



FINNISH
INDUSTRIAL
INTERNET
FORUM

Introduction to OPC Unified Architecture

FIIF Event: OPC UA

3.11.2022



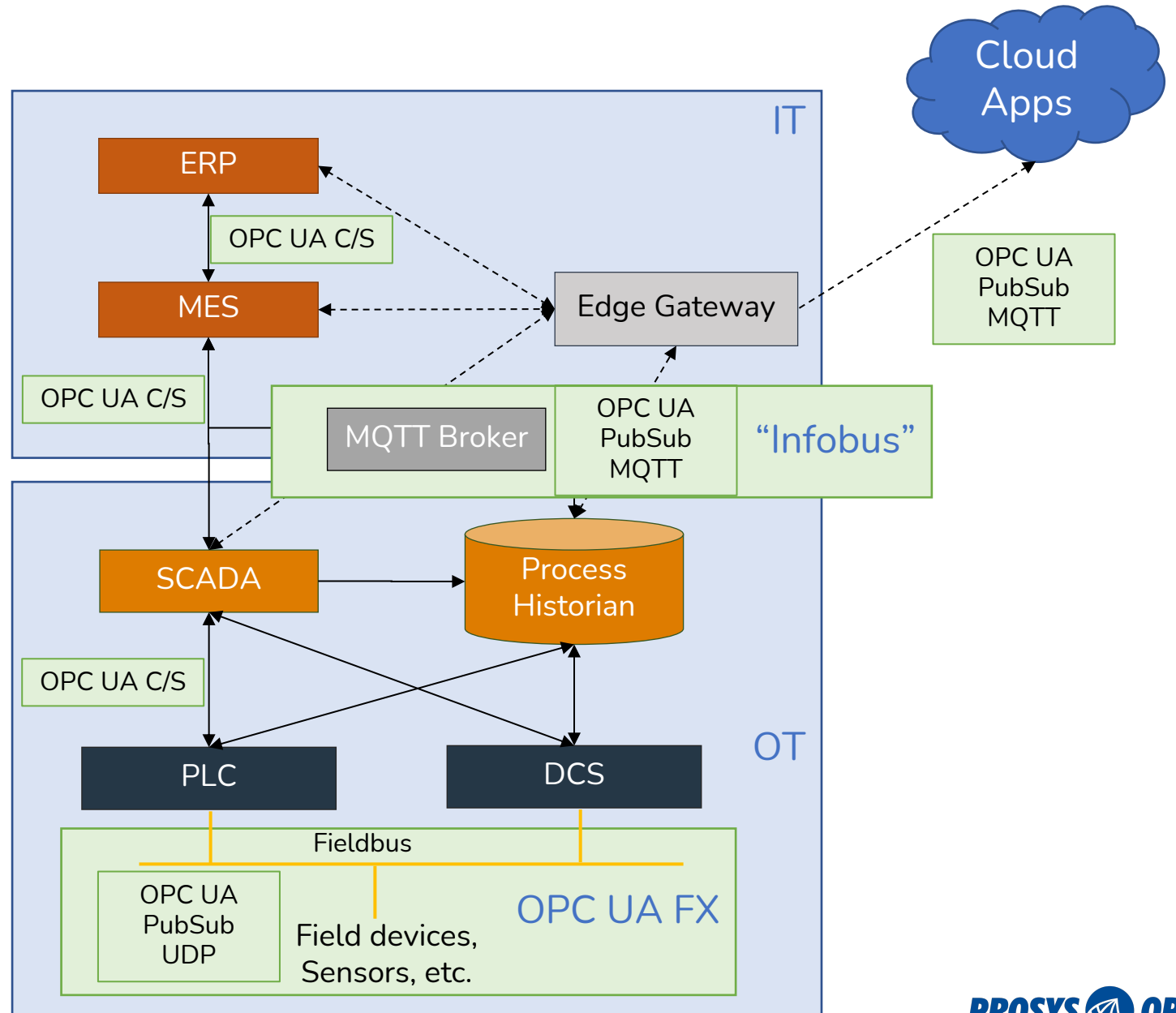
PROSYS  **OPC**

Jouni Aro
Chief Technology Officer

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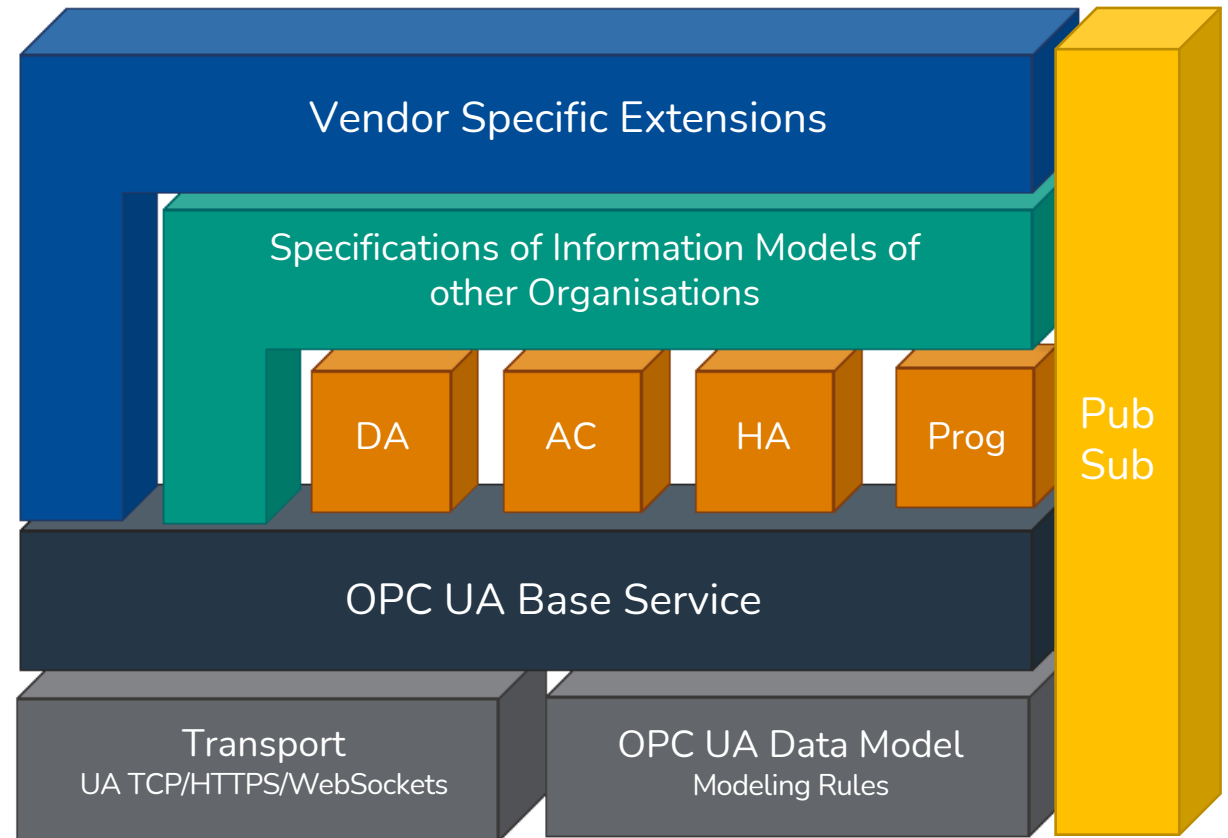
OPC UA Use Cases

- OPC UA Client/Server (C/S)
 - Process Monitoring
 - Production Control (SCADA)
 - Production Orchestration (MES)
- OPC UA PubSub UDP
 - Field Level
 - OPC UA Field Exchange (FX)
- OPC UA PubSub MQTT
 - Cloud Connectivity
 - Information Level “Infobus”

