RTCP FB NACK storm suppression and its impact on retransmission in RTP SSM sessions with unicast FB

draft-vancaenegem-avtcore-fb-supp-and-retransm-00

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Prague
03/28/2011

Intro :
FB storm suppression in Multiparty Sessions

1. Realised by AVPF suppression rule in RFC 4585 :

- *"Feedback suppression is used to avoid feedback implosion in multiparty sessions: The receiver waits for a (short) random dithering interval to check whether it sees a corresponding FB message from any other receiver reporting the same event. (..) If a corresponding FB message from another member is received, this receiver refrains from sending the FB message and continues to follow the Regular RTCP transmission schedule."*

2. draft-wu-avt-retransmission-supression-rtp [sic]

- *Abstract: "In a large RTP session using the RTCP feedback mechanism defined in RFC 4585, a media source or middlebox may experience transient overload if some event causes a large number of receivers to send feedback at once. This feedback implosion can be mitigated if the device suffering from overload can send a third party loss report message to the receivers to inhibit further feedback (..)"*

....*No Clear Rationale Why a Third Party Loss Message is needed*....

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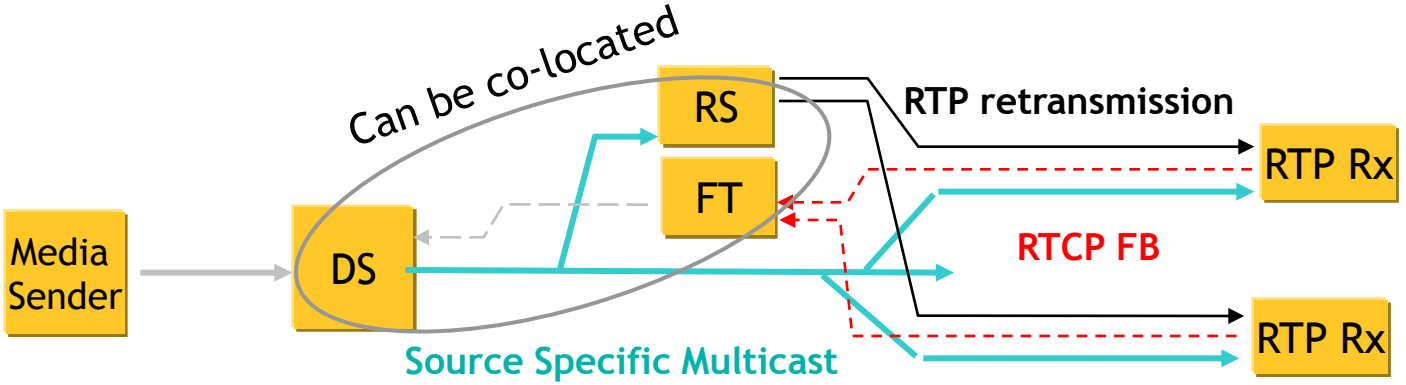
- Focuses on "SSM with Feedback Target" architecture (RFC 5760), enhanced with Retransmission Server (draft-ietf-avt-rapid-acquisition-for-rtp; aka RAMS)



Note: RFC 5760 defines Simple Feedback model AND Summary Feedback model

- Describes "interference" between RTP retransmission (RFC 4588) and FB suppression resulting from AVPF suppression rule (RFC 4585)
- Looks at three packet loss event cases and presents possible solutions for the behaviour of RS, DS, FT and SSM RTP Rx, targeting an optimised balance between FB suppression and retransmission efficacy

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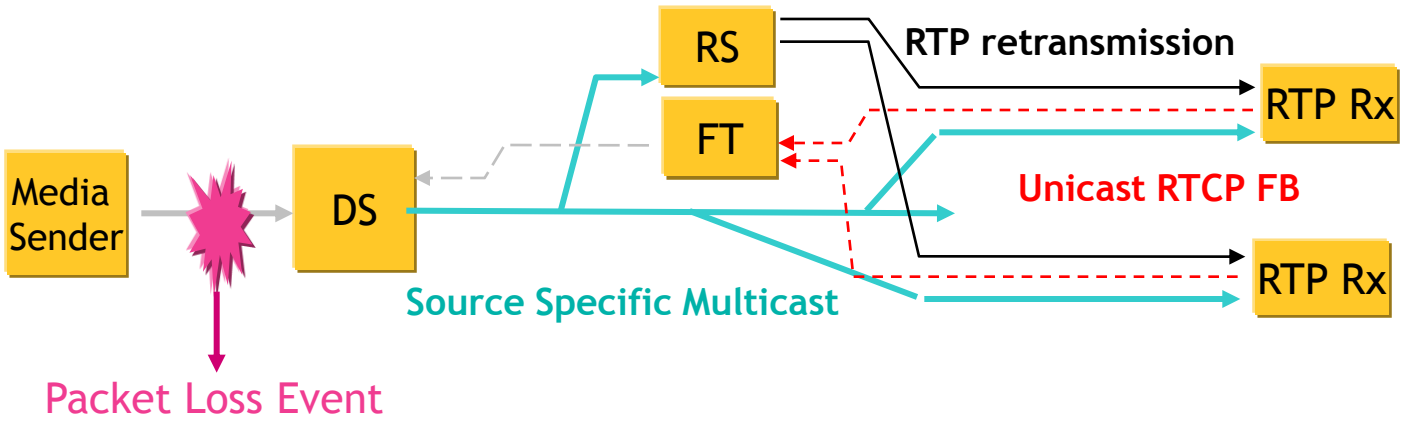
Case 1 : SSM with single FT; Packet Loss upstream of DS



