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Autonomous-System-Wide Unique BGP Identifier for BGP-4

Abstract

To accommodate situations where the current requirements for the BGP Identifier are not met, this document relaxes the definition of the BGP Identifier to be a 4-octet, unsigned, non-zero integer and relaxes the "uniqueness" requirement so that only Autonomous-System-wide (AS-wide) uniqueness of the BGP Identifiers is required. These revisions to the base BGP specification do not introduce any backward compatibility issues. This document updates RFC 4271.

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/rfc6286.

1. Introduction

Currently, the BGP Identifier of a BGP speaker is specified as a valid IPv4 host address assigned to the BGP speaker [RFC4271]. In addition, the deployed BGP code requires that two BGP speakers be of distinct BGP Identifiers in order to establish a BGP connection.

To accommodate situations where the current requirements for the BGP Identifier are not met (such as in the case of an IPv6-only network), this document relaxes the definition of the BGP Identifier to be a 4-octet, unsigned, non-zero integer and relaxes the "uniqueness" requirement so that only AS-wide uniqueness of the BGP Identifiers is required. These revisions to the base BGP specification do not introduce any backward compatibility issues.

2. Protocol Revisions

The revisions to the base BGP specification [RFC4271] include the definition of the BGP Identifier and procedures for a BGP speaker that supports the AS-wide Unique BGP Identifier.

2.1. Definition of the BGP Identifier

For a BGP speaker that supports the AS-wide Unique BGP Identifier, the BGP Identifier is specified as the following:

> The BGP Identifier is a 4-octet, unsigned, non-zero integer that should be unique within an AS. The value of the BGP Identifier for a BGP speaker is determined on startup and is the same for every local interface and every BGP peer.

2.2. Open Message Error Handling

For a BGP speaker that supports the AS-wide Unique BGP Identifier, the OPEN message error handling related to the BGP Identifier is modified as follows:

> If the BGP Identifier field of the OPEN message is zero, or if it is the same as the BGP Identifier of the local BGP speaker and the message is from an internal peer, then the Error Subcode is set to "Bad BGP Identifier".

2.3. Connection Collision Resolution

For a BGP speaker that supports the AS-wide Unique BGP Identifier, the procedures for connection collision resolution are extended as follows to deal with the case in which the two BGP speakers share the same BGP Identifier (thus, it is only applicable to an external peer):

> If the BGP Identifiers of the peers involved in the connection collision are identical, then the connection initiated by the BGP speaker with the larger AS number is preserved.

This extension covers cases in which the 4-octet AS numbers are involved [RFC4893].

3. Remarks

It is noted that a BGP Identifier allocated based on [RFC4271] fits the revised definition.

In case of BGP Confederation, the whole confederation is considered as one AS for the purpose of supporting the AS-wide Unique BGP Identifier.

A BGP speaker that supports the AS-wide Unique BGP Identifier cannot share a BGP Identifier with its external neighbor until the remote BGP speaker is upgraded with software that supports the specified revisions.

In addition to the OPEN message, the BGP Identifier is currently also used in the following areas:

- In the AGGREAGTOR attribute of a route where the combination of a BGP Identifier and an AS number uniquely identifies the BGP speaker that performs the route aggregation.

- In the Route Reflection within an AS, where only the BGP Identifier of an internal neighbor may be propagated in the route reflection related attributes.

- In the route selection, where the BGP Identifier is not used in comparing a route from an internal neighbor and a route from an external neighbor. In addition, routes from BGP speakers with identical BGP Identifiers have been dealt with (e.g., parallel BGP sessions between two BGP speakers).

Therefore, it is concluded that the revisions specified in this document do not introduce any backward compatibility issues with the current usage of the BGP Identifier.

4. Security Considerations

This extension to BGP does not introduce new security considerations. BGP security considerations are discussed in [RFC4271].

5. Acknowledgments

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6. Normative References

[RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, January 2006.

[RFC4893] Vohra, Q. and E. Chen, "BGP Support for Four-octet AS Number Space", RFC 4893, May 2007.

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