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IPv6 BGP Identifier Capability for BGP-4
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Abstract

To solve the problem of BGP Identifier in an IPv6-only network without special configuration and planning considerations, this document extends BGP to allow a BGP Identifier to be a valid IPv6 global unicast address assigned to the BGP speaker. Protocol extension includes the definition of a BGP capability code, "IPv6 BGP Identifier capability", to be used by a BGP speaker to indicate its support for IPv6 address as a BGP Identifier. This document updates [RFC 4271](#).

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[1.](#) Introduction

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.

In an IPv6-only network, the requirements for the BGP Identifier in [[RFC4271](#)] are not met as no IPv4 address is configured to the BGP speaker. To accommodate this situation, [[RFC6286](#)] relaxes the definition of the BGP Identifier to be a 4-octet, unsigned, non-zero integer and requires AS-wide uniqueness of the BGP Identifiers.

The proposal in [[RFC6286](#)] requires that a 4-octet integer be configured as BGP Identifier on the BGP speaker after basic IPv6 information (such as IPv6 addresses) configuration has been completed. The 4-octet integer to be configured as BGP Identifier has to be planned carefully in advance to guarantee uniqueness within the AS. In a large IPv6-only AS the extra configuration and planning work introduced by the special integers can be troublesome.

To solve the problem of BGP Identifier in an IPv6-only network without special configuration and planning considerations, this document extends BGP to allow a BGP Identifier to be a valid IPv6 global unicast address assigned to the BGP speaker. Protocol extension includes the definition of a BGP capability code, "IPv6 BGP Identifier capability", to be used by a BGP speaker to indicate its support for IPv6 address as a BGP Identifier.

2. Protocol Extension

A new BGP capability [[RFC5492](#)] is defined to convey the IPv6 global unicast address to be used as the BGP Identifier. A BGP speaker uses BGP Capabilities Advertisements in its OPEN message to advertise its neighbors this IPv6 BGP Identifier ability. The BGP Identifier field of the OPEN message is set to zero, indicating that actual BGP ID is in the Capability Optional Parameter.

The Capability Length field of the IPv6 BGP Identifier Capability is set to 16, and the Capability value field is set to one of the IPv6 global unicast addresses that have been assigned to the BGP speaker.

The BGP Identifier is also used in the AGGREGATOR attribute, so a BGP speaker that uses IPv6 BGP Identifier Capability sets the AGGREGATOR attribute accordingly. The BGP Identifier carried in the attribute is encoded as a 16-octet entity.

3. Operations

3.1. Processing Received OPEN messages

A BGP speaker checks the BGP Identifier field of the OPEN message received first. If the BGP Identifier field is not zero, then the OPEN message is processed in the way of the message that does not contain IPv6 BGP Identifier, and any IPv6 BGP Identifier Capability in the Capability Optional Parameter of the message is ignored. If the BGP Identifier field is zero, then the BGP speaker checks if any IPv6 BGP Identifier Capability is carried in the Capability Optional Parameter. If there is no IPv6 BGP ID Capability, or the capability value of the IPv6 BGP ID Capability is not a valid IPv6 global unicast address, then a Notification message is generated, with Error Code set to 2 (OPEN Message Error) and Error subcode set to 3 (Bad BGP Identifier).

3.2. Connection Collision Detection

In case of collision detection, the BGP Identifiers of the peers involved in the collision are compared and only the connection initiated by the BGP speaker with the higher-valued BGP Identifier is retained. Comparing BGP Identifiers is done by converting them to host byte order and treating them as 16-octet unsigned integers.

3.3. Route Selection Decision

If a route is advertised by an IPv4 BGP speaker and an IPv6 BGP speaker respectively, then the route advertised by the IPv6 BGP speaker is selected; if a route is advertised by two IPv6 BGP

speakers respectively, then their IPv6 BGP IDs are compared, and the route advertised by the BGP speaker with the lower-valued BGP Identifier is selected.

4. Security Considerations

TBD.

5. IANA Considerations

This document requests a new BGP Capability Code to be allocated by IANA.

6. Normative References

- [RFC4271] Rekhter, Y., Li, T., and S. Hares, "A Border Gateway Protocol 4 (BGP-4)", [RFC 4271](#), January 2006.
- [RFC5492] Scudder, J. and R. Chandra, "Capabilities Advertisement with BGP-4", [RFC 5492](#), February 2009.
- [RFC6286] Chen, E. and J. Yuan, "Autonomous-System-Wide Unique BGP Identifier for BGP-4", [RFC 6286](#), June 2011.

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