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BGP Link Bandwidth Extended Community
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Abstract

This document describes an application of BGP extended communities that allows a router to perform unequal cost load balancing.

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1. Introduction

When a BGP speaker receives multiple paths from its internal peers, it could select more than one path to send traffic to. In doing so, it might be useful to provide the speaker with information that would help it distribute the traffic based on the bandwidth of the external (DMZ) link. This document suggests that the external link bandwidth be carried in the network using a new extended community [[RFC4360](#)] - the link bandwidth extended community.

1.1. Requirements Language

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](#)].

2. Link Bandwidth Extended Community

When a BGP speaker receives a route from an external neighbor and advertises this route (via IBGP) to internal neighbors, as part of this advertisement the router may carry the cost to reach the external neighbor. The cost can be either configured per neighbor or derived from the bandwidth of the link that connects the router to a directly connected external neighbor. This value is carried in the Link Bandwidth Extended Community. No more than one link bandwidth extended community SHALL be attached to a route. Additionally, if a route is received with link bandwidth extended community and the BGP speaker sets itself as next-hop while announcing that route to other peers, the link bandwidth extended community should be removed.

The extended community is optional non-transitive. The value of the high-order octet of the extended Type Field is 0x40. The value of the low-order octet of the extended type field for this community is 0x04. The value of the Global Administrator subfield in the Value Field SHOULD represent the Autonomous System of the router that attaches the Link Bandwidth Community. If four octet AS numbering scheme is used [[RFC4893](#)], AS_TRANS should be used in the Global Administrator subfield. The bandwidth of the link is expressed as 4 octets in IEEE floating point format, units being bytes (not bits!) per second. It is carried in the Local Administrator subfield of the Value Field.

3. Deployment Considerations

The usage of this community is restricted to the cases where BGP multipath can be safely deployed. In other words, the IGP distance

between the load balancing router and the exit points should be the same. Alternatively, the path between the load sharing router and the exit points could be tunneled. If there are multiple paths to reach a destination and if only some of them have link bandwidth community, the receiver should not perform unequal cost load balancing based on link bandwidths.

4. Acknowledgments

The authors would like to thank Yakov Rekhter, Srihari Sangli and Dan Tappan for proposing unequal cost load balancing as one possible application of the extended community attribute.

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5. IANA Considerations

This document defines a specific application of the two-octet AS specific extended community. IANA is requested to assign a sub- type value of 0x04 for the link bandwidth extended community.

Name	Value
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non-transitive Link Bandwidth Ext. Community	0x4004

6. Security Considerations

There are no additional security risks introduced by this design.

7. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC4360] Sangli, S., Tappan, D., and Y. Rekhter, "BGP Extended Communities Attribute", [RFC 4360](#), February 2006.
- [RFC4893] Vohra, Q. and E. Chen, "BGP Support for Four-octet AS Number Space", [RFC 4893](#), May 2007.

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