

Internet Engineering Task Force (IETF)  
Request for Comments: 9003  
Obsoletes: 8203  
Updates: 4486  
Category: Standards Track  
ISSN: 2070-1721

J. Snijders  
NTT  
J. Heitz  
Cisco  
J. Scudder  
Juniper  
A. Azimov  
Yandex  
January 2021

## 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>.

### Copyright Notice

Copyright (c) 2021 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<https://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

### Table of Contents

1. Introduction
  - 1.1. Requirements Language
2. Shutdown Communication
3. Operational Considerations
4. Error Handling
5. IANA Considerations
6. Security Considerations
7. References

7.1. Normative References

7.2. Informative References

Appendix A. Changes to RFC 8203

Acknowledgements

Authors' Addresses

## 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:

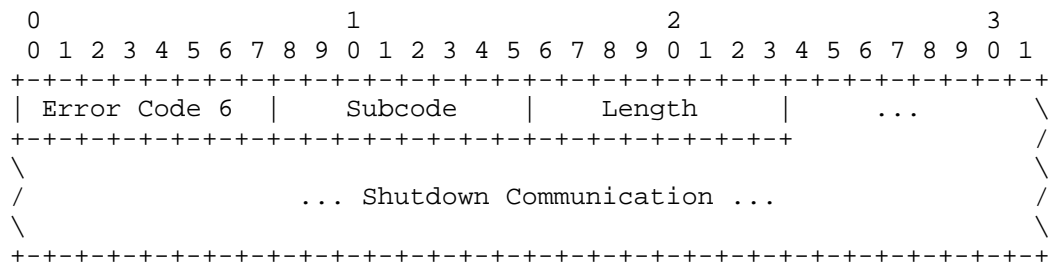


Figure 1

**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

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <<https://www.rfc-editor.org/info/rfc2119>>.
- [RFC3629] Yergeau, F., "UTF-8, a transformation format of ISO 10646", STD 63, RFC 3629, DOI 10.17487/RFC3629, November 2003, <<https://www.rfc-editor.org/info/rfc3629>>.
- [RFC4271] Rekhter, Y., Ed., Li, T., Ed., and S. Hares, Ed., "A Border Gateway Protocol 4 (BGP-4)", RFC 4271, DOI 10.17487/RFC4271, January 2006, <<https://www.rfc-editor.org/info/rfc4271>>.
- [RFC4486] Chen, E. and V. Gillet, "Subcodes for BGP Cease Notification Message", RFC 4486, DOI 10.17487/RFC4486, April 2006, <<https://www.rfc-editor.org/info/rfc4486>>.
- [RFC8174] Leiba, B., "Ambiguity of Uppercase vs Lowercase in RFC 2119 Key Words", BCP 14, RFC 8174, DOI 10.17487/RFC8174, May 2017, <<https://www.rfc-editor.org/info/rfc8174>>.

### 7.2. Informative References

- [RFC4272] Murphy, S., "BGP Security Vulnerabilities Analysis", RFC 4272, DOI 10.17487/RFC4272, January 2006, <<https://www.rfc-editor.org/info/rfc4272>>.
- [RFC5424] Gerhards, R., "The Syslog Protocol", RFC 5424, DOI 10.17487/RFC5424, March 2009, <<https://www.rfc-editor.org/info/rfc5424>>.
- [RFC6973] Cooper, A., Tschofenig, H., Aboba, B., Peterson, J., Morris, J., Hansen, M., and R. Smith, "Privacy Considerations for Internet Protocols", RFC 6973, DOI 10.17487/RFC6973, July 2013, <<https://www.rfc-editor.org/info/rfc6973>>.
- [RFC8203] Snijders, J., Heitz, J., and J. Scudder, "BGP Administrative Shutdown Communication", RFC 8203, DOI 10.17487/RFC8203, July 2017, <<https://www.rfc-editor.org/info/rfc8203>>.
- [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.

## Acknowledgements

The authors would like to gratefully acknowledge Tom Scholl, David Freedman, Jared Mauch, Jeff Haas, Peter Hessler, Bruno Decraene, John Heasley, Peter van Dijk, Arjen Zonneveld, James Bensley, Susan Hares, Saku Ytti, Lou Berger, Alvaro Retana, and Adam Roach.

The authors would like to thank Enke Chen and Vincent Gillet for their work on [RFC4486] and granting the related BCP 78 rights to the IETF Trust.

The authors would like to acknowledge Misha Grishin (MSK-IX) for raising awareness that the length specification of [RFC8203] was insufficient in context of multibyte character sets.

## Authors' Addresses

Job Snijders  
NTT Ltd.  
Theodorus Majofskistraat 100  
1065 SZ Amsterdam  
Netherlands

Email: [job@ntt.net](mailto:job@ntt.net)

Jakob Heitz  
Cisco  
170 West Tasman Drive  
San Jose, CA 95134  
United States of America

Email: [jheitz@cisco.com](mailto:jheitz@cisco.com)

John Scudder  
Juniper Networks  
1133 Innovation Way  
Sunnyvale, CA 94089  
United States of America

Email: [jgs@juniper.net](mailto:jgs@juniper.net)

Alexander Azimov  
Yandex  
Ulitsa Lva Tolstogo 16

Moscow  
119021  
Russian Federation  
  
Email: [a.e.azimov@gmail.com](mailto:a.e.azimov@gmail.com)