MASQUE
HTTP Datagrams
Design Team Output

draft-ietf-masque-h3-datagram
draft-ietf-masque-connect-udp

Interim – Virtual – 2022-02-14

David Schinazi – dschinazi.ietf@gmail.com
Previously, on MASQUE...

We are building CONNECT-UDP, like CONNECT but for UDP!

There is interest in datagrams beyond CONNECT-UDP, so we split the draft into HTTP Datagrams + CONNECT-UDP

We had an interim in 2021-04, focused on the design of HTTP Datagrams

We redesigned everything, and after discussion on the list, merged some PRs

We then re-redesigned everything

We didn't agree on a solution at IETF 112, so we formed a design team
Design Team Participants

Eric Rescorla, Mozilla
Martin Thomson, Mozilla
Mike Bishop, Akamai
Tommy Pauly, Apple
Alan Frindell, Facebook

Lucas Pardue, Cloudflare
Alex Chernyakhovsky, Google
Marcus Ihlar, Ericsson
Ben Schwartz, Jigsaw
Victor Vasiliev, Google
David Schinazi, Google (lead)
Goal of the Design Team

Reach (rough) consensus amongst design team members on an overall design for HTTP Datagrams (the means by which WebTransport, CONNECT-UDP, and CONNECT-IP exchange datagrams)

Output of this design team will be a recommendation written up as PR(s) which will be discussed at a MASQUE interim before IETF 113, then we will confirm MASQUE WG consensus on list
Output of the Design Team

https://github.com/ietf-wg-masque/draft-ietf-masque-h3-datagram/pull/135

https://github.com/ietf-wg-masque/draft-ietf-masque-connect-udp/pull/77
Capsule Protocol

Sequence of TLVs on data stream, carries end-to-end messages even with intermediaries

New methods / upgrade tokens can choose to use the Capsule Protocol

CONNECT-UDP uses it

New Capsule-Protocol HTTP header that allows endpoints to inform intermediaries that the capsule protocol is in use

Intermediaries can translate between different versions of HTTP
HTTP Datagrams

HTTP Datagrams are associated with a currently open HTTP request stream.

HTTP Datagrams can be sent either using the QUIC DATAGRAM frame, or inside a new DATAGRAM capsule.

HTTP Datagrams are supported for all existing versions of HTTP.

```
DATAGRAM QUIC Frame {
    Type (i) = 0x30..0x31,
    [Length (i)],
    Quarter Stream ID (i),
    HTTP Datagram Payload (..),
}

Datagram Capsule {
    Type (i) = DATAGRAM,
    Length (i),
    HTTP Datagram Payload (..),
}
```
Extensibility / Demultiplexing

Moved from HTTP Datagrams to CONNECT-UDP
CONNECT-UDP

connect-udp HTTP Upgrade Token
:method = CONNECT
:protocol = connect-udp

Context ID
0 means UDP Payload
non-zero is dynamically allocated
even IDs are client-allocated
odd IDs are server-allocated

DATAGRAM QUIC Frame {
  Type (i) = 0x30..0x31, 
  [Length (i)],
  Quarter Stream ID (i),
  Context ID (i),
  Payload (..),
}

Datagram Capsule {
  Type (i) = DATAGRAM,
  Length (i),
  Context ID (i),
  Payload (..),
}
CONNECT-UDP Context ID Registration

CONNECT-UDP draft defines concept of registration:
   means informing the peer of the semantics/format of the payload

Registration can use HTTP headers and/or capsules

Specifics of how registration is done is currently not defined and left to extensions
   we will confirm whether this is the state we want with the WG
   separately from the outcome of this design team
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