



Linux Kernel-based TSN Evaluation

Description of Master's Thesis

May 23, 2023

Title: "Linux Kernel-based TSN Evaluation"

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Context

Time-Sensitive Networking (TSN) is a set of standards that enables deterministic and low-latency communication over standard Ethernet networks. It allows for the transmission of time-critical data and guarantees predictable network behavior, making it suitable for real-time applications. TSN achieves this by incorporating mechanisms such as time synchronization, traffic scheduling, and Quality of Service (QoS) management.

Linux operating system (OS) has gained significant popularity and widespread adoption, not only in general-purpose computing but also in real-time systems. Linux provides a flexible and customizable platform for various applications, including those with real-time requirements. It offers a rich set of networking features, allowing developers to implement and evaluate TSN functionalities on Linux-based systems.

The objective of this topic is to evaluate the performance and feasibility of Linux-based TSN solutions. The internship will involve the following tasks:

- Research and study TSN principles and standards to gain a solid understanding of the technology.
- Configure and set up TSN-enabled Linux systems, ensuring proper network parameter settings.
- Conduct comprehensive performance evaluations, including measurements of latency, jitter, and synchronization accuracy.
- Analyze and document the results, identifying the strengths and limitations of the implemented solutions.

Requirements

- **Very good Python/C++ programming skills.**
- **Networking Knowledge: Familiarity with networking concepts such as IP addressing, routing, VLANs, and network protocols.**
- **Proficiency in Linux Systems: Strong understanding and experience with Linux operating systems, including command-line usage, system administration, and network configuration.**
- **Analytical and Problem-Solving Skills: Ability to analyze technical challenges, troubleshoot issues, and propose effective solutions within the Linux-based TSN evaluation context.**
- Independent and able to work with minimal supervision.
- Please note that while prior experience with TSN is desirable, we also welcome candidates who possess a strong foundation in Linux systems and networking and are eager to learn and delve into the specifics of TSN technology during the internship.

Contact

If you are interested in this topic, please send your full application (CV, current transcript of records, research interests, possible start dates) to Rubi Debnath (rubi.debnath@tum.de).