            Clarification of the Flowspec Redirect Extended Community
                  draft-ietf-idr-flowspec-redirect-rt-bis-04

Abstract

   This document updates RFC 5575 (Dissemination of Flow Specification
   Rules) to clarify the formatting of the the BGP Flowspec Redirect
   Extended Community.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

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   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on October 13, 2015.

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1. Introduction

   Dissemination of Flow Specification Rules [RFC5575], commonly known
   as BGP Flowspec, provided for a BGP Extended Community [RFC4360] that
   served to redirect traffic to a VRF routing instance that matched the
   flow specification NLRI. In that RFC, the Redirect Extended
   Community was documented as follows:

```
: +--------+-------------------+-------------------------+
: | type   | extended community | encoding               |
: +--------+-------------------+-------------------------+
: | 0x8008 | redirect          | 6-byte Route Target     |
: +--------+-------------------+-------------------------+
:
: [...]
:
: Redirect:  The redirect extended community allows the traffic to be
: redirected to a VRF routing instance that lists the specified
: route-target in its import policy.  If several local instances
: match this criteria, the choice between them is a local matter
: (for example, the instance with the lowest Route Distinguisher
: value can be elected).  This extended community uses the same
: encoding as the Route Target extended community [RFC4360].
: [...]
:
: 11. IANA Considerations
: [...]
:
: The following traffic filtering flow specification rules have been
: allocated by IANA from the "BGP Extended Communities Type -
: Experimental Use" registry as follows:
: [...]
:
: 0x8008 - Flow spec redirect
```

The IANA registry of BGP Extended Communities clearly identifies
communities of specific formats. For example, "Two-octet AS Specific
Extended Community" [RFC4360], "Four-octet AS Specific Extended
Community" [RFC5668] and "IPv4 Address Specific Extended Community"
[RFC4360]. Route Targets [RFC4360] identify this format in the high-
order (Type) octet of the Extended Community and set the value of the
low-order (Sub-Type) octet to 0x02. The Value field of the Route
Target Extended Community is intended to be interpreted in the
context of its format.

Since the Redirect Extended Community only registered a single code-
point in the IANA BGP Extended Community registry, a common
interpretation of the redirect extended community's "6-byte route
target" has been to look, at a receiving router, for a route target
value that matches the route target value in the received redirect
extended community, and import the advertised route to the
corresponding VRF instance subject to the rules defined in [RFC5575].
However, because the route target format in the redirect extended
community is not clearly defined, the wrong match may occur.

This "value wildcard" matching behavior, which does not take into
account the format of the route target defined for a local VRF and
may result in the wrong matching decision, does not match deployed
implementations of BGP Flowspec. Deployed implementations of BGP
Flowspec solve this problem by defining different redirect extended
communities that are specific to the format of the route target
value. This document defines the following redirect extended
communities:

```
+--------+-------------------+------------------------------------+
| type   | extended community | encoding                          |
+--------+-------------------+------------------------------------+
| 0x8008 | redirect AS-2byte | 2-octet AS, 4-octet Value          |
| 0x8108 | redirect IPv4     | 4-octet IPv4 Address, 2-octet Value |
| 0x8208 | redirect AS-4byte | 4-octet AS, 2-octet Value          |
+--------+-------------------+------------------------------------+
```

It should be noted that the low-order nibble of the Redirect's Type
field corresponds to the Route Target Extended Community format field
(Type). (See [RFC4360], Secs. 3.1, 3.2, and 4 plus [RFC5668], Sec.
2.) The low order octet (Sub-Type) of the Redirect Extended
Community remains 0x08, contrasted to 0x02 for Route Targets.

The IANA Registries for BGP Extended Communities [RFC7153] document
was written to update the previously-mentioned IANA registries to
better document BGP Extended Community formats. The IANA
Considerations section below further amends those registry updates in
order to properly document the Flowspec redirect communities.

