PCEP Extensions for Segment Routing

draft-ietf-pce-segment-routing-01.txt

IETF 92

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Segment Routing Background

- Segment Routing (SR) enables a head-end node to select path for traffic without using signaling protocol (e.g., RSVP-TE).

- Operates with any data-plane (including MPLS) that support forwarding operation based on a list of Segment Identifiers (SID)

- A SR path can be derived manually or more intelligently via Stateful/Stateless PCE.
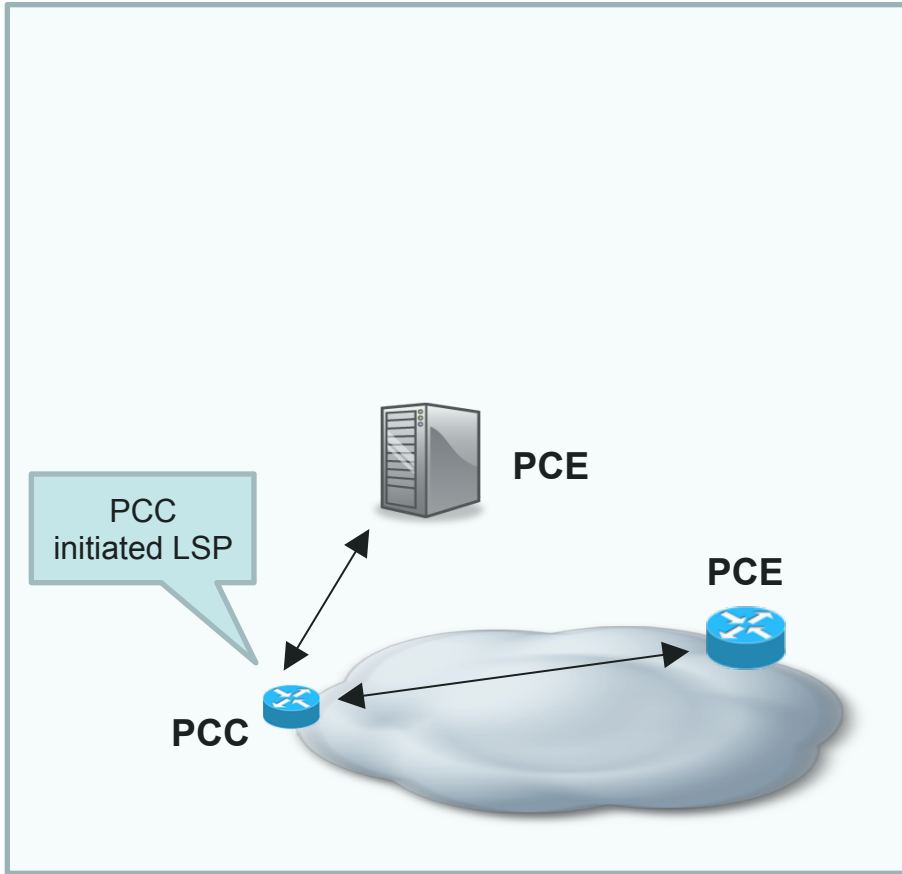
SR: PCE Models

