CSE/PC/B/T/316
Computer Networks
Topic 8- IEEE 802.11

Sarbani Roy
sarbani.roy@jadavpuruniversity.in
Office: CC-5-7
Cell: 9051639328

IEEE 802.11

IEEE has defined the specifications for a wireless LAN, called IEEE 802.11, which covers the physical and data link layers.

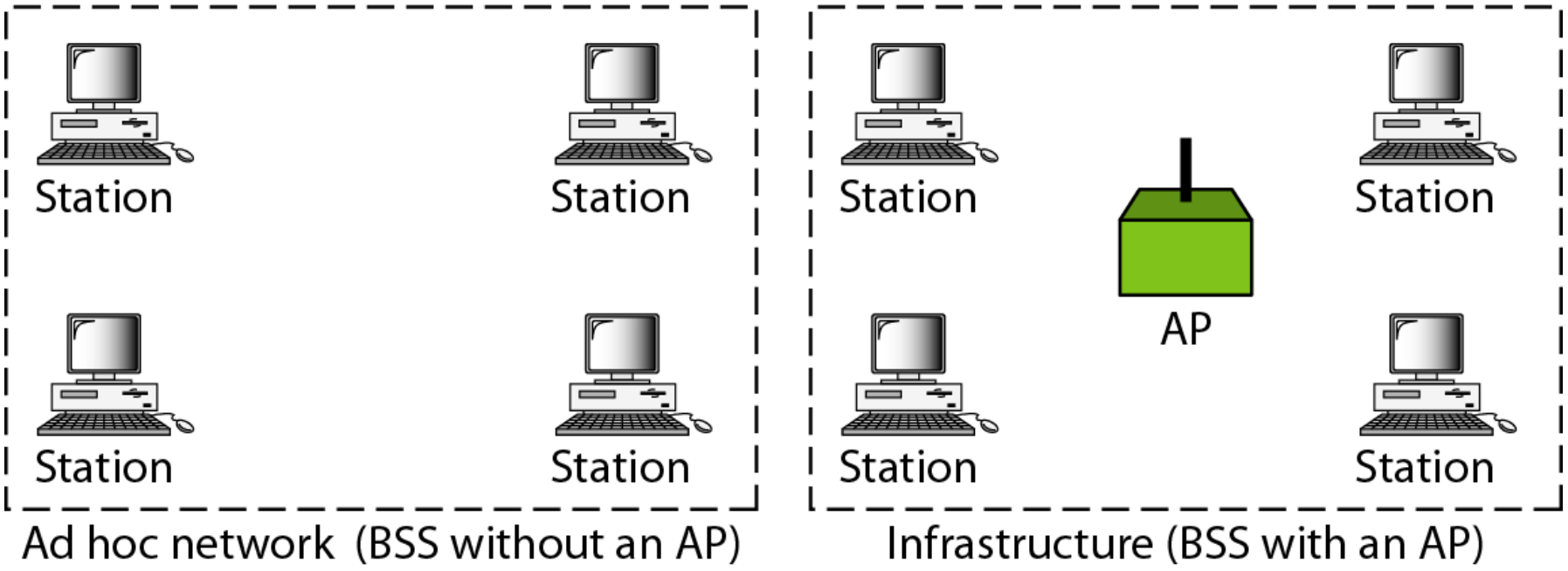
Architecture
MAC Sublayer
Physical Layer

Note

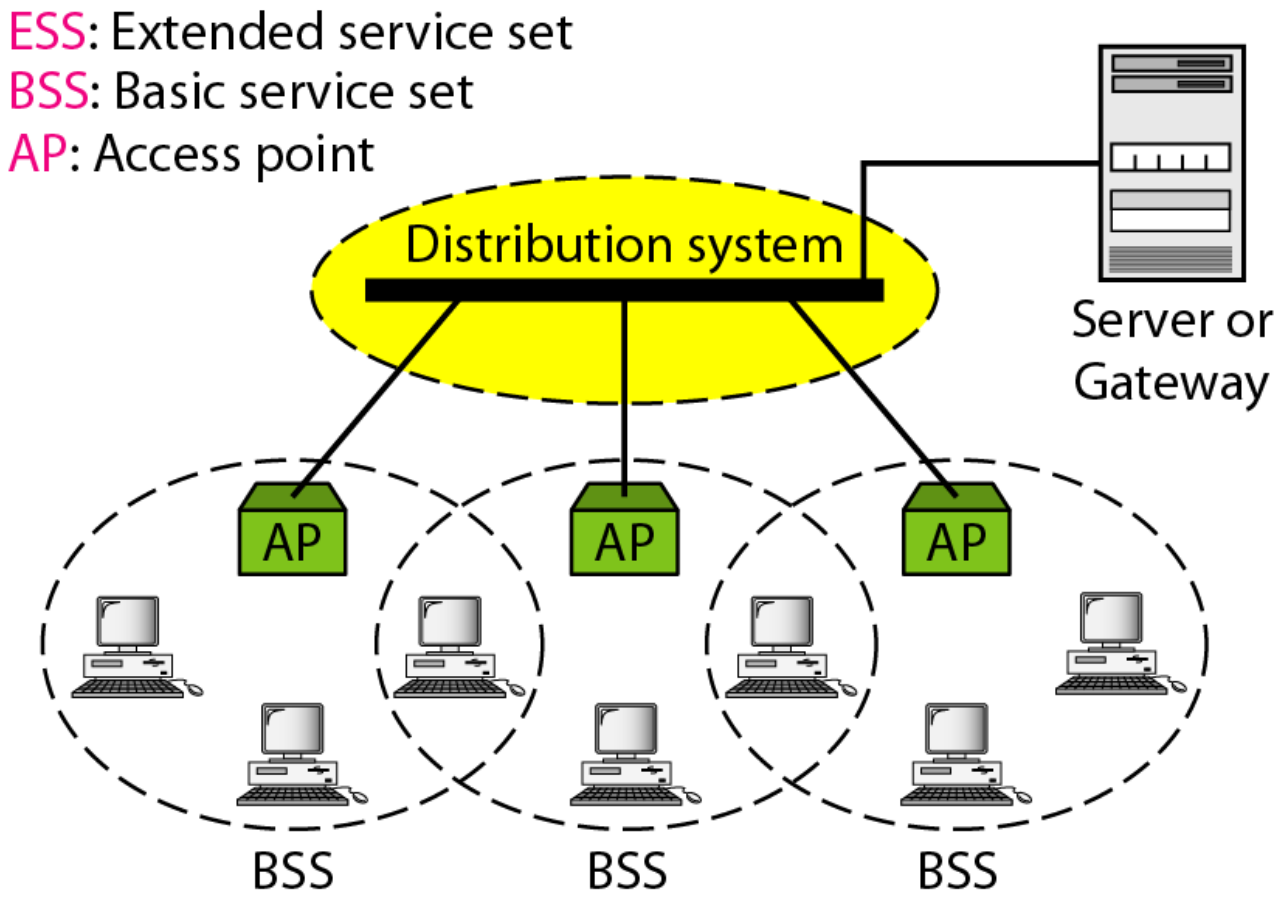
A BSS without an AP is called an ad hoc network;
a BSS with an AP is called an infrastructure network.

