Hybrid Two-step measurement method

draft-mirsky-ippm-hybrid-two-step

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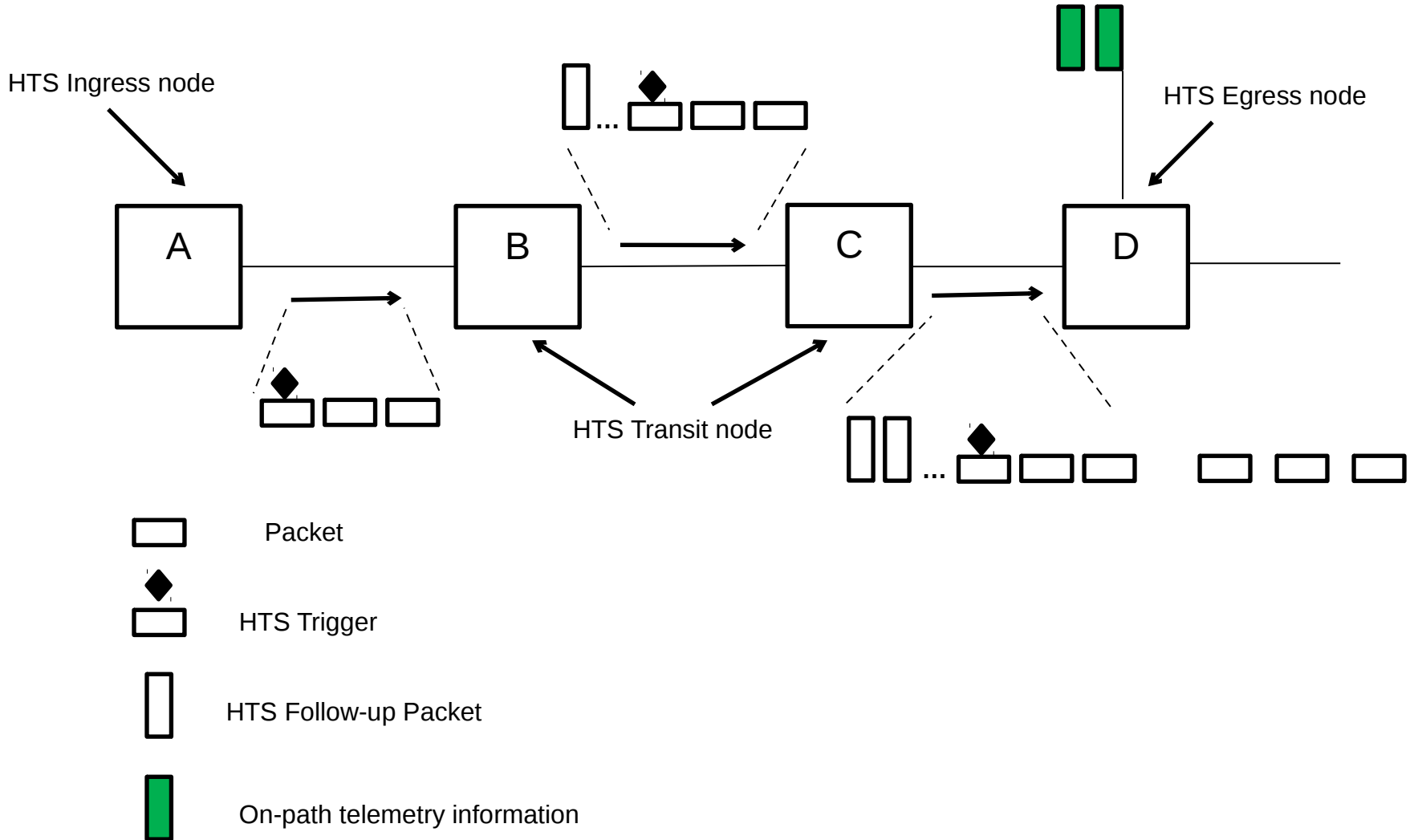IETF-103 November 2018, Bangkok

Problem statement

- Quality of measurement in large degree depends on the consistency of taking the reading of the metric
  - For example, reading the wall clock when measuring delay/delay variation. It is the most advantageous to read the wall clock as close as possible to the moments when physical transmission and reception of the packet begins, e.g., first octet being transmitted or received. That allows to exclude variable delays between reading the wall clock and transmitting/receiving the packet by the test point.

