SR-MPLS over IP

draft-xu-mpls-sr-over-ip-00.txt

Xiaohu Xu <xiaohu.xxh@alibaba-inc.com>
Stewart Bryant <stewart.bryant@gmail.com>
Adrian Farrel <afarrel@juniper.net>
Ahmed Bashandy <bashandy@cisco.com>
Wim Henderickx <wim.henderickx@nokia.com>
Zhenbin Li <lizhenbin@huawei.com>

IETF-101, London, March 2018
Success!

• We managed to merge
  – draft-xu-mpls-unified-source-routing-instruction
  – draft-bryant-mpls-unified-ip-sr

• Thanks
  – Robin Li really made this happen

• Sorry
  – We are limited to 6 front page authors
  – Not every one can be on the front page
    • We focused on those who wrote most text
  – This is the IETF and we hope the draft will be the product of the working group
Overview of Objectives

1. Tunnel SR-MPLS over an IP network
   - To connect two SR-MPLS networks (e.g., data centres)

2. Enable SR in legacy networks by tactically introducing SR-capable nodes at strategic points in the network

3. It is not a specific objective, but the approach is IPv4/v6 neutral.
Use Case 1: Domain Interconnection

- Connect islands of SR-MPLS nodes
  - Such as data center sites
- Incremental deployment of SR-MPLS by tunneling across parts of a network that are not SR-MPLS enabled
Use Case 2:
Enable SR-MPLS Within an IP Network

- Provide a transition technology that enables SR in an IPv4 and/or IPv6 network where many routers have not yet been upgraded to have SRv6 capabilities.
Technical Overview

- Take MPLS-over-UDP encapsulation [RFC 7510] as an example:

<table>
<thead>
<tr>
<th>IP Header</th>
<th>UDP Header</th>
<th>MPLS SID Stack</th>
<th>Payload</th>
</tr>
</thead>
</table>

- Encapsulate an SR-MPLS SID stack in UDP in IP
- Address packet to next SR-MPLS-capable node in the SR path (top SID)
- UDP destination port indicates “MPLS below”
- UDP source port provides entropy if needed
A Little More Detail

Src = Sending SR capable node
Dst = Next SR capable node
Next protocol = UDP

Src Port = Entropy
Dst Port = MPLS-in-UDP

Stack of SIDs exactly like it is an SR-MPLS packet

Unchanged IP header and data
I.e., encapsulated packet
Packet Forwarding Example With PHP

- IP(A-->E)
  - UDP
  - L(G)
  - L(H)
  - Packet

- IP(E-->G)
  - UDP
  - L(H)
  - Packet

- IP(G-->H)
  - UDP
  - Explicit Null
  - Packet
Packet Forwarding Example Without PHP

A → B → C → D → H

- IP(A-->E)
  - UDP
  - L(E)
  - L(G)
  - L(H)
  - Packet

- IP(E-->G)
  - UDP
  - L(G)
  - L(H)
  - Packet

- IP(G-->H)
  - UDP
  - L(H)
  - Packet
Control Plane Work

• Control plane work may be needed
  – SID advertisements are just like for SR-MPLS
    • IGP or BGP advertises
      – Address of node or link
      – Associated SID
    • All SID types are supported
  – Need to add advertisements in routing protocol to specify
    • Encapsulation Type
    • PHP behaviour

• We think this should be in separate documents
  – Move discussion to the context of those documents
Next Step

• WG adoption?