

PCEP Procedures and Extension for VLAN-based Traffic Forwarding

[\[draft-wang-pce-vlan-based-traffic-forwarding\]](#)

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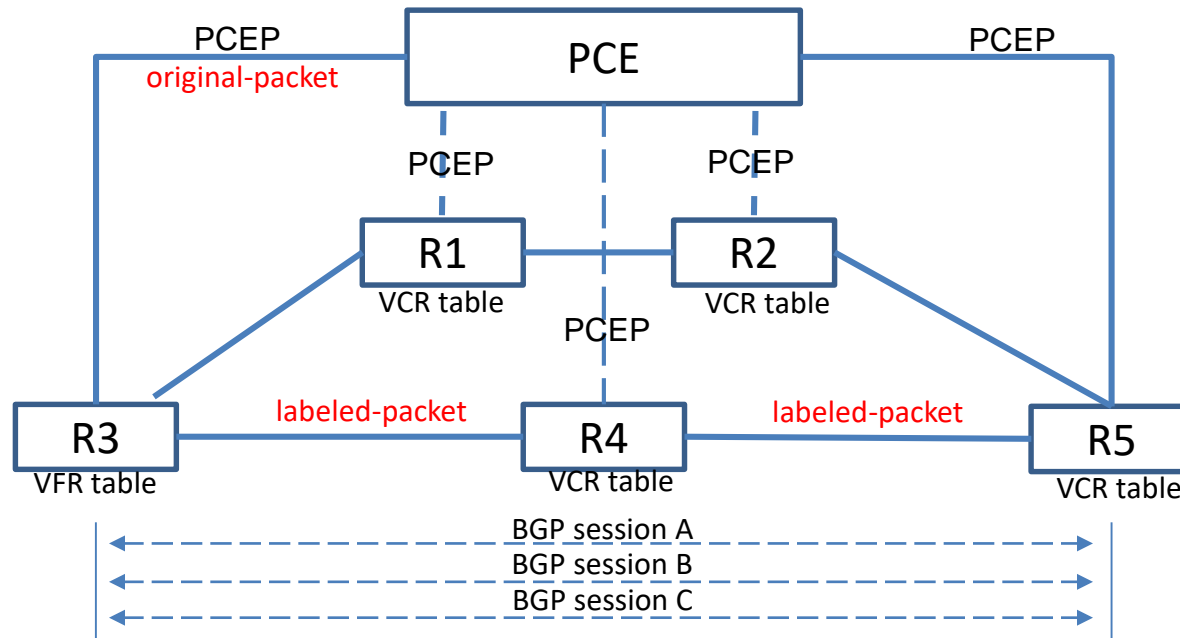
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Motivation

- Draft-ietf-pce-pcep-extension-native-ip describes the PCEP extensions and procedures to practically build a PCE-based central control mechanism.
- With the large scale deployment of Ethernet interface, it is possible to use the info contained in the Layer2 frame to simplify the E2E packet forwarding procedure.
- This document defines PCEP extension for VLAN-based traffic forwarding in native IP network and describes the processes of the data packet forwarding system based on VLAN info.
- This mechanism uses a completely new address space and is suitable for ipv4 and ipv6 networks and can leverage the existing PCE technologies as much as possible.

Procedures for VLAN-based Traffic Forwarding



1. The PCE calculates the explicit route and sends the route information to the PCCs through PCInitiate messages.
2. The ingress PCC forms a VLAN-Forwarding routing(VFR) table, the transit PCC and the egress PCC forms a VLAN-Crossing routing(VCR) table.
3. The packet to be guaranteed matches the table and then be labeled with corresponding VLAN tag.
4. The labeled packet will be further sent to the PCC's specific subinterface identified by the VLAN tag and then be forwarded.

Capability Advertisement

- RFC8408 defines the Path Setup Type Capability TLV to indicate the path type supported by the PCE and PCC

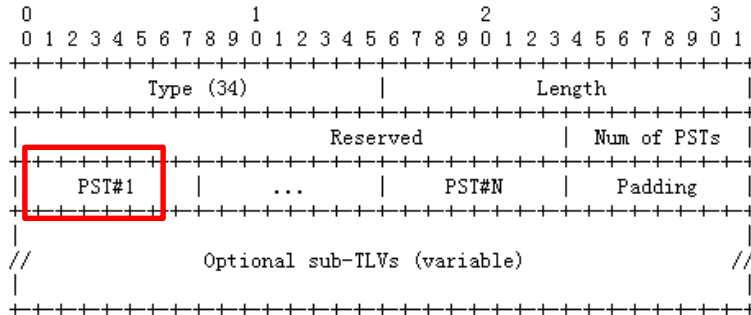


Figure 1: PATH-SETUP-TYPE-CAPABILITY TLV

- New PST(TBD) is defined for VLAN-based traffic forwarding

- Draft-ietf-pce-pcep-extension-native-ip describes the PCECC capability sub-TLV to indicate the capability for TE in Native IP network.

