Introduction Presentation

Bachelor Theses:
Universal Decentralized Sensor Network

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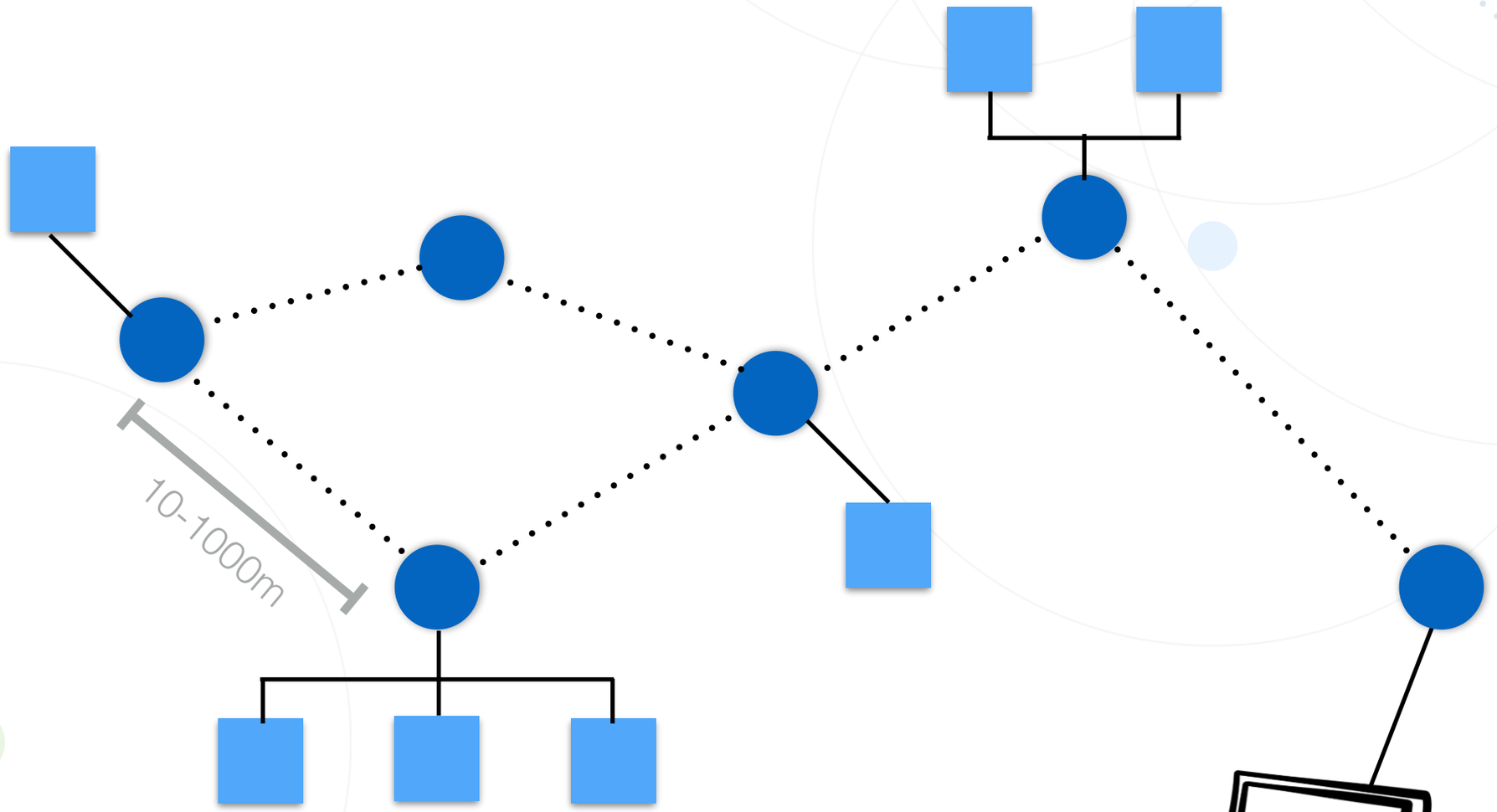
Motivation

