

CS: wireless sensor network (A Branch maybe?)
 → Sensor Network (Historical-before IoT)
IoT (its just a name change actually)

↳ Autonomis
 Can collect data and act on it

WSN - wireless sensor network

Routing a package from node to node - network
 ↳ Smart but limited (It decides where to go)

Main idea is to start talking at the same language so communication can be established (protocol)

Def. Computer connected to other computers via wireless network

→ intelligent entities
 autonomous

Sensors and microchips are so cheap they can be used as nodes in a network but energy still is an important problem in wireless sensor network

Energy: Main source: Battery

↳ Some of the applications allows other sources of energy like sun, vibration or heat but mostly you are dependent on battery.

↳ Solving energy problem is very important to create a reliable, long time node network

↳ Relation between communication (signal) range and energy used is quadratic.

Using P2P jumps rather than connecting to base station can save energy. This concept called multi hop.

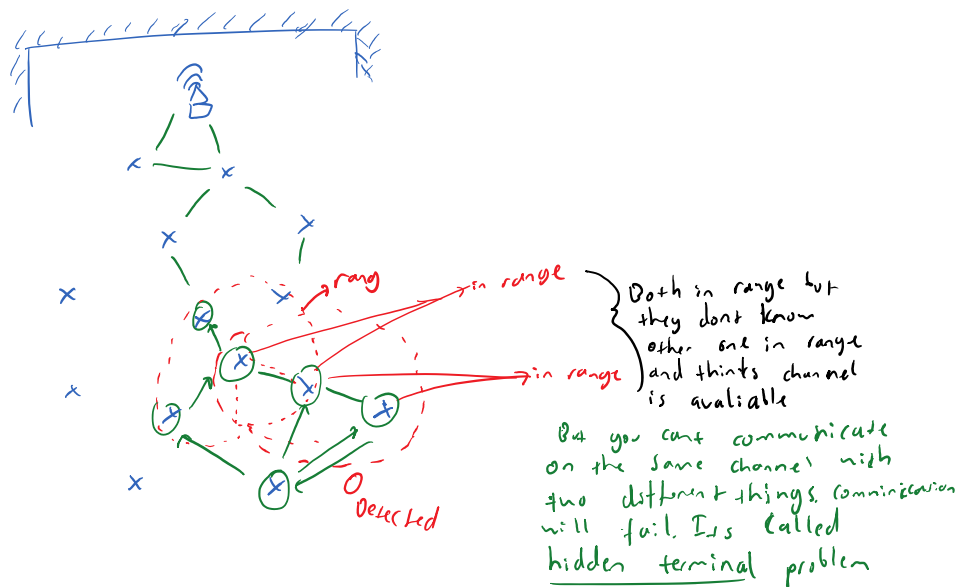


Possible problems

- Security
- Package loss
 send multiple packages (Not energy efficient)
- It should be real-time
 Find path that can give answer in RT

Note Realtime systems depends on the system
 you work for example: an intrusion detection system will have different real-time specifications for a human being and for a rocket.

Example Intrusion detection



If what we hear not the thing we said channel is not available. It's called overlap communications.

Multiple or single entities might be using and create noise on channel.

Solution: Wait for random/different times and check channel after that. It's called backoff.

Time can be increasing with each try or can depend on priority. Statistically impossible situations can be happen but they are so rare that refreshing or trying again solves it.

CSMA: Find safe channel in computer communications.
Only approach taken on internet comm.

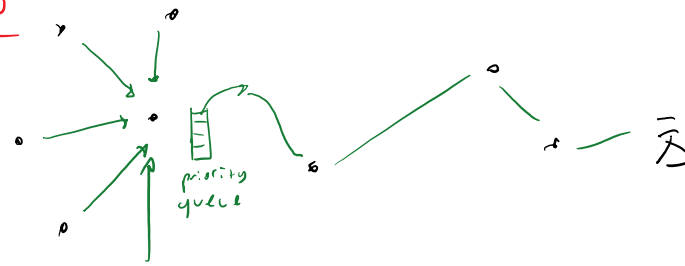
Fixed data package lengths helps to determine waiting time

Queue on each node is limited, therefore if queue is full some packages received and dropped intentionally.

Original source where package came from must keep package until it gets a message that destination get the package.

Papers are about this concepts

RAP



• each node makes its own decisions

Destination map,
Geographical locations and physical distances known.
Therefore maximum time required to transfer known.
speed of the package known. And each package has a deadline, assign priority according to speed.

Knowing geographical positions is hard. Maybe some nodes have GPS and other nodes define their location based on that

Geographical map is important because the path package will follow should be known.
Prioritization is on package not on node.

Backoff times also can change.

Dynamic and static approaches possible

$$Sum: dis(x_s, y_s, z_s, x_d, y_d, z_d) / deadline$$

↳ uses average velocity

$$OVR: dis(x_m, y_m, z_m, x_d, y_d, z_d) / (deadline - time_{elapsed})$$

↳ calculate at each node

↳ it requires time and energy on each node

Next week: SWR