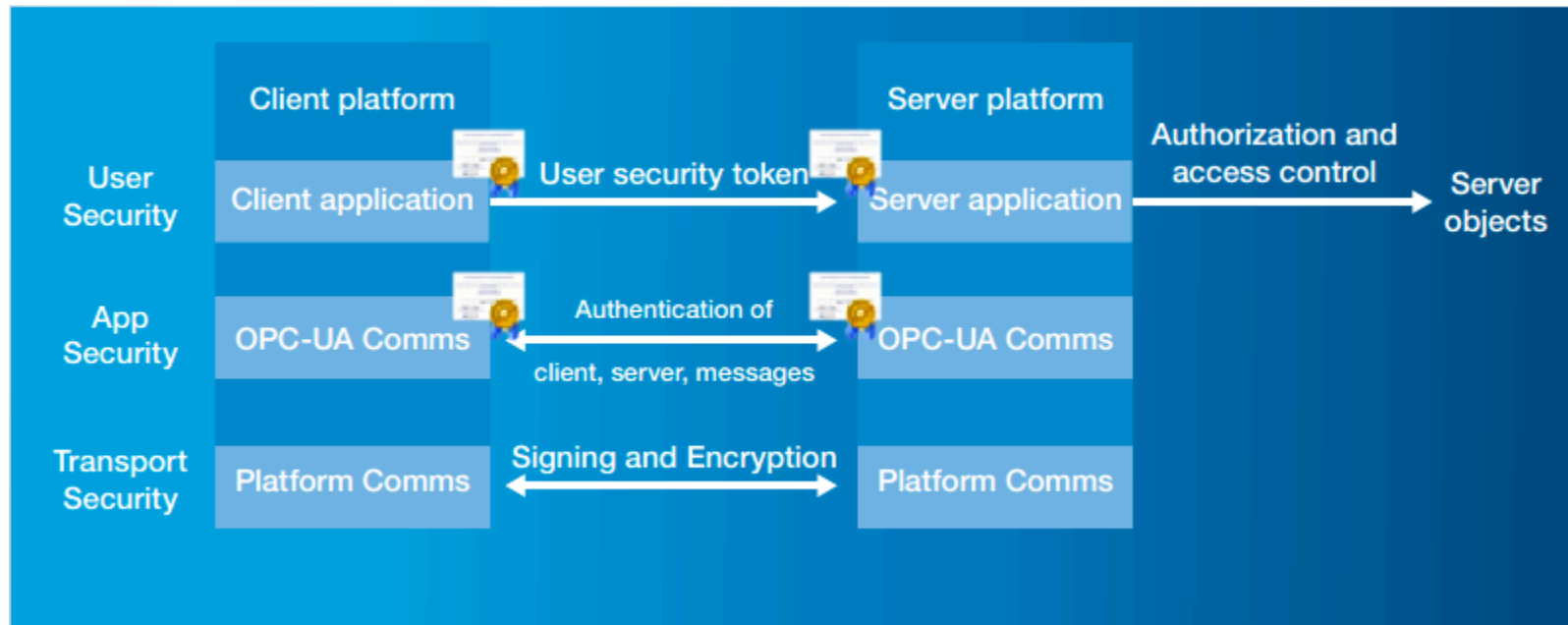


OPC Unified Architecture (UA)

- OPC is de facto communication protocol in industrial systems since 1995 (OPC Classic)
 - Originally: OLE for Process Control → OPC
 - Microsoft DCOM based
 - Separate protocols
 - Data Access (DA)
 - Alarms & Events (AE)
 - Historical Data Access (HDA)
- OPC UA since 2009
