

transport-wide-cc-extensions-01

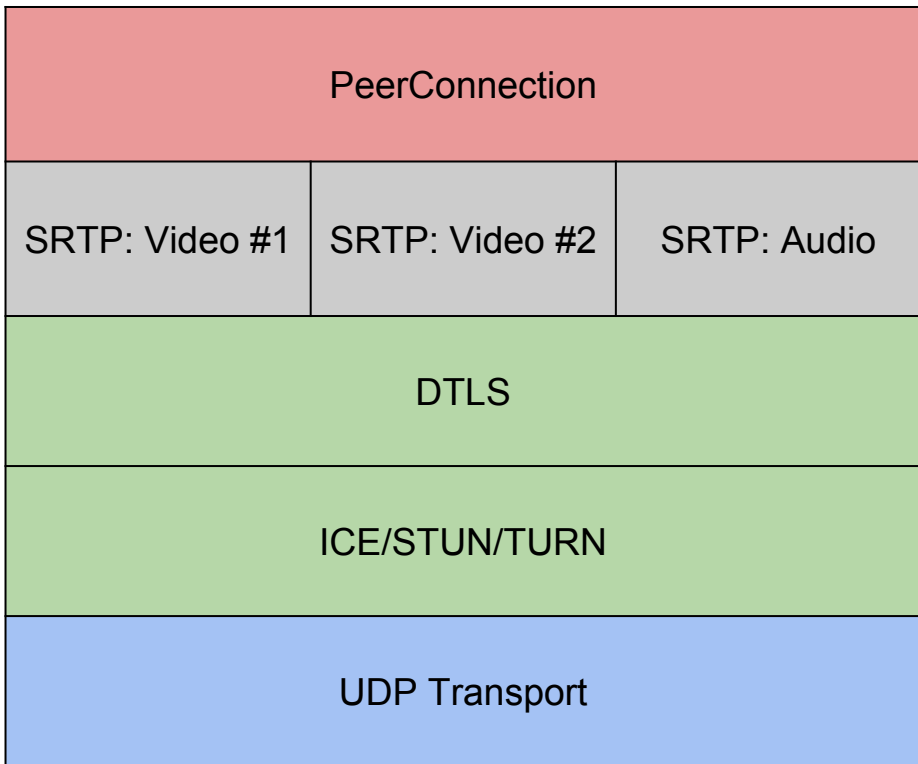
{holmer,mflodman,sprang}@google.com

Problem

- All RMCAT drafts propose different specialized RTCP messages. Interop will be difficult.
- Splitting logic between sender and receiver.
 - Makes interop even more difficult.
 - May require synchronized roll-outs of improvements.
 - Running experiments will be simpler.

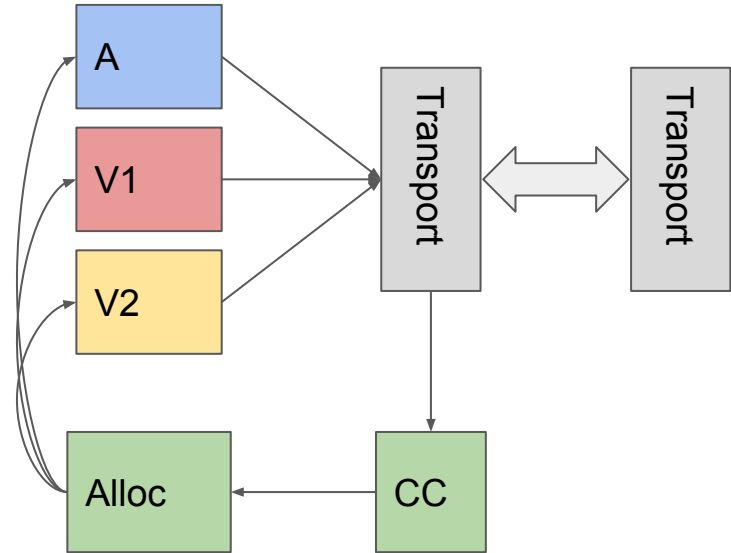
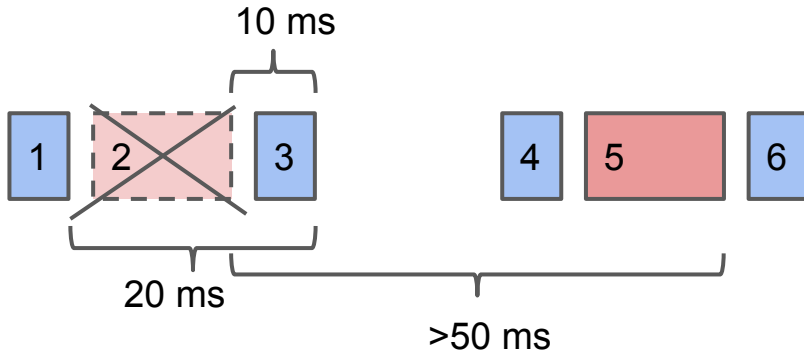
Where does RMCAT/CC operate?

- Per stream or per transport?
- Media/streams doesn't really matter. Interested in flows of packets.
- Packets transmitted over the same path.



Why "Transport-level" Congestion Control?

