

Re-ECN: Adding Accountability for Causing Congestion to TCP/IP

[<draft-briscoe-tsvwg-re-ecn-tcp-03>](#)

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updated draft 03

- Re-ECN: Adding Accountability for Causing Congestion to TCP/IP
 - **updated draft:** [draft-briscoe-tsvwg-re-ecn-tcp-03.txt](#)
 - **ultimate intent:** standards track
 - **immediate intent:** hold ECN nonce ([RFC3540](#)) at experimental
 - **intent over ensuing months:** build a community around the goal of balancing Internet freedom with fairness through IETF standards process
- events since previous draft 02
 - tried to build above community of interest but they don't focus on the IETF
 - operators, researchers
 - those who do focus on the IETF have a different religion
 - hence “Flow rate fairness: dismantling a religion”
 - [draft-briscoe-tsvarea-fair-00.pdf](#) (presented yesterday in tsv-area)
 - see what effect this has on likelihood of forming community
 - revisions to draft (this presentation)

re-ECN recap: solution statement (§1)

- current Internet gives freedom but no fairness
 - the more you take, the more you get; the more polite you are, the less you get
 - but we don't want to lose freedom by enforcing fairness
- solution: allow ISPs to enforce user-specific congestion control fairness



conservative acceptable use policies

- might want to throttle if unresponsive to congestion (VoIP, video, DDoS)

middle ground

- might want to cap congestion caused per user (e.g. 24x7 heavy p2p sources, DDoS)
- evolution of hi-speed/different congestion control

liberal acceptable use policies

- open access, no restrictions

- IETF shouldn't pre-judge answer to these socio-economic issues
 - Internet needs all these answers – balance to be determined by natural selection
 - 'do-nothing' doesn't maintain liberal status quo, we just get more middlebox kludges
- re-ECN at network layer: goals
 - just enough support for conservative policies without breaking 'net neutrality'
 - nets that allow their users to cause congestion in other nets can be held accountable

new appendix “Argument for holding back the ECN nonce” (§AI)

ECN nonce status

- RFC3168 Addition of ECN to IP (proposed std)
 - reserves codepoint for ECN nonce (no stds language)
- RFC3540 ECN signalling with Nonces (experimental)
 - specifies nonce for TCP/IP (no stds language)
- RFC4340 DCCP (proposed std)
 - “DCCP sender SHOULD set ECN nonces ...”
- RFC4341 TCP-like cc profile for DCCP (proposed std)
 - “The sender will use the ECN Nonce ...”
- RFC4342 TFRC cc profile for DCCP (proposed std)
 - “The sender [uses] ... ECN Nonce Echoes ...”
- running code?

new appendix “Argument for holding back the ECN nonce” (§AI)

