

# Experiences from a protocol-design contest

Anirudh Sivaraman, Keith Winstein, Pauline  
Varley  
(includes joint work with many others)

MIT CSAIL

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## Contest setting

1. MIT's Graduate Computer Networks class
2. Spring 2013
3. Goal: Design a transport protocol to achieve high throughput and low delay on cellular links
4. Baseline protocol: Sprout (NSDI 2013)

## Contest specifics

1. Students provided with an Amazon VM running Mininet
2. Teams of two
3. Two weeks in total
4. Evaluated on a replayed Verizon network trace

# Evaluation procedure

1. Average throughput
2. 95th-percentile delay
3. **Throughput / Delay**
4. ... on 3 minutes of Verizon data

But: final evaluation will be on fresh data collected over spring break.

## Interface skeleton

- ▶ `ack received( sequence number, send timestamp, recv timestamp )`
- ▶ `window size()`

# Prizes

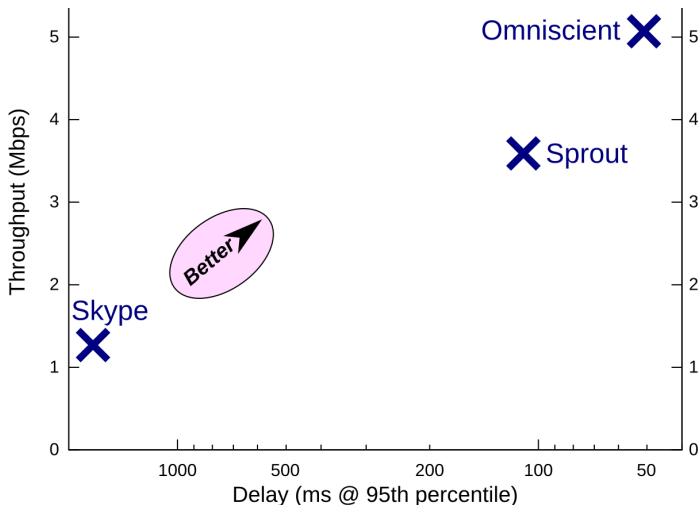
- ▶ 2nd prize: 40 \$
- ▶ 3rd prize: 30 \$
- ▶ 4th prize: 20 \$

# Grand Prize

Co-authorship on a future research paper about results of the contest

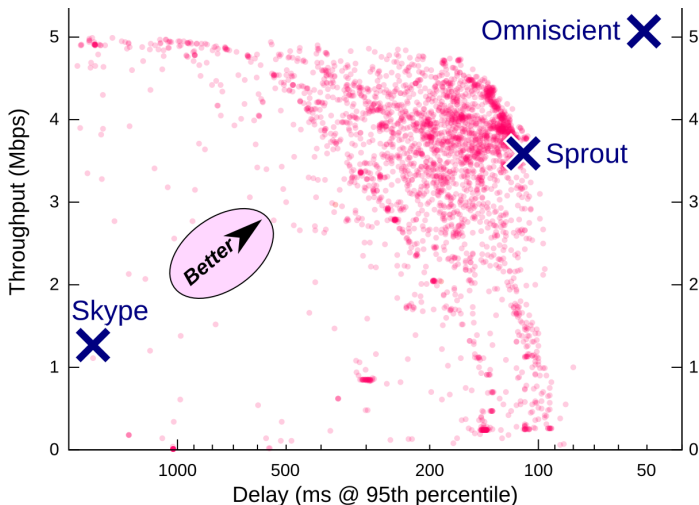


# A crowdsourced throughput-delay tradeoff region



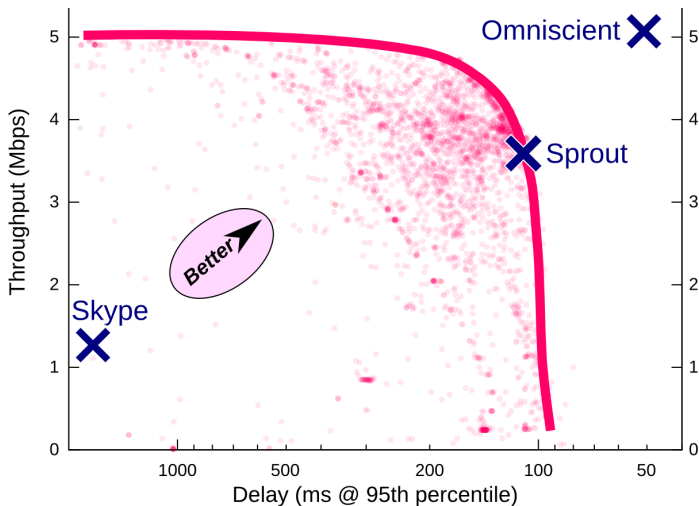
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# Performance on training vs testing traces

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Significant “overfitting” among protocols

# Two student protocols were comparable with Sprout

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Protocol Design Contests: Anirudh Sivaraman, Keith Winstein, Pauline Varley, João Batalha, Ameesh Goyal, Somak Das, Joshua Ma, and Hari Balakrishnan, CCR July 2014

# Acknowledgements

- ▶ Jonathan Perry
- ▶ The students of 6.829



# Takeaways

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- ▶ Lets us simplify problems to their essentials
- ▶ Tools like Mininet are critical
- ▶ Can we make reproducible research even easier?