Mobile Communications

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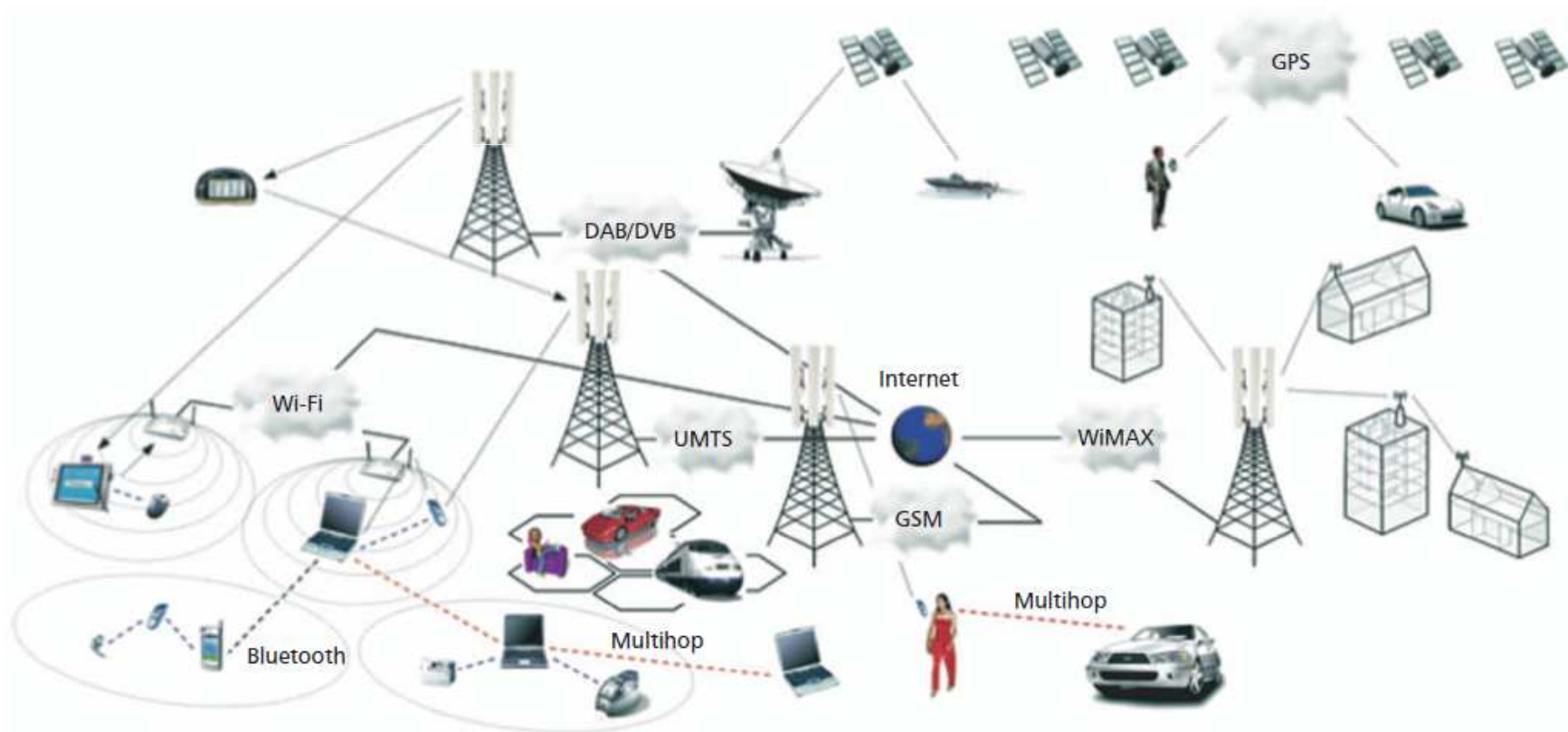
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