
IEEE 802.1 TSN

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Discussion of Questions related to the proposed P802.1Qcb PAR:
***“Short Introduction to Frame Replication
and Elimination for Reliability”***

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Background

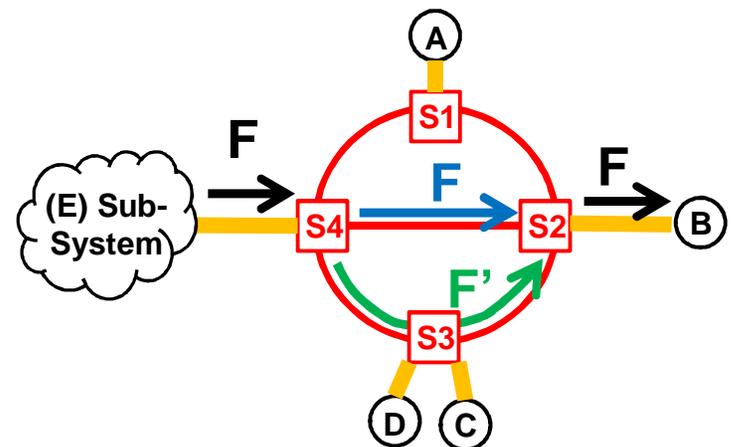
- Representatives of Industrial Control and Automotive have shown significant interest in an IEEE standardized solution for Seamless Redundancy by:
 - Repeatedly presenting use cases and market potential
 - Preparing technical proposals for the integration of Seamless Redundancy techniques into IEEE 802.1
 - Carefully addressing concerns related to the feasibility of the proposed solution.
 - Intensively discussing these topics multiple times within the 802.1 TSN task group in the course of the last 2 years.

- The purpose of this presentation to refresh the memory of all participants on the general concepts by giving a birds eye view of the proposal.

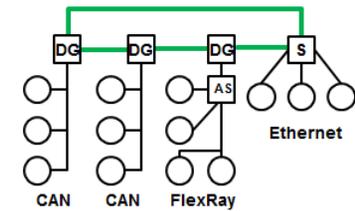
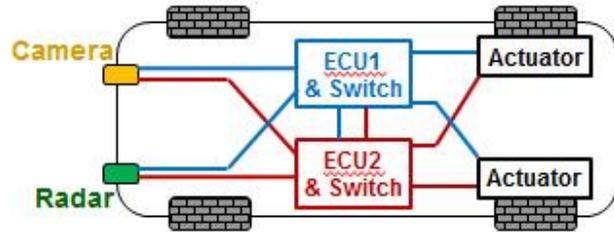
- The basic use cases are characterized by the following three requirements:
 - Enable fault tolerance in applications with very tight latency constraints.
 - Enable mission critical applications.
 - Enable fail operational behavior:
In case of a failure of e.g. a link or a bridge, the communication is maintained without interruption. Current mechanisms like RSTP require a certain reconfiguration time before communication is re-enabled.

Core Characteristics of the Proposal

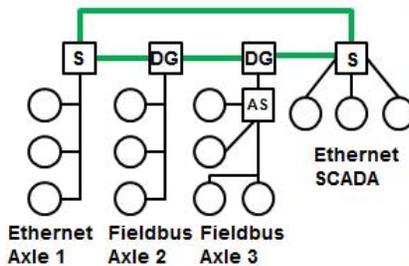
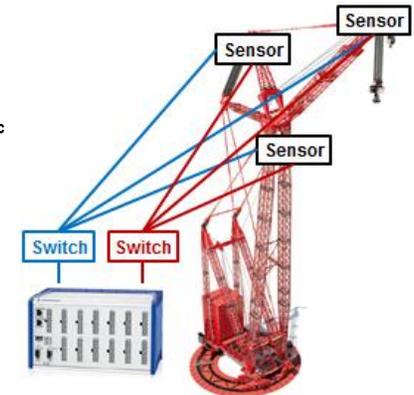
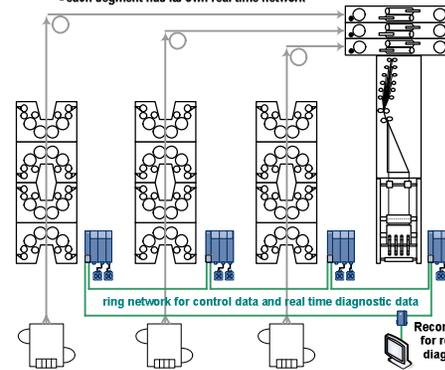
- The proposal relies on the following core characteristics / mechanisms:
 - Sending redundant copies of messages in parallel over two paths.
 - This requires two operations:
 - Replication of messages (to “generate” redundant copies) where the two paths fork
 - Elimination of duplicates where the two paths merge.
- Path Discovery and configuration are not part of the proposal
 - This is in the scope of P802.1Qca.



Multiple industrial and automotive use cases have been shown in previous presentations



- multiple printing units per column
- up to 10 axes per column
- a segment can consist up to 10 column
- each segment has its own real time network



Hard Real-Time Traffic only

- Which applications / traffic classes require Seamless Redundancy:
 - We do not require Seamless Redundancy support for:
 - Best Effort Traffic (Strict Priority Scheduling)
 - We propose to provide Seamless Redundancy support for the following traffic classes:
 - Reserved Traffic (Credit based Shaper)
 - Scheduled Traffic
 - Of course it is **NOT REQUIRED** to send all reserved traffic or all scheduled traffic redundantly, but it is **POSSIBLE**.
 - Seamless redundancy can be used for streams that we classify to be mission critical !