TUM

Thesis B.Sc.

Thesis M.Sc.

IDP

Asynchronous Traffic Shaping with Paternoster

Motivation

Asynchronous Traffic Shaping (ATS) [3] is a new standard for Time Sensitive Networking (TSN) [1]. ATS guarantees per-hop bounded latencies for different priority classes without time synchronisation between different TSN nodes. ATS defines two algorithms for policing and scheduling of frames: UBS and Paternoster [3]. UBS can be used directly on Linux with the Linux Traffic Control tool `tc` [2]. For Paternoster, currently no implementation exists that we are aware of.

The goals of this thesis are to design a model on how to use Paternoster on Linux, to implement and evaluate a prototype, to describe and analyse the differences and potentials of using Paternoster compared using ATS with UBS, and to compare the results of both approaches.

Your Profile

- General interest in computer networks
- Experience with C Programming
- Interest in Linux Kernel Programming

Your Tasks

- Conducting research on ATS and TSN
- Model a possible approach for the implementation
- Implement a prototype
- Evaluate and discuss the results
- Compare the results to a proposed solution for UBS

Literature

[1] N. Finn. Introduction to time-sensitive networking. *IEEE Communications Standards Magazine*, 2(2):22–28, 2018.

[2] B. Hubert et al. Linux advanced routing & traffic control howto. *Netherlabs BV*, 1, 2002.

[3] Z. Zhou, Y. Yan, M. Berger, and S. Ruepp. Analysis and modeling of asynchronous traffic shaping in time sensitive networks. In *2018 14th IEEE International Workshop on Factory Communication Systems (WFCS)*, pages 1–4. IEEE, 2018.

Contact

Florian Wiedner   wiedner@net.in.tum.de
Christoph Schwarzenberg schwarzenberg@net.in.tum.de