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PCEP extensions for SR-TP
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Abstract

This document proposes a set of extensions to PCEP for Segment Routing in MPLS Transport Profile (SR-TP) networks and defines a mechanism to create the bi-directional SR tunnel in SR-TP networks with PCE.

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[1.](#) Introduction

The Path Computation Element Communication Protocol (PCEP) defined in [[RFC5440](#)] provides mechanisms for Path Computation Elements (PCEs) to perform path computations in response to Path Computation Clients (PCCs) requests.

[I-D.ietf-pce-segment-routing] proposes extensions to PCEP that allow a stateful PCE to compute Traffic Engineering (TE) paths in segment routing (SR) networks. But it is applicable to Multi-protocol Label Switching (MPLS) networks. [[I-D.hu-spring-sr-tp-use-case](#)] describes the use case of SR tunnel to be deployed in MPLS Transport Profile (SR-TP) network. It is required to extend the PCEP protocol to meet the new requirement for SR-TP.

This document proposes a set of extensions to PCEP for Segment Routing in MPLS Transport Profile (SR-TP) networks and defines a mechanism to create the bi-directional SR tunnel in SR-TP networks with PCE.

[1.1.](#) Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

1.2. Terminology

The terminology is defined as [\[RFC5440\]](#),
[\[I-D.ietf-pce-segment-routing\]](#) and [\[I-D.hu-spring-sr-tp-use-case\]](#).

2. The SR-TP Architecture with PCE

As described in [[I-D.hu-spring-sr-tp-use-case](#)], in SR-TP networks, the centralized controller may calculate the end to end SR paths, and creates the ordered segment list. The centralized controller may be replaced to PCE as the Figure 1 shown. The PCE can calculate the SR paths and initiate a SR path on a PCC.

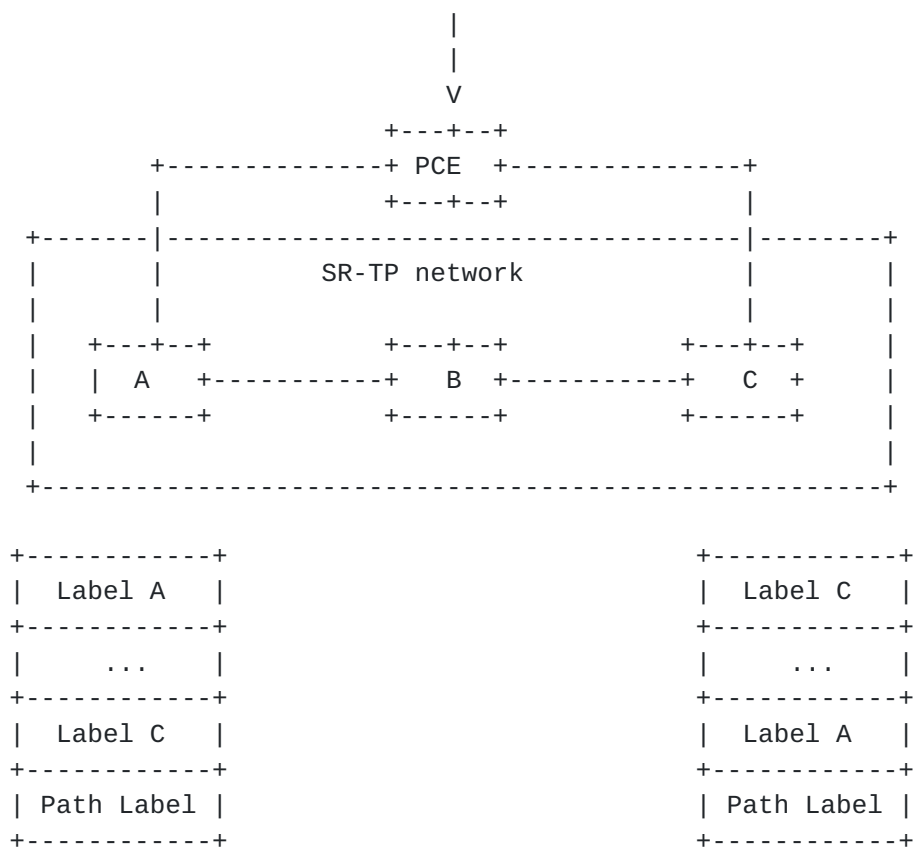


Figure 1 The SR-TP Architecture with PCE

It is required to support bi-direction tunnel to meet the requirement of SP-TP networks. A label named Path segment at both ends of the paths was defined to identify the direction of the SR paths as described in [[I-D.cheng-spring-mpls-path-segment](#)]. It mainly aims to bind two unidirectional SR paths to a single bi-directional tunnel.

