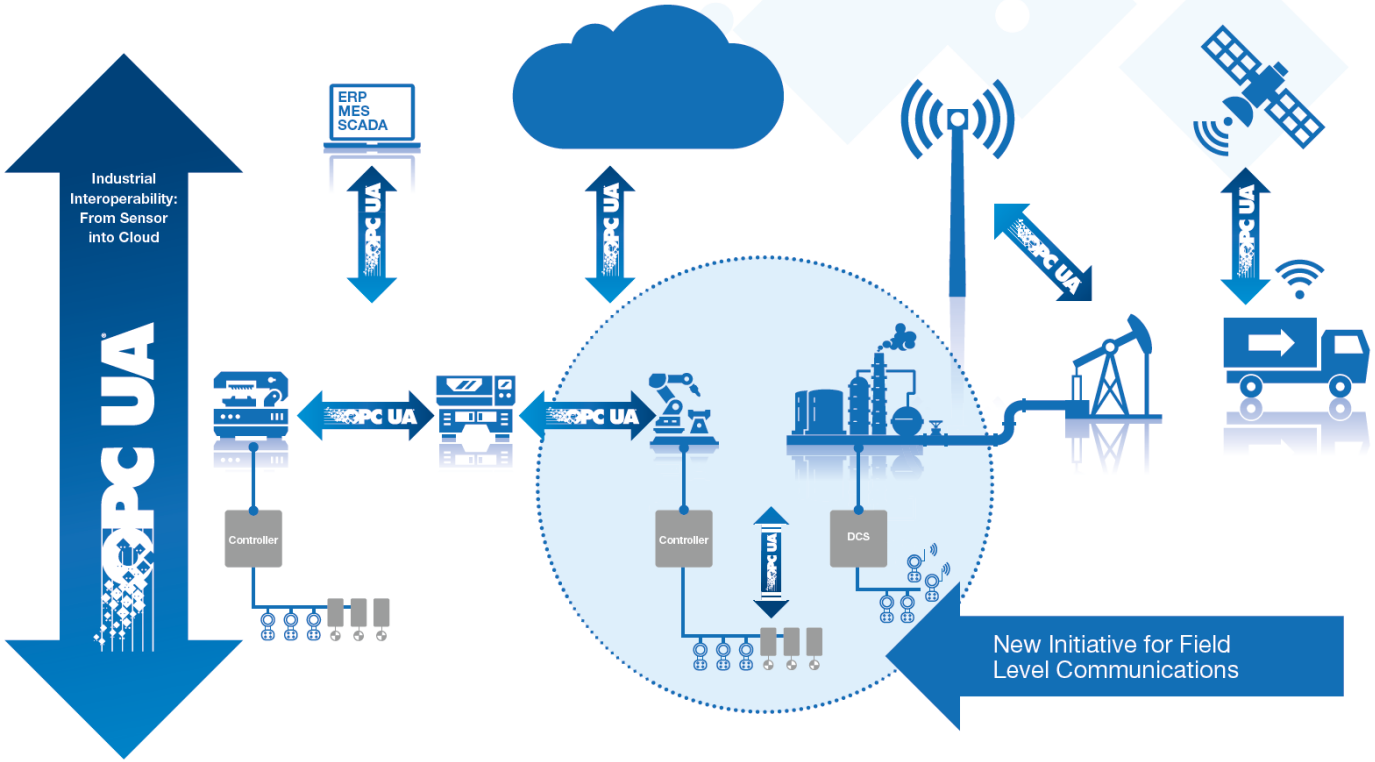
OPC UA
Field Level Communications Initiative

OPC Day Finland, Helsinki
November 7, 2019

Peter Lutz, Director FLC, OPC Foundation

OPC-F “Field Level Communications Initiative”
Extending OPC UA including TSN down to field level



OPCF Press Conference SPS 2018
Overcrowded!

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

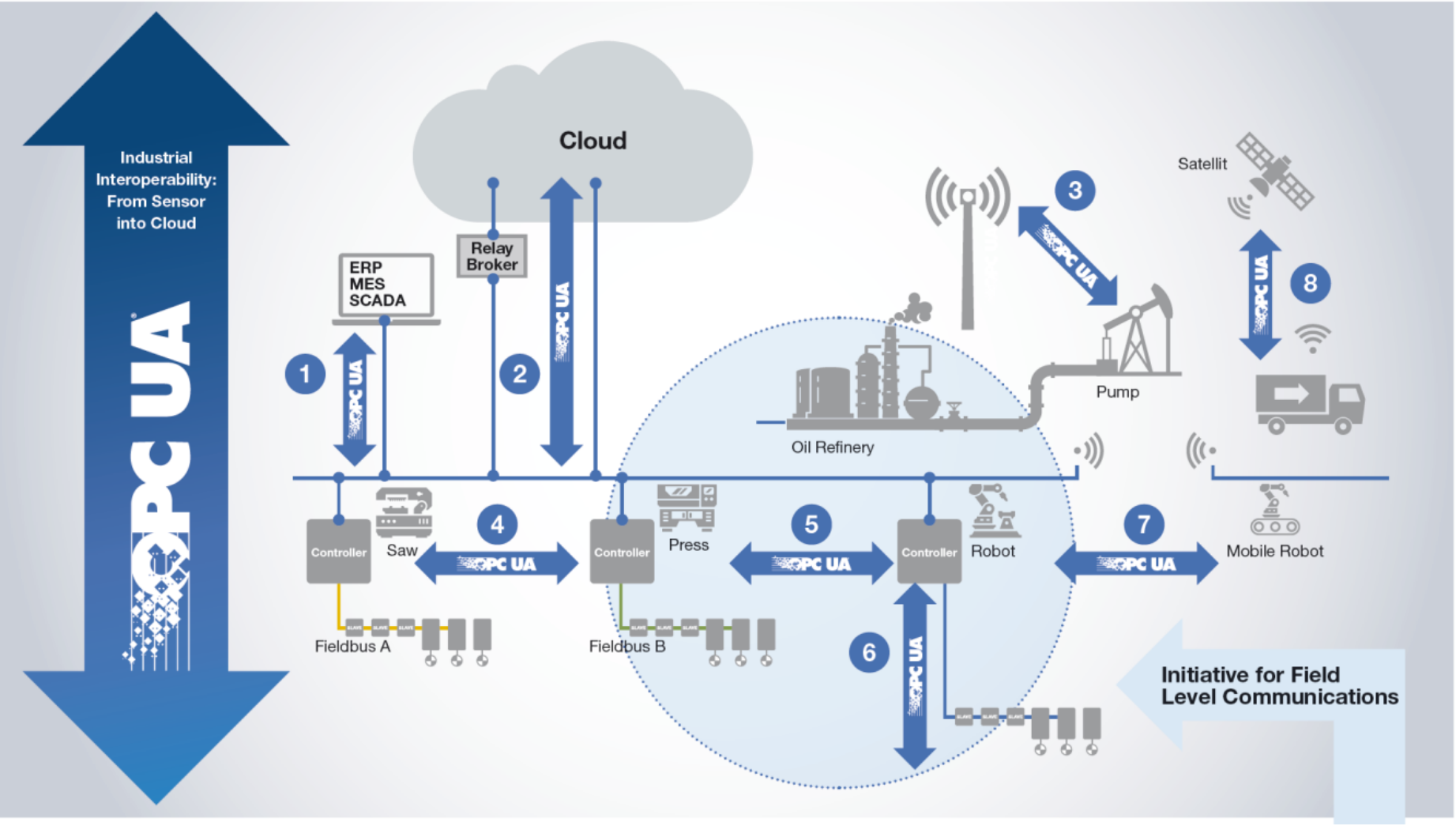
OPCF Field Level Communications Initiative
Initial supporting Industry Players

