
QUIC

&


http://

Why QUIC for HTTP?

1. TCP HoL blocking

2. 0RTT handshake for transport **and** crypto

3. Beat ossification — more flexibility in client transport implementation

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A. Video

B. High Loss Networks

C. High Latency Clients

Status

- QUIC WG is focusing on core transport now
  - 79 transport/recovery/tls issues; 15 http issues
- Draft -04 will be the First Implementation Draft
  - Handshake only; no app data, recovery
- 10 implementers have expressed intent
- Still just getting started

Generic QUIC

- Discussion of:
  - Unidirectional vs. Bidirectional streams
  - Peer-to-Peer, client/server
  - Multipath
  - Partial Reliability
  - Middlebox interactions (or lack thereof)
- A Transport for All Applications?

H2 over QUIC

- Current approach is to change H2 as little as possible to “fit” onto QUIC
- Alt-Svc for discovery
- Rely on QUIC for framing, multiplexing, stream lifetime, flow control
- **No guarantee of ordering between streams**

Stream Ordering

- SETTINGS can’t be changed after initial handshake
- PRIORITY requires ordering to achieve consistency
  - On Stream 1 along with SETTINGS
- HPACK requires ordering for correctness
  - -04: HPACKd frames contain a counter -> HoL blocking!
  - Splits exchanges into two streams to allow data to be cancelled without effecting HPACK state
- Extensions?

HPACK Alternative: QPACK

- “A connection-wide series of table update instructions sent on a dedicated headers stream

- Non-modifying instructions which use the current header table state to encode message headers”

- Header table management stream allows “cautious” deletes

- HoL blocking still possible if an update is dropped or delayed

HPACK Alternative: QCRAM

- Only use indexed header table entries when:
  - Value is the same packet, or
  - Frame setting value has been ACKd.

Questions

1. Is HPACK HoL bad enough to justify something new? If so, what are we looking for?

2. How much do H2 extensions need to co-exist with HTTP-over-QUIC extensions?

3. Should http-over-quic profile H2? Extend it?