RTP Payload for Interleaved Audio

draft-ietf-avt-rtp-interleave-00.txt

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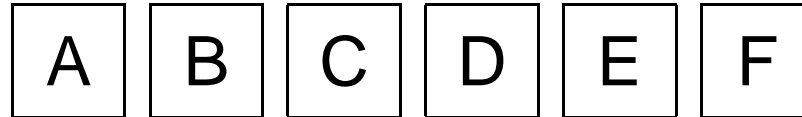
Information Sciences Institute

Talk Outline

- What is Interleaving?

- Motivation

- Payload Requirements

- Interleaver Parameters
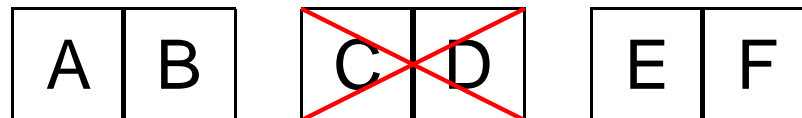
- Proposed Payload

- Concluding Remarks

What is Interleaving?

A: Simple technique for re-ordering the transmission of symbols across a communications medium. For audio streams, it can disperse effects of losses.
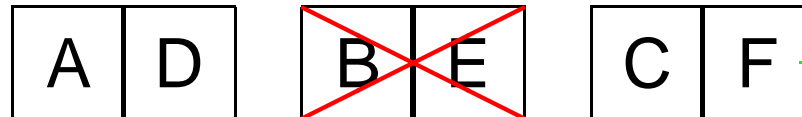
Audio Frames

| A | B | C | D | E | F |

Audio Packets

| A | B | C | D | E | F |

Audio Packets w/

| A | D | B | E | C | F |

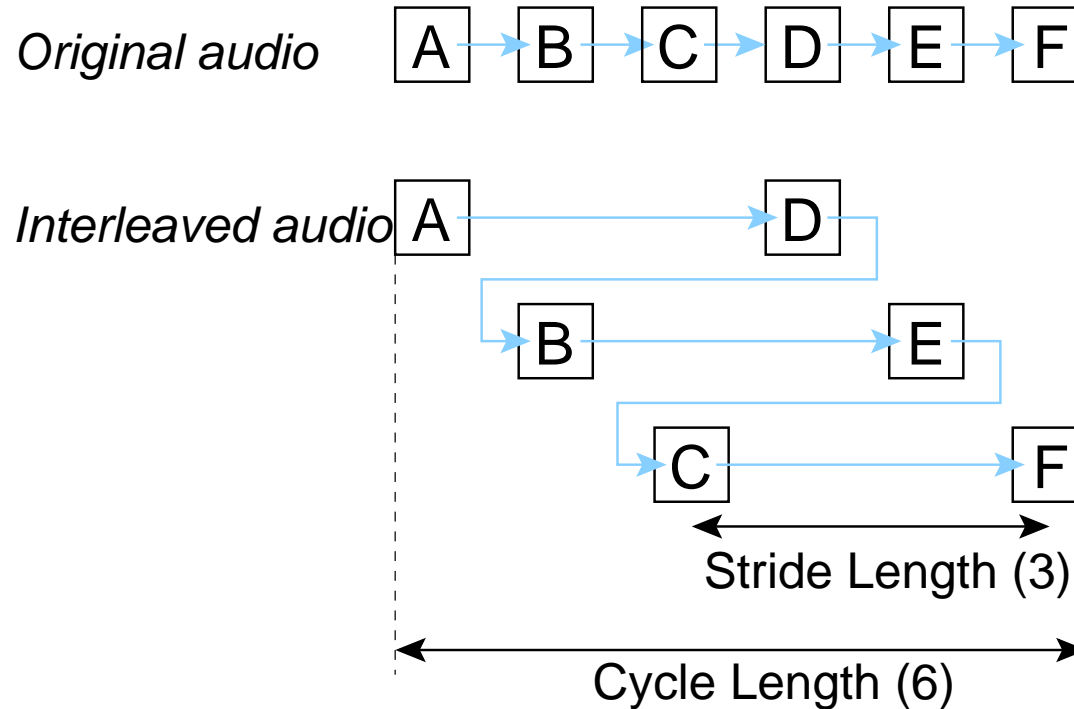Interleaved Frames

| A | B | C | D | E | F |

Motivation

- Provide an option for applications prepared to trade delay for dispersed losses, eg. broadcast style applications.

- Provide payload that the majority of existing RTP audio payloads, and future payloads, can use. A few payloads support interleaving within payload, eg. AMR/AMR-WB, EVRC/SMV, MP3.

- Provide functionality for RTP audio apps that exists in proprietary streaming applications.

Requirements

- Low overhead payload format.

- Work with audio codecs with fixed size or self-describing frame sizes.

- Support codec changes mid-stream.

- Support streams employing silence suppression.

- Reasonably easy to implement.

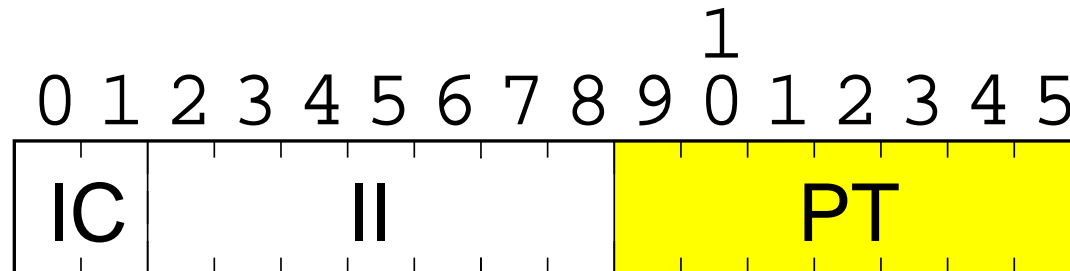# Interleaver Parameters

Original audio   A → B → C → D → E → F

Interleaved audio

A	→ D
B	→ E
C	→ F

Stride Length (3)

Cycle Length (6)

Cycle Length and *Stride Length* are assumed to be conveyed, eg. via SDP.

Proposed Payload

2 bytes per audio packet:

```
                  1
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
┌───┬───────────┬───────────────┐
│IC │    II     │      PT       │
└───┴───────────┴───────────────┘
```

- **IC: Interleaver Cycle**, the interleaver cycle count modulo 4. Eases decoding.

- **II: Interleaver Index**, the position within the interleaver cycle of the first audio frame in packet. Subsequent frames in packet are offset by the *Stride Length* value.

- **PT: Audio Payload**, the payload of the audio frames contained within packet.

Timestamping Technicality

Interleaving should not affect timestamps. Source employing interleaving should stamp packets as if interleaving not employed. This preserves playout measures, ie jitter and delay.

Example
For cycle length 8, stride length 4, 2 frames per packet, the output sequence is:

AE, BF, CG, DH

Timestamps should be:

t(A), t(C), t(E), t(G)

which correspond to uninterleaved stream:

AB, CD, EF, GH

Concluding Remarks

- Please read the draft, draft-avt-interleaving-00.txt, it contains more details and examples.

- Raise issues this week with Colin Perkins.

- Post comments to the AVT-list: avt@ietf.org

NB Particularly like to hear from anyone interested in implementing payload – *it's supposed to be simple!*