

# On The Passive Measurability of QUIC

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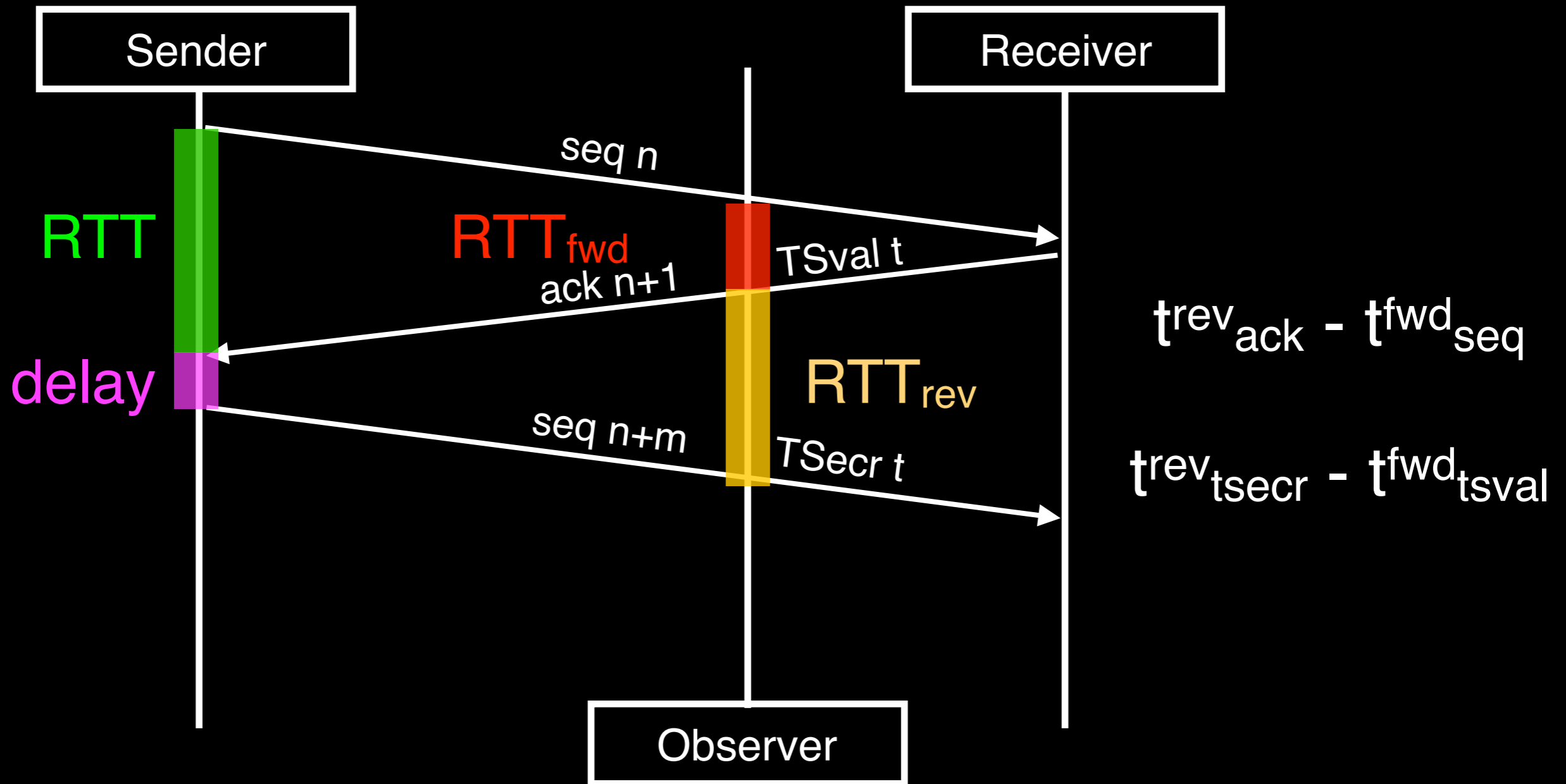
# QUIC in review

- UDP-encapsulated transport protocol being standardized by the IETF.
  - Rolled out by Google since 2014:  
35% of Google traffic, 7% of Internet traffic.
- Designed for deployability, evolvability, low-latency, and security.
- Initial focus on support for HTTP/2, but is a new, general-purpose Layer 4 protocol.

