RTP Payload Format for HTTP Adaptive Streaming

draft-wei-payload-has-over-rtp-01
ietf97@Seoul
Background

• Paid video service is becoming a revenue driver for operators.

• The draft aims at providing some convergence of OTT & IPTV, to help deliver better video service.

OTT Video

HTTP Adaptive Streaming (e.g. DASH/HLS) are widely adopted.

Managed IPTV Network

Already uses RTP over IP Multicast, with features (e.g. FCC, FEC, RET) to ensure Quality of Experience.
Progress since IETF96

• Architectural work has been initiated in the Broadband Form.

• Updates to the draft
  – Revised the architecture and use scenarios
  – Updated some fields in the payload format
Proposed Architecture

- Pull adaptive streams from OTT Server
- Put each stream to a multicast group
- Cut media segments to fit into RTP packets

- Multicast to STB (multicast receiver)
- Multicast to M2U (RTP translator), then convert multicast to RTP unicast to end devices (unicast receivers).

Trade-offs are made for live video of high quality (e.g. 4K UHD).

- Multicast Gateway: reduced complexity to ensure low delay and high TPT
- Receivers: may require function update
Why HAS Over RTP?

• We want to simplify the processing of the multicast gateway:
  – Only needs to parse manifest files (e.g. DASH .mpd, HLS .m3u8) and packetize media segments.
  – Don’t need to concern too much about the specific packaging formats of the media segments.

• Using existing RTP payload formats:
  – Maybe compatible with existing clients.
  – Added complexity because the multicast gateway may have to parse the specific media segments.
RTP Header

- **Marker (M):** set to 1 to indicate the last fragment of a media segment
- **Payload Type (PT):** set accordingly to the type used
- **Sequence Number:** increment by one per fragment
- **Timestamp:** same for all fragments of a media segment
Packetization Examples

RTP packet 1
| TS = 1099234 |
| Seq = 0 |

RTP packet 2
| TS = 1099234 |
| Seq = 1 |

HAS Media
Segment 1
| TS = 1099234 |

HAS Media
Segment 2
| TS = 2143126 |
| Seq = 2 |

RTP packet 1
| TS = 2143126 |
| Seq = 2 |

RTP packet 2
| TS = 2143126 |
| Seq = 3 |
HAS Payload

- Fragmentation (F): set to 1 to indicate it is a fragment of a media segment.
- URL: to help relate a packet to the URL of a media segment
- (added) Offset: to help locate the fragment in the media segment
- (removed) Type: 0=Manifest, 1=Initial Information, 2=Media Seg.
Fragmentation Considerations

• Straightforward way
  – blindly cut the media segments to fit into the MTU
  – less resilient to packet loss, one lost of fragment can lead to the whole media segment undecidable,

• Intelligent way
  – If hints are provided to the multicast gateway, it can repack media segments into smaller decodable pieces, then fragmentation may be avoided
  – Added complexity, but more resilient to packet loss, the processing can be expensive

• Trade-off should be made to balance between packet loss and complexity in the multicast gateway.
Next Step

• Comments & suggestions?
• WG Adoption?