Chair of Network Architectures and Services
School of Computation, Information, and Technology
Technical University of Munich

TUM

Thesis B.Sc.

Thesis M.Sc.

IDP, Guided Research

Optimal Stream-Aware Multipath QUIC Scheduling with SRPT-ECF

Introduction

Multipath QUIC (MPQUIC) extends QUIC's stream multiplexing capabilities to multiple network paths. When used by HTTP/3 applications, novel stream-aware multipath schedulers are needed to efficiently saturate the aggregated bandwidth. The *Shortest Remaining Processing Time* (SRPT) algorithm is a promising candidate when combined with *Earliest Completion First* as it is optimal for the average stream completion time, integrable with deployed strict prioritization schemes, and avoids priority inversions [1]. These provable properties, however, are only theoretical. In this Thesis, you implement a practical online implementation and assess the impact of your changes.

Tasks

- Familiarize yourself with Cloudflare's quiche [2]
- Integrate SRPT-ECF in MPQUIC
- Evaluate the scheduler's performance with reproducible experiments

Requirements

- Systems programming experience with Rust or a similar language
- Structured work style
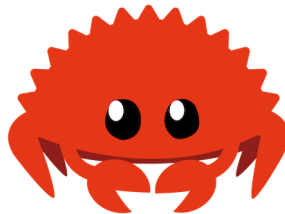
Related Work

[1] B. Jonglez, M. Heusse and B. Gaujal, "SRPT-ECF: challenging Round-Robin for stream-aware multipath scheduling," 2020 IFIP Networking Conference (Networking), Paris, France, 2020, pp. 719-724.https://ieeexplore.ieee.org/document/9142713

[2] https://github.com/cloudflare/quiche

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