

OAM for Deterministic Networks

draft-mirsky-detnet-oam

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IETF-103 November 2018, Bangkok

Update

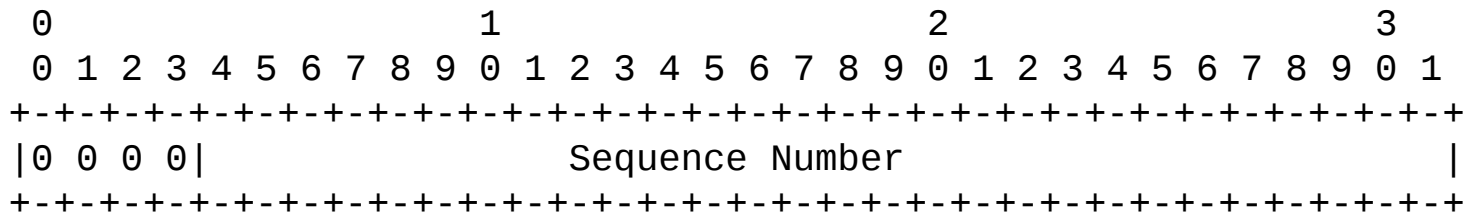
- Welcome Mach Chen
- Moved from the problem statement to the proposed solution

Problem statement

- Deterministic Networking (DetNet) intended to provide transport layer solution for services that require bounded low latency and very low, almost none, packet loss. The scope of the DetNet solution includes networking domains with MPLS and IPvX data planes as Layer 2, Ethernet, domains to use Time-Sensitive Networking (TSN) (product of [IEEE 802.1 TSN Task Group](#)).
- In addition to using traffic engineered paths, policing and traffic shaping, DetNet may use Packer Replication and Elimination function (PREF) to further minimize packet loss in the DetNet network. PREF ingress generates two or more copies of the DetNet packet. The packets are forwarded over disjoint paths to the PREF egress. The egress node eliminates all but the first arrived copy of the packet using a sequence number.

DetNet over MPLS data plane

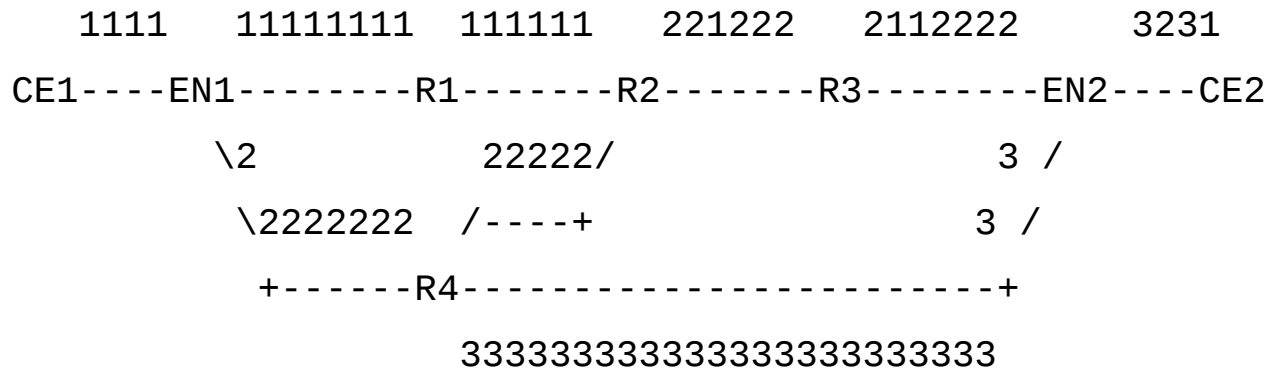
Solution, extracted from draft-ietf-detnet-dp-sol, draft-bryant-detnet-mpls-dp resembles PW with mandatory DetNet CW which is similar to PW CW:



Like PW label, DetNet service identified by S-label, which is BoS. DetNet service transport, T-labels, may be MPLS LSP or SR-MPLS.

