

OPC DAY
FINLAND 2022
29.11.2022

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

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Director Field Level Communications



FINNISH SOCIETY OF AUTOMATION
SUOMEN AUTOMAATIOSEURA RY

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BECKHOFF



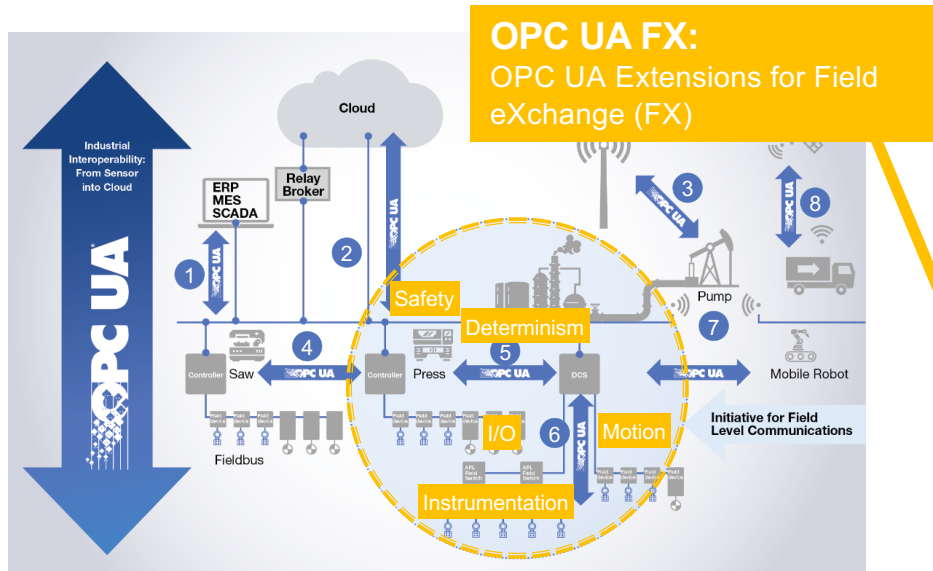
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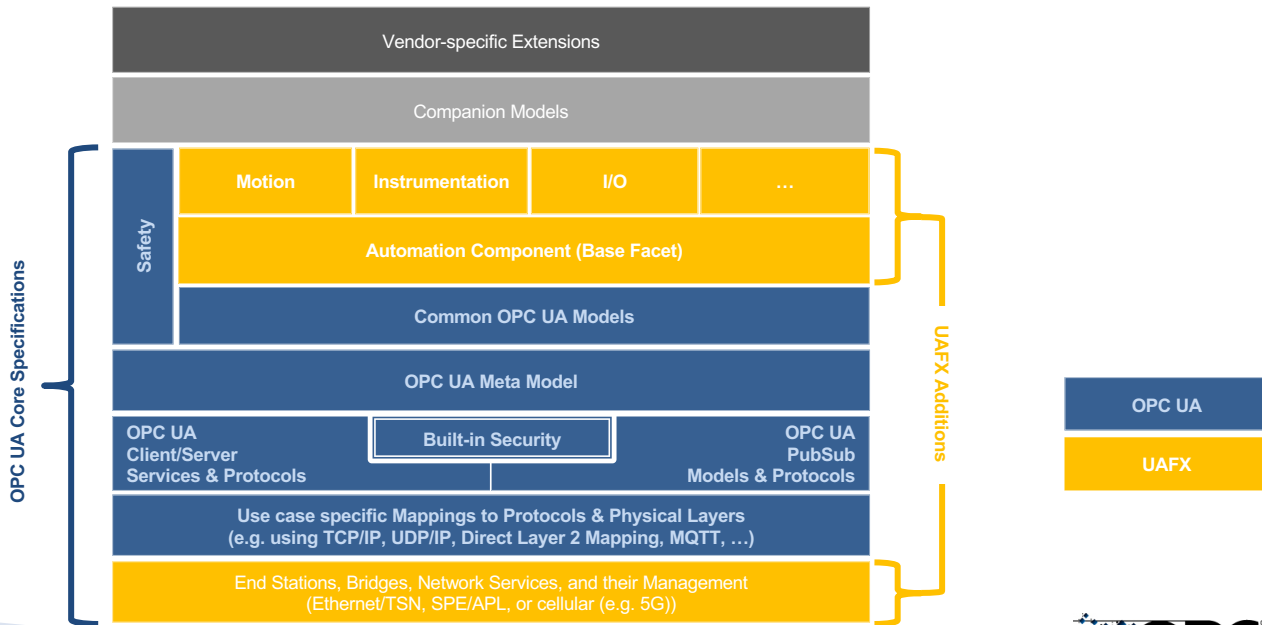


