

RSVP-TE Extensions in Support of Proactive Protection

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

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Overview & Summary of Changes

➤ Main ideas of this draft:

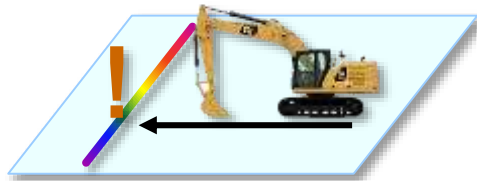
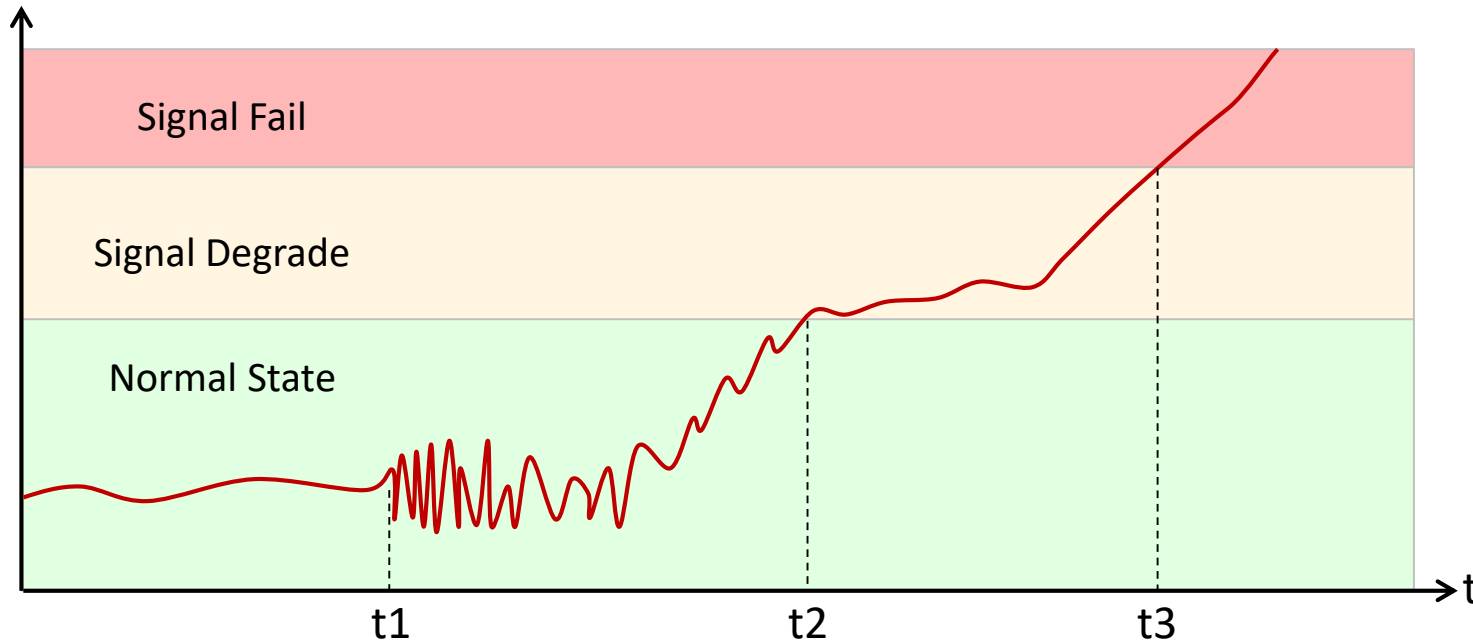
- Proposing a new protection method called **Proactive Protection**
- Creating protecting LSP when predicting a failure on the working LSP (before real failure happens)

➤ 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)