Vision for Field Level Communications Initiative

The vision of the initiative is…

…to aim for an open, unified, standards-based IIoT communication solution between sensors, actuators, controllers and cloud addressing all requirements of industrial automation

OPC Unified Architecture – from Sensor to Cloud



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

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Field Level Communications Initiative

Information Models
Semantic
Security
IT Connectivity

OPC UA

IEEE 802 TSN

Converged, real-time capable Ethernet networks

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Combine Strength

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Major automation vendors in the initiative add their long time field level communications know-how

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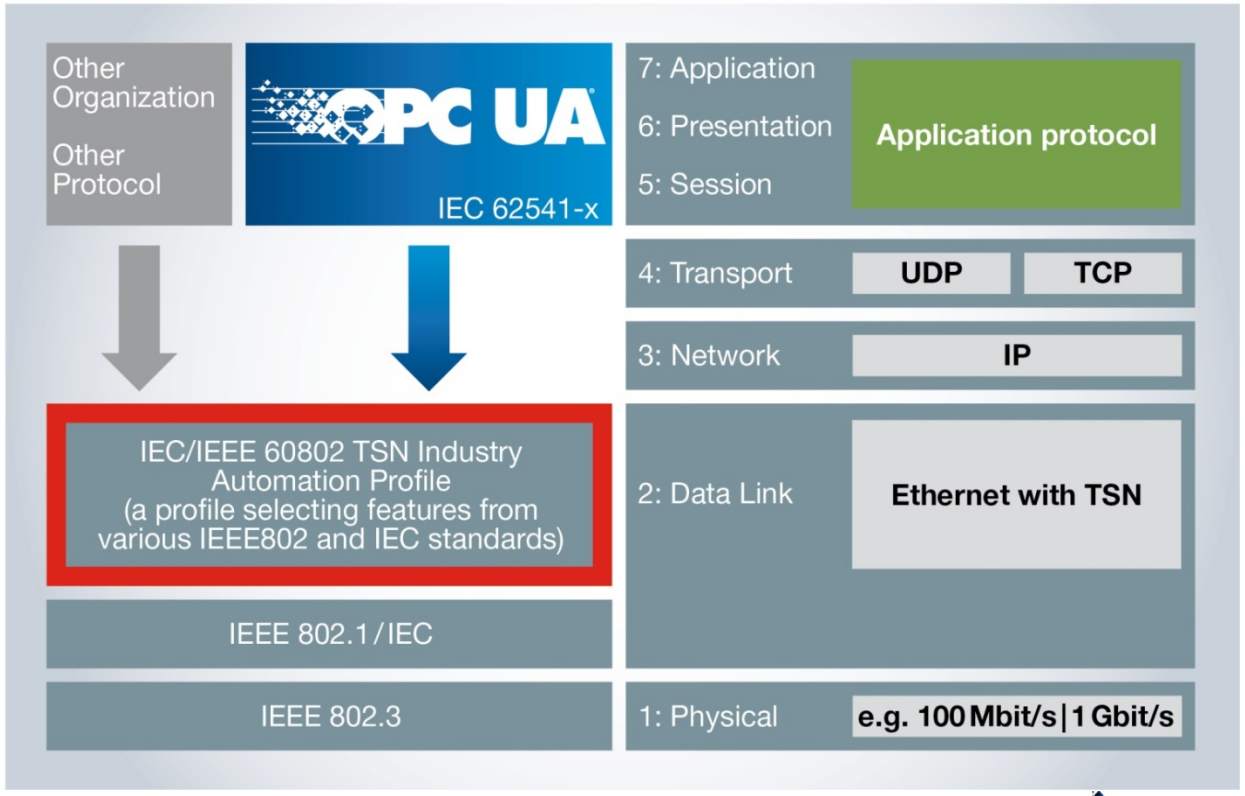
Technology base – collaboration with IEC and IEEE

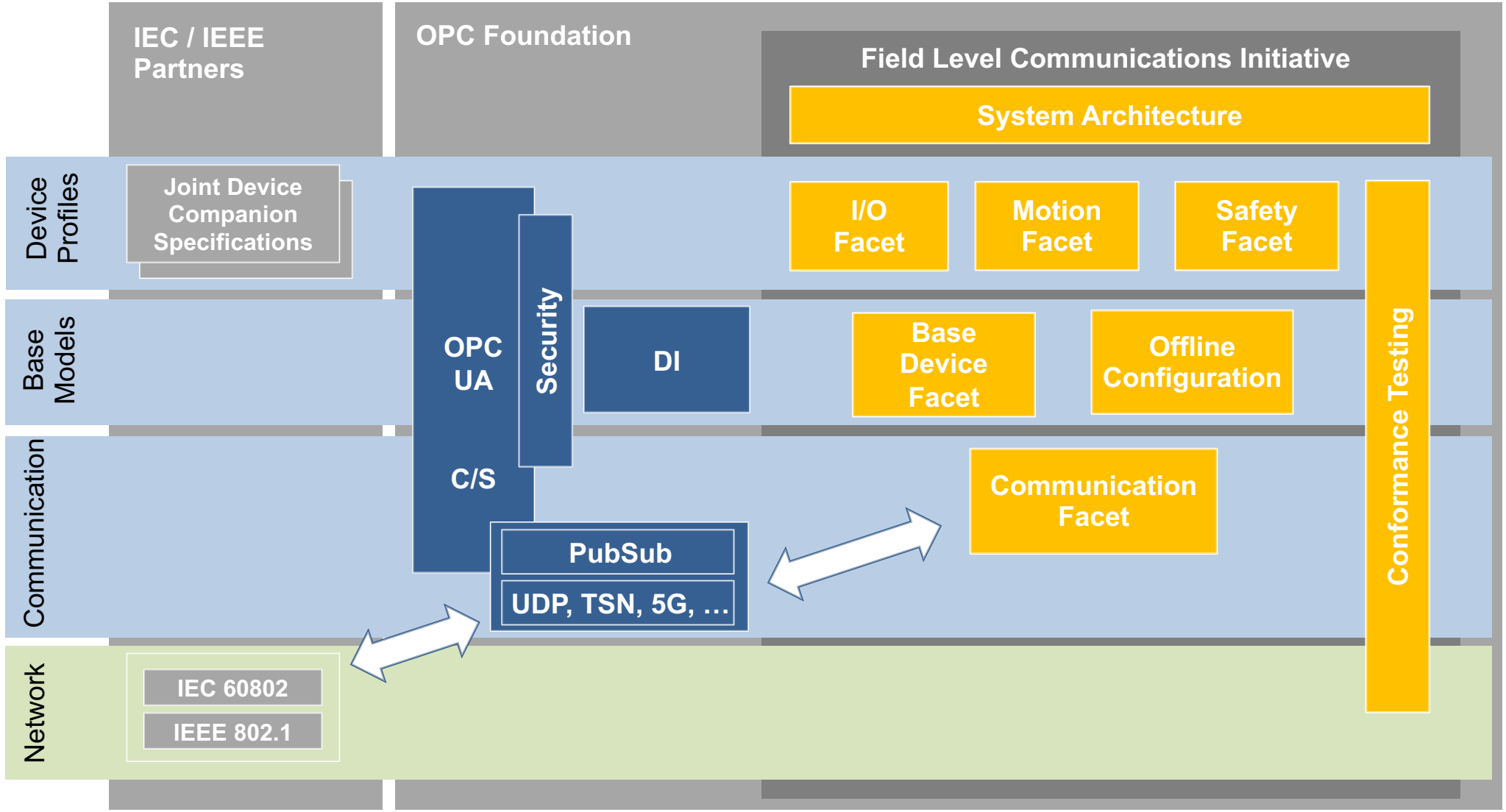
The working groups will closely align with the TSN Profile for Industrial Automation (TSN-IA-Profile) which will be standardized by the IEC/IEEE 60802 standardization group. This will help ensure that a single, converged TSN network approach is maintained so that OPC UA can share one common multi-vendor TSN network infrastructure together with other applications.

