

Mobile Devices and Computing

Mobile Computing

Overview

Mobility in computing



Micro computers

Portable Computers

Tablet computers

Mobile Phones

Enabling Technologies

Mobile Computing - Apps

Software

Sensors

Wifi

Mini Mother-boards

Electronics/Optics

VLSI

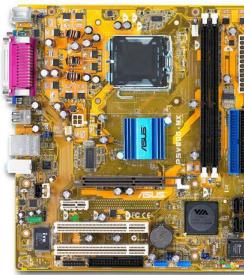
Computing Hardware - VLSI - PCBs



Intel CPU



Standard-ATX



Micro-ATX



Mini-ITX



Nano-ITX



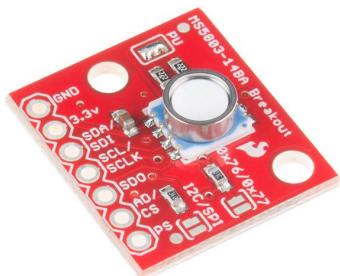
Pico-ITX



Mobile Chip - CPUs, GPUs and Neural Engines



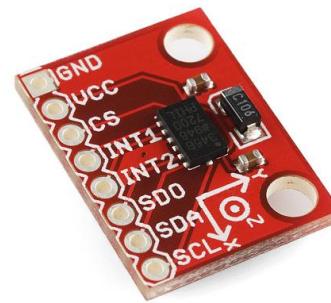
Sensing Hardware



Pressure
Sensor



Mobile
Camera

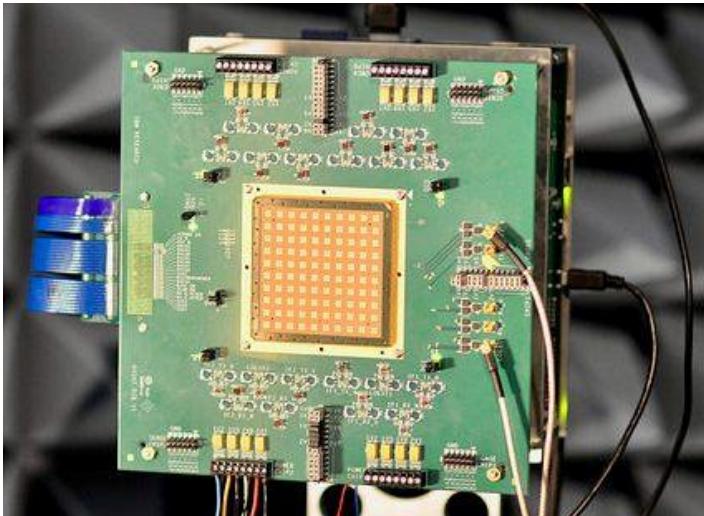


Positioning
Sensor



Temperature
Sensor

Antenna on a mobile phone



Mobile Phone Battery

- Li-ion battery
- At least 24 hours before a recharge
- Wireless charging
- Adapter based charging



Mobile LCD display

- Large screen
- High resolution
2532-by-1170-pixel
resolution
- High refresh rate
- High contrast rate
- Millions of colors