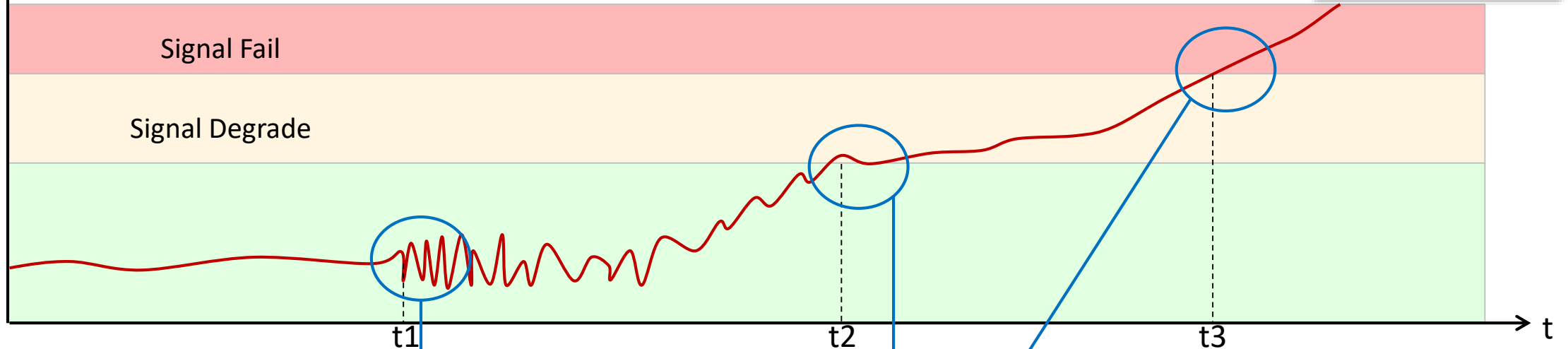
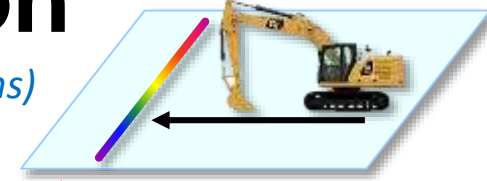
- **There will be some indications before a physical failure happens**
 - E.g., abnormal high change rate of a certain physical parameter
- **Such failures are **predictable**^[1]**
- **Predicted failure != SD or SF**
 - Predicted failure: still **under the threshold** of SD or SF, **no impact** to the traffic in the LSP

[1] E.g., ref to: F. Boitier et. al, Nokia Bell Labs and Orange Labs, "Proactive Fiber Damage Detection in Real-time Coherent Receiver", ECOC2017, 2017.09

The Main Idea of Proactive Protection

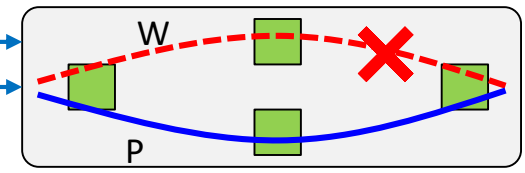
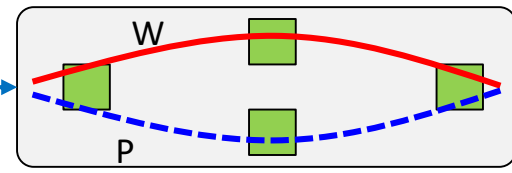
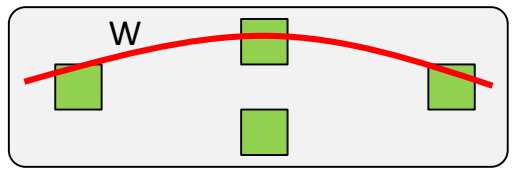
Case 1: predicted failure becomes real failure (e.g., digger working near a fiber, and finally fiber break happens)

