

Module contents

★ IEEE 802.11 Terminology

★ IEEE 802.11 MAC Frames

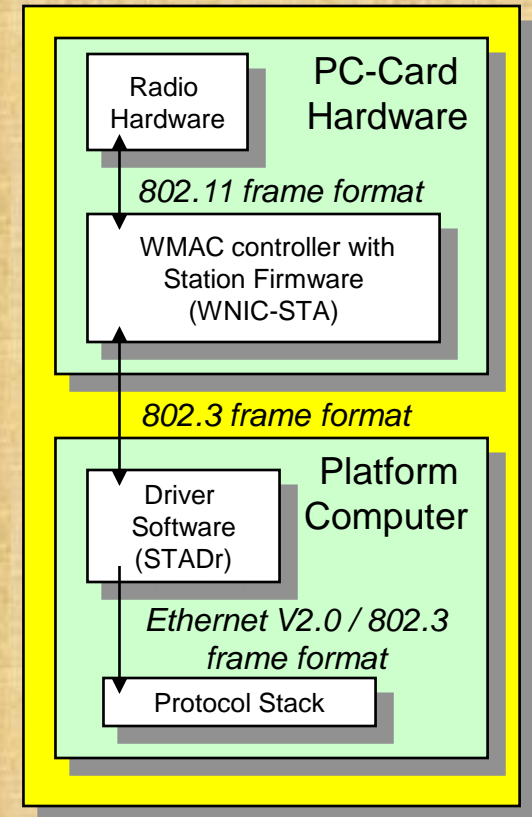
★ Basic processes in IEEE802.11 networks

★ Configuration parameters

IEEE 802.11 Terminology

Station (STA) Architecture:

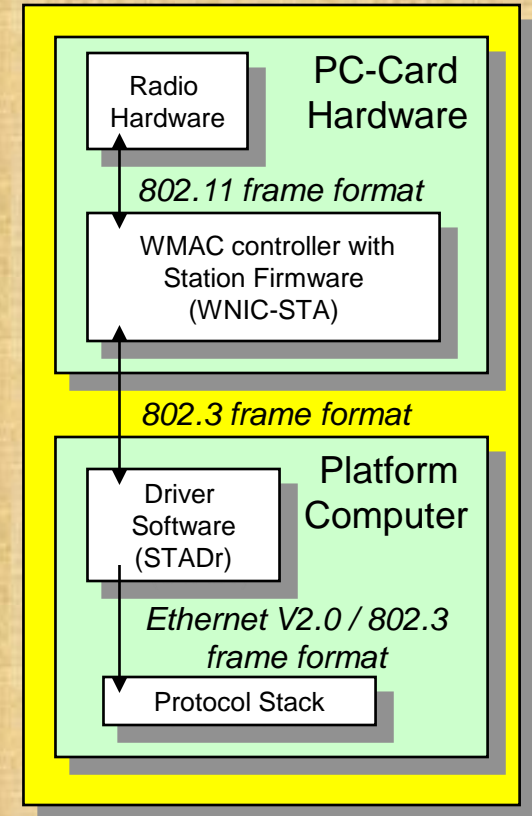
- ★ Device that contains IEEE 802.11 conformant MAC and PHY interface to the wireless medium, but does not provide access to a distribution system
- ★ Most often end-stations available in terminals (work-stations, laptops etc.)
- ★ Implemented in Avaya Wireless IEEE 802.11 PC-Card



IEEE 802.11 Terminology

Station (STA) Architecture (cont'd):

