BGP Neighbor Autodiscovery

draft-xu-idr-neighbor-autodiscovery-01

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Problem Statement

- **BGP is used as IGP in many MSDCs (Massively Scalable Data Centers) (see RFC7938).**

- **However, BGP is not as good as IGP from the perspective of automation .**

  - Connection address and Autonomous System Number (ASN) of each BGP neighbor have to be manually configured.

  - In the case where loopback addresses are used as the connection addresses, static routes to the loopback addresses have to be configured or IGP has to be enabled.

Solution Overview

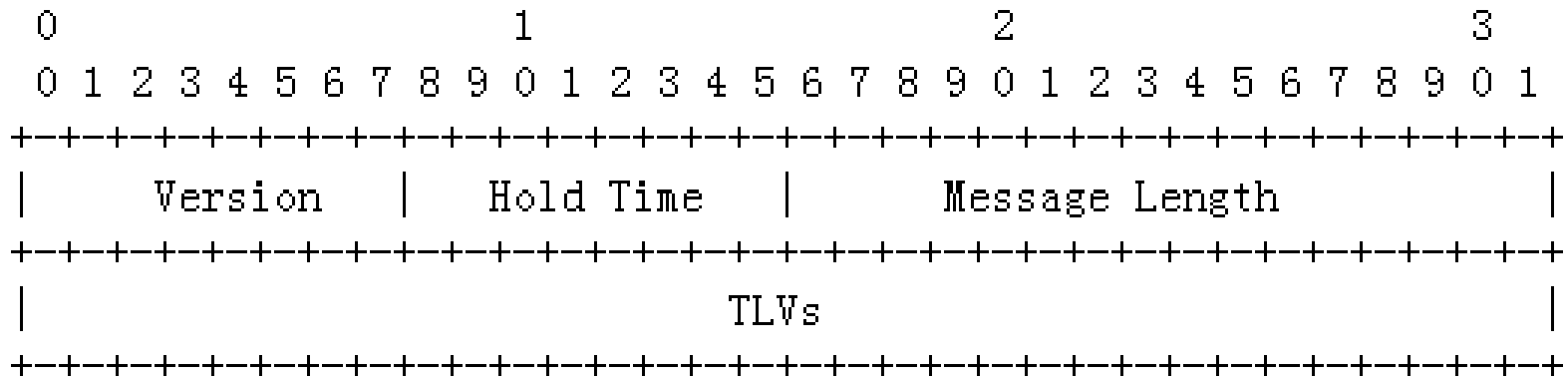- **This document specifies a BGP neighbor discovery mechanism by borrowing ideas from the LDP [RFC5036].**
  - BGP routers automatically discover the connection address and the ASN of their peers through the exchange of the to-be-defined BGP HELLO messages.
  - The BGP session establishment process is triggered once BGP neighbors have been discovered.
- **In the case where the connection addresses are loopback addresses, routes towards the loopback addresses are dynamically created.**

BGP Hello Message

- **The BGP HELLO message is a new BGP message which has the same fixed-size BGP header as the exiting BGP messages.**

- **However, the HELLO message MUST be sent as a UDP packet (179 is the suggested port value) to the "all routers on this subnet" multicast address (i.e., 224.0.0.2 in the IPv4 case and FF02::2 in the IPv6 case). The IP source address is set to the address of the interface over which the message is sent out.**

BGP Hello Message (con't)

- **In addition to the fixed-size BGP header, the HELLO message contains the following fields:**

```
 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
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|     Version     |    Hold Time    |       Message Length        |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                              TLVs                              |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- **Version: This 1-octet unsigned integer indicates the protocol version number of the message. The current BGP version number is 4.**
- **Hold Time: Hello hold timer in seconds.**
- **Message Length: This 2-octet unsigned integer specifies the length of the TLVs field in octets .**
- **TLVs: contains ASN TLV, Connection Address TLV and other TLVs.**

ASN TLV

```
 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=TBD2             |             Length          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                  AS Number (2-octet or 4-octet)                |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```
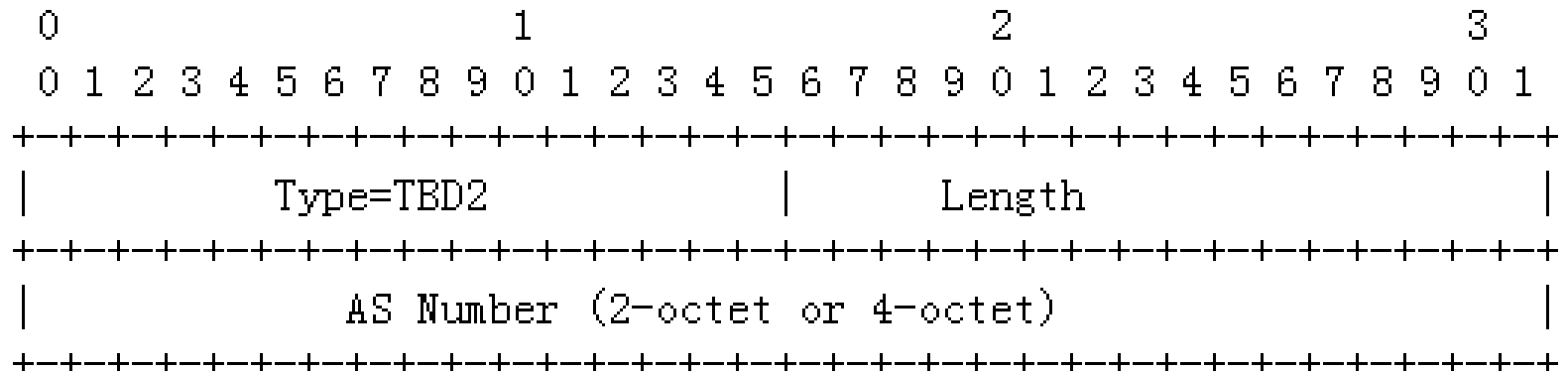
- **Type: TBD2.**

- **Length: Specifies the length of the Value field in octets.**

- **AS Number: This variable-length field indicates the 2-octet or 4-octet ASN of the sender.**

Connection Address TLV

```
 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=TBD3           |             Length            |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|         Connection Address (4-octet or 16-octet)             |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- **Type: TBD3**

- **Length: Specifies the length of the Value field in octets.**

- **Connection Address: This variable-length field indicates the local IPv4 or IPv6 address which is used for establishing BGP sessions.**

Next Steps

- Comments and suggestions are welcome.