Segment Routing for Service Chaining

draft-dawra-idr-bgp-sr-service-chaining-00

draft-clad-spring-segment-routing-service-chaining-00

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MUST READ !!!!!!!

draft-filsfils-spring-srv6-network-programming

Also Read

draft-ietf-6man-segment-routing-header
draft-dawra-idr-bgpl-srv6-ext
Agenda

• Problem
• Solution
What we want to do

• Enable Service Chaining based on Segment routing over MPLS/IPv6 Dataplane
• Discover Services and associated SIDs
• Enable Flexible, Scalable Service Chaining Solution.
Agenda

- Problem
- Solution
Service Functions

- **SR-Aware**: Service is bound to an SR endpoint function
  - **Processes all the traffic** headed to the service SID
- **SR-Unaware**: Service is not able to process SR traffic
  - Requires an SR proxy to operate properly
- **Services** are expressed with **segments**
  - Flexible
  - Scalable
  - Stateless

**SR**: \(\langle S1, C1, S2, S3, D \rangle\)

**C1**
SR proxies

- SR endpoint behaviors realizing the SR processing on behalf of an SR-unaware SF
  - Static proxy
  - Dynamic proxy
  - Shared-memory proxy
  - Masquerading proxy
Static proxy

Statically configured SR information on the proxy.

- **Ingress (SR-MPLS or SRv6 endpoint):**
  - Active SID is E1::A where function 0xA is associated with End.AS behavior
  - Pop outer IP and ext. headers
  - Forward to SF on OIF (with Eth addr of NH)

- **Egress (inbound policy on IIF):**
  - Encapsulation with configured IP and SR headers
  - Forward based on next segment

- Inner header can be IPv4, IPv6 or Ethernet
- Per-chain static configuration
- Provides similar functionality as current solutions
Dynamic proxy

Store encapsulation headers in a **local cache** on the proxy.

- **Ingress (SR-MPLS or SRv6 endpoint):**
  - Active SID is E1::B where function 0xB is associated with End.AD
  - Forward to SF on OIF (with Eth addr of NH)

- **Egress (inbound policy on IIF):**
  - Restore encapsulation (IP + ext. headers)
  - Forward based on next segment

- Inner header can be IPv4, IPv6 or Ethernet
- Per-chain dynamic configuration
Proposed BGP Extensions

• Extend SR BGP-LS to discover Services
• Proposed BGP-LS Sub-TLVs to encode Service Information
Service Chaining Attribute Sub-TLV

- Separate BGP-LS SAFI 71 or SAFI 72 advertisement for each attached Service

```
+--------------------------------------+
|          Type (2 octet)               |
+--------------------------------------+
|         Length (2 octet)             |
+--------------------------------------+
|      Service Type(ST) (2 octet)      |
+--------------------------------------+
|       Flags (1 octet)                |
+--------------------------------------+
|     Traffic Type (1 octet)           |
+--------------------------------------+
| RESERVED (2 octet)                   |
+--------------------------------------+

Type: TBD
Length: Length of Sub-TLV
Service Type: Registry Service Table Type(STT)
Flags: Future
Traffic Type: (OR operation)
Bit 0: IPv4
Bit 1: IPv6
Bit 2: L2/Ethernet
Opaque METADATA Sub-TLV

- This TLV is used to encode opaque data such as:
  - Vendor specific (brand, version)
  - Extra Information
- Publisher/Consumer understand Opaque-Type and data encoded

+-------------------------------+
|    Type (1 octet)             |
+-------------------------------+
|    Length (2 octet)           |
+-------------------------------+
|  Opaque-Type (2 octet)        |
+-------------------------------+
|    Flags (1 octet)            |
+-------------------------------+
|    Value (variable)           |
+-------------------------------+

Type:
IANA code type

Length:
Length of the Sub-TLV

Opaque Type:
TBD

Flags:
Flags for opaque data behavior

Value: (Variable)
Meta Data value
Implementation Status

- Proxy functions on open-source software
  - Linux
  - FD.io VPP
- Static proxy on Cisco hardware
- SR-aware open-source services (soon)
Draft: Next Steps

- Seeking WG input and feedback
- Suggestions/comments are welcome!!