ECN SUPPORT IN QUIC

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draft-johansson-quin-ecn
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ECN = Explicit Congestion Notification
- Makes it possible for congested nodes to mark instead of discard packets
- Look for instance in RFC3168 for more info
- Concept is a key component in L4S
draft-briscoe-.tsvwg-l4s-arch, draft-ietf-.tsvwg-ecn-experimentation
- Objective: Get ECN support in QUIC already from beginning
  - Implement necessary support for ECN experimentation
  - Do not specify congestion control
  - Not a given that draft becomes a WG item
OUTLINE OF DRAFT-JOHANSSON-QUIC-ECN

› QUIC specific:
  – ECN negotiation: Performed after connection setup
  – ECN feedback: In ACK frames
  – Monitoring

› More general:
  – Fallback in case of ECN failure
  – OS sockets specifics
ECN NEGOTIATION

› Takes place after connection setup → avoid that ECN failures delay connection setup
› Implemented as a 2 octet ECN negotiation frame
› Both peers send ECN negotiation frame and echoes the ECN negotiation frame
› IP header ECN bits are set to ’11’ when ECN negotiation frames are transmitted

<table>
<thead>
<tr>
<th>0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5</th>
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<tbody>
<tr>
<td>C</td>
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| +--+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
| Type |

- C: Challenge bit, indicates that the transmitted ECN negotiation frame is a challenge, if bit is not set then it is a response.
- R: Possible to read ECN bits in IP header
- W: Possible to write ECN bits in IP header
- EE: Echo of ECN bits
- U: Unused
ECN ECHO

› Included in ACK frame
› Additional bit in ACK frame header can be used to indicate presence of ECN echo
› 4 alternatives, pick one!
  - 2 alternatives indicate how each packet is marked
  - 2 alternatives indicate amount on ECT(0) ECT(1) and CE marked bytes

› Question: Is it necessary to know which packets are ECN marked or are byte counters sufficient?
OTHER

› Monitoring
  – Useful for indication of paths that do not implement ECN support correctly
  – Details T.B.D

› ECN fault detection and fallback
  – Details T.B.D but earlier work exist

› OS socket specifics
  – Document OS socket specifics i.e access to ECN bits in IP header from user space
COMMENTS WELCOME

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