ERICSSON

ECN SUPPORT IN QUIC

draft-johansson-quic-ecn

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INTRO

- 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 negotation 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

```
 0                   1
 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
|  Type           |C|R|W|U U U|E E|
+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
```

- 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 precense 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 acceess to ECN bits in IP header from user space

COMMENTS WELCOME

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