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**Large BGP Communities**  
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Abstract

The BGP Communities Attribute [[RFC1997](#)] is heavily used by operators, but is inadequate to represent large enough values, particularly Four-octet Autonomous System numbers [[RFC6793](#)] plus additional values. This document describes an extension to BGP [[RFC4271](#)] to address this need with a new extended form of the BGP community Attribute.

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 [[RFC2119](#)].

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## [1.](#) Introduction

BGP implementations typically support a routing policy language (RPL) to control the distribution of routing information. Network operators add BGP communities to routes via the RPL to identify intrinsic differentia of a route such as its origin country or specify a RPL action to be taken, or one that has been taken, on an individual route or group of routes. Because BGP communities are optional transitive BGP attributes, these differentia and actions identified by the communities may be acted upon or otherwise utilized by the RPL in any Autonomous System (AS) in the Internet, often are and often the goal of adding a community is to signal an AS one or more AS-hops away.

BGP Communities Attributes are 4-octet values split into two 2-octet values where the most significant word is an Autonomous System number (ASN) and the least significant word is a value whose meaning is



Local Data part 2: 4-octet operator-defined value.



### 3. Textual Representation

The textual representation of BGP Communities [[RFC1997](#)] in RPLs and the networking community is known well as two 2-octet unsigned integers and is often represented as such, separated a colon. For example, 65000:12345 (ASN:differentia).

Large Communities MUST be represented similarly, as three 4-octet unsigned integers with no leading zeros. An integer MUST NOT be omitted, even when zero. Implementations MUST represent Large Communities in RPL in a manner consistent with their representation of BGP Communities [[RFC1997](#)]. For example, 65000:1:2 (ASN:Local Data Part 1:Local Data Part 2) or 65000:0:0.

The following Large BGP Communities textual specification uses the Augmented Backus-Naur Form (ABNF) notation as specified in [[RFC5234](#)].

```
positive-digit = "1" / "2" / "3" /  
                "4" / "5" / "6" /  
                "7" / "8" / "9"  
  
digit          = "0" / positive-digit  
  
non-zero-int   = positive-digit *9digit  
  
part           = "0" / non-zero-int ; max value is 4294967295  
  
large-community = part ":" part ":" part
```

Vendors MAY provide other textual representations.

### 4. Error Handling

The error handling of Large Community is as follows:

- o A Large Community BGP Path Attribute with a length of zero MUST be ignored upon receipt and removed when sending.
- o A Large Community attribute SHALL be considered malformed if its length is not a non-zero multiple of 12 bytes.
- o A BGP UPDATE message with a malformed Large Community attribute SHALL be handled using the approach of "treat-as-withdraw" as described in [section 2 \[RFC7606\]](#).



## **5. Security Considerations**

This extension to BGP has similar security implications as BGP Communities [[RFC1997](#)].

underlying security issues. Specifically, an AS relying on the BGP attributes carried in BGP must have trust in every AS in the path to the source of the route, as any AS in the path may have altered or deleted attributes or added false attributes. Specifying the mechanism(s) to provide such trust is beyond the scope of this document.

## **6. Implementation status - RFC EDITOR: REMOVE BEFORE PUBLICATION**

This section records the status of known implementations of the protocol defined by this specification at the time of posting of this Internet-Draft, and is based on a proposal described in [[RFC7942](#)]. The description of implementations in this section is intended to assist the IETF in its decision processes in progressing drafts to RFCs. Please note that the listing of any individual implementation here does not imply endorsement by the IETF. Furthermore, no effort has been spent to verify the information presented here that was supplied by IETF contributors. This is not intended as, and must not be construed to be, a catalog of available implementations or their features. Readers are advised to note that other implementations may exist.

As of today these vendors have produced an implementation of Large BGP Community:

- o Cisco IOS XR
- o ExaBGP
- o GoBGP

The latest implementation news is tracked at <http://largebgpcommunities.net/> [[1](#)].

## **7. IANA Considerations**

IANA is requested to assign a BGP path attribute value for the Large Community attribute.





## **8. Acknowledgements**

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## **9. References**

### **9.1. Normative References**

- [RFC1997] Chandra, R., Traina, P., and T. Li, "BGP Communities Attribute", [RFC 1997](#), DOI 10.17487/RFC1997, August 1996, <<http://www.rfc-editor.org/info/rfc1997>>.
- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), DOI 10.17487/RFC2119, March 1997, <<http://www.rfc-editor.org/info/rfc2119>>.
- [RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", [RFC 4271](#), DOI 10.17487/RFC4271, January 2006, <<http://www.rfc-editor.org/info/rfc4271>>.
- [RFC6793] Vohra, Q. and E. Chen, "BGP Support for Four-Octet Autonomous System (AS) Number Space", [RFC 6793](#), DOI 10.17487/RFC6793, December 2012, <<http://www.rfc-editor.org/info/rfc6793>>.
- [RFC7606] Chen, E., Ed., Scudder, J., Ed., Mohapatra, P., and K. Patel, "Revised Error Handling for BGP UPDATE Messages", [RFC 7606](#), DOI 10.17487/RFC7606, August 2015, <<http://www.rfc-editor.org/info/rfc7606>>.



## 9.2. Informative References

- [RFC5234] Crocker, D., Ed. and P. Overell, "Augmented BNF for Syntax Specifications: ABNF", STD 68, [RFC 5234](#), DOI 10.17487/RFC5234, January 2008, <<http://www.rfc-editor.org/info/rfc5234>>.
- [RFC7942] Sheffer, Y. and A. Farrel, "Improving Awareness of Running Code: The Implementation Status Section", [BCP 205](#), [RFC 7942](#), DOI 10.17487/RFC7942, July 2016, <<http://www.rfc-editor.org/info/rfc7942>>.

## 9.3. URIs

- [1] <https://largebgpcommunities.net>

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