

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

Scope and Status

Prepared by
Günter Steindl
(Siemens AG)

Basic scope - PAR -

IEC / IEEE 60802 project authorization request (PAR):

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

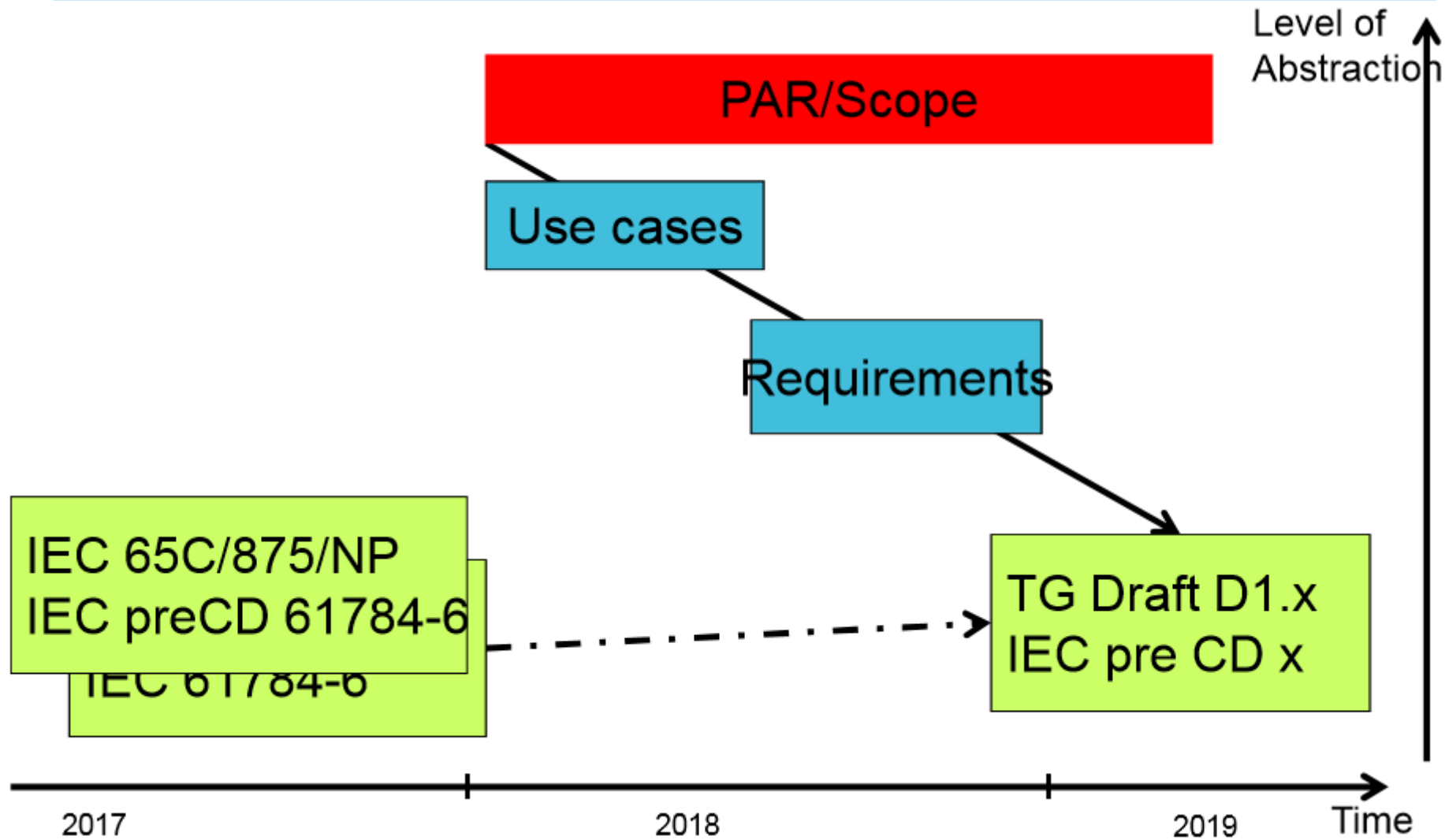
2.1 Title: Time-Sensitive Networking Profile for Industrial Automation

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.

