

# MVPN Upstream DF Selection

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# Background

- [RFC9026] defines UMH Selection Based on Provider-Tunnel Status for MVPN fast failover.
  - “Hot root standby” will result 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
- 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.
- 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.

# Upstream Forwarder Selection Extended Community

- Dual-homing upstream PEs both carry the new Extended Community on BGP VPN routes, to inform downstream PEs to execute “anycast” RPF checking.
- The Upstream Forwarder Selection is an IP-address-specific Extended Community.
  - Global Administrator field -- an identical virtual IP address (such as VRRP Virtual IP) or similar identity between upstream PEs
  - Local Administrator field -- a master or backup status determined by the DF election

# 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 through the Upstream Forwarder Selection Extended Community 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

- Specify more details.
  - Load-balance approach, where each Upstream (Root) PE acts as DF of partial of Leaf-PEs (Per-Leaf DF Selection).
  - Consider more other upstream forwarder selection methods. Per-Flow DF Selection ?
- Seek for comments and discussions.

Thanks