

Accurate ECN Feedback for TCP (AccECN)

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TCP Congestion Feedback Background & Problem

- L4S repurposes standard Explicit Congestion Notification (ECN) [RFC3168]
 - which "marks" more packets in the IP header (v4 & v6), the greater the queue.
- L4S sender keeps delay v low by adjusting rate in response to **extent** of these marks
 - reported via end-to-end transport layer feedback
- Works fine with feedback in modern transports like QUIC, DCCP or RTCP [RFC9000, RFC4340, RFC8888]
- ...but TCP was only designed to feed back existence not extent of congestion
 - sufficient when ECN was added back in 2001 [RFC3168]

Accurate ECN TCP feedback

draft-ietf-tcpm-accurate-ecn

- AccECN reuses the 3 ECN flags in the main TCP header (**ACE**)
 - 3-bit counter to feed back number of IP-ECN marks
 - also to negotiate support by both TCP ends during the handshake

- **AccECN TCP Option** optionally adds wider counters that won't wrap

- Planned Proposed Standard generic TCP wire protocol
 - also supports non-L4S behaviours

- IETF WG last call Mar'23

- Implemented in Linux (being maintained by Google), FreeBSD & Apple OSs (in progress)

