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## Extension of Link Bandwidth Extended Community

## Abstract

[[I-D.ietf-idr-link-bandwidth](#)] defines a BGP link bandwidth extended community attribute, which can enable devices to implement unequal-cost load-balancing. However, the bandwidth value encapsulated by the extended community attribute is of the floating-point type, which is inconvenient to use. In this document, a set of new types of link bandwidth extended community are introduced to facilitate the configuration and calculation of link bandwidth.

## 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].

## Status of This Memo

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## 1. Introduction

In [[I-D.ietf-idr-link-bandwidth](#)], the link bandwidth extended community attribute is added to implement unequal-cost load balancing based on the bandwidth on a path. As defined in the draft, the bandwidth of a link is expressed in 4-octets in IEEE floating-point format.

In practice, the use of this floating-point format may result errors in configuration and computation. When an operator needs to manually specify the bandwidth, you also need to consider the conversion from the bandwidth value to the floating-point number. This mode is not user-friendly, especially when the routing policy is used for bandwidth matching.

This document introduce a more intuitive expression of link bandwidth in BGP. It uses an unsigned long integer value to describe the link bandwidth value. This is easier for operators to use and understand, and can avoid configuration and computation errors.

## 2. Link Bandwidth Extended Community

The type of Link Bandwidth Extended Community is 0x40, and the subtype is 0x04. In the attribute value, the global administrator subfield is set to the AS number of the route to which the Link Bandwidth attribute is added. In the local administrator subfield,

the link bandwidth value [[I-D.ietf-idr-link-bandwidth](#)] is set to the IEEE floating-point type.

A new type of IPv6 Address Specific Extended Community[[RFC5701](#)] is added in this document. The ASN field of this attribute is set to the AS number of the route to which the link bandwidth attribute is added. The Link Bandwidth value field (8 bytes) is set to the link bandwidth. The following extended contents are added:

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	2	3	4	5	6	7	8	9	0	1
+ - + -																																									

\*The value of the high-order octet of the extended Type, refer to [[RFC4360](#)], It is recommended that 0x03 and 0x43 be used.

\*New Link Bandwidth, subtype is TBD. The value of the Link Bandwidth subfield is an unsigned long integer, in bytes per second.

The subtypes defined here can be used for both optional transitive and non-transitive extended community attributes.

### 3. Deployment Considerations

The extended link bandwidth extended community attribute in this document should not be used together with the standard link bandwidth extended community attribute. If a route carries both the standard link bandwidth extended community attribute and the unit link bandwidth extended community attribute, the standard link bandwidth extended community attribute is ignored.

In actual deployment, if a routing policy is used to match link bandwidth attributes, you can directly perform exact value matching.

### 4. IANA Considerations

This document defines a specific application of the two-octet AS specific extended community. IANA is requested to assign new subtypes for both non-transitive and transitive extended communities.

SubType	Description
TBD	Link Bandwidth EC in bytes per second

## 5. Security Considerations

There are no additional security risks introduced by this design.

## 6. Acknowledgements

## 7. References

### 7.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.

### 7.2. References

[I-D.ietf-idr-link-bandwidth] Mohapatra, P. and R. Fernando, "BGP Link Bandwidth Extended Community", Work in Progress, Internet-Draft, draft-ietf-idr-link-bandwidth-07, 5 March 2018, <<https://www.ietf.org/archive/id/draft-ietf-idr-link-bandwidth-07.txt>>.

[RFC4360] Sangli, S., Tappan, D., and Y. Rekhter, "BGP Extended Communities Attribute", RFC 4360, DOI 10.17487/RFC4360, February 2006, <<https://www.rfc-editor.org/info/rfc4360>>.

[RFC5701] Rekhter, Y., "IPv6 Address Specific BGP Extended Community Attribute", RFC 5701, DOI 10.17487/RFC5701, November 2009, <<https://www.rfc-editor.org/info/rfc5701>>.

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