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presented during
OPC FLC kick-off meeting,
January 8, 2019 in Munich

Scope and Status

Prepared by
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(Siemens AG)

Basic scope
- PAR -

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IEC / IEEE 60802 project authorization request (PAR):

http://www.ieee802.org/1/files/public/docs2018/60802-draft-PAR-0318-v01.pdf

2.1 Title: Time-Sensitive Networking Profile for Industrial Automation

5.2 Scope: This standard defines time-sensitive networking profiles for industrial automation. The profiles select features, options, configurations, defaults, **protocols and procedures of bridges, end stations, and LANs** to build **industrial automation networks**.

5.5 Need for the Project: IEEE 802 standards address a very wide range of networking scenarios. Users and vendors of interoperable bridged time-sensitive networks for **industrial automation need guidelines for the selection and the use of IEEE 802 standards and features** in order to be able to deploy converged networks to simultaneously support operations technology traffic and other traffic.

5.6 Stakeholders for the Standard: Developers, providers, vendors, and users of networking services and components for **industrial automation equipment**. These components may include bridges, end stations, network interface cards, and integrated circuits.

Basic scope
- Work flow -

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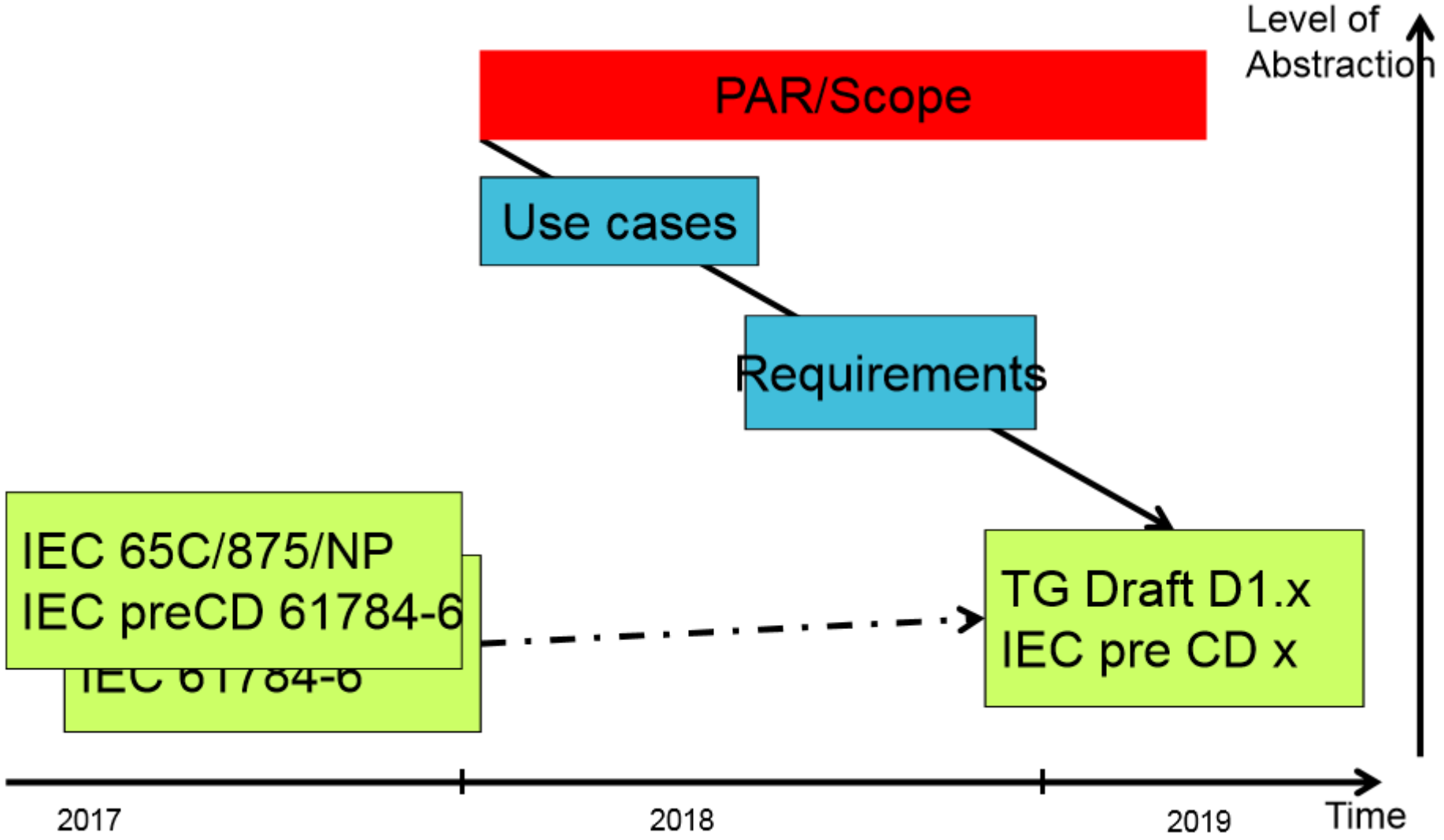

