PCN Encoding for Packet-Specific Dual Marking (PSDM)
draft-menth-pcn-psdm-encoding-00

Michael Menth
University of Wuerzburg

Jozef Babiarz
Nortel Networks

Toby Moncaster
BT

Bob Briscoe
BT & UCL
Baseline Encoding vs. Packet-Specific Dual Marking (PSDM)

• **Similarity**
  – Possibly could use Voice-Admit DSCP for PCN traffic
  – One DSCP
  – Use ECN field for
    • Differentiation of PCN traffic from non-PCN traffic
    • PCN encoding

• **Difference**
  – Baseline encoding supports only one marking scheme in a PCN domain
  – PSDM-encoding supports two marking schemes in a network, but only one per packet
    • Excess Marking
    • Exhaustive Marking
Motivation for PSDM

• Motivation
  – Robust, probe-based (signalled) AC: probe packets need exhaustive (threshold) marking based on admissible rate
  – As well support FT: PCN data packets need excess marking based on supportable rate

• Idea
  – Use excess and exhaustive (threshold) marking in same network
  – All PCN traffic is subject to both meters
  – Probe packets are subject to exhaustive marking only
  – PCN data packets are subject to excess marking only
  – ECN bits are used to tell routers which meter marks which packet
  – Excess and exhaustive marking re-mark packets to the same codepoint “11”
  – Egress node knows if packet is probe or PCN data, therefore infers whether packet was excess or exhaustive marked
PCN Codepoints - Redefinition of ECN Field

- **ECN field: Semantic**
  - “00” not-PCN: Voice-Admit traffic not subject to PCN control
  - “10” not-excess-marked (not-ExM): unmarked PCN traffic subject to excess marking
  - “01” not-exhaustive-marked (not-EhM): unmarked PCN traffic subject to exhaustive marking
  - “11” marked (M): marked traffic
Applicability of PCN Encoding for PSDM

• Only AC
  – Use exhaustive marking only (single marking)
  – All packets not-EhM “01” marked at ingress

• Only FT
  – Use excess marking only (single marking)
  – All packets not-ExM “10” marked at ingress

• AC & FT (SM) as per charny-pcn-single-marking
  – Use excess marking only (single marking – meter configured rate set to admission level)
  – All packets not-ExM “10” marked at ingress

• Probe-based (signalled) AC & FT
  – Use excess and exhaustive marking (dual marking)
  – All PCN traffic is subject to both meters, but only to one marker
  – Probe packets are not-EhM “01” market at ingress
  – PCN data packets are not-ExM “10” market at ingress
PSDM Limitation – options going forward

- end-to-end ECN can be supported through tunneling in PCN domain
  - Until end-to-end PCN is defined

- not supported CL style AC & FT when both are used) (measurement of marking at egress)
  - Requires 2\textsuperscript{nd} DSCP

<table>
<thead>
<tr>
<th>DSCP</th>
<th>Not-ECT “00”</th>
<th>ECT(0) “10”</th>
<th>ECT(1) “01”</th>
<th>CE “11”</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSCP 1</td>
<td>Not-PCN</td>
<td>Not-ExM</td>
<td>Not-EhM</td>
<td>M</td>
</tr>
</tbody>
</table>

PSDM using single DSCP

Simple evolution from SM to CL for both AC & FT encoding

<table>
<thead>
<tr>
<th>DSCP 1 (FT)</th>
<th>Not-PCN</th>
<th>Not-ExM</th>
<th>Not-used</th>
<th>M (ETM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSCP 2 (AC)</td>
<td>Not-PCN</td>
<td>Not-used</td>
<td>Not-EhM</td>
<td>M (ThM)</td>
</tr>
</tbody>
</table>

Note: end-to-end ECN can be supported through tunneling in PCN domain until end-to-end PCN is defined

Further analysis required
Conclusion

- PCN encoding for packet-specific dual marking (PSDM)
  - Requires only one DSCP (possibly Voice-Admit)
  - Extension of “baseline encoding”
  - Supports two concurrent marking schemes (excess and exhaustive marking)
  - More (at least 4) deployment scenarios possible than with “draft 02 of baseline encoding”
Motion

• Would like that PCN WG adopt the encoding method defined in draft-menth-pcn-psdm-encoding-00 as WG work item.