

PCEP Extensions for Segment Routing

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

IETF 87

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Segment Routing Background

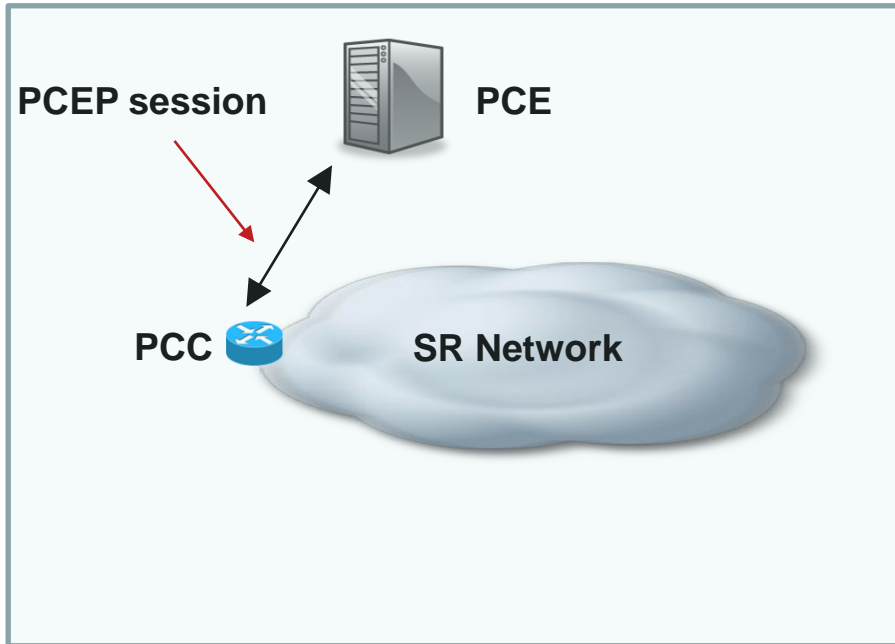
- Segment Routing (SR) enables a head-end node to select path for traffic without using signaling protocol (e.g., RSVP-TE).
- Operates with both IPv4 and IPv6 control planes.
- Operates with any data-plane (including MPLS) that support forwarding operation based on a list of Segment Identifiers (SID)
- A SR path can be derived manually or more intelligently via **Stateful/Stateless PCE**.

Related IETF Activities

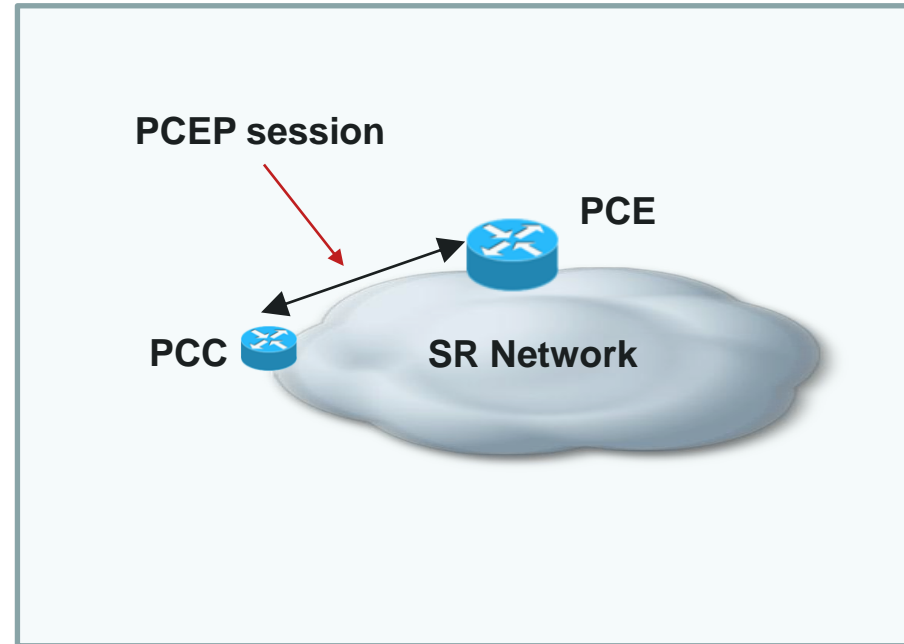
Topic	IETF Reference	WG
Abstract Routing Model	draft-filsfils-rtgwg-segment-routing	RTGWG
IPv6 Instantiation	New draft to be submitted	IPv6
Use Cases	draft-filsfils-rtgwg-segment-routing-use-cases	RTGWG
Perf Eng. LSP with SR	draft-shakir-rtgwg-sr-performance-engineered-lsps	RTGWG
ISIS SR Extensions	draft-previdi-isis-segment-routing-extensions	ISIS
OSPF SR Extensions	draft-psenak-ospf-segment-routing-extensions	OSPF
FRR SR	draft-francois-sr-frr	RTGWG

