BFD in BIER

draft-hu-bier-bfd

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Motivation

- Proactive defect detection in BIER network is required
- IETF published relevant RFCs – RFC 8562 and RFC 8563
- RFC 8562 allows a tail (BFER) to detect a failure in the multicast distribution tree
- RFC 8563 details two methods for a head (BFIR) to discover a failure of the multicast distribution tree for a set of BFERs (one or more BFERs)

P2MP BFD with Active Tail

- RFC 8563:
  - Head notification and tail solicitation with multipoint polling

    BFIR occasionally transmits Poll sequence packet (BFD Control packet with P(Poll) bit set in addition to the periodic transmission of non-Poll BFD packets

    The BFER is expected to reply with F (Final) bit set over the unicast reverse path that is disjoint with the multicast (that is how a BFER informs the BFIR of the receipt of the multipoint Poll)

    If either multipoint Poll or the unicast Final lost, the BFIR detects the defect but is not certain about the state of the multicast
  - Head notification with composite polling

    The BFIR's behavior is as described above. In addition, the BFIR may send unicast Poll to a specified BFER, e.g., the one failed to respond to the multipoint Poll, over the forward unicast path (disjoint from multicast) (out-of-band for multicast)

    Because this method uses the out-of-band probe, the BFIR can better localize the failure and be aware of the state of multicast tree. It is not 100% certainty but still better than with only multipoint Polls.