E.g., SOP



Predicted Failure

SD or SF



- Normal State
- Only working LSP

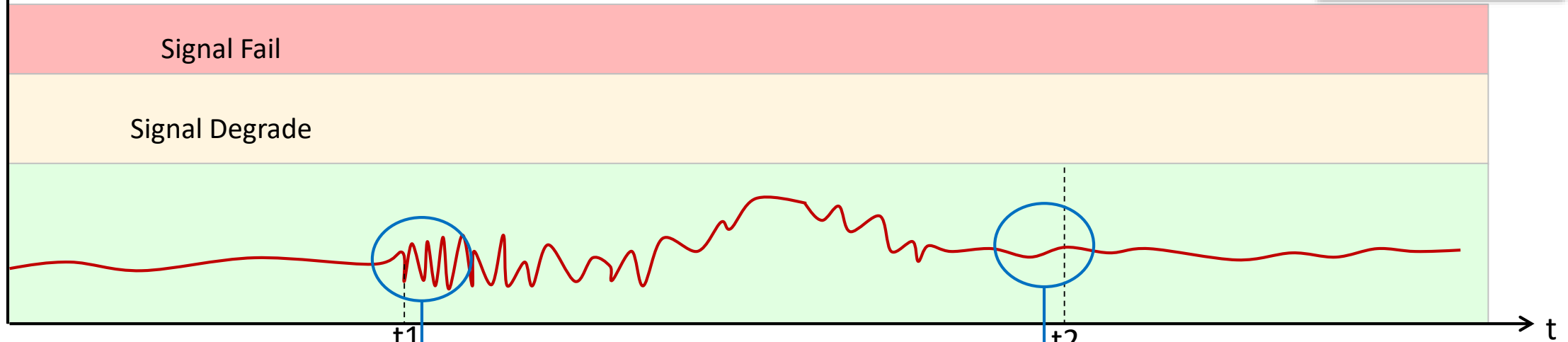
- At t1, predicted failure detected
- Protecting LSP created
- Traffic still remains in working LSP (no real failure now)

- At t2 or t3, real failure (SD or SF) happened
- Protection switch triggered
- Same as 1+1 or 1:1 protection switch

The Main Idea of Proactive Protection

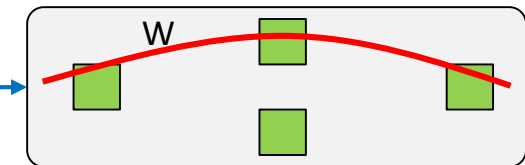
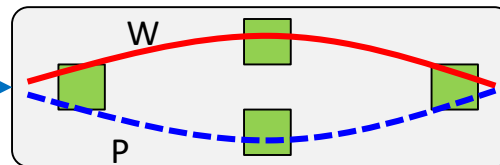
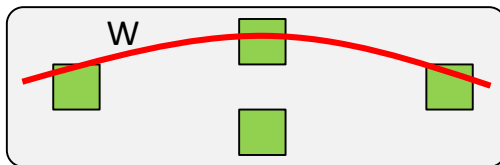
Case 2: predicted failure finally didn't happen (e.g., the digger goes away from the fiber)