External Stateful or Stateless PCE

PCEP session

PCE

PCC

SR Network
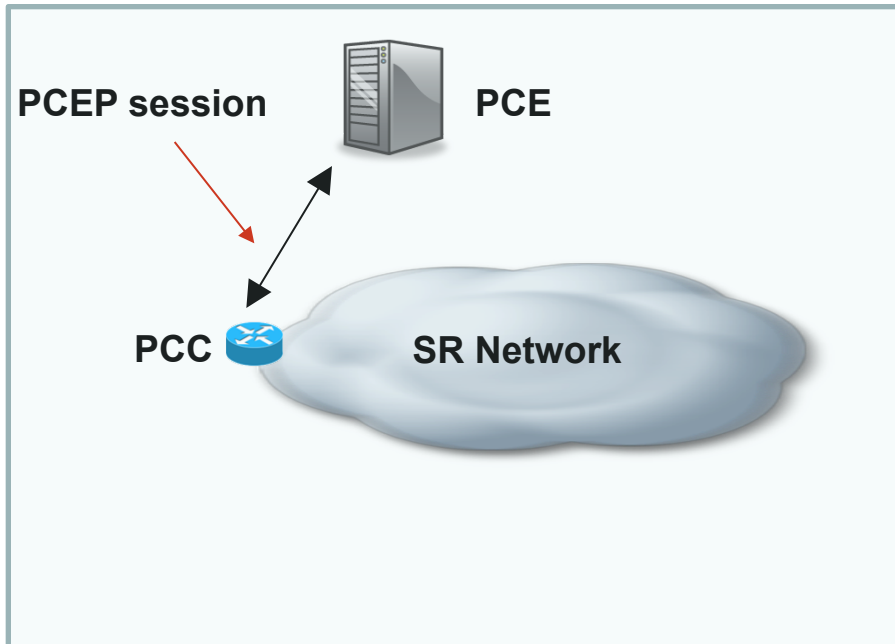
Router based Stateful or Stateless PCE
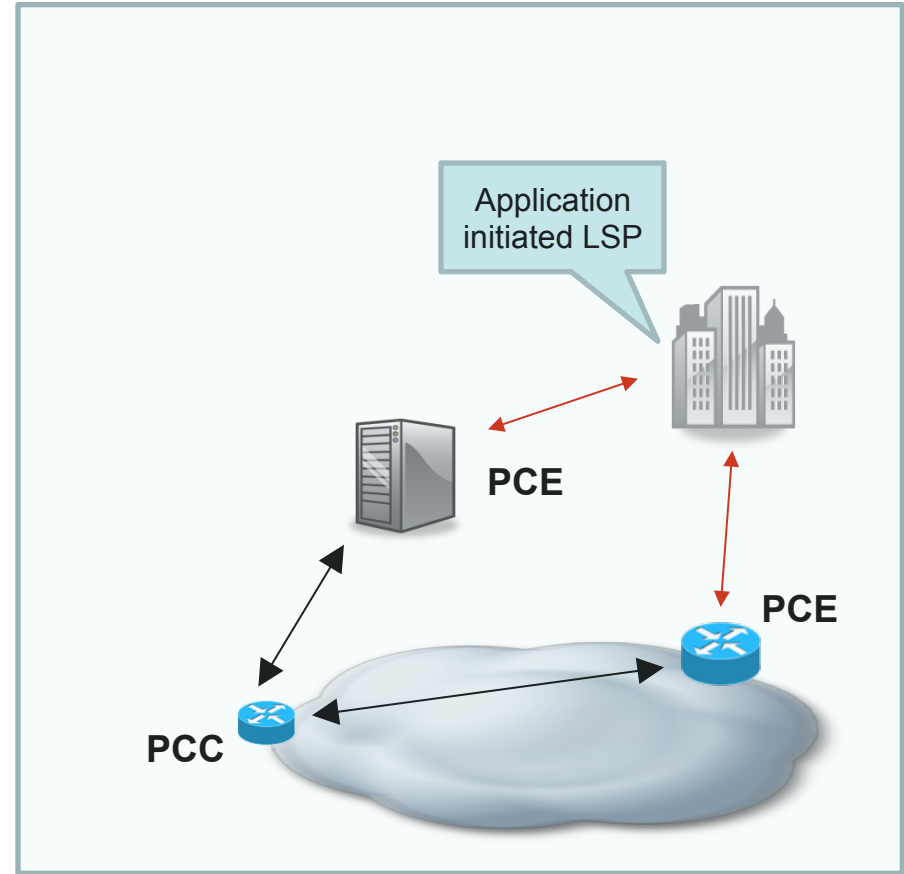
PCEP session

