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W. Li
H. Wang
J. Dong
Huawei Technologies
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Extension of Link Bandwidth Extended Community
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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](#)].

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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. The combination of unit type and unsigned integer value is used to describe the link bandwidth value. This is easier for operators to use and understand, and can avoid configuration and computation errors.

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[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.

This document retains the basic format of Link Bandwidth Extended Community, uses several special subtypes to identify different bandwidth units, and uses a combination of units and integers to accurately represent a specific bandwidth value.

- * bps Link Bandwidth, subtype is TBD. The value of bandwidth in the Local Administrator subfield is an unsigned integer. The unit of this type of link bandwidth is bps.
- * Kbps Link Bandwidth, subtype is TBD. The value of bandwidth in the Local Administrator subfield is an unsigned integer. The unit of this type of link bandwidth is Kbps.
- * Mbps Link Bandwidth, subtype is TBD. The value of bandwidth in the Local Administrator subfield is an unsigned integer. The unit of this type of link bandwidth is Mbps.
- * Gbps Link Bandwidth, subtype is TBD. The value of bandwidth in the Local Administrator subfield is an unsigned integer. The unit of this type of link bandwidth is Gbps.
- * Tbps Link Bandwidth, subtype is TBD. The value of bandwidth in the Local Administrator subfield is an unsigned integer. The unit of this type of link bandwidth is Tbps.

We can use different unit bandwidth values to identify the required bandwidth.

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

[3.](#) Deployment Considerations

In network deployment, a routing policy may be used to match the link bandwidth advertised by BGP link bandwidth extended community, based on the mechanisms of this document, the operator can specify the bandwidth in different units as required, so that exact value matching can be achieved.

Bandwidths of different units may be used together. For example, an link bandwidth extended community with the type Gbps and value 1, and another link bandwidth extended community with the type Mbps and value 500 may be used to represent 1.500 Gbps. However, it is RECOMMENDED to use a single link bandwidth extended community with the type Mbps and value 1500 Mbps to achieve the same purpose.

[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 bps unit
TBD	Link Bandwidth EC in Kbps unit
TBD	Link Bandwidth EC in Mbps unit
TBD	Link Bandwidth EC in Gbps unit
TBD	Link Bandwidth EC in Tbps unit

[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>>.

Authors' Addresses

Li, et al.

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Wenyan Li
Huawei Technologies
Huawei Campus, No. 156 Beiqing Road
Beijing
100095
China

Email: liwenyan@huawei.com

Haibo Wang
Huawei Technologies
Huawei Campus, No. 156 Beiqing Road
Beijing
100095
China

Email: rainsword.wang@huawei.com

Jie Dong
Huawei Technologies

Huawei Campus, No. 156 Beiqing Road
Beijing
100095
China

Email: jie.dong@huawei.com