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A. Raghuram  
A. Goddard  
C. Yadlapalli  
AT&T  
J. Karthik  
S. Sivabalan  
J. Parker  
Cisco Systems, Inc.  
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**Ability for a stateful PCE to request and obtain control of LSP**  
**draft-raghu-pce-lsp-control-request-00.txt**

Abstract

The stateful PCEP extensions provide stateful control of Multiprotocol Label Switching (MPLS) Traffic Engineering Label Switched Paths (TE LSP) via PCEP, for a model where a PCC delegates control over one or more locally configured LSPs to a stateful PCE. There are use-cases in which a stateful PCE may wish to request and obtain control of one or more LSPs from a PCC. This document describes a simple extension to stateful PCEP to achieve such objective.

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](#)].

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## [1.](#) Introduction

Stateful PCEP extensions [[I-D.ietf-pce-stateful-pce](#)] specifies a set of extensions to PCEP to enable stateful control of TE LSPs between and across PCEP sessions in compliance with [[RFC4657](#)]. It includes mechanisms to effect LSP state synchronization between PCCs and PCEs, delegation of control of LSPs to PCEs, and PCE control of timing and sequence of path computations within and across PCEP sessions. The stateful PCEP defines the following two useful network operations:

- o Delegation: an operation in which a PCC temporarily grants the rights to modify one or more LSPs to a PCE, and such LSPs are referred to as delegated LSPs.
- o Revocation: an operation in which a PCC revokes the previously granted rights to modify one or more LSPs from a PCE.

Some network operators prefer head-end (PCC) based reactivity to network events (e.g., link failure). For example, typically operators would like to reduce the time that backup LSP are being used for fast-reroute protection as the links that a backup LSP



traverses may be congested when fast-reroute is active. PCC based LSP failure detection and re-routing mechanisms enable operators to minimize the duration of such congestion and meet operational requirements/constraints. As such, during normal operations, it may be preferable for PCC to have full control of its LSPs. However, operators shall prefer to use PCE for planned events such as centralized optimization and placement of LSPs. In this case, it is preferable for a PCE to obtain the control of one or more LSPs from a PCC, rather than waiting for the PCC to delegate the control. Once the PCE completes its operation, it relinquishes the control of the LSPs. Such capability enables operators to combine the benefits of both centralized and distributed control of TE LSPs to get the best of both worlds.

This specification provides a simple extension using which a PCE can request control of one or more LSPs from any PCC over stateful PCEP channel. The procedures for granting and relinquishing control of the LSPs are specified in accordance with the specification [[I-D.ietf-pce-stateful-pce](#)].

## **2. Terminology**

The following terminologies are used in this document:

PCC: Path Computation Client.

PCE: Path Computation Element

PCEP: Path Computation Element Protocol.

PCRpt: PCEP report message.

PCUpd: PCEP update message.

PLSP-ID: A PCEP-specific identifier for the LSP.

## **3. LSP Control Request Flag**

The LSP object is defined in [[I-D.ietf-pce-stateful-pce](#)] and included here for ease of reference.



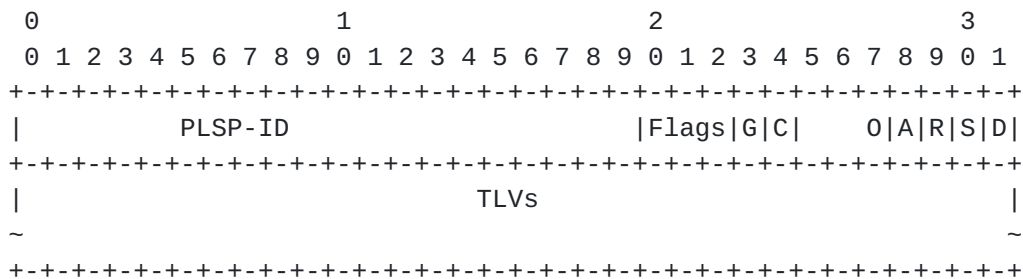


Figure 1: The LSP Object

A new flag, the "LSP Control Request Flag" (G), is introduced. On a PCUpd message, a PCE sets the G Flag to 1 to indicate that it wishes to gain control of LSP(s). A PLSP-ID of value other than 0 and 0xFFFF is used to identify the LSP for which the PCE requests control. The PLSP-ID value of 0 indicates that the PCE is requesting control of all LSPs originating from the PCC.

#### 4. Operation

During normal operation, a PCC that wishes to delegate the control of an LSP sets the D Flag to 1 in all PCRpt messages pertaining to the LSP. The PCE confirms the delegation by setting D Flag to 1 in all PCUpd messages pertaining to the LSP. The PCC revokes the control of the LSP from the PCE by setting D Flag to 0 in PCRpt messages pertaining to the LSP. If the PCE wishes to relinquish the control of the LSP, it sets D Flag to 0 in all PCUpd messages pertaining to the LSP.

If a PCE wishes to gain control over an LSP, it sends a PCUpd message with G Flag set to 1. The LSP for which the PCE requests control is identified by the PLSP-ID. The PLSP-ID of 0 indicates that the PCE wants control over all LSPs originating from the PCC. If the LSP(s) is/are already delegated to the PCE, the PCC ignores the G Flag. A PCC can decide to delegate the control of the LSP at its own discretion. If the PCC grants or denies the control, it sends PCRpt message with D Flag set to 1 and 0 respectively in accordance with according with stateful PCEP [[I-D.ietf-pce-stateful-pce](#)]. If the PCC does not grant the control, the PCE may choose to retry requesting the control preferably using exponentially increasing timer. A PCE ignores the G Flag on PCRpt message

In case multiple PCEs request control over an LSP, and if the PCC is willing to grant the control, the LSP MUST be delegated to only one PCE chosen by the PCC based on its local policy.



## **5. Security Considerations**

No additional security measure is required.

## **6. IANA Considerations**

None.

## **7. Acknowledgements**

TBD.

## **8. Normative References**

- [I-D.ietf-pce-stateful-pce]  
Crabbe, E., Minei, I., Medved, J., and R. Varga, "PCEP Extensions for Stateful PCE", [draft-ietf-pce-stateful-pce-14](#) (work in progress), March 2016.
- [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>>.
- [RFC4657] Ash, J., Ed. and J. Le Roux, Ed., "Path Computation Element (PCE) Communication Protocol Generic Requirements", [RFC 4657](#), DOI 10.17487/RFC4657, September 2006, <<http://www.rfc-editor.org/info/rfc4657>>.
- [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

Aswatnarayan Raghuram  
AT&T  
200 S Laurel Aevenue  
Middletown, NJ 07748  
USA

Email: ar2521@att.com





Al Goddard  
AT&T  
200 S Laurel Aevenue  
Middletown, NJ 07748  
USA

Email: ag6941@att.com

Chaitanya Yadlapalli  
AT&T  
200 S Laurel Aevenue  
Middletown, NJ 07748  
USA

Email: cy098d@att.com

Jay Karthik  
Cisco Systems, Inc.  
125 High Street  
Boston, Massachusetts 02110  
USA

Email: jakarthi@cisco.com

Siva Sivabalan  
Cisco Systems, Inc.  
2000 Innovation Drive  
Kanata, Ontario K2K 3E8  
Canada

Email: msiva@cisco.com

Jon Parker  
Cisco Systems, Inc.  
2000 Innovation Drive  
Kanata, Ontario K2K 3E8  
Canada

Email: jdparker@cisco.com

