PCEP Extension for Flow Specification

draft-li-pce-pcep-flowspec-00

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Motivation

- Using PCEP to install a packet classification rule for LSPs

- Distributing the flow specifications from PCE controller to network device without BGP protocol
- When a TE-LSP is set up, the head end needs to know how to use it
  - What traffic to send on the LSP
- PCEP allows an active PCE to set up or modify LSPs
  - So we need a way to tell the head end how to use the LSP

- This document specifies a set of extensions to PCEP to support dissemination of flow specifications.
  - The extensions include the instantiation, updation and deletion of flow specifications.

Requirements for PCEP extension

- Capability Advertisement
  - During PCEP session establishment, both the PCC and the PCE must announce their support of PCEP extensions for FlowSpec.
- PCEP FlowSpec Message
  - Sent by a PCE to a PCC to trigger creation, modification or deletion of a FlowSpec rule.
- Objects and TLVs
  - OPEN Object
    - PCE FlowSpec Capability TLV
  - FLOW Object
    - Flow Filter TLVs
  - ACTION Object
    - ACTION TLVs

OPEN Object

- The PCE-FLOWSPEC-CAPABILITY TLV is an optional TLV associated with the OPEN Object [RFC5440] to exchange PCE FlowSpec capability of PCEP speakers.

- Its format is shown in the following figure:

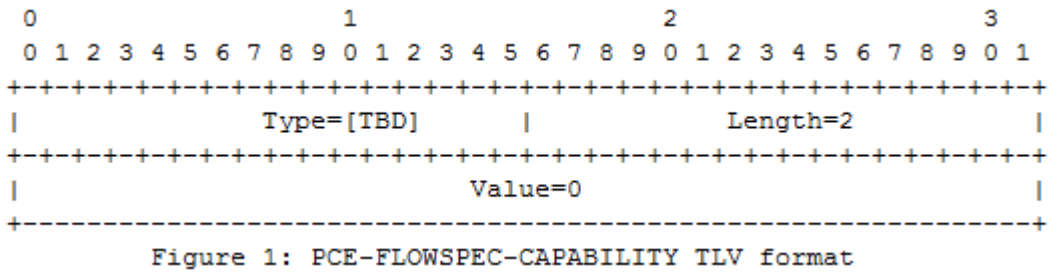


Figure 1: PCE-FLOWSPEC-CAPABILITY TLV format

FLOW Object

The FLOW object MUST be present within FlowSpec messages.
The FLOW object carries a set of FlowSpec filter rules.

FLOW Object-Class is to be assigned by IANA.

Two FLOW Object-Type are defined so far:
- o IPv4 FLOW: FLOW Object-Type is 1.
- o IPv6 FLOW: FLOW Object-Type is 2.

The format of the FLOW object is as follows:

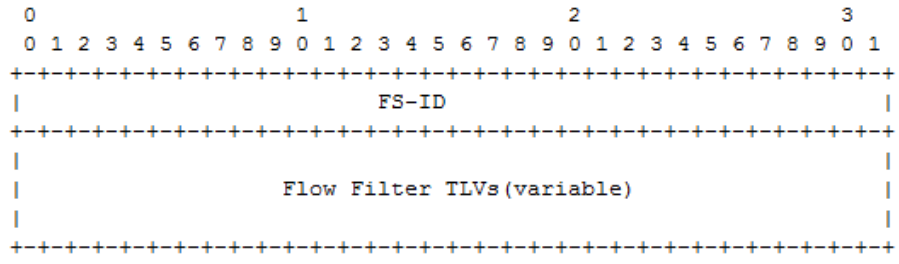


Figure 2: FLOW Object Body Format

The following flow filter types are supported:

