

FLEXFEC SDP

Ali C Begen
Varun Singh
Mo Zanaty

MMUSIC
IETF 91

Motivation

- Current FEC standards lack sufficient flexibility to be usable for many use cases, including RTCWEB
- RFC 2733 XOR with 24-bit mask: obsoleted by 5109
- RFC 5109 XOR with 48-bit mask and ULP:
 - SSRC multiplexing not supported
 - draft-lennox-payload-ulp-ssrc-mux proposes a=ssrc-group:FEC
 - 48-bit mask insufficient for interleaved FEC to recover from burst loss, and requires >2% FEC
- RFC 6015 XOR with fixed 1D interleaved FEC:
 - Non-standard RTP header prevents general use
 - Fixed parameters not suited for adaptive real-time cases
- RFC 6682 Raptor FEC: IPR declarations exist
- RFC 6865 Reed-Solomon FEC: no RTP format

Proposed Solution

- New flexible FEC payload format 'FLEXFEC'
- **Flexibility to use different multiplexing:**
 - SSRC multiplexing (e.g. BUNDLE, Unified Plan)
 - RTP session multiplexing (e.g. multicast, legacy SIP)
 - PT multiplexing within the same RTP stream
 - RED multiplexing within the same RTP packet
- Flexibility for sender to adapt FEC scheme based on dynamic network conditions (e.g. RTCP)
- 16, 48 or 112-bit mask for irregular FEC patterns
 - 112-bit mask allows larger source blocks and <1% FEC
- Virtual bit mask for larger, regular FEC patterns up to:
 - 255 non-interleaved (1D row) source packets, or
 - 255x255 interleaved (2D column*row) source packets

SDP using PT association

a=rtpmap:96 VP8/90000

a=rtpmap:97 H264/90000

a=rtpmap:98 FLEXFEC/90000

a=fmtp:98 apt=96,97; code=xor; repair-window=200ms

- apt associates the Redundant Stream packets with the source Encoded Stream packets. (Similar to RTX)
- repair-window specifies how long the receiver can wait for repair packets, in units of ms or us.
- code is an optional parameter for future extensibility to more FEC codes.
 - default is xor if omitted

SDP using SSRC association

a=rtpmap:96 VP8/90000

a=rtpmap:97 H264/90000

a=rtpmap:98 FLEXFEC/90000

a=fmtp:98 code=xor; repair-window=200ms

a=ssrc:1234

a=ssrc:5678

a=ssrc-group:FEC-FR 1234 5678

- **ssrc-group** associates the Redundant Stream (SSRC 5678) with the source Encoded Stream (SSRC 1234).

Next steps

- Agree in MMUSIC on multiplexing and binding source and repair streams in SDP
- Adoption as PAYLOAD WG-item