

MPLS Working Group
Internet-Draft
Updates: [4379](#) (if approved)
Intended status: Standards Track
Expires: August 8, 2015

K. Raza
N. Akiya
C. Pignataro
Cisco Systems, Inc.
February 4, 2015

IPv6 Router Alert Option for MPLS OAM
draft-ietf-mpls-oam-ipv6-rao-03

Abstract

[RFC 4379](#) defines the MPLS LSP Ping/Traceroute mechanism, in which the Router Alert Option MUST be set in the IP header of the MPLS Echo Request messages, and may conditionally be set in the IP header of the MPLS Echo Reply messages depending on the Reply Mode used. While a generic "Router shall examine packet" Option Value is used for the IPv4 Router Alert Option (RAO), there is no generic Router Alert Option Value defined for IPv6 that can be used. This document allocates a new generic IPv6 Router Alert Option Value that can be used by MPLS OAM tools, including the MPLS Echo Request and MPLS Echo Reply messages for MPLS in IPv6 environments. Consequently, it updates [RFC 4379](#).

The initial motivation to request an IPv6 Router Alert Option (RAO) Value for MPLS OAM comes from MPLS LSP Ping/Traceroute. However, this Value is applicable to all MPLS OAM and not limited to MPLS LSP Ping/Traceroute.

Status of This Memo

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

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at <http://datatracker.ietf.org/drafts/current/>.

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."

This Internet-Draft will expire on August 8, 2015.

Internet-Draft

MPLS OAM IPv6 Router Alert

February 2015

Copyright Notice

Copyright (c) 2015 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. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1.	Introduction	2
2.	Specification of Requirements	3
3.	IPv6 Router Alert Option (RAO) Value for MPLS OAM	3
4.	Updates to RFC 4379	3
5.	IANA Considerations	4
6.	Security Considerations	4
7.	Acknowledgments	4
8.	References	4
8.1.	Normative References	4
8.2.	Informative References	5
	Authors' Addresses	5

[1.](#) Introduction

A commonly deployed MPLS OAM tool is specified in [[RFC4379](#)], "Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures", which is used to diagnose MPLS network data planes. This specification [[RFC4379](#)], often referred to as "MPLS LSP Ping/Traceroute", requires the use of Router Alert Option in the IP header. For example, the [section 4.3 of \[RFC4379\]](#) states that IP Router Alert Option MUST be set in the IP header of an MPLS Echo Request message. Similarly, the [section 4.5](#) states that IP Router Alert Option MUST be set in the IP header of an MPLS Echo Reply message if the Reply Mode in the echo request is set to "Reply via an IPv4/IPv6 UDP packet with Router Alert".

[RFC2113] defines a generic Option Value 0x0 for IPv4 Router Alert Option (RAO) that is used in LSP Ping and LSP Traceroute for MPLS in IPv4 environments. However, currently there is no generic IPv6 Router Alert Option Value defined that can be used in LSP Ping and LSP Traceroute for MPLS in IPv6 environments. Specifically,

[RFC2711] defined the router alert for a general IPv6 purpose but required the Value field in the Router Alert Option to indicate a specific reason for using the Router Alert Option. Because there is no defined value for MPLS LSP Ping/Traceroute use or for general use, it is not possible for MPLS OAM tools to use the IPv6 Router Alert mechanism.

As vendors are starting to implement MPLS on IPv6 control plane (e.g., [[I-D.ietf-mpls-ldp-ipv6](#)]), there is a need to define and allocate such an Option Value for IPv6 in order to comply with [[RFC4379](#)]. This document defines a new IPv6 Router Alert Option Value that can be used by MPLS OAM tools, including the MPLS Echo Request and MPLS Echo Reply messages for MPLS in IPv6 environments.

[2.](#) Specification of Requirements

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 [[RFC2119](#)].

[3.](#) IPv6 Router Alert Option (RAO) Value for MPLS OAM

This document defines a new Option Value (TBD1) for the IPv6 Router Alert Option (RAO) to alert transit routers to examine the packet more closely for MPLS OAM purposes. This Option Value is used by any MPLS OAM application that requires their packets to be examined by a transit router.

