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TRILL Support of Point to Multipoint BFD
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Abstract

Point to multipoint (P2MP) BFD is designed to verify multipoint connectivity. This document specifies the support of P2MP BFD in TRILL. Similar to TRILL point-to-point BFD, BFD Control packets in TRILL P2MP BFD are transmitted using RBridge Channel message.

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1. Introduction

TRILL supports multicast forwarding. Applications based on TRILL multicast may need quick detection of multicast failures using P2MP BFD. This document specifies TRILL support of P2MP BFD.

To use P2MP BFD, the head end needs to periodically transmit BFD Control packets to all tails using TRILL multicast. A new RBridge Channel message is allocated for this purpose.

In order to execute the global protection of distribution used for multicast forwarding [I-D.ietf-trill-resilient-trees], the head needs to track the active status of tails [I-D.ietf-bfd-multipoint-active-tail]. If the tail loses connectivity of the new RBridge Channel message from the head, the tail should notify the head of the lack of multipoint connectivity with unicast BFD Control packets. These unicast BFD Control packets are transmitted using the existing RBridge Channel message assigned to BFD Control [RFC7175].

2. Acronyms and Terminology

2.1. Acronyms

Data Label: VLAN or Fine Grained Label [RFC7172].

BFD: Bidirectional Forwarding Detection

P2MP: Point to Multi-Point

TRILL: Transparent Interconnection of Lots of Links or Tunneled Routing in the Link Layer

2.2. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

Familiarity with [RFC6325], [RFC7175], and [RFC7178] is assumed in this document.

3. Bootstrapping

The TRILL adjacency mechanism bootstraps the establishment of the BFD session [RFC7177]. A slight wording update to the second sentence in Section 6 of [RFC7177] is required.

It currently read:

> If an RBridge supports BFD [RFC7175], it will have learned whether the other RBridge has BFD enabled by whether or not a BFD-Enabled TLV [RFC6213] was included in its Hellos.

Now it should read:

> If an RBridge supports BFD [RFC7175] [this document], it will have learned whether the other RBridge has BFD enabled by whether or not a BFD-Enabled TLV [RFC6213] was included in its Hellos.

4. A New RBridge Channel Message for P2MP BFD

RBridge Channel message protocol 0x002 is defined for TRILL point-to-point BFD Control packets in [RFC7175]. If the M bit of the TRILL Header of the RBridge channel packet containing a BFD Control packet is non-zero, the packet MUST be dropped [RFC7175]. In P2MP BFD, the head is required to probe tails using multicast. This means the M bit will be set to 1. For this reason, a new RBridge Channel message, whose protocol code point is TBD, is specified in this document. An RBridge that supports P2MP BFD MUST support the new RBridge Channel message for P2MP BFD. The capability to support the RBridge Channel message for P2MP BFD, and therefore support performing P2MP BFD, is announced within the "RBridge Channel Protocols Sub-TLV" in LSPs [RFC7176].

As specified in [RFC7178], when the tail receives TRILL Data packets sent as BFD RBridge channel messages, it will absorb the packets itself rather than deliver these packets to its attached end-stations.

5. Discriminators and Packet Demultiplexing

The processing in Section 3.2 of [RFC7175] applies except that the test on the M bit in the TRILL Header is reversed. If the M bit is zero, the packet is discarded. If the M bit is one, it is processed.

After the Section 3.2 of [RFC7175] processing, the tail demultiplexes incoming BFD packets based on a combination of the source address and My Discriminator as specified in [I-D.ietf-bfd-multipoint]. In addition to this combination, TRILL P2MP BFD that requires the tail use the Data Label, which is either the inner VLAN or the Fine Grained Label [RFC7172], for demultiplexing. If the tail needs to notify the head about the failure of a multipath, the tail is required to send unicast BFD Control packets using the same Data Label as used by the head.

6. Tracking Active Tails

According to[I-D.ietf-bfd-multipoint], the head has a session of type MultipointHead that is bound to a multipoint path. Multipoint BFD Control packets are sent by this session over the multipoint path, and no BFD Control packets are received by it. Each tail dynamically creates a MultipointTail per a multipoint path. MultipointTail sessions receive BFD Control packets from the head over multipoint paths.

If the head is keeping track of some or all of the tails [I-D.ietf-trill-resilient-trees], it has a session of type MultipointClient per tail that it cares about [I-D.ietf-bfd-multipoint-active-tail]. See [I-D.ietf-bfd-multipoint-active-tail] for detail operations of tacking active tails.

7. Security Considerations

P2MP BFD control packets can be encapsulated as the payload of the RBridge Channel Tunnel [I-D.ietf-trill-channel-tunnel]. In that case, the security option of RBridge Channel Tunnel can secure the transmission of BFD control packets.

The demultiplexing of TRILL P2MP BFD at the tail is Data Label aware. This enhances the security of the dynamic creation of MultipointTail sessions at tails. In order to forge BFD Control packets, the

attacker has to acquire the right Data Label that the head uses for P2MP BFD.

For general multipoint BFD security considerations, see [I-D.ietf-bfd-multipoint].

For general RBridge Channel security considerations, see [RFC7178].

8. IANA Considerations

IANA is required to allocate one RBridge Channel protocol number from the Standards Action range, as follows:

Protocol	Number
P2MP BFD Control	TBD

9. Acknowledgements

Authors would like to thank the comments and suggestions from Donald Eastlake.

10. References

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