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Bitmask Route Target
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Abstract

This document specifies a new type of Route Target called Bitmask Route Target as a BGP Community Container. The key element of a Bitmask Route Target is a Bitmask. Two Bitmask Route Targets are considered equivalent for the purpose of controlling route propagation (via Route Target Constraints) and importation if the result of logical "AND" operation of the Bitmask of the two is non-zero.

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

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1. Introduction

The importation and propagation of BGP routes can be controlled using Route Targets [RFC4364] and Constrained Route Target Distribution (RT-C) [RFC4684]. RT-C relies on matching a Route Target prefix. The typical matching use case is the full 8-octet encoding of the Route Target Extended Community.

For some applications, it's desirable to have a Route Target with the semantic of a bit-string. For such situations and it may be desirable to match such bit-string Route Targets that have specific bits set. This document defines a new type of Route Target for that purpose.

An example use case of this Bitmask Route Target is documented in [I-D.zzhang-teas-network-slicing-with-flex-te].

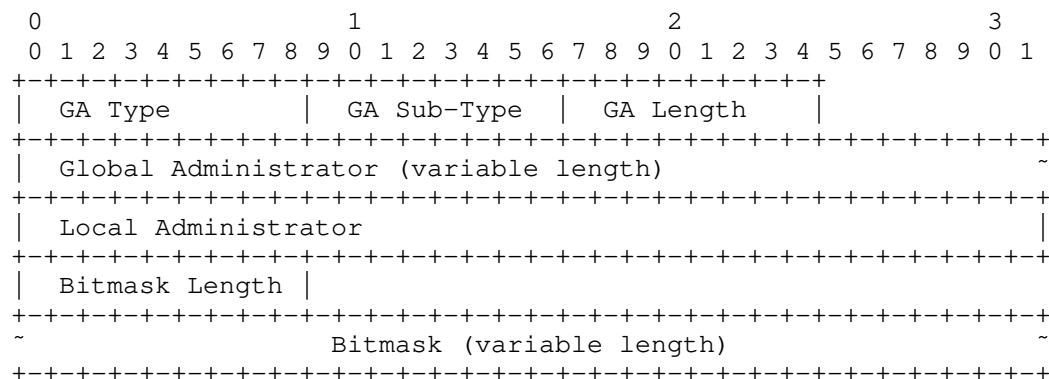
The use of Bitmask Route Target with Constrained Route Target Distribution is specified separately in [I-D.zzhang-idr-bgp-rt-constrains-extension].

2. Specification

The Bitmask Route Target is a Transitive BGP Community Container of type TBD1 [I-D.ietf-idr-wide-bgp-communities].

The semantics of Global Administrator and Local Administrator are identical to those in [RFC4360].

The container's contents is a series of Bitmask Route Targets. Each Bitmask Route Target includes a 1-octet Global Administrator (GA) Type, a 1-octet GA Sub-Type, 1-octet GA Length, a variable length GA, a 4-octet Local Administrator (LA), a 1-octet Bitmask Length in number of octets, and a variable length Bitmask.



The following GA Types and corresponding lengths are defined in this document:

- 1: AS Number, 4-octets
- 2: IPv4 Address, 4-octets
- 3: IPv6 Address, 16-octets

The follow GA Sub-Types are defined in this document:

- 2: Route-Target

2.1. Matching Semantics

A Bitmask Route Target, A, is considered to match Bitmask Route Target, B, for the purpose of controlling propagation and importation of a route with an attached Bitmask Route Target B if the following conditions are met:

- * The GA Type, GA Sub-Type, GA Length, GA, and LA fields in A and B match.
- * Either:
 - The Bitmask Length of A is 0. In other words, "match all".
 - The result of the logical "AND" operation of the Bitmask field in A and B is not 0. When A and B have different Bitmask Lengths, the shorter Route Target's Bitmask is considered to be padded with zeroes for match purposes vs. the longer one.

3. Error Handling

A Bitmask Route Target MUST NOT be originated with a RESERVED GA Type. Implementations receiving BGP Routes with a RESERVED Bitmask Route Target MUST check its syntactic correctness and MAY silently discard it.

A Bitmask Route Target SHOULD NOT be originated with a Bitmask Length of 0.

A Bitmask Route Target is considered malformed if:

- * The length of the Bitmask Route Target is less than the minimum length of 8: 1-octet GA Type, 1-octet GA Sub-Type, 1-octet GA Length, 0-length GA, 4-octet LA, 0-octet Bitmask.
- * The Bitmask Route Target GA Type is known by the implementation and the GA Length is incorrect vs. the registered GA Type.
- * The total computed length of the Bitmask Route Targets in a BGP Community Container is not identical to the BGP Community Container Length. Each Bitmask Route Target's computed length is: 1-octet GA Type, 1-octet GA Length field, N-octet GA Length value, 4-octet LA field, 1-octet Bitmask Length, N-octet Bitmask Length value.

BGP Updates containing malformed Bitmask Route Targets should use the Treat-as-withdraw behavior for the routes in the Update according to [RFC7606].

4. Security Considerations

This document does not change security aspects as discussed in [RFC4364] and [I-D.ietf-idr-wide-bgp-communities].

5. IANA Considerations

This document requests IANA to assign a BGP Community Container Type for the Bitmask Route Target from the "BGP Community Container Types" registry for TBD1.

This document requests IANA to setup a "Bitmask Route Target Global Administrator Type Registry". The initial allocation and policy for this registry is:

GA Type	GA Type Name	GA Type Length (octets)	Reference
0	RESERVED	UNSPECIFIED	This document
1	AS Number	4	This document
2	IPv4 Address	4	This document
3	IPv6 Address	16	This document
4..127	Available, Specification Required	TBD	-
128..254	Available, First Come, First Served	TBD	-
255	RESERVED	UNSPECIFIED	This document

Table 1: Bitmask Route Target GA-Type Registry

This document requests IANA to setup a "Bitmask Route Target Global Administrator Sub-Type Registry". The initial allocation and policy for this registry is:

GA Sub-Type	GA Sub-Type Name	Reference
0	RESERVED	This document
1	Available, Specification Required	-
2	Route-Target	This document
3..127	Available, Specification Required	-
128..254	Available, First Come, First Served	-
255	RESERVED	This document

Table 2: Bitmask Route Target GA-Sub-Type Registry

6. Acknowledgements

The authors thank John Scudder for his comments and suggestions.

7. References

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