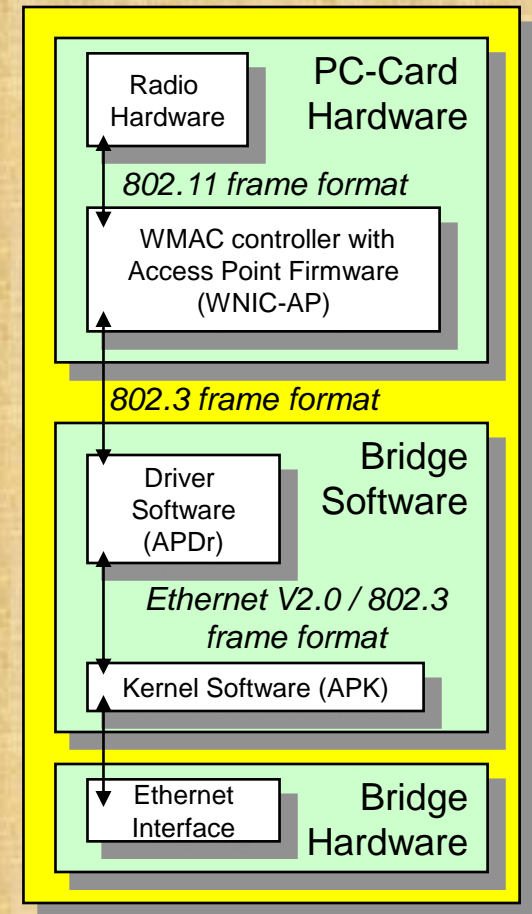
- ★ Ethernet-like driver interface
 - ★ supports virtually all protocol stacks
- ★ Frame translation according to IEEE Std 802.11H
 - ★ IEEE 802.3 frames: translated to 802.11
 - ★ Ethernet Types 8137 (Novell IPX) and 80F3 (ARP) encapsulated via the Bridge Tunnel encapsulation scheme
 - ★ All other Ethernet Types: encapsulated via the RFC 1042 (Standard for the Transmission of IP Datagrams over IEEE 802 Networks) encapsulation scheme
 - ★ Maximum Data limited to 1500 octets
- ★ Transparent bridging to Ethernet



IEEE 802.11 Terminology

Access-Point (AP) Architecture:

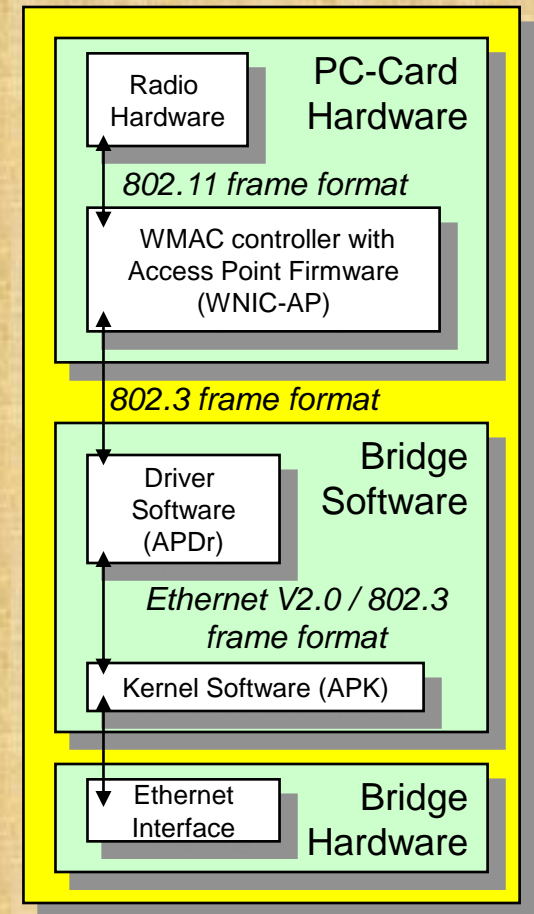
- ★ Device that contains IEEE 802.11 conformant MAC and PHY interface to the wireless medium, and provide access to a distribution system for associated stations
- ★ Most often infra-structure products that connect to wired backbones
- ★ Implemented in Avaya Wireless IEEE 802.11 PC-Card when it is inserted in an AP-500 or AP-1000



IEEE 802.11 Terminology

Access-Point (AP) Architecture (cont'd):

- ★ Stations select an Access-Point and “associate with it”
- ★ Access-Points :
 - ★ Support roaming
 - ★ Provide time synchronization functions (beaconing)
 - ★ Provide Power Management support
- ★ Traffic typically flows through Access-Point
 - ★ in IBSS direct Station-to-Station communication takes place

