IT 601: Mobile Computing

Session 1

Introduction

Prof. Anirudha Sahoo

IIT Bombay

Course Evaluation

- Home assignment – 10%
- Pop Quizzes – 5%
- MidSem – 25%
- Project – 25%
- EndSem – 35%

Course Evaluation

- Academic dishonesty (in any form) will not be tolerated
  - will result in FF grade
- Attendance : as per Institute rules
- Audit Requirements
  - attendance : as per Institute rules
  - must appear midsem and endsem exams
  - may exchange endsem with project
  - take quiz/homework
  - at least CC grade in the evaluation

Prerequisite

- Basic Computer Networks
  - –Sound knowledge in traditional MAC protocols
  - –IP routing protocols
  - –TCP
- Basics of Probability theory and queuing theory

References

- Mobile Communications – J. Schiller, Pearson education publishing 2003
- Wireless Communications and Networks – W. Stallings, Pearson education publishing 2002
- Technical papers – will be given out throughout the course

Introduction

- What is different in wireless network?
  - Bandwidth
  - Error rate
  - Media
  - Signal strength (fading)
  - MAC
  - Mobility
  - Security

Wireless networks

- Two types
  - Voice network
    - Cellular systems (GSM, CDMA etc.)
  - Data network
    - WiFi, HiperLAN
- Networks are moving towards an integrated network
  - GPRS
  - Voice over WiFi

Physical Layer (PHY)

- Binary (digital) data transmitted over airwave
- Requires antenna
- characterized by transmission range, power, modulation scheme, frequency range

MAC Layer

- How wireless stations share the air medium and avoid contention to transmit data successfully
- “listen before you speak” or “speak at predetermined interval”
- Unique problems
  - Hidden node
  - Exposed node

