「IEC62443のセキュリティ要件のシステム要件とOPC UAとセキュリティ監視システムについて」

株式会社ICS研究所
代表取締役社長
村上正志

- OPC FoundationのOPC UAがIEC62443のセキュリティ要件FRのシステム要件SRのどこの部分を担っているかについてお話します。また、セキュリティレベル2,3,4では、セキュリティ監視システム設置が要件にありますが、それについて解説します。

Agenda

- 現場のゾーンごとの時刻合わせの技術動向／OPC UA TSNとフィールドバスの時刻同期に関するお話
- デジタルトランスフォーメーションやデジタルツインを実現する上で必要となるデータモデルや情報モデルのCompanion Specificationのお話
- デジタルトランスフォーメーションやデジタルツインを実現する上でのセキュリティ対策のお話

Voting Members
- Corporate Members
- End-User Members

Other Members
- Non-Voting Members
- Logo Members

Designated Member Representatives nominate and elect Directors for 2 years

Report in Annual Meeting

Nominate candidates for election
Extend / reduce number of seats

Board of Directors

Elect

Officers

Send member representatives to working groups and marketing teams

Report / Control

Technical Control Board (TCB)

Marketing Control Board (MCB)

Daily Operations

Report / Control

Report / Control

1

Technical Advisory Council (TAC)

Regional Marketing Teams

Report

N

Technical Working Groups

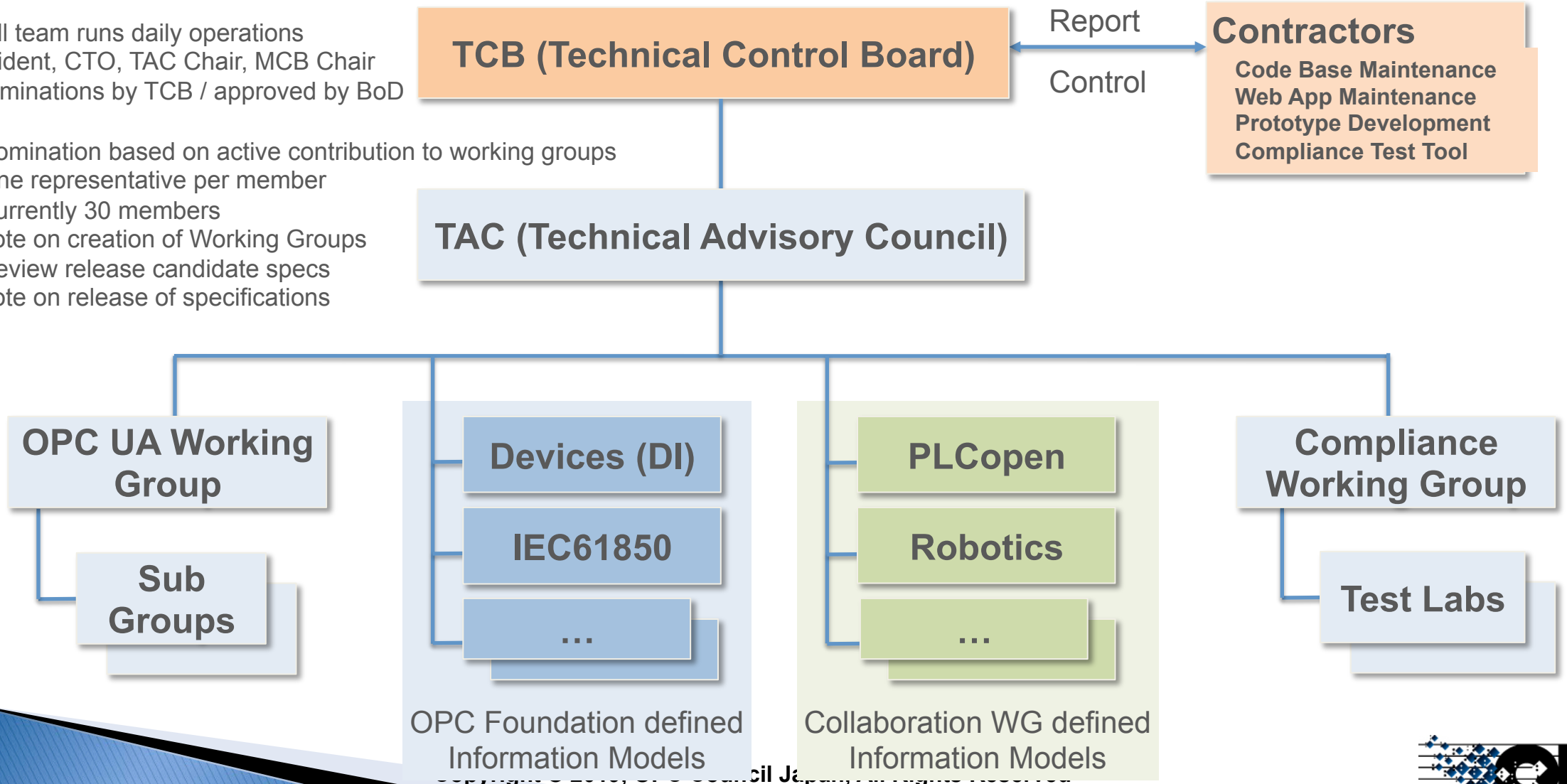
- Starts new working groups
- Review and release of specifications developed in technical working groups

OPC FOUNDATION

OPC Foundation Technical Organization

Small team runs daily operations
President, CTO, TAC Chair, MCB Chair
+ Nominations by TCB / approved by BoD

- Nomination based on active contribution to working groups
- One representative per member
- Currently 30 members
- Vote on creation of Working Groups
- Review release candidate specs
- Vote on release of specifications



Collaborations

The OPC Foundation closely cooperates with organizations and associations from various branches. Specific information models of other standardization organizations are mapped onto OPC-UA and thus become portable.