OPC UA for Field eXchange (FX): Extending OPC UA to the field incl. Determinism, Safety & Motion

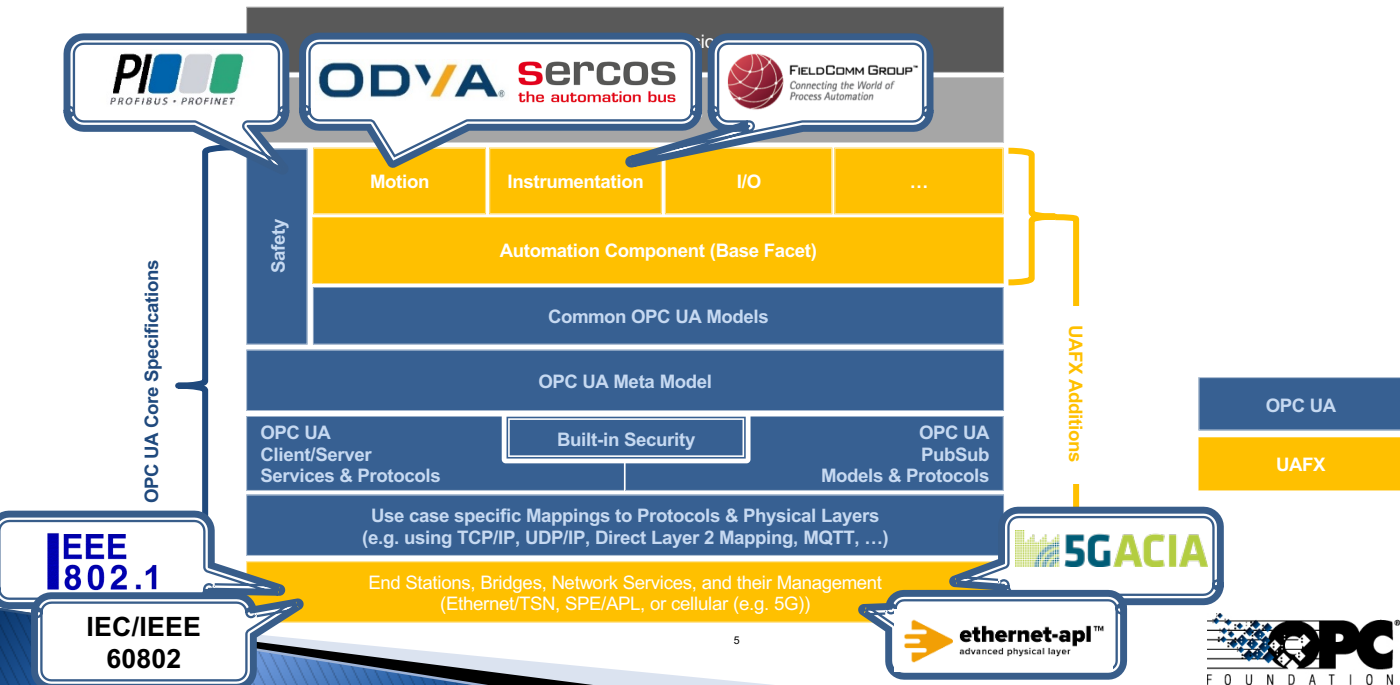


- 1 IT / OT Communication
- 2 Cloud Integration
- 3 Secure Remote Access
- 4 Local OT Communication
- 5 Controller to Controller
- 6 Controller to Device incl. Device to Device
- 7 Wireless Integration (5G)
- 8 Future Ready

