

COMPUTER NETWORKS LAB (CS315)

Assignment-12

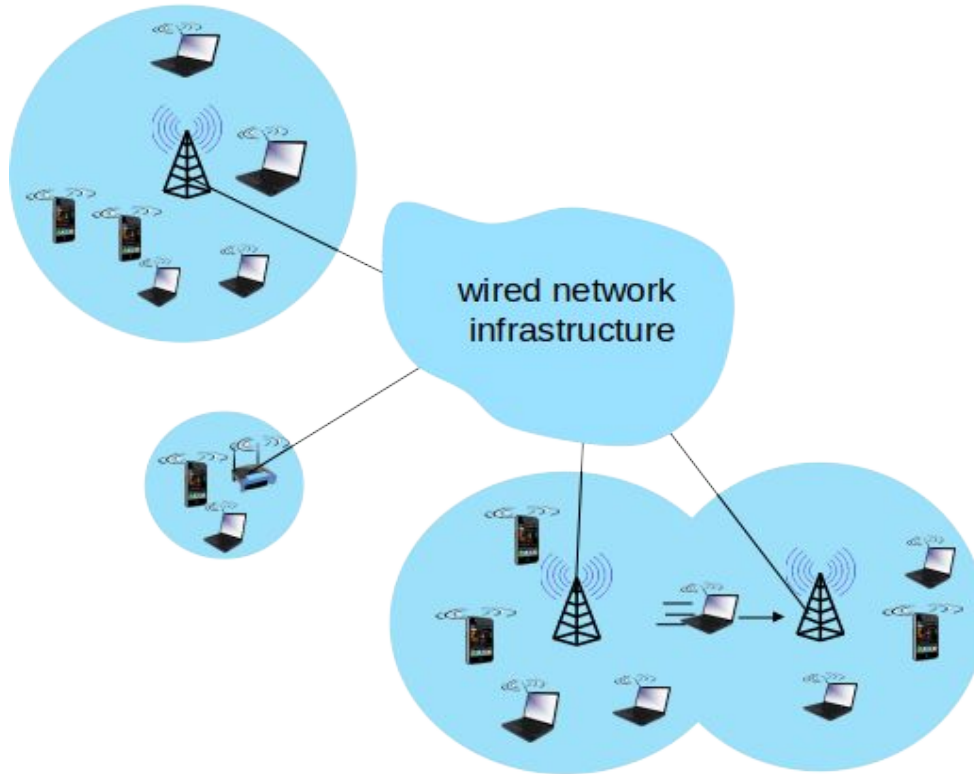
802.11 WiFi

Date: 28 March 2024

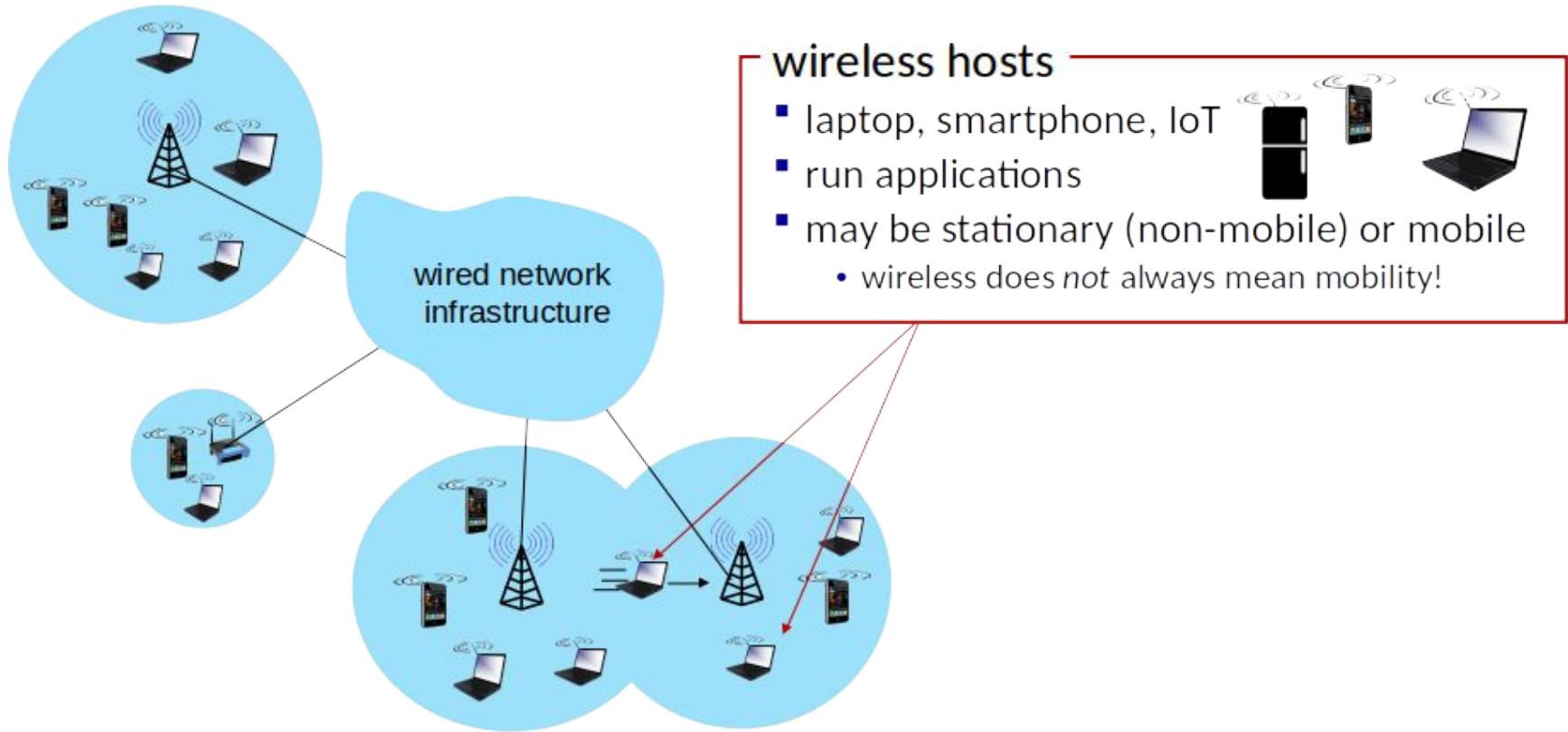


