Investigating Interdomain Routing Policies in the Wild

Ruwaifa Anwar[1], Haseeb Niaz[1], David Choffnes[2], Italo Cunha[3], Phillipa Gill[1], Ethan Katz-Bassett[4]

[1]Stony Brook University, [2]Northeastern University, [3]Universidade Federal de Minas Gerais, [4]University of Southern California,

How do we innovate in the Internet?

- Building new protocols, playing what-if scenarios
    - Can't test the ideas straight on the Internet
    - Might require Internet-wide changes, cause disruptions
    - Restricts research to today's Internet deployments

How do we innovate in the Internet?

- Building new protocols, playing what-if scenarios
  - Can't test the ideas straight on the Internet
  - Might require Internet-wide changes, cause disruptions
  - Restricts research to today's Internet deployments
- Solution?
  - Use Internet models to evaluate what would happen

How do we innovate in the Internet?

- Building new protocols, playing what-if scenarios
  - Can't test the ideas straight on the Internet
  - Might require Internet-wide changes, cause disruptions
  - Restricts research to today's Internet deployments
- Solution?
  - Use Internet models to evaluate what would happen

Problem solved?

- # How do we innovate in the Internet?
  - ## Building new protocols, playing what-if scenarios
    - Can't test the ideas straight on the Internet
    - Might require Internet-wide changes, cause disruptions
    - Restricts research to today's Internet deployments
  - ## Solution?
    - Use Internet models to evaluate what would happen

  Problem solved?

- # Gao Rexford (GR) Model
  - ## ASes connect based on business relationships
    - Prefer customer > peer > provider path
    - Pick the one with shortest path length
    - Export customer paths to all neighbours
    - Export provider or peer paths to customers only

- **How do we innovate in the Internet?**
  - Building new protocols, playing what-if scenarios
    - Can't test the ideas straight on the Internet
    - Might require Internet-wide changes, cause disruptions
    - Restricts research to today's Internet deployments
  - Solution?
    - Use Internet models to evaluate what would happen

  Problem solved?

- **Gao Rexford (GR) Model**
  - ASes connect based on business relationships
    - Prefer customer > peer > provider path
    - Pick the one with shortest path length
    - Export customer paths to all neighbours
    - Export provider or peer paths to customers only

  But how well this model hold?

- **Methodology**
  - Ripe Atlas probes from different countries and Ases
  - Traceroutes towards popular content providers
  - Compare AS paths with CAIDA's AS topologies
  - How many decisions followed GR model?

- **Methodology**
  - Ripe Atlas probes from different countries and Ases
  - Traceroutes towards popular content providers
  - Compare AS paths with CAIDA's AS topologies
  - How many decisions followed GR model?

    64.7% of total decisions followed Gao-Rexford

- **Methodology**
  - Ripe Atlas probes from different countries and ASes
  - Traceroutes towards popular content providers
  - Compare AS paths with CAIDA's AS topologies
  - How many decisions followed GR model?

  64.7% of total decisions followed Gao-Rexford

- **Causes of limitations**
  - Siblings
  - Prefix specific policies
  - Undersea cables
  - Improvement?

- **Methodology**
  - Ripe Atlas probes from different countries and ASes
  - Traceroutes towards popular content providers
  - Compare AS paths with CAIDA's AS topologies
  - How many decisions followed GR model?

  64.7% of total decisions followed Gao-Rexford

- **Causes of limitations**
  - Siblings
  - Prefix specific policies
  - Undersea cables
  - Improvement?

  20% more of the total decisions followed GR

- **Takeaways**
  - Future models can take into account limitations we observed

- **Methodology**
  - Ripe Atlas probes from different countries and Ases
  - Traceroutes towards popular content providers
  - Compare AS paths with CAIDA's AS topologies
  - How many decisions followed GR model?

  64.7% of total decisions followed Gao-Rexford

- **Causes of limitations**
  - Siblings

For more details, refer to our paper:
"Investigating Interdomain Policies in the Wild" (IMC'15)

Ruwaifa Anwar
manwar@cs.stonybrook.edu
Networking Research Group, Stony Brook University, New York
www.nrg.cs.stonybrook.edu