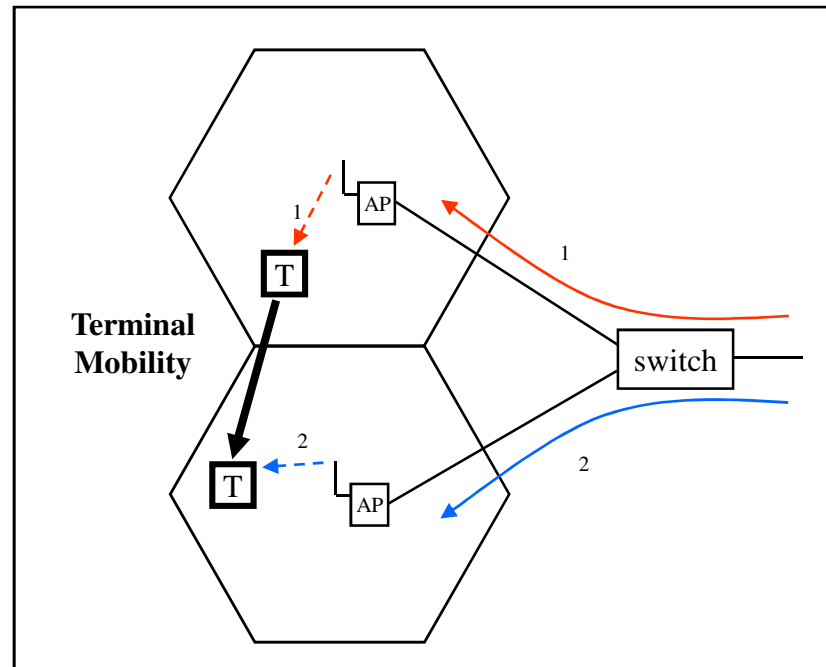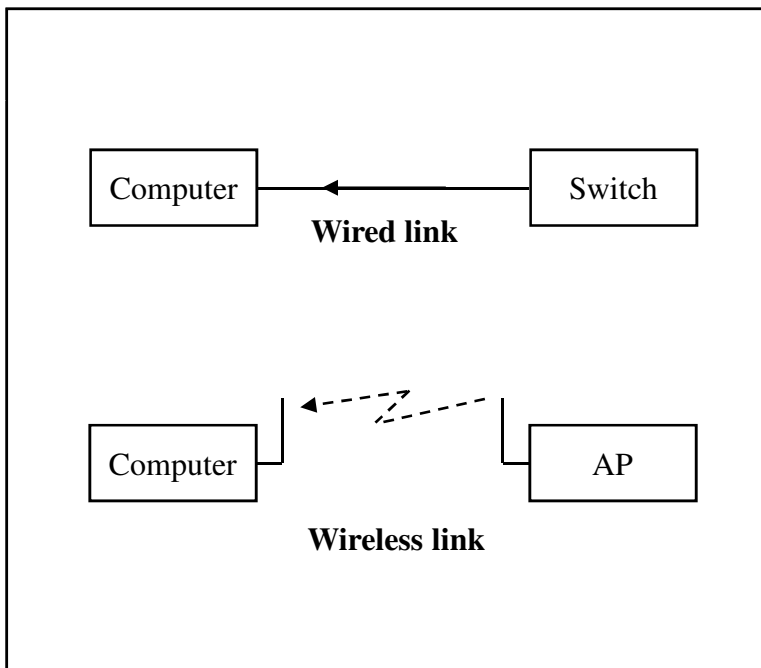What is CMOV about? How does CMOV work?