Goal of IEC/IEEE 60802

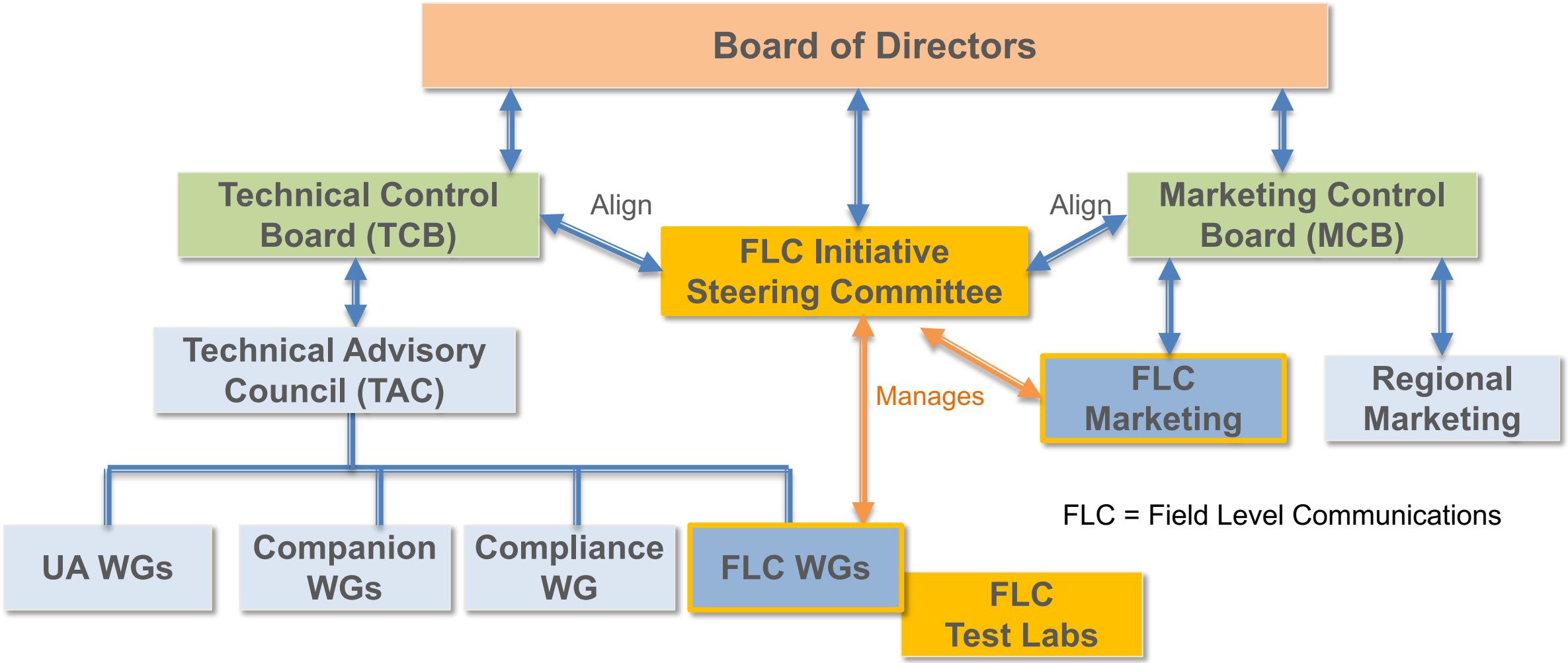
- Converged TSN network: different protocols can share the same TSN network infrastructure
- Use of common HW components



Technology overview – FLC work items and dependencies

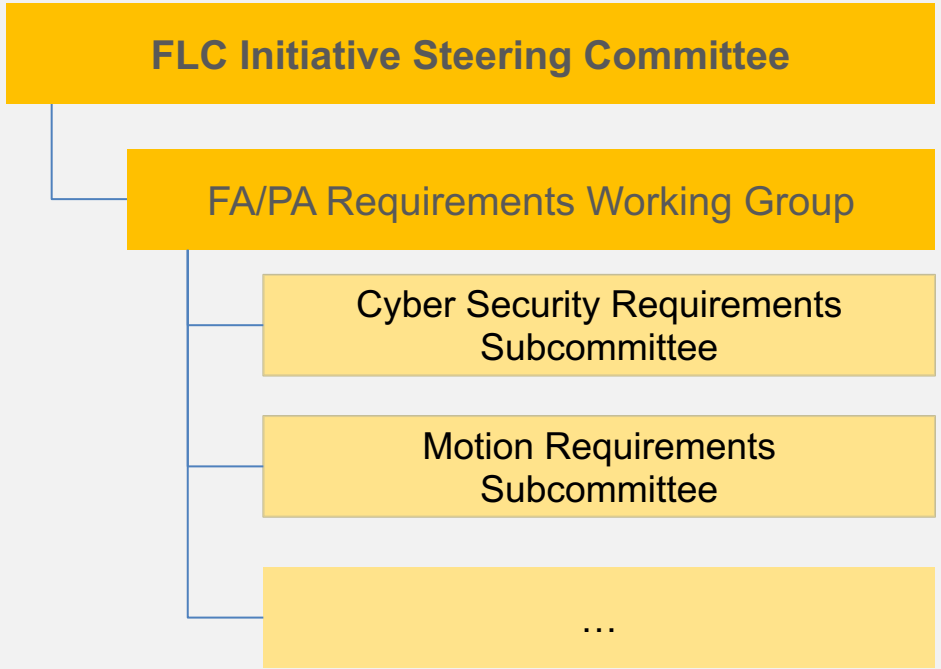


Integration of FLC Initiative into OPC Foundation



FA-PA Requirements working group (1)