Indian Institute of Technology Dharwad
भारतीय प्रौद्योगिकी संस्थान धारवाड़

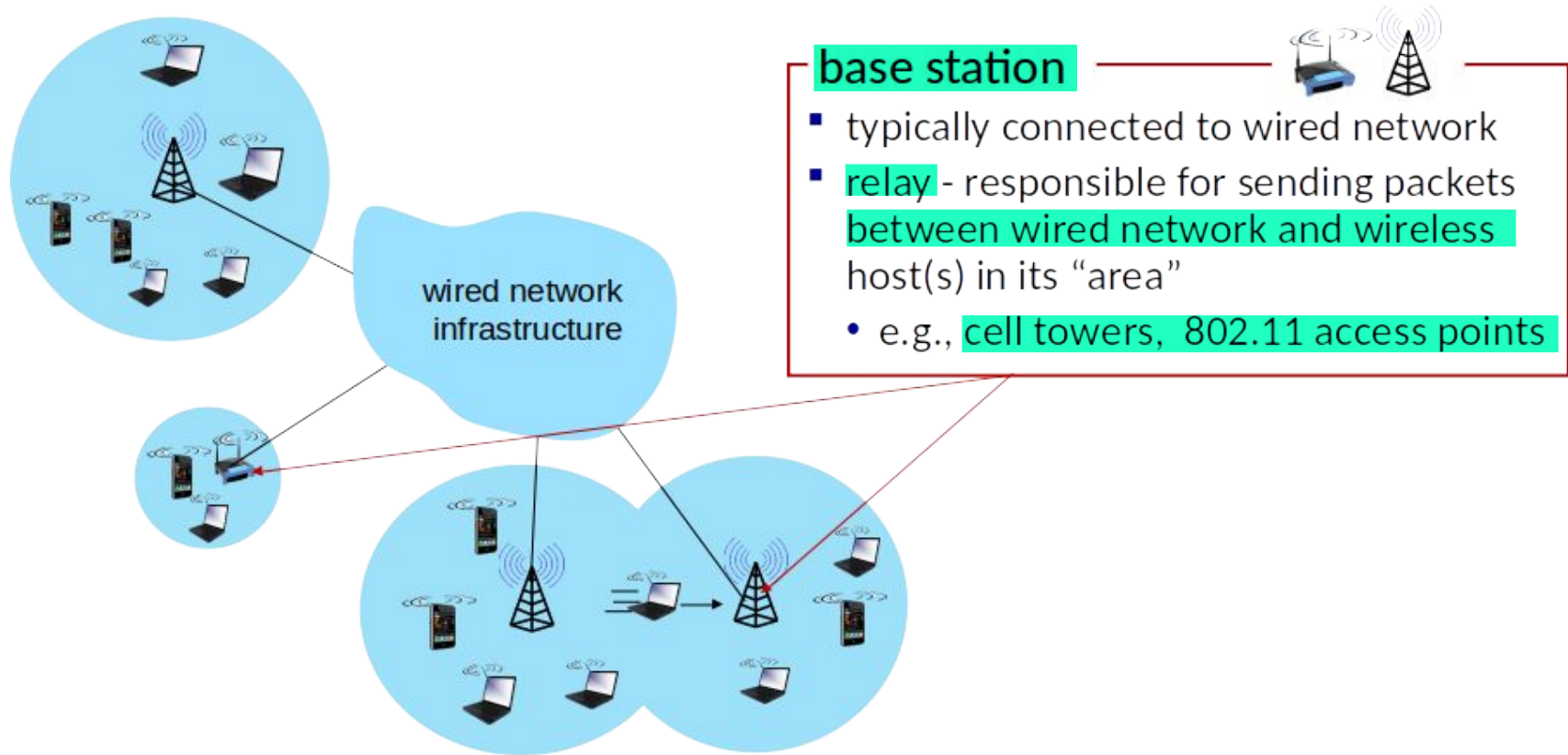
Elements of a wireless network



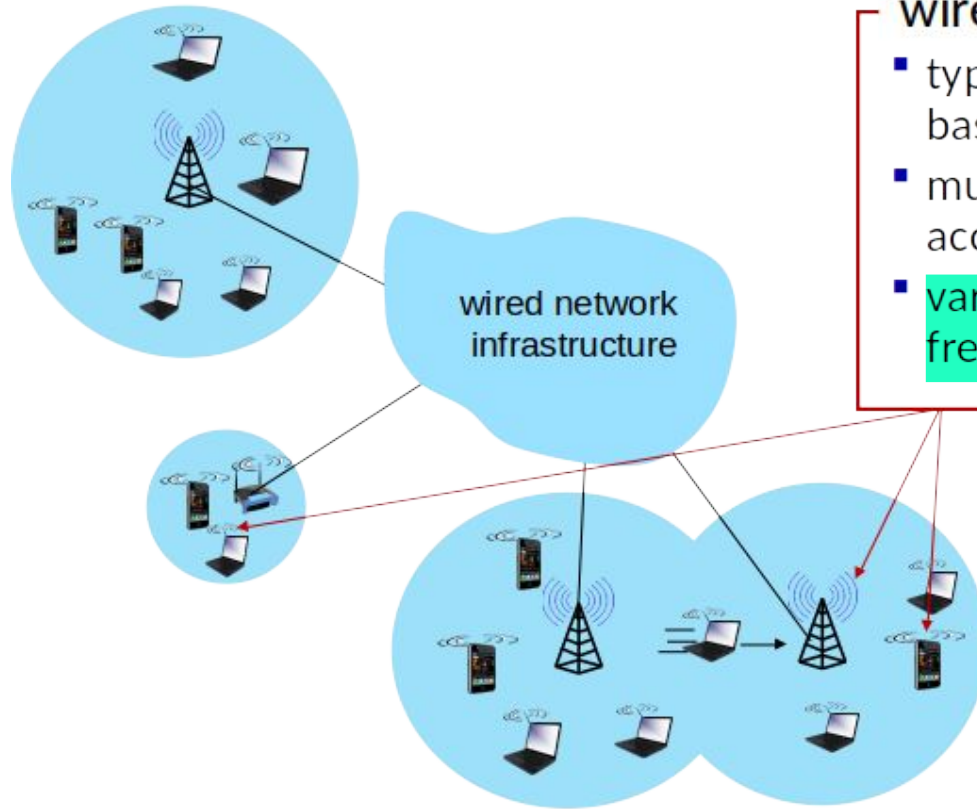
