

QUIC: A Transport Layer Network Protocol

Student Name: Yuezhen Qin, Student id: 2237514

ACM SIGCOMM 2017

The QUIC Transport Protocol: Design and Internet-Scale Deployment

Adam Langley, Alistair Riddoch, Alyssa Wilk, Antonio Vicente, Charles Krasnic, Dan Zhang, Fan Yang, Fedor Kouranov, Ian Swett, Janardhan Iyengar, Jeff Bailey, Jeremy Dorfman, Jim Roskind, Joanna Kulik, Patrik Westin, Raman Tenneti, Robbie Shade, Ryan Hamilton, Victor Vasiliev, Wan-Teh Chang, Zhongyi Shi *

Google

quic-sigcomm@google.com

ABSTRACT

We present our experience with QUIC, an encrypted, multiplexed, and low-latency transport protocol designed from the ground up to improve transport performance for HTTPS traffic and to enable rapid deployment and continued evolution of transport mechanisms. QUIC has been globally deployed at Google on thousands of servers and is used to serve traffic to a range of clients including a widely-used web browser (Chrome) and a popular mobile video streaming app (YouTube). We estimate that 7% of Internet traffic is now QUIC. We describe our motivations for developing a new transport, the principles that guided our design, the Internet-scale process that we used to perform iterative experiments on QUIC, performance improvements seen by our various services, and our experience deploying QUIC globally. We also share lessons about transport design and the Internet ecosystem that we learned from our deployment.



Figure 1: QUIC in the traditional HTTPS stack.

TCP (Figure 1). We developed QUIC as a user-space transport with UDP as a substrate. Building QUIC in user-space facilitated its deployment as part of various applications and enabled iterative changes to occur at unification update timescales. The use of UDP

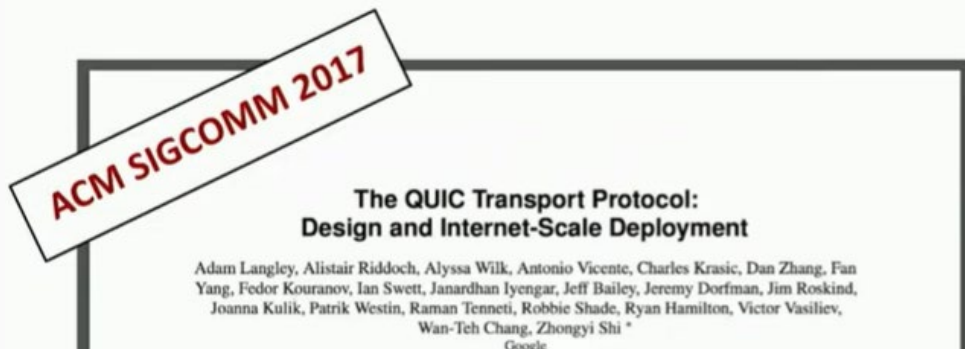
Agenda

- What is QUIC? Why it's promising in modern network?
- Social Issue: Encryption and Visibility
- Legal Issue: IETF Standardization

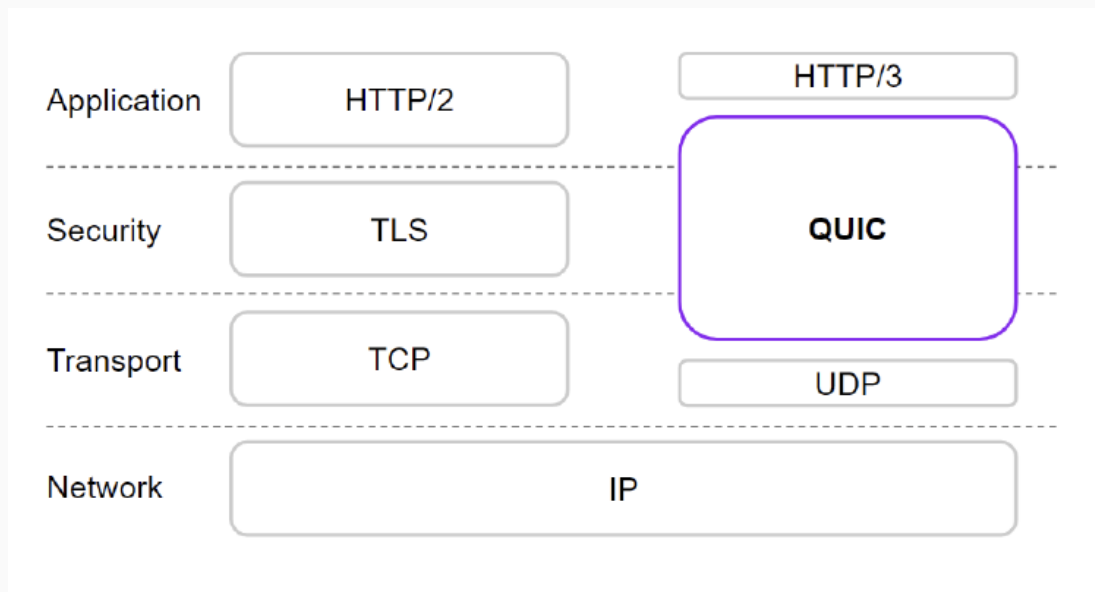
Introduction: QUIC

What is QUIC? Why it's promising?

