Internet Engineering Task Force (IETF)
Request for Comments: 8356
Updates: 5440
Category: Standards Track
ISSN: 2070-1721

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March 2018

Experimental Codepoint Allocation for the Path Computation Element Communication Protocol (PCEP)

Abstract

IANA assigns values to the Path Computation Element Communication Protocol (PCEP) parameters (messages, objects, TLVs). IANA established a top-level registry to contain all PCEP codepoints and sub-registries. This top-level registry contains sub-registries for PCEP message, object, and TLV types. The allocation policy for each of these sub-registries is IETF Review.

This document updates RFC 5440 by changing the allocation policies for these three registries to mark some of the codepoints as assigned for Experimental Use.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 7841.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at https://www.rfc-editor.org/info/rfc8356.

Table of Contents

1. Introduction

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

Further, in order to support use cases described in [RFC8051], [RFC8231] specifies a set of extensions to PCEP to enable stateful control of MPLS-TE and GMPLS LSPs via PCEP. [RFC8281] describes the setup, maintenance, and teardown of PCE-initiated LSPs under the stateful PCE model.

In Section 9 of [RFC5440], IANA assigns values to the PCEP protocol parameters (messages, objects, TLVs). IANA established a top-level registry to contain all PCEP codepoints and sub-registries. This top-level registry contains sub-registries for PCEP message, object and TLV types. The allocation policy for each of these sub-registries is IETF Review [RFC8126]. Also, early allocation [RFC7120] provides some latitude for allocation of these codepoints but is reserved for features that are considered appropriately stable.

Recently, there have been rapid advancements in PCE technology, which has created an enhanced need to experiment with PCEP. It is often necessary to use some sort of number or constant in order to actually test or experiment with the new function, even when testing in a closed environment. In order to run experiments, it is important that the value not collide with existing codepoints or any future allocations.

This document updates [RFC5440] by changing the allocation policies for these three registries to mark some of the codepoints as assigned for Experimental Use. As stated in [RFC3692], experiments using these codepoints are not intended to be used in general deployments, and due care must be taken to ensure that two experiments using the same codepoints are not run in the same environment. See [RFC3692] for further discussion of the use of experimental codepoints (also referred to as "experimental and testing numbers").

2. Experimental PCEP Messages

PCEP message types are in the range 0 to 255. This document sets aside message types 252-255 for experimentation as described in Section 6.1.

3. Experimental PCEP Objects

PCEP objects are identified by values in the range 0 to 255. This document sets aside object identifiers 248-255 for experimentation as described in Section 6.2.

4. Experimental PCEP TLVs

PCEP TLV type codes are in the range 0 to 65535. This document sets aside object identifiers 65504-65535 for experimentation as described in Section 6.2.

5. Handling of Unknown Experimentation

A PCEP implementation that receives an experimental PCEP message that it does not recognize reacts by sending a PCErr message with Error-Type=2 (capability not supported) per Section 6.9 of [RFC5440].

If a PCEP speaker does not understand or support an experimental object, then the way it handles this situation depends on the message type. For example, a PCE handles an unknown object in the Path Computation Request (PCReq) message according to the rules of [RFC5440]. Message-specific behavior may be specified (e.g., [RFC8231] defines rules for a PCC to handle an unknown object in a Path Computation LSP Update Request (PCUpd) message).

As per Section 7.1 of [RFC5440], an unknown experimental PCEP TLV would be ignored.

6. IANA Considerations

IANA maintains the "Path Computation Element Protocol (PCEP) Numbers" registry at <http://www.iana.org/assignments/pcep>.

6.1. PCEP Messages

Within the PCEP Numbers registry, IANA maintains the "PCEP Messages" sub-registry.

IANA has changed the registration procedure for this registry to read as follows:

0-251	IETF Review
252-255	Experimental Use

IANA has also marked the values 252-255 in the registry accordingly.

