Global Routing Operations
Internet-Draft
Updates: 7948 (if approved)
Intended status: Best Current Practice
Expires: 10 June 2025

J. Snijders
Fastly
S. Konstantaras
AMS-IX
M. Shivji
LINX
7 December 2024

Recommendation to Aavoid use Use of BGP Extended Communities at Internet Exchange Points (IXPs) Route Servers

draft-ietf-grow-ixp-ext-comms-01

Abstract

This document outlines a recommendation to the Internet operational community to avoid the use of BGP Extended Communities at Internet Exchange Point (IXP) Route Servers. It The document also includes guidance for both the Internet Service Provider side peering with Route Servers and IXPs operating Route Servers. This recommendation aims to help the global Internet routing system's performance and help protect Route Server participants against misconfigurations.

a mis en forme : Surlignage

Status of This Memo

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

Internet-Drafts are working documents of the Internet Engineering Task Force (IETF). Note that other groups may also distribute working documents as Internet-Drafts. The list of current Internet-Drafts is at https://datatracker.ietf.org/drafts/current/.

Internet-Drafts are draft documents valid for a maximum of six months and may be updated, replaced, or obsoleted by other documents at any 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 10 June 2025.

Table of Contents

1. Introduction

This document outlines a recommendation to the Internet operational community to avoid the use of BGP Extended Communities [RFC4360] at Internet Exchange Point (IXP) Route Servers [RFC7947], [RFC7948]. It includes guidance for both the Internet Service Provider side peering with Route Servers and IXPs operating Route Servers.

This ~~recomendation~~recommendation aims to help the global Internet routing system's performance and help protect Route Server participants against misconfigurations.A

Commenté [MB1]: As this is identical to the abstract, suggest the background text to be moved here (and replace this one).

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.

"BGP Classic Communities" refers to the Communities Attribute defined in [RFC1997].

3. Background

The main ~~use~~use ~~-case~~ cases for BGP Extended Communities are as Route Targets (RTs) within VPNs [RFC4364] deployments. However, ~~, but~~ historically Extended Communities also have been used as an operational utility to signal requests to IXP Route Servers such as ~~functionality to reduce~~reduce propagation scope or request AS_PATH prepending.

Commenté [MB2]: I wonder whether we can refer to data such as in https://marinho-barcellos.github.io/publication/2022-conext-mazzola/conext2022-communities.pdf and the like

Use of Extended Communities arose from a lack of support to fit 4-octet Autonomous System Numbers (ASNs) [RFC4893] in Classic BGP

~~communities~~ Communities [RFC1997], thus operators improvised a method that could allow BGP signaling from IXP participants with 4-octet ASN. The 6-octet space for the Global and Local ~~administrator~~ Administrator parts of the BGP Extended Community provides sufficient space for a single 4-octet ASN. However, the 6-octet space is not sufficient enough should a 4-octet ASN participant of an IXP want to send a signal to a 4-octet ASN Route Server or to another 4-octet ASN participant. Moreover, the flexibility to insert a 4-octet ASN either in the Global or the Local Administrator parts, proved to bring extra complexity both in the BGP implementations and in the route propagation functions that are being triggered through BGP Extended Communities. Although, this method was widely considered to be an acceptable workaround ~~for a period of time~~at the time, a more robust and future proof solution ~~was needed~~ that ~~could~~ overcomes the aforementioned obstacles is needed.

BGP Large C~~c~~ommunities [RFC8092] ~~addressed~~ addresses the operational requirements for ~~working~~ manipulating ~~with~~ 4-octet ASNs in a variety of scenarios. With a total space of 12 octets divided into 3 separate fields, signalling between 2-octet ASNs and 4-octet ASNs, or 4-octet ASNs and 4-octet ASNs, making the use of BGP Extended Communities redundant. Since the introduction of BGP Large communities in 2017 - by now - virtually all BGP implementations have adopted this standard, making this feature usable in all public Internet deployments.

At the moment of writing this recommendation, there are still some ~~IP~~ (n~~N~~etwork and IXP) operators that support BGP Extended Communities for IXP Route Server signaling purposes. However, supporting three flavors of BGP Communities (Classic, Large, and Extended) contribute to increased memory consumption, increased complexity in r~~R~~outing ~~Policies~~policies, and reduced stability of the Internet ecosystem as BGP speakers need to send a BGP UPDATE message every time any type of BGP Community is added, removed, or modified. As each and every BGP UPDATE message propagated and received requires CPU cycles for processing, any efforts that minimize the number of BGP UPDATE messages are advantageous for the global routing system. The authors of this document posit that Extended Communities are superfluous in context of the existence of Large Communities.

Commenté [MB3]: I would delete and focus on the reco that (will) represent the WG consensus, not only the authors opinion

4. Recommendation

IXP Route Server operators that match on route announcements with Extended Communities for 4-octet ASNs SHOULD replace these configurations with equivalent functionality implemented using Large Communities [RFC8092].