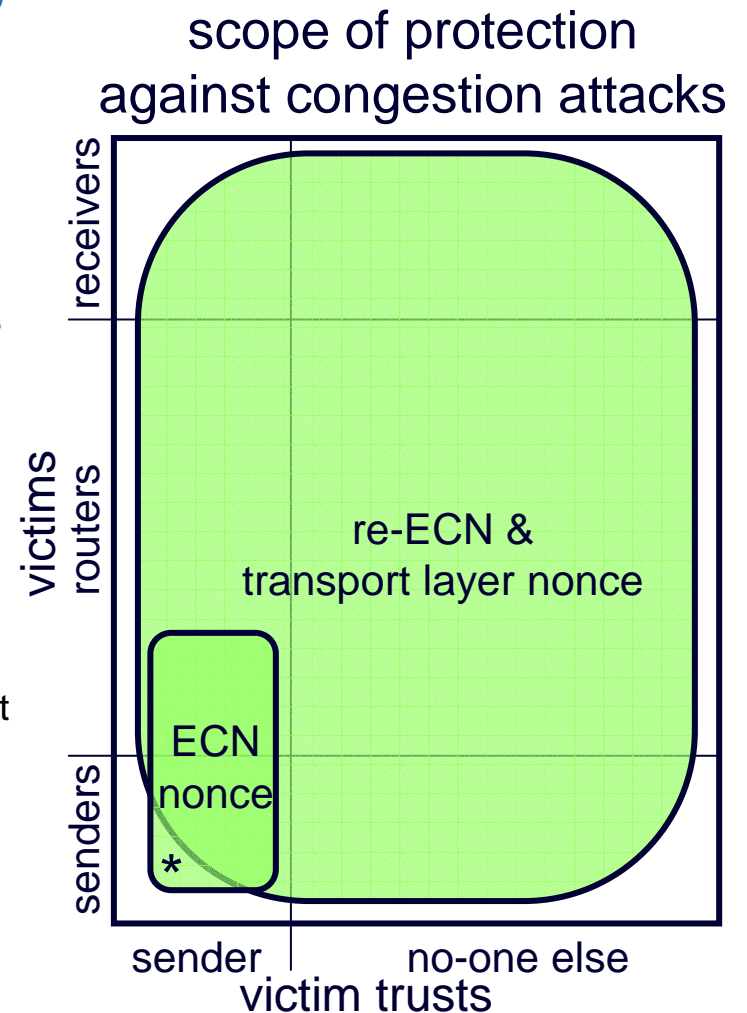
ECN nonce usefulness

- attack detected: suppression of congestion info in f/b loop
 - detection of attack: only by the sender
 - potential attackers: other routers, receivers, or senders
 - who stands to gain: sender and/or receiver
- potential victim of attack: a congested router
 - victim relies for defence on potential attacker, who gains from the attack
 - responsible servers are possibly an important set of senders
 - router only defended if *all* senders behave responsibly
 - alternative: re-ECN protects against all suppression of f/b
 - and against senders not responding to the f/b
- potential (secondary) victim of attack: sender's transport
 - assumes sender shares its *own* resources only based on each flow's *network* congestion
 - without a sharing policy for its own congestion
 - the ECN nonce allows such a sender to limit receivers who lack feedback integrity
 - alternative: a nonce at the transport layer 'would' give the same protection...
 - detects early acks
 - detects suppression of feedback about drop
 - but not suppression of ECN feedback

new appendix “Argument for holding back the ECN nonce” (§AI)

ECN nonce usefulness

- re-ECN and a transport layer nonce defend against wide range of attacks
 - ECN nonce defends against a small subset
 - and only one outside re-ECN’s range (*)
 - a sender that uses network ECN to allocate its own resources, can limit a lying receiver
 - sender can contain this attack without nonce
- IP header bits used to do this:
 - ECN nonce $1/4b$ (leaving last bit)
 - re-ECN $3/8b$ (using last bit)
- one common codepoint
 - re-ECN negotiates its use, but ECN nonce doesn’t
- propose to hold back ECN nonce
 - to see if we can find a coding to do both
 - to see if we can prevent (*) another way
 - develop a transport layer nonce



recap doc roadmap

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intent

§3: overview in TCP/IP

§4: in TCP & other transports

§5: in IP

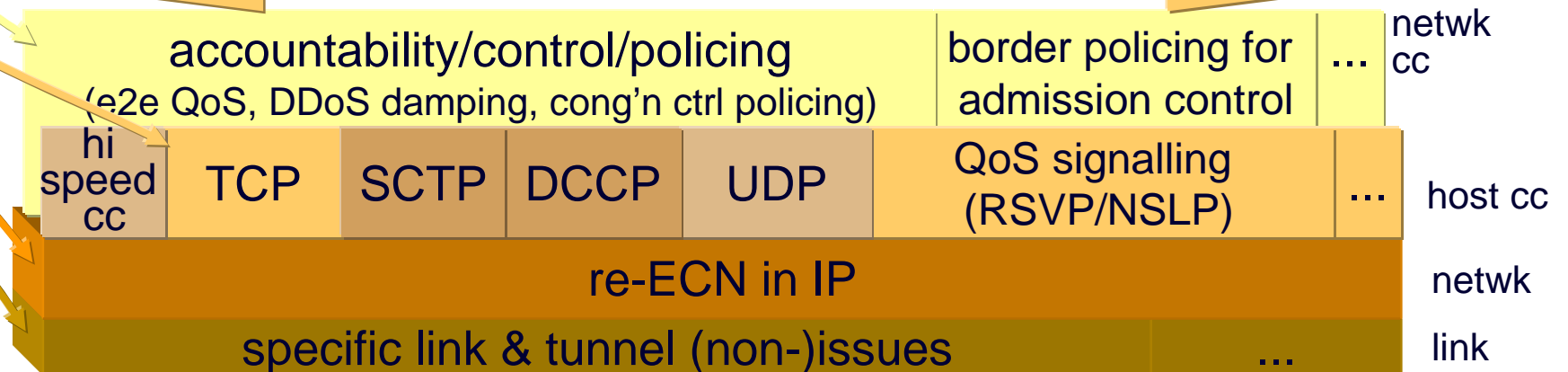
§6: accountability apps

inform'l

stds

dynamic

sluggish



guidelines for adding re-ECN to other transports

- main focus of <[draft-briscoe-tsvwg-re-ecn-tcp-03](#)>
 - IP (§5)
 - TCP (§4.1)
- added very brief sections giving guidelines for
 - DCCP (§4.2.3)
 - SCTP (§4.2.4)
 - spec would have to be a new I-D in each case
- focus of <[draft-briscoe-tsvwg-re-ecn-border-cheat-01](#)>
 - RSVP/NSIS transports ('re-PCN')
 - proposed technique to extend PCN-based admission control
 - Internet wide (edge-edge) – many untrusting domains
- our current focus
 - controlling fairness between current transports & hi-speed congestion control

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Q&A