- V (VLAN-based-forwarding-CAPABILITY - 1 bit - TBD2) is defined to indicate the PCEP speaker's capability of VLAN based traffic

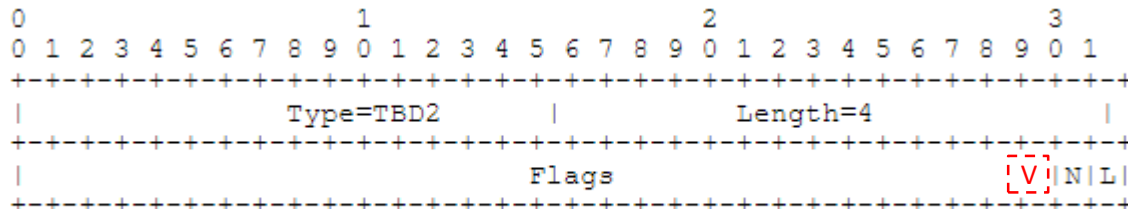


Figure 1: PCECC Capability sub-TLV

Updated PCEP Messages

```
<PCInitiate Message> ::= <Common Header>
                           <PCE-initiated-lsp-list>

Where:
  <Common Header> is defined in [RFC5440]

  <PCE-initiated-lsp-list> ::= <PCE-initiated-lsp-request>
                               [<PCE-initiated-lsp-list>]

  <PCE-initiated-lsp-request> ::=
    (<PCE-initiated-lsp-instantiation>|
     <PCE-initiated-lsp-deletion>|
     <PCE-initiated-lsp-central-control>)

  <PCE-initiated-lsp-central-control> ::= <SRP>
                                          <LSP>
                                          <cci-list>|
                                          ((<BPI>|<PPA>))
                                          <new-CCI>

  <cci-list> ::= <new-CCI>
                [<cci-list>]
```

Where:

<cci-list> is as per [I-D.ietf-pce-pcep-extension-for-pce-controller].
<PCE-initiated-lsp-instantiation> and
<PCE-initiated-lsp-deletion> are as per [RFC8281].
<BPI> and <PPA> are as per [draft-ietf-pce-pcep-extension-native-ip-09]

```
<PCRpt Message> ::= <Common Header>
                     <state-report-list>

Where:
  <state-report-list> ::= <state-report> [<state-report-list>]

  <state-report> ::= (<lsp-state-report>|
                    <central-control-report>)

  <lsp-state-report> ::= [<SRP>]
                        <LSP>
                        <path>

  <central-control-report> ::= [<SRP>]
                               <LSP>
                               <cci-list>|
                               ((<BPI>|<PPA>))
                               <new-CCI>
```

Where:

<path> is as per [RFC8231] and the LSP and SRP object are also defined in [RFC8231].
<BPI> and <PPA> are as per [draft-ietf-pce-pcep-extension-native-ip-09]

- When PCInitiate message is used to create VLAN-based forwarding instructions, the SRP, LSP and CCI objects MUST be present.
- Only one of BPI, PPA or one type of CCI objects MUST be present.

New PCEP Objects(2/2)

