RTCP XR Report Block for Packet Delay Variation Metric Reporting
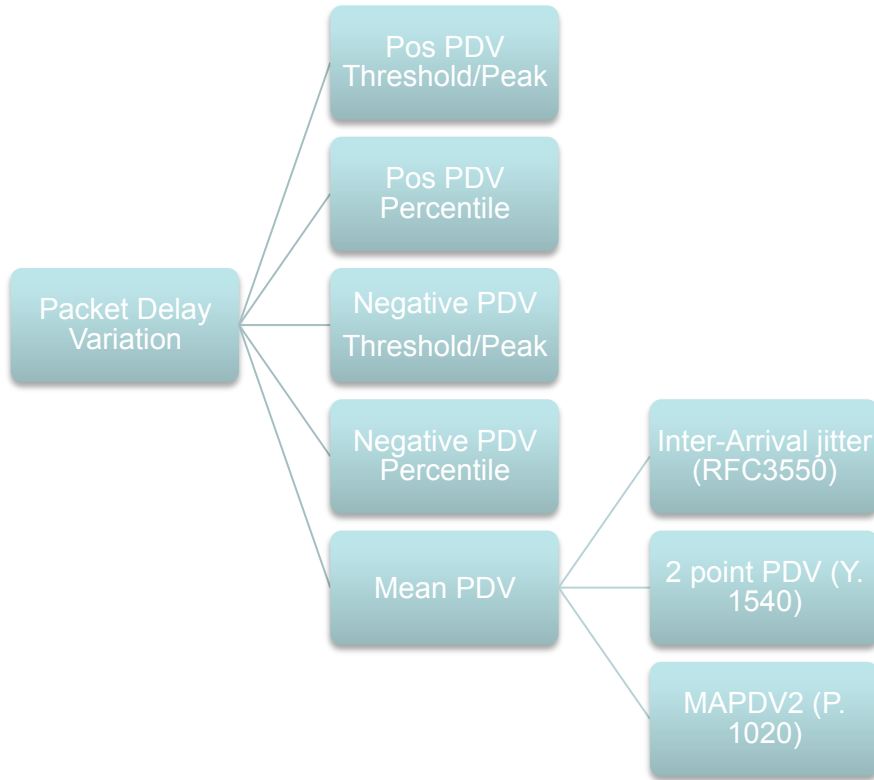## draft-ietf-xrblock-rtcp-xr-pdv-01

Qin Wu (sunseawq@huawei.com)
G. Hunt (r.geoff.hunt@gmail.com)
Alan Clark (alan.d.clark@telchemy.com)

Overview

- ## Background
  - draft discusses the metric for packet delay variation.
  - The metric belong to transport metrics
  - 01 version received comments on the list
  - 01 version contains a few changes
    - Follow consensus to draft-ietf-avtcore-monarch

- ## Changes since 00 version
  - Remove tag field in Block header
  - Add SSRC field in the Block payload.
  - Remove the reference to tag field that is related to measurement identity draft.
  - Fix typo on SDP parameter from "delay" to "pkt-dly-var".
  - Reference update.

Metric overview

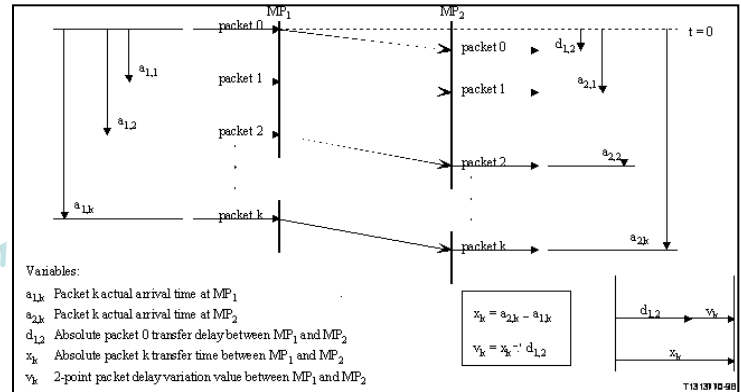If Si is the RTP timestamp from packet i, and Ri is the time of arrival in RTP timestamp units for packet i, then for two packets i and j, D may be expressed as

