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Extended BGP Administrative Shutdown Communication

Abstract

This document enhances the BGP Cease NOTIFICATION message "Administrative Shutdown" and "Administrative Reset" subcodes for operators to transmit a short free-form message to describe why a BGP session was shut down or reset. This document updates RFC 4486 and obsoletes RFC 8203 by defining an Extended BGP Administrative Shutdown Communication of up to 255 octets to improve communication using multibyte character sets.

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/rfc9003.

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1. Introduction

It can be troublesome for an operator to correlate a BGP-4 [RFC4271] session teardown in the network with a notice that was transmitted via offline methods, such as email or telephone calls. This document updates [RFC4486] by specifying a mechanism to transmit a short free-form UTF-8 [RFC3629] message as part of a Cease NOTIFICATION message [RFC4271] to inform the peer why the BGP session is being shut down or reset. This document obsoletes [RFC8203]; the specific differences and rationale are discussed in detail in Appendix A.

1.1. 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.

2. Shutdown Communication

If a BGP speaker decides to terminate its session with a BGP neighbor, and it sends a NOTIFICATION message with the Error Code "Cease" and Error Subcode "Administrative Shutdown" or "Administrative Reset" [RFC4486], it MAY include a UTF-8-encoded string. The contents of the string are at the operator's discretion.

The Cease NOTIFICATION message with a Shutdown Communication is encoded as below:

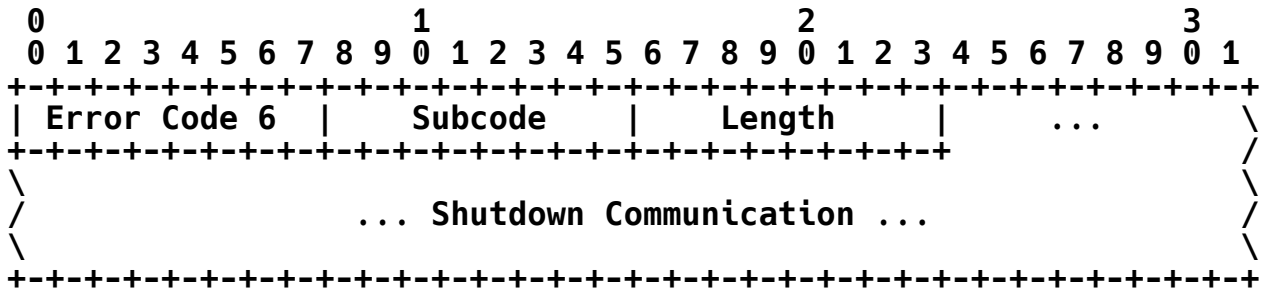

Figure 1

Subcode: The Error Subcode value MUST be one of the following values: 2 ("Administrative Shutdown") or 4 ("Administrative

Reset").

Length: This 8-bit field represents the length of the Shutdown Communication field in octets. When the length value is zero, no Shutdown Communication field follows.

Shutdown Communication: To support international characters, the Shutdown Communication field MUST be encoded using UTF-8. A receiving BGP speaker MUST NOT interpret invalid UTF-8 sequences. Note that when the Shutdown Communication contains multibyte characters, the number of characters will be less than the length value. This field is not NUL terminated. UTF-8 "Shortest Form" encoding is REQUIRED to guard against the technical issues outlined in [UTR36].

Mechanisms concerning the reporting of information contained in the Shutdown Communication are implementation specific but SHOULD include methods such as syslog [RFC5424].

3. Operational Considerations

Operators are encouraged to use the Shutdown Communication to inform their peers of the reason for the shutdown of the BGP session and include out-of-band reference materials. An example of a useful Shutdown Communication would be:

"[TICKET-1-1438367390] software upgrade; back in 2 hours"

"[TICKET-1-1438367390]" is a ticket reference with significance to both the sender and receiver, followed by a brief human-readable message regarding the reason for the BGP session shutdown followed by an indication about the length of the maintenance. The receiver can now use the string 'TICKET-1-1438367390' to search in their email archive to find more details.

If a Shutdown Communication longer than 128 octets is sent to a BGP speaker that implements [RFC8203], then that speaker will treat it as an error, the consequence of which should be a log message.

If a Shutdown Communication of any length is sent to a BGP speaker that implements neither [RFC8203] nor this specification, then that speaker will treat it as an error, the consequence of which should be a log message.

In any case, a receiver of a NOTIFICATION message is unable to acknowledge the receipt and correct understanding of any Shutdown Communication.

Operators should not rely on Shutdown Communications as their sole form of communication with their peers for important events.

If it is known that the peer BGP speaker supports this specification, then a Shutdown Communication that is not longer than 255 octets MAY be sent. Otherwise, a Shutdown Communication MAY be sent, but it SHOULD NOT be longer than 128 octets.

4. Error Handling

If a Shutdown Communication with an invalid UTF-8 sequence is received, a message indicating this event SHOULD be logged for the attention of the operator. An erroneous or malformed Shutdown Communication itself MAY be logged in a hexdump format.

5. IANA Considerations

IANA has referenced this document at subcodes "Administrative Shutdown" and "Administrative Reset" in the "BGP Cease NOTIFICATION message subcodes" registry under the "Border Gateway Protocol (BGP) Parameters" group in addition to [RFC4486].

6. Security Considerations

This document uses UTF-8 encoding for the Shutdown Communication. There are a number of security issues with Unicode. Implementers and operators are advised to review Unicode Technical Report #36 [UTR36] to learn about these issues. UTF-8 "Shortest Form" encoding is REQUIRED to guard against the technical issues outlined in [UTR36].

As BGP Shutdown Communications are likely to appear in syslog output, there is a risk that carefully constructed Shutdown Communication might be formatted by receiving systems in a way to make them appear as additional syslog messages. The 255-octet length limit on the BGP Shutdown Communication may help limit the ability to mount such an attack.

Users of this mechanism should be aware that unless a transport that provides integrity is used for the BGP session in question, a Shutdown Communication message could be forged. Unless a transport that provides confidentiality is used, a Shutdown Communication message could be snooped by an attacker. These issues are common to any BGP message, but they may be of greater interest in the context of this proposal since the information carried in the message is generally expected to be used for human-to-human communication. Refer to the related considerations in [RFC4271] and [RFC4272].

Users of this mechanism should consider applying data minimization practices as outlined in Section 6.1 of [RFC6973] because a received Shutdown Communication may be used at the receiver's discretion.

7. References

7.1. Normative References

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[UTR36] Davis, M., Ed. and M. Suignard, Ed., "Unicode Security Considerations", Unicode Technical Report #36, August 2010, <http://unicode.org/reports/tr36/>.

Appendix A. Changes to RFC 8203

The maximum permitted length was changed from 128 to 255.

Feedback from operators based in regions that predominantly use multibyte character sets showed that messages similar in meaning to what can be sent in other languages using single-byte encoding failed to fit within the length constraints as specified by [RFC8203]. For example, the phrase "Planned work to add switch to stack. Completion time - 30 minutes" has a length of 65 bytes. Its translation in Russian has a length of 139 bytes.

If a Shutdown Communication message longer than 128 octets is sent to a BGP speaker that implements [RFC8203], then that speaker will bring it to the attention of an operator but will otherwise process the NOTIFICATION message as normal.

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