Practical limitations for Reaction Point

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Practical limitations on RP

Consider following implementations for RP:

1. Dynamic allocation of RLs for congested flows:
   - Install RL for a flow when congestion information is received.
   - Only congested flow goes through RL, all other flows continue unaffected
   - Remove flow from RL when: it returns to scheduling rate of link speed and it is empty

2. Static Allocation of flows to available RLs:
   - All flows are statically hashed (e.g. {DA, Pri}) to available rate limiters
   - Scheduling rate for RLs is modified according to congestion information received and recovery/drift mechanisms
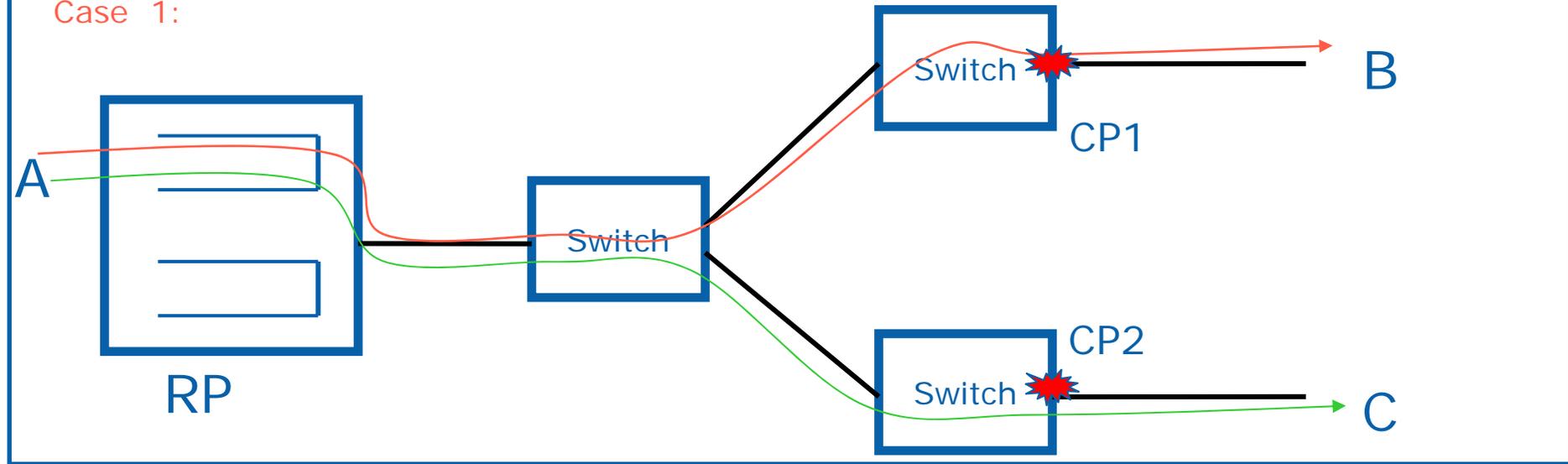
3. Combination of above

NOTE:

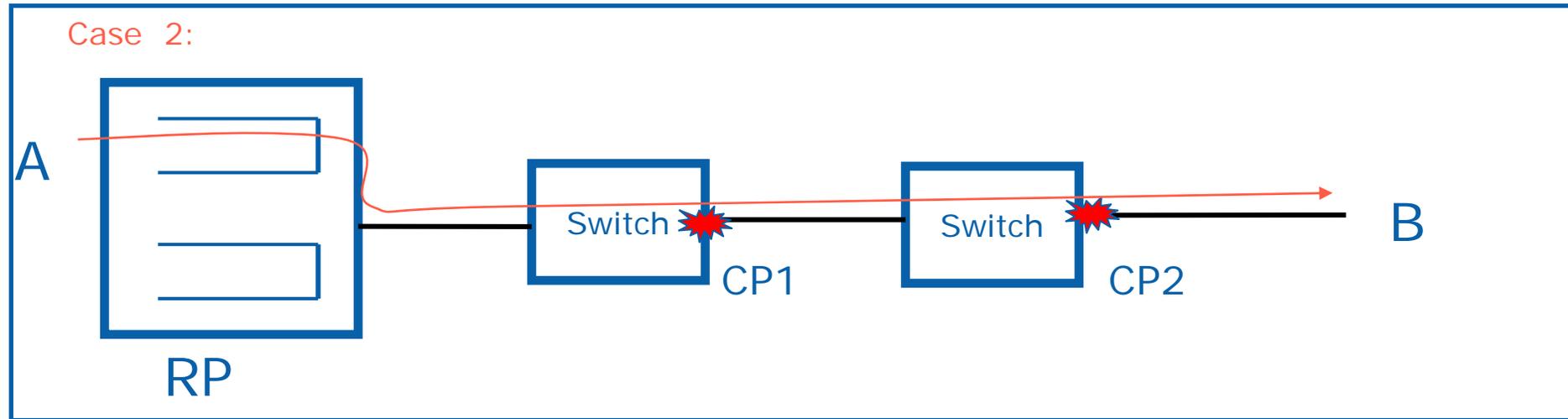In #1 above, when Number_of_congested_flows > Number_of_RLs, flows get hashed to available RLs – degenerates in #2

Need to support case : multiple flows mapped to single RL

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Multiple Congestion Points in single RP

Case 1:

Switch — B

CP1

Switch

RP

Switch — CP2

Switch — C

Case 2:

A

Switch — CP1

Switch — CP2 — B

RP

3

Case 1: Effect of multiple CPs

Negative Feedback:

- Should work, Max negative feedback can take effect – "winner CP"

Positive Feedback with RP/CP association:

- CPID helps in associating this feedback with "winner CP"

- But creates hard RP/CP association
    - Needs drift to recover from possible corner cases (RP getting stuck: CP vanishing, flow re-routing, flow-completion)

Self clocked recovery (no RP/CP association):

- Should work, Max negative feedback can take effect

"No congestion" feedback (no RP/CP association):

- May cause increase in flip-flop for Self clocked recovery

Rate feedback/Path probes:

- How to resolve different rate feedbacks from different paths (flows)?

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Case 2: Effect of multiple CPs

Negative Feedback:

• Should work, Max negative feedback can take effect – "winner CP"

Positive Feedback with RP/CP association:

• CPID helps in associating this feedback with "winner CP"

• But creates hard RP/CP association
  – Needs drift to recover from possible corner cases (RP getting stuck: stuck:CP vanishing, flow re-routing, flow-completion)

Self clocked recovery (no RP/CP association):

• Should work, Max negative feedback can take effect

"No congestion" feedback (no RP/CP association):

• Should work as feedback is consolidated through the path

Rate feedback/Path probes:

• Should work as rates are consolidated through the path

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Summary

- Practical implementations will have finite number of rate limiters at Reaction Point

- Multiple flows (to different destinations/paths) may get mapped into same Rate Limiter

- Proposed 802.1Qau solution needs to address this case

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