PCEP Extensions for traffic steering support in Service Function Chaining

draft-wu-pce-traffic-steering-sfc-04
Qin Wu(bill.wu@huawei.com)
Dhruv Dhody (dhruv.ietf@gmail.com)
Mohamed Boucadair (mohamed.boucadair@orange.com)
Christian Jacquenet (christian.jacquenet@orange.com)
Jeff Tantsura (Jeff.Tantsura@ericsson.com)

PCEP Extensions for SFC support

- Objective
  - Specify extensions to the PCEP that allow a stateful PCE to compute and instantiate Service Function Paths (SFP).
- Motivation
  - [I-D.ietf-pce-pce-initiated-lsp] provides motivations and extensions needed for stateful PCE-initiated LSP instantiation.
    - Stateful PCE is centralized controller
      - provide stateful control over LSPs that are locally configured on the PCC
      - support dynamic creation and tear down of LSPs
        - » LSP placement can be either static or dynamic
  - As described in [I-D.merged-sfc-architecture-00], the SFC control plane is responsible for constructing the SFPs;
    - translating the SFCs to the forwarding paths
    - propagating path information to participating nodes
  - How to instantiate Service Function Path by using PCE-initiate LSP instantiation become a interesting issue.
    - Allow dynamic creation and tear down of service function path
    - Allow Delegation and Cleanup of service function path
    - Allow service function path(SFP)update
  - [draft-ww-sfc-control-plane] discuss general signaling procedure for chain construct and path setup.

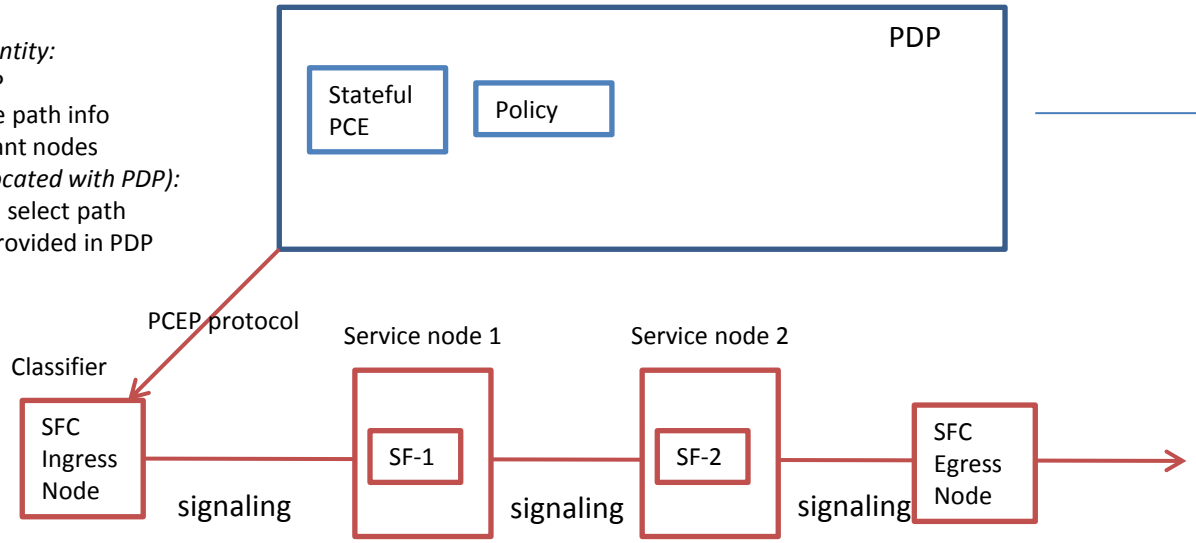
SFP instantiation via PCE

- To instantiate Service Function Path by using PCE-initiate LSP instantiation, we have the following scenario:

Control Plane:
PDP centralized entity:
1. Construct SFP
2. Communicate path info with participant nodes

Stateful PCE (collocated with PDP):
1. Compute and select path

Based on policy provided in PDP



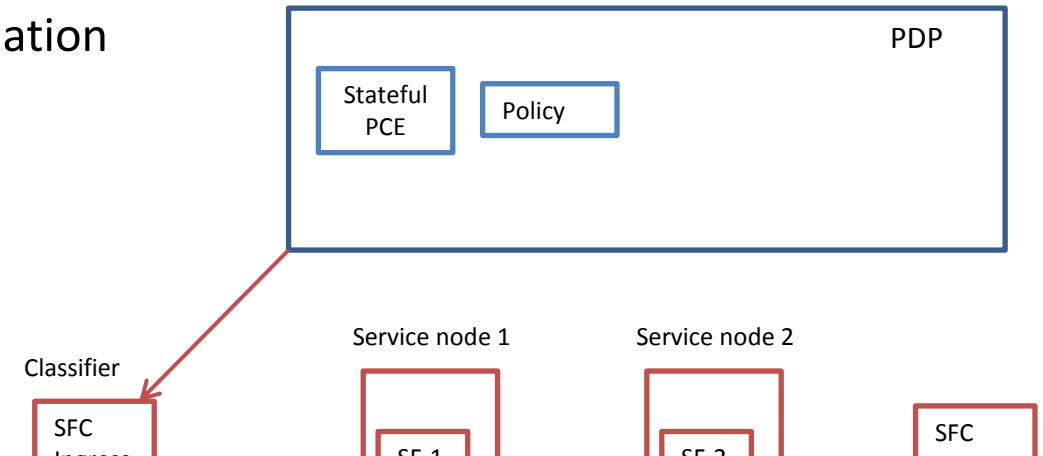
Data plane:
Participant node include:
a. SFC Ingress node(classifier)
b. Service node
c. SFC Egress node (optional)

This classifier is responsible for classifying flows to determine which Service Function Chain they belong to (See [draft-boucadair-pcp-sfc-classifier-control-00]).

