

Time-Based Scheduling for Real-Time Deterministic Communication in an Industrial Setting.

Bachelor's Thesis/Master's Thesis

Project

In production environments, real-time deterministic communication is essential to guarantee the exchange of time-critical traffic. Time-Sensitive Networking (TSN) is a non-proprietary Ethernet standard aimed at providing real-time capable networking across converged IT/OT environments. Operating at layer 2, it is compatible with higher-lying protocols. In an era where hardware functions are increasingly virtualized into datacenter-like infrastructures, TSN presents an interesting set of functionalities that could reshape industrial communication as we know it. This thesis will focus on time-based scheduling in a TSN-aware environment. The goal is to develop and compare different architectures on the server-side and leverage Network Card (NIC) capabilities to enforce an application relevant schedule.

The work will be remunerated with a monthly salary and located at the Research Campus of SEW-Eurodrive (Campus 3, 76646 Bruchsal). The total duration would be 6 months.

Tasks

1. Analysis of time-based scheduling policies in the context of TSN and NIC technologies
2. Setup of a reproducible test environment and implementation of the developed architectures and solutions
3. Empirical evaluation regarding relevant metrics (i.e. jitter)

Requirements

- ✓ Understanding of the network stack
- ✓ Programming experience and basic knowledge of Linux-based systems
- ✓ First contact with real-time systems, TSN, NICs and virtualization technologies are advantageous.

Institute

Communications
Engineering
Lab

Hertzstr. 16
Gebäude 06.45
76187 Karlsruhe
www.cel.kit.edu

Contact

**Prof. Dr.-Ing.
Peter Rost**

Room 103
peter.rost@kit.edu