Multimedia On W-LAN

Shiva Sitaula

WLAN Standards

- **802.11 (IEEE)**
  - Data rate: 1 to 11 Mbps
  - Frequency: 2.4 GHz
- **HIPERLAN (European Standard)**
  - Data rate: Up to 54 Mbps
  - Frequency: 5 GHz
  - Range: Up to 150 m.
- **Bluetooth (Industry Approach, small range)**
  - Data rate: 721 Kbps
  - Frequency: 2.4 GHz
  - Support: voice and data
  - Range: 10 m.
TransmissionTeknology

- One based on infrared light
  HIPERLAN, Bluetooth, IEEE 802.11
- Radio transmission
  IEEE 802.11

Wireless Network Approach

Infrastructure based:

- Communication between node and access point
- Access point act as bridge to wired or wireless network
- Network functionality on access point
- Design is simple
- Examples: IEEE 802.11, HIPERLAN
Wireless Network Approach

Ad hoc based:

- No access point needed
- Direct communication between node
- Need to be within radio range
- No medium access mechanism
- Examples: Bluetooth

Wireless multimedia traffic

Streaming multimedia

- Constant transfer rate important
- Short disruption is noticeable
- Initial delay is acceptable
- Example: audio and video streams

Interactive multimedia

- Concerned with real-time data transfers and temporal fluctuation
- Tolerate minor error but not long delays
- Examples: Video telephony, VoIP
Multimedia Consideration

- Network technology
- End-user device
- Quality of Service (QoS)
- Application Development:
  - Java multimedia Framework

WLAN challenge

- Short communication range
- Low bandwidth (low data rate)
- Support of QoS guidelines for multimedia application
- Error prone channel: High packet loss and BER
- Poor performance in wireless link: Transport protocol
IEEE802.11 and Multimedia

- Different 802.11 family standards provide high data rate
  - 802.11 (1-2 Mbps)
  - 802.11b (1-6 Mbps)
  - 802.11a (25 Mbps):
    - Connectionless
    - 5 GHz band
    - 25 Mbps (raw)

- None of standard support QoS!!
- Research on new standard: 802.11e with QoS!

Example

Voice over WLAN

802.11b:

- Capable of running 3 audio streams
- Need compression to audio signal to increase supported audio streams

**SOLUTION:**

- Use higher performing standard: 802.11a
- 802.11a handles four times as much video traffic as 802.11b
HIPERLAN and Multimedia

- HIPERLAN 1:
  - Data rate: 24 Mbps
  - Indoors user only!!

- HIPERLAN 2
  - Connection oriented
  - Data rate: 54 Mbps
  - Range: 150 Meter
  - Offers QoS for real-time video and streaming multimedia application
  - Support time critical services through MAC-layer
  - Compatible with other networks: IP, ATM, Ethernet

Multi Cell WLAN Scenario

Without QoS multimedia support
Multi Cell WLAN Scenario

BUSY !!!

With QoS multimedia support

THE END !