Mapping the Technological Frontier and Sources of Innovation

kc claffy
kc@caida.org

caida
www.caida.org

Center for Applied Internet Data Analysis
University of California, San Diego

ENABLING INNOVATION IN ICT ECOSYSTEM

enabling (i.e., general, stable, trustworthy) technology
plus
capital, incentive, permission

ENABLING INNOVATION

- canonical example: endpoint addressability
- "technological" lever for innovation
- but it's about ***permission,*** *i.e., freedom to connect*"
- we have lost it, btw:

  As measured by the allocations of public address space in the IPv4 network, the pace of growth of the Internet slowed down substantially in 2014. The allocation of 65 million addresses in 2014…represents a growth rate of 1.9% for the year…the lowest relative growth rate in recent years. Geoff Huston, Jan. 2014. *http://www.potaroo.net/ispcol/2015-01/addressing2014.html*

ENABLING INNOVATION

- how to recover endpoint addressability?
- IPv6 was the standards community's attempt
- but counter-incentives prevail: issues of trust, manageability, economics
- in the meantime, IPv4 address secondary markets are emerging without oversight or understanding of their implications

BARRIERS TO INNOVATION

where Moore's Law is not enabling rapid innovation

- network architecture and standards
- construction costs (last mile access)
- battery performance
- human brain capability and attention span
- advertising revenue
- spectrum capacity
- regulation
- security and trust (fundamental vulnerabilities)

BUSINESS ARCHITECTURE INNOVATIONS

private IP-based interconnected platforms

- in parallel w/public Internet, e.g., on same routers
- multi-sided platforms support range of "specialized services", and pricing models
  - largely unregulated
  - higher returns on capital investment
  - leaves public Internet at risk ("dirt road" scenario)
    - e.g., 300GB/month = 3 hrs/day of HDTV
    - definitely hinders innovation

LAYERED PLATFORMS

clouds, CDN's, specialized services, apple/fb/amaz

need to understand more about how conditions in these industries support or hinder innovation at edge

POLICY INNOVATIONS

adaptive regulation

- Requires five conditions

1. Measurable policy goals
2. Measuring progress toward those goals
3. Designing regulatory options intended to move toward those goals
4. Determining that policies caused outcomes
5. Dealing with potential destabilization of ecosystem, due to rapid policy adjustments

RELATED READING

http://www.caida.org/publications/papers/2014/

1. Platform Models for Sustainable Internet Regulation (JIP14)
2. Anchoring policy development around stable points: an approach to regulating the co-evolving ICT ecosystem
3. Approaches to transparency aimed at minimizing harm and maximizing investment (FCC NPRM comment)
4. Measurement and Analysis of Internet Interconnection and Congestion (TPRC14)
5. Named Data Networking: An Introduction (CCR)
6. A World on NDN: Affordances & Implications of the Named Data Networking Future Internet Architecture (TR)