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Data Communication CS601 Lecture No 35

Lecture Prepared By

Muhammad Abid Ali

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CS601 Lecture No 35 Topic 205 to 212

Wireless communication

- **Wireless communication is one of the fastest-growing technologies**
- **The demand for connecting devices without the use of cables is increasing everywhere**

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- **Wireless LANs can be found on college campuses, in office buildings, and in many public areas**

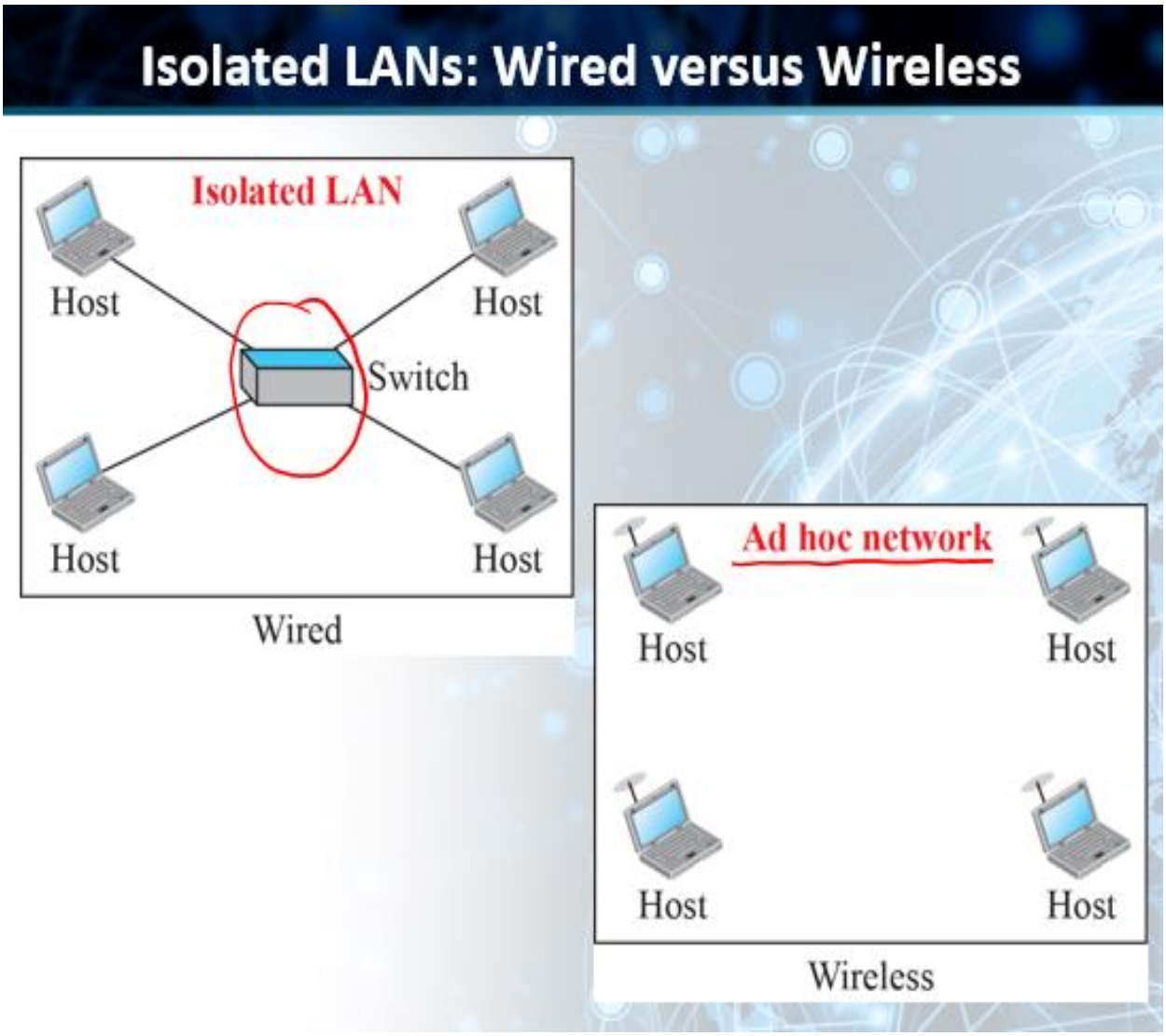
Architectural Comparison

- **Architecture comparison of wired and wireless LANs**
  - ✓ **Medium**
  - ✓ **Hosts**
  - ✓ **Isolated LANs**
  - ✓ **Connection to other Networks**
  - ✓ **Moving between Environments**

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Characteristics of a Wireless LAN

- **Several characteristics of wireless LANs either do not apply to wired LANs or the existence of these is negligible and can be ignored**
  - ✓ **Attenuation**
  - ✓ **Interference**
  - ✓ **Multipath Propagation**

