

Path Congestion Metric

[draft-dang-ippm-congestion-01](#)

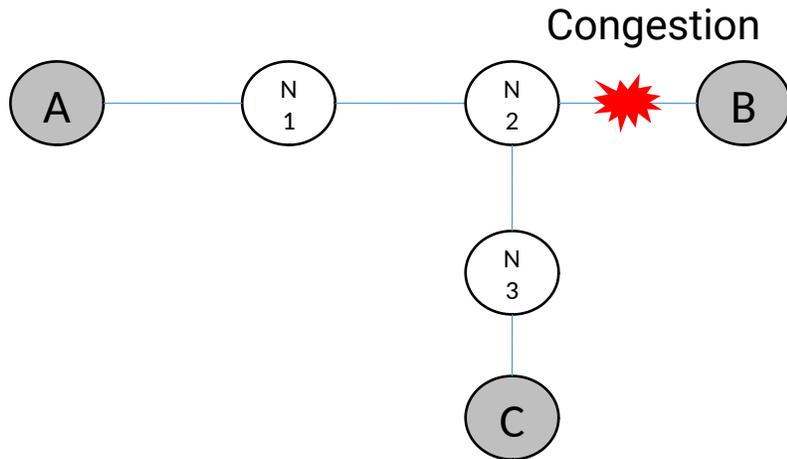
Joanna Dang dangjuanna@huawei.com,
Jianglong Wang wangjl1.bri@chinatelecom.cn

Overview

- Charter for IPPM WG: define **specific metrics** and procedures for accurately measuring and documenting these metrics.
- Path Congestion Metric [*draft-dang-ippm-congestion-01*] is mainly measuring E2E path congestion.

Motivation

- Two Path
 - Path1: A->N1->N2->B
 - Path2: C->N3->N2->B



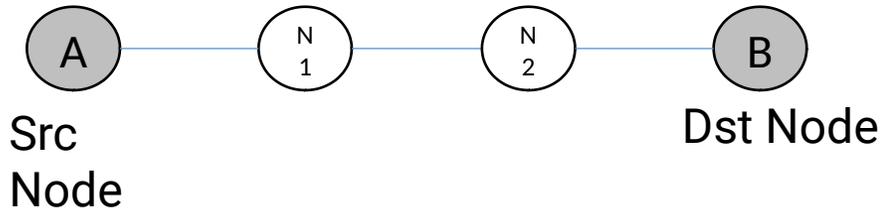
- NodeA/NodeC doesn't sense the congestion between node N2 and Node B.
- We don't know why the congest occurs or which path the congestion affects.

Path Congestion Metric is required.

- If path1 is congested by measurement, nodeA will adapted part of the traffic to relief the congestion between N2 and B.
- If path2 is congested by measurement, nodeC will adapted part of the traffic to relief the congestion between N2 and B.

As a result, the congestion will be avoided and the service experience in path1 and path2 will also be guaranteed.

Path



A path : A->N1->N2->B

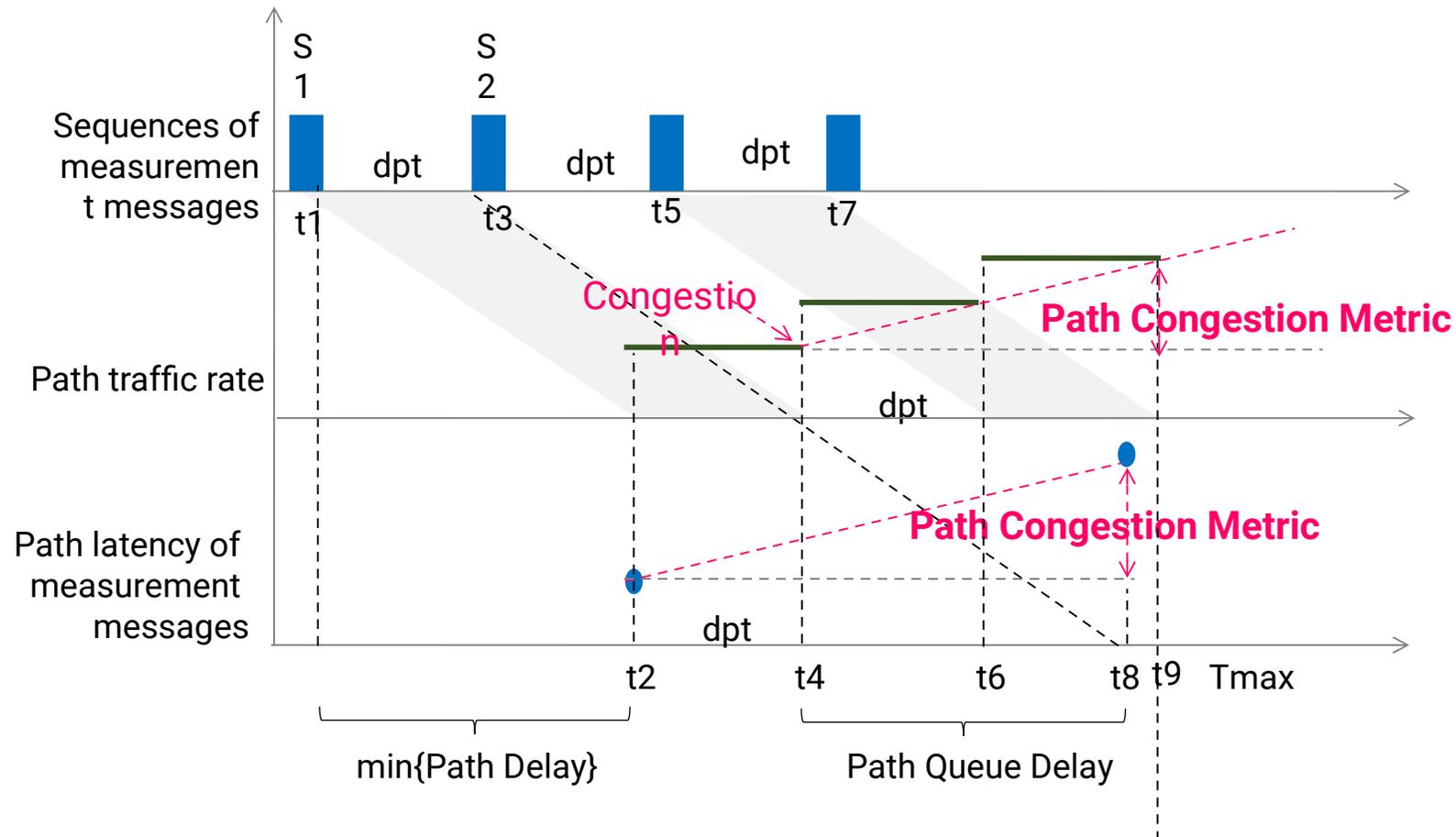
- Has a definite Src node and Dst Node
- A path of multiple paths in the equal-cost multi-path (ECMP) or unequal-cost multiple (UCMP) scenarios
- Be unidirectional
 - Statistics on the number of packets at the Src node and the Dst node
 - One-way delay measurement

