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Interoperability of the "audio/mpa-robust" RTP Payload Format
<draft-finlayson-avt-mpa-robust-interoperability-01.txt>

Status of this Memo

Abstract

In order for the "audio/mpa-robust" RTP payload format specification
to advance from Proposed Standard to Draft Standard, it is required
to demonstrate interoperability for all functionality described by
the specification. This document describes the interoperability
shown between different implementations of this specification.

1. **Introduction**

The "audio/mpa-robust" RTP payload format for MP3 audio is described
in RFC 3119 [3119] (and updated in [3119BIS] to correct typographical
errors). This payload format is an alternative to the format
described in RFC 2250 [2250], and performs better if there is
packet loss.

This RTP payload format specification is currently at Proposed
Standard. In order to advance to Draft Standard, the Internet
standards process [2026] requires "at least two independent and
interoperable implementations from different code bases," and that
interoperability be shown for "all of the options and features of
the specification." This document describes the interoperability

shown between three independent implementations:
        1/ "LIVE.COM Streaming Media" project's "testMP3Streamer"
           application [LIVEMEDIA].
        2/ RealNetworks' "RealPlayer 9" media player [REAL].
        3/ The "MPEG4IP" project's "mp4player" media player [MPEG4IP].
           (Despite its name, this player plays MP3 audio in addition
            to MPEG-4 formats.)

2. **Features Tested for Interoperability**

    RTP payloads conforming to this specification can vary in the
    following ways:

    1/ Descriptor size.
       As specified by the "T" (descriptor type) flag in each ADU
       descriptor, the descriptor size can be either 1 byte (for ADU
       frame sizes < 64), or 2 bytes.

    2/ Fragmentation.
       If an "ADU frame" is too large to fit within a RTP packet, it
       is fragmented across more than one RTP packet (each beginning with
       an ADU descriptor. The fragmentation is indicated by the "C"
       (continuation) flag in each ADU descriptor.

    3/ Interleaving.
       The high-order 11 bits of each MPEG header ('syncword') can either
       remain at 0xFFE - which indicates that no ADU frame interleaving
       is performed - or it can consist of an "Interleaving Sequence
       Number" - which indicates that ADU frames are rearranged in an
       interleaving pattern.

    As described in the next section, we demonstrated interoperability
    by testing each combination of these three variables.

3. **Test Results**

    The results of the interoperability tests are shown in the table
    below. In each case, the LIVE.COM "testMP3Streamer" application
    was used as the transmitter, and one (or both) of the "RealPlayer 9"
    and MPEG4IP "mp4player" applications was used as the receiver.

Stream Features			Receiver	
descriptor size	fragmentation?	interleaving?	Real	mp4player
1 byte	no	no	Yes	Yes
1 byte	no	yes	Yes	Yes
1 byte	yes	no	No	Yes
1 byte	yes	yes	No	Yes

```
|      2 bytes    |       no        |       no        || Yes  | Yes       |
|      2 bytes    |       no        |       yes       || Yes  | Yes       |
|      2 bytes    |       yes       |       no        || No   | Yes       |
|      2 bytes    |       yes       |       yes       || No   | Yes       |
+----------------+---------------+---------------++------+-----------+
```

Note: As noted in the table, "RealPlayer 9" was unable to handle
fragmented ADU frames. However, because "mp4player" was able to play
fragmented frames from the LIVE.COM "testMP3Streamer" application,
this is sufficient to demonstrate interoperability of this feature
between two independent implementations.

4. Security Considerations

   Not applicable.

5. Normative References

   [3119]   Finlayson, R., "A More Loss-Tolerant RTP Payload
                 Format for MP3 Audio," RFC 3119, June 2001.

   [2026]   Bradner, S., "The Internet Standards Process
                 -- Revision 3," RFC 2026, October 1996.

6. Informative References

   [3119BIS]   Finlayson, R., "A More Loss-Tolerant RTP Payload
                 Format for MP3 Audio,"
                 draft-ietf-avt-rfc3119bis-02.txt,
                 Work in progress, February 2004.

   [2250]   Hoffman, D., Fernando, G., Goyal, V. and M. Civanlar,
                 "RTP Payload Format for MPEG1/MPEG2 Video", RFC 2250,
                 January 1998.

   [LIVEMEDIA]   "LIVE.COM Streaming Media," Live Networks, Inc.,
                 <http://www.live.com/liveMedia/>.

   [REAL]   RealNetworks, Inc., <http://www.real.com/>.

   [MPEG4IP]   The "MPEG4IP Open Streaming Video and Audio" project,
                 <http://mpeg4ip.sourceforge.net/>.

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