BGP-LS Extensions for Advertising Path MTU
draft-zhu-idr-bgp-ls-path-mtu-03
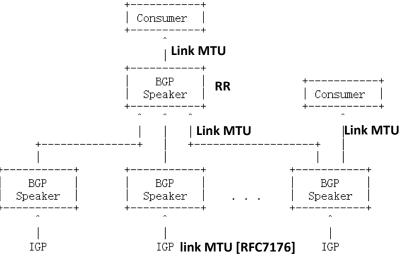
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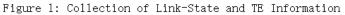Robbins Mwehaire
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Motivation

- In traditional MPLS, the Path MTU can be signaled via signaling protocols like RSVP-TE[3209] and LDP[RFC3988].

- However, there is no additional signaling to establish Segment Routing(SR) paths, so the SR tunnel cannot currently support the negotiation mechanism of the Path MTU.
  - SR information is reported by BGP-LS, and the SDN can calculate the SR Paths based on this info.

- When SIDs (Label or IPv6 address) are pushed in a packet, the packet will be dropped (in IPv6) or fragmented in forwarding since the packet size may exceed the Path MTU.

- From Operator:
  - When using leased line over multi-domains, MTU should be learned to avoid dropping packets.

- This draft is to specify the extensions to BGP Link State (BGP-LS) to carry **link MTU** messages.

Deployment Scenario

- RFC7752 specifies the collection of link-state and TE information and its distribution to consumers.
    - Concretely, a router maintains one or more databases for storing link-state information about nodes and links in any given area.
    - The router's BGP process can retrieve topology from these LSDBs and distribute it to a consumer, either directly or via a peer BGP speaker (typically a dedicated Route Reflector).

- The **link MTU** information is acquired through the process of collecting link state and TE information by BGP-LS.

- RFC7176 specifies the IS-IS mechanism and extensions for **link MTU Sub-TLV**.

```
                                  +------------+
                                  | Consumer   |
                                  +------------+
                                        ^
                                        | Link MTU
                                  +------------+
                                  |    BGP     |  RR        +------------+
                                  |  Speaker   |            | Consumer   |
                                  +------------+            +------------+
                                     ^   ^     | Link MTU        ^ Link MTU
                  +---------------+   |   +------------------+    | |
                  |               |   |                     |    | |
            +------------+   +------------+            +------------+
            |    BGP     |   |    BGP     |            |    BGP     |
            |  Speaker   |   |  Speaker   |   . . .    |  Speaker   |
            +------------+   +------------+            +------------+
                  ^               ^                          ^
                  |               |                          |
                 IGP             IGP  link MTU [RFC7176]    IGP
```

Figure 1: Collection of Link-State and TE Information

Sub-TLV for link MTU

- [RFC7752] defines the TLVs that map link-state information to BGP-LS NLRI and the BGP-LS attribute.

- In this document, a new sub-TLV for **link MTU** is added to the Link Attribute TLV.
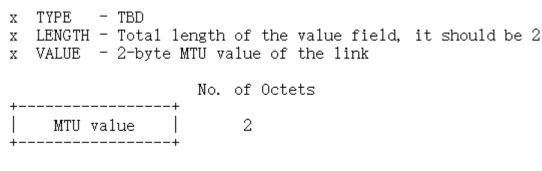
```
x   TYPE    - TBD
x   LENGTH  - Total length of the value field, it should be 2
x   VALUE   - 2-byte MTU value of the link

                          No. of Octets
    +-----------------+
    |   MTU value     |        2
    +-----------------+
```

Figure 2. Sub-TLV Format for MTU

- Whenever there is a change in MTU value represented by Link Attribute TLV, BGP-LS should re-originate the respective TLV with the new MTU value. Then, the controller can calculate the Path MTU.
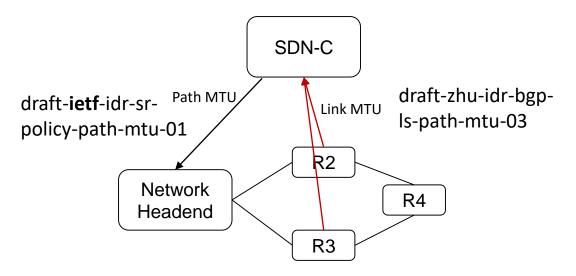
Changes

- Be more specific on the IGP/IS-IS extensions for link MTU.

  - "As for how IGP collects link MTU information and stores it in LSDB, which is beyond the scope of this article." is changed to

  - "[RFC7176] specifies the IS-IS mechanism and extensions for link MTU Sub-TLV."

Next Step

- draft-ietf-idr-sr-policy-path-mtu-01 has been progressed and become a WG draft.
  - It defines extensions to BGP to distribute **path MTU** information within SR policies.

- draft-zhu-idr-bgp-ls-path-mtu-03 would need to be progressed as well.
  - It specifies the extensions to BGP-LS to carry **link MTU** messages.

- We would like to call for adoption for this draft.

SDN-C

draft-**ietf**-idr-sr-policy-path-mtu-01   Path MTU

Link MTU

draft-zhu-idr-bgp-ls-path-mtu-03

R2

R4

Network Headend

R3

Thank you for your attention!