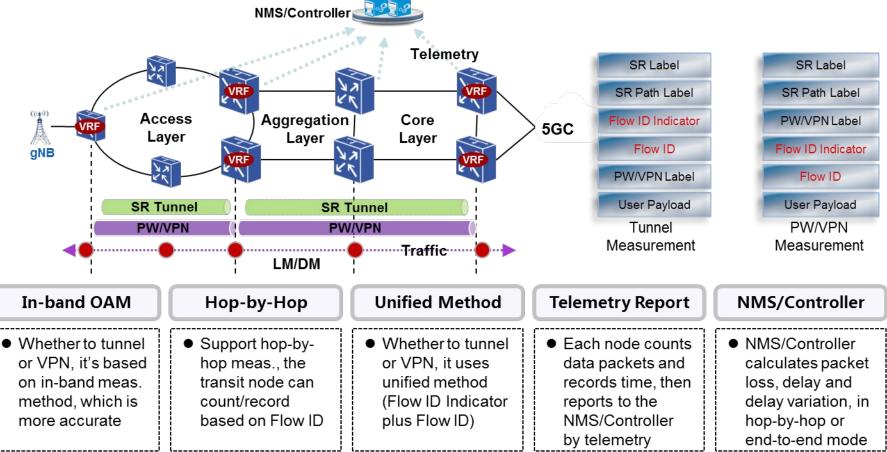# Encapsulation For MPLS Performance Measurement with Alternate Marking Method

draft-cheng-mpls-inband-pm-encapsulation-02

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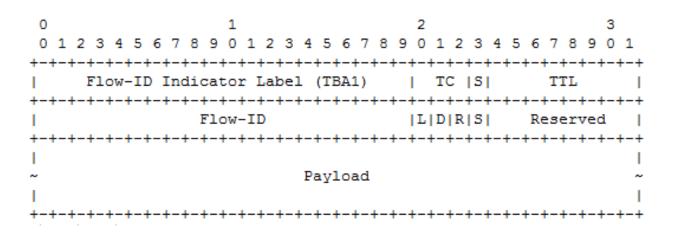Yoav Peleg   yoav.peleg@broadcom.com

Requirements of MPLS PM

The quantity of backhaul network nodes is huge usually, e.g. There are over 30k nodes of backhaul nodes in Beijing City. The operation and maintenance is really challenging. We need more simple and effective MPLS PM, especially for SR-TE.

Intention of this draft

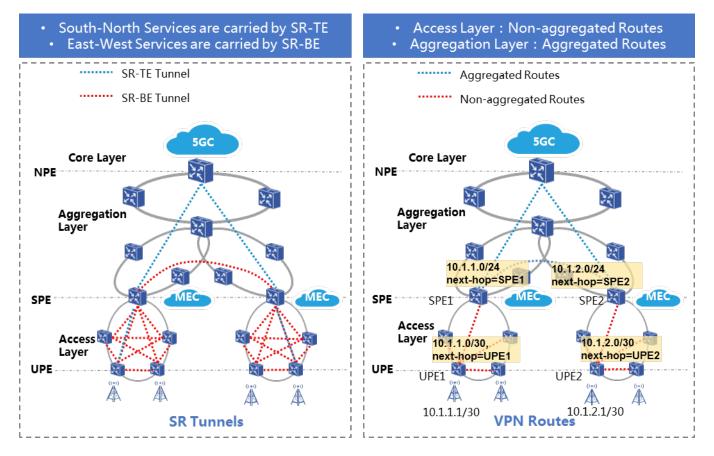- Defines the encapsulation for MPLS performance measurement with alternate marking method:

    - Alternate marking method requires one color bit of data packet to measure packet loss of data traffic flow

    - Alternate marking method requires one more timestamp bit of data packet to measure delay and jitter of data traffic flow

    - Alternate marking method requires flow identification of the measured data traffic flow
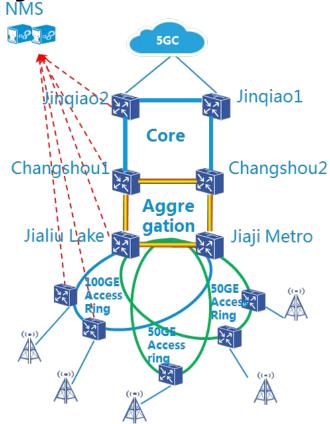
Flow-based PM Encapsulation

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|      Flow-ID Indicator Label (TBA1)     | TC |S|     TTL      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 Flow-ID                 |L|D|R|S|   Reserved  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
~                          Payload                              ~
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- One **Flow-ID Indicator Label** (special-purpose label) followed by one **Flow-ID label** which includes:
  - **Flow-ID:** 20-bits MPLS flow identification
  - **L bit:** Loss Measurement color marking
  - **D bit:** Delay Measurement color marking
  - **S bit:** Bottom of Stack indicator

Deployment Scenario

- South-North Services are carried by SR-TE
- East-West Services are carried by SR-BE

········ SR-TE Tunnel
········ SR-BE Tunnel

SR Tunnels

- Access Layer : Non-aggregated Routes
- Aggregation Layer : Aggregated Routes

········ Aggregated Routes
········ Non-aggregated Routes

10.1.1.0/24
next-hop=SPE1

10.1.2.0/24
next-hop=SPE2

10.1.1.0/30,
next-hop=UPE1

10.1.2.0/30
next-hop=UPE2

10.1.1.1/30   **VPN Routes**   10.1.2.1/30

- From left diagram we see stitched SR tunnels
- From right diagram we see end-to-end VPN services
- So we need PM on both SR tunnels and VPN services

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Deployment Real Case

- In Shanghai/Beijing, China Mobile has already deployed the PM method described in this draft
- It works very well and our operation team gave very good feedback on it

Next steps

- Many concerns received till now:
  - One special purpose label is unable to be assigned
  - Traffic Class and TTL of MPLS Label can't be changed
  - It seems SFL solution can be used to resolve the MPLS PM requirements

- Possible Comments Resolution:
  - Extended special purpose label is requested
  - TC and TTL of MPLS Label won't be touched
  - Current version of SFL draft can't fulfill our requirements including hop-by-hop PM and PM on LSP and VPN in parallel