CREW

Cognitive Radio Experimentation World

FACT
Furthering Airborne Cognitive Technologies [KU-Leuven]

Goals

- Evaluate context-aware multiple-hop communication strategies for a IEEE802.15.4 sensor network.
- Enhance throughput with cross layer techniques.
- Evaluate Cross-Layer Adaptable Wireless System (CLAWS): custom built IEEE 802.15.4 prototype from KU-Leuven.

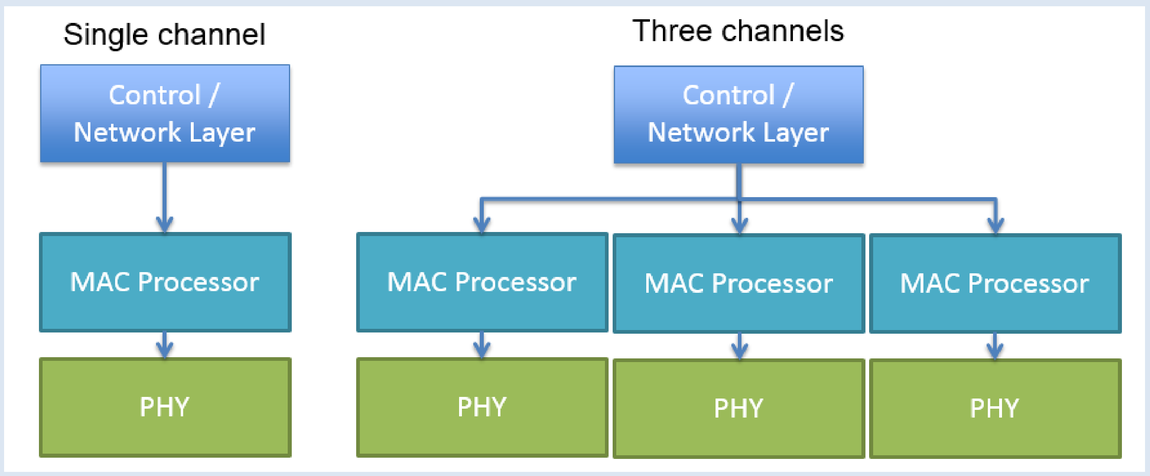
Challenges

- Validate if simulated performance improvements of CLAWS can be reproduced in a real-time test.
- Check the robustness and interoperability of CLAWS when communicating with a large number of off the shelf IEEE802.15.4 sensor nodes.

FACT experiments

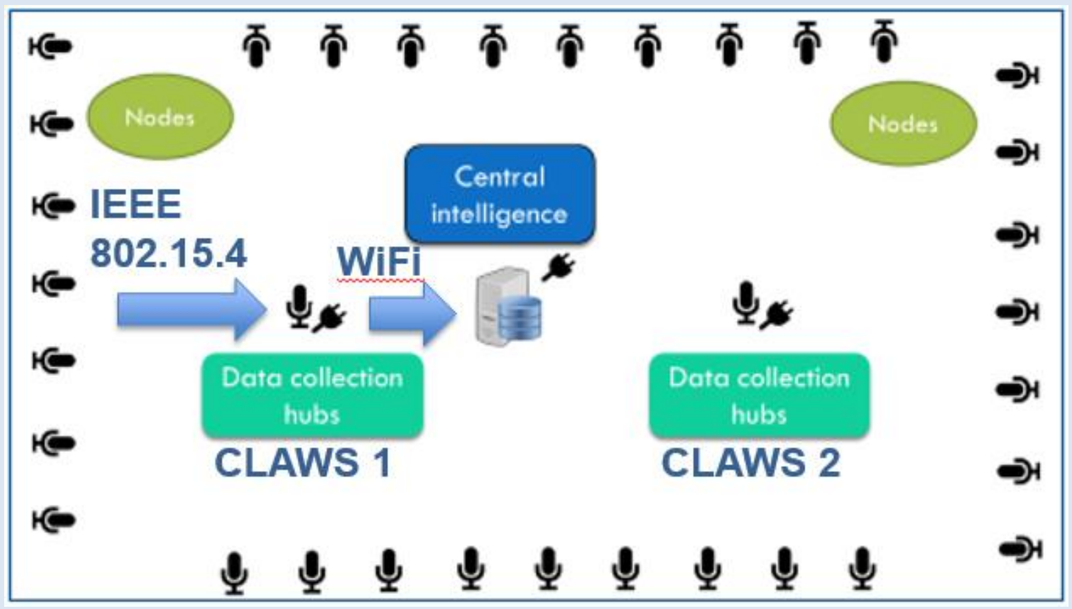
Uplink throughput tests:

