TCP ACK Pull

draft-gomez-tcpm-ack-pull-01

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Status

- Initial version presented in IETF 105
- Updated version is -01
  - Incorporate feedback from the room
Motivation

• Delayed ACKs may be detrimental
  – Segment carrying a message of up to 1 MSS, no app-layer response, 2nd data segment not sent earlier than Delayed ACK timer
  – Unnecessary delay

• Consequences
  – Using Nagle, the sender may be prevented from sending more data while awaiting the ACK
    • High underperformance in high bit rate environments (e.g. DNS stateful operations, RFC 8490)
  – IoT devices
    • Memory resources cannot be released until ACK arrival
    • Increased energy consumption
    • Delay might be exacerbated (in some L2 mechanisms)
ACK Pull mechanism

• Use of a TCP header reserved bit: AKP flag

![Diagram of TCP header with AKP flag highlighted]

13th and 14th bytes of the TCP header

• A sender sets the AKP flag to request an immediate ACK for a data segment

• Upon reception of a data segment with AKP flag set, a receiver (conforming to this spec) MUST send the ACK immediately
Updates in -01

• Introduction
  – Delayed ACK timer value of ~50 ms
  – Presented problem: low performance, solution avoiding (header, packet) overhead

• Annex. Alternative approaches
  – AckCC [RFC 5690]
    • Sender tells the receiver the ACK ratio “R” to be used
    • “TCP ACK Congestion Control Permitted” option (2 bytes)
    • “TCP ACK Ratio” option (3 bytes)
  – TLP
    • Additional ACKs at the receiver by sending probe segment

• Workarounds
  • Sending an old byte
  • “Split hack” (Contiki OS): splitting a message into two segments
Further motivation and approaches

• Delayed ACK suppression during slow start
  – Getting up to speed fast without inducing much queue
    • draft-kuehlewind-tcpm-accurate-ecn-03
    • Discussions in the context of QUIC

• Active Detection of Classic ECN AQMs
  – “Rather niche”
  – Trigger quick ACKs

• Middlebox traversal of bits 4-6
  – Not so good?

• Use Urgent Pointer
  – E.g. use 3 bits to define an ACK ratio exponent

Thanks to Bob Briscoe!
Questions/Comments?

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