Geoffrey Werner-Allen et al. (2006)

- Low Power (but Battery sourced)
- Distance between Nodes (200m - 400m)
- Predefined set of Sensors (Volcano Activity)
- Expensive nodes

Our vision



Wire

Radio Wave

Sensor

Node

What we have so far

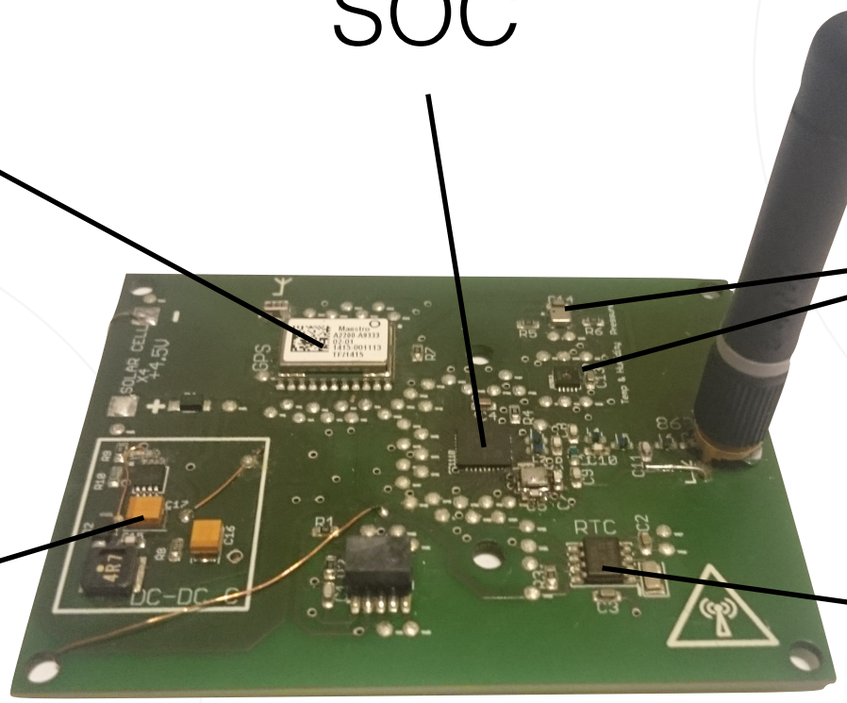
GPS Receiver

SOC

Sensors

