Jacobson’s Algorithm for TCP timeout

The idea

• Instead of calculating EstimatedRTT as a simple average, take the variation of the RTT samples into account.
Approach

SampleRTT = ACK_time – Send_time (as before)

Diff = SampleRTT – Current EstimatedRTT

EstimatedRTT = EstimatedRTT + δ Diff

Dev = Dev + δ(|Diff| - Dev)

Where 0 < δ < 1

Then:

Timeout value = EstimatedRTT + p Dev

Where typical p = 4

How this works

When variance is small:

Timeout → the long-term average

When variance is large:

Timeout → 4 x variance
Calculating

- A direct implementation would require floating-point arithmetic
- An integer approach:
  - Scale the calculation by $2^n$, where $\delta = 1/2^n$
  - All mult and div can be done with shifts