OPC UA + UAFX Communication Stack Architecture

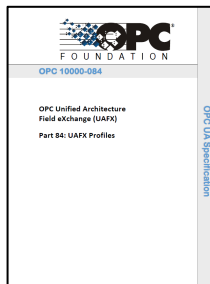
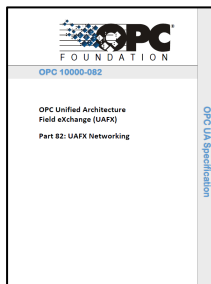
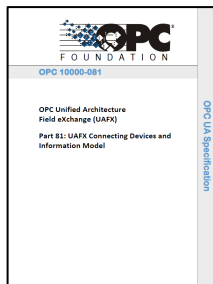
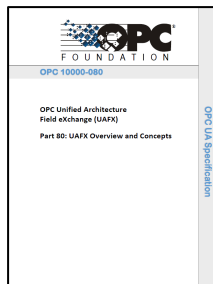


Cooperations to speed-up & to align developments



OPC UA FX Specifications: Parts 80, 81, 82 & 84

First Release



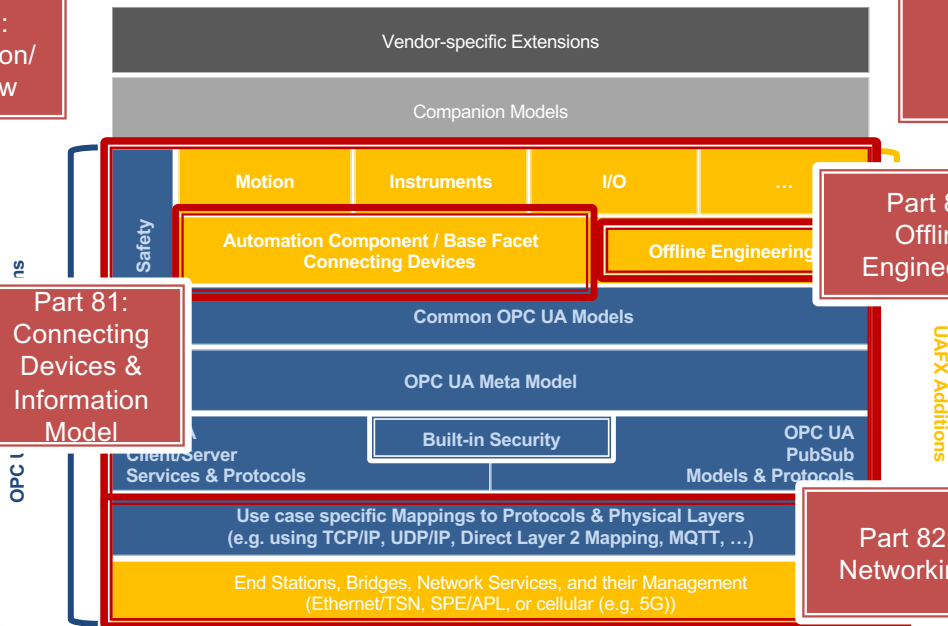
Thanks & Congrats to
more than 320 experts
from more than
65 OPCF member companies!

- ▶ **First Release published** with the focus on Controller-to-Controller (C2C)
 - Consists of 4 Parts (OPC 10000-080, 10000-81, 10000-082, 10000-084)
 - UAFX specifications have passed in-depth OPCF member reviews and extensive prototyping to ensure their implementations maintain cross-vendor interoperability
 - Automation vendors can now start adopting UAFX functionality in their offerings, and end-users can look forward to the advantages UAFX-based field communications offer
- ▶ **Test specifications & Test cases are being developed to provide conformance testing by end of Q2/2023**