Step-up-down Converter

RTC



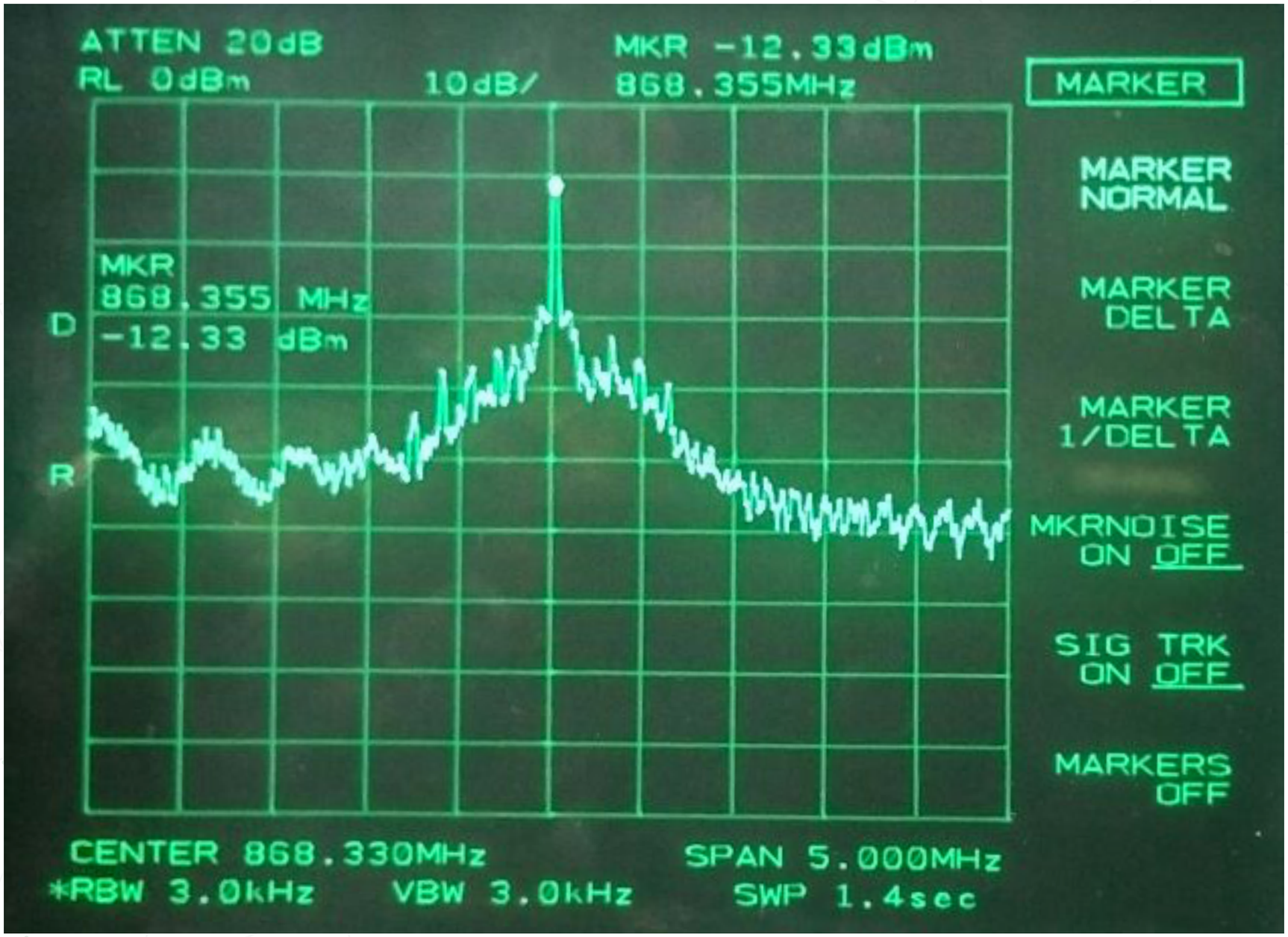
What we are using

- Customized node prototype, specifications:
  - Core: TI CC1110
  - Baseband: 868MHz

Lessons learned (so far)

- You can’t review enough:
  - Ground polygon under balun
  - Small soldermask gaps
  - Do not use the wrong parts (Oscillator)