Basic scope
- Timeline -

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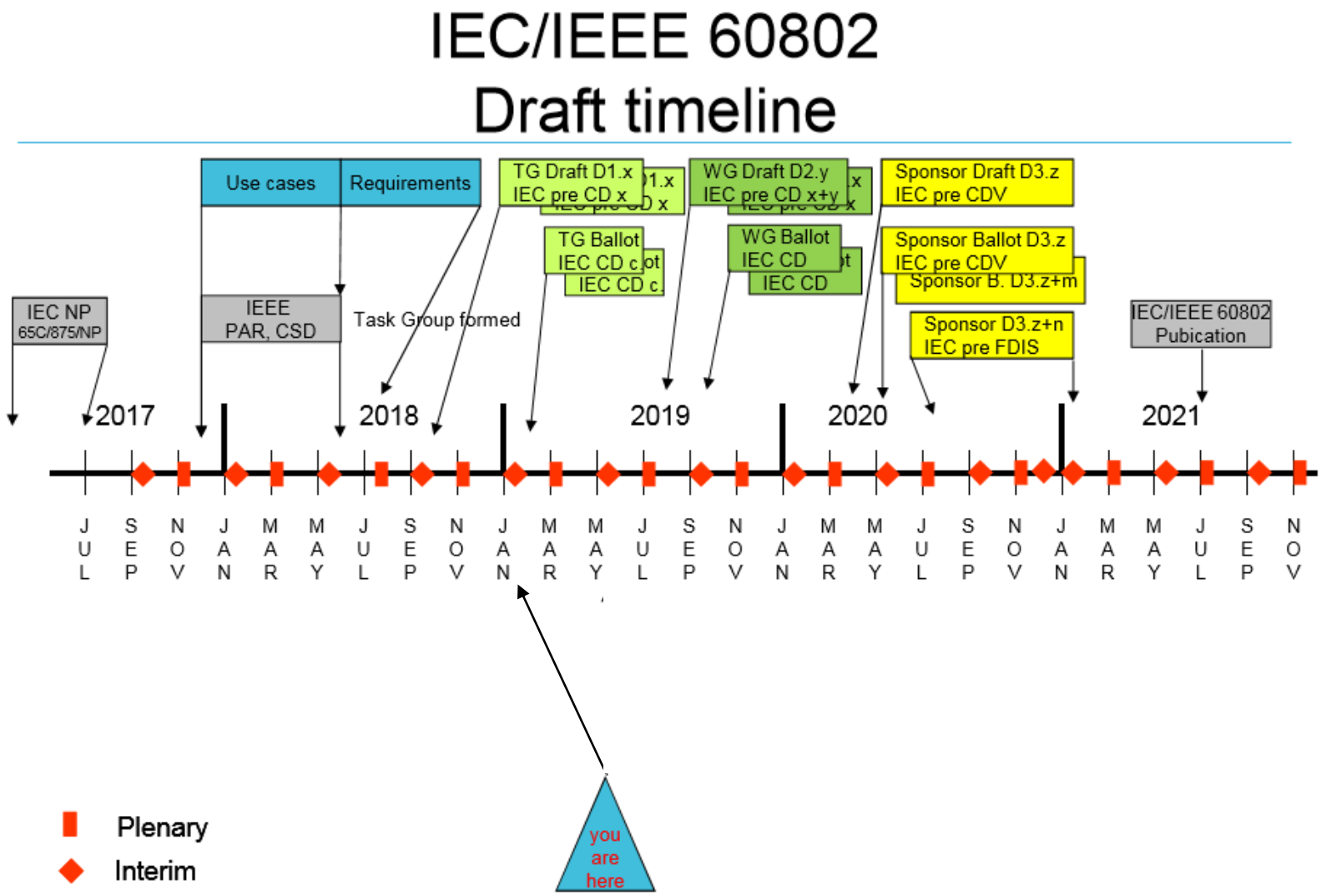

