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IANA Registries for BGP Extended Communities

Abstract

This document reorganizes the IANA registries for the type values and sub-type values of the BGP Extended Communities attribute and the BGP IPv6-Address-Specific Extended Communities attribute. This is done in order to remove interdependencies among the registries, thus making it easier for IANA to determine which codepoints are available for assignment in which registries. This document also clarifies the information that must be provided to IANA when requesting an allocation from one or more of these registries. These changes are compatible with the existing allocations and thus do not affect protocol implementations. The changes will, however, impact the "IANA Considerations" sections of future protocol specifications. This document updates RFC 4360 and RFC 5701.

Status of This Memo

This is an Internet Standards Track document.

This document is a product of the Internet Engineering Task Force (IETF). It represents the consensus of the IETF community. It has received public review and has been approved for publication by the Internet Engineering Steering Group (IESG). Further information on Internet Standards is available in Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at http://www.rfc-editor.org/info/rfc7153.

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1. Introduction

RFC 4360 [RFC4360] defines the BGP "Extended Communities" (EC) attribute. This attribute consists of a sequence of eight-octet "extended communities". The high-order octet is defined to be the "Type" field. Each Type has a range of values for "Transitive Extended Community Types" and a range of values for "Non-transitive Extended Community Types". Some of these ranges are further subdivided into a sub-range of values to be assigned by IANA under the "Standards Action" policy, a sub-range of values to be assigned

by IANA under the "First Come First Served" policy, and a sub-range for "experimental use". (See [RFC5226], [RFC7120], and [RFC3692] for an explanation of these policies.)

For some Extended Community Types, the second octet of the Extended Community is a "Sub-Type" field, and the remaining six octets are the "Value" field. These are referred to as "Extended Types". For other types, there is no "Sub-Type" field, and the "Value" field contains seven octets. These are referred to as "Regular Types".

RFC 4360 is not very specific about how the IANA registries for Extended Community Types and/or Sub-Types are to be organized, and this has led to some confusion. The purpose of this document is to reorganize the registries to make the IANA codepoint allocation task more straightforward.

2. Types, Sub-Types, and Registries

The high-order octet of an Extended Community will be known as the "Type" field.

There will be one IANA registry for "Transitive Extended Community Types" (see Section 5.1.1) and one for "Non-transitive Extended Community Types" (Section 5.1.2). Each registry specifies three ranges, and each range is associated with a particular IANA allocation policy.

There will be a set of IANA registries for Extended Community Sub-Types (see Section 5.2). Each such registry will have a range of 0x00-0xFF. Values in the range 0x00-0xBF are assignable by IANA according to the "First Come First Served" allocation policy of [RFC5226]. Values in the range 0xC0-0xFF are assignable by IANA according to the "IETF Review" allocation policy of [RFC5226].

If a particular Type has Sub-Types, that Type’s entry in its Type registry identifies its Sub-Type registry. Note that some Types do not have Sub-Types. When the request is made to establish a new Type registry, the request must specify whether or not there is to be a Sub-Type registry associated with that Type.

Whether a given Type has Sub-Types is determined when the Type is initially defined; this cannot be changed later.

3. Applicability to IPv6-Address-Specific EC Attribute

RFC 5701 [RFC5701] defines the IPv6-Address-Specific Extended Community to be a 20-octet quantity whose high-order two octets may be considered to be the "Type" field. The high-order octet is either

0x00, indicating a transitive Extended Community; or 0x40, indicating a Non-transitive Extended Community. The second octet is said to be a "Sub-Type", and it is suggested that the Sub-Types are the same as the Sub-Types for the IPv4-Address-Specific Extended Community. However, the existing IANA codepoint allocations for this octet do not always match the corresponding allocations for the IPv4-Address-Specific Extended Community Sub-Types.

This document modifies RFC 5701 by removing any requirement for the values of the second octet of the IPv6-Address-Specific Extended Community Type codepoints to match the codepoints in either of the IPv4-Address-Specific Sub-Types registries.

