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BMP Extension for Path Marking TLV
draft-cppy-grow-bmp-path-marking-tlv-00

Abstract

The BGP Monitoring Protocol (BMP) provides the monitoring of BGP adj-rib-in [[RFC7854](#)], BGP local-rib [[I-D.ietf-grow-bmp-local-rib](#)] and BGP adj-rib-out [[I-D.ietf-grow-bmp-adj-rib-out](#)] through Route Monitoring (RM) messages. With the capability of allowing optional data to be added to the RM Messages in the format of TLV [draft-lucente-bmp-tlv](#) [[I-D.lucente-bmp-tlv](#)], more information about the BGP Update message encapsulated in the RM can be revealed. This document proposes an extension to BMP to describe the BGP path status through the definition and use of Path Marking TLV.

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

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1. Introduction

For a given prefix, multiple paths with different path status, e.g., the "best-path", the "best-external-path" and so on, may co-exist in the BGP module upon the local policy processing. In addition, during the whole process, from receiving a BGP route to advertising it, a path can also undergo various status in different processing states. Such path status information is currently not carried in the BGP Update Message [RFC4271](#) [[RFC4271](#)]. However, they can be useful to enable a lot of applications. For example, for traffic steering purposes in a SDN enviroment, the operator/SDN controller needs the reachability information of multiple paths to ensure the selected optimized route is reachable.

This document defines a so-called Path Marking TLV to convey the BGP path status information to the BMP server. The BMP Path Marking is defined to be prepended in the BMP Route Monitoring (RM) Message.

2. Path Marking TLV for the RM Message

Per [RFC4271](#) [[RFC4271](#)], the BMP RM Message consists of the Common Header, Per-Peer Header, and the BGP Update PDU. According to [draft-lucente-bmp-tlv](#) [[I-D.lucente-bmp-tlv](#)], optional trailing data in TLV format is allowed in the BMP RM Message to convey characteristics of transported NLRIs (ie. to help stateless parsing) or vendor-specific data. Such TLV types are to be defined per each application.

To include the path status along with each BGP path, we define the Path Marking TLV, shown as follows.

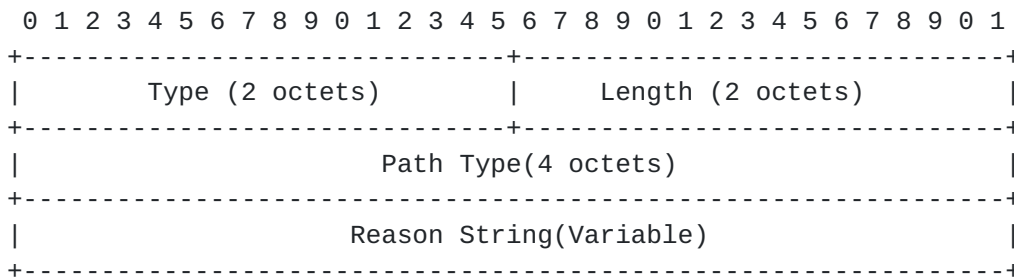


Figure 1: Path Marking TLV

- o Type = TDB1 (2 Octets): Path Marking.
- o Length (2 Octets): indicates the length of the value field of the Path Marking TLV. The value field further consists of the Path-Type field and Reason String field.
- o Path-Type (4 Octets): indicates the path status of the BGP Update PDU encapsulated in the RM Message. Currently 8 types of path status are defined, as shown in Table 1.
- o Reason String (Variable): indicates the reasons/explanations of the path status indicated in the Path Type field. The detailed Reason String format is defined in Figure 2.

2.1. Path Type

Value	Path type
0x0000	Unknown
0x0001	Best path
0x0002	Best external path
0x0004	Primary path
0x0008	Backup path
0x0010	Non-installed path
0x0020	Unreachable next-hop

Table 1: Path Type

The Path type field contains a bitfield where each bit encodes a specific role of the path. Multiple bits may be set when a path is used in multiple roles.

