QUIC-Aware Proxying Using CONNECT-UDP

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Why QUIC-aware?

Allow proxies to reuse upstream ports

Improve performance!

• Processing overhead on clients and proxy

• Loss of MTU due to encapsulation
Applicability

Useful for enabling multiple proxy hops

- First N proxy hops can use forwarding mode, and a last hop can re-encapsulate

Useful for proxies that exist for routing optimization, access control, or IP obfuscation without needing extra payload security

Both client and proxy must consent to use forwarding
Test Setup

QUIC-aware CONNECT-UDP proxy

- Quiche H3 and QUIC
- NIC forwarding implemented with XDP\(^1\) and eBPF\(^2\) rules

Target HTTP/3 server

- NGINX with quiche

1g Ethernet link

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Measurements

- Direct: 910 Mbps
- CONNECT-UDP: 473 Mbps
- QUIC Aware Forwarding: 905 Mbps
Interesting Issues

Changes in MTU due to forwarding mode

   Servers can better use the link if they do PMTUD, or else get an explicit signal

Advice for connection migration

   Similar to CONNECT-UDP in general, but forwarding mode must be sure to pace/drop packets on unvalidated paths

Prohibit sharing server-facing sockets with non-QUIC flows