PCE

PCC

SR Network
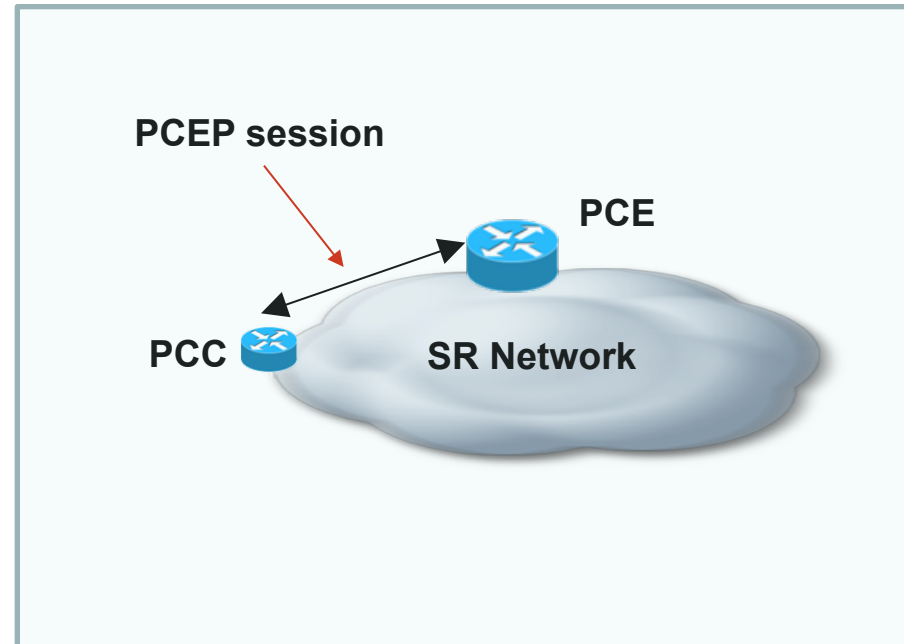
SR: LSP Initiation Model

PCC-initiated LSP

PCE-initiated LSP

SR-PCE-CAPABILITY TLV

```
 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=TBD            |            Length=4           |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|            Reserved           |      Flags     |      MSD      |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
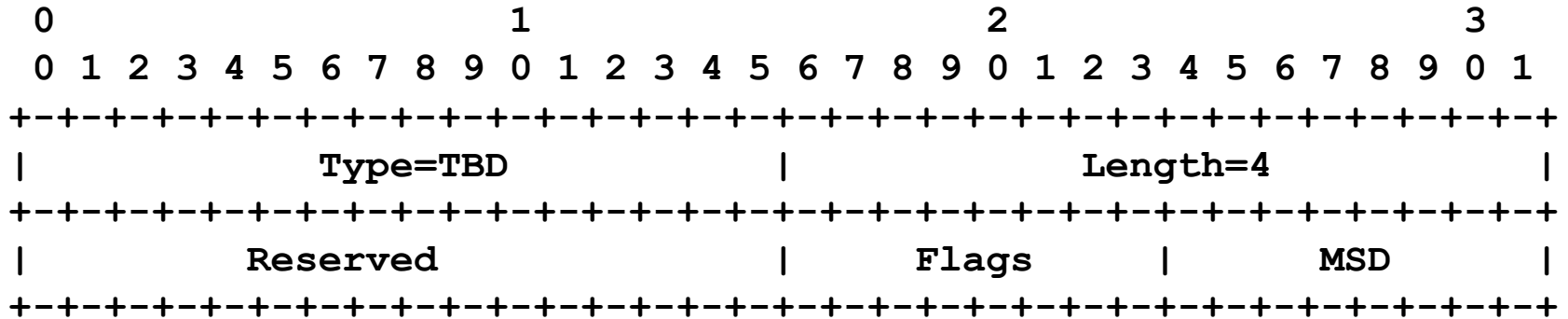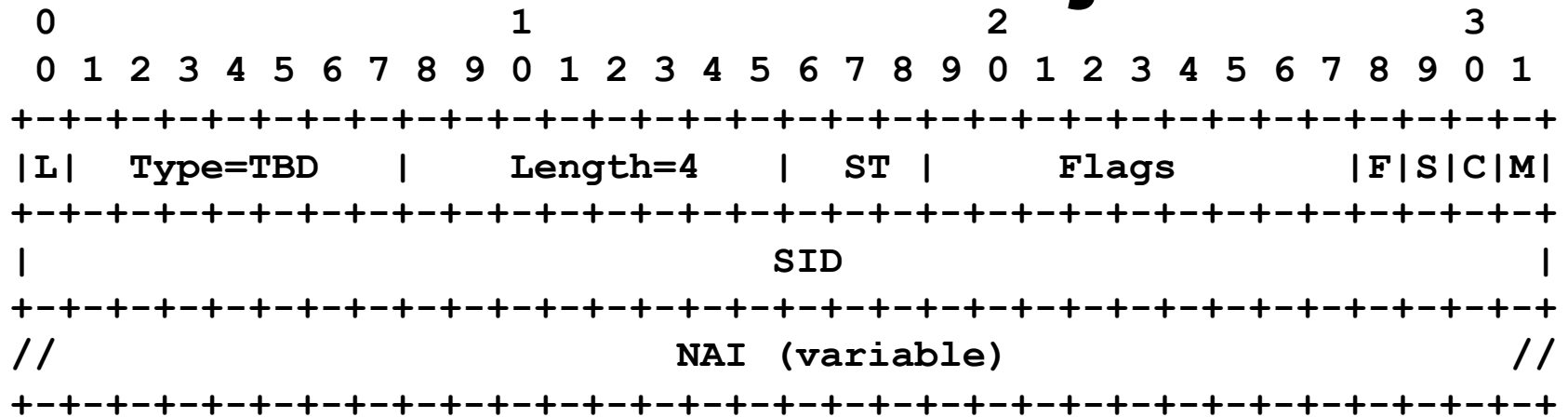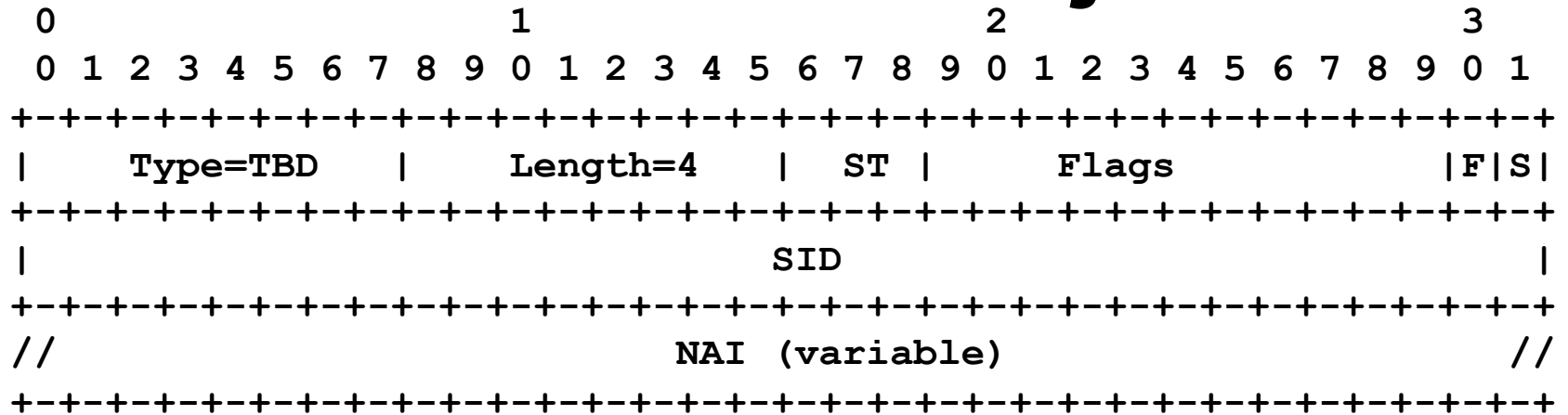
- Optional TLV exchanged via OPEN message.

- Max. Segment Depth (MSD):
  - maximum number of SIDs that a PCC is capable of imposing on a packet.

SR-ERO Sub-Object

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|L|   Type=TBD   |    Length=4   | ST  |     Flags       |F|S|C|M|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                             SID                               |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
//                       NAI (variable)                        //
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Segment ID (SID):
  - can be an MPLS label entry.

- Nodal Adjacency Identifier (NAI):
  - identifies node or adjacency associated with SID.
  - Can be in various formats; IPv4 node ID, IPv4 adjacency, etc.

- Segment Type (ST):
  - Identifies the type of NAI associated with SID.

SR-RRO Sub-Object

```
 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=TBD      |    Length=4    | ST |      Flags      |F|S|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                              SID                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
//                        NAI (variable)                       //
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Fields have the same meaning as SR-ERO sub-object

PATH-SETUP-TYPE

- PATH-SETUP-TYPE field in an OPTIONAL TLV defined in "draft-ietf-pce-lsp-setup-type-.txt".

- This draft defines a new PATH-SETUP-TYPE (value = 1) for "Segment Routed Traffic Engineering LSP"

Conclusions

- This draft proposes simple extensions to carry SR path information over PCEP sessions.

- First presented at IETF 88.

- 3 or 4 implementations exist

- Would like to request for last call.

Thank You !