

Identifying Modified ECN Semantics for Ultra-Low Queuing Delay

draft-briscoe-tsvwg-ecn-l4s-id-01

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IETF-95 Apr 2016

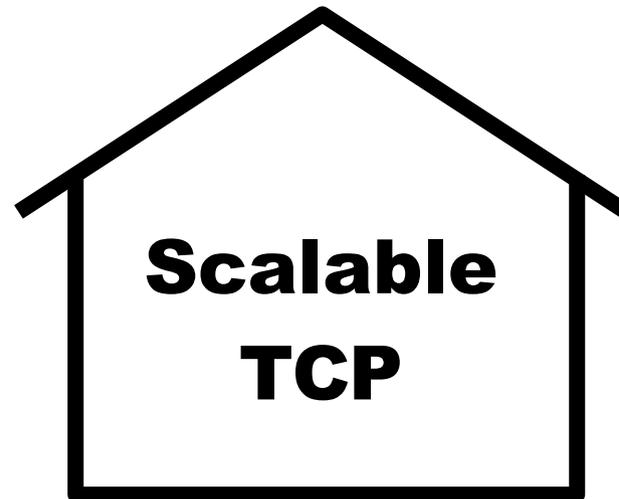
Low Latency Low Loss Scalable throughput (L4S) – background



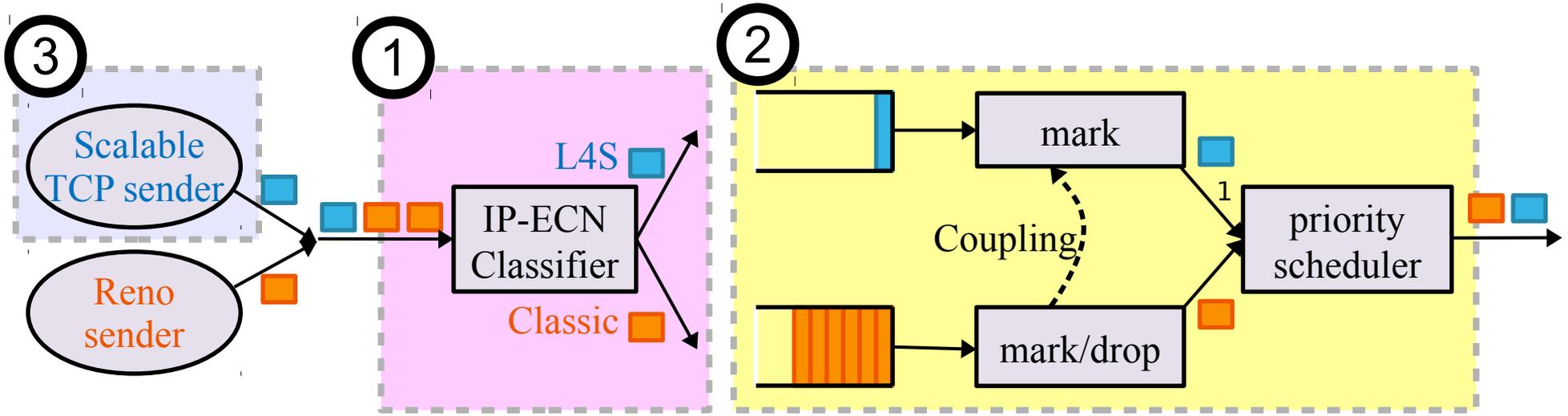
- Recall: demo at Prague IETF (aqm wg & bits-n-bites)
 - see <https://riteproject.eu/dctth/> for videos, papers, etc
- L4S could incrementally replace “best efforts”
 - ultra-low queuing delay
 - zero congestion loss
 - scalable throughput (beyond Reno, Compound, Cubic)
- Eventually for *all* Internet traffic
- Aim: to be worth the deployment hassle – so much better than today

very high level

- problem: TCP is the elephant in the room
- solution: build another room without the elephant



