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Well-Known Community Policy Behavior  
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Abstract

Popular BGP implementations manipulate Well-known Communities differently from one another. This results in difficulties for operators. Network operators are encouraged to deploy consistent community handling across their networks, taking the inconsistent behaviors from the various BGP implementations they operate into consideration. This document recommends specific action items to limit future inconsistency, namely BGP implementors are expected to not create any further inconsistencies from this point forward.

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## Table of Contents

<a href="#">1.</a>	Introduction . . . . .	<a href="#">2</a>
<a href="#">2.</a>	Requirements Language . . . . .	<a href="#">3</a>
<a href="#">3.</a>	Manipulation of Communities by Policy . . . . .	<a href="#">3</a>
<a href="#">4.</a>	Community Manipulation Policy Differences . . . . .	<a href="#">3</a>
<a href="#">5.</a>	Documentation of Vendor Implementations . . . . .	<a href="#">4</a>
<a href="#">5.1.</a>	Note on an Inconsistency . . . . .	<a href="#">5</a>
<a href="#">6.</a>	Note for Those Writing RFCs for New Community-Like Attributes	5
<a href="#">7.</a>	Action Items . . . . .	<a href="#">5</a>
<a href="#">8.</a>	Security Considerations . . . . .	<a href="#">6</a>
<a href="#">9.</a>	IANA Considerations . . . . .	<a href="#">6</a>
<a href="#">10.</a>	Acknowledgments . . . . .	<a href="#">6</a>
<a href="#">11.</a>	References . . . . .	<a href="#">6</a>
<a href="#">11.1.</a>	Normative References . . . . .	<a href="#">6</a>
<a href="#">11.2.</a>	Informative References . . . . .	<a href="#">6</a>
	Authors' Addresses . . . . .	<a href="#">6</a>

## [1.](#) Introduction

The BGP Communities Attribute was specified in [[RFC1997](#)] which introduced the concept of Well-Known Communities. In hindsight, [[RFC1997](#)] did not prescribe as fully as it should have how Well-Known Communities may be manipulated by policies applied by operators. Currently, implementations differ in this regard, and these differences can result in inconsistent behaviors that operators find difficult to identify and resolve.

This document describes the current behavioral differences in order to assist operators in generating consistent community-manipulation policies in a multi-vendor environment, and to prevent the introduction of additional divergence in implementations.

This document recommends specific action items to limit future inconsistency.

## [2.](#) Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [BCP 14](#) [[RFC2119](#)] [[RFC8174](#)] when, and only when, they appear in all capitals, as shown here.

## [3.](#) Manipulation of Communities by Policy

[RFC1997] says:

"A BGP speaker receiving a route with the COMMUNITIES path attribute may modify this attribute according to the local policy."

One basic operational need is to add or remove one or more communities to the received set. The focus of this document is another common operational need, to replace all communities with a new set. To simplify this second case, most BGP policy implementations provide syntax to "set" community that operators use to mean "remove any/all communities present on the route, and apply this set of communities instead."

Some operators prefer to write explicit policy to delete unwanted communities rather than using "set;" i.e. using a "delete community \*:\*" and then "add community x:y ..." configuration statements in an attempt to replace all received communities. The same community manipulation policy differences described in the following section exist in both "set" and "delete community \*:\*" syntax. For simplicity, the remainder of this document refers only to the "set" behaviors, which we refer to collectively as each implementation's "set" directive.'

## [4.](#) Community Manipulation Policy Differences

Vendor implementations differ in the treatment of certain Well-Known

communities when modified using the syntax to "set" the community. Some replace all communities including the Well-Known ones with the new set, while others replace all non-Well-Known Communities but do not modify any Well-Known Communities that are present.

These differences result in what would appear to be identical policy configurations having very different results on different platforms.

## [5.](#) Documentation of Vendor Implementations

In this section we document the syntax and observed behavior of the "set" directive in several popular BGP implementations.

In Juniper Networks' Junos OS, "community set" removes all received communities, Well-Known or otherwise.

In Cisco Systems' IOS XR, "set community" removes all received communities except for the following:

Numeric	Common Name
0:0	internet
65535:0	graceful-shutdown
65535:1	accept-own <a href="#">rfc7611</a>
65535:65281	NO_EXPORT
65535:65282	NO_ADVERTISE
65535:65283	NO_EXPORT_SUBCONFED (or local-AS)

Communities not removed by Cisco IOS XR

Table 1

IOS XR does allow Well-Known communities to be removed by explicitly enumerating each one, not in the aggregate; for example, "delete community accept-own". Operators are advised to consult IOS XR

documentation and/or Cisco Systems support for full details.

On Extreme networks' Brocade NetIron: "set community X" removes all received communities and sets X.

In Huawei's VRP product, "community set" removes all received communities, well-known or otherwise.

In OpenBSD's OpenBGPD, "set community" does not remove any communities, Well-known or otherwise.

Nokia's SR OS has several directives that operate on communities. Its "set" directive is called using the "replace" keyword, replacing all received communities, Well-known or otherwise, with the specified communities.

### [5.1.](#) Note on an Inconsistency

In IOS XR, "set community" will not overwrite some well-known communities. However, it will overwrite other well-known communities. Conversely, In IOS XR, "set community" will not overwrite some communities that are not well-known (e.g., (internet == 0:0)).

This merely notes an inconsistency. It is not a plea to 'protect' the entire IANA list from "set community."

### [6.](#) Note for Those Writing RFCs for New Community-Like Attributes

When establishing new [[RFC1997](#)]-like attributes (large communities, wide communities, etc.), RFC authors should state how the new community attribute is to be handled.

### [7.](#) Action Items

Network operators are encouraged to limit their use of the "set" directive (within reason), to improve the readability of their configurations and hopefully to achieve behavioral consistency across

platforms.

Unfortunately, it would be operationally disruptive for vendors to change their current implementations.

Vendors SHOULD clearly document the behavior of "set" directive in their implementations.

Vendors MUST ensure that their implementations' "set" directive treatment of any specific community does not change if/when that community becomes a new Well-Known Community through future standardization. For most implementations, this means that the "set" directive MUST continue to remove the community; for those implementations where the "set" directive removes no communities, that behavior MUST continue.

Given the implementation inconsistencies described in this document, network operators are urged never to rely on any implicit understanding of a neighbor ASN's BGP community handling. I.e., before announcing prefixes with NO\_EXPORT or any other community to a neighbor ASN, the operator should confirm with that neighbor how the community will be treated.

## 8. Security Considerations

Surprising defaults and/or undocumented behaviors are not good for security. This document attempts to remedy that.

Also see [Appendix A of \[RFC5706\]](#).

## 9. IANA Considerations

This document has no IANA Considerations.

## 10. Acknowledgments

The authors thank Martijn Schmidt, Qin Wu for the Huawei data point, Greg Hankins, Job Snijders, David Farmer, John Heasley, and Jakob

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Borkenhagen, et al.

Expires November 17, 2019

[Page 6]

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