TCP ACK Pull
draft-gomez-tcpm-ack-pull-01

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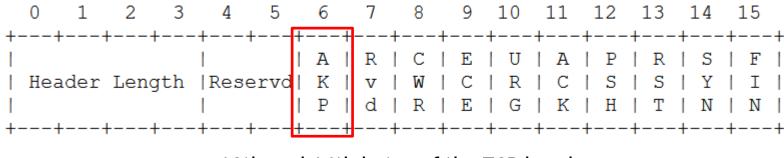
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Status

- 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

```
   0   1   2   3   4   5   6   7   8   9  10  11  12  13  14  15
 +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
 |               |           | A | R | C | E | U | A | P | R | S | F |
 | Header Length |Reservd| K | v | W | C | R | C | S | S | Y | I |
 |               |           | P | d | R | E | G | K | H | T | N | N |
 +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
```

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

Thanks to
Bob Briscoe!

- Middlebox traversal of bits 4-6
  - Not so good?
- Use Urgent Pointer
  - E.g. use 3 bits to define an ACK ratio exponent

Questions/Comments ?

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