

RTP and QUIC

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Heads up

- An I-D to come based on our EPIQ 2019 paper
“Real-time Audio-Visual Media Transport over QUIC”

<https://mailarchive.ietf.org/arch/msg/quic/tUMYPmNce6XDkingYKkRiTkUdN4>

Approaches to “real-time” over QUIC so far

- Quite a bit of ad-hoc engineering
- Streaming media: just run DASH over HTTP/2
 - And enjoy that head-of-line blocking is less an issue
- Interactive media: multiple (partly complementary) approaches
 - Map each video frame to a QUIC stream
 - Limit retransmission of potentially stale data
 - DATAGRAMs
 - ...
- Taking a step back and analysing how QUIC and RTP could co-evolve

#	RTP Field and Function	QUIC Mapping	Support?
1	Seq# for loss detection	Seq# plus ACK mechanism	Yes
2	ECN marking	ECN marking	Yes
3	Media-specific timestamps	Use metadata on top of QUIC	No
4	(One-sided) wall-clock sync	Extension or metadata on top of QUIC	No
5	Data retransmission	Adapt retransmission for partial reliability	(Yes)
6	Generic FEC	Could be added as a generic function (was discussed)	(No)
7	Media-specific redundancy	Could be realized as payload	N/A
8	General RX stats from RTCP RR	ACK blocks for losses (abs. and rel.) to be augmented	Partly
9	Congestion control	Done by QUIC, may need an API	(Yes)
10	Selective encryption of payloads	Almost full encryption largely including headers	(Yes)
11	SSRC and CNAME for media bundling	Bundling implicit within a QUIC connection	Implied
12	Payload type + M bit marking	Use payload framing on top of QUIC	N/A
13	Source identification (SSRC/CSRC)	Use metadata on top of QUIC	N/A
14	SDES session metadata	Use metadata on top of QUIC	N/A
15	External signalling channel	Use an in-band QUIC stream if feasible	(Yes)
16	IP Multicast support	Not required	No
17	Mixers and translators	Implement in the application above QUIC	No
18	Transmission scheduling control	Done by QUIC, needs an API	(Yes)
19	Header extensions and metadata	Use metadata on top of QUIC	No
20	Application level framing	Partial, via QUIC streams	Yes
21	Avoidance of HoL blocking	Partial, via QUIC streams	Yes

Suggesting a minimal strawman design

- RT-Streams – *real-time media needs timing info, not just datagrams*
 - ADU sequence numbers
 - Media-specific timestamp
 - Controlled retransmissions
 - Detailed reception reporting (timestamps)
- Wall clock time synchronization
- Further function at the application layer
 - RTP payloads + session management
- Reduces to DATAGRAM-style service as a special case