Coloring based IP Flow Performance Measurement Framework

draft-chen-ippm-coloring-based-ipfpm-framework-00

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Problem Statement

- The IPPM WG focus on active measurement in past decade

    - Set of useful specifications finished and used in the field.

- Some limitation of active measurement

    - Extra injected packets to evaluate the performance of path

    - The accuracy of the results depends on the rate, numbers and interval of the injected packets

    - Injected packets have to follow the same path as the real traffic

    - May not suitable for the scenarios that are sensitive to the accuracy of the results

- Passive measurement is required and now is in the charter

Scenario of Passive Measurement
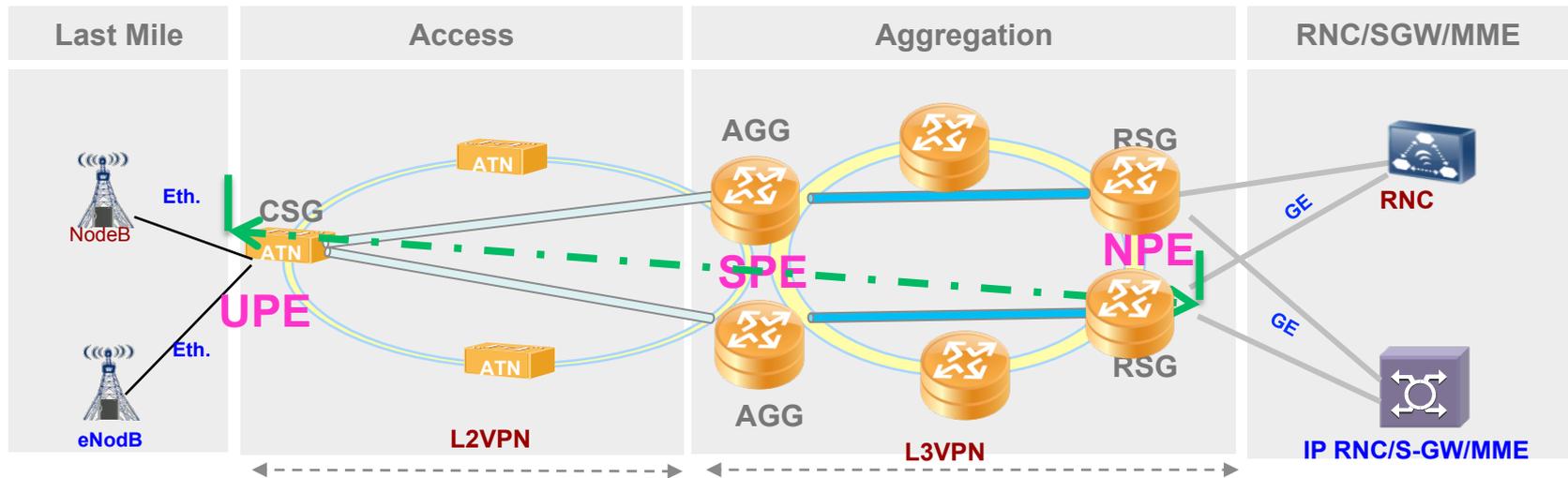
- Mobile Backhaul Network

  - Require to monitor and measure the performance of the path between a specific NodeB and RSG, for:

    - SLA verification

    - Fault demarcation
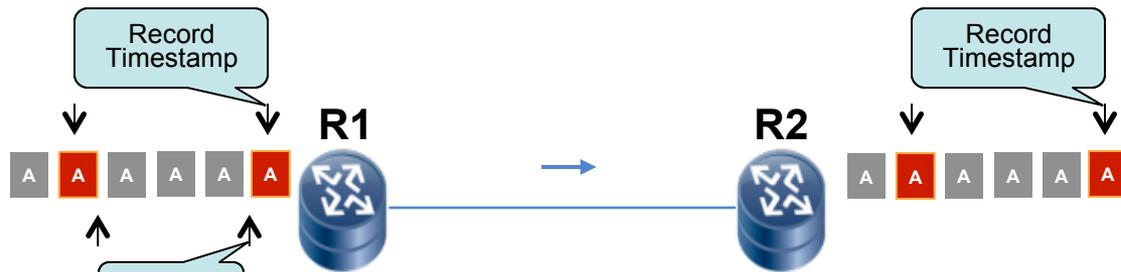
    - Fault localization