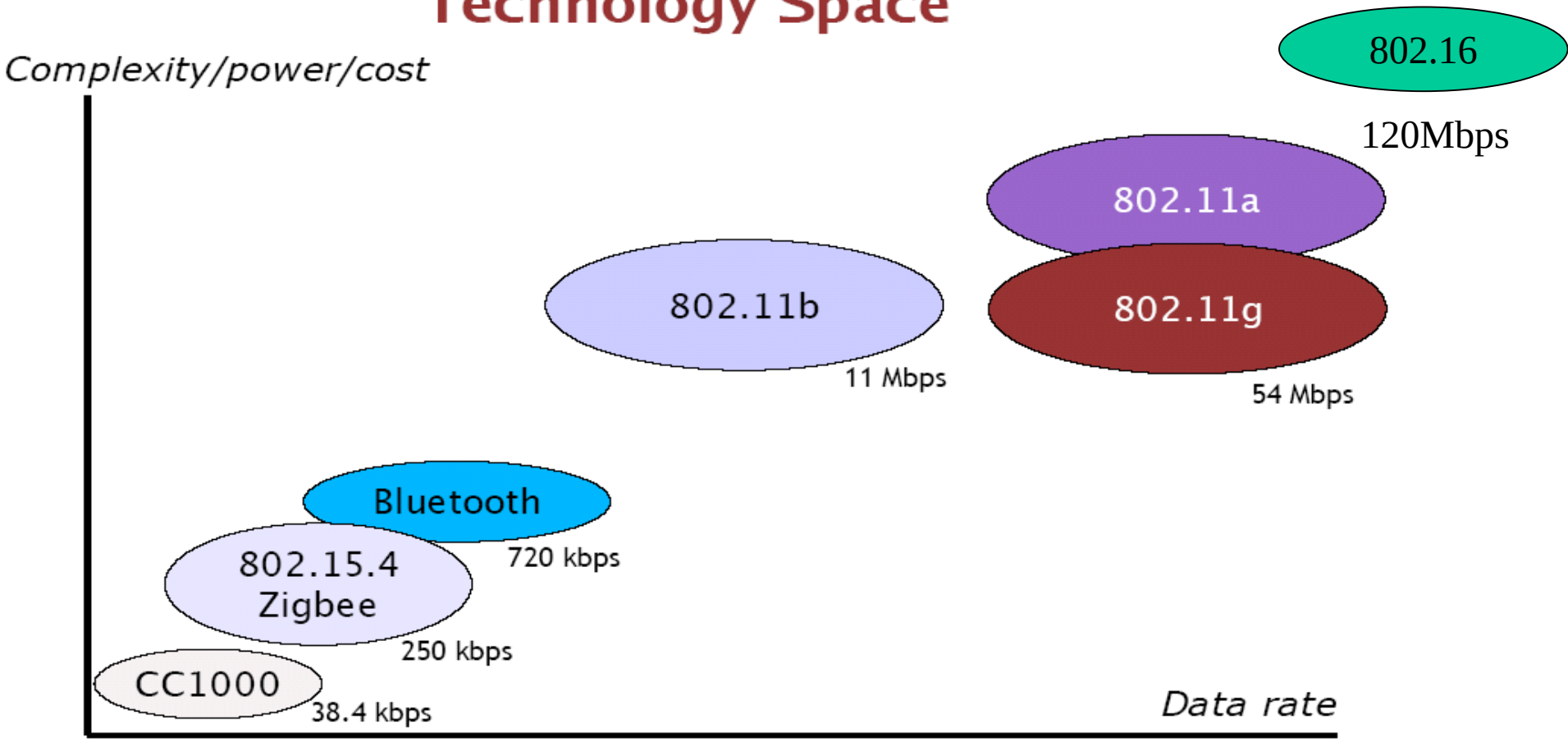
Network Layer

- Responsible for facilitating multihop communication
- Need to run some routing protocol
- Traditional routing protocols may not work efficiently
- Mobility at IP layer

Transport Layer

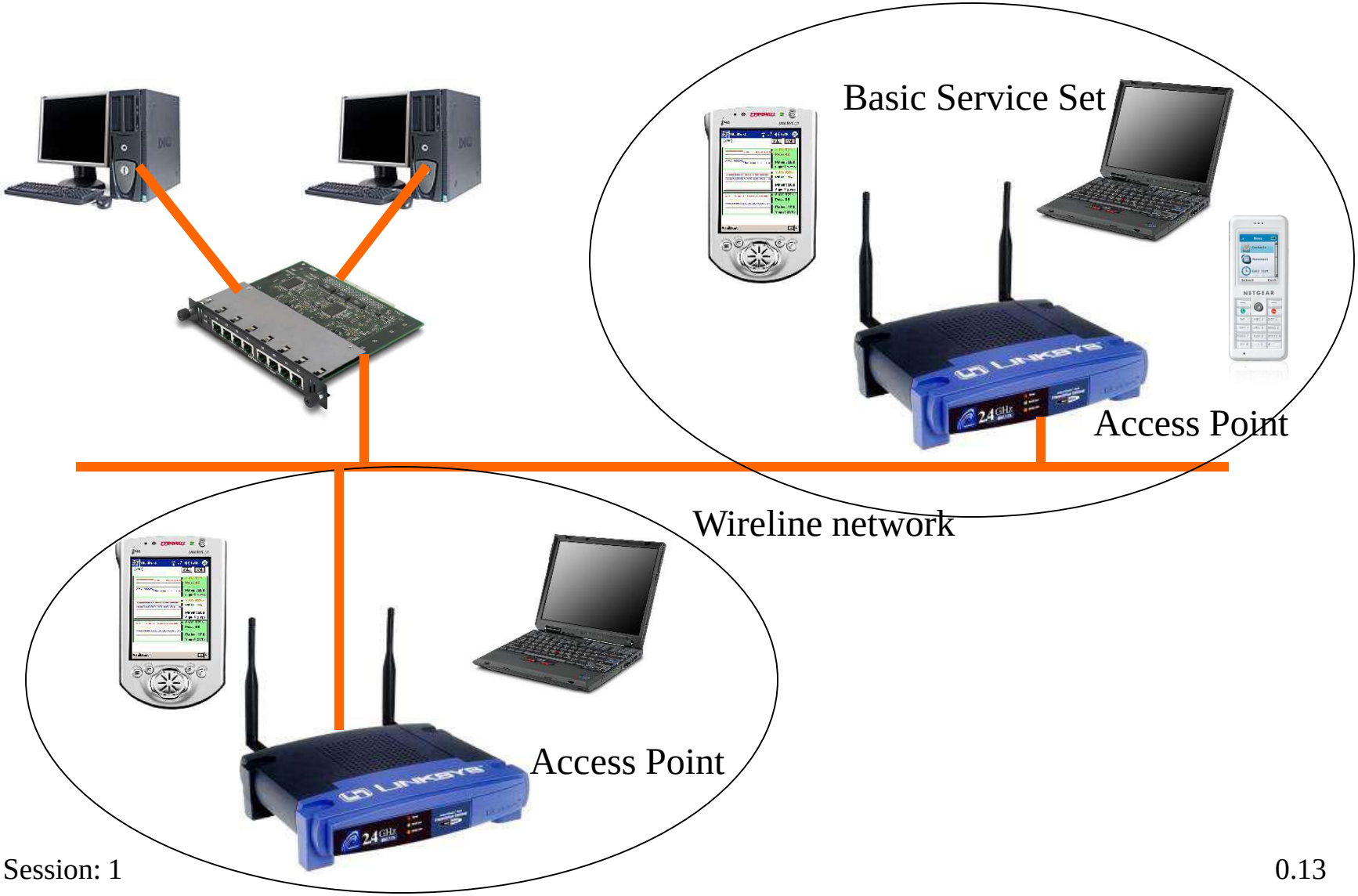
- Reliable Transport such as TCP may not work well in wireless medium
  - TCP inherently assumes that packet loss is due to congestion
  - Needs modification for wireless network

