MASQUE CONNECT-UDP

draft-ietf-masque-connect-udp

IETF 109 – Virtual – 2020-11

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MASQUE Can Help!

Summary / Recap from IETF 108

CONNECT-UDP is like CONNECT, but for UDP!

When used in HTTP/3, it uses QUIC DATAGRAM frames to avoid retransmissions

Since last IETF, document was adopted by the MASQUE WG

Using QUIC DATAGRAM frames from HTTP/3

Currently relying on draft-schinazi-quic-h3-datagram

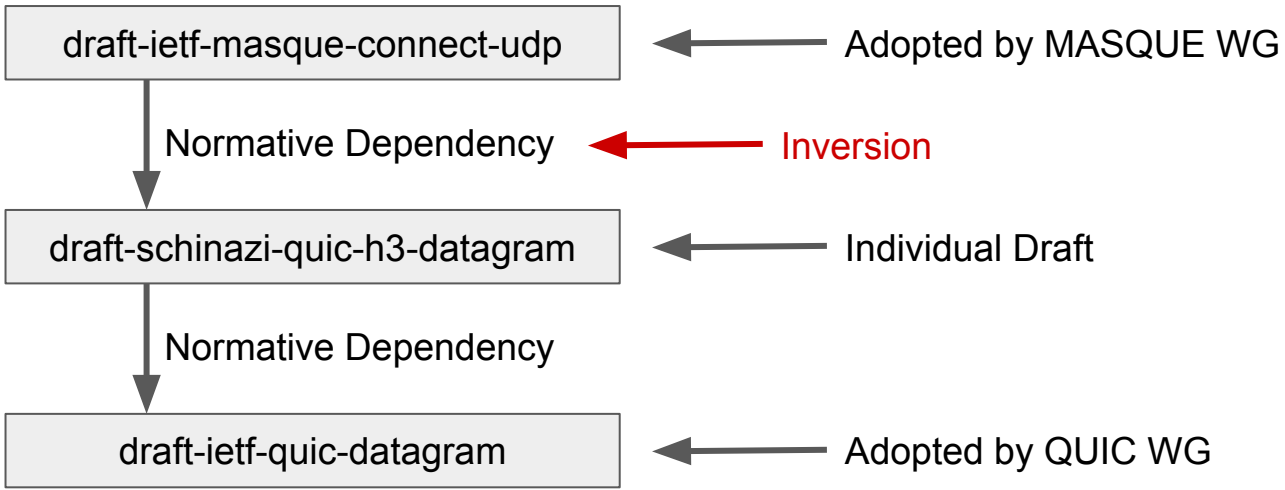
When QUIC is in use and ALPN=h3,

- Every QUIC DATAGRAM frame starts with a Flow Identifier (62-bit integer)
- Both endpoints provide a flow allocation service to get unique identifiers
- The protocol to negotiate these flow IDs is not defined in that draft

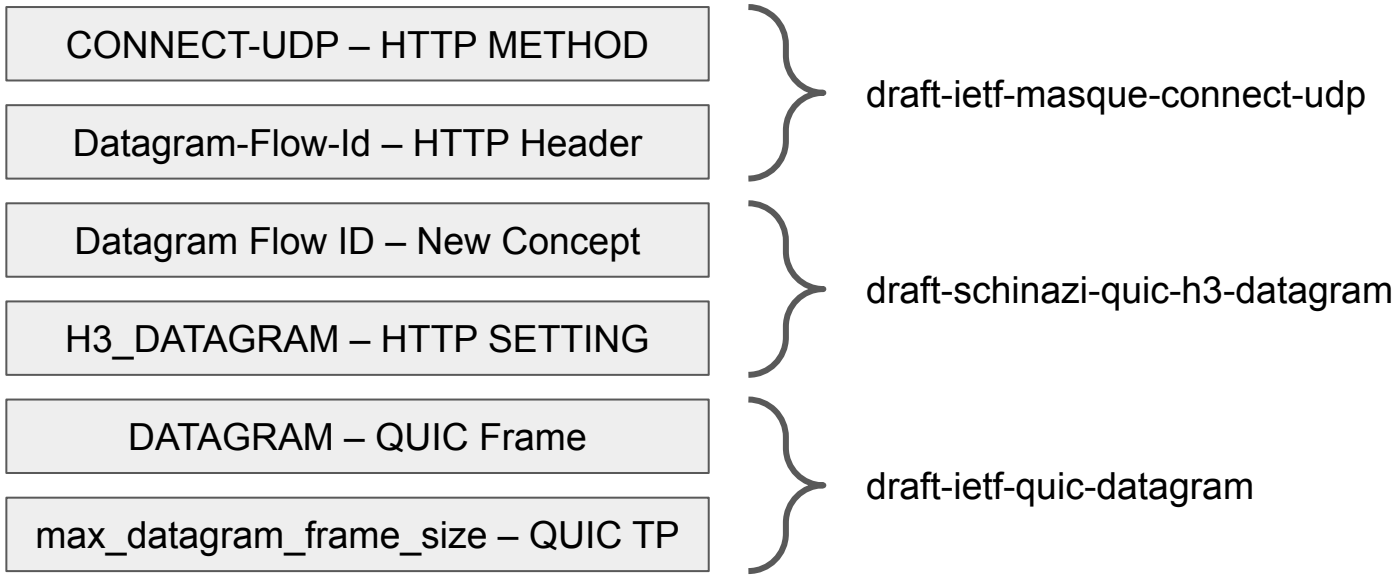
CONNECT-UDP carries the new "Datagram-Flow-Id" header to indicate flow ID

```
:method = CONNECT-UDP
:authority = server.example.com:443
Datagram-Flow-Id = 42
```