Basic scope
- meeting cadence -

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IEC / IEEE 60802 meets every two month face to face.

Four meetings are in US, one in Europe and one in Asia.

Sync call can be scheduled by the chair/editor as needed, e.g. every week or bi-weekly!

All meetings are scheduled parallel to the IEEE interim or plenary meetings to allow IEEE802.1 experts joining the IEC/IEEE 60802 working group.

Next meeting:
Hiroshima from 14.01. – 18.01.

IEEE standards
- Bridges and End-Stations -

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IEC / IEEE 60802 defines a standard selection

IEEE802.3-2018 - IEEE Standard for Ethernet

IEEE802.1Q-2018 - Bridges and Bridged Networks

IEEE802.1AB-2016 - Station and Media Access Control Connectivity Discovery

IEEE802.1AS-2019* - Timing and Synchronization for Time-Sensitive Applications

and optional more, e.g.

IEEE802.1CB-2017 - Frame Replication and Elimination for Reliability

IEEE802.1X-2010 - Port-based Network Access Control

…

* Assuming that this standard will be released 2019

Configuration
- Bridges and End-Stations -

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IEC / IEEE 60802 defines a selection of managed objects for the selected standards and the access to this managed objects
http://www.ieee802.org/3/ad_hoc/ngrates/public/16_01/zhuang_ecdc_01_0116.pdf

Netconf or Restconf

for the access of the selected managed objects using YANG models

and optional

Simple Network Management Protocol (SNMP)

for the access of the selected managed objects using MIBs

Requirements
- Principle of interoperation -

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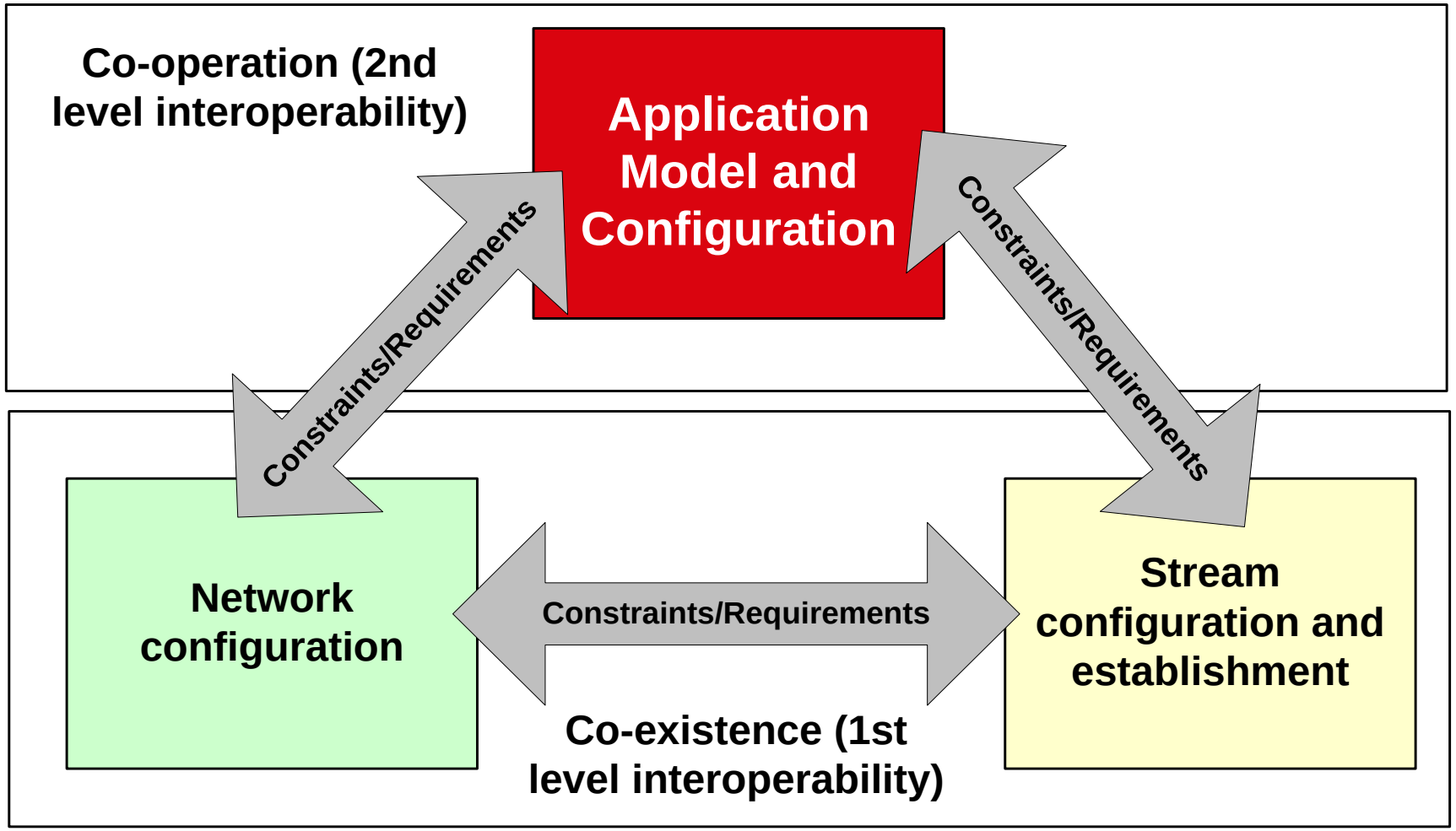

