

almost always, IoT devices are limited by the fact that they rely on batteries for power

IoT has multiple definitions

e.g. network of internet-connected heterogeneous devices with capabilities to interact with the physical environment

limitations

- processing / computing
- storage space
- bandwidth capability to transmit information in one packet
- energy

interacts with physical environment

- sensing
- actuation

big numbers

4-tier architecture

- device e.g. TI sensor Tag
- gateway e.g. Raspberry Pi
- cloud e.g. Azure IoT, IBM Watson IoT
- user request service from cloud tier

some tiers may be combined

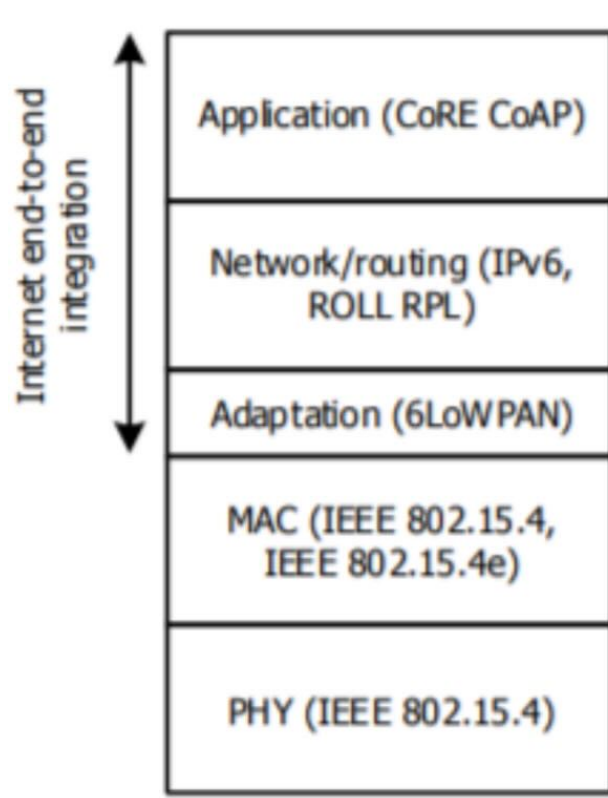


protocol suite: a set of network protocol layers that work together

protocol stack: implementation of a computer networking protocol suite

there is not a single protocol stack

our target: very constrained devices (WSN nodes) wireless sensor network



IEEE 802.15.4

- PHY modulation
- MAC channel access

Offset Quadrature Phase Shift Keying (OQPSK)

in practice 250 kbps data transmission (physically is 2 Mbps)

direct sequence spread spectrum (DSSS) to mitigate noise

MAC layer goals

- reliability losing a packet costs a lot
- efficiency should communicate at low frequency

time synchronized channel hopping



MAC layer attacks

- tracking
- impersonation / man-in-the-middle
- spoofing
- message manipulation
- denial of sleep
- denial of service

restful application: CoAP over UDP

publish-subscribe: MQTT message queuing