



Evaluation of HTTP/3 for Media Streaming

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Overview



- Problem Statement
- HTTP/3 – What is new?
- Comparison TCP vs QUIC
- Potential Solution / Concept
- Next Steps
- References

Problem Statement



- Media Streaming makes up the majority of all Internet traffic
 - In 2017: **72%** ^[1]
- HTTP/3 aims to reduce latency, head of line (HOL) blocking and improve the user experience
 - Better stream multiplexing
 - Faster verification handshake ^[2]

HTTP/3 – What is new?



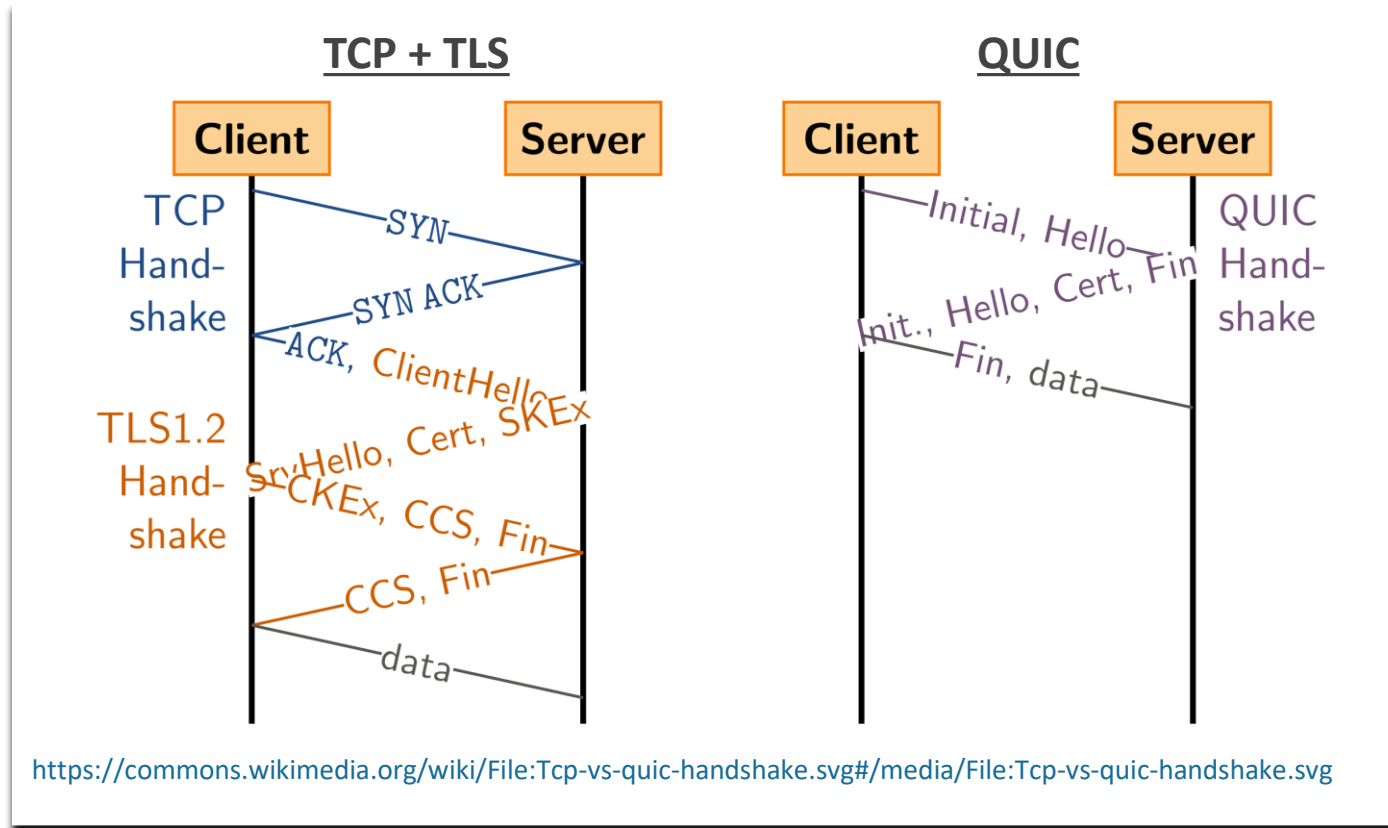
- Standardization of QUIC as version 3 of HTTP
 - QUIC made by Google
- Relies on UDP + TLS
 - Error correction through retransmission
- Allows bidirectional communication
 - Utilizes streams
 - Supports multiple streams through multiplexing
- Uses WebTransport client-side, similar to WebSockets

Comparison TCP vs QUIC



TCP + TLS	QUIC (UDP + TLS)
Slower handshake before receiving data	Faster handshake before receiving data
Client bears computational load	Computational load offloaded to server
Client polls data through requests	Data can be sent on uni-/bidirectional streams
Encryption is optional (HTTPS used by 82.7%)	Always encrypted (HTTPS)

Comparison TCP vs QUIC Handshakes



Potential Solution / Concept



There have been 3 standards proposed:

- RUSH by Facebook ^[3]
- WARP by Twitch ^[4]
- QUICR by Cisco ^[5]

Next Steps



Our goal is to evaluate these propositions and potentially make adjustments to them.

- Setting up RUSH, WARP, QUICR
- Evaluating the performance in their current state
- Possibly make adjustments and evaluate again
- Compile results and final report

References



- [1] M. Nguyen, D. Lorenzi, F. Tashtarian, H. Hellwagner and C. Timmerer, "DoFP+: An HTTP/3-Based Adaptive Bitrate Approach Using Retransmission Techniques," in *IEEE Access*, vol. 10, pp. 109565-109579, 2022, doi: 10.1109/ACCESS.2022.3214827.
- [2] Divyashri Bhat, Rajvardhan Deshmukh, and Michael Zink. 2018. Improving QoE of ABR Streaming Sessions through QUIC Retransmissions. In Proceedings of the 26th ACM international conference on Multimedia (MM '18). Association for Computing Machinery, New York, NY, USA, 1616–1624. DOI:<https://doi.org/10.1145/3240508.3240664>
- [3] <https://github.com/facebookexperimental/webcodecs-capture-play>
- [4] <https://github.com/kixelated/warp>
- [5] <https://github.com/Quicr/qmedia>
- [6] <https://w3techs.com/technologies/details/ce-httpsdefault>

Thank you for listening! Any questions?