Elements of a wireless network



Elements of a wireless network



Elements of a wireless network

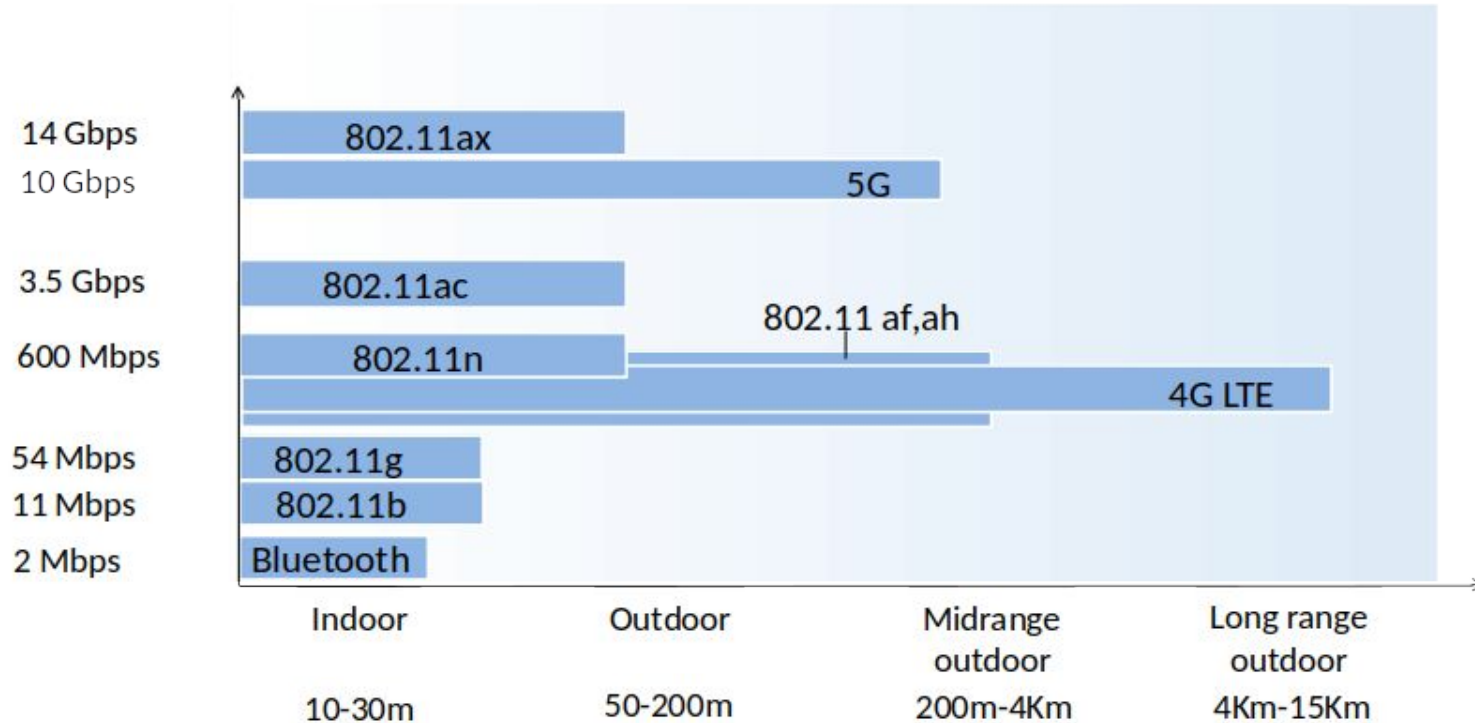


wireless link

