



Multi-flow QUIC Evaluation

Abstract

QUIC is a secure general-purpose, encrypted, multiplexed, and low-latency transport protocol designed from the ground up to improve transport performance for HTTPS traffic. QUIC has recently (May 2021) become RFC standard (RFC 9000) and is expected to become the dominant transport protocol in the Internet over TCP. Multipath QUIC is an extension to the QUIC protocol that enables hosts to exchange data over multiple networks over a single connection. Compared to Multipath QUIC, Multiflow QUIC gets rid of the bidirectional constraint to fully take advantage of asymmetric, or even unidirectional, network paths. In this project you will explore these two variants and compare their performance to TCP.

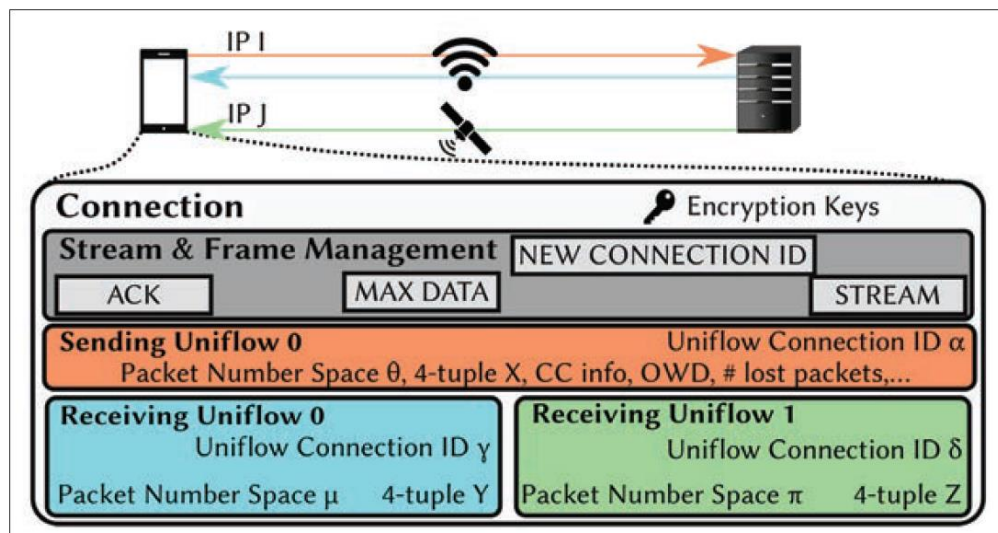


FIGURE 1. State of a Multiflow QUIC connection from the client's perspective. The client has IP I when using the upper network path and IP J when using the lower one.

Project objective

Evaluate Multi flow QUIC performance: Multipath vs Single path connections

Project overview

1. Read the paper [\[1\]](#) and review the benefits and deficiencies of using Multi Flow QUIC vs Single flow QUIC.
2. Implement a test setup for the multi flow example described in the article and compare your results to the published results.
3. Design a test-bench to compare a multipath QUIC connection scenario (a connection composed of several low bandwidth paths) vs single high bandwidth QUIC connection.



- a. Define KPIs to compare the two scenarios
 - b. Build the test bench on real hardware in the lab or on virtual machines
 - c. Summarize your results
4. Submit a final report, a project presentation, a project poster and a gitlab repository that contains all required materials to reproduce your project.

Notes

- The above list is an estimate. Goals and tasks might be modified during the first few weeks of the projects before the finalization of High Level Design Document.

General requirements for all LCCN Projects are specified at the lab website:

<https://lccn.cs.technion.ac.il/lab-courses/>

Prerequisites:

1. Introduction to computer networks (236334) – Mandatory.
2. Internet Networking (236341) – (Very) nice to have.

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References:

[1] Q. De Coninck and O. Bonaventure, "[Multiflow QUIC: A Generic Multipath Transport Protocol](#)," in IEEE Communications Magazine, vol. 59, no. 5, pp. 108-113, May 2021, doi: 10.1109/MCOM.001.2000892.