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Deprecation of BGP Entropy Label Capability Attribute

Abstract

The BGP Entropy Label Capability attribute is defined in RFC 6790. Regrettably, it has a bug: although RFC 6790 mandates that routers incapable of processing Entropy Labels must remove the attribute, fulfillment of this requirement cannot be guaranteed in practice. This specification deprecates the attribute. A forthcoming document will propose a replacement.

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/rfc7447.

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1. Introduction

[RFC6790] defines the Entropy Label Capability attribute (ELCA), an optional, transitive BGP path attribute. For correct operation, an intermediate node modifying the next hop of a route must remove the ELCA unless the node doing so is able to process entropy labels. Sadly, this requirement cannot be fulfilled with the ELCA as specified, because it is an optional, transitive attribute. By definition, a node that does not support the ELCA will propagate the attribute (this is a general property of optional, transitive attributes; see [RFC4271]). But such an ELCA-oblivious node is likely to be incapable of processing entropy labels and is exactly the node that we desire to remove the attribute!

This specification updates RFC 6790 by deprecating the version of ELCA defined in Section 5.2 of that document. A forthcoming document will propose a replacement. All other sections of RFC 6790 are unchanged.

1.1. Requirements Language

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 RFC 2119 [RFC2119].

2. Deprecation of ELCA

This document deprecates the ELCA path attribute. This means that implementations MUST NOT generate the attribute. If received, the attribute MUST be treated as any other unrecognized optional, transitive attribute as per [RFC4271], until and unless the code point is reused by some new specification. (To the authors' best knowledge, there are no implementations of ELCA at the time of writing.)

3. IANA Considerations

For the reasons given in Section 1, IANA has marked attribute 28 "BGP Entropy Label Capability Attribute" in the "BGP Path Attributes" registry as "deprecated" and has added a reference to this RFC.

4. Security Considerations

ELCA, as defined in Section 5.2 of [RFC6790], has in common with other optional, transitive path attributes the property that it will be "tunneled" through intervening routers that don't implement the relevant specification. Unfortunately, as discussed elsewhere in this document, implementations of ELCA that receive such "tunneled" attributes could -- sometimes improperly -- rely on them. The consequence of doing so could be a black hole in the forwarding path for the affected routes. Whether or not this is a new security issue is somewhat debatable, since an attacker would have to be part of the control-plane path for the route in question in order for the attacker to exploit the issue. Under those circumstances, an attacker already has a panoply of mischief-making tools available, as discussed in [RFC4272].

In any case, this document renders any real or imagined security issues with ELCA moot, by deprecating it.

5. References

5.1. Normative References

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

[RFC6790] Kompella, K., Drake, J., Amante, S., Henderickx, W., and L. Yong, "The Use of Entropy Labels in MPLS Forwarding", RFC 6790, November 2012, <http://www.rfc-editor.org/info/rfc6790>.

5.2. Informative References

[RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, January 2006, <http://www.rfc-editor.org/info/rfc4271>.

[RFC4272] Murphy, S., "BGP Security Vulnerabilities Analysis", RFC 4272, January 2006, <http://www.rfc-editor.org/info/rfc4272>.

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