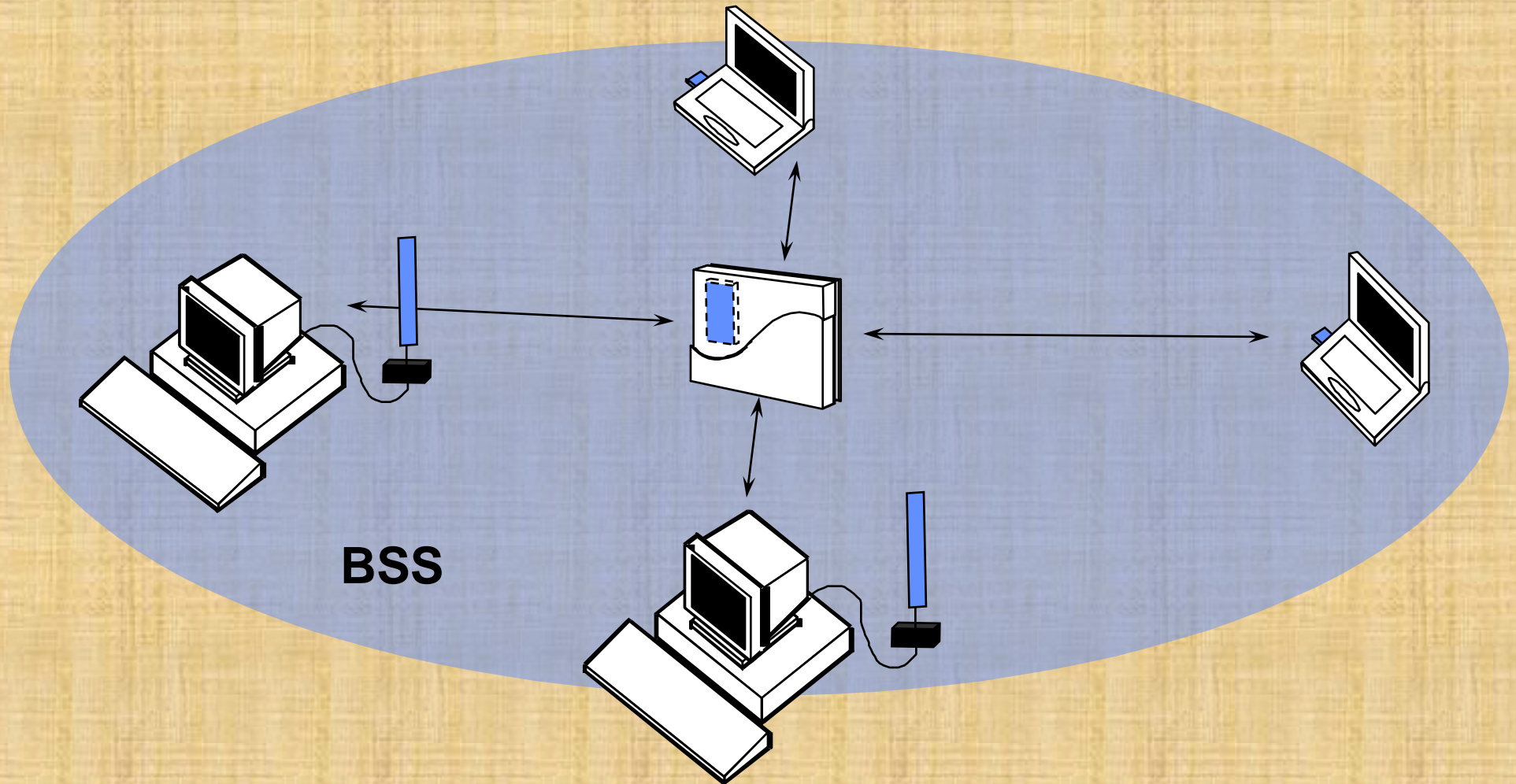


IEEE 802 .11 Terminology

Basic Service Set (BSS):

- ★ A set of stations controlled by a single “Coordination Function” (=the logical function that determines when a station can transmit or receive)
- ★ Similar to a “cell” in pre IEEE terminology
- ★ A BSS can have an Access-Point (both in standalone networks and in building-wide configurations), or can run without an Access-Point (in standalone networks only)
- ★ Diameter of the cell is app. twice the coverage-distance between two wireless stations

Basic Service Set (BSS)

