Adding Acknowledgement Congestion Control to TCP

S. Floyd, A. Arcia, D. Ros, and J. Iyengar

draft-floyd-tcpm-ackcc-01.txt

TCPM

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What is this draft about?

• Adding an optional congestion control mechanism to TCP for pure ack traffic.
• Based on the ack congestion control (ackcc) in DCCP’s CCID 2.
• Urgent? Nope.
• Useful? Probably.
  – E.g., TCP connections over asymmetric links.
  – Reducing congestion for aggregate traffic.
• Questions? Many.
How would TCP’s ackcc work?

- **Negotiation** between sender and receiver:
  - (Ack-Congestion-Control-Permitted option).
- **Start** with an Ack Ratio of 2.
- The sender detects **lost Ack packets**:
  - And tells the receiver the new Ack Ratio.
- **The sender** uses Appropriate Byte Counting and rate-based pacing (in response to Acks acking more than two packets).
Related work:

- **BPK97, Balakrishnan et al.**:
  - Based on ECN, sender reporting ECN-marked ACK packets to receiver.
- **TJW00, Ming-Chit et al.**:
  - Receiver-based Ack congestion control.
- **CCID-2, Floyd and Kohler**:
  - The sender detects lost or marked ACKs,
  - computes the desired ACK ratio,
  - tells the receiver.
Possible Complications:

• Delayed acknowledgements.
• Duplicate acknowledgements.
• Two-way traffic.
• Reordering of Ack packets.
• Abrupt changes in the Ack path.
• ...
Congestion on the reverse path:

• Does pure Ack traffic really contribute to congestion?
  – Yes, somewhat, if the queue is in units of packets.
  – Measurement studies of congested links?

• How might ackcc be useful to the connection?
  – ECN-capable ACK packets.
  – Possibly reducing the ACK drop rate even without ECN.

• How might ackcc be harmful to the connection?
  – Costs of a larger Ack Ratio.
Security Considerations:

• Cheating with ECN-capable ACK packets?
  – If the receiver cheats, the sender could detect it.
  – If the sender cheats, the receiver can’t easily detect it.
  • Middleboxes probably could detect it.
Questions:

• A TCPM work item, for Experimental?
• Feedback?