                  Subcodes for BGP Finite State Machine Error

Abstract

   This document defines several subcodes for the BGP Finite State
   Machine (FSM) Error that could provide more information to help
   network operators in diagnosing BGP FSM issues and correlating
   network events. 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/rfc6608.

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1. Introduction

   This document defines several subcodes for the BGP [RFC4271] Finite
   State Machine (FSM) Error that could provide more information to help
   network operators in diagnosing BGP FSM issues and correlating
   network events. This information is also helpful to developers in
   lab situations. This document updates [RFC4271] by requiring that
   BGP implementations insert appropriate FSM Error subcodes in
   NOTIFICATION messages for BGP FSM errors.

2. 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].

3. Definition of Finite State Machine Error Subcodes

   This document defines the following subcodes for the BGP Finite State
   Machine Error:

   0 - Unspecified Error

   1 - Receive Unexpected Message in OpenSent State

   2 - Receive Unexpected Message in OpenConfirm State

   3 - Receive Unexpected Message in Established State

4. Usage of FSM Error Subcodes

   If a BGP speaker receives an unexpected message (e.g., KEEPALIVE/
   UPDATE/ROUTE-REFRESH message) on a session in OpenSent state, it MUST
   send to the neighbor a NOTIFICATION message with the Error Code

Finite State Machine Error and the Error Subcode "Receive Unexpected
Message in OpenSent State". The Data field is a 1-octet, unsigned
integer that indicates the type of the unexpected message.

If a BGP speaker receives an unexpected message (e.g., OPEN/UPDATE/
ROUTE-REFRESH message) on a session in OpenConfirm state, it MUST
send a NOTIFICATION message with the Error Code Finite State Machine
Error and the Error Subcode "Receive Unexpected Message in
OpenConfirm State" to the neighbor. The Data field is a 1-octet,
unsigned integer that indicates the type of the unexpected message.

If a BGP speaker receives an unexpected message (e.g., OPEN message)
on a session in Established State, it MUST send to the neighbor a
NOTIFICATION message with the Error Code Finite State Machine Error
and the Error Subcode "Receive Unexpected Message in Established
State". The Data field is a 1-octet, unsigned integer that indicates
the type of the unexpected message.

5. Security Considerations

Specification, implementation, and deployment of the proposed BGP FSM
Error subcodes could make BGP implementation fingerprinting easier
and probably more accurate. Operators using BGP need to consider
this as an operational security consideration of their BGP deployment
decisions.

[BFMR2010] discusses a number of BGP security issues and potential
solutions that might be relevant both to BGP implementers and BGP
operators.

6. IANA Considerations

IANA has created the registry "BGP Finite State Machine Error
Subcodes", within the "BGP Error Subcodes" registry, with a
Registration Procedure of "Standards Action" as defined in [RFC5226]
(early allocation of such subcodes is allowed, in accordance with
[RFC4020]).

The registry has been populated with the following values:

Value	Name
0	Unspecified Error
1	Receive Unexpected Message in OpenSent State
2	Receive Unexpected Message in OpenConfirm State
3	Receive Unexpected Message in Established State

7. Contributors

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9. References

9.1. Normative References

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   [RFC4271]   Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A
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   [RFC5226]   Narten, T. and H. Alvestrand, "Guidelines for Writing an
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9.2. Informative References

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