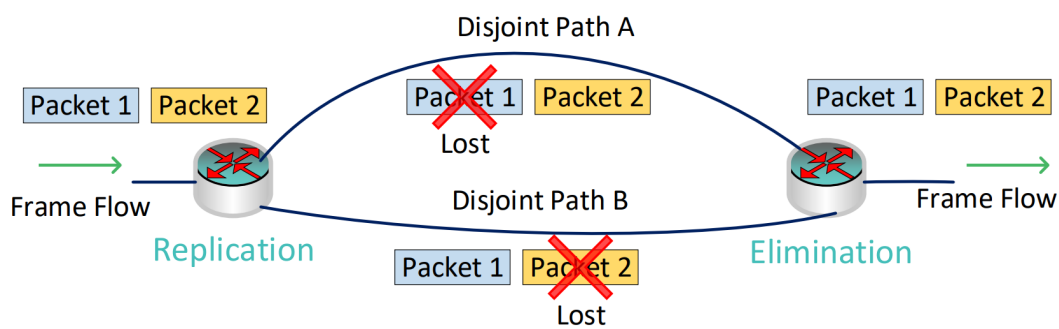


Analyzing TSN's Frame Replication and Elimination Protocol for Enhanced Reliability

Topic for Project Work (Oberseminar, PBL, Wissenschaftliche Arbeitsmethodik)



Description

Time-Sensitive Networking (TSN) is a set of IEEE standards to achieve deterministic^{Link} communication over Ethernet networks. This is especially relevant for industrial domains, such as medical, banking, avionics, or automotive. The communication is characterized by strict requirements on delay, packet delay variations, and packet loss. In order to achieve certain guarantees, the TSN standards provide different algorithms, metrics, and tools.

One of the key TSN protocols to ensure reliability is Frame Replication and Elimination. The primary objective of this undertaking is to delve into the inner workings of this protocol and assess its impact on enhancing the reliability of communication.

Tasks

Within the scope of this task, the student is expected to begin by understanding the problem statement that necessitates the use of Frame Replication and Elimination (FRER). Explore why this protocol is required in TSN scenarios and the challenges it aims to address regarding communication reliability.

In addition, student task also includes:

- Protocol Understanding: Gain a comprehensive understanding of the Frame Replication and Elimination protocol, including its mechanisms and intricacies.



- Reliability Assessment: Evaluate the extent to which this protocol contributes to enhancing communication reliability in TSN environments.
- Exploring Alternatives: Explore alternative approaches that can be employed alongside Frame Replication and Elimination to bolster communication reliability further.
- Integration Strategies: Identify and elucidate the most pertinent complementary protocols that can be effectively integrated with Frame Replication and Elimination to optimize communication reliability collectively.

This endeavor aims to provide valuable insights into the functioning and efficacy of the Frame Replication and Elimination protocol, offering a roadmap for integrating it with other protocols to achieve heightened reliability within TSN systems.

Keywords

Time-Sensitive Networking, Frame replication and elimination

Resources and Material

You can access additional information through the provided resources to learn more about the topic.

- General information of Time-Sensitive Networking and DetNet
 - Wikipedia^{Link}
 - A. Nasrallah et al.: *“Ultra-Low Latency (ULL) Networks: The IEEE TSN and IETF DetNet Standards and Related 5G ULL Research”*^{Link}

Contact

Depending on the project topic and student preferences, certain members of the TSN group will be responsible for supervising this project.

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- Language: German or English
- Start: Flexible