# RTP Payload Format for VC-1

## draft-ietf-avt-rtp-vc1-01.txt

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# General developments

- An IPR disclosure was sent to IETF
  - Should soon be available on http://www.ietf.org/ietf/IPR/

- The VC-1 spec (421M) is now available
  - See http://www.smpte.org/smpte_store/standards

- Interest in referencing this RTP payload format in DVB-H
  - To be published as ETSI 102 005

# Changes since -00

- RTP Timestamp now Presentation Time

- AU fields aligned to 16-bit boundaries

- "Seq Count" field became "RA Count" field
  - Now incrementing on every Entry-Point header instead of Sequence Layer header

- Added "SL" bit – toggled when Sequence Layer changes
  - Likely to be a much less frequent occurrence than a change in the Entry-Point header

- Described how to trim leaky bucket information from Sequence Layer header
  - Allows this header to be repeated frequently with less overhead

# Comments on -01

- Add support for SIP offer/answer feature?
  - Requires additional SDP parameters to indicate receiver capabilities
    - E.g., max-level, max-width, max-height, max-framerate

  - Easy enough to add, but is it really required?
    - No offer/answer in RFC-3640, even though it was published 17 months after RFC-3264
    - Offer/answer in RFC-3984 (H.264) takes up ~8 pages!
    - RFC-4175 (published Sept'05) defines "width" and "height" but has no offer/answer section…

- Q: Why is "config" SDP parameter Hex instead of Base64
  - A: "config" is Hex in RFC-3640
  - Makes debugging through visual inspection much easier

# Next steps

1. Post updated I-D (version -02)
    – ETA Nov. 16

2. Try Last Call after that
    – DVB-H is waiting for this RFC…

Planning to review this document?
    – Then please send comments ASAP

# Backup slides

IETF AVT WG

# Sample SDP

- Simple Profile, Main Level

```
m=video 49170 RTP/AVP 98
a=rtpmap:98 VC1/90000
a=fmtp:98 profile=0;level=2;width=352;height=288;framerate=15000;
   bitrate=384000;buffer=2000;config=4e291800
```
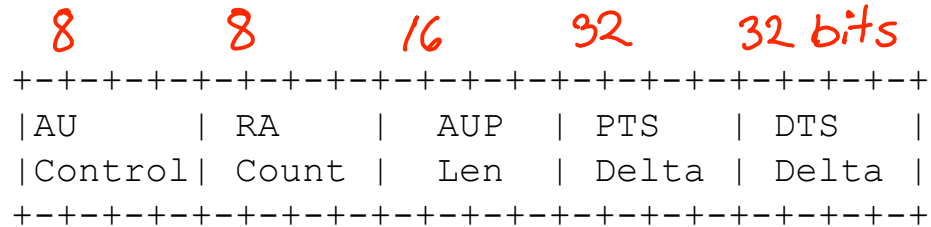
# Payload Format

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+- .. +-+-+-+-+
| RTP       | AU(1) | AU(2) |    | AU(n) |
| Header    |       |       |    |       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+- .. +-+-+-+-+
```

- Each AU is a single picture (frame)
- Sequence Layer and Entry-Point headers also included, if applicable
- Fragmentation occurs at Slice Layer boundary, if possible
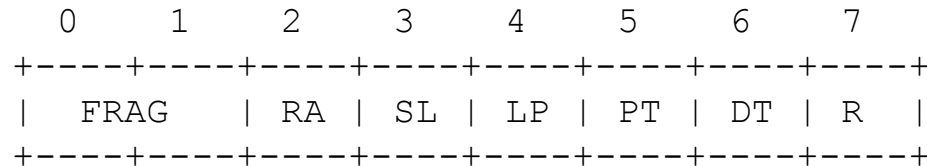- Each AU starts with variable length header (shown on next slide)

# AU header

```
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|AU      | RA     | AUP   | PTS   | DTS    |
|Control| Count  | Len   | Delta | Delta |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- AU Control and RA Count must always be present

- RA Count must change on each Random Access point
  - Allows receiver to know if it lost a packet that contained an Entry-Point header

# AU Control field

```
  0    1    2    3    4    5    6    7
+----+----+----+----+----+----+----+----+
|   FRAG   | RA | SL | LP | PT | DT | R  |
+----+----+----+----+----+----+----+----+
```

- FRAG: 2 bits
  - 0: The AU payload contains a fragment of a frame other than the first or last fragment.
  - 1: The AU payload contains the first fragment of a frame.
  - 2: The AU payload contains the last fragment of a frame.
  - 3: The AU payload contains a complete frame (not fragmented.)
- RA: 1 bit
  - Random Access Point indicator.  This bit MUST be set to 1 if the AU contains a frame that is a random access point.  In the case of Simple and Main profiles, any I-picture is a random access point. In the case of Advanced profile, the first frame after an entry-point header is a random access point. Note that if entry-point headers are not transmitted at every random access point, this MUST be indicated using the MIME parameter "mode=3".
- SL: 1 bit
  - Sequence Layer Counter. This bit MUST be toggled, i.e., changed from 0 to 1 or from 1 to 0, if the AU contains a sequence layer header and the sequence layer header is different from the most recently transmitted sequence layer header.
- LP: 1 bit
  - Length Present.  This bit MUST be set to 1 if the AU header includes the AUP Len field.
- PT: 1 bit
  - PTS Delta Present.  This bit MUST be set to 1 if the AU header includes the PTS Delta field.
- DT: 1 bit
  - DTS Delta Present.  This bit MUST be set to 1 if the AU header includes the DTS Delta field.
- R: 1 bit
  - Reserved.  This bit MUST be set to 0 and MUST be ignored by receivers.