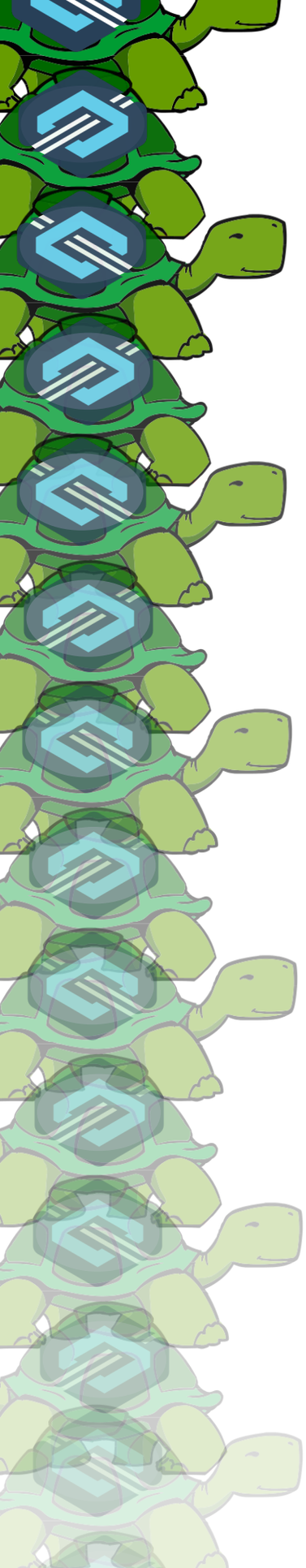

Optimizing Proxies for QUIC

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MASQUE

IETF 108, July 2020, Virtual

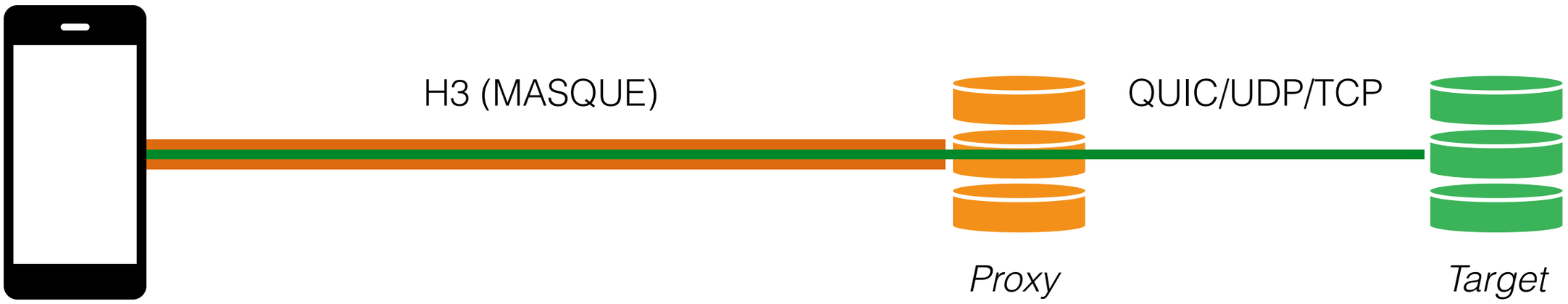
Optimization Opportunity

CONNECT-UDP allows tunneling UDP in H3

Adds extra encapsulation and encryption for proxied QUIC flows

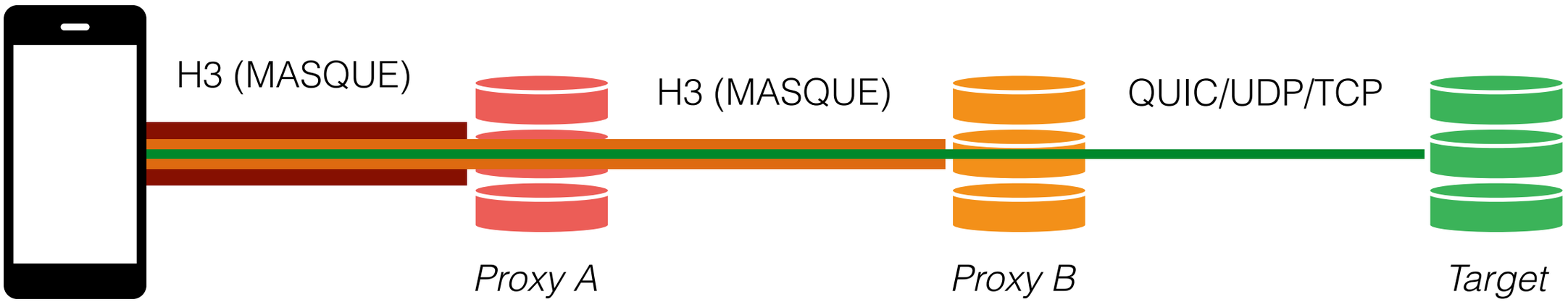
Traditional TCP proxies do not require this overhead

Single-Hop Proxying



Optimize for a target that supports QUIC

Multi-Hop Proxying



Optimize for multiple MASQUE proxies

CONNECT-QUIC

QUIC packets are either

1. Tunneled: client ↔ target Long Header packets encapsulated in client ↔ proxy DATAGRAMs
2. Forwarded: client ↔ target Short Header packets sent directly on client ↔ proxy UDP socket

CONNECT-QUIC Requests

Map one direction of a Connection ID to a proxied flow, with a DATAGRAM ID to use for Long Header packets.

