**Topic for a Bachelor/Master/Pre-Thesis, Master Project,
or to work on as a Student Research Assistant**

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Performance Evaluation of Multipath TCP and Multipath QUIC using Mininet-WiFi

The technical capabilities of communication infrastructure and end devices are steadily increasing. The availability of multiple network interfaces (NICs) per device lays the foundation for advanced optimization strategies. Possible goals include increasing end-to-end throughput, providing a higher robustness to link failures, or improving load-balancing in the network.

Above the Internet Protocol (IP), there are different candidate transport-layer protocols for the transparent utilization of multiple network interfaces. Prominent protocols are Multipath TCP (MPTCP, https://datatracker.ietf.org/doc/html/rfc6824) and the UDP-based Multipath QUIC (MPQUIC, https://datatracker.ietf.org/doc/html/draft-deconinck-quic-multipath-07).

For the performance evaluation of real-world protocol implementations, network virtualization frameworks such as Mininet (http://mininet.org/) and its derivate Mininet-WiFi (https://mininet-wifi.github.io/) can be used. First comparisons of MPTCP and MPQUIC can be found in the literature (see, e.g., https://ieeexplore.ieee.org/abstract/document/8784653), but are often focusing on wired networks only.

Consequently, the aim of this thesis is to design and conduct experiments in Mininet-WiFi that investigate the performance of MPTCP and MPQUIC also in wireless and combined (wired/wireless) scenarios.

Summarized, the following tasks have to be solved:

- Familiarization with the fundamentals of TCP/QUIC and their multipath variants MPTCP/MPQUIC
- Familiarization with the network virtualization frameworks Mininet / Mininet-WiFi
- Conception and implementation of Mininet-WiFi-based experiments for MPTCP/MPQUIC comparison
- Experimental performance analysis of MPTCP/MPQUIC in adequate scenarios
- Detailed documentation of all work steps

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