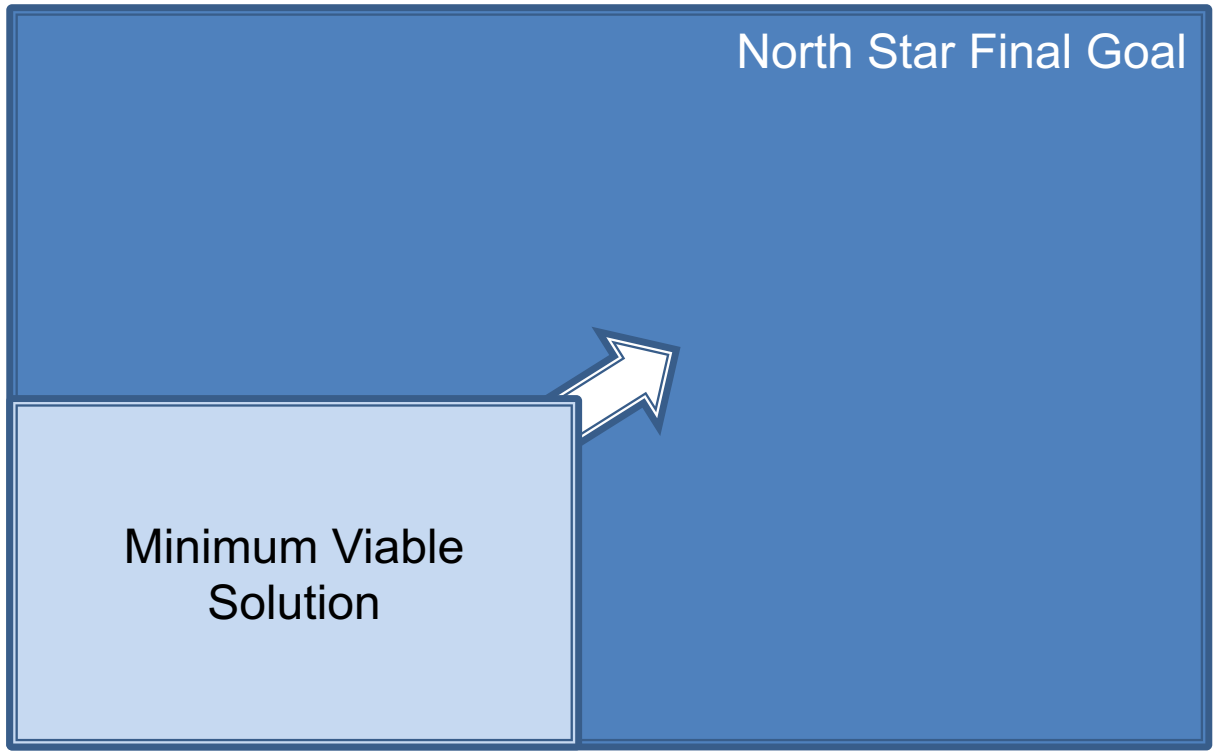
- FA/PA Requirements Working Group is responsible for defining the user requirements under the control of the FLC Initiative Steering Committee
- Participation is limited to members of the FLC Initiative



FA-PA Requirements working group (2)

- **Requirements are generated for:**
  - NorthStar vision (long term goal – no end date)
  - MVS (Minimum Viable Solution)

  - Work in progress –
    creation of user stories /
    derivation of formal requirement /
    ongoing refinement /
    define constraints & boundary conditions
    (decided by the Steering Committee)



Field Level Communications Working Group (FLC-WG)

- FLC-WG has already 215 members from 45 companies

- January 8-10, 2019 Kick-Off
  - 90 participants from 38 companies
  - Presentation of planned working group setup and pre-work used as input
  - Brainstorming sessions for initial work and setup

- Election of chairman and editor of architecture working group
  - Chairman: Clark Case Rockwell Automation
  - Editor: Georg Biehler Siemens