Basic service sets (BSSs)

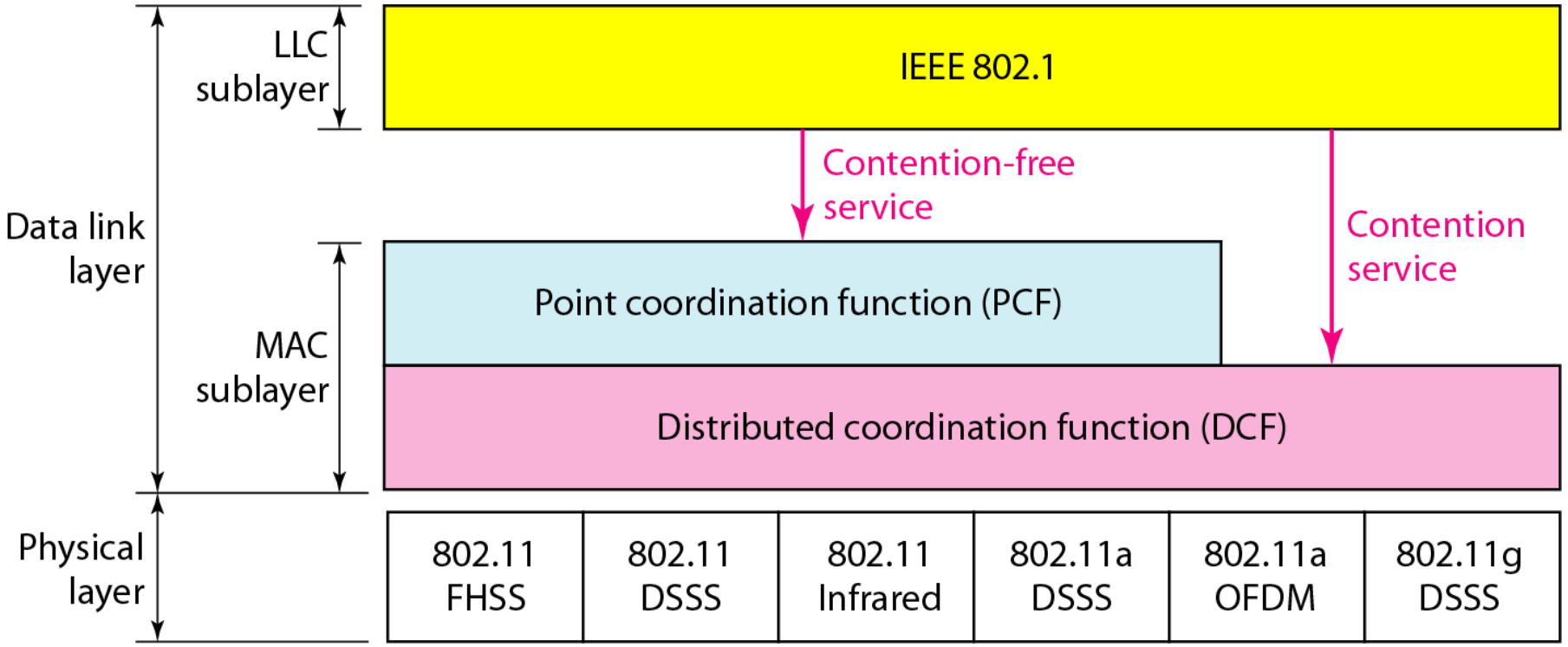
BSS: Basic service set
AP: Access point



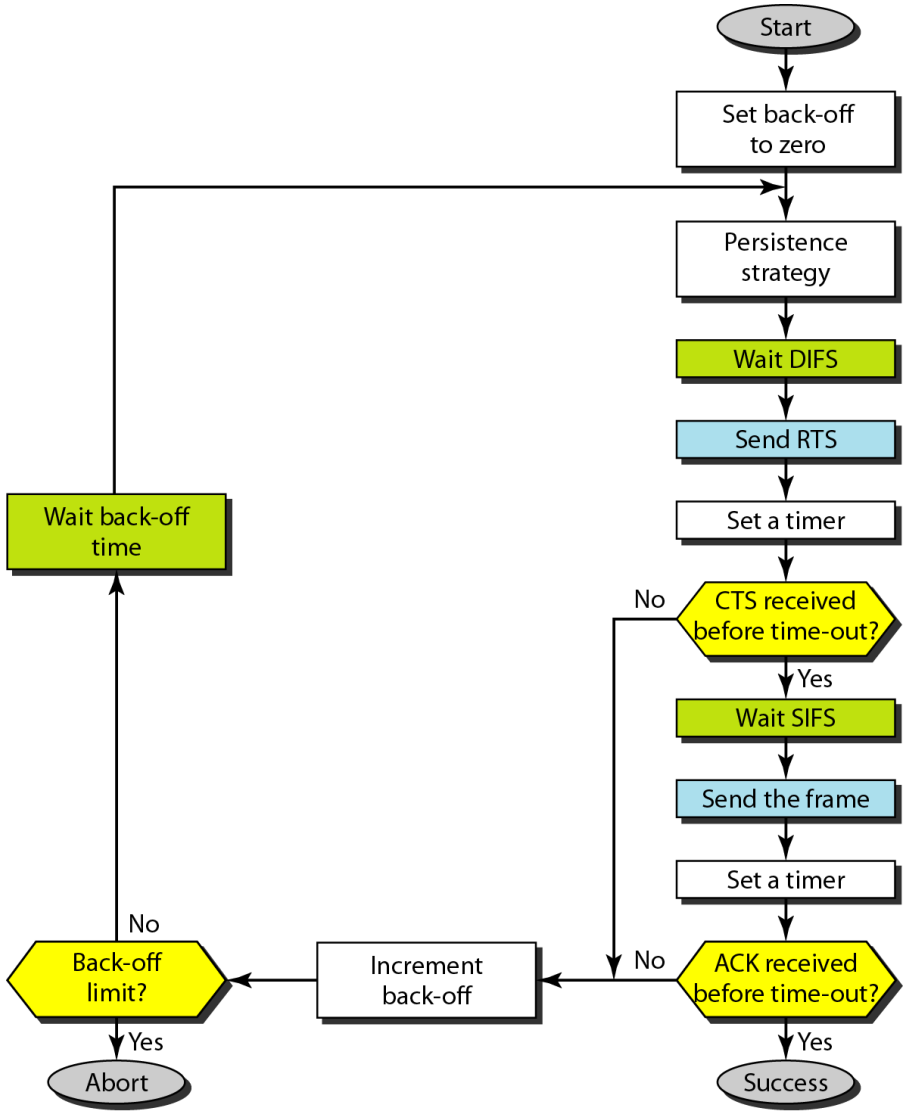
Extended service sets (ESSs)



