

# Information Technology

2023-2024  
Spring Semester

» Mobile and Sensor Networks

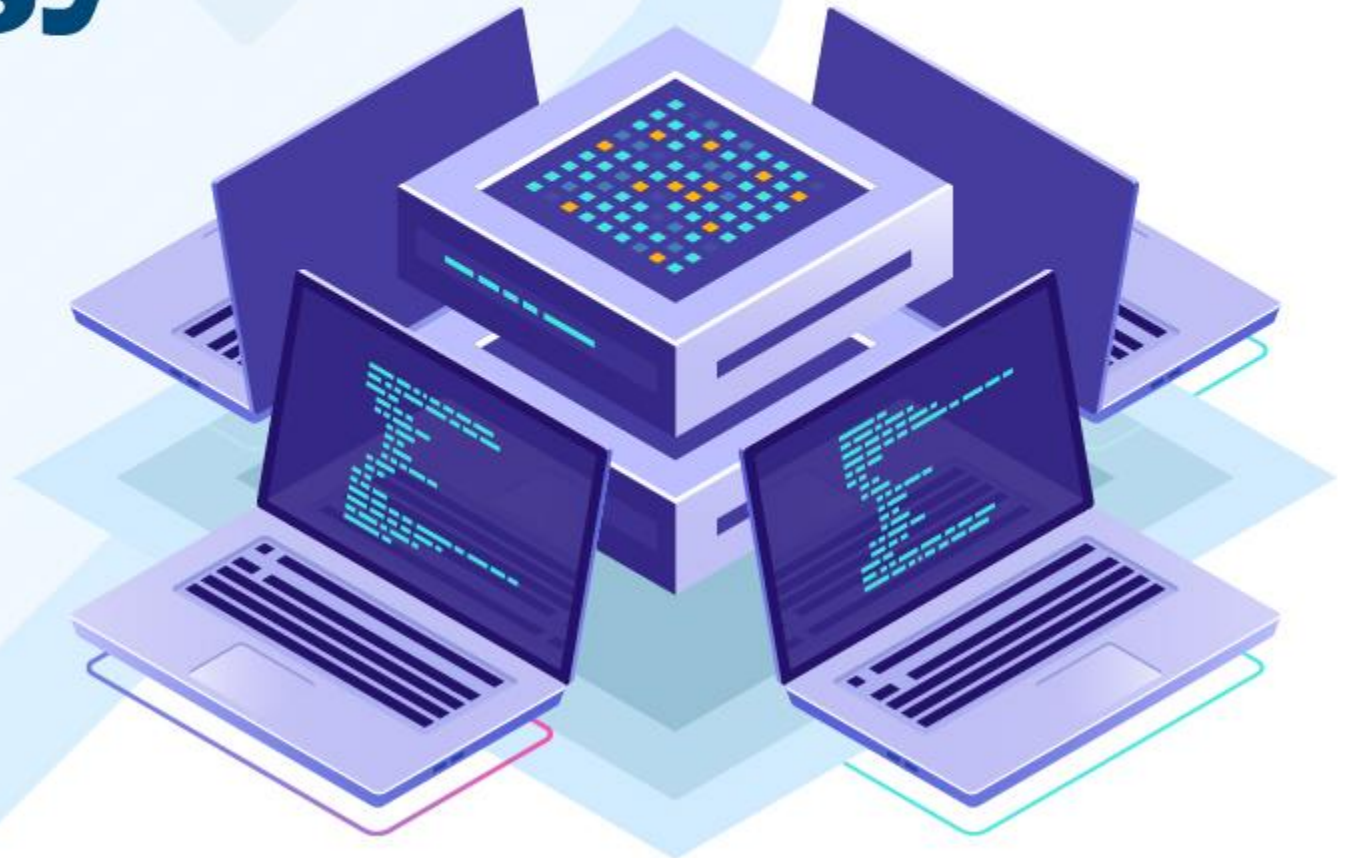
» Dr. Ahmed Abdelreheem

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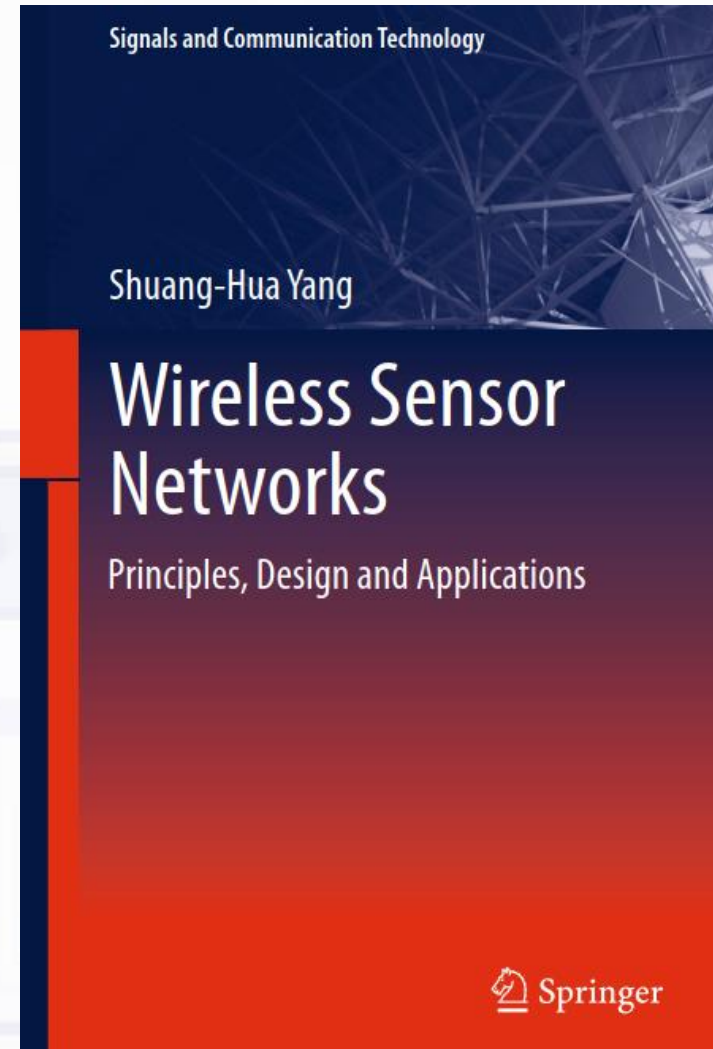
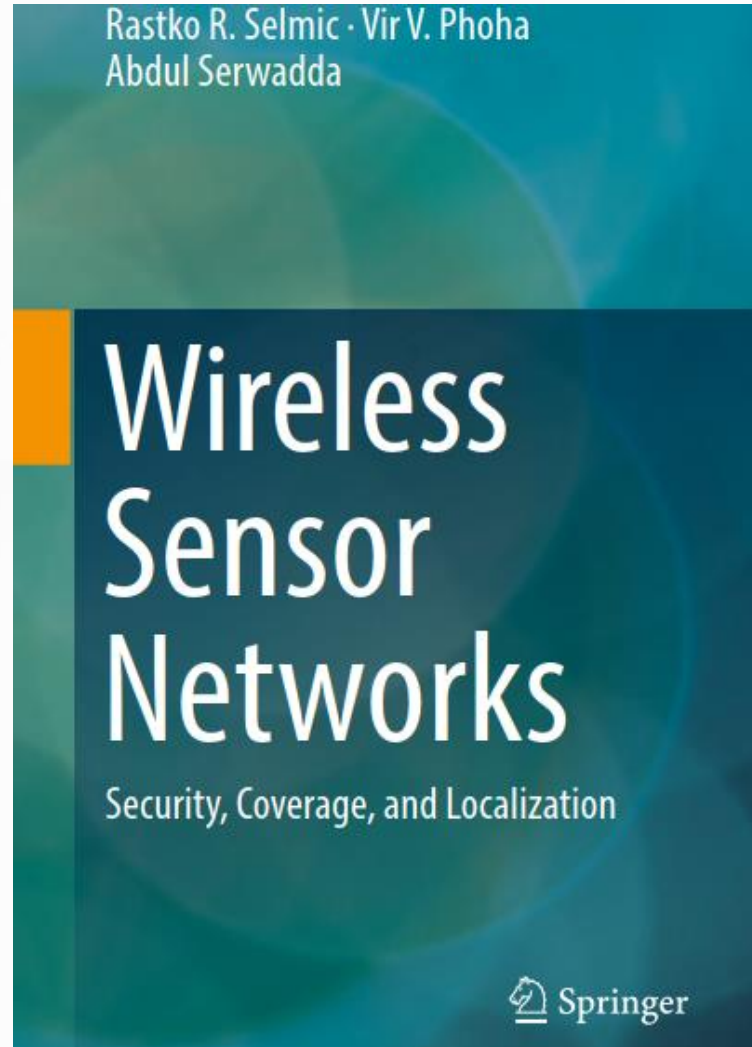
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## References



