

Compact Alternate Marking Methods for Passive and Hybrid Performance Monitoring

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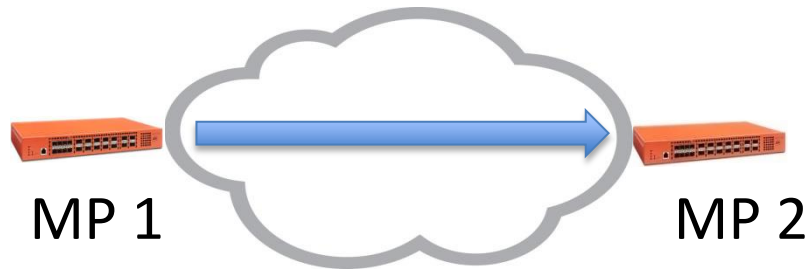
Scope of the Current Draft

- Analysis of RFC 8321 methods
- New alternate marking methods with low overhead:
 - Single bit per packet.
 - Zero bits per packet.
- It makes a summary of alternate marking methods.
- It is possible to understand the most useful method depending on the case.

RFC 8321 Background

Monitor data traffic from MP 1 to MP 2

- Packet Loss Measurement is well-known



- Delay/Delay Variation Measurement
 - Single Marking– First/Last Packet
 - Single Marking– Mean Delay
 - Double Marking

An Additional Variation of RFC 8321: Multiplexed Marking

- A single bit is used for C / T
- Same measurement resolution as Double Marking

Packets that should be timestamped

Traffic Flow

AAAAA BBBBB AAAAA BBBBB

Color Bit: C=

00000 11111 00000 11111

Timestamp Bit: T=

00100 00100 00100 00100

Using only one bit:

T xor C

00100 11011 00100 11011

Time

How to employ RFC 8321 with RFC 5475: Hash-based Selection

- Hash is computed over packet header.
- Zero Marking Hash (RFC 5475):
 - If Hash is equal to a Selected Value then Packet is selected for both loss and delay measurement. Similar to Pulse Marking.
- Single Marking Hash: It uses a mixed approach (RFC 8321 + RFC 5475)
 - Color bit for packet loss measurement
 - Hash-based sampling for delay measurement
 - Static hash has some issues
 - Dynamic hash can be used to pace the number of samples per period

Summary of Marking Methods: focus on Delay Measurement

Marking Methods	# of bits	LM on All Packets	DM Resilience to Reordering	DM Resilience to Packet Drops	DM Multipoint compatible
Single Marking – 1st Packet	1	Yes	--	-	No
Single Marking – Mean Delay	1	Yes	+	-	Yes
Double Marking	2	Yes	+	=	No
Single Marking Multiplexed	1	Yes	+	=	No
Pulse Marking	1	No	+	=	Yes
Zero Marking Hashed	0	No	+	+	Yes
Single Marking Hashed	1	Yes	+	+	Yes

+ Accurate measurement

= Invalidate only if a measured packet is lost (detectable).

- No measurement in case of disturbance (detectable).

-- False measurement in case of disturbance (not detectable).

Next Steps

This document highlights marking methods strengths and weaknesses.

It makes a survey of the available technologies that can be considered if 0 bit, 1 bit or 2 bits are employed for performance measurements.

Ask for working group adoption.

Inputs and Comments always welcome