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Internet-Draft   Vidyo
Updates: 5109 (if approved)   February 18, 2013
Intended status: Standards Track
Expires: August 22, 2013

         Supporting Source-Multiplexing of the Real-Time Transport Protocol (RTP)
                Payload for Generic Forward Error Correction
                      draft-lennox-payload-ulp-ssrc-mux-00

Abstract

   The Real-Time Transport Protocol (RTP) Payload format for Generic
   Forward Error Correction (FEC), specified in RFC 5109, forbids
   transmitting FEC repair flows as separate sources in the same RTP
   session as the flows being repaired. This document updates RFC 5109
   to lift that restriction, as long as the association between original
   and repair flows is properly signaled and negotiated.

Status of this Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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   This Internet-Draft will expire on August 22, 2013.

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1. Introduction

The Real-Time Transport Protocol (RTP) [RFC3550] payload format for
Generic Forward Error Correction (FEC) [RFC5109] defines two
mechanisms by which the Forward Error Correction stream can be
transmitted alongside the payload stream. As defined in Section 14
of that document, the packets can either be sent in separate SDP
media streams, i.e. a separate RTP session, associated through the
"FEC" semantics [RFC5956] of the SDP grouping framework [RFC5888]; or
they can be sent in the same packets, in an [RFC2198] redundant
coding.

The payload format specifically says that "the FEC and the payload
MUST NOT be multiplexed by SSRC into one single RTP session since
they always have the same SSRC." However, this constraint is only
necessary as a consequence of the fact that [RFC5109] chose to use
SSRC alignment to associate the payload and the repair streams sent
in separate RTP sessions. The mechanism described by which the
forward error correction packets are used to reconstruct missing
payload packets does not actually rely on this SSRC alignment
property. The "MUST NOT" results from the absence of any alternative
mechanism by which payload and repair streams can be associated.

The Source-Specific Media Attributes [RFC5576] specification defines
an "ssrc-group" semantic, "FEC", which is designed to address this
problem -- it allows endpoints to indicate, in SDP, the associations
among source flows and repair flows within a single RTP session,
through a similar mechanism to the [RFC5888] / [RFC5956] grouping of
RTP sessions.

However, [RFC5576] did not update the "MUST NOT" statement in
[RFC5109], so the FEC ssrc-group semantics arguably cannot be used.
This document fixes that oversight, updating [RFC5109] to clarify
when SSRC-multiplexed payload and repair streams can be used.

2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
"SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this
document are to be interpreted as described in RFC 2119 [RFC2119] and
indicate requirement levels for compliant implementations.

3. Change to RFC 5109

This sentence, the final sentence of the third paragraph of section
14.1 of [RFC5109]:

In addition, the FEC and the payload MUST NOT be multiplexed by
SSRC into one single RTP session since they always have the same
SSRC.

is updated instead to read:

The FEC and the payload MAY also be multiplexed by SSRC into one
single RTP session, with separate SSRC values, if the association
between FEC and payload streams are communicated to all members of
the session. If SDP is used, this association MAY be communicated
through the FEC ssrc-group semantic [RFC5576]; other mechanisms
are also possible. Receivers MUST NOT attempt to interpret FEC
streams for which they do not have information to associate them
with the corresponding payload streams.

4. Other mechanisms

The wording about "other mechanisms" in the previous section is
designed to address the possibility that non-SDP mechanisms could
also be used to associate FEC and payload streams. Potential
examples of this would be the BUNDLE
[I-D.ietf-mmusic-sdp-bundle-negotiation] or SRCNAME
[I-D.westerlund-avtext-rtcp-sdes-srcname] proposals, if standardized.

5. Security Considerations

An attacker who could force a receiver to mis-associate payload
streams and repair streams could potentially trick a receiver into
mis-decoding streams. Thus, the association between payload streams
and repair streams MUST be integrity-protected with at least the same
strength of security as the streams are themselves.

6. IANA Considerations

This document makes no request of IANA.

7. References

7.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
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[RFC5109] Li, A., "RTP Payload Format for Generic Forward Error

Correction", RFC 5109, December 2007.

[RFC5576] Lennox, J., Ott, J., and T. Schierl, "Source-Specific
           Media Attributes in the Session Description Protocol
           (SDP)", RFC 5576, June 2009.

7.2. Informative References

[I-D.ietf-mmusic-sdp-bundle-negotiation]
           Holmberg, C., Alvestrand, H., and C. Jennings,
           "Multiplexing Negotiation Using Session Description
           Protocol (SDP) Port Numbers",
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           progress), February 2013.

[I-D.westerlund-avtext-rtcp-sdes-srcname]
           Westerlund, M., Burman, B., and P. Sandgren, "RTCP SDES
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           draft-westerlund-avtext-rtcp-sdes-srcname-02 (work in
           progress), October 2012.

[RFC2198] Perkins, C., Kouvelas, I., Hodson, O., Hardman, V.,
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[RFC3550] Schulzrinne, H., Casner, S., Frederick, R., and V.
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           Applications", STD 64, RFC 3550, July 2003.

[RFC5888] Camarillo, G. and H. Schulzrinne, "The Session Description
           Protocol (SDP) Grouping Framework", RFC 5888, June 2010.

[RFC5956] Begen, A., "Forward Error Correction Grouping Semantics in
           the Session Description Protocol", RFC 5956,
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