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

Scope of Vendor specific
Scope of IEC 61158-x-y / IEC61784 -x-y
Goals:
• co-operation as 2nd level of interoperability
• Common hardware requirements

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

Network configuration
Stream configuration and establishment
Application
Model and Configuration

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, …)
Principle 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 pattern are known, too.

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

Friendly, well defined and tested neighborhood. Less protection requirements for bridges "inside".

Port executing the TSN-Domain boundary "Guard" e.g. Priority Regeneration.

Port executing the TSN-Domain boundary "Guard" e.g. Priority Regeneration.
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 e.g. Qbv, Qci, ...

Port executing the TSN-Domain boundary „Guard“ e.g. Priority Regeneration
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 applications including both, isochronous cyclic real-time and cyclic real-time traffic.
Thank you

Questions?