Sensommet Research Opportunities in GENI and FIND

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Background

- GENI
  - Global Environment for Network Innovations
  - infrastructure to enable network research
- FIND
  - Future Internet Design
  - research program future Internet architectures

Sensornets and the Internet?
(view from Internet researchers)

- the NEW Internet
  - possibly many independent sensornets
  - doesn’t face how sensornets and Internet could interact
  - sensornet is basically a peripheral

Sensornets and the Internet?
(view from Sensornet researchers)

- Sensornet Architecture
  - Culler, Stoica, et al.
  - Innovation: MAC-like SP in the waist of the architecture

- Tenet Architecture
  - Govindan, Estrin, et al.
  - Innovation: mix 32-bit nodes into 8-bit cloud

Richer Interaction Between Sensornets and The Internet

- Internet-side of sensornets and the Internet
- federated sensornets
- wired and hybrid sensornets

GENI and Sensornets

- goal of GENI: provide infrastructure to answer these questions
- sensornet sub-committee of GENI wireless planning group
  - D. Estrin, R. Govindan, J. Heidemann, M. Welch
  - wireless group co-chairs: M. Gefa, D. Raychauduri
- several proposed deployments
- looking for feedback on options
GENI Sensornet Deployments: trade scale, repeatability, sensing

- testbed: like Emulab or ORBIT
  - support repeatable experiments
- urban mesh: available, programmable, wireless coverage
  - support in-situ experiments
- kits: standard platforms
  - bring GENI into your lab
  - and your data to GENI

100s of nodes, very controlled, signaled sensing

100s of nodes, less controlled, real-world sensing

fewer nodes per lab, control up to you, supports many different sensing applications

FIND: New Internet Technologies and Sensornets

- new Internet technologies
  - ubiquitous, very high bandwidth optical
  - peer-to-peer technologies
  - overlay networks
  - new security architectures
  - delay-tolerant networks
  - how do each of these interact with sensornets?

New Research: Sensor-Internet Sharing and Search (SISS)

- PIs: John Heidemann (USC), Mark Hansen, Junghoo Cho (UCLA)
- goal: understand how sensor networks change Internet architecture
- motivations: federated sensor networks and slogging
  - connecting some or many sensors via the Internet

Slogging: Sensor Blogging

- what if there were millions of collaborating sensor networks
  - the sensor network equivalent of blogging
  - each mini-sensor net run by a "citizen-scientist"
  [due to Mark Hansen, keynote talk at SIAM Conf. on Data Mining, 2008]

SISS Research Questions

- standard protocols to exchange sensor data?
  - both over wireless nets and the Internet
- sample building blocks
  - gateway software, storage sites, search engines
- manage data quality?
  - especially naïve and malicious users
- manage data privacy?
  - especially with 1000s of slogs and naïve users
- can we create a blog-like feedback loop
  - data fostering user data, self-selection and editing

More Information

- http://www.isi.edu/lense
- http://sensorbase.org
- http://www.geni.net