RTP Payload Format for SVC Video – draft-ietf-avt-rtp-svc-13

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What has happened since last IETF

- Alex became co-author
- SVC Design Team: Co-authors, Roni Even, Jonathan Lennox, Mike Nilsson, Peter Amon, Miska Hannuksela, Thomas Wiegand, Colin Perkins, Sam Ganesan
- 10 SVC Design Team Calls
- 1 Editor Conference Call & 1 Physical Meeting last week during JVT

- Changes in the draft summarized on next slides

What is new - General

- Draft re-structured

- New Introduction section

- Checked and improved definitions

- Motivation improved

What is new – Packet Types

- PACSI, packet type: 30

  - Payload Content Summary Information

  - May contain CS-DON

  - Mandatory for some multi-session modes

  - Optional for other modes

  - PACSI can be contained in Single NAL unit Packet

What is new – Packet Types (cont.)

- Non-interleaved MTAP (NI-MTAP): type 31
  - For reducing header overhead
  - Combining data alignment information (dummy data) with real data in multi-session transmission
  - Empty packet for data alignment in multi-session transmission

What is new – New Packet Types
(next version)

- Problem: NI-MTAP used the last available packet type

- Extension packet type: 31

    – For SVC and future extensions

    – 5 bit sub-type and 3 bit flags

- NI-MTAP: sub-type 1

- Empty packet: sub-type 2

    – For data alignment in multi-session transport

What is new – Transport Modes

- Packetization modes derived from RFC3984
    - Extended by new packet types
- Two general transport modes:
    - Single-session transmission (SST)
    - Multi-session transmission (MST)

Single-session transmission (SST)

- Payload type H264-SVC
- Used with RFC3984 packetization modes
- Presence of PACSI is optional
- NI-MTAP may be present in non-interleaved mode

Multi-session transmission (MST)

- Sub-modes based on timestamp alignment or Cross Session Decoding Order Number (CS-DON)

- Three basic sub-modes
  - Non-interleaved timestamp based (NI-T)
  - Non-interleaved CS-DON based (NI-C)
  - Interleaved CS-DON based (I-C)

- Fourth mode : NI-TC mode
  - Satisfies both NI-T and NI-C rules

Multi-session transmission (MST) (cont.) -Non-interleaved time stamp based (NI-T)

- Former "Classical RTP Mode"
- Based on NTP timestamps
- RFC 3550 data alignment
- Data alignment is required (New - Empty packet)
- Re-order packets in multiple sessions according to presence of data in the highest session
- Non-interleaved transmission only

Multi-session transmission (MST) (cont.) -Non-interleaved CS-DON based (NI-C)

- Former "Cross Layer DON Mode"

- Based on Cross Session-DON (CS-DON)

- CS-DON value present in PACSI packets

- No data alignment required

- Re-order packets in multiple sessions according to CS-DON value

- Non-interleaved transmission only

Multi-session transmission (MST) (cont.) -Interleaved CS-DON based (I-C)

- Same session re-ordering as NI-C mode
  - But: With interleaving
- Based on Cross Session-DON (CS-DON)
- DON in RFC3984 required to be CS-DON
  - Requires the use of the Interleaved session packetization mode
- For interleaved transmission

Non-interleaved timestamp and CS-DON based mode (NI-TC)

- Satisfies both
  - NI-T and
  - NI-C

- Data alignment ensured for NI-T

- Presence of CS-DON ensured for NI-C

- Receivers are free to implement the decoding order recovery process according to either NI-T or NI-C

Signaling

- Payload type "H264-SVC"
- With RFC3984 packetization modes
- Additional parameter: "mst-mode"
- DON parameters for CS-DON based MST modes
- sprop-scalability-info: Binary of Scal. Info. SEI
- scalable-layer: Indication/Selection of one layer "in SEI"
- sprop-layer-range: Indication/Selection of range of layers

Signaling (cont.)

- sprop-spatial-resolution:
  - declarative only (?)
- More declarative parameters describing SVC stream? Similar parameters are present as binary in the Scal. Info. SEI:
  - sprop-spatial-resolution-min-op, sprop-spatial-resolution-max-op
  - sprop-avg-framerate-min-op, sprop-avg-framerate-max-op
  - sprop-max-framerate-min-op, sprop-max-framerate-max-op
  - sprop-avg-bitrate-min-op, sprop-avg-bitrate-max-op
  - sprop-max-bitrate-min-op , sprop-max-bitrate-max-op

Open Issues

- Using NTP instead of RTP timestamps for alignment in NI-T mode may introduce delay

  – See presentation of draft-lennox-avt-rtp-layered-encoding-timestamps-01

- Can binary of "sprop-scalability-info" be used for Offer/Answer?

Our to-do list

- Signaling
- Shorten length of draft, if possible
- Further improve introduction