

Encapsulation For MPLS Performance Measurement with Alternate Marking Method

draft-cheng-mpls-inband-pm-encapsulation-01

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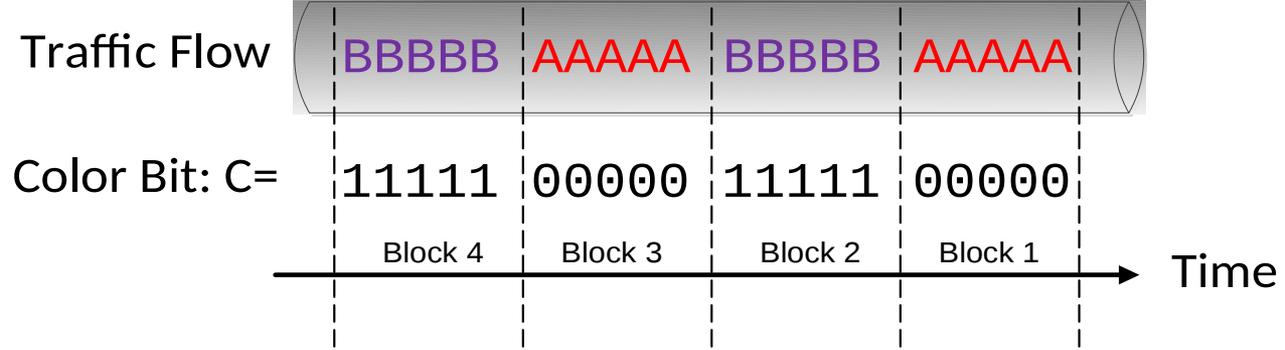
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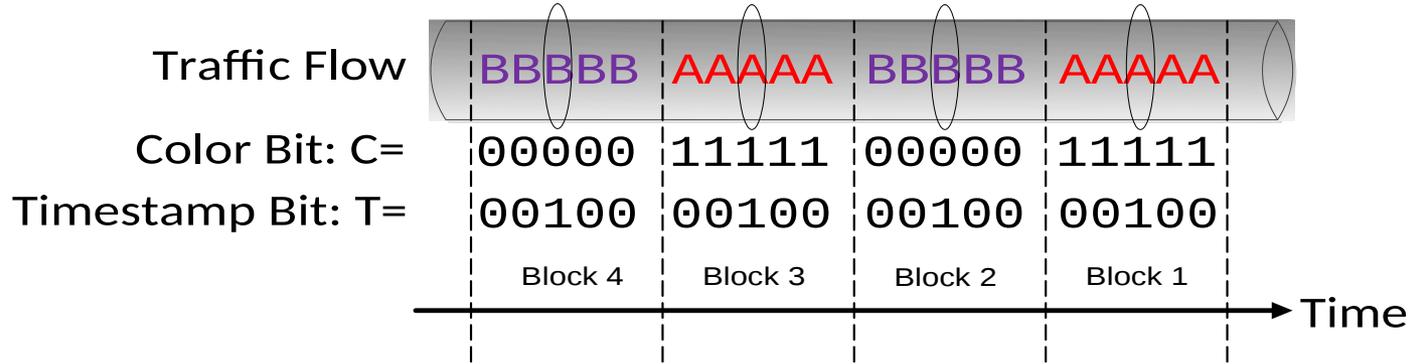
Intention of this draft