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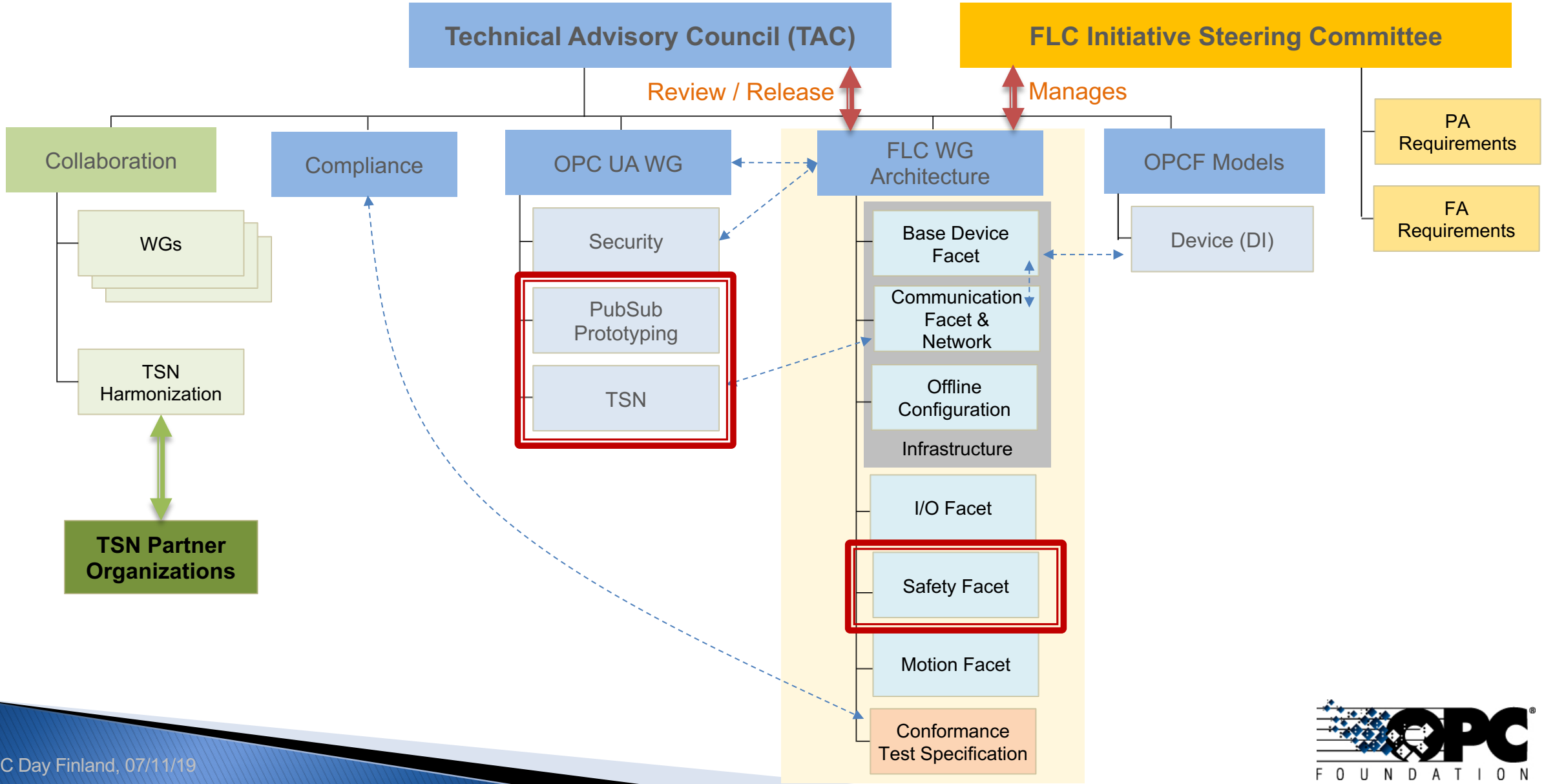
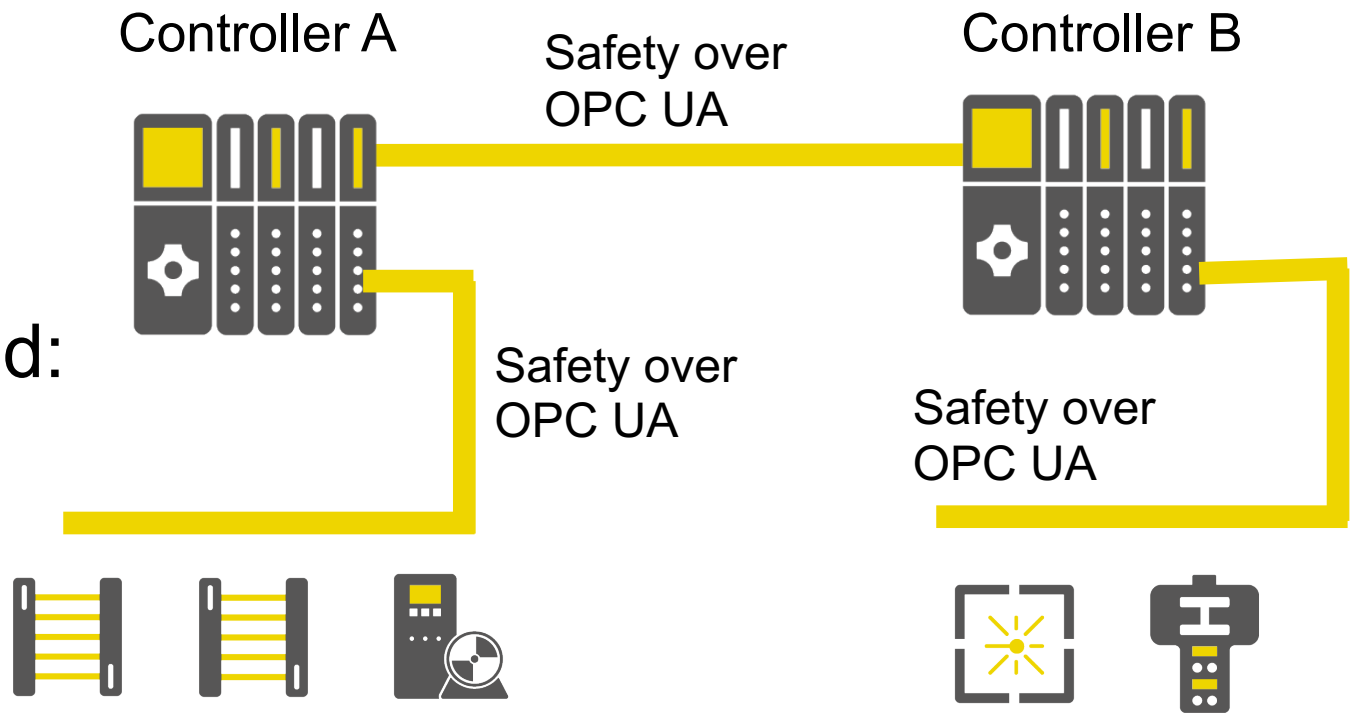
FLC Initiative Working Groups