# Rationale of Coloring based PM (Packet Delay)
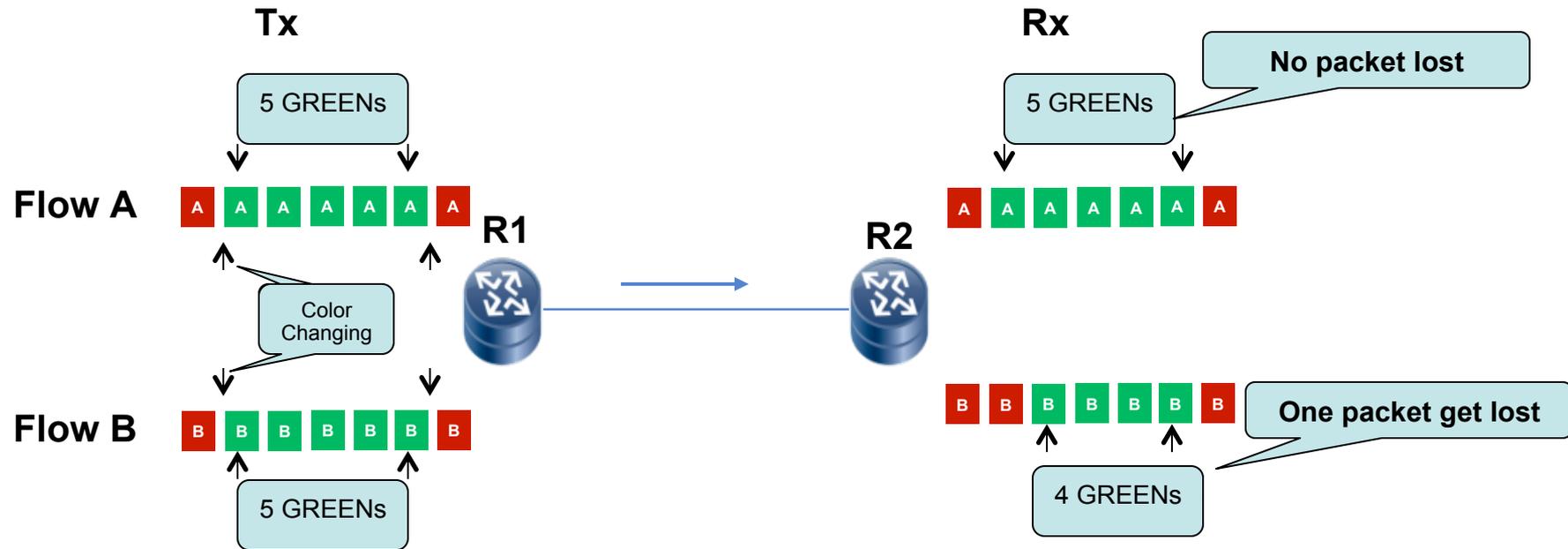
- Packet Loss

  - Use one or more unused bits of IP header to color the packets

  - Different colors divide the flows into different consecutive blocks

  - Counting based on each color block, two counters, one for **RED**, the other for **GREEN**

