An update on rLEDBAT

ICCRG, IETF 109

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Microsoft

Credits to Marcelo Bagnulo and Alberto Garcia-Martinez, UC3M
rLEDBAT

• rLEDBAT brings benefits of LEDBAT++ to the receive side of the transport connection

• Use the flow control mechanism to throttle the peer
  • TCP receive window tuning
  • Don’t shrink advertised window

• Why is this important?
  • Software updates use CDNs – most CDNs don’t have LEDBAT(++) support
  • Proxies can prevent effective use of send LEDBAT on end-to-end path
  • Enforce receiver driven preference because it has more information about priority of traffic

rLEDBAT in Windows

• Based on rLEDBAT draft
• Implemented for TCP
• The same (private) API enables both LEDBAT++ and rLEDBAT
• Includes all the additional mechanisms of LEDBAT++
  • Round trip latency measurements
  • Slower than Reno cwnd increase with adaptive gain factor
  • Multiplicative cwnd decrease with adaptive reduction factor
  • Modified slow start
  • Initial and periodic slowdown
• Enable TCP timestamp negotiation for 3WHS and enable rLEDBAT only if negotiation succeeds
Deviations from LEDBAT++/rLEDBAT drafts

• Simplified periodic slowdown
  • One slowdown period per base delay measurement interval

• Base delay measurement interval
  • 60 seconds

• Use a target delay of 40 msec

• We will continue to fine tune these constants and update draft with recommendations
Initial lab results

Bottleneck params: 50ms/100Mbps/1250pkt queue
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Low Latency Competition

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Next Steps

• Real world measurements for a software update workload
• Constant tuning
• Dynamic TARGET
• Explore co-existence with BBRv2 (preliminary tests show problems)
• IETF drafts
  • rLEDBAT
    • Reference only LEDBAT++?
    • Update based on data and tuning
  • LEDBAT++
    • Add pseudocode
    • Make standalone