

Label Sharing for Fast PE Protection

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Goal: Fast PE Protection

- A CE is often connected to multiple PEs in order to realize a reliable VPN connection to the SP's backbone network.
- It's possible to make use of local repair to achieve a 50msec switchover.
- In this draft, the egress PE and the link attached to it on the primary path are protected.

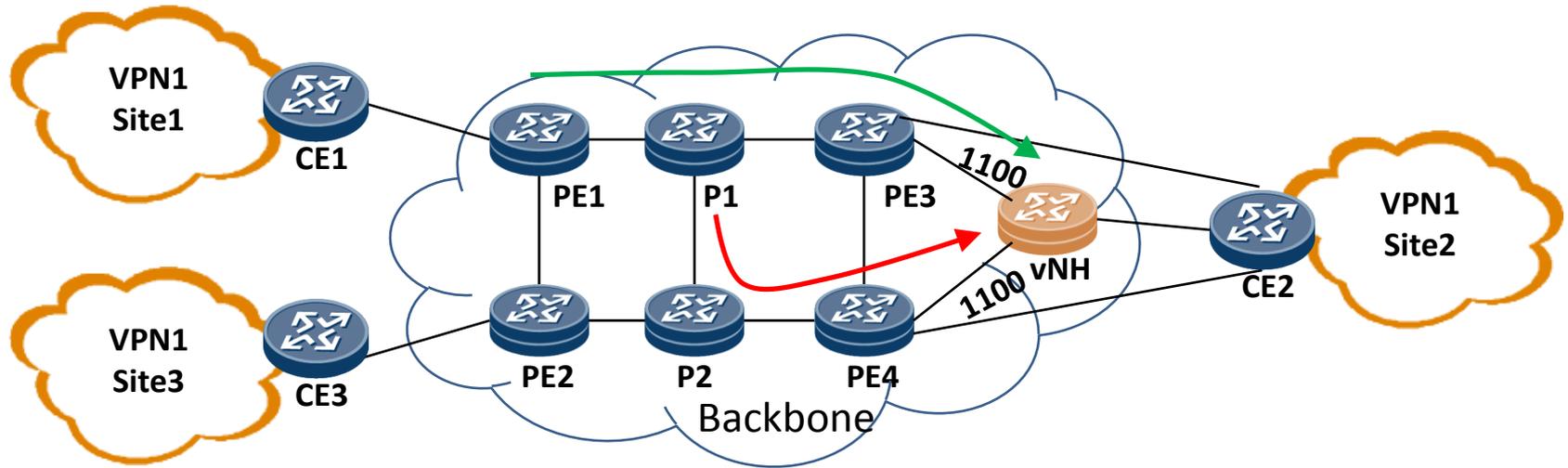
Sharing the Label

- All egress PEs in a Redundant Group (RG) assign the same VPN route label for the routes of the VPN that the CE is in.
- If a packet is redirected to another egress PE, its VPN route label can be recognized.

vNH Represents the CE

- A virtual router (vNH) is created in the backbone network to represent the CE.
- In a normal route propagation process, egress PEs use their own addresses as the 'BGP next hop'. In our method, we let all egress PEs use the address of the vNH as the 'BGP next hop'.
- vNH will be used as the last hop of the tunnels.

Example Figure



- Ingress PEs: PE1, PE2
- Egress PEs: PE3, PE4, they share the label 1100 for VRFs that CE2 is associated with.
- vNH: the virtual BGP Next Hop
- Primary tunnel: PE1->P1->PE3-vNH
- When PE3 fails, backup tunnel P1->P2->PE4->vNH can be used.

