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IPv6 Address Specific BGP Extended Community Attribute

Abstract

Current specifications of BGP Extended Communities (RFC 4360) support the IPv4 Address Specific Extended Community, but do not support an IPv6 Address Specific Extended Community. The lack of an IPv6 Address Specific Extended Community may be a problem when an application uses the IPv4 Address Specific Extended Community, and one wants to use this application in a pure IPv6 environment. This document defines a new BGP attribute, the IPv6 Address Specific Extended Community, that addresses this problem. The IPv6 Address Specific Extended Community is similar to the IPv4 Address Specific Extended Community, except that it carries an IPv6 address rather than an IPv4 address.

Status of This Memo

This document specifies an Internet standards track protocol for the Internet community, and requests discussion and suggestions for improvements. Please refer to the current edition of the "Internet Official Protocol Standards" (STD 1) for the standardization state and status of this protocol. Distribution of this memo is unlimited.

Copyright Notice

1. Introduction

Current specifications of BGP Extended Communities [RFC4360] support the IPv4 Address Specific Extended Community, but do not support an IPv6 Address Specific Extended Community. The lack of an IPv6 Address Specific Extended Community may be a problem when an application uses IPv4 Address Specific Extended Community and one wants to use this application in a pure IPv6 environment.

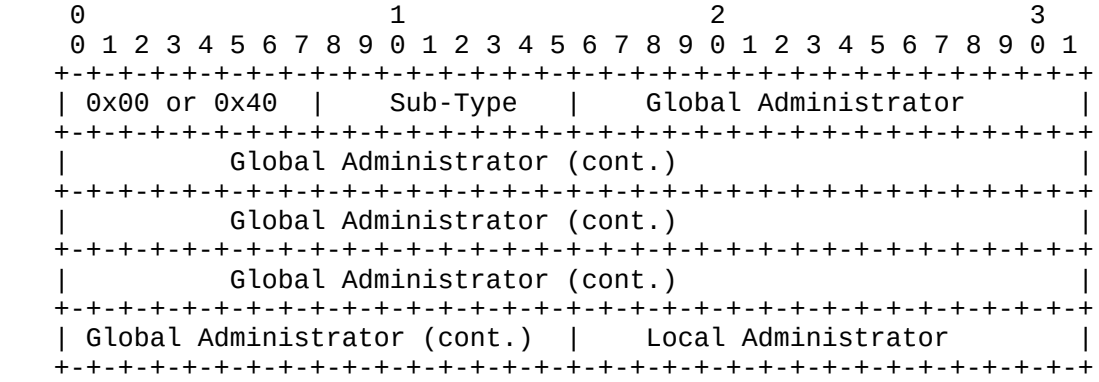
Because the BGP Extended Community attribute defines each BGP Extended Community as being 8 octets long, it is not possible to define the IPv6 Specific Extended Community using the existing BGP Extended Community attribute [RFC4360]. Therefore, this document defines a new BGP attribute, the IPv6 Address Specific Extended Community, that has a structure similar to the IPv4 Address Specific Extended Community, and thus could be used in a pure IPv6 environment as a replacement of the IPv4 Address Specific Extended Community.

2. IPv6 Address Specific BGP Extended Community Attribute

The IPv6 Address Specific Extended Community Attribute is a transitive, optional BGP attribute [BGP-4]. The attribute consists of a set of "IPv6 Address Specific extended communities". All routes with the IPv6 Address Specific Extended Community attribute belong to the communities listed in the attribute.

Just like all other BGP Extended Communities, the IPv6 Address Specific Extended Community supports multiple sub-types.

Each IPv6 Address Specific extended community is encoded as a 20-octet quantity, as follows:



The first high-order octet indicates whether a particular sub-type of this community is transitive across Autonomous Systems (ASes) (0x00), or not (0x40). The second high-order octet of this extended type is used to indicate sub-types. The sub-types are the same as for the IPv4 Address Specific Extended Community.

Global Administrator field: 16 octets

This field contains an IPv6 unicast address assigned by one of the Internet registries.

Local Administrator field: 2 octets

The organization that has been assigned the IPv6 address in the Global Administrator field can encode any information in this field. The format and meaning of the value encoded in this field should be defined by the sub-type of the community.

3. IANA Considerations

This document defines a new BGP attribute, called the IPv6 Address Specific Extended Community (value 25).

This document defines a class of extended communities, called the IPv6 Address Specific Extended Community, for which the IANA has created and will maintain a registry entitled "IPv6 Address Specific Extended Community". Future assignments are to be made using the "First Come First Served" policy defined in [RFC5226]. The Type values for the transitive communities of the IPv6 Address Specific Extended Community class are 0x0000-0x00ff; for the non-transitive communities of that class, they are 0x4000-0x40ff. Assignments consist of a name and the value.

This document makes the following assignments for the IPv6 Address Specific extended community types:

Name	Type Value
IPv6 address specific Route Target	0x0002
IPv6 address specific Route Origin	0x0003

4. Security Considerations

This document does not add new security issues. All the security considerations for BGP Extended Communities apply here. At the time that this document was written, there were significant efforts underway to improve the security properties of BGP. For examples of documents that have been produced up to this time of publication, see [RFC4593] and [SIDR].

There is a potential serious issue if a malformed, optional, transitive attribute is received. This issue and the steps to avoid it are discussed in [OPT_TRANS].

5. Acknowledgements

Many thanks to Michael Lundberg and Emre Ertekin for their review and comments.

6. References

6.1. Normative References

[BGP-4] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, January 2006.

[RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 5226, May 2008.

[RFC4360] Sangli, S., Tappan, D., and Y. Rekhter, "BGP Extended Communities Attribute", RFC 4360, February 2006.

6.2. Informative References

[OPT_TRANS] Scudder, J. and E. Chen, "Error Handling for Optional Transitive BGP Attributes", Work in Progress, April 2009.

[RFC4593] Barbir, A., Murphy, S., and Y. Yang, "Generic Threats to Routing Protocols", RFC 4593, October 2006.

[SIDR] Lepinski, M. and S. Kent, "An Infrastructure to Support Secure Internet Routing", Work in Progress, July 2009.

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