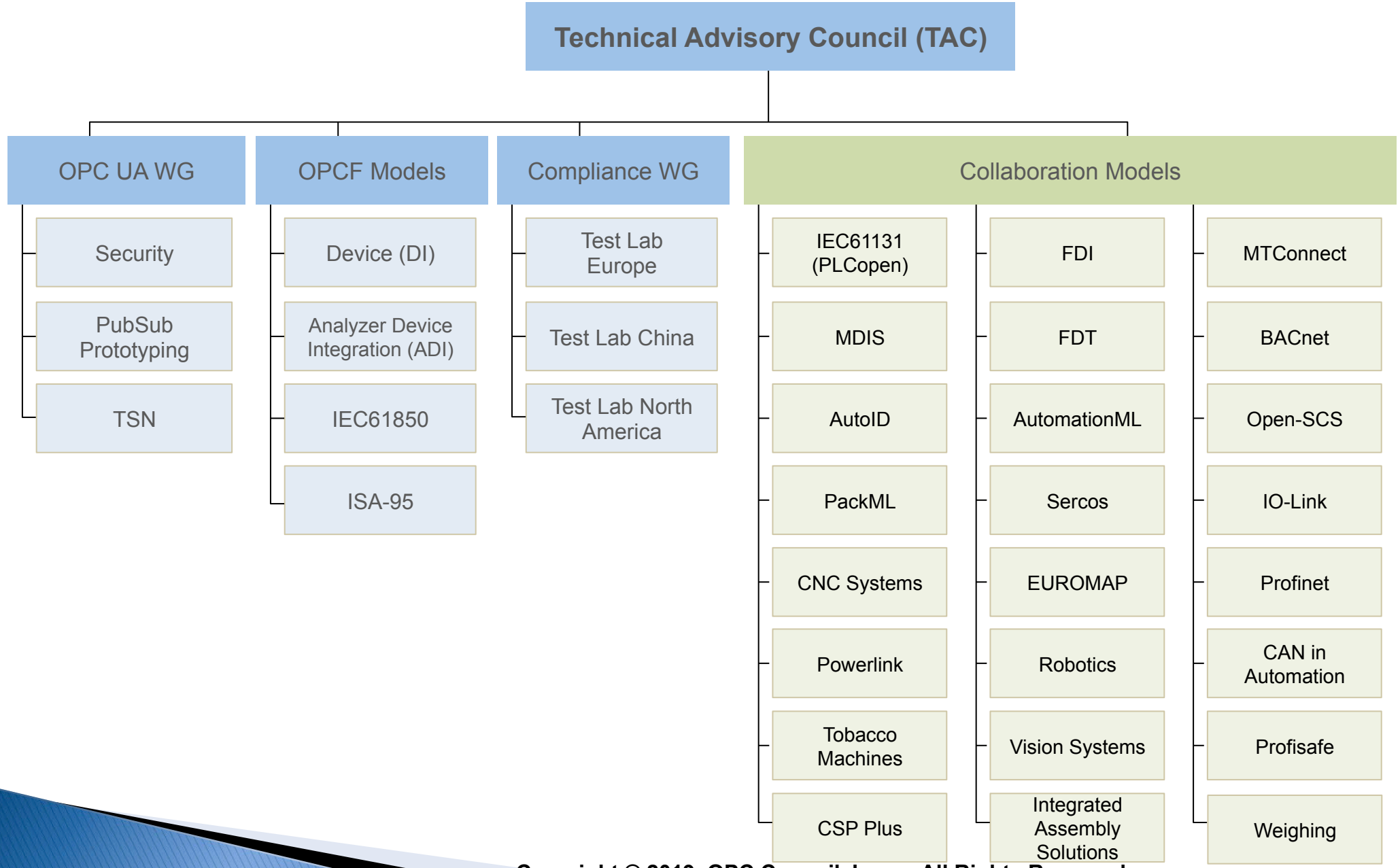
OPC Foundation strategy:

- Rules for OPC UA CS developed together with partners
- Predefined process for joint OPC UA CS
- Templates to ensure standardized format and potential certifications
- Compliance
- Intellectual Property
- Working Processes

Markets https://opcfoundation.org/markets-collaboration/

- **Automation**
- **Building Automation**
- **Energy**
- **Engineering**
- **Measurement**
- **Oil & Gas**
- **Transportation**

OPC FOUNDATION



Partner Organizations

- PLCopen
- VDMA
- VDW
- MTConnect
- OMAC
- AIM
- FieldCom Group
- FDT Group
- CLPA
- EPSG
- PI
- CiA
- SI
- ETG
- IO-Link
- MDIS
- …

The Industrial Interoperability Standard

OPC UA: The industrial framework enabling secured, standardized data and interfaces

Interoperability

Independent:
Vendor, Platform, Market and OS

Open Source on GitHub

Discoverable Services Oriented Architecture (SOA) independent of the transport method

Owned by a Non-Profit (OPC Foundation)

50M installed base and exponential growth

Scalability: From Sensor to Cloud

Data Modelling

Rich data modeling preserves source context

Vendors can extend the data model of each product (Companion Specification)

