RSVP-TE Extensions in Support of Proactive Protection

TEAS WG Virtual meeting, 2020.04.23

draft-lin-teas-gmpls-proactive-protection-00

Authors: Yi Lin (yi.lin@huawei.com)
Bin Yeong Yoon (byyun@etri.re.kr)
Overview & Summary of Changes

- **Main ideas of this draft:**
  - Proposing a new protection method called **Proactive Protection**
  - Creating protecting LSP when predicting a failure on the working LSP (before real failure happens)

- **Main Changes:**
  - Moved from CCAMP WG to **TEAS WG**, as agreed by TEAS Chairs in IETF 106th
  - Changed to “**explicit style**” for tearing down of protecting LSP if the predicted failure didn’t happen
  - Added **Bin Yeong Yoon** (ETRI) as one of the authors
Failure Prediction

E.g., SOP (State of Polarization)

- Signal Fail
- Signal Degrade
- Normal State

- There will be some indications before a physical failure happens
  - E.g., abnormal high change rate of a certain physical parameter
  - Such failures are predictable\[1\]

- Predicted failure ≠ SD or SF
  - Predicted failure: still under the threshold of SD or SF, no impact to the traffic in the LSP

The Main Idea of Proactive Protection

*Case 1: predicted failure becomes real failure (e.g., digger working near a fiber, and finally fiber break happens)*

**Signal Fail**
- At \(t_2\) or \(t_3\), real failure (SD or SF) happened
- Protection switch triggered
- Same as 1+1 or 1:1 protection switch

**Signal Degrade**
- At \(t_1\), predicted failure detected
- Protecting LSP created
- Traffic still remains in working LSP (no real failure now)

**Normal State**
- Only working LSP

**Predicted Failure**
- When predicted failure becomes real failure (e.g., digging near a fiber, and finally fiber break happens)

**E.g.,** SOP
The Main Idea of Proactive Protection

*Case 2: predicted failure finally didn’t happen (e.g., the digger goes away from the fiber)*

- **Normal State**
- **Only working LSP**

- **At \( t_1 \)**, predicted failure detected
- **Protecting LSP created**
- **Traffic still remains in working LSP (no real failure now)**

- **Real failure does not happen**
- **Tearing down of protecting LSP, to save resource**
Protocol Extension (1): PROTECTION Object

**Extension to PROTECTION Object**

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length</th>
<th>Class-Num(37)</th>
<th>C-Type (2)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>S</th>
<th>P</th>
<th>N</th>
<th>O</th>
<th>T</th>
<th>Res.</th>
<th>LSP Flags</th>
<th>Reserved</th>
<th>Link Flags</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>I</th>
<th>R</th>
<th>A</th>
<th>Reserved</th>
<th>Seg.Flags</th>
<th>Reserved</th>
</tr>
</thead>
</table>

### T (Triggered E2E Proactive Protection):
- **T = 1**: E2E Proactive Protection is required
- When **T = 1**, **LSP Flags** SHOULD be 1+1 or 1:N

### A (proActive Segment Protection):
- **A = 1**: Proactive Segment Protection is required
- When **A = 1**, **Seg. Flags** SHOULD be 1+1 or 1:N

**Initial stage:**

- **PATH message**
  - **T = 1 or A = 1**

The “T=1” or “A=1” is used to enable the prediction function on the nodes along the LSP.
Protocol Extension (2.1): Notification

1. **Notify message**
   - Predicted failure ID = 1

2. **PATH message**
   - To create protecting LSP

- **Predicted Failure ID**: indicate the predicted failure
- **Cause of the Predicted Failure** (optional): the cause of the predicted failure in text format
Protocol Extension (2.2): Notification

- **Predicted Failure ID**: indicate that the previous predicted failure is now cleared
- The source node (A) MAY tearing down the protecting LSP to save resource, according to local policy

![Diagram showing the protocol extension process]

1. **Node B Explicitly notify that Predicted failure is now cleared**
2. **(Optional) Tearing down protecting LSP**
Next Steps

- Continue to work on the solution
- Get feedbacks from the WG level and move forward
Thank you