Interconnection measurement for policy and for research

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Is interconnection a policy issue?

- Aspiration?
  - reach
  - unblocked
  - choice

- Legal imperative?
  - Common carrier:
    - duty to interconnect
    - prohibition on unreasonable or unreasonably discriminatory charges and practices
  - RIF:
    - no legal authority in Comm Act
      - no current harms
      - market will mitigate risk of blocking, throttling, prioritization using interconnection
    - legal authority through anti-trust, consumer protection
      - anti-competitive conduct

Policy goals

- prohibit:
  - harmful discriminatory interconnection practices
  - harmful refusal to upgrade interconnection capacity
  - unreasonable access fees
  - ➔ rules, oversight
- discourage (rather than prohibit):
  - (the stuff above)
  - ➔ transparency

What to measure

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

Research goals

- develop model for researchers:
  - what determines the cost of interconnection?
  - what determines the value of interconnection?
  - how should the price of interconnection be determined?
  - who should pay for interconnection?
- develop model for oversight:
  - is an offered interconnection arrangement unreasonable, or unreasonably discriminatory?

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

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

Who should measure

- ISPs
  - e.g. transparency requirement
- FCC
  - e.g. Measuring Broadband America
- Researchers
  - usually from the edge

Who should measure what?

- border router to border router
  - ISP is in the best position to measure
  - MBA could work with ISPs
  - measurement from the edge is possible

Who should measure what?

- direct connection between content provider and ISP
  - ISP is in the best position to measure
  - more difficult for MBA (route across ISP network)
  - hoping measurement from the edge is possible

Who should measure what?

- indirect connection through a transit provider
  - ISP could work with transit provider
  - more difficult for MBA [need to work with ISP & transit provider (?)]
  - hoping measurement from the edge is possible