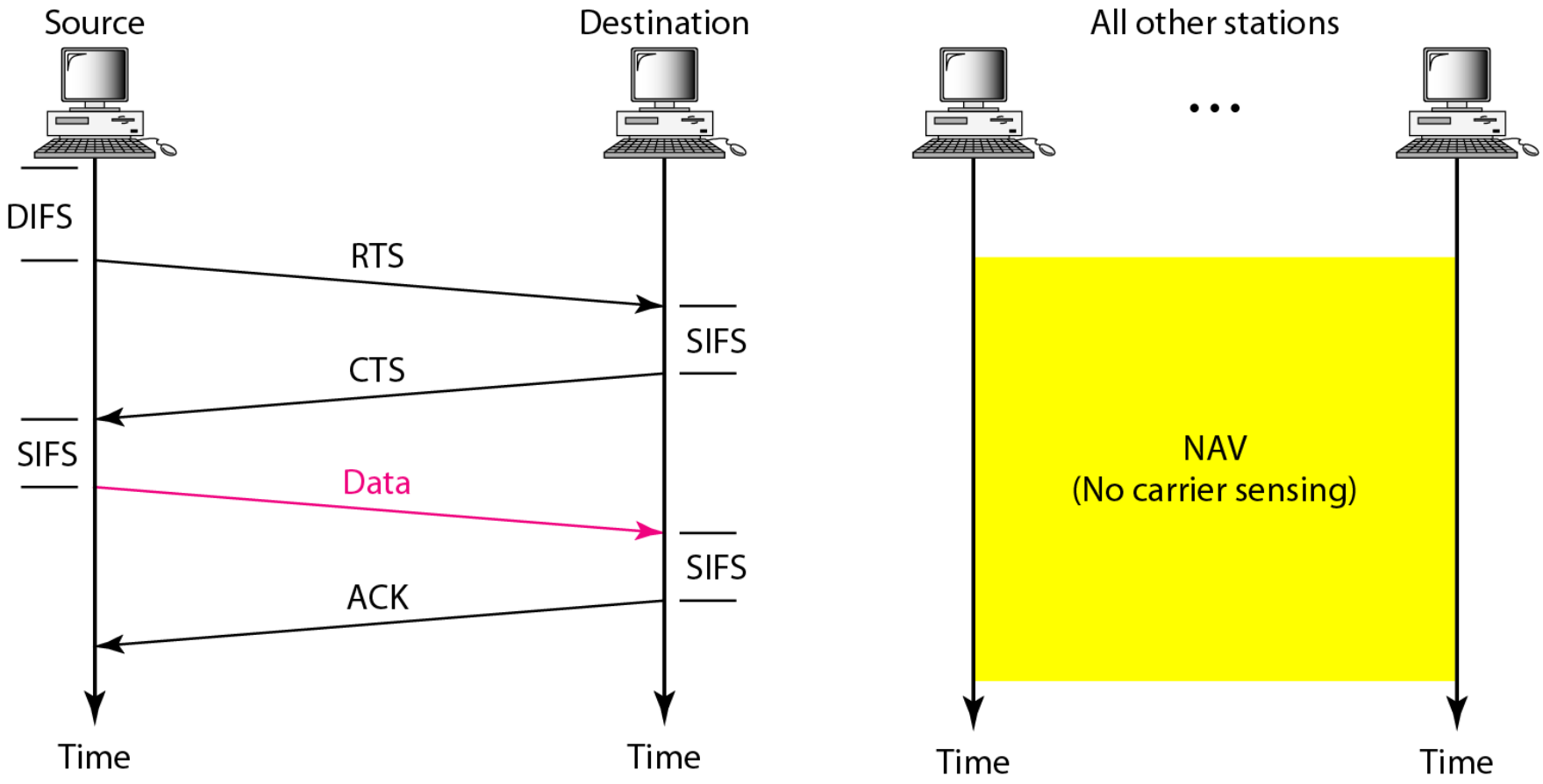
MAC layers in IEEE 802.11 standard



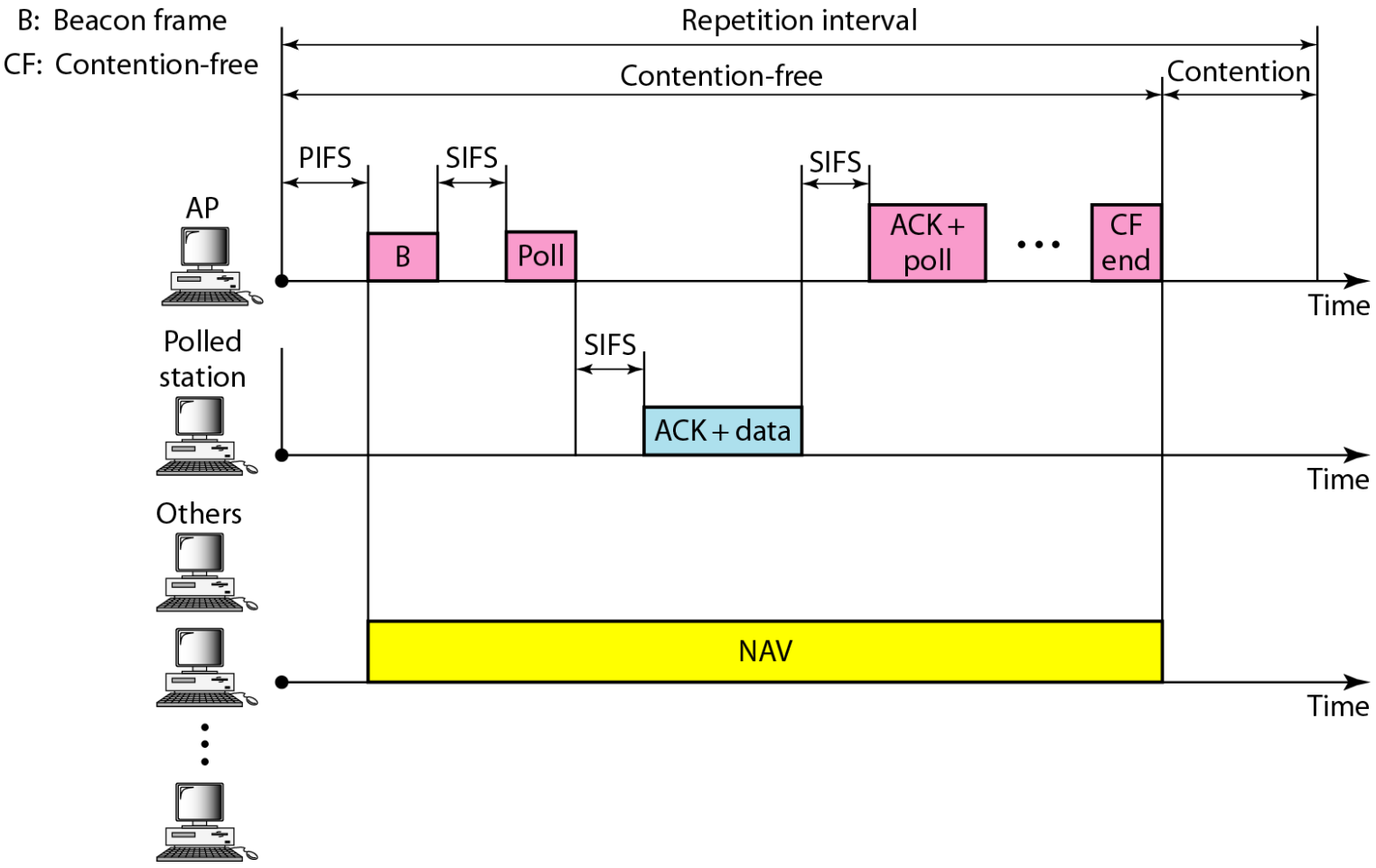
CSMA/CA flowchart



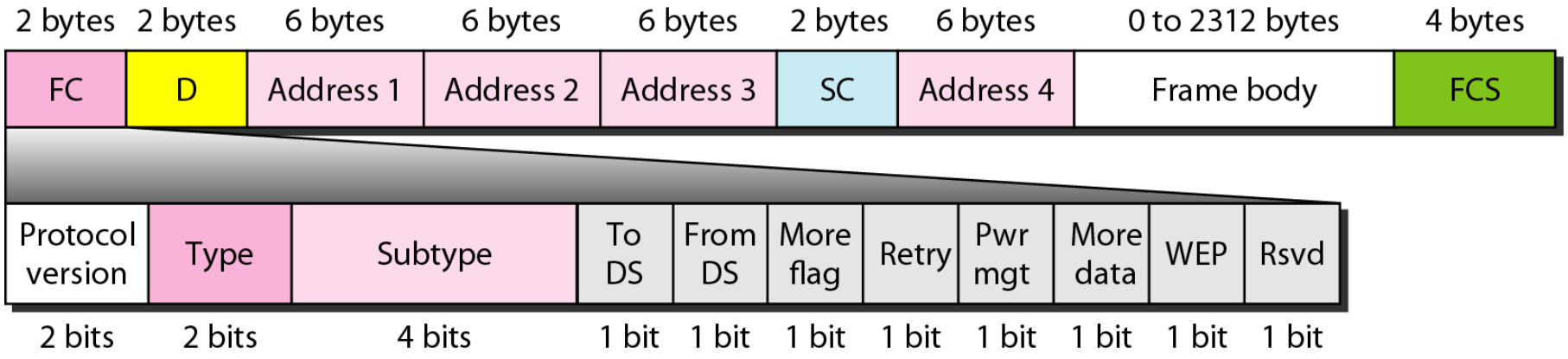
CSMA/CA and NAV



Example of repetition interval



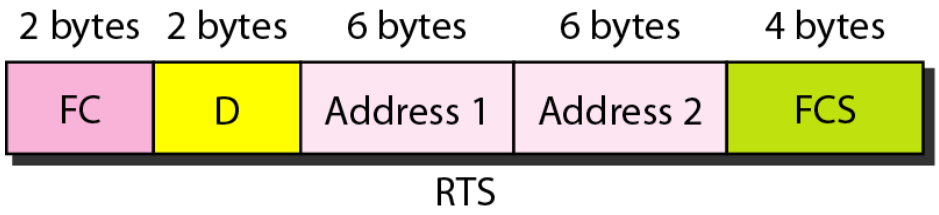
Frame format

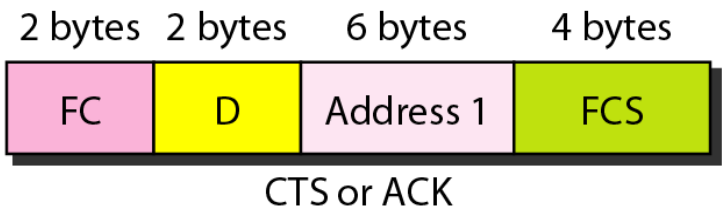


Subfields in FC field

Field	*Explanation*
Version	Current version is 0
Type	Type of information: management (00), control (01), or data (10)
Subtype	Subtype of each type (see Table 14.2)
To DS	Defined later
From DS	Defined later
More flag	When set to 1, means more fragments
Retry	When set to 1, means retransmitted frame
Pwr mgt	When set to 1, means station is in power management mode
More data	When set to 1, means station has more data to send
WEP	Wired equivalent privacy (encryption implemented)
Rsvd	Reserved

