PSC Updates

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Background

- Since the publication of RFC6378 in Oct. 2011, ITU-T has performed technical analysis on PSC providing many comments to IETF:
  - LS 1162 in June 2012 (https://datatracker.ietf.org/liaison/1162/) highlights a number of differences in the operational behavior of PSC and linear protection as defined in G.808.1 "Generic protection switching –Linear trail and subnetwork protection" and G.8031 "Ethernet linear protection switching" and a list of technical issues
  - LS 1205 in Oct. 2012 (https://datatracker.ietf.org/liaison/1205/) provides further technical issues with PSC
  - LS 1234 in Feb. 2013 (https://datatracker.ietf.org/liaison/1234/) further clarified and identified the issues with PSC

- Several internet drafts have been submitted to address the issues raised by ITU-T as recommended by IETF in LS 1229 in January 2013

- During IETF 86 meeting in March 2013, a group has been formed to review the drafts for updating PSC
  - The outcome of the group activity, as sent to the MPLS WG mailing list on April 16, 2013 is "Team generally agreed that the four drafts under discussion address the requirement they intend to request"

- During ITU-T SG15 Plenary meeting in July 2013, WP3/15 agreed that it "would like to initiate work on a revision to G.8131, that will include normative references to the IETF MPLS-TP RFCs, that will meet the requirements expressed by ITU-T. WP3/15 requests that the work to update the MPLS-TP linear protection RFCs to satisfy the requirements expressed by the ITU-T is completed in time to allow us to consent a revision to G.8131 in April 2014"

Purpose and Design Criteria of PSC Updates

- Purpose:
  - To align PSC protocol (RFC 6378) to ITU-T transport requirements
  - To preserve the network operation behavior to which network operators have become accustomed

- Design criteria
  - No modification in PSC packet format
  - No modification in PSC control logic construct and its operational principle

List of Drafts for PSC Updates

- draft-rhd-mpls-tp-psc-priority-00
- draft-cdh-mpls-tp-psc-non-revertive-00
- draft-rhd-mpls-tp-psc-sd-00
- draft-dj-mpls-tp-exer-psc-01

draft-rhd-mpls-tp-psc-priority-00

PRIORITY SWAPPING BETWEEN FS AND SF-P

draft-rhd-mpls-tp-psc-priority-00

- Objective:
  - To change FS and SF-P priorities
  - To avoid operational scenarios that bring to traffic losses
  - To align RFC 6378 (PSC) to ITU-T transport requirements

- Priority as in RFC 6378 (PSC): FS > SF-P
- Proposal as in draft-rhd-mpls-tp-psc-priority-00: SF-P > FS

Current PSC priority brings to the following behaviors

- Network operation scenario 1:
  1. Working path (W) and protection path (P) are normal.
  2. Forced Switch (FS) command is issued for maintenance on the W.
  3. Traffic moves from W to P.
  4. When Signal Fail occurs on P (SF-P), traffic remains in P as FS > SF-P.
  5. Now, service is interrupted and cannot be recovered.

  Note: SF-P in step 4 could occur for example as a result of accidentally un-plugging a fiber on protection path.

draft-rhd-mpls-tp-psc-priority-00

- Network operation scenario 2:
    1. There is an existing signal fail on a protection path (SF-P) and traffic is on W.
    2. FS command is issued at end node A, in order to move the traffic to P.
    3. Node A moves traffic from W to P.
    4. But, the other end node, Z still uses W since the FS command cannot be signaled to node Z due to SF-P.
    5. Now, two end nodes use different paths and the operator's intention to move traffic to P cannot be achieved. And this also results in an interruption of service from which the protocol will not automatically recover.

    Note: If an operator wants the absolute power to keep traffic on P even when SF-P occurs, a local Freeze command can be used at both end nodes. Freeze command is described in Appendix of draft-rhd-mpls-tp-psc-priority-00.

draft-rhd-mpls-tp-psc-priority-00

- Priority as in RFC 6378 (PSC) has been designed according to RFC 4427 (see LS 1229)
- It has been clarified that RFC 4427 was "written correctly though lacking in detail causing mis-interpretation"
- draft-helvoort-ccamp-fs-priority has been submitted to clarifies Forced Switch priority in RFC 4427

NON REVERTIVE BEHAVIOR AND MS-W

draft-cdh-mpls-tp-psc-non-revertive-00

- Objective:
  - To change non-revertive operation to behave in the same way irrespectively of the triggers of protection switching (fault or operator command FS, MS)
  - To align RFC 6378 (PSC) to ITU-T transport requirements
  - To introduce MS-W operator command as per RFC 5654

- Current PSC behavior foresees non-revertive operation
- Non revertive operation only applies to protection switching caused by fault
- Non revertive operation is not applied when protection switching is caused by operator commands
- draft-cdh-mpls-tp-psc-non-revertive-00 extends non revertive operation to operator commands

draft-cdh-mpls-tp-psc-non-revertive-00

- draft-cdh-mpls-tp-psc-non-revertive-00 also adds Manual Switch to Working (MS-W) a.k.a "Manual switch-over for recovery LSP/span"
    - MS-W is defined in RFC 5654, requirement 83 but not implemented in RFC 6378 (PSC)
    - MS-W has to be supported to be able to move the traffic from P to W safely after SF-W is cleared in non-revertive mode.
        - Lockout of protection (LO), as proposed in RFC6378, is not desirable as LO ignores any failure on W, in which case service is interrupted

draft-rhd-mpls-tp-psc-sd-00

SIGNAL DEGRADE

draft-rhd-mpls-tp-psc-sd-00

- Objective
  - Provides extensions to the PSC to support Signal Degrade (SD)

