CSE 6392 Mobile Computer Systems

Lecture 2 : Mobile and Wireless Networks

With Dr. Mohan Kumar

Lesson 2

Topics to be covered in this lesson on Wireless Networks

Wireless Network Limitations and Functions

MAC Protocols for Wireless Networks

Types of Wireless Networks

Mobile and Wireless Networks

What are mobile networks?

What are wireless networks?

Wireless Networks

Limited channel capacity

Wireless Networks

Limited channel capacity

Higher noise and interference

Wireless Networks

Limited channel capacity

Higher noise and interference

Frequency allocation restrictions

Wireless Networks

Limited channel capacity

Higher noise and interference

Frequency allocation restrictions

Information is transmitted through free space

Mobile Network functions

Maintaining communication despite mobility

Mobile Network functions

Maintaining communication with mobility

Keeping track of locations

Wireless network functions

Provide wireless interfaces to users

Wireless network functions

Provide wireless interfaces to users

Bandwidth allocations and error control

MAC protocols

FDMA

MAC protocols

FDMA

TDMA

MAC protocols

FDMA

TDMA

CDMA

MAC protocols

FDMA

TDMA

CDMA

GSM

Emerging Mobile and Wireless Networks

Wireless LANs

Wireless Loops

Satellites

Wireless ATM

Cellular/PCS

Wireless LANs

For small areas such as a building, hallway, park or office

Wireless LAN standards

IEEE 802.11

1 Mbps

is being enhanced to 11 Mbps

Wireless LAN standards

IEEE 802.11

1 Mbps

Physical media can be infrared or spread spectrum

Wireless LAN standards

IEEE 802.11

1 Mbps

Physical media can be infrared or spread spectrum

Prioritized access to the medium

Wireless LAN standards

IEEE 802.11

1 Mbps

Physical media can be infrared or spread spectrum

Prioritized access to the medium

Battery conservation for inactive or idle wireless users

Wireless LAN standards

IEEE 802.11(Contd..)

Many universities and companies use 802.11 WLAN

Wireless LAN standards

HIPERLAN

23.5 Mbps

Wireless LAN standards

HIPERLAN

23.5 Mbps

Physical media is spread spectrum

Wireless LAN standards

HIPERLAN

23.5 Mbps

Physical media is spread spectrum

Prioritized access to the medium

Wireless LAN standards

HIPERLAN

23.5 Mbps

Physical media is spread spectrum

Prioritized access to the medium

HIPERLAN2 provide different levels of quality of service to the applications

Wireless Networks

- Wireless local loops
  - LMDS

Wireless Networks

Wireless local loops

Satellites

Satellites

Iridium

A LEO system which uses 66 satellites to provide mobile communications.

Wireless ATM

ATM cell transmitted over wireless channels.

Wireless ATM

Advantages

Seamless interconnection with backbone ATM networks

Wireless ATM

Advantages:

- Seamless interconnection with backbone ATM networks
- Support for QoS in wireless networks

Wireless ATM

Advantages:

- Seamless interconnection with backbone ATM networks
- Support for QOS of wireless and mobile users
- Suitability of small packets over wireless channels.

Wireless ATM

Challenges

Maintaining end-to-end ATM connections as the user moves

Wireless ATM

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- Maintaining end-to-end ATM connections as the user moves
  - Connection re-routing needs to be performed

Wireless ATM

Challenges

- Maintaining end-to-end ATM connections as the user moves
  - Connection re-routing needs to be performed
- Support for quality of service

Wireless ATM

Challenges

- Lack of standards
- Cost and complexity in implementation
- Amount of overheads