PCE Working Group
Internet Draft

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PCEP Extension for Native IP Network
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Abstract

This document defines the PCEP extension for CCDR application in Native IP network. The scenario and architecture of CCDR in native IP is described in [draft-wang-teas-ccdr] and [draft-wang-teas-pce-native-ip]. This draft describes the key information that is transferred between PCE and PCC to accomplish the end2end traffic assurance in Native IP network under central control mode.

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1. Introduction

Traditionally, MPLS-TE traffic assurance requires the corresponding network devices support MPLS or the complex RSVP/LDP/Segment Routing

etc. technologies to assure the end-to-end traffic performance. But in native IP network, there will be no such signaling protocol to synchronize the action among different network devices. It is necessary to use the central control mode that described in [draft-ietf-teas-pce-control-function] to correlate the forwarding behavior among different network devices. Draft [draft-wang-teas-pce-native-ip] describes the architecture and solution philosophy for the end2end traffic assurance in Native IP network via Dual/Multi BGP solution. This draft describes the corresponding PCEP extension to transfer the key information about peer address list, peer prefix association and the explicit peer route on on-path router.

2. Conventions used in this document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

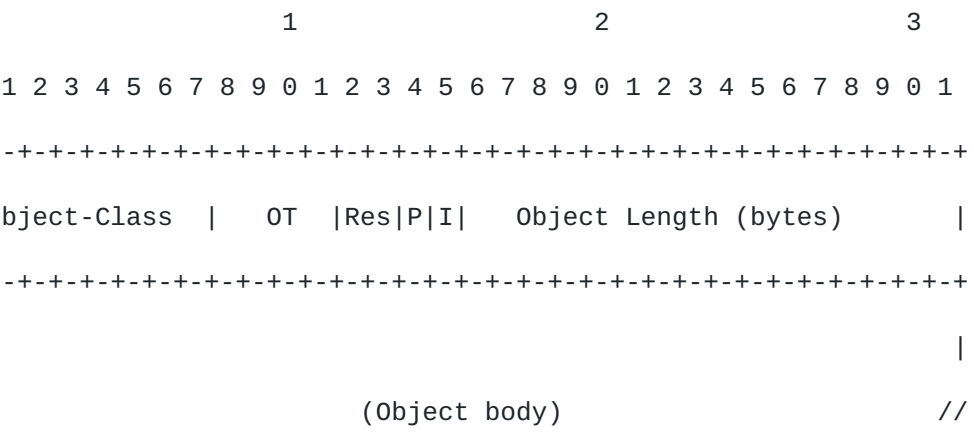
3. New Objects Extension

Three new objects are defined in this draft; they are Peer Address List Object (PAL Object), Peer Prefix Association Object (PPA Object)
and Explicit Peer Route object (EPR Object).

Peer Address List object is used to tell the network device which peer it should be peered with dynamically, Peer Prefix Association is used to tell which prefixes should be advertised via the corresponding peer and Explicit Peer Route object is used to point out which route should be to taken to arrive to the peer.

4. Object Formats.

Each extension object takes the similar format, that is to say, it began with the common object header defined in [RFC5440] as the following:



Different object-class, object type and the corresponding object body is defined separated in the following section.

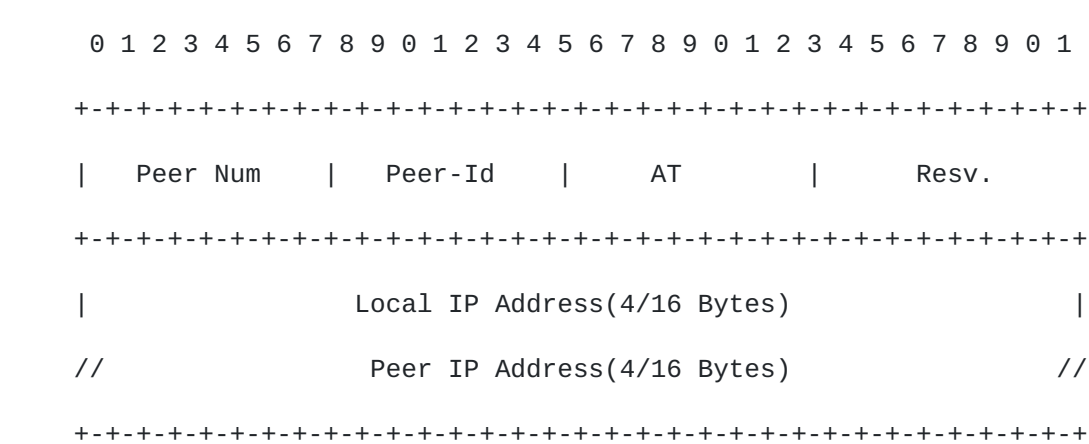
4.1. Peer Address List object.

