Overlay Routing for Multi-region SD-WAN

draft-sheng-rtgwg-overlay-routing-requirement

Cheng Sheng/**Hang Shi**/Linda Dunbar
Huawei, Futurewei

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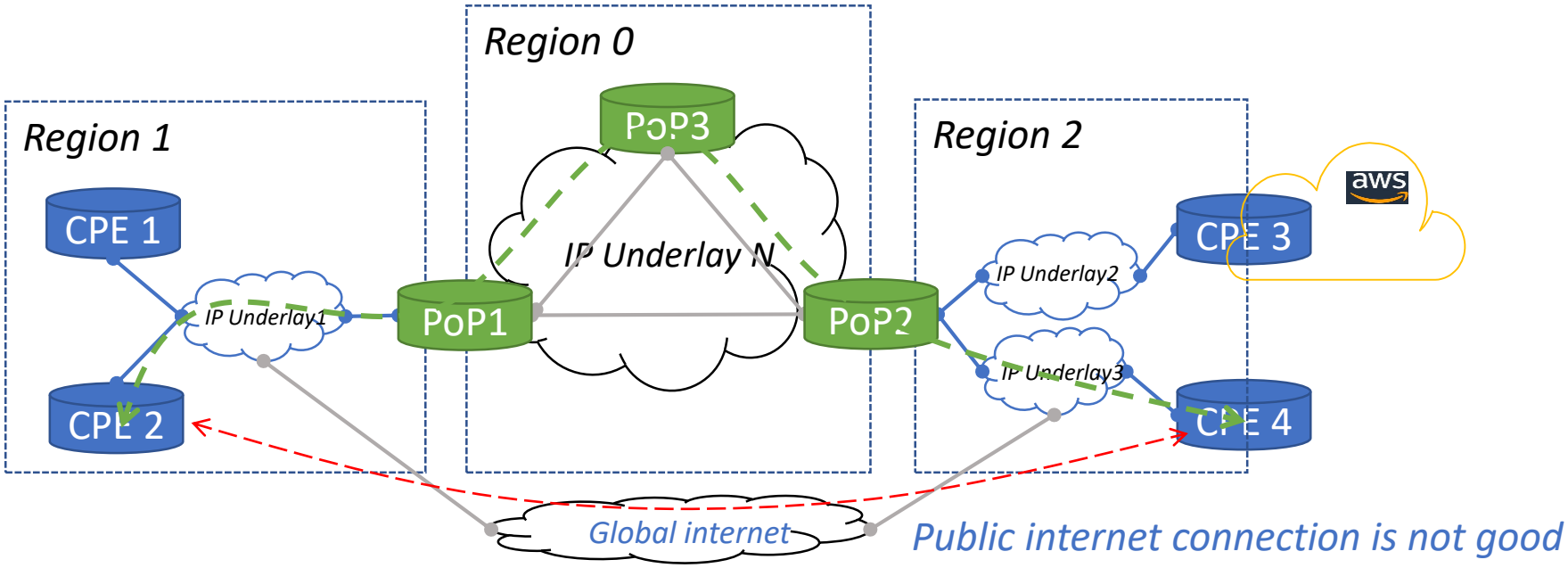
Multi-region SD-WAN



