Overview of IEEE 802.11b Wireless LAN

S-72.4210 Postgraduate course in Radio Communications

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Outline

- Introduction

- Standardization

- Physical layer (PHY)
  - Direct-sequence spread spectrum
  - Complementary Code Keying
  - Physical layer convergence protocol (PLCP)

- Medium access control layer (MAC)
  - CSMA/CA
  - MAC frames

- Conclusion

- References

- Homework

Introduction

- IEEE 802.11b is a wireless LAN standard that defines a physical layer and MAC layer for wireless communications within a short range (up to 300 meters) and with low power consumption.

- IEEE 802.11b provides a substitute for wired LAN and also offers flexibility in terms of mobility.

- The 802.11b is an extension for the original 802.11 and provides up to 11 Mbps transmission rates over the air interface.

- Devices have been on the market for several years now. Currently the dominating WLAN standard seems to be 802.11g, but most of those devices are compatible also with 802.11b.

- WLAN networks can be either infrastructured networks, when there is an access point (AP) that controls access to the (wired) network, or ad hoc networks that are composed solely of the stations transmitting to each other.
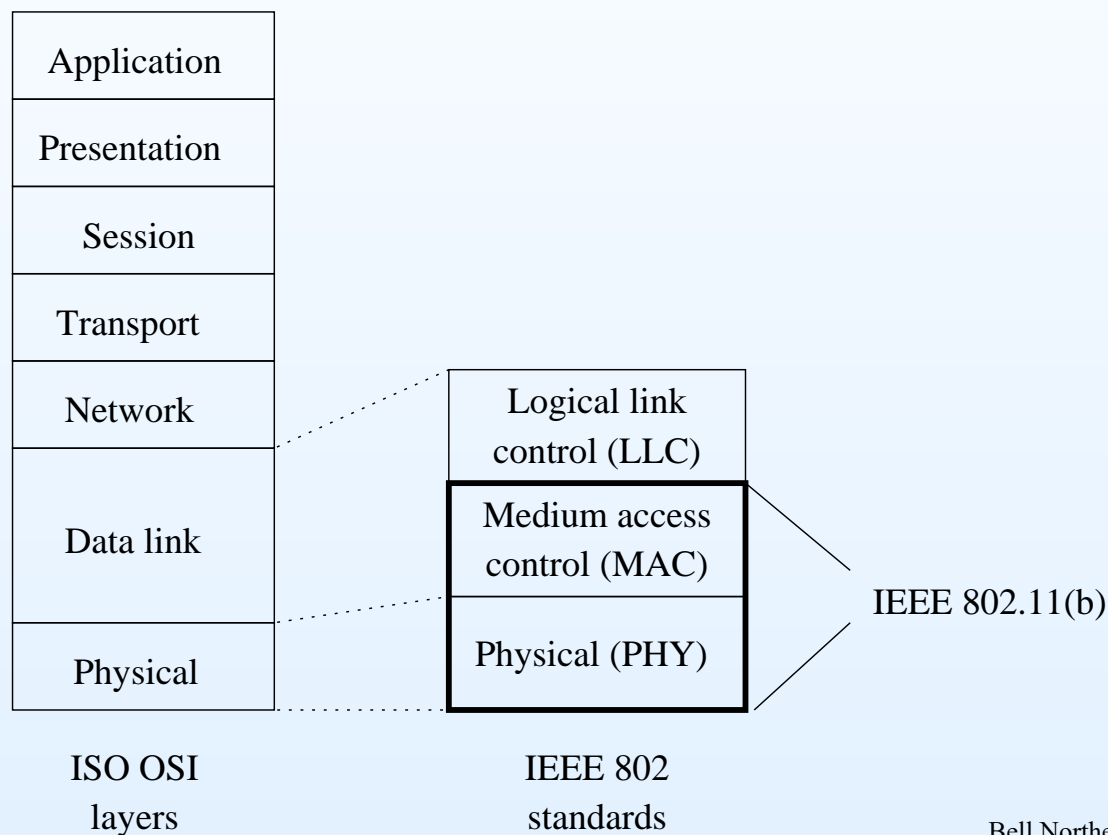
IEEE 802.11 standards

- **IEEE 802.11: up to 2 Mbps, 2.4 GHz, approved in 1997**
- IEEE 802.11a: up to 54 Mbps, 5 GHz, approved in 1999
- **IEEE 802.11b: up to 11 Mbps, 2.4 GHz, approved in 1999**
- IEEE 802.11g: up to 54 Mbps, 2.4 GHz, approved in 2003
- IEEE 802.11e: new coordination function for QoS, not yet approved
- IEEE 802.11f: IAPP, inter-AP protocol, approved in 2003
- IEEE 802.11h: use of 5 GHz band in Europe, approved in 2003
- IEEE 802.11i: new encryption standards, approved in 2004
- IEEE 802.11n: MIMO physical layer, not yet approved

Standards are available at http://standards.ieee.org/getieee802/portfolio.html

IEEE 802.11 standards

IEEE 802.11 standards specify MAC and PHY layers. PHY layer is further divided into PLCP (physical layer convergence procedure) and PMD (physical medium dependent) sublayers.

ISO OSI layers
Application
Presentation
Session
Transport
Network
Data link
Physical

IEEE 802 standards
Logical link control (LLC)
Medium access control (MAC)
Physical (PHY)

IEEE 802.11(b)

ISO OSI layers

IEEE 802 standards

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