                   Well-Known Community Policy Behavior
                      draft-ietf-grow-wkc-behavior-00

Abstract

   Well-Known BGP Communities are manipulated inconsistently by current
   implementations. This results in difficulties for operators. It is
   recommended that removal policies be applied consistently to Well-
   Known Communities.

Requirements Language

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to
   be interpreted as described in RFC 2119 [RFC2119] only when they
   appear in all upper case. They may also appear in lower or mixed
   case as English words, without normative meaning.

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1. Introduction

   The BGP Communities Attribute was specified in [RFC1997] which
   introduced the concept of Well-Known Communities. In hindsight, it
   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.

2. 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."

A basic operational need is to add or remove one or more communities
to the received set. Another common need is to replace all received
communities with a new set. To simplify the second case, most BGP
policy implementations provide syntax to "set" community that
operators use to mean "remove any/all communities present on the
update received from the neighbor, 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.

3. 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.

4. Documentation of Vendor Implementations

In Juniper Networks' JunOS, "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 rfc7611                |
            | 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 one at a time
   by explicit policy; for example, "delete community accept-own".
   Operators are advised to consult IOS-XR documentation and/or Cisco
   Systems support for full details.

   On Brocade NetIron: "set community X" removes all 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.

4.1. Note on an Inconsistency

   The IANA publishes a list of Well-Known Communities [IANA-WKS].

   IOS-XR's set of well-known communities that "set community" will not
   overwrite diverges from IANA's list. Quite a few well-known
   communities from IANA's list do not receive special treatment in IOS-
   XR, and at least one specific community on IOS-XR's special treatment
   list (internet == 0:0) is not really on IANA's list -- it's taken
   from the "Reserved" range [0x00000000-0x0000FFFF].

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

5. Note for Those Writing RFCs for New Community-Like Attributes

   Care should be taken when establishing new [RFC1997]-like attributes
   (large communities, wide communities, etc) to avoid repeating this
   mistake.

6. Action Items

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

   Vendors SHOULD share the behavior of their implementations for
   inclusion in this document, especially if their behavior differs from
   the examples described.

   For new well-known communities specified (after this draft), vendors
   MUST treat "community set" command to mean "remove all other
   communities, Well-Known or otherwise."

7. Security Considerations

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

8. IANA Considerations

   This document has no IANA Considerations other than to be aware that
   any future Well-Known Communities will be subject to the policy
   treatment described here.

9. Acknowledgements

   The authors thank Martijn Schmidt for his contribution, Qin Wu for
   the Huawei data point.

10. Normative References

   [IANA-WKS]
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   [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
             Requirement Levels", BCP 14, RFC 2119,
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