Control frames





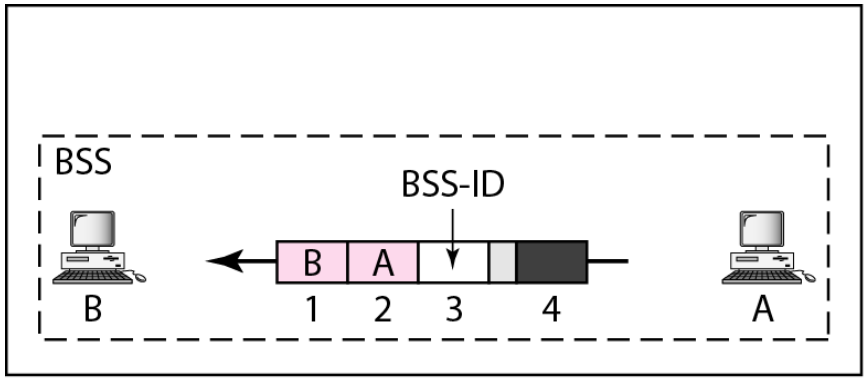
Values of subfields in control frames

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

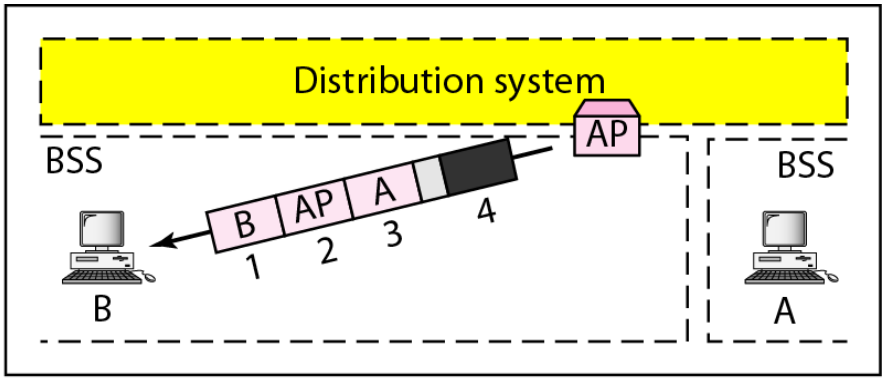
Addresses

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

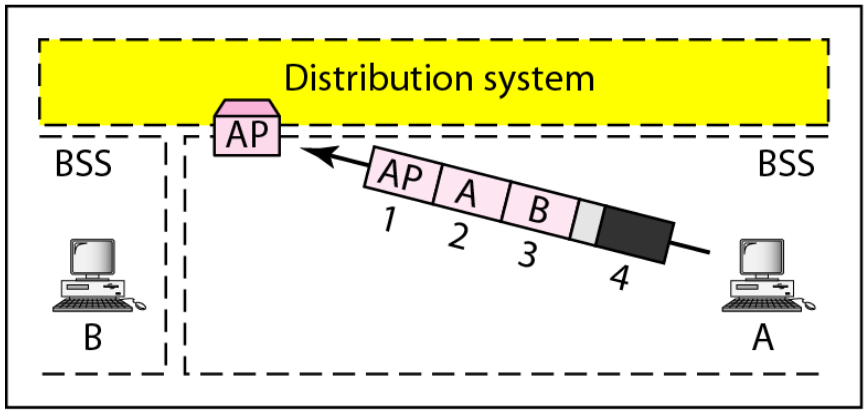
Addressing mechanisms



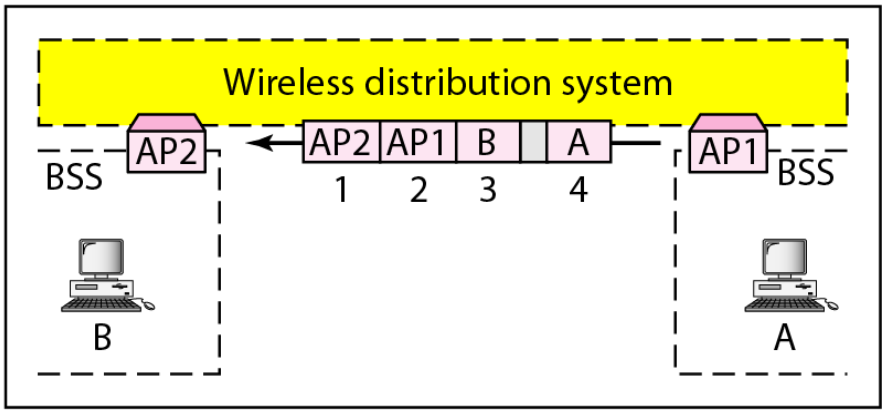
a. Case 1



b. Case 2

