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# Sending Multiple Media Streams in a Single RTP Session

[draft-ietf-avtcore-rtp-multi-stream-03](#)

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# Overview



- › Document Update Summary
- › Scheduling Algorithm
- › Open Issues
  1. Recommendations for many SSRCs joining
  2. RTCP parameters for common scenarios
  3. Scheduling algorithm under dynamic changes
  4. Compatibility issues with AVG\_RTCP\_SIZE calculation
  5. Optimizations of Feedback Messages (AVPF) scheduling
- › Next Steps

# Update Summary



- › Changed usage of Media Stream
- › Added Updates: RFC 4585
- › Added rules for how to deal with RTCP when aggregating multiple SSRCs reported in same compound packet:
  - avg\_rtcp\_size calculation
  - Scheduling rules to maintain timing
- › Started a section clarifying and discussing RTP/AVPF Feedback Packets and their scheduling.

# Scheduling Algorithm



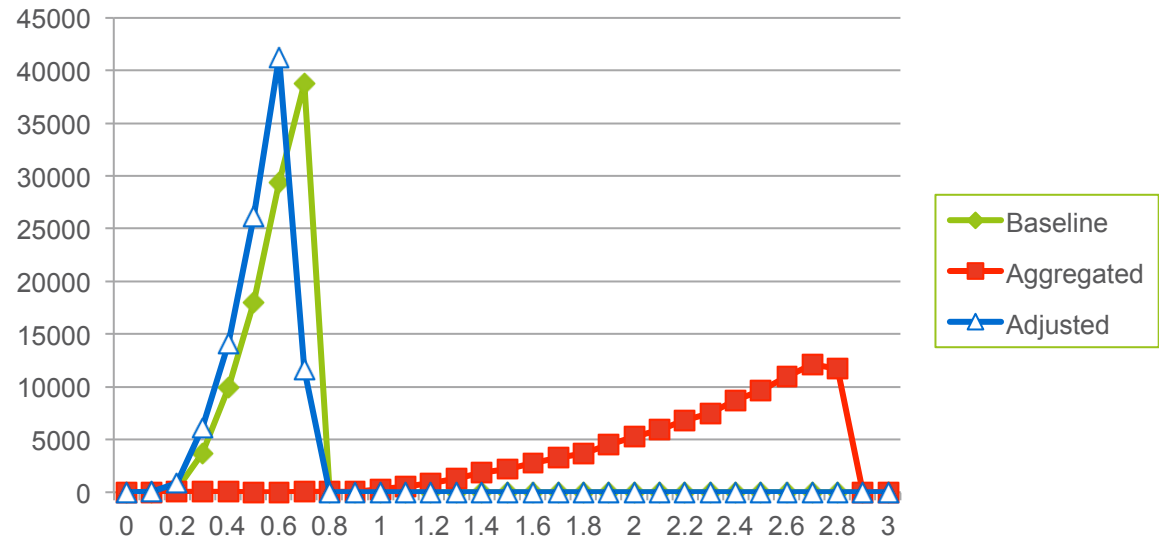
- › Schedule all local SSRCs independently
- › Each time a transmission event triggers
  - Do Reconsideration
- › When an RTCP compound packet is to be sent
  - Continue to add SSRCs that are closest in time if its data fits in MTU
- › When an SSRC has been included in aggregate
  - Perform reconsideration by calculating a new  $T$
  - If  $T$  is lower than  $T_n$  set  $T_p$  to  $T_n$
  - If  $T$  is larger than  $T_n$  set  $T_n$  to  $T$  and reconsider
- › Results in  $T_p$  values in future
- › Reschedule a new  $T_n$  as new  $T + T_p$  value

# Simulation Results

## Static Session



- › SSRC Aggregation
- › 2 Endpoints
- › 4 SSRCs per Endpoint
- › RTCP bandwidth
  - RS: 10 kbps
  - RR: 15 kbps
- › Regular AVPF
  - T\_RR\_INT = 0
- › Include Full Cross Reporting
  - Each SSRC reports on the other 7



|            | Bit Rates (kbps) | AVG_RT CP_SIZE | AVG T (s) |
|------------|------------------|----------------|-----------|
| Aggregated | 6,253            | 916            | 2,341     |
| Baseline   | 24,983           | 250            | 0,640     |
| Proposal   | 25,017           | 228            | 0,585     |

# Issue #1

## Recommendations for many SSRCs joining



- › Clarified that in unicast sessions the initial delay MAY be zero when adding a new SSRC
- › The concern we have is that if an endpoint adds a lot of SSRCs in a short time-interval this creates a burst of initial RTCP compound packets.
  - Which was why the initial delay was created
- › Question:
  - Should there be limits or recommendations for when it is no longer okay to use a zero initial delay?
  - If so, what number of new SSRCs is this limit?