Service node is used to host service function and forward packets to service function using overlay encapsulation and sfc header extension.

SFP instantiation via PCE

- Service Function path creation
  - PDP structures service function chain
    - For example: {15, {IPv6_Firewall, HOST_ID_Inject, NAT64}}.
    - SF is assigned with a unique identifier and but doesn't need to have locator
    - Service function chain is assigned with a service function map index or SFP ID.
  - PDP communicate with stateful PCE to determine the path
    - translate the SFCs to the forwarding paths
      - Which path is associated with which SFC?
      - In case of multiple SFPs being mapped to one SFC (e.g.,load balancer case)
    - determine an ordered list of locators of each service function in the service function chain
  - Stateful PCE instantiates Service Function Path by appending SFP ID TLV in the PCEP instantiation message.
    - SFP ID is used to identify a service function chain or than service function path?
    - Classifier then know how to map service chain to different SFP and how to assign flow to different chain.
  - PDP propagates path information to participating nodes



SFP instantiation via PCE

- Service Function path tear down
  - PDP tears down SFC placement and revoke SFP ID from that SFC.
  - PDP communicates with stateful PCE to decide the path associated with SFP ID
    - translate the SFCs to the forwarding paths
      - Which path is associated with which SFC?
  - Stateful PCE tear down Service Function Path by appending SFP ID TLV in the PCEP de-instantiation message.
  - PDP propagating path information(SFP ID)

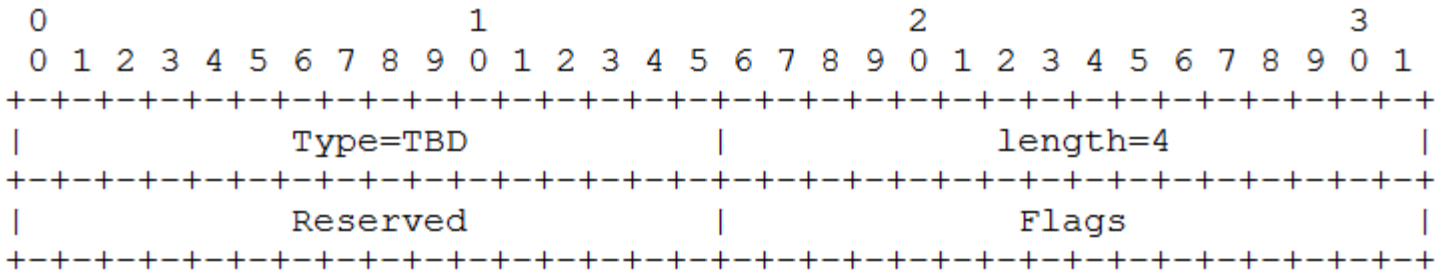
  to participating nodes to release resource.

SFP instantiation via PCE

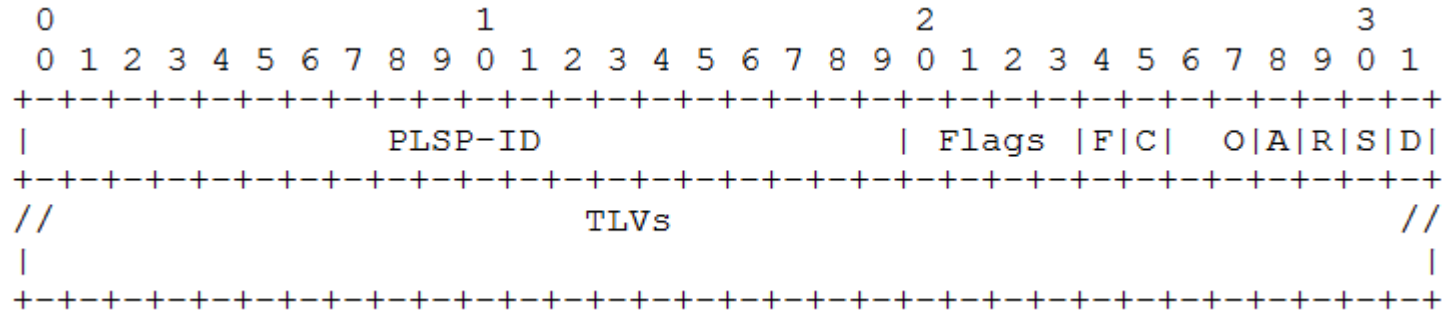
- **SFP Delegation and Cleanup**
  - same as defined in section 6 of [I-D.ietf-pce-pce-initiated-lsp].
- **SFP State Synchronization**
  - same as defined in section 5.4 of [I-D.ietf-pce-pce-initiated-lsp].
- **SFP Update and Report**
  - re-signal the SFP with updated attributes
  - Report is same as defined in section 6 of [I-D.ietf-pce-pce-initiated-lsp].

SFP instantiation via PCE : Object Format

- Define Open Object to advertise the SFC capability on the PCEP session



- Extend the LSP Object with a new flag bit (i.e.,F bit)to indicate SFP included



- Define a new TLV to carry SFP ID, the format and operation is TBD

Next Step

- Open issue:
  - SFP ID is used to identify a service chain or service function path?
- Accepted as WG doc?