 - Unified Architecture: DA, AC, HA, etc.
 - Platform independent
 - Built-in security
 - Information modeling
 - OPC = Open Platform Communications
- PubSub since 2018
- IEC 62541
 - Enables Secure Industrial Internet!
 - Smart Manufacturing
 - Smart Cities
 - Etc.



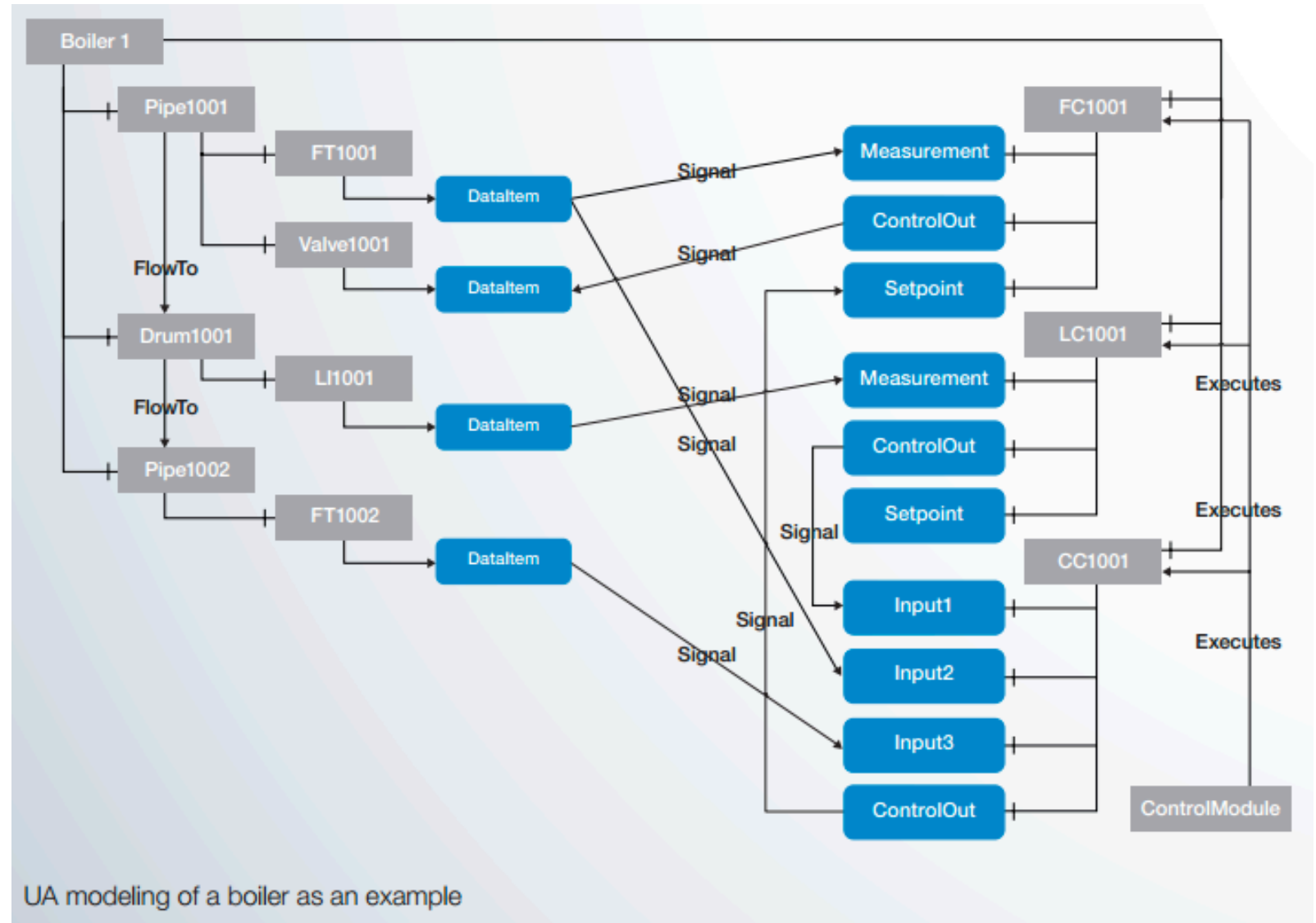
Security Concept (Client/Server)



