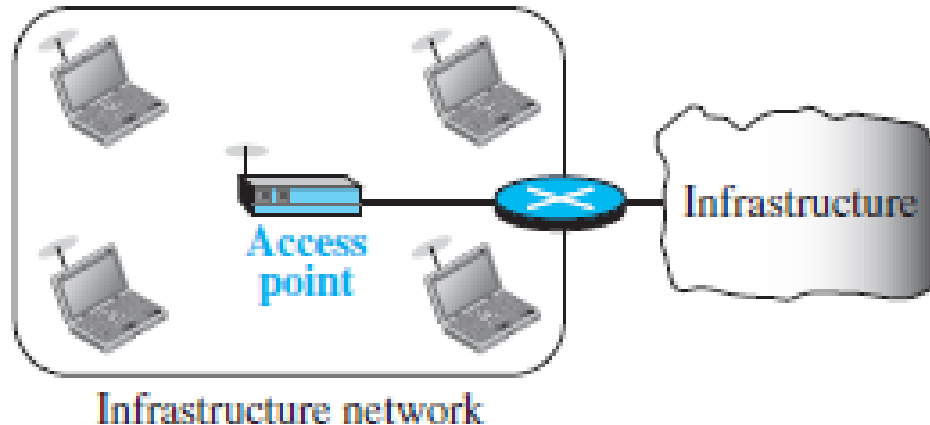
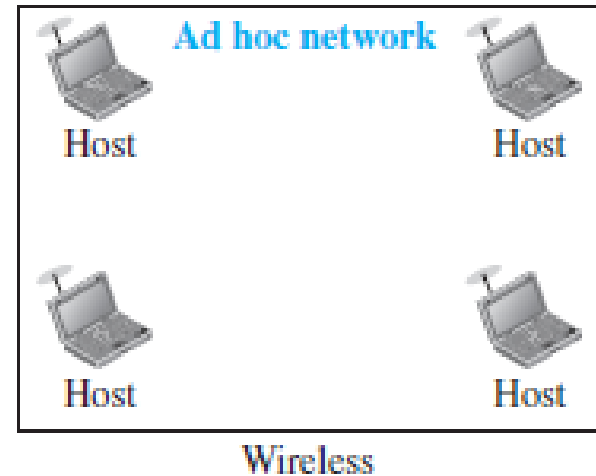
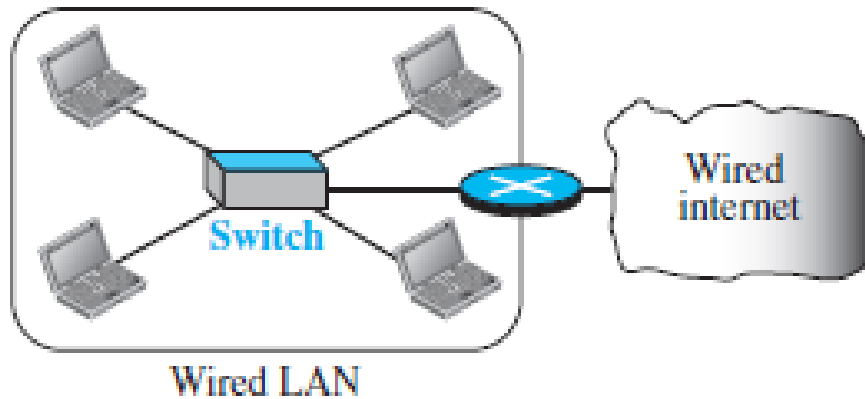