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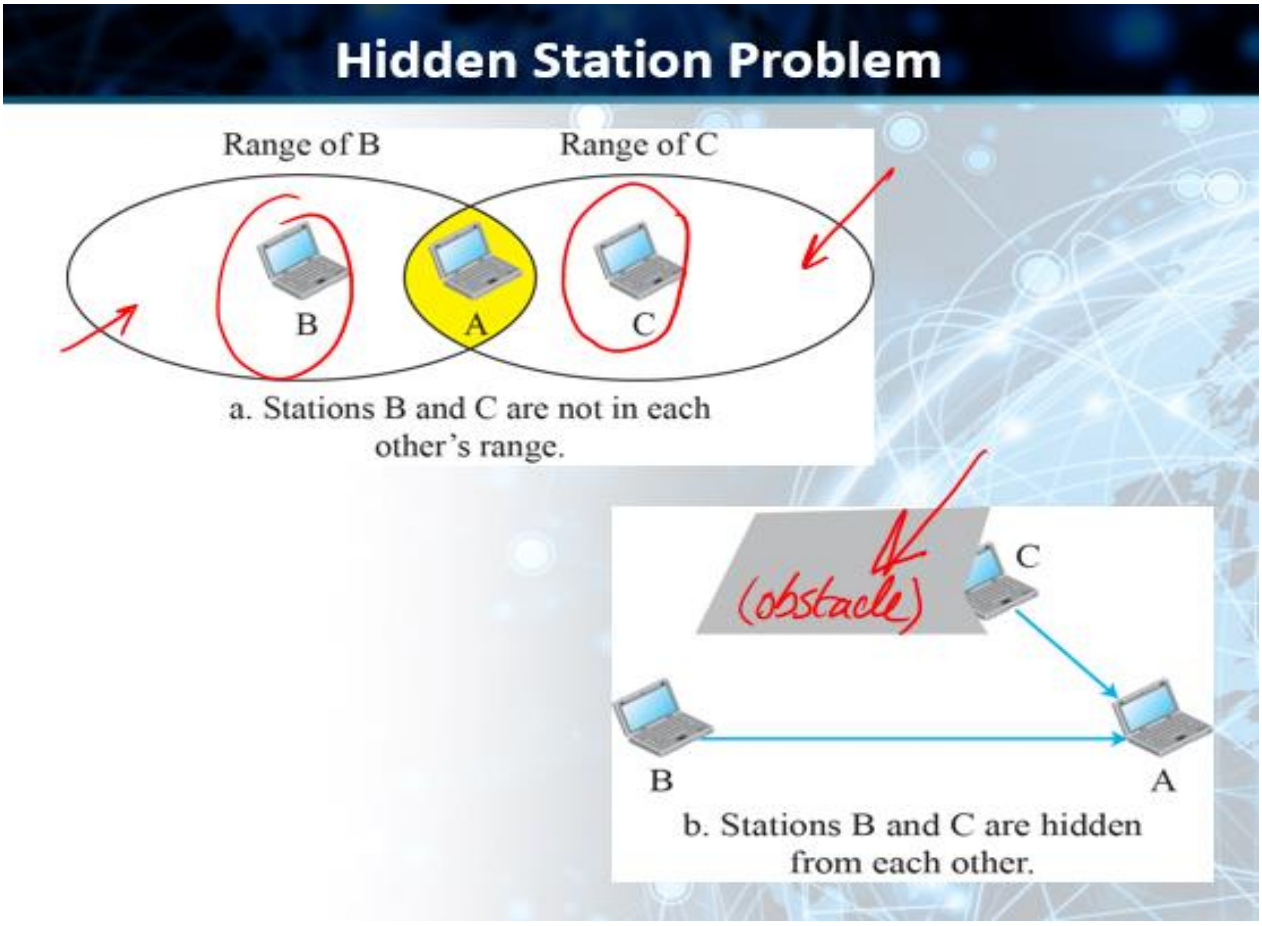
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- ✓ **Error**

Access Control

- **Most important issue in a wireless LAN is how a wireless host can get access to the shared medium (air)**
- **CSMA/CD does not work in wireless LANs for three reasons:**
    1. **Wireless hosts don't have power to send and receive at the same time**
- **The hidden station problem prevents collision detection**
- **The distance between stations can be large**



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IEEE 802.11 PROJECT

- **IEEE has defined the specifications for a wireless LAN, called IEEE 802.11, which covers the physical and data-link layers**
- **It is sometimes called Wireless Ethernet**
- **The term WiFi (short for wireless fidelity) as a synonym for wireless LAN (certified by WiFi alliance)**

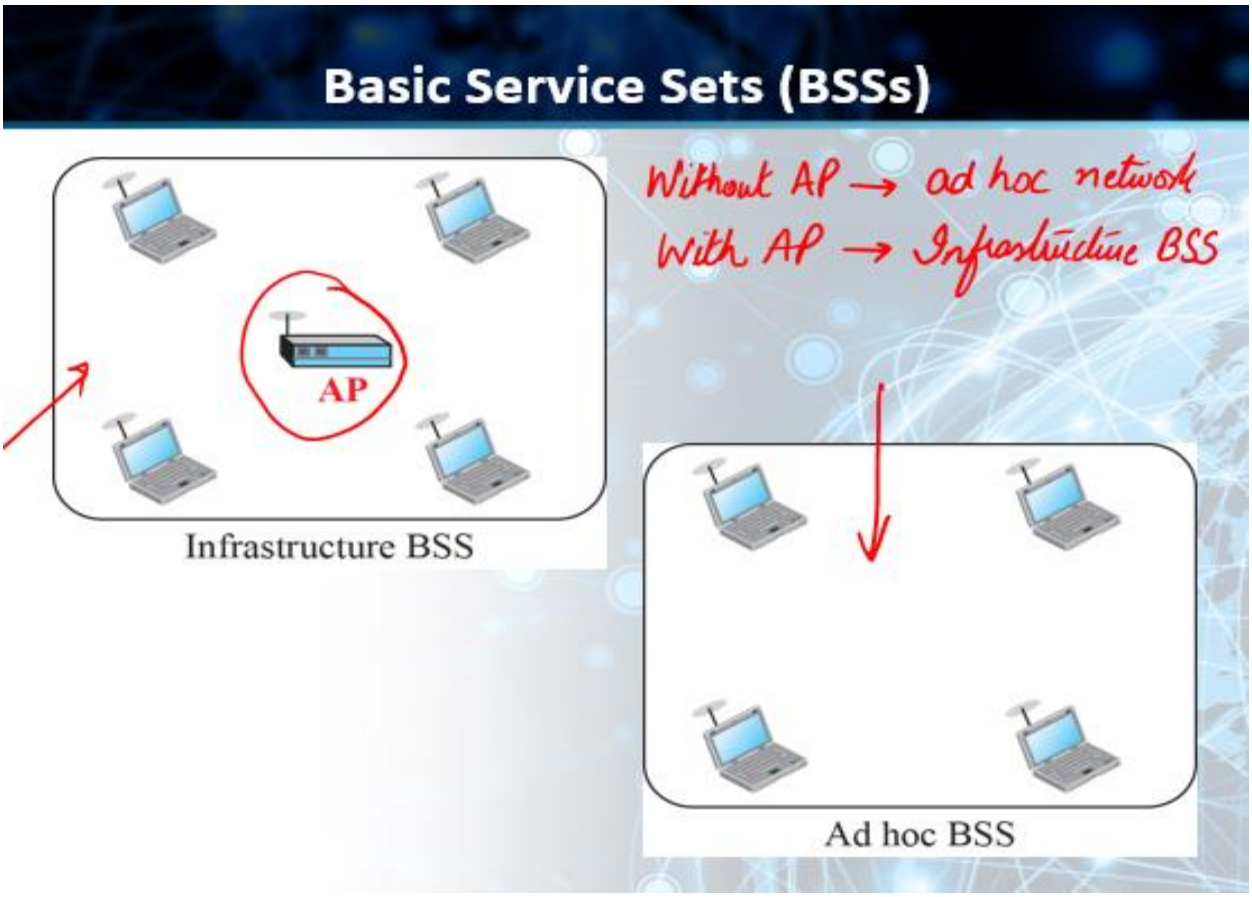
Architecture

- **The standard defines two kinds of services:**
  - ✓ **The basic service set (BSS); and**
  - ✓ **The Extended service set (ESS)**