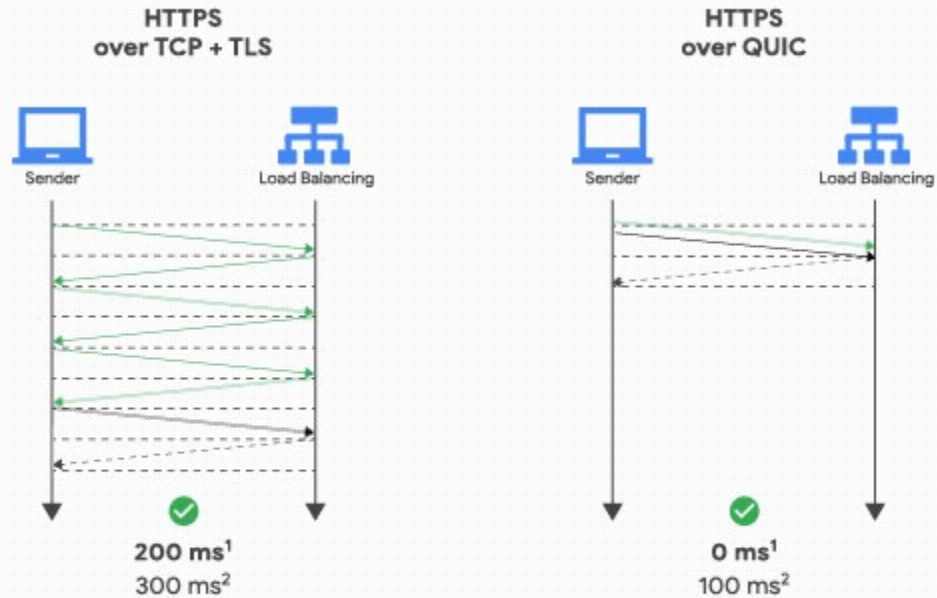
- Google's answer to the latency challenge in modern network.
- Stands for **Q**uick **U**DP **I**nternet **C**onnections.
- With designed goals
 - Reduce connection **latency**
 - Produce **security** protection comparable to TLS



Position of QUIC in Network Architecture

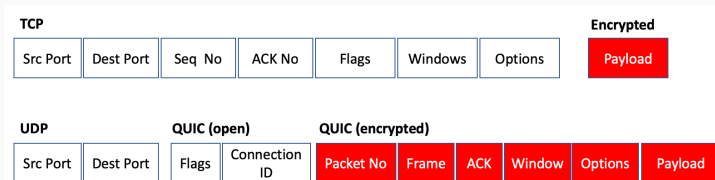
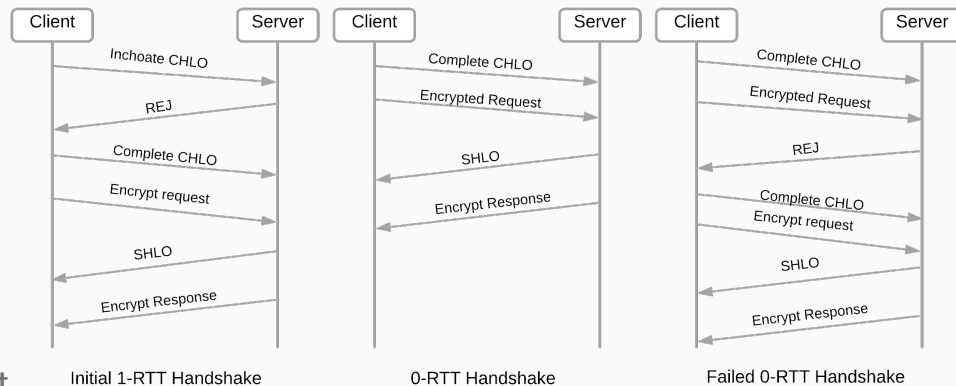


HTTPS over QUIC vs. TCP+TLS1.3



Social Issue: Security Vulnerability

- Potential security vulnerabilities in the server/client implementation, such as DDos attack.
- Can Encryption and Visibility Co-Exist: QUIC's packet headers contain **less** plain text information than those with TCP connections, tasks like troubleshooting, traffic regulation, or network management become more difficult.





Legal Issue

- IETF Standardization
- Intellectual Property: Developed by Google Inc.

Thanks!

Contact:

Yuezhen.Qin@warwick.ac.uk

