

Working Title

A Hybrid Centralized and Distributed Time Slot
and Channel Hopping Scheme for 6TiSCH Wireless
Sensor Networks

By

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Main Objective

What is impact of a hybrid of a load-balanced centralized and distributed scheduling schemes on performance of 6TiSCH networks

Specific Objectives

Load-Balanced Objective Function for RPL to determine optimal routes

QoS Supervisor to monitor network Conditions and initiate switching between centralized and distributed scheduling

Minimal Idle-listening and Load-Balanced centralized Channel hopping and time slot scheduler

A hybrid of centralized and distributed scheduling schemes that outperforms both centralized and distributed scheduling schemes in 6TiSCH networks used in isolation.

Progress

Fair Load-balanced energy aware OF (obj 1)

- Finished the experiment
- Extracted data on energy consumption of bottleneck nodes for 3 algorithms
 - FLBEAOF
 - MRHOF
 - OF0
- **Results not good:** FLBEAOF consumes more energy than all the rest
- Analysis has revealed that FLBEAOF sends many broadcast packets
- Observation : The exchange of load amongst the nodes takes place in duplicates

Minimal idle listening timeslot and channel hopping scheduling algorithm

- Designed pseudocode for the algorithm using Q-Learning
 - Objective: Minimize idle listening, collisions and throughput
- Acquired an implementation of a centralized scheme, which we are modifying to incorporate our algorithm

Others

- Free and Open Source RSS2 Mote application : Development was stopped to enable changing of porting of the application from older mote to new one
 - Challenges (getting new compiler toolchain, incompatibilities of code, challenges downloading firmware to mote)

Plans

- Find ways of eliminating excess broadcast packets in FLBEAOF
- Finish data analysis
- Submit paper
- Start implementing the scheduling algorithm