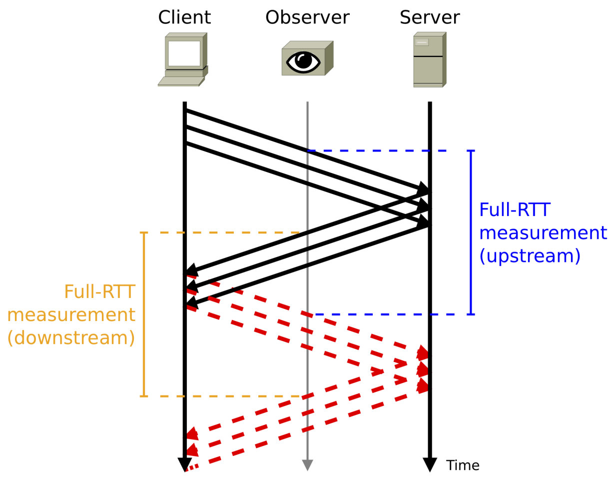
Chair of Network Architectures and Services
Department of Informatics
Technical University of Munich

Thesis B.Sc. | Thesis M.Sc. | Guided Research

Evaluation of the QUIC Spin Bit

Motivation



QUIC is a protocol developed by Google [1] and is the designated successor of the TCP / TLS stack. It is implemented on top of UDP and improves several issues with TCP and is currently standardized by the IETF [2]. QUIC allows low latency handshakes, gets rid of head-of-line blocking, enables fast development and allows switching IP addresses within one connection.
Also TLS1.3 is enforce such that all packets must be encrypted. Furthermore, QUIC tries to encrypt as much protocol internals. TCP allowed passive traffic analysis by for example observing sequence and acknowledgement numbers or TCP Timestamp Options.
To provide a method for passive latency measurments, QUIC contains a *Spin Bit* which allows to compute the connections RTT at any point on the path.

[1] Langley, Adam, et al. "The quic transport protocol: Design and internet-scale deployment." Proceedings of the Conference of the ACM Special Interest Group on Data Communication. ACM, 2017.
[2] https://datatracker.ietf.org/doc/draft-ietf-quic-transport/
[3] https://datatracker.ietf.org/doc/draft-ietf-quic-spin-exp/

Your Task

- Understand how the *Spin Bit* method works and how it is specified
- Develope a test setup with Mininet for QUIC measurements
- Evaluate how different factors can influence the precision of the RTT estimation (e.g. different latencies, jitter, packet loss, cross traffic, congestion, . . .)
- Compare the precision of the *Spin Bit* with other RTT estimation methods (e.g. TCP Timestamp Options, SEQ-ACK)
- Optionally: Survey in which extend Google's QUIC supports this feature and how it is implemented on web servers and clients

Contact

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