Maps domain specific protocols, e.g. BACNet | MTConnect | Weihenstephan…

Maps domain specific information e.g. Robotics, Machine Vision, …

Security

Secure Design from group-up

Based on **open security standards**

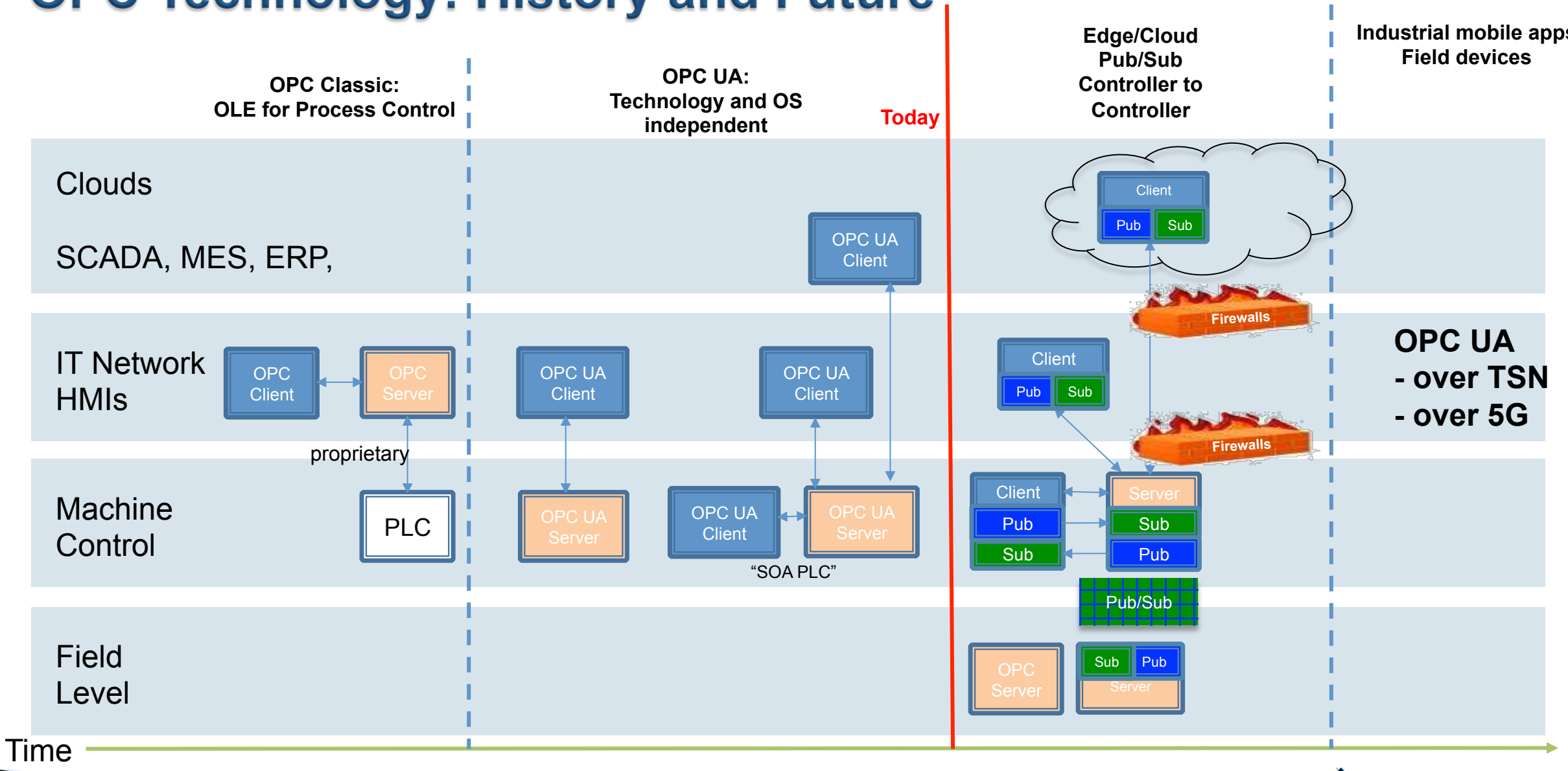
Authentication | Encryption

Evolves as security technologies evolve

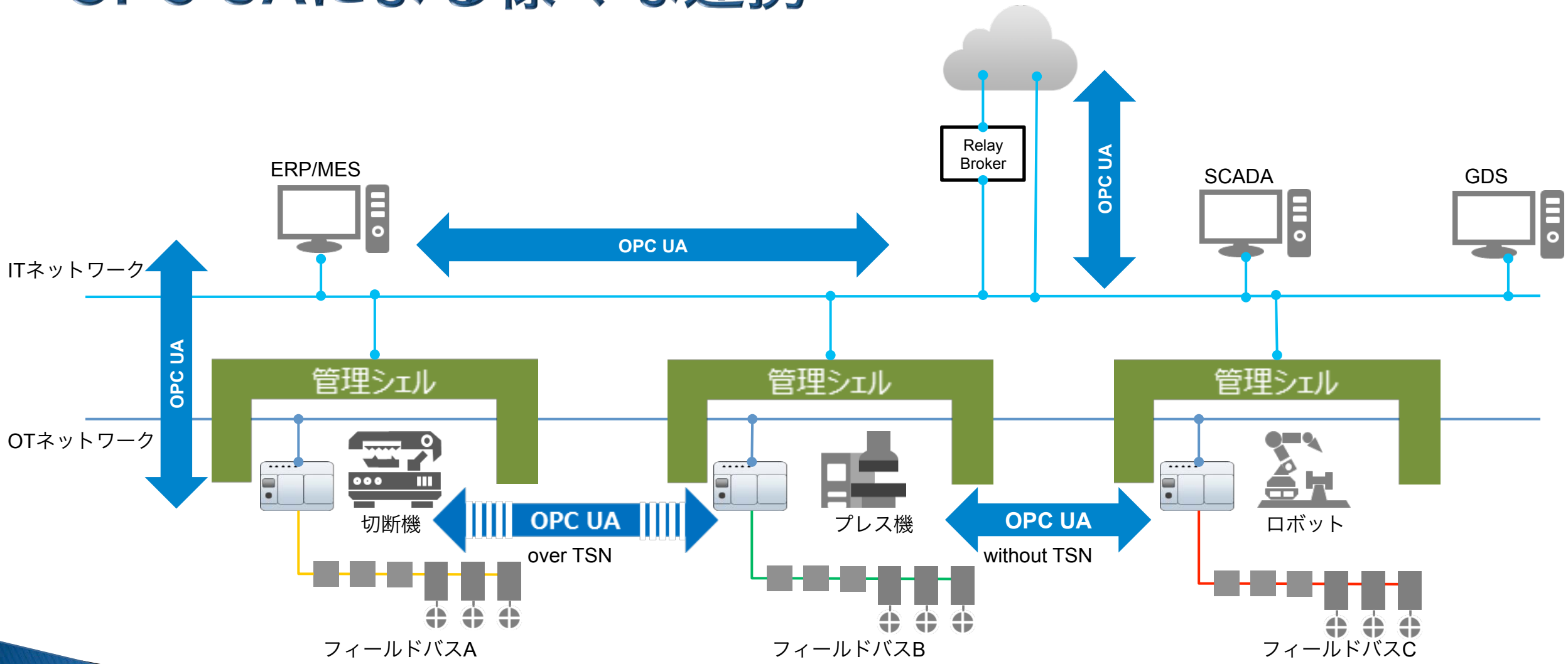
Vendors/Users can choose level of security

