Robust wireless Link and Interference minimizing Channel assignment utilizing multi-radio Acess Points

Bachelor Thesis

Konstantin Manna
Supervisors: Christoph Wollgarten, Jó Ágila Bitsch

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Comsys.rwth-aachen.de

COM SYS Communication & Distributed Systems

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www.lancom.de

LANCOM Systems

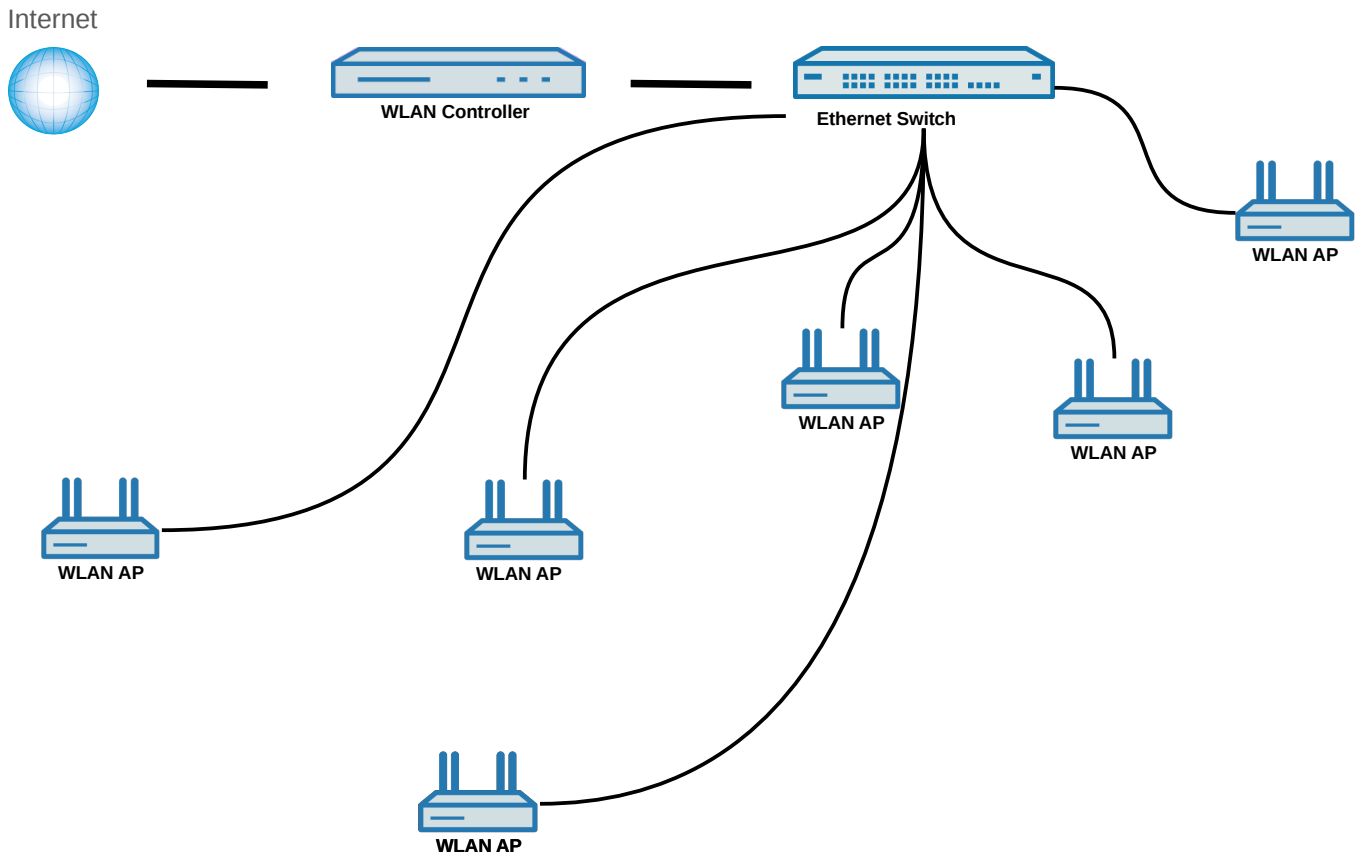
Introduction to Lancom & Topic

Dummy-slide (not part of presentation later)
What is a Lancom?
http://lancom.eu/en/solutions/

