Low Extra Delay Background Transport

draft-shalunov-ledbat-congestion-00

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Goals reminder

• saturate the bottleneck
• keep delay low with no other traffic
• yield to TCP
• add little extra delay
Receiver reminder

on data:

create ack
ack.ackseq = ...
ack.delay = time() - data.time
send ack
Rough pseudocode reminder (sender)

on ack:

\[
\begin{align*}
\text{current\_delay} &= \text{ack\_delay} \\
\text{base\_delay} &= \min(\text{base\_delay}, \text{current\_delay}) \\
\text{queuing\_delay} &= \text{current\_delay} - \text{base\_delay} \\
\text{off\_target} &= \text{TARGET} - \text{queuing\_delay} \\
\text{cwnd} &= \text{cwnd} + GAIN \times \frac{\text{off\_target}}{\text{cwnd}}
\end{align*}
\]

on loss:

\[
\text{cwnd} /= 2
\]

(see the draft for more precision)
Framing

• General-purpose congestion control loop
• Works over UDP
• Possibly a TCP mod/option in the future
  • need timestamps
• Possibly a DCCP CCID
• Possibly an SCTP mod/option
No late-comer’s advantage

- Late-comer’s advantage is based on incorrect base measurements by a late comer
- Enough dips with realistic numbers of flows to get a real base measurement every once in a while
No multiplying target by number of flows

• All flows measure the same queue
• All flows target the same queue size
• That’s the size you get, no multiplying
Fairness by random redistribution

• What if we added a small random quantity to all measurements?
• It’s there already, no need to add
• Flows see slightly different queue size
• Depends on, e.g., your arrival relative to serialization of previous packet
• Also small errors introduced by scheduling
Fairness by random redistribution, cont.

• With an extra deviate in measured delay, flows give or take a little on each packet

• Total used capacity stays the same on RTT timescale (absent change in cross-traffic)

• Random redistribution

• Rounds of random redistribution $\rightarrow$ comparable capacity for each flow
Parameter values

- Target of 25ms? 5ms? 50ms? 3ms?
- (Gain of 1 MSS/RTT? 10?)
- The values in the draft work
- A wide range of other values works, too
Target choice considerations

• Higher values are more robust
• Lower values add less delay
• At the low end, diminishing returns
• Human perception threshold a useful benchmark
QUESTIONS?