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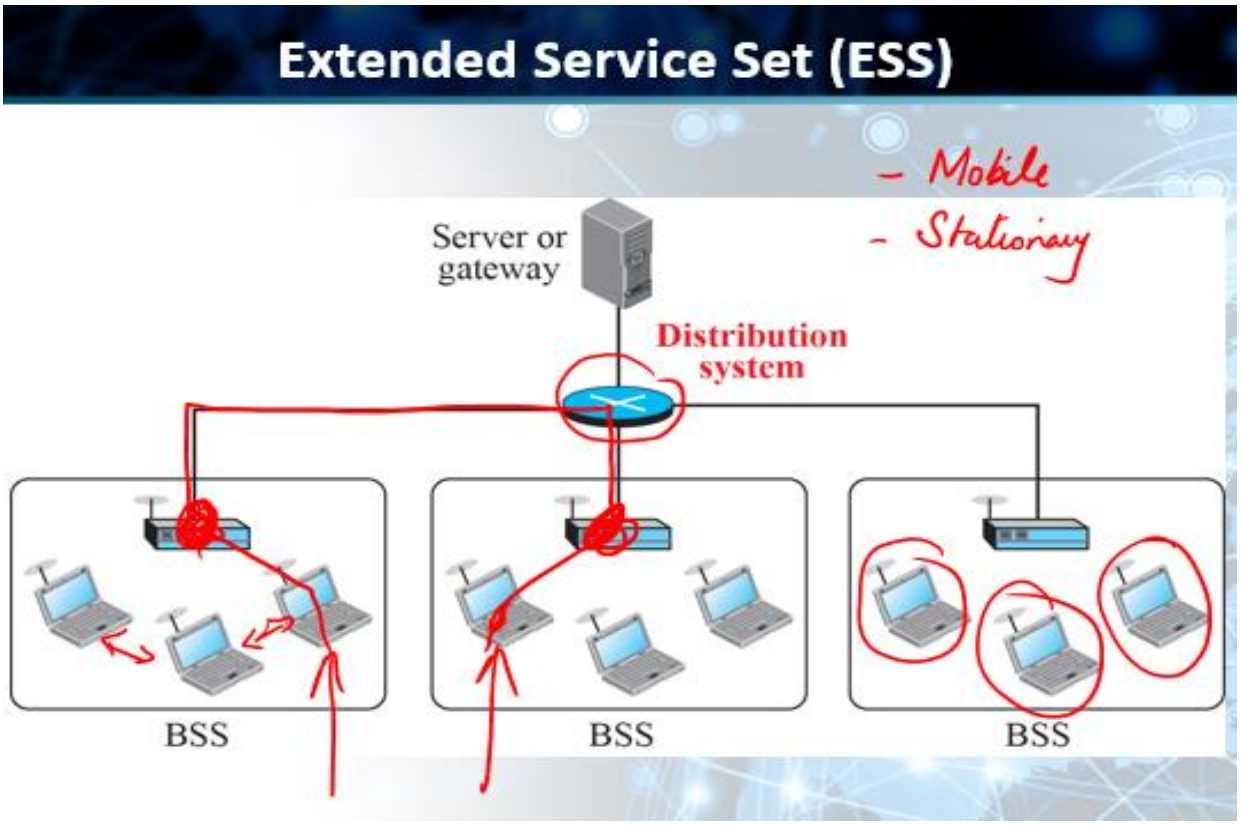
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Types of Stations

- **No-Transition Mobility**
- **BSS-Transition Mobility**
- **ESS-Transition Mobility**