When the request STREAM closes, remove mapping

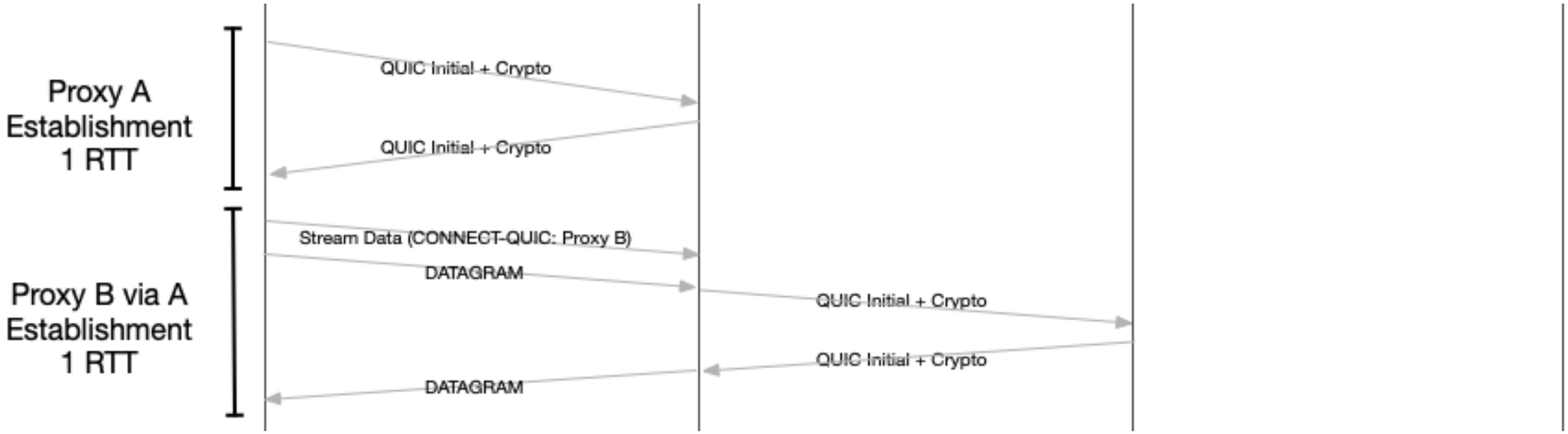
```
Client-Connection-Id = sf-binary

Server-Connection-Id = sf-binary

Datagram-Flow-Id = sf-integer
```

Request format

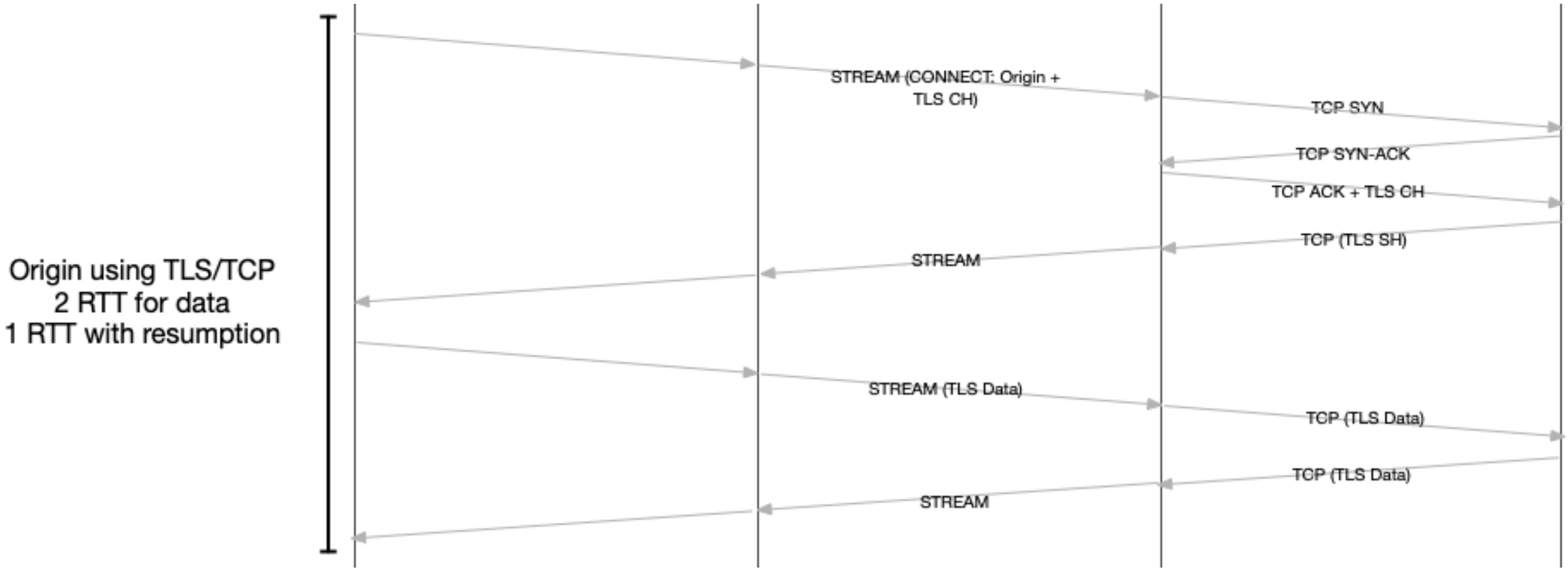
Proxy Client CID 0x31323334 to target.example.com:443, use DATAGRAM flow 1:

```
HEADERS + END_HEADERS
:method = CONNECT-QUIC
:authority = target.example.com:443
client-connection-id = :MTIzNA==:
datagram-flow-id = 1
```

