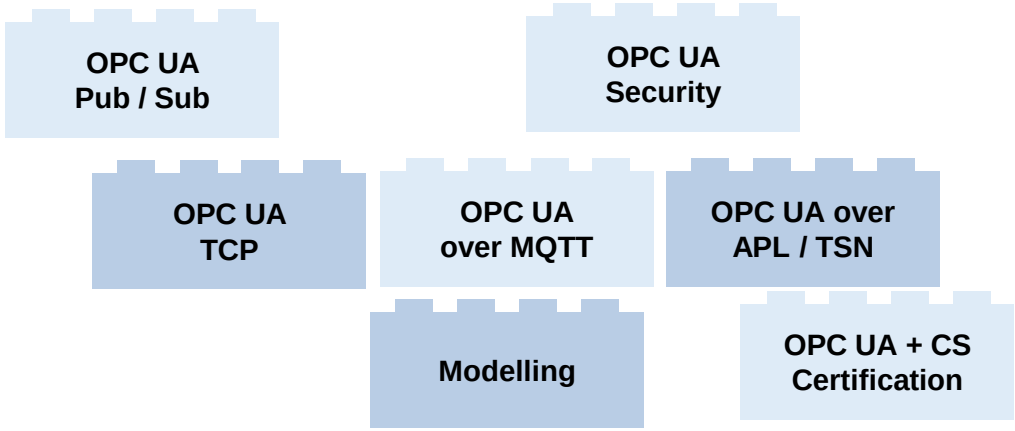
Technical paper (40 pages) now available to explain the technical approach and the basic concepts for OPC UA-based field level communications





Download: https://opcfoundation.org/flc/

(OPC UA + Companion Specs)
= Promize for Interoperability



- **OPC UA: Collection of technology bricks**
  - Connectivity, different protocols
  - Security
  - Information modeling capabilities

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- **Companion Specifications: Collection of bricks for different markets**
  - Information modelling to describe specific market
  - Field devices need TCP, UDP, Safety, Motion, real-time, ...
  - Gateway & Cloud services need UA over MQTT, 5G

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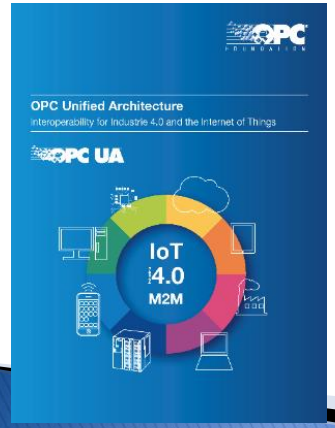
- **OPC UA + Companion Spec guarantee 100% Interoperability**
  - Mandatory bricks guarantee interoperability
  - Optional bricks allow flexibility
  - OPCF: Tools and infrastructure for certification

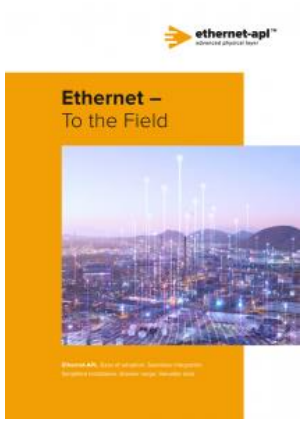
OPC Foundation - Information

Material (PDF & recordings) available
https://opcfoundation.org/marcom-presentations
https://www.youtube.com/user/TheOPCFoundation

https://opcfoundation.org/opcua-en.pdf



https://opcfoundation.org/FLC



https://opcfoundation.org/APL

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iTunes https://apple.co/2CzTGsL
Spotify https://spoti.fi/2Kax46k
Google: http://bit.ly/2PKsY7O

OPC Foundation: The United Nations for Industrial Automation

Thank you! - Questions?

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