6.2. PCEP Objects

Within the PCEP Numbers registry, IANA maintains the "PCEP Objects" sub-registry.

IANA has changed the registration procedure for this registry to read as follows:

```
0-247   IETF Review
248-255 Experimental Use
```

IANA has also marked the values 248-255 in the registry accordingly, and Object-Types 0-15 have been marked for Experimental Use.

6.3. PCEP TLVs

Within the PCEP Numbers registry, IANA maintains the "PCEP TLV Type Indicators" sub-registry.

IANA has changed the registration procedure for this registry to read as follows:

```
0-65503     IETF Review
65504-65535 Experimental Use
```

IANA has also marked the values 65504-65535 in the registry accordingly.

7. Security Considerations

This document does not introduce any new security considerations to the existing protocol. Refer to [RFC5440] for further details of the specific security measures.

[RFC3692] asserts that the existence of experimental codepoints introduce no new security considerations. However, implementations accepting experimental codepoints need to take care in how they parse and process the messages, objects, and TLVs in case they come, accidentally, from another experiment. Further, an implementation accepting experimental codepoints needs to consider the security aspects of the experimental extensions. [RFC6709] provides various design considerations for protocol extensions (including those designated as experimental).

8. References

8.1. Normative References

[RFC3692] Narten, T., "Assigning Experimental and Testing Numbers Considered Useful", BCP 82, RFC 3692, DOI 10.17487/RFC3692, January 2004, <https://www.rfc-editor.org/info/rfc3692>.

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

[RFC8126] Cotton, M., Leiba, B., and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 8126, DOI 10.17487/RFC8126, June 2017, <https://www.rfc-editor.org/info/rfc8126>.

[RFC8231] Crabbe, E., Minei, I., Medved, J., and R. Varga, "Path Computation Element Communication Protocol (PCEP) Extensions for Stateful PCE", RFC 8231, DOI 10.17487/RFC8231, September 2017, <https://www.rfc-editor.org/info/rfc8231>.

[RFC8281] Crabbe, E., Minei, I., Sivabalan, S., and R. Varga, "Path Computation Element Communication Protocol (PCEP) Extensions for PCE-Initiated LSP Setup in a Stateful PCE Model", RFC 8281, DOI 10.17487/RFC8281, December 2017, <https://www.rfc-editor.org/info/rfc8281>.

8.2. Informative References

[RFC6709] Carpenter, B., Aboba, B., Ed., and S. Cheshire, "Design Considerations for Protocol Extensions", RFC 6709, DOI 10.17487/RFC6709, September 2012, <https://www.rfc-editor.org/info/rfc6709>.

[RFC7120] Cotton, M., "Early IANA Allocation of Standards Track Code Points", BCP 100, RFC 7120, DOI 10.17487/RFC7120, January 2014, <https://www.rfc-editor.org/info/rfc7120>.

[RFC8051] Zhang, X., Ed. and I. Minei, Ed., "Applicability of a Stateful Path Computation Element (PCE)", RFC 8051, DOI 10.17487/RFC8051, January 2017, <https://www.rfc-editor.org/info/rfc8051>.

Appendix A. Other PCEP Registries

Based on feedback from the PCE WG, it was decided to allocate an Experimental codepoint range only in the message, object, and TLV sub-registries. The justification for this decision is that, if an experiment finds that it wants to use a new codepoint in another PCEP sub-registry, it can implement the same function using a new experimental object or TLV instead.

Acknowledgments

The authors would like to thank Ramon Casellas, Jeff Tantsura, Julien Meuric, Lou Berger, Michael Shroff, and Andrew Dolganow for their feedback and suggestions.

We would like to thank Jonathan Hardwick for shepherding this document and providing comments with text suggestions.

Thanks to Brian Carpenter for the GENART review. Thanks to Ben Niven-Jenkins and Scott Bradner for RTGDIR and OPSDIR reviews respectively.

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