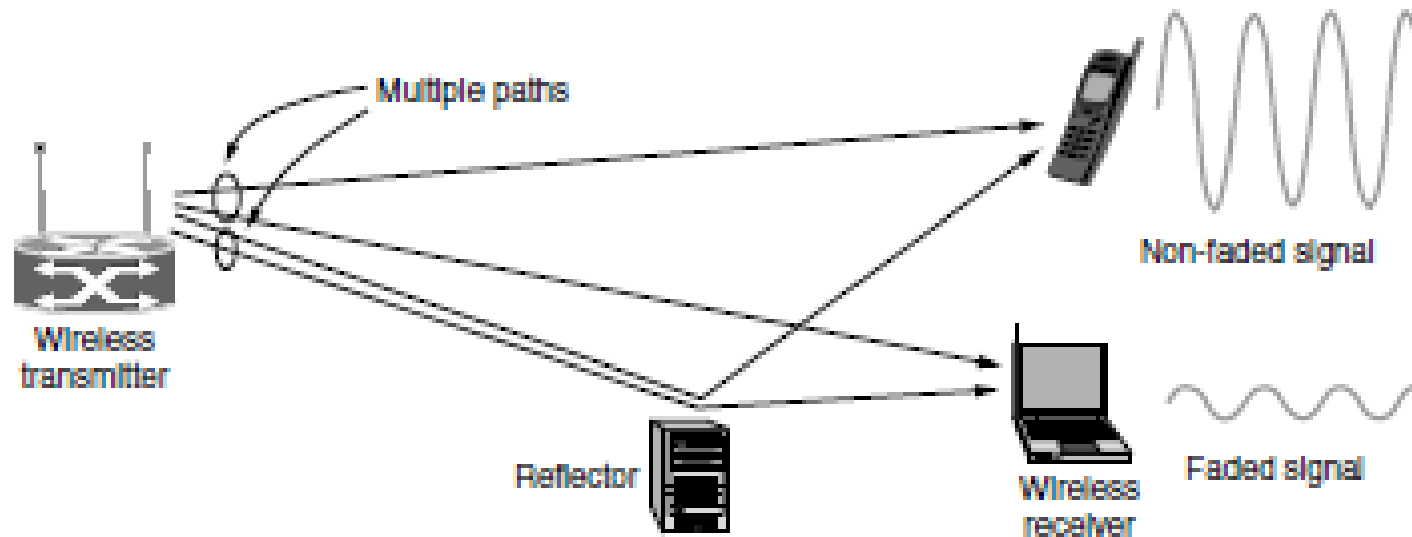
## **DATA LINK LAYER**

# IEEE 802.11 Wireless LAN



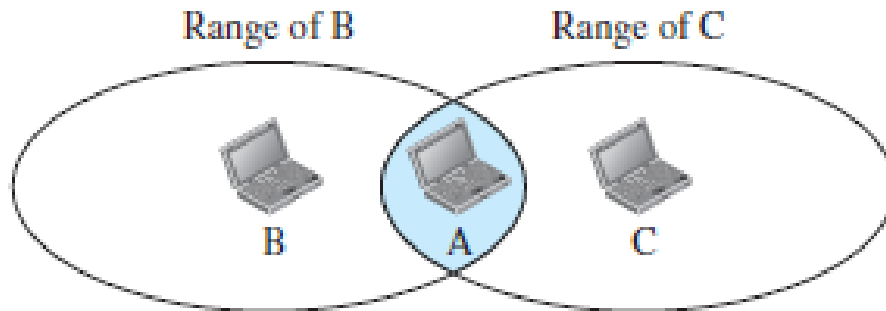
# IEEE 802.11 Wireless LAN

- *Attenuation*
- *Error*
- *Multipath Propagation*

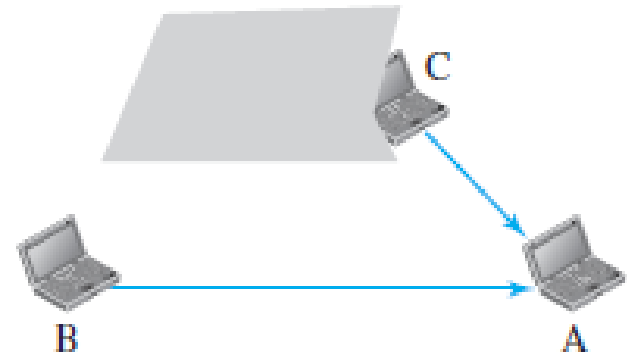


# Access Control

CSMA/CD can not be used in Wireless medium because of hidden and exposed terminals



a. Stations B and C are not in each other's range.

