WLAN Concepts 2

802.11 Wireless Topology Modes

Ad hoc - connect clients in peer-to-peer manner without an AP

Infrastructure - connect clients to the network using an AP

Tethering - Variation of ad hoc topology
- Smartphone or tablet w/ cellular data access is enabled to create a personal hotspot

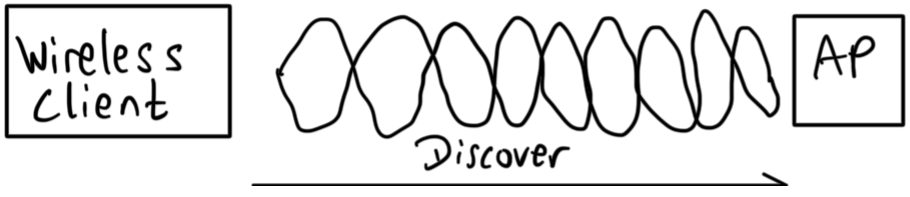
2 Infrastructure topology blocks : Basic Service Set (BSS)
: Extended Service Set (ESS)

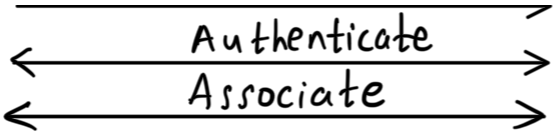
BSS - Uses single AP
- To interconnect all associated wireless clients
- Clients in different BSSs cannot communicate

ESS - A union of two /more BSSs
- Interconnected by wired distribution system
- Clients in different BSSs can communicate through the ESS

WLAN Operation

Wireless Client and AP Association





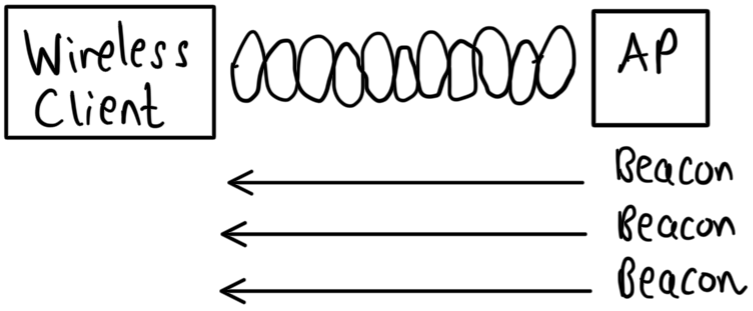
Parameters requirements for AP association

(1) SSID : Network name to connect
(2) Password : Client to AP authentication
(3) Network Mode : 802.11 standard in use
(4) Security Mode : Security Parameter Settings (WEP, WPA, WPA2, WPA3)
(5) Channel settings : Frequency bands in use

Passive / Active Discover Mode [Probing / Scaning]

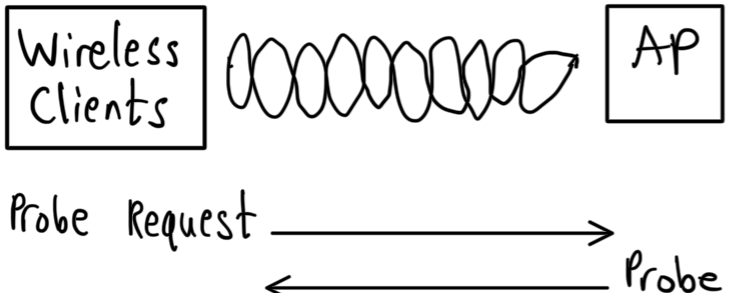
Passive : AP openly advertises its service by periodically sending broadcast beacon frames

Beacon frames = SSID + Supported IEEE Standards + Security Settings



Passive Mode

Active : Wireless Clients must know SSID name
Initiates the process from client by broadcasting a probe request frame on multiple channels



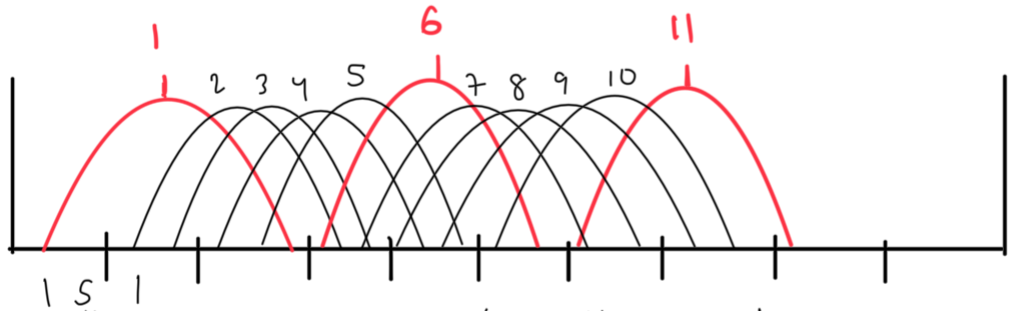
Active Mode

Response

Probe Request = SSID + Supported IEEE standards

Probe Response = SSID + Supported IEEE standards + Security Settings

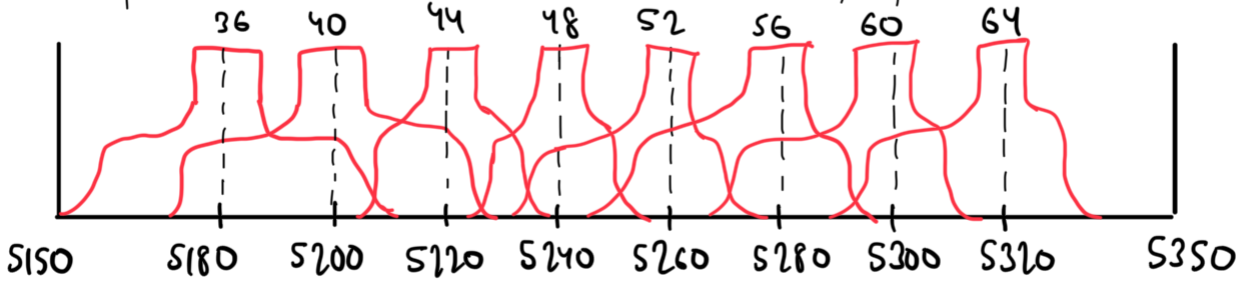
Channel Selection



- 2.4 GHz band → 11 channels
22 MHz each

* Each channel differs by 5 MHz

For 802.11 b/g/n WLANs requiring multiple APs → Use multiple non-overlapping channels such as 1, 6, 11



- 5 GHz band → 24 channels

* Each channel differs by 20 MHz

Multiple non-overlapping channels : 36, 48, 60

WLAN Deployment dependencies

(1) Geographical layout
(2) Number of bodies and devices
(3) Data rate per user
(4) Use of non-overlapping channels by multiple APs
(5) Power Transmission settings