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Updates to MPLS Transport Profile (MPLS-TP) Linear Protection in Automatic Protection Switching (APS) Mode draft-ryoo-mpls-tp-aps-updates-01.txt

Abstract

This document contains updates to MPLS Transport Profile (MPLS-TP) linear protection in Automatic Protection Switching (APS) mode defined in RFC 7271. The updates provide rules related to the initialization of the Protection State Coordination (PSC) Control Logic, in which the state machine resides, when operating in APS mode.

Status of This Memo

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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This Internet-Draft will expire on April 19, 2016.

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1. Introduction

MPLS Transport Profile (MPLS-TP) linear protection in Automatic Protection Switching (APS) mode is defined in RFC 7271 [RFC7271]. The actions being performed at the initialization of the Protection State Coordination (PSC) Control Logic are not described in either [RFC7271] or RFC 6378 [RFC6378]. Although it is a common perception that the state machine starts at the Normal state (but, not explicitly specified in any of the documents), various questions have been raised concerning the detailed actions that the PSC Control Logic should take.

The state machine described in [RFC7271] operates under the assumption that both end nodes of linear protection domain start in the Normal state. In the case that one node reboots while the other node is still in operation, various scenarios may arise resulting in problematic situations. This document is intended to resolve all the problematic cases and to minimize traffic disruptions related to initialization including both cold and warm reboots that require re-initialization of the PSC Control Logic.

This document contains updates to the MPLS Transport Profile (MPLS-TP) linear protection in Automatic Protection Switching (APS) mode defined in [RFC7271]. The updates provide rules related to initialization of the PSC Control Logic, in which the state machine resides, when operating in APS mode. The updates also include

modifications to the state transition table defined in Section 11.2 of [RFC7271]. The changes in the state transition table were examined to make sure that they do not introduce any new problems.

This document does not introduce backward compatibility issues with implementations of [RFC7271]. In case a node implementing this document restarts, the new state changes will not cause problems at the remote node implementing [RFC7271] and the two ends will converge to the same local and remote states. In case a node implementing [RFC7271] restarts, the two ends behave as of today.

The reader of this document is assumed to be familiar with [RFC7271]. This document shares the acronyms defined in Section 3 of [RFC7271].

2. Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 [RFC2119].

3. Updates

This document updates [RFC7271] by specifying the actions that will be performed at the initialization of the PSC Control Logic and modifies the state transition table defined in Section 11.2 of [RFC7271].

3.1. Initialization Behavior

When the PSC Control Logic is initialized, the following actions MUST be performed:

- Stop the WTR timer if it is running.
- Clear any operator command in the Local Request Logic.
- If an SF-W or SF-P exists as the highest local request, transit to the PF:W:L or UA:P:L state, respectively.
- When the node being initialized has no local request:
  - If the node being initialized does not remember the active path or if the node being initialized remembers the working path as the active path, send NR(0,0) in Normal state.
  - If the node being initialized remembers the protection path as the active path, send either NR(0,1) in WTR state or DNR(0,1) in DNR state depending on the configuration.

- Any local SD MUST be ignored and the detection of a local SD MUST be (re-)started after the local node completes the initialization and responds to the first protocol message received from the remote node.

- When the local node receives an EXER message as the first protocol message after rebooting and the remote EXER becomes the top-priority global request, align the position of the bridge and selector with the Path value in the EXER message and transit to the E::R state .

Remembering the active path in case of no local request is intended to minimize traffic switchovers in case that the other node is still in operation and does not cause any problem even if the remembered active path is not valid any more due to any local input at the other node while the initializing node is out of operation.

Note that while the local SD input is being ignored and there exist no other local requests, the local node restats with no local request. Since the equal priority resolution stated in Section 7.4 of [RFC7271] does not converge when the active paths that two nodes remember are different from each other. an SD detection needs to be (re-)started after both nodes converge to the same view on their active paths.

It is worth noting that in some restart scenarios (e.g., cold rebooting), no valid SF/SD indications may be present at the input of the Local Request logic. In this case, the PSC Control Logic would restart as if no local requests are present. If a valid SF/SD indication is detected later on, this would be notified to the PSC Control Logic and trigger state change.

3.2. State Transition Modification

State transition by remote message defined in Section 11.2 of [RFC7271] MUST be modified as follows (only modified cells are shown):

	MS-W	MS-P	WTR	EXER	RR	DNR	NR
N			(13)			DNR	
PF:W:R						DNR	
PF:DW:R						DNR	

4. IANA Considerations

This document makes no request of IANA.

Note to RFC Editor: this section may be removed on publication as an RFC.

5. Security Considerations

No specific security issue is raised in addition to those ones already documented in [RFC7271]

6. References

6.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, DOI 10.17487/RFC2119, March 1997, <http://www.rfc-editor.org/info/rfc2119>.

[RFC7271] Ryoo, J., Ed., Gray, E., Ed., van Helvoort, H., D'Alessandro, A., Cheung, T., and E. Osborne, "MPLS Transport Profile (MPLS-TP) Linear Protection to Match the Operational Expectations of Synchronous Digital Hierarchy, Optical Transport Network, and Ethernet Transport Network Operators", RFC 7271, DOI 10.17487/RFC7271, June 2014, <http://www.rfc-editor.org/info/rfc7271>.

6.2. Informative References

[RFC6378] Weingarten, Y., Ed., Bryant, S., Osborne, E., Sprecher, N., and A. Fulignoli, Ed., "MPLS Transport Profile (MPLS-TP) Linear Protection", RFC 6378, DOI 10.17487/RFC6378, October 2011, <http://www.rfc-editor.org/info/rfc6378>.

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