Wireless Technology Overview

Samuel Kim

samuelk@cs

Brief History

- Analog -> Old School
  - Cellular
- Digital -> New School
  - PCS (Personal Communication Services)
  - Data is sampled and transmitted as bits
  - Allows better security and compression
  - Several different technologies

CDMA

- Code Division Multiple Access
- Users transmit simultaneously in the same channel
  - Spread Spectrum Technology (IS-95)
  - Digital codes uniquely identify users
  - Wide 1.25 Mhz channel
  - Each transmission is marked and spread across the channel to minimize interference with other's data
  - "Soft Capacity"

TDMA

- Time Division Multiple Access
- Users take turns transmitting
  - Large frequency band divided into smaller channels
  - Each channel is divided into several time slots, depending on the specification
  - A user is assigned a time slot and transmits during that time slots turn
  - "Hard Capacity"

GSM

- Global System for Mobile Communication
- Derivative of TDMA
  - 25 Mhz band divided into 124 frequencies of 200 Khz each
  - Each channel contains 8 time slots
- Used widely in Europe and Asia

Service Providers

AT&T Wireless
- Analog and digital TDMA networks
- Recent addition of GSM network
- 3G plan is to upgrade to EDGE

cingular WIRELESS
- Mixed TDMA and GSM networks
- Eventual full migration to GSM
- 3G plan is to upgrade to EDGE

NEXTEL
- Uses iDen which is another derivative of TDMA
- Mostly business user
- Exclusively Motorola phones

Service Providers (cont.)

Sprint Sprint PCS
- All digital, all CDMA network
- "Built from the ground up"
- 3G plan is to upgrade to cdma2000 1xRTT

T··Mobile
- First nationwide GSM network
- First to provide GPRS high speed data
- Formerly VoiceStream

verizon wireless
- Mostly CDMA network
- Uses BREW as mobile platform
- 3G plan is to upgrade to cdma2000 1xRTT

Looking Ahead

- Current Data Rates (9.6 kbps – 14.4 kbps)
- 2.5G (56 kbps – 144 kbps)
  - GPRS
  - HSCSD
- 3G (384 kbps – 2 Mbps)
  - WCDMA
  - CDMA2000
  - EDGE

Looking Ahead (cont.)

- Fast networks = More data
  - More than just voice can be transferred
- Need hardware to take advantage of faster networks
  - Many have built in cameras, video, etc
    - Nokia 7250,3650
    - Samsung S205
    - Motorola T705i

Applications

- Take advantage of new technology!
- Some ideas:
  - Mobile "sticker pictures"
  - Remote control
  - Updating online journals
  - Group messaging

Advanced Tools

- Wireless Toolkit 2.0
  - Mobile Media API (MMAPI)
  - Wireless Message API (WMA)
- Phone-specific Emulators
- Phone-specific APIs

Wireless Toolkit 2.0

- Supports WMA
  - Send/Receive SMS messages
- Supports MMAPI
  - Audio/video playback and capture

Developer Sites

- Get emulators and APIs here
- Service Provider Developer Programs
  - http://www.tmobileapps.com/
  - http://developer.sprintpcs.com/
  - http://developers.verizonwireless.com/
  - http://alliance.cingularinteractive.com/
  - http://www.attws.com/developer/
- Hardware Developer Programs
  - http://www.forum.nokia.com/
  - http://kb.motorola.metrowerks.com/motorola/pcsHome.do/

Other Sites

- http://midlet.org/index.jsp
- http://www.midletcentral.com/
- http://www.microjava.com/