- Priority level of SD is already defined in RFC6378
- Mechanism for detecting SD is outside the scope of PSC protocol similarly to
  - How to detect SF
  - How MS and FS commands are initiated in a management system and signaled to PSC
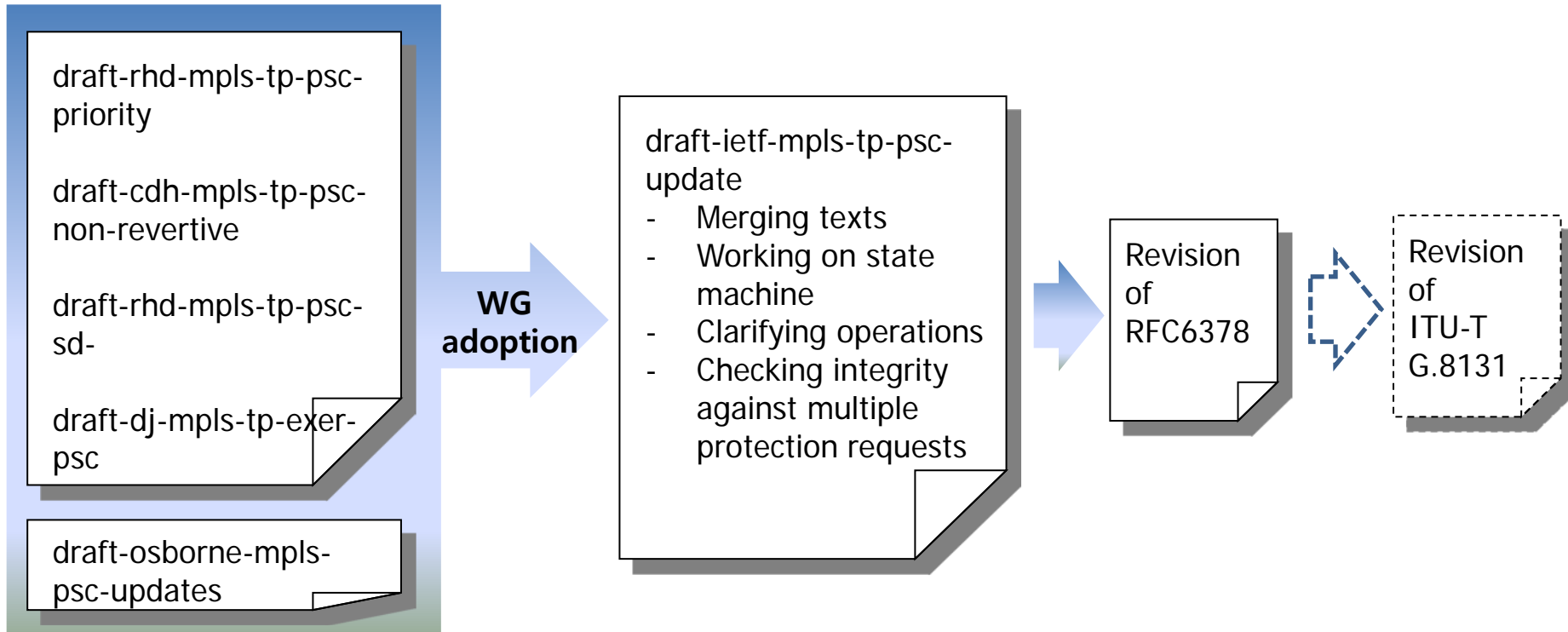- The proposed draft covers SD-triggered protection, no matter what kind of SD detection methods is used.

draft-dj-mpls-tp-exer-psc-01

EXERCISE

draft-dj-mpls-tp-exer-psc-01

- Objective
  - To add the EXER/RR commands to test if the PSC communication is operating correctly
  - To meet ITU-T transport requirements
  - To satisfy RFC5654, R84
- Exercise tests and validates the linear protection mechanism and PSC protocol including
  - the aliveness of the Local Request logic,
  - the PSC state machine,
  - the PSC message generation and reception, and
  - the integrity of the protection path,

  without triggering the actual traffic switching.

Next Steps

draft-rhd-mpls-tp-psc-priority

draft-cdh-mpls-tp-psc-non-revertive

draft-rhd-mpls-tp-psc-sd-

draft-dj-mpls-tp-exer-psc

draft-osborne-mpls-psc-updates

WG adoption

draft-ietf-mpls-tp-psc-update
- Merging texts
- Working on state machine
- Clarifying operations
- Checking integrity against multiple protection requests

Revision of RFC6378

Revision of ITU-T G.8131

Summary

- The drafts that aim to align RFC6378 to ITU-T transport requirements are presented.

- Asking WG adoption of all the documents listed in this presentation.