Longitudinal Internet Measurement:
Problems and Possible Paths

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1st Layer of Problems

• Generally need more measurements from more vantage points over a longer period of time
2nd Layer of Problems

• Invisibility problems
  • home networks, cloud networks, etc.
• Snapshot problem
  • we tend to measure things once and report without sustaining the measurements
2nd Layer of Problems (cont.)

• Moving sands issue
  • measuring the same thing doesn’t always mean running the same code

• Vantage point issues
  • we measure where we can, but our individual reach is often limited
3rd Layer of Problems

- Incentives
  - publication, promotion, graduation, etc. favor novelty over sustained effort
- Lack of interest in sustaining measurements
3rd Layer of Problems (cont.)

- Funding
  - too hard to get small bits of money to sustain small-ish measurement efforts
- Structure of network just naturally hides things now
  - e.g., what happens “in the cloud”?
Existing (Underused?) Solutions

- FCC’s MARS program: Measure Broadband America-Assisted Research Studies
- Possible role for NSF/community in oversight board
- Individual projects can use linode, etc.
Moving Forward: Easy

• Study what has worked and why
  • e.g., Atlas, DNS DITL, RouteViews/RIS, etc.
  • Dimensions: ease of use, uniqueness of data
  • Many funded from operations community
• How do other communities (e.g., astronomy) sustain infrastructure and measurement? How do they decide what to support and collect?
  • Also HPC (CICI, C* programs) and connectivity (going back to NSFnet)
Moving Forward: Easy

- Could there be a lightweight way to obtain small amounts of money for maintenance?
Moving Forward: Medium

- Can we evolve incentives towards prizing developing and sustaining things useful to others?
  - infrastructure, data collection, etc.
  - IMC session or paper type for reappraisal
  - awards, promotion guidelines, citable datasets
- Transition measurements and/or infrastructure to some organization to sustain while freeing individual faculty from the task?
Moving Forward: Hard

• Can we encourage more industry / academic collaboration in some way?
  • e.g., more industry consortiums (or better use of existing consortiums …)
  • e.g., by encouraging joint appointments
  • e.g., by figuring out how to better share industry data
• (See Session 6)
Moving Forward: Hard

- MBA has been cited as useful, but not scalable in # of experiments and can’t name names
- could it provide the starting point for some PlanetLab++ sort of infrastructure?
- how to arrive at common deployment to meet most needs?
- could we shoehorn in home and mobile networks?