MAC Sub-layer Wireless communication

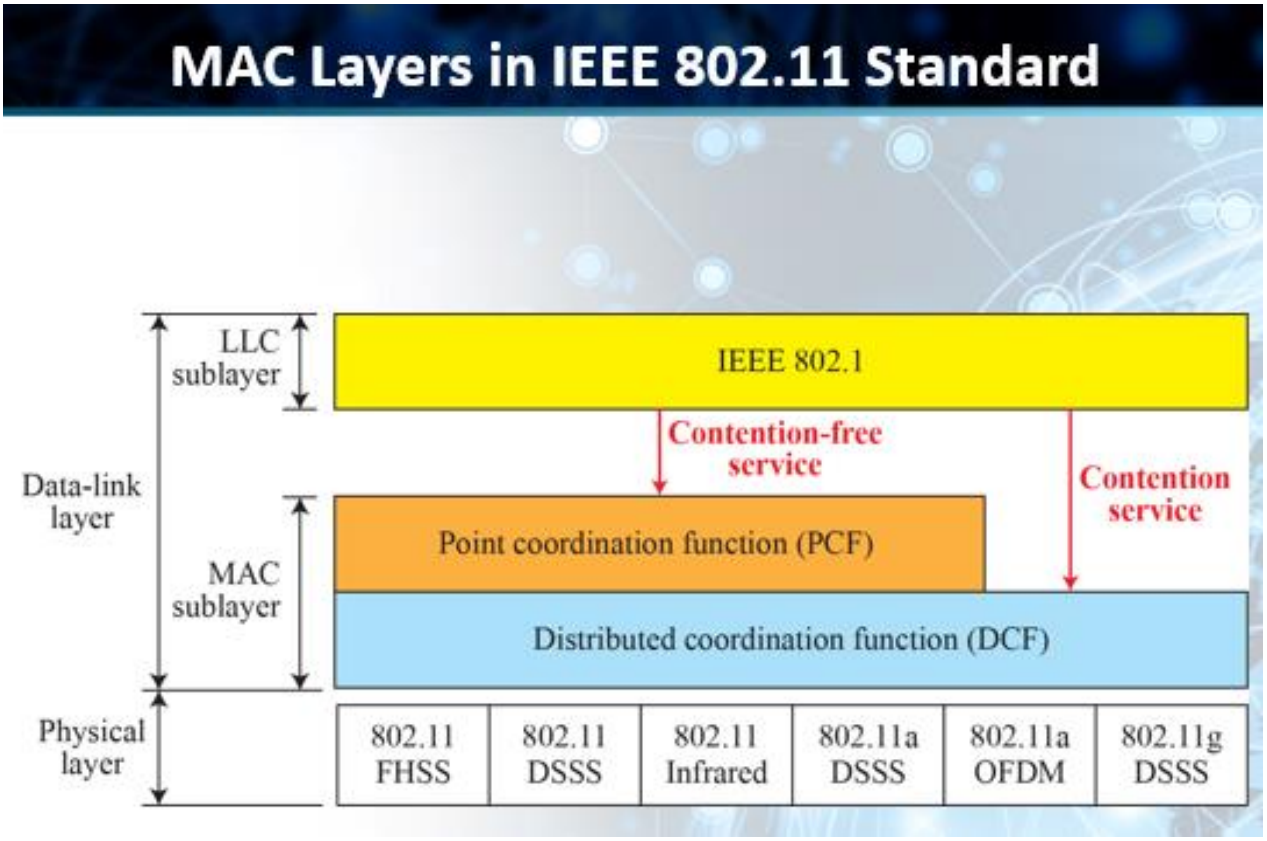
- **IEEE 802.11 defines two MAC sub-layers:**
  - ✓ **The Distributed Coordination Function (DCF) ; and**

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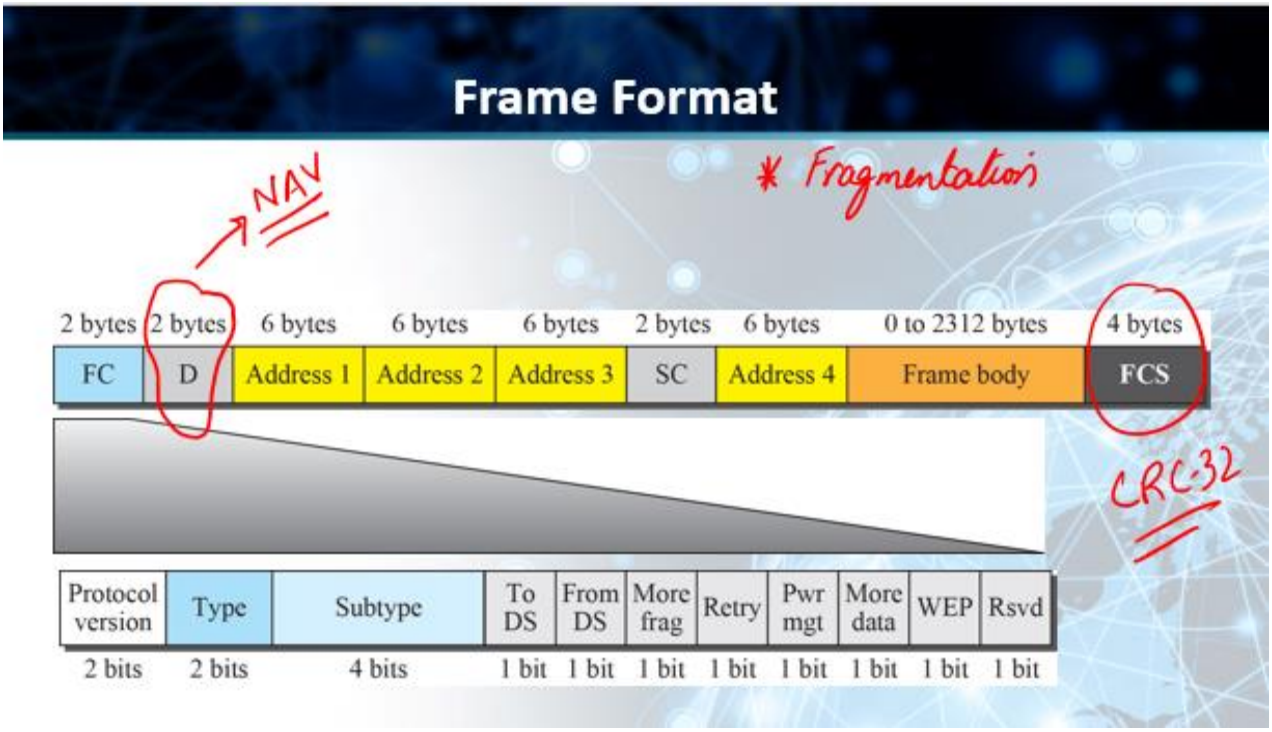
- ✓ **The Point Coordination Function (PCF)**



