FLC's needs & expectations

(V1.0)

of the IEC/IEEE 60802 profile

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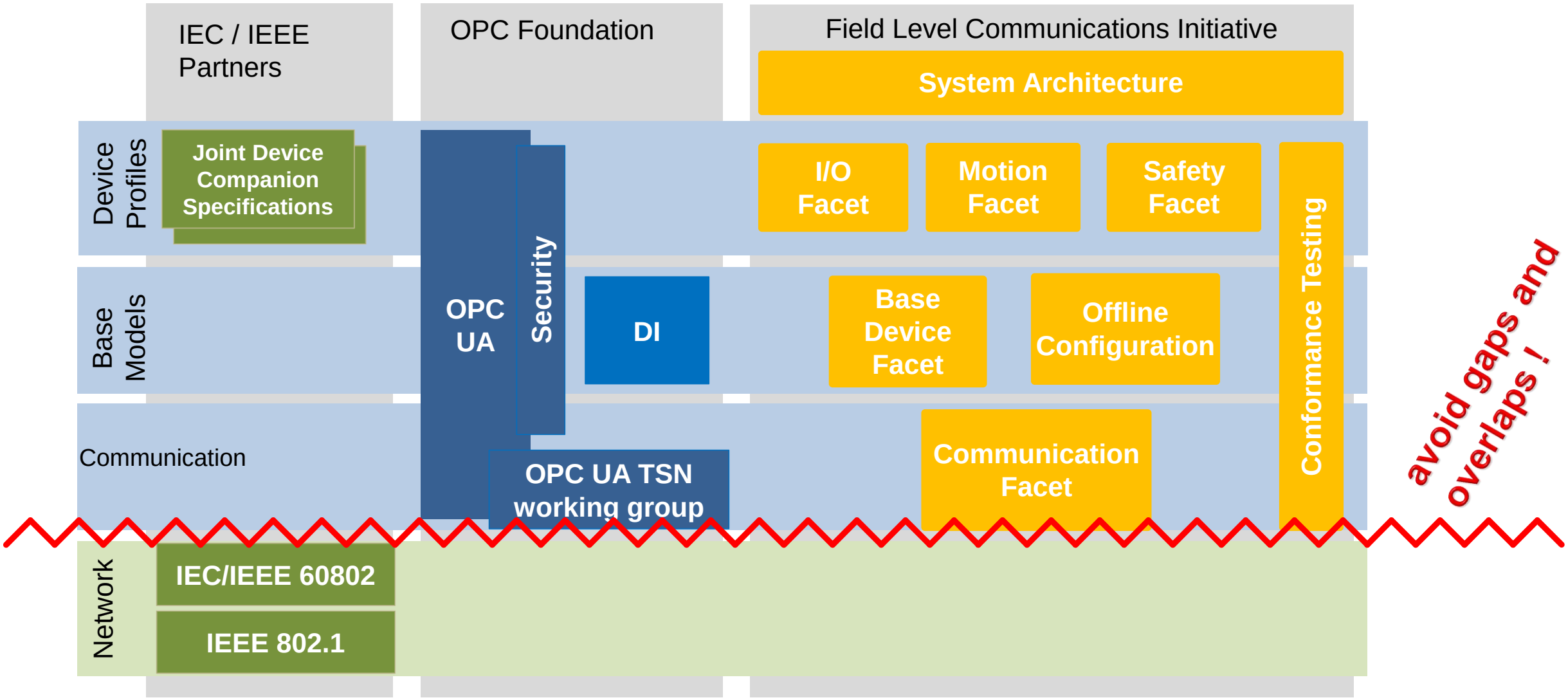
Introduction

- Goals of IEC/IEEE 60802 (as understood by OPC FLC)
  - Converged TSN network, different protocols can share the same TSN network infrastructure
  - Use of common hardware components, shared network protocols and base configurations
- Goals of the OPC FLC Initiative
  - Open, unified, standards-based IIoT communication solution between sensors, actuators, controllers
  - Interoperability of devices from different vendors on several levels (e.g. communication, device management, application, tooling etc.)
  - User and good citizen of a converged TSN network
- Intentions
  - FLC specifications will be built on and aligned with the TSN-IA profile to reach the goals of both groups
  - This presentation is a snapshot of the current state and will be refined/extended in the future

Technology overview – work items and dependencies



OPC FLC's needs & expectations of IEC/IEEE 60802

- **Time synchronization**
  - FLC will use IEEE 802.1AS-Rev as the mandatory time synchronization protocol for TSN bridges. The intention of FLC is to rely on IEC/IEEE 60802 profile definition for this purpose
  - FLC expects selection of IEEE 802.1AS-Rev by IEC/IEEE 60802 including specification of operating behaviors and parameters to ensure interoperability

    Examples:
    - Range for announce interval times
    - Threshold/timeout for missing announce messages
    - Clear definition of how to determine whether a clock is in sync or not
    - Clear definition how mechanisms of IEEE 802.1ASrev should be used to implement clock redundancy

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- **Topology Discovery**
  - FLC will use LLDP for topology discovery. The intention of FLC is to rely on IEC/IEEE 60802 profile definition for this purpose
  - FLC will need definitions for default announcement content, rate, and mode of operation for end-devices and bridges. FLC will additionally need a standardized network management interface to query LLDP neighborhood information

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- **Performance Indicators and Quantities**
  - When using IEC/IEEE 60802 compliant bridges with FLC it should be possible to verify whether the planned infrastructure components fulfill the requirements for individual applications
  - Engineering tools shall be able to do this verification offline based on a standardized set of parameters provided by the infrastructure component vendors

OPC FLC's needs & expectations of IEC/IEEE 60802

- **TSN domains**
  - An FLC system may be segmented into multiple networks (e.g. machines / productions lines / factories / …)
  - The networks are often independent, preconfigured and validated, but will still require communication relations to other FLC networks
  - FLC needs a definition of the term TSN Domain that can reflect this logical structuring, and associated mechanisms to setup TSN communication between these domains

OPC FLC's needs & expectations of IEC/IEEE 60802

- **Bridge management, stream reservation and diagnostics**
  - To ensure interoperability on various communication and application layers FLC needs standardized data models and communication protocols for bridges
  - This includes network management mechanisms, stream configuration and stream reservation as well as diagnostic mechanisms
  - FLC expects that the IEC/IEEE 60802 will specify mandatory mechanisms in a way to ensure interoperability between bridges and bridged end-stations from multiple vendors

OPC FLC's needs & expectations of IEC/IEEE 60802

- **Media/path redundancy**
  - FLC systems may require media/path redundancy
  - Further details will be shared with IEC/IEEE 60802 as requirements are clearly defined by FLC

OPC FLC's needs & expectations of IEC/IEEE 60802

What's next ?

What is the preferred way for further interaction between OPC FLC and IEC/IEEE 60802 ?

Thank you for your attention !

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Do you have questions ?