What is the szenario?
http://lancom.eu/en/solutions/wireless-lan/hotspot-solutions/hotspots-in-schools-and-universities/

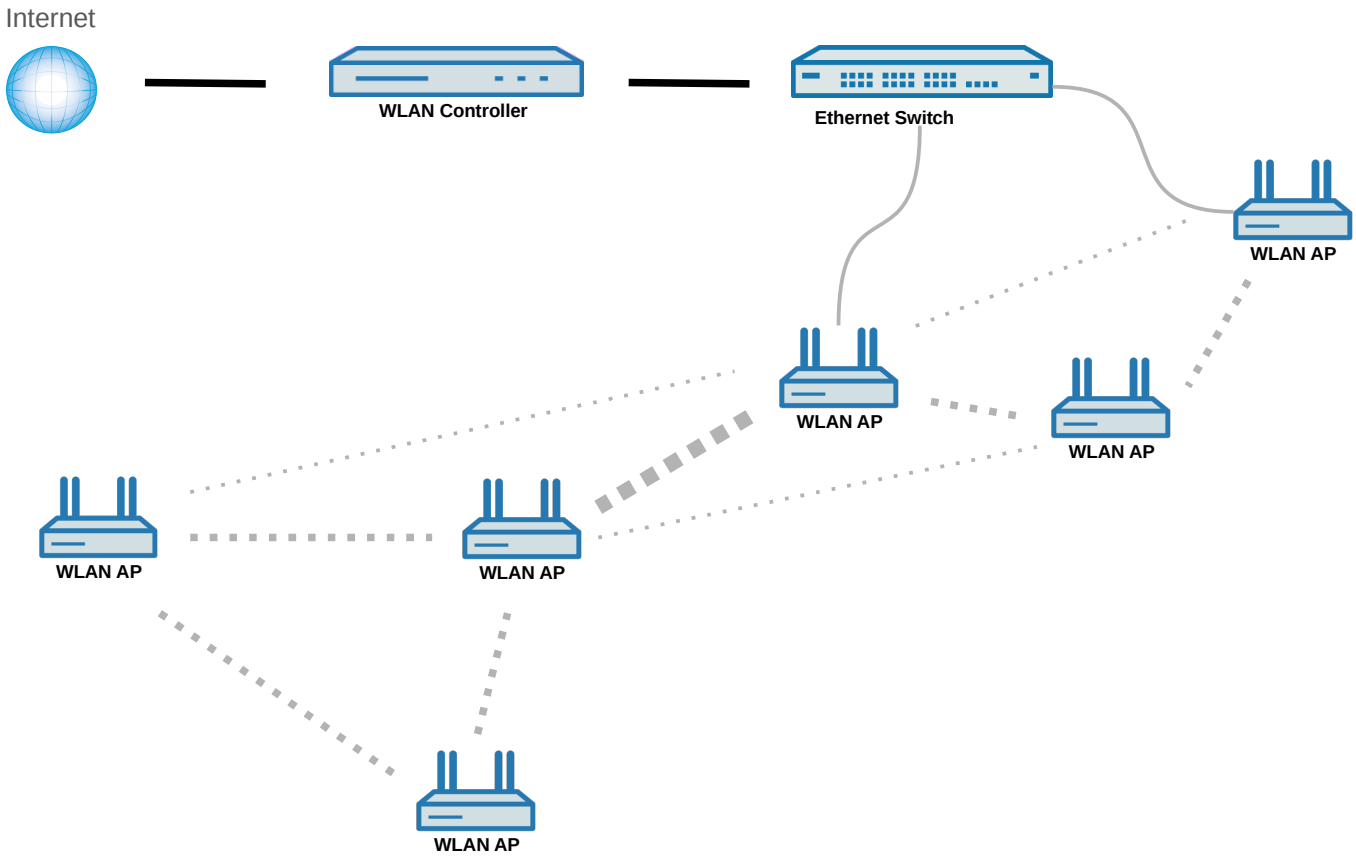
Common Access Point deployment

The way it has been done so far (connect APs by cable to backbone)