Type	Description	Ref TLV	Value defined in
TBD1	Destination IPv4 Prefix	1	RFC5575
TBD2	Source IPv4 Prefix	2	RFC5575
TBD3	IP Protocol	3	RFC5575
TBD4	Port	4	RFC5575
TBD5	Destination port	5	RFC5575
TBD6	Source port	6	RFC5575
TBD7	ICMP type	7	RFC5575
TBD8	ICMP code	8	RFC5575
TBD9	TCP flags	9	RFC5575
TBD10	Packet length	10	RFC5575
TBD11	DSCP	11	RFC5575
TBD12	Fragment	12	RFC5575
TBD13	Flow Label	13	I-D.ietf-idr-flow-spec-v6
TBD14	Destination IPv6 Prefix	1	I-D.ietf-idr-flow-spec-v6
TBD15	Source IPv6 Prefix	2	I-D.ietf-idr-flow-spec-v6
TBD16	Next Header	3	I-D.ietf-idr-flow-spec-v6

Table 2: Flow Filter Types

ACTION Object

The ACTION object MUST be present within FlowSpec messages when creating or updating the FlowSpec.
The ACTION object carries a set of FlowSpec actions.

ACTION Object-Class is to be assigned by IANA.
ACTION Object-Type is 1.

The format of the ACTION object body is:

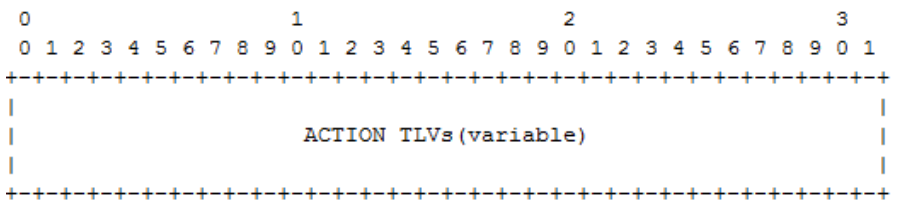


Figure 3: ACTION Object Body Format

The following FlowSpec action types are supported:

Type	Description	Ref TLV	Value defined in
TBD17	traffic-rate	TBD	I-D.ietf-ospf-flowspec-extensions
TBD18	traffic-action	TBD	I-D.ietf-ospf-flowspec-extensions
TBD19	traffic-marking	TBD	I-D.ietf-ospf-flowspec-extensions
TBD20	redirect-to-IPv4	TBD	I-D.ietf-ospf-flowspec-extensions
TBD21	redirect-to-IPv6	TBD	I-D.ietf-ospf-flowspec-extensions
18(*)	IPV4-LSP-IDENTIFIERS	-	I-D.ietf-pce-stateful-pce
19(*)	IPV6-LSP-IDENTIFIERS	-	I-D.ietf-pce-stateful-pce
17(*)	Symbolic-Path-Name	-	I-D.ietf-pce-stateful-pce

Table 3: Flow Action Types

(*) The type is defined in [I-D.ietf-pce-stateful-pce]

