

Service-Oriented MPLS Path Programming (SoMPP)

draft-li-spring-mpls-path-programming-01/

draft-li-idr-mpls-path-programming-01

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Introduction of SoMPP

- Service-oriented MPLS programming proposed by [I-D.li-spring-mpls-path-programming] is to provide customized service process based on flexible label combinations.
- Use cases for unicast service MPLS path programming is shown as follows:

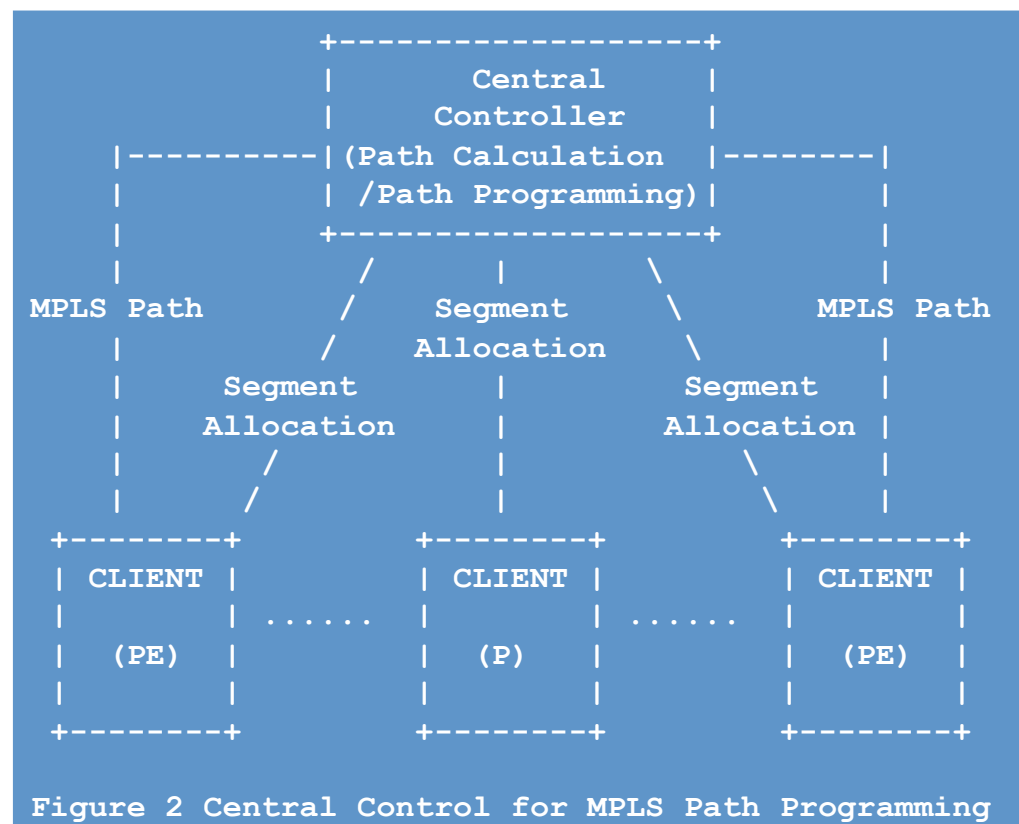
```
+-----+-----+-----+-----+-----+
| Entropy | Steering |VPN Prefix|   VPN   | Source | ---> Transport
| Label   | Label   | Label   | Label   | Label   |           Tunnel
+-----+-----+-----+-----+-----+
```

- Use cases for multicast service MPLS path programming is shown as follows (using BUM in EVPN as the example) :

```
+-----+-----+-----+
| Multicast |   EVPN   | Source | --->   Transport
| Payload  | Label   | Label  |           Multicast Tunnel
+-----+-----+-----+
```

Architecture of SoMPP

- BGP will play an important role for MPLS path programming to allocate MPLS segment, download programmed MPLS path and the mapping of the service path to the transport path.



