BGP-LCU

draft-szarecki-idr-bgp-lcu-traffic-steering-00

Louis Chan, Rafal Szarecki – Juniper Networks
Presented by Jeffrey Haas for IETF 105
Problem Statement

Service traffic requires desired transport treatment
- End to End -
across Network Domains (Metros, AS Boundaries)
Foundation

• Traffic treatment encoded as 32b integer – COLOR
  • Agreed among all domains

• Intra-domain tunnels marked w/ COLOR is satisfies desired treatment
Network slicing with BGP-LCU

MP-BGP VPN
[L100 RD1, IP-x], NH=PE2, RT=1, color-ext-comm=red
[L100 RD1, IP-y], NH=PE2, RT=1, color-ext-comm=blue

BGP-LCU
[L1’ <red.PE2>], NH=ASBR2
[L2’ <blue.PE2>], NH=ASBR2

BGP-LCU
[L1” <red.PE2>], NH=ASBR1
[L2” <blue.PE2>], NH=ASBR1

BGP-LCU
[L1 <red.PE2>], NH=AR
[L2 <blue.PE2>], NH=AR

Network slicing with BGP-LCU

Juniper Business Use Only
## LCU NLRI

Following RFC8277:

```
0                   1                   2                   3  
| 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 |
+---------------------------------------------+
| Length | Label | Rsrv | S | ~ |
+---------------------------------------------+
|                  |       |      |   |  |
| prefix.           |       |      |   |  |
| ~                 |       |      |   |  |
```

```
0                   1                   2                   3  
| 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 |
+---------------------------------------------+
| Length | ~ | Label | Rsrv | S | ~ |
+---------------------------------------------+
|       |  |       |      |   |  |
| prefix. |       |      |   |  |
| ~       |       |      |   |  |
```

```
0                   1                   2                   3  
| 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 |
+---------------------------------------------+
| Length | ~ | Label | Rsrv | S | ~ |
+---------------------------------------------+
|       |  |       |      |   |  |
| prefix. |       |      |   |  |
| ~       |       |      |   |  |
```

• Follows RFC8277
LCU NLRI

- Follows RFC8277
  - Prefix := <COLOR,DESTINATION>
    - COLOR:= integer (32b)
    - DESTINATION:= IPv4/IPv6 subnet address
  - Length 1 or 2 octets (511B)
    - COLOR, IPv6/128 DESTINATION w/ a lot of labels (160+)
BGP-LCU attributes considerations

- Remote Next-Hop
  - resolved by tunnel of matching color
- color-extended-community
  - may be useful for some deployment
  - Recommended to carry only one
- Tunnel-encapsulation
  - SHOULD NOT be carried
- Prefix SID
  - allowed
Why not tunnel encaps encoding?

• Tunnel encaps can carry endpoint, color, and a stack!
• But the NLRI key would be one instance of an end-point without allowing for path diversity for color.
• Could use add-paths to get the diversity:
  • But add-paths is per BGP neighbor and not interdomain.
BGP-LCU characteristic

• Domain independent technology;
  • Domain can use any tunnel technology.
    • E.g. SR-TE, RSVP, SR w/ IGP FlexAlgo, MRT LDP, PIGEONS, SDN/PCE/OpenFlow, ...
    • As long as tunnels meets T-intent and can carry MPLS over

• Domain Operator in full control of it’s domain.
TBD

• Non-identical and/or conflicting color codes intra- vs. inter-domain
• #COLORS x #DESTINATIONS scale
  • MPLS states on ASBRs (convergence)
  • Label space exhaustion (H/W limits)
We ask for

• Contribution