We have an adoption inversion to fix



Let's look at what's in these drafts today



Datagram Flow Identifiers

In HTTP/3, every QUIC DATAGRAM Frame starts with a variable-length integer that represents the Datagram Flow Identifier

HTTP SETTING exists to indicate support for this extension

We need a namespace:

- What does each datagram flow ID map to?
- How does one allocate new unique datagram flow IDs?
- How do we ensure that our peer understands this mapping?

Two ways of solving this

Reuse the HTTP request stream ID

Simpler

Forces 1-to-1 mapping from request to ID

Only uses 25% of available IDs
    Leads to longer varint encoding

Datagram-Flow-Id HTTP Header

Distinct namespace

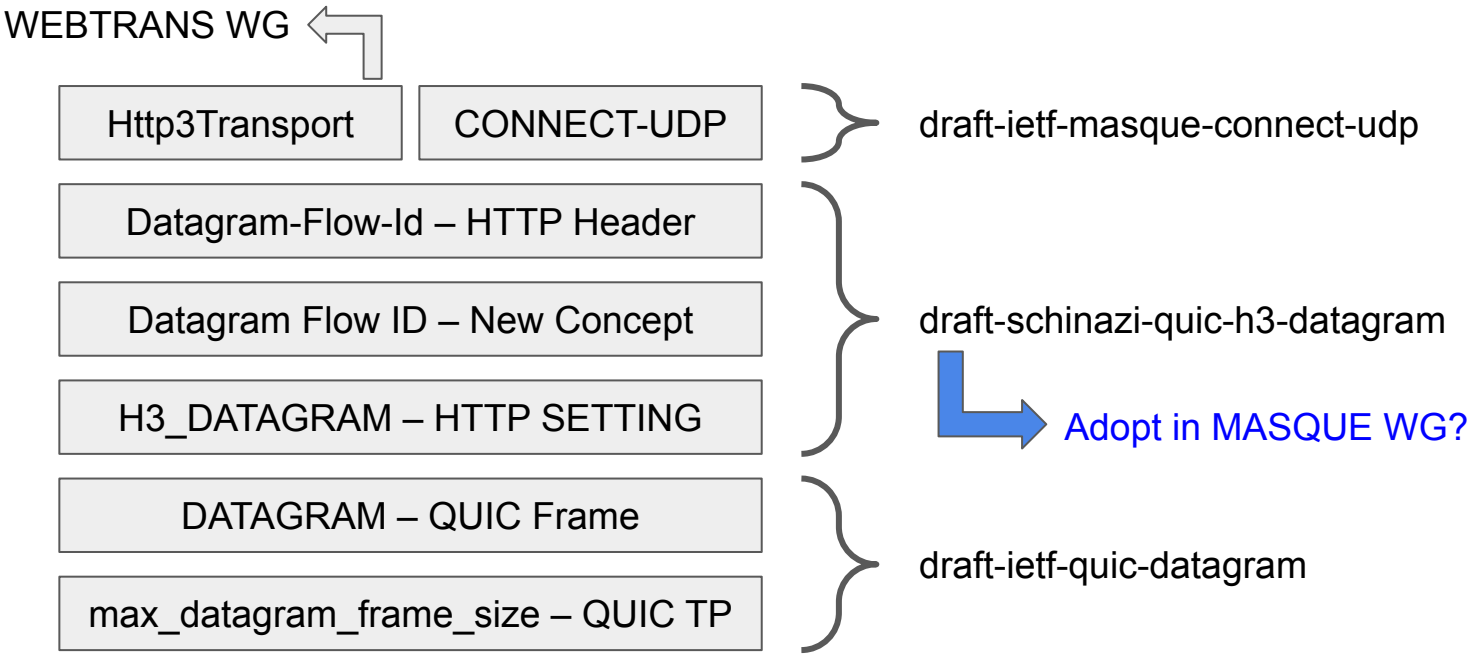
Requires explicitly negotiating via header

