draft-ietf-detnet-dp-sol-00

Issues

Detnet working group, IETF100, November, 2017

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Issues

• 42 comments recorded in dp-sol-00.
• Other email discussions.
• We cannot go into every comment, here.
• Following is a selection of topics suitable for discussion here, most of which span multiple individual comments.

• Questions for the WG to answer in blue.
Generalized Associate Channel (GACH)

- Will the GACH work with PREF?
- All uses?
- To Be Determined and added to dp-sol.
Load Sharing

• We’ve had email discussions about "Load Sharing". That is, distributing (not replicating) a flow’s packets over multiple links, because no one link has sufficient bandwidth to carry the flow.

• We would, presumably, use PREF to restore the packets to the right order.

• This would need to be documented in at least the architecture and dp-sol drafts, and perhaps be added to the use cases and/or problem statement.

• Is this a DetNet requirement, a distraction, or something in-between?
What goes in what draft (to be RFC)?

• Some parts of dp-sol, especially parts of sections 1 and 4, need to be eliminated, reduced, or incorporated into architecture draft.

• dp-sol includes two solutions: IPv6 encapsulation, and something similar to pseudowires.

• Should dp-sol be split into two drafts, describing the two different solutions, or remain a single draft?
Which particular “pseudowire-ish solution”?

• Three ways to describe the pseudowire-ish solution are proposed:
  • dp-sol is based on RFC6073 Multi-Segment Pseudowires (MS-PW).
  • It could be based on RFC7432 BGP MPLS-Based Ethernet VPN (EVPN).
  • It could describe a brand-new construct, the “DetNet Wire” (DW).

• How much do these choices differ in the implementation of the data plane?
Issues driven by MS-PW / EVPN / DW answer

• The rotating sequence number in the control word skips over 0, because 0 means, “sequencing not done; don’t eliminate me”.
  • Skipping over 0 is not done in three existing L2 technologies with which we wish to interwork, and dropping duplicates is not optional.
  • Is this behavior an exception to existing RFCs, or do we describe a new DW?

• There are terminology issues among these choices, with the IPv6 encapsulation, and with the architecture document.
  • The architecture draft necessarily uses neutral terms different from all of the above.
  • dp-sol is inconsistent in its choices to use terms from the architecture draft, or terms from its basis RFC6073 MS-PW.
  • Which RFCs’ terminology do we use in dp-sol?
Aggregation encapsulation techniques

• Not well explored in current dp-sol draft. Additional work needed.
• Aggregation is required to scale up the number of flows receiving bounded latency service. Adding an outer MPLS label is all we need.
• Do we need multi-layer PREF? Examples:

- PREF + aggregation for reliability (how to add sequence to aggregate?)
- PREF + PREF for VERY unreliable links (CW + PW label + label + CW + PW label???)
End-to-End PREF vs. “ladders”

• End-to-end PREF, where only one point (at or near the source) replicates packets, and only one point (at or near the destination) eliminates packets, makes the solution much simpler.

• However, the authors feel that there are use cases where protection against just one failure is inadequate. For example:
  • Factory floor: Main ring + attached rings.
  • Planned break in main ring is required to add/delete attached rings.
  • Planned break in main + unplanned break in attached ring = end-to-end failure.
    • 3 or 4 paths is a big burden on the host.
 Various aspects of packet replication and elimination are discussed in all five of the adopted DetNet drafts: architecture, problem-statement, use-cases, dp-sol, and security.

• Replication is easy.
• Elimination maybe not so easy:
PREF in complex, federated routers

- Various aspects of packet replication and elimination are discussed in all five of the adopted DetNet drafts: architecture, problem-statement, use-cases, dp-sol, and security.

- Replication is easy.

- Elimination maybe not so easy:
  - (If red packet comes first, it goes to both output interfaces.)

![Diagram showing packet replication and elimination](image_url)
PREF in complex, federated routers

• If you have a “one-chip” router, then PRE may be easy to implement.
PREF in complex, federated routers

• If you have a “one-chip” router, then PRE may be easy to implement.

• If you have a “federated” router, with multiple line cards and an interconnect, PRE may be relatively more difficult to implement.

• It is common to make all decisions in the “ingress” line card. The line cards are stupid in the output direction.

• It is not easy to distribute the question, ”Which is first?”
PREF in complex, federated routers

• We could allow the packet elimination function to be moved to the other end of the wire by defining an elimination function that works on the input side.

• If you have the bandwidth to carry all copies of all the flows that use a given link, this can work.

• (E.g. IEC 62439-3 “quad box” with input-only elimination uses $2x$ bandwidth on link 1 and $2x$ or $3x$ bandwidth on links 2 and 3.)
A number of potential remedies have been discussed:

1. Drop PREF as a DetNet concept.
2. Divorce PREF from bounded latency, placing PREF into separate set of architecture, data plane, and security documents.
3. Restrict PREF to one-chip routers.
4. Expand architecture and dp-sol to include input-only elimination.
5. Mention this issue in the architecture document.
7. Leave it to the implementer to figure out.
Further discussion

• More on the above items?
• Any specific comments from draft-ietf-detnet-dp-sol-00?
• New comments?