PCE-initiated IP Tunnel

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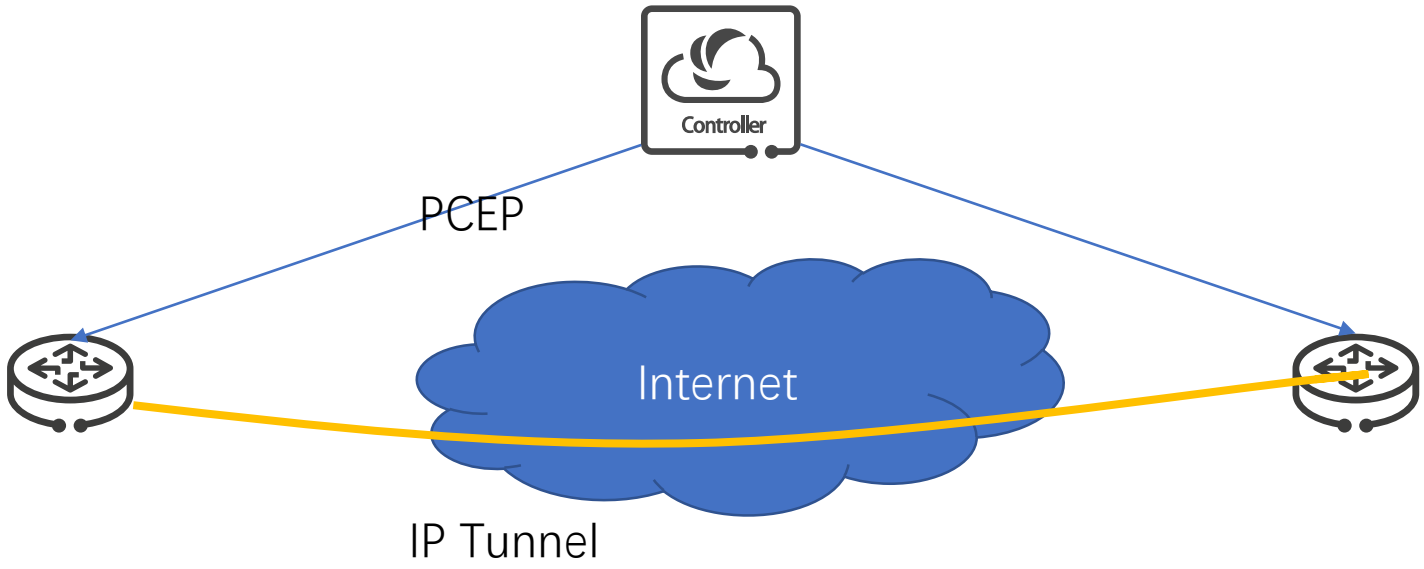
draft-chen-pce-pce-initiated-ip-tunnel-02

#IETF 115

Motivation

- SD-WAN use IP Tunnel to traverse WAN
- PCE can be used to initiate IP tunnel

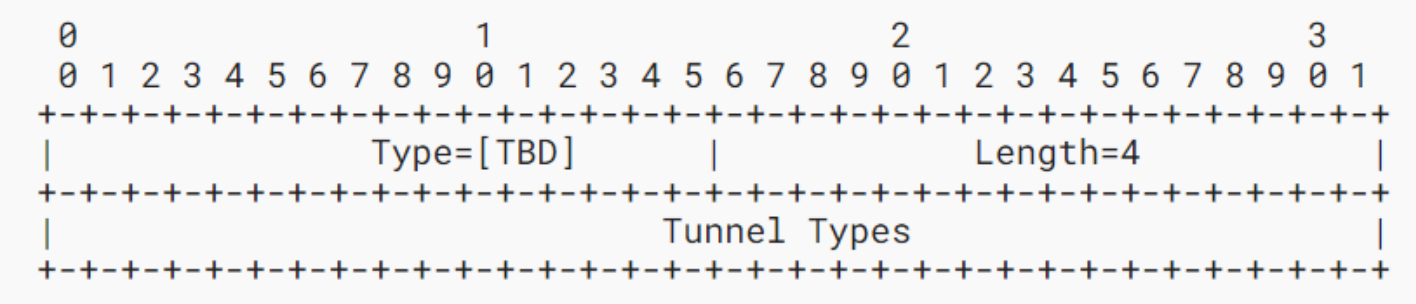


Overview

- Capability advertisement
  - PCE Initiated Tunnel Capability for specific tunnel types.
- Set up, maintain and tear down PCE-initiated IP Tunnels
- Not include tunnel state synchronization, PCC local policy and timeout process, the session failure process, etc.