- Optional Message Signing and Encryption (AES-128/256)
- Applications authenticated with Application Instance Certificates (X.509)
- Users authenticated with user name / password or certificates
- Authorization on application level

Information Modeling

- Enable exchange of semantic information
 - Standard models
 - Devices
 - Machinery
 - PLCopen
 - PackML
 - Robots
 - ISA95
 - + over 40 industry specific models published
 - Custom models



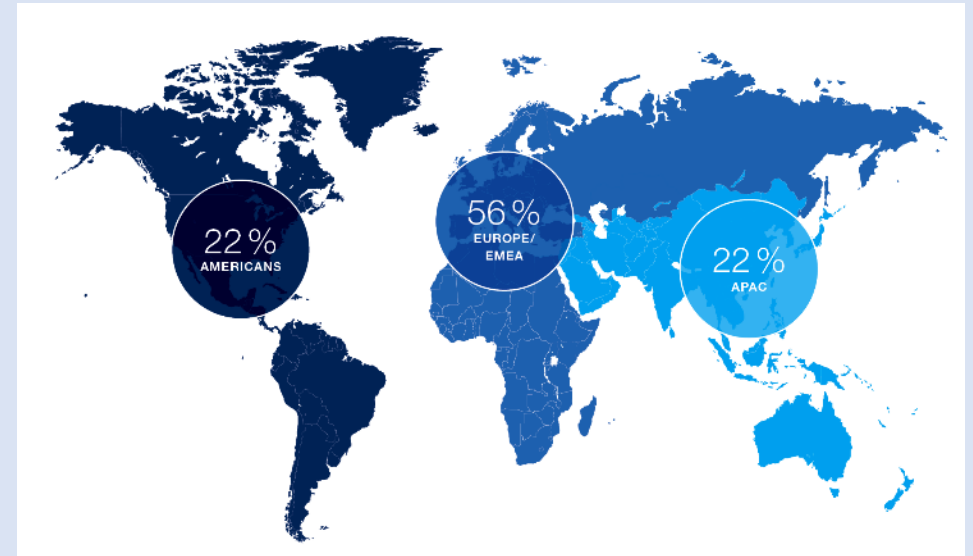
OPC Foundation

- 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: 891 (Status: Sept 20th, 2022)



Board of Directors (elected for 2022/2023)