# Basic Course Information

- Course code: NWE407
- Course name: Mobile and Sensor Networks
- Level: Four Year / B.Sc.
- Course Credit: 3 credits
- Instructor: Dr. Ahmed Abdelreheem

## Assessment method

Activity	%
assignments	5
Quizzes	20
Tutorial and Lab Attendance Performance and Interaction (electronic and physical)	5
Mid -Term Exam	20
Final Exam	50
Total	100

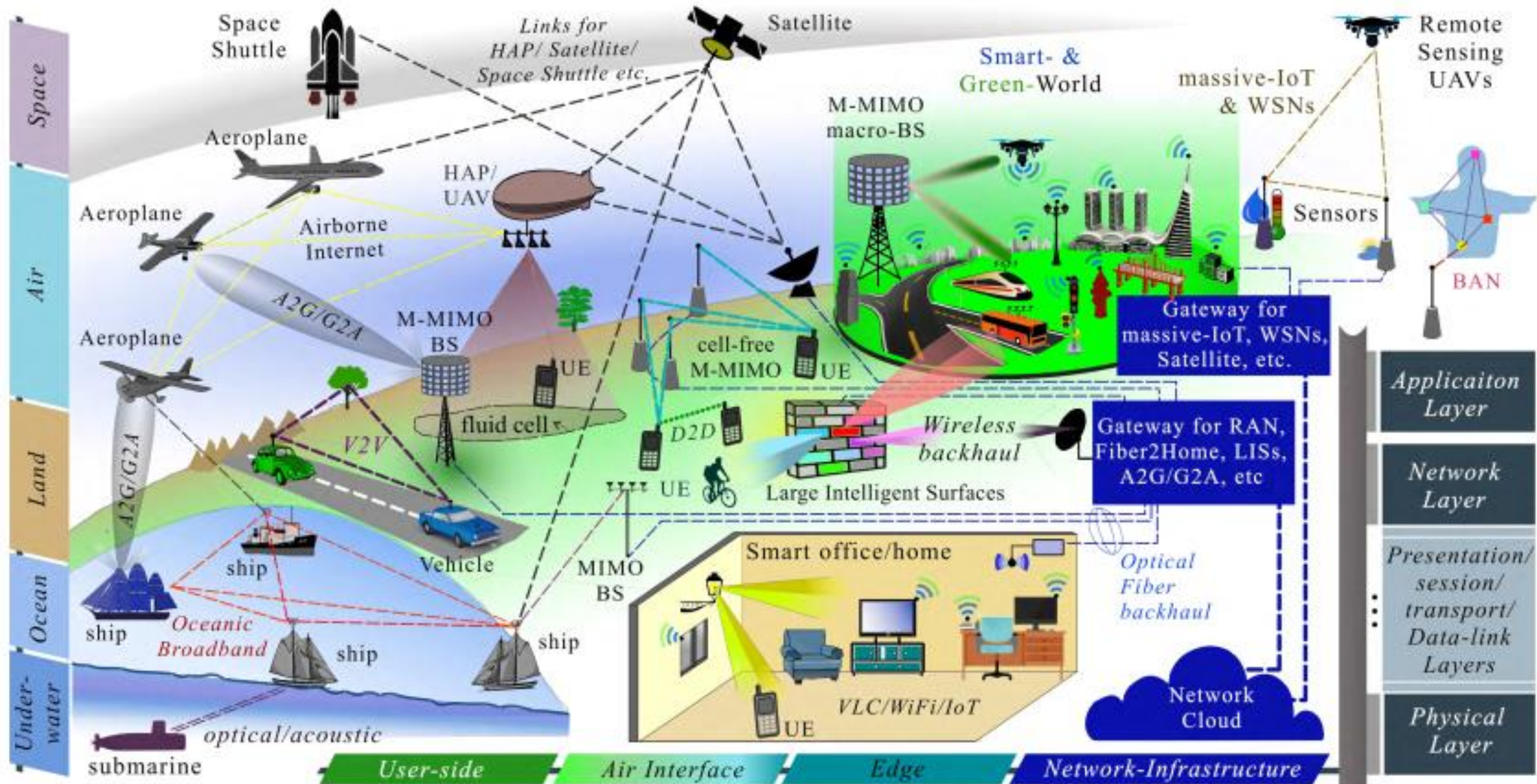
# Outlines

- **Module 01: Introduction and history of wireless networks**
- **Module 02: Wireless Physical and Mac Layers**
- **Module 03: Mobile Network Layer**
- **Module 04: Cellular Technology Concepts and Standards**
- **Module 05: Case Studies: WLAN and Sensor Networks**

# Outlines

- **Module 01: Introduction and history of wireless networks**
- Module 02: Wireless Physical and Mac Layers
- Module 03: Mobile Network Layer
- Module 04: Cellular Technology Concepts and Standards
- Module 05: Case Studies: WLAN and Sensor Networks

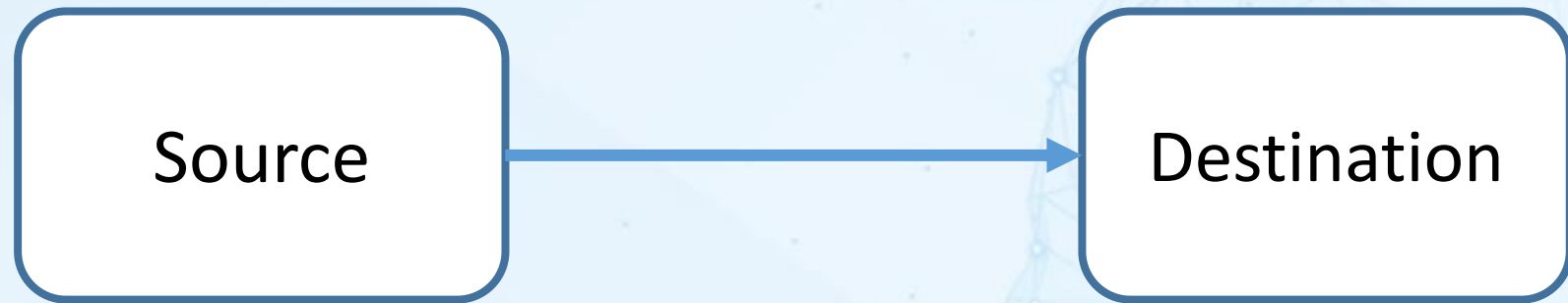




M-IoT, M-MIMO, tiny-cells, cell-free, fluid cells, mmWave, multiterahertz, VLC, SD fluid antennas, LISs, V2X, D2D, mMTC, MEC, NOMA, intelligent caching, energy harvesting, wireless backhaul, UAVs/satellites/airborne/underwater/oceanic, etc

# Introduction to Communication System

- **Communications** is the Process of Transmitting Information from a Source to a Destination

