

Opt-in WG

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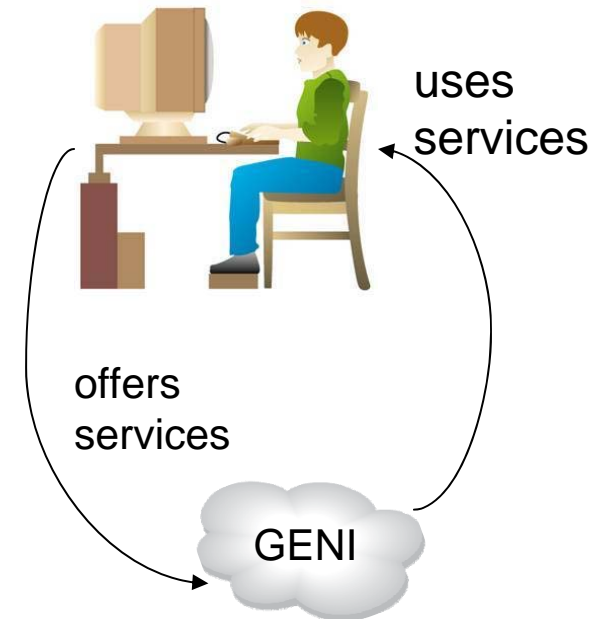
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legal & politics
Application
Transport
Network
Link
Physical

Overview

- Scoping: the facets of opt-in
 - opt-in = where GENI meets the non-GENIs :-)
- technical issues
- legal & “IRB” issues



Who are the users?

- ~ Internet 2
 - students at major research universities
 - researchers
- Early adopters
 - e.g., open wireless access
- Your mother
 - why? how?
- Bad guys
 - we'll need more of them!

Scoping

- GENI infrastructure OAM
- Services for experimenters
- **Services for and by users**
 - related to federation?

A modest proposal

- GENI needs users, with motivation
- New applications:
 - health advice
 - international cooperation opportunities
 - investment banking
- Even willing to pay for services!

Opt-in views

- GENI as ISP
 - alternative network interface
 - “Internet 3”
- Generalized end-user services
 - services running on user devices
 - “SETI@HOME 2.0” --> users providing resources
- In-network services
 - services provided by GENI infrastructure
 - “PlanetLab 2.0”

User-provided services

- GENI users contribute compute cycles or storage
 - caching, peer-to-peer
- GENI users provide 802.11 access
 - FON-like
- GENI users add mobility
 - data mules
- GENI users add realism
 - unreliable end nodes
 - one-way connectivity (NATs)
 - limited bandwidth
 - scale

Opt-in retail & wholesale

- Retail
 - each user decides
 - per service
 - per destination
- Wholesale
 - by origin: campus dorm, open access wireless network
 - e.g., Amazon EC2 becomes GENI component
 - by destination: reach group of services

Infrastructure needed

- GENI OS?
 - run as VM on user host
 - isolation from other user services
 - privacy, risk reduction, resource limitation
 - ability to run semi-trusted code on end system
- How different from regular GENI node?
- Generalization of federation concept?

User motivation

- *bribe'em, woo'em, force'em*
- Cheaper
 - subsidy, not inherently - “bribery”
- Faster
 - not likely for I2 users
 - non-I2 users: restricted by access (bandwidth metering!)
- More reliable
 - unlikely for experimental system
- Less restricted
 - symmetric connectivity (no NATs)
 - also not likely for I2 users

Access to GENI

- Virtual ISP
 - easy for WLAN-style access or VLANs
 - not hard if users can configure DHCP server
- Non-IPv4/6 services
 - VPN-style tunneling, e.g., L2TP
 - just another network interface - leverage IPv6 experience
- L7 services over IP
 - addressed as usual

Incentives

- Can users be provided with trade-able incentives?
 - provide CPU cycles, storage, wireless access, human cycles, ...
 - money = medium of exchange (vs. barter)
- Can users sell GENI services?
- Virtual currency?
 - cf. Linden Dollars (SecondLife)

User risks

- Risks *to* users
 - installed software: GENI = spyware
 - data gathering as part of experiments (cf. AOL)
 - highly personal data: web browsing, mobility, location-based services, ...
- Risks *from* users
 - no strong identification (cf. experimenter)
 - GENI = next-generation bot net
 - GENI = PirateBay, taxpayer-funded

Legal & IRB issues

- Informed consent?
 - standard IRB template?
 - data gathering best practices for GENI?
- Just privacy statements?
 - P3P?
- Who is responsible if bad guys get SSNs and credit card numbers from user machines running GENI services?
- CALEA?

Work needed

- Document risks
- Incentives and opportunities
- Technical issues
 - end-user resource allocation and monitoring