Updates of draft-li-spring-mpls-path-programming-01

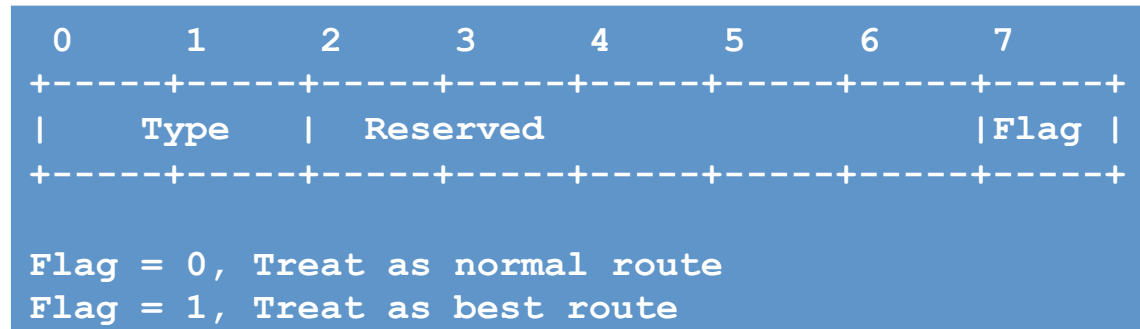
- This document defines the concept of MPLS path programming, then proposes use cases, architecture and protocol extension requirements in the service layer for the SPRING architecture.
- Updates:
 - Enhanced requirements definition.
 - REQ 05:** BGP extensions SHOULD be introduced to specify the end-points to accept the prefix advertised by the central controller.
 - REQ 06:** BGP extensions SHOULD be introduced to specify the priority for the prefix with attributes of MPLS path programming advertised by the central controller.
 - REQ 07:** When route selection is done in the client node, the path advertised by the central controller SHOULD have higher priority than the path calculated on the client's own.

Updates of draft-li-idr-mpls-path-programming-01

- This document defines BGP extensions to support service-oriented MPLS path programming.
- Updates
 - Enhanced BGP Extensions of SoMPP
 - Extended Label attribute
 - Extended Unicast Tunnel Attributes
 - Extended PMSI Tunnel Attribute
 - Route Flag Extended Community
 - Destination Node Attribute

Route Flag Extended Community

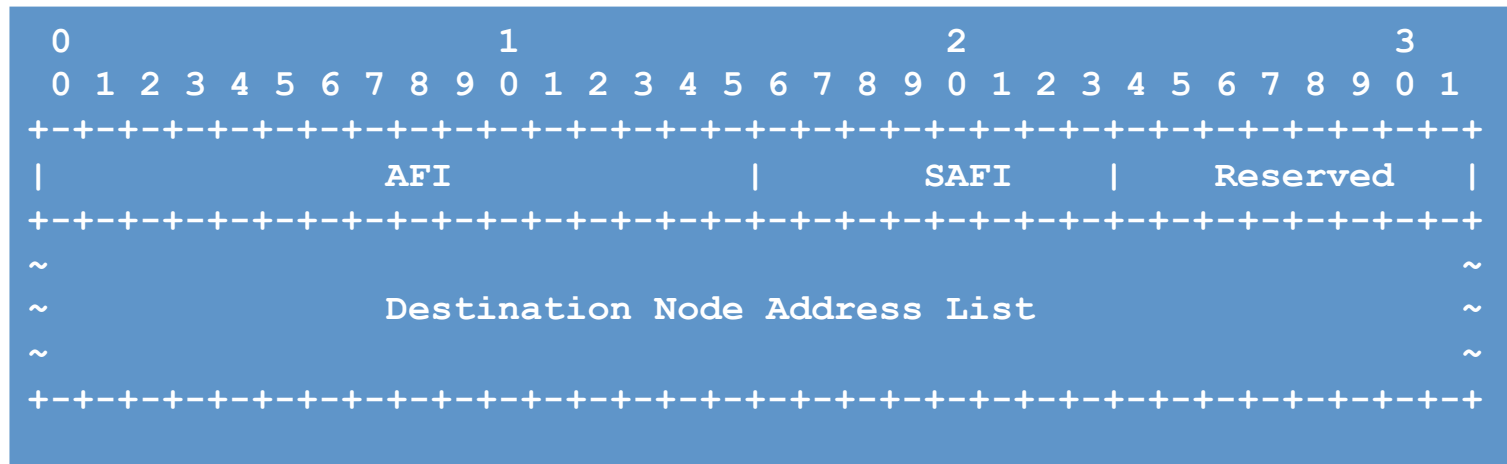
- The Route Flag Extended Community is used to carry the flag appointed by a BGP route server (e.g., a central controller):



- ✓ When a router receives a BGP route with a Route Flag Extended Community and the Flag set to "1", it SHOULD use the route as the best route when select the route from multiple routes for a specific prefix.

Destination Node Attribute

- A new optional, non-transitive BGP attribute called as the "Destination Node attribute", can be applied to any address family:



- ✓ The Destination Node attribute is used to carry a list of node addresses, which are intended to be used to determine the nodes where the route with such attribute SHOULD be considered.
- ✓ If a node receives a BGP route with a Destination Node attribute, it MUST check the node address list. If one address of the list belongs to this node, the route MUST be used in this node. Otherwise the route MUST be ignored silently.