OPC UA FX (Field eXchange) - Technical Solution Approach

Part 80:
Introduction/
Overview

Part 84:
Profiles



Part 81:
Connecting
Devices &
Information
Model

Part 83:
Offline
Engineering

OPC UA

UAFX

Part 82:
Networking

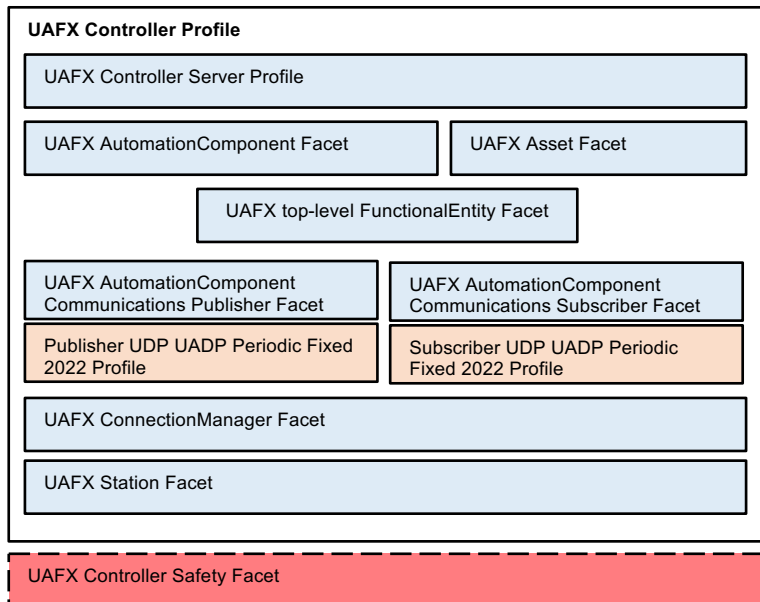
UAFX Controller Profile (as specified in Part 84)

Legend:

Required UAFX Facet

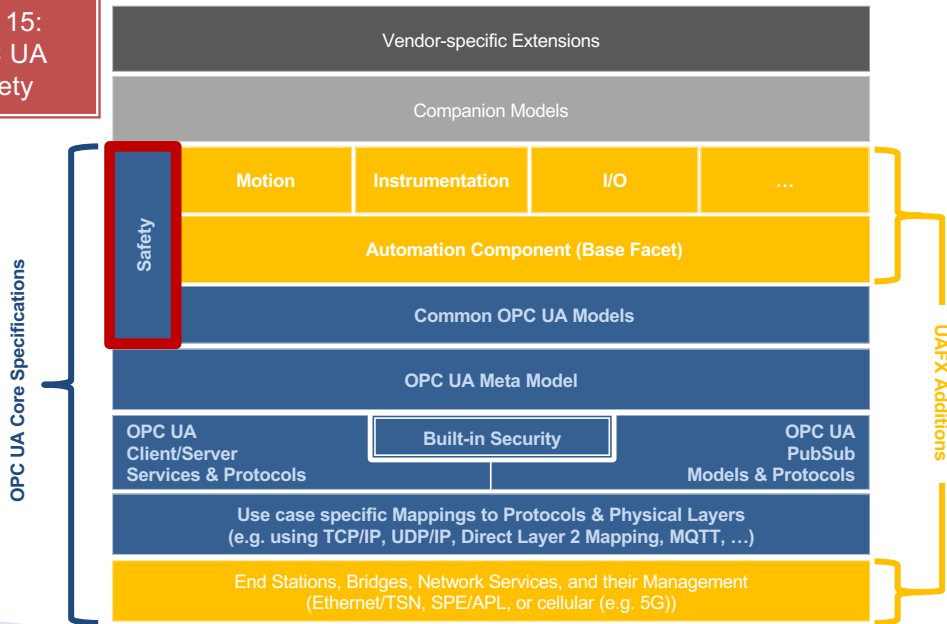
Required UA Facet

Optional Facet



OPC UA + UAFX Communication Stack Architecture

Part 15: OPC UA Safety



OPC UA Safety Specification: Part 15

Upcoming Revision

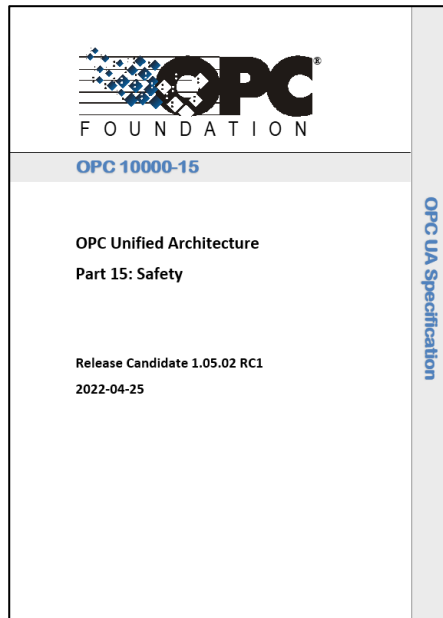
- ▶ OPC UA Safety Specification R 1.05.02 currently under member review, publication planned for Q4/2022

