Use of p2mp BFD in PIM-SM DR Load Balancing (over shared-media segment)
draft-mirsky-pim-bfd-p2mp-use-case

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Proposed solution

```
 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 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Type = 34           |          Length = 4           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|              Reserved                     |Hash Algorithm |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

 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 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|          Type = 35           |            Length             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Group Mask                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                         Source Mask                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                           RP Mask                            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   GDR Candidate Address(es)                  |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

 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 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         OptionType           |          OptionLength         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                       My  Discriminator                      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- draft-ietf-pim-drlb defines the mechanism of load balancing multicast flows among eligible PIM-SM routers
- RFC 8562 BFD for Multipoint Networks extends BFD for use in multipoint and multicast networks
- draft-ietf-pim-drlb defined DRLB-Cap and DRLB-List Hello Options
- This draft already defined BFD Discriminator PIM Hello Option

How It Works: Advertisement

- PIM router that includes DRLB-Cap Hello Option MAY include BFD Discriminator PIM Hello Option
  - The router MUST create a BFD session and set itself as MultipointHead per RFC 8562
  - The router MUST set bfd.SessionState in the MultipointHead session to Down
- If a PIM router that along with DRLB-Cap Hello Option includes BFD Discriminator Option finds its address in DRLB-List PIM Hello Option as Group Designated Router (GDR) Candidate for the first time, the router MUST set bfd.SessionState to Up and start periodically transmit BFD control messages
  - Note, PIM DR and BDR that support using BFD Discriminator PIM Hello Option for faster PIM DR/BDR convergence MAY use the same My Discriminator value to advertise along with DRLB-Cap Hello Option

How It Works: GDR Candidate

- If the PIM router that was GDR Candidate doesn't find its address in the most recent DRLB-List Option, the router MUST set bfd.SessionState to Down and cease transmitting BFD control messages

- For each GDR Candidate that includes BFD Discriminator Option in its PIM Hello, PIM DR creates a MultipointTail session per RFC 8562
  - Note, PIM DR is GDR Candidate and does not create the p2mp BFD session to monitor itself

- PIM DR demultiplexes BFD sessions based on the value in My Discriminator field and the source IP address

- If PIM DR detects a failure of one of the sessions, it MUST remove that router from the GDR Candidate list and immediately transmit a new DRLB-List Option

Next steps

- Comments are welcome
- WG LC?

Thank you!