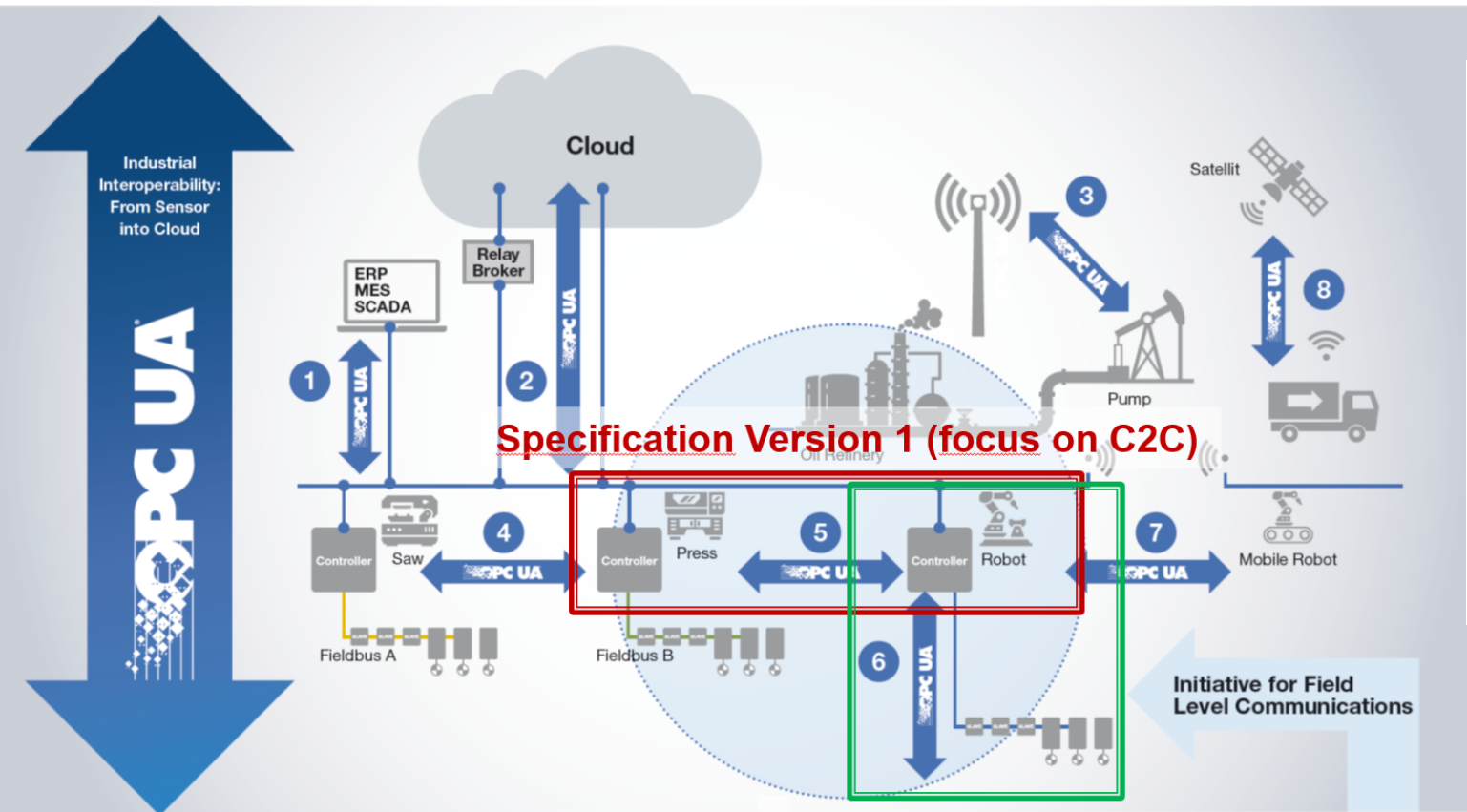
Microsoft	Honeywell	Rockwell
SAP	Yokogawa	Schneider
Siemens	Mitsubishi	ABB
Beckhoff	Ascolab	VDMA

Collaboration

- Wide collaboration with other standard bodies
- Reuse existing information models (in various formats)
- OPC UA defines a common modeling language
 - Generic platform for communicating all kinds of information models over a standard and secure interface



OPC UA Field Exchange (UAFX)