  - Detection time – interval between Polls

Head Notification with Multicast and Composite Polling

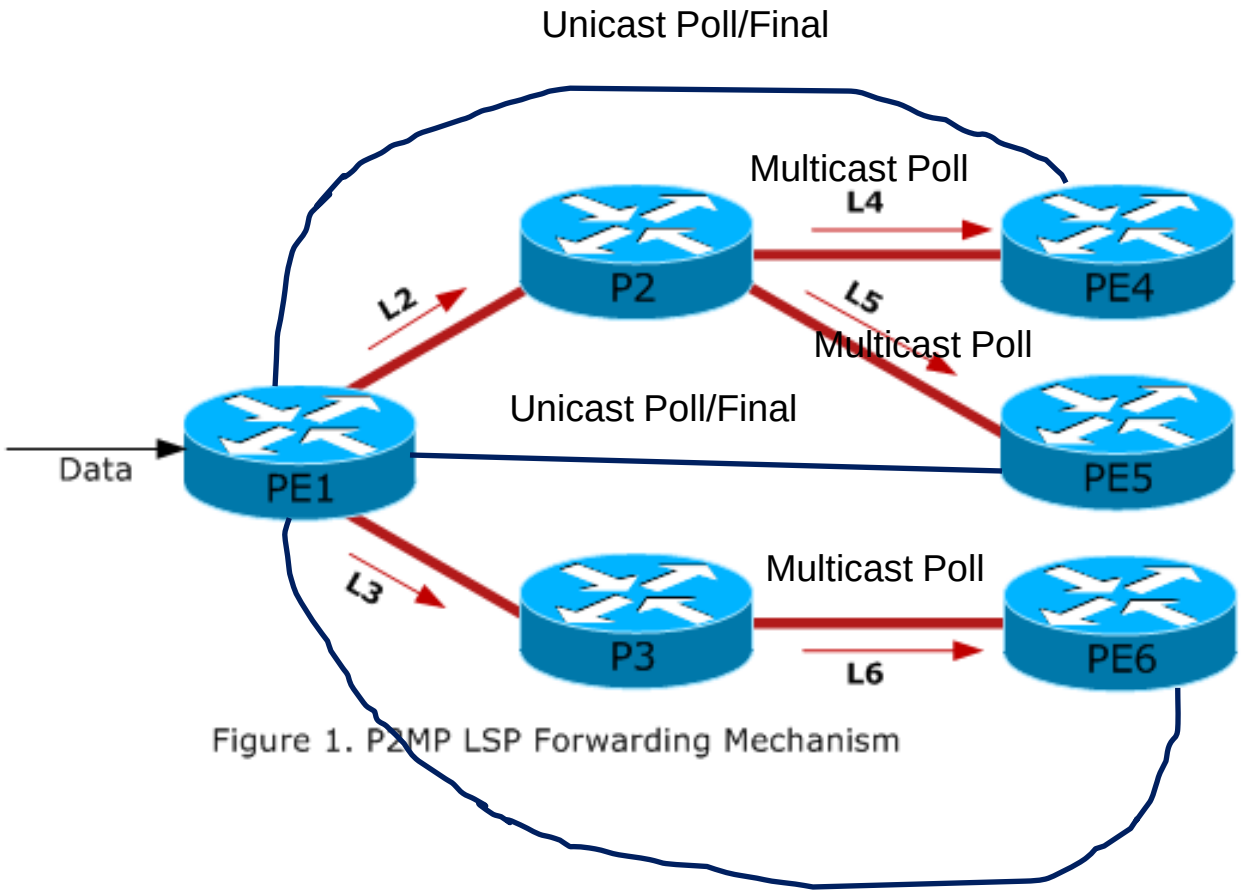
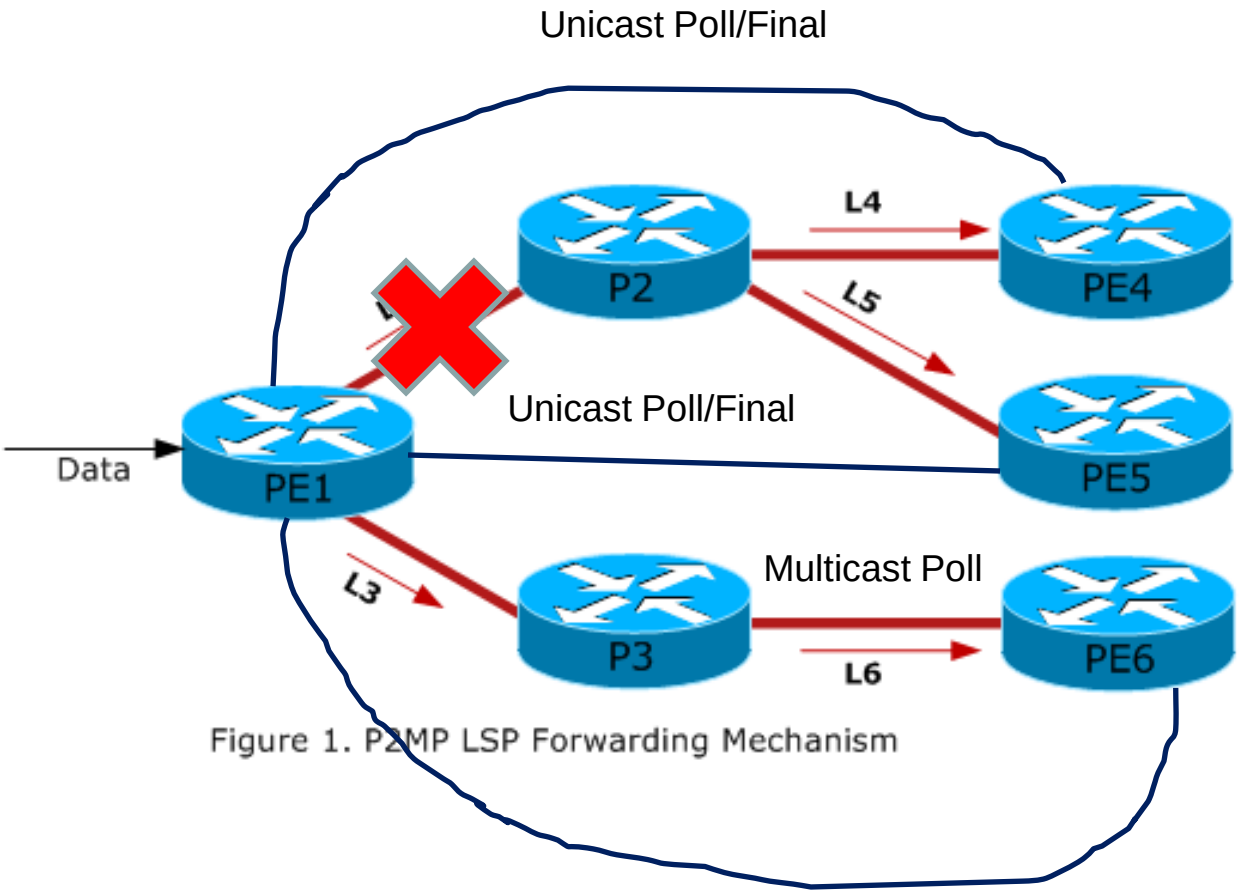


Figure 1. P2MP LSP Forwarding Mechanism

Head Notification with Multicast and Composite Polling



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Head Notification Without Polling (Unsolicited, Event Triggered)

As suggested by the name, the BFIR sends no Polls, but it is a BFER that, upon detecting a failure, transmits unicast Poll over the reverse unicast path with the Diag field to signal the failure to the BFIR.