Easily acceptable by IT departments

OPC Technology: History and Future



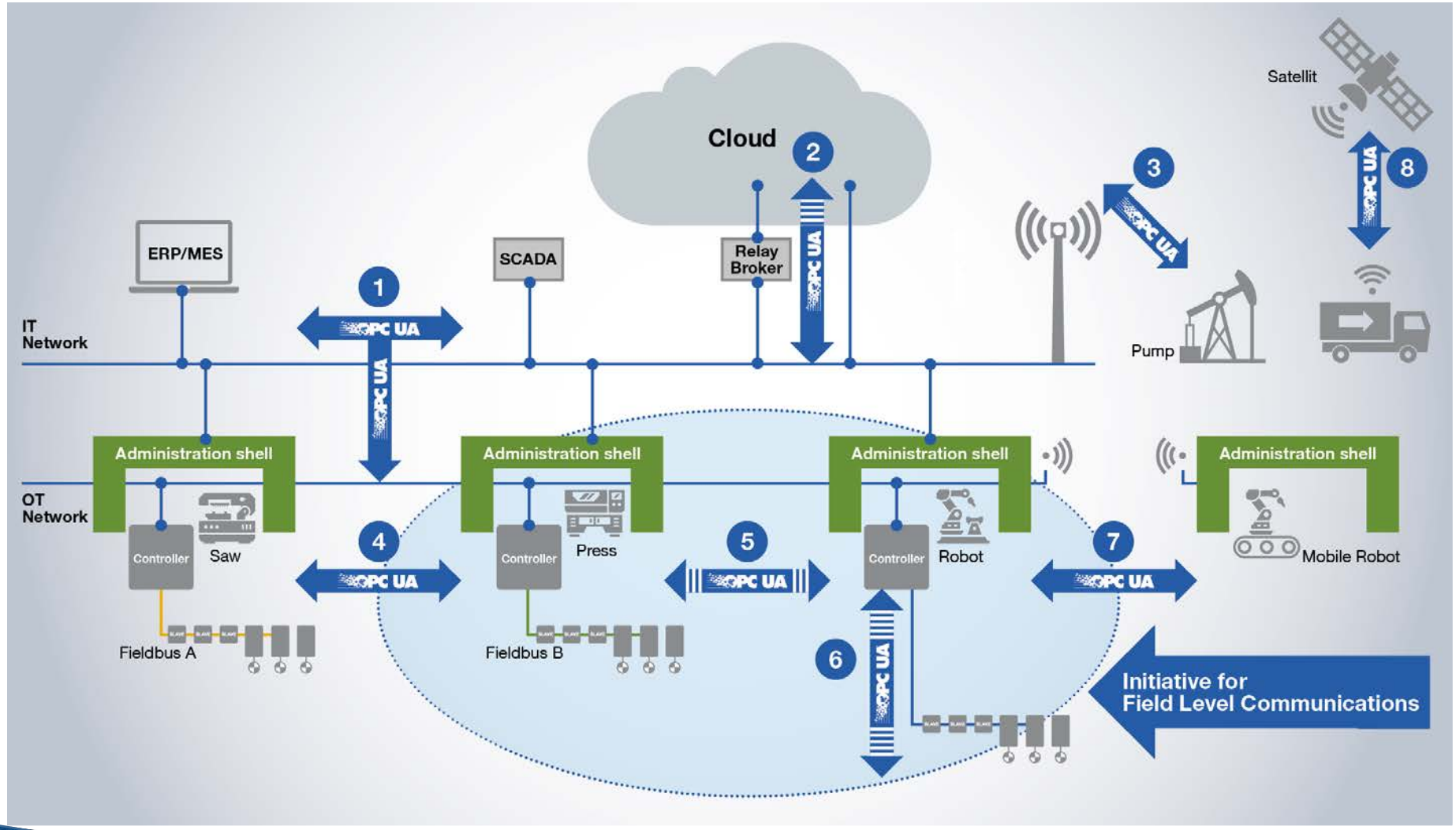
OPC UAによる様々な連携



何故、管理シェルが標準制御システム仕様になるのか？

当日お話します。

OPC Unified Architecture – from Sensor to Cloud

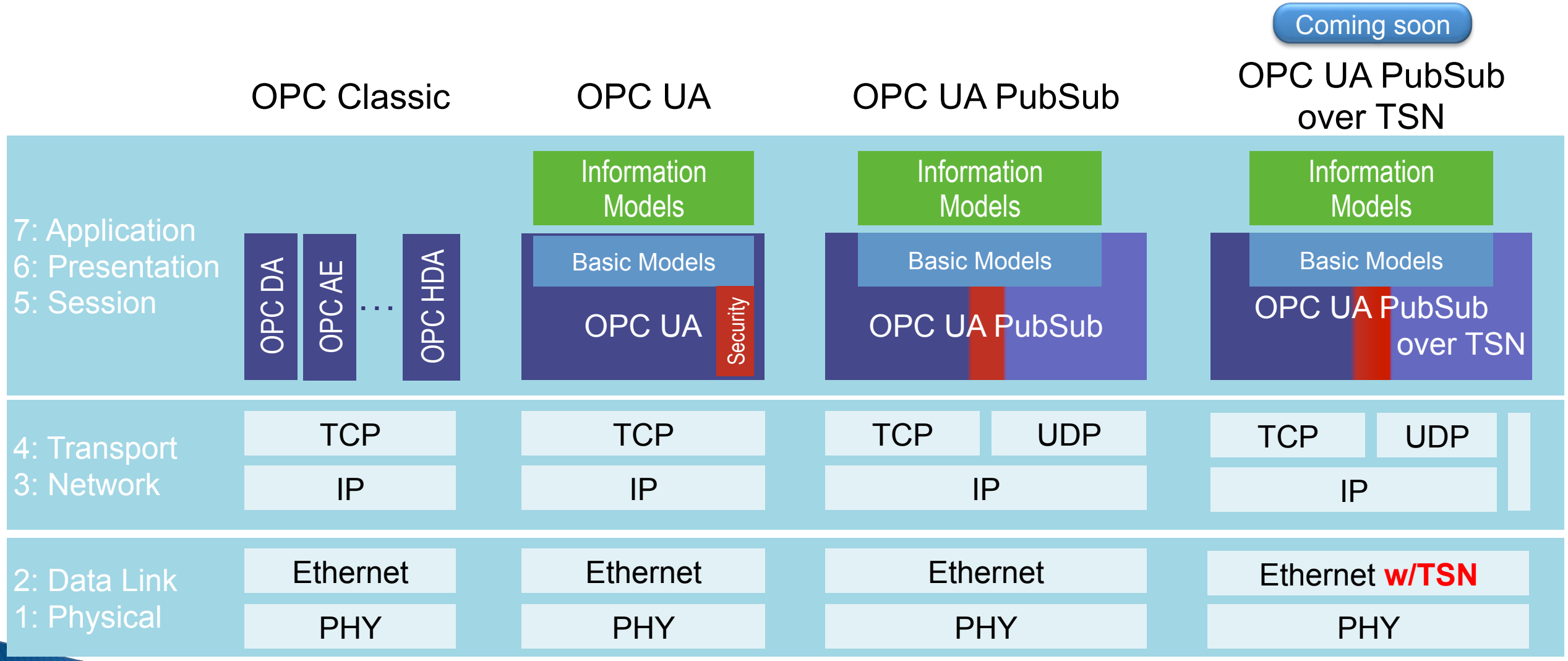


1. IT / OT Communication
2. Cloud Integration
3. Secure Remote Access
4. Local OT Communication
5. Controller to Controller
6. Controller to Field Device
7. Wireless Integration (5G)
8. Future Ready