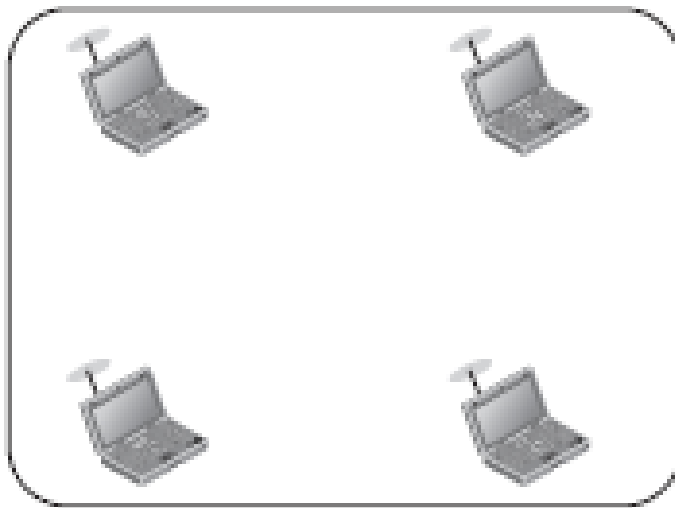


b. Stations B and C are hidden from each other.

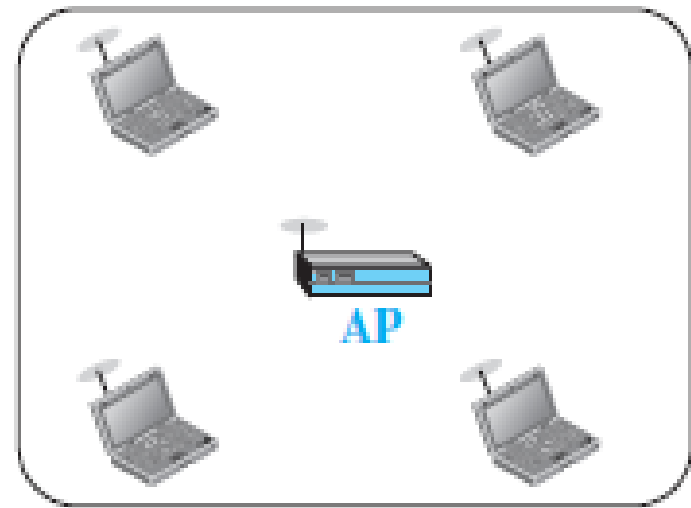
# IEEE 802.11

## *Basic service sets (BSSs)*

---



Ad hoc BSS



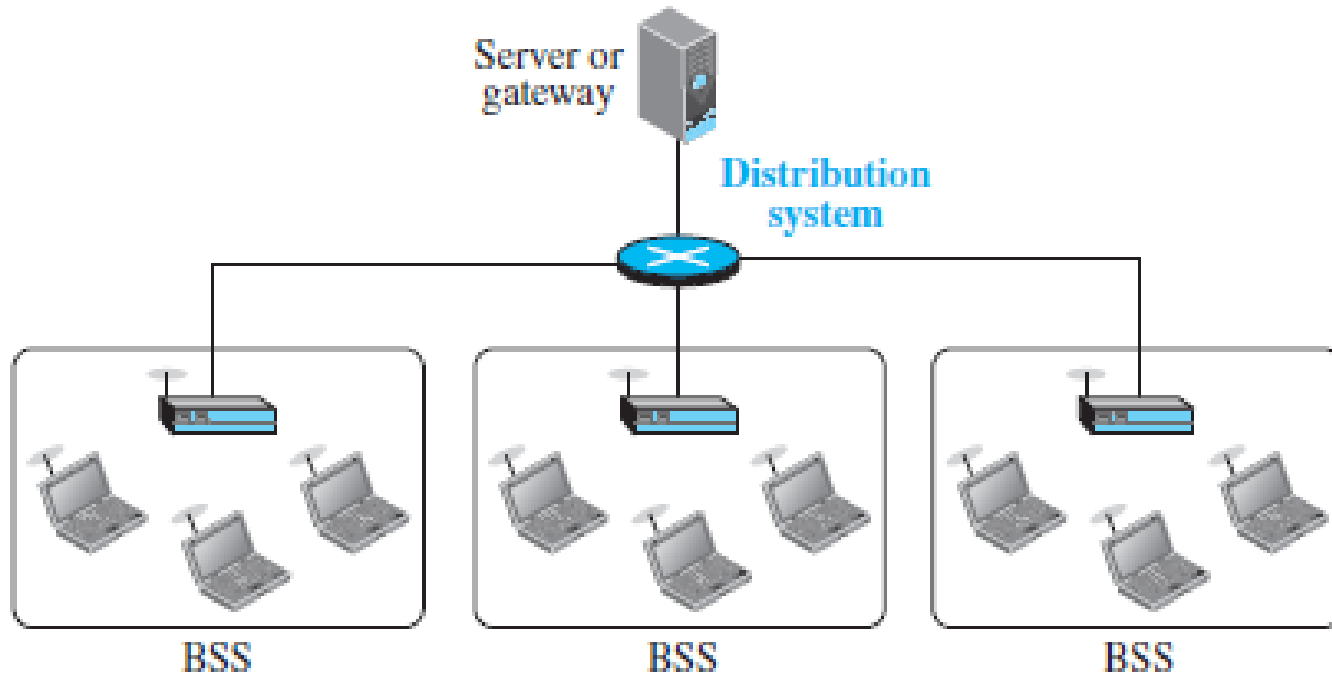