Requirements
- Layers -

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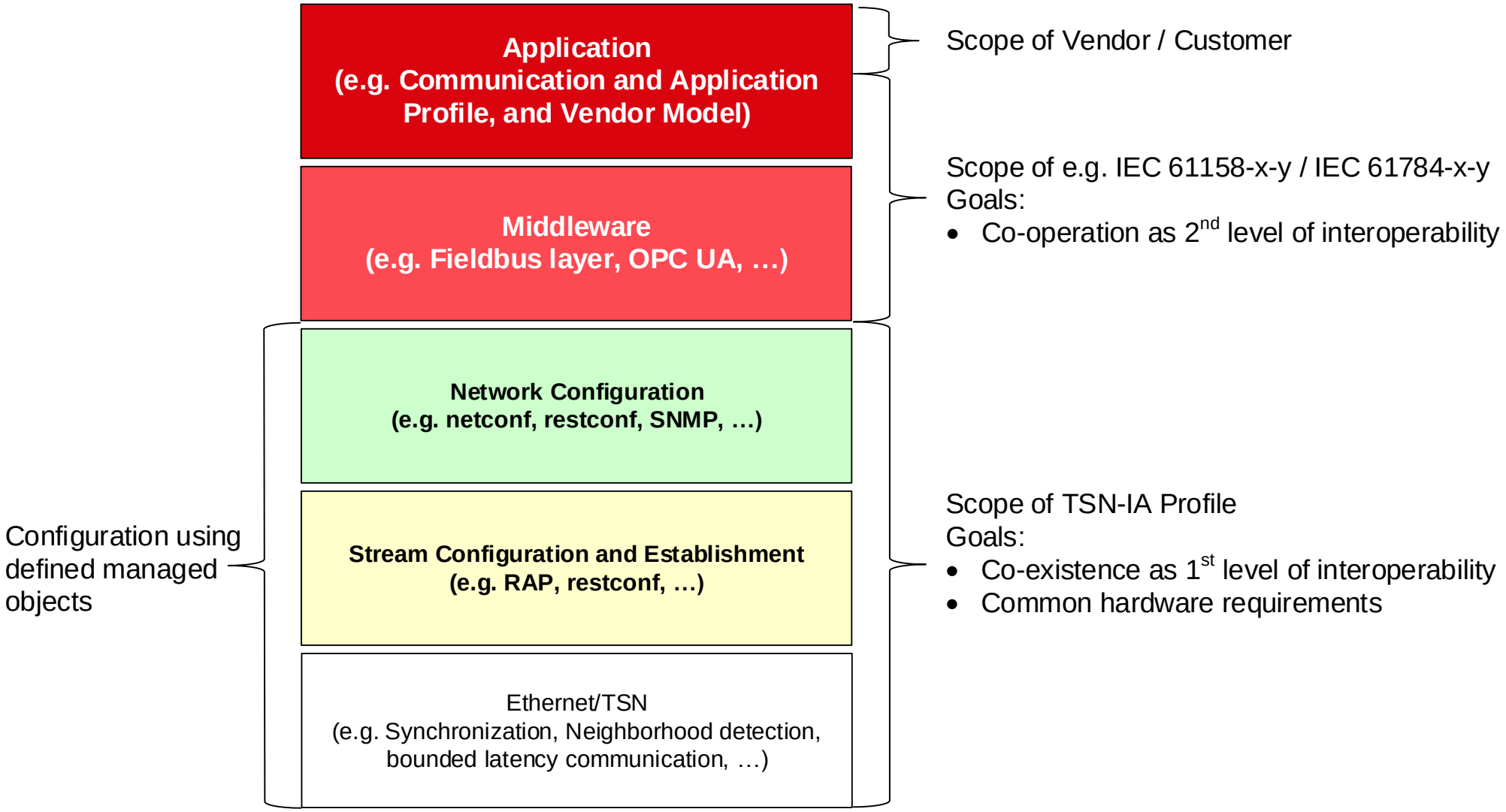

