DetNet Data Plane Protection
Implementation Report

János Farkas, Balázs Varga, István Moldován

IETF 99

2017-07-20
Guaranteed data transport with bounded low latency, low delay variation, and extremely low loss.
Reliability at Packet Level

› **FRER**: Frame Replication and Elimination for Reliability
  - 802.1CB: mechanism, pseudo code, L2 data plane

› **PREF**: Packet Replication and Elimination Function
  - draft-dt-detnet-dp-sol-01: L3 data plane, i.e., IPv6 and PW over MPLS

› Per-packet 1+1 (or 1+n) redundancy
  - Send packets on two (or more) disjoint paths, then combine and delete extras
Demo Setup

- Remote control of a balancing robot
- Control loop through a packet network
- PREF / FRER implemented in Ericsson Research software switch on PCs
- Reference: 50ms protection switching
PW MPLS Data Plane for TSN Service

- VID
- EtherType
- S-MAC
- D-MAC
- DetNet CW
- PW Label
- MPLS T-Label

Figure 2 in draft-dt-detnet-dp-sol-01

Balancer Robot
PW MPLS Data Plane Example

Wireshark:
Demo Scenario 1: Link Failure

- Protection switching
  - Triggered by the failure
  - 50ms outage on working path (the protection path is 2ms longer)
  - Impacts the application

- PREF / FRER eliminate packet loss caused by outage
Scenario 1 – Link Failure
Protection Switching
Scenario 1 – Link Failure

Controller — EN1 — CN1 — EN2 — Balancer Robot

packet network
Demo Scenario 2: Link Flapping

- Link Flapping
  - Typical L1 problem caused by faulty cable or HW
- Protection switching does not react
  - Multiple 20ms loss periods impact the application
- PREF / FRER eliminate packet loss caused by outages
Scenario 2: Link Flapping Protection Switching
Scenario 2: Link Flapping
Summary

› PREF provides extremely low packet loss
  – Hitless failover because there is no switchover
  – Protection against failure events that are not even noticed in some environments

› Implemented the Packet Replication and Elimination Function on PW over MPLS data plane as described in draft-dt-detnet-dp-sol-01

› It works fine
› No caveats found

› Demo: today during the coffee break starting 15:30 in Tyrolka, Mezzanine Level