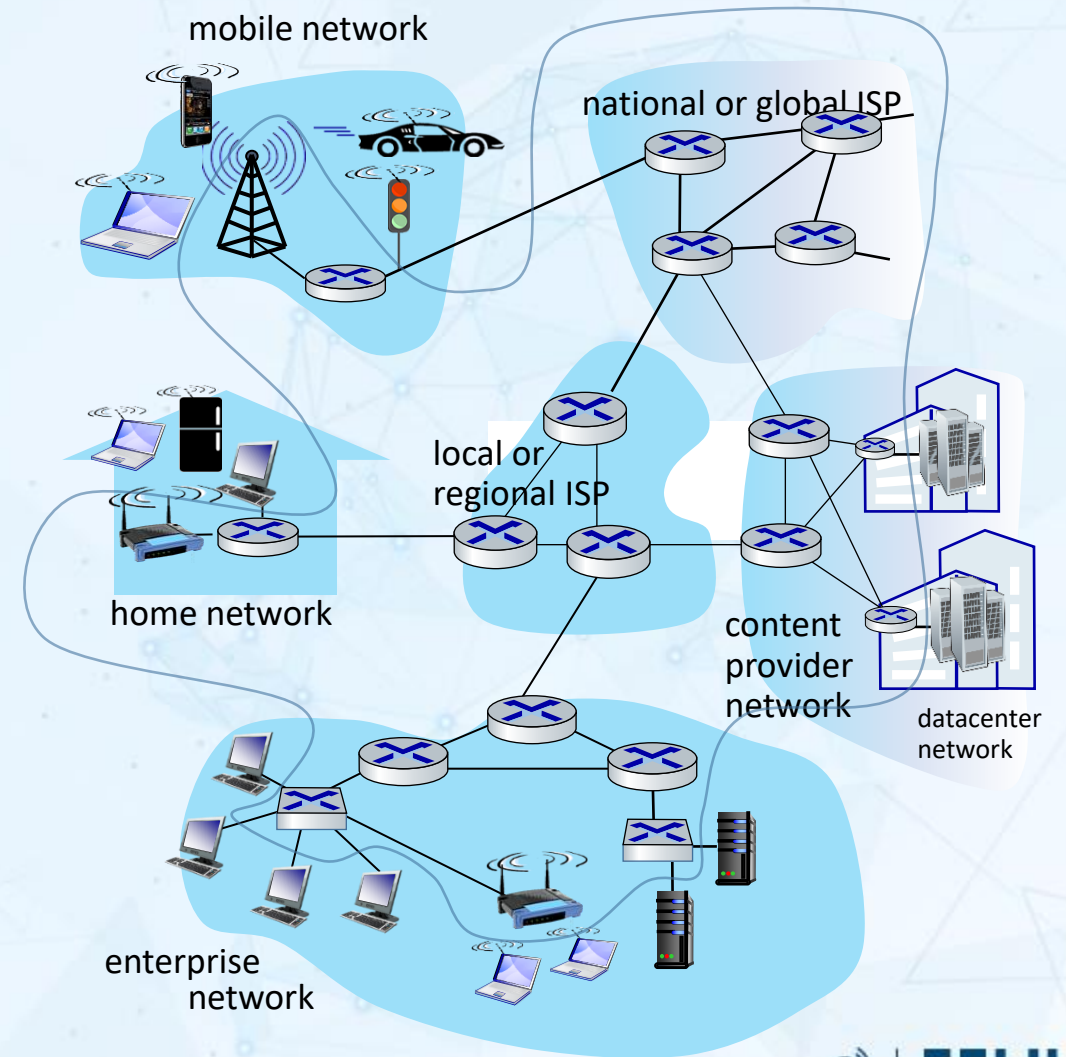
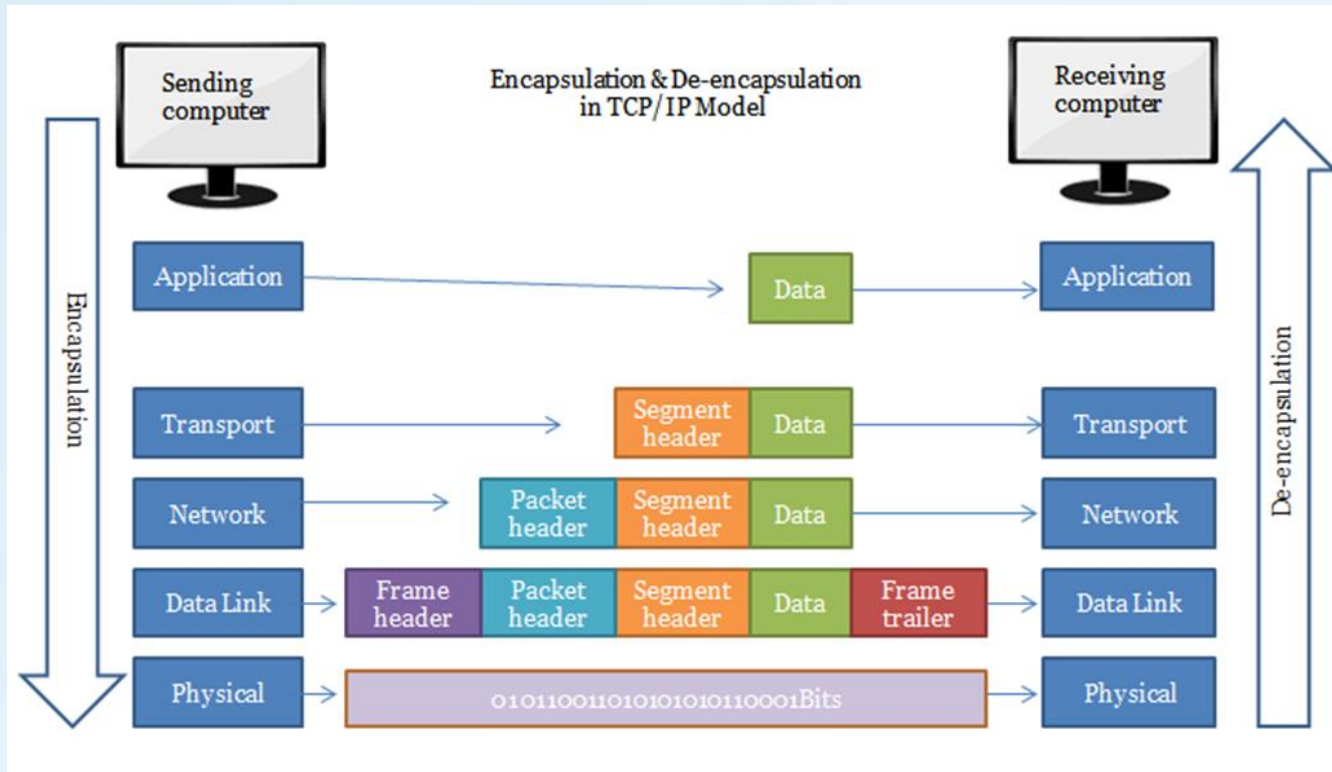


- **Example of typical communication systems**

1. Wire-line telephone
2. **Cellular phone**
3. TV broadcasting system
4. **IEEE 802.11 Wireless LAN(WLAN)**
5. **Satellite communications.**