Use cases
- What needs to be covered -

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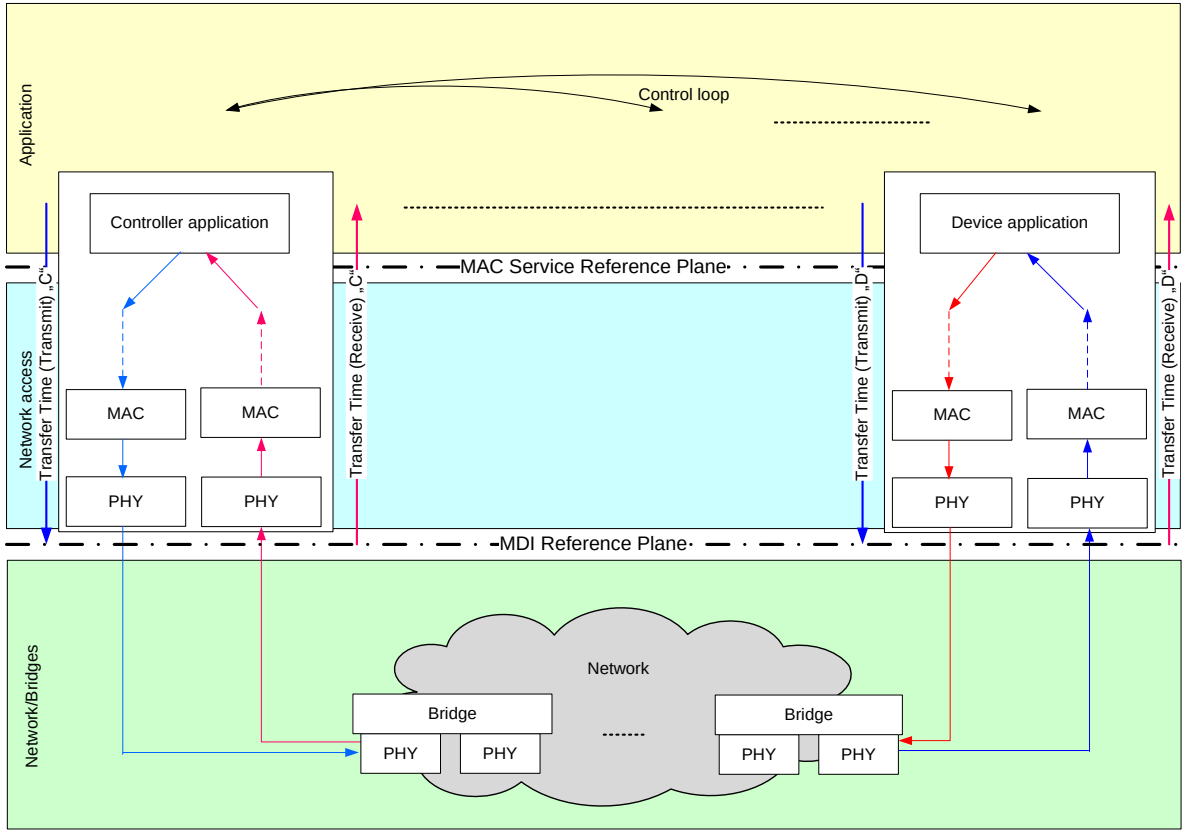
http://www.ieee802.org/1/files/public/docs2018/60802-industrial-use-cases-0918-v13.pdf