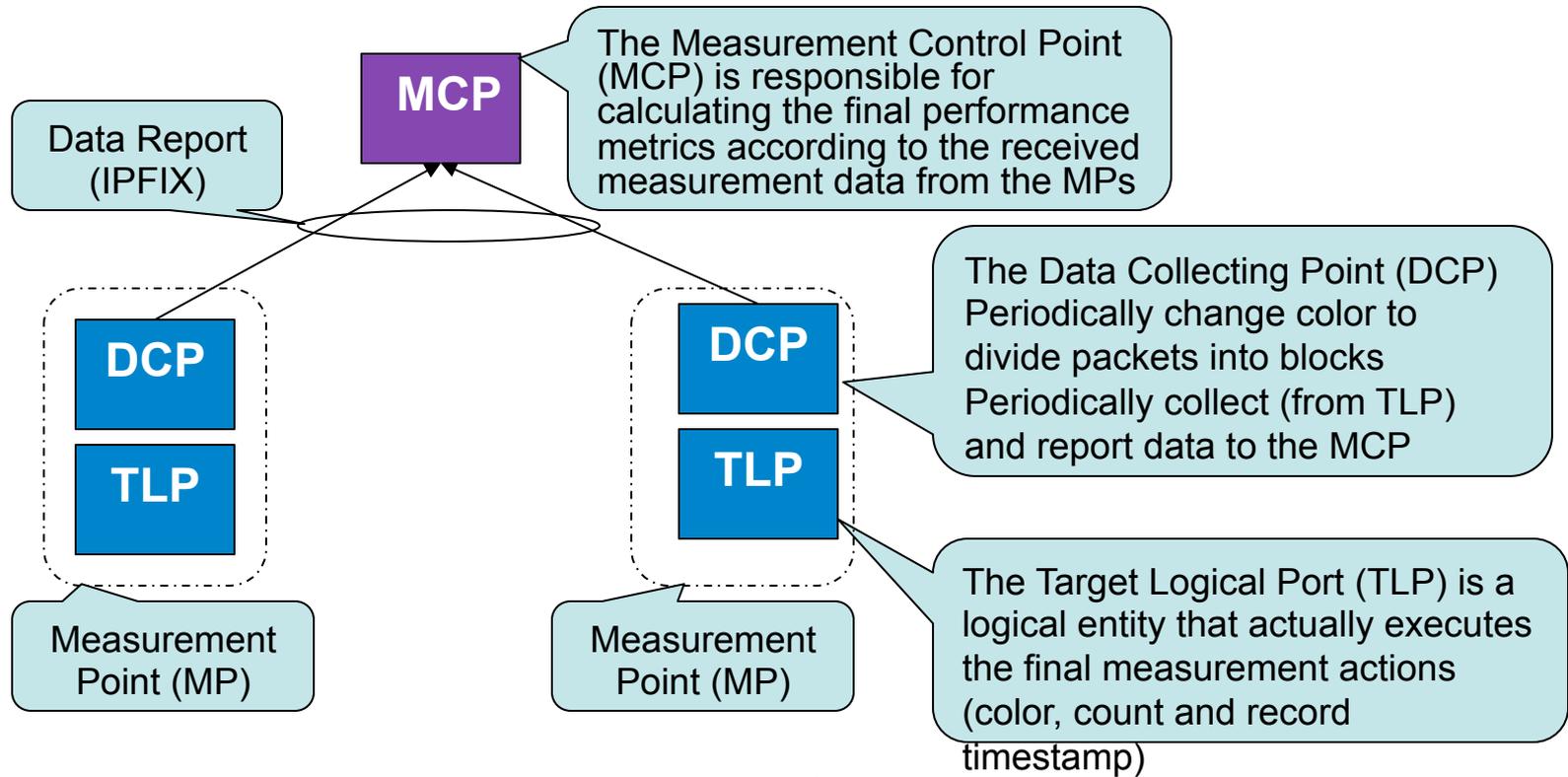# Rationale of Coloring based PM (Packet Delay)

Option 1:
Only color ***ONE*** packet in each period,
Measure packet delay based on ***THE*** packet
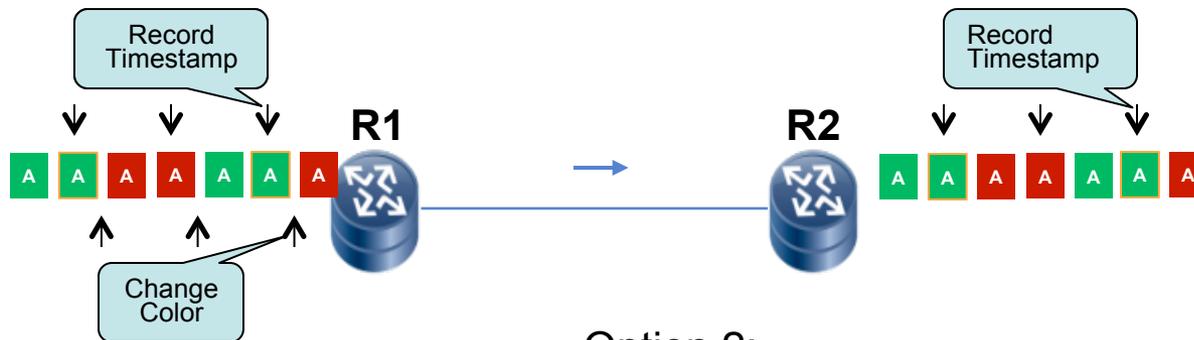
Option 2:
Periodically color packets to blocks, just like packet loss does
Measure packet delay based on the ***FIRST*** packet of each block
Require no packets re-ordering