DetNet' Packet Replication and Elimination Function (PREF)

PREF egress is to use the Sequence Number information included in the DetNet Control Word (d-CW) when eliminating extra copies of the packet it already forwarded:

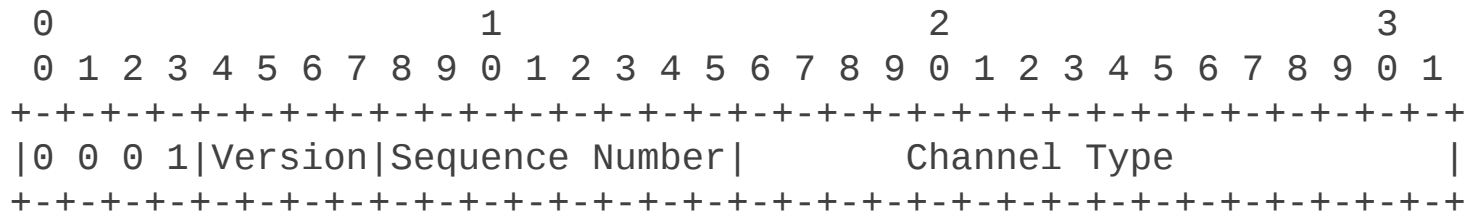


PREF is composed of two sub-functions:

- replication;
- elimination.

DetNet OAM over MPLS data plane

For DetNet OAM propose to use d-ACH that replaces DetNet CW in the encapsulation:

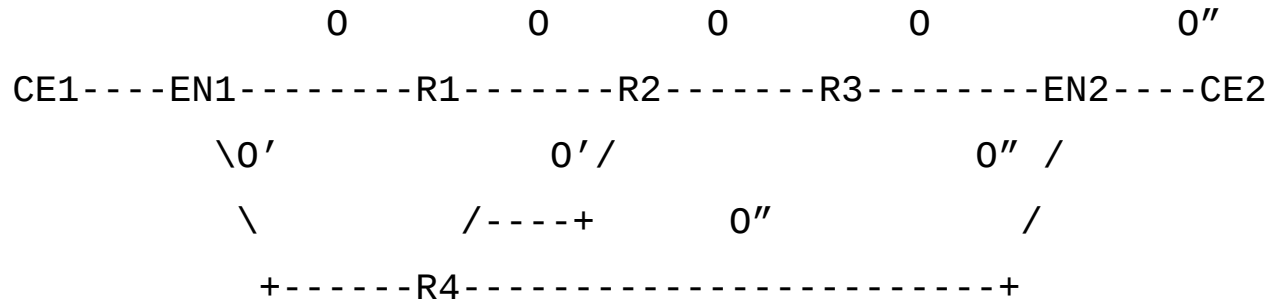


- Bits 0..3 MUST be 0b0001. This value of the first nibble allows the packet to be distinguished from an IP packet [RFC4928] and a DetNet data packet [I-D.ietf-detnet-dp-sol-mpls].
- Version: this is the version number of the d-ACH. This specification defines version 0.
- Sequence Number: this is unsigned eight bits-long field. The originating DetNet node MUST set the value of the Sequence Number field to a non-zero before packet being transmitted. The originating node MUST monotonically increase the value of the Sequence Number field for the every next active OAM packet.
- Channel Type: the value of DetNet Associated Channel Type is one of values defined in the IANA PW Associated Channel Type registry.

Use of GAL is optional. If GAL is used, it MUST precede S-Label on the label stack, and the S-Label MUST be followed by d-ACH. Use of GAL in DetNet OAM MAY require special processing by the replication and elimination sub-functions.

Active OAM and DetNet' PREF (cont.)

Consider an active OAM packet traversing DetNet domain if the replication sub-function uses S-label only:



The replication sub-function creates copies of the OAM packet at nodes EN1 and R4.

The elimination sub-function considers 28 higher order bits of d-ACH as the number. As result, node R2 will drop late packet O' and EN2 will drop late copy O.

Next steps

- DetNet OAM over IP data plane
- Your comments, suggestions, questions always welcome and greatly appreciated
- WG adoption