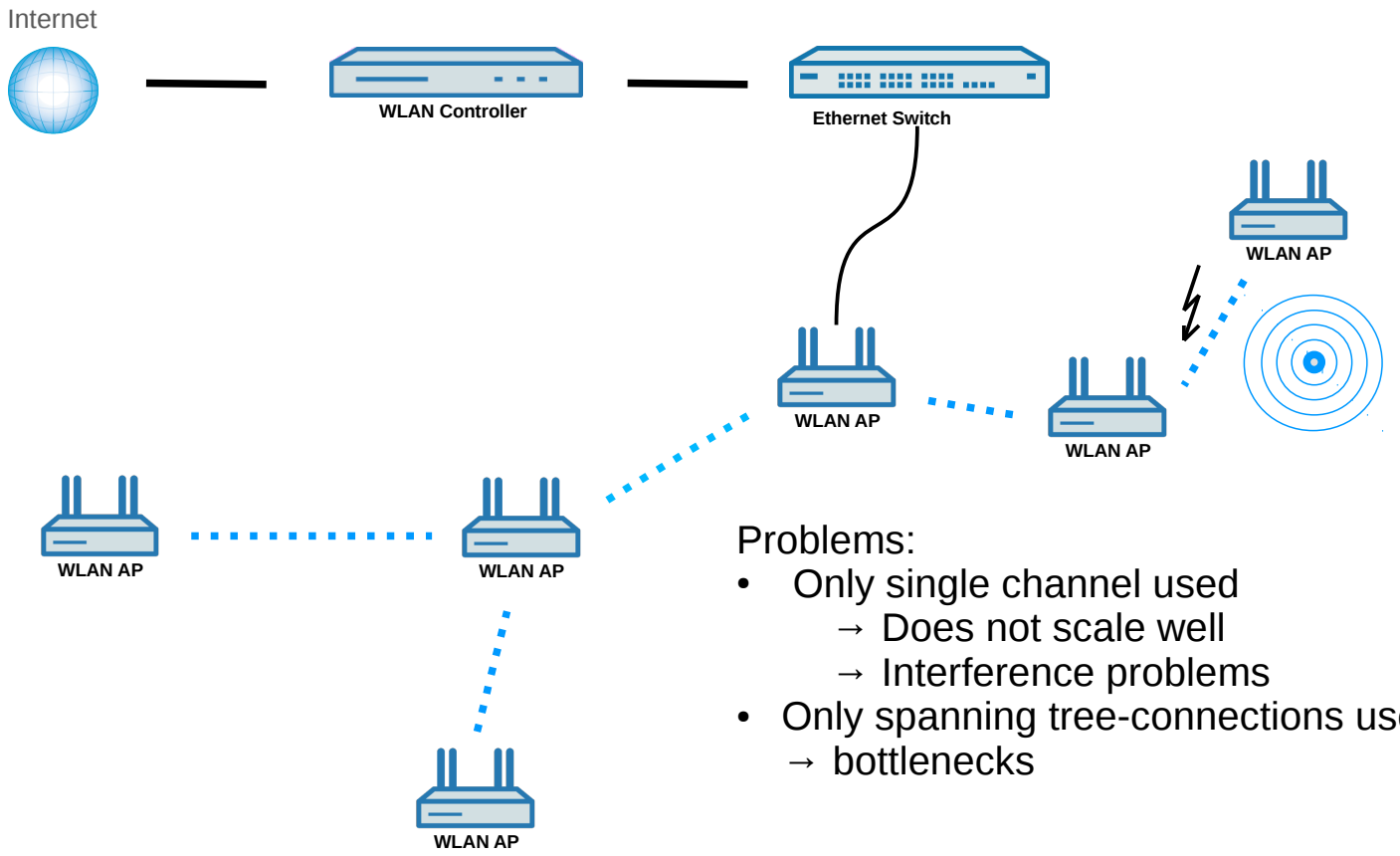
Access Point deployment with AutoWDS

Connecting APs by cable for some reason not possible
→ use wireless radios instead (APs equppied with multi-radios)