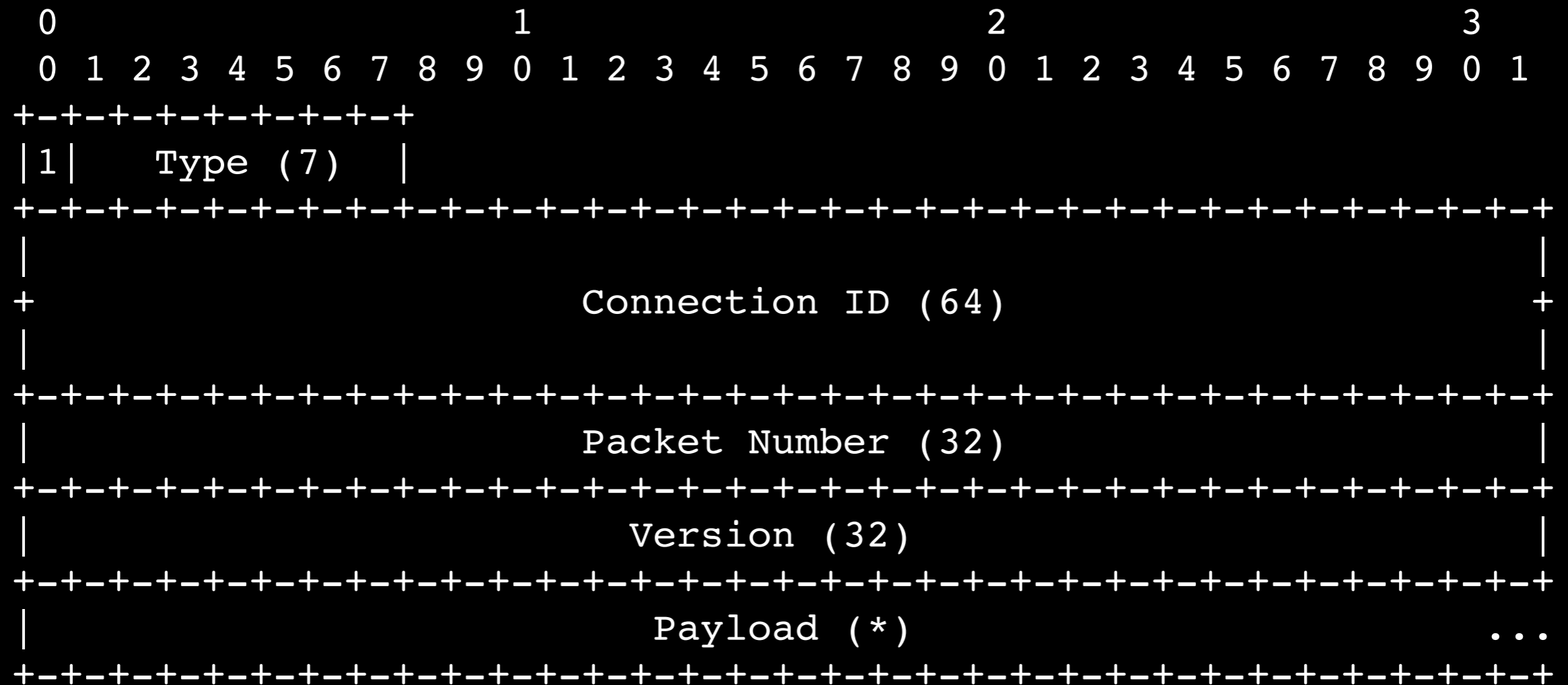
# What's up and why should I care?

- TCP continuously radiates information about loss and RTT to passive observers along the path.
  - Loss and RTT measurement useful for intra- and inter-network health monitoring and troubleshooting.
  - Ruru is an excellent illustration of this.
- QUIC (as presently defined) doesn't do this.
  - QUIC traffic on your network is of limited use for passive measurement
  - ***Is this a problem?***

