QUIC-Aware Proxying
Using CONNECT-UDP

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MASQUE
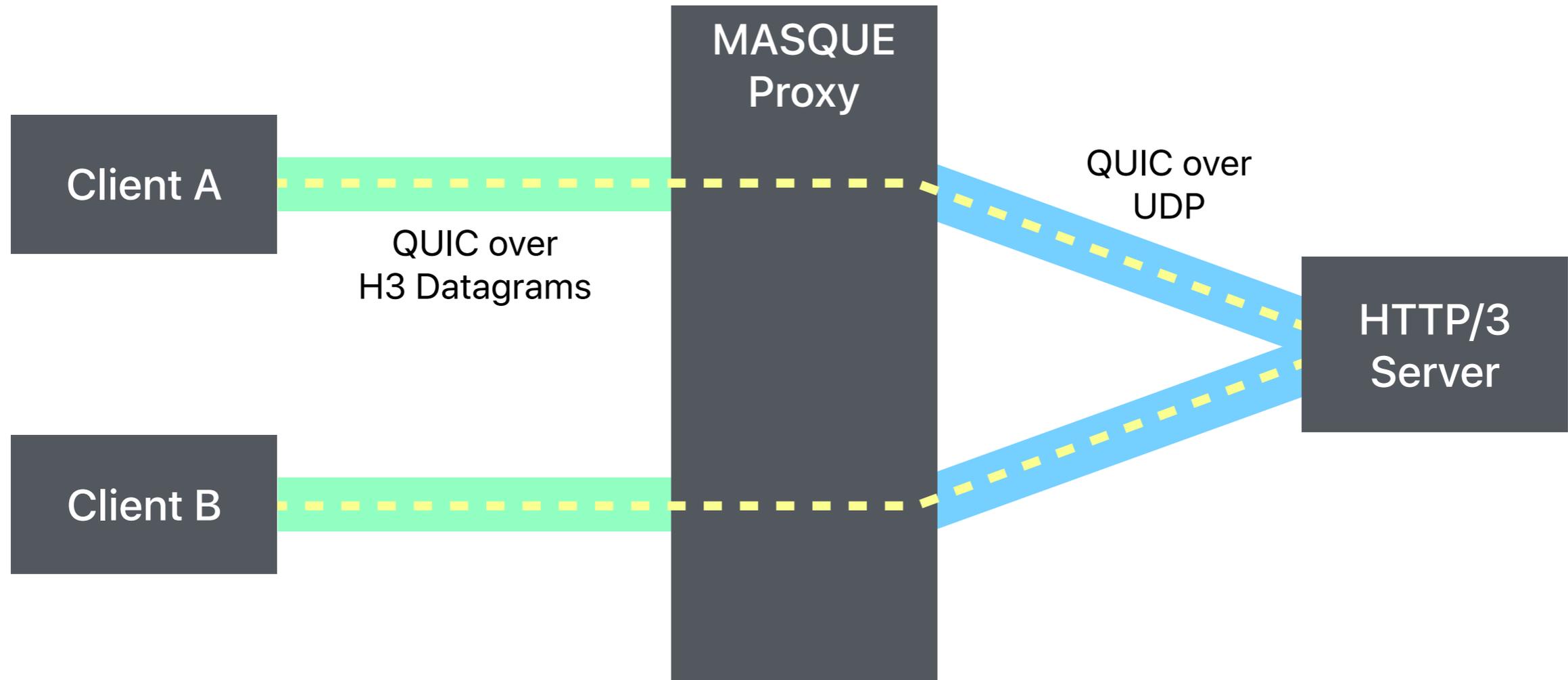IETF 109, November 2020, Virtual