History:

- ▶ Cooperation with PROFIBUS & PROFINET International (PI) started in 02/2018
- ▶ Release 1.04: Client/Server support (10/2019)
- ▶ Release 1.05: PubSub support (11/2021)
- ▶ Release 1.05.02: Revisions

■ Related Activities:

- Safety Test Tool (UASCTT) prototype available
- Safety Stack prototype available
- TÜV Assessment & Certification planned for Q1/2023



UA FX Multi-Vendor Demos @ SPS 2022



UAFX C2C Multi-Vendor Demo – Highly flexible automation solutions

Benefits

Standardized Information flow between different Vendors, Assets, Markets

Benefits

Semantic industrial Interoperability on Field level Controller and Device: C2C, C2D, D2D

OPC UA FX (Field eXchange)

Harmonized Interoperability for Process and Factory Automation

Dashboard to monitor all controllers & all OPC UA / UAFX connections

Controllers from 17 different manufacturers (PLCs, Motion Controllers, Robot Controllers, DCS Systems), including all major automation suppliers in the world

Communication infrastructure consisting of Ethernet Switches, Ethernet TSN Switches and a 5G Testbed

UAFX C2C Multi-Vendor Demo – Dashboard / Controller View

 Manufacturer Name ABB Ltd. Product Name C++ SDK OPC UA Demo Server ABB Status OPC UA: connected Subscribed to: active Publishing to: active	 Manufacturer Name Beckhoff Automation GmbH & Co. KG Product Name CX5140-0155 Status OPC UA: connected Subscribed to: active Publishing to: active	 Manufacturer Name B&R Industrial Automation GmbH Product Name C++ SDK OPC UA Demo Server BR Status OPC UA: connected Subscribed to: active Publishing to: active	 Manufacturer Name Bosch Rexroth AG Product Name cTIX AUTOMATION OPC UA Server Status OPC UA: connected Subscribed to: active Publishing to: active
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 Manufacturer Name Yokogawa Electric Corporation Product Name e-RT3 Plus Status OPC UA: connected Subscribed to: active Publishing to: active	Production Lines		
Assets			
All Controllers			

UAFX C2C Multi-Vendor Demo: Application scenario

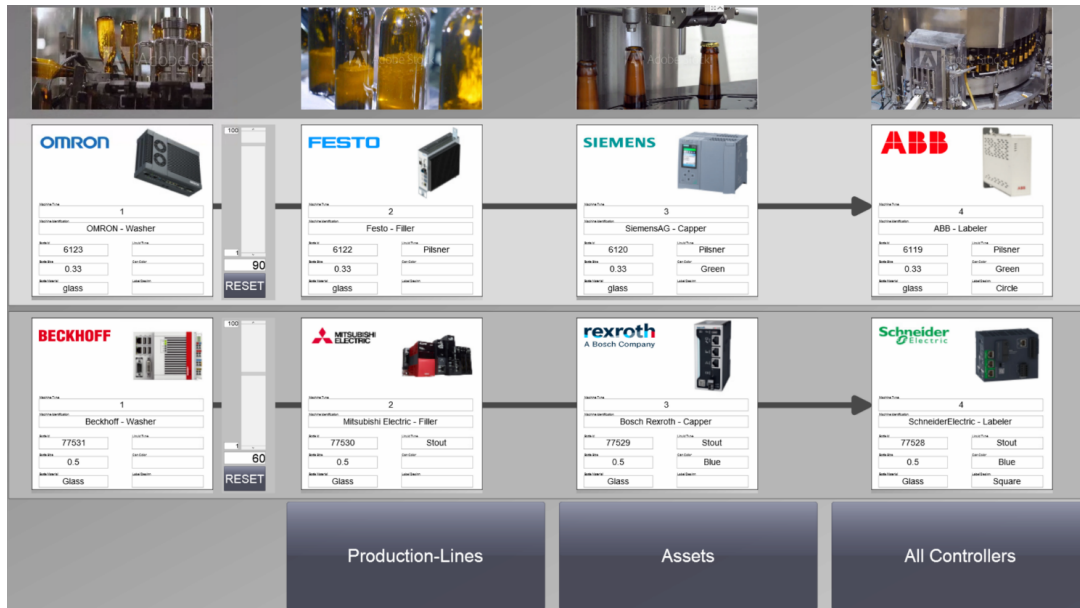
- ▶ Bottling Line using UAFX Connections between UAFX Controller prototypes
- ▶ Controllers acting as publishers, subscribers or publishers/subscribers



