Model issues identified during Rosemount / Pittsburgh meetings

-To be discussed-

Prepared by
Günter Steindl
(Siemens AG)
Basic scope

The TSN cloud shown at the initial presentation in Frankfurt is replaced by

1.) Hierarchical Industrial Automation structure and
2.) Dependencies triangle
Basic scope

co-existent and co-operative CPs

IEC/IEEE 60802 Network (of TSN Bridges)

Network configuration

Co-existence (1st level interoperability)

Stream configuration and establishment

Co-operation (2nd level interoperability)

Scope of Vendor specific

Scope of IEC 61158-x-y / IEC61784 -x-y Goals:
• co-operation as 2nd level of interoperability

Scope of TSN-IA Profile Goals:
• co-existence as 1st level of interoperability
• Common hardware requirements

Application
(e.g. Communication Profile and Vendor Model)

Middleware
(e.g. Fieldbus layer, OPC UA, …)

Network Configuration
(e.g. netconf, restconf, SNMP, …)

Stream Configuration and Establishment
(e.g. RAP, restconf, …)

Ethernet/TSN
(e.g. Synchronization, Neighborhood detection, bounded latency communication, …)
Zoom in

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(e.g. Communication Profile and Vendor Model)

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Scope of Vendor specific

Scope of IEC 61158-x-y / IEC61784 -x-y
Goals:
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Scope of TSN-IA Profile
Goals:
• co-existence as 1st level of interoperability
• Common hardware requirements
Prinzipal design pattern

Two principle design pattern seems to exist:

1.) „Friendly, guarded neighborhood“
Well defined TSN-Domain. All nodes in this domain are known during the design time. Traffic patterns are known, too.

2.) „hostile neighborhood“
Classical network design pattern. Bridges need to ensure expected/defined patterns due to unknown or even hostile endstation behavior.
Friendly, guarded neighborhood

Friendly, well defined and tested neighborhood. Less protection requirements for bridges "inside".
Hostile neighborhood expecting hostile end-stations to be connected.
Protection against this nodes need to be implemented in each bridge.

Bridge responsible for executing Guard function.

Port executing the TSN-Domain boundary „Guard“.
Derived design pattern

Assumption:
A „Friendly, guarded neighborhood“ allows the use of simpler shapers/setups to achieve the customer goals.

Example:
Within a TSN-Domain supporting Gigabit links, the use of strict priority together with pre-emption may fit for many customer application including both, isochronuos cyclic real-time and cyclic real-time traffic.
Thank you

Questions?