Infrastructure BSS

Adhoc-The BSS without an AP is a stand-alone network and cannot send data to other BSSs.

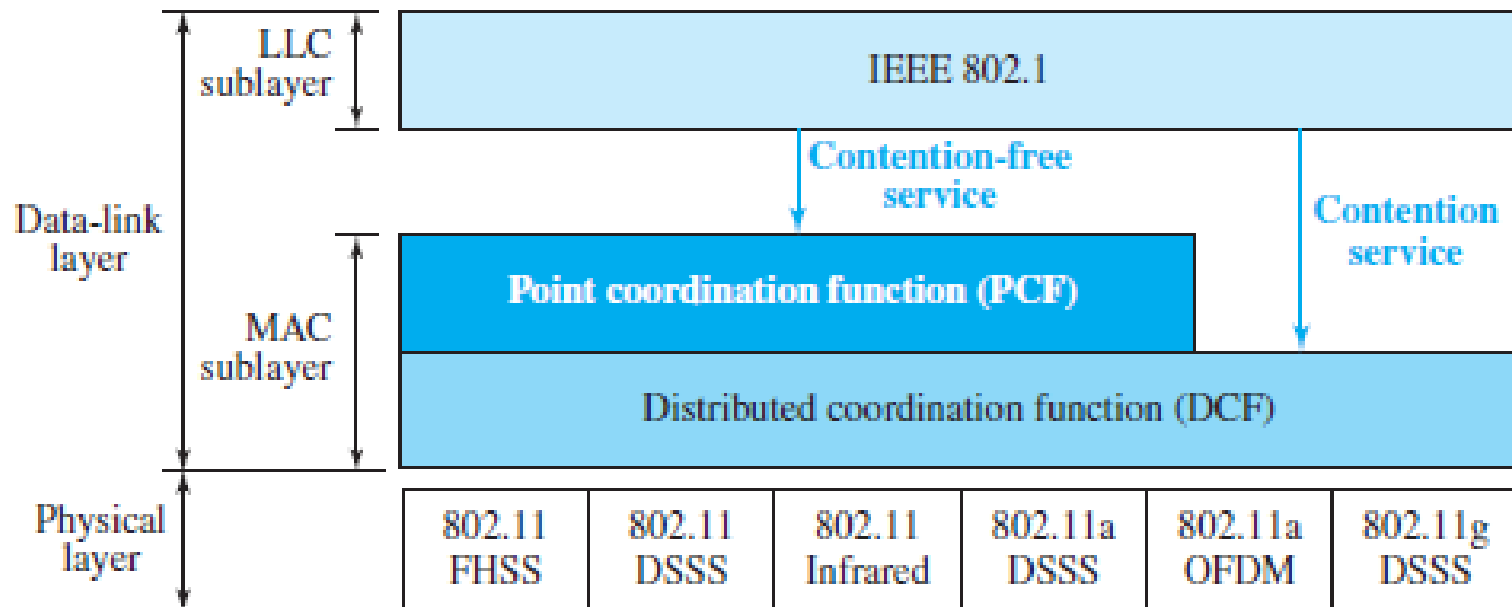
Infrastructure- BSS with AP and connected to other networks