In the scope of this document, this Option Value will be used by the MPLS Echo Request and MPLS Echo Reply for its IPv6 messages as required by [[RFC4379](#)].

[4.](#) Updates to [RFC 4379](#)

[RFC4379] specifies the use of the Router Alert Option in the IP header. Sections [4.3](#) and [4.5](#) of [[RFC4379](#)] are updated as follows:

for every time in which the "Router Alert IP option" is used, the following text is appended:

In case of an IPv4 header, the generic IPv4 Router Alert Option value 0x0 [[RFC2113](#)] SHOULD be used. In case of an IPv6 header, the IPv6 Router Alert Option value TBD1 allocated through this document for MPLS OAM MUST be used.

[5.](#) IANA Considerations

This document defines a new Value (TBD1) for the IPv6 Router Alert Option to alert transit routers to examine the packet more closely for MPLS OAM purposes. IANA is requested to assign a new code point under its "IPv6 Router Alert Option Values" registry defined by [[RFC2711](#)], updated by [[RFC5350](#)] and maintained in [[IANA-IPv6-RAO](#)]. The new code point is as follows:

Value	Description	Reference
TBD1	MPLS OAM	[document.this]

[6.](#) Security Considerations

This document introduces no new security concerns in addition to what have already been captured in [[RFC4379](#)] and [[RFC6398](#)], the latter of which expands the security considerations of [[RFC2113](#)] and [[RFC2711](#)].

IPv6 packets containing the MPLS OAM Router Alert Option are encapsulated with an MPLS Header and not expected to be inspected by every label switched hop within an MPLS LSP. Consequently, this value of the Router Alert Option will be processed by the appropriate router and is not subject to the problem of being ignored as described in [Section 2.2 of \[RFC7045\]](#).

[7.](#) Acknowledgments

The authors would like to thank George Swallow, Ole Troan, Bob

Hinden, Faisal Iqbal, Mathew Janelle, and Gregory Mirsky for their useful input.

8. References

8.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC2711] Partridge, C. and A. Jackson, "IPv6 Router Alert Option", [RFC 2711](#), October 1999.
- [RFC4379] Kompella, K. and G. Swallow, "Detecting Multi-Protocol Label Switched (MPLS) Data Plane Failures", [RFC 4379](#), February 2006.

Raza, et al.

Expires August 8, 2015

[Page 4]

Internet-Draft

MPLS OAM IPv6 Router Alert

February 2015

- [RFC5350] Manner, J. and A. McDonald, "IANA Considerations for the IPv4 and IPv6 Router Alert Options", [RFC 5350](#), September 2008.
- [RFC6398] Le Faucheur, F., "IP Router Alert Considerations and Usage", [BCP 168](#), [RFC 6398](#), October 2011.

8.2. Informative References

- [I-D.ietf-mpls-ldp-ipv6]
Asati, R., Pignataro, C., Manral, V., Papneja, R., and K. Raza, "Updates to LDP for IPv6", [draft-ietf-mpls-ldp-ipv6-14](#) (work in progress), October 2014.
- [IANA-IPv6-RA0]
IANA, "IPv6 Router Alert Option Values",
<<http://www.iana.org/assignments/ipv6-routeralert-values>>.
- [RFC2113] Katz, D., "IP Router Alert Option", [RFC 2113](#), February 1997.
- [RFC7045] Carpenter, B. and S. Jiang, "Transmission and Processing

of IPv6 Extension Headers", [RFC 7045](#), December 2013.

Authors' Addresses

Kamran Raza
Cisco Systems, Inc.
2000 Innovation Drive
Kanata, ON K2K-3E8
CA

Email: skraza@cisco.com

Nobo Akiya
Cisco Systems, Inc.
2000 Innovation Drive
Kanata, ON K2K-3E8
CA

Email: nobo@cisco.com

Raza, et al.

Expires August 8, 2015

[Page 5]

Internet-Draft

MPLS OAM IPv6 Router Alert

February 2015

Carlos Pignataro
Cisco Systems, Inc.
7200-12 Kit Creek Road
Research Triangle Park, NC 27709
USA

Email: cpignata@cisco.com

