Multiplexing Updates for QUIC

draft-aboba-avtcore-rfc7983bis

AVTCORE WG

IETF 108

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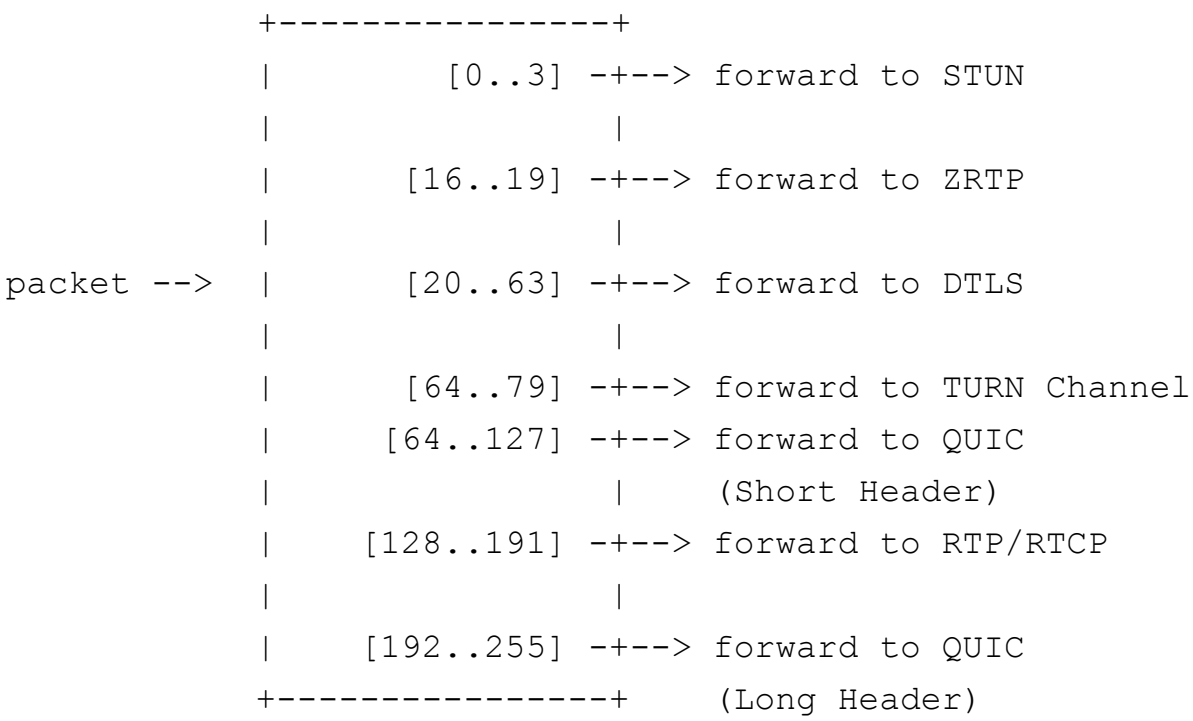
Recapping the Problem (from IETF 103)

- QUIC is potentially attractive as a transport for peer-to-peer data transfer in WebRTC applications.
  - Reliable transport (defined in draft-ietf-quic-transport)
    - Potential scenario: file transport friendly with audio/video
  - Unreliable transport
    - Potential scenario: fire and forget updates (such as for games), media
      - Unreliable datagram extension: https://tools.ietf.org/html/draft-ietf-quic-datagram
- WebRTC applications (almost always) multiplex SRTP/SRTCP/STUN/DTLS on the same socket, as described in RFC 7983.

A Recap of Past Events...

- March 30, 2017: Colin Perkins and Lars Eggert first notice the incompatibility of QUIC transport with RFC 7983, and file an Issue against the QUIC transport specification:
  - https://github.com/quicwg/base-drafts/issues/426
- November 16, 2017: Colin Perkins presents to AVTCORE at IETF 100:
  - https://datatracker.ietf.org/meeting/100/materials/slides-100-avtcore-quic-multiplexing-with-rtp-03
- November 29, 2017: Solution proposed to AVTCORE WG proposed as a PR and merged into draft-ietf-quic-transport-08:
  - PR: https://github.com/quicwg/base-drafts/pull/956
- December 18, 2017: PR to undo the changes rejected:
  - https://github.com/quicwg/base-drafts/pull/995
- IETF 103: Issues found in draft-ietf-quic-transport-16, fixed in -17
- Solution stable, remains in draft-ietf-quic-transport-29
- Final multiplexing scheme documented in draft-aboba-avtcore-quic-multiplexing

QUIC Multiplexing Scheme



Since Then: Increasing Traction

- 2019: RTCQuicTransport (P2P) Origin Trial in Chrome and Edge Beta (M73-M75):
  - Based on JS APIs under development in W3C:
    - https://w3c.github.io/webrtc-quic/
    - https://w3c.github.io/webrtc-ice/
  - Implementation based on gQUIC (no multiplexing support)
  - Support for bidirectional and unidirectional streams as well as datagrams.
- 2020: QuicTransport (c/s) Origin Trial in Chrome and Edge (M84-M86):
  - https://github.com/WICG/web-transport
  - Compatibility with draft-ietf-quic-transport-29 (starting with M85).
  - Support for bidirectional and unidirectional streams as well as datagrams.

Why Can’t We Declare Victory Yet?

- While QUIC multiplexing is supported in draft-ietf-quic-transport-29, it is not documented in RFC 7983.
- History shows that ***undocumented agreements*** have a low probability of working out.
  - No documentation of requirements in IANA registries
    - No ability to flag conflicting allocations
  - Undocumented algorithms likely to exhibit interoperability problems.
- With trials completed, we are rapidly approaching an inflexion point:
  - Multiple QUIC implementations in progress (both c/s and P2P)
  - Given current popularity of multiplexing, implementations will ***depend*** on it.
  - Problems with multiplexing support would have **consequences**.
  - Multiplexing a major advantage of IETF QUIC (not supported in gQUIC)
- For these reasons, RFC 7983bis is needed.

RFC 7983bis

- Update to RFC 7983 Section 7, documenting QUIC multiplexing.
  - Description of multiplexing SRTP, SRTCP, STUN, TURN, DTLS, ZRTP and QUIC
  - Guidance on handling overlap between QUIC and TURN channels (not an issue in WebRTC).
- Update to (D)TLS Content-Type Field IANA page to reference new RFC (no other change needed)
- Caveat:
  - “Since new versions of QUIC are allowed to change aspects of the wire image, there is no guarantee that future versions of QUIC beyond version 1 will adhere to the multiplexing scheme described in this document.”
- Ask: Can we adopt RFC 7983bis as an AVTCORE work item?

(D)TLS Content-Type Field

TLS ContentType

Registration Procedure(s)
Standards Action
Reference
[RFC8446][RFC7983]
Available Formats

csv

- Content-Type 25 assigned for DTLS 1.3.

Value	Description	DTLS-OK	Reference
0-19	Unassigned (Requires coordination; see [RFC7983])		[RFC5764][RFC7983]
20	change_cipher_spec	Y	[RFC8446]
21	alert	Y	[RFC8446]
22	handshake	Y	[RFC8446]
23	application_data	Y	[RFC8446]
24	heartbeat	Y	[RFC6520]
25-63	Unassigned		
64-255	Unassigned (Requires coordination; see [RFC7983])		[RFC5764][RFC7983]

Discussion