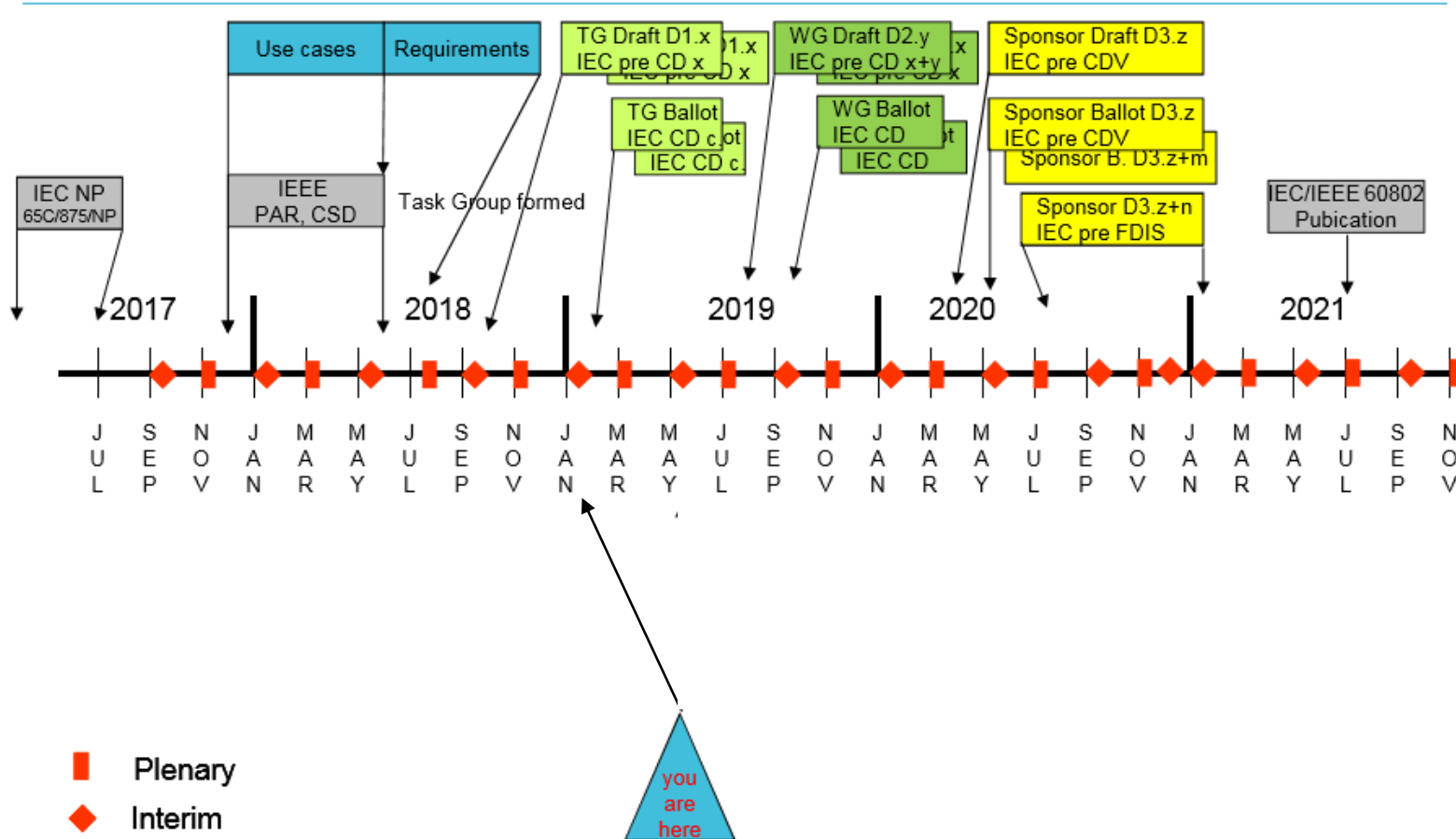
5.6 Stakeholders for the Standard: Developers, providers, vendors, and users of networking services and components for **industrial automation equipment**. These components may include bridges, end stations, network interface cards, and integrated circuits.

