

# QUIC

Google reports 30% of their egress traffic is QUIC.  
Google also heavily peers with tier-1 and tier-2, so likely that's where the QUIC traffic is visible at the moment.

30% is not correlated to heavy peering.

# QUIC for operators

- The protocol encrypts (almost) everything at the transport layer.
- Operators want QUIC endpoints to expose information into the network for management\* purposes.
- Even if all requests are baked, trustworthiness of information sent on the network is still an issue.
- It's believed that CDN providers want to move operators out of the business chain.

\* based on the understanding of IETF participants on how networks are managed.

# QUIC for researchers

- Independent reporting of measurements conducted by researchers has been valuable input for IETF operations.
- QUIC makes it hard to (passively) measure protocol performance and independently report findings.
- Machine learning on encrypted traffic will become a hot topic in the coming years. (use active measurements to train a dataset to apply on a passive encrypted trace)
- Privacy issues.

# QUIC | spin bit

- Spin the bit on receiving an ACK.
- Provides a way to passively measure RTT on the path.
- How would middle boxes react in anomalous situations?
- QUIC and STUN (not part of the charter)
- Brian Trammell submitted an individual I-D on spin-bit.

# QUIC | timeline

- v1 core specs by end of 2018.
- ECN baked in (but only during handshake for v1)
- with TLS 1.3 (available in picotls, openssl, NSS, et al.)\*
- supporting HTTP/2 (expected future applications in the next revision of the charter)

\* see [QUIC github](#) for more

# QUIC | interoperability

- picoquic
- quic-go (implementation in GO, moving to IETF)
- quickly (fastly' implementation by kazuho)
- F5 (closed-source, supports h/w acceleration)
- NTAP/quant
- ngtcp2
- 3 interop events already; 4th one in December 2017.

# QUIC | future research

- hardware offloading
- multipath QUIC (with multicast, for adaptive streaming)
- cut-through encryption (may bring benefits in order of  $\mu\text{s}$ )