Connection Manager	Washer	Filler	Capper	Labeller
Siemens	Beckhoff	Festo	B&R	ABB
Unified Automation	Omron	Mitsubishi	Rexroth	Schneider Electric
		Wago	Siemens	Unified Automation

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UAFX C2C Multi-Vendor Demo – Production Lines View

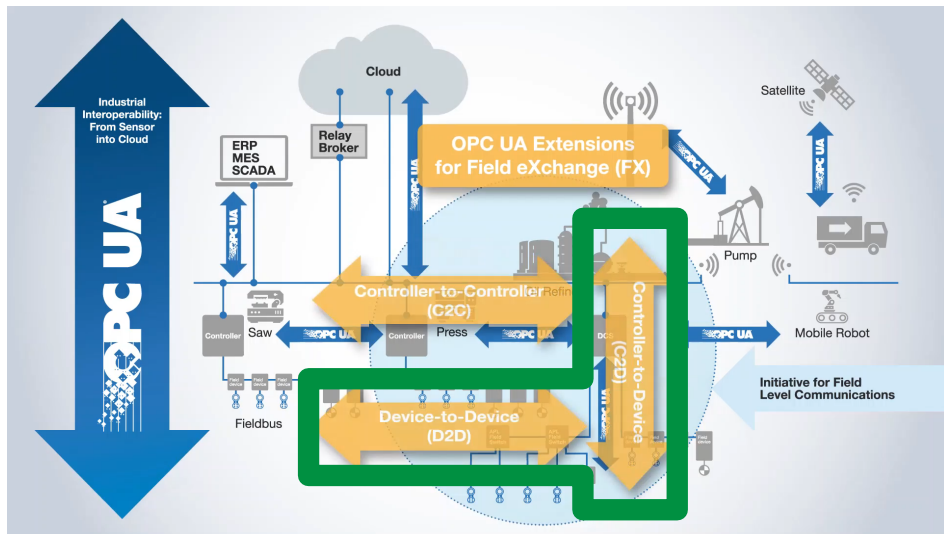


UAFX C2C – Highly flexible automation solutions: Application Areas



FLC Initiative: Further Roadmap

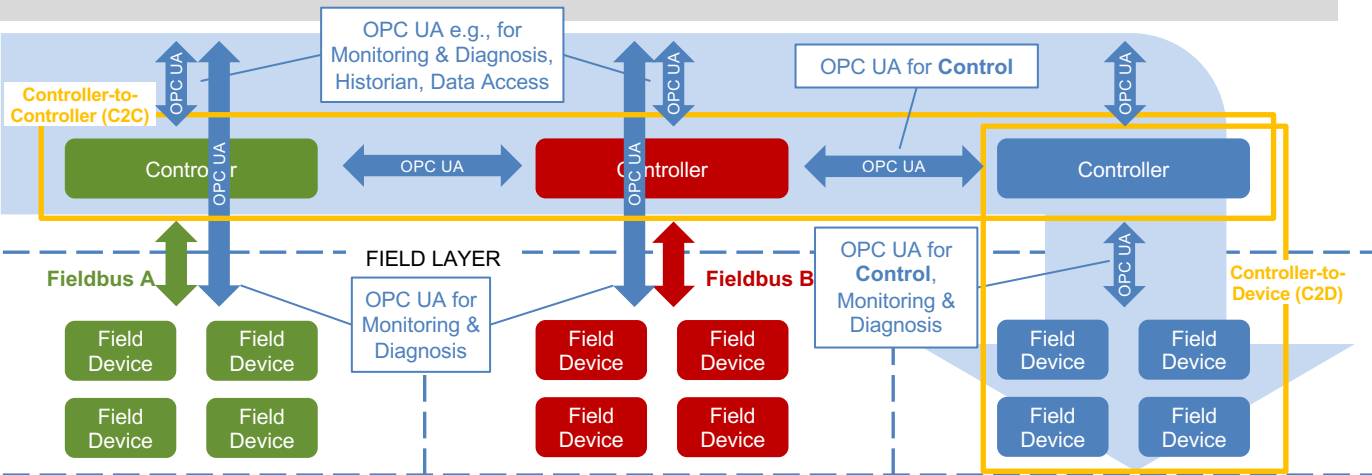
- ▶ Kick-off Technical Work on **Controller-to-Device (incl. Device-to-Device)** held on July 26-28, 2022
- ▶ Handover of Requirements
- ▶ Work Items:
 - Parametrization
 - Networking
 - Diagnosis
 - Motion
 - Instrumentation
 - I/O
- ▶ Working group structure established



