Chair of Connected Mobility
School of Computation, Information and Technology
Technische Universität München

QUIC to the Moon Measurements

Natia Piotrowski

Jörg Ott

6 November 2025

TIPTOP WG @ IETF 124

Scene setting

- QUIC for lunar scenarios and nearby
- Presumed of primary relevance
- Focus of the charter anyway

- How do QUIC implementations perform <u>without</u> specific network support?

Measurements

Network characteristics (all symmetric)

- Link data rate: 25 Mbit/s
- RTT: 1 – 9 seconds
- Outrages: none, 2 – 60 seconds
- Packet losses: 0 – 5%

Metrics

- Flow completion time
- Recovery time after outages
  - Reaching 90% of the baseline cwin post outage

QUIC implementations

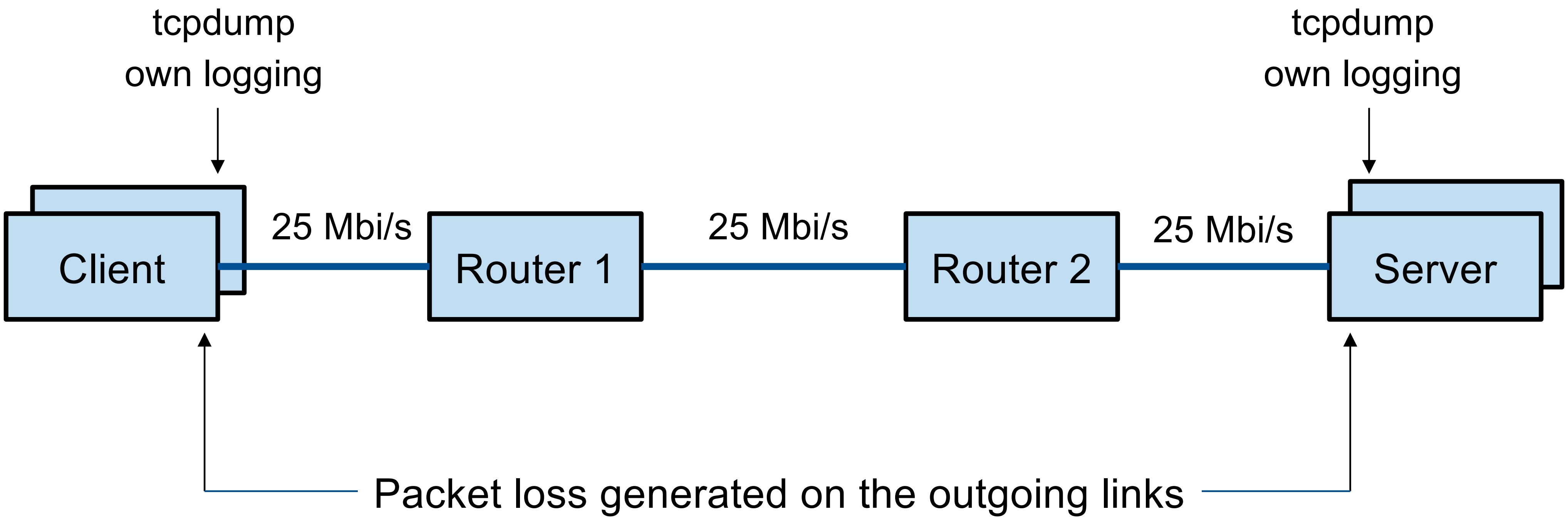
- Quinn
- Quiche (tokio-quiche w/async API)

QUIC properties

- Connection timeout: large!
- Initial RTT assumption: RTT + 1s
- Congestion control: BBR, CUBIC
- Careful resume
- ACK frequency (Quinn only)

Chair of Connected Mobility
School of Computation, Information and Technology
Technische Universität München

Measurement setup



Large queue sizes on all outgoing links: O (10k packets)

High-level summary (use with caution)

- CR is useful for both Quinn and Quiche
- ACK frequency has not proven to improve (Quinn) performance
- Recovery generally works more reliably for higher RTTs – huh?
- Recovery metric may deserve further refinement
- Quiche: encountered crypto fail issue in roughly 10% of outage runs
- Quiche and Quinn are both fair (Jain's fairness index)
- Quinn seems faster than Quiche in our setup