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BGP Extended Communities Attribute

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2. Abstract

This document describes an extension to BGP [[BGP-4](#)] which may be used to provide flexible control over the distribution of routing information.

3. Introduction

The Extended Community Attribute provides two important enhancements over the existing BGP Community Attribute:

- It provides an extended range, ensuring that communities can be assigned for a plethora of uses, without fear of overlap.
- The addition of a Type field provides structure for the community space.

The addition of structure allows the application of policy based on the application for which the community value will be used. For example, one can filter out all communities of a particular type, or allow only certain values for a particular type of community. Without structure this can only be accomplished by explicitly enumerating all community values which will be denied or allowed.

4. BGP Extended Communities Attribute

The Extended Communities Attribute is a transitive optional BGP attribute. The attribute consists of a set of "extended communities". Each extended community is coded as an eight octet value. All routes with the Extended Communities attribute belong to the communities listed in the attribute.

The Extended Communities Attribute has Type Code 16.

Each Extended Community is encoded as an eight octet quantity, as follows:

- Type Field: 2 octets

Types 0 through 0x7fff inclusive are assignable by IANA. Types 0x8000 through 0xffff inclusive are vendor-specific.

- Value Field: 6 octets

When the high-order octet of the Type field is 0x00, the Value field consists of two subfields:

Administrator: 2 octets

This subfield contains an Autonomous System number assigned by IANA.

Assigned Number subfield: 4 octets

This subfield contains a number from a numbering space which is administered by the organization to which the Autonomous System number in the Administrator subfield has been assigned by IANA.

When the high-order octet of the Type field is 0x01, the Value field consists of two subfields:

Administrator: 4 octets

This subfield contains an IPv4 address assigned by IANA.

Assigned Number subfield: 2 octets

This subfield contains a number from a numbering space which is administered by the organization to which the IPv4 address in the Administrator subfield has been assigned by IANA.

When the high-order octet of the Type field is 0x02, the Value field consists of two subfields:

Administrator: 4 octets

This subfield contains a 4-octets Autonomous System number assigned by IANA.

Assigned Number subfield: 2 octets

This subfield contains a number from a numbering space which is administered by the organization to which the Autonomous System number in the Administrator subfield has been assigned by IANA.

5. Route Target Community

The Route Target Community identifies one or more routers that may receive a set of routes (that carry this Community) carried by BGP.

The Type field for the Route Target Community is 0x0002 or 0x0102.

6. Route Origin Community

The Route Origin Community identifies one or more routers that inject a set of routes (that carry this Community) into BGP.

The Type field for the Route Origin Community is 0x0003 or 0x0103.

7. Link Bandwidth Community

When a router receives a route from a directly connected external neighbor (the external neighbor that is one IP hop away), and advertises this route (via IBGP) to internal neighbors, as part of this advertisement the router may carry the bandwidth of the link that connects the router with the external neighbor. This bandwidth is carried in the Link Bandwidth Community, and is encoded as 4 octets in IEEE floating point format. The units are bytes per second.

A router is expected to strip the Link Bandwidth Community attribute from a route when advertising this route to an external neighbor.

When a router receives a route with the Link Bandwidth Community, the router should ignore the information carried in the Link Bandwidth

Community of the route if this Community was attached to the route by some router that is in a different Autonomous System than the router that receives the route. The router that receives the route determines the Autonomous System of the router that attached the Link Bandwidth Community by examining the Community itself (as it carried the Autonomous System of the router that attached the Community).

The Type field for the Link Bandwidth Community is 0x0004.

8. Operations

A BGP speaker may use the Extended Communities attribute to control which routing information it accepts, prefers or distributes to its peers.

A BGP speaker receiving a route that doesn't have the Extended Communities attribute may append this attribute to the route when propagating it to its peers.

A BGP speaker receiving a route with the Extended Communities attribute may modify this attribute according to the local policy.

A route may carry both the BGP Communities attribute as defined in [[RFC1997](#)]), and the Extended BGP Communities attribute. In this case the BGP Communities attribute is handled as specified in [[RFC1997](#)], and the Extended BGP Communities attribute is handled as specified in this document.

9. IANA Considerations

As specified in [section 4](#) of this document, an Extended Community Attribute contains a two-byte Type Field. Type Field values 2, 3, and 4 are assigned in this document. Type Field values 5-0x7fff are to be assigned by IANA, using the "First Come First Served" policy defined in [RFC 2434](#). Type values 0x8000-0xffff are for vendor-specific types, and values in this range are not to be assigned by IANA.

10. Security Considerations

This extension to BGP does not change the underlying security issues.

11. Acknowledgements

To be supplied.

12. References

[BGP-4] Rekhter, Y., and T. Li, "A Border Gateway Protocol 4 (BGP-4)", [RFC 1771](#), March 1995.

[RFC1997] Chandra, R., Traina, P., Li, T., "BGP Communities Attribute", [RFC1997](#), August 1996.

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