IPFPM Framework and Components

MCP

The Measurement Control Point (MCP) is responsible for calculating the final performance metrics according to the received measurement data from the MPs

Data Report (IPFIX)

DCP

TLP

DCP

TLP

The Data Collecting Point (DCP)
Periodically change color to divide packets into blocks
Periodically collect (from TLP) and report data to the MCP

Measurement Point (MP)

Measurement Point (MP)

The Target Logical Port (TLP) is a logical entity that actually executes the final measurement actions (color, count and record timestamp)

- Time synchronization is required among DCPs.

- A period number attached to each count or timestamp from different DCPs

- The MCP uses the period number to index the counts and timestamps from DCPs

  - Same period number means the count or timestamp is based on the same color block

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MP2MP Reference Model
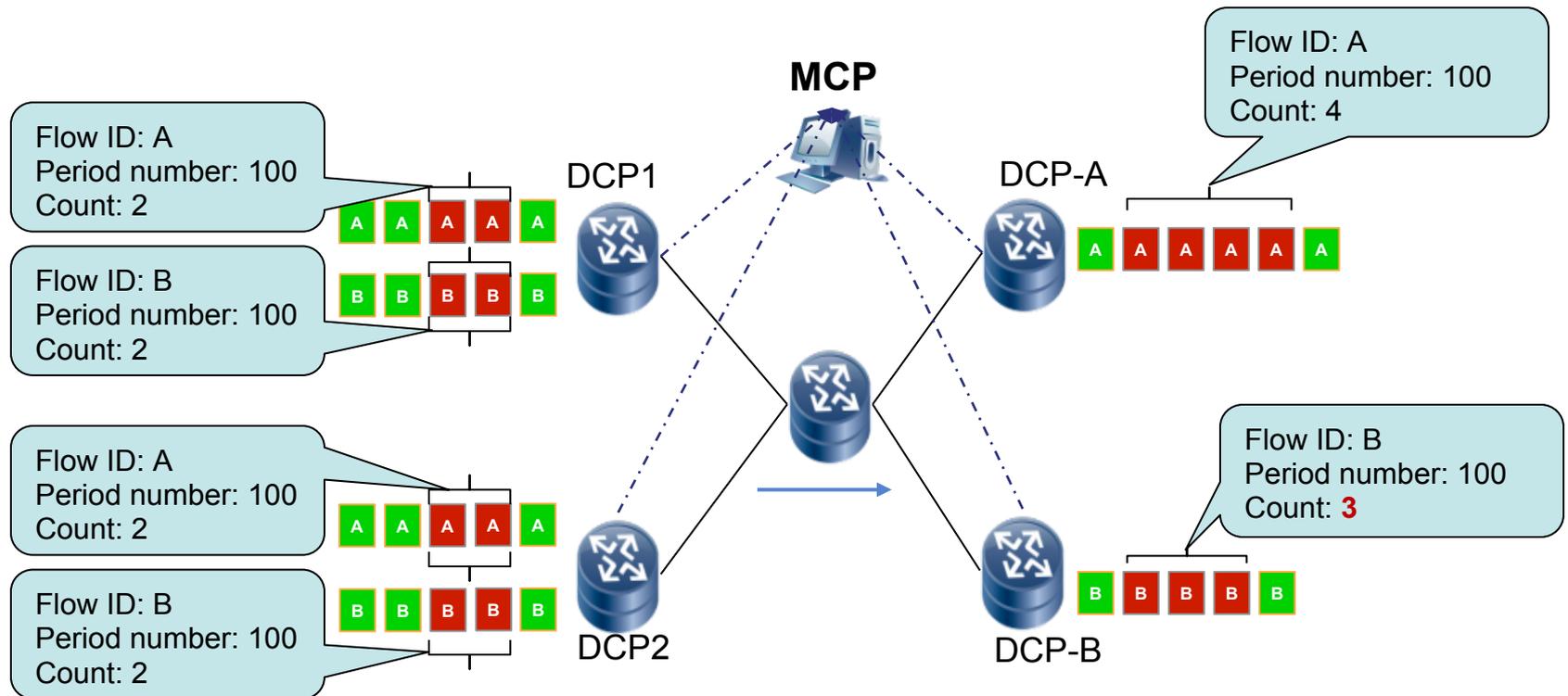
- A flow can be monitored at multiple ingress and/or egress DCPs