Radio Modul Measurements



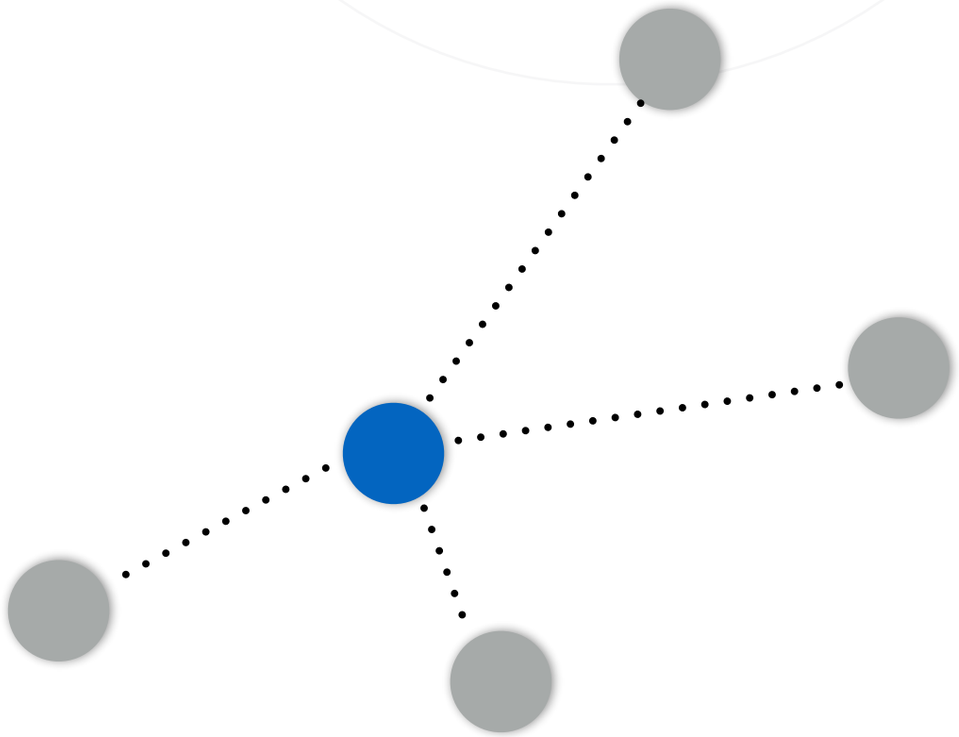
Bachelor Theses

Two theses

- Big project with many components
- Different protocols needed
- Different responsibilities

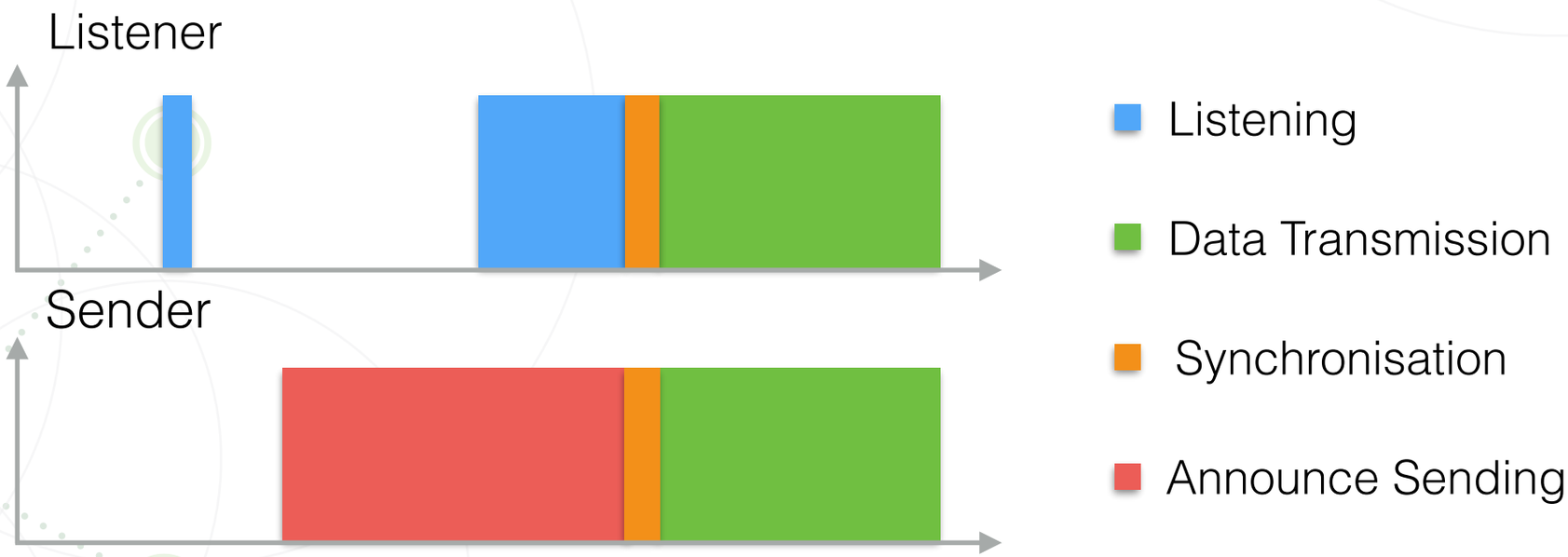
Thesis 1

- Develop and implement a link layer
  - Energy Efficiency
  - Robust
  - know the adjacent nodes



