SCONE for TCP

https://datatracker.ietf.org/doc/draft-eddy-tcpm-scone/

Wesley Eddy (wesleyeddy@meta.com)
Matt Joras (mjoras@meta.com)

Problem Statement

- Rate-limiting within the network causes performance problems for some types of applications, such as Adaptive Bit Rate (ABR) video.
    - Rate limiting of video flows is common in mobile networks.
- If the application knows about the presence of rate limiting, it can select media that comply with the rate.
    - Improves user quality of experience, and reduces losses, retransmissions, latency, etc.
- For details, see: https://datatracker.ietf.org/doc/draft-joras-scone-video-optimization-requirements/

SCONE WG was formed to tackle this for QUIC!

SCONE

- Specification is maturing, using a new QUIC packet type to carry an encoding of rate limit information that middleboxes can read and set.
  - https://datatracker.ietf.org/wg/scone/about/
  - https://datatracker.ietf.org/doc/draft-ietf-scone-protocol/
- Working for TCP was a secondary concern during the BoF period, and was put out of scope in order to focus the charter.

```
SCONE Packet {
  Header Form (1) = 1,
  Reserved (1),
  Rate Signal High Bits (6),
  Version (32) = 0x6f7dc0fd or 0xef7dc0fd,
  Destination Connection ID Length (8),
  Destination Connection ID (0..2040),
  Source Connection ID Length (8),
  Source Connection ID (0..2040),
}
```

Bitrate	Rate Signal
100 Kbps	0
112 Kbps	1
126 Kbps	2
141 Kbps	3
1 Mbps	20
1.12 Mbps	21
10 Mbps	40
11.2 Mbps	41
100 Mbps	60

SCONE for TCP

- Think about MSS clamping.
  - A “network element” modifies the TCP MSS option in order to provide useful information / advice to the downstream stack.
- Our approach here is similarly to use a TCP option.
  - Indicating throughput guidance instead of MSS guidance.
  - The same network elements that are being built and deployed for UDP/QUIC SCONE can also look for and modify the TCP option.

```
                         1                   2                   3
 0             8         6                   4                   2
+-------------+-----------+-------------------------+
|  Kind=TBD |  Length=4  |   Throughput Guidance    |
+-------------+-----------+-------------------------+
```

Questions/Discussion

- **Is this something others might be interested in?**
- Are there any initial concerns, etc?

There are details to work out with regard to application interfaces, interactions with other TCP options, when to send the option, if it might be inserted by the network, etc.