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Route Target Constrain Extension
draft-zzhang-idr-bgp-rt-constrains-extension-00

Abstract

This document specifies the extensions to Route Target Constrain mechanism so that it works with various types of Route Targets of arbitrary lengths.

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.

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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This Internet-Draft will expire on January 13, 2021.

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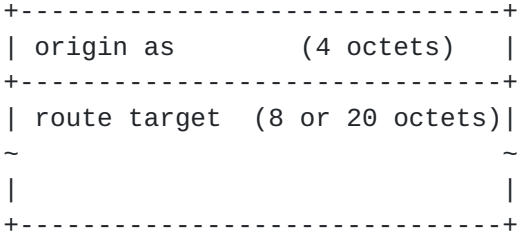
1. Introduction

The importation and propagation of BGP routes can be controled using Route Targets [RFC4364] and Route Target Constrains [RFC4684].

A Route Target (RT) could be an 8-octet BGP Extended Community (EC) or a 20-octet IPv6 Address Sepcfic EC, though the RT Constrain mechanism specified in [RFC4684] was designed for the 8-octet RTs only.

[I-D.ietf-idr-bgp-ipv6-rt-constrain] extends the mechanism to handle IPv6 Address Specific RTs by allowing the NLRI prefix to be of 0 to 24 octets (vs. 0 to 12 octets as in [RFC4684]):



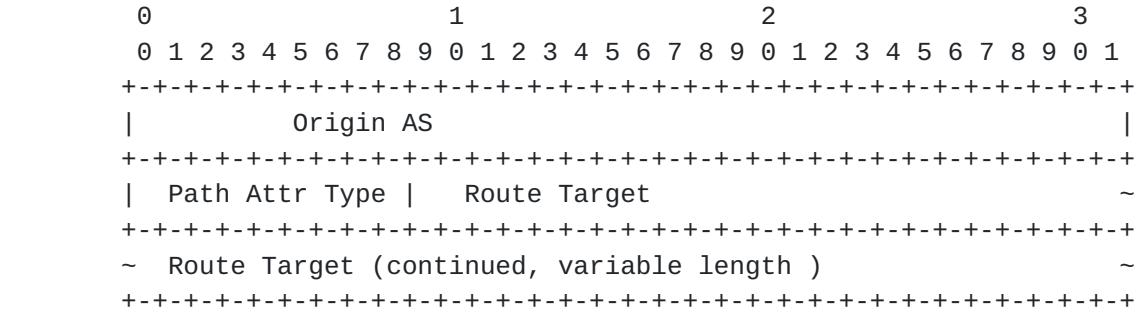
There is a limitation with the approach in [I-D.ietf-idr-bgp-ipv6-rt-constrain] - when the prefix is not more than 12 octets, there is no way to determine if the route target part is a partial IPv6 Address Sepcific RT or a full/partial AS or IPv4 Address Specific RT.

Additional types of RTs of arbitrary lengths could also be defined, e.g. [I-D.zzhang-idr-bitmask-route-target]. To extend the RT Constrain mechanisms in a generic way so that any forseeable types of RTs can be used, this document proposes the extensions specified in the following section.

While the extended mechnism specified in this document can be used for existing RTs including IPv6 Address Specific RTs, it is not the intention of this document to replace or obsolete the mechansim defined in [I-D.ietf-idr-bgp-ipv6-rt-constrain], given its current status and potential existing implementations and deployments. An operator may choose either way as long as there is no ambiguity.

2. Specification

To advertise Route Target Membership with various types of RTs, a new NLRI encoding with a new SAFI "Extended Route Target constrains" is used as following:



The one-octet "Path Attr Type" indicates the category of Route Target that follows it, using the type of BGP Path Attribute for the RT. For example, the "Path Attr Type" is 16 (Extended Community) for regular RTs, 25 (IPv6 Address Specific Extended Community) for IPv6 Address Specific RTs, or 34 (BGP Community Container Attribute) for any RT defined as a BGP Community Container (e.g. [I-D.zzhang-idr-bitmask-route-target]).

Similar to [RFC4684], except for the default route target, which is encoded as a zero-length prefix, the minimum prefix length is 40 bits - the Origin AS field and the Path Attr Type field cannot be interpreted as a prefix. Route targets MAY then be expressed as prefixes, where, for instance, a prefix would encompass all regular or IPv6 Address Specific RTs assigned by a given Global Administrator. Semantics of adverising Route Target Membership for other types of RTs as prefixes MUST be defined with the specfication of those types of RTs.

3. Security Considerations

This document does not change security aspects as discussed in [RFC4684].

4. IANA Considerations

This document requests IANA to assign a new SAFI "Extended Route Target constrains".

5. Acknowledgements

The authors thank John Scudder for his comments and suggestions.

6. References

6.1. Normative References

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[RFC4684] Marques, P., Bonica, R., Fang, L., Martini, L., Raszuk, R., Patel, K., and J. Guichard, "Constrained Route Distribution for Border Gateway Protocol/MultiProtocol Label Switching (BGP/MPLS) Internet Protocol (IP) Virtual Private Networks (VPNs)", RFC 4684, DOI 10.17487/RFC4684, November 2006, <https://www.rfc-editor.org/info/rfc4684>.

[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>.

6.2. Informative References

[I-D.ietf-idr-wide-bgp-communities] Raszuk, R., Haas, J., Lange, A., Decraene, B., Amante, S., and P. Jakma, "BGP Community Container Attribute", draft-ietf-idr-wide-bgp-communities-05 (work in progress), July 2018.

[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>.

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