BGP Performance-aware Routing (PAR) draft-ietf-idr-performance-routing

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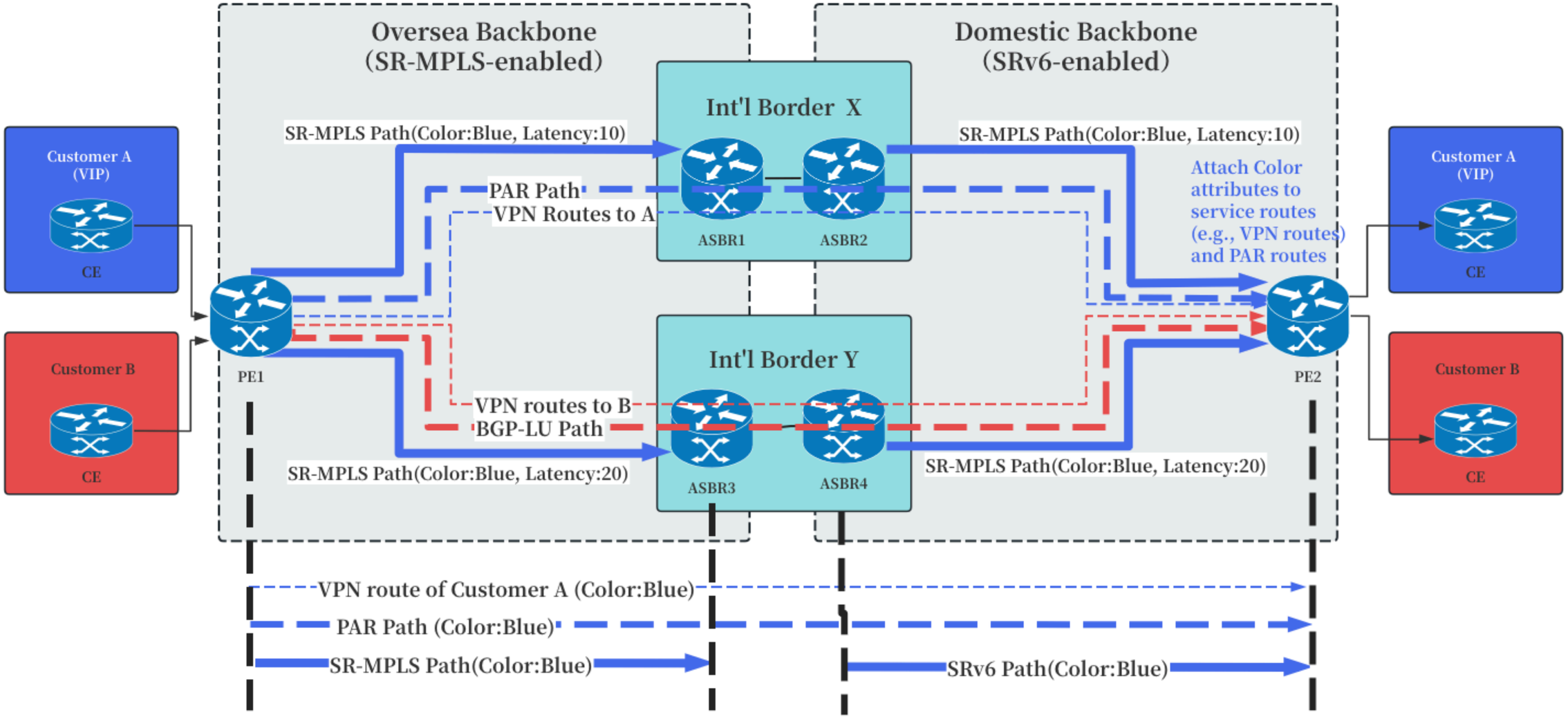
Backgrounds

- Cloud and/or network service providers (service providers in short) with global reach aim to deliver low-latency network connectivity service to their customers as a competitive advantage.
- Performance-aware routing (PAR) paradigm should coexist with the vanilla routing paradigm to 1) ensure backward compatibility with existing BGP implementations and maintain the stability of the overall routing system; and 2) make it as a value-added service.
- For the sake of simplicity, BGP PAR considers only one network performance metric: the network latency metric.
  - Note: For inter-AS routing, especially inter-continental routing, only the network latency metric matters in practice.

Solution Description

- Performance-aware routes are exchanged by using a specific SAFI and also be carried as **labeled routes**.
- Network latency metrics are attached to the performance-aware routes via a new TLV of the AIGP attribute, referred to as NETWORK_LATENCY TLV.
- The network latency metric comparison SHOULD be executed just ahead of the AS-Path Length comparison step.
  - Prior to executing the network latency metric comparison, the value of the NETWORK_LATENCY TLV SHOULD be increased by adding the network latency from the BGP speaker to the NEXT_HOP of that route.
- The path latency to the NEXT_HOP SHOULD approximately represent the network latency of the exact forwarding path towards the NEXT_HOP.

Illustration



Implementation Status

- The BGP PAR has been implemented by China Mobile Cloud on our SONiC-based NOS.
  - Service routes including both VPN routes and global routes can be resolved over the performance-aware routes.
- The BGP PAR is scheduled to be deployed across China Mobile's global WAN backbone, which consists of two ASes: one domestic AS and one overseas AS.

Next Steps

- The Early IANA Code Point Allocation is needed.
  - The PAR Capability.
  - A specific SAFI for PAR.
  - The NETWORK_LATENCY TLV of the AIGP attribute.