Prototype Work: Intra VPN Traffic Steering (1)

- Intra VPN Traffic Steering
 - PCE-Initiated LSP is created in the ingress nodes.
 - BGP extensions is to change the tunnel for the VPN routes in the ingress node.
- All traffic steering work is initiated from the controller which can save huge configuration work of the traditional traffic steering method.

Prototype Work: Intra VPN Traffic Steering (2)

Steps:

T1: VPN uses Tunnel 1 (PCE-initiated LSP)

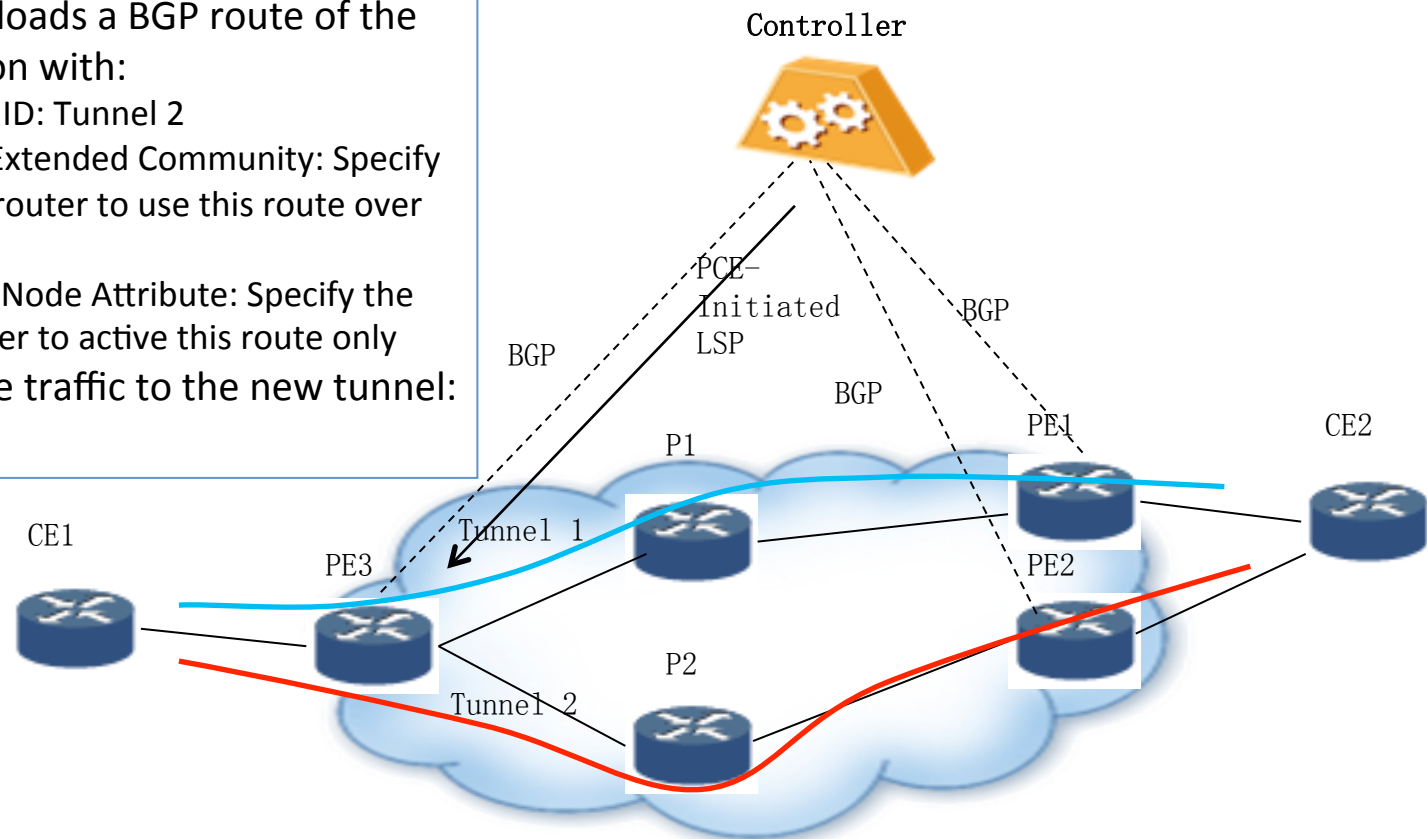
T2: Tunnel 1 is overloaded

T3: Controller creates Tunnel 2 (PCE-initiated LSP)

T4: Controller downloads a BGP route of the traffic destination with:

- 1) New tunnel ID: Tunnel 2
- 2) Route Flag Extended Community: Specify the ingress router to use this route over other path
- 3) Destination Node Attribute: Specify the ingress router to activate this route only

T5: VPN switches the traffic to the new tunnel:
Tunnel 2



Next Step

- Seek comments and feedbacks
- Revise the draft