Thesis 1

- Divide the link layer into two sublayers:
  - MAC Layer (CSMA/CA)
  - Asynchronous Radio Duty Cycle Protocol



Thesis 2

- Evaluate and implement a routing protocol
  - Optimized
  - Dynamic topology
  - Uniform nodes

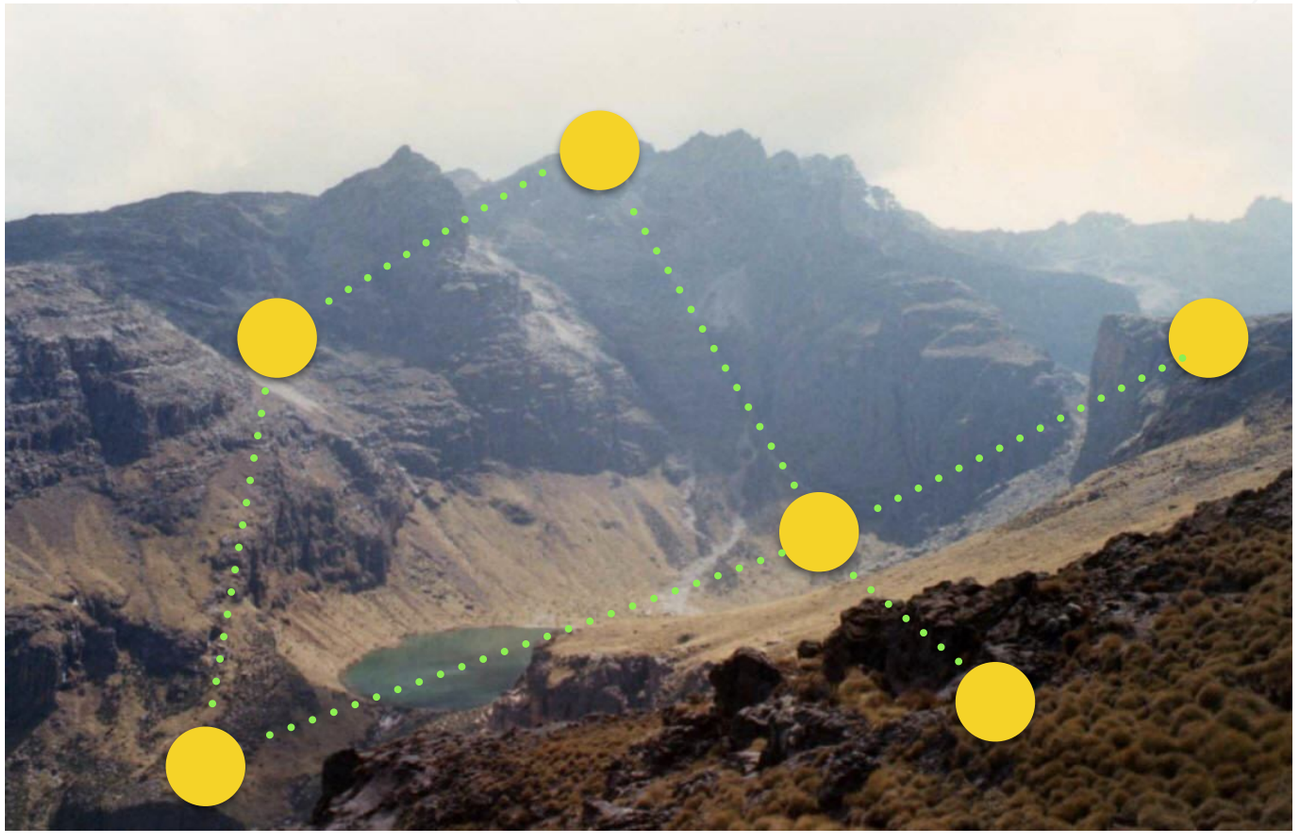
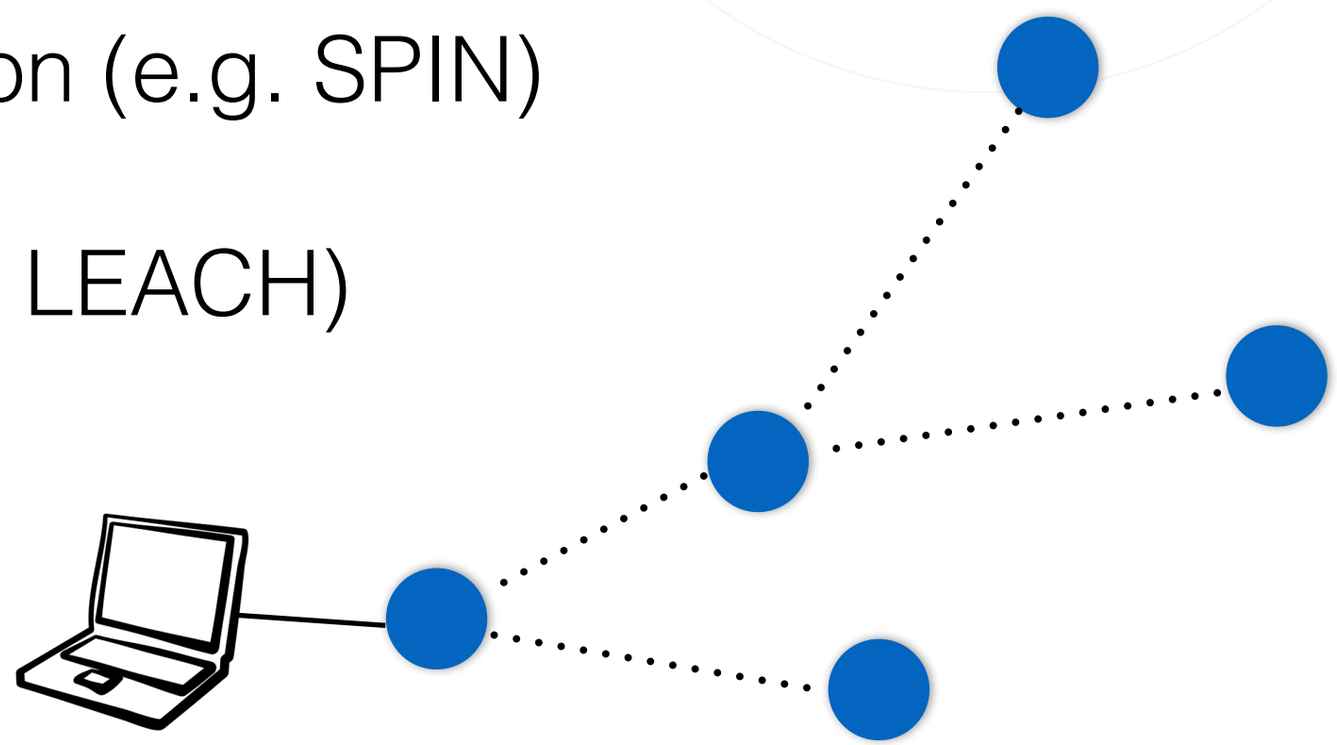


