A BGP Cease NOTIFICATION Subcode for Bidirectional Forwarding Detection
(BFD)

Abstract

   The Bidirectional Forwarding Detection (BFD) protocol (RFC 5880) is
   used to detect loss of connectivity between two forwarding engines,
   typically with low latency. BFD is leveraged by routing protocols,
   including the Border Gateway Protocol (BGP), to bring down routing
   protocol connections more quickly than the original protocol timers.

   This document defines a subcode for the BGP Cease NOTIFICATION
   message (Section 6.7 of RFC 4271) for use when a BGP connection is
   being closed due to a BFD session going down.

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
   https://www.rfc-editor.org/info/rfc9384.

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1. Introduction

   The Bidirectional Forwarding Detection (BFD) protocol [RFC5880] is
   used to detect loss of connectivity between two forwarding engines,
   typically with low latency. BFD is utilized as a service for various
   clients, including routing protocols, to provide an advisory
   mechanism for those clients to take appropriate actions when a BFD
   session goes down [RFC5882]. This is typically used by the clients
   to trigger closure of their connections more quickly than the
   original protocol timers might allow.

   Border Gateway Protocol version 4 (BGP-4) [RFC4271] terminates its
   connections upon Hold Timer expiration when the speaker does not
   receive a BGP message within the negotiated Hold Time interval. As
   per Sections 4.2 and 4.4 of [RFC4271], the minimum Hold Time interval
   is at least three seconds, unless KEEPALIVE processing has been
   disabled by negotiating the distinguished Hold Time of zero.

   If a BGP speaker desires to have its connections terminate more
   quickly than the negotiated BGP Hold Timer can accommodate upon loss
   of connectivity with a neighbor, the BFD protocol can be relied upon
   by BGP speakers to supply that faster detection. When the BFD
   session state changes to Down, the BGP speaker terminates the
   connection with a Cease NOTIFICATION message sent to the neighbor, if
   possible, and then closes the TCP connection for the session.

   This document defines a subcode, "BFD Down", to be sent with the
   Cease NOTIFICATION message that indicates the reason for this type of
   connection termination.

2. Requirements Language

   The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT",
   "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and
   "OPTIONAL" in this document are to be interpreted as described in
   BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all
   capitals, as shown here.

3. BFD Cease NOTIFICATION Subcode

   The value 10 has been allocated by IANA for the "BFD Down" Cease
   NOTIFICATION message subcode.

   When a BGP connection is terminated due to a BFD session going into
   the Down state, the BGP speaker SHOULD send a NOTIFICATION message
   with the error code "Cease" and the error subcode "BFD Down".

4. Operational Considerations

A BFD session may go into the Down state when there is only a partial loss of connectivity between two BGP speakers. Operators using BFD for their BGP connections make choices regarding what BFD timers are used based upon a variety of criteria -- for example, stability vs. fast failure.

In the event of a BGP connection being terminated due to a "BFD Down" event from partial loss of connectivity as detected by BFD, the remote BGP speaker might be able to receive a BGP Cease NOTIFICATION message with the "BFD Down" subcode. The receiving BGP speaker will then have an understanding that the connection is being terminated because of a BFD-detected issue and not an issue with the BGP speaker.

When there is a total loss of connectivity between two BGP speakers, it may not have been possible for the Cease NOTIFICATION message to have been sent. Even so, BGP speakers SHOULD provide this reason as part of their operational state. Examples include bgpPeerLastError per the BGP MIB [RFC4273] and "last-error" per [BGP-YANG].

When the procedures in [RFC8538] for sending a NOTIFICATION message with a "Cease" code and "Hard Reset" subcode are required, and the BGP connection is being terminated because BFD has gone into the Down state, the "BFD Down" subcode SHOULD be encapsulated in the Hard Reset's data portion of the NOTIFICATION message.

5. Security Considerations

Similar to [RFC4486], this document defines a subcode for the BGP Cease NOTIFICATION message that provides information to aid network operators in correlating network events and diagnosing BGP peering issues. This subcode is purely informational and has no impact on the BGP Finite State Machine beyond that already documented by [RFC4271], Sections 6.6 and 6.7.

6. IANA Considerations

IANA has assigned the value 10 from the "BGP Cease NOTIFICATION message subcodes" registry (https://www.iana.org/assignments/bgp-parameters/), with the name "BFD Down" and a reference to this document.

7. References

7.1. Normative References

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