Wireless Networking
An emerging area, many answers are still unclear
-where do you put the different pieces?
-In what layers do things go? (i.e. Multicast – which layer?)
-How is real-time supported?

Wireless Goals
Transparent application support if there is a handoff between physical networks would be nice, but this is extremely hard.

Applications to consider:
telnet – transparent or re-login
Outlook – reconnect periodically
Chat room
Compilation database
Voice over IP

Solutions
a. Multiple active IP addresses - prenegotiate

Should support be in:
  Application layer? (system services)
  TCP/IP?
  -Transaction atomically and completely
  -File system
  -Disconnection aware

b. DNS-aware
  name – IP address mapping is already there, so you could just add support to handle relocations as part of this process

c. application-aware
  Needs something better than TCP socket returns error on disconnect
  Application-level retry (painful)
  -better API than sockets
  -Needs Q of S info
  -rerouting
  -disconnection
d. TCP-aware

e. IP-aware – app/server needs visitability (wireless, phone call)
   Is TCP-aware or IP-aware better?

Design Principles for Mobile Computing
   Everything must be aware
   Visibility or transparency
   On demand at each mobile layer

One possibility is to have a forwarding agent that acts as a fixed host
and forwards to the mobile host. The problem here is that the host at
IP’ must send back through the agent for everyone to see packets
coming from IP. The top drawing shows the initial connection – the
bottom shows how things work when the host moves to IP’. The agent
assumes control of the initial IP.

Cell Phones
- single address ($50/month)
- forwarding agent

TCP-aware
- new IP address
- re-establish connection
- re-forwarded by agent

Name routing
- constant name
- transient IP
- (i3) -> mailboxes
- scalability issues
- issues routing through agent

**DNS Design Issues**
There are a few root nameservers at UW that handle the Washington.edu Sub-domains are handled by local nameservers Name service gateways cache addresses to reduce load – but this can cause issues for mobile addresses One idea to resolve this is to have the address expire (TTL = 0) but this causes a great deal of load

**Cell phone discussion on Japan’s cell phone model**
- Applications are mobile
- In Japan, the charge is per packet