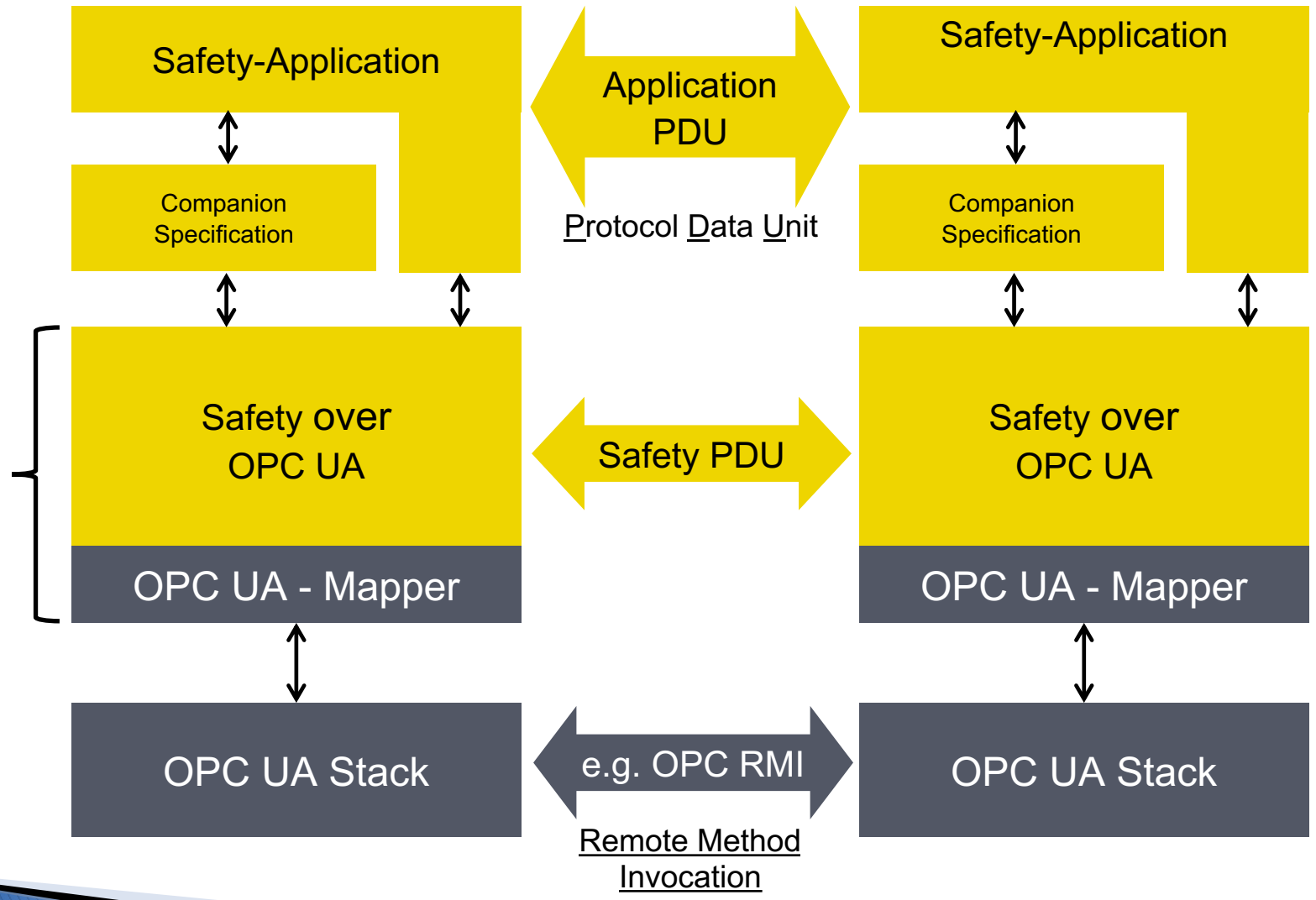
OPC UA Safety

Scope of OPC UA Safety

- Original scope:
  - functional safety for communication **between controllers of different vendors**
- Since April 2019, the scope has been extended:
  - safety facet for field level communication (FLC) over OPC UA



Network layers of OPC UA Safety



Scope of "OPC UA Safety"

Certified according to:

IEC 61508
IEC 61784-3
…

"Black Channel": changes here do not require re-certification

OPC UA Safety – Status & Timeline

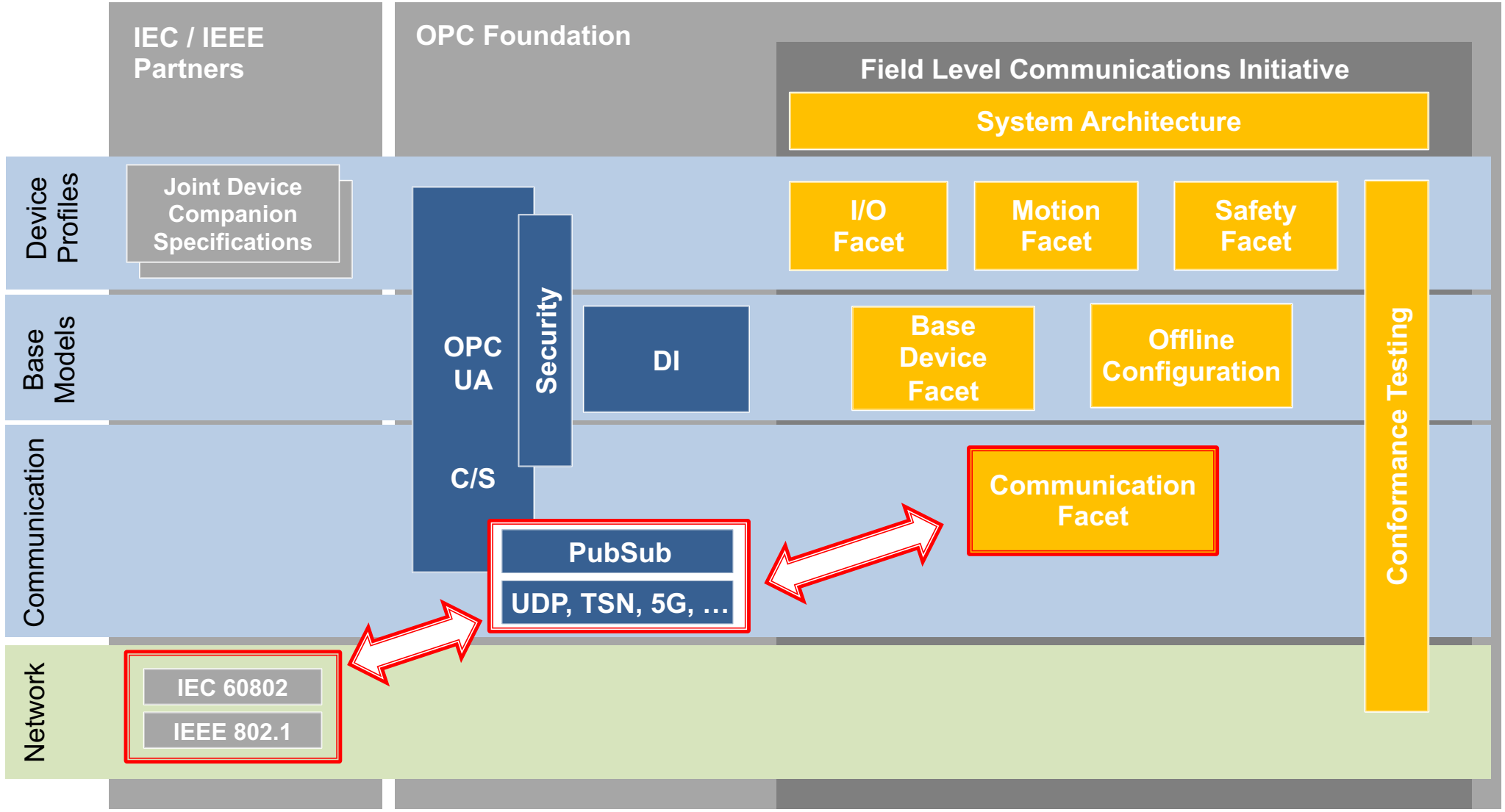
- OPC UA Safety – functional safe communication on all levels
- Key feature: dynamic establishment of connections during runtime

- V1.0 is currently under review, including
  - C2C-communication
  - OPC UA client/server
  - Run-time communication (no parametrization)