IEC/IEEE 60802 working group decided to start with a use case definition to ensure a fitting definition for the TSN-IA profile.

Network access and Network/Bridge need to be covered by the profile.

Application is out of scope!

Thus, data rates from 10Mbit/s up to 100Gbit/s, as defined by IEEE802.3 are selectable together with all MAU Types supporting the required IEEE standards.



Use cases
- Topics -

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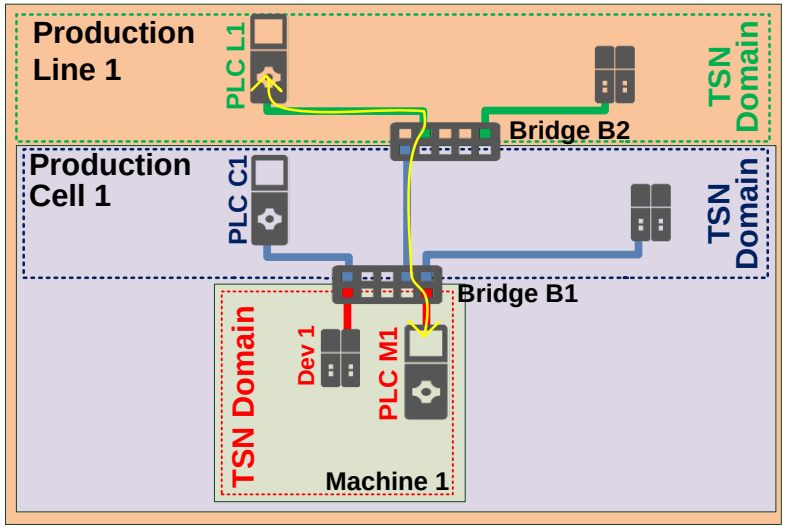
Basic definition, e.g. structure of an industrial network or TSN domain definitions are covered.

Additional, the area of concern – who is responsible for what – is shown.

Interconnection between TSN domains using different options are added due to customer feedback.

Synchronization – IEEE802.1AS-2019 is a core standard for the TSN-IA profile – is covered.



Use cases
- Topics -

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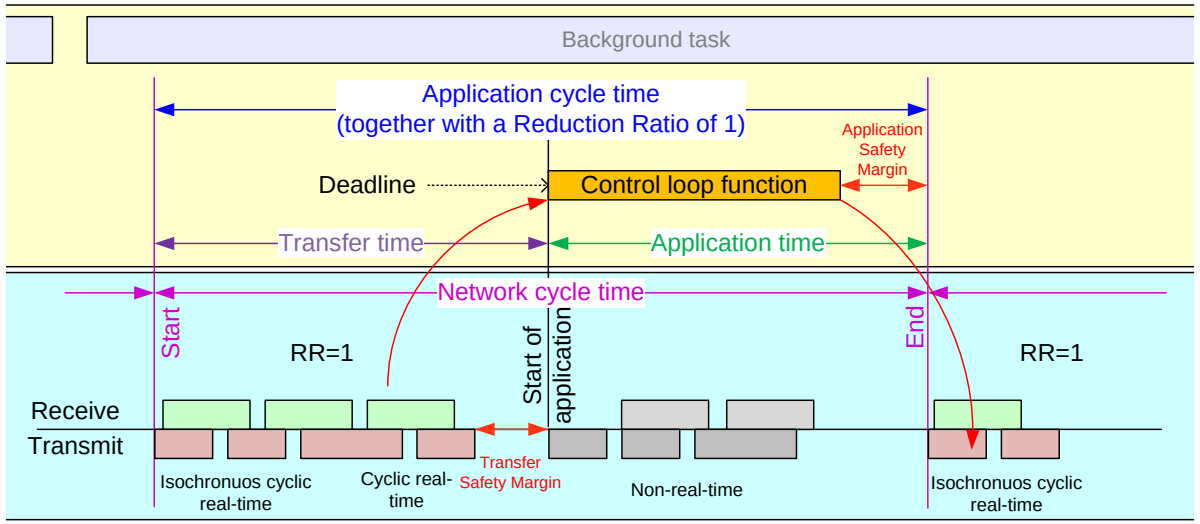
Modes of operation as used in todays industrial automation systems need to be covered.