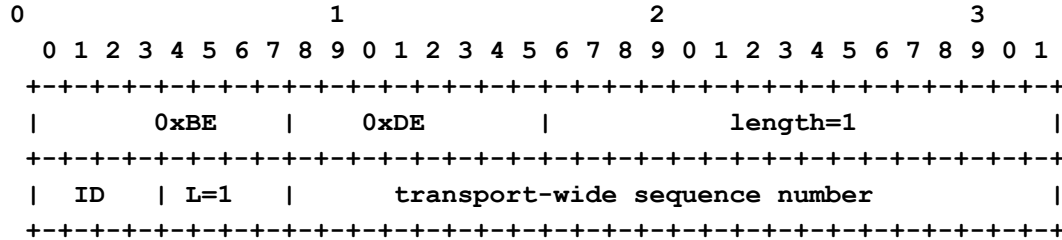
- One CC instance per transport instead of one instance per stream.
 - Up to the sender to decide.
- Streams will not have to fight over bandwidth.
- Tail losses detected earlier.
- Care must be taken regarding:
 - DSCP markings.
 - BUNDLE vs. non-BUNDLE.



Proposal

- Standardize on a single, flexible RTCP message for CC.
- Standardize on running the algorithm logic on the send-side.
- Two components:
 - RTP header extension: transport-wide packet sequence number.
 - RTCP message: arrival-time for every received packet.

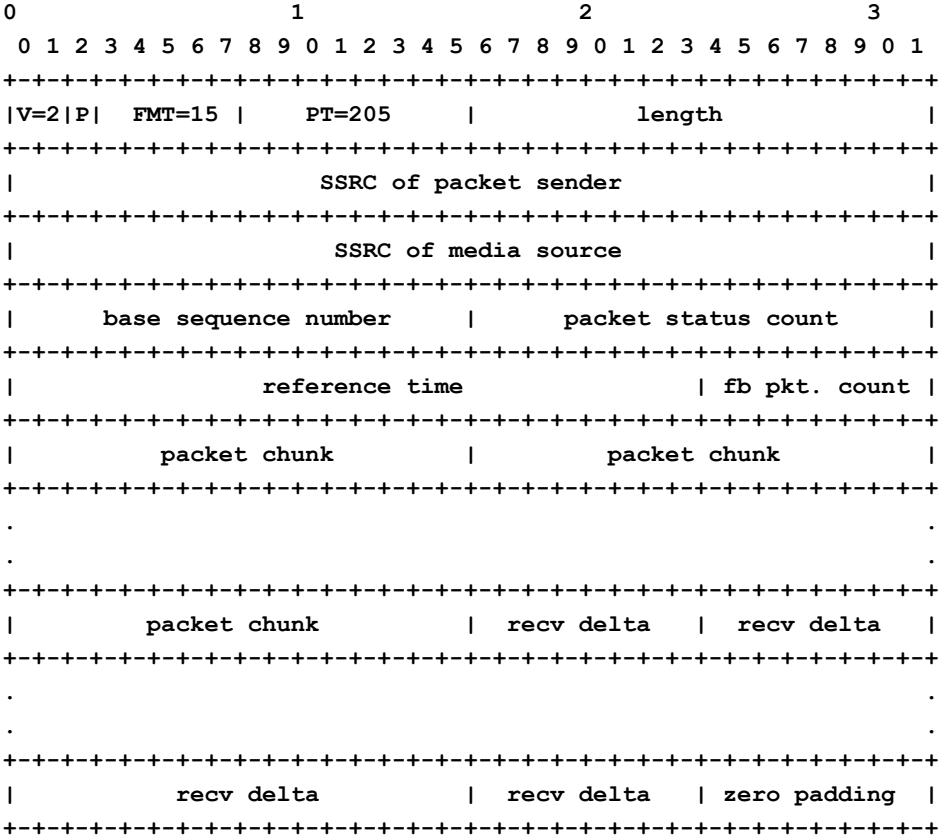
RTP Header Extension



- 16 24 bits sequence number.
- Incremented by one for each packet sent on the transport.

RTCP Message

- Transport-wide feedback message.
- Sent X times per RTT or once every ~30 ms.
- Similar to a combination of RTCP XR **Loss RLE Report Block** and **Packet Receipt Times Report Block**, but per transport.

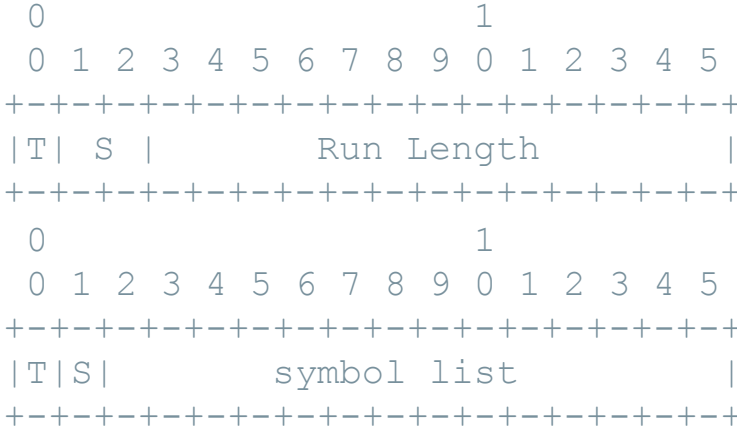


Backup Slides

RTCP Message Details

- Packet Status Symbol -- 2 bits:
 - 00 - Not received
 - 01 - Packet received, small delta
 - 10 - Packet received, large or negative delta

- Packet Status Chunks -- 16 bits:
 - 0 - Run Length Chunk
 - 1 - Status Vector Chunk



Example - run length chunk:



RTCP Message Details

- Reference Time -- 24 bits:
 - One per RTCP Message
 - Multiples of 64 ms
 - Possibility to calculate delta to previous RTCP Messages
- Receive Deltas:
 - Small Delta: [0, 63.75] ms -- 8 bits
 - Large Delta: [-8192.0, 8191.75] ms -- 16 bits
 - The first delta is relative to Reference Time
 - Others are relative to the previous Delta

Less Self-induced Jitter?