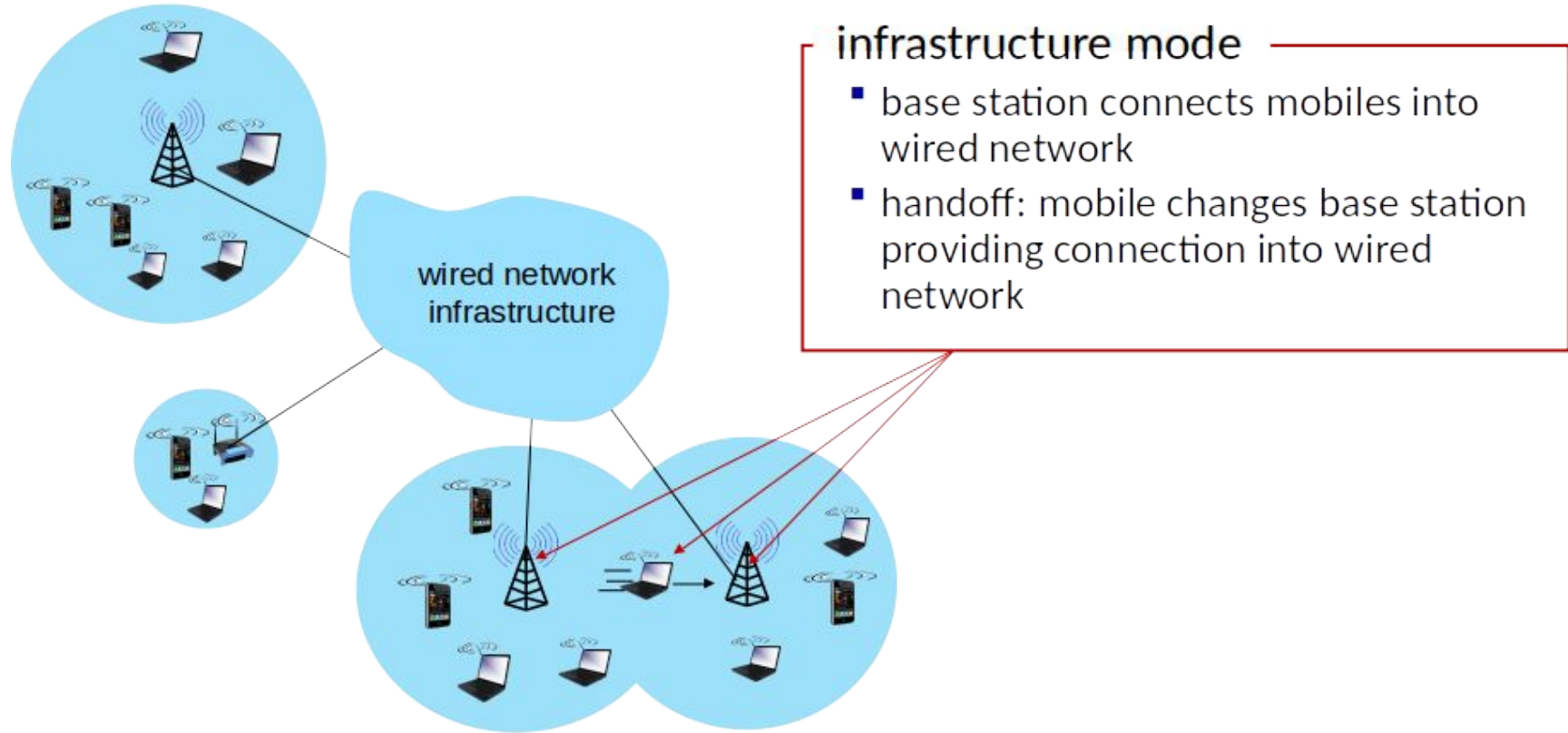


- typically used to connect mobile(s) to base station, also used as **backbone link**
- multiple access protocol coordinates link access
- **various transmission rates and distances, frequency bands**

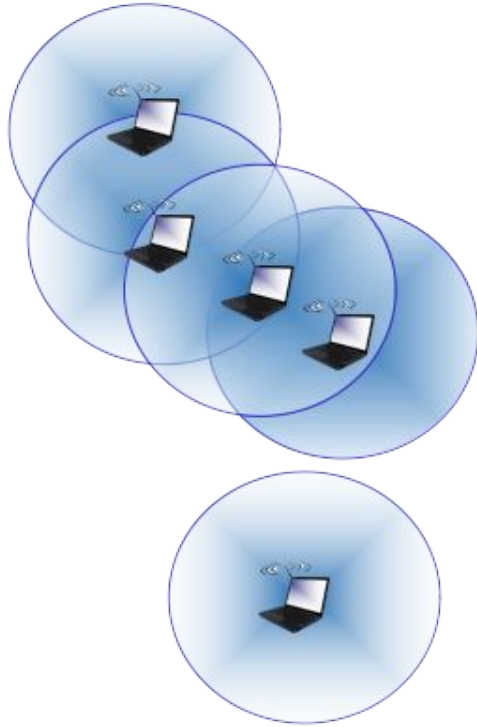
Characteristics of selected wireless links



