Multi-point BFD in VRRP use case

draft-ietf-bfd-p2mp-vrrp-use-case

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Motivation

- RFC 9568 supports Advertisement_Interval as small as 10 msec, thus enabling Active_Down_Interval to be at ~33 msec.
- Backup Routers monitor the Active Router.
- Active Router is not aware of the identity of the Backup routers.
- Monitoring the availability of the Active Router is another incarnation of Continuity Check OAM.
- RFC 5880 defined BFD.
- A Backup Router can use the Asynchronous mode to monitor the availability of the Active Router.
- Concerns with the use of Async RFC 5880:
  1. Active Router doesn't know the identities of Backup Routers in the given VRID on the same LAN segment.
  2. Although Active Router is not interested in the state change of a Backup Router, it maintains the state of the BFD session per Backup Router.
  3. The Active Router transmits a BFD Control packet for each Backup Router at a high rate
  4. Backup Routers periodically transmit BFD Control packets..

VRRP Fast Failure Detection Using P2MP BFD

- BFD for Multipoint Networks (RFC 8562) extends BFD for use in multipoint and multicast networks.
- The Active Router advertises its BFD My Discriminator in the VRRP control packet (extension to RFC 9568) to bootstrap a p2mp BFD session.
- A Backup creates a MultipointTail session and uses the My Discriminator value from the VRRP control packet and Active IP address to demultiplex BFD Control packets.
- As a result, the p2mp BFD session per VRID has an Active Router as root and Backup Routers as tails. The Active Router uses one of the IP addresses associated with the VRID as the source IP address for p2mp BFD Control packets.
- Advantages of using p2mp BFD:
  1. No three-way handshake to reach the Up state.
  2. No unnecessary BFD state on the Active Router.
  3. A Backup Router doesn’t transmit BFD Control packets.
  4. The Active Router transmits a single BFD Control packet for all Backup Routers in the VRID
  5. Based on ##2 and 3, using p2mp BFD leads to times fewer BFD Control packets, where N – number of Backup Routers in the VRID.