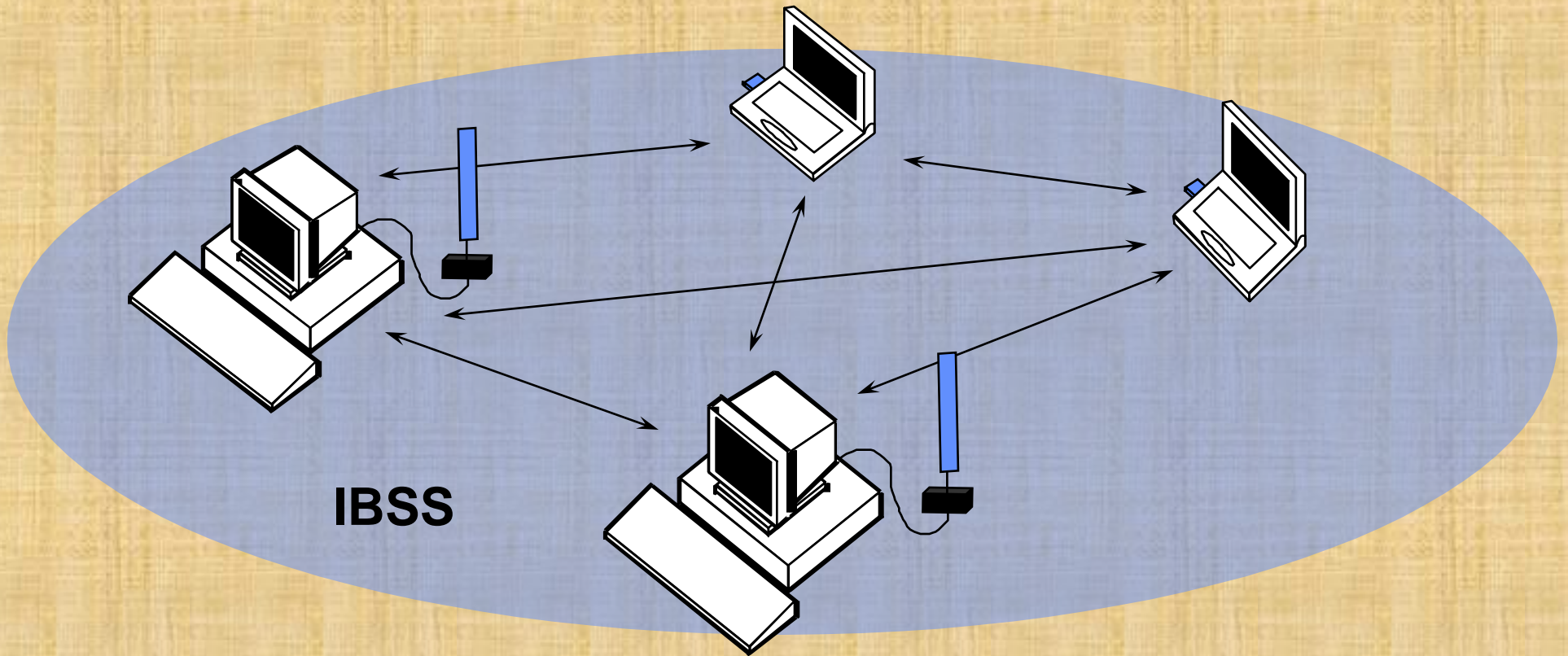


IEEE 802 .11 Terminology

Independent Basic Service Set (IBSS):

- ★ A Basic Service Set (BSS) which forms a self-contained network in which no access to a Distribution System is available
- ★ A BSS without an Access-Point
- ★ One of the stations in the IBSS can be configured to “initiate” the network and assume the Coordination Function
- ★ Diameter of the cell determined by coverage distance between two wireless stations

Independent Basic Service Set (IBSS)



IEEE 802 .11 Terminology

Extended Service Set (ESS):