何故、フィールドの時刻合わせが必要になるのか？

当日お話します。

OPCの進化：OSI参照モデルによる階層表現



Field Level Communications Initiative

Information Models
Semantic
Security
IT Connectivity

OPC UA

IEEE 802

IEC

TSN

Converged, real-time capable Ethernet networks

OPC UA

Combine Strength

OPC FOUNDATION MEMBER

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

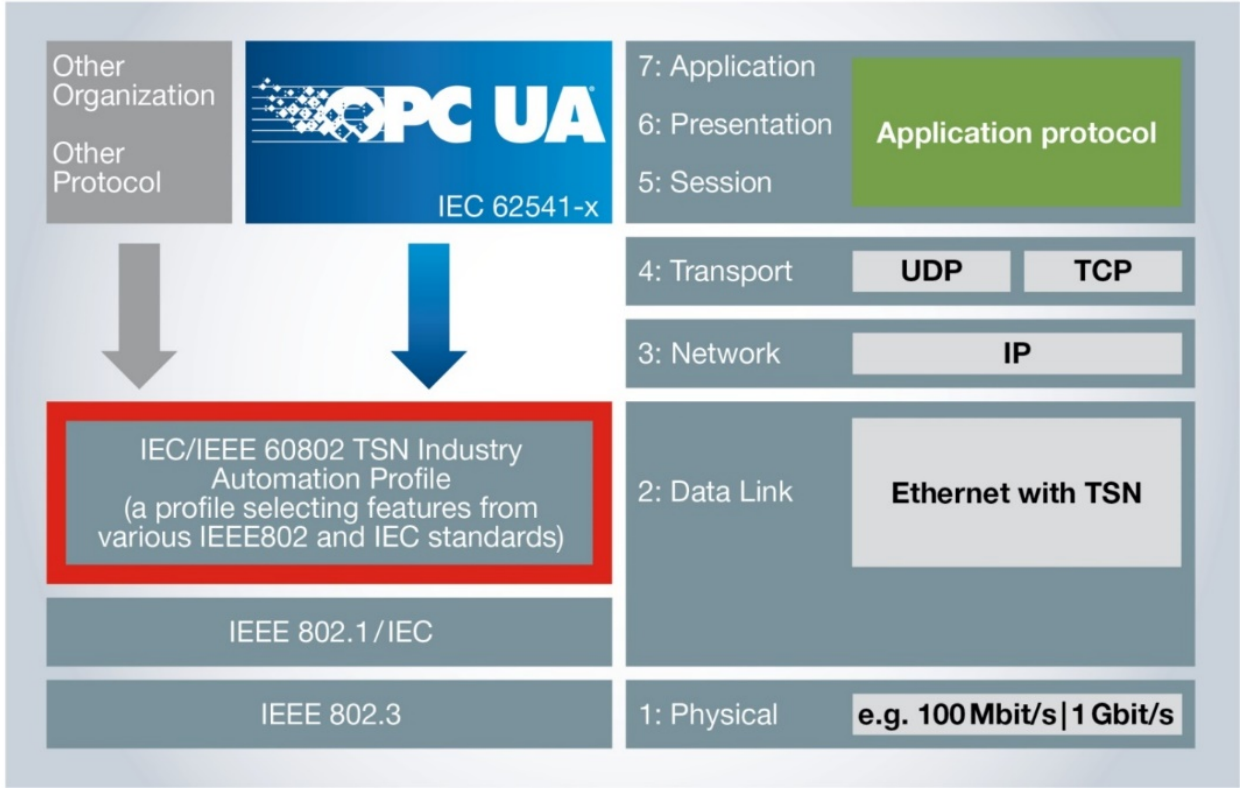
OPC FOUNDATION

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

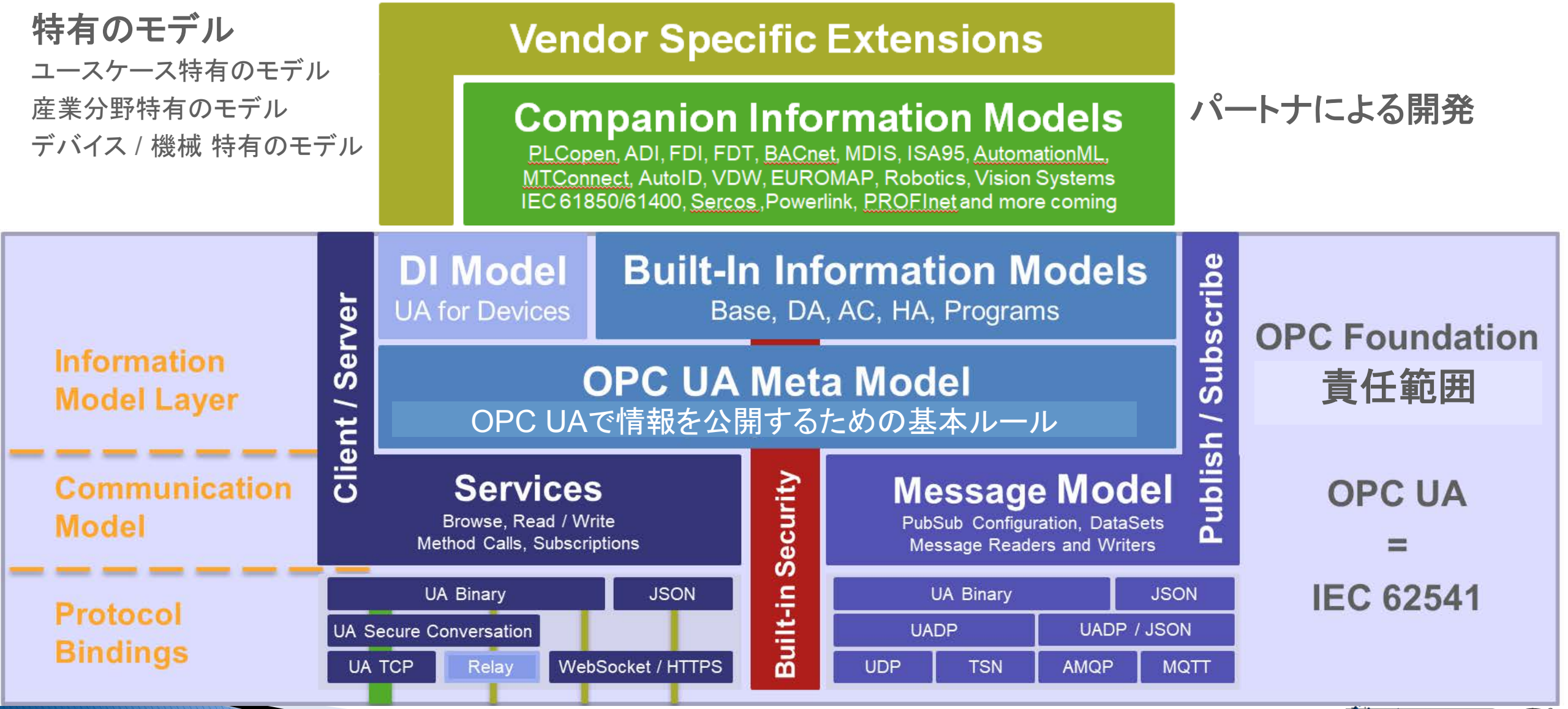
- Converged TSN network: different protocols can share the same TSN network infrastructure
- Use of common HW components



