ECN++: Adding ECN to TCP Control Packets

draft-ietf-tcpm-generalized-ecn-11

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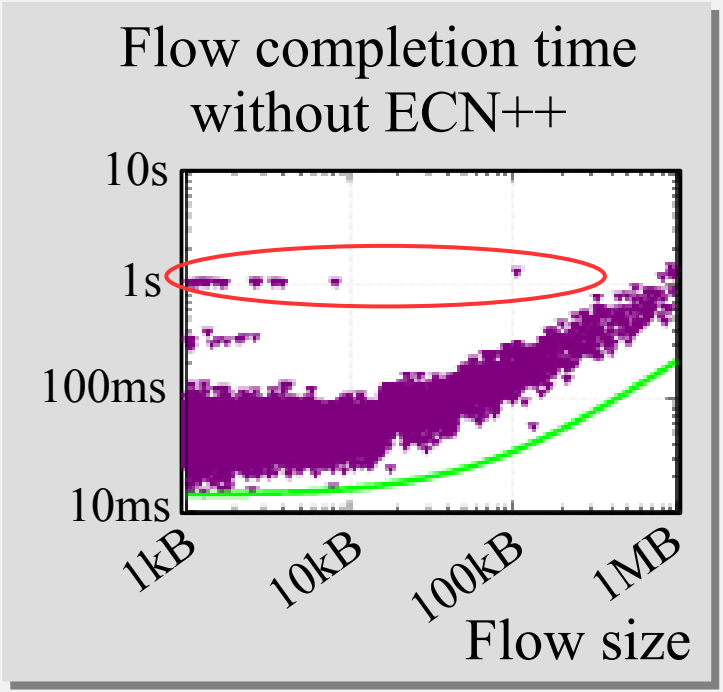
ECN++ motivation

- Cuts flow completion time variance

- 1s timeouts: due to loss of TCP SYN or SYN/ACK
  - ECN++ protects TCP control packets from loss



Experiment Details
Each point represents FCT (SYN-FIN) of one ECN-Cubic flow over 7ms base RTT ADSL bottleneck @40Mb/s. With 2 long-running background flows. AQM: PIE in default config. Green line is ideal FCT if long-running flows were not present.

ECN++ Recap

TCP packet type	RFC3168	ECN++ [draft-ietf-tcpm-generalized-ecn-11]		
		AccECN f/b negotiated	RFC3168 f/b negotiated	response to congestion experienced (CE)
SYN[1]	not-ECT	ECT	not-ECT[3]	[2]Reduce IW
SYN-ACK	not-ECT	ECT	ECT	Reduce IW
Pure ACK	not-ECT	ECT	not-ECT	[2] “Usual” cwnd response & MAY AckCC [RFC5690]
Window probe	not-ECT	ECT	ECT	Usual cwnd response
FIN	not-ECT	ECT	ECT	None or MAY AckCC [RFC5690]
RST	not-ECT	ECT	ECT	N/A
Re-XMT	not-ECT	ECT	ECT	Usual cwnd response
Data	ECT	ECT	ECT	Usual cwnd response

[1] For SYN, 'negotiated' means requested
[2] Obviously only in AccECN case
[3] ECT if IW1 (client → server)

Recent changes

- Stable in technical terms
- Just editorial, e.g. fixing "idnits"
  - abstract: highlights update to ECN+ [RFC5562]
  - updated refs

Next Steps

- Ready for WGLC
    - Normative ref to accurate-ecn