This document requests IANA to create two IPv6-Address-Specific Extended Community registries -- one for transitive communities and one for non-transitive communities. See Section 5.3.

4. How to Request EC Type and/or Sub-Type Codepoints

When a codepoint is needed for a new Extended Community, the requester should first determine whether an existing Type can be used. If so, IANA should be asked to allocate a codepoint from the corresponding Sub-Type registry, if there is one.

If a new Extended Community Type is needed, the requester should ask IANA to allocate a new type from the "BGP Transitive Extended Community Types" registry, the "BGP Non-Transitive Extended Community Types" registry, or both. It is up to the requester to state whether an allocation is needed from one or both of these registries. When an allocation from both registries is requested, the requester may find it desirable for both allocations to share the same low-order six bits. If so, it is the responsibility of the requester to explicitly request this of IANA.

Of course, any request for a codepoint from a particular registry must follow the defined registration procedures for that registry.

If a new Extended Community Type is needed and the new Type is to have Sub-Types, the requester should specify whether an existing Sub-Type registry can be used for the new Type or a new Sub-Type registry is needed. (At the current time, every Type that has Sub-Types is associated with a unique Sub-Type registry. It is possible that in the future a new Type registry may be created that is associated with a pre-existing Sub-Type registry.) In either case, if a new Sub-Type value needs to be allocated from a particular Sub-Type registry, the request should explicitly identify the registry.

If the creation of a new Sub-Type registry is requested, the range of values is always 0x00-0xFF. It is recommended that the allocation policy described in Section 2 be used, i.e., 0x00-0xBF to be allocated by IANA under the "First Come First Served" policy and 0xC0-0xFF to be allocated by IANA under the "IETF Review" policy.

Commonly, a new Extended Community is defined such that it can be of several Types. For example, one may want to define a new Extended Community so that it can be either transitive or non-transitive, either the two-octet AS Number Type or the four-octet AS Number Type, etc. The requester is responsible for explicitly asking IANA to allocate codepoints in all the necessary Type and/or Sub-Type registries.

When a new Extended Community is defined, it may be necessary to ask IANA to allocate codepoints in several Sub-Type registries. In this case, it is a common practice to ask IANA to allocate the same codepoint value in each registry. If this is desired, it is the responsibility of the requester to explicitly ask IANA to allocate the same value in each registry.

When a new Extended Community Sub-Type codepoint is allocated, it may also be desirable to allocate a corresponding value in one or both of the IPv6-Address-Specific Extended Community registries. The requester is responsible for requesting this allocation explicitly. If the requester would like the same numerical value to be allocated in an IPv6-Address-Specific Extended Community registry that is allocated in some other registry, it is the responsibility of the requester to explicitly ask this of IANA.

5. IANA Considerations

IANA has replaced the pre-existing BGP Extended Communities registries with the registries described in this section.

The registries reproduced below do not include the "references" or "date" fields for the individual codepoints in the registries, because it is difficult to incorporate those within the 72-character line limitation of RFCs. The references and associated dates have been copied from the existing registries when creating the new registries; the authors have worked with IANA to ensure that this information has been carried over correctly to the reorganized registry. As this document does not change the usage or semantics of any of the codepoints, the references associated with the individual codepoints do not change.

On the other hand, the references for each of the registries defined in this section have been changed to refer to this document.

5.1. Registries for the "Type" Field

5.1.1. Transitive Types

The following note has been added to the "BGP Transitive Extended Community Types" registry.

> This registry contains values of the high-order octet (the "Type" field) of a Transitive Extended Community.

