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A. Farrel
Old Dog Consulting
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Updated Rules for Processing Stateful PCE Request Parameters Flags draft-farrel-pce-stateful-flags-03

Abstract

Extensions to the Path Computation Element Communication Protocol (PCEP) to support stateful Path Computation Elements (PCEs) are defined in [RFC 8231](#). One of the extensions is the Stateful PCE Request Parameters (SRP) object. That object includes a Flags field that is a set of 32 bit flags, and [RFC 8281](#) defines an IANA registry for tracking assigned flags. However, [RFC 8231](#) does not explain how an implementation should set unassigned flags in transmitted messages, nor how an implementation should process unassigned, unknown, or unsupported flags in received messages.

This document updates [RFC 8231](#) by defining the correct behaviors.

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Table of Contents

1.	Introduction	2
2.	Requirements Language	3
3.	Updated Procedures	3
4.	Compatibility Considerations	3
5.	Implementation Status	4
6.	Management Considerations	4
7.	Security Considerations	4
8.	IANA Considerations	4
9.	Acknowledgements	5
10.	References	5
10.1.	Normative References	5
10.2.	Informative References	5
	Author's Address	6

1. Introduction

[RFC5440] describes the Path Computation Element Communication Protocol (PCEP). PCEP defines the communication between a Path Computation Client (PCC) and a Path Computation Element (PCE), or between PCEs, enabling computation of Multiprotocol Label Switching (MPLS) for Traffic Engineering Label Switched Path (TE LSP) characteristics.

[RFC8231] specifies a set of extensions to PCEP to enable stateful control of LSPs within and across PCEP sessions in compliance with [RFC4657]. It includes mechanisms to effect Label Switched Path (LSP) State Synchronization between PCCs and PCEs, delegation of control over LSPs to PCEs, and PCE control of timing and sequence of path computations within and across PCEP sessions.

One of the extensions defined in [RFC8231] is the Stateful PCE Request Parameters (SRP) object. That object includes a Flags field that is a set of 32 bit flags, and [RFC 8281](#) defines an IANA registry for tracking assigned flags. However, [RFC 8231](#) does not explain how an implementation should set unassigned flags in transmitted messages, nor how an implementation should process unassigned or unknown flags in received messages.

Farrel

Expires May 3, 2020

[Page 2]

This document updates [RFC 8231](#) by defining the correct behaviors.

2. Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [BCP 14](#) [[RFC2119](#)] [[RFC8174](#)] when, and only when, they appear in all capitals, as shown here.

3. Updated Procedures

[Section 7.2 of \[RFC8231\]](#) defines the PCEP SRP object. It describes the flags field as:

Flags (32 bits): None defined yet.

This document updates that text as follows:

Flags (32 bits): This document does not define any flags. Unassigned flags MUST be set to zero on transmission and MUST be ignored on receipt. Implementations that do not understand any particular flag MUST ignore the flag.

4. Compatibility Considerations

While one of the main objectives of the changes made by this document is to enable backward compatibility, there remains an issue of compatibility between existing implementations of [RFC 8231](#) and implementations that are consistent with this document.

It should be noted that common behavior for flags fields is as described by the updated text presented in [Section 3](#). Thus, many implementations, lacking guidance from [RFC 8231](#), will still have implemented a consistent and future-proof approach. However, for completeness it is worth noting how behaviors might interact between implementations.

SRP objects generated by an implementation of this document will set all unknown flag bits to zero and will therefore cause no issues to an older implementation even if it inspects those bits. Similarly, an implementation of this document will not inspect any unknown flag bits and will therefore be unaffected by older implementations no matter how they set the flags.

There will remain an issue with compatibility between implementations of [RFC 8231](#) that might set any of the unassigned flags, and current (such as [[RFC8281](#)]) and future (such as

[[I-D.ietf-pce-lsp-control-request](#)]) specifications. That problem cannot be fixed in old implementations by any amount of documentation, and can only be handled for future specifications by obsoleting the Flags field and using a new technique. Fortunately, however, most implementations will have been constructed to set unused flags to zero which is consistent with the behavior described in this document.

5. Implementation Status

[NOTE TO RFC EDITOR: Please remove this section before publication as an RFC.]

While this document describes changes to [[RFC8231](#)] that are important for implementation, and while the document gives advice to implementations, there is nothing specific in this document to implement.

A private and unscientific poll of implementers of [RFC 8231](#) conducted by the author suggests that existing implementations already abide by the modification set out in this document.

6. Management Considerations

Implementations receiving set SRP flags that they do not recognize MAY log the fact. That could be helpful for diagnosing backward compatibility issues with future features that utilize those flags.

7. Security Considerations

[RFC8231] sets out security considerations for PCEP when used for communication with a stateful PCE. This document does not change those considerations.

However, by defining the expected behavior of implementations, this document may improve the stability of networks and thus reduce the attack surface.

8. IANA Considerations

IANA maintains a registry called the "Path Computation Element Protocol (PCEP) Numbers" registry with a subregistry called "SRP Object Flag Field". IANA is requested to update the Reference in that subregistry to include a reference to this document in addition to [[RFC8281](#)].

Farrel

Expires May 3, 2020

[Page 4]

9. Acknowledgements

Thanks to the authors of [[I-D.ietf-pce-lsp-control-request](#)] for exposing the need for this work. Thanks to Dhruv Dhody and Julien Meuric for discussing the solution. Additional thanks to Hariharan Ananthakrishnan for his Shepherd's review.

10. References

10.1. Normative References

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Author's Address

Adrian Farrel
Old Dog Consulting

Email: adrian@olddog.co.uk