3. PCEP extensions for SR-TP

3.1. Bi-directional LSP extension

3.1.1. The B flag in SRP Object

The format of the SRP object is defined in [RFC8231] and included here for easy reference with the addition of the new B flag.

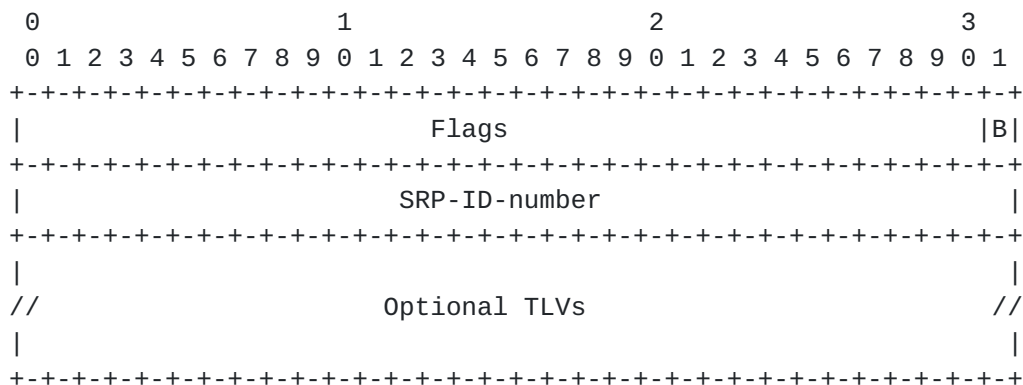


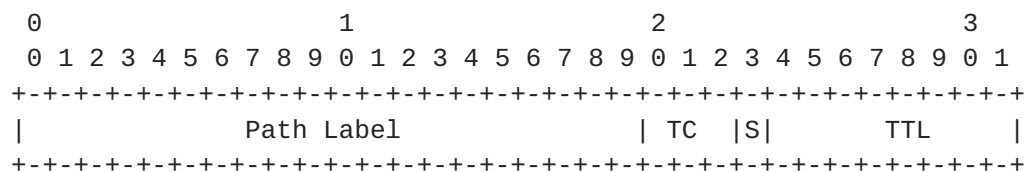
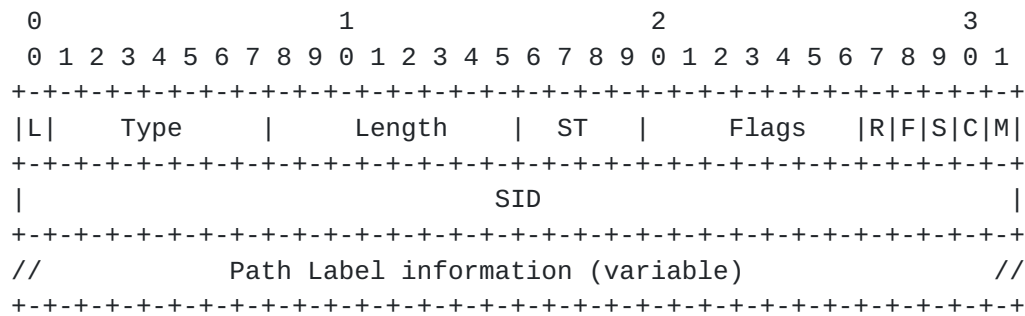
Figure 2 The SRP Object Format

A new flag is defined to indicate a bi-directional LSP operation initiated by the PCE:

B(Bi-directional -- 1 bit):when set, the PCE specifies that the request relates to a bi-directional TE LSP that has the same traffic engineering requirements including fate sharing, protection and restoration, LSRs, TE links, and resource requirements (e.g., latency and jitter) in each direction. When cleared, the TE LSP is unidirectional.

3.2. SR-TP ERO extension

As described in [I-D.hu-spring-sr-tp-use-case], it is required to support bi-directional tunnel to meet the requirement of SP-TP networks. But it is the uni-directional tunnel for SR and engineering traffic network as discussed in [I-D.ietf-pce-segment-routing]. The SR path is carried in the Segment Routing Explicit Route Object (SR-ERO), which consists of a sequence of SR subobjects. This document proposes the extension of the SR-ERO Subobject to carry the bi-directional tunnel information as the Figure 3 shown.



The B bit in SRP Object MUST be set and the two unidirectional SR paths may be computed from the forward and reverse direction and sent to the source and destination PCC respectively in SR-ERO object. The path labels which binding the paths may be generated in PCE and sent to the related PCC carried in the bottom of the SR-ERO. When the PCCs at both ends receiving the PCInitiate message with the labels in

SR-ERO subobjects, they may forward the packets from bi-directional tunnel in SR-TP networks.

4. Security Considerations

TBD.

5. IANA Considerations

TBD.

6. Acknowledgements

TBD.

7. References

7.1. Informative References

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