As an additional recommendation, Route Server operators should communicate a clear timeline for their clients to transition from Extended to Large communities.

Finally, operators of ~~Internet Exchange~~IXP Route Servers are RECOMMENDED to:

* Scrub the BGP Extended Communities at the inbound direction which are ~~intendend~~intended for L3VPN purposes. That concerns the Extended communities where the sub-type value has been set to 0x02 (Route Target).

* Allow the rest of the BGP Extended Communities to transit transparently through the Route Servers.

5. Changes to RFC_7948

This document updates Section 4.6.1 of [RFC7948] to replace all occurrences of BGP Extended Communities with BGP Large Communities, as defined in [RFC8092].

~~Old OLD~~~~Text~~:
Prefixes sent to the route server are tagged with specific standard BGP Communities [RFC1997] or Extended Communities [RFC4360] attributes, based on predefined values agreed between the operator and all clients.

~~New Text~~NEW:
Prefixes sent to the route server are tagged with specific standard BGP Communities [RFC1997] or BGP Large Communities [RFC8092] attributes, based on predefined values agreed between the operator and all clients.

~~Old Text~~OLD:
As both standard BGP Communities and Extended Communities values are restricted to 6 octets or fewer, it is not possible for both the global and local administrator fields in the BGP Communities value to fit a 4-octet AS number.

~~New Text~~NEW:
As a standard BGP Communities value is restricted to a total of 4 octets, it is not possible for both the global and local administrator fields in the BGP Communities value to fit a 4-octet AS number.

The Informative Reference to [RFC4360] in [RFC7948] is replaced with an Informative Reference to [RFC8092].

6. Acknowledgments

The authors would like to thank Jeffrey Haas, Nick Hilliard and Martin Pels for their useful feedback and suggestions during the review process through the GROW mailing list.

7. Security Considerations

There are no security considerations accompanying this document.

8. IANA Considerations

This document has no actions for IANA.

Commenté [MB4]: May be point to rfc4364#section-4.3.1?

Commenté [MB5]: Maybe remind this is already the base reco in RFC7947, e.g., this part:

«Transitive as well as non-transitive Communities attributes applied to an NLRI UPDATE sent to a route server SHOULD NOT be modified, processed, or removed, except as defined by local policy. »

Commenté [MB6]: It might be cleaner to include those in an RFC 7948-bis if there are other queued changes.

Commenté [MB7]: Note sure we need this.

Commenté [MB8]: At least a reminder of the sec cons of the various cited RFCs (7948, 8092) should be included.

9. References

9.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <https://www.rfc-editor.org/info/rfc2119>.

[RFC7948] Hilliard, N., Jasinska, E., Raszuk, R., and N. Bakker, "Internet Exchange BGP Route Server Operations", RFC 7948, DOI 10.17487/RFC7948, September 2016, <https://www.rfc-editor.org/info/rfc7948>.

[RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <https://www.rfc-editor.org/info/rfc8174>.

9.2. Informative References

[RFC1997] Chandra, R., Traina, P., and T. Li, "BGP Communities Attribute", RFC 1997, DOI 10.17487/RFC1997, August 1996, <https://www.rfc-editor.org/info/rfc1997>.

[RFC4360] Sangli, S., Tappan, D., and Y. Rekhter, "BGP Extended Communities Attribute", RFC 4360, DOI 10.17487/RFC4360, February 2006, <https://www.rfc-editor.org/info/rfc4360>.

[RFC4364] Rosen, E. and Y. Rekhter, "BGP/MPLS IP Virtual Private Networks (VPNs)", RFC 4364, DOI 10.17487/RFC4364, February 2006, <https://www.rfc-editor.org/info/rfc4364>.

[RFC4893] Vohra, Q. and E. Chen, "BGP Support for Four-octet AS Number Space", RFC 4893, DOI 10.17487/RFC4893, May 2007, <https://www.rfc-editor.org/info/rfc4893>.

[RFC7947] Jasinska, E., Hilliard, N., Raszuk, R., and N. Bakker, "Internet Exchange BGP Route Server", RFC 7947, DOI 10.17487/RFC7947, September 2016, <https://www.rfc-editor.org/info/rfc7947>.

[RFC8092] Heitz, J., Ed., Snijders, J., Ed., Patel, K., Bagdonas, I., and N. Hilliard, "BGP Large Communities Attribute", RFC 8092, DOI 10.17487/RFC8092, February 2017, <https://www.rfc-editor.org/info/rfc8092>.

Authors' Addresses

Job Snijders
Fastly, Inc.
Amsterdam
Netherlands
Email: job@fastly.com

Stavros Konstantaras
Amsterdam Internet Exchange
Amsterdam

Netherlands
Email: stavros.konstantaras@ams-ix.net

Mo Shivji
London Internet Exchange Ltd
London
United Kingdom
Email: moyaze@linx.net