   D(i,j) = (Rj - Ri) - (Sj - Si) = (Rj - Sj) - (Ri - Si)

The interarrival jitter SHOULD be calculated continuously as each data packet i is received from source SSRC_n, using this difference D for that packet and the previous packet i-1 in order of arrival (not necessarily in sequence), according to the formula

   J(i) = J(i-1) + (|D(i-1,i)| - J(i-1))/16

Whenever a reception report is issued, the current value of J is sampled.

Packet Delay Variation
- Pos PDV Threshold/Peak
- Pos PDV Percentile
- Negative PDV Threshold/Peak
- Negative PDV Percentile
- Mean PDV
  - Inter-Arrival jitter (RFC3550)
  - 2 point PDV (Y. 1540)
  - MAPDV2 (P. 1020)

Variables:
$a_{1,k}$ Packet k actual arrival time at MP_1
$a_{2,k}$ Packet k actual arrival time at MP_2
$d_{1,2}$ Absolute packet 0 transfer delay between MP_1 and MP_2
x_k Absolute packet k transfer time between MP_1 and MP_2
v_k 2-point packet delay variation value between MP_1 and MP_2

$$x_k = a_{2,k} - a_{1,k}$$
$$v_k = x_k - d_{1,2}$$

The short term jitter is computed for current packet (i) whose delay is designated t_i. Packet (i) is compared to a running estimate of the mean delay (using the 16 previous packet delays), and assigned either a positive or negative deviation value.

   mean delay $D_i = (15 \times D_{i-1} + t_{i-1}) / 16$

   positive deviation $P_i = t_i - D_i$ if $t_i > D_i$ (N_i is NA)

   negative deviation $N_i = D_i - t_i$ if $t_i < D_i$ (P_i is NA)

   if $t_i = D_i$ then P_i is NA and N_i is NA

We compute Mean Absolute Packet Delay Variation 2 (MAPDV2) for packet (i) as

   $MAPDV2 = mean(P_i) + mean(N_i)$

where $mean(P_i)$ is the overall P including the current packet.

Issue- Cumulative, Interval and Sample metrics

- Current draft assigned one bit for Cumulative/Interval indication
- Proposal to increase two bits to allow for the indication of a Sampled value
- Discussion about sample metric
    - PPDV also can be cumulative metric when all the packets in the whole measurement duration are measured.
    - PPDV also can be Interval metric when all the packets in the recent measurement Interval are measured.
    - Some metrics are sampled and don't have validity for an interval or a call/session
    - PPDV can be a sampled value of a running average and only has validity for the last 200-300ms before the value is sampled.
    - When it is impractical to gather all the packets, you may sample a subset of packets during each consecutive measurement Interval.
    - PPDV algorithm is better described in sample metric since computation overhead is overwhelming
- Action
    - Apply this sample indication only to PDV metric? (Qin)
    - Apply this sample indication to any future metric? (Alan)

Proposed changes

- Proposed change to the Interval metric flags in relevant XR blocks:
  - Interval Metric flags (I): 2 bits

    This field is used to indicate whether the ????????????
    metrics block is an Interval, Cumulative or Sampled report, that is,
    whether the reported values apply to the most recent measurement
    interval duration between successive metrics reports (I=10) (the
    Interval Duration) or to the accumulation period characteristic of
    cumulative measurements (I=00) (the Cumulative Duration) or
    to the value of a continuously measured or calculated that has been
    sampled at end of the interval (I=01) (Sampled Value).

- Proposed change to Monarch draft
  - Do we have Interval Metric Flags definition in Monarch draft
    - This definition apply to almost all the new metric block
    - But it influence monarch draft? No?
    - Have definition for terms like interval, cumulative, sample metric?
      - Reasonable!
      - Interval metric flags definitions should refer to this terms

Follow Up

- Question?
- WGLC ?