Alternative Handling of Dynamic Chaining and Service Indirection

https://tools.ietf.org/html/draft-purkayastha-sfc-service-indirection-01

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InterDigital

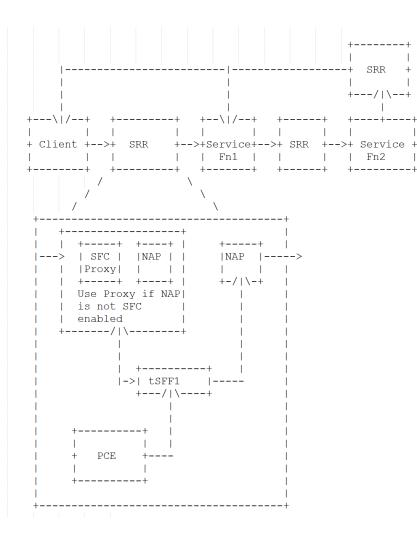Z. Despotovic, R. Khalili

Huawei

IETF-100, SFC WG, November 2017

From last meeting

- Service Indirection: dynamic and fast switching of service path between Service Functions

- "SRR service function" handles dynamic indirection

  - Decouples Service Consumer (SC) and Service Providers (SP)

  - Single SC may be connected to multiple SPs through this SRR SF

  - Reclassification may not be required, switches traffic flow to any SPs

    - Based on Instantaneous situation, Policy etc.
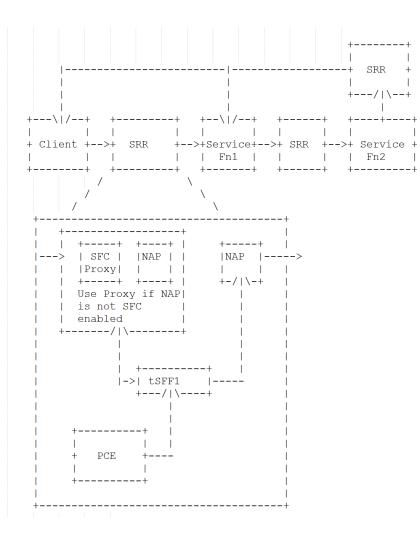
HTTP based transport

- Extension to SFC framework

  - Utilize URLs as addressing scheme

  - Create SFPs such as : 192.168.x.x -> www.foo.com -> 192.168.x.x -> www.foo2.com ->   192.168.x.x -> ... -> www.fooN.com."

  - This "name-based" relationship that we see possibly realized through specific replicated instances, where in turn the routing towards those specific instances is realized by the SRR

- Operation in SFC architectural framework

  - Classifier function may interact with SRR to obtain an SE (Service Encapsulation).

    - E.g. The Classifier function may look into the network locator map and determine the next SF is www.foo.com.

    - This information is provided to SRR to obtain the next hop information.

    - SRR returns the SE for next hop

Details of SRR Service Function (1/2)

```
                                                         +---------+
                                                         |         |
           |----------------------|------------------+   |  SRR    |
                                                         |         |
           |                      |                      +---/|\--+
           |                      |
+---\|/--+    +---------+   +--\|/--+   +------+   +----+---+
|        |    |         |   |       |   |      |   |        |
+ Client +-->+   SRR    +-->+Service+-->+ SRR  +-->+ Service +
|        |    |         |   |  Fn1  |   |      |   |   Fn2   |
+--------+    +---------+   +-------+   +------+   +---------+
           |         /            \
           |        /              \
           |       /                \
+----------------------------------------------------+
|    +-----------------+         |
|    | +-----+ +----+ |      +-----+   |
|--> | | SFC | |NAP | |      |NAP  |----->
|    | |Proxy| |    | |      |     |   |
|    | +-----+ +----+ |      +-/|\-+   |
|    | Use Proxy if NAP|        |      |
|    | is not SFC      |        |      |
|    | enabled         |        |      |
|    +-------/|\------+         |      |
|           |                  |      |
|           |    +----------+  |      |
|           |->| tSFF1     |-----     |
|           +---/|\----+         |
|                  |             |
|    +----------+  |             |
|    |          | |             |
|    +   PCE    +----            |
|    |          | |             |
|    +----------+               |
|                               |
+-------------------------------+
```

- NAP at the ingress, terminates on the client side Layer 3 and above protocols, such as TCP

- NAP at the egress, terminates any transport protocol on the network outgoing (server) side

- PCE, Path Computation Element
  - Select the correct next SF, realizing path policy enforcement.
  - Initial request to a specific URL on the SFP for the first time results in a Path Identifier
  - The Path identifier is utilized for any future request for a given URL-based SF
  - Delivered to the ingress NAP

- Contd..

Details of SRR Service Function (2/2)

- Transport-derived SFF (tSFF1): the communication between ingress and egress NAPs as well as NAPs to PCE is realized via a transport-derived SFF.

- Three possible tSFFs
  - SDN-based: utilizes path-based forwarding, using SDN-based wildcard matching fields
  - Realized via a BIER overlay, in turn it is realized over a BIER-compliant underlay, such as MPLS.
  - Utilize a flow aggregation approach, called edge switch classification (ESC)

Protocol Considerations

- Following protocol changes are required:
  - NAP-to-NAP protocol for HTTP: HTTP based message exchange between client and server NAPs
  - NAP-PCE protocol: Used for path computation, obtaining routing information as well as provide path updates
  - Overlay transport protocol: Used for transport-level exchange over any underlay network
  - Registration protocol: Used to register FQDN service endpoints
  - Content certificate distribution protocol: Used for HTTPS support

Next steps

- Collect feedback from the WG
    - Does the use cases and protocol changes proposal look reasonable?

- We will work on this use case and a solution in the H2020 FLAME project with experiments planned for early 2018 and beyond