Wireless MAC

1   Elements of a wireless network

Wireless hosts:

- Laptop, smartphone

- Run applications

- May be stationary or mobile

Base station:

- Typically connected to wired network

- Relay - responsible for sending packets between wired network and wireless host(s) in its "area"

Wireless link:

- Typically used to connect mobile(s) to base station

- Also used as backbone link

- Multiple access protocol coordinates link access

- Various data rates, transmission distances

Infrastructure mode:

- Base station connects mobiles into wired network

- Handoff: mobile changes base station providing connection into wired 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

Standard	Frequency Range	Data Rate
802.11b	2.4 GHz	Up to 11 Mbps
802.11a	5 GHz	Up to 54 Mbps
802.11g	2.4 GHz	Up to 54 Mbps
802.11n	2.4 GHz and 5 GHz	Up to 450 Mbps
802.11ac	5GHz	Up to 1300 Mbps

2   Wireless Link Characteristics
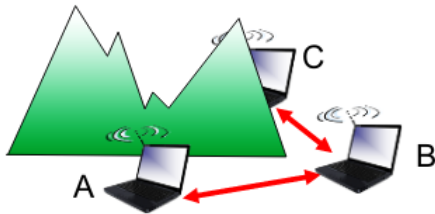
Important differences from wired link

- Decreased signal strength: radio signal attenuates as it propagates through matter

- Interference from other sources: standardized wireless network frequencies shared by other devices interfere as well

- Multipath propagation: radio signal reflects off object ground, arriving at destination at slightly different times

Make communication across a wireless link much more difficult
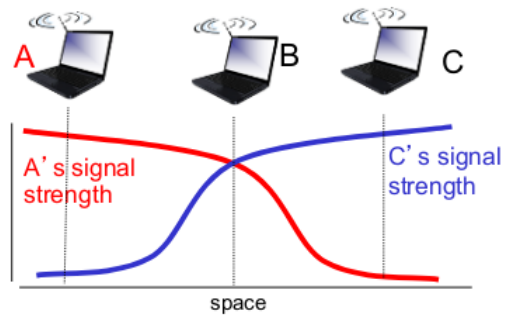
Definition: Hidden terminals

Senders that cannot sense each other but nonetheless collide at intended receiver

Multiple wireless senders and receivers create additional problems (beyond multiple access)

Hidden terminal problem

- B,A hear each other

- B,C hear each other

- A,C can't hear each other, means A,C unaware of their interference at B

Signal attenuation:

- B,A hear each other

- B,C hear each other

- A,C can't hear each other interfering at B

Definition: Exposed terminals

Senders who can sense each other but still transmit safely (to different receivers)