TRILL Support of Point to Multipoint BFD
draft-zhang-trill-p2mp-bfd-02

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 an RBridge Channel.

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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 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]. When the tail loses
connectivity from the head, the tail should notify the head of the
lack of multipoint connectivity with unicast BFD Control packets.
These packets are transmitted using the existing RBridge Channel
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][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 for P2MP BFD

RBridge Channel 0x002 is defined for TRILL point-to-point BFD Control
packets in [RFC7175]. If the M bit of the TRILL Header of the
channeled packet containing the BFD Control packet is non-zero, the
packet MUST be dropped [RFC7175]. While for 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, whose code
point is TBD, is specified in this document. An RBridge that
supports P2MP BFD MUST support the new RBridge Channel for P2MP BFD.
The capability to support the RBridge Channel 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 on the channel, 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 requires the tail to use
the Data Label, which is either the inner VLAN or the Fine Grained
Label [RFC7172], for demultiplexing. If the tail need 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:

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    Protocol          Number
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    P2MP BFD Control  TBD
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9. Acknowledgements

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Eastlake.

10. References

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