Mobile Software - Apps



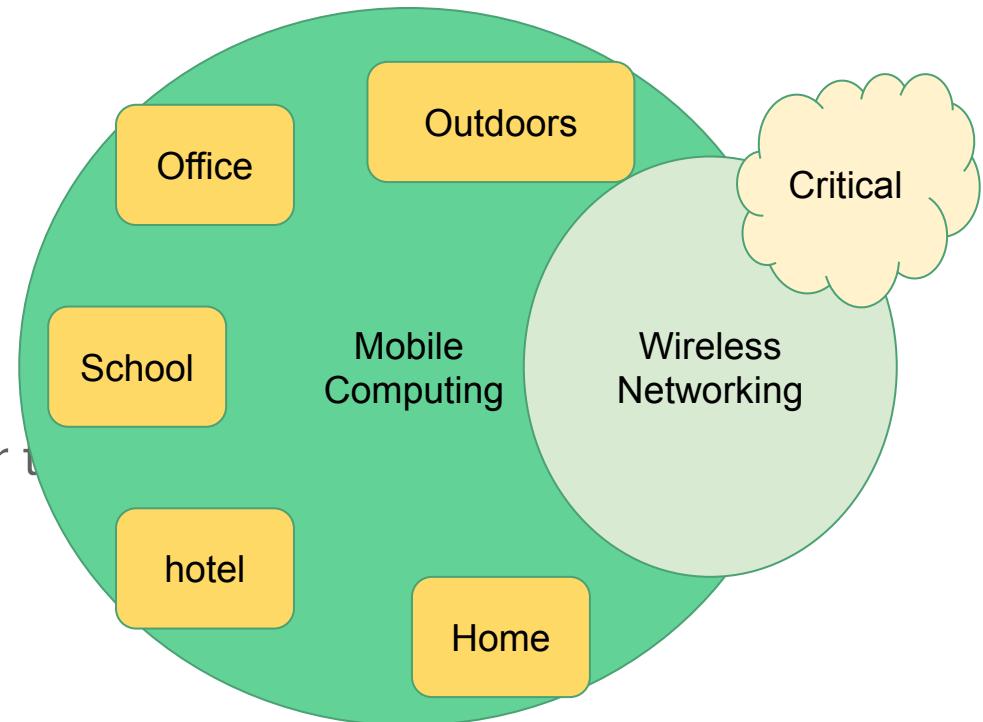
Mobile Computing

- Synonyms
 - Ubiquitous computing, Nomadic computing
- Definition
 - “Ability to compute anywhere and anytime”
- Mobile Communication and Computing
 - User can be moving

Mobile Computing vs. Wireless Networking

Mobile Computing vs. Wireless Networking

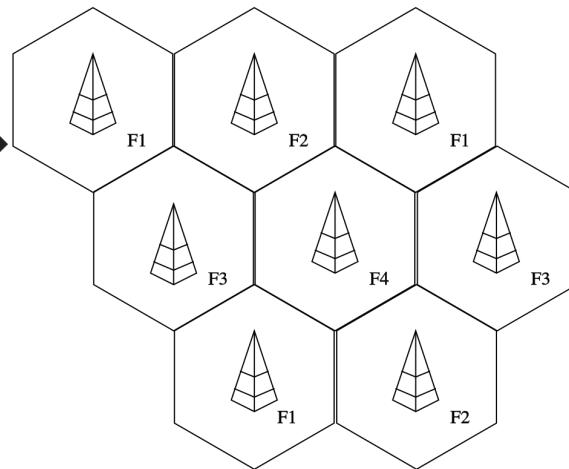
- Mobile Computing
 - Access information and remote computational resources
- Wireless Networking
 - Provide infrastructure for the above services