Access Point deployment with AutoWDS

What AutoWDS already does:

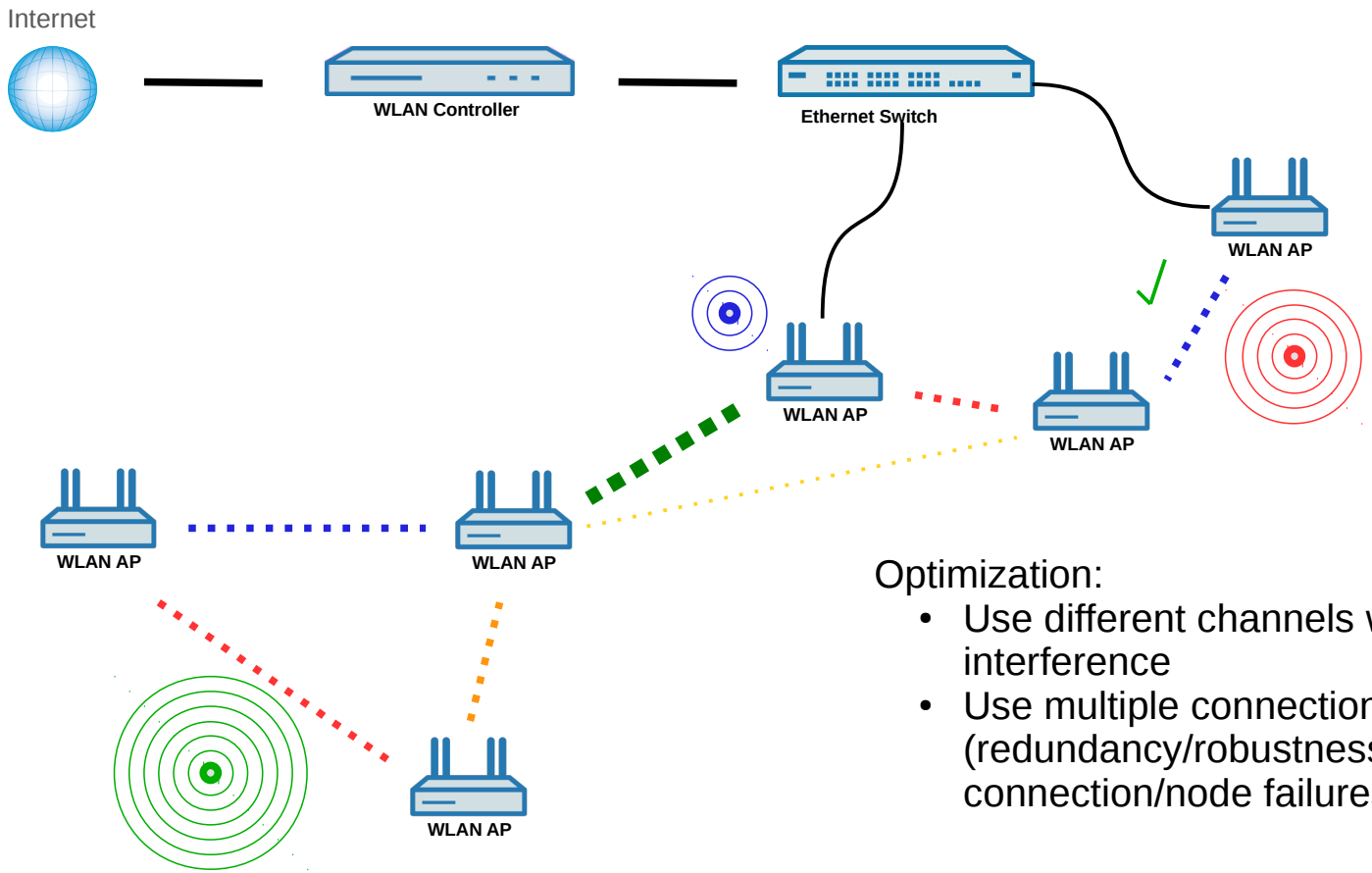


Problems:

- Only single channel used
  - → Does not scale well
  - → Interference problems
- Only spanning tree-connections used
  - → bottlenecks

Access Point deployment with optimized AutoWDS

What AutoWDS would rather like to do (my job):



Optimization:

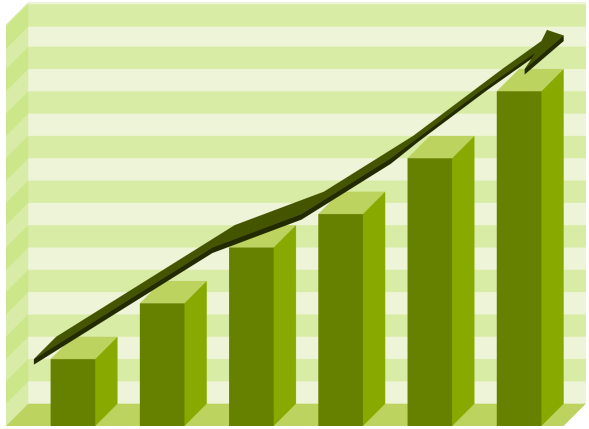
- Use different channels with least interference
- Use multiple connections (redundancy/robustness against connection/node failures)

How to get there?

- General CA-problem reduceable to a form of COLORING
  - At least the CA-problem is NP-hard
    → no perfect CA solution
- Various papers with different approaches and promising results
  - Which one to take ? Which fits our needs?
    - Static / centralized system (WLC decides, not the APs)
    - Only one channel per wlan-radio (No channel switching)
- Interfaces to devices (WLC/APs) exist and are usable
  - Easy to get the data → Nothing to do here
- Still a lot of little unanswered questions to solve
  - What is the link-quality
  - Usage of radios for clients?

Evaluation of results

- How to evaluate the new algorithm compared to the old way?
- Real world testing?
  - Limited ressources (Clients!)
- Simulations?
  - Which tool? (ns3/omnet/opnet)
  - Significance for real World?
- Which characteristics to take into account?
  - Bandwidth ?
  - Latency ?
  - Packet loss ?



General schedule

Select algorithm

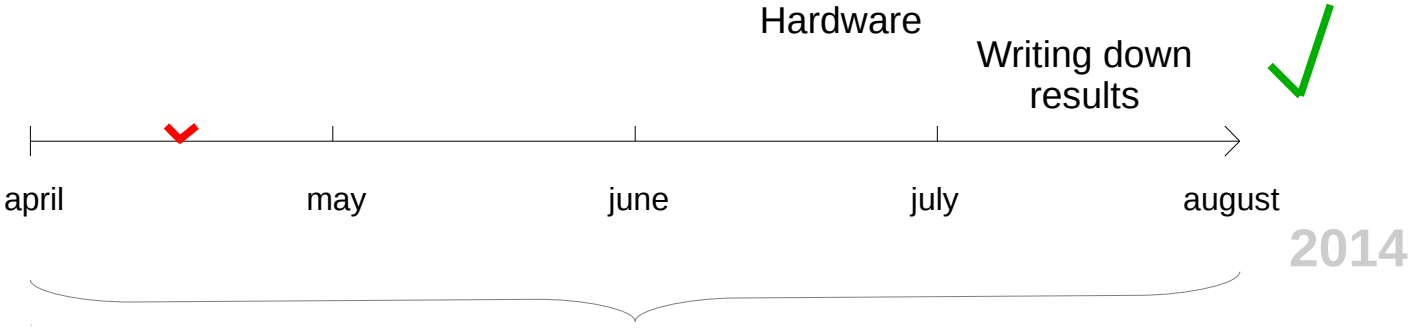
Adapt algorithm to our needs

Implementation

Evaluation in Software

Hardware

Writing down results



4 months

Thank you for your attention!

Further information…

See for more informationen for products, solutions and services at

www.lancom.eu

LANCOM Systems GmbH
Adenauerstraße 20/B2
52146 Wuerselen
Germany

Now it's time for your questions