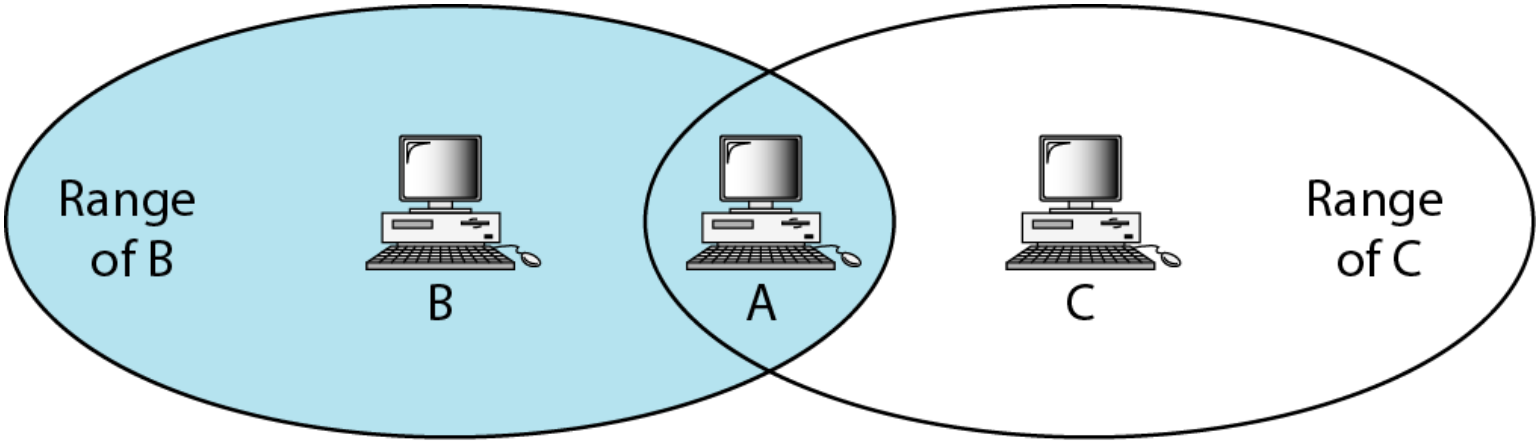


c. Case 3



d. Case 4

Hidden station problem

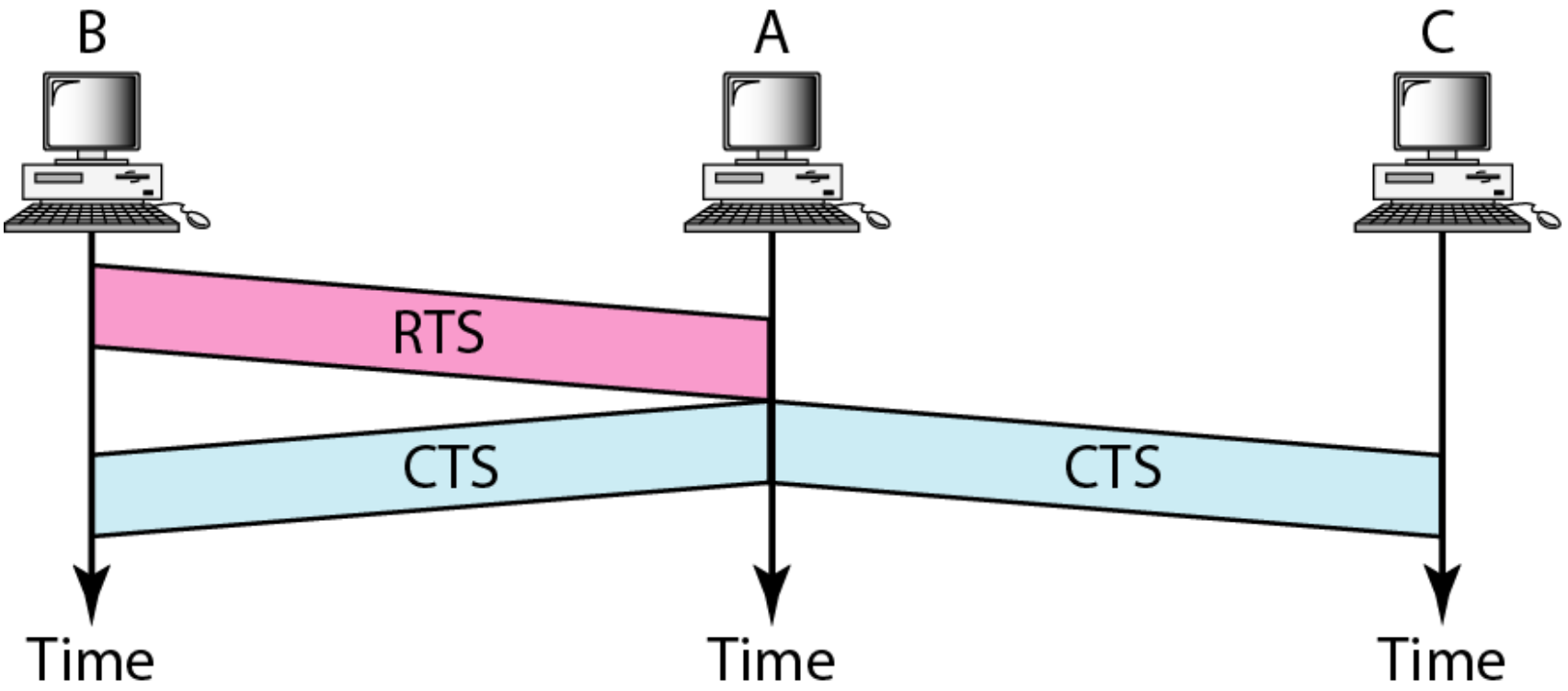


B and C are hidden from each other with respect to A.

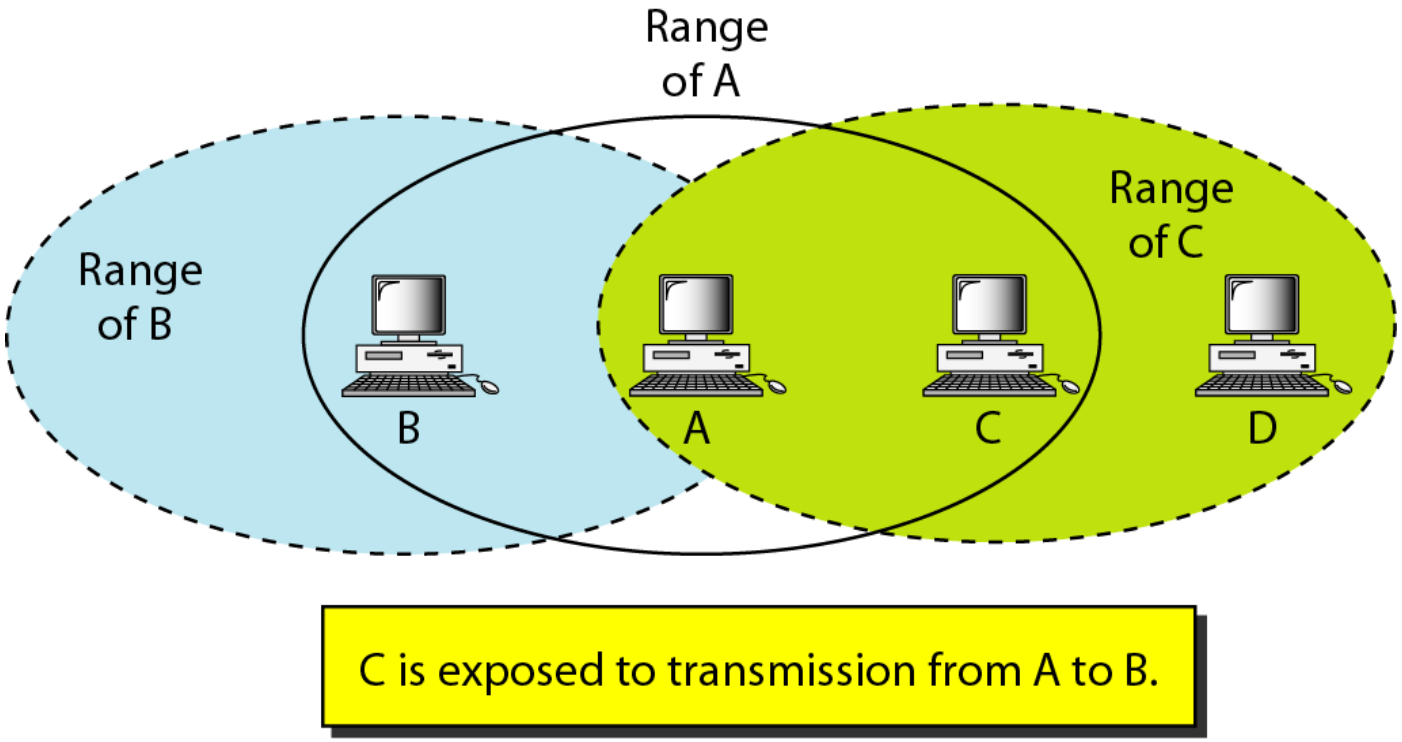
Note

The CTS frame in CSMA/CA handshake can prevent collision from a hidden station.

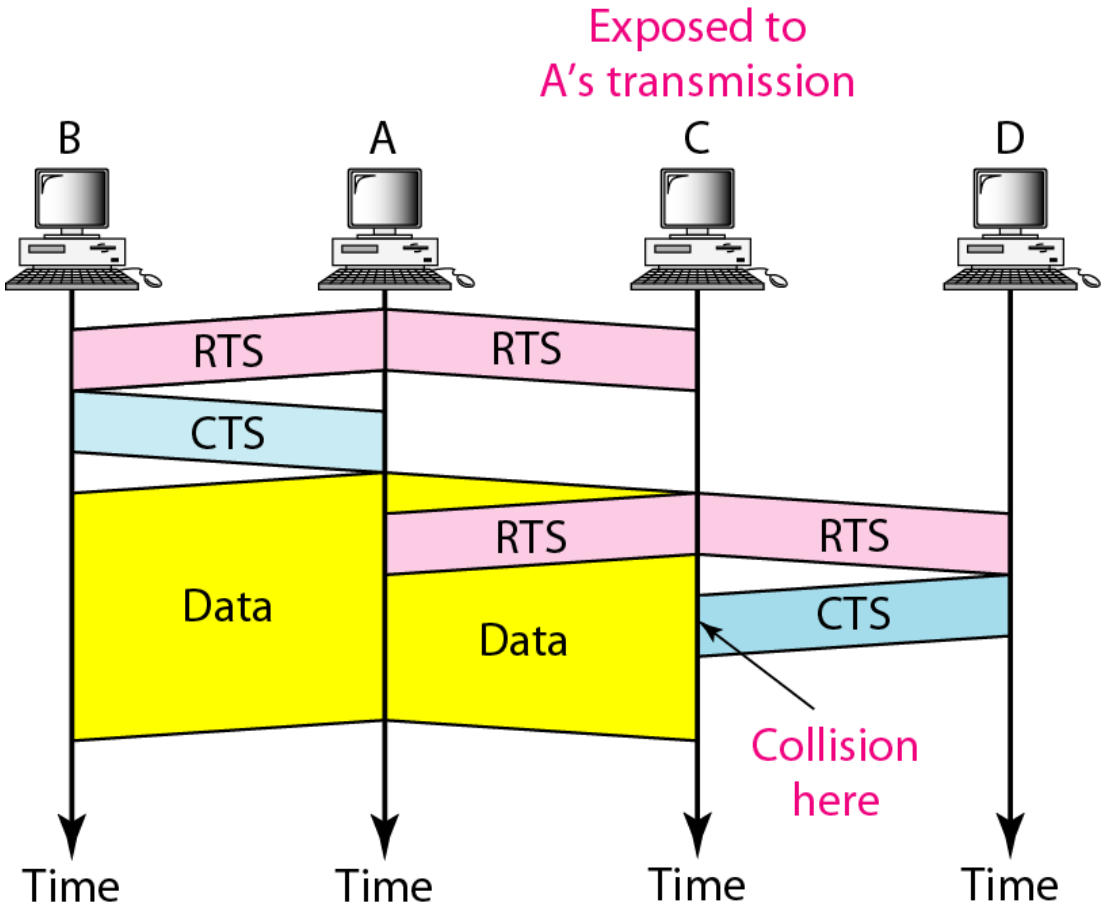
Use of handshaking to prevent hidden station problem