  - DCP1 and DCP2: the ingress measurement points

  - DCP-A and DCP-B: the egress measurement points

  - The counts and timestamps from distributed DCPs are indexed by period number and flow ID.

Some Considerations

- Color bits selection

  - Should not affect the services, the egress DCP should have be able to recovery the color bit(s)

  - Should not affect hash result

R-Timer Consideration
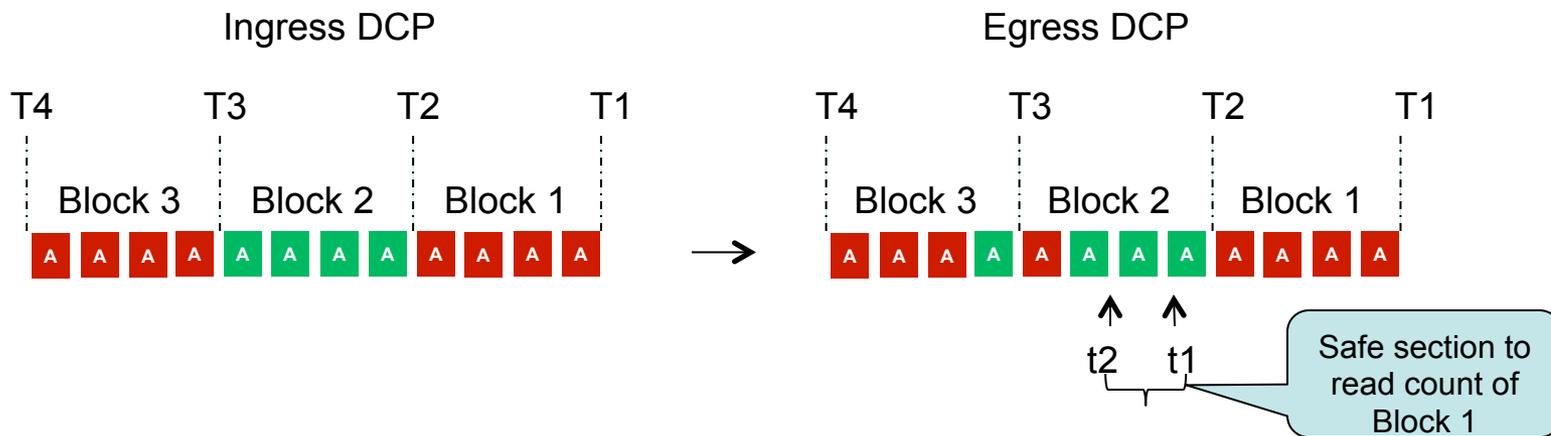
- Each DCP maintains two timers (C-Timer and R-Timer with the same interval)

    - C-Timer for changing color

    - R-Timer for reading count and timestamp, in order to allow for a certain degree of packets re-ordering

        - R-Timer should be started later than delta-T after C-Timer started

        - t1 < (R-Timer + delta-T) < t2

Next Steps

- Implementation show on Thursday's Bits-N-Bites

- Would like to solicit comments and feedbacks of the WG

- Update the draft