Basic scope - Work flow -



Basic scope - Timeline -

IEC/IEEE 60802 Draft timeline



Basic scope - meeting cadence -

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

Three plenary and three interim meetings somewhere in US, Canada, Europe or 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-Station -

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-Station -

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

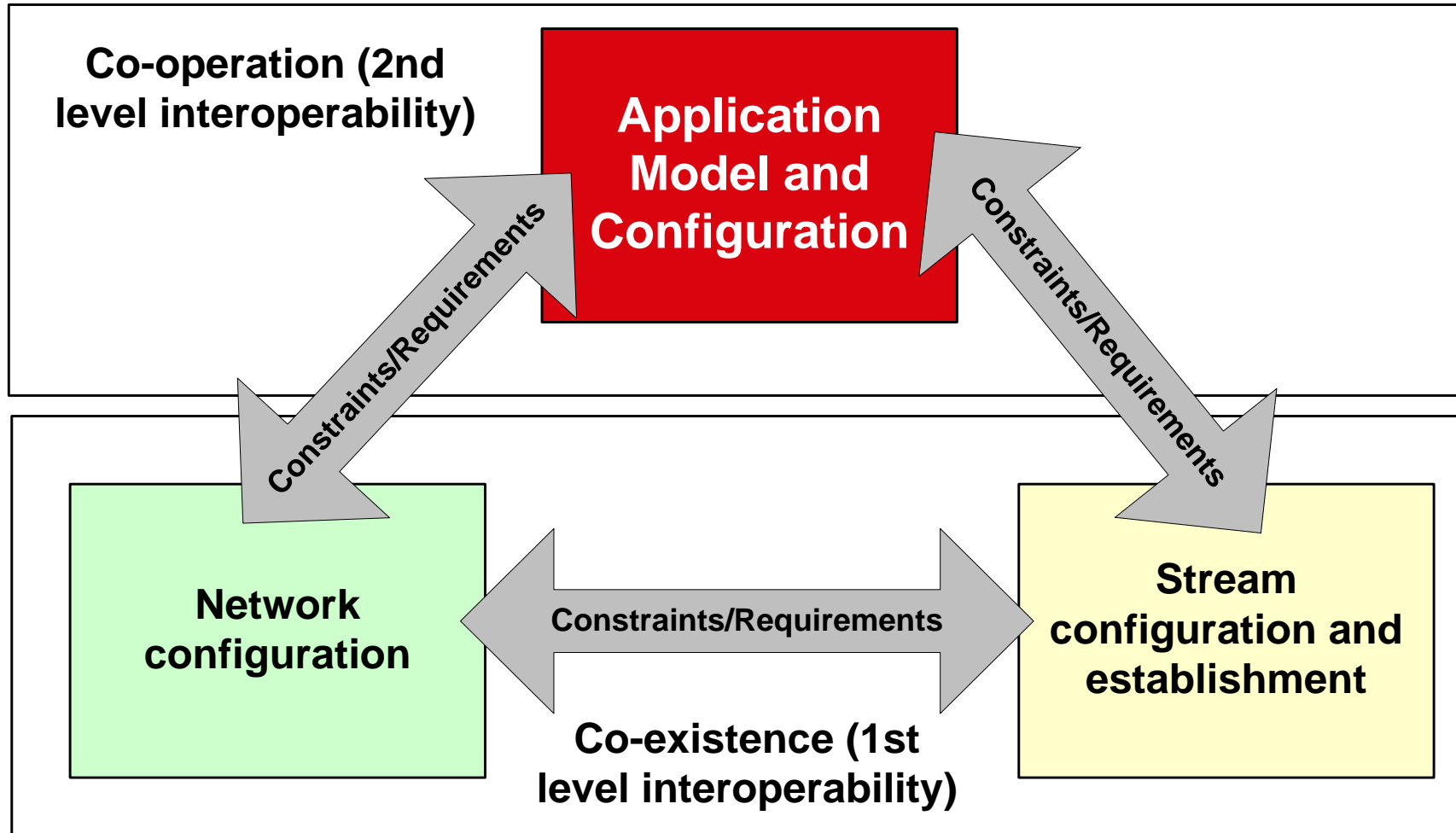
and optional

Simple Network Management Protocol (SNMP)

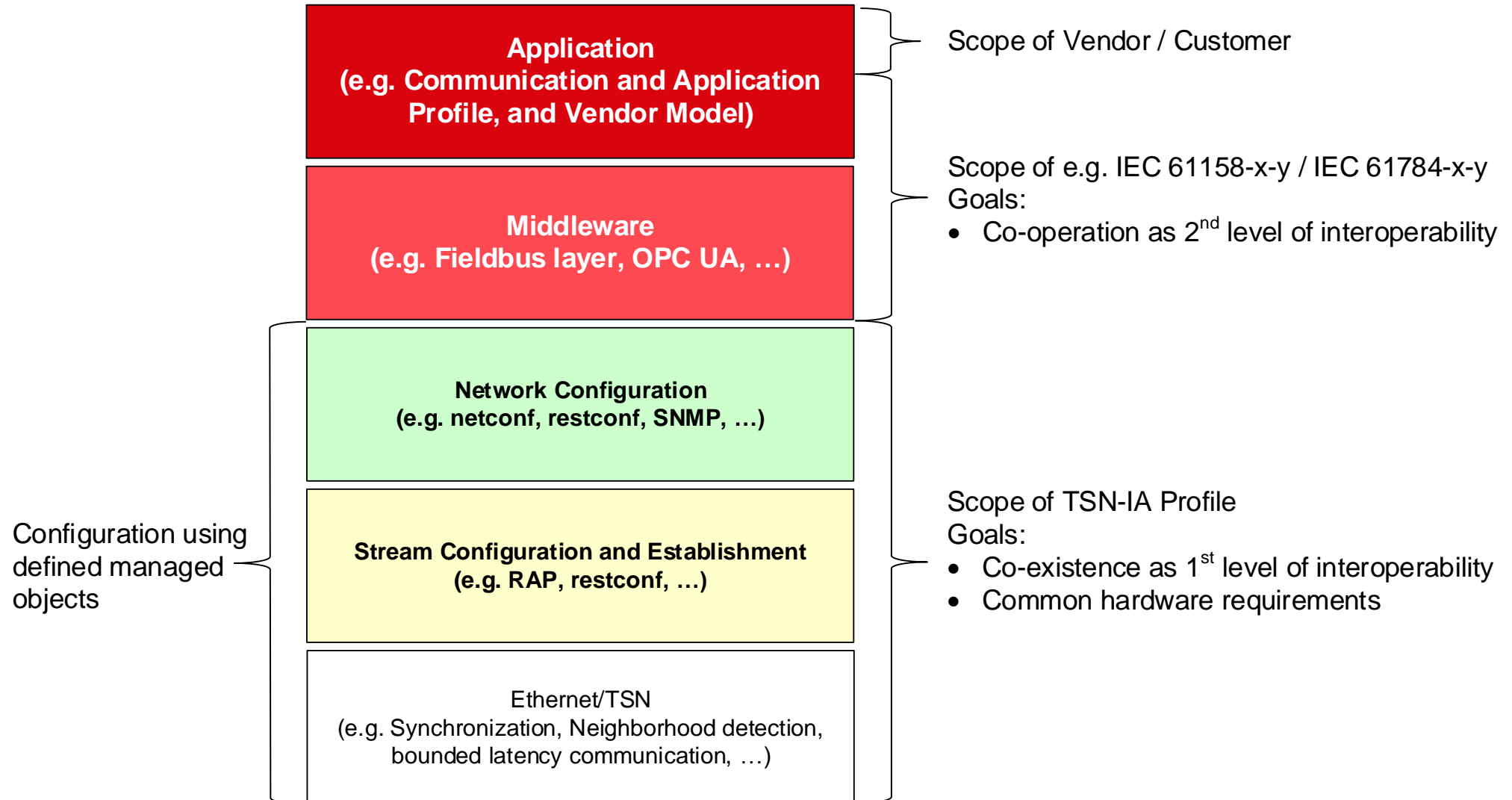
for the access of the selected managed objects using MIBs