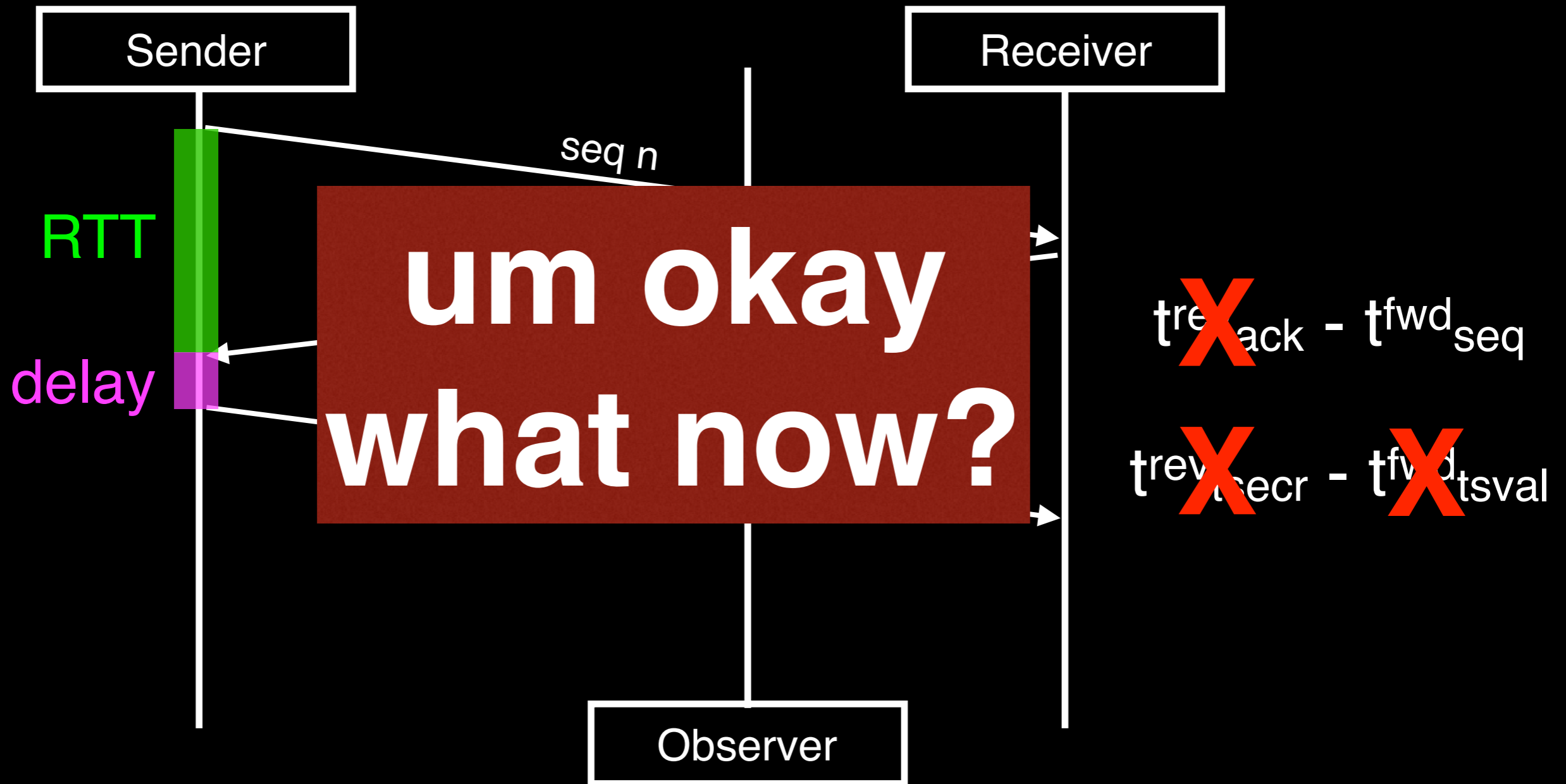
# Back to TCP School: Passive RTT Measurement