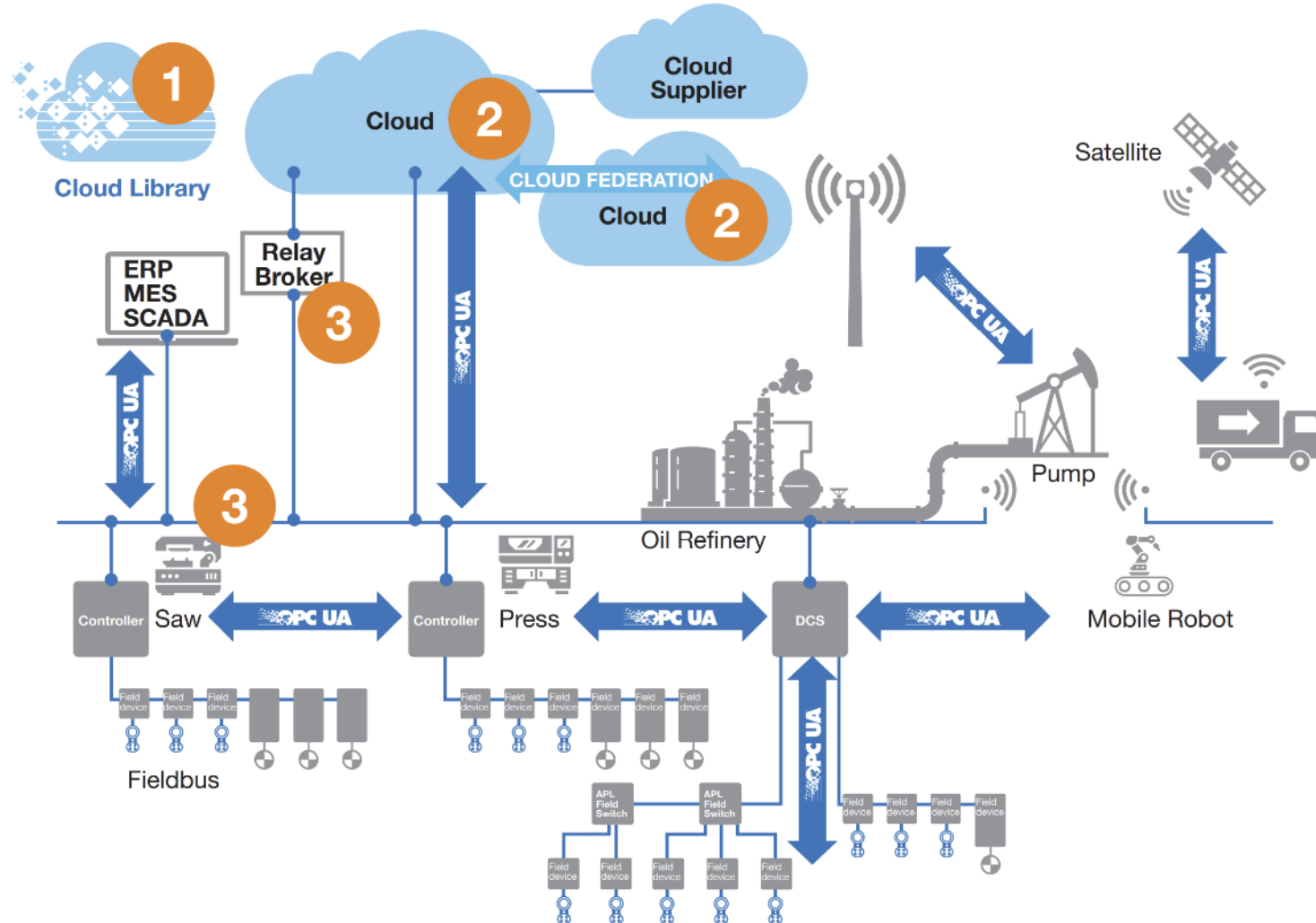


- 1 IT / OT Communication
- 2 Cloud Integration
- 3 Secure Remote Access
- 4 Local OT Communication
- 5 Controller to Controller
- 6 Controller to Field Device
- 7 Wireless Integration (5G)
- 8 Future Ready

Specification Version 2 (extensions for C2D and D2D)

