

# Video Frame Info RTP Header Extension

draft-ietf-avtext-framemarking-01

Espen Berger, Suhas Nandakumar, Mo Zanaty  
(Cisco)

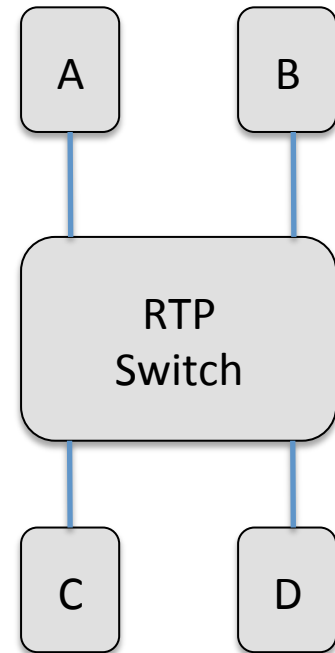
AVTEXT WG

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# Review: Main Motivation

## Payload-Agnostic RTP Switch

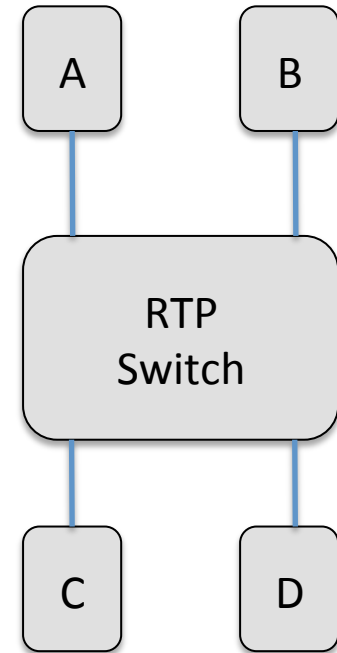
- Payload may be encrypted
  - Avoid decryption cost to improve switch scale and latency
- Payload may be encrypted end-to-end
  - Impossible to decrypt / inspect payload without end-to-end keys
- Payload may be unknown format
  - Codec-agnostic switching can support any format, old or new



# Review: More Motivations

## Smarter RTP Switch

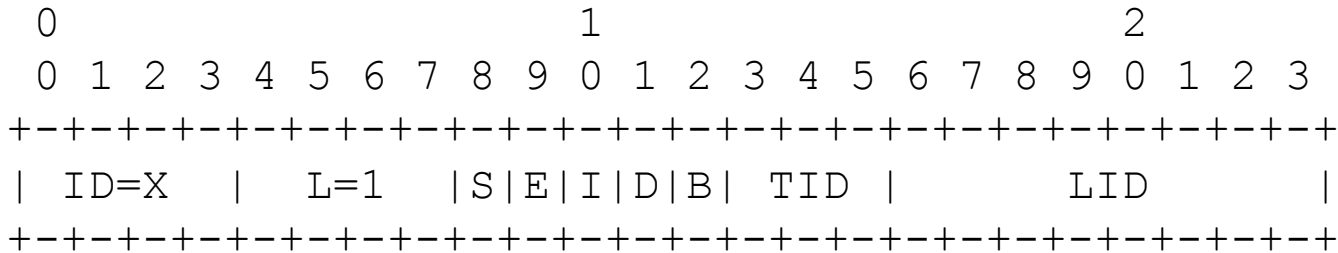
- Clean video switching at intra-frames
- Better recovery during packet loss
- Drop least important packets during congestion
- Drop scalable enhancement layers for constrained endpoints



## Smarter Endpoints

- Better recovery during packet loss

# Video Frame Info Extension

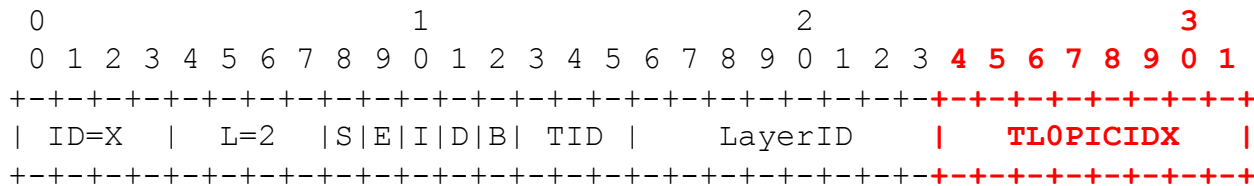


- S: Start of Frame - MUST be 1 in the first packet in a frame within a layer.
- E: End of Frame - MUST be 1 in the last packet in a frame within a layer.
- I: Independent Frame - MUST be 1 for frames that can be decoded independent of prior frames, e.g. key/intra-frame; otherwise MUST be 0.
- D: Discardable Frame - MUST be 1 for frames that can be dropped, and still provide a decodable media stream; otherwise MUST be 0.
- B: Base Layer Sync - MUST be 1 if this frame only depends on the base layer; otherwise MUST be 0.
- TID: Temporal ID (3 bits) - The base temporal quality starts with 0, and increases with 1 for each temporal layer/sub-layer.
- LID: Layer ID (8 bits) - The spatial and quality layer ID defined by scalable codecs.



# Open Issues: TLOPICIDX

- Some comments proposed adding TLOPICIDX



- What is TLOPICIDX?
  - If TID=0, it is a running index of TID=0 frames.
  - If TID>0, it signals a dependency on only that TID=0 frame.
- How is it used?
  - After frame loss, it can be used to determine if dependencies are met for subsequently received frames so they can be forwarded by MANEs and rendered by endpoints.

# TLOPICIDX

- MRST and MRMT
  - Frame loss in base layer is easy to detect by RTP SEQ gap, so no need for TLOPICIDX.
- SRST
  - Frame loss in base layer is easy to detect by RTP TS gap for fixed GOP and frame rate (e.g. VP9 SS non-flexible mode), so no need for TLOPICIDX.
  - For variable GOP and frame rate (e.g. VP9 flexible mode), TLOPICIDX can be useful to signal dependencies.
  - However, for complex variable GOPs, there is rarely a simple single dependency, so TLOPICIDX may be insufficient.
- RECOMMENDATION
  - Do not include TLOPICIDX, since simple, regular scalability structures can use SEQ/TS to infer dependencies, while complex, flexible modes likely need to express more complex dependencies than TLOPICIDX.