PCEP Extensions for Bidirectional Forwarding Detection

draft-li-pce-bfd-00

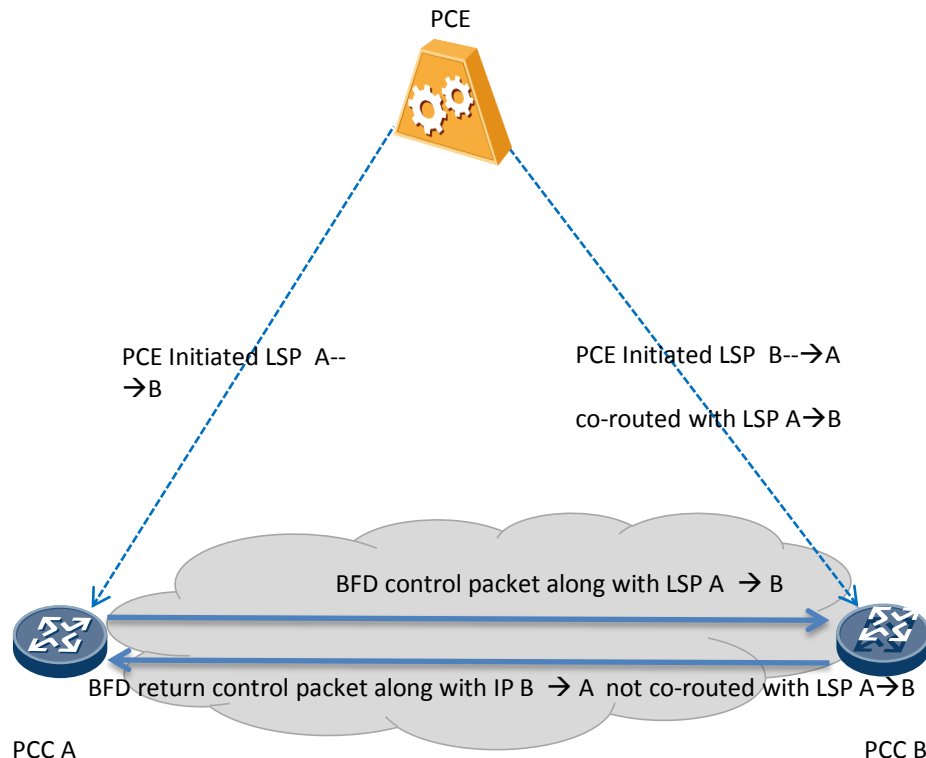Zhenbin Li, Huawei
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IETF 95, Buenos Aires, Argentina

Introduction

- This document describes the extensions to the PCEP to notify BFD parameters for LSPs from PCE to PCC for PCE-initiated LSP.

- The extensions include:

  - PCE notify BFD protocol parameters
  - Allow PCC to support BFD for PCE-Initiated LSP whose BFD session is a bi-directional co- routed channel.

Requirement

- BFD session for the PCE-initiated LSP is created dynamically. The return path is implicitly the shortest path. Such BFD session whose forward and reverse paths are possibly not co-routed. This may lead to the false failure deduction.

- It requires BFD session for the PCE-initiated LSP is a bi-directional co-routed channel.

