

TEAS Working Group
Internet Draft

A.Wang
China Telecom
Boris Khasanov
Huawei Technologies
Sudhir Cheruathur
Juniper Networks

Intended status: Standard Track
Expires: April 23, 2017

October 24, 2016

PCEP Extension for Native IP Network
draft-wang-pcep-extension-native-ip-00.txt

Status of this Memo

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#).

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#). This document may not be modified, and derivative works of it may not be created, and it may not be published except as an Internet-Draft.

This Internet-Draft is submitted in full conformance with the provisions of [BCP 78](#) and [BCP 79](#). This document may not be modified, and derivative works of it may not be created, except to publish it as an RFC and to translate it into languages other than English.

It is for publication as an RFC or to translate it into languages other than English.

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF), its areas, and its working groups. Note that other groups may also distribute working documents as Internet-Drafts.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any time. It is inappropriate to use Internet-Drafts as reference material or to cite them other than as "work in progress."

The list of current Internet-Drafts can be accessed at <http://www.ietf.org/ietf/1id-abstracts.txt>

The list of Internet-Draft Shadow Directories can be accessed at <http://www.ietf.org/shadow.html>

<A.Wang>

Expires December 30, 2016

[Page 1]

Copyright Notice

Copyright (c) 2016 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to [BCP 78](#) and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document.

Abstract

This document defines the PCEP extension for PCE application in Native IP network. The scenario and architecture of PCE in native IP is described in [I-D.[draft-wang-teas-pce-native-ip-01.txt](#)]. 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.

Table of Contents

1.	Introduction	2
2.	Conventions used in this document	3
3.	New Objects Extension	3
4.	Object Formats.	3
4.1.	BGP PEER Object.....	4
4.2.	BGP PREFIX Object.....	5
4.3.	STATICROUTE Object	6
5.	Management Consideration.....	7
6.	Security Considerations.....	7
7.	IANA Considerations	7
8.	Conclusions	7
9.	References	7
9.1.	Normative References.....	7
9.2.	Informative References.....	7
10.	Acknowledgments	8

[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

<A.Wang>

Expires December 30, 2016

[Page 2]

necessary to use the central control mode that described in [I-D.[draft-zhao-teas-pce-control-function](#)] to correlate the forwarding behavior among different network devices. Draft [I-D.[draft-wang-teas-pce-native-ip-00.txt](#)] 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 BGP peer relationship, BGP Prefix advertised and the static 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 BGP PEER object, BGP PREFIX object and STATICROUTE object.

BGP PEER object is used to tell the network device which peer it should be peered with dynamically, BGP PREFIX object is used to tell which prefixes should be advertised via the corresponding BGP peer and STATICROUTE object is used to point out which route should be taken to arrive to the bgp 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:

[illegible]

<A.Wang>

Expires December 30, 2016

[Page 3]

+--+

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

4.1. BGP PEER Object.

The BGP PEER object is used in a PCE Initiate message [[draft-ietf-pce-pce-initiated-lsp](#)] to specify the ip address of BGP 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.

BGP PEER Object Object-Class is **

BGP PEER Object Object-Type is **

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

+--+

	Peer-Id		AT		Resv.
--	---------	--	----	--	-------

+--+

	IP Address of BGP Peer(4/16 Bytes)	
--	------------------------------------	--

// IP Address of BGP Peer(4/16 Bytes) //

+--+

Peer-Id(8 bits): To distinguish the different BGP Peer, will be referenced in BGP PREFIX object, if the PCE use multiBGP solution for different QoS assurance requirement.

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

Resv(16 bits): Reserved for future use.

4.2. BGP PREFIX Object

THE BGP PREFIX 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 BGP 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.

```
BGP PREFIX Object Object-Class is **
```

BGP PREFIX Object Object-Type is **

[illegible]

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

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

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

BGP Advertised IP Prefix TLV: Variable Length, use the TLV format to indicate the advertised IP Prefix.

4.3. STATICROUTE Object

THE STATICROUTE Object is carried in a PCE Initiate message [[draft-ietf-pce-pce-initiated-lsp](#)] to specify the static route to the corresponding BGP 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.

```
STATICROUTE Object Object-Class is **
```

STATICROUTE Object Object-Type is **

```

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
+-+-+
|  Peer-Id      |          AT          |      Resv.          |
+-+-+
|  Next Hop Address to the BGP Peer (IPv4/IPv6)  |
+-+-+

```

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

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

Resv(16 bits): Reserved for future use.

Internet-Draft PCE Extension for Native IP Network June 30, 2016
Next Hop Address to the BGP Peer TLV: Variable Length, use the TLV
format to indicate the next hop address to the corresponding BGP
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

[I-D.[draft-ietf-pce-pce-initiated-lsp-07](#)]
E.Crabbe, I.Minei, S.Sivabalan, R.Varga, "PCEP Extensions for PCE-
initiated LSP Setup in a Stateful PCE Model",
<https://tools.ietf.org/html/draft-ietf-pce-pce-initiated-lsp-07>
(work in progress), July, 2016

[I-D.[draft-wang-teas-pce-native-ip-01](#)]

Aijun Wang, Quintin Zhao, Boris Khasanov, Raghavendra Mallya, "PCE in Native IP Network", <https://tools.ietf.org/html/draft-wang-teas-pce-native-ip-01>(work in progress),October, 2016

[I-D.[draft-zhao-teas-pce-control-function](#)]

Farrel, Q.Zhao "An Architecture for use of PCE and PCEP in a Network with Central Control"
<https://datatracker.ietf.org/doc/draft-zhao-teas-pce-control-function/> (work in progress),June, 2016

10. Acknowledgments

TBD

Authors' Addresses

Aijun Wang
China Telecom
Beiqijia Town, Changping District
Beijing,China

Email: wangaj@ctbri.com.cn

Boris Khasanov
Huawei Technologies
Moskovskiy Prospekt 97A
St.Petersburg 196084
Russia

EMail: khasanov.boris@huawei.com

Sudhir Cheruathur
Juniper Networks
1133 Innovation Way
Sunnyvale, California 94089 USA

Email: scheruathur@juniper.net