E.g., SOP



Predicted Failure

Predicted Failure Cleared



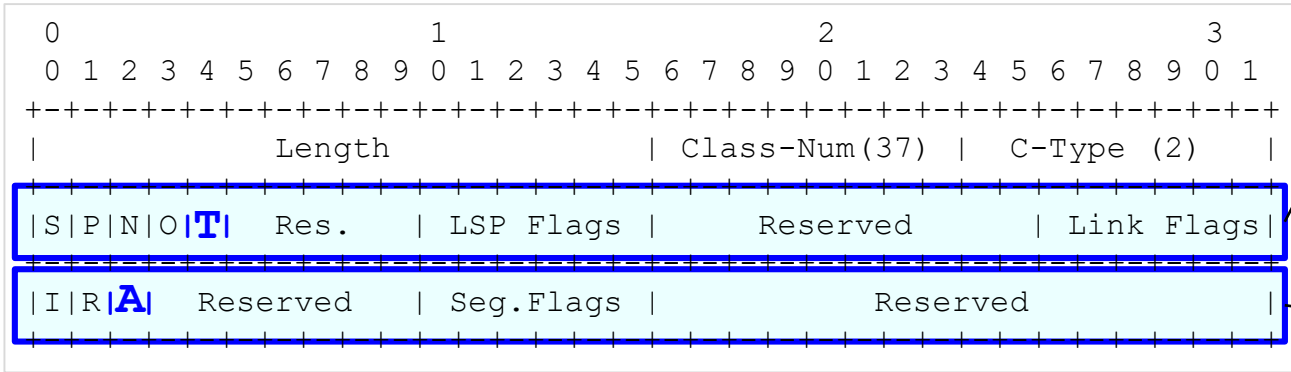
- Normal State
- Only working LSP

- At t1, 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

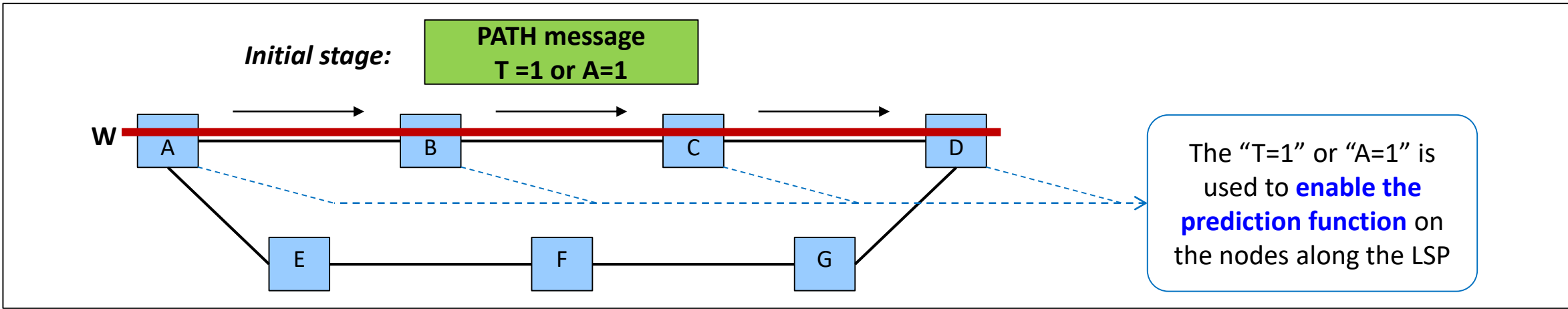


➤ **T (Triggered E2E Proactive Protection):**

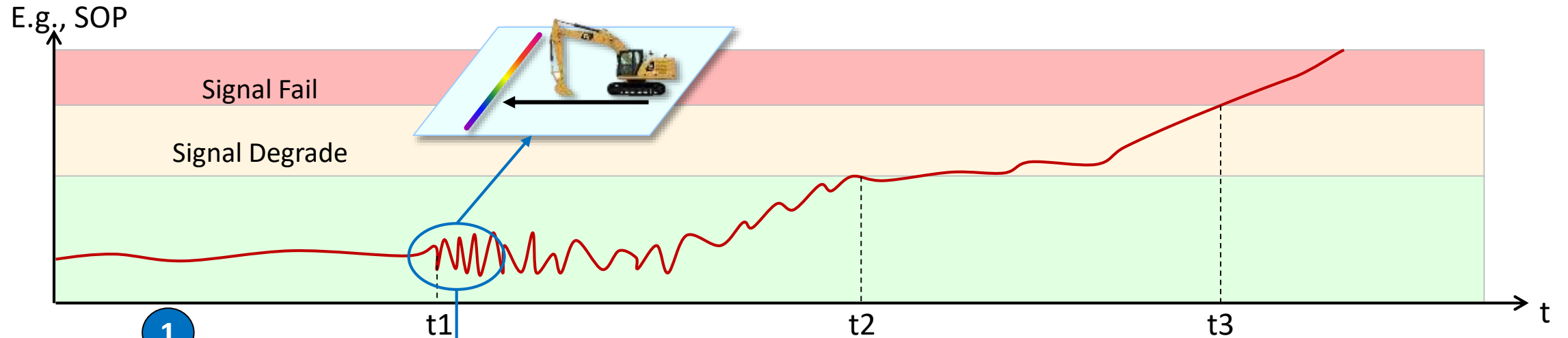
- **T = 1:** E2E Proactive Protection is required
- When **T = 1**, **LSP Flags** SHOULD be 1+1 or 1:N

➤ **A (proActive Segment Protection):**

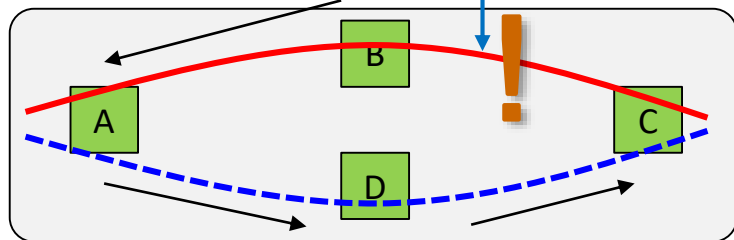
- **A = 1:** Proactive Segment Protection is required
- When **A = 1**, **Seg. Flags** SHOULD be 1+1 or 1:N



