

Master Thesis Proposal

[Time Critical Networks AB](#) (TCN) develops [TCN TimeAnalysis™](#) for digital twin modeling and simulation of primarily automotive electrical architectures and networks that incorporate [Time-Sensitive Networking \(TSN\)](#), the new IEEE standards for making traditional Ethernet networks more deterministic and robust with regards to time-sensitive data streams.

Target users of the tool are found, for example, within the automotive industry, using the software for designing the upcoming autonomous driving communication systems, in-vehicle as well as outside the vehicle (V2V/V2X).

Background

TSN networks are Ethernet networks that provide QoS guarantees for high critical traffic in terms of latency, jitter and bandwidth. In order to do that, the configuration of TSN elements (switches and endpoints) needs to be optimized and properly tested.

Proposed Work

In this project, the objective is to automate the configuration of TSN network elements using TCN's simulation tool. This includes the deployment of scheduling algorithms to derive the configuration, testing the derived configuration in the simulator, checking the results and pushing the configuration to the network elements.

Technical details:

Specifically, we have developed a CNC unit (i.e. an SDN based controller for TSN networks) able to configure the TSN-enabled switch in our testbed using Netconf/Yang protocol. The configuration is derived by a network optimizer external to the CNC using a network optimization interface. We also have access to TCN's simulator engine that we use to simulate the network under the optimized configuration to have an idea on the expected performance. The task of the thesis is to put the three pieces (CNC, TCN's simulator and Network optimizer) together through defining and implementing the interface between them as well as to automate the optimization - simulation - deployment workflow. The task also includes the deployment of the optimizer and its interface to the CNC in the best way to perform the aforementioned workflow.

Note: The development of the optimization algorithm is not part of the project, as they will be provided to you.

Contact Persons

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