draft-petithuguenin-avt-multiple-clock-rates-01

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Clock Rate

- The clock rate is the multiplier used to convert a wallclock value (in seconds) to an equivalent RTP timestamp (without the random offset).
- The following data uses the clock rate as unit:
  - RTP timestamp in the RTP packet
  - RTP timestamp in SR RTCP packet
  - Interarrival jitter in RR RTCP packet
  - Timestamp and jitter carried in other RTCP packets.

The Problem

- Using multiple clock rates in the same RTP session is underspecified:
- Some implementations use a different SSRC for each clock rate.
- Some implementations change the clock rate without changing the SSRC and use monotonic RTP timestamps.
- Some implementations change the clock rate without changing the SSRC but use non-monotonic RTP timestamps.

The consequences

- Depending on the method used by the RTP Sender:
  - It can be difficult to synchronize multiple sessions.
  - The jitter calculation can be incorrect
  - The interpretation of the jitter can be incorrect.

Proposals (1)

- New I-D updates RFC 3550.
- Using different SSRC for different clock rates is mandatory when using RTCP.
- Questions:
  Can the SSRC be reused?

  If not, should a BYE be sent?

Proposals (2)

- Using SSRC for different clock rates is recommended when not using RTCP but may use non-monotonic timestamps in the same SSRC.

  The consensus is that using different SSRC is the correct way to use clock rates, but non-monotonic timestamp is easier to implement for implementations not using RTCP.

Proposals (3)

- The compound RTCP packet send by an RTP Sender contains one SR packet for each SSRC sent during the last interval, the first SR packet been for the current SSRC.
- The rapid synchronization RTP header can also be used to accelerate synchronization.

Proposals (4)

- An RTP Receiver must handle multiple SSRC or non-monotonic timestamps.
- Questions:
  Should we care about legacy implementations implementing multiple clock rates with monotonic timestamps?

  Perhaps asking SIPit participants what existing implementations are doing?

Next

- WG Item?
- Questions?

Monotonic Timestamps

- The monotonic timestamp method uses the following formula:

  timestamp = previous_timestamp + (current_capture_time – previous_capture time) * current_clock_rate

- The jitter formula gives incorrect values during the transition
- For the correct formula for jitter to work, the packet must arrives in the same order and not been lost.

Non-monotonic Timestamps

- The non-monotonic timestamp method uses the following formula:
  timestamp = capture_time * clock_rate
- The jitter calculation is correct with this formula, and does not depends on the ordering of packets.
- The RTP timestamp does not increase monotonically but RFC 3550 states that this is the wallclock that must increase monotonically, not the RTP timestamp