IPv6 Segment Routing (SRv6)
Interoperability Results

MPLS World Congress
April 2019
Why are we here?

- Provide an overview of IPv6 Segment Routing (SRv6) testing conducted at EANTC 2019
- Second year of SRv6 testing at EANTC
- But what is SRv6?
Source Routing

- topological and service (NFV) path is encoded in the packet header

MPLS

- 1 segment = 1 label
- a segment list = a label stack

IPv6

- 1 segment = 1 address
- a segment list = an address list in source routing extension header (SRH)
Network instruction

128-bit SRv6 SID

- Locator: routed to the node performing the function
- Function: any possible function either local to NPU or app in VM/Container
- Flexible bit-length selection

Locator  Function
Network Program in the Packet Header

Active segment

IPv6 header
- Source Address
- Locator 1 → Function 1

Segment Routing header
- Segments Left → TAG
- Locator 1 → Function 1
- Locator 2 → Function 2
- Locator 3 → Function 3

IPv6 payload: TCP, UDP, QUIC

Next instruction

“Global” argument
SRv6 VPN

No new protocol (just BGP)
- No new SAFI
- Light ext. to BGP Prefix-SID attribute

Automated
- No tunnel to configure

Efficient
- SRv6 for everything
- No other protocol, just IPv6 with SRv6
  - In fact, SRH not even needed (one single SID fits DA)
  - “go to node 2, decaps and lookup in VRF B”
Interop Highlights

- What was successfully tested?
  - SRv6 IS-IS extensions
  - SRv6 VPN
  - SRv6 Topology-Independent LFA (TI-LFA)
  - SRv6 OAM (ping / traceroute)
### Interop Highlights - Participants

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Model</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cisco</td>
<td>NCS 5500, NCS 540</td>
<td>PE, P</td>
</tr>
<tr>
<td>Huawei</td>
<td>NE9000-8, NE40E-X8A</td>
<td>PE, P</td>
</tr>
<tr>
<td>Ixia</td>
<td>IxNetwork</td>
<td>PE, CE</td>
</tr>
<tr>
<td>Spirent</td>
<td>TestCenter</td>
<td>PE, CE</td>
</tr>
</tbody>
</table>
Topology Setup

A

CE1

B

CE2

CE3

C

Cisco

D

Cisco

E

Cisco

F

Cisco

ISIS SRv6

PE / P

CE
Topology Setup

PE = Cisco – Huawei
P = Cisco – Huawei

PE / P
CE
Topology Setup

PE = Cisco – Ixia
P = Cisco – Huawei
Topology Setup

PE = Cisco – Spirent
P  = Cisco – Huawei

BGP VPNv4

IPv4

IPv6

IPv4 Packet

PE / P

CE
Let’s watch the demo !!!
THANK YOU