RTCP Feedback for Congestion Control

draft-dt-rmcat-feedback-message-01

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Goals

- Design team building common congestion control feedback format:
  - Per-packet arrival times
  - Per-packet loss events
  - Per-packet ECN feedback

- Desire to send feedback in scheduled compound RTCP packets or as RTP/AVPF early transport layer feedback
Feedback in scheduled compound RTCP packets

- RTP endpoints send regularly scheduled RTCP packets
  - Frequency of reporting depends on allocated RTCP bandwidth – defaults to 5% session bandwidth, but configurable
- Each report MUST be a compound RTCP packet
  - Sender report/receiver report (SR/RR)
  - Source description (SDES) containing CNAME item, other items optional
  - Other RTCP packets
- Extended Report (XR) packets provide detailed reception quality feedback → define XR block for congestion control feedback
Proposed RTCP XR packet format

<table>
<thead>
<tr>
<th>V=2</th>
<th>P</th>
<th>reserved</th>
<th>PT=XR=207</th>
<th>length</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSRC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BT=RC2F</td>
<td>Report count</td>
<td>Block Length = ...</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Report Timestamp (32bits)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSRC of 1st media source</td>
<td></td>
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</tr>
<tr>
<td>begin_seq</td>
<td>end_seq</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>ECN</td>
<td>Arrival time offset</td>
<td></td>
<td></td>
</tr>
<tr>
<td>...</td>
<td></td>
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</tr>
</tbody>
</table>

XR header

Congestion control report header

Congestion control report 1

Congestion control report \( n \)
Optimising the proposed RTCP XR packet format

- Could define as custom RTCP packet type, rather than XR block to save four octets

- Might also be possible to optimise format of report data
Overhead of compound RTCP

- Compound RTCP packets MUST contain SR/RR and SDES CNAME
- Gives *minimum* 80 octets overhead per-report
- SR comprising sender info (28 octets) + a reception report block (24 octets)
- SDES + RFC7022 CNAME (28 octets)
- Sessions with multiple streams have a higher overhead

- Implication: optimising the XR block likely not worthwhile
Non-compound RTP/AVPF transport layer feedback

• Reduce overheads using non-compound RTCP with RTP/AVPF

• Still need to send scheduled compound RTCP packets

• But, can also send non-compound packets in between – these contain just a transport layer RTCP feedback packet containing congestion feedback
Proposed RTP/AVPF Transport Layer Feedback Packet

Same information as in the XR block, formatted to fit in a transport layer feedback packet

Sent as a non-compound RTCP, without SR/RR or SDES packets
Status and Discussion

• Proposed simple way of encoding required feedback
  • As XR block in a scheduled compound RTCP packet
  • As transport layer feedback in a non-compound RTCP packet sent between scheduled reports
  • The format has not been optimised – can trade complexity for some space saving, but unclear if this is worthwhile:
    • Likely to report on <16 packets per report – per packet saving small
    • Use of non-compound packets gives much greater per-packet saving

• Questions for the working group:
  • Is this the right information to report?
  • Is encoding this using RTCP XR and transport layer feedback appropriate?
  • Is the format reasonable? Should it be optimised?