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## Security for IEC/IEEE 60802, July 2021 Plenary Session

# Briefing on IEC/IEEE 60802 Security

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# Illustrating IA Devices/Controllers

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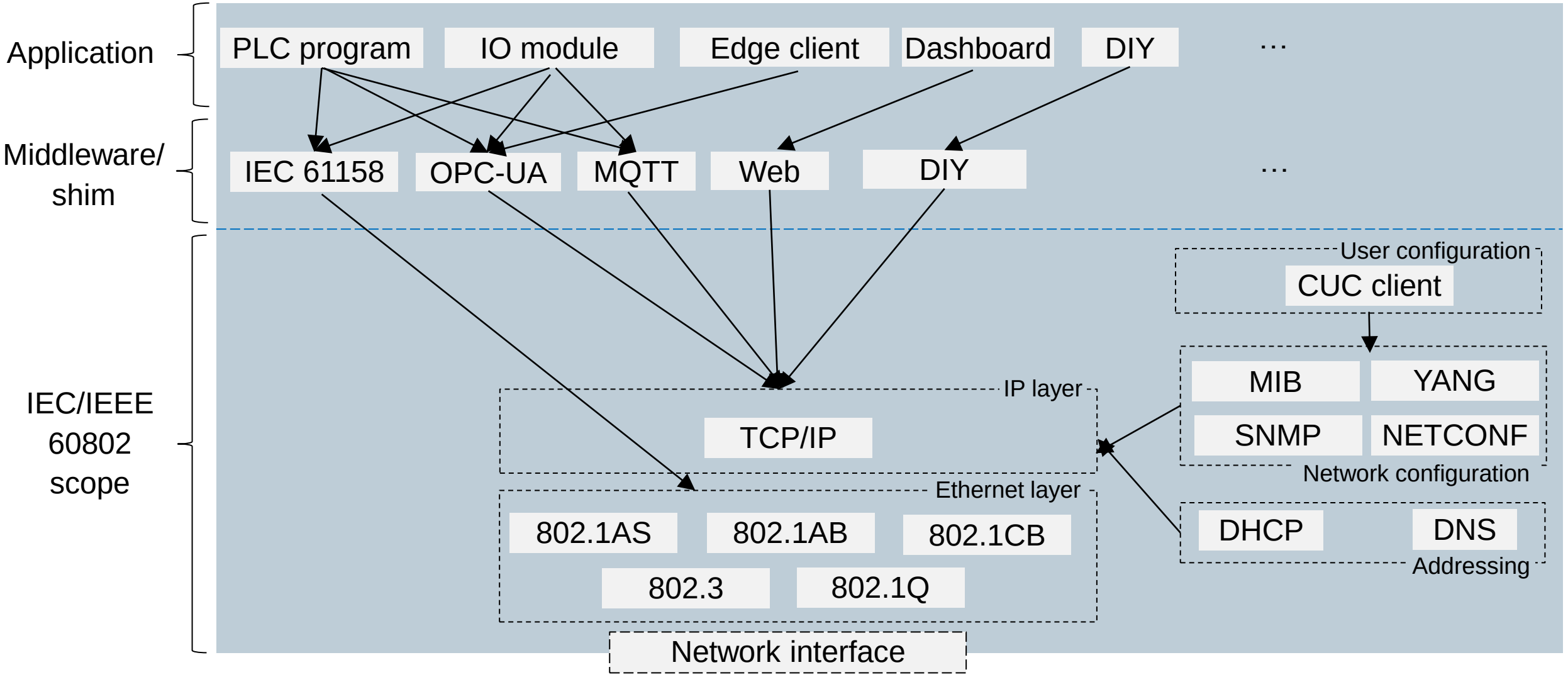

# Scope of the Security Contribution

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- **Security between stations**, in particular:
  - Discovering neighborhood relations
  - Provisioning of network configuration including TDMEs
  - Establishing streams including TDMEs
  - Synchronizing time
- **Shared security means,** considering the joint use for IEC/IEEE 60802 security and application/middleware security on a single station, in particular:
  - Profiling the set of cryptographic algorithms, their usage (e.g. TLS record layer or 802.1AE and protocols for managing this usage (e.g. TLS handshake layer or 802.1X)
  - Using a single security resource, e.g. (HW) secure element upon a single station for this purpose
- **Securing-the-security**, in particular:
  - Supplying/managing initial keys/credentials/security configuration to individual stations in a secure manner

# Guiding Principle

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- Converged networks need a **‘converged security’** model
- Converged security means:
  i. An **interoperable solution** for IEC/IEEE 60802 security - covering the above identified scope, especially *security between stations*
  ii. **Co-existence** of IEC/IEEE 60802 security with the security for application/middleware as (sub)components on the same physical entity (station) – a part of the above identified scope, especially *shared security means* and *securing-the-security*