Path Congestion Metric

There are 3 scenarios about path congestion metric.

- No packet loss occurs, **path congestion metric is**
 - 0 when there is no path congestion.
 - Path Delay = (Propagation Delay + Transmission Delay)
 - In one cycle, the number of packets received by the Dst is the same as sent packets by the Src.
 - >0 when the path is congested.
 - Path Delay = (Propagation Delay + Transmission Delay + Path Queue Delay)
 - In one cycle, the number of packets received by the Dst is less than sent packets by the Src.
- When packet loss occurs, packet loss is more serious than congestion. Therefore, the packet loss problem is solved first and then the path congestion metric is monitored.

Methodologies for a Type-P-Path-Congestion Metric



Short-term measurement

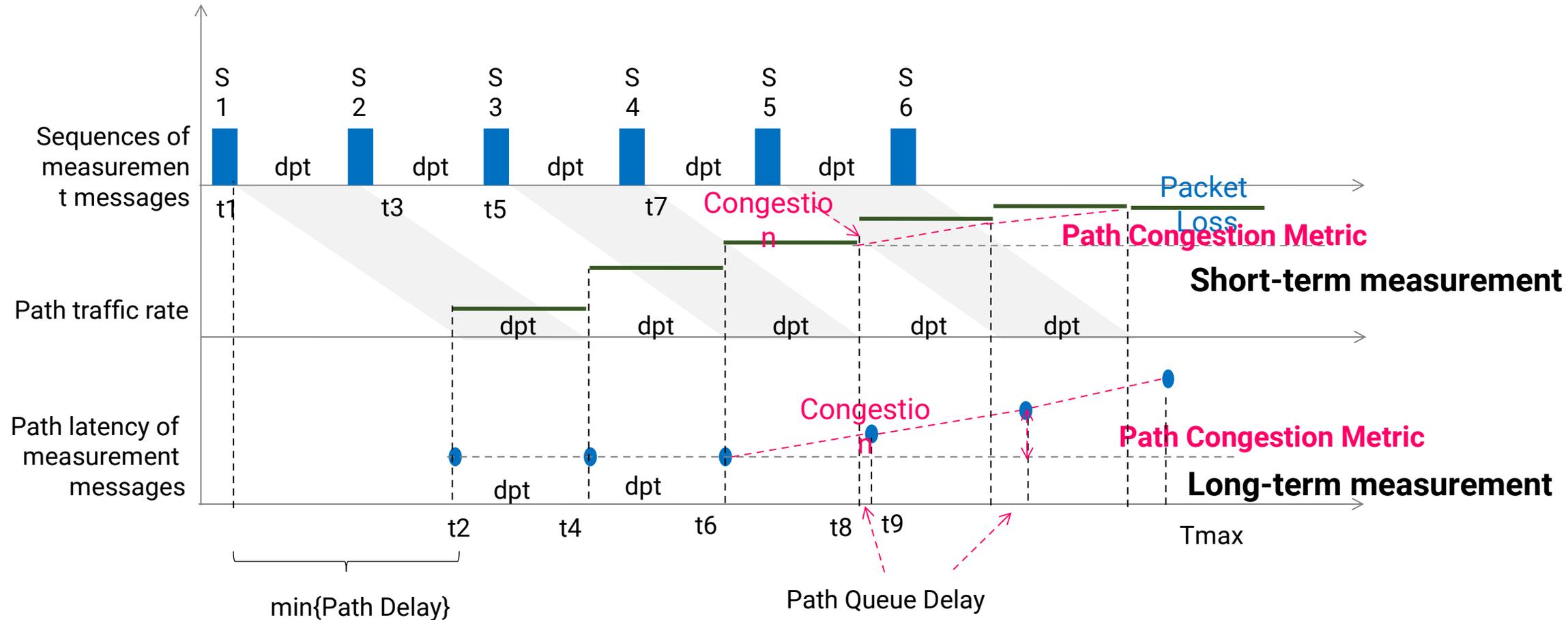
- Although not receiving the second measurement packet, but the number of service traffic packets reached at Dst is periodically counted after receiving the first measurement packet.

Long-term measurement

- The Dst receives the second measurement packet.

When the period is shorter, the measurement accuracy is higher.

Methodologies for Samples of Path Congestion



Next Step

- Think deeply in conjunction with In-situ OAM (IOAM) and Segment Routing Version6 (SRv6) scenarios
- Make congestion adjustment and avoidance

Thank you!