Elements of a wireless network



Elements of a wireless network



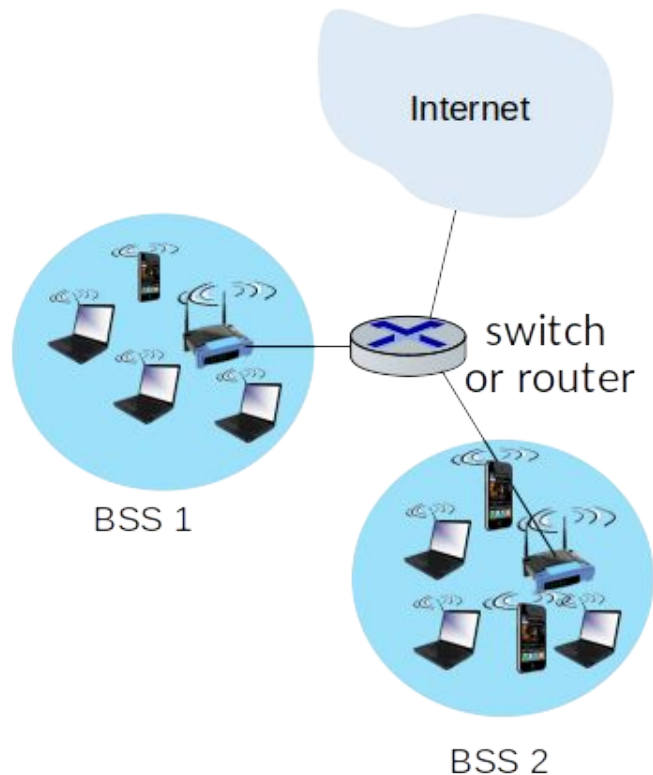
ad hoc mode

- no base stations
- nodes can only transmit to other nodes within link coverage
- nodes organize themselves into a network: route among themselves

Wireless network taxonomy

	single hop	multiple hops
infrastructure (e.g., APs)	host connects to base station (WiFi, cellular) which connects to larger Internet	host may have to relay through several wireless nodes to connect to larger Internet: <i>mesh net</i>
<i>no infrastructure</i>	no base station, no connection to larger Internet (Bluetooth, ad hoc nets)	no base station, no connection to larger Internet. May have to relay to reach other a given wireless node MANET, VANET

802.11 LAN architecture



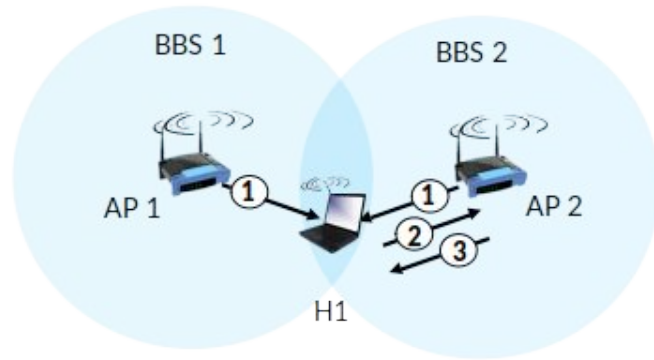
- wireless host communicates with base station
 - base station = access point (AP)
- Basic Service Set (BSS) (aka “cell”) in infrastructure mode contains:
 - wireless hosts
 - access point (AP): base station
 - ad hoc mode: hosts only

802.11: Channels, association

- spectrum divided into channels at different frequencies
 - AP admin chooses frequency for AP
 - interference possible: channel can be same as that chosen by neighboring AP!
- arriving host: must associate with an AP
 - scans channels, listening for beacon frames containing AP's name (SSID) and MAC address
 - selects AP to associate with
 - then may perform authentication [Chapter 8]
 - then typically run DHCP to get IP address in AP's subnet