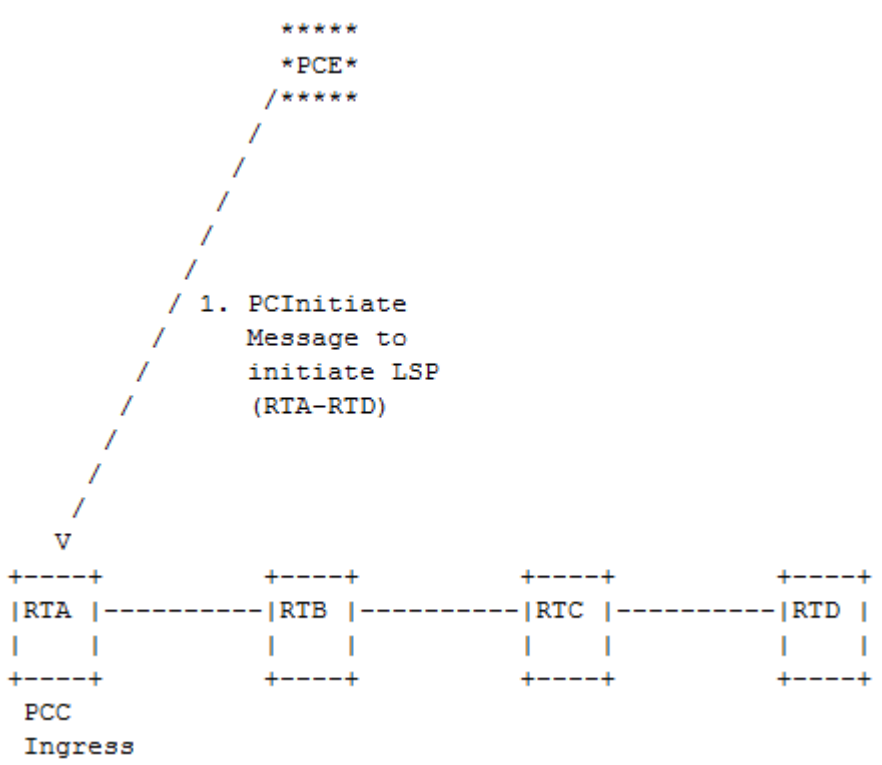
Overview of Procedures

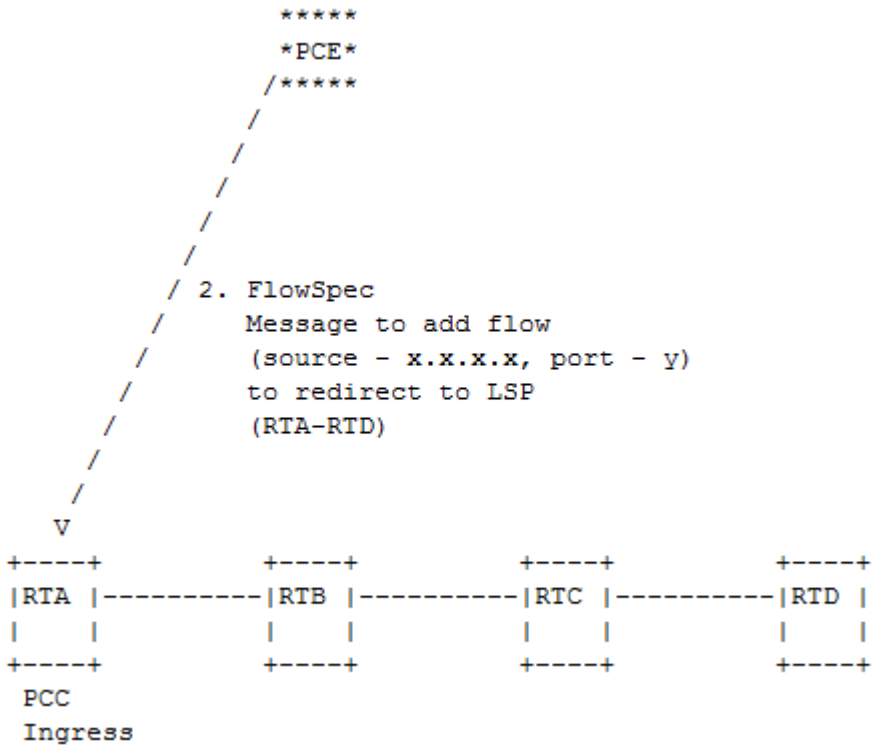
- Firstly both the PCE and PCC advertise the PCE FlowSpec Capability during the PCE session initiation phase.

- On the PCEP session with PCE FlowSpec Capability
  - PCE communicates with PCC to
    - Create FlowSpec
    - Update FlowSpec
    - Withdraw FlowSpec

Example Usage

- Once PCE initiate tunnels, it needs to further decide what data needs to flow on the newly created tunnel
- A flow specification can be created at the ingress to redirect the flow to the LSP as shown below.





Next step

- Solicit comments & cooperation
- Revise this draft