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Registry and Extensions for P-Multicast Service Interface Tunnel Attribute Flags

Abstract

The BGP-based control procedures for Multicast Virtual Private Networks (MVPNs) make use of a BGP attribute known as the "P-Multicast Service Interface (PMSI) Tunnel" attribute. The attribute contains a one-octet "Flags" field. The purpose of this document is to establish an IANA registry for the assignment of the bits in this field. Since the "Flags" field contains only eight bits, this document also defines a new BGP Extended Community, "Additional PMSI Tunnel Attribute Flags", that can be used to carry additional flags for the "P-Multicast Service Interface (PMSI) Tunnel" attribute. This document updates RFC 6514.

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 7841.

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/rfc7902.

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1. Introduction

A BGP attribute, "P-Multicast Service Interface (PMSI) Tunnel" attribute is defined in [RFC6514]. This attribute, referred to as the "PMSI Tunnel" attribute in this document, contains a one-octet "Flags" field. Only one flag is defined in that RFC, but there is now a need to define additional flags. However, that RFC did not create an IANA registry for the assignment of bits in the "Flags" field. This document creates a registry for that purpose. In addition, there may be a need to define more than eight flags. Therefore this document defines a new BGP Extended Community, "Additional PMSI Tunnel Attribute Flags", that can be used to carry additional flags for the "PMSI Tunnel" attribute. A registry is also created for this Extended Community, allowing IANA to assign flag bits from the Extended Community's six-octet value field.

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

2. Extending the "PMSI Tunnel" Attribute "Flags" Field

In [RFC6514], only a single octet in the "PMSI Tunnel" attribute is defined to carry bit flags. This allows eight flags, which is unlikely to be sufficient for all future applications.

This document defines a new Transitive Opaque Extended Community ([RFC4360] [RFC7153]), "Additional PMSI Tunnel Attribute Flags". It also defines a new bit flag in the "PMSI Tunnel" attribute "Flags" field, called the "Extension" flag.

The "Additional PMSI Tunnel Attribute Flags" Extended Community MUST NOT be carried by a given BGP UPDATE message unless the following conditions both hold:

- the given BGP UPDATE message is also carrying a "PMSI Tunnel" attribute, and
- the "Extension" flag of that "PMSI Tunnel" attribute's "Flags" field is set.

The six-octet value field of the "Additional PMSI Tunnel Attribute Flags" Extended Community is considered to be a string of 48 one-bit flags. As shown in Figure 1, the leftmost bit (the most significant bit of the most significant octet) is bit 0, and the rightmost bit (the least significant bit of the least significant octet) is bit 47.

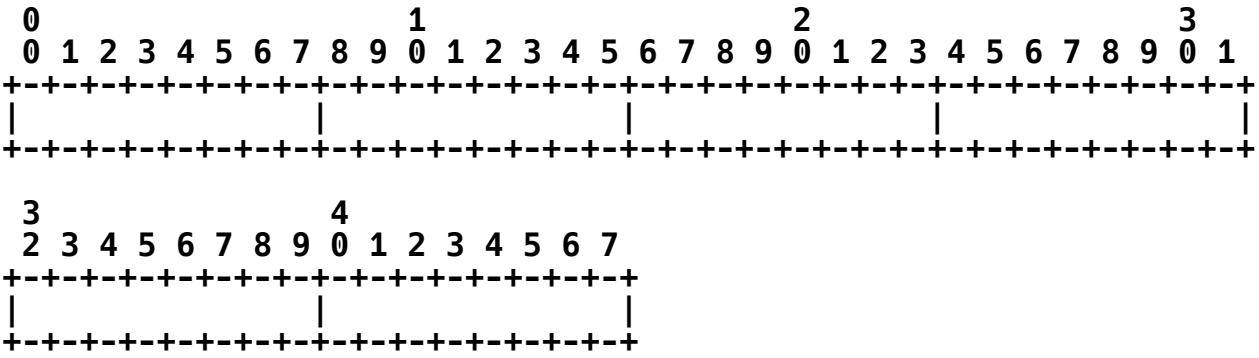

Figure 1: Value Field of the "Additional PMSI Tunnel Attribute Flags" Extended Community

A BGP speaker MUST NOT attach more than one "Additional PMSI Tunnel Attribute Flags" Extended Community to a given BGP UPDATE. If a given BGP UPDATE already contains an "Additional PMSI Tunnel Attribute Flags" Extended Community, a BGP speaker MUST NOT attach any additional such Extended Communities.

If a BGP speaker receives a BGP UPDATE with more than one "Additional PMSI Tunnel Attribute Flags" Extended Communities attached, only the flag settings in first occurrence of the Extended Community are significant. Flag settings in subsequent occurrences of the Extended Community MUST be ignored. When propagating the UPDATE, all instances of the Extended Community other than the first SHOULD be removed.

