

Panel 2: Network applications of the future

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New (and old) applications

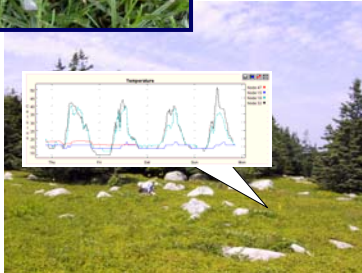
- various forms of tele*
- pervasive computing
- mobility
- homeland security
- e-sciences
- sensor nets

} evolutionary?
revolutionary?
hand-maiden?

Observations:

- limited success in predicting disruptive apps
- applications drive networking, yet networking often follows
- interesting diversity ... even within an area

Architecture: stovepipes or layers?



Duck Island: habitat sensing net



Oklahoma: atmospheric sensing net

The importance of network management

- ❑ focusing on control plane, not data plane
- ❑ large number of deployed devices: complexity/scale demands *automated management*
 - measure/monitor devices/services
 - models/abstraction needed for reasoning about system services, operations
- ❑ extending management beyond devices: automated management/reconfiguration of *services*

Lesson: applications demand multidisciplinary teams

The "folklore stage"

- *conventional wisdom*: "soft-state is robust, less complex than hard-state signaling"
 - how to define "robustness"?
 - how to define "complexity"?
- posing/answering such a question:
 - *hard*: no well-accepted models, paradigms
 - *easy*: little/no past research
 - *important*: a fundamental question
 - *open to the past*: lessons from telephony, ATM

"Folklore stage"

overheard at a major research lab in northern NJ:

Q: "Given the network topology and the traffic matrix, how do you optimize the routes?"

A1: "Uh...."

A2: "We don't really think about it that way...."

A3: "Well, we don't know the topology, we don't know the traffic matrix, the routers don't automatically adapt the routes to the traffic, and we don't know how to optimize the routing configuration. But, other than that, we're all set!"

Summary

- applications: *yes*
- management: increasing importance
- beyond folklore: fundamentals!