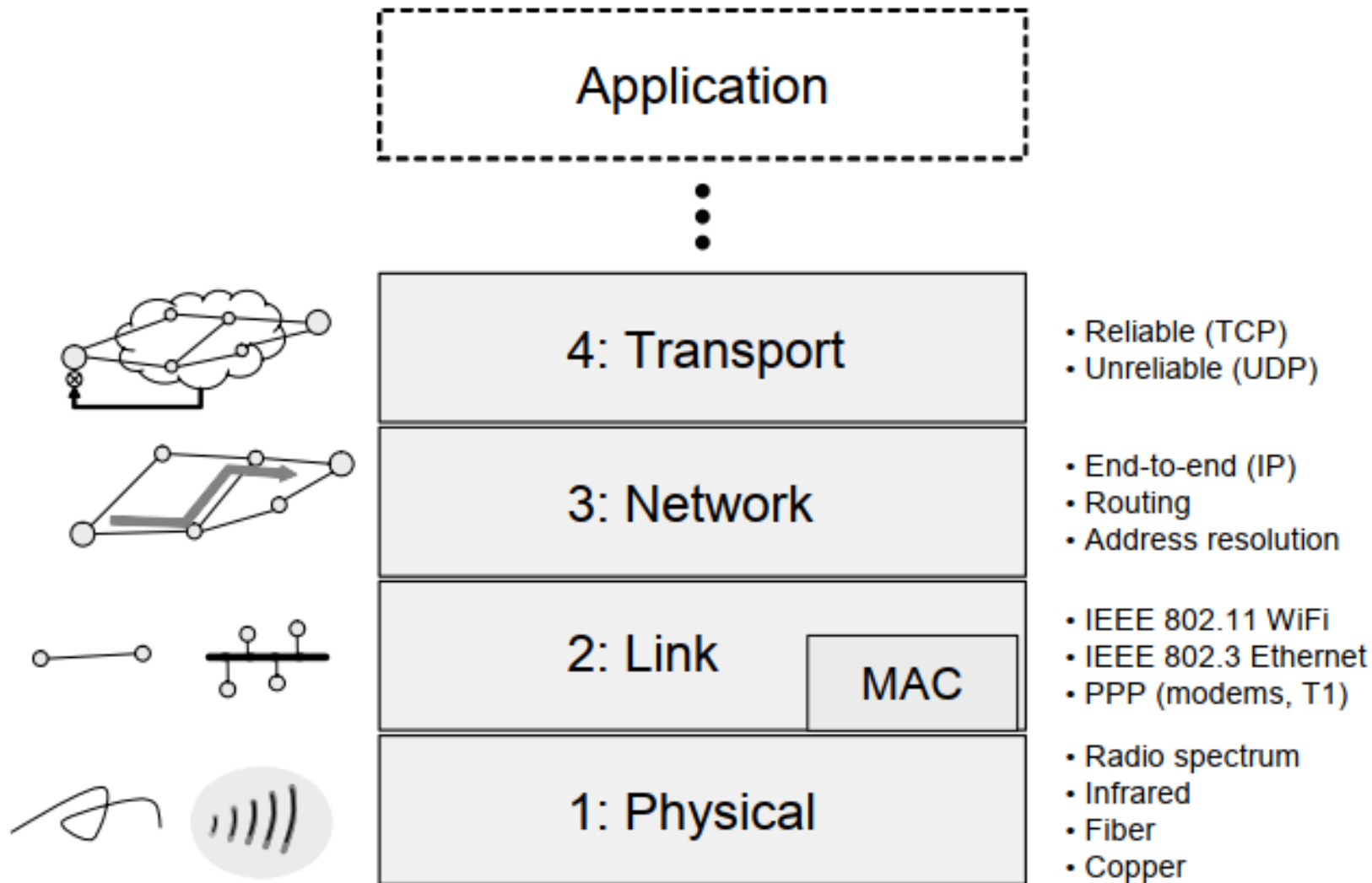


# Introduction to Communication System

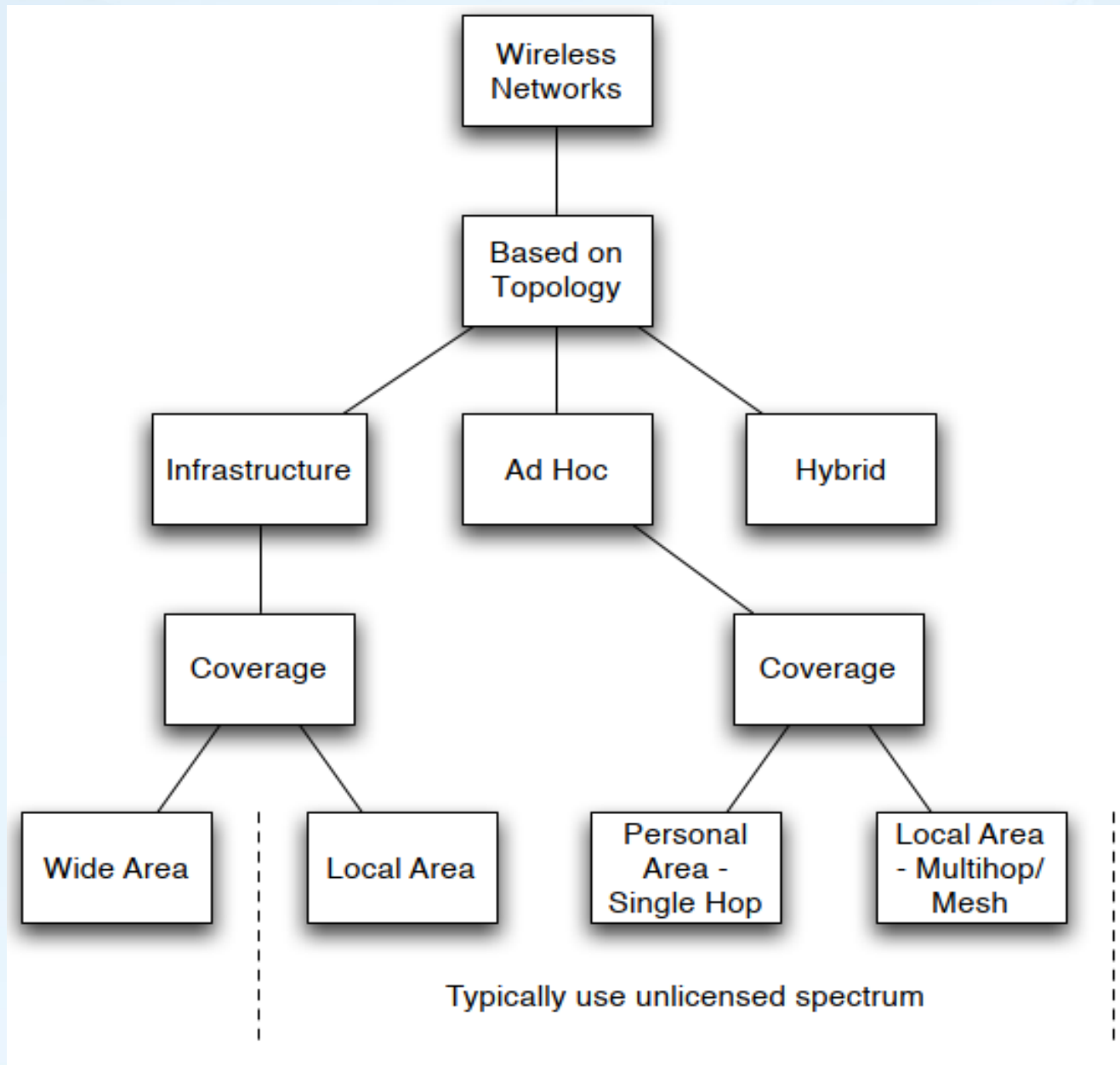




# Introduction to Communication System



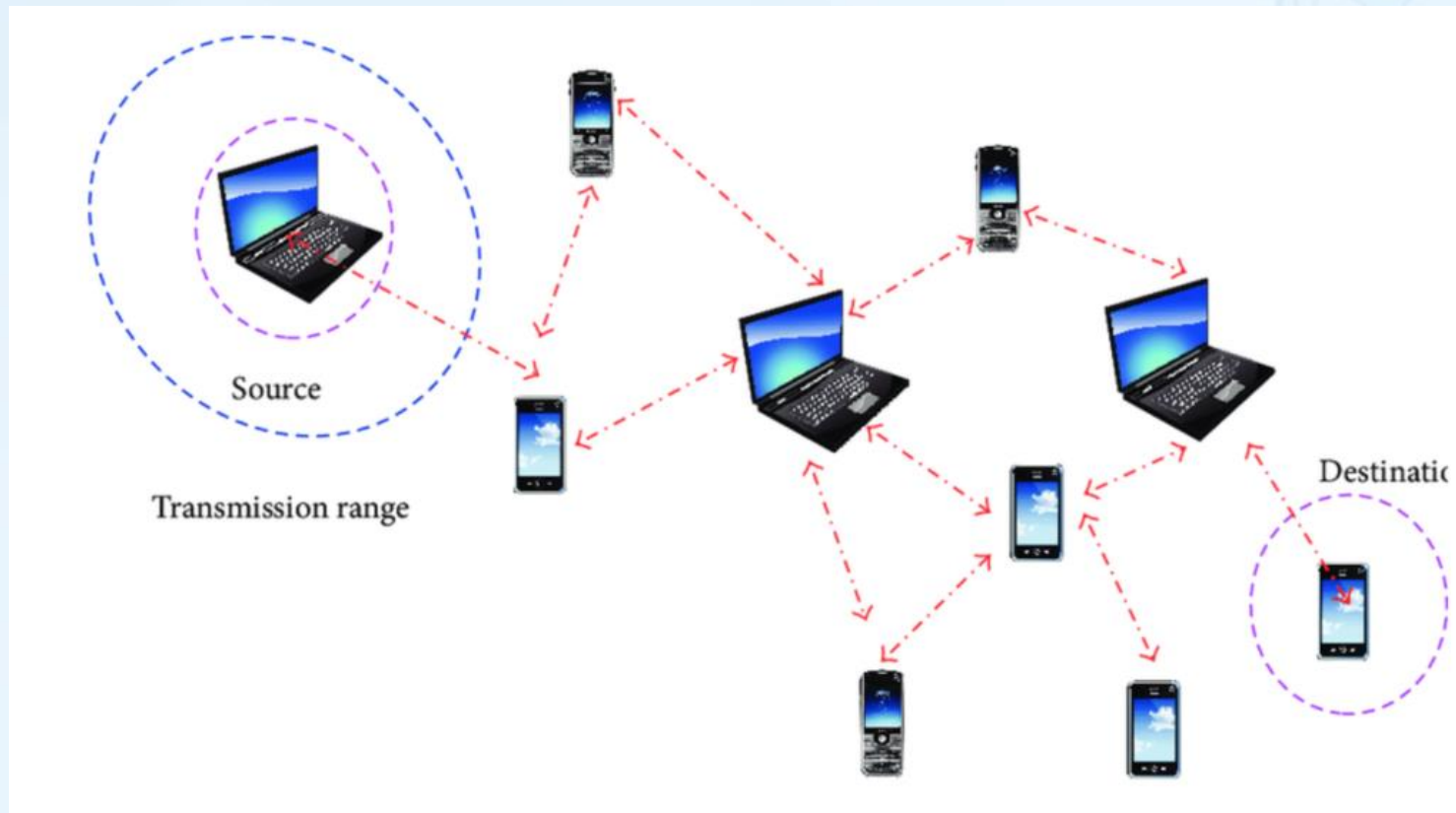
# Types of Wireless Networks



# Types of Wireless Networks

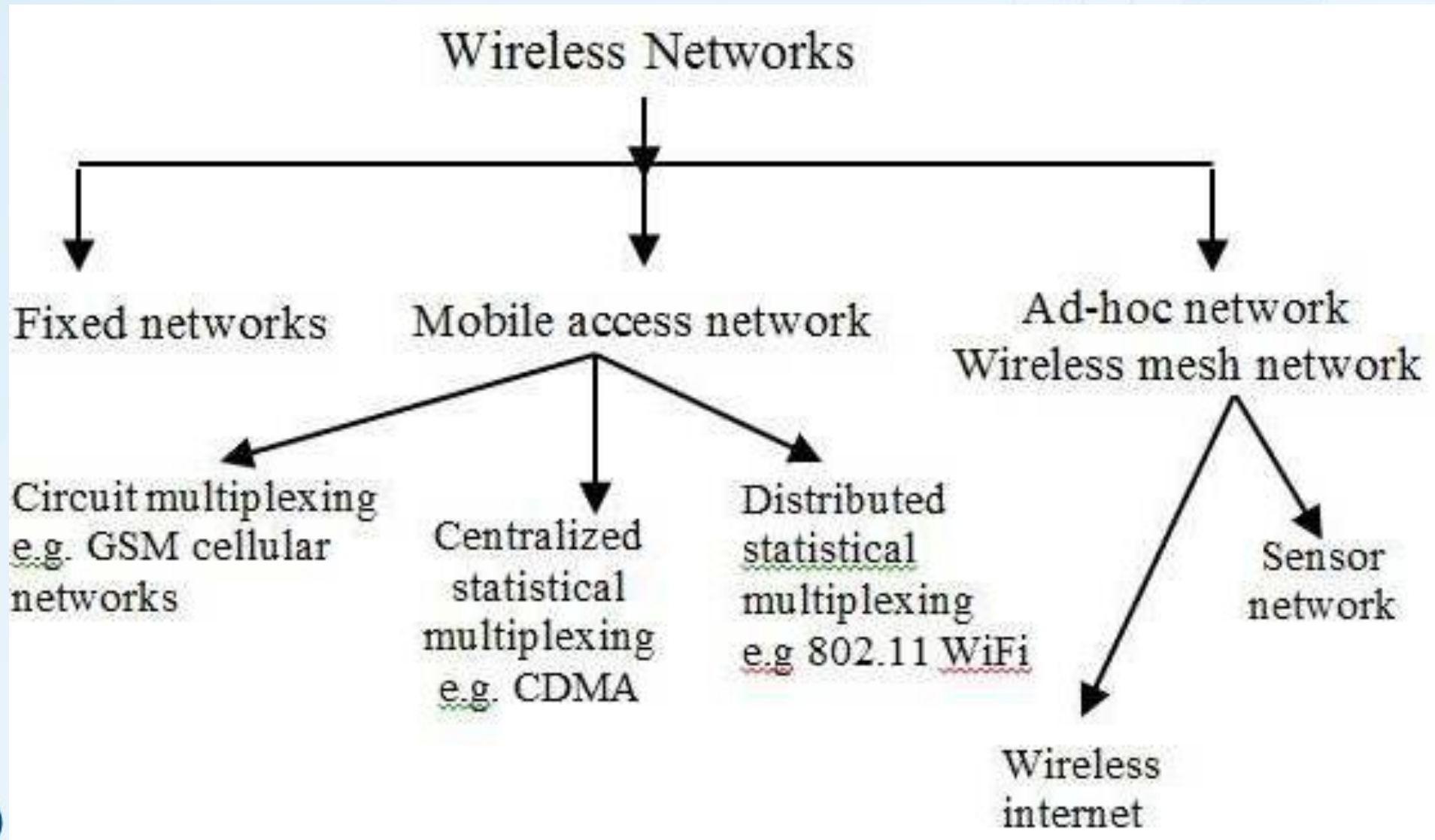
**Ad hoc networks :** Ad hoc literally means “for this purpose” in Latin.

have no pre-existing (fixed) infrastructure and the network architecture is configurable. They are formed by wireless stations which may be mobile and they route paths for each other. Every station in an ad hoc network can be set up as, and play the role of, a base station where it can directly transmit and receive from other stations in the network. Packets may need to traverse multiple links to reach a destination. Due to the mobility, the routes between stations may change dynamically. Ad hoc network can co-exist and co-operate, i.e., exchange data packets, with an infrastructure-based network.





