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BFD in Demand Mode over Point-to-Point MPLS LSP
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Abstract

This document describes procedures for using Bidirectional Forwarding Detection (BFD) in Demand mode to detect data plane failures in Multiprotocol Label Switching (MPLS) point-to-point Label Switched Paths.

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[1.](#) Introduction

[RFC5884] defined use of the Asynchronous method of Bidirectional Detection (BFD) [[RFC5880](#)] to monitor and detect failures in data path of a Multiprotocol Label Switching (MPLS) Label Switched Path (LSP). Use of the Demand mode, also specified in [[RFC5880](#)], has not been defined so far. This document describes procedures for using the Demand mode of BFD protocol to detect data plane failures in MPLS point-to-point (p2p) LSPs.

[2.](#) Conventions used in this document

[2.1.](#) Terminology

MPLS: Multiprotocol Label Switching

LSP: Label Switched Path

LER: Label switching Edge Router

BFD: Bidirectional Forwarding Detection

p2p: Point-to-Point

[2.2.](#) 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.

3. Use of the BFD Demand Mode

[RFC5880] defines that the Demand mode MAY be:

- o asymmetric, i.e. used in one direction of a BFD session;
- o switched to and from without bringing BFD session to Down state through using a Poll Sequence.

For the case of BFD over MPLS LSP, ingress Label switching Edge Router (LER) is usually acts as Active BFD peer and egress LER acts as Passive BFD peer. The Active peer bootstraps the BFD session by using LSP ping. Once the BFD session is in Up state the ingress LER that supports this specification MUST switch to the Demand mode by setting Demand (D) bit in its Control packet and initiating a Poll Sequence. If the egress LER supports this specification it MUST respond with the Final (F) bit set in its BFD Control packet sent to the ingress LER and ceases further transmission of periodic BFD control packets to the ingress LER.

In this state BFD peers MAY remain as long as the egress LER is in Up state. The ingress LER MAY check liveness of the egress LER by setting Poll flag. The egress LER will respond by transmitting BFD control packet with the Final flag set. If the ingress LER doesn't receive BFD packet with the Final flag from its peer after predetermined period of time, default wait time recommended 1 second, the ingress MAY transmit another packet with the Poll flag set. If ingress doesn't receive BFD control packet with the Final flag set in response to three consecutive packets with Poll flag, it MAY declare the BFD peer non-responsive and change state of the BFD session to Down state.

If the Detection timer at the egress LER expires it MUST send BFD Control packet to the ingress LER with the Poll (P) bit set, Status (Sta) field set to Down value, and the Diagnostic (Diag) field set to Control Detection Time Expired value. The egress LER sends these Control packets to the ingress LER at the rate of one per second until either it receives the valid for this BFD session control packet with the Final (F) bit set from the ingress LER or the defect condition clears and the BFD session state reaches Up state at the egress LER.

The ingress LER transmits BFD Control packets over the MPLS LSP with the Demand (D) flag set at negotiated interval per [RFC5880], the greater of `bfd.DesiredMinTxInterval` and `bfd.RemoteMinRxInterval`, until it receives the valid BFD packet from the egress LER with the Poll (P) bit and the Diagnostic (Diag) field value Control Detection Time Expired. Reception of such BFD control packet by the ingress

LER indicates that the monitored LSP has a failure and sending BFD control packet with Final flag set to acknowledge failure indication is likely to fail. Instead, the ingress LER transmits the BFD Control packet to the egress LER over the IP network with:

- o destination IP address MUST be set to the destination IP address of the LSP Ping Echo request message [[RFC8029](#)];
- o destination UDP port set to 4784 [[RFC5883](#)];
- o Final (F) flag in BFD control packet MUST be set;
- o Demand (D) flag in BFD control packet MUST be cleared.

The ingress LER changes the state of the BFD session to Down and changes rate of BFD Control packets transmission to one packet per second. The ingress LER in Down mode changes to Asynchronous mode until the BFD session comes to Up state once again. Then the ingress LER switches to the Demand mode.

4. IANA Considerations

TBD

5. Security Considerations

This document does not introduce new security aspects but inherits all security considerations from [[RFC5880](#)], [[RFC5884](#)], [[RFC7726](#)], [[RFC8029](#)], and [[RFC6425](#)].

6. Normative References

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- [RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in [RFC 2119](#) Key Words", [BCP 14](#), [RFC 8174](#), DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/info/rfc8174>>.

[Appendix A](#). Acknowledgements

TBD

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