Requirements

- Principle of interoperation -



Requirements - Layers -



Use cases

- What needs to be covered -

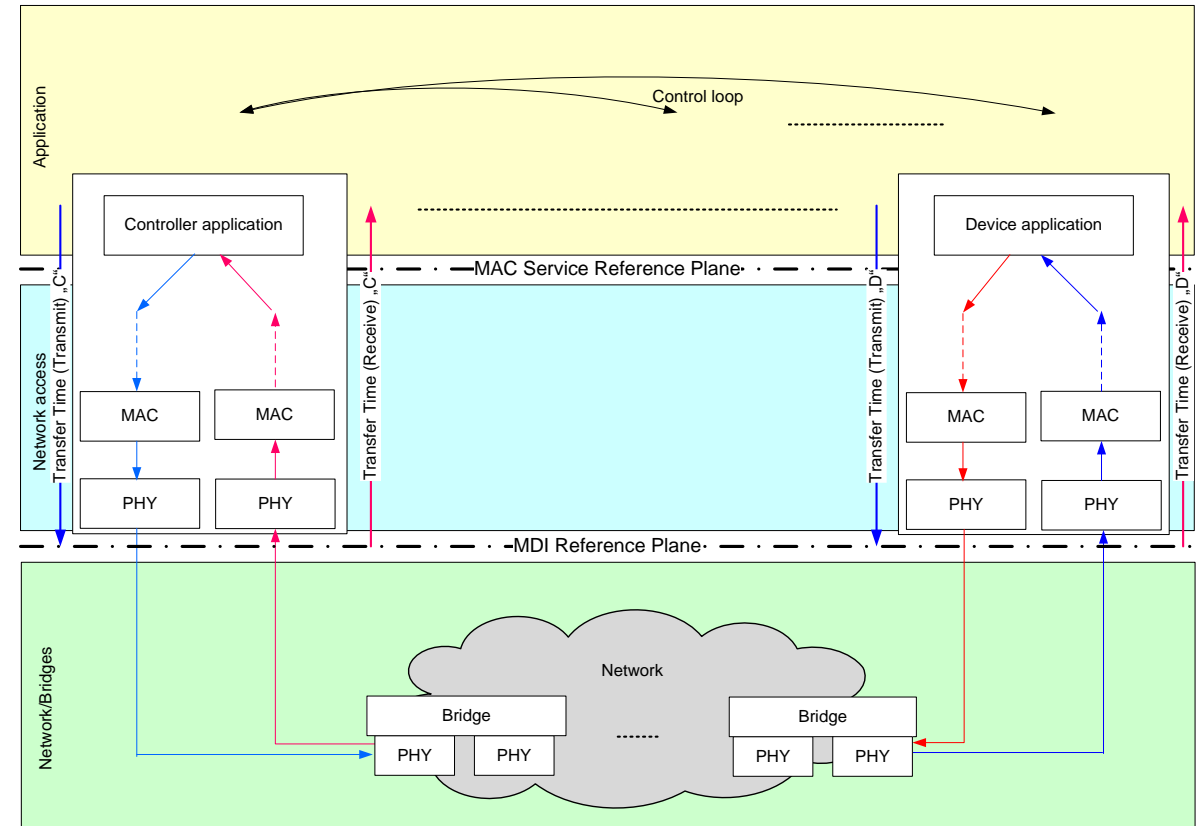
<http://www.ieee802.org/1/files/public/docs2018/60802-industrial-use-cases-0918-v13.pdf>

