Measurement to support policy research on interconnection and on privacy

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Interconnection

- How should a regulatory body determine whether interconnection agreements are reasonable?

- Networking-related questions:
  - what are the routes (including IXPs) for both indirect and direct interconnection between content providers and ISPs?
  - what is the QoS associated with each route?

- Research approach:
  - analytical model
  - parameterized by measurements
Interconnection: what to measure

- **performance metrics:**
  - border router to border router, across an IXP:
    - utilization
    - latency
    - packet loss

- **used:**
  - MANIC API

- **but no data on utilization**
Interconnection: what to measure

- traffic matrices:
  - source IXP to destination IXP
    - content provider
    - IXP at which traffic enters transit provider’s network (if any)
    - IXP at which traffic enters ISP’s network
    - closest IXP to the customer

- used:
  - AS-Relationships
  - AS-Rank
  - IXPs dataset
  - AS taxonomy
  - BGPStream

- but no data on traffic...
Interconnection: what to measure

- one-way delay matrices:
  - source IXP to destination IXP
    - border router in content provider’s network
    - through transit provider (if any)
    - border router in ISP’s network

- used:
  - nothing yet ...
Privacy

- What should a privacy law be?

- Networking-related questions:
  - what personal information is collected?
  - is it collected by first and/or third parties?
  - how is it used?
  - with whom is it shared?

- Research approach:
  - analysis of privacy policies
    - complemented by measurements ??
  - identification of policy problems
Privacy: what to measure

- What personal information is collected?
  - personal identifiers?
    - customer IP address, device identifier, ad identifier
    - cookie
  - behavioral information?
    - website, domain, destination IP address, URL
    - geolocation
    - devices on customer’s network
    - apps on customer’s device
    - app usage
    - audio, video, sensors
Privacy: what to measure

- How is personal information used?
  - what functionality breaks when specified personal information isn’t collected?
  - what advertising breaks when specified personal information isn’t collected?
Privacy: what to measure

- With whom is personal information shared?
  - service provider vs. advertiser?
  - what personal information?
  - where does it go after that?