Destination IP address – IP address of the Multipoint Head (BFIR ID easily mapped to IP address)

UDP Destination port – 4784 per RFC 5883 Multi-hop BFD

Your Discriminator is set to My Discriminator value associated with the BFD session (in the received BFD Control packets from the BFIR)

Poll bit is set

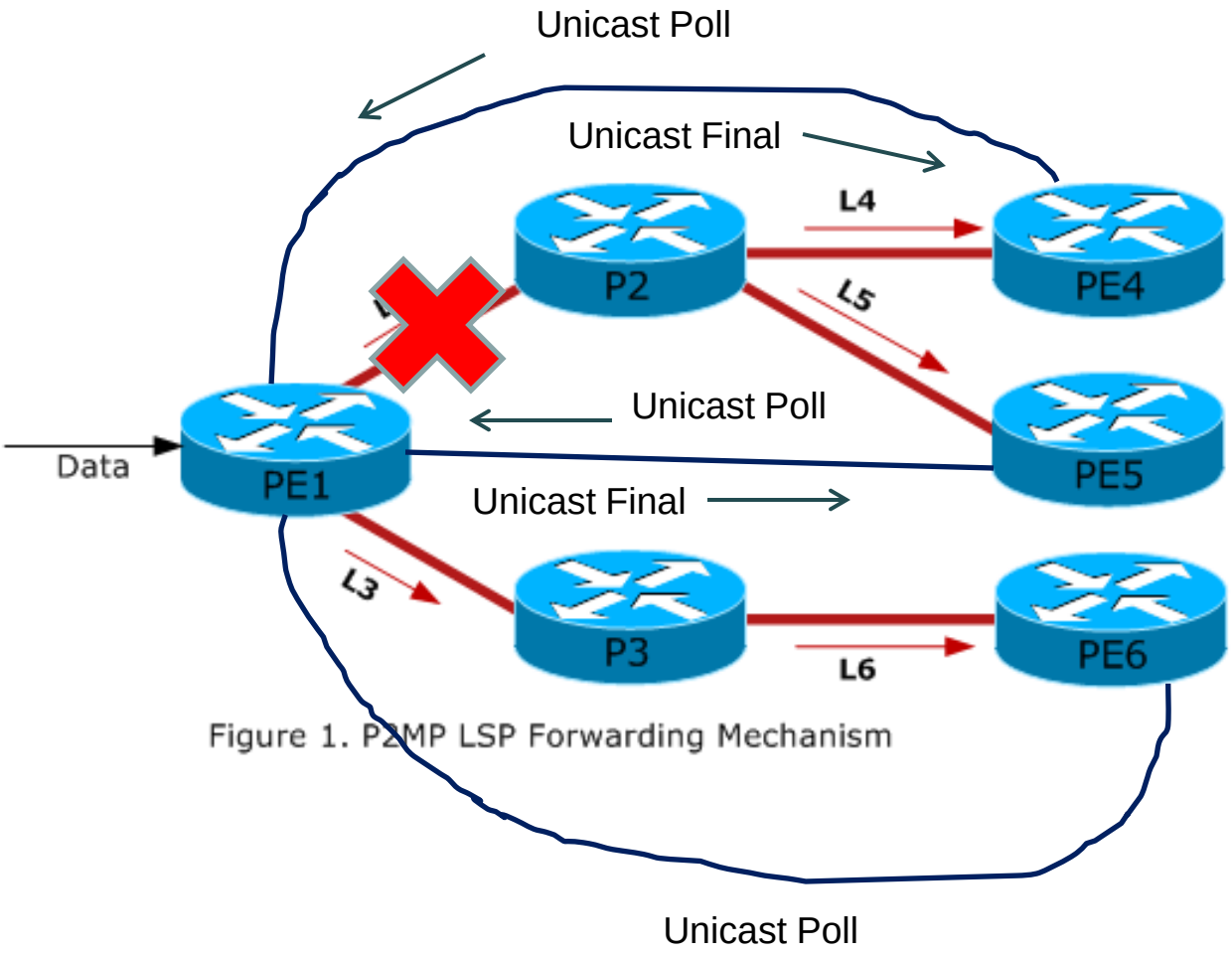
Sta (Status) – Down

Diag - Control Detection Time Expired value

Poll packet transmitted periodically (one per second) until either the failure clears or the Final packet from the BFIR received.

Detection time – BFD Detection = Desired Min TX Interval * Detect Mult plus RTT/2 of unicast BFER to BFIR.

Head Notification Without Polling



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Next steps

- Your comments, suggestions, questions are always welcome and greatly appreciated
- WG adoption