Kinds of Wireless Networks



WLAN



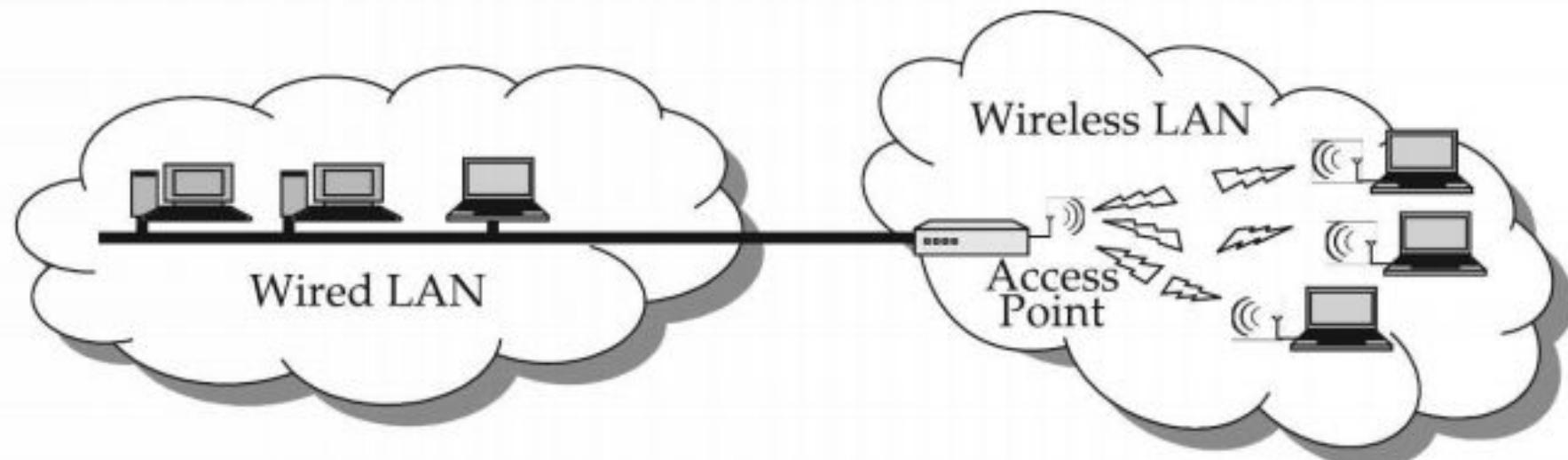
CWN



PAN

Type 1 - WLans

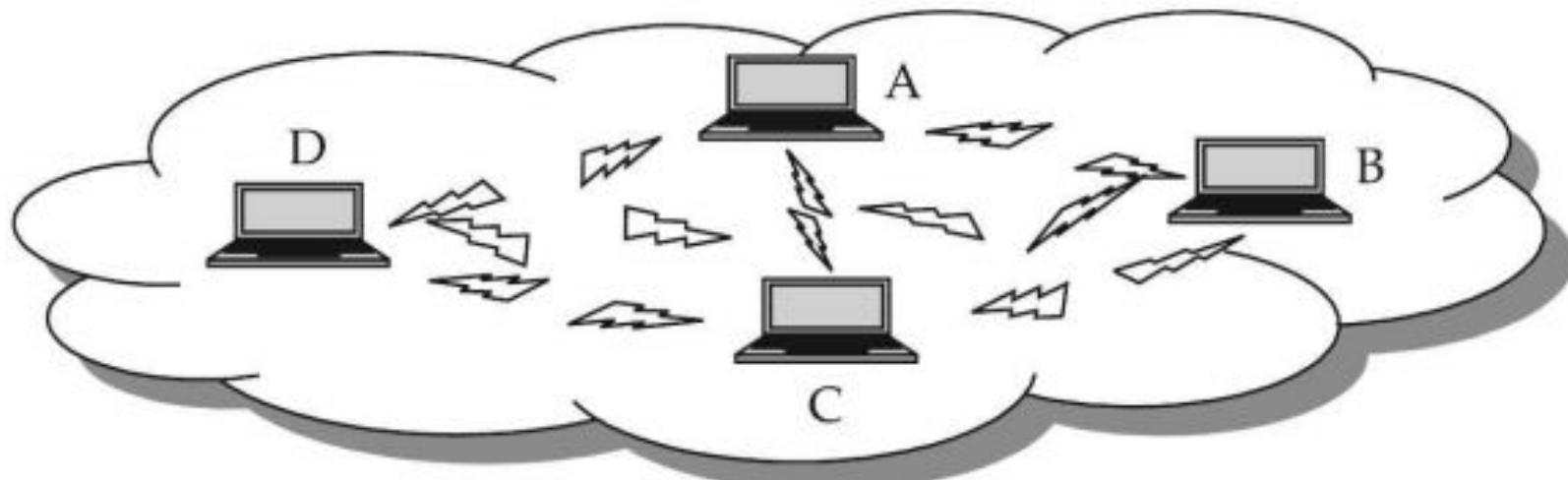
Fixed Infrastructure



Characteristics of Type 1 - WLans

- Single hop access to network via access point (AP)
- Important: Only the last hop is wireless via the AP
- AP - Bridge between the wired network and the wireless network
- Requires authentication - eg. password
- It depends on the IEEE 802.11 Wireless LAN Protocol