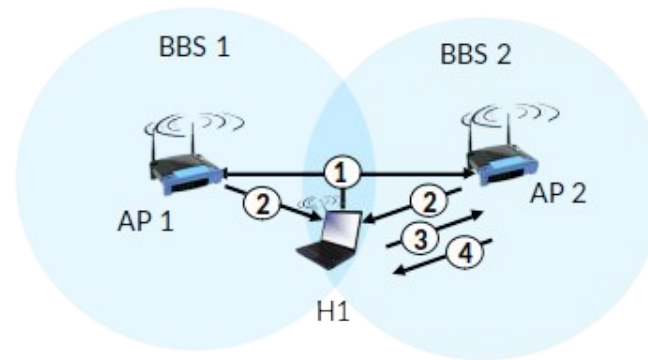


802.11: passive/active scanning



passive scanning:

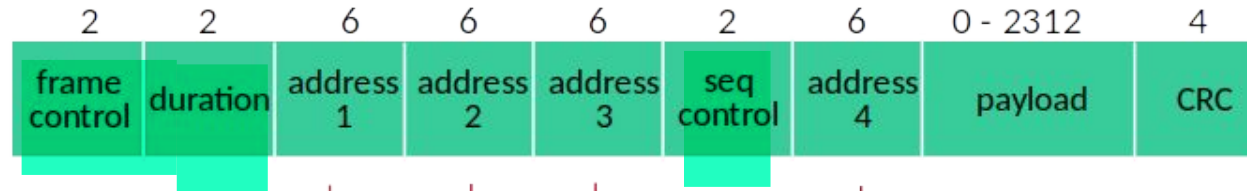
- (1) beacon frames sent from APs
- (2) association Request frame sent: H1 to selected AP
- (3) association Response frame sent from selected AP to H1



active scanning:

- (1) Probe Request frame broadcast from H1
- (2) Probe Response frames sent from APs
- (3) Association Request frame sent: H1 to selected AP
- (4) Association Response frame sent from selected AP to H1

802.11 frame: addressing



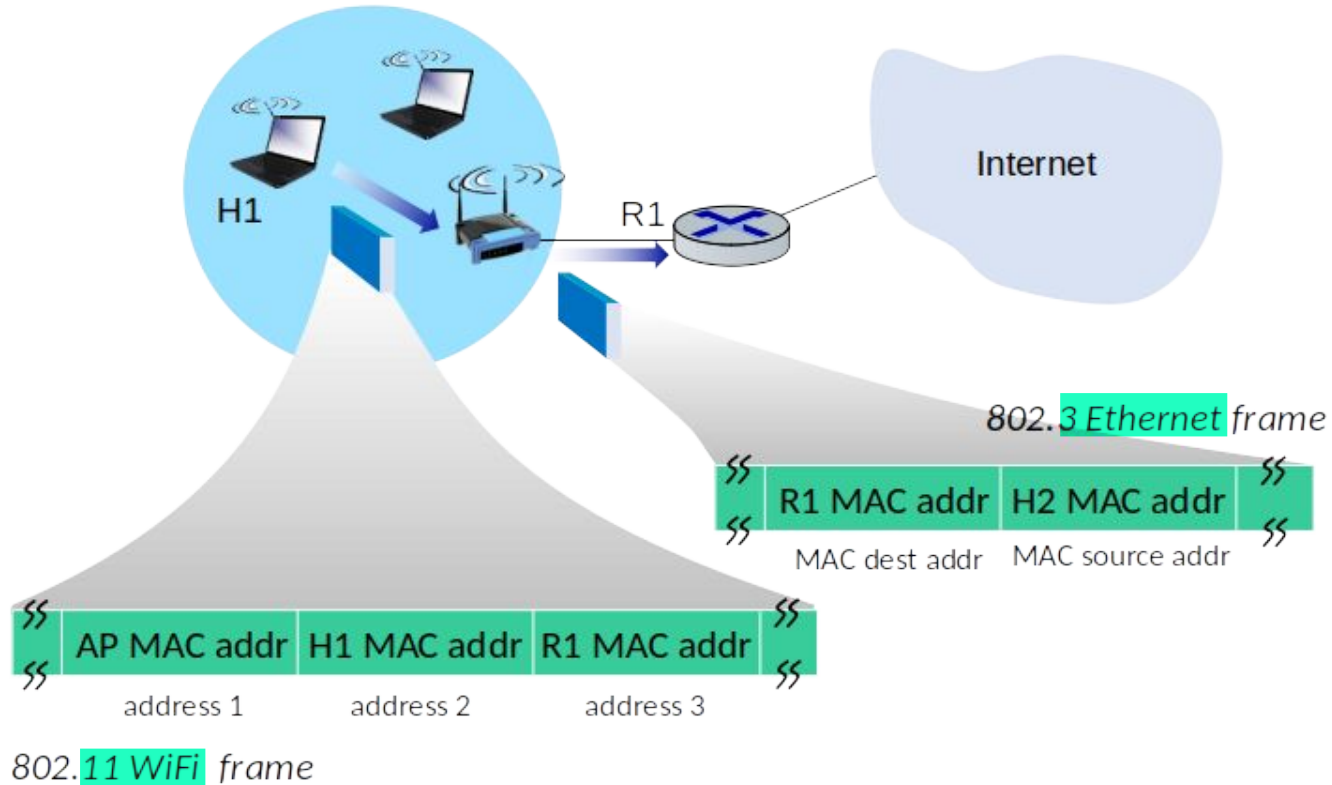
Address 1: MAC address of wireless host or AP to receive this frame

