TCP ACK Rate Request (TARR) option

draft-gomez-tcpm-ack-rate-request-06

Carles Gomez
Universitat Politècnica de Catalunya
Jon Crowcroft
University of Cambridge

Motivation

- Delayed ACKs
  - Intended to reduce protocol overhead
  - But may also contribute to suboptimal performance
- “Large” cwnd scenarios (i.e. cwnd >> MSS):
  - Saving up to 1 of every 2 ACKs may be insufficient
    - Performance limitations due to asymmetric path capacity
    - Computational cost and network load
- “Small” cwnd scenarios (i.e. cwnd up to ~1 MSS):
  - Data centers: BDP up to ~1 MSS
    - Delayed ACKs will incur a delay much greater than the RTT
  - Transactional data exchanges, or when cwnd decreases
    - Immediate ACKs may avoid idle times, allow faster cwnd growth

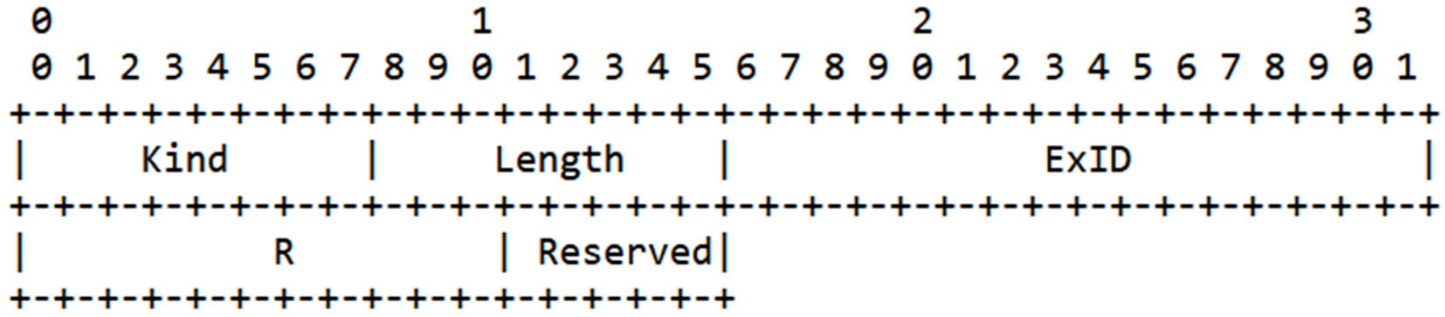
Status

- Related prior discussion
  - Sender control of TCP ACKs
  - Converged to defining a new TCP option serving two purposes:
    - Requesting a given ACK rate
    - Requesting immediate ACKs

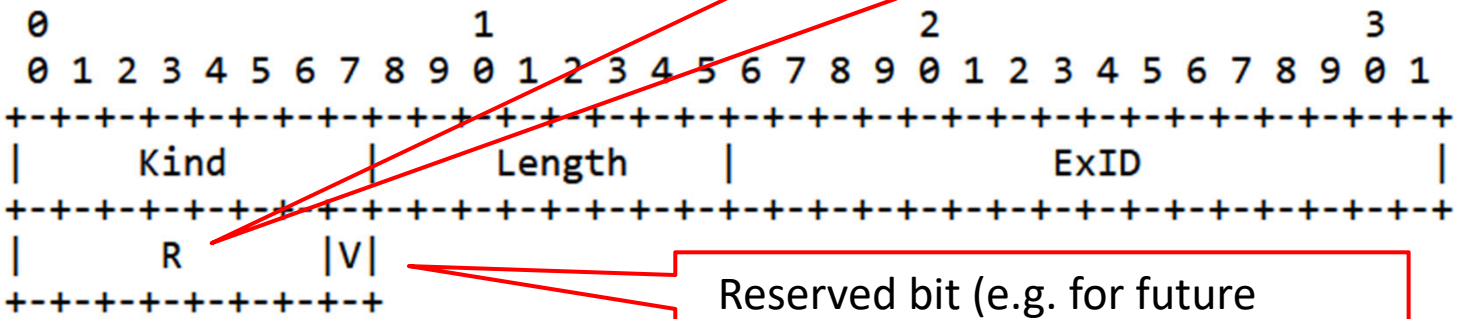
- Version -06
  - Aims to address the comments from IETF 114

Updates (I/III)

- Main format
  - OLD (-05):



  - NEW (-06):



- R carries binary encoding of ACK rate
- Maximum value of R: 127

Reserved bit (e.g. for future encodings/values of R, if needed)

Updates (II/III)

- Appendix A. TARR vs. RFC 5690 (AckCC)
  - Main goals and features
    - RFC 5690 (Informational, not yet implemented): reducing ACK traffic when congestion on the reverse path. It comprises:
      - » Component to detect lost and ECN-marked pure ACKs
      - » Mechanism for calculating the ACK ratio
      - » Mechanism to announce AckCC support (new TCP option)
      - » Method to indicate new ACK ratio (a second new TCP option)
    - TARR (Experimental): end-to-end performance and end-system resource conservation. It allows a sender to request:
      - » A given ACK ratio from the receiver
      - » An immediate ACK (while keeping steady-state ACK ratio)
    - TARR could be a component of other mechanisms

Updates (III/III)

- Appendix A. TARR vs. RFC 5690 (AckCC)
  - New TCP option details
    - RFC 5690: defines two TCP options:
      - » One intended to announce AckCC support
        - Always in SYN packets
      - » Another intended to communicate the ACK ratio
        - 1-byte field for R (encoding not specified)
    - No TCP option Kind value assigned by IANA
    - TARR: uses a single TCP experimental option Kind value (RFC 6994)
      - » To announce support of TARR
        - Not necessarily in SYN packets
      - » To request the ACK rate
    - ExID value 0x00AC allocated by IANA

Next steps…

- Document getting stable, purpose and methods clear
- Prototype implementation started
  - Michael Tuexen
  - FreeBSD
- Ready for **WG adoption**?

Thanks!
Questions? Comments?

Carles Gomez
Universitat Politècnica de Catalunya
Jon Crowcroft
University of Cambridge

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