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Path Computation Element communication Protocol extension for Associated
ECMP

[draft-chen-pce-association-ecmp-01](#)

Abstract

[[I-D.ietf-pce-association-group](#)] introduces and explains a generic mechanism to create a grouping of LSPs. The grouping can then be used to define associations between a set of LSPs and/or a set of attributes (such as configuration parameters or behaviours) and is equally applicable to the active and passive modes of a stateful PCE [[I-D.ietf-pce-stateful-pce](#)] as well as a stateless PCE [[RFC5440](#)].

This document specifies a PCEP extension to bind one or more LSPs into an ECMP Associated Group.

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[1.](#) Introduction

[[I-D.ietf-pce-association-group](#)] introduces and explains a generic mechanism to create a grouping of LSPs. The grouping can then be used to define associations between a set of LSPs and/or a set of attributes (such as configuration parameters or behaviours) and is equally applicable to the active and passive modes of a stateful PCE [[I-D.ietf-pce-stateful-pce](#)] as well as a stateless PCE [[RFC5440](#)].

This document specifies a PCEP extension to bind one or more LSPs into an ECMP Associated Group.

[2.](#) Conventions used in this document

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](#).

[3.](#) Overview

As shown in Figure 1, assume that paths AHE, ABCDE, and ABGE all have the same path cost. The three paths can be associated to form an associated ECMP Associated Group.

Note: The LSPs can also be binded into an ECMP Associated Group that satisfies the set of required constraints (i.g. bandwidth constraint, delay constraint). The LSPs should originate from the same head-end(s) and terminate at the same or different tail-end(s).

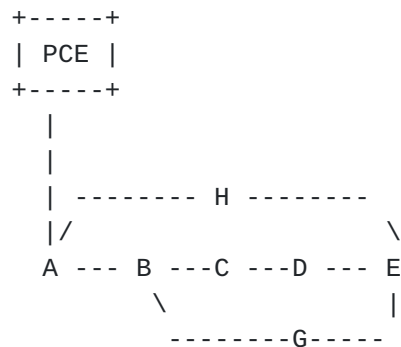


Figure 1

4. Protocol extension

4.1. Association Object

As per [[I-D.ietf-pce-association-group](#)], LSPs are associated by adding them to a common association group.

Based on the generic Association object, this document defines two new Association types as follows:

- o Association Type = TBD1, Per-packet ECMP Association
- o Association Type = TBD2, Per-flow ECMP Association

4.2. Per-packet ECMP Association TLV

The Per-packet ECMP Association TLV is an optional TLV for use with the Per-packet ECMP Association Type.

The following the Per-packet ECMP Association TLV is defined:

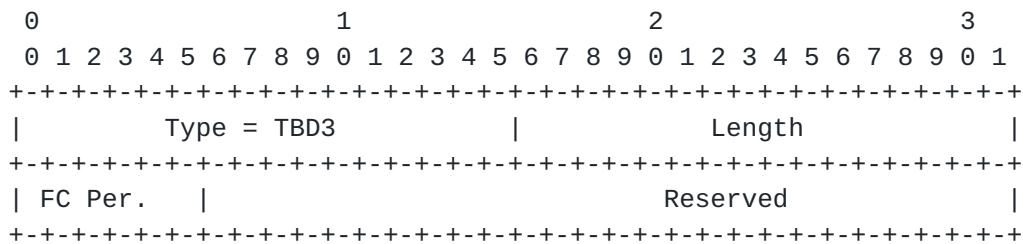


Figure 2

Type: TBD3, to be assigned by IANA.

Length: 2 octets.

FC Per.: Percentage of the traffic that carried by the LSP.

The Per-packet ECMP Association TLV MUST NOT be present more than once. If it appears more than once, first one MUST be used and subsequent ones MUST be ignored.

4.3. Per-flow ECMP Association TLV

The Per-flow ECMP Association TLV is an optional TLV for use with the Per-flow ECMP Association Type.

The following the Per-flow ECMP Association TLV is defined:

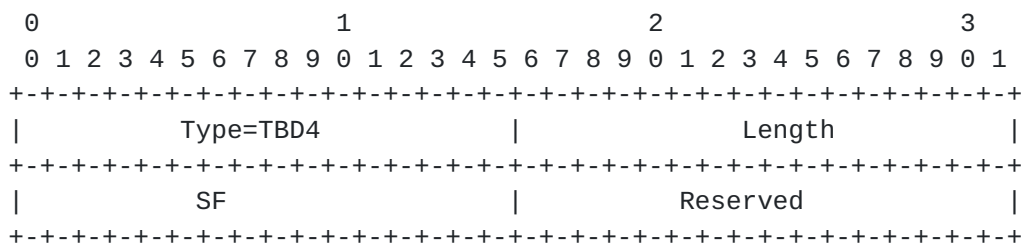


Figure 3

Type: TBD4, to be assigned by IANA.

Length: 2 octets.

SF: 2 octets, the route selected factor for load balance. The following is the route selected factor that recommended.


```

0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 .....in_port
0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0.....src_mac
0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 .....dst_mac
0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0.....eth_type
0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 .....vlan_id
0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0.....label
0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 .....ip_dscp
0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0.....src_ip
0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 .....dst_ip
0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0.....ip_proto
0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0.....src_port
0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 .....dst_port

```

5. Security Considerations

This document defines two new Association Types for the Association Object, which do not introduce no additional security concerns beyond those discussed in [\[RFC5440\]](#), [\[I-D.ietf-pce-association-group\]](#) and [\[I-D.ietf-pce-stateful-pce\]](#).

6. IANA Considerations

6.1. Association Types

This document defines the following Association Types for the Association Object defined in [\[I-D.ietf-pce-association-group\]](#).

Value Name	Reference
TBD1 Per-packet ECMP Association	[This I.D.]
TBD2 Per-flow ECMP Association	[This I.D.]

6.2. Per-packet ECMP Association TLV

This document defines a new TLV for the Per-packet ECMP Association Type as follows:

TLV Type	Value	TLV Name	Reference
TBD3		Per-packet ECMP Association TLV	This document

6.3. Per-flow ECMP Association Type

This document defines a new TLV for the Per-flow ECMP Association Type as follows:

TLV Type	Value	TLV Name	Reference
TBD4		Per-flow ECMP Association TLV	This document

7. Acknowledgements

TBD.

8. Normative references

[I-D.ietf-pce-association-group]

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[I-D.ietf-pce-stateful-pce]

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- [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>>.

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