Address 2: MAC address of wireless host or AP transmitting this frame

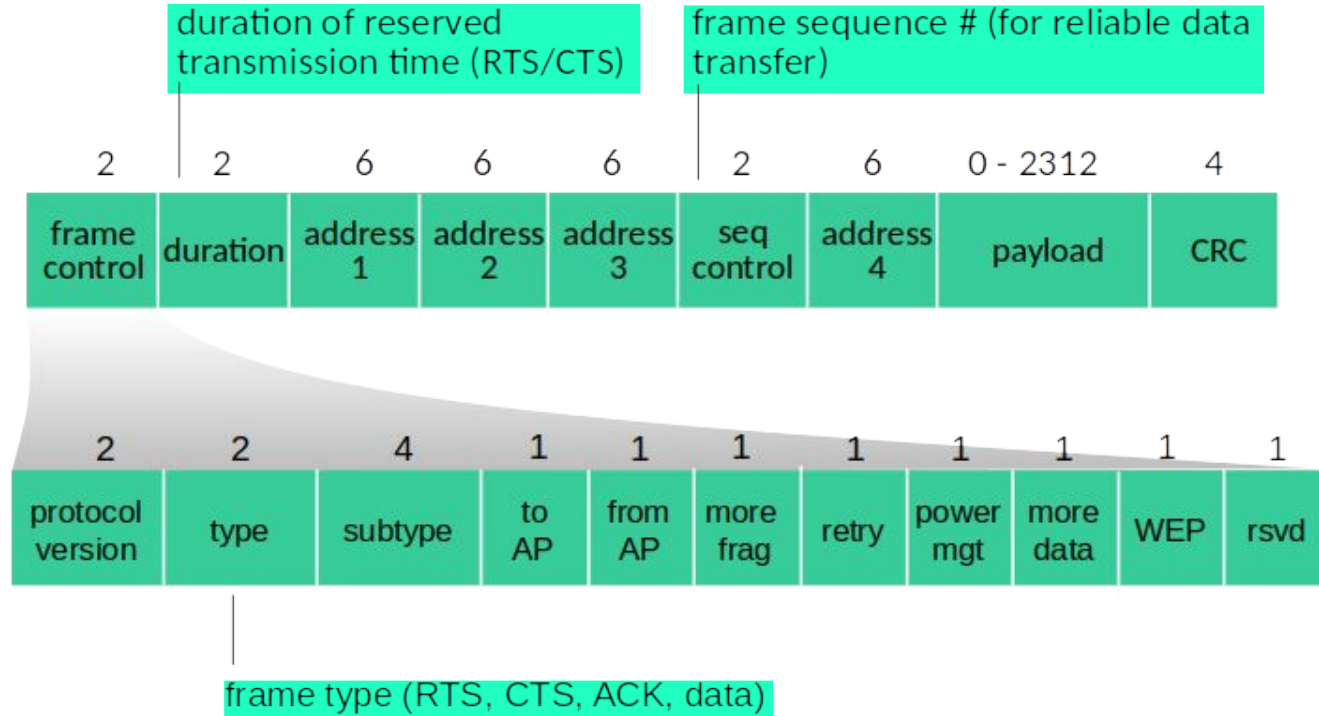
Address 3: MAC address of router interface to which AP is attached

Address 4: used only in ad hoc mode

802.11 frame: addressing



802.11 frame: addressing



Thank you