# IEEE 802.11

An **extended service set (ESS)** is made up of two or more BSSs with APs

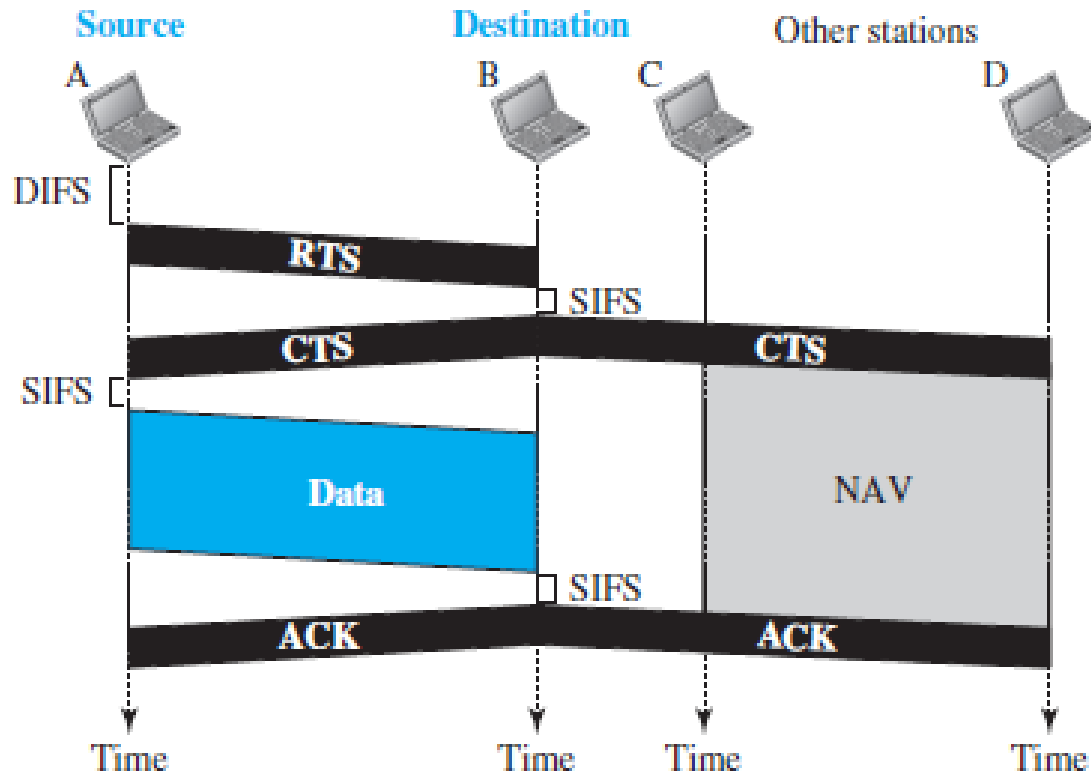


# MAC layers in IEEE 802.11 standard



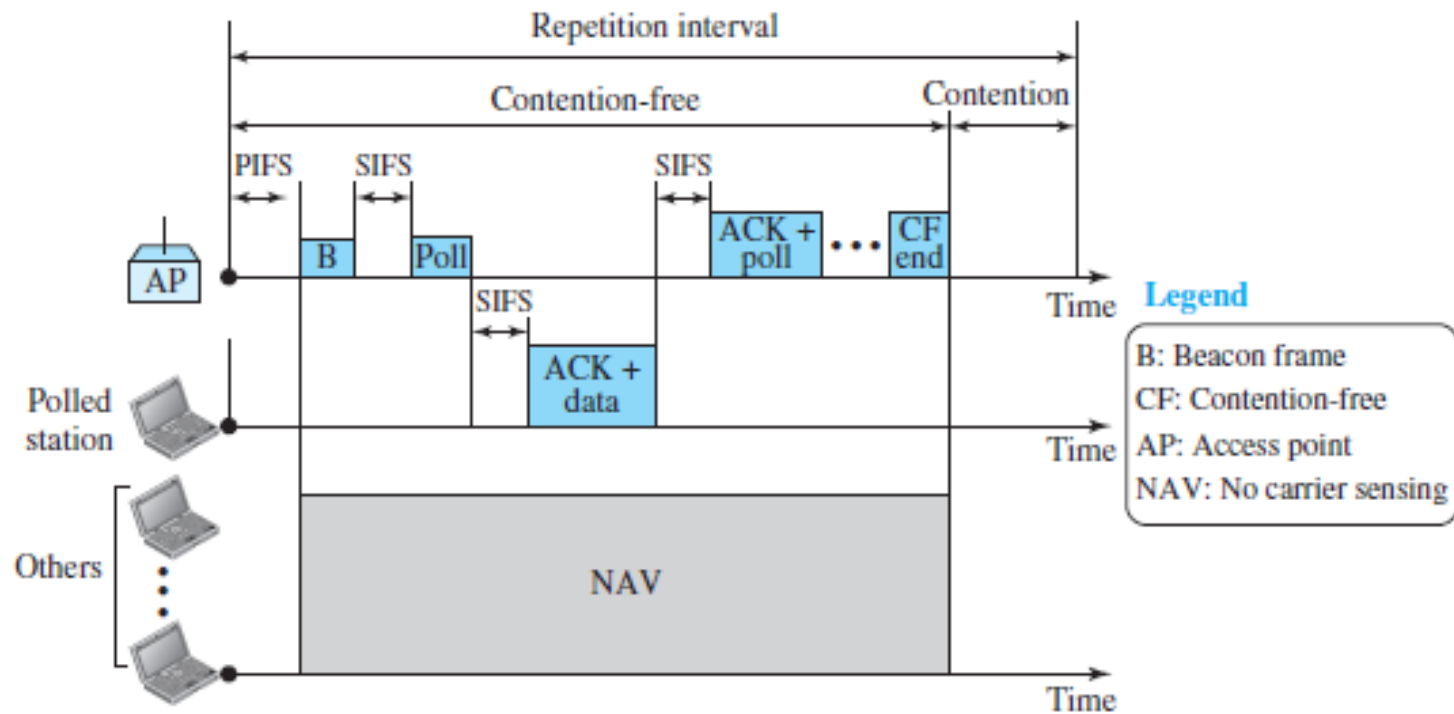