# Types of Wireless Networks

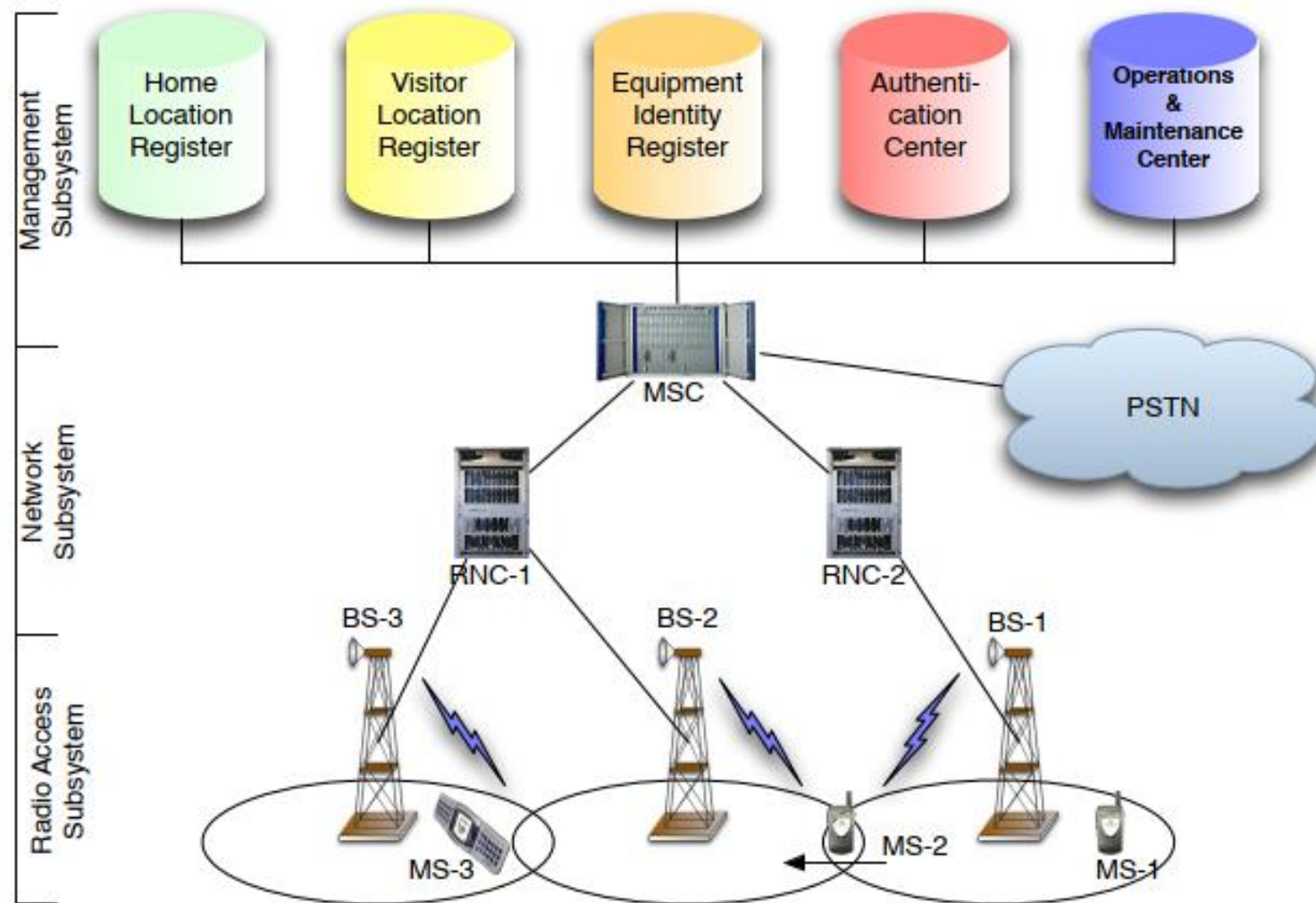


# Fixed network architecture

## Public Switched Telephone Network



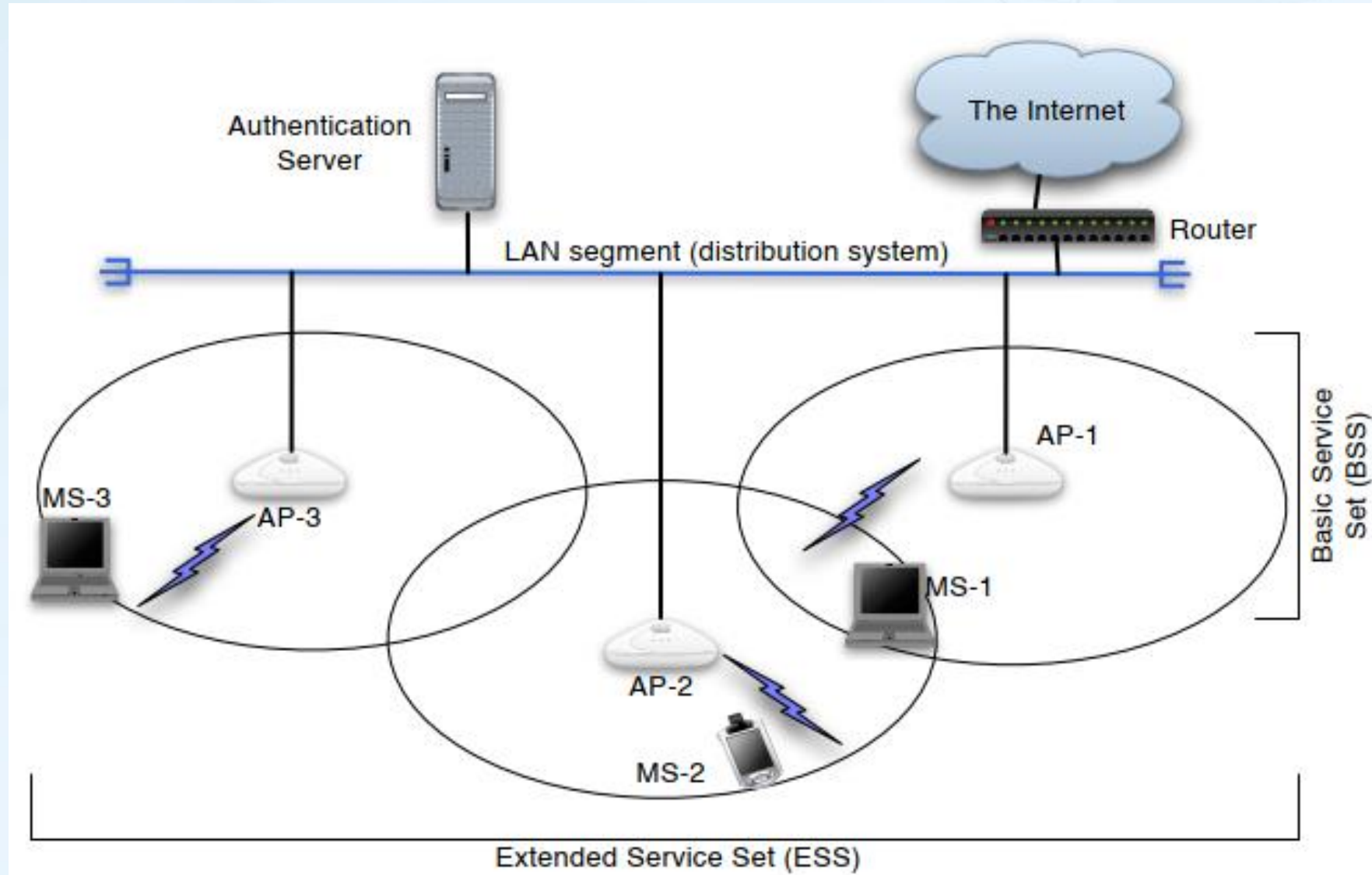
# Cellular network architecture



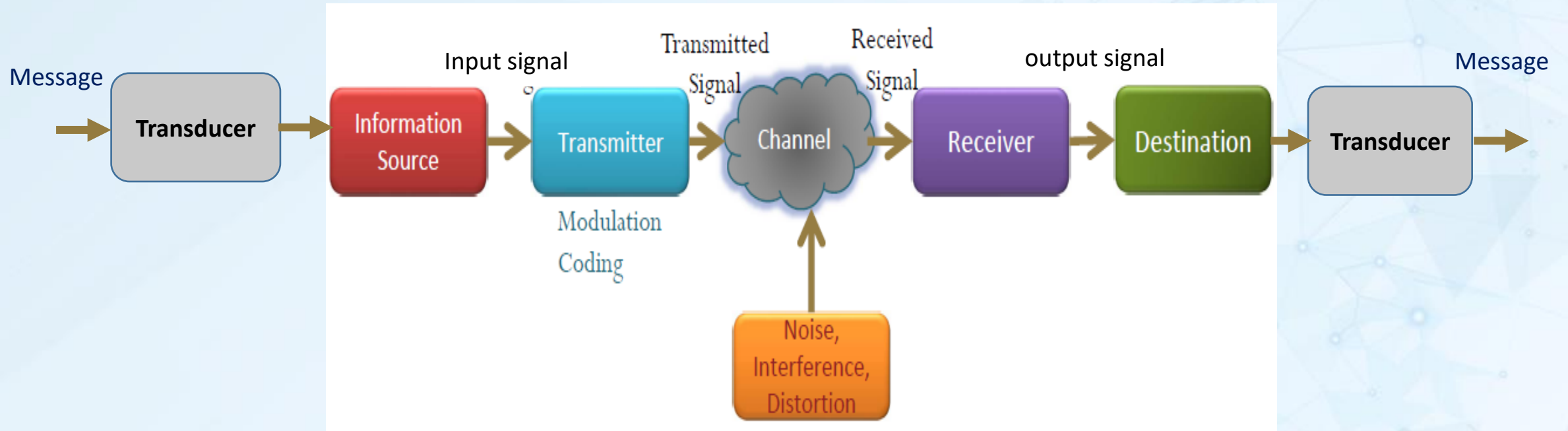