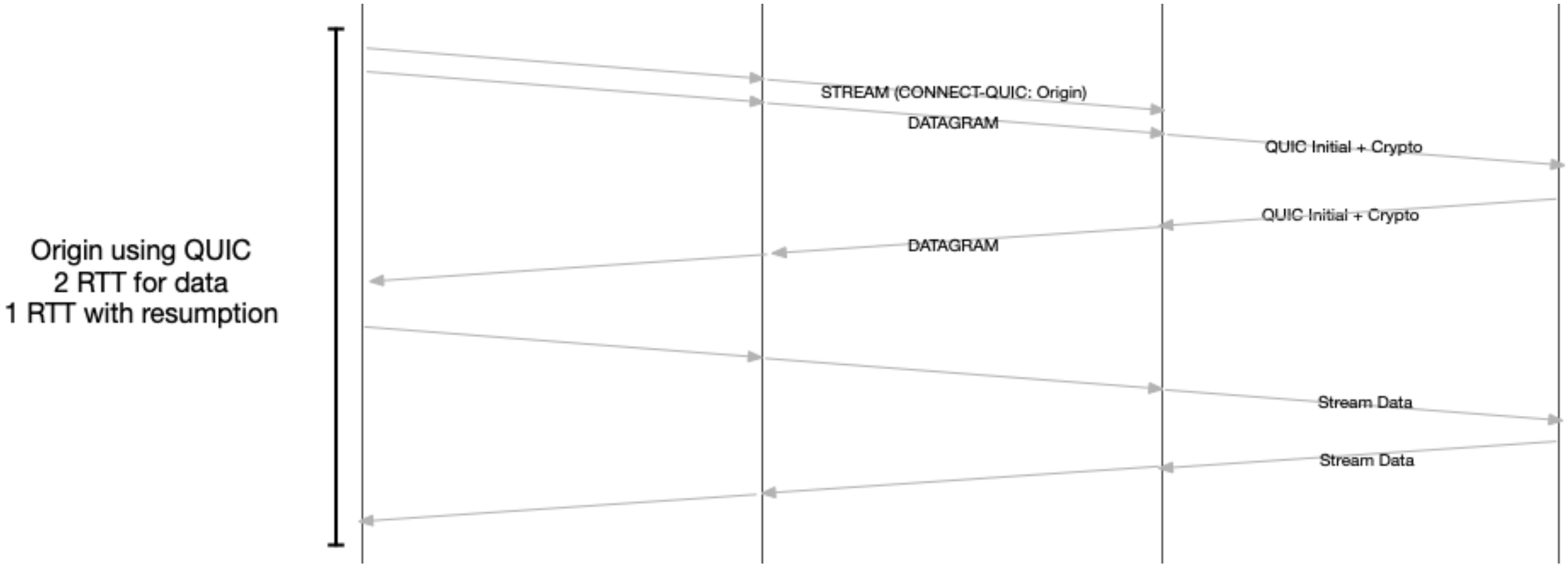
MASQUE Setup



TCP-through-MASQUE



QUIC-through-MASQUE



Merging with CONNECT-UDP

Very similar to the CONNECT-UDP case, which always tunnels

CONNECT-UDP should be extensible, and maybe generalized

CONNECT-QUIC needs to fall back to tunneling only (CONNECT-UDP) if not using H3

Open Issues

Allowing proxies to reuse next-hop UDP sockets

  Mapping Connection ID trickiness

Interactions with load balancers

Avoid forwarding replayed or injected packets