

Problem Statement of Signal Degrade Indication for Segment Routing over MPLS Network

draft-yang-mpls-ps-sdi-sr-00

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What is Signal Failure/Signal Degradation

- Signal Failure (SF) :
 - absence of network resources
 - e.g. physical or functional unavailability of port, link or equipment
- Signal Degradation (SD):
 - decrease of the signal quality quantifiable measurement
 - e.g. fiber aging, fiber impairment, fiber pollution, optical module mismatch or WDM transmission error

History & future

- **Definition** - [RFC4428]
- **MPLS-TP linear protection mechanism for signal failure in MPLS-TP** - [RFC6378]
- **MPLS-TP linear protection mechanism for signal failure and signal degrade to match SDH/OTN/ETN operations** - [RFC7271]
- **Signal degrade detection and consequent protection mechanism in MPLS-TP** - [I-D.rkhd-mpls-tp-sd], [I-D.zhl-mpls-tp-sd]
- **No signal degrade mentioned in SR-MPLS OAM or BFD** - [I-D.ietf-spring-sr-oam-requirement], [I-D.ali-spring-bfd-sr-policy]
- **Future work: signal degrade discussion in SR-MPLS** – [I-D.yang-mpls-ps-sdi-sr]

Problem Statements

- **PS1: Signal degrade in diversity of PHYs, no uniform FEC mechanism**
- **PS2: Performance management detection approaches**
 - Active PM: not always online
 - Passive PM: consumes too much network resources
 - Not feasible and efficient
- **PS3: Fault management detection approaches**
 - BFD: not always detectable of signal degrade, and the best case is 3.3ms*3 later than the signal degrade happens
 - SR MPLS Ping/Traceroute: active approach
 - Lower layer fault management (e.g. transport layer OAM alarms): BER (bit error rate) -> PLR (packet loss rate)
- **PS4: LER and LSR considerations**
 - For MPLS-TP, LSRs play dumb, because LSP is static
 - For SR-MPLS, LSRs process the label stack, LSRs should be smart
- **PS5: Other signal degrade approaches**
 - Control-plane signaling
 - Network Management System (NMS) or SDN controller trigger

Next steps

- Comments, suggestions and questions are greatly welcome and appreciated
- Propose alternative solutions for SR-MPLS data plane

Thank you!