Foo-Over-QUIC

Challenges when using QUIC for Control Plane Protocols

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Jeffrey Haas <jhaas@juniper.net>

Control Plane Protocols and TCP

- Our control plane protocols leverage TCP
  - Stream-based protocol
  - Reliable
- Most of our control plane protocols can operate over anything that gives us those properties with minor tweaks.
  - I’ve worked on BGP over TCP, Unix domain socket, TLS, SSH, etc.

A surge in interest in QUIC for control plane

QUIC - RFC 9000 et al.

- draft-retana-idr-bgp-quic
- draft-liu-grow-bmp-over-quic
- draft-liu-sidrops-rpki-rtr-over-quic
- draft-ietf-netconf-over-quic
- … and probably others that I haven’t noticed.

What's interesting about QUIC - Speed?

- Faster than TCP?
    - Our control plane protocols don't generally need speed.
    - We regularly send cat videos larger than full BGP or BMP feeds.
    - The control plane is generally not I/O bound, it's CPU-bound.
- What else?

What’s interesting about QUIC - TLS?

- QUIC uses TLS 1.3.
- Encryption!
- Certificates
  - If you’re doing control plane, certificates may thrill you, but probably just scares you.

What's interesting about QUIC - Streams?

- QUIC provides a partial OSI Layer 5 by providing multiple bi-directional or uni-directional *streams*.
- Whether this is interesting to a given control plane application will depend.
  - What this is starting to mean is that protocols are evolving to leverage this feature.
  - This potentially diverges development of the protocol over TCP.

What’s interesting about QUIC - Session Resumption

- Unlike TCP, when a QUIC connection is dropped, it might be able to be resumed.
- For Graceful Restart type applications, this might be very helpful!
- The control plane protocols likely require minor tweaks for integrating this functionality.

QUIC challenges

- Implementations primarily in user-space rather than kernel. Kernel implementations are happening.
  - This can be an integration challenge depending on your software ecosystem.
- No API. See your favorite stack. (A nod to why POSIX was good for us.)
- The contents are a black box, which can impair active traffic shaping.
  - A feature for non-control plane applications.
- Implementing Non-Stop Routing challenging.
  - Unaware of work in this space in QUIC WG. Need to do homework!
- Implementations permitted to services streams at their own pace.
  - This can impact sender behaviors which can impact convergence.

Why give this quic(k) talk?

- Bubble up a bit of attention on this problem/solution space.
- Control plane developers generally don’t want to be bothered with the details of transport.
- Transport, and transport security implications usually frustrate relevant ADs when reviewing new protocols.
- Making those ADs happy will likely require designing some boilerplate for our “applications”.