# Distributed Coordination Function

## CSMA/CA and NAV

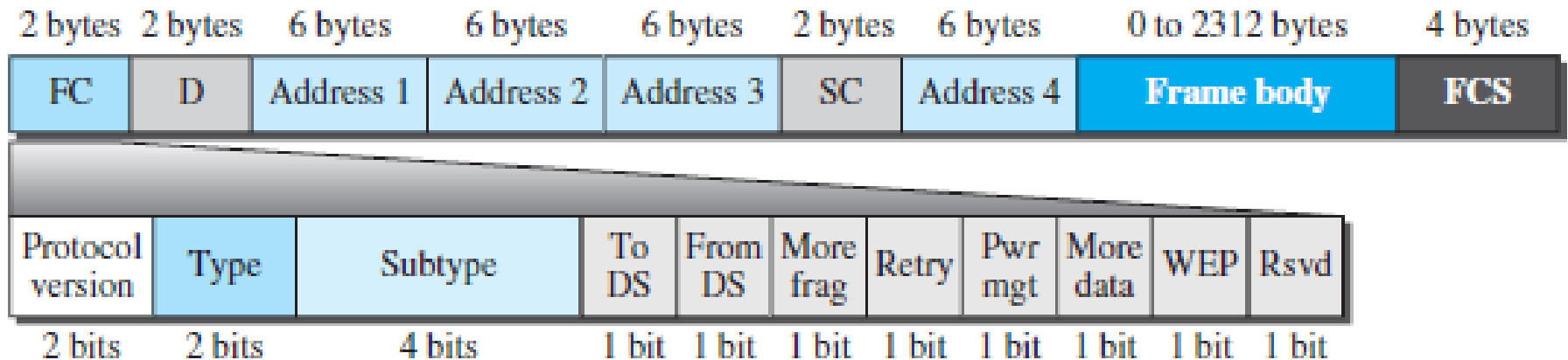




# Point Coordination Function



# MAC Layer Frame



IEEE 802.11 has three categories of frames:

- Management frames
- Control frames
- Data frames.