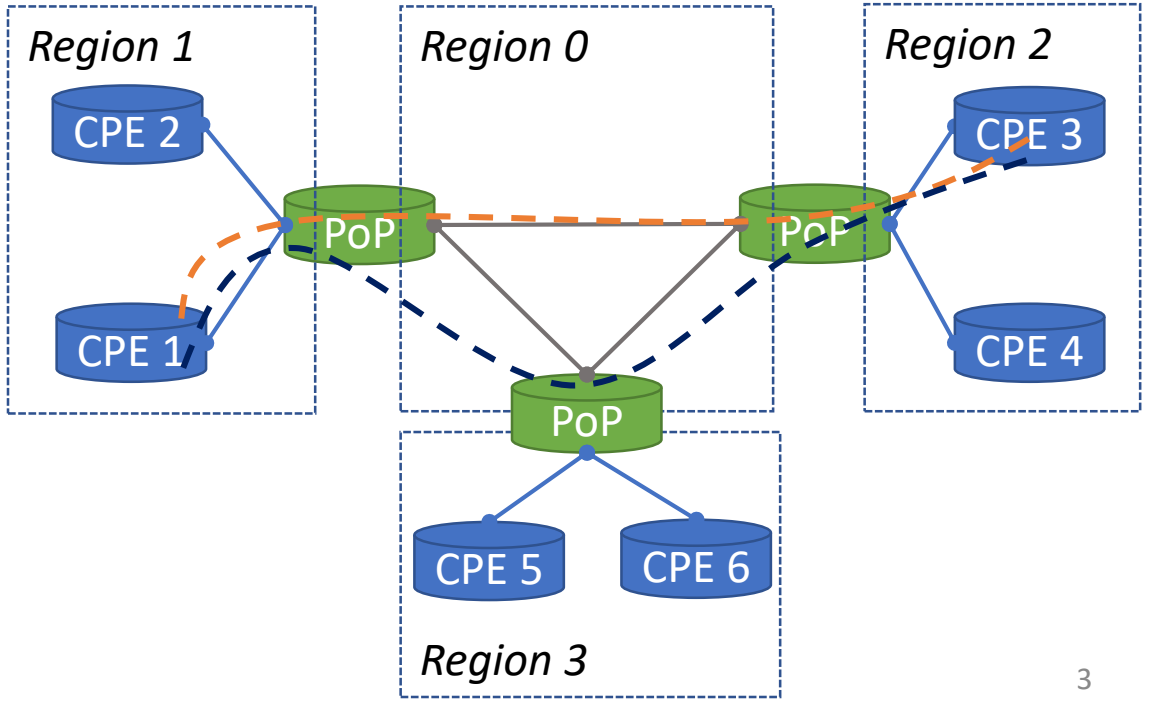
- Challenge: Two enterprise edges across different geographical regions often uses tunnel over public internet: quality can be not good
- Solution: Deploy middle-mile SD-WAN pop gateway to establish multi-hop tunnel to improve the connection quality between edges

1. Multi-hop Routing for Multi-region SD-WAN

- Requirement: In a complex multi-hop SD-WAN, there may exist multiple overlay paths between CPEs. Need to choose the best effort(shortest) one.

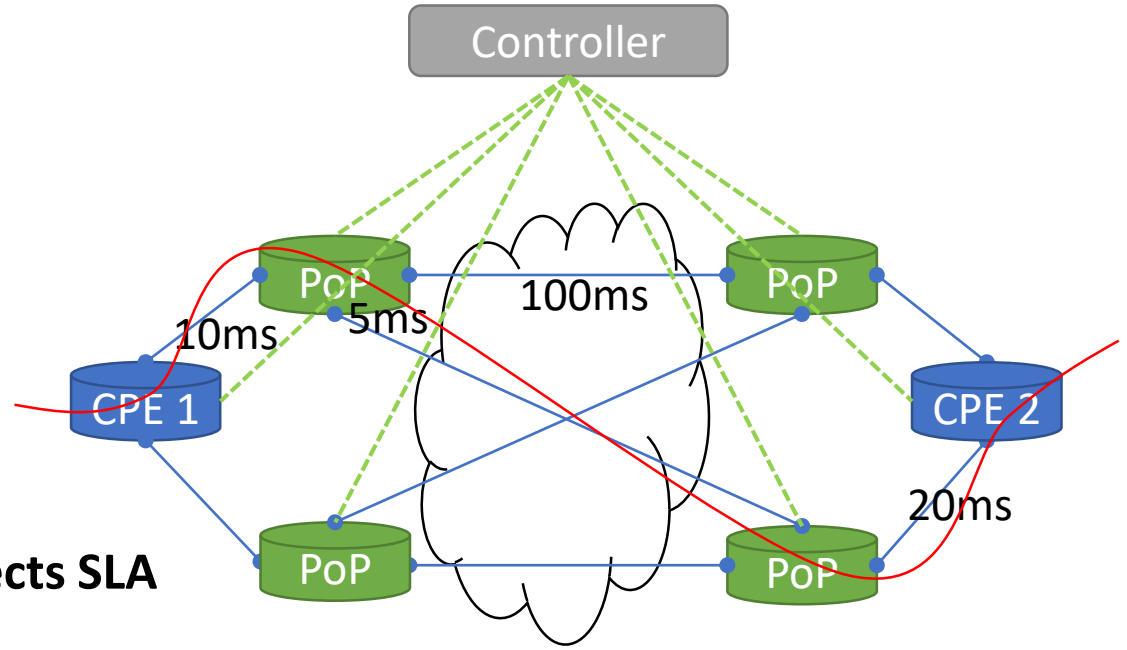
- Solution: overlay multi-hop routing
- Based on SD-WAN implementation specified by ietf-idr-sdwan-edge-discovery, **only BGP is deployed**. Two following enhancements are needed:

