IETF 110, IPPM WG draft-ietf-ippm-connectivity-monitoring

Scope:
Monitor Segment Routed subpaths or links to detect and locate loss of connectivity and congestion.

Changes -00 and -01:
-00: improved prose description of SR monitoring loop overlay and metrics.
-01: formalized measurement loop and metric definitions. Still incomplete and will benefit from review.

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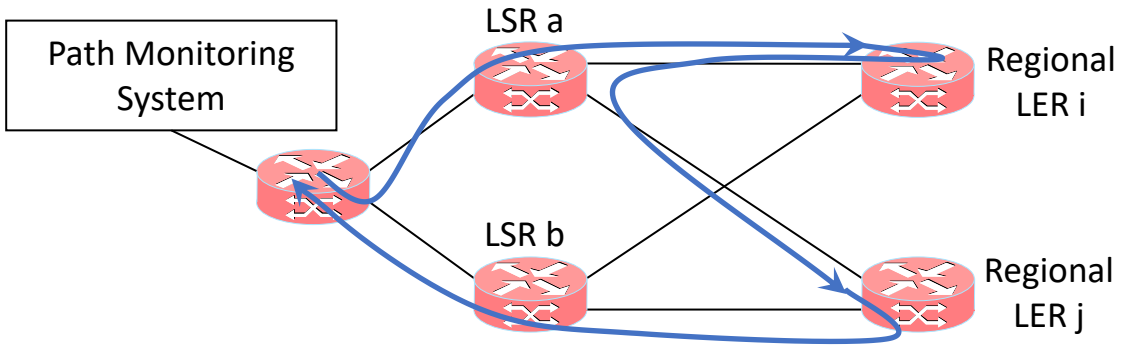
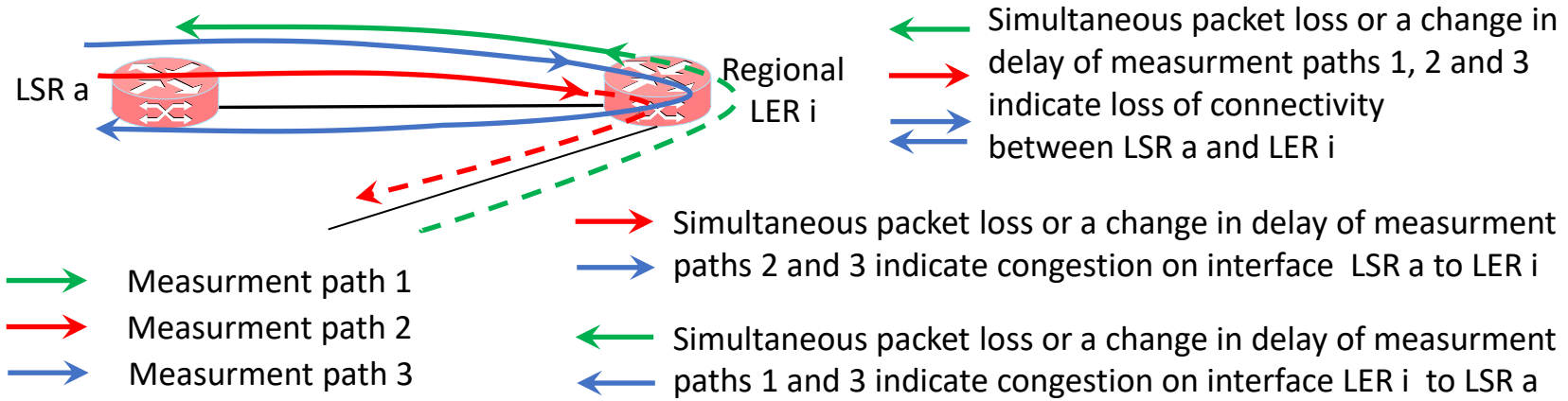
Set-up of each individual measurement path (one only shown):
1 round trip, 1 downstream & 1 upstream pass of different monitored LSR – LER IFs.



