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 <u>multiple times</u> 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.

Objectives

➢ 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.
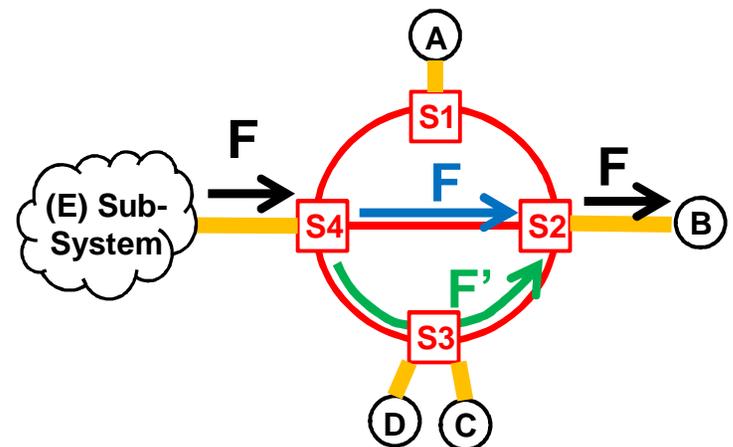
Multiple industrial and automotive use cases have been shown in previous presentations
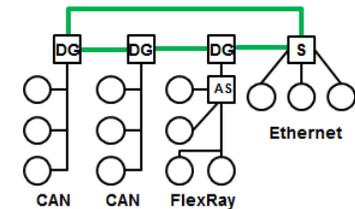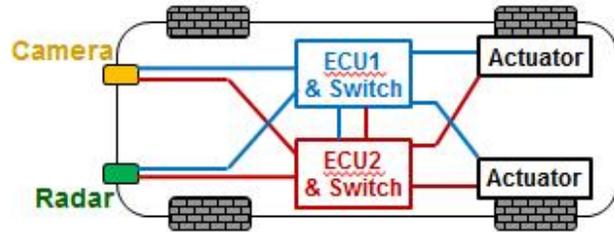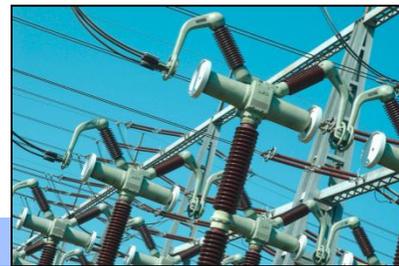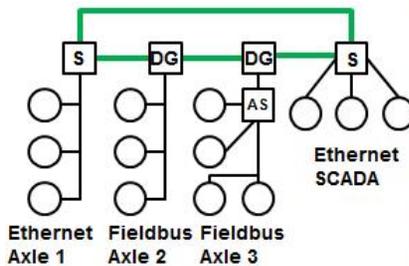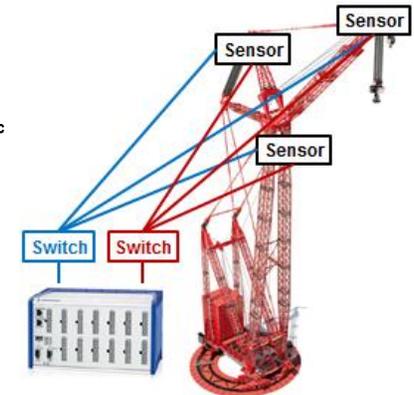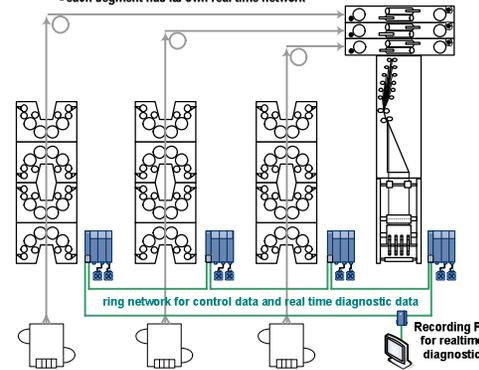
Hard Real-Time Traffic only

➢ 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 !