Protocol Extension (2.1): Notification



1
Notify message
Predicted failure ID = 1

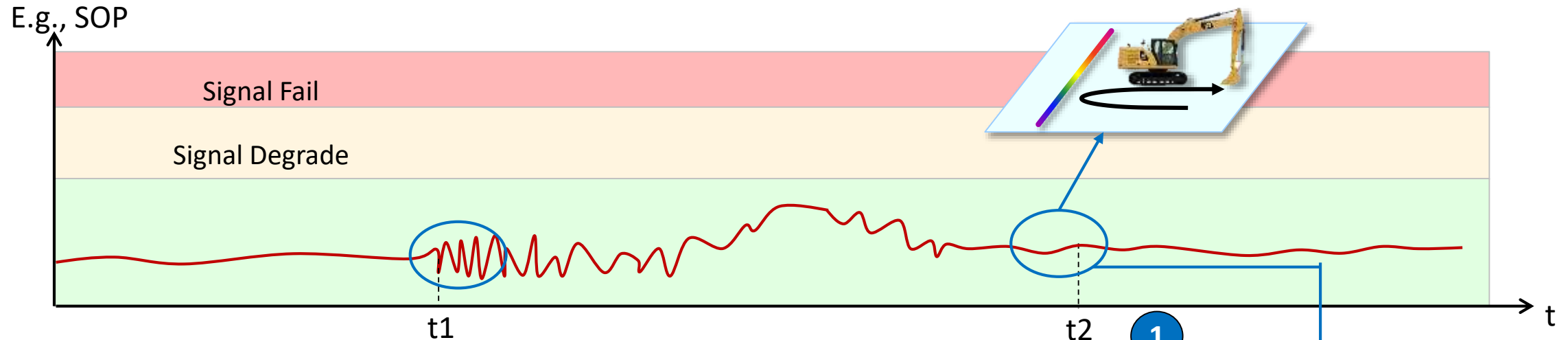


2
PATH message
To create protecting LSP

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 = TBA3		Length	
Predicted Failure ID			
Cause of the Predicted Failure			
			Padding Bits

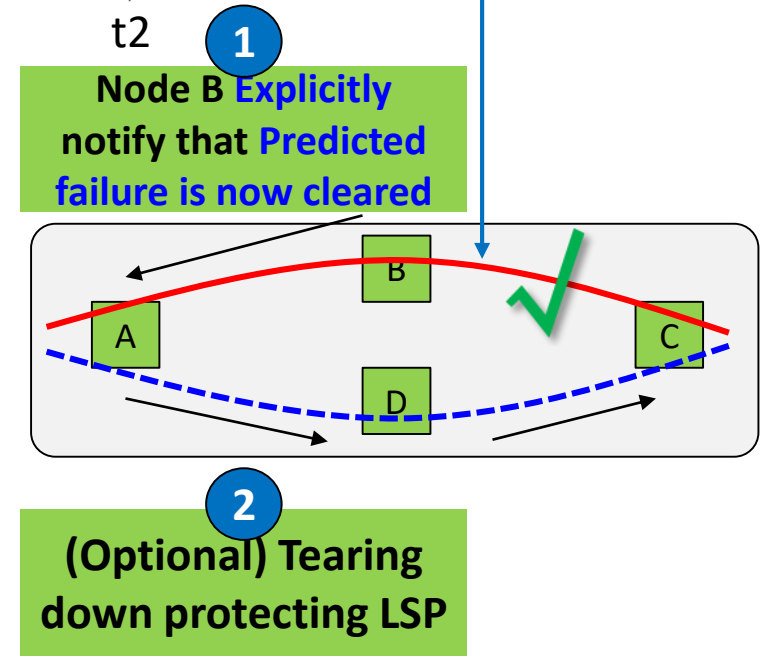
- **Predicted Failure ID**: indicate the predicted failure
- **Cause of the Predicted Failure** (optional): the cause of the predicted failure in text format

Protocol Extension (2.2): Notification



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	2	3	4	5	6	7	8	9										
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- **Predicted Failure ID:** indicate that the pervious predicted failure is now cleared
- The source node (A) MAY tearing down the protecting LSP to save resource, according to local policy



Next Steps

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

Thank you