



ECN SUPPORT IN QUIC

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DETAILS



- › ECN QUIC team
- › Working document...
 - <https://github.com/quicwg/base-drafts/wiki/ECN-in-QUIC>
- › Suggested additions to transport and recovery drafts
 - <https://github.com/quicwg/base-drafts/wiki/ECN-in-QUIC#suggested-additions-to-to-become-rfcs>
 - Capability exchange
 - ECN counters
 - ACK_ECN frame
 - Connection migration
 - Congestion control
- › The draft is not updated, please ignore it!

CAPABILITY EXCHANGE



› Outline

- 1st packet (1st frame) sets the ECT code point as per RFC8311 (support for classic ECN and L4S)
- ACK_ECN indicates number of ECT and CE marked packets
- Success (ECN capable) if ACK indicates a match. OS stacks can read and set the ECN bits an the path is not ECN bleached*
- Both peers perform capability exchange

› Open question

- Should ECT be set in for retransmitted 1st frame ?
- Fear of ECT black holes, but these are very rare!

* Network node clears the ECN bits

ECN COUNTERS



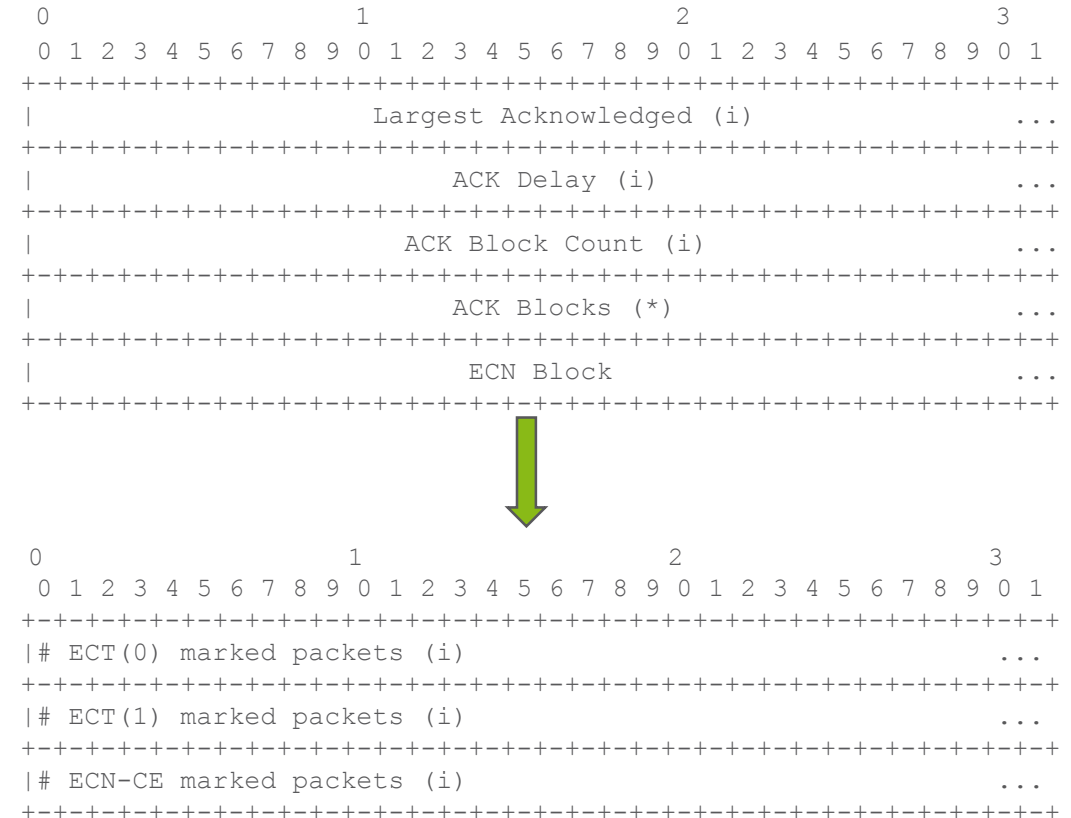
- › Receiver side should implement 3 64 bit counters that are copied to the ECN block when an ACK_ECN frame is generated.
- › All counters are initialized to 0
- › Duplicate packets SHOULD NOT increment the counters

ECT(0)	Incremented when a packet marked ECT(0) is received
ECT(1)	Incremented when a packet marked ECT(1) is received
CE	Incremented when a packet marked CE is received

ACK-ECN FRAME



- › Equal to ACK frame but with appended [ECN](#) block
- › ECN block is encoded as variable length integers *
- › Packet counters deemed sufficient for L4S, and it saves overhead
- › Overhead compression is left as future work ([ideas exist](#))



* Section 8.1 in <https://quicwg.github.io/base-drafts/draft-ietf-quic-transport.html>

CONNECTION MIGRATION



- › ECN capability should be verified again at [connection migration](#)
- › Verifies that new path is not ECN bleached

CONGESTION CONTROL



- › [Congestion control](#) specifics defined for classic ECN.
- › L4S is future work
- › Function OnAckReceived(..) modified
- › New function OnPacketsMarked
- › Undocumented function “ack is of type ”
- › New global variable ack_ce_counter

WAY FORWARD



- › Find open issues
- › Move suggested changes to transport and recovery draft