Technology Space



Source: Matt Welsh, Harvard University

WiFi Network



WiFi Network

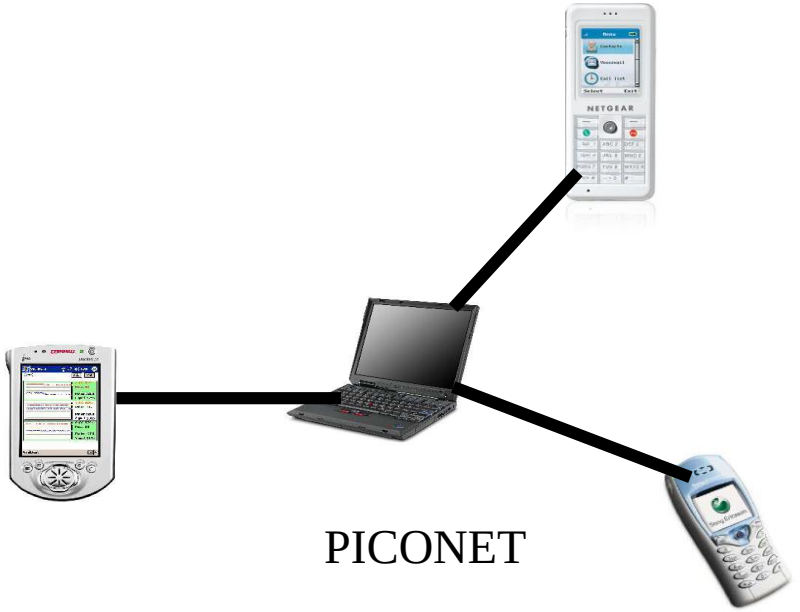
- 802.11b and 802.11g Use 2.4 GHz ISM band
- 802.11b : 11 Mbps
- 802.11g : 54 Mbps
- 802.11a : uses 5 GHz band: 54Mbps

Bluetooth

- Short range (10m),moderate data rate (720kbps) for creating an adhoc network between personal devices
- One master and upto

  7 slaves in a piconet
- Master controls the transmission

  schedules of all the devices
  - TDMA scheduling
- Frequency hopping used to avoid interference with other piconets
  - 79 channels in the 2.4GHz ISM band, with 1 MHz spacing
  - Frequency hopping at 1600 hops/s



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