- 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

Alternate Marking Method Overview

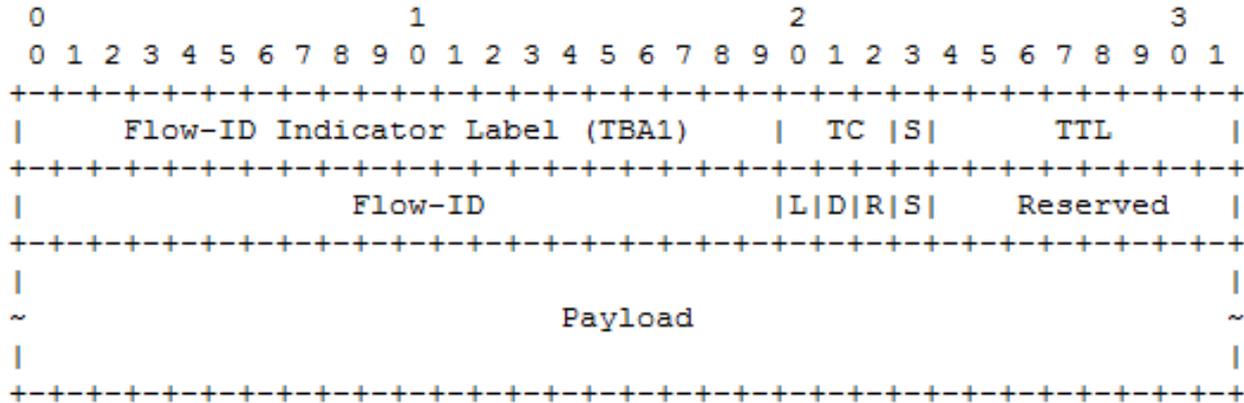


- For packet loss measurement, coloring the measured traffic flow and flip the packet color periodically, each node reports its counters of each block to the NMS/Controller



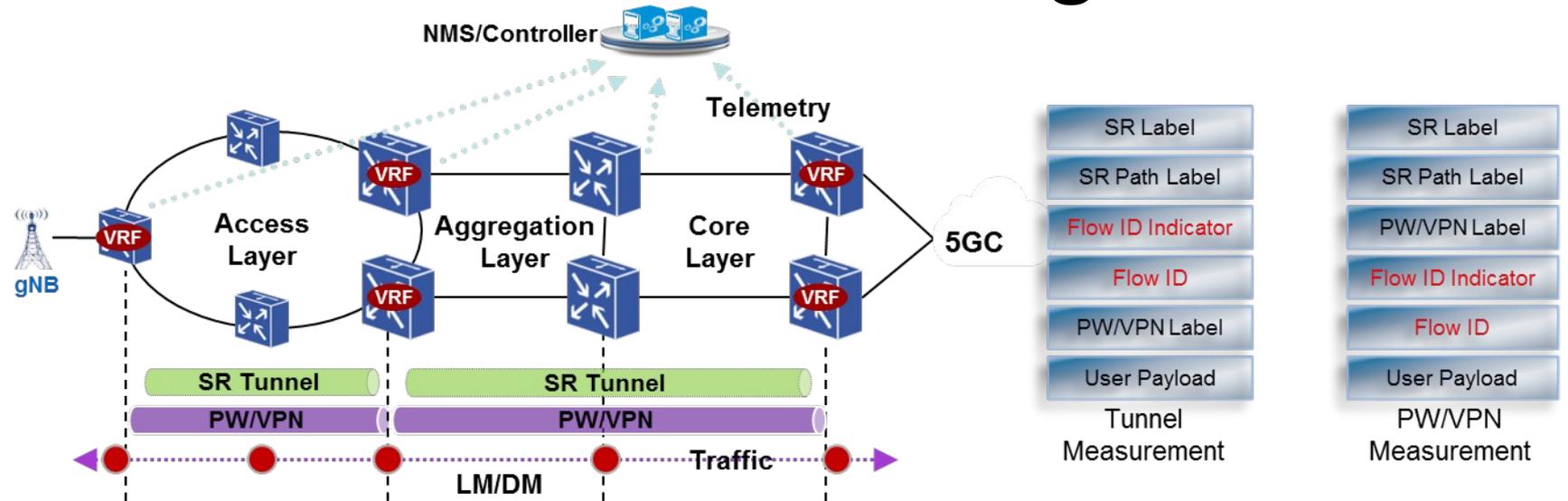
- For packet delay measurement, marking one packet within each block, each node reports its timestamps of processing each marked packet to the NMS/Controller