CMOV

- ◆ About mobile communications systems
- ◆ Addressed from a networking perspective

Mobile vs Fixed networks

♦ Mobile communications systems characterised by

» wireless links

» mobility of terminals

Wireless Link

- ## Susceptible to *noise*

  Ł large % of bits received in error

- ## Broadcast nature

  - Demands security mechanisms
  - Adequate for broadcast services

Mobility

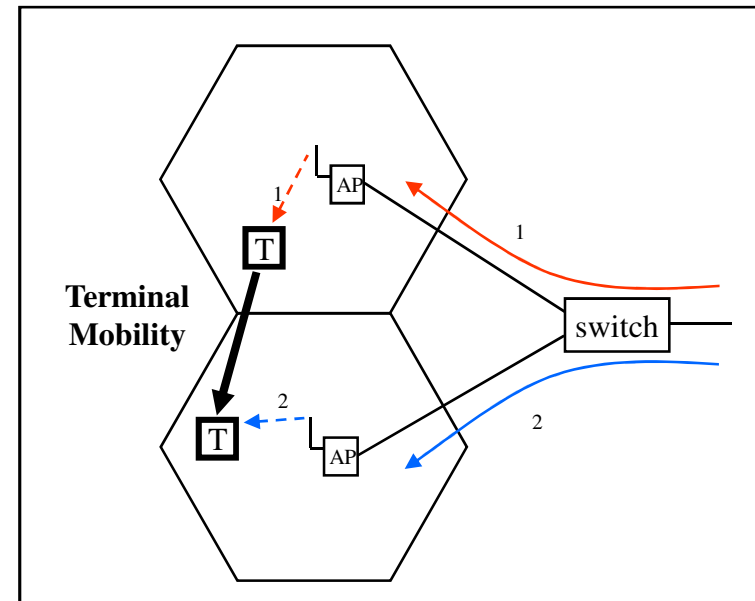♦ **Mobility is a characteristic of portable terminals.**

♦ **Problems introduced by the mobile terminal**

  » determine its new location

  » finding the new path to deliver data

♦ **Networks do also move!**
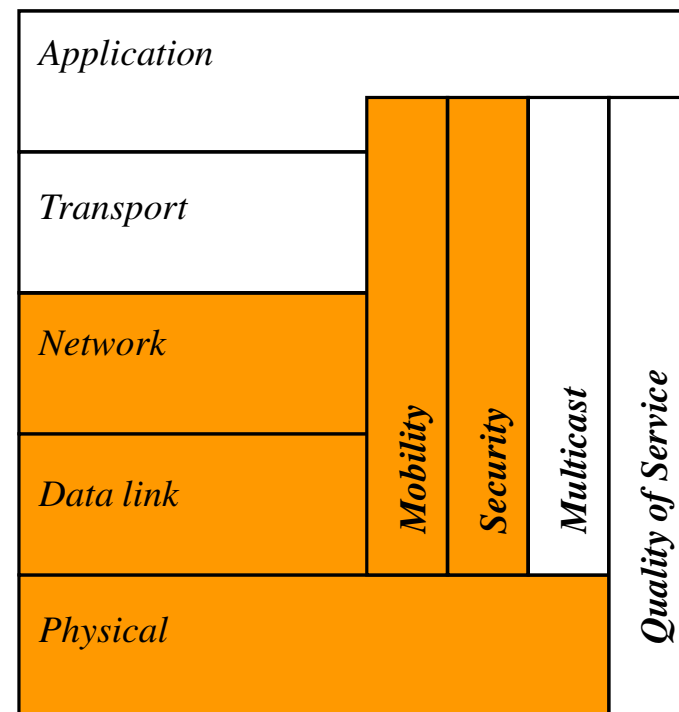
  » Personal or vehicle network

Terminal Mobility

To Think About

1. Wireless link: How to proceed to obtain low Bit Error Ratio?

2. How to manage the terminal mobility?

Layers and Functions Addressed in CMOV

- ## Layers
  - Physical
  - Data Link
  - Network

- ## Management Functions
  - Mobility
  - Security

Application				
Transport				
Network				
Data link	Mobility	Security	Multicast	Quality of Service
Physical				

Program (1/3)

