RTCP Guidelines

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Why RTCP Guidelines...?

- RTP/RTCP provides a powerful toolbox for realizing adaptive applications
- Tailored to the nature of Internet communications

But: RTCP gets implemented only slowly
Yet: RTCP extensions invented for many purposes
And: Extensions sometimes appear redundant or are architecturally not in line with RTP

- Recap what RTP and RTCP can already do
- Discuss the fundamental limitations
- Give guidance on extending RTCP
RTCP Capabilities

• Sender and receiver reports [RFC3550]
  – (in “regular” intervals, typically ≥ 5s)
  – Reception statistics (cumulative, sliding mean)
  – Sender RTT
  – Receiver RTT with XR [RFC 3611]
• More timely feedback [RFC 4585]
• More frequent feedback
  – Adapt the RTCP bit rate [RFC 3556]
  – Reduce the mean message size [non-compound]

• Unicast, multicast (SSM, ASM)
RTP and RTCP Feedback Loop

- Adaptive real-time applications
  - Tunable feedback loop for individual and group communications
  - From reporting per 5s and more to event-driven to once per RTT

Sender
- RTP Media stream (coded media, FEC, repair)
- RTCP Sender Reports
  - Timing, synchronization
  - Data rate, packet count
  - “Traffic characteristics”
- Long-term adaptation
  - Codec choice
  - Packetization size
  - FEC, interleaving
- Short-term adaptation
  - Retransmissions
  - Retro-active FEC
  - Congestion control
  - Adaptive source coding

Receiver
- RTCP Receiver Reports
  - Long-term rough statistics
  - Detailed statistics
  - Instant event notifications
  - Congestion information
- Dejittering, sync, playout
- Monitoring + reporting
- Instant event notifications
- Local error concealment

3rd Party “Qos” Monitor
Fundamental RTCP Limitations

- RTCP provides only occasional feedback. There is no per-packet feedback.
- Feedback not truly instant: $O(\text{RTT}) \rightarrow O(\text{seconds})$
- RTCP is inherently unreliable
RTCP Extensions: Basic Checks

- How much of this can existing RTCP already do?
  - Think hard!
  - Avoid functional redundancy

- Is the extension really of general use for entities in the Internet?
  - Or is it just link-specific?

- ...

- ...

- ...
Questions to ask and answer

• How will this new building block work with others?
• Will this work with all profiles?
• Is this in line with AVP or should this a new profile?
• Interoperability with non-extended nodes?
  – This includes mixed multicast groups
• Scalability across different networking conditions
  – Degradation with increased packet loss, latency, …
  – Group sizes, group dynamics – RTP is *fundamentally* a group communication protocol
• …
General Guidelines

• Think IP! Think groups! (and think semantics)
  – It’s a different network
  – Don’t re-create your favorite PSTN operation here
• Target re-usability
• Be precise and unambiguous and complete for all definitions
• Think about complexity
• Implicit local derivation vs. explicit signaling
• Soft vs. hard reliability
• …
Now, where to go with this...?

• This is a rough first draft.
• Is this document useful?
• Should a future version make it into a WG item?

• Please read and comment