

On the Behaviour of the T2 MAC and CC2420 Radio Under Heavy Contention

The sensor networks community has put a great deal of effort into producing MAC algorithms and networking primitives designed to extend network lifetime. Energy efficiency is achieved with mechanisms that assume applications are frugal in their use of bandwidth. As a result, the needs of applications with short periods of high activity, such as event detection or network reprogramming, have largely been ignored.

In this talk we focus on scenarios where maximising capacity is of greater concern than energy efficiency. Specifically, we look at the behaviour of the TinyOS 2.x non-LPL (low-power listening) MAC for the popular CC2420 radio with increasing densities of nodes. We expose several quirks of the implementation that reduce performance under heavy contention and analyse its effectiveness with up to 48 senders.

Finally we outline our current work on building a MAC layer based on 'Idle Sense' that senses the utilisation of the medium to desynchronise senders. Our aims are both to increase throughput and improve fairness.