PCN Encoding

draft-ietf-pcn-baseline-encoding-04
draft-ietf-pcn-3-in-1-encoding-00
draft-ietf-pcn-3-state-encoding-00
draft-ietf-pcn-psdm-encoding-00

Philip Eardley on behalf of:
Toby Moncaster (all), Bob Briscoe (all), Michael Menth (not 3-in-1), Jozef Babiarz (PSDM)
Baseline

- 2 iterations,
- Completed WG LC, now in “Publication Requested”
- No significant changes.
- Clarifications from WGLC & Gorry Fairhurst reviews
  - Added Section 4.3.1 to clarify why we need the not-PCN codepoint.
  - Stated that the PCN WG will maintain a list of PCN-compatible DSCPs. This should help avoid inter-operability issues.
  - Abstract re-written.
  - Clarified throughout that this re-uses the ECN bits in the IP header.
  - Re-arranged order of terminology section for clarity.
  - Table 2 replaced with new table and text.
  - Security considerations re-written.
  - Appendixes re-written to improve clarity.
### Baseline vs Experimental encodings

<table>
<thead>
<tr>
<th></th>
<th>DSCP</th>
<th>00</th>
<th>10</th>
<th>01</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong></td>
<td>DSCP1</td>
<td>Not-PCN</td>
<td>NM</td>
<td>EXP</td>
<td>M</td>
</tr>
<tr>
<td><strong>PSDM</strong></td>
<td>DSCP1</td>
<td>Not-PCN</td>
<td>NM ExM</td>
<td>NM ThM</td>
<td>M</td>
</tr>
<tr>
<td><strong>Basic 3 state</strong></td>
<td>DSCP1</td>
<td>Not-PCN</td>
<td>NM</td>
<td>CU/EXP</td>
<td>ExM</td>
</tr>
<tr>
<td><strong>Extended</strong></td>
<td>DSCP1</td>
<td>Not-PCN</td>
<td>NM</td>
<td>NM(CE)</td>
<td>ExM</td>
</tr>
<tr>
<td><strong>3 state</strong></td>
<td>DSCP2</td>
<td>Not-PCN</td>
<td>NM(ECT(0))</td>
<td>NM(ECT(1))</td>
<td>ThM</td>
</tr>
<tr>
<td><strong>3-in-1</strong></td>
<td>DSCP1</td>
<td>Not-PCN</td>
<td>NM</td>
<td>ThM</td>
<td>ExM</td>
</tr>
</tbody>
</table>
• WG i-d from draft-menth-pcn-psdm-encoding without change

• Basic idea:
  – Threshold mark (only) ECN-01 pkts; excess mark (only) ECN-10 pkts
  – Ingress sets ECN-01 for "signalling admission request" pkts & ECN-10 for data pkts
  – Egress checks whether marked pkts are data or adm request (look in higher layer)
  – Gets both PCN-marked states with 1 DSCP & existing tunnels (but extra ingress & egress behaviour etc)
• WG i-d from draft-briscoe-pcn-3-in-1-encoding
• Basic idea: obvious solution if tunnelling behaviour is sorted out
• Minor updates only:
  – Introduction altered to include new standard description of PCN.
  – References updated.
  – Terminology brought into line with [I-D.iarf-pcn-marking-behaviour].
• WG i-d from draft-moncaster-pcn-3-state-encoding)
• Basic idea of “base 3 state”:
  – Get both PCN-marked states with 2 DSCPs & existing tunnels
• Basic idea of “extended 3 state”
  – Adds limited end-to-end ECN support preserved (also: Get both PCN-marked states with 2 DSCPs & existing tunnels)
• Quite a lot of wording changes (encoding & principles unchanged):
  – Imposed structure /guidelines /consistency with baseline doc (about how to write encoding extensions)
Discussion questions 1 (mine!)

• Do we want to go forward with all 4 exptl encodings to RFC?
  – 3-in-1 looks best IF ecn tunnelling behaviour is sorted [I-D.ietf- tsvwg-ecn-tunnel].
  – Base-3-state IF enough DSCPs but tunnel behaviour not sorted
  – Extended-3-state IF also want (some) e2e ecn support & don’t want to tunnel across PCN-domain
  – PSDM interesting if can assume adm ctrl signalling pkts

• How do we decide this?
• Should we combine them into one RFC?
• The names of 3-state &/or 3-in-1 make my head hurt
Discussion questions 2 (mine!)

• How should the expts be run?
  – Request any DSCPs used for PCN are registered with WG?
  – Request results are presented to WG?
  – Suggest questions that would be interesting to answer?
    • Comparative implementation complexity?
    • Extra DSCP vs adm signalling?
    • Is e2e ecn useful? If yes, is tunnelling it ok?
  – Should we define criteria or formalise process?
Backup

• Michael’s PSDM SLIDES…
PCN Encoding for Packet-Specific Dual Marking (PSDM)
draft-menth-pcn-psdm-encoding-00

Michael Menth, Jozef Babiarz, Toby Moncaster, Bob Briscoe
Baseline Encoding vs. Packet-Specific Dual Marking (PSDM)

- **Similarity**
  - Use Voice-Admit DSCP for PCN traffic
  - 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
Motivation for PSDM

• Motivation
  – Robust FT method: PCN data packets need excess marking based on supportable rate
  – Probe-based AC: probe packets need threshold marking based on admissible rate

• Idea
  – Use excess and threshold marking in same network
  – All PCN traffic subject to both meters
  – Probe packets subject to threshold marking only
  – PCN data packets subject to excess marking only
  – Hide details from routers: use PCN codepoint to tell routers which marking applies to unmarked packet
  – Excess and threshold marking re-mark packets to same marked codepoint
  – Infer from type of marked packet whether packet was excess or threshold marked
PCN Codepoints

• Redefinition of ECN field
  – 00: not-PCN
  – 10: not-excess-marked (not-ExM)
  – 01: not-threshold-marked (not-ThM)
  – 11: marked (M)

• Semantic
  – not-PCN: Voice-Admit traffic not subject to PCN control
  – not-ExM: unmarked PCN traffic subject to excess marking
  – not-ThM: unmarked PCN traffic subject to threshold marking
  – M: marked traffic
Applicability of PCN Encoding for PSDM

- Only AC
  - Use threshold marking only (single marking)
  - All packets not-ThM marked at ingress

- Only FT
  - Use excess marking only (single marking)
  - All packets not-ExM marked at ingress

- Probe-based AC & FT
  - Use excess and threshold marking (dual marking)
  - All PCN traffic is subject to both meters, but only to one marker
  - Probe packets are not-ThM at ingress
  - PCN data packets are not-ExM at ingress
What about End-to-End ECN for PCN Traffic?

• Different story
  – Use tunnelling across PCN domain to preserve ECN bits if desired
  – Use special tunnel to provide PCN marking to applications if desired
Conclusion

• PCN encoding for packet-specific dual marking (PSDM)
  – Requires only one DSCP (Voice-Admit)
  – Extension of „baseline encoding“
  – Supports two concurrent marking schemes (excess and threshold marking)
  – More deployment scenarios possible than with „baseline encoding“