- Measurement information, a.k.a. telemetry, should be secured
  - Transporting telemetry in clear may be exploited by man-in-the-middle scenario when data being altered to affect the view of the QoE
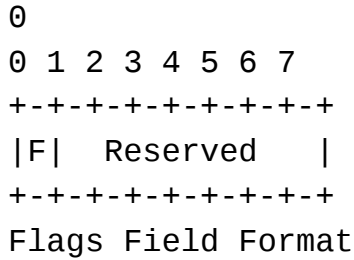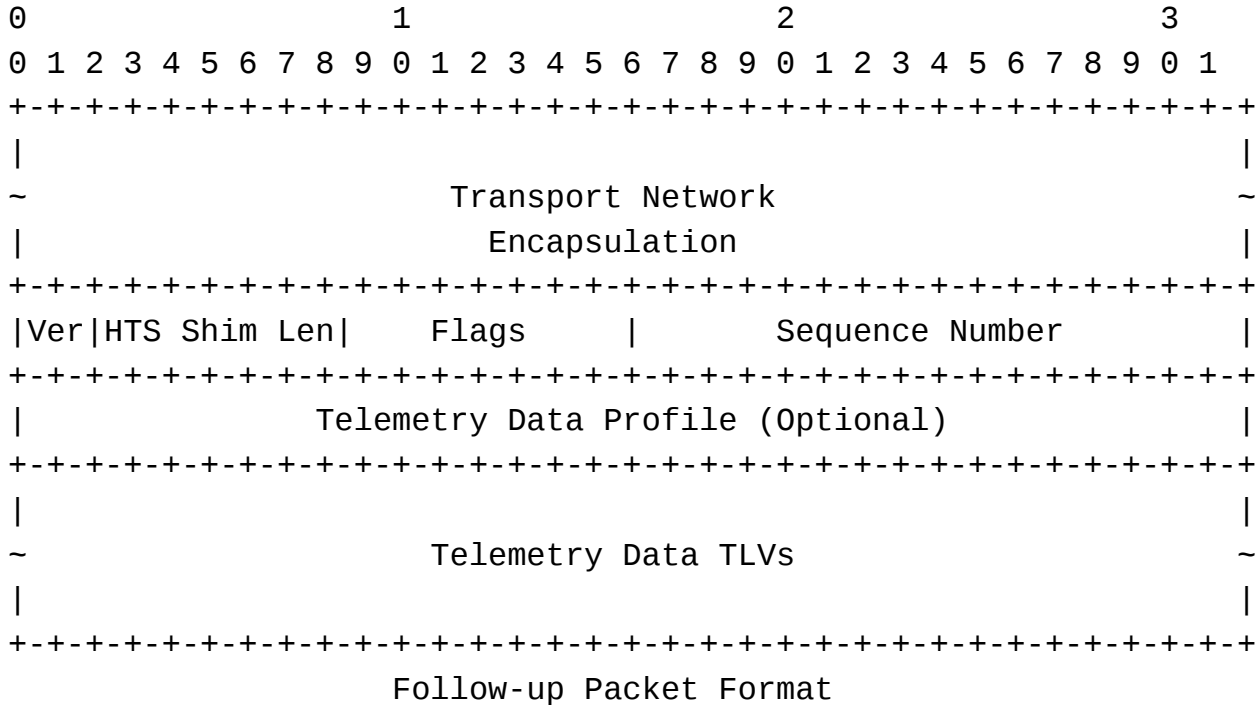
Proposed solution

- RFC 8169 Residence Time Measurement in MPLS Networks defined two modes of operation of RTM-capable LSR:
  - One-step – nodal residence time accumulated in the packet that carries PTP control message
  - Two-step – nodal residence time collected in the follow-up message that includes sufficient characteristic information about the PTP control messages to which the measurement is attributed
- Hybrid two-step measurement method generalizes two-step RTM mode proposed in RFC 8169:
  - HTS Trigger is layer specific
  - The follow-up message originated by the ingress node, and it shares the same transport encapsulation as the original packet
  - The follow-up message is terminated by the egress node thus not leaving the domain
  - Only one outstanding follow-up message may be "in-flight", i.e., one set of telemetry can be held for the next follow-up message

Theory of operation

HTS Ingress node

HTS Egress node

A   B   C   D

HTS Transit node

Packet

HTS Trigger

HTS Follow-up Packet

On-path telemetry information

The Follow-up packet format

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
~                     Transport Network                         ~
|                       Encapsulation                           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|Ver|HTS Shim Len|    Flags      |         Sequence Number       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|              Telemetry Data Profile (Optional)                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
~                     Telemetry Data TLVs                       ~
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
                   Follow-up Packet Format


 0
 0 1 2 3 4 5 6 7
+-+-+-+-+-+-+-+-+
|F|  Reserved   |
+-+-+-+-+-+-+-+-+
Flags Field Format
```

Next steps

- Your comments, suggestions, questions always welcome and greatly appreciated
- WG adoption