

Thesis
B.Sc.

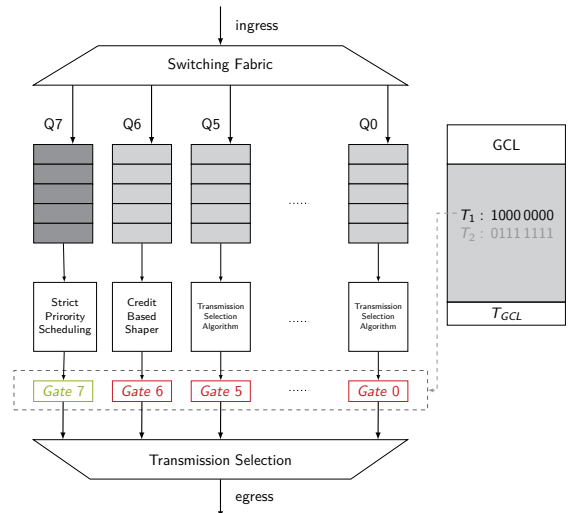
Thesis
M.Sc.

IDP,
Guided
Research

Exploration of Alternative Qbv Schedule Synthesis Al- gorithms

Motivation

Time Sensitive Networking (TSN) is a set of standards aiming at providing deterministic service to Ethernet applications [1]. One of those standards, namely Qbv is concerned with the time triggered sending of Ethernet frames and the synchronization of gate openings along certain paths [2]. This allows for, among other things, minimal jitter values — leading to a more deterministic experience for the application users. TSN is mostly deployed in smaller, local networks. One reason for that is the poor scalability of the generation of schedules for the gate openings over multiple devices and traffic paths. It has been shown that the execution times of the schedule synthesis algorithm scale exponentially with the problem size [3]. Multiple different approaches for the schedule synthesis exist [4,5]. Each tries to find a certain trade-off between optimality and complexity.



- [1] https://en.wikipedia.org/wiki/Time-Sensitive_Networking
- [2] <http://www.ieee802.org/1/pages/802.1bv.html>
- [3] <https://ieeexplore.ieee.org/abstract/document/8247599>
- [4] <https://networked-embedded.de/paper/pahlevan-etfa-2018.pdf>
- [5] <https://ieeexplore.ieee.org/abstract/document/8430062>

Your Task

- Familiarize with TSN and Qbv
- Perform a literature review of existing approaches and classify them
- Design and implement your own schedule synthesis approach with a focus on reduced computational complexity and on better scalability
- Evaluate your approach based on scalability and optimality

Requirements

- Affinity to algorithmic design
- Some experience with genetic algorithms or machine learning
- Experience working with Linux

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