Field Level Communications (FLC) Initiative

OPC Foundation extends OPC UA including TSN down to field level

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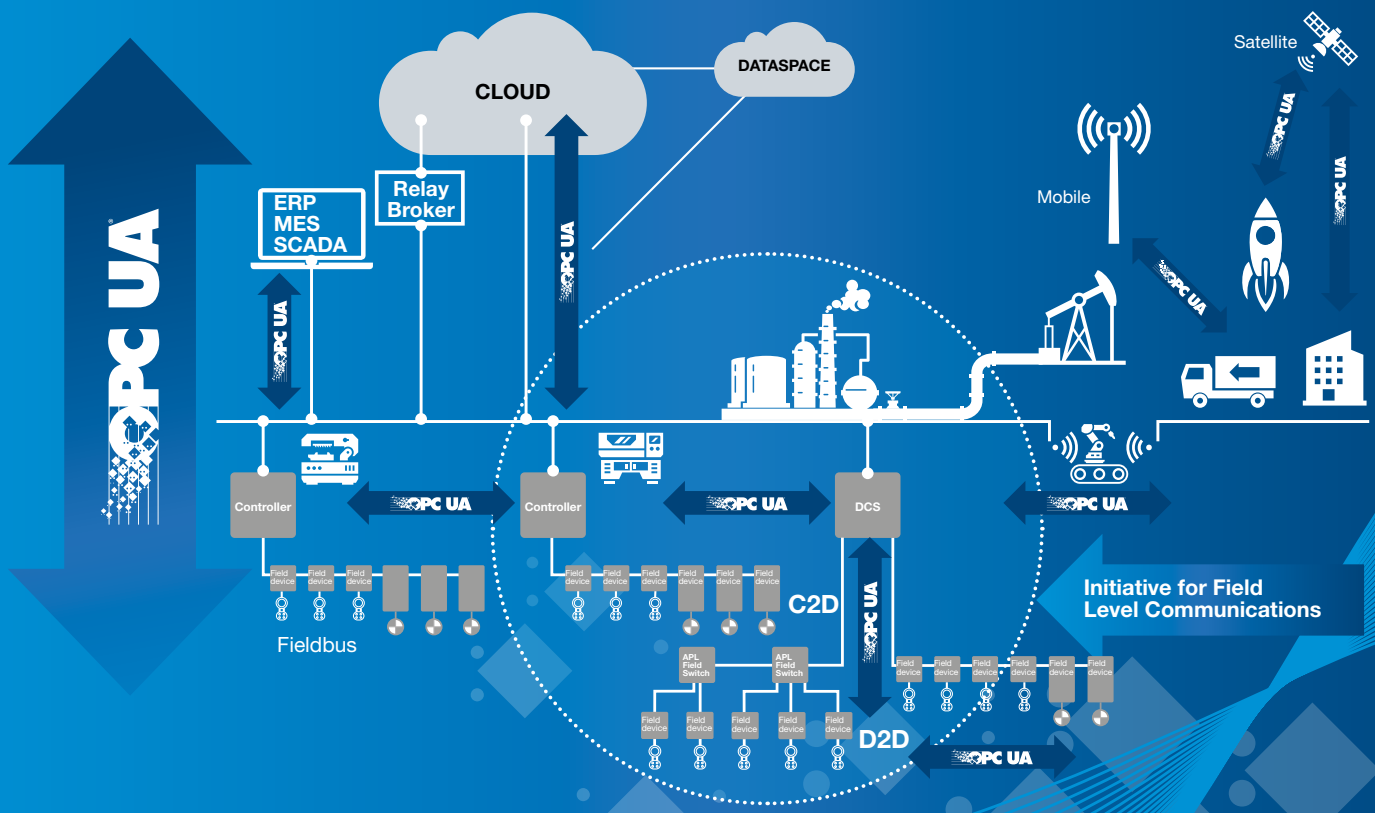
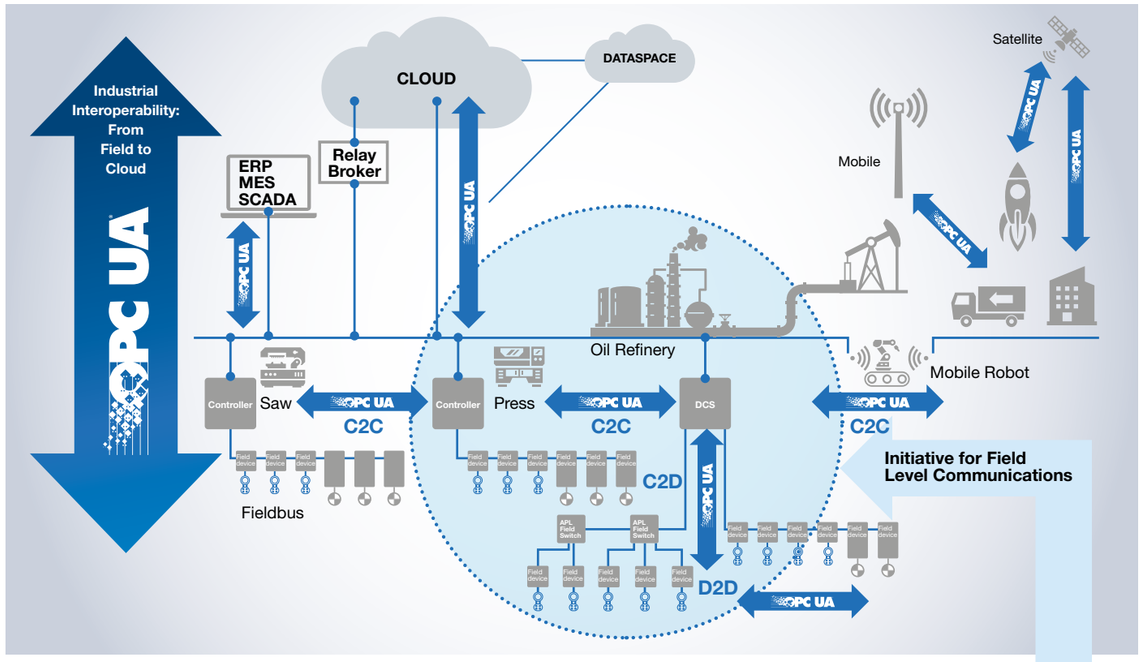


