Operations, Administration and Maintenance (OAM) for DetNet

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Documents

• Framework of OAM features for DetNet
• OAM for DetNet with IP data plane
• OAM for DetNet with MPLS data plane
General Requirements for DetNet OAM

• OAM session between DetNet MEPs
• Proactive and on-demand monitoring and measurement OAM methods
• Support unidirectional OAM methods, e.g., continuity check, packet delay and packet loss measurement
• Support OAM for bi-directional DetNet flows
Requirements for DetNet OAM at the Forwarding Sub-layer

• Support PMTUD

• Support RDI

• Support monitoring levels for resources allocated to the given DetNet flow. For example, buffer allocation, transmit scheduler calendar

• Support monitoring of any sub-path traversed by the particular DetNet flow
Requirements for DetNet OAM at the Service Sub-layer

- OAM functions for the DetNet service sub-layer
- Support the discovery of DetNet relay nodes
- Support the discovery of Packet Replication, Elimination and Order preservation sub-function locations in the DetNet domain
- Support the collection of DetNet service sub-layer specific information
- Support the ability exercising functionality of Packet Replication, Elimination, and Order preservation functions
- Support the use of Alarm Indication Signal between DetNet relay nodes
- Support performance monitoring in a DetNet service sub-layer with PREOF in use
“Native” OAM in DetNet IP

• Multiple IP OAM protocols:
  • ICMP – on-demand continuity check, defect localization
  • BFD – pro-active continuity check
  • STAMP – performance monitoring

• Operational challenge – mapping a particular OAM test session to the monitored DetNet flow:
  • ICMP – <source IP address, destination IP address, DSCP>
  • OAM using UDP transport – <source IP address, destination IP address, DSCP, source UDP port>
Active OAM using DetNet-in-UDP encapsulation

- An IP DetNet flow is encapsulated in UDP
- A DetNet-in-UDP tunnel between IP DetNet nodes ensures that active OAM test packets are fate-sharing with the packets of the monitored DetNet flow.
DetNet Service sub-layer OAM MUST use the MPLS-over-UDP encapsulation to ensure it is in-band with the monitored DetNet flow.
d-ACH

• DetNet Associated Channel Header (d-ACH)
  • First nibble: MUST be 0b0001
  • Version = 0x1 (thus d-ACH is different from PW ACH)
  • Sequence number: OAM session specific
  • Channel Type: DetNet Associated Channel Type
  • Node ID: Originator node
  • An active DetNet OAM packet MUST include d-ACH immediately following the S-label
Thank you for your comments, discussions that made the OAM documents essential part of the Deterministic Networking