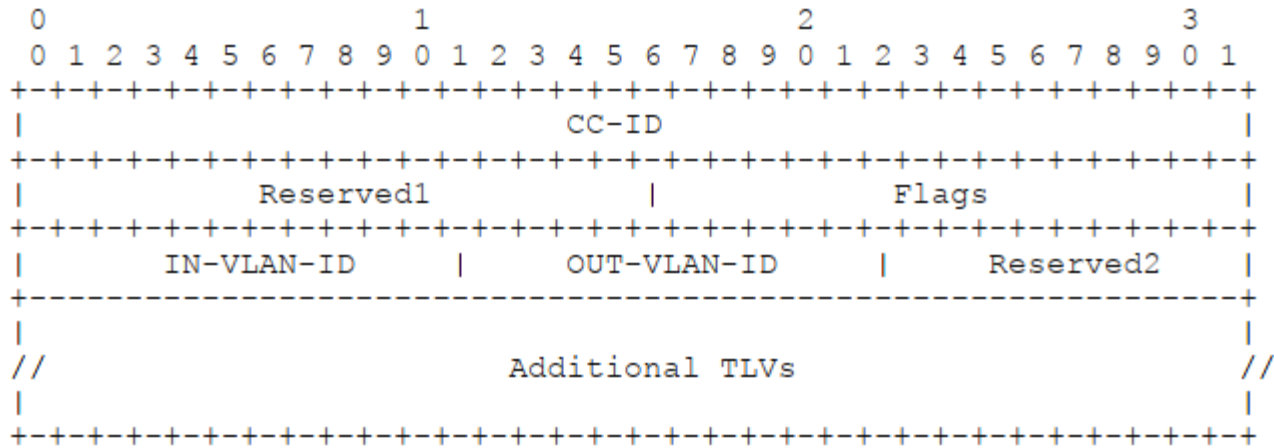


Figure 6: VLAN Crossing CCI Object

- IN-VLAN ID(12 bits): The ID of the VLAN forwarding path which is used to identify the traffic that needs to be protected.
- OUT-VLAN ID(12 bits):The ID of the VLAN forwarding path that the PCC will set up on its logical subinterface in order to transfer the packet labeled with this VLAN ID to the specific hop.
 - transit PCC - the value must not be 0.
 - egress PCC - the value must be 0.

VLAN-Based crossing info Advertisement Procedures

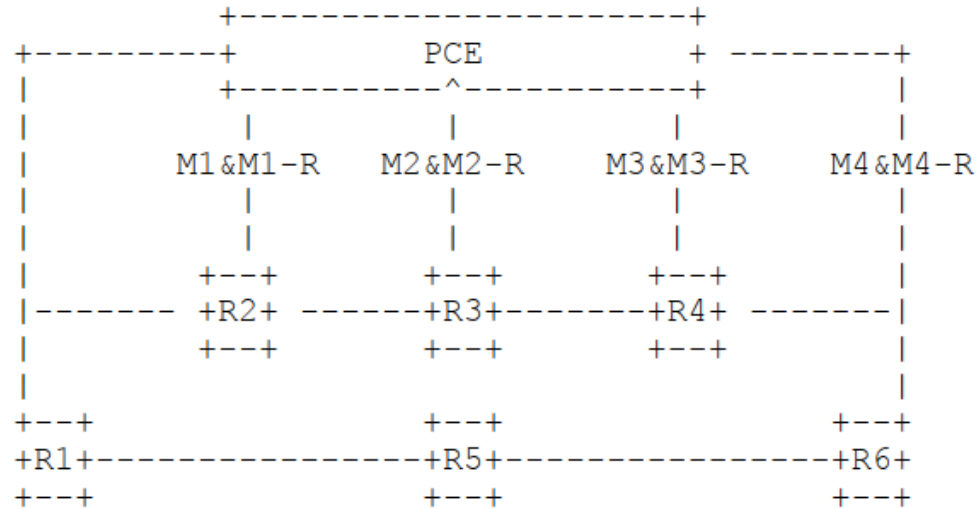


Figure 4: VLAN-Based crossing info Advertisement Procedures for transit PCC and egress PCC

Table 2: Message Information

No.	Peers	Type	Message Key Parameters
M1	PCE/R2	PCInitiate	CC-ID=X1
M1-R		PCRpt	VLAN crossing CCI Object (IN_VLAN_ID=VLAN_R1_R2,OUT_VLAN_ID=VLAN_R2_R3)
M2	PCE/R3	PCInitiate	CC-ID=X1
M2-R		PCRpt	VLAN crossing CCI Object (IN_VLAN_ID=VLAN_R2_R3,OUT_VLAN_ID=VLAN_R3_R4)
M3	PCE/R4	PCInitiate	CC-ID=X1
M3-R		PCRpt	VLAN crossing CCI Object (IN_VLAN_ID=VLAN_R3_R4,OUT_VLAN_ID=VLAN_R4_R6)
M4	PCE/R6	PCInitiate	CC-ID=X1
M4-R		PCRpt	VLAN crossing CCI Object (IN_VLAN_ID=VLAN_R4_R6,OUT_VLAN_ID=0)

Next Step

- Comments

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