The Industrial Interoperability Standard OPC UA from Sensor to Cloud



1. **OPC UA on the business LAN** for open and secure data interoperability between IT and OT networks. e.g. MES, ERP systems.
2. **OPC UA for Cloud** (WAN) optionally using message brokers.
   OPC UA Reverse Connect: WAN friendly Client/Server connectivity where firewalls are prevelant.
3. **OPC UA over GSM** (cellular) to connect assets secure to IT.
4. **OPC UA – Supervisory Control** at the operations level (OT). e.g. HMIs, plant historians, PLCs, and DCSs.
5. **OPC UA –** enables data interoperability between systems on the shop floor incl. Controller-to-Controller resp. Machine-to-Machine (M2M). Scalability in performance by usage of TCP, UDP and TSN.
6. **OPC UA –** for field level communications incl. I/O, motion control, instrumentation, safety systems and redundancy. Scalability in performance by usage of UDP, Raw Ethernet and TSN.
7. **OPC UA over 5G** (cellular) enables deterministic data interoperability between systems on the shopfloor. Machine to Machine (M2M).
8. **Future Ready:** OPC UA adopts new transports as it expands into new verticals and new technologies emerge.

OPC Foundation extends OPC UA including TSN down to field level

The OPC Foundation has launched an initiative to further enable OPC UA adoption throughout industrial automation by extending standardization and harmonization activities for OPC UA including TSN enabled Ethernet networks.

The goal of this initiative is to deliver an open, cohesive approach to implement OPC UA including TSN and associated application profiles. This will advance the OPC Foundation providing vendor independent end-to-end interoperability into field level devices for all relevant industry automation use-cases. The OPC Foundation vision of becoming the worldwide industrial interoperability standard is advanced by integrating field devices and the shop floor.

A new set of working groups is identifying, managing and standardizing the OPC UA relevant topics focused on industrial automation including:

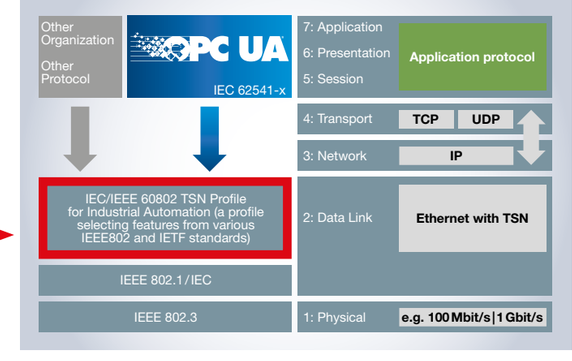
- harmonization and standardization of application profiles
  like I/O, motion control, instrumentation, functional safety system redundancy
- standardization of OPC UA information models for field level devices
  in online and offline scenarios e.g. device description resp. diagnostics
- mapping of OPC UA application profiles related to real-time operations
  on ethernet networks including TSN and Ethernet-APL (Advanced Physical Layer)
- definition of certification procedures

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.

This initiative integrates well with existing joint working groups engaged in ongoing companion specification e.g. description of machines. The extensions for OPC UA to cover the use cases and requirements for the field-level are named OPC UA FX (Field eXchange).

Goals for OPC UA & UAFX

- Converged TSN network: OPC UA can share multi-vendor TSN network with other network participants and other protocols
- Use of common HW and SW components





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