A packet based method for passive performance monitoring

draft-tempia-ippm-p3m-00

Alessandro Capello Ed.
Mauro Cociglio Ed.
Giuseppe Fioccola Ed.

Alternate Marking story

- Alternate Marking TI patent application (December 2008)
- Implementation in TI network is the first example (2009)

- IETF experimental drafts:

  - A method for IP multicast performance monitoring draft-cociglio-mboned-multicast-pm - February, 2010

  - A packet-based method for passive performance monitoring draft-tempia-opsawg-p3m - March, 2011

  - A packet based method for passive performance monitoring draft-tempia-ippm-p3m-00 - March, 2015

Alternate Marking methodology

Packet Loss Measurement: OAM Packets vs Alternate Marking

1. OAM Packets methodology (Y.1731, RFC6374,…) doesn't work if Out of Order packets.

2. OAM Packets have to be inserted in the right place (performing hardware, buffering,…).

3. Alternate Marking works in case of Out of Order (Equal Cost Multi-Path (ECMP) and also where there is no ECMP but synchronization problems).

4. Alternate Marking permits to define a posteriori the monitored flow (for example you can mark all the traffic at the starting point and then you can aggregate data at the intermediate and ending points by choosing the desired criteria)

5. Alternate Marking is a Relaxing Method (low computational load)

Alternate Marking methodology

Delay/Jitter Measurement: the same strenghts of Packet Loss Measurement (it works with Out of Order packets).

- Average delay (it needs single marking, it solves out of order issue, but doesn't give the minimum and maximum delay values)

- Double marking methodology (between packets with the second marking there should be a security time gap to avoid out of order issues)
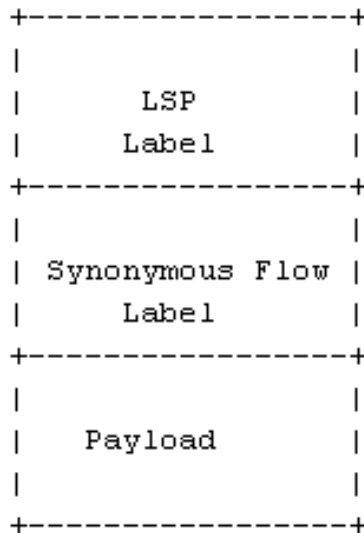
Alternate Marking Use Case

draft-tempia-ippm-p3m as reference:

- draft-chen-ippm-coloring-based-ipfpm-framework
- draft-morton-ippm-active-passive
- draft-bryant-mpls-flow-ident
- draft-bryant-mpls-synonymous-flow-labels
- draft-bryant-mpls-sfl-control
- draft-bryant-mpls-rfc6374-over-udp
- draft-ietf-bier-mpls-encapsulation
- …

Alternate Marking Use Case

from draft-bryant-mpls-synonymous-flow-labels:

RFC6374 uses the RFC6374 packet as the packet accounting
demarcation point: Out of order issues

```
+----------------+
|                |
|     LSP        |
|    Label       |
|                |
+----------------+
|                |
| Synonymous Flow |
|    Label       |
|                |
+----------------+
|                |
|    Payload     |
|                |
|                |
+----------------+

Label Stack with SFL
```

RFC6374 packet loss measurement:

Consider an MPLS application such as a pseudowire (PW); Two
labels, synonymous with the PW labels.

By alternating between these SLs and using them in place of
the PW label, the PW packets may be batched for counting
without any impact on the PW forwarding behaviour.

Alternate Marking Use Case

from draft-ietf-bier-mpls-encapsulation:

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|0 1 0 1|  Ver  |  Len  |             Entropy                   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 BitString  (first 32 bits)                   ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                                                              ~
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
~                 BitString  (last 32 bits)                    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|OAM|    Reserved       | Proto |           BFIR-id            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

              Figure 1: BIER Header
```
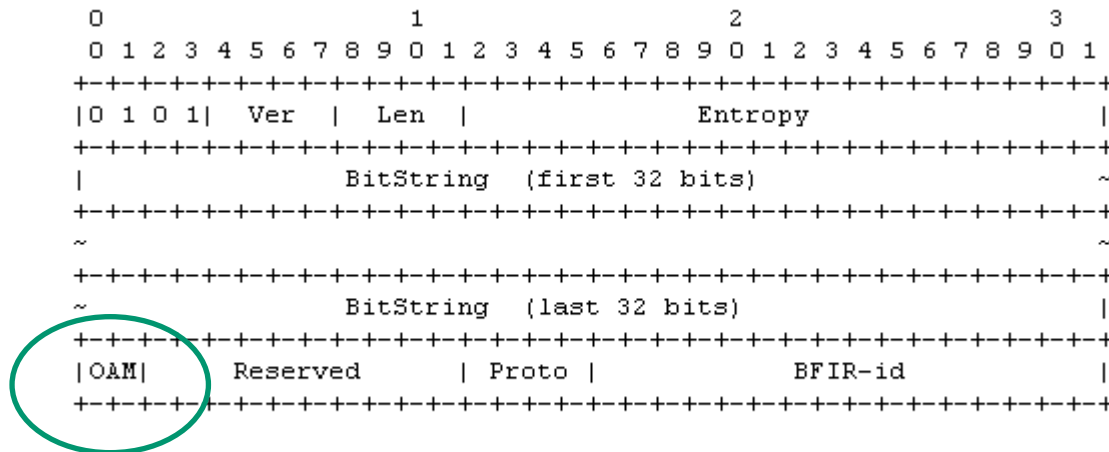
OAM: These two bits are used for the passive performance measurement marking method described in [PPM].

Next Steps

Purpose to generalize the description of the alternate marking principle for a generic packet flow (transport agnostic)

WG adoption

Unique denomination and General reference for other solutions based on the alternate marking:

- in MPLS you can mark via Synonymous Flow Label,
- in BIER packet you can mark bits allocated in packet header,
- …

Reviews and comments always welcome