PCEP Extensions for traffic steering support in Service Function Chaining

draft-wu-pce-traffic-steering-sfc-07
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)

Motivation and Goal

- Motivation
  - [I-D.ietf-pce-pce-initiated-lsp] enables stateful PCE to setup, maintain, teardown LSP without local configuration on the PCC.
  - The SFC control plane described in [I-D.ietf-sfc-architecture-00], 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
- Goal
  - Specify extensions to the PCEP that allow a stateful PCE to compute and instantiate Service Function Paths (SFP).

Update since the last meeting

- Update in v-06 and v-07
  - Align with network service header document ([I-D.ietf-sfc-nsh])and Specify the detail format of SFP Identifier TLV and use of SFP Identifier
  - Align with SFC architecture draft ([I-D.ieft-sfc-architecture])and Update figure 2 to add SFF and support both SFF separated from SF and SFF integrated with SF in the same box.
  - Align with Service Function Chaining (SFC) Control Plane Components & Requirements document ([I-D.ww-sfc-control-plane])and allows send the explicit SFF-SF-sequence or SF-sequence to the SFC head-end
- Open question asked by chair :
  - what is the requirements for PCEP extension for SFC support ?
  - our progress:
    - » Raised some discussion on SFC ML before Prague to discuss requirements on the interface between SFC Classifier and SFC Control&Management Plane.
    - » Document PCEP protocol requirements in the SFC Control Plane Components & Requirements draft

PECP Requirements for SFC support

- Support constrained SFP (specified in [I-D.ww-sfc-control-plane])
  - Send explicit SFF-SF-sequence to the SFC head-end
  - Send SF-sequence to the SFC head-end
    - Only list SFs that need to be soliciated
    - Rely on signaling protocol to establish the SFF-SF-sequence based on the SF-sequence.
  - SFPs can be fully specified
    - List all the SFF/SFs that need to be solicited
  - SFPs can be partially specified
    - E.g.,exclude some nodes in the path
    - E.g.,explicitly select which instance of a given SF needs to be invoked (debatable).
      - » PCE keep track of all instances for a given SF
      - » Leave this complexity to SFF node

Solution

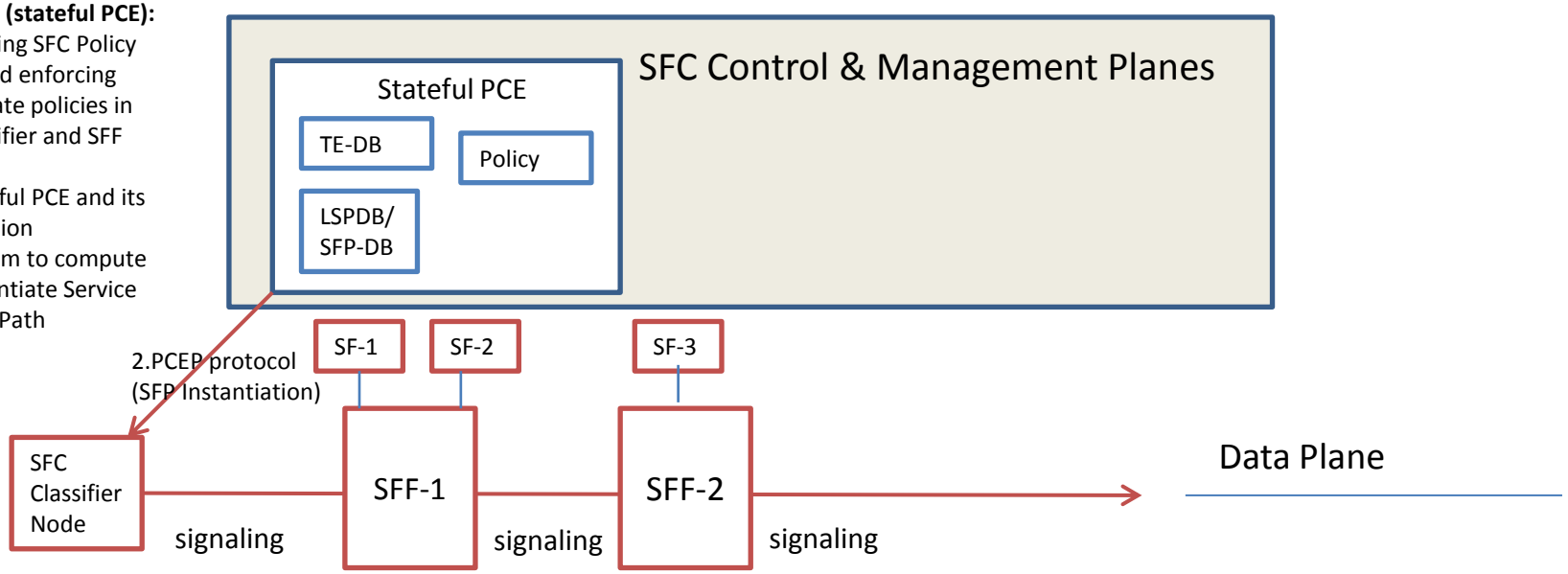
- Use the Explicit Route Object (ERO) to encode either a sequence of SF functions or a combination of SFs and SFFs to establish a SFP.
- In case the said SFFs and SFs can be identified with an IP address, Use the IP sub-object for SF/SFF identification.
- Use SFP ID TLV for SFP identification.
- Define 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

Solution

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

Control Plane (stateful PCE):

a. Maintaining SFC Policy Tables and enforcing appropriate policies in SFC Classifier and SFF Nodes
b. Use stateful PCE and its instantiation mechanism to compute and instantiate Service Function Path



Data plane:

Participant node include:

a. SFC classifier node
b. SFF node
c. SF node

This classifier is responsible for
1.classifying flows to determine which Service Function Chain they belong to.

2. use signaling protocol to establish the SFF-SF-sequence based on the SF-sequence.

SFF node is used to host service forwarding function and forward packets to SF node using sfc header extension and forward packet the next SFF node using overlay encapsulation.

SF node is used to host service function and process packet that Is using SFC header extension.

Next Step

- One open issue remains:
  - In case a PCE-Initiated Signaling mechanism is used to setup the service function path, then does the classifier / PCE- Initiated signaling protocol needs to understand if the IP address is for SFF or SF or the signaling protocol is only used to signal IP address for SFs?
- Prepare new version based on guidance on the open issue discussion.