BGP-SPF for Multi-segment SDWAN

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Recap: SDWAN

- IPSec tunnels added to existing VPN path
- BGP as the control plane to distribute the Port attribute, IPSec SA
- Details can be found in: draft-ietf-idr-sdwan-edge-discovery-10
  - Edge discovery instead of tunnel discovery
  - Controller does not know if the tunnel is created or not

![Diagram of SDWAN setup]

- BGP UPDATE 1
  - MP-NLRI (AFI/SAFI = 1/1)
  - Prefix: 10.1.1.x; 20.1.1.x
  - Encapsulation Extended Community: TunnelType = SDWAN-Hybrid
  - Color Extended Community: Color = RED

- BGP UPDATE 2
  - Next hop: x.x.x.x
  - NLRI: SAFI = SDWAN
  - Tunnel Encap Attr (SDWAN-Hybrid)
    - Tunnel-egress-endpoint SubTLV
    - GRE tunnel (via the L3VPN)
    - IPSec SA-ID Sub-TLVs

- BGP UPDATE 1
  - Prefix: 10.1.1.x; 20.1.1.x
  - Encapsulation Extended Community: TunnelType = SDWAN-Hybrid
  - Color Extended Community: Color = RED

- BGP UPDATE 2
  - Next hop: 2.2.2.2
  - NLRI: SAFI = SDWAN
  - Tunnel Encap Attr (SDWAN-Hybrid)
    - Tunnel-egress-endpoint SubTLV
    - GRE tunnel (via the L3VPN)
    - IPSec SA-ID Sub-TLVs
Multi-segment SDWAN

• Tunnel over public internet connection suffers bad quality, SD-WAN pop gateway is deployed to establish multi-segment tunnel to improve the quality. Multiple local optimal tunnel is stitched together.

• The gateway forms an overlay network. The link of each segment can be:
  • SD-WAN Tunnel over Internet/MPLS, see draft-ietf-idr-sdwan-edge-discovery-10
  • SD-WAN over Cloud Backbone, see draft-dmk-rtgwg-multisegment-sdwan-00
  • Direct link: No need for SDWAN tunnel
Usage of BGP SPF for SD-WAN

• For SDWAN tunnel: BGP SPF relationship is established between GW and RR to collect the topology information.

• For Direct link: BGP SPF relationship is established
  • Between GWs: link discovery
  • Between GW and RR: topology collection

• Node NLRI: Autonomous System + BGP-LS ID

• LINK NLRI: WAN port IP addresses

• LINK attribute: SLA
Update: Extension of BGP LS to collect link-type

- When calculate “best” overlay path, different customer requires different type of link:
  - FinTech customer (Bank): Extremely secure link only. Exclude Internet/LTE path. Include MPLS/Physical link.
  - Highest quality link: Only use physical link.
  - Low cost mode: Use LTE only as backup
- Proposal: new Link Attribute TLV

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<tr>
<th>Type Number</th>
<th>Link type</th>
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<td>Cloud Backbone</td>
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Summary and what’s next

• BGP SPF to collect SDWAN link topology
• Extension to BGP LS link attribute to carry the link type
• Informational to standard track.
• Comments and suggestion?