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 -

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

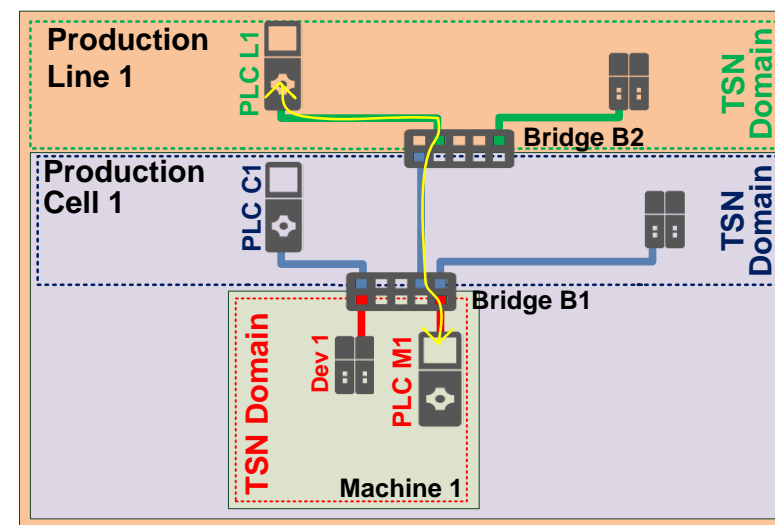
Additional, the area of concern – who is responsible for what – is shown.

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.

2	→ TSN in Industrial Automation	9
2.1	→ Interoperability	10
2.2	→ TSN Domain	11
2.2.1	→ General	11
2.2.2	→ Interconnection of TSN Domains	12
2.2.2.1	→ General	12
2.2.2.2	→ Bridges (Layer 2)	13
2.2.2.3	→ Routers (Layer 3)	14
2.2.2.4	→ Application Gateways (Layer 7)	15

2.3	→ Synchronization	15
2.3.1	→ General	15
2.3.2	→ Universal Time Synchronization	16
2.3.3	→ Working Clock Synchronization	16
2.3.4	→ Use-case 01: Sequence of events	17



Use cases

- Topics -

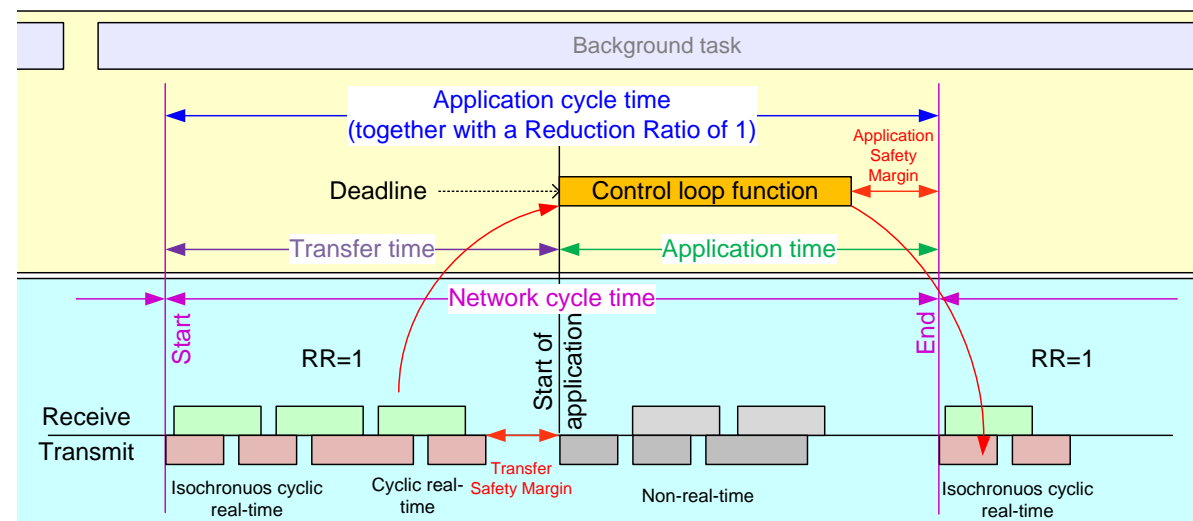
Modes of operation as used in today's industrial automation systems need to be covered.