SR: PCE Models

External Stateful or Stateless PCE

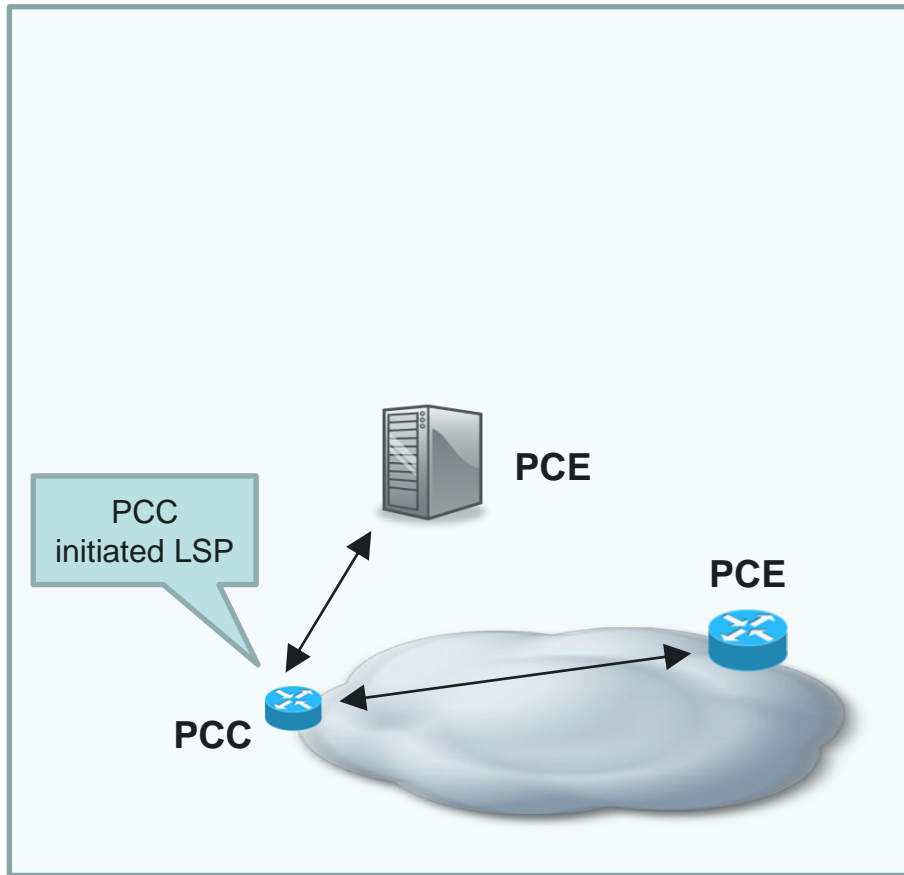


Router based Stateful or Stateless PCE

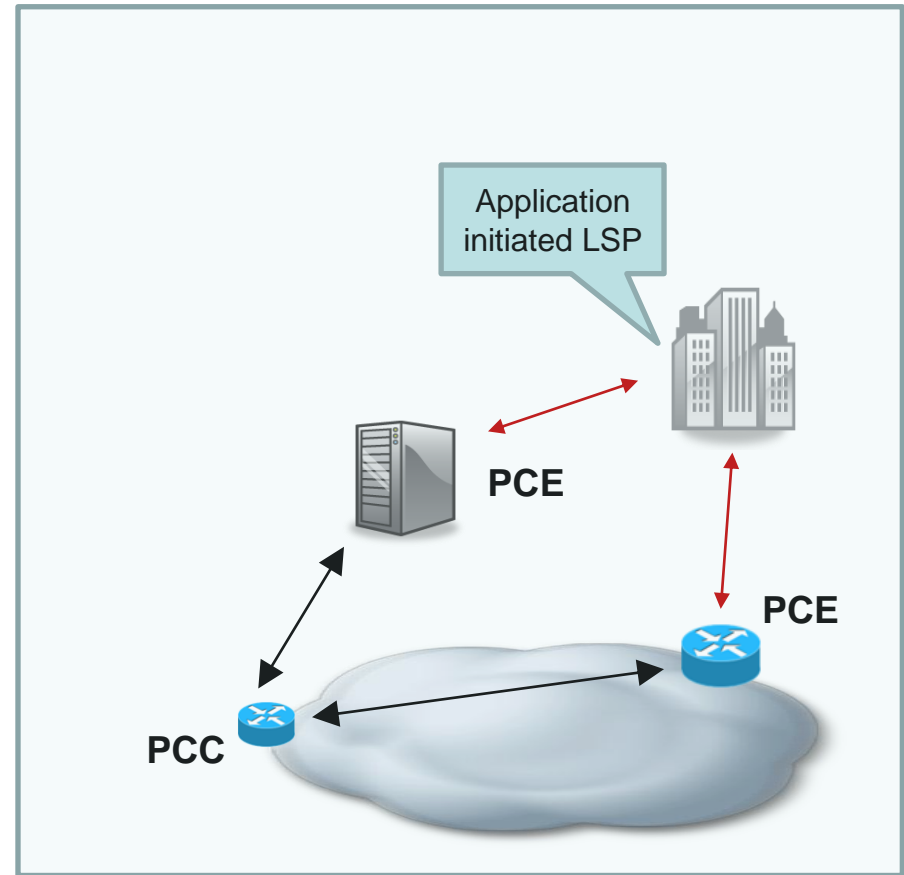


SR: LSP Initiation Model

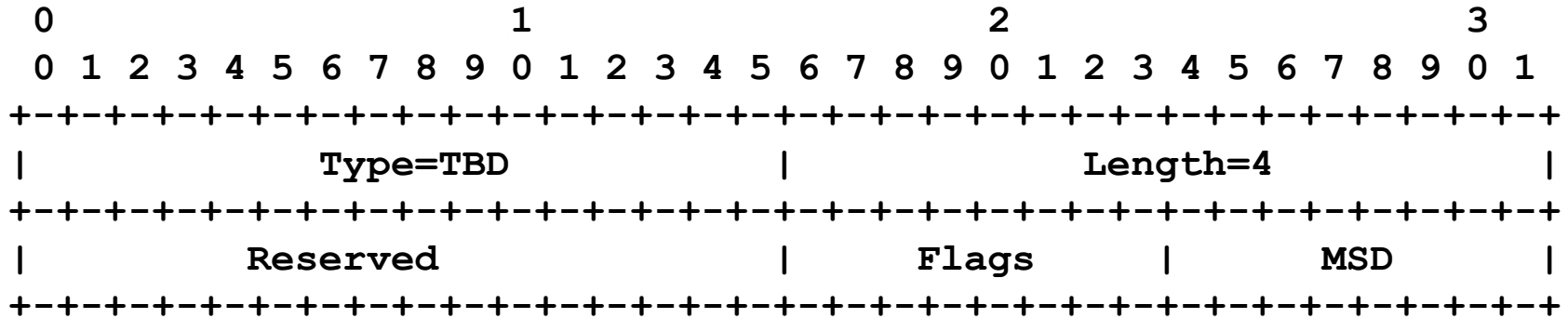
LSP request originates on routers



SDN use-case



SR-PCE-CAPABILITY TLV

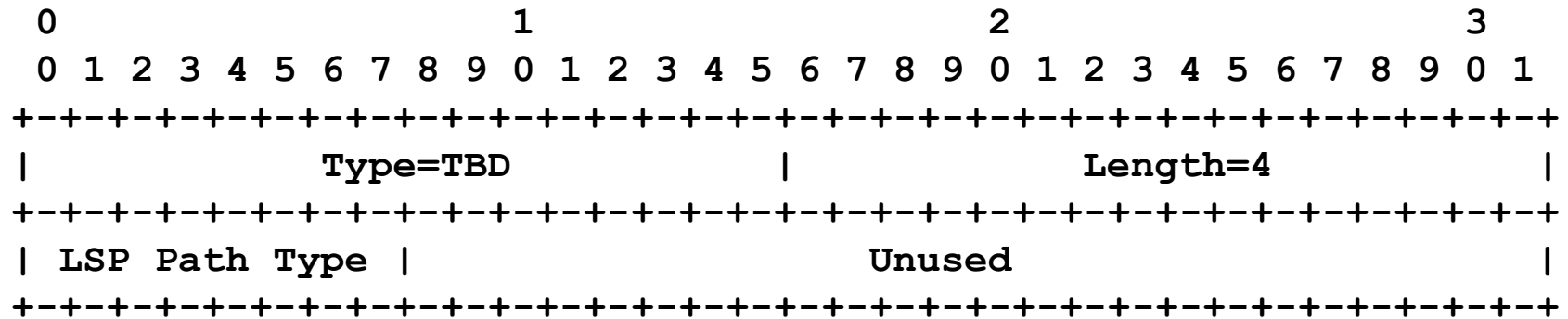


- Optional TLV exchanged via OPEN message.
- Max. Segment Depth (MSD):
 - maximum number of SIDs that a PCC is capable of imposing on a packet.

Node/Adjacency ID (NAI)

NAI Type	ST value	Length (Octets)
IPv4 Nodal Segment	1	4
IPv6 Nodal Segment	2	16
IPv4 Adjacency Segment	3	8
IPv6 Adjacency Segment	4	32
Unnumbered Adjacency Segment	5	16

LSP-PATH-TYPE TLV



- A PCE may be able to compute path for RSVP-TE LSPs as well as SR paths.
- A PCC should be able to indicate a PCE the type of ERO it is interested in receiving in PCReq message.
- LSP-PATH-TYP TLV:
 - Identifies the type of path. Currently, two types have been defined; 0 for RSVP-TE path and 1 for SR path.
 - Associated with RP object

LSP-SIG-TYPE

- LSP-SIG-TYPE field is carried in the LSP object.
- A new value of LSP-SIG-TYPE is introduced for “Segment Routing”

New PCEP Error Codes

Error Type	Error Value	Meaning
10	2	Bad label value (when SID represents MPLS label entry)
	3	Unsupported number of Segment ERO subobjects.

Conclusions

- This draft proposes simple extensions to carry SR path information over PCEP sessions.
- Supports both stateful and stateless PCE.
- The proposed extensions allow a single PCEP session to carry path information for both RSVP-TE LSPs and SR Traffic Engineering Paths.
- IGP capability to discover SR-capable PCE is specified in another draft.

Thank You !