BFD Extension for DetNet Remote Defect Indication (RDI)

draft-huang-detnet-rdi-00

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Background

- Deterministic Networking (**DetNet**) – reliable packet delivery service

- Strict QoS REQUIREMENTS of DetNet
  1. Deterministic bounded end-to-end **latency**
     - IP neglects latency → leave it to transport+ layer
     - Best-effort delivery aggravates the situation
  2. Strict packet **loss** ratio
     - Lossy underlay network
     - DetNet applies Service Protection to eliminate loss
  3. Upper bound of out-of-**order** packet delivery
     - Packet Ordering Function (POF) to preserve order

Motivation

- DetNet **OAM** requires quick defect detection and dissemination
  - Detection of violation
  - Dissemination -- Remote Defect Indication (RDI)

- Existing practice: Bidirectional Forwarding Detection (**BFD**)
  - Forwarding plane
  - Detect and report failures

Not specific for DetNet-domain defects

Looking at DetNet-Specific Defects

- Detection
  - [Out of scope]

- Dissemination/Notification/RDI
  - Latency and out-of-order: not defined
  - Loss: insensitive as triggered by BFD

*No **EXPLICIT** DetNet-specific defect indicators*

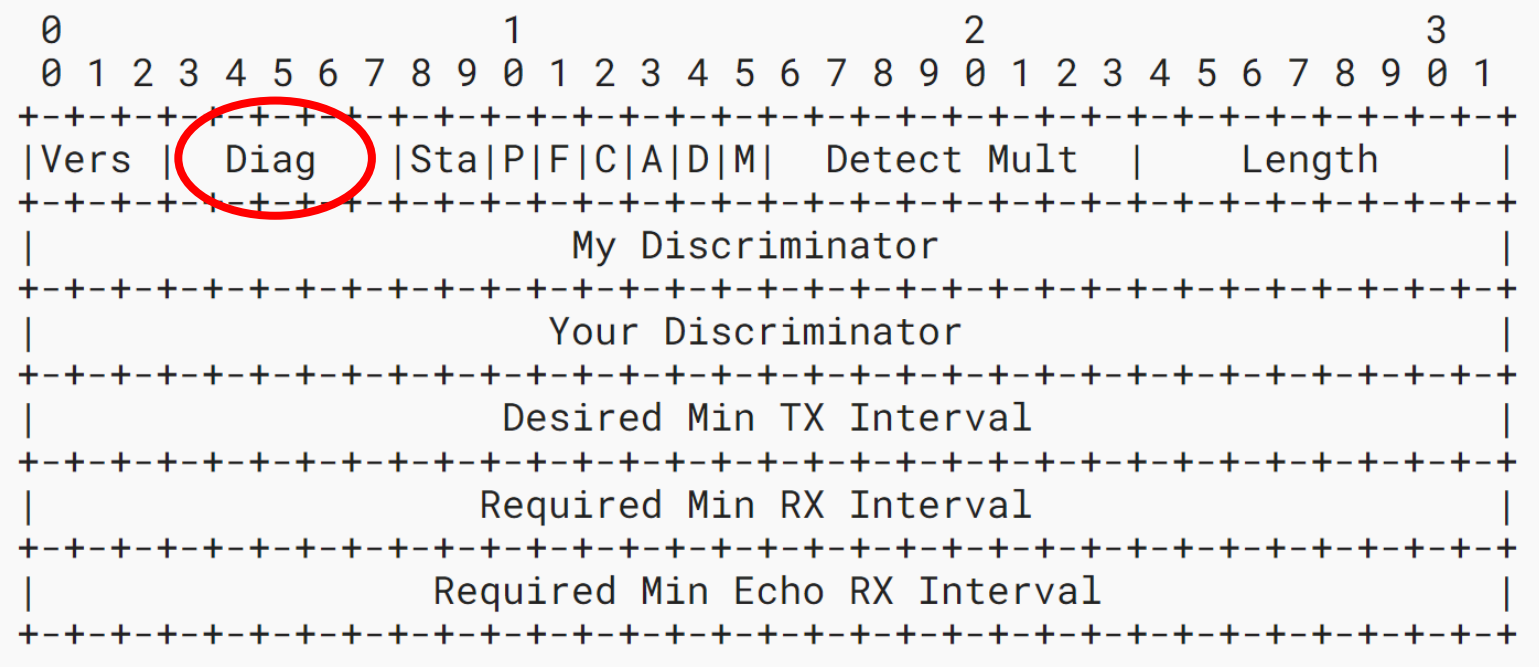
Define Detnet-Specific Defect Indicators

1. Ratio of out-of-order packets
2. Packet latency
3. Ratio of packet loss

RDI: BFD Extension

- BFD control packet
- "**Diag**"– diagnostic
  - 0-8 [RFC5880]
  - 9 [RFC6428]
  - 10-31 Reserved

