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Multimedia Congestion Control: Circuit Breakers for Unicast RTP Sessions

draft-ietf-avtcore-rtp-circuit-breakers-05

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Recent Changes

- Changes in -04:
  - Keep-alive only, no technical changes
- Changes in -05:
  - Update recommendations for choice of TCP throughput equation in §4.3
  - Add media usability RTP circuit breaker

Choice of TCP Throughput Equation

- Two versions of TCP throughput equation used for congestion circuit breaker
  - Simple model due to Mathis; more complete model due to Padhye
  - Clarify that either throughput model can be used for RTP circuit breaker, although simple model is RECOMMENDED
  - Reference papers that discuss trade-off between two approaches:

    Zaheduzzaman Sarker, Varun Singh, and Colin Perkins, An Evaluation of RTP Circuit Breaker Performance on LTE Networks, Proceedings of the IEEE Infocom Workshop on Communication and Networking Techniques for Contemporary Video, Toronto, Canada, April 2014.

    Varun Singh, Stephen McQuistin, Martin Ellis, and Colin Perkins, Circuit Breakers for Multimedia Congestion Control, Proceedings of the 20th International Packet Video Workshop, San Jose, CA, USA, December 2013. DOI:10.1109/PV.2013.6691439

    Both sets of results have been presented at previous IETF meetings
- Expect different throughput models to be developed in future, that might be better suited to real-time applications, but current throughput models are good enough

Media Usability RTP Circuit Breaker

- Add RTP/AVP circuit breaker #4: media usability
  - Key text: “applications SHOULD monitor the reported packet loss and delay to estimate whether the media is suitable for the intended purpose. If the packet loss rate and/or latency is such that the media has become unusable for the application, and has remained unusable for a significant time period, then the application SHOULD cease transmission”
  - Does not define bounds on packet loss/latency → application specific
- Intended as a catch-all if other circuit breakers fail
  - If the quality is unacceptable, don’t feel you need to keep sending

Open Issues

- Magnus sent feedback to mailing list (27-2-2014)
  - Media timeout circuit breaker triggers if RTP sent, but RTCP SR/RR show no packets received; likelihood of triggering higher when few RTP packets sent per RTCP interval
    - Agree that this is a concern – can highlight issue in the draft
    - Should we add a threshold to counter this? If so, what? Suggestion: don't trigger if sending less than 3 packets per reporting interval
  - Issue with reports from multiple remote SSRCs
    - Clarify that the circuit breaker operates per-SSRC, and be clear what reporting interval is used
  - When using RTP/AVPF, do we need to give advice for triggering interval when using T_rr_interval?
    - I expect this will be needed, but unclear what advice to give
    - Discuss offline with Magnus and simulate result, to ensure correct timeout used
  - Assorted requests for editorial clarifications that will be incorporated

Status and Next Steps

- Basic mechanism has been stable for some time
- Experiments show circuit breaker safe to deploy
  - Tends towards conservative; only triggers in extreme cases (preferable to overly sensitive)

- Resolve open issues from Magnus, then believe this is ready for working group last call