Extending CONNECT-UDP

CONNECT-UDP lets you proxy UDP packets in HTTP/3, which implicitly supports QUIC

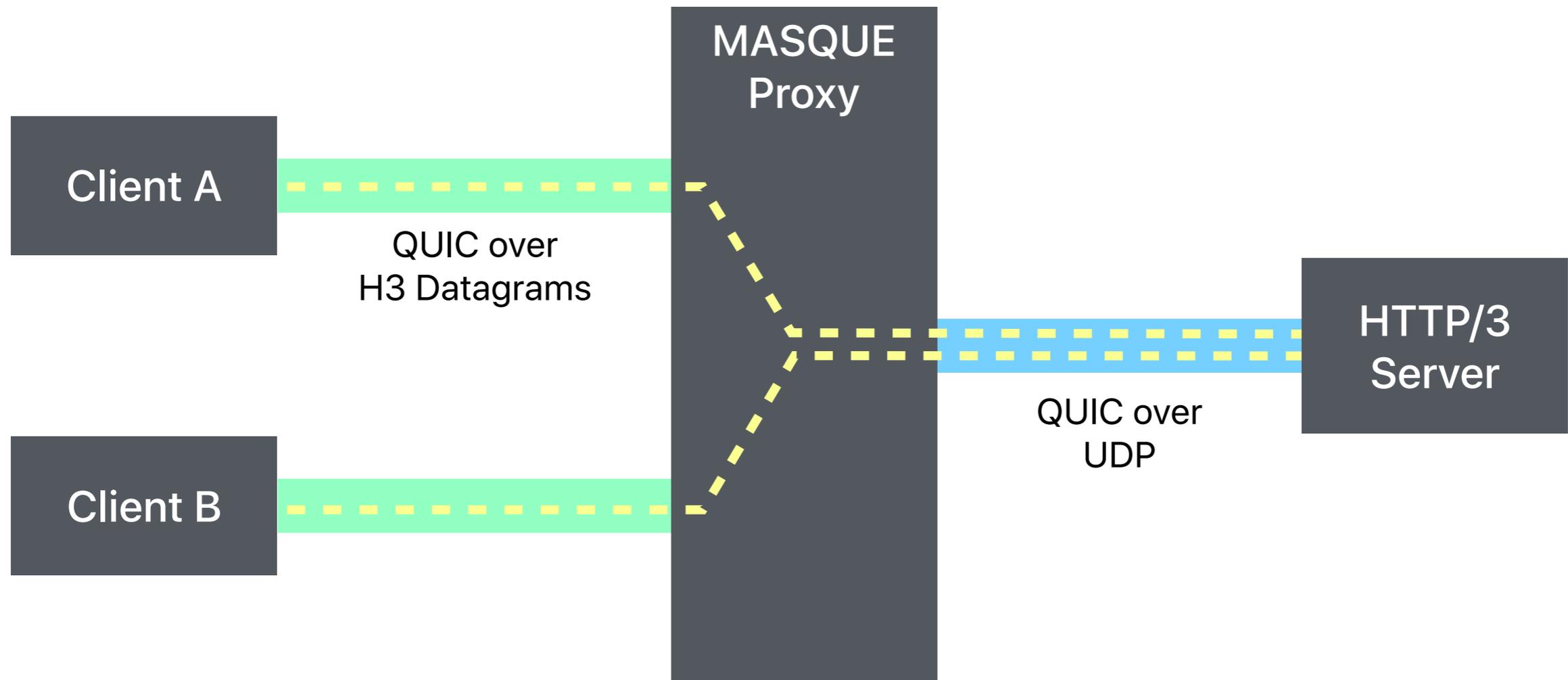Extensions add QUIC-awareness to provide two optional capabilities:

1. Proxy reuse of UDP four-tuples

2. Forwarding of QUIC short header packets between client and proxy, without double encapsulation
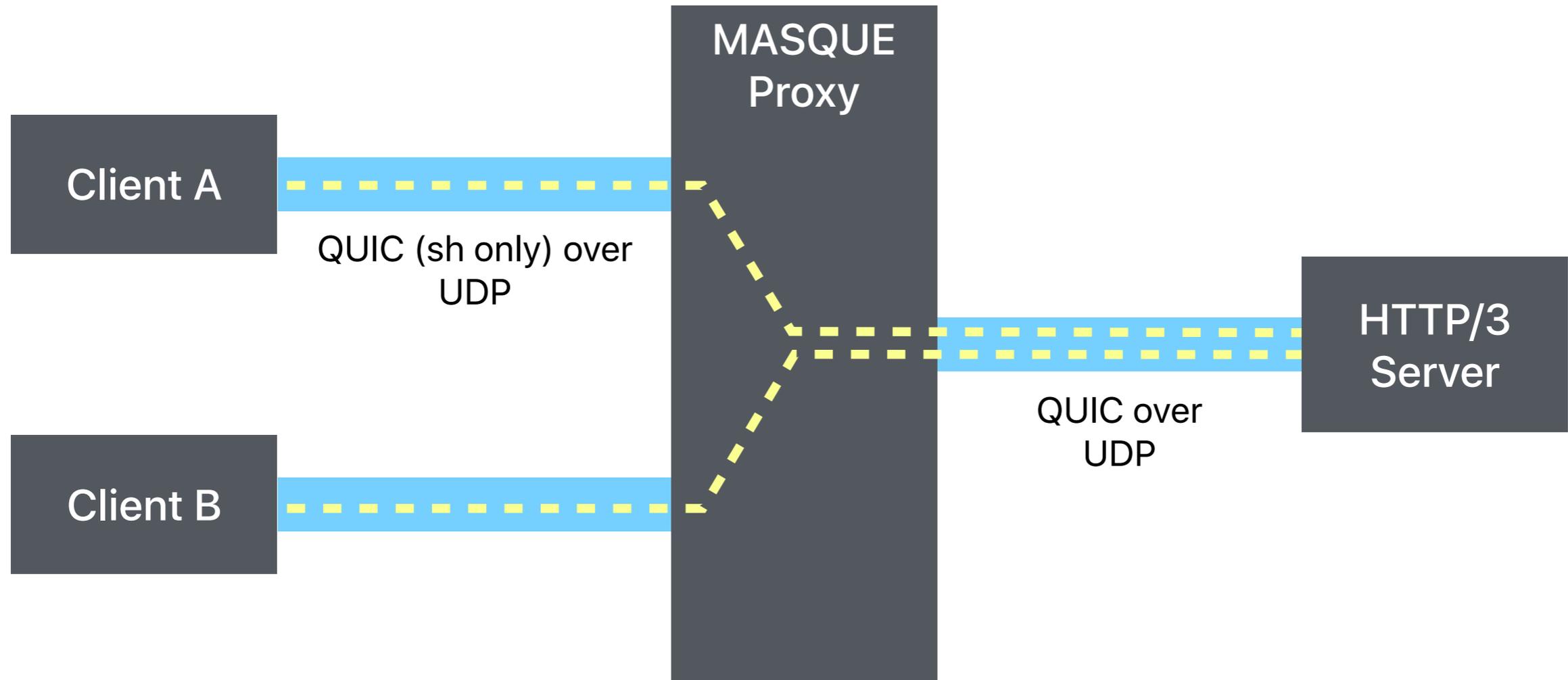
CONNECT-UDP

