

Minimum Traffic Types inside the TSN domain boundary

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Caution

- This contribution shows only a beginning of discussion.
It has never proposed any concluding profile.

Forward

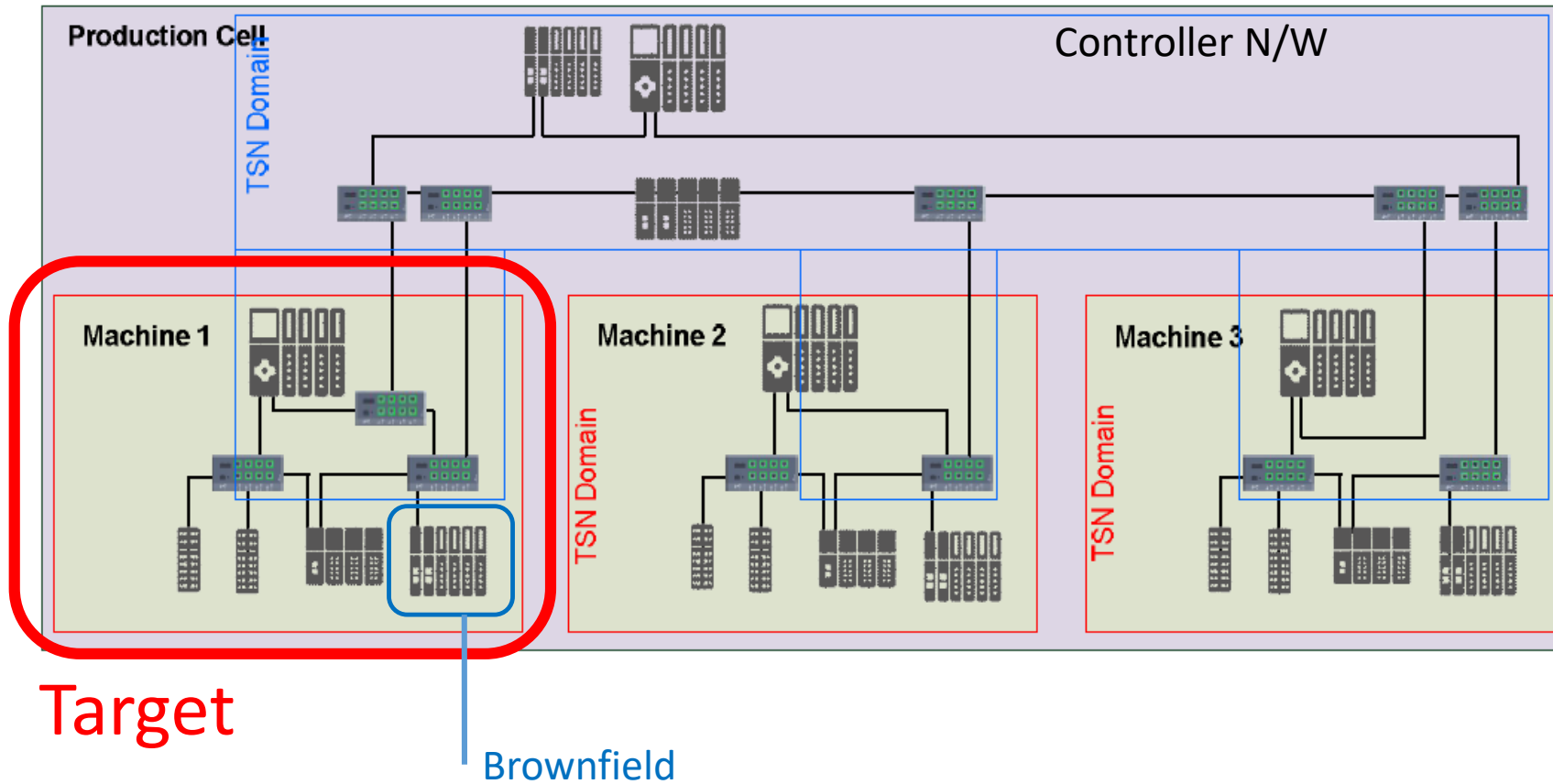
- This contribution intends to foster a consensus about the TSN-IA profile so that it shows the example of the following items based on the use case #17.
 - Traffic types
 - Network design
 - Minimum parameters setup
- This contribution is looking to clear minimum requirements.

Communication inside TSN boundary

- The communication inside TSN boundary is one case of the minimal case.
- It is available to configure the TSN network preliminary.
 - All End stations are designated.
 - No unknown End stations
 - No unknown streams
 - No unknown brown fields
- The boundary protects End stations from outside.

TSN domain

- Use case 17



TSN domain (continue)

- The Machine as TSN domain contains assigned devices for minimum case inside the boundary, shown by Use case 17.
Here, devices are
 - TSN End station
 - TSN Bridged end station
 - TSN Bridge
 - Brown field devices
- Scheduling by IEEE 802.1Qbv and IEEE 802.1AS

Bridged end station

- Bridged end station functions for minimum use case.
 - End station = Application
 - Bridge function
 - Physical ports
- **Bridge functional element** embedded in the bridged end station are;
 - Bridge management
 - Time synchronization
 - Parser
 - Time Aware Shaper (TAS)

Traffic types

- Mandatory stream classes inside TSN boundary
 - Isochronous cyclic real time
 - e.g. Machin control (Motion, I/O and etc.), Reactor control, etc.
 - Network control
 - e.g. Time synchronization
 - Configuration / diagnostics
 - e.g. SNMP + LLDP and/or Application Specific Protocol etc.
 - Best effort
 - Other IP communication

Traffic types (continue)

- Isochronous cyclic real time
 - e.g. Machin control (Motion, I/O and etc.), Reactor control, etc.
 - This contribution does not cover this stream, since it depends on the application.