A general cellular network architecture



# WIRELESS LOCAL AREA NETWORKS (WLAN)

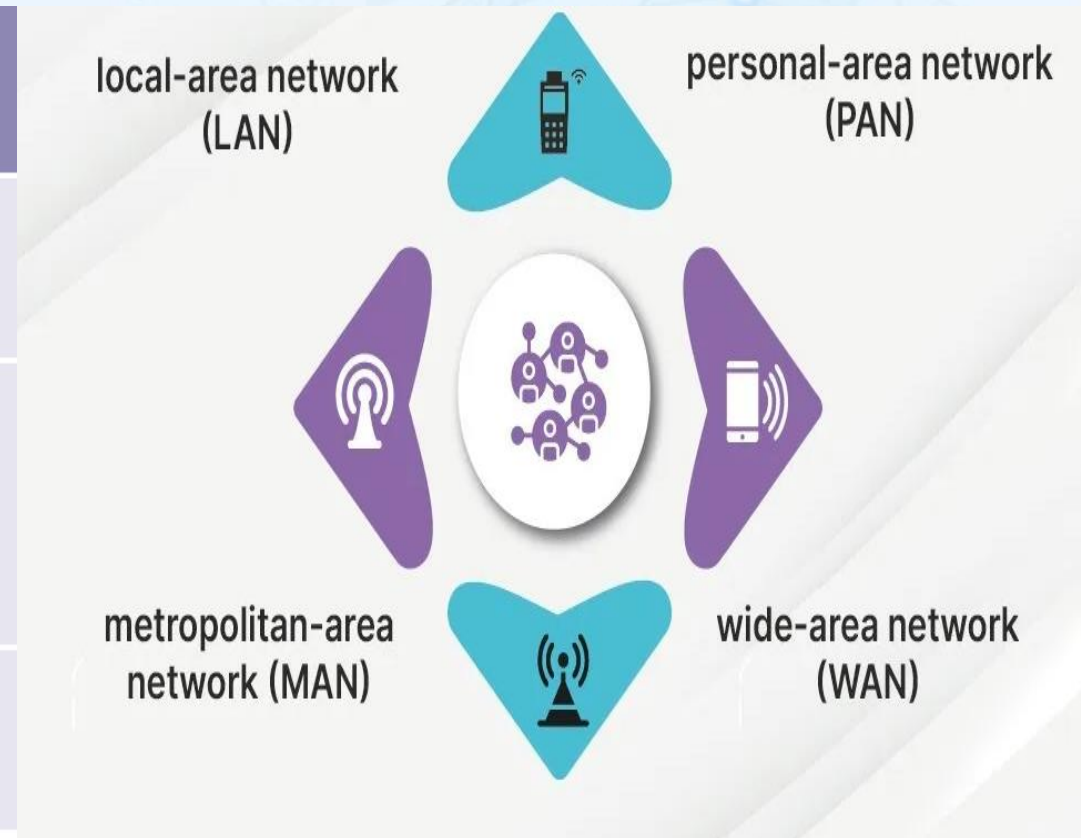


# Introduction to Communication System



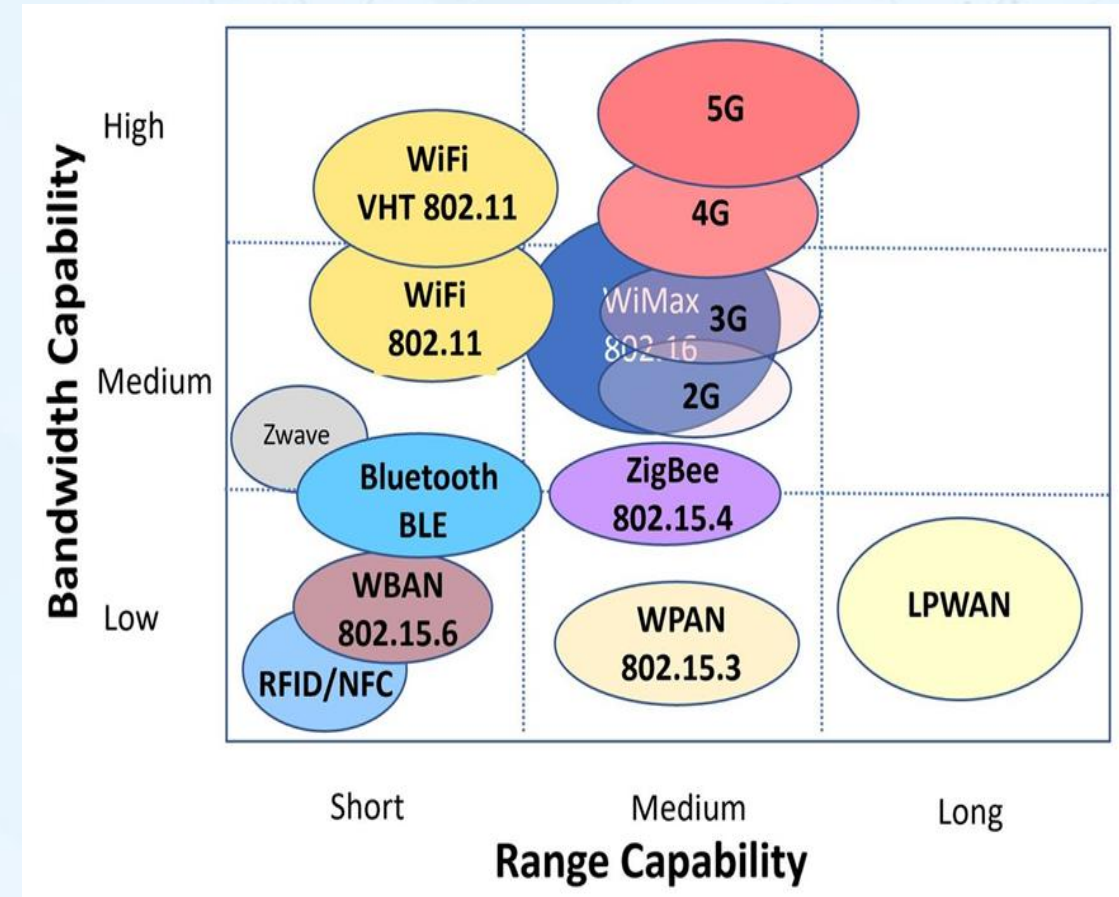
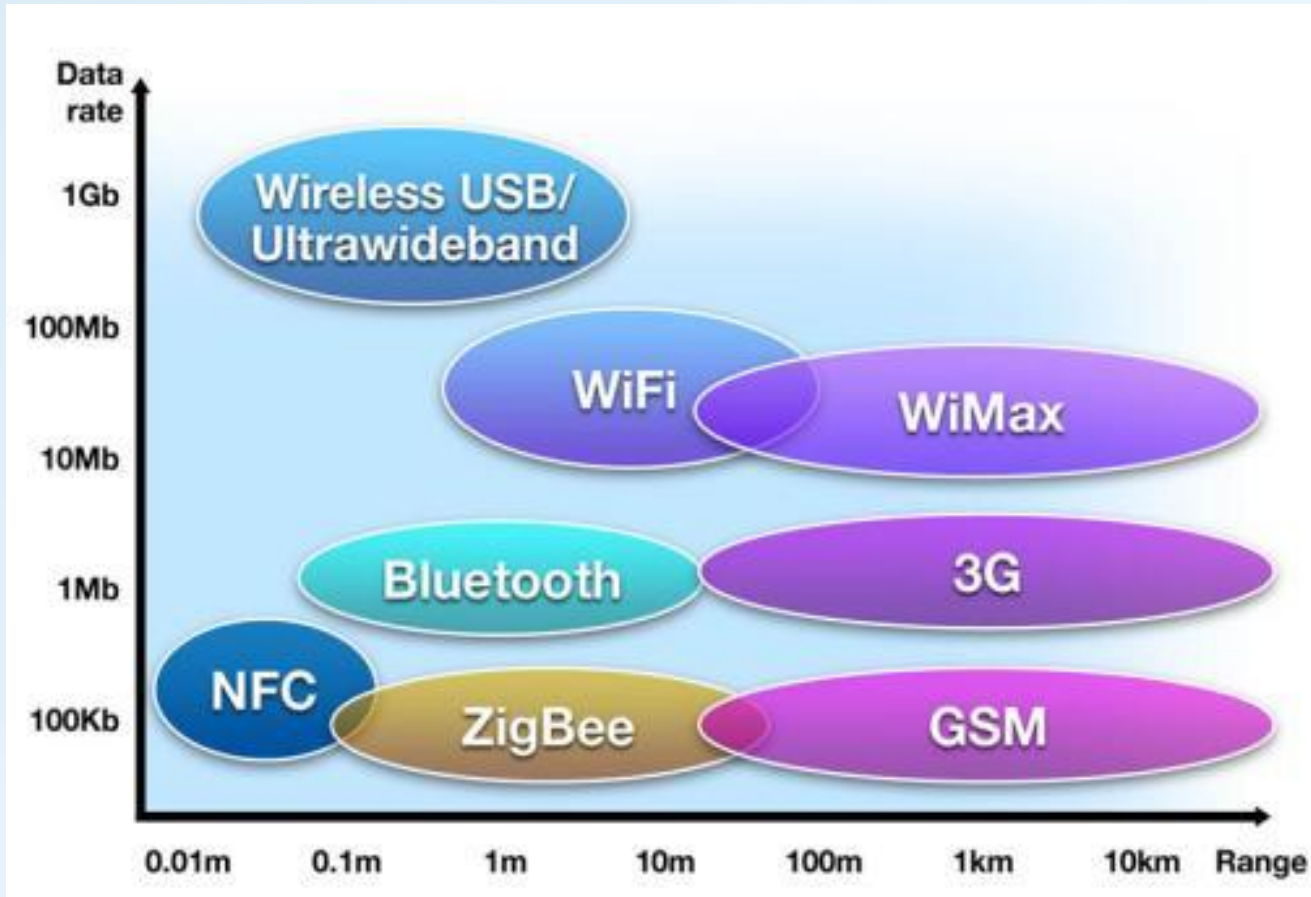
# Types of Wireless Networks