# MAC Layer Frame

## Control frames



Values of type and subtype fields in control frames

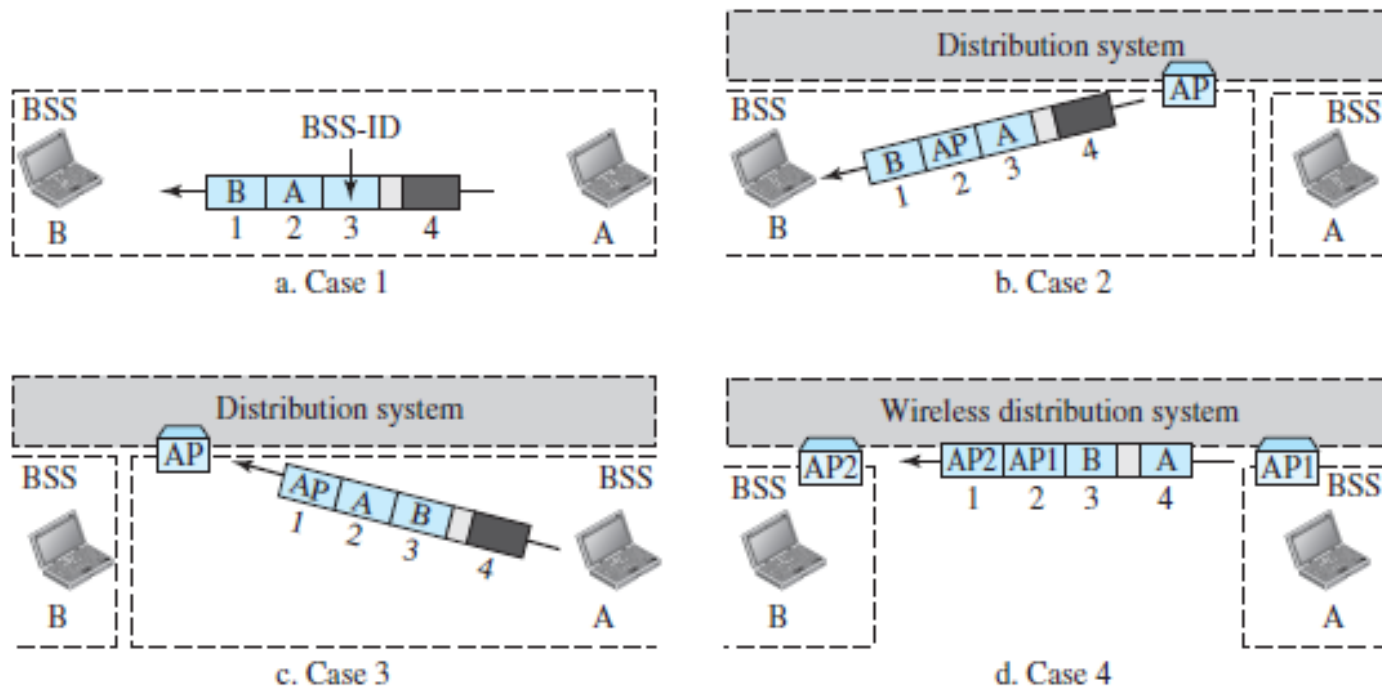
Version	Current version is 0
Type	Type of information: management (00), control (01), or data (10)

<i>Subtype</i>	<i>Meaning</i>
1011	Request to send (RTS)
1100	Clear to send (CTS)
1101	Acknowledgment (ACK)

# MAC Layer Frame

## Addressing

To DS	From DS	Address 1	Address 2	Address 3	Address 4
0	0	Destination	Source	BSS ID	N/A
0	1	Destination	Sending AP	Source	N/A
1	0	Receiving AP	Source	Destination	N/A
1	1	Receiving AP	Sending AP	Destination	Source