Exposed station problem



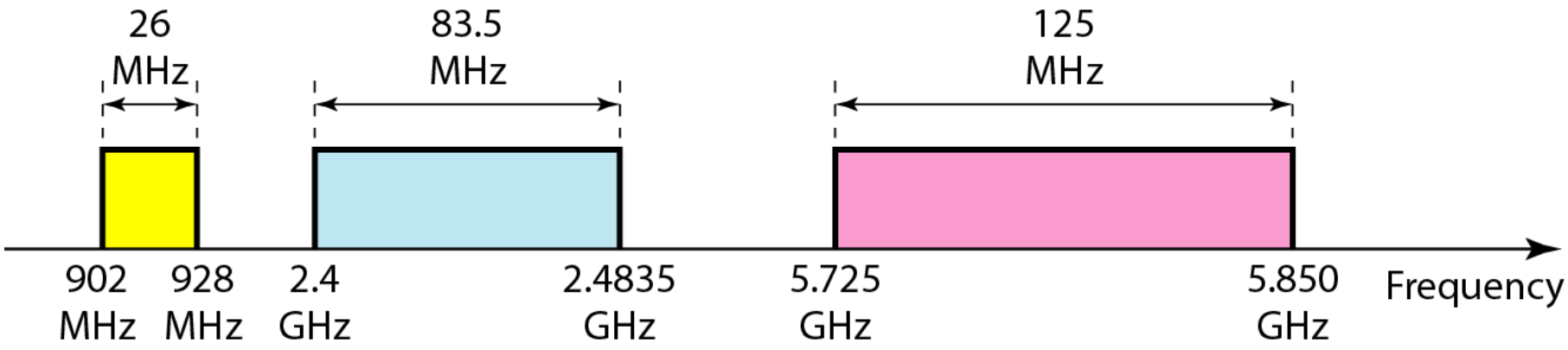
Use of handshaking in exposed station problem



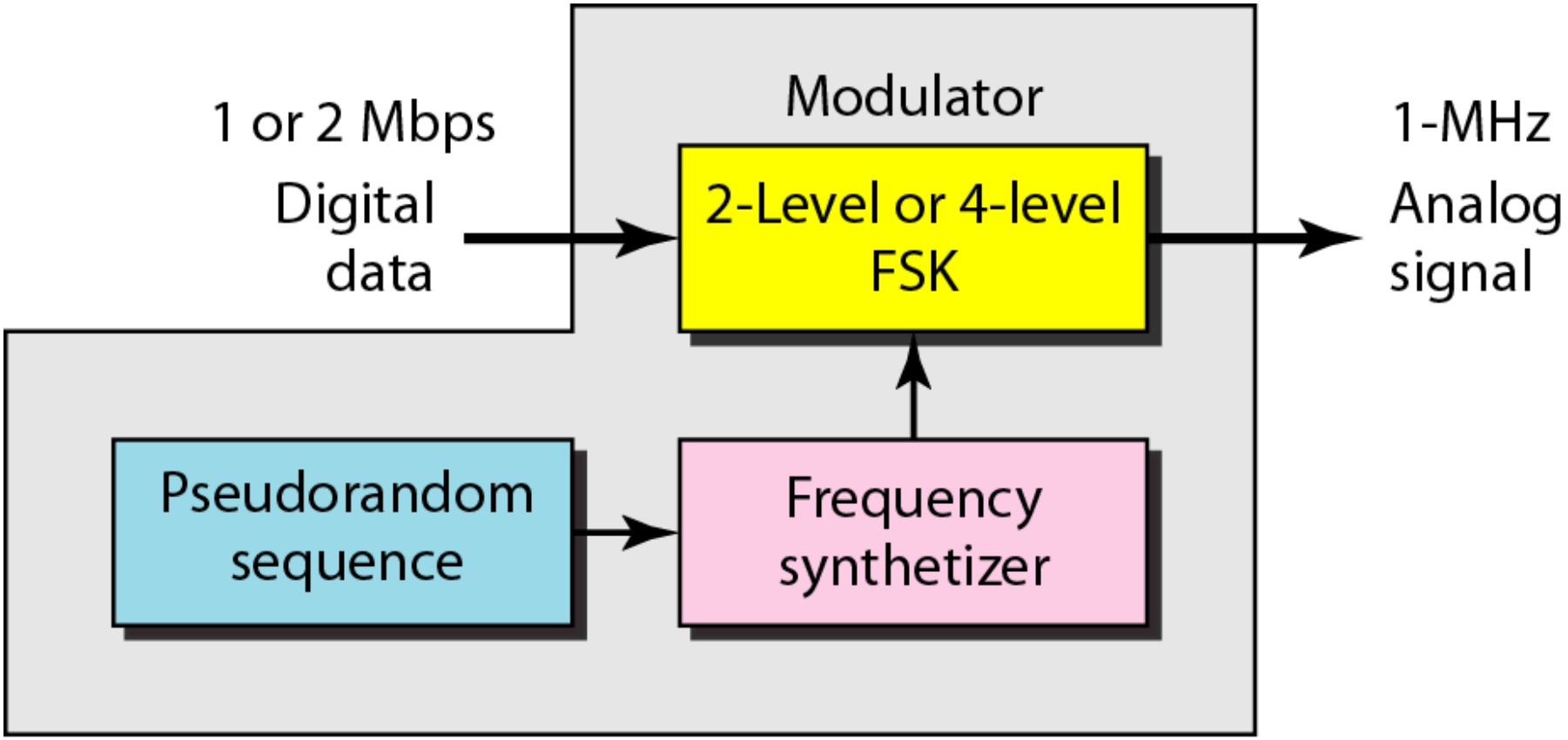
Physical layers

IEEE	*Technique*	*Band*	*Modulation*	*Rate (Mbps)*
802.11	FHSS	2.4 GHz	FSK	1 and 2
	DSSS	2.4 GHz	PSK	1 and 2
		Infrared	PPM	1 and 2
802.11a	OFDM	5.725 GHz	PSK or QAM	6 to 54
802.11b	DSSS	2.4 GHz	PSK	5.5 and 11
802.11g	OFDM	2.4 GHz	Different	22 and 54