2. IANA Considerations

2.1. Update to BGP Generic Transitive Experimental Use Extended Community Sub-Types

IANA is requested to update the "BGP Generic Transitive Experimental
Use Extended Community Sub-Types" registry as follows:

0x08 - Flow spec redirect AS-2byte format. [RFC5575, RFC-to-be]

(Note to RFC Editor - replace RFC-to-be with this RFC number.)

IANA is requested to update the "BGP Transitive Extended Community
Types" registry as follows:

```
      0x81 - Generic Transitive Experimental Use Extended Community
             Part 2 (Sub-Types are defined in the "Generic Transitive
             Experimental Extended Community Part 2 Sub-Types" Registry)
      0x82 - Generic Transitive Experimental Use Extended Community
             Part 3 (Sub-Types are defined in the "Generic Transitive
             Experimental Extended Community Part 3 Sub-Types" Registry)
```

[2.2](2.2). Generic Transitive Experimental Extended Community Part 2 Sub-Types

   IANA is requested to create the "Generic Transitive Experimental Use
   Extended Community Part 2 Sub-Types" registry. This registry should
   be created under the BGP Extended Communities registry. It will
   contain the following note:

      This registry contains values of the second octet (the "Sub-Type"
      field) of an extended community when the value of the first octet
      (the "Type" field) is 0x81.

   Registry Name: Generic Transitive Experimental Use Extended Community
   Part 2 Sub-Types

```
       RANGE                REGISTRATION PROCEDURE           REFERENCE

       0x00-0xBF            First Come First Served
       0xC0-0xFF            IETF Review

       SUB-TYPE VALUE       NAME
       0x00-0x07            Unassigned
       0x08                 Flow spec redirect IPv4 format.  [RFC-to-be]
       0x09-0xff            Unassigned
```

   (Note to RFC Editor - replace RFC-to-be with this RFC number.)

[2.3](2.3). Generic Transitive Experimental Extended Community Part 3 Sub-Types

   IANA is requested to create the "Generic Transitive Experimental Use
   Extended Community Part 3 Sub-Types" registry. This registry should
   be created under the BGP Extended Communities registry. It will
   contain the following note:

      This registry contains values of the second octet (the "Sub-Type"
      field) of an extended community when the value of the first octet
      (the "Type" field) is 0x82.

   Registry Name: Generic Transitive Experimental Use Extended Community
   Part 2 Sub-Types

```
   RANGE                 REGISTRATION PROCEDURE             REFERENCE

   0x00-0xBF             First Come First Served
   0xC0-0xFF             IETF Review

   SUB-TYPE VALUE        NAME
   0x00-0x07             Unassigned
   0x08                  Flow spec redirect AS-4byte format.  [RFC-to-be]
   0x09-0xff             Unassigned
```

   (Note to RFC Editor - replace RFC-to-be with this RFC number.)

3. Security Considerations

   This document introduces no additional security considerations than
   those already covered in [RFC5575]. It should be noted that if the
   wildcard behavior were actually implemented, this ambiguity may lead
   to the installation of Flowspec rules in an incorrect VRF and may
   lead to traffic to be incorrectly delivered.

4. Acknowledgements

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   discussions of BGP Flowspec with the following individuals:

      Andrew Karch (Cisco)

      Robert Raszuk

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      Matthieu Texier (Arbor Networks)

      Kaliraj Vairavakkalai (Juniper)

5. Normative References

   [RFC4360] Sangli, S., Tappan, D., and Y. Rekhter, "BGP Extended
              Communities Attribute", RFC 4360, February 2006.

   [RFC5575] Marques, P., Sheth, N., Raszuk, R., Greene, B., Mauch, J.,
              and D. McPherson, "Dissemination of Flow Specification
              Rules", RFC 5575, August 2009.

   [RFC5668] Rekhter, Y., Sangli, S., and D. Tappan, "4-Octet AS
              Specific BGP Extended Community", RFC 5668, October 2009.

   [RFC7153]   Rosen, E. and Y. Rekhter, "IANA Registries for BGP
               Extended Communities", RFC 7153, March 2014.

Author's Address

   Jeffrey Haas (editor)
   Juniper Networks

   Email: jhaas@juniper.net