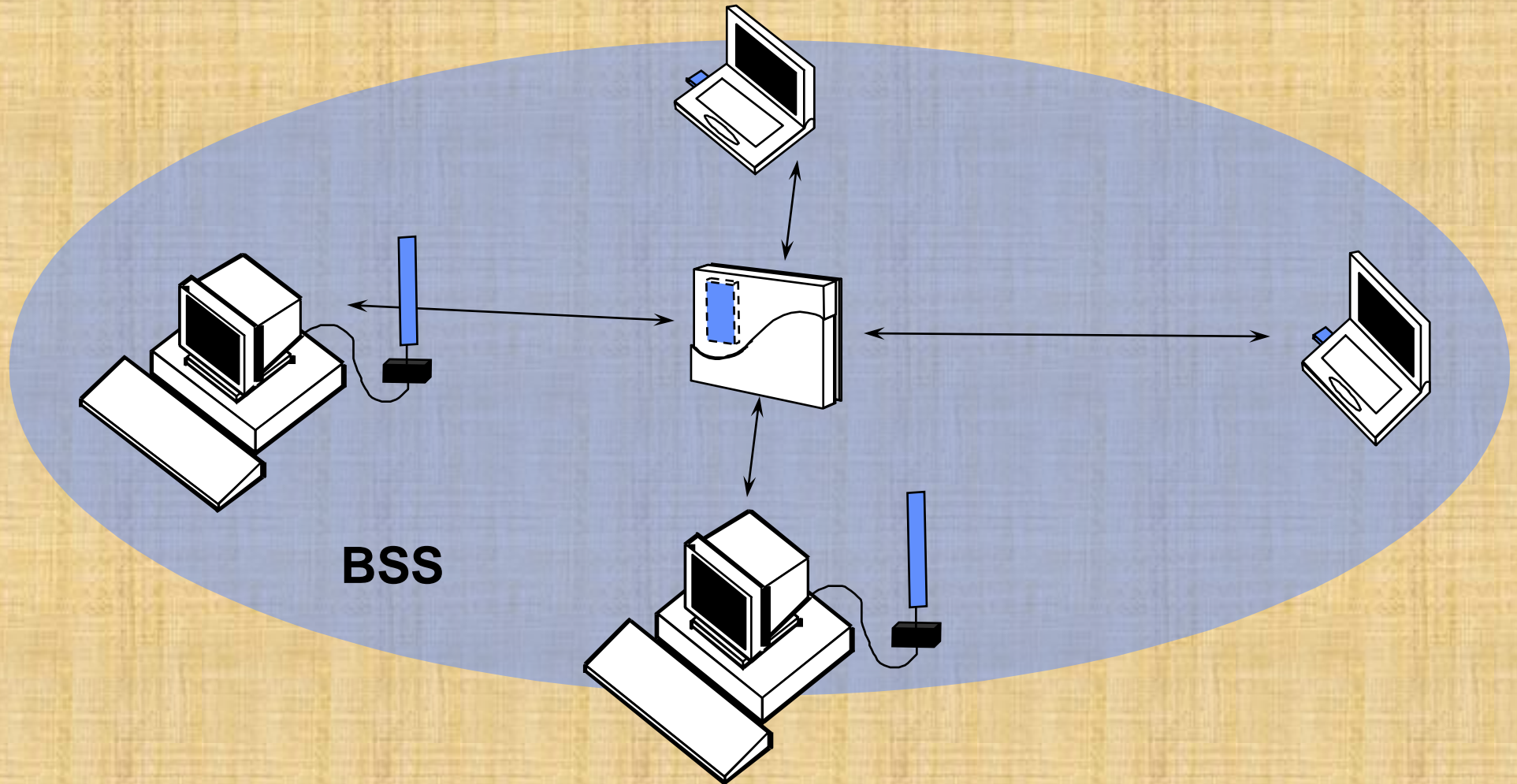
- ★ A set of one or more Basic Service Sets interconnected by a Distribution System (DS)
- ★ Traffic always flows via Access-Point
- ★ Diameter of the cell is double the coverage distance between two wireless stations

Distribution System (DS):

- ★ A system to interconnect a set of Basic Service Sets
 - ★ Integrated; A single Access-Point in a standalone network
 - ★ Wired; Using cable to interconnect the Access-Points
 - ★ Wireless; Using wireless to interconnect the Access-Points

