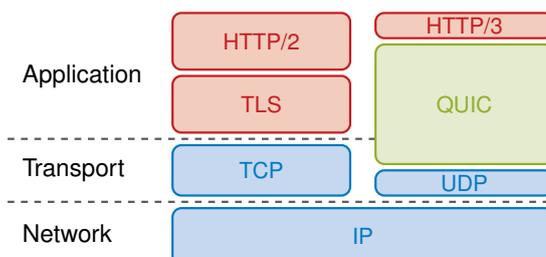


Identifying Throughput Limitations of QUIC

Motivation

The evolution of Internet services and increasing demand for confidentiality and authenticity finally led to the standardization of the reliable and connection-oriented transport layer protocol QUIC (Quick UDP Internet Connections) in 2021^a. Used as the transport layer protocol of HTTP/3, QUIC integrates TLS by default and is purposed to exceed TCP regarding performance.



Throughput is one of the major performance indicators to assess the performance of network connections as directly impacting user experience. Therefore, it is of large 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), has already been surveyed^b, there are no approaches to the RCA of QUIC connections.

Accordingly, this thesis is intended to survey and implement RCA for the QUIC protocol.

^a<https://datatracker.ietf.org/doc/html/rfc9000>

^bSiekkinen, M., Urvoy-Keller, G., Biersack, E. W., & Collange, D. (2008). A root cause analysis toolkit for TCP. Computer Networks.

Your Task

- Survey which factors could limit the throughput of QUIC connections
- Implement an approach to determine root causes behind QUIC throughput, e.g., based on *qlog*^c
- Evaluate your approach based on generated ground truth data

^cMarx, R., Piroux, M., Quax, P., & Lamotte, W. (2020, July). Debugging QUIC and HTTP/3 with *qlog* and *qvis*. In Proceedings of the Applied Networking Research Workshop

Requirements

- Interest in networking and protocols, in particular: QUIC :)
- Affinity to GIYF-based working approaches

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