Wireless LAN (WLAN)	Wireless MAN (WMAN)	Wireless PAN (WPAN)	Wireless WAN (WWAN)
Local area network	Metropolitan area network	Personal area network	Wide area network
Provide internet access within a building or limited outdoor area	Provide access outside office and home networks, typically regional	Transmit signals between devices in limited areas, typically 100 meters	Provide access outside the range of WLANs and WMANs
Cellular	IEEE 802.16 WiMax	Bluetooth, Zigbee and infrared	LTE

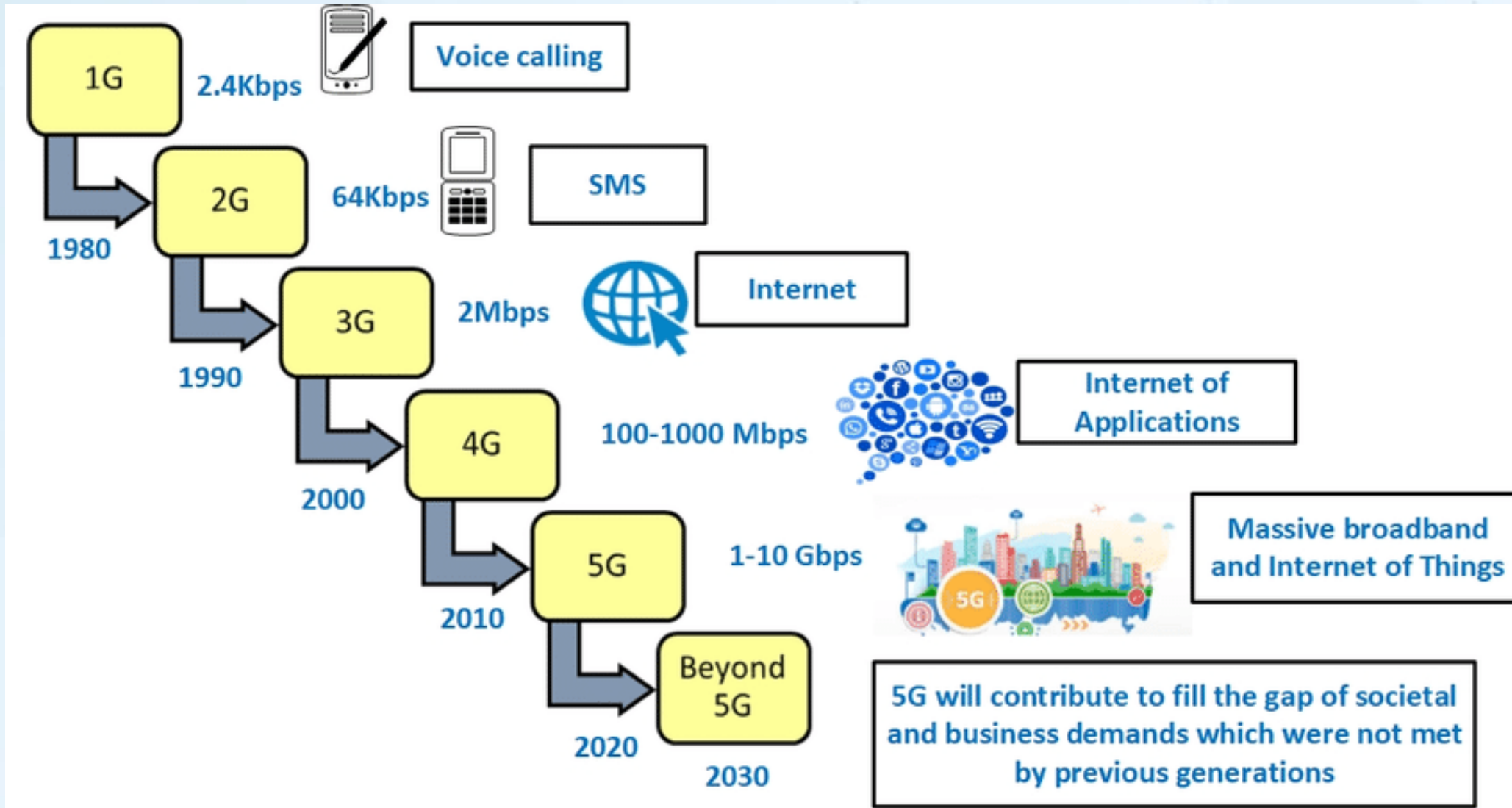




# Types of Wireless Networks



# Mobile Communication Generations





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## THANK YOU FOR WATCHING

### QUESTIONS?