Registry Name: BGP Transitive Extended Community Types

RANGE	REGISTRATION PROCEDURES
0x00-0x3F	First Come First Served
0x80-0x8F	Experimental Use (see RFC 3692)
0x90-0xBF	Standards Action

TYPE VALUE	NAME
0x00	Transitive Two-Octet AS-Specific Extended Community (Sub-Types are defined in the "Transitive Two-Octet AS-Specific Extended Community Sub-Types" registry)
0x01	Transitive IPv4-Address-Specific Extended Community (Sub-Types are defined in the "Transitive IPv4-Address-Specific Extended Community Sub-Types" registry)
0x02	Transitive Four-Octet AS-Specific Extended Community (Sub-Types are defined in the "Transitive Four-Octet AS-Specific Extended Community Sub-Types" registry)
0x03	Transitive Opaque Extended Community (Sub-Types are defined in the "Transitive Opaque Extended Community Sub-Types" registry)
0x04	QoS Marking
0x05	CoS Capability
0x06	EVPN (Sub-Types are defined in the "EVPN Extended Community Sub-Types" registry)
0x08	Flow spec redirect/mirror to IP next-hop

0x80	Generic Transitive Experimental Use Extended Community (Sub-Types are defined in the "Generic Transitive Experimental Use Extended Community Sub-Types" registry)

5.1.2. Non-Transitive Types

The following note has been added to the "BGP Non-Transitive Extended Community Types" registry.

> This registry contains values of the high-order octet (the "Type" field) of a Non-transitive Extended Community.

Registry Name: BGP Non-Transitive Extended Community Types

RANGE	REGISTRATION PROCEDURES
0x40-0x7F	First Come First Served
0xC0-0xCF	Experimental Use (see RFC 3692)
0xD0-0xFF	Standards Action

TYPE VALUE	NAME
0x40	Non-Transitive Two-Octet AS-Specific Extended Community (Sub-Types are defined in the "Non-Transitive Two-Octet AS-Specific Extended Community Sub-Types" registry)
0x41	Non-Transitive IPv4-Address-Specific Extended Community (Sub-Types are defined in the "Non-Transitive IPv4-Address-Specific Extended Community Sub-Types" registry)
0x42	Non-Transitive Four-Octet AS-Specific Extended Community (Sub-Types are defined in the "Non-Transitive Four-Octet AS-Specific Extended Community Sub-Types" registry)
0x43	Non-Transitive Opaque Extended Community (Sub-Types are defined in the "Non-Transitive Opaque Extended Community Sub-Types" registry)
0x44	QoS Marking

5.2. Registries for the "Sub-Type" Field

5.2.1. EVPN Extended Community Sub-Types

The following note has been added to the "EVPN Extended Community Sub-Types" registry:

> 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 0x06.

Registry Name: EVPN Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x00	MAC Mobility
0x01	ESI MPLS Label
0x02	ES Import

5.2.2. Transitive Two-Octet AS-Specific Extended Community Sub-Types

The following note has been added to the "Transitive Two-Octet AS-Specific Extended Community Sub-Types" registry:

> 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 0x00.

Registry Name: Transitive Two-Octet AS-Specific Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x02	Route Target
0x03	Route Origin
0x05	OSPF Domain Identifier
0x08	BGP Data Collection
0x09	Source AS
0x0A	L2VPN Identifier
0x10	Cisco VPN-Distinguisher

5.2.3. Non-Transitive Two-Octet AS-Specific Extended Community Sub-Types

The following note has been added to the "Non-Transitive Two-Octet AS-Specific Extended Community Sub-Types" registry:

> 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 0x40.

Registry Name: Non-Transitive Two-Octet AS-Specific Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x04	Link Bandwidth Extended Community

5.2.4. Transitive Four-Octet AS-Specific Extended Community Sub-Types

The following note has been added to the "Transitive Four-Octet AS-Specific Extended Community Sub-Types" registry:

> 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 0x02.

Registry Name: Transitive Four-Octet AS-Specific Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x02	Route Target
0x03	Route Origin
0x04	Generic
0x05	OSPF Domain Identifier
0x08	BGP Data Collection
0x09	Source AS
0x10	Cisco VPN Identifier

5.2.5. Non-Transitive Four-Octet AS-Specific Extended Community Sub-Types

The following note has been added to the "Non-Transitive Four-Octet AS-Specific Extended Community Sub-Types" registry:

> 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 0x42.