OPC Foundationとパートナによるコラボレーション

特有のモデル

ユースケース特有のモデル
産業分野特有のモデル
デバイス / 機械 特有のモデル



OPC UA over TSNのステータス(2019.04現在)

OPC UA over TSN 技術 と 責任分担

標準EthernetのTSN拡張	**IEEE**
産業プロファイルとネットワーク構成	**IEEE / IEC**
OPC UA Part 14 PubSub	**OPC Foundation**
OPC UA Quality of Service Parameters for TSN	**OPC Foundation**
OPC UA Black Channel for Safety	**OPC Foundation**
OPC UA for Devices	**OPC Foundation**
Device specific OPC UA Information Models	**Partners**

OPC UA over TSNのステータス(2019.04現在)

OPC UA over TSN 技術 と 責任分担

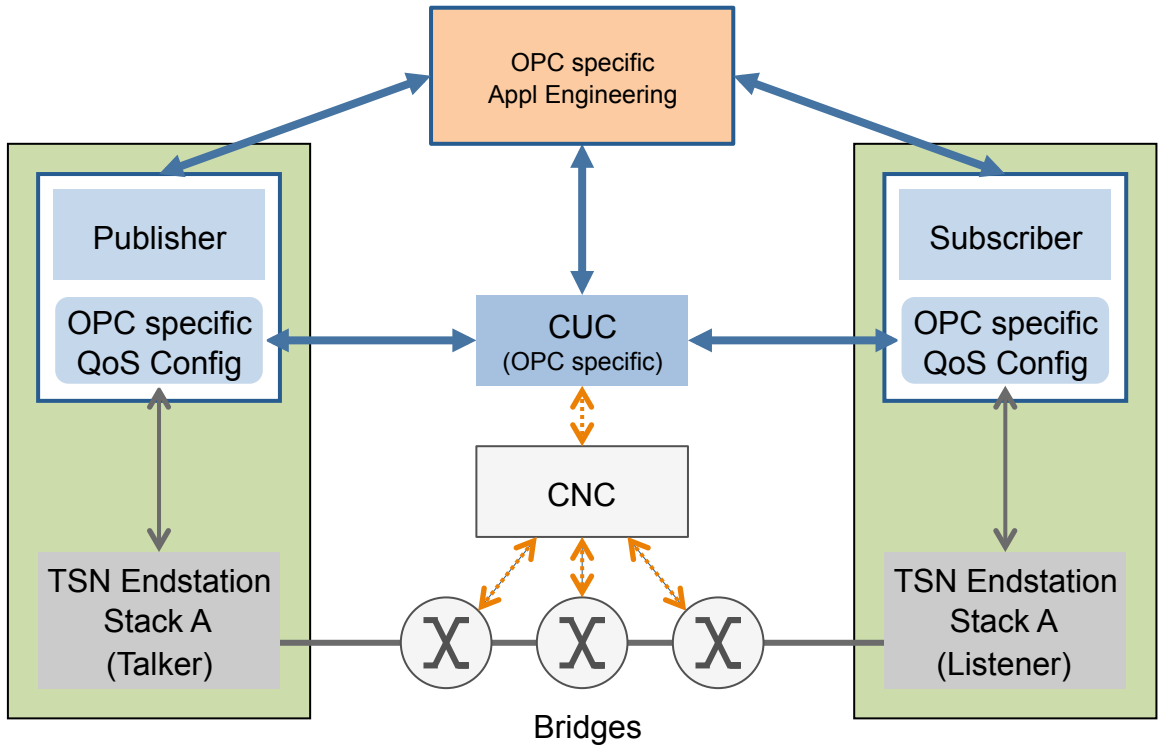
- 標準EthernetのTSN拡張 **IEEE**
  - リリース済
    - IEEE 802.1Qbv Enhancements for Scheduled Traffic
    - IEEE 802.1Qbu Frame Preemption
    - IEEE 802.1Qca Path Control and Reservation
    - IEEE 802.1CB Seamless Redundancy
    - IEEE 802.1Qcp Yang Data Models
  - Draft
    - IEEE 802.1AS-REV Time Synchronization for Time-Sensitive Applications D8.0:16 Jan 2019
    - IEEE 802.1Qcc Stream Reservation Protocol (SRP) Enhancements and Performance Improvements
    - IEEE 802.1Qcr Asynchronous Traffic Shaping
    - IEEE 802.1CS Link local registration D2.1:8 Mar 2019