CONNECT-UDP
Shared UDP Tuple

MASQUE Proxy

Client A

QUIC over
H3 Datagrams

Client B

HTTP/3
Server

QUIC over
UDP

CONNECT-UDP
Forwarded Mode

MASQUE Proxy

Client A

QUIC (sh only) over UDP

Client B

HTTP/3 Server

QUIC over UDP

Client Requests

First request includes Client-Connection-Id

Proxy can reject, which leads the client to select a new Connection ID

Allow "fast-open", sending DATAGRAM frames with first request

To enable forwarding, client sends a request once it knows the Server-Connection-Id
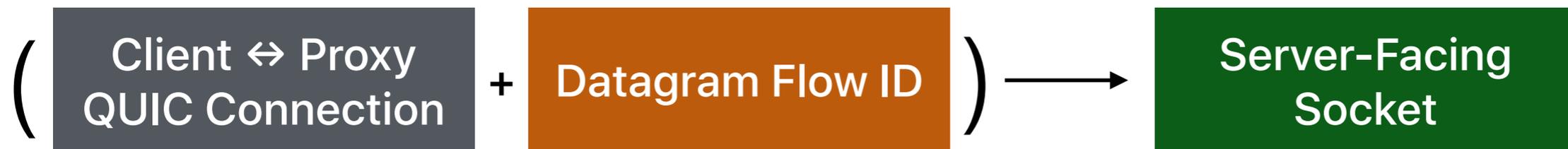
Proxy State

Proxy maintains state to map Connection IDs and UDP sockets

All mappings are created based on client requests, and can be rejected if conflicting
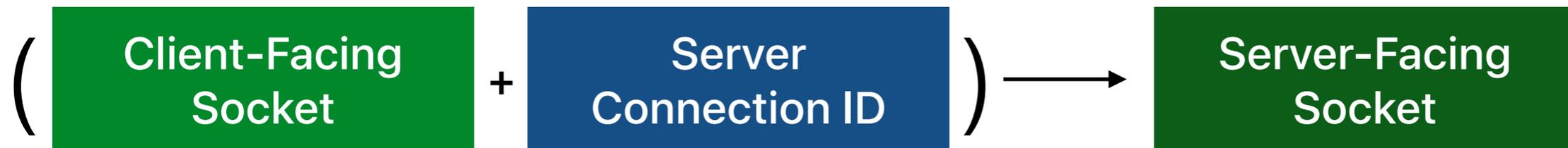
Both clients and proxies have the option to not forward

Proxy Mappings

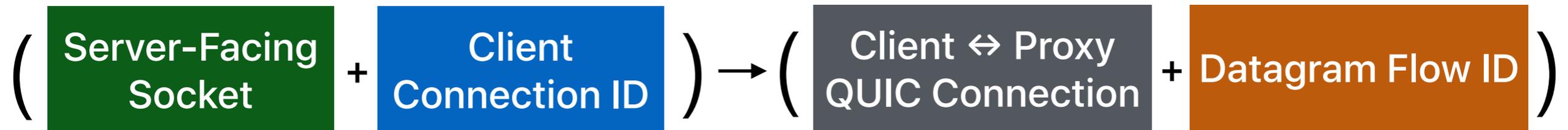Map tunnelled client-to-server packets:

(**Client ↔ Proxy QUIC Connection** + **Datagram Flow ID**) ⟶ **Server-Facing Socket**

Map forwarded client-to-server packets:

(**Client-Facing Socket** + **Server Connection ID**) ⟶ **Server-Facing Socket**

Proxy Mappings

Map tunnelled server-to-client packets:

(**Server-Facing Socket** + **Client Connection ID**) → (**Client ⟷ Proxy QUIC Connection** + **Datagram Flow ID**)

Map forwarded server-to-client packets:

(**Server-Facing Socket** + **Client Connection ID**) → **Client-Facing Socket**

Connection ID Conflicts

Conflict is detected if all elements on the "left-hand" side of a mapping overlap with another mapping

Sends 409 (Conflict) status response

Very short client Connection IDs likely to conflict

Clients are always aware of proxying, and should choose longer Connection IDs if they want QUIC-aware proxying

Next steps

Consider merging into CONNECT-UDP

Consider adopting as an extension document

Questions?