PCEP Extensions for traffic steering support in Service Function Chaining

draft-wu-pce-traffic-steering-sfc-08
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Objective and Motivation

- Objective:
  - Specify extensions to the PCEP that allow a stateful PCE to compute and instantiate Traffic Engineering (TE) Service Function Paths (SFP).
- Motivation:
  - [RFC7665] also briefly discusses how to use the SFC control plane to establish SFP, e.g., construct path, translating the SFCs to the forwarding paths
  - [I-D.ietf-sfc-control-plane] first discusses SFP adjustment Use Case in section 4.10 .1
    - Traffic engineered SFP
    - SFP fail-over
    - SF/SFP Load-balancing
  - [I-D.ietf-sfc-control-plane] further discusses SFP establishment and adjustment requirements
    - **Head End Initiated SFP Establishment** in section 4.10.2
    - Use of SFP info in section 4.10.4 and 4.10.5
      - **Encoding the Exact SFF/SF Sequence in Data Packets in section 4.10.4**
      - **Fully Controlled SFF/SF Sequence for a SFP in section 4.10.5**
    - **Service Function Path Adjustment in section 4.10.1**
      - Select SF instances to re-determine a SFP
      - Replace target SF instances (e.g., in a failure or overloaded) with newly selected ones
      - Enforce the updated SFP for upcoming SFC traversal to SFFs (optional)

Approach

- [I-D.ietf-pce-pce-initiated-lsp] enables stateful PCE to setup, maintain, teardown LSP without local configuration on the PCC.
- Using PCE-initiated LSP mechanism to instantiate TE Service Function Path
  - Use the Explicit Route Object (ERO) to encode either a sequence of SF functions or a specific sequence 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
  - Extend the LSP Object with a new flag bit (i.e.,F bit)to indicate SFP included
  - Define SFP ID TLV to carry SFP.

Update since the last meeting

- The version (-04) was discussed in IETF 90 Toronto meeting
- The version (-06) was presented in IETF93 Prague meeting
- Following Prague meeting chair's suggestions
  - We raised discussion on SFC control plane architecture draft
  - Documented SFP adjustment use case and SFP establishment and adjustment requirements in the SFC control plane architecture draft
  - Build consensus on SFP adjustment and establishment requirement and move SFC control plane architecture draft as WG draft [I-D.ietf-sfc-control-plane].
    - » relationship between SFC,SFP and RSP was clarified
    - » Service Chaining doesn't requires correlating service path IDs with service chain IDs within the data plane
    - » Encoding the Exact SFF-SF-sequence in Data Packets and Fully Controlled SFF-SF-Sequence for a SFP were also discussed
    - » control-plane requirements defined in SFC control plane architecture allows to instruct a loose path (SFP) or a strict path (RSP),
      - whether a full path is specified within a domain or if it is deferred to SFFs is really deployment-specific.
- Update in v-08
  - Replace [I-D.ietf-sfc-architecture] with RFC7665
  - Update SFP Identifier TLV definition to align with SFC Architecture draft (RFC7665) and highlight the use of SFP Identifier on Classifier and SFF.
  - Update section 3 to align with SFC architecture draft ([I-D.ietf-sfc-control-plane])
    - » allow encode either Exact SFF/SF Sequence or SF-sequence to the SFC head-end.
    - » In the latter case, the SFC head-end generate SFF/SF sequence based on SF-sequence.
  - allocate a new code point in the PCEP TLV Type Indicators registry for SFC capability
  - Update section 7 to emphasize the mechanism defined in this document work together with generic SFC encapsulation defined in [I-D.ietf-sfc-nsh]
  - Update figure to align with with SFC architecture draft ([I-D.ietf-sfc-control-plane])

Open issue

- Do we need to allow encode both full sequence of SF or specific sequence SFF/SF?
  - How classifier tell ERO is for encoding full sequence of SFs or specific sequence SFF/SF?
    - One proposal is to use L Bit of ERO sub-object to indicate loose path support(full sequence of SFs) or strict path support(full sequence of SFF/SF)

Next Step

- The SFP establishment and adjustment requirement have been well documented in

  [I-D.ietf-sfc-control-plane]
- [I-D.ietf-sfc-control-plane] had been well discussed in SFC WG and is now in WGLC.
- [I-D.wu-pce-traffic-steering-sfc] provides a solution to address the above requirements defined in [I-D.ietf-sfc-control-plane]
- It is now ready for WG adoption.