**Thesis M.Sc.**

IDP

Ground Truth Data for TCP Root Cause Analysis

Motivation

Validating traffic analysis approaches requires ground truth data sets to assess the quality and accuracy of analysis results. TCP root cause analysis (RCA)[a][b], also referred to as TCP throughput limitation analysis is purposed to determine the reason why a TCP connection does not further increase throughput. While approaches exist to determine the root cause behind the throughput of a connection, no dataset exists to evaluate the root cause estimation accuracy.

This thesis is intended to develop a framework to generate TCP traffic suffering from specific throughput limitations. This task includes implementing traffic generation for different root cause scenarios like application limitation, bottleneck links, or limitation by the TCP receiver window. Next to generating traffic, the framework has to be capable of logging network parameters and each flow's actual root cause scenario.
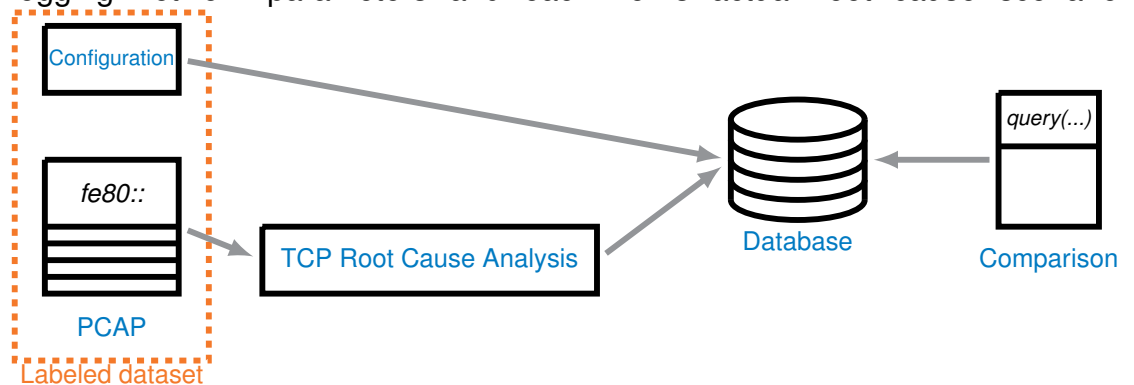
[a]Siekkinen, Matti, et al. "A root cause analysis toolkit for TCP." Computer Networks 52.9 (2008)
[b]S. Bauer, K. Holzinger, B. Jaeger, P. Emmerich, and G. Carle, "Online Monitoring of TCP Throughput Limitations," NOMS 2020

Your Task

- Determine requirements for a traffic generation framework to validate TCP RCA implementations
- Design network scenarios for the different root causes
- Implement a tool chain from configuration-based traffic generation to the comparison of measurement results with logged data
- Show the applicability of your approach by conducting first measurements

Requirements

- Basic programming knowledge in Python and Go

Contact

Simon Bauer   bauer@net.in.tum.de
Benedikt Jaeger   jaeger@net.in.tum.de