Centralized vs. Distributed Network Configuration Model

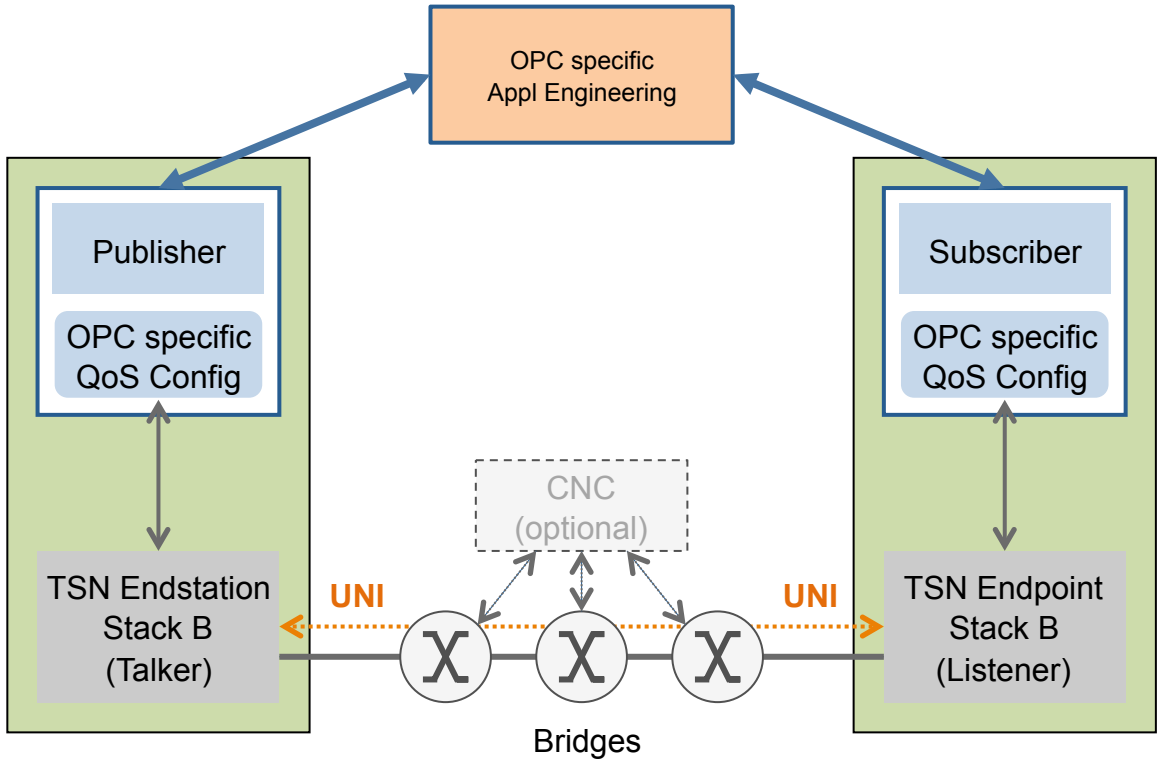
OPC 特有のコンフィギュレーション データフロー (OPC UA通信を使用)

Network特有のコンフィギュレーション データフロー

CUC: Centralized User Configuration
CNC: Centralized Network Configuration



Centralized Configuration



Distributed Configuration

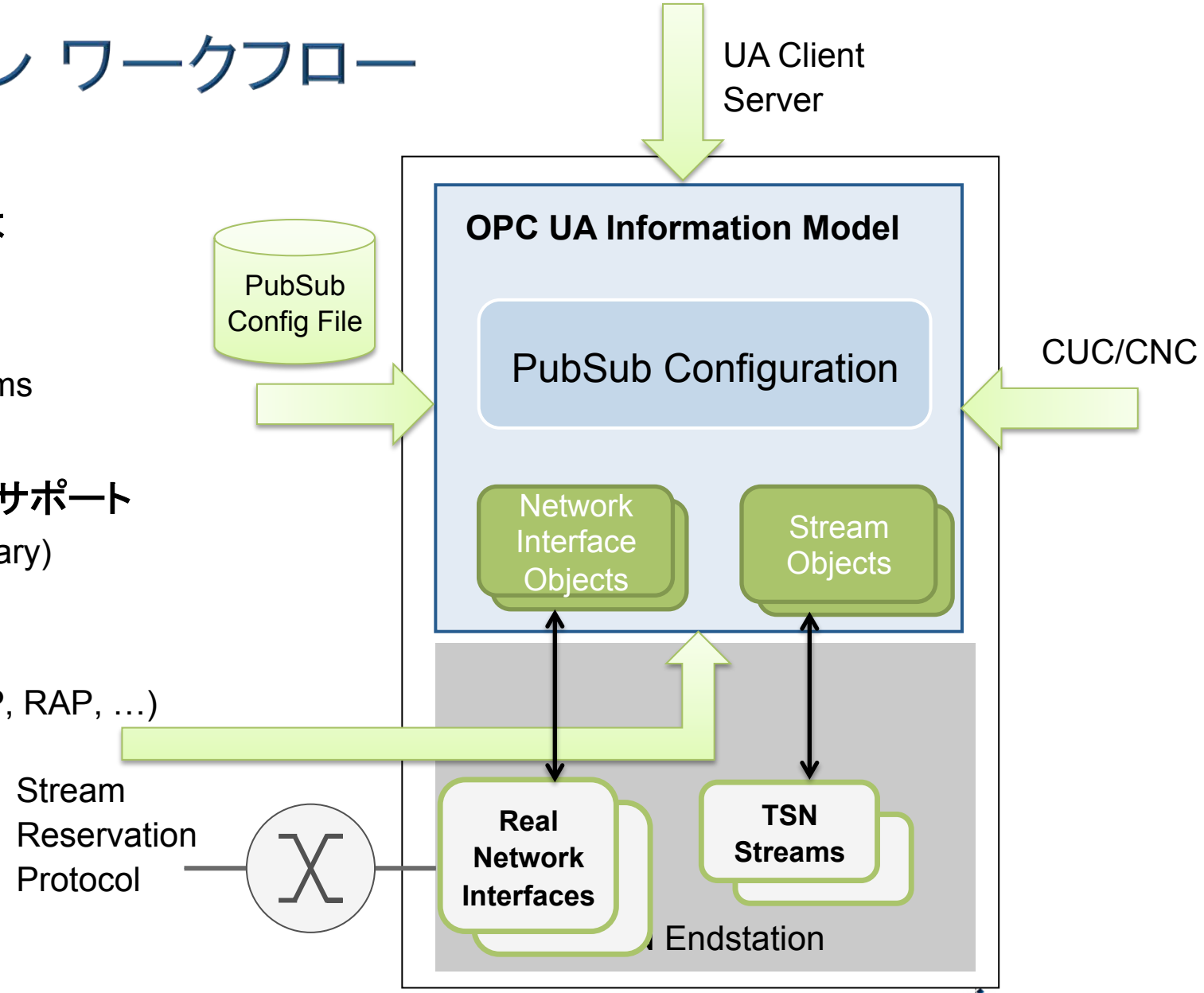
何故、現場の時刻合わせ方式が欧米で異なっているのか？

当日お話します。

TSN コンフィギュレーション ワークフロー

- **コンフィギュレーションワークフローは サポート要**
  - Pre-engineered Streams
  - “Ad-Hoc” / “On-demand” TSN-Streams