The best-path is defined in [RFC4271](#) [[RFC4271](#)] and the best-external path is defined in [draft-ietf-idr-best-external](#) [[I-D.ietf-idr-best-external](#)].

A primary path is a recursive or non-recursive path that can be used all the time as long as a walk starting from this path can end to an adjacency [draft-ietf-rtgwg-bgp-pic](#) [[I-D.ietf-rtgwg-bgp-pic](#)]. A prefix can have more than one primary path. A best-path is also considered as a primary path.

A backup path is also installed in the RIB, but it is not used until some or all primary paths become unreachable. Backup paths are used for fast convergence in the event of failures.

All other reachable paths are marked as 'Non-installed'.

Lastly, all paths that are considered unreachable are marked as 'Unreachable next-hop'. Unreachable paths may be sent only in special cases.

[2.2. Reason String](#)

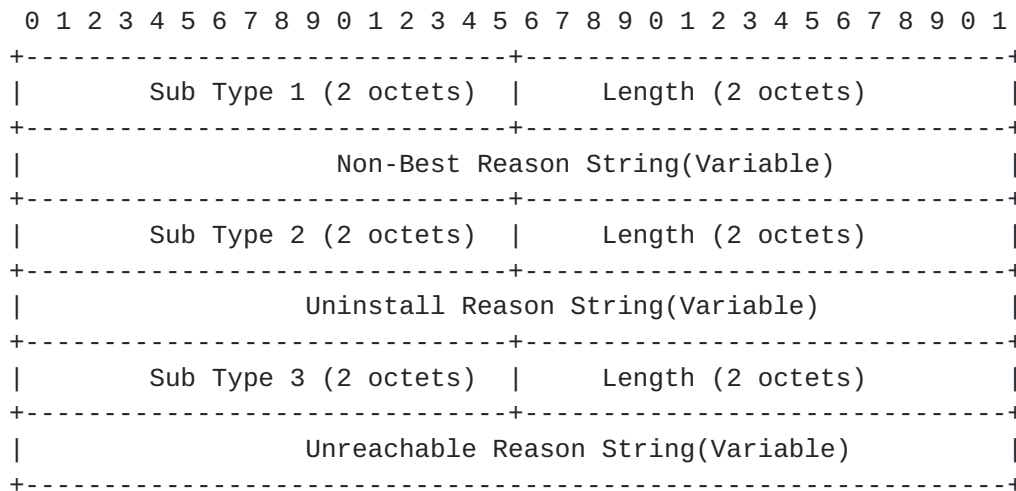


Figure 2: Reason String field

- o Sub Type 1 (2 Octets) = TDB2: Non-Best Reason String.
- o Length (2 Octets): indicates the length of the value field of the Non-Best Reason String.
- o Non-Best Reason String (Variable): includes user specific description of the non-best reason in the format of ASCII string.
- o Sub Type 2 (2 Octets) = TDB3: Uninstalled Reason String.
- o Length (2 Octets): indicates the length of the value field of the Non-Best Reason String.
- o Uninstalled Reason String (Variable): includes user specific description of the uninstalled (into RIB) reason in the format of ASCII string.
- o Sub Type 3 (2 Octets) = TDB4: Unreachable Reason String.
- o Length (2 Octets): indicates the length of the value field of the Non-Best Reason String.
- o Unreachable Reason String (Variable): includes user specific description of the unreachable reason in the format of ASCII string.

3. Acknowledgements

TBD.

4. IANA Considerations

This document requests that IANA assign the following new parameters to the BMP parameters name space.

4.1. Path Marking TLV

This document defines the Path Marking TLV with Type = TDB1: Path Marking ([Section 2](#)).

4.2. Path Marking TLV Reason String

This document defines three new sub types of the Reason String in the Path Marking TLV ([Section 2.2](#)).

Sub Type 1 = TDB2: Non-Best Reason String.

Sub Type 2 = TDB3: Uninstalled Reason String.

Sub Type 3 = TDB4: Unreachable Reason String.

5. Security Considerations

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

6. Normative References

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