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TLV support for BMP Route Monitoring and Peer Down Messages

Abstract

Most of the message types defined by the BGP Monitoring Protocol (BMP) do provision for optional trailing data. However, Route Monitoring messages (to provide a snapshot of the monitored Routing Information Base) and Peer Down messages (to indicate that a peering session was terminated) do not. Supporting optional data in TLV format across all BMP message types allows for an homogeneous and extensible surface that would be useful for the most different use-cases that need to convey additional data to a BMP station. While it is not intended for this document to cover any specific utilization scenario, it defines a simple way to support optional TLV data in all message types.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on 28 April 2022.

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1. Introduction

The BGP Monitoring Protocol (BMP) is defined in The Route Monitoring message consists of: The Peer Down Notification message consists of: RFC 7854 [RFC7854].

*Common Header

*Per-Peer Header

*BGP Update PDU

*Common Header

*Per-Peer Header

*Reason

*Data (only if Reason code is 1, 2 or 3)

This means that both Route Monitoring and Peer Down messages have a non-extensible format. In the Route Monitoring case, this is limiting if wanting to transmit characteristics of transported NLRIs (ie. to help stateless parsing) or to add vendor-specific data. In the Peer Down case, this is limiting if matching TLVs sent with the Peer Up is desired. The proposal of this document is to bump the BMP

version, for backward compatibility, and allow all message types to provision for trailing TLV data.

2. Terminology

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 RFC 2119 [RFC2119] RFC 8174 [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. TLV encoding

The TLV data type is already defined in Section 4.4 of [RFC7854] for the Initiation and Peer Up message types. A TLV consists of:

*2 octets of TLV Type,

*2 octets of TLV Length,

*0 or more octets of TLV Value.

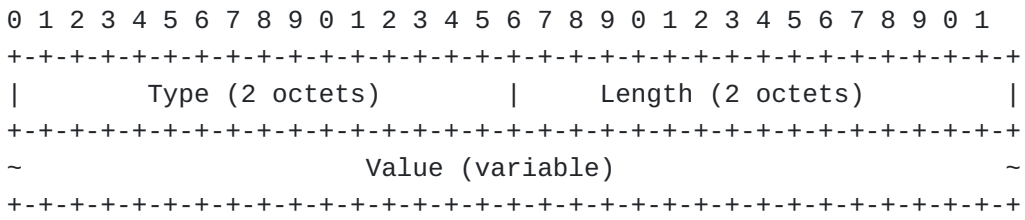

Figure 1

TLVs SHOULD be sorted by their code point. Multiple TLVs of the same type can be repeated as part of the same message, and it is left to the specific use-cases whether all, any, the first or the last TLV should be considered.

Route Monitoring messages may require per-NLRI TLVs, that is, there may be a need to map TLVs to NLRIs contained in the BGP Update message, for example, to express additional characteristics of a specific NLRI. For this purpose specifically, TLVs in Route Monitoring messages MUST be indexed, with the index starting at one (1) to refer to the first NLRI. Index zero (0) specifies that a TLV does apply to all NLRIs contained in the BGP Update message. Indexed TLVs are encoded as in the following figure:

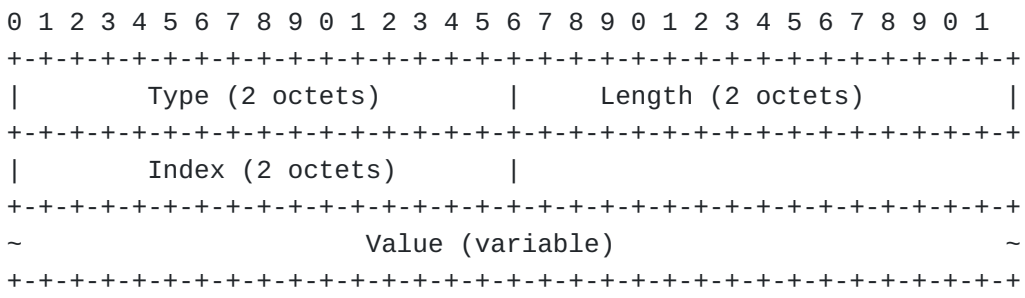

Figure 2

Of the BMP message types defined so far, indexed TLVs do apply only to Route Monitoring messages and, for example, they do not apply to Route Mirroring ones because the sender may not be aware of the payload of the transported BGP Update message.

4. BMP Message Format

4.1. Common Header

Section 4.1 of [RFC7854] defines the Common Header. While the structure remains unaltered, the following two definitions are changed:

- Version: Indicates the BMP version. This is set to '4' for all messages.

- Message Length: Total length of the message in bytes (including headers, encapsulated BGP message and optional data)

4.2. TLV data in Route Monitoring

The Route Monitoring message type is defined in Section 4.6 of [RFC7854]. The BGP Update PDU Section 4.3 of [RFC4271] MAY be followed by TLV data. This document defines the following new code points to help stateless parsing of BGP Update PDUs:

- Type = TBD1: the BGP Update PDU is encoded with support for the 4-octet AS number capability RFC 6793 [RFC6793], value MUST be boolean.

- Type = TBD2: the BGP Update PDU is encoded with the ADD-PATH capability RFC 7911 [RFC7911], value MUST be boolean.

- Type = TBD3: the BGP Update PDU is encoded with the Multiple Labels capability RFC 8277 [RFC8277], value MUST be boolean.

4.3. TLV data in Peer Down

The Peer Down Notification message type is defined in Section 4.9 of [RFC7854]. For Reason codes 1 or 3, a BGP Notification PDU follows; the PDU MAY be followed by TLV data. For Reason code 2, a 2-byte field to give additional FSM info follows; this field MAY be followed by TLV data. For all other Reason codes, TLV data MAY follow the Reason field.

4.4. TLV data in other BMP messages

All other message types defined in RFC7854 [RFC7854] do already provision for TLV data. It is RECOMMENDED that all future BMP message types will provision for trailing TLV data.

5. Security Considerations

It is not believed that this document adds any additional security considerations.

6. Operational Considerations

In Route Monitoring messages, the number of TLVs can be bound to the amount of NLRIs carried in the BGP Update message. This may degrade the packing of information in such messages and have specific impacts on the memory and CPU used in a BMP implementation. As a result of that it should always be possible to disable such features to mitigate their impact.

7. IANA Considerations

This document defines the following new TLV types for BMP Route Monitoring and Peer Down messages (Section 4.2):

*Type = TBD1: Support for the 4-octet AS number capability. The value field contains a boolean value of 1 if the BGP Update PDU enclosed in the Route Monitoring message was encoded according to the capability.

*Type = TBD2: ADD-PATH capability. The value field contains a boolean value of 1 if the BGP Update PDU enclosed in the Route Monitoring message was encoded according to the capability.

*Type = TBD3: Multiple Labels capability. The value field contains a boolean value of 1 if the BGP Update PDU enclosed in the Route Monitoring message was encoded according to the capability.

8. Normative References

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