3 parts to standardise



1)	The identifier	draft-briscoe-tsvwg-ecn-l4s-id	tsvwg ← this talk
2)	The DualQ AQM	draft-briscoe-aqm-dualq-coupled	aqm
3a)	Scalable	draft-ietf-tcpm-accurate-ecn	tcpm
3b)	transport	draft-ietf-tcpm-dctcp (bis)	

- #1, #2 are as general as possible
- #3a) fixes TCP feedback, other transports are already OK
- #3b) one concrete example transport behaviour: DCTCP

choice of identifier

- Three possibilities; all involve compromises
 - two other possibilities quickly discounted
 - ECT(1) + CE chosen
 - reasoning recorded in Appendix A of draft
 - table highlights solely the distinguishing issues

Issue	DSCP _x + ECN		ECN*	ECT(1) + CE	
	initial	eventual		initial	eventual
end-to-end?	Poor	Ordinary	Good	Good	Good
tunnels	Ordinary	Ordinary	Good	Good	Good
lower layers	Poor	Ordinary	Good	Ordinary	Good
codepoints	Poor	Good	Good	Poor	Good
reordering	Good	Good	Good	Ordinary	Good
control packets	Good	Good	Ordinary	Ordinary	Good

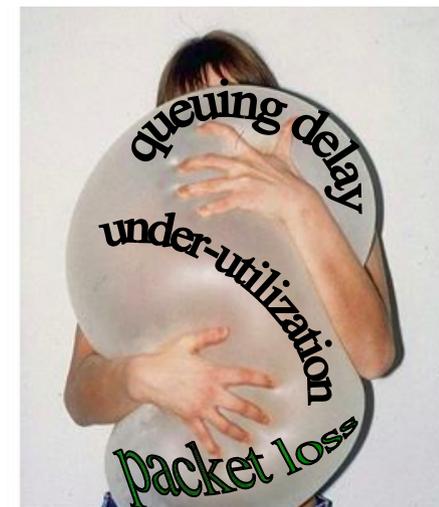
Legend	
Poor	?
Ordinary	?
Good	?
Optimistic	?

CAVEAT: The table is not meant to be understandable without referring to the text.

* only feasible to use ECN alone if Classic ECN becomes obsolete
 “ECN” shares the eventual scores of “ECT(1) + CE”

meaning of this new identifier?

- Original goals of ECN included lower delay with modified TCP
 - but too many combinations to standardise a winner
 - so [RFC3168] defined 'Classic' ECN behaviour as *equivalent* to drop...could allow new criteria to be developed for setting the CE codepoint, and new congestion control mechanisms for end-node reaction to CE packets. However, this is a research issue, and as such is not addressed in this document.
 - so ECN inherited the dilemma of drop-based TCP...



- Proposed meaning of L4S identifier:

The likelihood that an AQM drops a Not-ECT Classic packet MUST be roughly proportional to the square of the likelihood that it would have marked it if it had been an L4S packet.

The constant of proportionality does not have to be standardised for interoperability, but a value of 1 is RECOMMENDED.

If we choose ECT(1): what do we preclude?

- would obsolete ECN nonce [RFC3540]
 - other ways to do feedback integrity without a codepoint
- various “less severe than CE” schemes from the research community, incl. for flow start-up
- see Appendix B
- consider carefully before consuming the last ECN codepoint

Intended Status

- If Proposed Standard, it would update:
 - ECN in IP [RFC3168]
 - ECN in TCP [RFC3168]
 - ECN in SCTP [RFC4960]
 - ECN in RTP [RFC6679]
 - ECN in DCCP [RFC4340]
- Draft written as Experimental
 - can obsolete ECN nonce (also experimental)
 - if experimental, cannot update all the above proposed standards
- Discuss

Next Steps

- Please review and comment
 - brief draft (8pp without boilerplate & appendices)
- Plenty of discussion (on aqm) when issue first raised
 - quiet since
- Industry L4S assessment activities in progress
 - TSVWG will need visibility of this before it can adopt

Q&A

large saw teeth can ruin the quality of your experience



Q) why is queuing delay of DCTCP so low?

A1) Finer saw-teeth of a Scalable TCP