Value	BFD Diagnostic Code Name	Reference
0	No Diagnostic	[RFC5880]
1	Control Detection Time Expired	[RFC5880]
2	Echo Function Failed	[RFC5880]
3	Neighbor Signaled Session Down	[RFC5880]
4	Forwarding Plane Reset	[RFC5880]
5	Path Down	[RFC5880]
6	Concatenated Path Down	[RFC5880]
7	Administratively Down	[RFC5880]
8	Reverse Concatenated Path Down	[RFC5880]
9	mis-connectivity defect	[RFC6428]
10-31	Unassigned	

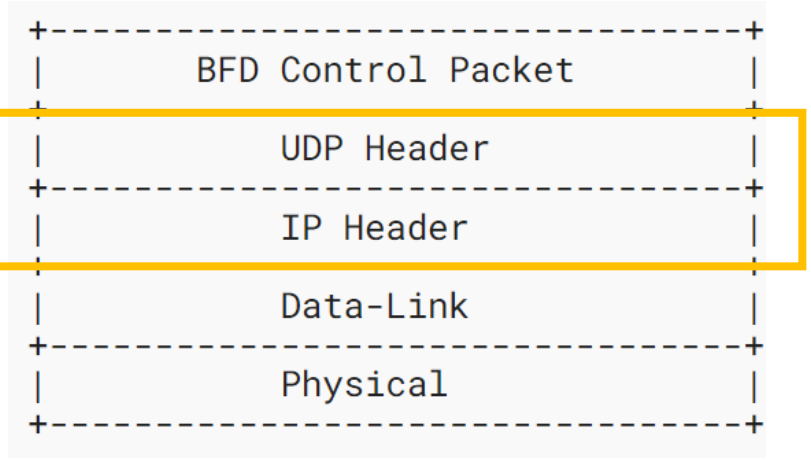


BFD Extension for RDI (cont'd)

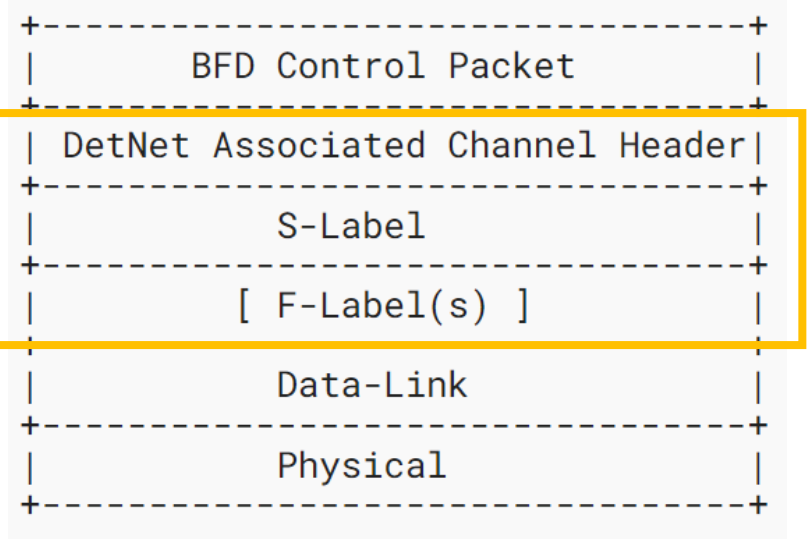
- Append DetNet-specific error codes

Value	BFD Diagnostic Code Name
TBD1	Packet_Misorder_Ratio_Limit_Reached
TBD2	Packet_Latency_Limit_Reached
TBD3	Packet_Loss_Ratio_Limit_Reached

Encapsulation: IP/MPLS



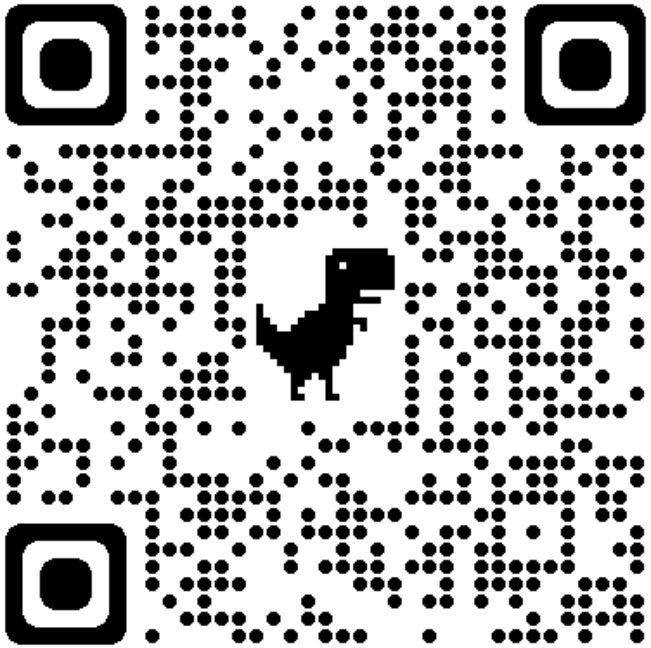
IP encapsulation



MPLS encapsulation

Next Steps

- Any questions or comments
- Seeking for feedbacks on the draft



Draft Link

THANK YOU