Flow-based PM Encapsulation



- 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

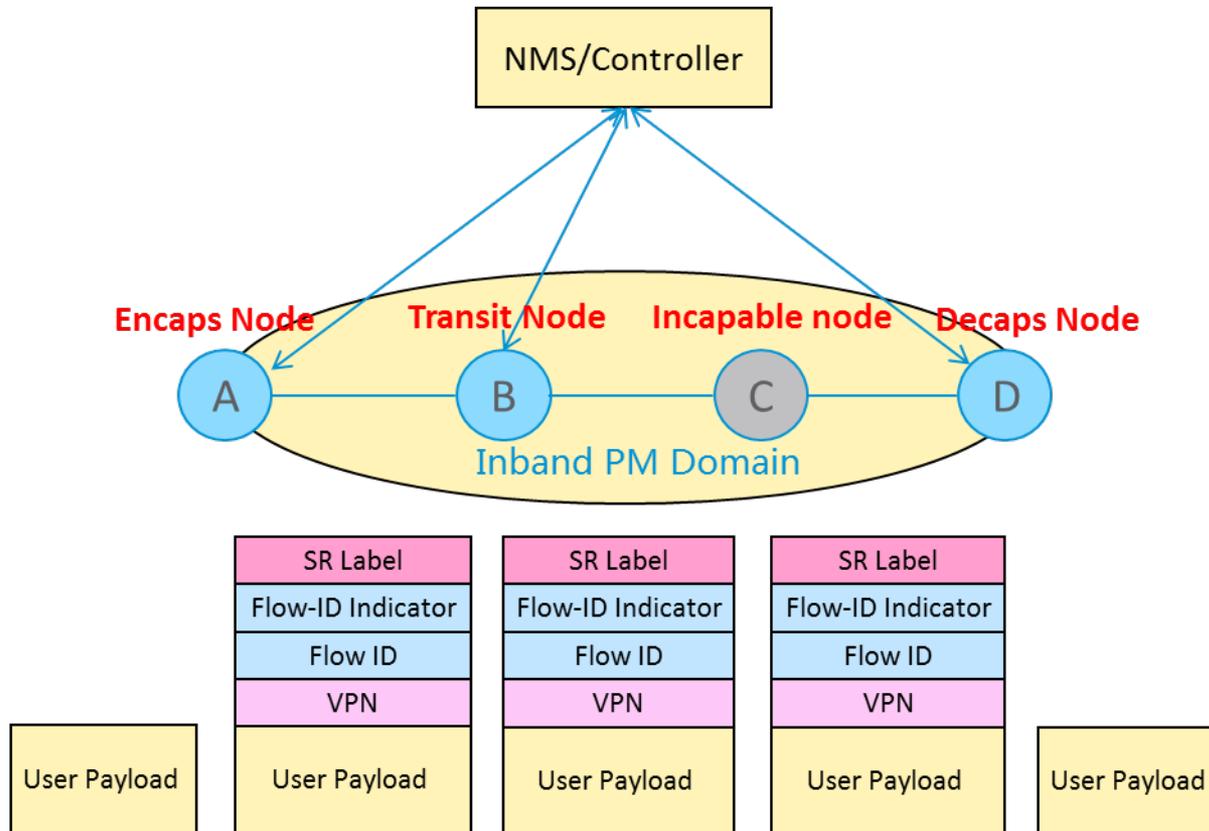
Illustration on usage of MPLS PM with alternate marking method



In-band OAM	Hop-by-Hop	Unified Method	Telemetry Report	NMS/Controller
<ul style="list-style-type: none"> Whether to tunnel or VPN, it's based on in-band meas. method, which is more accurate 	<ul style="list-style-type: none"> Support hop-by-hop meas., the transit node can count/record based on Flow ID 	<ul style="list-style-type: none"> Whether to tunnel or VPN, it uses unified method (Flow ID Indicator plus Flow ID) 	<ul style="list-style-type: none"> Each node counts data packets and records time, then reports to the NMS/Controller by telemetry 	<ul style="list-style-type: none"> NMS/Controller calculates packet loss, delay and delay variation, in hop-by-hop or end-to-end mode

