Rapid Synch for RTP Multicast Sessions

draft-versteeg-avt-rapid-synchronization-for-rtp-02

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Recap: Proposed Approach

- Prior to join, receiver requests a unicast burst from a server caching the recent data.

Data the RTP receiver needs to get from the retransmission server
Summary

• RTP receiver says to the retransmission server:
  “I have no synch with the stream. Send me a repair burst that will get me on the track with the multicast session”

• Differences compared to conventional retransmission:
  – Receiver does not know exactly what it is missing
  – Retransmission server
    • May need to parse data from earlier in the stream than it is needed for retransmission (Reference information may be dispersed)
    • May need to burst faster than real time

• We define a method that enables a joining receiver to acquire and process a multicast flow quickly

• The method is applicable to any RTP-encapsulated multicast flow
Changes since Version -01

• Two drafts have been combined together:
  – draft-versteeg-avt-rapid-synchronization-for-rtp-01
  – draft-levin-avt-rtcp-burst-00

• A new section on protocol design considerations has been added

• The draft is no more MPEG2-TS specific

• The video-specific discussions have been moved to:
  – draft-begen-avt-rtp-mpeg2ts-preamble-00

• The RMS-R, RMS-I and RMS-T messages have been modified

• The discussion of RTCP XR report has been moved to:
  – draft-begen-avt-rapid-sync-rtcp-xr-00
Rapid Synchronization

Open Issue:

Any need to explicitly address other topologies where FT, Burst and Retransmission Sources are not co-located?

The Feedback:

Such topologies are for further study
Rapid Synchronization

Multicast Source | Retransmission Server | Router | RTP Receiver

-- RTP Multicast --
-- RTP Multicast ->

<"""""""""""" RTCP RMS-R "'
'' (RTCP RMS-I) """"""""'>
.. Unicast RTP Burst .............>
'' (RTCP RMS-I) """"""""

<~~ IGMP Join ~~

-- RTP Multicast --

<"""""""""""" RTCP RMS-T "'
<"""""""""" (RTCP NACK)''
.. (Unicast Retransmissions) ....>
<"""""""""" RTCP BYE "'

Ali C. Begen (abegen@cisco.com)
**RMS Request (RR ➔ RS)**
(Payload-Independent) Transport-Layer Feedback (PT=RTPFB, FMT=5)

- Sending one RMS-R is required prior to RMS
  - Min RMS Buffer Fill Req: RR’s min data req (in ms) from the burst
    - A zero value means it is not specified
  - Max RMS Buffer Fill Req: Max data (in ms) RR can accept from the burst
    - A zero value means it is not specified
  - Max Receive Bitrate: Maximum bitrate (in bps) that RR can receive
    - A zero value means it is not specified
RMS Information (RS $\rightarrow$ RR)
(Payload-Independent) Transport-Layer Feedback (PT=RTPFB, FMT=6)

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0                   1                   2                   3
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- Extended RTP Seqnum of the First Burst Packet
- Earliest IGMP Join Time
- Rapid Synchronization Duration
- Max Burst Bitrate

• Sending one RMS-I is required before or during the burst
  – Response may indicate whether RMS request has been accepted or not
  – Response may be used to signal RR to join immediately or at an indicated time

• Further RMS-I messages may be sent to update any information
  – MSN indicates message seqnum (useful to identify reordered messages)
**RMS Termination (RR → RS)**
*(Payload-Independent) Transport-Layer Feedback (PT=RTPFB, FMT=7)*

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- Although RS may end the burst proactively, sending RMS-T at least once is required
- If RR has not joined the multicast session or has not started receiving multicast packets
  - RR sends an empty RMS-T message (w/o an RTP seqnum)
  - RS must stop the burst upon receipt
- If RR has started receiving multicast packets
  - RR sends an RMS-T message with the RTP seqnum of the first multicast packet
  - RS should continue bursting until the reported seqnum
- RS may continue bursting if RMS-T message gets lost
  - RMS-T messages may be repeated (by following the rules of RFC 4585)
  - RS should eventually end the burst at some point (e.g., after a timeout)
- If RR needs to cancel an active/pending unicast session, RR sends a BYE
TLV Encoding in Control Plane

- Almost all fields in RMS control messages are optional
  - Not every implementation needs every field
  - An implementation may not need every field all the time
- Then, why not make every field TLV encoded?
  - Unused fields will not be encoded
    - Saves bandwidth
  - Eliminates the need for special values and ambiguity
Extensions for Control Plane

• New TLV elements may be defined later
  – These extend the protocol in a vendor-neutral manner
  – These should be accompanied by informational RFCs

• Vendors may need vendor-specific extensions
  – For interoperability, such extensions MUST NOT collide
  – Use numbers from http://www.iana.org/assignments/enterprise-numbers

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(TLV-encoded) Fields as Defined in This Document:

- Type = TBD
- Length
- Ent. Number
- Ent. Number contd.
- Value
- Value contd.
Known Implementations

• Open Source RTP Receiver Implementation by Cisco

  Documentation:
  http://www.cisco.com/en/US/docs/video/cds/cda/vqe/3_0/user/guide/ch1_over.html

  FTP Access:
  ftp://ftpeng.cisco.com/ftp/vqec/

  Preliminary Results:
  See the references

• IPTV Commercial Implementation by Microsoft

  Information:
  http://www.microsoft.com/mediaroom
  http://informitv.com/articles/2008/10/13/channelchangetimes/
Other Open Issues

• Name confusion with draft-perkins-avt-rapid-rtp-sync
  – We propose to update our title as:
    Unicast-Based Rapid Acquisition of Multicast RTP Sessions
  – Any other proposals?

• Collision in FMT numbering space

• Using extended RTP seqnums in RMS-I and RMS-T

• Discussion of burst shaping, NAT and security issues
Next Steps

• Shall we add a milestone to AVT's charter to produce an RFC on rapid acquisition of multicast RTP sessions?

• Breakout Session:
  – Tomorrow at 9am (till 10:30am)
  – Room: Yosemite A
  – Bridge: See AVT mailing list