FB storm suppression realised by AVPF algorithm implemented by SSM RTP receivers

- DS sends / forwards a single RTCP FB NACK on the SSM
- If packet becomes available for retransmission, the RS SHOULD provide "unsollicited" retransmission to all SSM receivers
  - Dedicated SSM retransmission session (session-muxed with original SSM)
  - Retransmissions in unicast sessions (as per [I-D.ietf-avt-ports-for-ucast-mcast-rtp])

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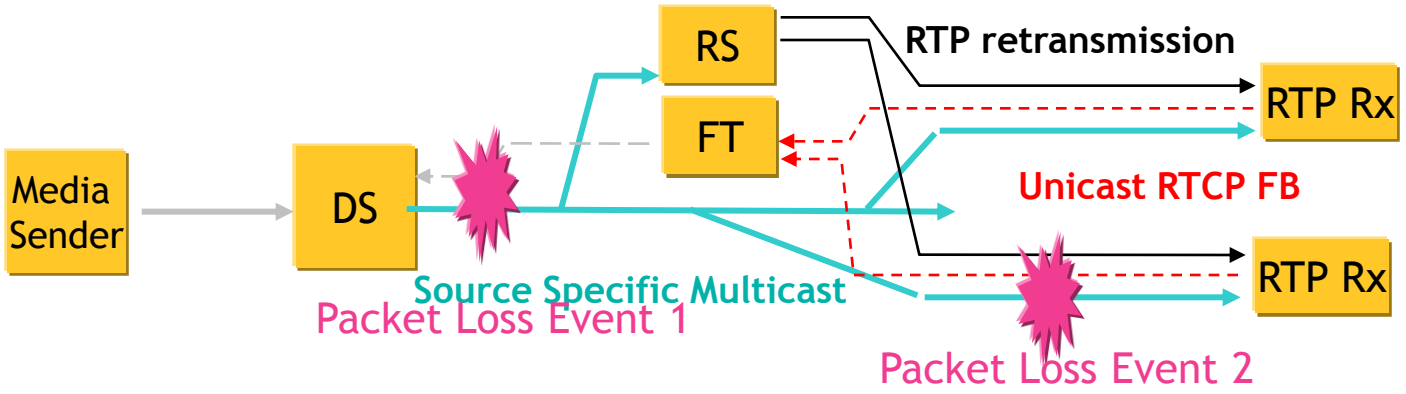
Case 2: SSM with single FT ; Packet Loss downstream of DS



- Reflection or FW-ing by DS of 1st received NACKs will result in FB suppression

…BUT : RS will NOT know which (other) SSM receivers suffered from packet loss !!

- Proposed Solutions
  - DS in simple FB model : Allow selective reflection of RTCP FB (NACK) messages
    - DS determines whether to reflect RTCP FB NACKs (and suppress FB) based on e.g. pattern of incoming NACKs
  - DS in summary FB model : Define "selective FW-ing" mode for RTCP FB messages
  - RS SHOULD provide Retransmissions to all SSM Receivers when FB was suppressed

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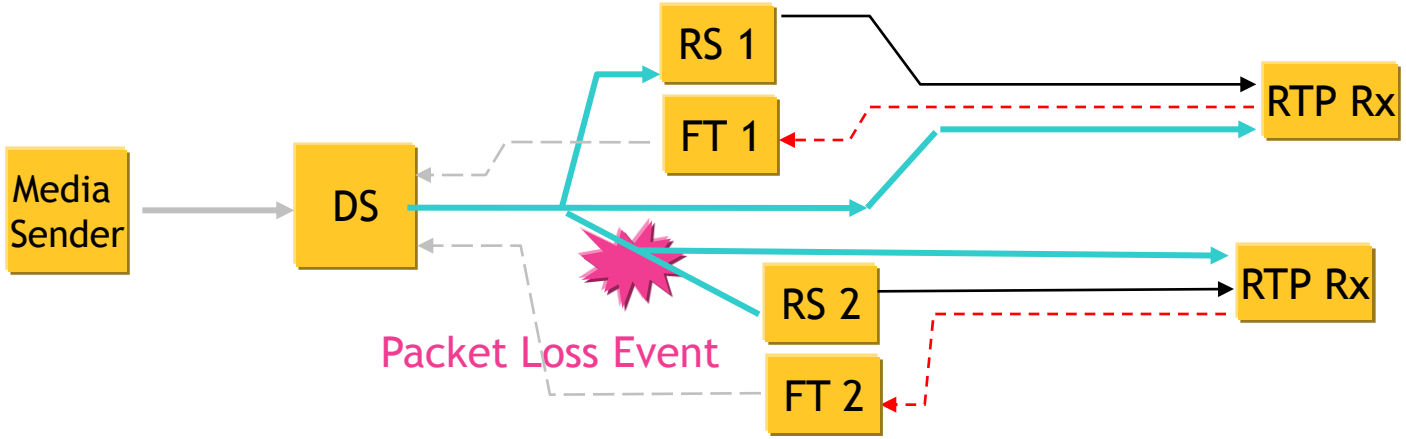
Case 3: SSM with multiple FTs/RSs



- Packet Loss event will trigger FB Suppression across entire SSM Rx population, even though there are separate subdomains, each with their own FT/RS
- Proposed Solution:
  - FT/RS does not forward RTCP FB NACKs received from SSM Rx to DS. Instead it transmits single NACK or 3rd party Loss , acting as SSM Rx or Translator, to the DS
  - All SSM RTP Rx only apply AVPF FB suppression rule when they receive RTCP FB message (NACK or 3rd Party Loss) in SSM, that has SSRC identifier of local FT/RS
  - Requires SSM RTP Rx to learn SSRC of local FT/RS (acting as translator or SSM RTP Rx)
    - Using Receiver Summary Information RTCP message or as SSRC attribute in session description

AT THE SPEED OF IDEAS