# QUIC packet header



# Matching packets with QUIC





# Why encrypt SEQ/ACK/TS?

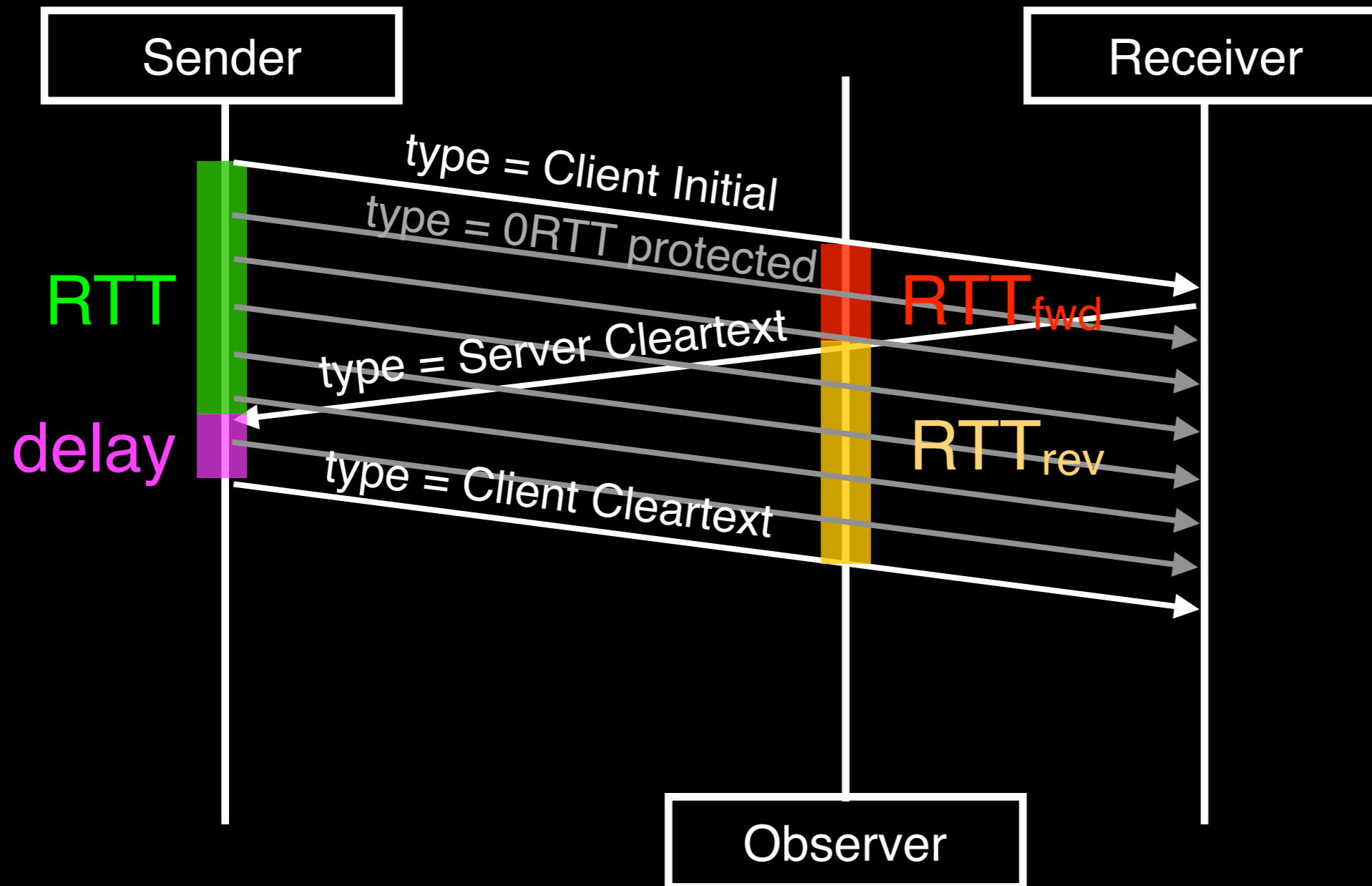
- A **minimal wire image** is a design goal of QUIC:
  - Defense against “collect it all” is “encrypt it all”
  - Every bit we put on the wire is a bit we won’t be able to change in the future.
  - Every bit we put on the wire is a bit that might be used against us in the future.



