Support Postcard-Based Telemetry for SRv6 OAM
draft-song-6man-srv6-pbt-00

Abstract

This document describes a method based on Postcard-based Telemetry with Marking for SRv6 on-path OAM, which avoids the extra overhead for encapsulating telemetry-related instruction and metadata in SRv6 packets.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119][RFC8174] when, and only when, they appear in all capitals, as shown here.

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1. Introduction

The ability to collect the on-path data about SRv6 packets at each segment is important for SRv6 OAM, especially for monitoring the application-aware services. The In-situ OAM (IOAM) [I-D.brockners-inband-oam-data] trace option can be used for such purpose. However, SRv6’s SRH can be large due to the long segment list. The IOAM trace option introduces significant additional overhead to the SRv6 packets with its instruction and data trace. The large header overhead complicates the packet processing and may exceed the forwarding hardware’s header processing capability.

The extra IOAM trace option header also brings some encapsulation challenges as documented in [I-D.li-6man-ipv6-sfc-ifit]. Here we restate a subtle issue about the IOAM scope: if IOAM header is encapsulated as another IPv6 extension header, the juxtaposition of IOAM and SRH makes it ambiguous to determine the coverage of IOAM: should it be applied to the entire forwarding path or just to the segment nodes?

The PBT-I scheme introduced in [I-D.song-ippm-postcard-based-telemetry] partially relieves the packet overhead pressure but the encapsulation issues remain. In
In this draft, we propose to apply the PBT-M scheme from the same document for on-path SRv6 telemetry.

2. PBT Triggered by Marking for SRv6

PBT-M requires marking a packet as a trigger to collect on-path data about the packet. The collected data are exported by an independent "postcard" packet. Therefore, there is no new header encapsulation requirement.

Eight flag bits are currently reserved in SRH. One of those bits can be used as the marking flag, as shown in the following figure. If the "T"-bit is set to 1, the segment node which process the SRH needs to export the on-path data about this packet as configured.

```
0                   1                   2                   3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
<table>
<thead>
<tr>
<th>Next Header</th>
<th>Hdr Ext Len</th>
<th>Routing Type</th>
<th>Segments Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>Last Entry</td>
<td>T</td>
<td>Flags</td>
<td>Tag</td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>----------------</td>
<td>----------------</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Segment List[] &amp; TLV</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>----------</td>
<td>----------------</td>
<td></td>
</tr>
</tbody>
</table>
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

Figure 1: SRH with PBT Mark Flag

2.1. Data Template

Although it is possible to configure the segment nodes about the data set to collect, different flows may require different data collection profiles. It would be more flexible to have multiple different data templates supported by the segment nodes and each packet can designate one template that best suits its interests to use. The template ID can be carried as a TLV in SRH.

2.2. Postcard Correlation

As discussed in [I-D.song-ippm-postcard-based-telemetry], PBT-M has some issues to correlate the postcards from the different segment nodes for the same user packet. While several solutions are given to
mitigate the problem, it is ideal to be able to correlate the postcards without any constraint and precondition.

A flow ID and a sequence number can be included as TLVs in SRH. The specification and usage of the flow ID and the sequence number are the same as those in PBT-I in [I-D.song-ippm-postcard-based-telemetry]. Further, the exported postcard may include the SRH or the current SID which provides a trace to order the postcards.

2.3. Operational Considerations

The SR source node is responsible to determine the policy for setting or resetting the "T"-bit.

The segment node can decide independently whether or not to react on the "T"-bit.

3. Security Considerations

Since PBT incurs some extra packet processing and transport cost, "T" flag is usually selectively set on a subset of packets by the source node. A potential DoS attack may set the "T" flag for all the packet with the intention to overwhelm the segment nodes. Therefore, the postcards should be generated on the basis of the best effort.

4. IANA Considerations


5. Contributors

TBD.

6. Acknowledgments

TBD.

7. References

7.1. Normative References


7.2. Informative References


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