image: http://www.adventureafricaholidays.com/mountkenyahiking/narumoruroutetrekking.html

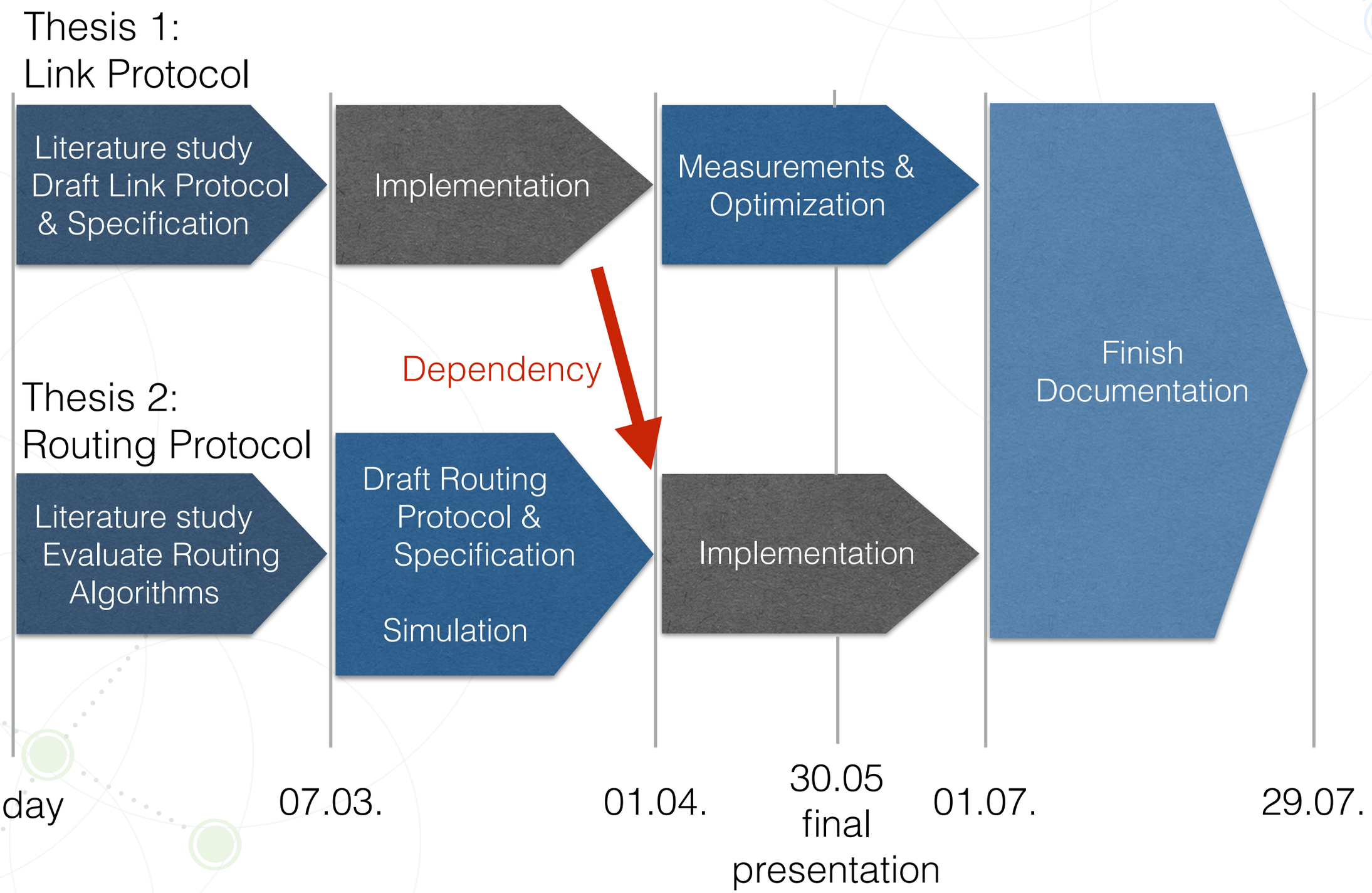
Thesis 2

- Two types of routing protocols:
  - Data dissemination (e.g. SPIN)
  - Hierarchical (e.g. LEACH)

1. advertise
2. request
3. send data



Our schedule



Thank you for your attention

Discussion & Questions

References

- Geoffrey Werner-Allen et al. (2006): Deploying a Wireless Sensor Network on an Active Volcano

- Anwander, Markus; Braun, Torsten (2013): A reliable, traffic-adaptive and energy-efficient link layer for wireless sensor networks

- Wendi Rabiner Heinzelman et al. (2000): Energy-Efficient Communication Protocol for Wireless Microsensor Networks

- Jamal, N. Al-Karaki; Ahmed E., Kamal (2004): Routing Techniques in Wireless Sensor Networks: A Survey