# Issue #2

## RTCP parameters for common scenarios



- › In Section 6.2.2:
  - a future version of this memo will include examples of how to choose RTCP parameters for common scenarios
- › Are these examples needed or is the text for calculating this sufficiently good?

# Issue #3

## Scheduling algorithm under dynamic changes



- › The Scheduling algorithm as describe above hasn't been tested with dynamic changes
- › Will be simulated by Magnus after meeting
  - Others please perform simulations
- › Group size growing:
  - Next T grows and delays transmission from  $T_p$
  - Happens  $T_p - T_c$  later but that is equal for all SSRCs aggregated.
- › Group size shrinking
  - Reverse reconsideration at time  $T_c$ 
    - › Pulls  $T_p$  proportional towards  $T_c$



# Issue #4

## Compatibility issues with AVG\_RTCP\_SIZE



- › The current proposal in the Scheduling includes
  - AVG\_RTCP\_SIZE is updated total size / number of SSRCs
  - Number of SSRCs are the ones that include SR or RR
- › Effect on non-updated RTCP sender
  - Updates AVG\_RTCP\_SIZE with total size
  - Results in that average transmission interval increases
    - › By a factor of the number of SSRCs aggregated
  - If AVG\_RTCP\_SIZE difference factor becomes  $\geq \sim 4-5$ 
    - › Timeout of legacy SSRCs within a single reporting interval on updated endpoints will be possible
    - › Their transmission interval will be severely reduced

# Issue #4

## Compatibility issues with AVG\_RTCP\_SIZE



› How do we deal with this?

› Alternatives

1. We require updated hosts to track peer endpoints' behavior and stop aggregating if significant increase of reporting interval occurs
2. We require updated hosts to base timeout calculation on full packet size
3. We move the SSRC aggregation to the Optimization draft
  - › Only used when signaling indicates support
4. We add signaling for SSRC aggregation

› Opinions!

# Issue #5

## Optimizations for Feedback Messages (AVPF)



- › Section 5.4.2 does not specify any change to FB sending
  - Possible to schedule all suitable SSRCs for FB message sending
  - Suppression will skip any FB packet already sent
  - Sent packet will be a reduced size or a full early packet
- › However, if no SSRC suitable to send a FB packet
  - Currently rules say the FB shall be discarded
  - Another SSRC may send a compound packet within  $T_{\text{max\_fb\_delay}}$  but is not suitable to originate FB message
  - Desirable to piggyback the FB message on the compound packet?

# Issue #5

## Optimizations for Feedback Messages (AVPF)



### › A Likely Problem-Free Option

- Cache the FB message
- If any other SSRC sends a compound packet prior to  $T_{\text{max\_fb\_delay}}$  include it

### › A Bigger-Impact Proposal

- An SSRC(s) unable to send a FB triggers the early sending of early Full Compound packet (if allowed)
- Allows for even more bursty RTCP transmission due to event storms
- Can prevent other SSRCs from using their early transmission slots for FB they are suitable to.

# Next Steps



- › Perform Simulations
- › Attempt to find answers to open issues and propose text
- › Address any received feedback
  - Do you volunteer to review?
- › Target an update before end of May



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# Grouping RTCP Reception Statistics and Other Feedback

[draft-ietf-avtcore-rtp-multi-stream-optimisation-02](#)

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# Overview



- › Document Update Summary
- › Issues
  1. Middlebox Considerations are Missing
  2. Transmission of Feedback (AVPF)
- › Next Steps

# Update Summary



- › Major Changes
  - Document restructuring
  - Proposal for AVPF feedback scheduling
  - Interactions with RTCP XR
  - Added SDP signalling
  - Security Consideration
- › Even more small ones
  
- › Please review if you haven't!



# Open Issue #1



- › Middlebox Considerations
- › Author's haven't gotten around to writing it
- › Need to get it done in next version

# Open Issue #2



- › Tried clarify how to send AVPF Feedback (Section 3.3):
  - All local SSRCs see same conditions
  - Who sends feedback may matter due to FB message semantics
  - Each member of an RTCP reporting group SHOULD therefore send RTP/AVPF feedback/codec control messages independently of the other members of the reporting group, to respect the semantic meaning of the message sender.
  - Suppression will normally result in single copy sent
  - Endpoint MAY choose to send all its feedback from the reporting source
    - › If not semantically important
    - › RTP/AVPF timing rules operate on a per-SSRC basis.

# Open Issue #2



- › This may be sufficient
  - Authors had discussion while writing
- › Needs further consideration
  - Please think about it

# Next Steps



- › Write Middlebox Consideration
- › Implement Feedback
  - Who volunteer to review?
- › See if any issues in draft-ietf-rtp-multi-stream requires changes in this document
- › Make draft ready for WG last call