- **TSN設定をするため 複数の手法 をサポート**
  - PubSub Configuration Files (UA-Binary)
  - UA Client / Server
  - CUC + CNC
  - Stream Reservation Protocol (MSRP, RAP, …)



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- VDMA: Manufacturing industries
- 15+ verticals active on OPC UA CS

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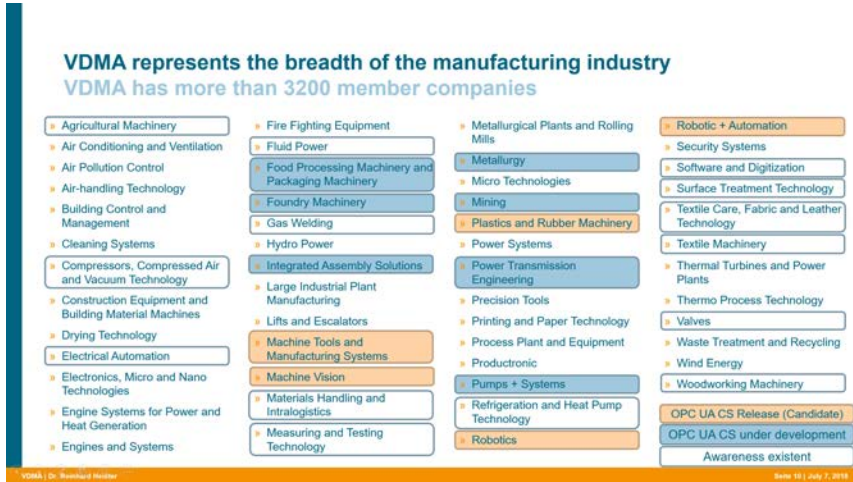

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umati
universal
machine tool
interface

OPC FOUNDATION

EMO 2019 ハノーバー　2019年9月16日～21日

VDWとOPC FoundationがCcompanion Specificationsで連携

工作機械100台連係へ共通基盤
独工業会VDWが「Umati」
EMOで実演

今後について

- TSN
- 5G
- Security
- Companion workingとの調和
- More...

何故、Companion Specificationが必要になるのか？

当日お話します。

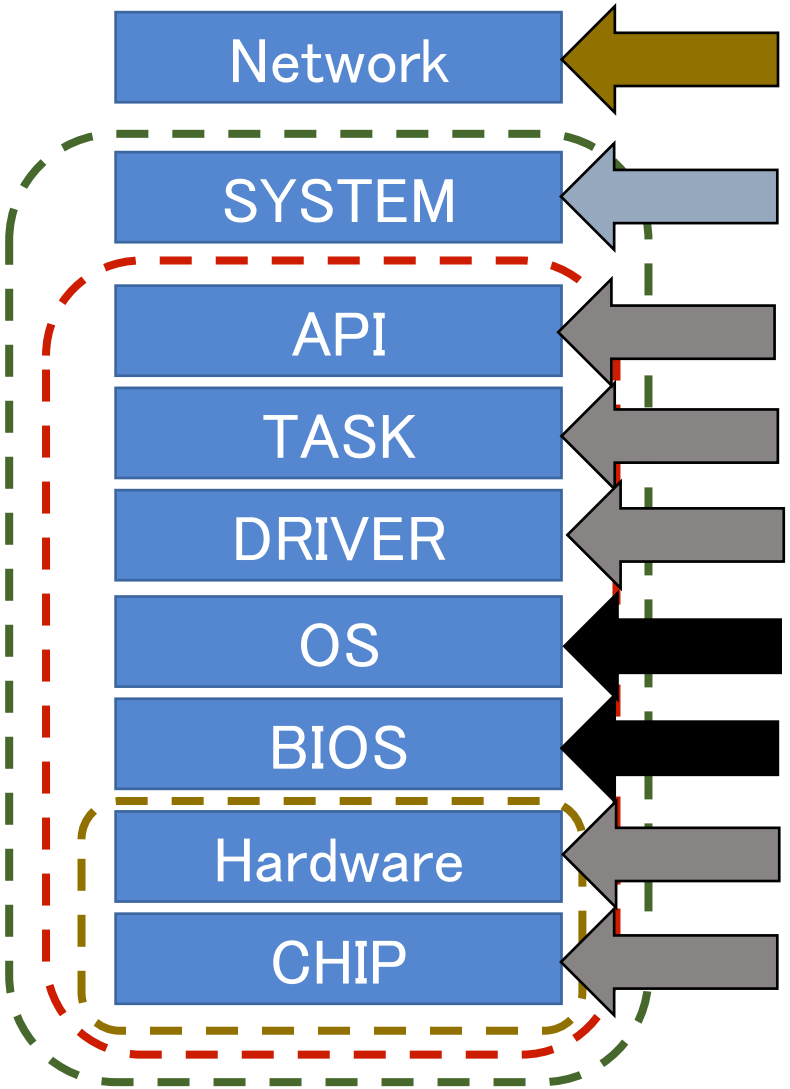
5Gが導入されると製造現場がどう変わるのか？

当日お話します。

５Gが製造現場に入るとどのような制御セキュリティ対策が必要になるのか？

当日お話します。

サイバー攻撃と脆弱性／侵入口



サイバー攻撃の手法は、ターゲットの脆弱性の場所と脆弱性内容によって異なる。

よって、制御製品の脆弱性対策も、基本設計からこの課題を考慮した対策を実施していくことになる。

特にServer製品は左図の分類別に対策が必要であり、デバイス製品はアーキテクチャー構造から見直すことになります。

今後の制御製品開発環境と製品仕様はどう変わらなければならないのか？

当日お話します。

今後の制御システムインテグレータは、どうしなければならないのか？

当日お話します。