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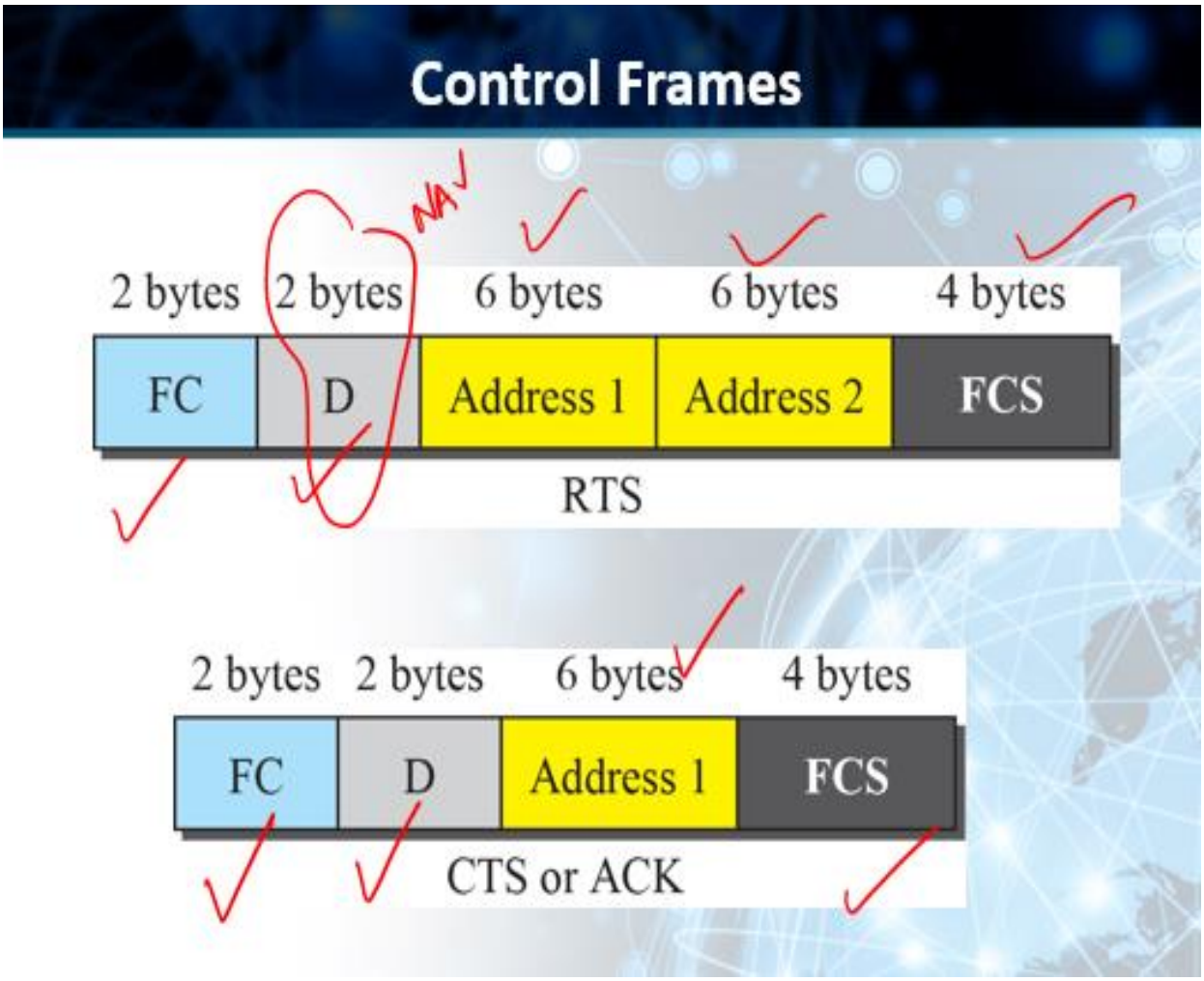
Frame Types

- **Management Frames**
- **Control Frames**
- **Data Frames**

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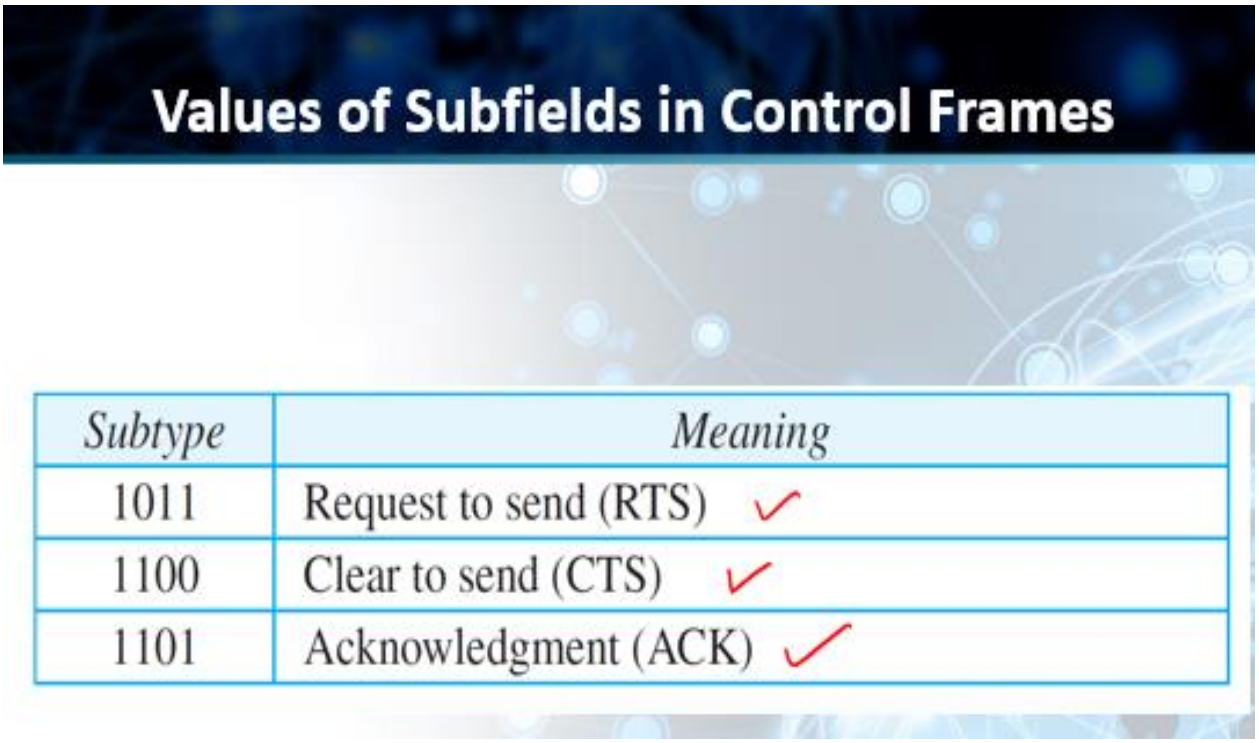
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Subtype	Meaning
1011	Request to send (RTS) ✓
1100	Clear to send (CTS) ✓
1101	Acknowledgment (ACK) ✓

