

IDR  
Internet-Draft  
Intended status: Standards Track  
Expires: September 11, 2019

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March 10, 2019

**BGP Diagnostic Path Attribute**  
**draft-heitz-idr-diagnostic-attr-00**

Abstract

A BGP path attribute for the purpose of network diagnostics is described. It is non-transitive, such that BGP speakers will not forward it by default. It is structured as a list of elements. An element begins with the BGP identifier and AS number of the speaker that adds the element and includes a list of TLVs. Any speaker can add or remove an element to/from the list. TLVs for a timestamp and for a checksum are described.

Requirements Language

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [[RFC2119](#)].

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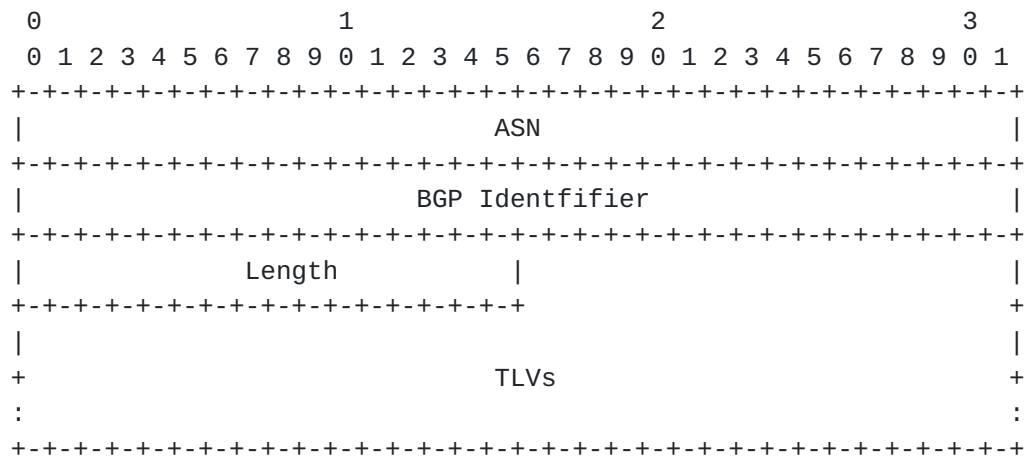
## [1.](#) Introduction

A BGP path attribute for the purpose of network diagnostics is described. It is non-transitive, such that BGP speakers will not propagate it by default. It is structured as a list of elements. An element begins with the BGP identifier and AS number of the speaker that adds the element and includes a list of TLVs. Any speaker can add or remove an element to/from the list. TLVs for a timestamp and for a checksum are described. The diagnostic attribute may be sent in a withdraw message.

## [2.](#) Data Formats

The BGP diagnostic consists of a series of elements, each of which is formatted as follows.



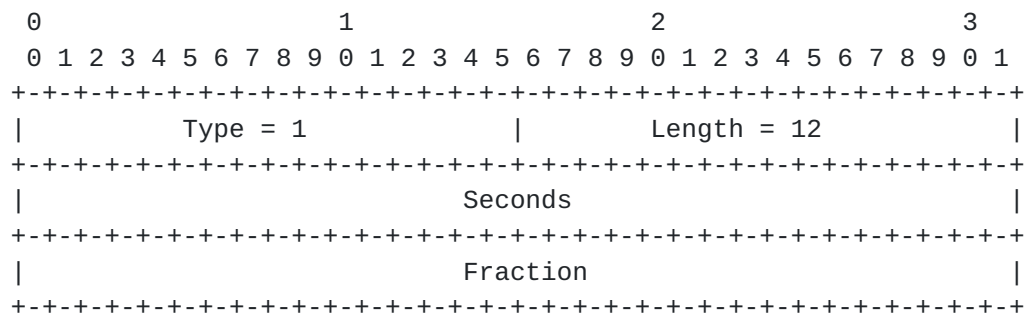


The fields are as follows:

- |                |  |
|----------------|--|
| ASN            | - 4 octet Autonomous System Number of the speaker that added this element.                               |
| BGP Identifier | - BGP Identifier of the speaker that added this element.   |
| Length         | - The number of octets comprising this element, If there were no TLVs included, this length would be 10. |
| TLVs           | - Any number of TLVs as further described. Each TLV is optional.   |

### 2.1. Timestamp TLV

The time at which the indicated speaker created this attribute during the process of creating the message to be sent. The precision of the timestamp depends upon the diagnostic application that requires it and is out of scope of this document.