1. Enhance BGP SPF for overlay topology: Each SD-WAN node(SD-WAN edge/gateway) advertises overlay adjacency to the RR and get synchronized
2. Based on 1, each node can run SPF algorithm to calculate the best effort route



2. SLA Based Routing for Multi-region SD-WAN

- Different tunnels may go through different undelay(MPLS/Internet) and have different SLA
- App have various SLA requirement
  - Video need high bandwidth
  - Voice is sensitive to latency and jitter

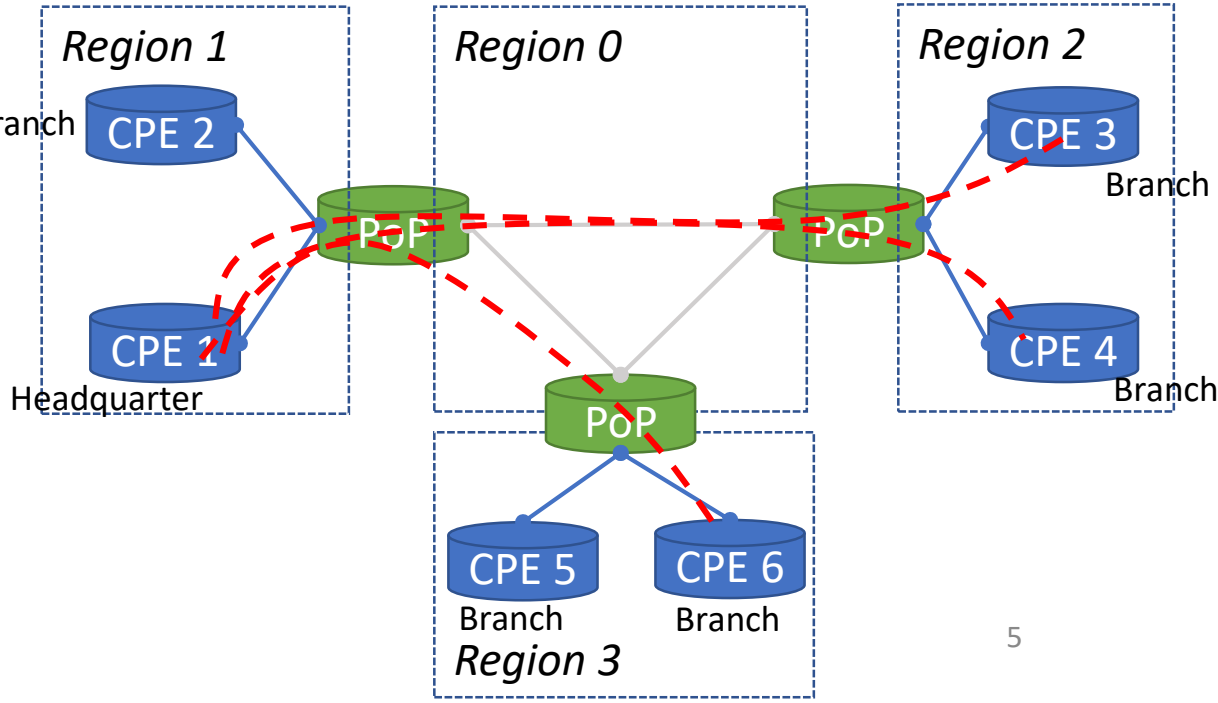


- Solution: overlay TE
  - In addition to the topology information, also **collects SLA info(bandwidth, latency, loss)** of each tunnel
  - Calculate the tunnel list satisfying the SLA requirement of application
  - Distribute the tunnel list to the edge

3. SD-WAN Multicast

- Multicast traffic is common in SD-WAN. E.g:
  - Headquarter distributes the meeting conference traffic to multiple branches
- Underlay is usually different transport network which may not support multicast.

- Solution: SD-WAN multicast
- Options:
  1. PIM over SD-WAN: slow to converge
  2. BIER over SD-WAN: need to extend BGP to carry BIER information
- Prefer option 2



Summary

- Multi-region SD-WAN is key solution for enterprise WAN network in cloud era
- We identified several necessary enhancements for routing protocol listed as above
- Draft will be updated this week
- Questions and comments are welcome!