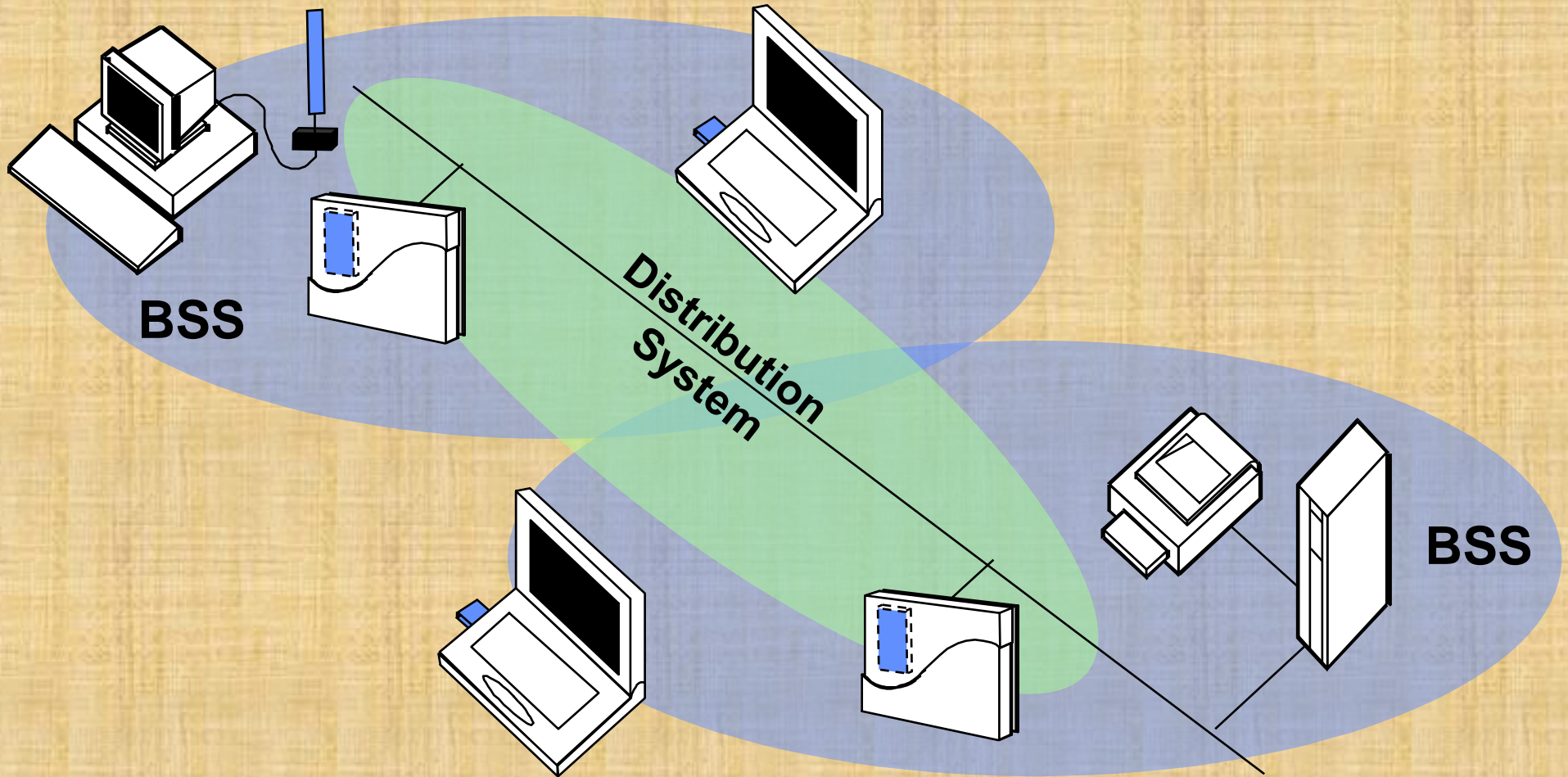
Extended Service Set (ESS)

single BSS (with integrated DS)



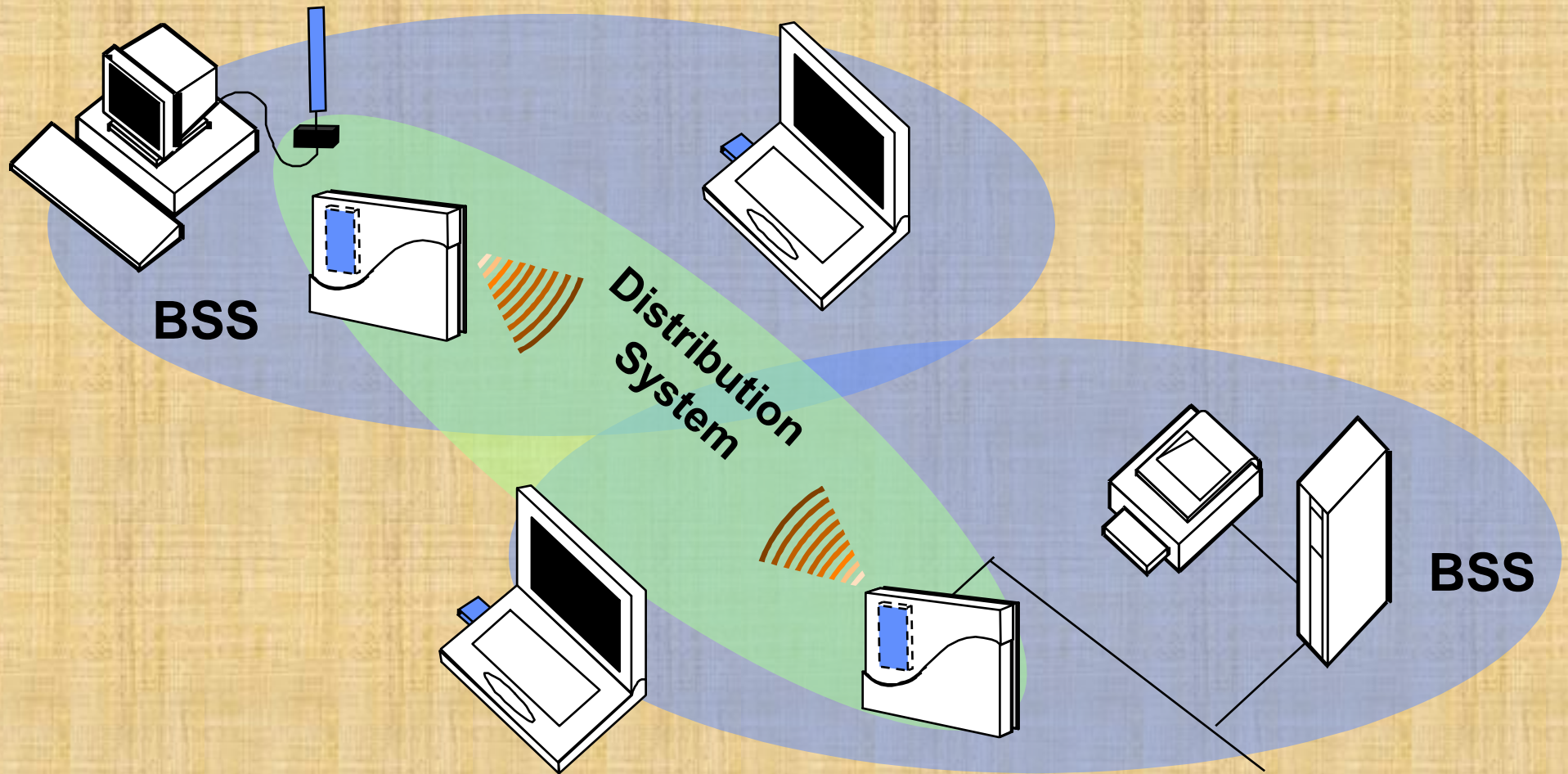
Extended Service Set (ESS)

