Video Frame Info
RTP Header Extension

draft-ietf-avtext-framemarking-04
Note Well: https://datatracker.ietf.org/ipr/2876/
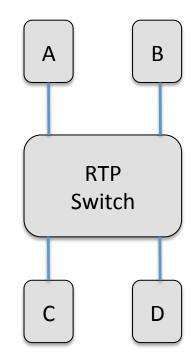
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AVTEXT WG
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Review: Main Motivation

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
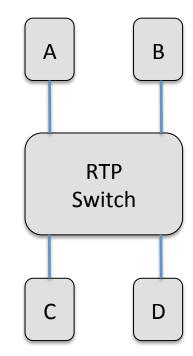 - Codec-agnostic switching can support any format, old or new

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

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| ID=?  |  L=2/0|S|E|I|D|B| TID |    LayerID    |   TL0PICIDX   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- **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.
- **TL0PICIDX: Temporal Base Layer 0 Picture Index** (8 bits) - Running index of base temporal layer frames and dependencies on them.

Changes in version -04

- Allowed the short header for scalable streams.

    3.1. Extension for Non-Scalable Streams
    The following RTP header extension is RECOMMENDED for non-scalable streams. It MAY also be used for scalable streams if the sender has limited or no information about stream scalability.

- Allowed the long header for non-scalable streams.

    3.2. Extension for Scalable Streams
    The following RTP header extension is RECOMMENDED for scalable streams. It MAY also be used for non-scalable streams, in which case TID, LID and TL0PICIDX MUST be 0.

Changes in version -04

- Added section for LRR

  3.4.1. Relation to Layer Refresh Request (LRR)

  Receivers can use the Layer Refresh Request (LRR) [I-D.ietf-avtext-lrr] RTCP feedback message to upgrade to a higher layer in scalable encodings. The TID/LID values and formats used in LRR messages correspond to the same values and formats specified in Section 3.2.

Changes in version -04

- Clarified this only applies to video Source RTP Streams, not audio nor RTX/FEC Redundancy RTP Streams.

    This extension is only specified for Source (not Redunadancy) RTP Streams [RFC7656] that carry video payloads. It is not specified for audio payloads, nor is it specified for Redundancy RTP Streams. The (separate) specifications for Redudancy RTP Streams often include provisions for recovering any header extensions that were part of the original source packet. Such provisions SHALL be followed to recover the Frame Marking RTP header extension of the original source packet.

Changes in version -04

- Imported relevant information from:

  draft-aboba-avtcore-sfu-rtp

  – MUST match the corresponding info in video payload structures
    - H.264-SVC NAL/PACSI, H.265 NAL/PACI, etc.

Open Issues

- Marking for Redundancy RTP Streams?
  - Not intended for RTX, FEC
  - Recommend a separate draft if RTX or FEC need some form of marking

- RTP Padding Only bit proposal for PERC use
  - Can the Discardable bit be used instead?
  - Can RTX/FEC PT be used instead of real media PT?
  - If not, do not recommend adding this oddity

Next Steps

- Ready for WGLC after resolving open issues.

- Questions?

- Thank you!