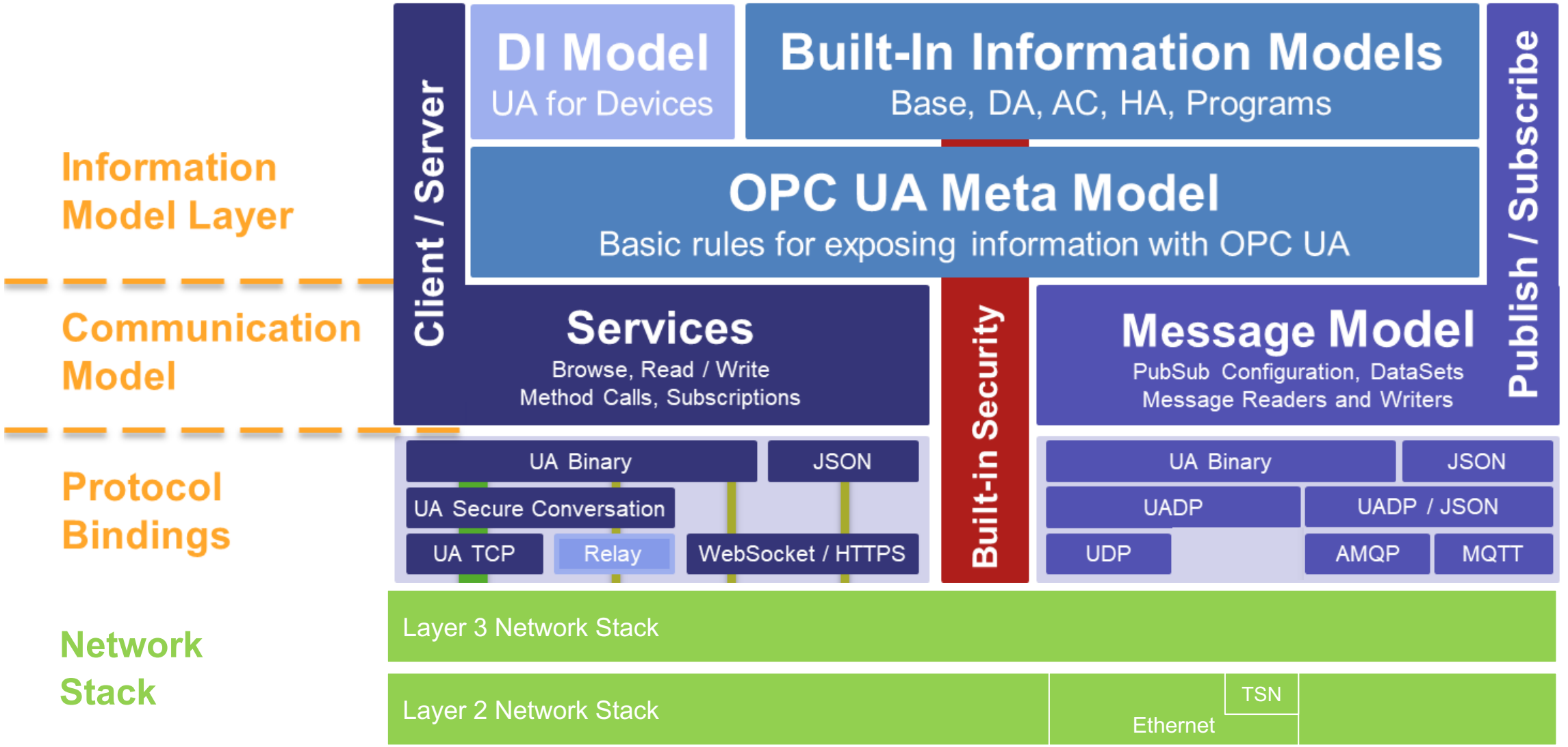
- Current & future work:
  - Mapper for PubSub (including TSN) – part of the black channel!
  - Standardized parametrization
  - Test specification

OPC UA PubSub TSN

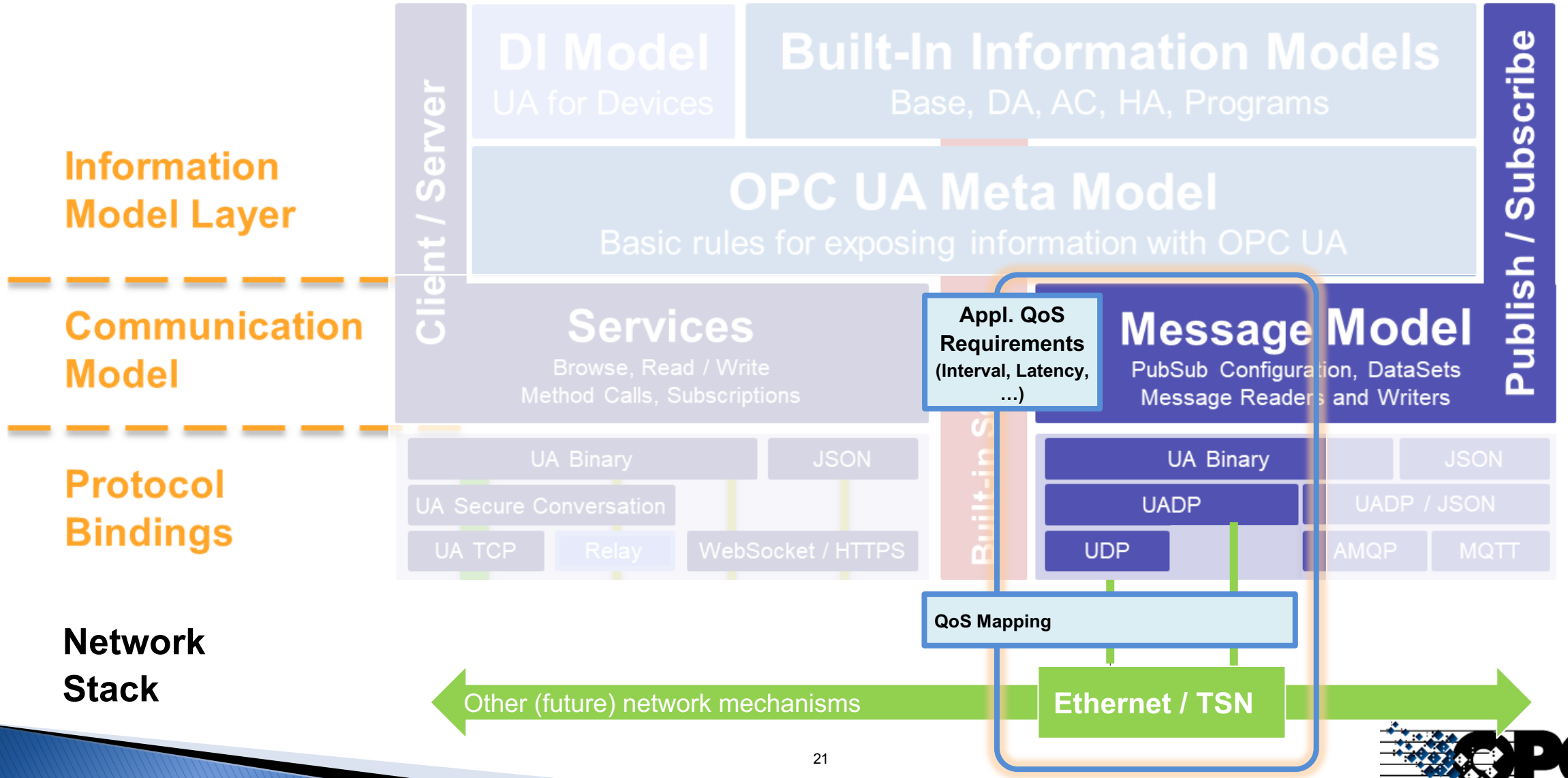
Context of OPC UA TSN Sub-group



OPC UA Framework with PubSub TSN (1)



OPC UA Framework with PubSub TSN (2)



OPC UA PubSub TSN – Status & Timeline

Status

- Working Draft for prototyping is available
- Prototyping started in July 2019

Next Steps

- Synchronization with FLC Architecture & Infrastructure WG and FLC TSN Expert Assessment Team (working assumption on future IA IEC/IEEE 60802 profile)
- Continuing PubSub prototyping
  - Integrate TSN Configuration Protocols in PubSub Devices
  - Interoperability Tests between different vendors
  - If successful: handover to TSN Testbeds (IIC TSN Testbed Stuttgart, LNI 4.0 TSN Testbed Augsburg)