Traffic types (continue)

- Network control
 - e.g. Time synchronization

Traffic types (continue)

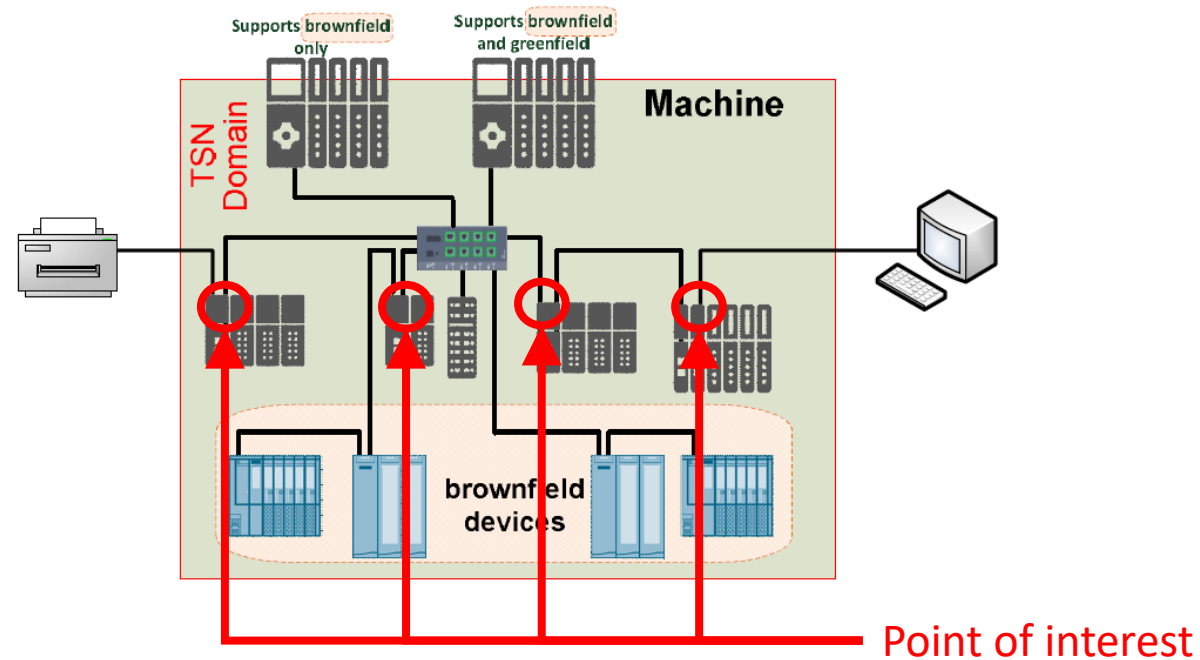
- Configuration / diagnostics
 - e.g. SNMP + LLDP and/or Application Specific Protocol etc.
 - This contribution does not cover diagnostics, since it depends on the application.

Traffic types (continue)

- Best effort
 - Other IP communication
 - This contribution does not cover this stream, since it depends on the application.

Network design

- Predesign configuration is available for the TSN domain which only assigned devices.
- The configuration conforms to centralized systems.



Minimum network parameter setup

- Time synchronization
- Timeslot
- Stream identification

Time Synchronization setup

- initialLogSyncInterval
 - Sync message transmission cycle
- initialLogAnnounceInterval
 - Announce message transmission cycle
- announceReceiptTimeout
 - Announce receive timeout setup
- InitialLogPdelayReqInterval
 - Pdelay_Req, Delay_Req message transmission cycle
- syncReceiptTimeout
 - Sync deviation timeout setup

Time Synchronization setup (continue)

- domainNumber
 - Number setup for time synchronization domain
- Priority1
 - GM selection priority 1
- Priority2
 - GM selection priority 2
- clockClass
 - characterizes the clock
 - atomic clock/ gps / terrestrial Radio/ ptp / ntp / handset / Internal oscillator

Timeslot setup

- Mandatory entities shall be supported.
- Here is an example set of minimum management entities.
 - AdminControlList
 - Sequence of Gate control entity
 - AdminCycleTime
 - Administrative value of gating cycle time
 - AdminBaseTime
 - Administrative value of base time
 - ConfigChange
 - A start signal to the state machine
- Fixed values are available for the other read/write entities.

Stream identification setup

- Mandatory entities shall be supported.
- Here is an example set of minimum management entities.
 - EtherType
 - Entity value for time slot identification
 - VLAN ID
 - VLAN ID for time slot identification

Conclusion

- This contribution intends to foster a consensus about the TSN-IA profile so that it shows the example of the following items based on the use case #17.
 - Traffic types
 - Network design
 - Minimum parameters setup
- This contribution is looking to clear minimum requirements.
- It is desirable that this contribution will trigger consensus building.