PCE

PCE Initiated LSP A--→B

PCE Initiated LSP B--→A

co-routed with LSP A→B

BFD control packet along with LSP A → B

BFD return control packet along with IP B → A not co-routed with LSP A→B
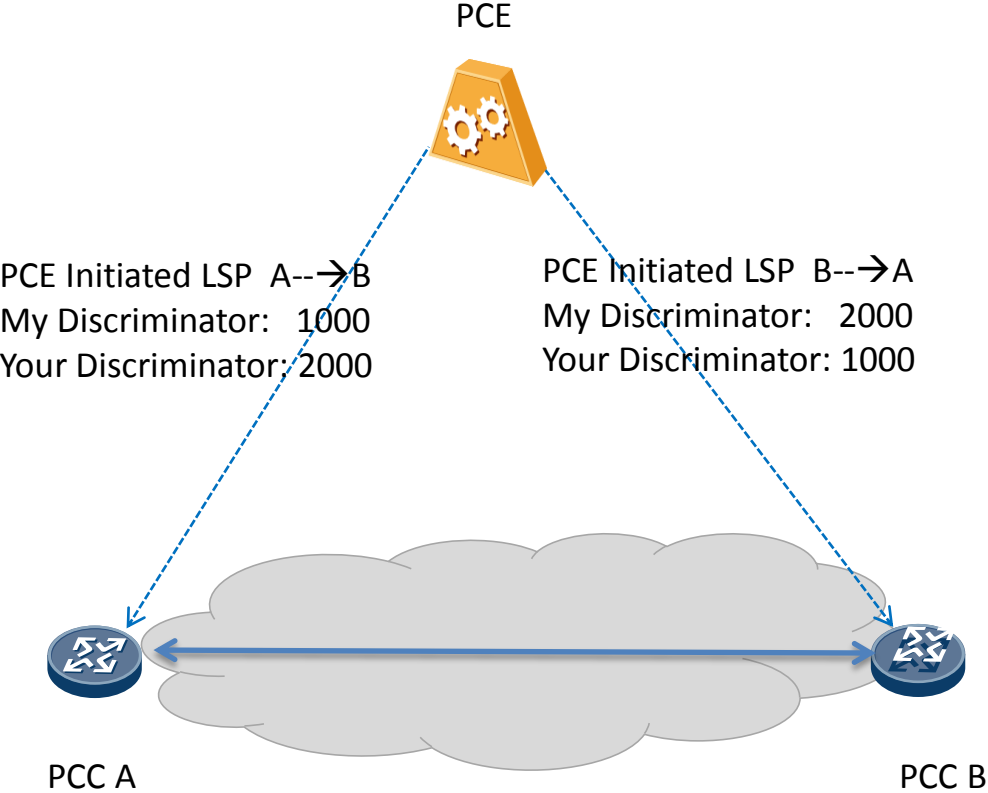
PCC A

PCC B

Requirement

- The BFD protocol parameters such as detection time multiplier, desired Min TX Interval, required Min RX Interval for PCE-initiated LSP can come from the public template or global configuration on PCC. All the LSPs can share the same BFD parameters.

- Sometimes it is necessary to adjust BFD parameters for special PCE-initiated LSP .

Building Bi-directional Co-routed BFD Session

Two methods:

- Building BFD session without LSP Ping
- Building BFD session with LSP Ping

Building BFD session without LSP Ping

PCE

PCE Initiated LSP A--→B
My Discriminator: 1000
Your Discriminator: 2000

PCE Initiated LSP B--→A
My Discriminator: 2000
Your Discriminator: 1000

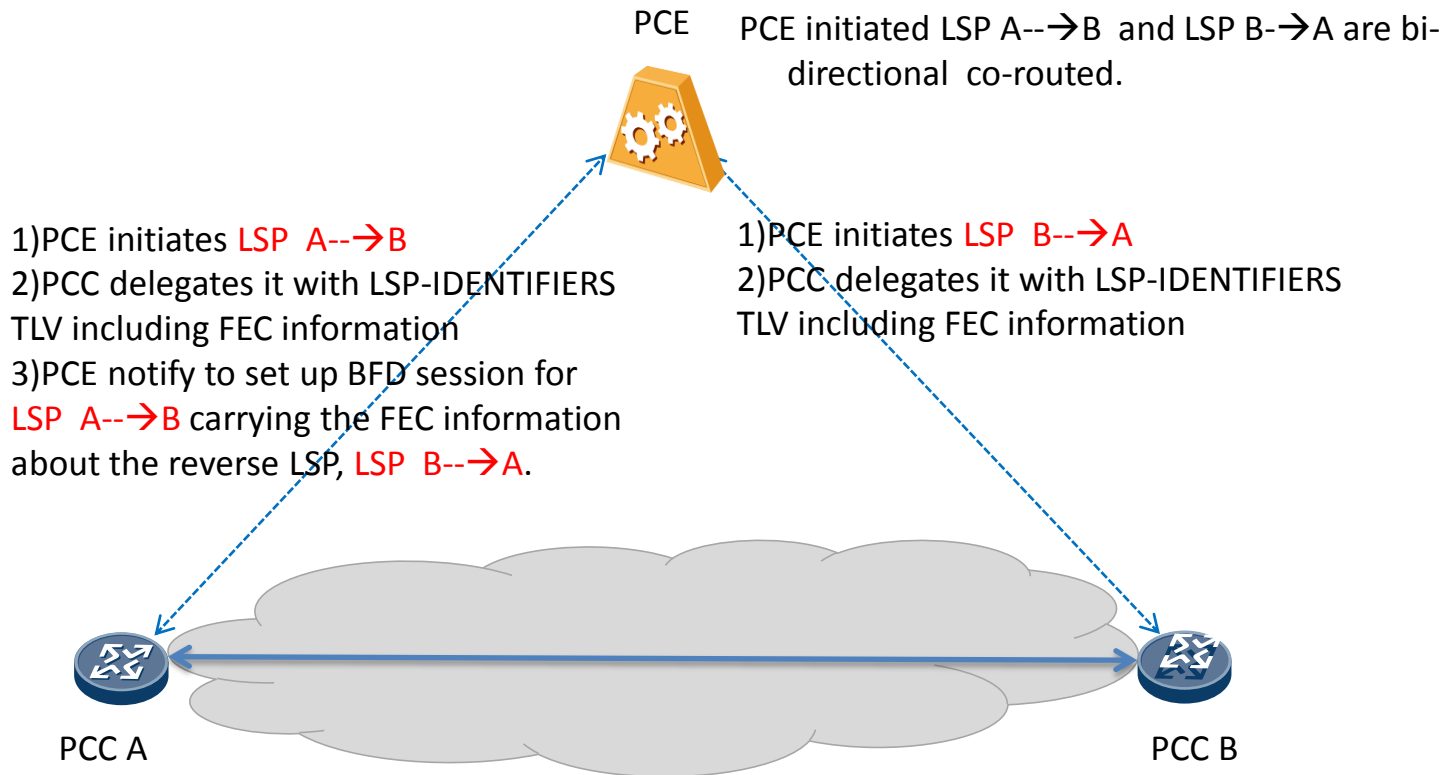1) PCE initiates LSP A--→B and LSP B-→A which are bi-directional co-routed.
2) PCE allocate the pair of discriminators for the bi-directional co-routed LSPs.

BTW: How to guarantee the discriminators allocated by PCE and PCC are not the same is out of scope of this document.

PCC A

PCC B

BFD session for LSP A-→B is bi-directional co-routed channel.

The same BFD session is set up not only for LSP A→B but also LSP B→A.

Building BFD session with LSP Ping

PCE

PCE initiated LSP A--→B and LSP B-→A are bi-directional co-routed.

1)PCE initiates LSP A--→B
2)PCC delegates it with LSP-IDENTIFIERS TLV including FEC information
3)PCE notify to set up BFD session for LSP A--→B carrying the FEC information about the reverse LSP, LSP B--→A.

1)PCE initiates LSP B--→A
2)PCC delegates it with LSP-IDENTIFIERS TLV including FEC information

PCC A

PCC B

The procedure defined in draft-ietf-mpls-bfd-directed-02:
1)A send LSP Ping with BFD Reverse Path TLV carrying the FEC information about the reverse LSP, LSP B--→A.
2)BFD session for LSP A-→B is bi-directional co-routed channel.

