791M: Mobile Computing

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Fall 1996

Class: Mon/Wed – 9:05 until 10:20
Office Hours: Mon/Wed – 10:30 until 11:30

Mobile Computing?

"... the most perfect invention of modern times ... anything more perfect than *this* is scarecely conceivable, ... wonder what will be left for the next generation, upon which to expend the restless energies of the human mind"

– *from a newspaper*

<u>Mobile Computing</u>

▷ Goal: access information anywhere, anytime

▷ Aliases: Nomadic Computing, Wireless Computing, Ubiquitous Networking

▷ Expected to create an *entire* new class of applications
  - new massive markets
  - combining personal computing and consumer electronics

▷ Applications:

- *Vertical*: vehicle dispatching, tracking, point of sale, ...
- *Horizontal*: mail enabled applications, filtered information provision, collaborative computing...

Mobile Computers

PDAs, Personal Communicators

– dumb terminals, *walkstations*, palmtops, workstations.

- will run on AA^+/Ni-Cd batteries
- may be diskless
- wireless connection to information networks
  – either infrared or cellular phone

What is different?

▷ battery power restrictions

- transmit/receive, disk spinning, display, CPUs, memory consume power
- battery lifetime will see very small increase
- need energy efficient CPUs, memories, system software

Power consumption vs. resource utilization

▷ bandwidth restrictions and variability

What is different...?

- ▷ location changes
  - — user may *wake up* in a new environment
  - — dynamic replication of data
- ▷ querying wireless data – location-based responses
- ▷ bursty network activity – during connections
- ▷ handling disconnections (planned failures?)
  - — caching strategies, managing inconsistencies
- ▷ small screen sizes

$\Rightarrow$ New cost measures $\Rightarrow$ New solutions needed

What Needs to be Reexamined due to Mobility?

- Operating systems
- Databases and File systems
- Communication architecture and protocols
- Hardware and architecture
- Real-Time, multimedia, QoS
- Security
- Application requirements and design
- PDA design: Interfaces, Languages

Course Requirements

Choose a topic from previous slide (by Sep 11th)
– 2-3 students per topic (FCFS)

1. Each group will
   - Come up with a bibliography
   - Develop a short list of papers (2-3) for others to read
   - Present a comprehensive view of the topic (2 talks)
2. Each of you will write a page-long critique on papers from two other topics
   - Main contribution of the paper
   - 3 reasons why you wish you were an author of the paper
   - 3 reasons why you are glad you are not an author of the paper
3. Each group will
   - Execute a project (progress report due Oct 23rd)
   - Do a project presentation at the end of the semester
   - Write a project report (due Dec 11th)