IGP extension for PCEP security capability support in the PCE discovery

draft-wu-pce-discovery-pceps-support

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IGP extension for Discovery of PCE with TLS support

- Objective
  - Proposes new capability flag bits for PCE-CAP-FLAGS sub-TLV that can be announced as attributes in the IGP advertisement to distribute PCEP security support information.
    - E.g., PCE with TLS support
    - PCE with TCP-MD5 support
    - PCE with TCP-AO support
  - PCE-CAP-FLAGS sub- TLV is defined in [RFC5088] and [RFC5089] to advertise PCE capability.
- Motivation
  - draft-ietf-pce-pceps-00 describes using TLS to enhance PCEP security. This requires that both PCC and PCE server should support TLS
  - Before connecting to a PCE server with TLS support, PCC needs to know which PCE server supports TLS.
  - The current PCE discovery protocol define in [RFC5088] and [RFC5089] doesn’t provide such capability
  - without using discovery, it leads to unexpected failure or additional message exchange is needed to indicate error to PCC using PCErr message.

With Discovery

- * With discovery - PCE requiring TLS
  - PCC uses discovery to know it needs to use TLS to connect to the desired PCE
  - PCC initiates TCP connection and TLS handshake
  - PCEP exchange within TLS context
- * With discovery – PCE not requiring TLS
  - PCC uses discovery to know it needs not to use TLS to connect to the desired PCE
  - PCC initiates TCP connection
  - PCEP exchange over TCP

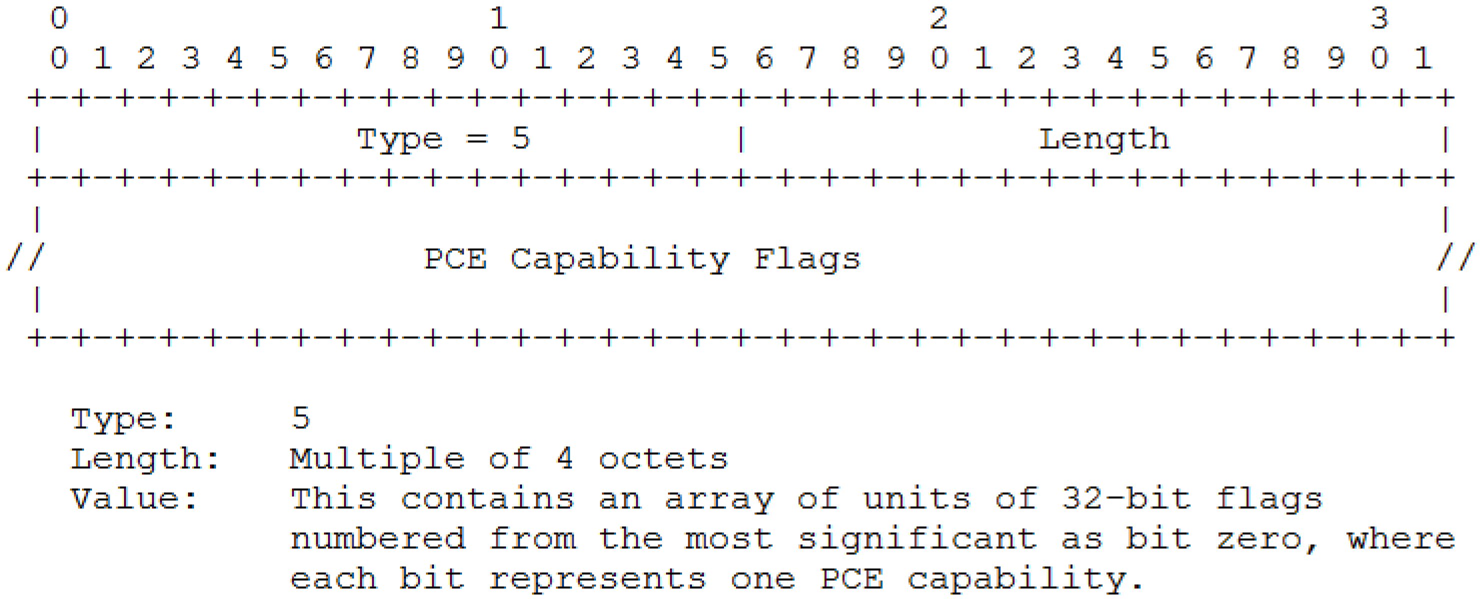
Without Discovery

- * Without discovery - PCE requiring TLS
  - 1.- PCC initiates TCP connection and TLS handshake
  - 2.- PCEP exchange within TLS context
- ---
  - 1.- PCC initiates TCP connection and attempts a PCEP OPEN message
  - 2.- PCE rejects the message with a PCErr message (Error-Type=1, Error-value=3, TLV identifying the need for TLS)
  - (optionally)
  - 3.- PCC initiates TCP connection and TLS handshake
  - 4.- PCEP exchange within TLS context

- * Without discovery - PCE not requiring TLS
  - 1.- PCC initiates TCP connection
  - 2.- PCEP exchange over TCP
- ---
  - 1.- PCC initiates TCP connection and TLS handshake
  - 2.- No TLS context established with PCE or error message received
  - (optionally)
  - 3.- PCC initiates TCP connection
  - 4.- PCEP exchange over TCP

New flag bits in PCE-CAP-FLAGS sub- TLV

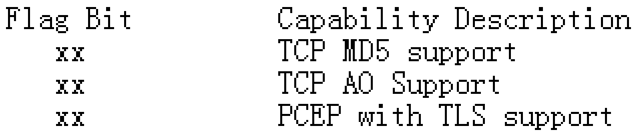
- PCEP-CAP-FLAGS Sub-TLV format



```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|               Type = 5        |              Length           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                                                               |
//                   PCE Capability Flags                      //
|                                                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+

  Type:      5
  Length:    Multiple of 4 octets
  Value:     This contains an array of units of 32-bit flags
             numbered from the most significant as bit zero, where
             each bit represents one PCE capability.
```

In the PCE capability Flags field, we add three new flag bits as follows:



Flag Bit	Capability Description
xx	TCP MD5 support
xx	TCP AO Support
xx	PCEP with TLS support