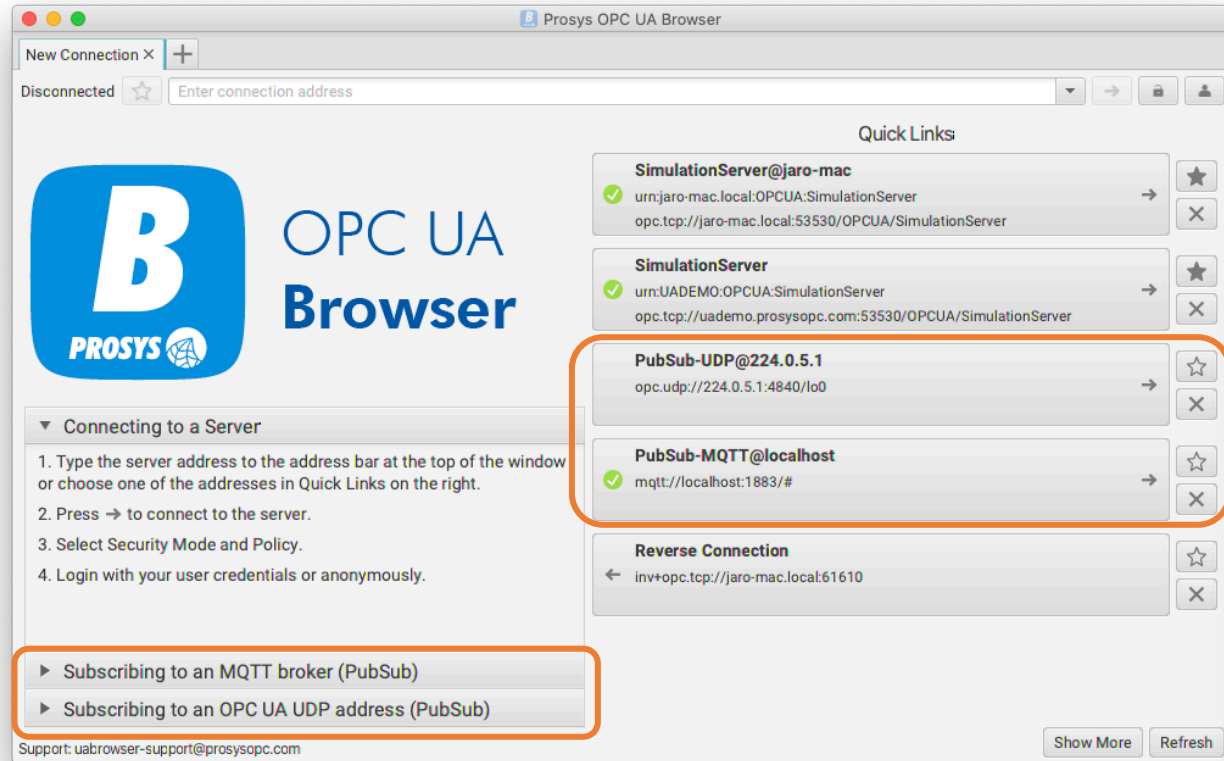


OPC UA for Cloud Initiative



- 1 Cloud Library**
 - Repository for OPC UA based information models (IMs)
 - Upload, store, search, download IMs
- 2 Cloud Federation**
 - Standardized communication
 - Cloud to Cloud
- 3 Asset / Edge / Cloud**
 - Standardized communication
 - Field to Cloud
 - Cloud to Field
- 4 Education, IIOT Starter Kit**
 - Success stories

Simulation & Test Tools

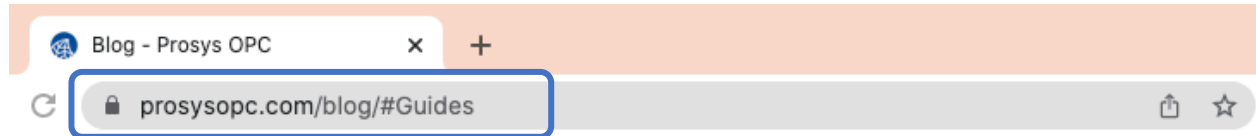


<https://prosysopc.com/>



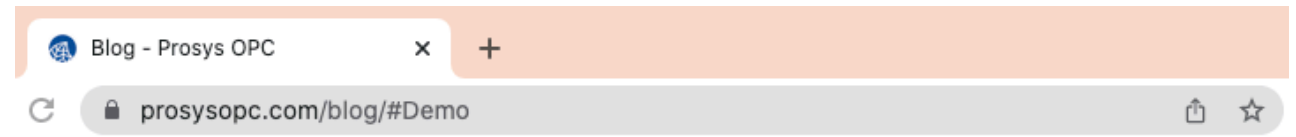
NEW: PubSub 9/2022

Prosys OPC Blog



Guides

- [Connecting OPC UA Simulation Server and OPC UA Browser to an OPC UA PubSub Network \(20.10.2022\)](#)
- [SimServer How To #2: Replicate any OPC UA Server with a Simulation Server \(12.07.2022\)](#)
- [SimServer How To #1: Build and simulate OPC UA Data Models \(22.03.2022\)](#)
- [Introduction to OPC UA Online Course - Instructions \(20.01.2021\)](#)
- [Transferring data from field devices through Prosys OPC UA Historian to the cloud using AWS IoT Greengrass and SiteWise \(16.03.2020\)](#)
- [Getting Started with OPC UA \(Videos\) \(12.10.2018\)](#)
- [Developing OPC UA applications in Android Studio \(27.07.2017\)](#)
- [Configuring Prosys OPC UA Modbus Server \(04.05.2016\)](#)
- [OPC UA & Wireshark \(11.09.2012\)](#)



Demo

- [OPC UA PubSub to Cloud via MQTT at SPS 2022 \(02.11.2022\)](#)
- [Connecting OPC UA Publisher to Azure IoT Central with MQTT \(20.07.2022\)](#)
- [OPC UA PubSub to Cloud via MQTT Demo at Hannover Messe 2022 \(23.05.2022\)](#)
- [Connecting OPC UA Publisher to Amazon AWS IoT with MQTT \(26.11.2021\)](#)
- [Connecting OPC UA Publisher to Azure with MQTT \(14.07.2021\)](#)

OPC UA Videos & Podcasts



SUOMEN AUTOMAATIOSEURA RY
FINNISH SOCIETY OF AUTOMATION

<https://www.youtube.com/channel/UCzkP4miVM9-vmDotXb7lfxQ/videos>

- ▶ OPC Day Finland 2015->



<https://www.youtube.com/user/TheOPCFoundation>

- ▶ OPC UA Technical Introduction, Uwe Steinkrauss
- ▶ OPC UA Security, Darek Kominek
- ▶ All About Certification, Alexander Allmendinger
- ▶ Getting Started with OPC UA, Jouni Aro
 - ▶ Part 1: End User Products
 - ▶ Part 2: Developer Kits
- ▶ Azure Industrial IoT – Overview, Erich Barnstedt
- ▶ Plus more about Companion Specifications, etc.

