L4S Status Update

draft-ietf-tsvwg-l4s-arch-16
draft-ietf-tsvwg-ecn-l4s-id-24
draft-ietf-tsvwg-aqm-dualq-coupled-21

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tsvwg, IETF-113--, Feb 2022
Recap – L4S Motivation

- Very low queuing delay and high throughput
- including for capacity-seeking & capacity-adaptive

The trick: scalable congestion control

<table>
<thead>
<tr>
<th></th>
<th>(1) Today (typical)</th>
<th>(2) Today (at best)</th>
<th>(3) Unacceptable</th>
<th>(4) L4S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottleneck</td>
<td>Bloated drop-tail buffer</td>
<td>AQM</td>
<td>Shallower AQM</td>
<td>Immediate AQM</td>
</tr>
<tr>
<td>Sender CC</td>
<td>Classic</td>
<td>Classic</td>
<td>Classic</td>
<td>Scalable (tiny saw-teeth)</td>
</tr>
</tbody>
</table>
L4S draft updates since IETF-112

- 3 main drafts updated twice, all in lock-step
  - 24 Dec 21 & 1 Feb 22
- each change below discussed on tsvwg list betw Nov'21 & now.
  - except items tagged 'upcoming' which will appear on the list ASAP

- slides are paraphrased, see drafts for actual text
Draft updates: L4S Architecture
l4s-arch-14 → 16

- Normative – n/a
- Technical - none
- Editorial
  - Under overload, drop of ECT packets introduced (previously said "ECN marking disabled", even tho' it isn't) [Authors]
  - Described references, not just bare citations [Stuart's rvw]
  - Referenced iccrg draft for BBRv2 and removed mention of BBRv1
- Upcoming
  - Delete Appx A (outdated ToDo list of L4S standardization items) [Authors/Wes]
Draft updates: ECN Protocol for L4S
ecn-l4s-id-22 → 24

• Normative
  − Prague req’s on ECN AQM fallback (§4.3, bullet #3) [Jake]:
    • tightened and clarified mandatory detection: MUST be implemented **and used**
    • "detection of potential problems" is either direct (actual problems), or by inference (from likely type of AQM)
  − §§4.4 & 5.2: L4S AQM MUST signal congestion ASAP, also allowed to mix in smoothed signals (replaces SHOULD NOT smooth variations, with an exception for mixing in smoothed signals) [Bob]
  − L4S identifier exceptions [Gorry, PeteH]
    • §5.4.1.1: To include additional traffic in L queue, MUST NOT alter Not-ECT or ECT(0) (replaces MUST NOT alter non-ECN identifiers, which strayed beyond L4S remit)
    • §5.4.1.2: If excluding any L4S packets from L queue, drops or marks MUST still be compatible with L4S senders, and MUST NOT mark with Classic prob, which would confuse sender

• cont...
Draft updates: ECN Protocol for L4S
ecn-l4s-id-22 → 24

• cont…

• Technical
  − Open Questions (§7.1) to be answered by L4S experiments. Added [Olivier]:
    • what types of L4S AQMs were deployed and how prevalent was each type?
    • are signalling patterns different from those envisaged when Prague req’ts written?
    • dependence of L4S performance on b/w or RTT?
    • how prevalent were bursty links that affected L4S performance, and how much did L4S have to be altered to accommodate them?

• Editorial
  • Various clarifications and corrections; Referenced iccrg draft for BBRv2 [Bob, DavidB]

• Upcoming Editorial
  • Just before discussion of hash collisions and VPNs: "With FQ, … different flows are not meant to coexist within be in the same queue" [Authors]
Draft updates: DualQ Coupled AQMs for L4S

aqm-dualq-coupled-19 → 21

• Normative - none

• Technical
  • Appx. A. DualPI2: Corrected pseudocode (when step generalized to ramp, it was still logical AND'd) [Authors]

• Editorial [Authors]
  • Under overload, drop of ECT packets introduced
    (previously said "ECN marking disabled", even tho' it isn't)
  • Referenced iccrg draft for BBRv2
  • Renamed Appx. A.2 from "Overload Handling" to "Edge Cases" and moved low-rate link case out of core algo, into here.

• Upcoming Technical
  • Pseudocode missed a long-standing change to the Linux overload code (use the max of the two queue delays), which replaces only using L delay if C queue empty. [Authors]
  • Clarified that normative overload requirement (about introducing drop of ECT packets) applies to both queues [Authors].
Developments outside tsvwg

- draft-briscoe-docsis-q-protection-00 → 02
  - Two reviews by Adrian Farrel
    - Two revs: 17 Dec 21 & 31 Jan 22
    - Added intended audience and why an additional publication was nec.
      - Pulls together strands from DOCSIS spec for IETF convenience
      - Gives necessary flow behaviour for CC developers
      - Gives algorithm rationale (not in DOCSIS spec)
    - Added further rationale sections
    - Tracked minor changes to the DOCSIS spec
    - Clearer signposting of potential extensions beyond DOCSIS
    - Clarifications & corrections throughout
  - Review also in progress by MagnusW
L4S Status Update

Thank you to all those who contributed to the WGLC, and to those still contributing to list discussion.

Q&A