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

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

Topologies like linear topology, star or ring are needed.

2.4	→ Industrial automation modes of operation	179
2.4.1	→ Industrial automation traffic types	179
2.4.1.1	→ General	179
2.4.1.2	→ Characterization of isochronous cyclic real-time and cyclic real-time	199
2.4.2	→ Bidirectional communication relations	209
2.4.3	→ Control Loop Basic Model	219
2.4.4	→ Use case 02: Isochronous Control Loops with guaranteed low latency	229
2.4.4.1	→ Isochronous cyclic operation model	259
2.4.4.2	→ Delay requirements	289
2.4.5	→ Use case 03: Non-Isochronous Control Loops with bounded latency	309
2.4.5.1	→ Cyclic operation model	309
2.4.5.2	→ Cyclic traffic pattern	319
2.4.6	→ Use case 04: Reduction ratio of network cycle	329
2.4.7	→ Use case 05: Drives without common application cycle	349
2.4.7.1	→ Background information	349
2.4.7.2	→ Controller communication	359
2.4.7.3	→ Timing Requirements	359
2.4.8	→ Use case 06: Drives without common application cycle but common network cycle	359



Use cases - Topics -

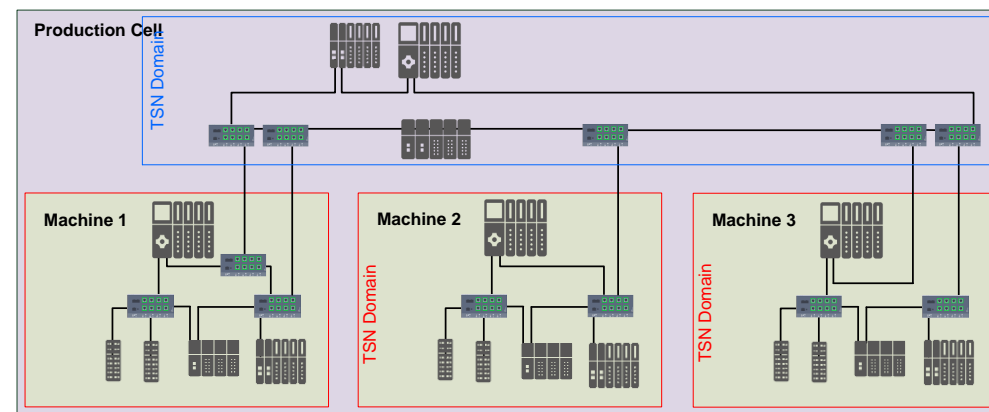
Industrial automation networks include today many different solutions.

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.