The fields are as follows:



- Type - 1.
- Length - 12.
- Seconds - The number of Seconds since 0 h 1 January 1900 UTC as further described in [Section 6 of \[RFC5905\]](#).
- Fraction - A fraction of the above seconds also described in [Section 6 of \[RFC5905\]](#).

## 2.2. Checksum TLV

A checksum of the BGP message, including the marker field. The checksum is only valid between the sending and receiving speaker. Since a receiving speaker may propagate an update, it will likely change the set of attributes or their order in its own update message, thus making the checksum useless in the propagated update. A BGP speaker MAY remove the checksum TLV from a propagated Diagnostic Path Attribute.

```

0           1           2           3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           Type = 2           |           Length = 6           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
|           Checksum           |
+---+---+---+---+---+---+---+---+---+---+---+---+---+---+

```

The fields are as follows:

- Type - 2.
- Length - 6.
- Checksum - The 16 bit checksum computed according to [\[RFC1071\]](#).

## 3. Operational Considerations

As with any new BGP attribute, if it is propagated, NLRI packing into BGP UPDATE messages may be affected. This needs to be taken into consideration when using the Timestamp TLV to measure bulk update message timing.

The Checksum TLV is useful to narrow down a source of corruption of UPDATE messages in each of the software and hardware layers between the actual BGP processes.



The Diagnostic Path Attribute MAY be sent in an UPDATE message that does not contain an NLRI field [RFC4271] or an MP\_REACH\_NLRI Path Attribute [RFC4760]. When carried in such a message, it is unlikely to be propagated, although it is possible.

#### 4. Error Handling

A checksum error shall not be treated as a protocol error. The response is implementation dependent.

A TLV length error shall be treated as attribute-discard according to [RFC7606].

An unrecognized TLV MUST not be treated as a protocol error.

#### 5. Security Considerations

This attribute is not forwarded by default. Therefore, it should cause no unexpected ill effects.

#### 6. IANA Considerations

IANA is requested to assign a BGP path attribute value for the BGP Diagnostic Path Attribute.

IANA is requested to create and maintain a registry for the TLV types. The allocation policies as per [RFC8126] are stated for the range of values.

Range	Allocation Policy
0-32767	First Come First Served
32768-65535	Experimental

Value	Description	Reference
0	Reserved	This RFC
1	Timestamp	This RFC
2	Checksum	This RFC

#### 7. Normative References

- [RFC1071] Braden, R., Borman, D., and C. Partridge, "Computing the Internet checksum", RFC 1071, DOI 10.17487/RFC1071, September 1988, <<https://www.rfc-editor.org/info/rfc1071>>.





- [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>>.
- [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>>.
- [RFC4760] Bates, T., Chandra, R., Katz, D., and Y. Rekhter, "Multiprotocol Extensions for BGP-4", [RFC 4760](#), DOI 10.17487/RFC4760, January 2007, <<https://www.rfc-editor.org/info/rfc4760>>.
- [RFC5905] Mills, D., Martin, J., Ed., Burbank, J., and W. Kasch, "Network Time Protocol Version 4: Protocol and Algorithms Specification", [RFC 5905](#), DOI 10.17487/RFC5905, June 2010, <<https://www.rfc-editor.org/info/rfc5905>>.
- [RFC7606] Chen, E., Ed., Scudder, J., Ed., Mohapatra, P., and K. Patel, "Revised Error Handling for BGP UPDATE Messages", [RFC 7606](#), DOI 10.17487/RFC7606, August 2015, <<https://www.rfc-editor.org/info/rfc7606>>.
- [RFC8126] Cotton, M., Leiba, B., and T. Narten, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 8126](#), DOI 10.17487/RFC8126, June 2017, <<https://www.rfc-editor.org/info/rfc8126>>.

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