Registry Name: Non-Transitive Four-Octet AS-Specific Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x04	Generic

5.2.6. Transitive IPv4-Address-Specific Extended Community Sub-Types

The following note has been added to the "Transitive IPv4-Address-Specific Extended Community Sub-Types" registry:

> 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 0x01.

Registry Name: Transitive IPv4-Address-Specific Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x02	Route Target
0x03	Route Origin
0x05	OSPF Domain Identifier
0x07	OSPF Route ID
0x0A	L2VPN Identifier
0x0B	VRF Route Import
0x10	Cisco VPN-Distinguisher

5.2.7. Non-Transitive IPv4-Address-Specific Extended Community Sub-Types

The following note has been added to the "Non-Transitive IPv4-Address-Specific Extended Community Sub-Types" registry:

> 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 0x41.

Registry Name: Non-Transitive IPv4-Address-Specific Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

None Assigned

5.2.8. Transitive Opaque Extended Community Sub-Types

The following note has been added to the "Transitive Opaque Extended Community Sub-Types" registry:

> 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 0x03.

Registry Name: Transitive Opaque Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x06	OSPF Route Type
0x0B	Color Extended Community
0x0C	Encapsulation Extended Community
0x0D	Default Gateway

5.2.9. Non-Transitive Opaque Extended Community Sub-Types

The following note has been added to the "Non-Transitive Opaque Extended Community Sub-Types" registry:

> 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 0x43.

Registry Name: Non-Transitive Opaque Extended Community Sub-Types

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x00	BGP Origin Validation State

5.2.10. Generic Transitive Experimental Use Extended Community Sub-Types

The following note has been added to the "Generic Transitive Experimental Use Extended Community Sub-Types" registry:

> 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 0x80.

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

RANGE	REGISTRATION PROCEDURE
0x00-0xBF	First Come First Served
0xC0-0xFF	IETF Review

SUB-TYPE VALUE	NAME
0x06	Flow spec traffic-rate
0x07	Flow spec traffic-action (Use of the "Value" field is defined in the "Traffic Action Fields" registry)
0x08	Flow spec redirect
0x09	Flow spec traffic-remarking
0x0A	Layer2 Info Extended Community

Note: RFC 5575 contains narrative text that declares the "Flow spec traffic-rate" to be non-transitive but then assigns it a codepoint that indicates that it is transitive. Addressing this error in RFC 5575 is not within the scope of this document.

5.2.11. Registries for the "Value" Field

At the time of the writing of this document, there is only one registry containing codepoints for the "Value" field of an Extended Community.

5.2.11.1. Traffic Action Fields

This registry has not been modified.

5.3. Registries for IPv6-Address-Specific ECs

5.3.1. Transitive Types

The following note has been added to the "Transitive IPv6-Address-Specific Extended Community Types" registry:

> This registry contains values of the two high-order octets of an IPv6-Address-Specific Extended Community.

Registry Name: Transitive IPv6-Address-Specific Extended Community Types

RANGE	REGISTRATION PROCEDURE
0x0000-0x00FF	First Come First Served

TYPE VALUE	NAME
0x0002	Route Target
0x0003	Route Origin
0x0004	OSPFv3 Route Attributes (deprecated)
0x000B	VRF Route Import
0x0010	Cisco VPN-Distinguisher
0x0011	UUID-based Route Target

5.3.2. Non-Transitive Types

The following note has been added to the "Non-Transitive IPv6-Address-Specific Extended Community Types" registry:

> This registry contains values of the two high-order octets of an IPv6-Address-Specific Extended Community.

Registry Name: Non-Transitive IPv6-Address-Specific Extended Community Types

RANGE	REGISTRATION PROCEDURE
0x4000-0x40FF	First Come First Served

None assigned

6. Security Considerations

No security considerations are raised by this document.

7. Acknowledgments

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The authors wish to thank Amanda Baber of IANA for educating us on some of the problems faced by IANA staff when responding to requests for BGP Extended Community Type and Sub-Type codepoint allocations.

8. Normative References

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[RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 5226, May 2008.

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