Suppose a BGP speaker receives an UPDATE message that contains a "PMSI Tunnel" attribute, but does not contain an "Additional PMSI Tunnel Attribute Flags" Extended Community. If the "Extension" flag of the "PMSI Tunnel" attribute is set, the UPDATE is considered to be malformed, and the "treat-as-withdraw" procedure of [RFC7606] MUST be applied.

If a BGP speaker receives an UPDATE message that contains one or more "Additional PMSI Tunnel Attribute Flags" Extended Communities, but either (a) that UPDATE message does not contain a "PMSI Tunnel" attribute, or (b) the "Extension" flag of the "PMSI Tunnel" attribute is not set, then the Extended Community(ies) SHOULD be removed and SHOULD NOT be redistributed. The BGP UPDATE message MUST be processed (and if necessary, redistributed) as if the Extended Community(ies) had not been present.

A BGP speaker that supports the current document, but does not recognize a particular flag (either in the" PMSI Tunnel" attribute "Flags" field or in the "Additional PMSI Tunnel Attribute Flags" Extended Community) MUST simply ignore that flag. If the BGP speaker propagates either the "PMSI Tunnel" attribute, the "Additional PMSI Tunnel Attribute Flags" Extended Community, or both along with the UPDATE message, it SHOULD leave the setting of the flag unchanged.

It is possible that a particular application will require all members of a particular set of BGP speakers to support a particular flag. How it is determined whether all such BGP speakers support that flag is outside the scope of this document.

In some situations, a BGP speaker may need to modify or replace the "PMSI Tunnel" attribute before propagating an UPDATE. If the "Extension" flag of the "PMSI Tunnel" attribute was set before the attribute is modified or replaced, but that flag is no longer set after the attribute is modified or replaced, any "Additional PMSI Tunnel Attribute Flags" Extended Communities MUST be removed before the UPDATE is propagated. If the "PMSI Tunnel" attribute is removed entirely before an UPDATE is propagated, the "Additional PMSI Tunnel Attribute Flags" Extended Communities (if any) MUST also be removed.

3. IANA Considerations

IANA has created a new registry called "P-Multicast Service Interface (PMSI) Tunnel Attribute Flags" in the "Border Gateway Protocol (BGP) Parameters" registry.

Per Section 5 of [RFC6514], a "PMSI Tunnel" attribute contains a "Flags" octet. The "Flags" field is a single octet, with bits numbered, left-to-right, from 0 to 7. IANA has initialized the registry as follows:

Bit Position (left to right)	Description	Reference
0	unassigned	
1	Extension	This document
2	unassigned	
3	unassigned	
4	unassigned	
5	unassigned	
6	unassigned	
7	Leaf Information Required (L)	RFC 6514

"PMSI Tunnel" Attribute Flags

The registration procedure for this registry is Standards Action.

IANA has also assigned the codepoint 0x07 from the "First Come, First Served" range of the "Transitive Opaque Extended Community Sub-Types" registry for "Additional PMSI Tunnel Attribute Flags".

IANA has established a registry for the bit flags carried in the "Additional PMSI Tunnel Attribute Flags" Extended Community. The bits are numbered 0-47, with 0 being the most significant bit and 47 being the least significant bit. The registration policy for this registry is "Standards Action".

The initial registry should be as follows:

Bit Flag	Name	Reference
0-47	Unassigned	

Additional "PMSI Tunnel" Attribute Flags

4. Security Considerations

This document establishes an IANA registry, and defines a new Transitive Opaque Extended Community ([RFC4360], [RFC7153]).

Establishment of an IANA registry does not raise any security considerations.

While this document defines a new Extended Community for carrying bit flags, it does not define any of the bit flags in that Extended Community. Therefore, no security considerations are raised.

This document defines a new flag, the "Extension" flag, in the "PMSI Tunnel" attribute. If a particular UPDATE contains a "PMSI Tunnel" attribute with this flag set, but the UPDATE does not contain an "Additional PMSI Tunnel Attribute Flags" Extended Community, then the UPDATE is considered to be malformed, and the "treat-as-withdraw" procedure of [RFC7606] is invoked. Thus, one can cause an UPDATE to be treated as a withdrawal by incorrectly setting this bit.

5. 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, <http://www.rfc-editor.org/info/rfc2119>.

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

[RFC6514] Aggarwal, R., Rosen, E., Morin, T., and Y. Rekhter, "BGP Encodings and Procedures for Multicast in MPLS/BGP IP VPNs", RFC 6514, DOI 10.17487/RFC6514, February 2012, <http://www.rfc-editor.org/info/rfc6514>.

[RFC7153] Rosen, E. and Y. Rekhter, "IANA Registries for BGP Extended Communities", RFC 7153, DOI 10.17487/RFC7153, March 2014, <http://www.rfc-editor.org/info/rfc7153>.

[RFC7606] Chen, E., Ed., Scudder, J., Ed., Mohapatra, P., and K. Patel, "Revised Error Handling for BGP UPDATE Messages", RFC 7606, DOI 10.17487/RFC7606, August 2015, <http://www.rfc-editor.org/info/rfc7606>.

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