Detection of events (different measurement paths combine as shown below to create an individual measurement path combination per monitored interface):



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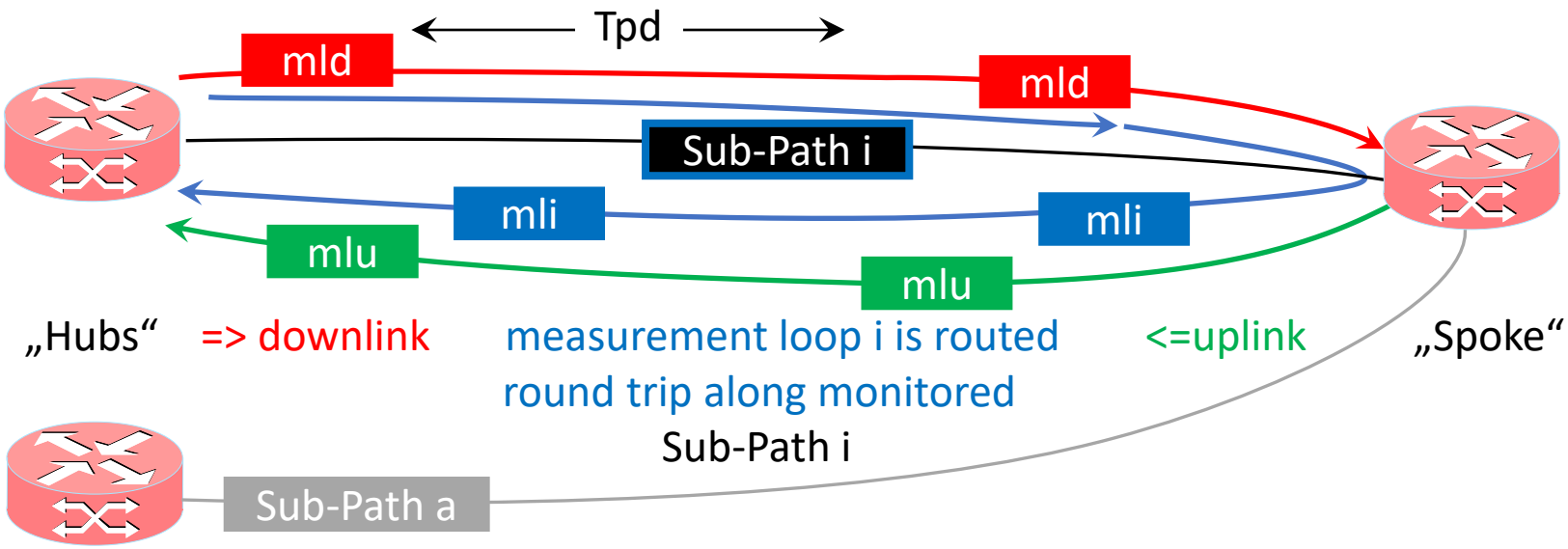
Extract of formal measurement loop definitions (some draft text still to be updated)



The metric requires each „Spoke“ to be connected by two different monitored Sub-Paths to (one or) two „Hubs“. The directions upstream/downstream an the roles Hub/Spoke are assigned for illustrative purposes only (the idea is a somewhat human-comprehensible description of the measurement loop overlay).

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The metrics section is incomplete. Most metrics are present and defined. Examples:

Basic metric/statistic: SR-Path-Periodic-Delay-Mean

Basic idea: the delay is constant in the absence of congestion.

Example: an 11 hop measurement loop offers a mean delay of 35104 µs and a standard-deviation of 45 µs (as 95% quantile out of more than 240 samples).

Subpath monitoring metrics (note, draft indices to be adopted to „u“ and „d“):

Round Trip Delay $RTD\_Sub\text{-}Path_i =$

$$\frac{3*Dmean\_mli + Dmean\_mlu + Dmean\_mld - Dmean\_mlx - Dmean\_mly - Dmean\_mlz}{4}$$

Changepoint detection by SR-Sub-Path-Delay-Changepoint

Sup(t)-mli-Delay = max (0, Sup(t-1) + xt - SR-Path-*-MeanCSi - ki) # read „S – upper“

This is a Cumulative Sum, a standard changepoint detection method. Parametrise for a desired mix of mean change detection speed and a minimum of false alerts.
ki = n * SR-Path-Delay-Std_mli (Delay Standard Deviation in absence of congestion)
xt = Type-P-SR-Path-Periodic-* singleton for measurement loop i at time t.