802.11 Networks

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- Standard used for home/office wireless networks,
- Branded as WiFi,
- Uses ISM band at 2.4GHz (802.11b/g),
- Or maybe at 5GHz (802.11a),
- Transfers packets of data like Ethernet.
- Carrier sense multiple access protocol.
Aloha: Good Transmission

Send

Repeat
Aloha: Collision

*silence*
What About WiFi?

- After transmission choose rand(0,CW-1).
- Wait until medium idle.
- Count down in slots.
- Transmit when get to 0 (if you have a packet).
- If ACK then $CW \leftarrow CW_{min}$ else $CW \leftarrow 2CW$. 
Transmissions (~500us)

Someone else transmits, stop counting!

Data and then ACK

Collision followed by timeout

Counting Down (20us)
Previous work


Impact of Collisions

- MAC is not perfect.
- For saturated network have Bianchi model.
- Use this to find probability of transmission.
- Then have binomial distribution of number transmitting.
- Use this to average energy per slot.
- Divide by average slot time to get power.
- Gives estimate of total network output.
Nominal power is 100mW.
Power for saturated broadcast network of $n$

Nominal power is 100mW.
Thanks!

Questions?