<https://opcfoundation.org/resources/podcast/>



**OPC
DAY
FINLAND
29.11.2022**
AS A LIVE EVENT AT
EXPO AND CONVENTION CENTRE
MESSUKESKUS HELSINKI

www.automatioseura.fi/opcdaysfinland2022

**OPC UA
EXTENDS TO
FIELD AND
CLOUD**

PROGRAMME

9:00

Opening

Jouni Aro, Finnish Society of Automation

9:10

Keynote: Latest News about OPC UA

Stefan Hoppe, OPC Foundation

9:35

OPC UA Field Level Communication (FLC) and OPC UA Field Exchange (FX)

Peter Lutz, OPC Foundation

10:00

Break, Meet the Sponsors

10:30

OPC UA Cloud – empowering central data modeling

Bo Biene, Inray

10:50

Latest News on OPC UA PubSub and Security Configuration

Matthias Damm, Unified Automation

11:10

OPC UA Machinery Information Model

Heiko Herden, VDMA

11:30

Lunch Break, Meet the Sponsors

12:30

Open Industry 4.0

Ricardo Dunkel, Open Industry 4.0 Alliance

12:50

Open Industry 4.0 Open Edge Computing

Konrad Heidrich, Hilscher

13:10

OPC UA Security Management and FX Configuration

Matthias Damm, Unified Automation

13:30

Break, Meet the Sponsors



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BECKHOFF



inray



NOKIA

Novotek



14:00

OPC UA & Measurement Technology

Aapo Vuoristo, Beckhoff

14:20

OPC UA PubSub - Hands-on Demonstration

Jouni Aro, Prosys OPC

14:40

Large Scale Production Data Delivery to Cloud with OPC UA PubSub

Jan Borch, Amazon Web Services

15:00

Break, Meet the Sponsors

15:30

OPC UA as Large Scale Aggregation Server

Mika Karaila, Valmet

15:50

Solving energy crisis: OPC UA and UPM Energy Beyond Spot Service

Veli-Pekka Salo, Wapice & Jukka-Pekka Häkli, UPM

15:30

OPC UA as Large Scale Aggregation Server

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Solving energy crisis: OPC UA and UPM Energy Beyond Spot Service

Veli-Pekka Salo, Wapice & Jukka-Pekka Häkli, UPM

16:10

Digital Transformation: Accelerating Time to Value and Unlocking Double Digit KPI Improvements at Scale

Thorsten Weiler, Inray

16:30

OPC UA for Creating Next Generation Cloud Edge and Cloud Data Solutions

Jukka Pirinen & Janne Laukkanen, Brightly Works

16:50

Final Q&A

17:10

End of the day



SUOMEN AUTOMAATIOSEURA RY
FINNISH SOCIETY OF AUTOMATION


OPC Day International 2022

Day 1: Keynotes: Energy transformation
Day 2: Technical Update

Day 3: Information model updates
Day 4: Success Stories

Day 5: Best practice

Agenda: <https://opcfoundation.org/opcdai>



The banner features a dark blue background with a glowing globe and network lines. The text is as follows:

- OPC DAY INTERNATIONAL**
- IT meets Automation**
- APR 25 – 29, 2022**
- OPC FOUNDATION** (with logo)
- DIGITAL EVENT** (in an orange box)
- BLOCK THE DATE!** (in a blue box)
- TECHNOLOGY SOLUTIONS**
- BUSINESS BENEFITS**
- APPLICATION REPORTS**
- ECO-SYSTEM ADAPTION**

Per day:

- 2h presentations
- 1h Q&A

- 2 times per day
to cover different time zones

Over 1900 registrations in total

**Recordings and Slides
available public**

OPC Day

- [OPC Day International 2022 - All Presentations \(18.05.2022\)](#)
- [OPC UA Enabling Plug & Produce - Report from OPC Day Finland 2019 \(11.02.2020\)](#)
- [OPC UA Getting Real and Real-time - Report from OPC Day Finland 2018 \(17.12.2018\)](#)
- [OPC UA is Enabling Smart Manufacturing - Report from OPC Day Finland 2017 \(25.10.2017\)](#)
- [OPC Day Europe 2017 - OPC UA is the Industry 4.0 Communication \(14.06.2017\)](#)
- [OPC Day Finland 2016 - Presentations Online \(09.12.2016\)](#)
- [OPC Day Europe 2016 - Industry 4.0 is committed to OPC UA \(29.08.2016\)](#)
- [OPC Day Finland 2015 - Watch the Presentations Online \(23.11.2015\)](#)
- [OPC Day Europe 2015 - OPC UA goes to the cloud, open source and towards real-time! \(27.05.2015\)](#)
- [OPC and MES Day Finland 2014: Industrial Internet and Industry 4.0 \(10.10.2014\)](#)
- [OPC and MES Day Finland 2013 \(22.10.2013\)](#)
- [OPC Day Italy 2013 \(04.10.2013\)](#)
- [OPC Day Europe 2013 \(20.05.2013\)](#)
- [OPC and MES Day & OPC UA Workshop 2012 \(15.10.2012\)](#)
- [OPC Day Europe 2012 \(29.05.2012\)](#)



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Thank you!



PROSYS  **OPC**

Jouni Aro
Chief Technology Officer

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See you at



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