Physical Layer

- **All physical implementations, except the infrared, operate in the industrial, scientific, and medical (ISM) band, which defines 3 unlicensed bands in 3 ranges:**
  - ✓ **902–928 MHz**
  - ✓ **2.400–4.835 GHz**
  - ✓ **5.725–5.850 GHz**

BLUETOOTH

- **Bluetooth is a wireless LAN technology designed to connect devices of different functions when they are at a short distance from each other**
- **A Bluetooth LAN is an ad hoc network**

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- **The devices, sometimes called gadgets, find each other and make a network called a Piconet**
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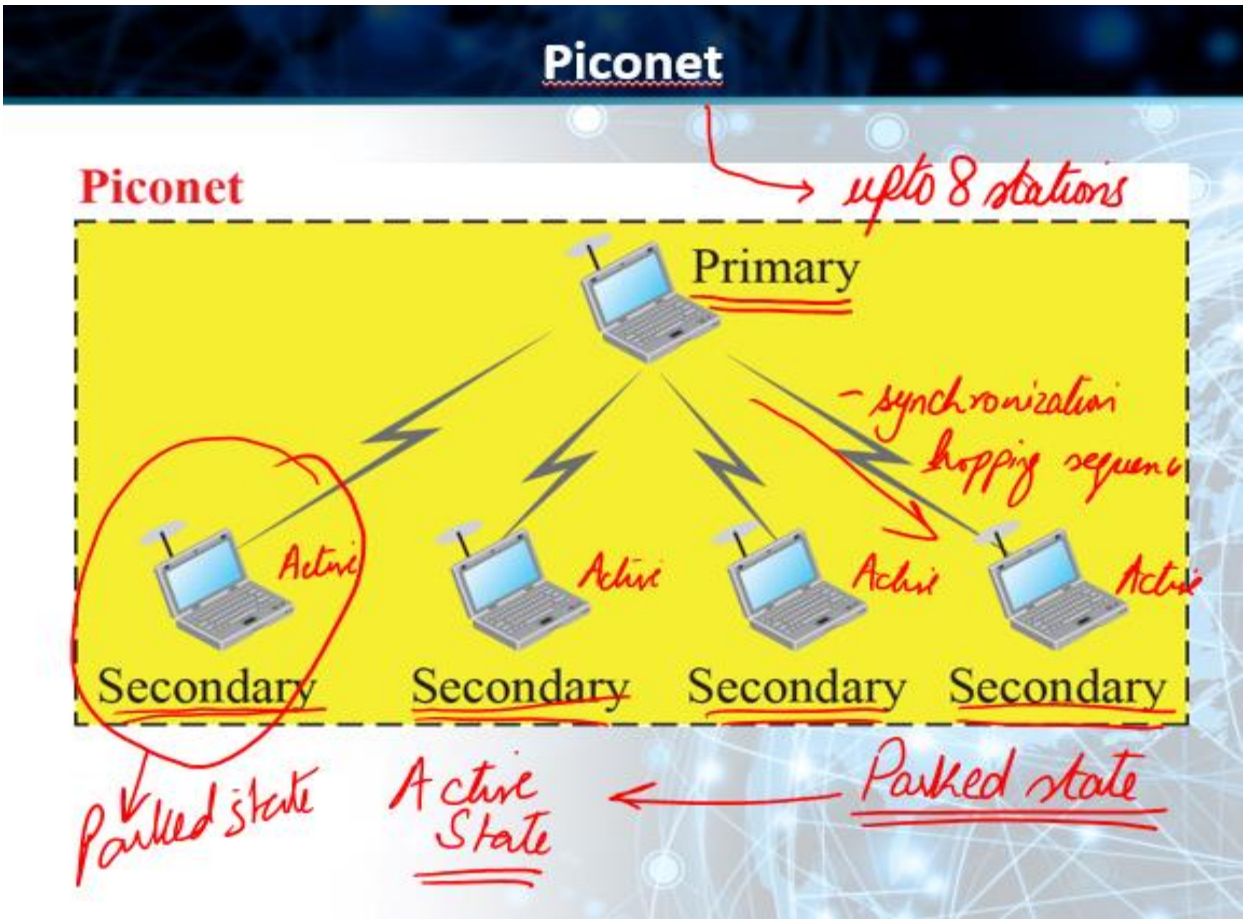
Architecture

- **Bluetooth defines two types of networks:**
  - ✓ **Piconet**
  - ✓ **Scatternet**

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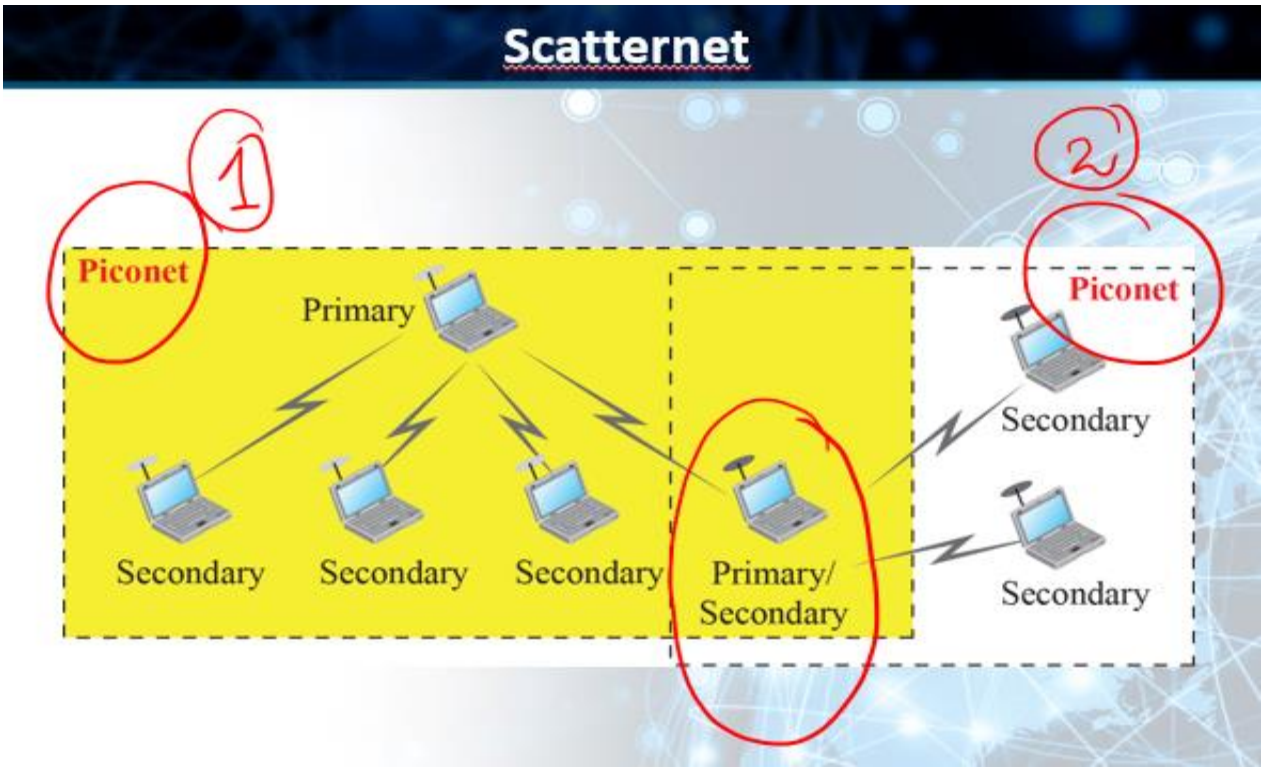
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Bluetooth Devices

