SACK TCP: The sender's congestion control algorithms for the implementation “sack1” in the LBNL's “ns” simulator.

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The internet draft:

"The congestion control algorithms present in the de facto standard TCP implementations MUST be preserved."

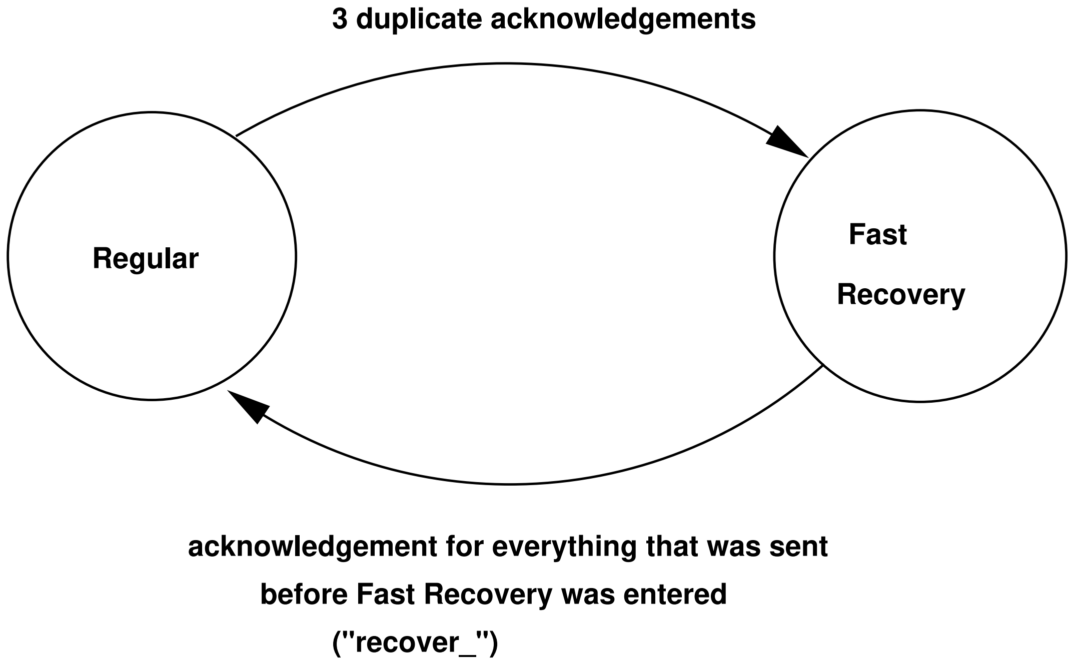
- Accomodates out-of-order delivery.
- Congestion window algorithms.
- Use of time-outs.

The implementation in the “ns” simulator:

- Three dup acks required to trigger Fast Recovery.
- Reduce congestion window by half; don't Slow-start.
- Response to further dup acks.

Main difference from Reno: When multiple packets are lost from a single window of data.

Two states: Regular and Fast Recovery



On entering Fast Recovery:

- Retransmit one packet.
- Cut the congestion window in half (“cwnd_”).
- Estimate the number of packets in the pipe (“pipe_”).

Behavior in Fast Recovery:

- When and how much to send: whenever the number of packets in the pipe is less than the congestion window.
- What to send: Fill “holes”, one packet at a time, in sequence number order. If there are no holes, send new packets.
- If a retransmitted packet is itself dropped, then slow-start. (The current implementation in ns waits for a retransmit timer to detect the dropped packet.)

Behavior in Fast Recovery: receiving ack packets

- Duplicate ACKs: Decrement "pipe_", call "send".

- An ACK that ends Fast Recovery: Call "send".

- An ACK that does not end Fast Recovery:
  Decrement "pipe_" by two packets, once for the retransmitted packet, and once for the original packet (now presumed to have been dropped). Call "send".

Behavior in Fast Recovery: details of sending data packets

- Send if the number of packets in the pipe (“pipe_”) is less than the congestion window (“cwnd_”).

- Use the SACK scoreboard to determine which packet to send.

- Increment “pipe_”.

Details:

- MaxBurst parameter

- Overhead parameter - just for the simulator.

Ns simulator available from:

`http://www-nrg.ee.lbl.gov/ns`

These viewgraphs available from:

`ftp://ftp.ee.lbl.gov/talks/sacks.ps`

Papers available from:

`http://www-nrg.ee.lbl.gov`