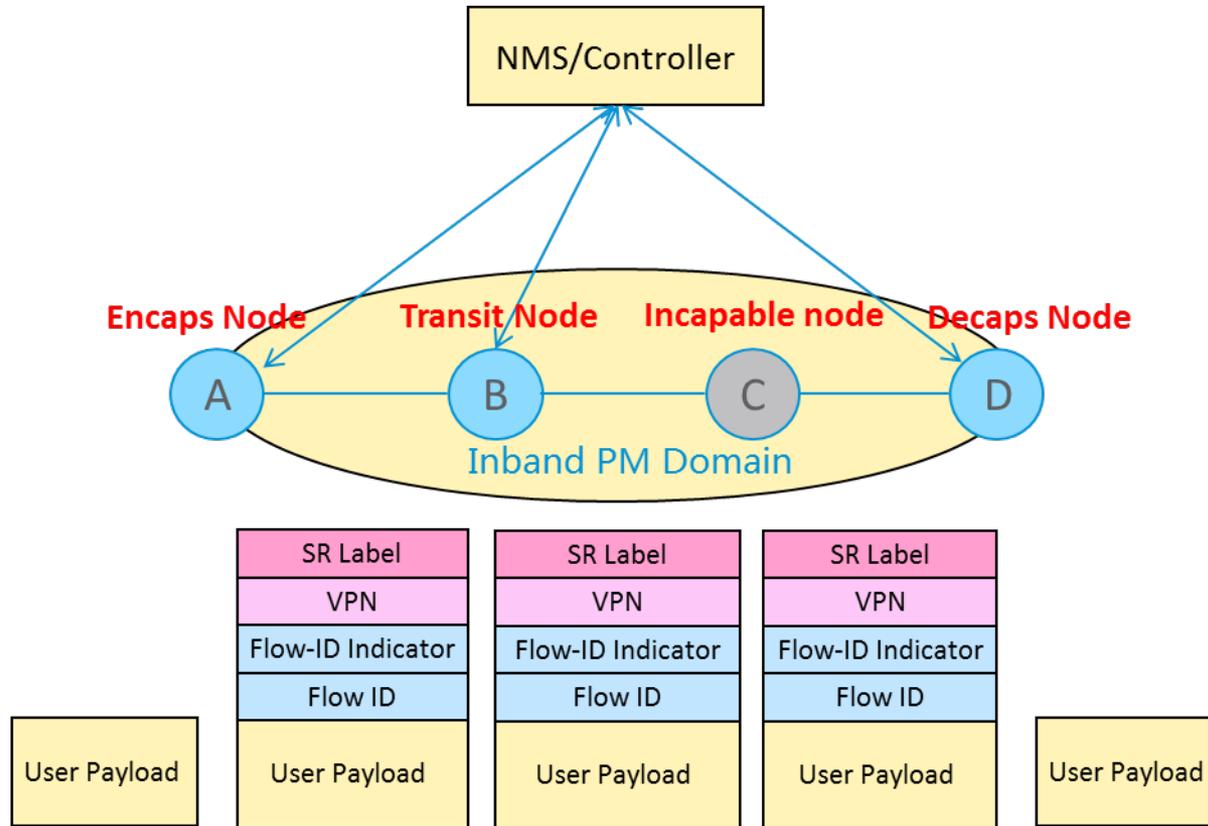
- Before any measurement starts, the NMS/Controller needs to provision unique Flow ID(also called Object ID) to each monitored object(SR tunnel or PW/VPN), at each NE

MPLS Label Stack Example (1)