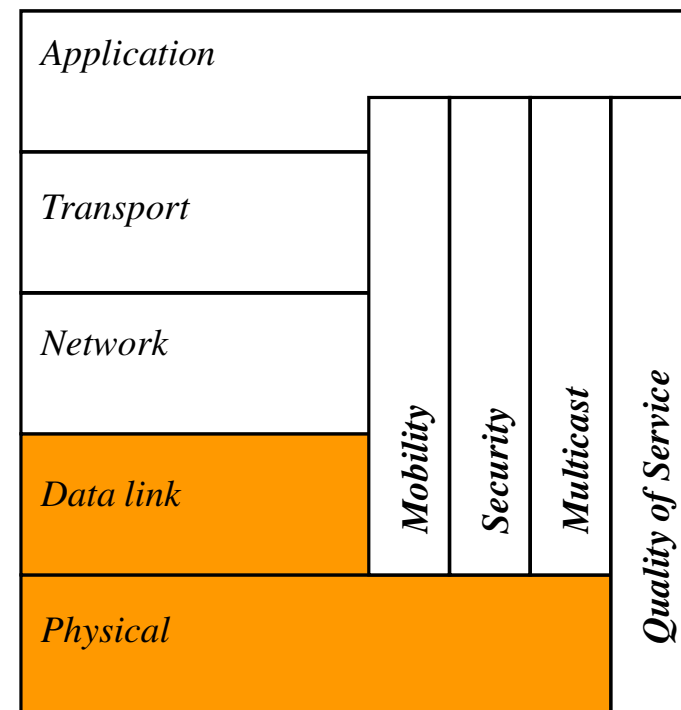- Characteristics of mobile communications systems
  - » History
  - » Standardization bodies
  - » Reference models

- Wireless Transmission
  - » Frequency allocation
  - » Propagation models
  - » Modulations
  - » Codification
  - » Adaptive techniques
  - » Ultra Wide Band

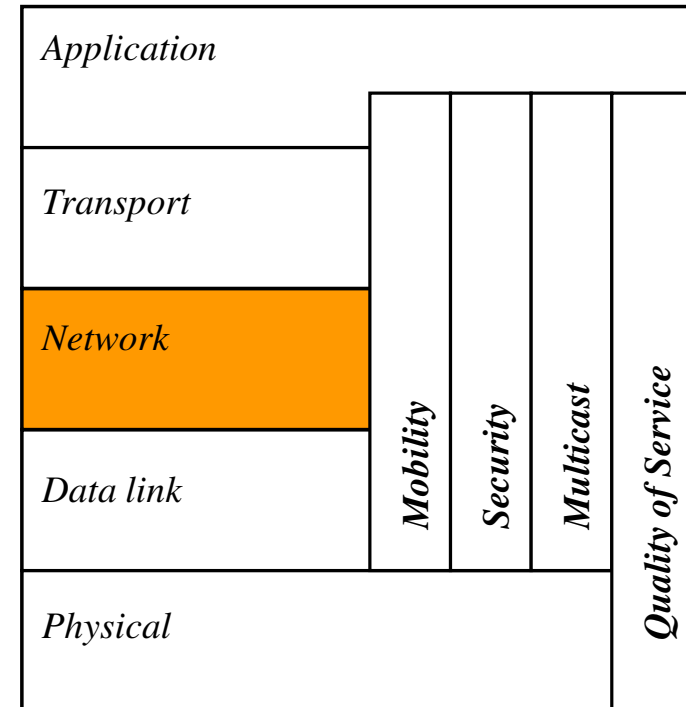- Data link layer
  - » Duplex transmission
  - » Multiple access techniques
  - » Logical link control
  - » Multi-hop logical links

Application				
Transport				
Network	*Mobility*	*Security*	*Multicast*	*Quality of Service*
Data link				
Physical				

Program (2/3)

♦ Networks over wireless links
  » Layer 2 vs layer 3
  » Tunnel techniques; network configurations
  » IPv6; address autoconfiguration
  » Properties of routing protocols
  » TCP over wireless networks

♦ Case studies
  » IEEE Networks
    – 802.11 (WLAN)
    – 802.15 (WPAN, sensors)
    – 802.16 (WMAN)

  » Telecommunication systems
    – GSM, TETRA
    – GPRS, UMTS
    – DVB, Satellite