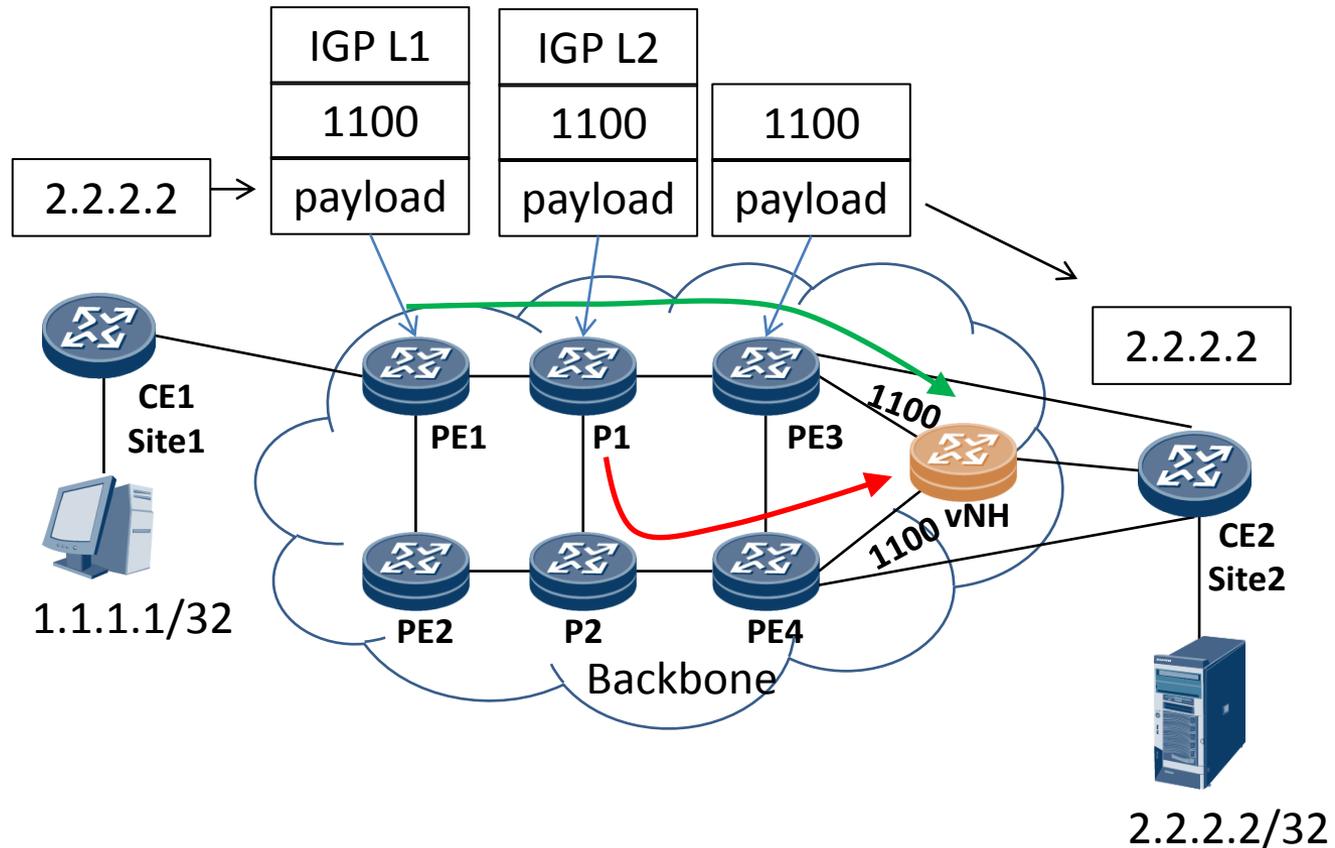
Leverage IGP FRR

- BGP/MPLS IP VPN supports LDP as the tunneling technology, which builds tunnels based on IGP routes.
- The backup tunnel is computed according to LFA (Loop-Free Alternative) [RFC6571].