- **A Bluetooth device has a built-in short-range radio transmitter**
- **The current data rate is 1 Mbps with a 2.4-GHz bandwidth**
- **This means that there is a possibility of interference between the IEEE 802.11b wireless LANs and Bluetooth LANs**

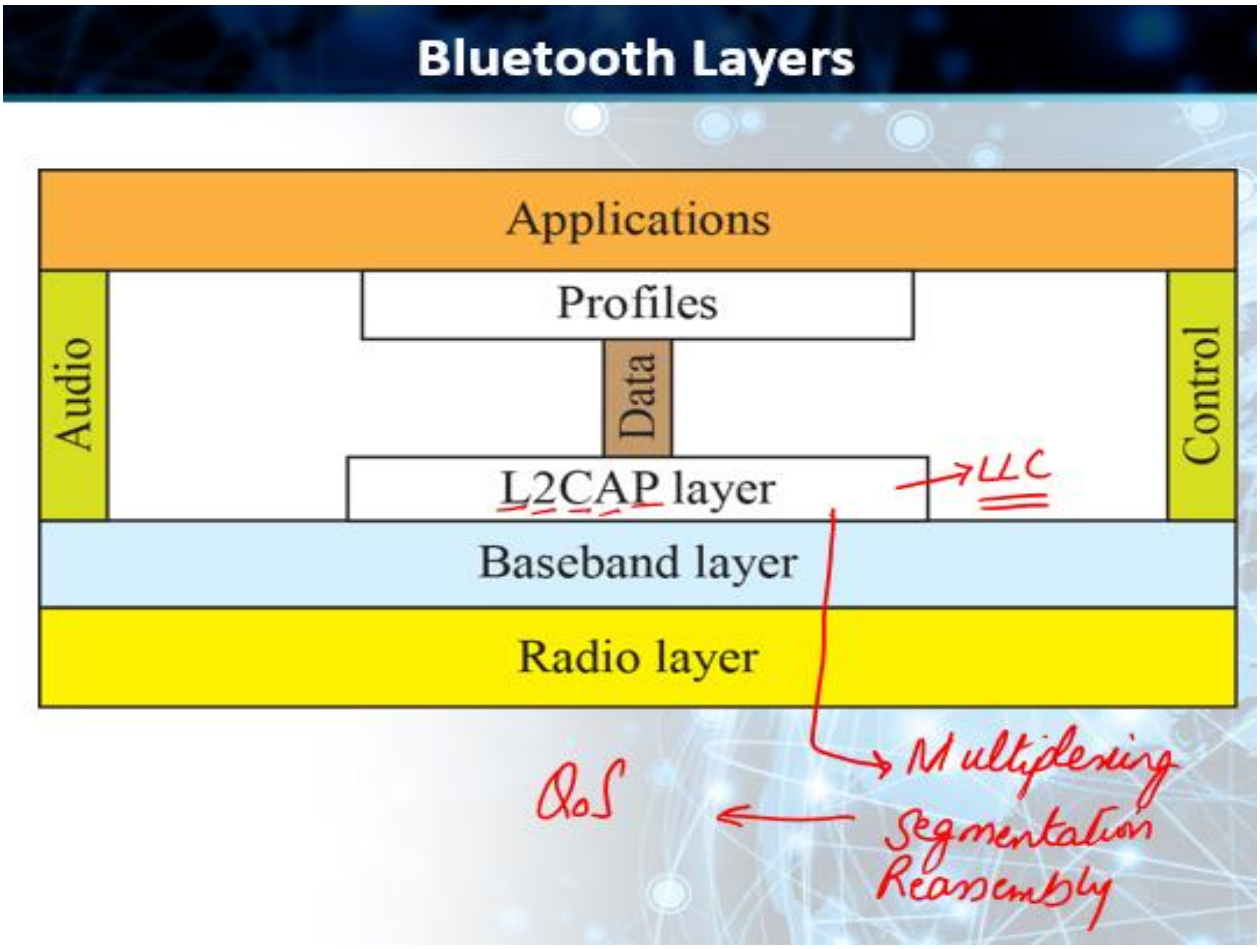
Bluetooth Layers

- **Bluetooth uses several layers that do not exactly match those of the Internet model we have defined already**

