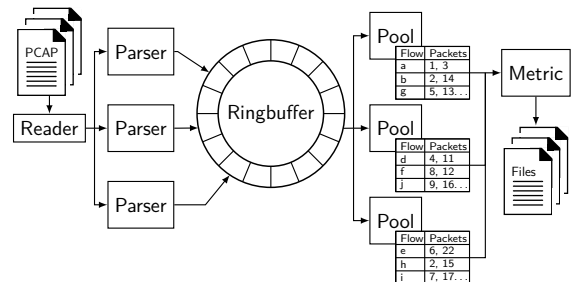


TCP Root Cause Analysis in Go

Motivation

Throughput is one of the major performance indicators to assess the performance of network connections. Therefore, it is of major interest to understand why a particular connection shows a certain throughput rate and why the connection did not achieve higher throughput rates.



While the analysis of TCP throughput limitations, also referred to as root cause analysis (RCA) was surveyed by different researchers ^{a b c}, the Chair of Network Architectures and Services works on refined approaches to TCP RCA. However, so far there only exist Python-based prototype implementations, which makes analyzing large amounts of data almost impossible due to performance reasons.

This thesis is purposed to implement existing RCA approaches in Go. Thereby, this thesis should extend a multi-threaded flow analysis tool written in Go, developed by the chair in previous research projects ^d. Further, use your implementation for measurements on captured Internet traffic to survey the analyzer's performance and to compare results of different RCA approaches.

^a Siekkinen, Matti, et al. "A root cause analysis toolkit for TCP." Computer Networks 52.9 (2008)

^b Timmer, Mark, P.T. de Boer, & Aiko Pras. "How to identify the speed limiting factor of a tcp flow." 2006 4th IEEE/IFIP Workshop on End-to-End Monitoring Techniques and Services. IEEE, 2006.

^c Zhang, Yin, et al. "On the characteristics and origins of internet flow rates." Proceedings of the 2002 conference on Applications, technologies, architectures, and protocols for computer communications. 2002.

^d Bauer, Simon, et al. "On the evolution of internet flow characteristics." Proceedings of the Applied Networking Research Workshop. 2021.

Your Task

- Implement TCP RCA in GO
- Run RCA on captured Internet traffic
- Survey difference between considered approaches and changes over time

Requirements

- Experience with Go or similar languages
- Affinity to GIYF-based working approaches

Contact

Simon Bauer bauer@net.in.tum.de