- 18 sensor nodes upload data to a central information sink
- Scenarios: use one or two CLAWS nodes for data collection, each with one or three channels.



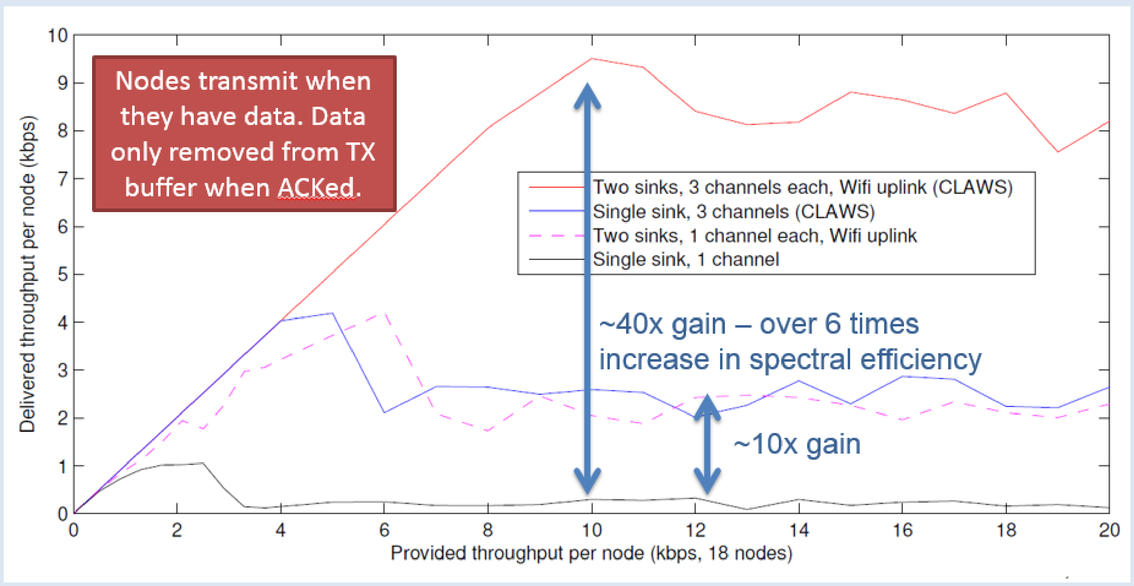
Setup

Multiple sensor nodes, one WiFi sink and two CLAWS systems at the w-iLab.t testbed, controlled by remote access



Results

- Validated that custom CLAWS nodes can cooperate with of the shelf IEEE802.15.4 sensor nodes.
- Found that effective throughput increases when more resources are allocated.
- Initial tests showed instabilities in the CLAWS units, and poor reproducability of experiments involving many sensors. A hardware fix was found and evaluated succesfully.



Conclusions

- While the relative throughput of the diffent scenarios is similar to theoretical results, the absolute througput differs significantly.
- The effort to configure the experiment remotely and collect debug data was underestimated, specifically during the initial phase where the CLAWS unit was unstable.

Testimony

- w-iLab.t provides the infrastructure for large scale experiments with sensor nodes.
- Instabilities in the CLAWS prototypes could be identified and fixed. These had not been detected during initial tests.
- Real life behavior is more complex than simulation results, motivating the use of a real-life testbed.

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PROJECT DATA

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