

The Computer for the 21st Century

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Mark Weiser

- ❖ Working in CS Lab at Xerox PARC
 - ☞ Chief Technologist of Xerox PARC
- ❖ Research interest
 - ☞ garbage collection
 - ☞ operating systems
 - ☞ user interfaces
 - ☞ ubiquitous computing
- ❖ Other
 - ☞ drummer for band Severe Tire Damage

Computing History

- ❖ three waves in computing
- ❖ Mainframes – history
- ❖ personal computing – now
- ❖ ubiquitous computing – future

Ubiquitous Computing

- ❖ What Ubiquitous Computing is
 - ☞ Computing is so profound to disappear into background of our lives
- ❖ What Ubiquitous Computing isn't
 - ☞ virtual reality
- ❖ Difference
 - ☞ virtual reality puts people inside a computer-generated world
 - ☞ ubiquitous computing forces the computer to live out here in the world with people

Scenerio 1 “6-pack of computers”

“Honey, pick up a 6-pack of computers on your way home”

- ❖ What will the \$2 computer do?
 - ☞ beam to nearby displays
 - ☞ work together to create a custom work or play environment
 - ☞ get specific content, such as news, novels, and homework assignments
 - ☞ authorize special document access, such as entertainment and searching

Scenerio 2 “augmented reality”


existing physical devices + cheap and easy-to-use electronic add-ons

- ❖ Wallet + . . . digital cash and digital ID
- ❖ Paper Notebook + . . . facts at your fingers
- ❖ Automobile + . . . directions and identity
- ❖ Kitchen Cabinet + . . . contents tracking


Principles of ubiquitous computing

- ❖ The purpose of a computer is to help you do something else.
- ❖ The best computer is a quiet, invisible servant.
- ❖ The computer should extend your unconscious.
- ❖ Technology should create calm.

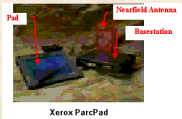
Early work in Ubiquitous Computing



- ❖ Tab - prototype handheld computer
- ❖ What is tab
 - ☞ Like pocket calculator and the pocket organizer
 - ☞ Example
 - ❖ employee ID card
 - ❖ Active badge, calendar and diary
 - ☞ Where to use
 - ❖ Helping find items

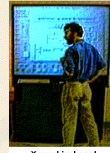


Early work in Ubiquitous Computing



- ❖ Pad - a prototype pen computer
- ❖ What is pad?
 - ☞ not portable computers - go everywhere with their owners
 - ☞ "scrap computers" - like scrap paper
- ❖ features
 - ☞ no individualized identity
 - ☞ use as many as you want
 - ☞ even as small and light as actual paper
 - ☞ fulfill many more of paper's functions than can computer screens.

Early work in Ubiquitous Computing



- ❖ boards - video screens and bulletin boards
- ❖ features
 - ☞ Electronic chalk
 - ☞ Do not worry if board is too high
 - ☞ Share in different rooms

Technology needed

- ❖ Cheap, low-power computers
- ❖ Network
 - ☞ Network ties computing devices together
 - ☞ three connection type:
 - ❖ tiny range wireless
 - ❖ long range wireless
 - ❖ very high speed wired
- ❖ software systems implementing ubiquitous applications
 - ☞ Scalability – hardware added and removed easily
 - ☞ Mobility – output can easily move with user

Social Issues

- ❖ Privacy
 - ☞ Hundreds of invisible background computers – easy to collecting info
 - ☞ High speed network – easy to send info
- ❖ Protection
 - ☞ Cryptographic techniques