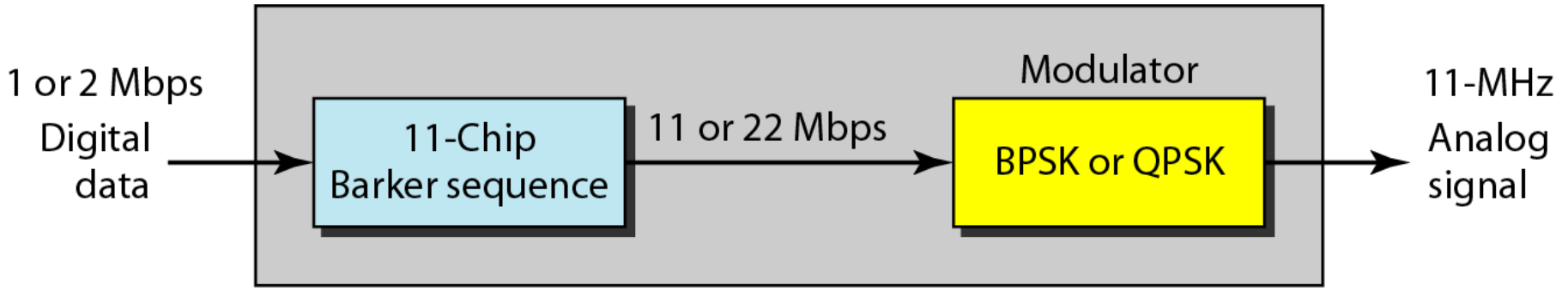
Industrial, scientific, and medical (ISM) band



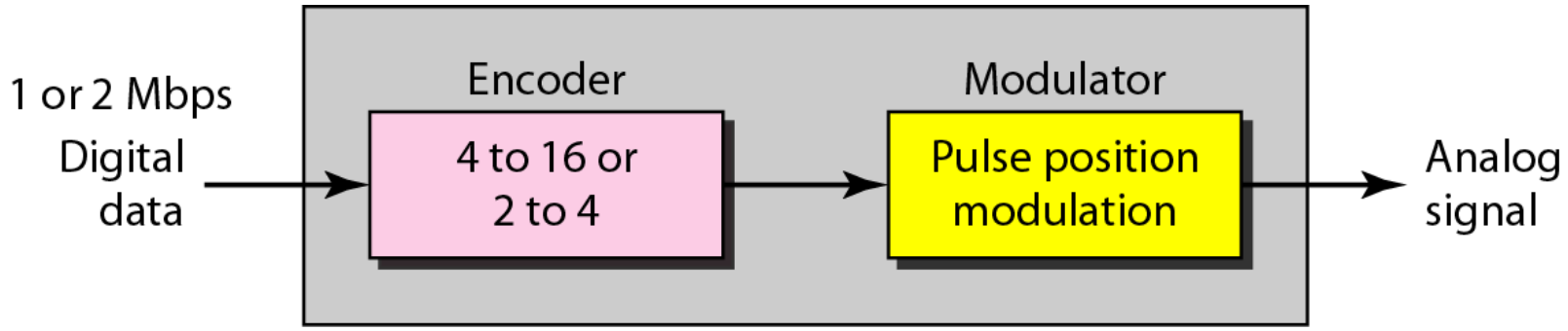
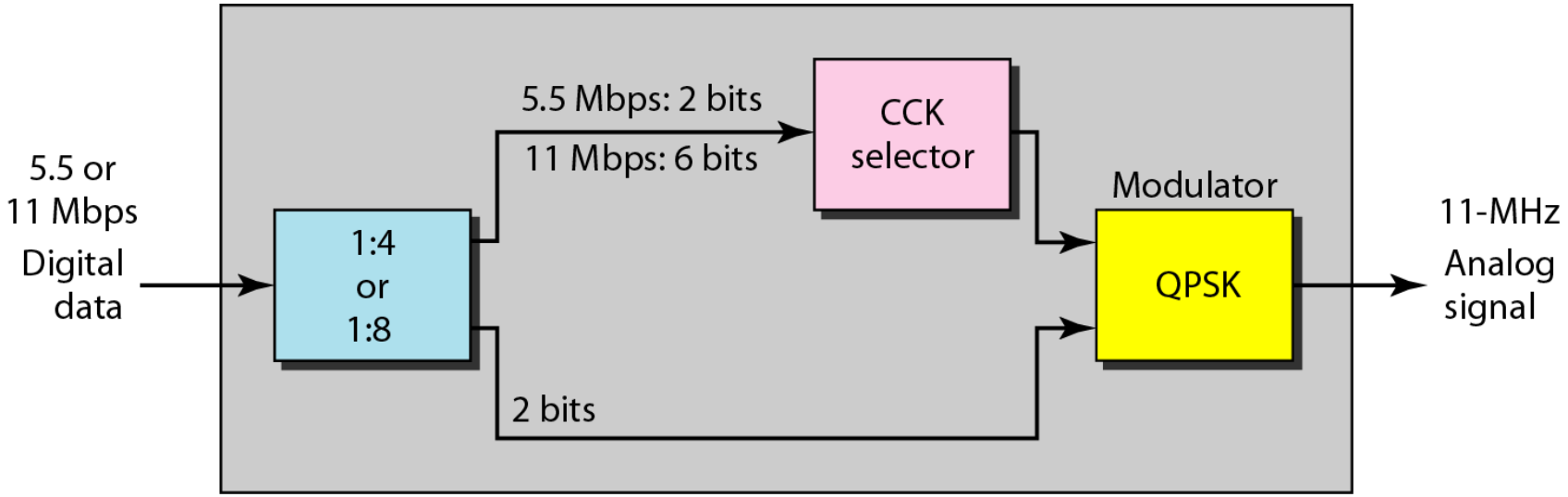
Physical layer of IEEE 802.11 FHSS



Physical layer of IEEE 802.11 DSSS



Physical layer of IEEE 802.11 infrared



Physical layer of IEEE 802.11b