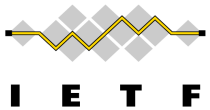
Mapping RTP streams to CLUE media captures

draft-even-clue-rtp-mapping-04

IETF-85

Roni Even

Jonathan Lennox



Introduction

- CLUE framework
  - Defines Media Captures that provide information about the semantics of streams, like spatial relation
  - Allows consumers to request specific Captures
- RTP is used to transmit the requested streams
- SDP is used to negotiate the characteristics of codecs and connections over which streams are sent
- Need to map between media captures and actual streams sent over RTP
- Try to avoid duplication of information between SDP and CLUE

Assumptions

- CLUE systems support different topologies
  - Point to point
    - Sender source is one to one mapped to RTP streams
  - Media mixers
    - Senders' sources are visible as Contributing sources (CSRCs).
  - Media switching mixers
    - Sender's source is visible as a Contributing source (CSRC).
  - Source projection mixers
    - Each media source is one to one mapped to a SSRC in Participant's RTP session.

SSRC behavior

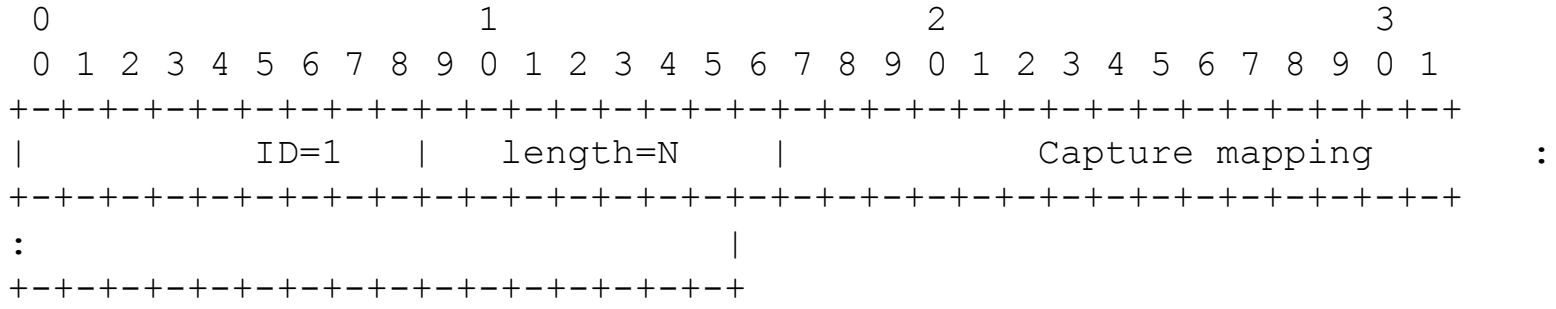
- Topologies show two major SSRC behaviors:
  - Static SSRCs
    - SSRCs assigned by MCU/mixer.
    - One or more static SSRC can be used for each CLUE media Capture. (simulcast)
    - Source information may be conveyed in CSRC.
  - Dynamic SSRCs
    - SSRCs of the original source relayed by the Mixer/MCU to participants.
    - Mapping between SSRCs and Media Captures changes with every source switch.

Mapping options – SDP overview

- Documents discussing SSRC multiplexing and simulcast support
  - SDP Source attribute [RFC5576] mechanisms to describe specific attributes of RTP sources based on their SSRC.
  - Negotiation of generic image attributes in SDP [RFC6236]
  - Draft-westerlund-mmusic-max-ssrc proposes a signaling solution to indicate support for multiple SSRCs within one RTP session.
  - Draft-westerlund-avtcore-rtp-simulcast proposes a solution for signaling simulcast using session multiplexing.
  - Draft-westerlund-avtext-rtcp-sdes-srcname provides an srcname extension that can be used in SDP, RTCP or RTP header extension to uniquely identify a single media source.

