MVPN Upstream DF Selection

draft-wang-bess-mvpn-upstream-df-selection-01

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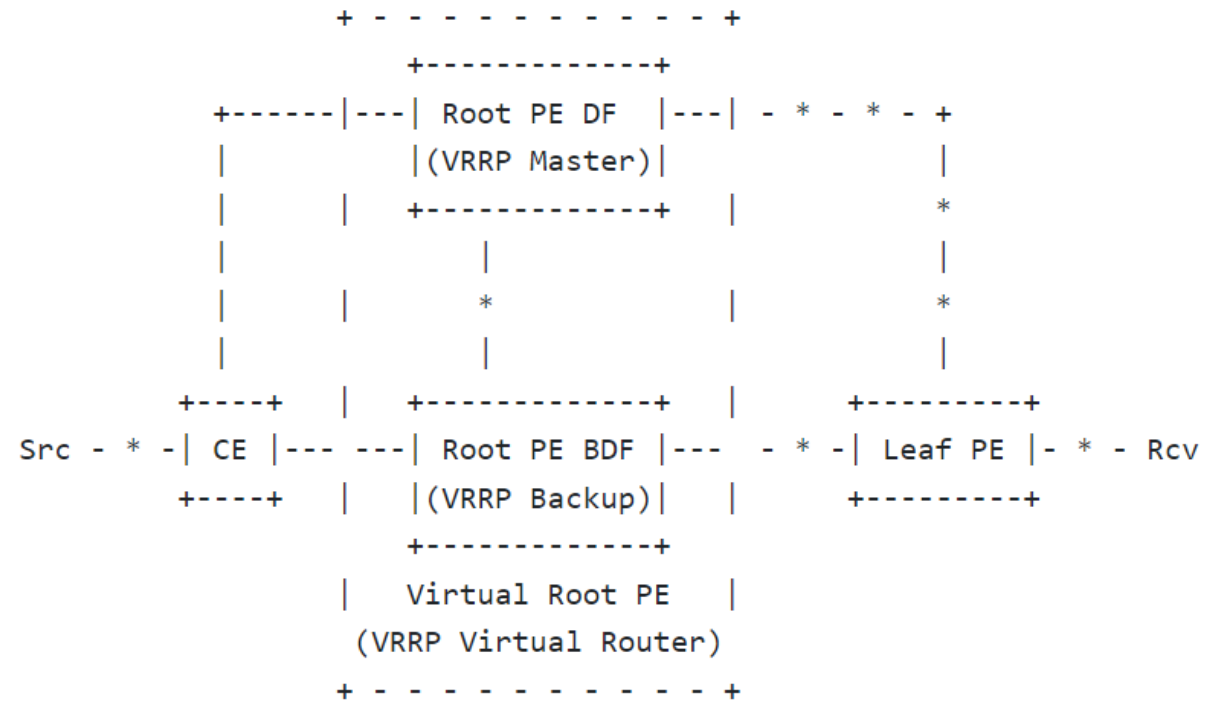IETF 114

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Background

- [RFC9026] defines UMH Selection Based on Provider-Tunnel Status for MVPN fast failover.

    - "Hot root standby" will results in the traffic redundancy throughout the backbone network.

    - It is somewhat complicated for the downstream PEs to find an efficient and accurate method to determine the "status" of a P-tunnel.

        - ✓ Discontinuous multicast flow

        - ✓ Lack of effective BFD capability

        - ✓ Remote upstream fault need to be perceived faster and more directly

- The idea: an upstream fast failover consideration.

    - Upstream PEs perform a Designated-Forwarder selection to prevent the traffic redundancy in the P-tunnel.

    - Downstream PEs perform "ANYCAST" RPF checking.

    - Upstream DF status described here is per-VPN, and could be more refined (per-leaf or per-flow) for further use case with stateless multicast underlay (IR/BIER) adopted.

Upstream Designated Forwarder Selection

- Map the role of the VRRP routers to that of the upstream PEs in MVPN dual homing upstream PEs.

  - Virtual Router -- pair of dual homing upstream PEs

  - Virtual Router Master -- the primary upstream PE

  - Virtual Router Backup -- the standby upstream PE

```
                         + - - - - - - - - - - - +
                            +-------------+
              +------|---|  Root PE DF   |---| - * - * - +
              |          |(VRRP Master)|             |
              |      |   +-------------+    |         *
              |          |                  |
              |      |        *             |         *
              |          |                  |
           +----+   |   +-------------+   |   +----------+
  Src - * -| CE |--- ---| Root PE BDF |---  - * -| Leaf PE |- * - Rcv
           +----+   |   |(VRRP Backup)|   |   +----------+
                        +-------------+
                     |   Virtual Root PE   |
                      (VRRP Virtual Router)
                         + - - - - - - - - - - - +
```

Upstream Designated Forwarder Selection

- Both the primary and standby PEs install VRF PIM state corresponding to BGP Source Tree Join route and send C-Join messages to the CE toward C-S.

- (C-S,C-G) flow arrive at both the primary and the standby upstream PEs.

- Only the primary upstream PE (Virtual Router Master according to VRRP) forwards (C-S,C-G) flow to downstream PEs through a P-tunnel.

- Other private implementations for DF selection (which should be deployed per VRF) could also be optional.

Downstream PE Behavior

- Standby C-multicast route advertising described in [RFC9026] is still necessary.

- Standby PE Community is no longer necessary.

- Downstream PEs recognize the Upstream DF Selection behavior (by using some provisioning methods) and execute the "ANYCAST" RPF checking.

- Downstream PEs accept the C-flow from any of candidate upstream PEs and forward it to CEs, the upstream DF selection prevents the C-flow duplication in backbone.

Next Steps

- Seek for comments and discussions.

Thanks