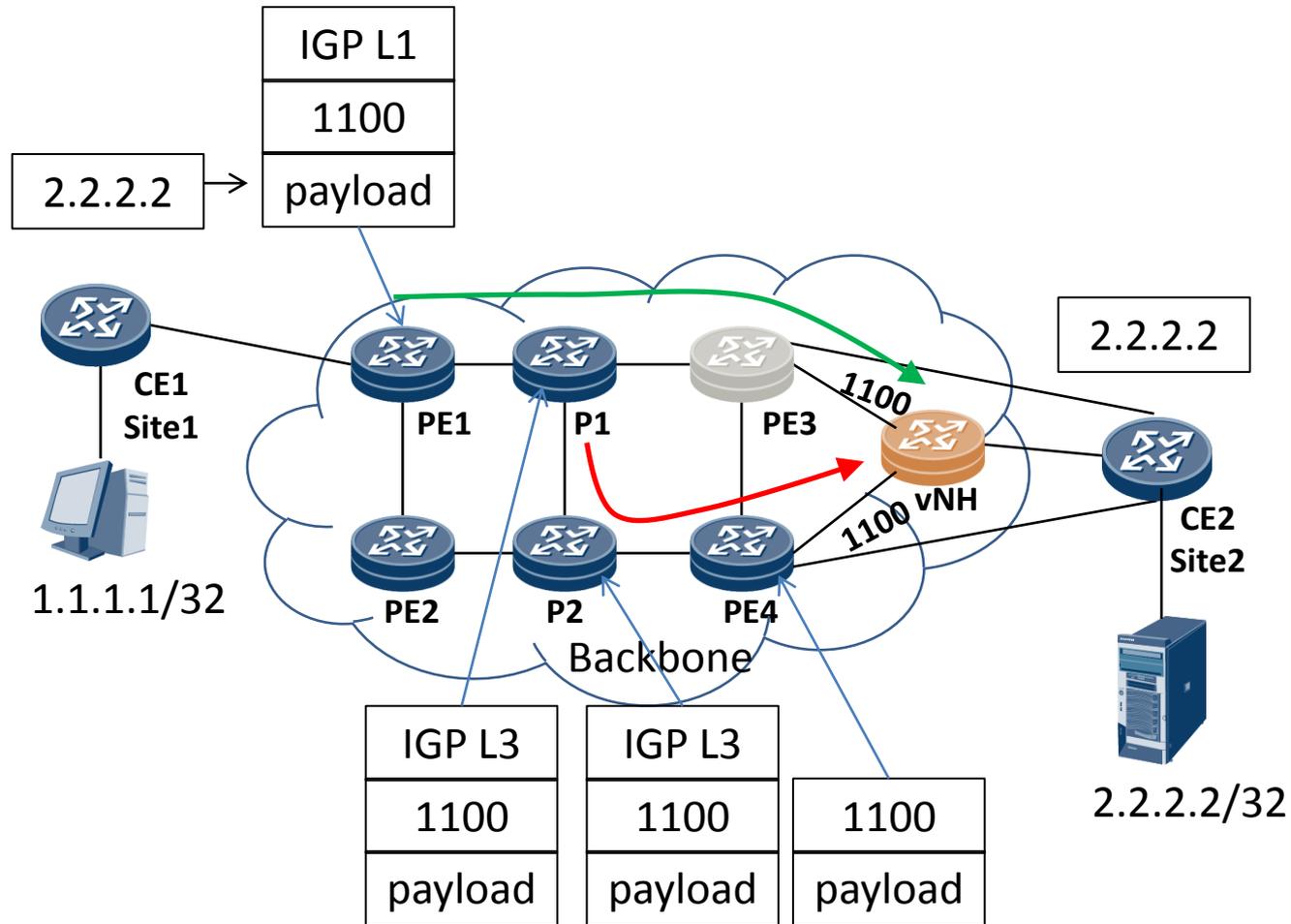
LSA/LSP Generation

- Egress PEs generate LSAs/LSPs to pretend there is a vNH router.
- One node, the primary PE need generate:
 - Type 1, Router-LSA
 - PDU Type 18, level-1 LSP
- Four links
 - Type 1 p2p links are included in Router-LSAs of both vNH and egress PEs
 - Type 22 Extended Intermediate System Neighbors TLV are included in level-1 LSPs of both vNH and egress PEs
- E.g.,
 - Overload mode is set. Transit traffic through vNH is avoided.
 - Link weights are set in a way that the alternative path calculated according to LFA always goes through the backup PE.

An Example to Walk Through



An Example to Walk Through (PE3 fails)



Next Steps

- Welcome to comments on this draft.
- Get directions from the WG.
- Ask for adoption.

Thanks!