Thus, bidirectional connections, control loops and cyclic operation models are shown.

Control loops from some µs to ms are required together with cyclic data exchange of kBytes of real-time data.

Topologies like linear topology, star or ring are needed.



Use cases
- Topics -

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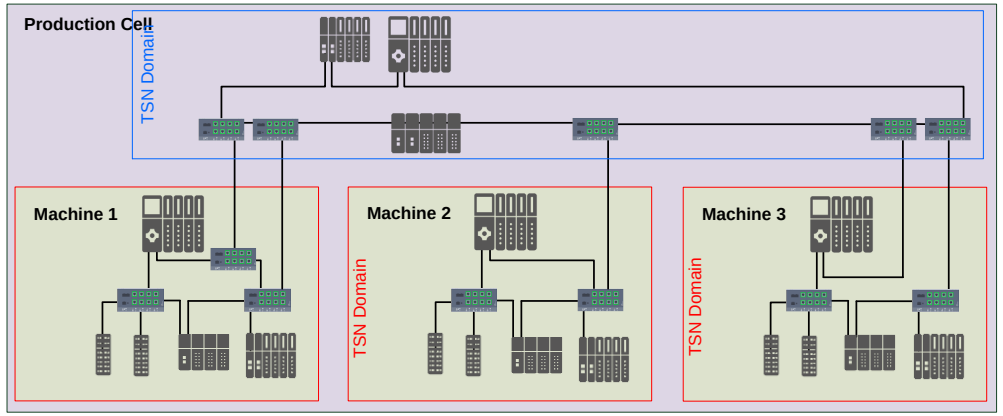
Industrial automation networks include today many different solutions.

TSN-IA profile shall not hinder any of this solutions – it shall support them.

This version of the TSN-IA profile will not support wireless, but its still needed for replacement of existing solutions.

High availability use cases or rather big domains need to be covered.



Use cases
- Topics -

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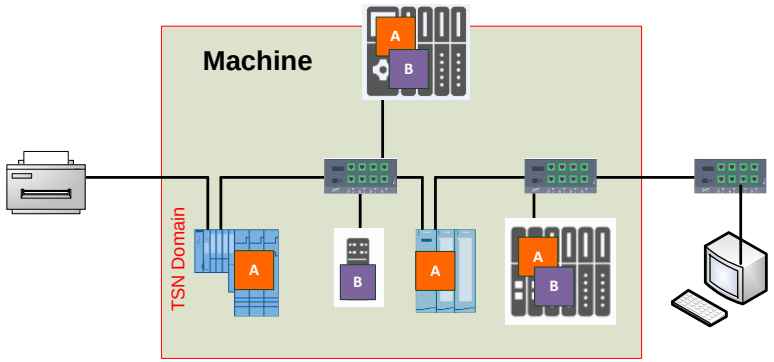
Industrial automation networks require dynamic extension of TSN domains together with the protection of a existing TSN domain.

These use cases are covered, too.

Process automation or DCS use cases are covered, too.

Additional use cases like network monitoring, digital twin or offline configuration are included.



Next steps
- Drafting the TSN-IA profile -

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IEC / IEEE 60802 started drafting the TSN-IA profile spec in 11/2018.

Working version will be presented during the meeting in Hiroshima by the Editor.

All shown contributions – but not the spec draft – are public available together with the F2F meeting.

No online participation allowed!

Liaisons or members are able to contribute to the IEC / IEEE 60802 working group!

Thank you

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Questions?