The Peer Address List object is used in a PCE Initiate message [draft-ietf-pce-pce-initiated-lsp] to specify the ip address of peer that the received network device should establish the BGP relationship with.

This Object should only be sent to the head and end router of the end2end path in case there is no RR involved. If the RR is used between the head end routers, then such information should be sent to head router/RR and end router/RR respectively.

Peer Address List object Object-Class is **

Peer Address List object Object-Type is **



Peer Num (8 bits): Peer Address Number on the advertised router.

Peer-Id(8 bits): To distinguish the different peer pair, will be referenced in Peer Prefix Association, if the PCE use multi-BGP solution for different QoS assurance requirement.

AT(8 bits): Address Type. To indicate the address type of Peer.
Equal to 4, if the following IP address of peer is belong to IPv4;
Equal to 6 if the following IP address of peer is belong to IPv6.

Resv(8 bits): Reserved for future use.

Local IP Address(4/16 Bytes): IPv4 address of the local router, used to peer with other end router. When AT equal to 4, length is 32bit;
when AT equal to 16, length is 128bit;

Peer IP Address(4/16 Bytes): IPv4 address of the peer router, used to peer with the local router. When AT equal to 4, length is 32bit;
IPv6 address of the peer when AT equal to 16, length is 128bit;

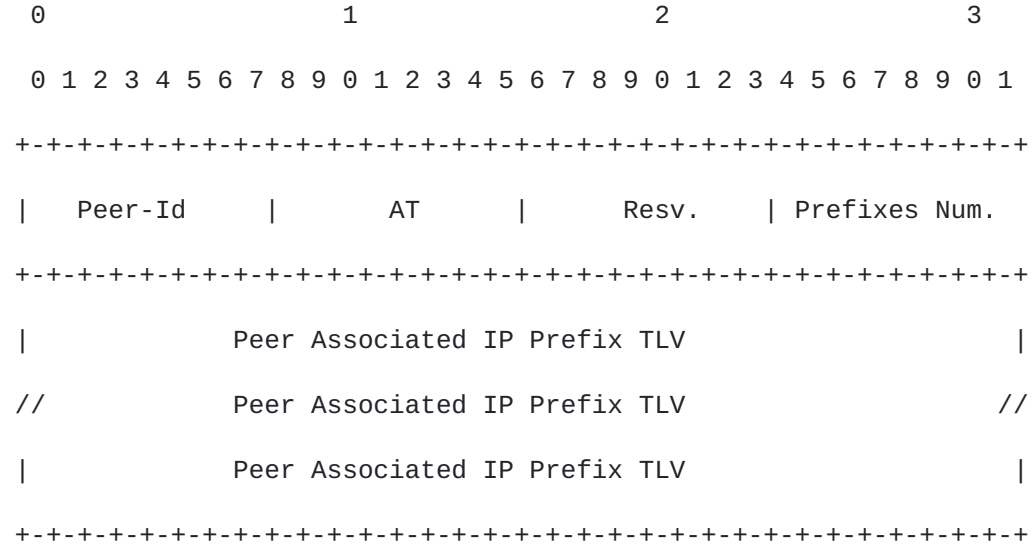
4.2. Peer Prefix Association

THE Peer Prefix Association object is carried within in a PCE Initiate message [draft-ietf-pce-pce-initiated-lsp] to specify the IP prefixes that should be advertised by the corresponding Peer.

This Object should only be sent to the head and end router of the end2end path in case there is no RR involved. If the RR is used between the head end routers, then such information should be sent to head router/RR and end router/RR respectively.

Peer Prefix Association object Object-Class is **

Peer Prefix Association object Object-Type is **



Peer-Id(8 bits): To indicate which peer should be used to advertise the following IP Prefix TLV. This value is assigned in the Peer Address List object and is referred in this object.