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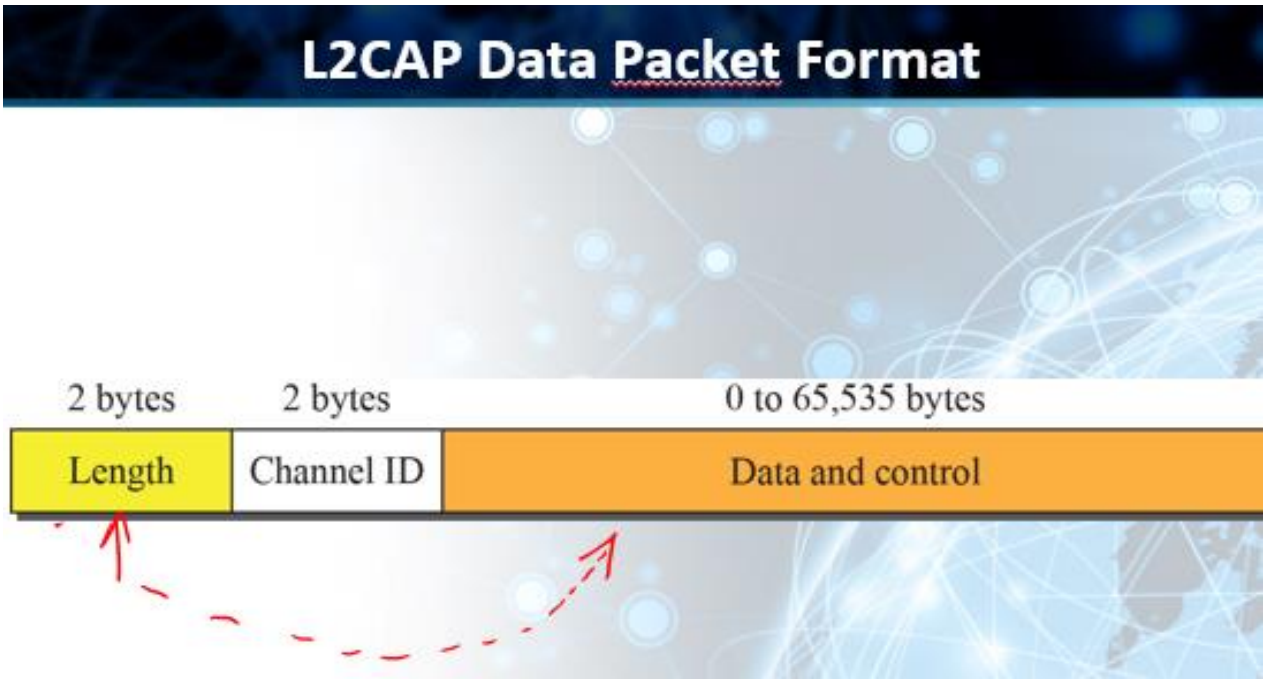
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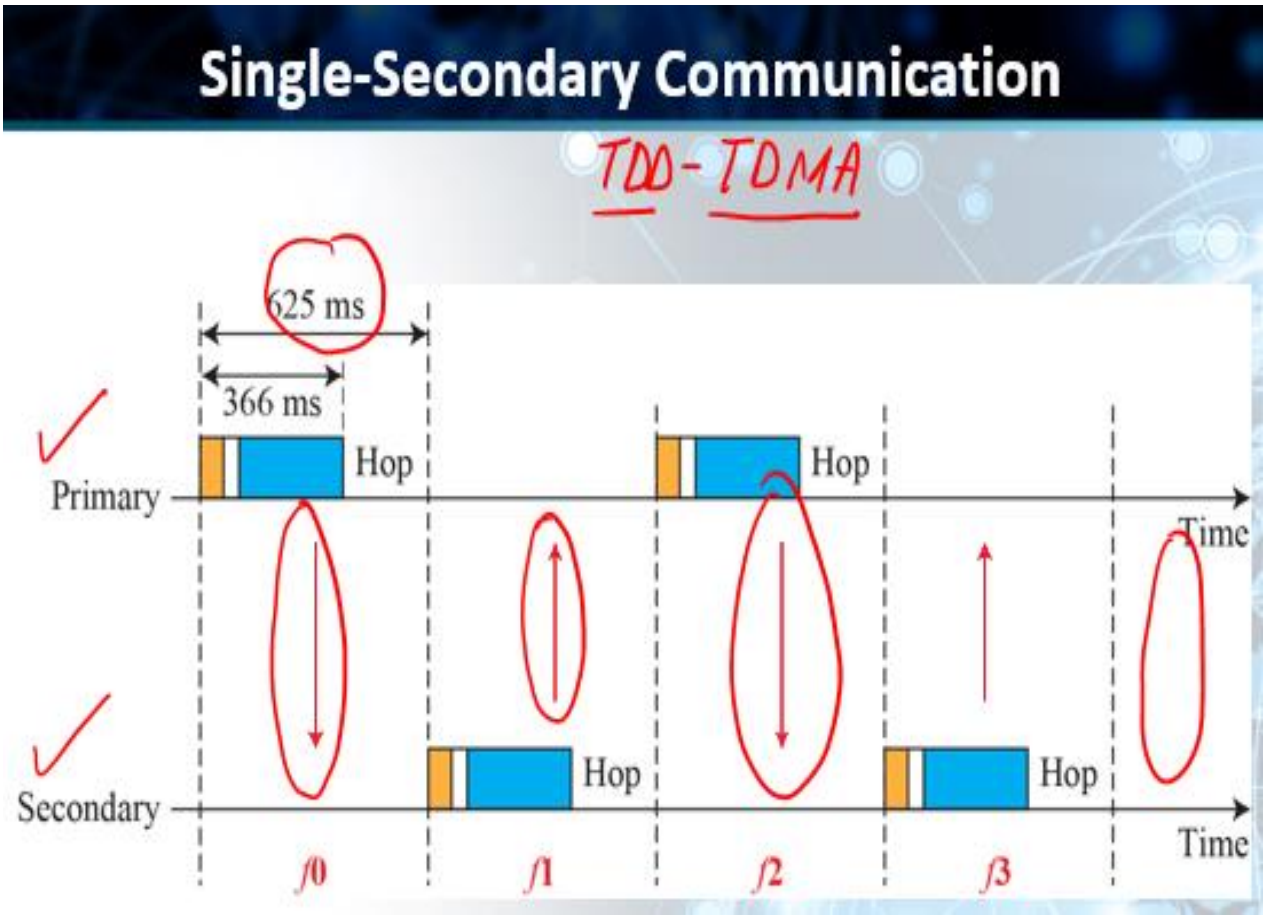
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