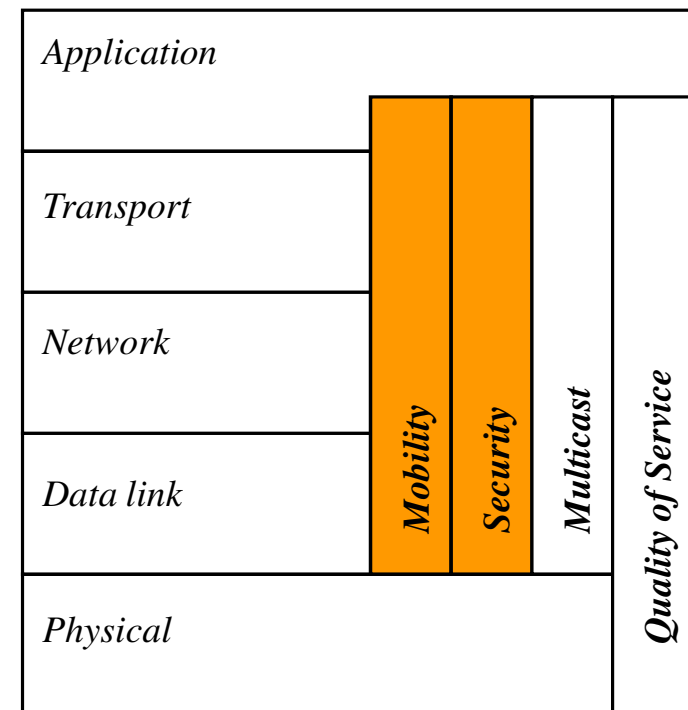| Application				
Transport				
Network	*Mobility*	*Security*	*Multicast*	*Quality of Service*
Data link				
Physical				

Program (3/3)

- ◆ Mobility management
  - » Models
  - » Case studies
    - from 3GPP, IEEE, and IETF networks
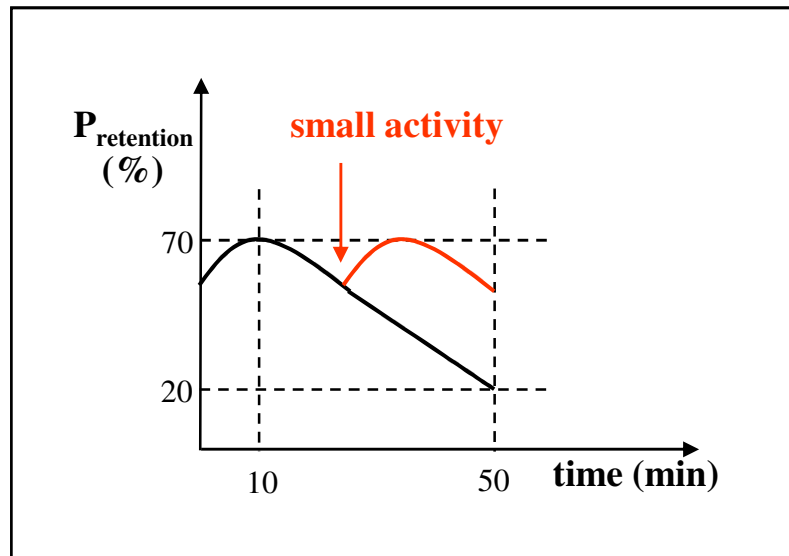 - » Network mobility
  - » Ad-hoc and mesh networks

- ◆ Security management
  - » Models for
    - authentication, encryption and access control
  - » Case studies
    - from 3GPP and IEEE networks

Application				
Transport				
Network				
Data link	*Mobility*	*Security*	*Multicast*	*Quality of Service*
Physical				

Aulas Teóricas

- Tutorial style - used to present new topics
- Oriented to the fundamentals
- Additional reading required!

- Students expected to participate in small activities

Aulas Laboratoriais

- ◆ 6 labs
  - » Lab1 - Issues on Wireless Transmission
  - » Lab2 – Indoor radio planning
  - » Lab3 - Wireless Networking
  - » Lab4 - Wireless Networking with mobility support
  - » Lab5 - Ad-hoc network using OLSR
  - » Lab6 - Secure Wireless Home Network

Evaluation

- ♦ Frequência
  - » Based on the laboratory works
  - » Mean laboratory classification >= 8.0 valores

- ♦ Nota Final

```
notaFinal= 0.4 * frequência + 0.6 * prova ,
  provided prova >= 9.0 valores
```