RSVP-TE Extensions for Bit Error Rate (BER) Measurement
draft-zhang-ccamp-rsvpte-ber-measure-02

Zhenbin Li, Li Zhang(Huawei Technologies)
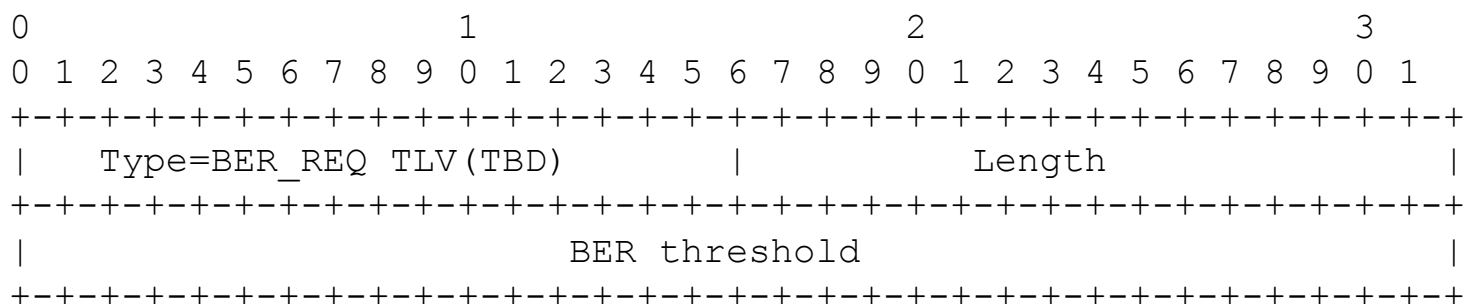Guangming Yang(China Telecom)

IETF 90, Toronto, Canada

Introduction

- Bit Error Rate (BER) is a significant parameter for Mobile Backhaul Service
- In IP/MPLS Mobile Backhaul Network, MPLS TE LSP is used to carry the mobile service, which maybe encapsulated in PW or L3VPN end to end
- MPLS TE Hot-standby is always used for traffic protection. The protection switch is always triggered by the failure detection instead of quality degradation.
- BER measurement requirement should be advertised to all of the LSRs of the MPLS TE LSP, and the BER measurement result need to report to the ingress LSR. It can be used for protection switch.
- Here, we propose two extensions of RSVP-TE:
  - 1. Advertise the BER measure requirement of the specific LSP to its transit LSRs and egress LSR
  - 2. Report the BER measurement result from any transit or egress LSR towards the ingress LSR

RSVP-TE extension (1)

- BER_REQUEST TLV

```
           LSP_ATTRIBUTES Class=197, C-Type=1
                 Type=TBD,BER_REQ 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=BER_REQ TLV(TBD)       |             Length          |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|                          BER threshold                       |
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- Procedure
  - RSVP-TE Path Message SHOULD be sent with BER_REQUEST TLV to advertise the BER measurement requirement to the transit LSRs and egress LSR
  - If a LSP dose not require BER measurement anymore, a Path Message without BRE_REQUEST TLV SHOULD be sent
  - The LSR receiving the Path Message with BER_REQUEST TLV will start BER measurement for this LSP with the threshold value set in the TLV

RSVP-TE extension (2)

- Error code of BER measurement report

```
Error code                  Error value                 Description
--------------------------------------------------------------------------
   TBD "BER                      0                   bit error elimination
   measurement report"           1                   bit error indication
```

- Procedure
  - when the BER measurement value exceeds the threshold, a PathErr Message MUST be sent towards the ingress LSR of the LSP with the BER Error Code with Error Value 1 for bit error indication
  - When the BER measurement value is less than the threshold, the LSR MUST send a PathErr Message with BER Error Value 0 for bit error elimination

Comments Response (1)

- Question1: How to measure the BER in IP network?
  - The bit error rate (BER) is the number of bit errors divided by the total number of transferred bits during a studied time interval. BER is a unitless metric for performance measurement and often expressed as a percentage.
  - In IP network, the traffic stream is based on data packet which may be not get the accurate BER value like the optical network. But it can use multiple alternative ways for BER measurement depending on implementation. For example, the optical layer's BER may be adopted as that of the IP layer for P2P link. The widely used CRC (Cyclic Redundancy Check) in the IP network is another possible way as the alternative of BER.

Comments Response (2)

- Question2: If this is a functionality always running, why not using IGP instead of RSVP-TE?
  - Since the application scenarios proposed here is to trigger the protection service traffic switch based on the BER measurement, the requirement is service-specific and the decision is determined by the service end-point. RSVP-TE is an appropriate way to advertise the BER measurement to the service end-point which has BER measurement requirement instead of flooding the BER information to all nodes like IGP extensions.
  - IGP is truly a possible way to flood BER information. It can be taken into account later for the enhanced traffic engineering path calculation application scenarios like other IGP TE extended metrics [I-D.ietf-isis-te-metric-extensions-03].

Comments Response (3)

- Question3:The error rate measurement is an OAM function. I wonder why you don't want to use already defined mechanisms of RSVP to turn on and off OAM functions and define a new one

  The mechanisms of RSVP to turn on and off OAM functions usually enabled only on the ingress and egress nodes. But for the BER measurement, all of the nodes along the LSP path should have knowledge of the BER measurement requirement to enable BER measurement function. So the new RSVP-TE protocol extensions are introduced.

Draft Updates

- One co-author is added: Guangming Yang from China Telecom.

- Redefine the requirement to cope with single-point BER measurement firstly.

- Correct text errors.

Next Steps

- Solicit comments and feedback.
- Request for WG acceptance.