# QUIC packet header



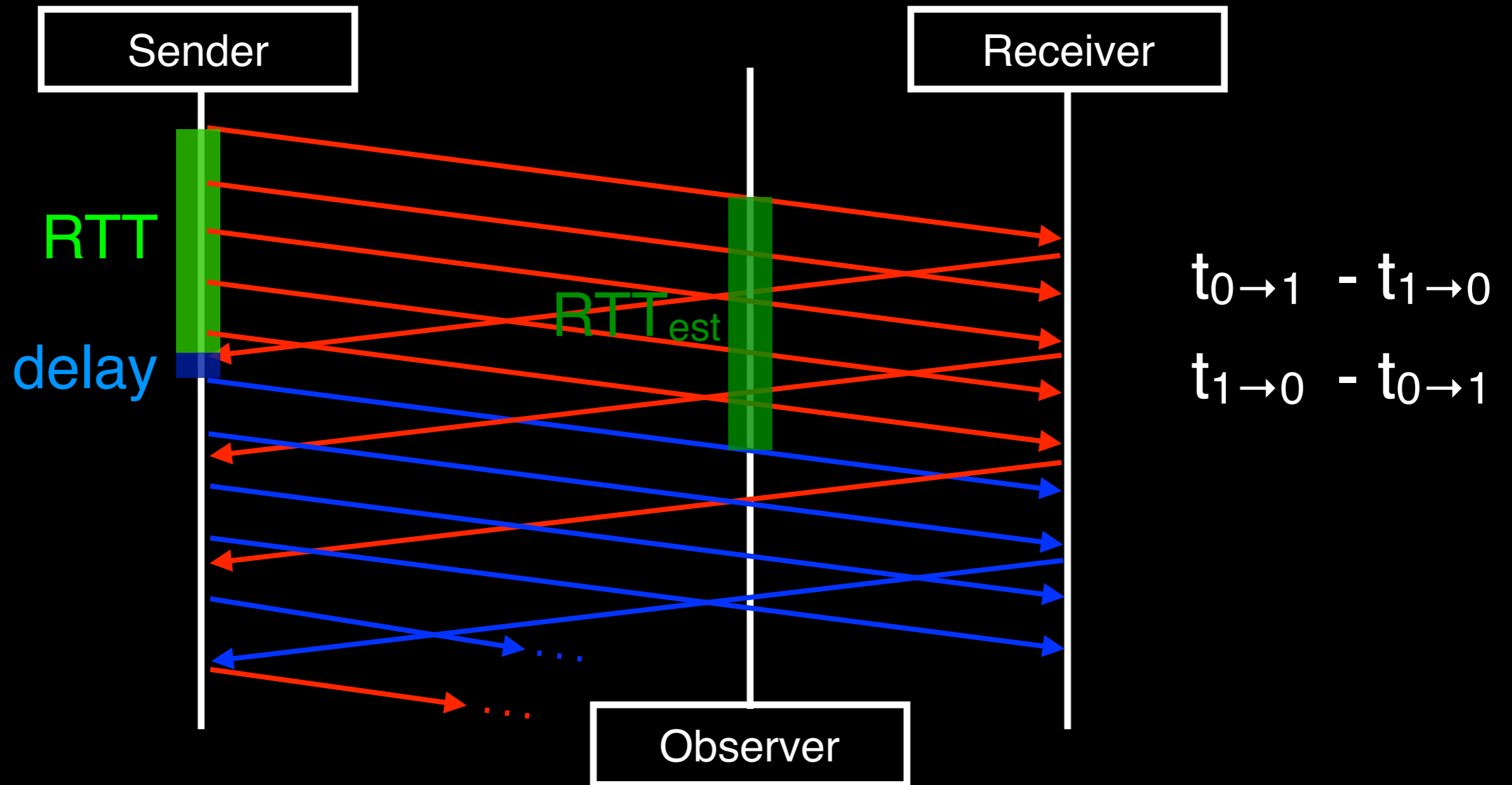
# Handshake RTT measurement in QUIC



# Explicit passive measurability of RTT

- If passive measurability of a protocol is a desirable feature, then it should be explicitly supported by the design of the protocol.
- Is there a way to do this with a minimal impact on the wire image?
  - One sample per flow: ensure handshake is distinguishable in both directions
  - Multiple samples per flow: latency spin bit

# The Latency Spin Bit



see <https://github.com/quicwg/base-drafts/pull/609>

# We need your input

- Do you presently use, or do you plan to use, passive RTT measurement on your network?
- IETF QUIC WG has appointed a design team to weigh utility v. risks, will (hopefully) come to conclusion at IETF 100 in Singapore in November.
- Come talk to me, or send mail to [<ietf@trammell.ch>](mailto:ietf@trammell.ch)
- General issues in wire image utility addressed in [draft-ietf-quic-manageability](#)