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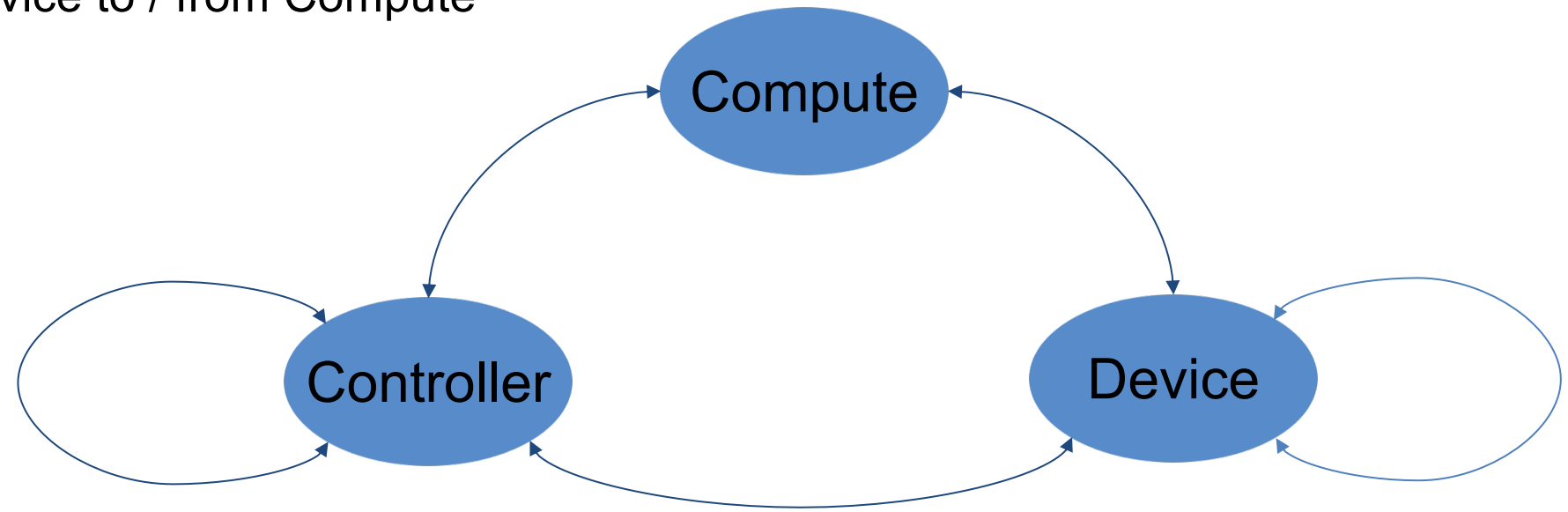
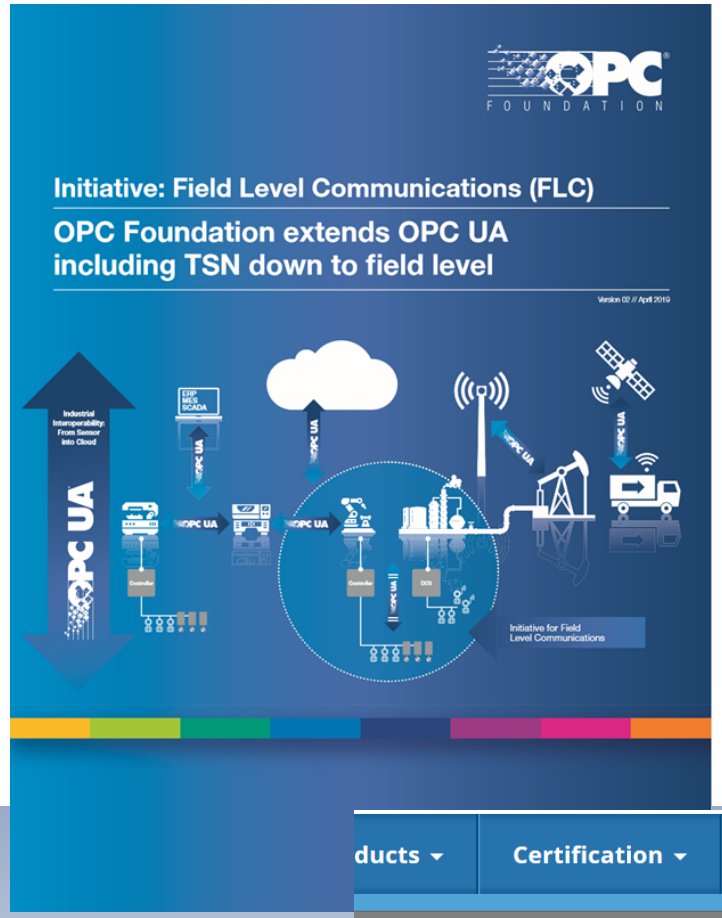
Interactions Model

- Controller to Controller
- Controller to / from Device
- Device to Device
- Controller to / from Compute (gateway, software, cloud)
- Device to / from Compute



Initial Supporters Field Level Communications Initiative

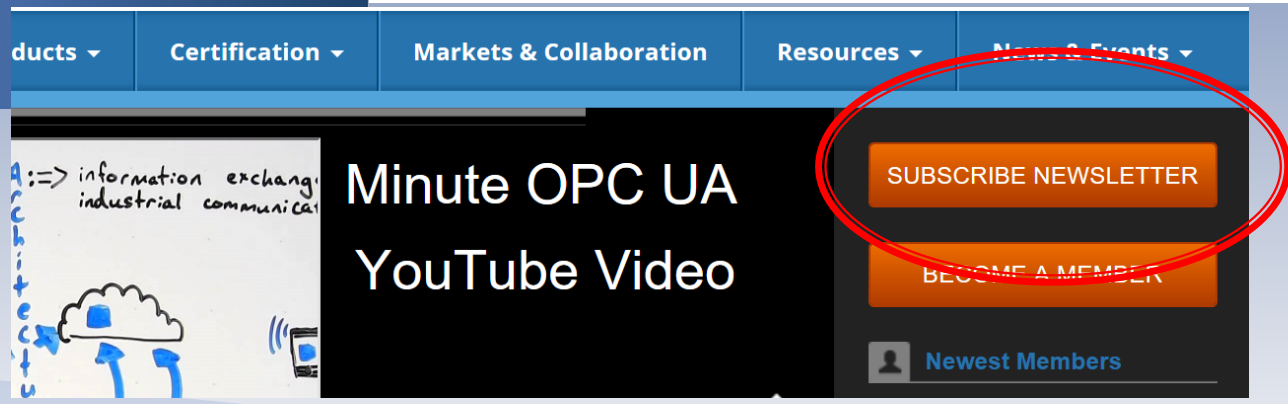
OPC-F “Field Level Communications Initiative”: Information



Brochure available from OPC-F Website:

https://opcfoundation.org/flc-pdf

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



Contact point

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