2.5	→ Industrial automation networks.....	37
2.5.1	→ Use case 07: Redundant networks.....	37
2.5.2	→ Use case 08: High Availability.....	37
2.5.3	→ Use case 09: Wireless.....	38
2.5.4	→ Use case 10: 10 ⁹ Mbit/s end-stations (Ethernet sensors).....	40
2.5.5	→ Use case 11: Fieldbus gateway.....	40
2.5.6	→ Use case 12: New machine with brownfield devices.....	41
2.5.7	→ Use case 13: Mixed link speeds.....	42
2.5.8	→ Use case 14: Multiple isochronous domains.....	44
2.5.9	→ Use case 15: Auto domain protection.....	45
2.5.10	→ Use case 16: Vast number of connected stations.....	46
2.5.11	→ Minimum required quantities.....	47
2.5.11.1	→ A representative example for VLAN requirements.....	47
2.5.11.2	→ A representative example for data flow requirements.....	49
2.5.11.3	→ A representative example of communication use cases.....	50
2.5.11.4	→ “Fast” process applications.....	50
2.5.11.5	→ Server consolidation.....	51
2.5.11.6	→ Direct client access.....	52
2.5.11.7	→ Field devices.....	52
2.5.12	→ Bridge Resources.....	53



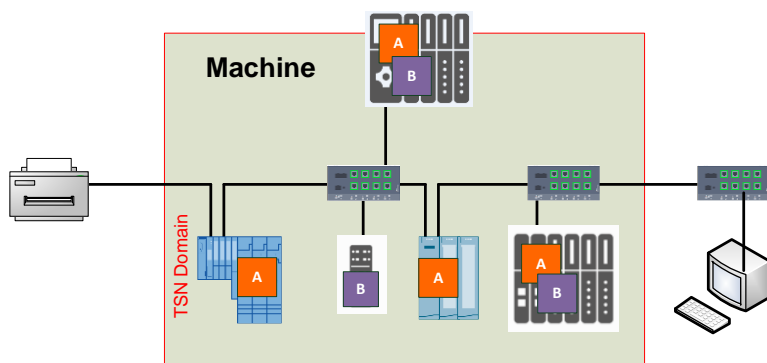
Use cases - Topics -

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.



2.6	→ Industrial automation machines, production cells, production lines	56
2.6.1	→ Use case 17: Machine-to-Machine/Controller-to-Controller (M2M/C2C) Communication	56
2.6.2	→ Use case 18: Pass-through Traffic	58
2.6.3	→ Use case 19: Modular machine assembly	60
2.6.4	→ Use case 20: Tool-changer	61
2.6.5	→ Use case 21: Dynamic plugging and unplugging of machines (subnets)	62
2.6.6	→ Use case 22: Energy Saving	63
2.6.7	→ Use case 23: Add machine, production cell or production line	63
2.6.8	→ Use case 24: Multiple applications in a station using the TSN-IA profile	64
2.6.9	→ Use case 25: Functional safety	64
2.6.10	→ Use case 26: Machine cloning	65
2.7	→ DCS Reconfiguration	66
2.7.1	→ Challenges of DCS Reconfiguration Use Cases	66
2.7.2	→ Use case 27: DCS Device level reconfiguration	66
2.7.3	→ Use case 28: DCS System level reconfiguration	67
2.8	→ Further Industrial Automation Use Cases	68
2.8.1	→ Use case 29: Network monitoring and diagnostics	68
2.8.2	→ Use case 30: Security	69
2.8.3	→ Use case 31: Firmware update	69
2.8.4	→ Use case 32: Virtualization	69
2.8.5	→ Use case 33: Offline configuration	71
2.8.6	→ Use case 34: Digital twin	72
2.8.7	→ Use case 35: Device replacement without engineering	72

Next steps - Drafting the TSN-IA profile -

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.

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

Information

- How to participate -

- IEC participation is through National Committees
- IEEE 802 participation is on individual basis
- Come to face to face meetings (registration required via meeting page)
- Attend conference calls
- Subscribe to the IEEE 802.1 email list
- Project web page:
<http://ieee802.org/1/tsn/iec-ieee-60802-tsn-profile-for-industrial-automation>

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Ingenuity for Life
added for convenience, but not shown during the initial presentation

Thank you

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Questions?