Allows many-to-1 mapping from request to ID
    Used by draft-pauly-masque-quic-proxy

Allows potentially reusing flow IDs

More extensible

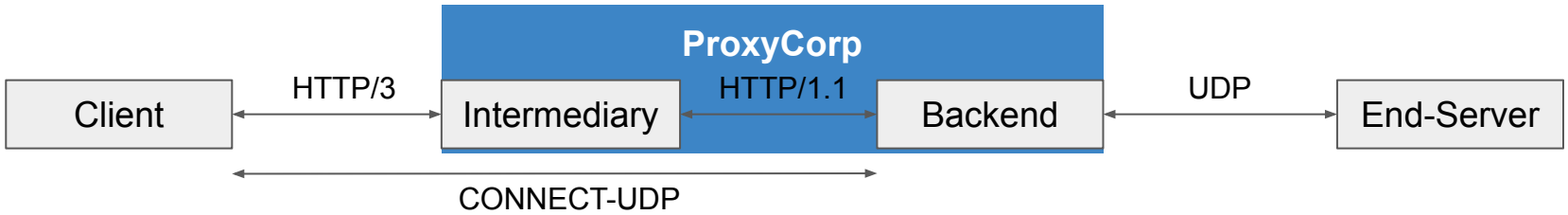
Where do we want everything to land?



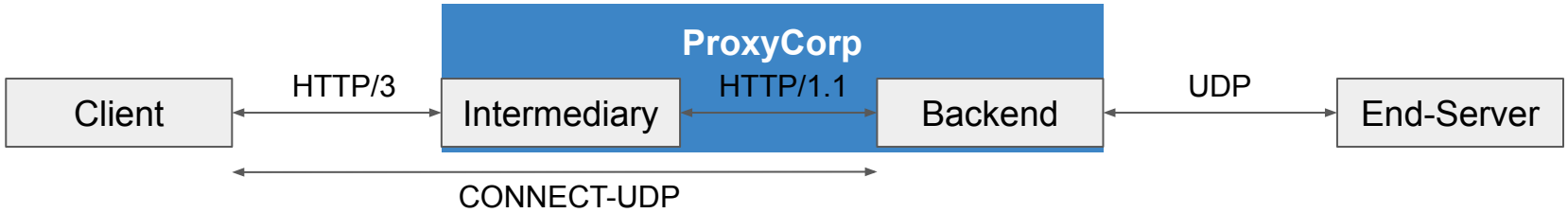
And Now for Something Completely Different: Some GitHub Issues!

Issues #1 and #3 – Chaining Multiple HTTP Proxies

Even though ProxyCorp appears to be a single machine to the client,
it can be implemented as one or more HTTP intermediaries leading to a backend



Issues #1 and #3 – Chaining Multiple HTTP Proxies



Chaining is straightforward when sending UDP payloads in the request stream

Negotiating Datagram Flow ID across multiple proxy hops is non-trivial,
as flow IDs are a property of the transport, and aren't end-to-end

Should we make "Datagram-Flow-Id" hop-by-hop,
and send the "Connection" header listing it to ensure it isn't forwarded?

Issue #8 – We need a request target URI

According to HTTP Semantics, all new methods MUST have a target URI

There was an exception for CONNECT but it doesn't help with a new method

How about: udp://target-host:port

Issue #11 – Limit packets before server response

CONNECT inherits this protection from TCP: it won't send anything to the target other than the SYN until it receives a SYN-ACK

UDP doesn't provide the same property

Should we say that the server SHOULD NOT send more than 10 packets per second until it's received any UDP in response from the target?

Questions?

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