Milestones & Migration Path with OPC UA

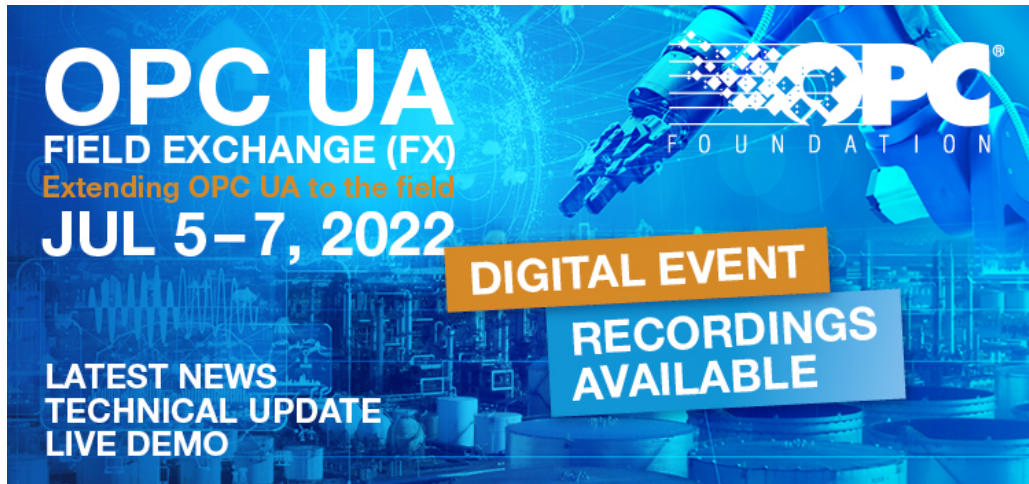
OPC UA + UAFX incl. APL + TSN support the convergence of industrial communication for FA & PA & beyond

Industrial backbone network / Public cloud network



OPC UA Field eXchange (FX) Digital Days

- ▶ Recordings available via OPCF Youtube Channel: [Day 1](#) [Day 2](#) [Day 3](#)
- ▶ Slides: [Link](#)

A promotional graphic for the OPC UA Field eXchange (FX) Digital Days event. The background is a blue-tinted image of an industrial facility with pipes and tanks. In the upper right, there is a stylized graphic of a robotic arm holding a plug. The text is arranged as follows: 'OPC UA' in large white letters, 'FIELD EXCHANGE (FX)' in smaller white letters below it, 'Extending OPC UA to the field' in orange text below that, and 'JUL 5-7, 2022' in large white letters. To the right of the date, the 'OPC FOUNDATION' logo is displayed. Below the logo, there are two overlapping rectangular boxes: an orange one with 'DIGITAL EVENT' in white, and a light blue one with 'RECORDINGS AVAILABLE' in white. In the bottom left corner, the text 'LATEST NEWS', 'TECHNICAL UPDATE', and 'LIVE DEMO' is stacked in white.

OPC UA
FIELD EXCHANGE (FX)
Extending OPC UA to the field
JUL 5-7, 2022

OPC FOUNDATION

DIGITAL EVENT

RECORDINGS AVAILABLE

LATEST NEWS
TECHNICAL UPDATE
LIVE DEMO

Thank you!





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Looking for more information?
Brochures, Recordings, Slides, ...

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<https://opcfoundation.org/flc>
<https://opcfoundation.org/apl>

