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Z. Li  
X. Chen  
N. Wu  
Huawei Technologies  
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**PCEP Link-State extensions for Segment Routing**  
**draft-li-pce-pcep-ls-sr-extension-01**

Abstract

Segment Routing leverages source routing. A node steers a packet through a controlled set of instructions, called segments, by prepending the packet with an SR header. A segment can represent any instruction, topological or service-based. SR allows to enforce a flow through any topological path and service chain while maintaining per-flow state only at the ingress node of the SR domain.

IGP protocols have been extended to advertise the segments. Because of IGP's propagation scope limitation, it is not suited for IGP to signal paths that span across AS borders. This document introduces extensions of PCEP-LS to solve the problem without the similar limitation.

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 [RFC 2119](#) [[RFC2119](#)].

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## [1.](#) Introduction

Segment Routing [[I-D.ietf-spring-segment-routing](#)] leverages source routing. A node steers a packet through a controlled set of instructions, called segments, by prepending the packet with an SR header. A segment can represent any instruction, topological or service-based. SR allows to enforce a flow through any topological path and service chain while maintaining per-flow state only at the ingress node of the SR domain.

IGP protocols have been extended to advertise the segments. Because of IGP's propagation scope limitation, it is not suited for IGP to signal paths that span across AS borders.



In order to fulfill the need for applications that require visibility of SR paths across IGP areas or even across ASes, this document defines extensions for the mechanism introduced in [I-D.dhodylee-pce-pcep-ls] to propagate SR information in those scenarios that have no IGP SR extension or BGP-LS running.

## 2. PCEP extensions for Segment Routing

PCEP-LS [I-D.dhodylee-pce-pcep-ls] introduces new message type and new object to accommodate link-state information in PCEP. This document defines new additional TLVs to map segment routing information. The value portion of these new TLVs can reuse the structure defined in [I-D.ietf-isis-segment-routing-extensions].

### 2.1. Node Attribute TLVs

Some new optional, non-transitive node attribute TLVs are defined for carrying segment routing information and are listed below:

TLV Code Point	Description	Length	Value defined
TBD1	SID/Label Binding	variable	[ISIS-SR]#section2.4
TBD2	SR-Capabilities	variable	[ISIS-SR]#section3.1
TBD3	SR-Algorithm	variable	[ISIS-SR]#section3.2

[ISIS-SR]: <https://datatracker.ietf.org/doc/draft-ietf-isis-segment-routing-extensions/>

Table 1: Node Attribute TLVs

### 2.2. Link Attribute TLVs

Some new optional, non-transitive link attribute TLVs are defined for carrying segment routing information and are listed below:

TLV Code Point	Description	Length	Value defined
TBD4	Adjacency Segment	variable	[ISIS-SR]#section2.2.1
TBD5	LAN Adjacency Segment	variable	[ISIS-SR]#section2.2.2
TBD6	Tunnel Segment	variable	



[ISIS-SR]: <https://datatracker.ietf.org/doc/draft-ietf-isis-segment-routing-extensions/>

Table 2: Link Attribute TLVs

### 2.3. Prefix Attribute TLVs

A new optional, non-transitive link attribute TLVs are defined for carrying segment routing information and are listed below:

TLV Code Point	Description	Length	Value defined
TBD7	Prefix Segment	variable	[ISIS-SR]#section2.1.2

[ISIS-SR]: <https://datatracker.ietf.org/doc/draft-ietf-isis-segment-routing-extensions/>

Table 3: Prefix Attribute TLVs

## 3. Operational Considerations

### 3.1. Segment Routing report

The procedure for segment routing information reporting from PCC to PCE will follow those defined in [I-D.dhodylee-pce-pcep-ls].

### 3.2. Tunnel Segment Identifier

Tunnel Segment introduced in [I-D.li-spring-tunnel-segment] is used to identify a tunnel of any kind in a segment routing network. It is originated by the tunnel ingress node and one SID is allocated and attached to it either locally or globally.

## 4. IANA Considerations

TBD.

## 5. Security Considerations

TBD.

## 6. Acknowledgements

TBD.



## **7. References**

### **7.1. Normative References**

- [I-D.dhodylee-pce-pcep-ls]  
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- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.

### **7.2. Informative References**

- [RFC5440] Vasseur, JP., Ed. and JL. Le Roux, Ed., "Path Computation Element (PCE) Communication Protocol (PCEP)", [RFC 5440](#), DOI 10.17487/RFC5440, March 2009, <<http://www.rfc-editor.org/info/rfc5440>>.

#### **Authors' Addresses**

Zhenbin Li  
Huawei Technologies  
Huawei Bld., No.156 Beiqing Rd.  
Beijing 100095  
China

Email: [lizhenbin@huawei.com](mailto:lizhenbin@huawei.com)



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Xia Chen  
Huawei Technologies  
Huawei Bld., No.156 Beiqing Rd.  
Beijing 100095  
China

Email: jescia.chenxia@huawei.com

Nan Wu  
Huawei Technologies  
Huawei Bld., No.156 Beiqing Rd.  
Beijing 100095  
China

Email: eric.wu@huawei.com