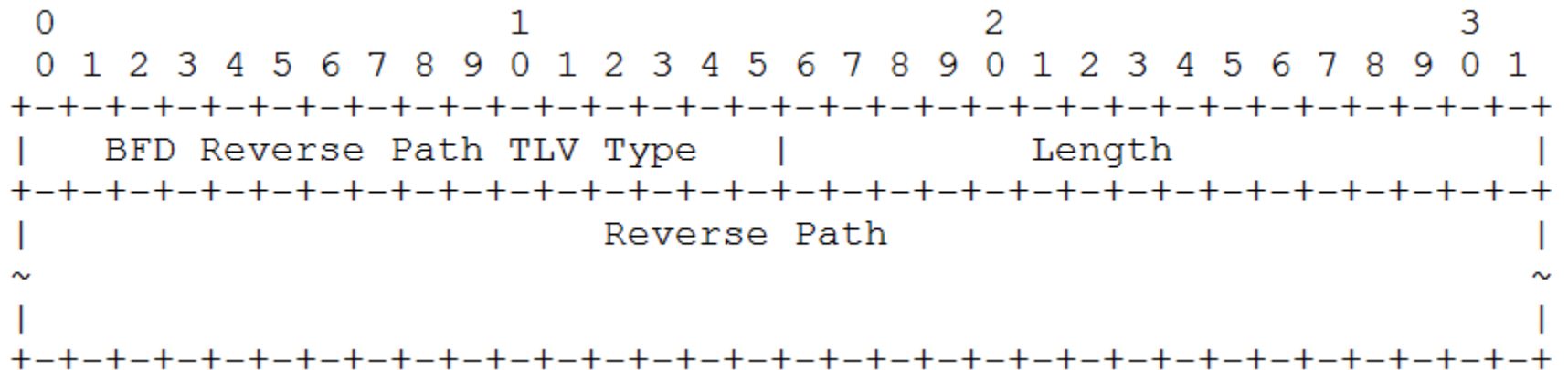BTW: Two BFD sessions are set up for LSP A--→B and LSP B-→A independently.

TLVs of PCEP Extensions for BFD

- BFD Reverse Path TLV

  - Provides BFD parameters used to indicate the reverse path for BFD session.

- BFD Generic TLV

  - Provides BFD generic parameters of BFD session

- BFD Authentication TLV

  - Provides BFD authentication parameters of BFD session.

BFD Reverse Path TLV

- Optionally included in the LSPA Object with PCUpd message

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    BFD Reverse Path TLV Type     |            Length           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          Reverse Path                          |
~                                                               ~
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Here reverse Path refers to Reverse Path defined in BFD Reverse Path TLV in draft-ietf-mpls-bfd-directed-02.
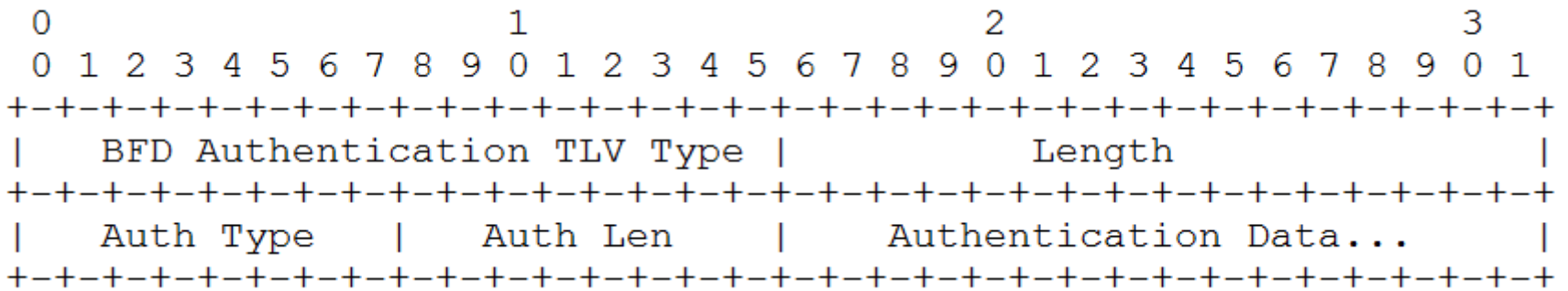
BFD Generic TLV