PCEP Open Object

- To negotiate the PCE Initiated Tunnel Capability for tunnel types according to PCE-INITIATE-TUNNEL-CAPABILITY TLV
- Each bit indicates one kind of tunnel. Each bit from right to left successively represents the value of tunnel type which is 0 to 31



Tunnel Type	Value
Reserved	0
GRE	2
VXLAN	8
NVGRE	9
MPLS in GRE	11
MPLS in UDP	13

Table 1: Tunnel Type

PCEP Messages

- PCTunnelInitiate Message
  - To instantiate or delete a tunnel, a PCE sends a PCTunnelInitiate message to a PCC.
- PCTunnelUpd Message
  - To modify the parameters of a tunnel, a PCE sends a PCTunnelUpd message to a PCC.
- PCTunnelRpt Message
  - To report the state of a tunnel, a PCC sends a PCTunnelRpt message to a PCE.
- Message comprise:
  - SRP Object: used to correlate PCTunnelInitiate and PCTunnelRpt or PCErr message, ‘R’ Flag means instantiation or deletion
  - TUNNEL Object

Tunnel Object

- Tunnel Identifier TLV
  - contains the source address, destination address, tunnel type, tunnel ID.
- Tunnel Name TLV
- Tunnel Parameter TLV
  - specifies information needed to construct the encapsulation header when sending packets through that tunnel.
- Tunnel Attribute TLV
  - specifies some of the information of the tunnel such as metric or TE metric which are carried in sub-TLVs.

Next step

- Which type of tunnel to support
  - FCFS registry, pick the most used
- Tunnel state synchronization?

Registration Procedure(s)
First Come First Served
Reference
[RFC9012]
Available Formats
CSV

Value	Description	Reference
0	Reserved	[RFC9012]
1	L2TPv3 over IP	[RFC9012]
2	GRE	[RFC9012]
3	Transmit tunnel endpoint (DEPRECATED)	[RFC9012]
4	IPsec in Tunnel-mode (DEPRECATED)	[RFC9012]
5	IP in IP tunnel with IPsec Transport Mode (DEPRECATED)	[RFC9012]
6	MPLS-in-IP tunnel with IPsec Transport Mode (DEPRECATED)	[RFC9012]
7	IP in IP	[RFC9012]
8	VXLAN Encapsulation	[RFC8365]
9	NVGRE Encapsulation	[RFC8365]
10	MPLS Encapsulation	[RFC8365]
11	MPLS in GRE Encapsulation	[RFC8365]
12	VXLAN GPE Encapsulation	[RFC8365]
13	MPLS in UDP Encapsulation	[RFC7510][RFC Errata 4350]
14	IPv6 Tunnel	[Martin_Djernaes]
15	SR TE Policy Type	[draft-ietf-idr-segment-routing-te-policy]
16	Bare	[Nischal_Sheth]
17	SR Tunnel (DEPRECATED)	[RFC9125]
18	Cloud Security	[Ramesh_Babu_Yakkala]
19	Geneve Encapsulation	[RFC8926]
20	Any-Encapsulation	[draft-ietf-bess-bgp-multicast-controller-06]
21	GTP Tunnel Type	[Keyur_Patel][Tetsuya_Murakami]
22	Dynamic Path Selection (DPS) Tunnel Encapsulation	[Venkit_Kasiviswanathan]
23	Originating PE (OPE)	[draft-heitz-bess-evpn-option-b-01]
24	Dynamic Path Selection (DPS) Policy	[https://eos.arista.com/eos-4-26-2f/dps-vpn-scaling-using-bgp][Sarah_Chen]
25	SDWAN-Hybrid	[draft-ietf-idr-sdwan-edge-discovery-04]
26-65535	Unassigned	