RTP Testing Strategies

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Objectives

A new draft (draft-ietf-avt-rtptest-00.txt) suggests means by which RTP implementations may be tested, to

- help demonstrate interoperability
- illustrate common implementation errors

This is *not* a set of conformance tests!

Functions tested

- End systems
  - Media transport
  - Basic RTCP including SR/RR, reaction to loss
  - RTCP SDES, BYE, APP
- Translators
- Mixers

Media Transport – Test Scenario

```
                +-----------------+
        +-------+ Test instrument +------+
        |       +-----------------+      |
        |                                |
+--------+-------+              +-------+--------+
|    First RTP   |              |   Second RTP   |
| implementation |              | implementation |
+----------------+              +----------------+
```

- Test instrument can delay or drop packets passing between the two implementations
- Test instrument can record packet contents for analysis

Media Transport – RTP Tests

Test instrument forwards packets with no loss or delay.

Verify exchange of media with a variety of codecs, including the following edge conditions:

- Timestamp & sequence number wraparound
- Padding, marker bit, header extension
- Sequence number increment, random start value
- Timestamp increment and, random start value
- Random choice of SSRC

Media Transport – Basic RTCP Tests

Test instrument forwards packets with no loss or delay.

Verify the following:

- Structure of compound RTCP packets
- Consistency of SR/RR headers with the data packets being sent
- RR packets show low jitter and no loss
- SDES packets – especially CNAME – and their correctness
- BYE packets – including ‘reason for leaving’ text

Media Transport – Advanced RTCP Tests

Test instrument variously inserts delay and/or loss.

Verify the following:

- Loss fraction in RR matches loss generated
- Jitter in RR varies with delay generated

Verify playout of media streams subject to small amount of delay/loss.

Translators – Test Scenario

```
                 +-----------------+
         +-------+ RTP Translator  +-----+
         |       +-----------------+     |
         |                               |
+--------+-------+               +-------+--------+
|    First RTP   |               |  Second RTP    |
| implementation |               | implementation |
+----------------+               +----------------+
```

Similar to previous tests, but with the translator forwarding packets between the implementations.

Translators – Tests

- Playout of translated stream
- Forwarding of RTCP packets
- Check that translated SR/RR match the translation

Details depend on the translation, so hard to give exact tests.

Mixers – Test Scenario

```
+-----------------+
|   Second RTP    |
| implementation  |
+--------+--------+
         |
         |       +------------+
         +-------+ RTP Mixer  +-----+
         |       +------------+     |
         |                          |
+--------+--------+         +-------+--------+
|    First RTP    |         |    Third RTP   |
| implementation  |         | implementation |
+-----------------+         +----------------+
```

Mixers – Tests

- Playout of mixed stream
- CC is set to 2 and CSRC list is present in RTP packets
- RTP packets have SSRC of the mixer
- RR packets generated towards sender
- SR packets generated towards receivers
- Forwarding of SDES packets
- Forwarding of BYEs, generation of BYE when mixer quits

To do...

- Tests for loop detection algorithm
- Tests for encrypted media
- Merge with the RTCP testing draft?

Futures...

- Is this sort of document a good idea?
- Make an informational RFC giving testing strategies for RTP implementations?