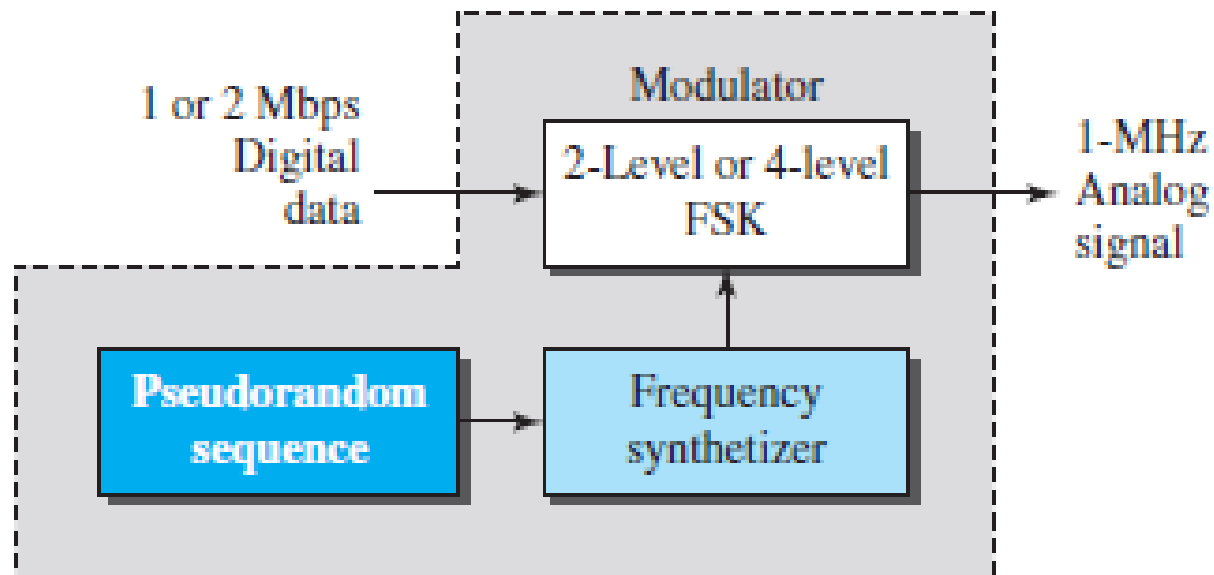
# PHYSICAL LAYER

<i>IEEE</i>	<i>Technique</i>	<i>Band</i>	<i>Modulation</i>	<i>Rate (Mbps)</i>
802.11	FHSS	2.400–4.835 GHz	FSK	1 and 2
	DSSS	2.400–4.835 GHz	PSK	1 and 2
	None	Infrared	PPM	1 and 2
802.11a	OFDM	5.725–5.850 GHz	PSK or QAM	6 to 54
802.11b	DSSS	2.400–4.835 GHz	PSK	5.5 and 11
802.11g	OFDM	2.400–4.835 GHz	Different	22 and 54
802.11n	OFDM	5.725–5.850 GHz	Different	600

# PHYSICAL LAYER

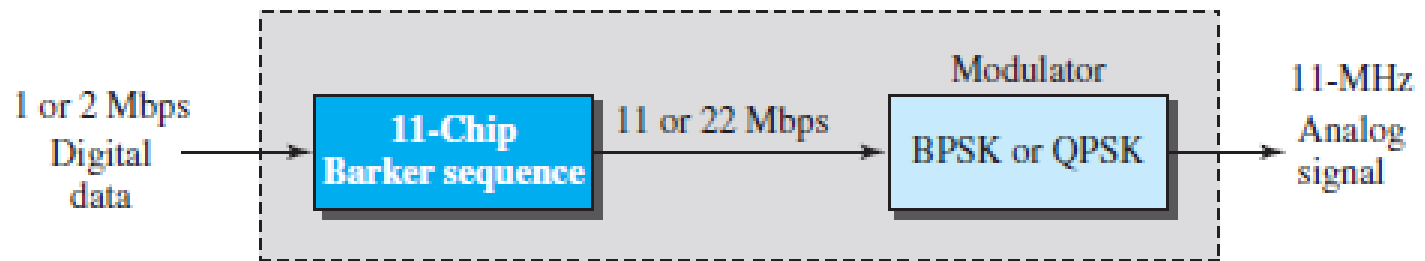
*Physical layer of IEEE 802.11 FHSS*

---



# PHYSICAL LAYER

## *Physical layer of IEEE 802.11 DSSS*



# PHYSICAL LAYER

## *Physical layer of IEEE 802.11 Infrared*