BSS's with wired Distribution System (DS)



Extended Service Set (ESS)

BSS's and wireless Distribution System (DS)



IEEE 802 .11 Terminology

Service Set Identifier (SSID):

- ★ “Network name”
- ★ 32 octets long
- ★ Similar to “Domain-ID” in the pre-IEEE WaveLAN systems
- ★ One network (ESS or IBSS) has one SSID

IEEE 802 .11 Terminology

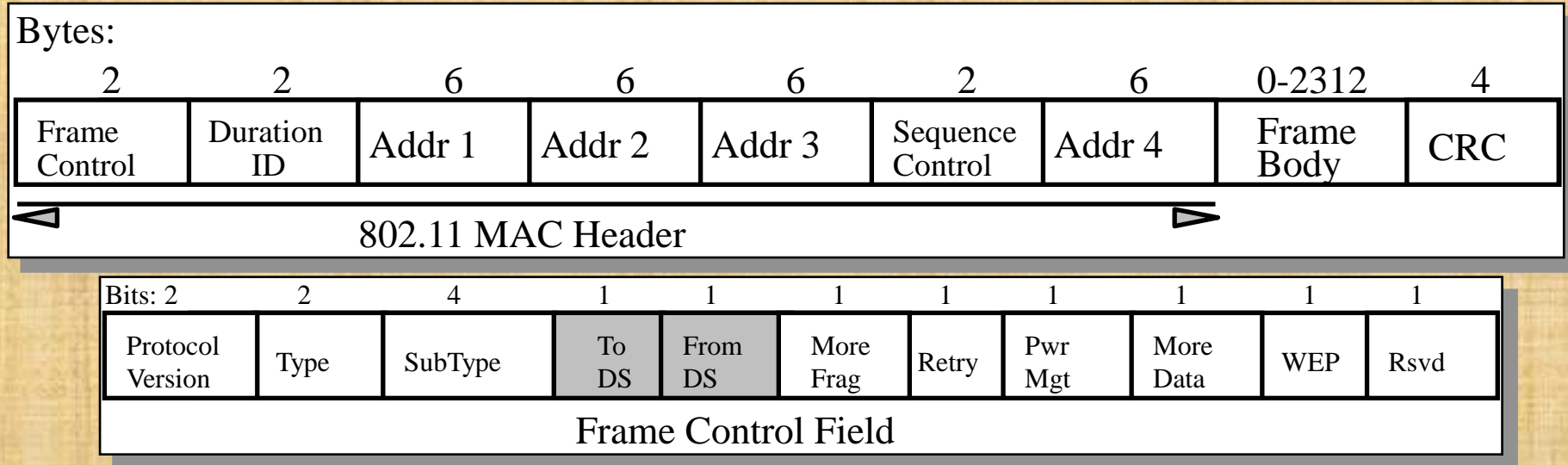
Basic Service Set Identifier (BSSID)

- ★ “cell identifier”
- ★ 6 octets long (MAC address format)
- ★ Similar to NWID in pre-IEEE WaveLAN systems
- ★ One BSS has one SSID
- ★ Value of BSSID is the same as the MAC address of the radio in the Access-Point