# Main Functional Objectives

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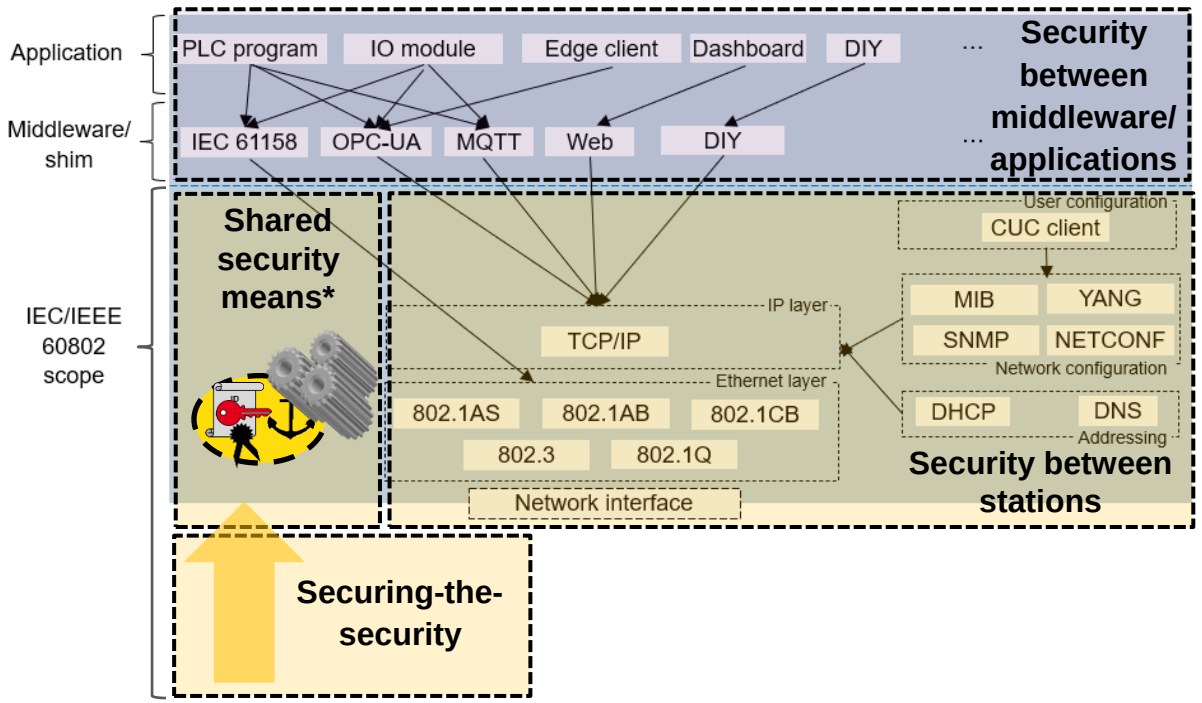
- **Message exchange protection** between identified stations:
  - Objective: protect communications against **forgery**, **tampering**, and **eavesdropping**
  - Features: (peer) entity identification and authentication, (data) integrity and confidentiality, replay protection
  - Scope: the system communications that are in-scope
- **Resource access authorization**:
  - Objective: protect system resources against **unauthorized access**
  - Features: coarse-grained authorization e.g. network isolation, fine-grained authorization e.g. application/middleware or network configuration resources
    - Prerequisite: message exchange protection, esp. (peer) entity identification and authentication
  - Scope: the system resources that are in-scope

# Building Blocks




- In-scope:
  i. **Security between stations**
  ii. **Shared security means**
  iii. **Securing-the-security**
- Out-of-scope for IEC/IEEE 60802: security between and at middleware/application components:
  - Protecting their message exchanges e.g. IEC 61158 communications between PLC programs and IO modules
  - Authorizing their resource accesses e.g. providing or changing instructions for the operation of an IO module

*: joined usage by application/middleware security is perceived but not shown here

# Respecting Industrial Automation

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- IEC/IEEE 60802 security shall respect the essential characteristics/properties of industrial automation components/systems
- In particular characteristics/properties that differentiate industrial automation from IT must be addressed adequately. Differentiators from IT include:
  - Dedicated set of use cases, e.g. ‘IA device replacement without engineering’, ‘machine cloning’
  - Embedded and constrained system components (lacking local user interfaces, limited computing power and memory, …)
  - System components that present physical entities and computing entities at the same time
  - Unattended operations
  - Undisturbed operations, e.g. bumpless key updates
  - Autonomy of production cells (with external cell control)
  - Deterministic communications particularly for time-aware streams
  - Physical world impacts, e.g. functional safety

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