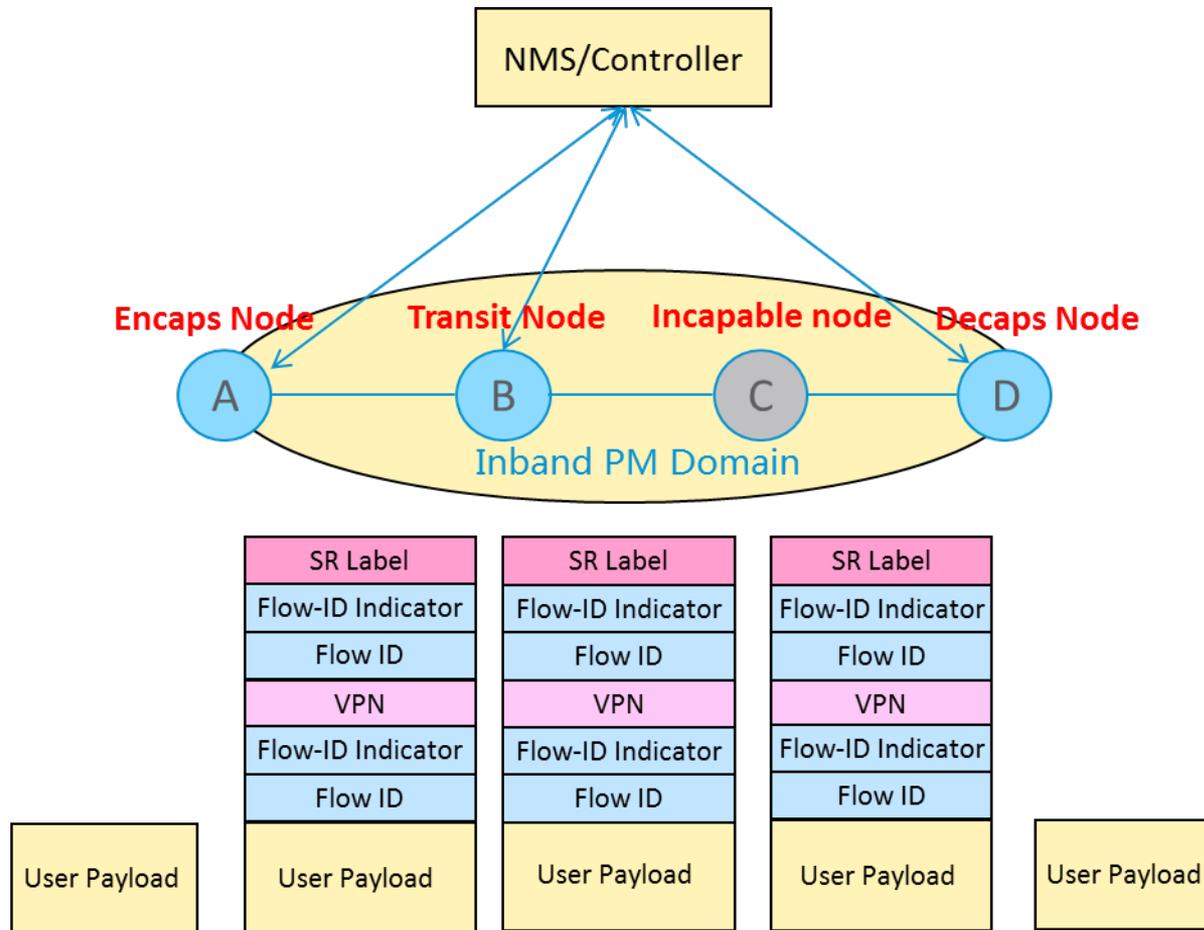
- This example illustrates the scenario where Flow-based PM is applied to LSP in MPLS network

MPLS Label Stack Example (2)



- This example illustrates the scenario where Flow-based PM is applied to VPN in MPLS network

MPLS Label Stack Example (3)



- This example illustrates the scenario where Flow-based PM is applied to both LSP and VPN in MPLS network

Next steps

- Ask for more reviews and comments
- Revise this draft to resolve comments
- Ask for WG adoption