Module contents

- ★ IEEE 802.11 Terminology
- ★ **IEEE 802.11 MAC Frames**
- ★ Basic processes in IEEE802.11 networks
- ★ Configuration parameters

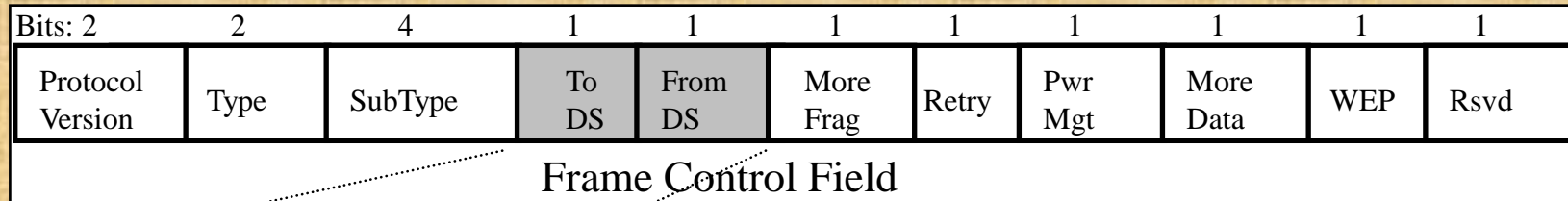
Frame Formats



MAC Header format differs per Type:

- ★ Control Frames (several fields are omitted)
- ★ Management Frames
- ★ Data Frames

Address Field Description



To DS	From DS	Address 1	Address 2	Address 3	Address 4
0	0	DA	SA	BSSID	N/A
0	1	DA	BSSID	SA	N/A
1	0	BSSID	SA	DA	N/A
1	1	RA	TA	DA	SA

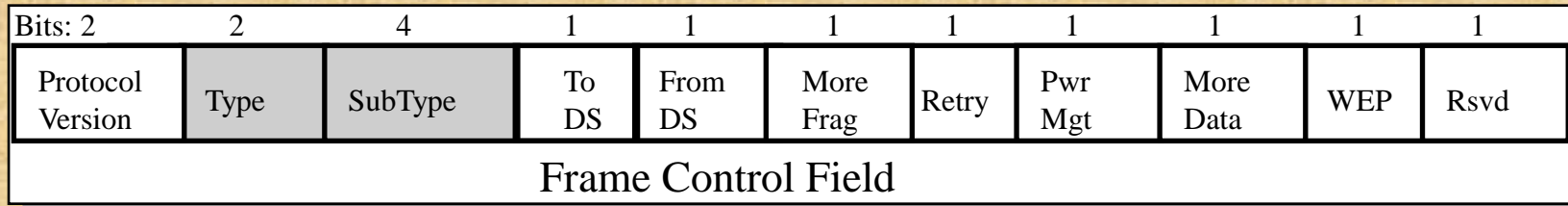
Addr. 1 = All stations filter on this address.

Addr. 2 = Transmitter Address (TA), Identifies transmitter to address the ACK frame to.

Addr. 3 = Dependent on *To* and *From DS* bits.

Addr. 4 = Only needed to identify the original source of WDS (*Wireless Distribution System*) frames

Type field descriptions



Type and subtype identify the function of the frame:

★ Type=00 Management Frame

Beacon (Re)Association
Probe (De)Authentication
Power Management

★ Type=01 Control Frame

RTS/CTS ACK

★ Type=10 Data Frame

MAC Management Frames

★ Beacon

- ★ Timestamp, Beacon Interval, Capabilities, SSID, Supported Rates, parameters
- ★ Traffic Indication Map

★ Probe

- ★ SSID, Capabilities, Supported Rates

★ Probe Response

- ★ Timestamp, Beacon Interval, Capabilities, SSID, Supported Rates, parameters
- ★ same for Beacon except for TIM

MAC Management Frames (cont'd)

- ★ Association Request

 - ★ Capability, Listen Interval, SSID, Supported Rates

- ★ Association Response

 - ★ Capability, Status Code, Station ID, Supported Rates

- ★ Re-association Request

 - ★ Capability, Listen Interval, SSID, Supported Rates, Current AP Address

- ★ Re-association Response

 - ★ Capability, Status Code, Station ID, Supported Rates

MAC Management Frames (cont'd)

- ★ Dis-association

- ★ Reason code

- ★ Authentication

- ★ Algorithm, Sequence, Status, Challenge Text

- ★ De-authentication

- ★ Reason