AT(8 bits): Address Type. To indicate the address type of Peer.
Equal to 4, if the following IP address of peer is belong to IPv4;
Equal to 6 if the following IP address of peer is belong to IPv6.

Resv(8 bits): Reserved for future use.

Prefixes Num(8 bits): Number of prefixes that advertised by the corresponding Peer. It should be equal to num of the following IP prefix TLV.

Peer Associated IP Prefix TLV: Variable Length, use the TLV format to indicate the advertised IP Prefix.

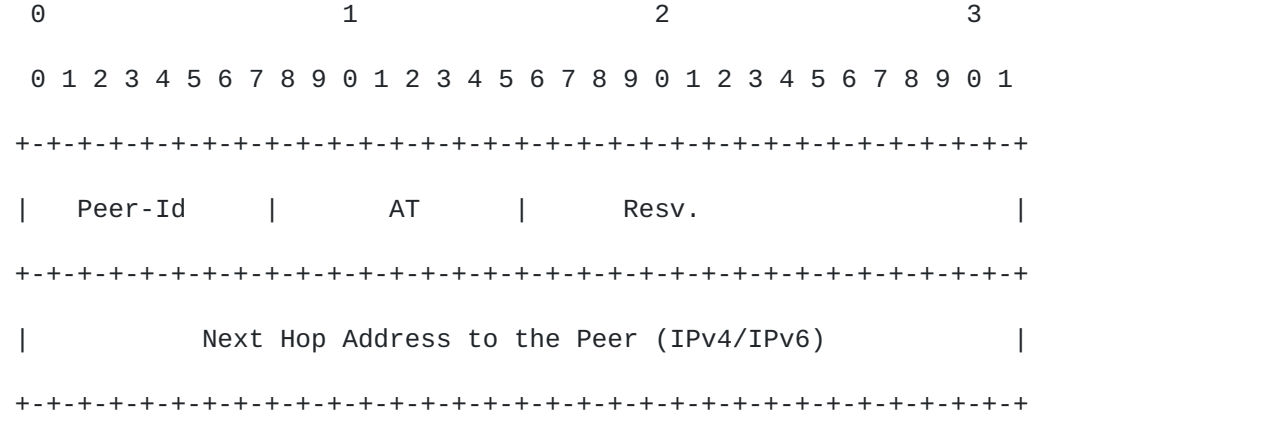
4.3. EXPLICIT PEER ROUTE Object

THE EXPLICIT PEER ROUTE Object is carried in a PCE Initiate message [draft-ietf-pce-pce-initiated-lsp] to specify the explicit peer route to the corresponding peer address on each device that is on the end2end assurance path.

This Object should be sent to all the devices that locates on the end2end assurance path that calculated by PCE.

EXPLICIT PEER ROUTE Object Object-Class is **

EXPLICIT PEER ROUTE Object Object-Type is **



Peer-Id(8 bits): To indicate the peer that the following next hop address point to. This value is assigned in the Peer Address List object and is referred in this object.

AT(8 bits): Address Type. To indicate the address type of explicit peer route. Equal to 4, if the following next hop address to the

peer is belong to IPv4; Equal to 6 if the following next hop address to the peer is belong to IPv6.

Resv(16 bits): Reserved for future use.

Next Hop Address to the Peer TLV: Variable Length, use the TLV format to indicate the next hop address to the corresponding peer that indicated by the Peer-Id.

5. Management Consideration.

6. Security Considerations

TBD

7. IANA Considerations

TBD

8. Conclusions

TBD

9. References

9.1. Normative References

[RFC4655] Farrel, A., Vasseur, J.-P., and J. Ash, "A Path Computation Element (PCE)-Based Architecture", RFC 4655, August 2006,<http://www.rfc-editor.org/info/rfc4655>.

[RFC5440]Vasseur, JP., Ed., and JL. Le Roux, Ed., "Path Computation Element (PCE) Communication Protocol (PCEP)", RFC 5440, March 2009, <http://www.rfc-editor.org/info/rfc5440>.

9.2. Informative References

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[I-D.draft-wang-teas-pce-native-ip]
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10. Acknowledgments

TBD

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