- Optionally included in the LSPA Object with PCInitiate or PCUpd message

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     BFD Generic TLV Type          |            Length          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Detect Mult  |                 Reserved                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                     My Discriminator                          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                    Your Discriminator                         |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Desired Min TX Interval                     |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                   Required Min RX Interval                    |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                 Required Min Echo RX Interval                 |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
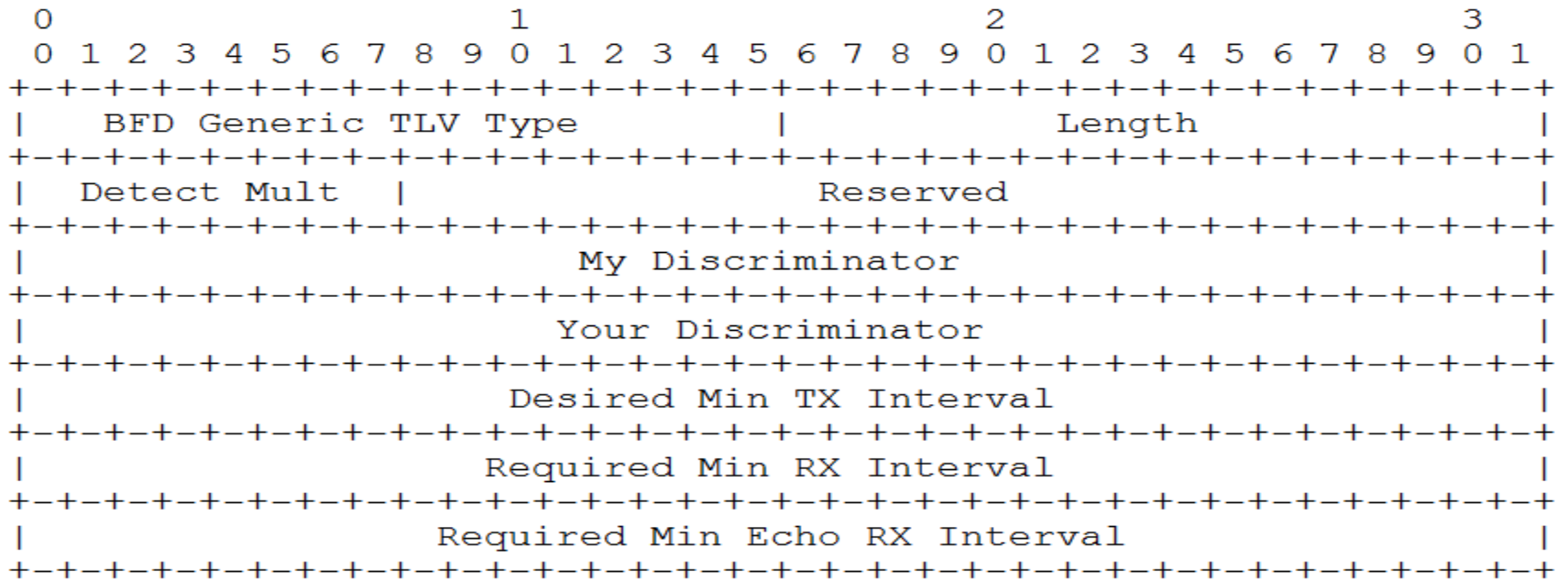
- Used to notify the BFD parameters for special LSP
- Used to notify the PCE allocated discriminator

BFD Authentication TLV

- Optionally included in the LSPA Object with PCInitiate or PCUpd message

```
 0                   1                   2                   3
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    BFD Authentication TLV Type |              Length           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|    Auth Type     |   Auth Len    |    Authentication Data...   |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Used to notify the BFD authentication parameters for special LSP

Next Steps

- Solicit comments.
- Revise the draft.