TCP ACK Rate Request (TARR) option

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

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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):
  
  ![Old Format Diagram]
  
  - R carries binary encoding of ACK rate
  - Maximum value of R: 127

• NEW (-06):
  
  ![New Format Diagram]
  
  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?

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