An Experiment of SRv6 Service Chaining at Interop Tokyo 2019 ShowNet

draft-upa-srv6-service-chaining-exp-00

Ryo Nakamura (The University of Tokyo),
Yukito Ueno (NTT Communications),
Teppei Kamata (Cisco Systems)
Interop Tokyo 2019 ShowNet NOC team
ShowNet at Interop Tokyo

• One of the largest live demonstration networks
  • Inter-operability tests, experiments, and demonstrations
    • 2019: **SRv6 service chaining**, 400G Ethernet, EVPN Type-5, RIETF, RoCEv2, etc.
  • Providing internet connectivity using the demonstrations for Inteorp exhibitors and visitors
    • over 200 booths and over 155,000 visitors for 3 days
Overview

1. T.Encaps for IPv4
   T.Insert for IPv6

2. Tagging Proxy
   2. End.AM

3. End.DT4
   3. End.DT4

3. End

1. T.Encaps for IPv4
   T.Insert for IPv6

External

Users
Devices contributed to the SRv6 Exp

- SRv6-aware devices

<table>
<thead>
<tr>
<th>Function</th>
<th>Product</th>
<th>Contributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>T.Insert</td>
<td>FX201</td>
<td>Furukawa Electric</td>
</tr>
<tr>
<td>T.Encaps</td>
<td>FX201</td>
<td>Furukawa Electric</td>
</tr>
<tr>
<td>End (+PSP)</td>
<td>FX201</td>
<td>Furukawa Electric</td>
</tr>
<tr>
<td>End.DT4</td>
<td>NCS55A1</td>
<td>Cisco Systems</td>
</tr>
<tr>
<td></td>
<td>NE40E-F1A</td>
<td>Huawei</td>
</tr>
<tr>
<td>End.AM</td>
<td>FX201</td>
<td>Furukawa Electric</td>
</tr>
<tr>
<td></td>
<td>Kamuee VPP</td>
<td>NTT Communications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>FD.io</td>
</tr>
<tr>
<td>End.AN</td>
<td>TM VNFS</td>
<td>Trend Micro</td>
</tr>
<tr>
<td>Tagging Proxy</td>
<td>Two OSS</td>
<td>Implemented by ShowNet NOC</td>
</tr>
</tbody>
</table>
Devices contributed to the SRv6 Exp

• SRv6-unaware services

<table>
<thead>
<tr>
<th>Service</th>
<th>Product</th>
<th>Contributor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>FortiGate 3601E</td>
<td>Fortinet</td>
</tr>
<tr>
<td></td>
<td>Lastline Defender</td>
<td>Lastline</td>
</tr>
<tr>
<td></td>
<td>PA-5280</td>
<td>Palo Alto Networks</td>
</tr>
<tr>
<td></td>
<td>SRX5400</td>
<td>Juniper Networks</td>
</tr>
<tr>
<td></td>
<td>Thunder 3230S CFW</td>
<td>A10 Networks</td>
</tr>
<tr>
<td>CGN</td>
<td>Thunder 7440-11 CFW</td>
<td>A10 Networks</td>
</tr>
</tbody>
</table>
Transparency of SRv6 header

• All the services contributed to ShowNet 2019 transparently delivered IPv6 packets with SRH under End.AM proxies
Services that cannot co-exist with End.AM

- Packets originated from SR-unaware services cannot be de-masqueraded because they do not have masqueraded SRH
  - i.e., Captive Portal
- Variant 2 of masquerading proxy (Caching) defined in ietf-spring-sr-service-programming is needed
Service liveness detection and conditional advertisement of service segments

• When a service is down, a proxy should stop advertising a corresponding service segment
• Some sort of detection mechanisms are needed, for example, integrating BFD into advertising service segments
Hop limit Decrement on SRv6 Proxies

- An implementation decrements hop limit on masquerading
- An implementation does not decrement hop limit on masquerading
- Former is correct as mentioned in the ML
Control Plane Capabilities

• We configured all the SRv6 functions manually
  • It was possible, but it was very hard...

• We hope the functionalities in the drafts would be implemented
  • draft-ietf-idr-segment-routing-te-policy
  • draft-dawra-idr-bgp-ls-sr-service-segments
Match Condition for Applying SRv6 Functions

- The devices applied SRv6 functions as results of longest prefix match.
- In service chaining, transit behaviors need to be associated with default routes:
  - because packets from users would have arbitrary destinations.
- VRF is a candidate. On the other hand, we suggest there is another candidate:
  - e.g., BGP Flowspec.

Users

- User A
  - VRF A
  - 0.0.0.0/0 : SR Policy A
- User B
  - VRF B
  - 0.0.0.0/0 : SR Policy B
- User C
  - VRF C
  - 0.0.0.0/0 : SR Policy C

Flowspec Routes on a Table

- Match src prefix A : SR Policy A
- Match src prefix B : SR Policy B
- Match src prefix C : SR Policy C
Thanks!

• We hope lessons learned from Interop Tokyo would help the community
• And, we would like to thank contributors of ShowNet 2019