Improving Internet Speed
A Comparison of Round-Trip Timer Algorithms
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Motivation and Goals

- Round-Trip Timer (RTT) is difficult to approximate exactly due to fluctuations and sudden drops and spikes
- Wanted to develop an algorithm which better approximated RTT using a new technique
- Implemented and compared three methods, the original RTT approximator - Jacobson's Algorithm, our Expert Algorithm, and a third Eifel Algorithm which claims to improve RTT
- Want to prove that our method is the best approximator

Round-Trip Timer

RTT = time to send package and acknowledge receipt

3 Algorithms

Jacobson
- Developed by Jacobson in 1988
- Original RTT implementation in all standard systems
- Simple arithmetic - addition, subtraction, multiplication
- Use bit shifting to perform simple multiplications
- Numbers stored as basic 29.3 integers

Experts
- Developed by Bruno Nunes, Kerry Veenstra, and Katia Obraczka in 2006
- Similar overall four step structure to Jacobson, with modified step two
- Complex arithmetic - exponential and logarithmic - needed to develop an entire math library
- Numbers stored as 29.3 integers

Eifel
- Developed by Reiner Ludwig and Keith Sklower in 2000
- Arithmetic allows division of floating point numbers
- Needed to incorporate 16.16 integers and bit shifting so as not to lose the data

Implementation

RTT Computational Cycle
- kernel can compute all three estimations at runtime
- only one result is used

Results

- Compare actual measured RTT with 3 estimation techniques
- Experts more closely approximates mrtt than Jacobson's original algorithm

Module
- RTT computation
  - kernel can compute all three estimations at runtime
  - only one result is used

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