Mapping options

- Advertisements are created by the neighbor peer
  - MCU / Mixer in multipoint
  - TP endpoint in point to point call
- Use a “capture ID” or “srcname” SDP attribute for mapping.
  - For each SSRC. A Media Capture can have more than one RTP stream *simulcast). This is a static mapping.
- Use RTP Header extension as in draft-lennox-rtp-usage-04



SDP examples – Static mapping

m=video 49200 RTP/AVP 99
a=extmap:1 urn:ietf:params:rtp-hdrex:clue-capture-id / for support
of dynamic mapping

a=rtpmap:99 H264/90000
a=max-send-ssrc:{*:6}
a=max-recv-ssrc:{*:4}
a=ssrc:11111 CaptureID:1
a=ssrc:22222 CaptureID:2

a=ssrc:33333 CaptureID:3
a=ssrc:44444 CaptureID:4
a=ssrc:55555 CaptureID:5
a=ssrc:66666 CaptureID:6
In the above example the provider can send up to five main streamsand one presentation stream.

SDP examples – Static mapping - simulcast

```
m=video 49200 RTP/AVPF 98
a=extmap:1 urn:ietf:params:rtp-hdrex:clue-capture-id
a=rtpmap:98 H264/90000
a=fmtp:98 profile-level-id=42c01f
a=imageattr:98 send [x=1280,y=720] [x=640, y=360]
a=max-send-ssrc:{*:7}
a=max-recv-ssrc:{*:4}
a=ssrc:11111 CaptureID:1
a=ssrc:11111 cname:alice@foo.com
a=ssrc:11111 srcname:v1.imgattr1
a=ssrc:11115 CaptureID:2
a=ssrc:11115 cname:alice@foo.com
a=ssrc:11115 srcname:v1.imgattr2
a=ssrc:22222 CaptureID:3
a=ssrc:22222 cname:alice@foo.com
a=ssrc:22222 srcname:v2.imgattr1
a=ssrc:22225 CaptureID:4
a=ssrc:22225 cname:alice@foo.com
a=ssrc:22225 srcname:v2.imgattr2
 ……  repeat for third MC.
a=ssrc:44444 CaptureID:7
a=ssrc:44444 cname:alice@foo.com
a=ssrc:44444 srcname:v4.imgattr1
```

SDP examples – Static mapping – using srcname for mapping

```
m=video 49200 RTP/AVP 99
a=extmap:1 urn:ietf:params:rtp-hdrex:srcname
a=rtpmap:99 H264/90000
a=max-send-ssrc:{*:6}
a=max-recv-ssrc:{*:4}
a=ssrc:11111 cname:alice@foo.com
a=ssrc:11111 srcname:v1
a=ssrc:22222 cname:alice@foo.com
a=ssrc:22222 srcname:v2
a=ssrc:33333 cname:alice@foo.com
a=ssrc:33333 srcname:v3
a=ssrc:44444 cname:alice@foo.com
a=ssrc:44444 srcname:v4
a=ssrc:55555 cname:alice@foo.com
a=ssrc:55555 srcname:v5
a=ssrc:66666 cname:alice@foo.com
a=ssrc:66666 srcname:v6
```

Proposal

- Media mixers and Media Switching mixers are common in products
- Source projection mixers are also used in products.
  - Allow more flexibility for switched captures
- Products may have mixed behavior for static and dynamic SSRC support
- Mapping static SSRCs to CLUE Media Captures - adding the RTP header extension for each packet is not necessary.
- To use static mapping, endpoints describe in SDP an SSRC for every capture/encoding pair that can be requested.
- Endpoints MUST support, as receivers, both the static declaration of capture encoding SSRCs, and the RTP header extension method of sharing capture IDs, with the extension in every media packet.
- An RFC3264 offer can specify static mapping to a CaptureID for one or more SSRC and later an RTP header extension can use the same identifier for a different SSRC. This will be a media switch for the specified CLUE media Capture.