Adhoc Networks



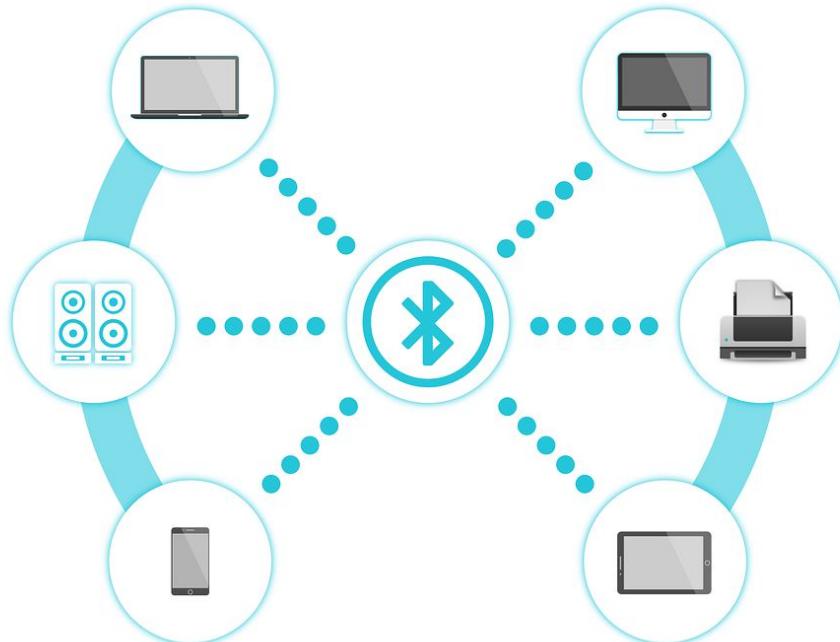
Characteristics of Adhoc Networks

- Multi-hop wireless communication network
- Does not required fixed infrastructure
- Intermediate nodes - Wireless connections - hops
- Eg. Node A can get signal from C via B or D or directly
- Recent advances: The Bluetooth Technology



Bluetooth Technology

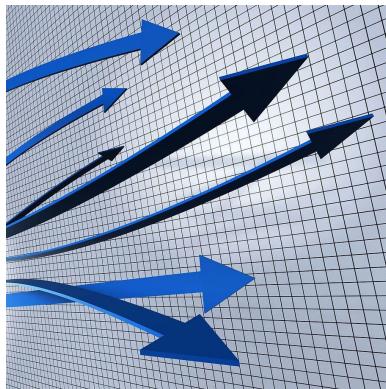
- Connect with printers, cameras, scanners and computers
- Bluetooth is a popular choice for ad-hoc wireless networks
- Easy to enable networks
- Automatic connections
- PANs - piconets
- Ad-hoc networks - scatternets



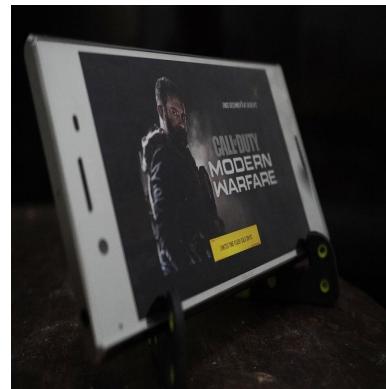
Mobile Computing Applications



Office Mobile



Investments



Games

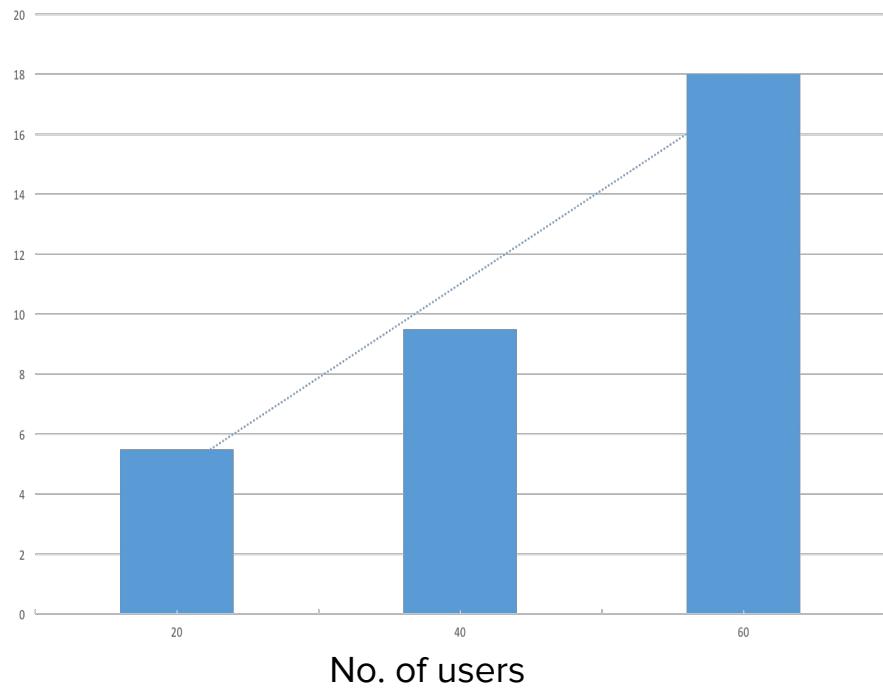


Messaging

Advantages



Ease of deployment



Scalability

Major Challenge - Data Security

