

Title: Energy-harvesting Low-power Wireless Bus for WSNs (EH-LWB)

Organization: TUDelft

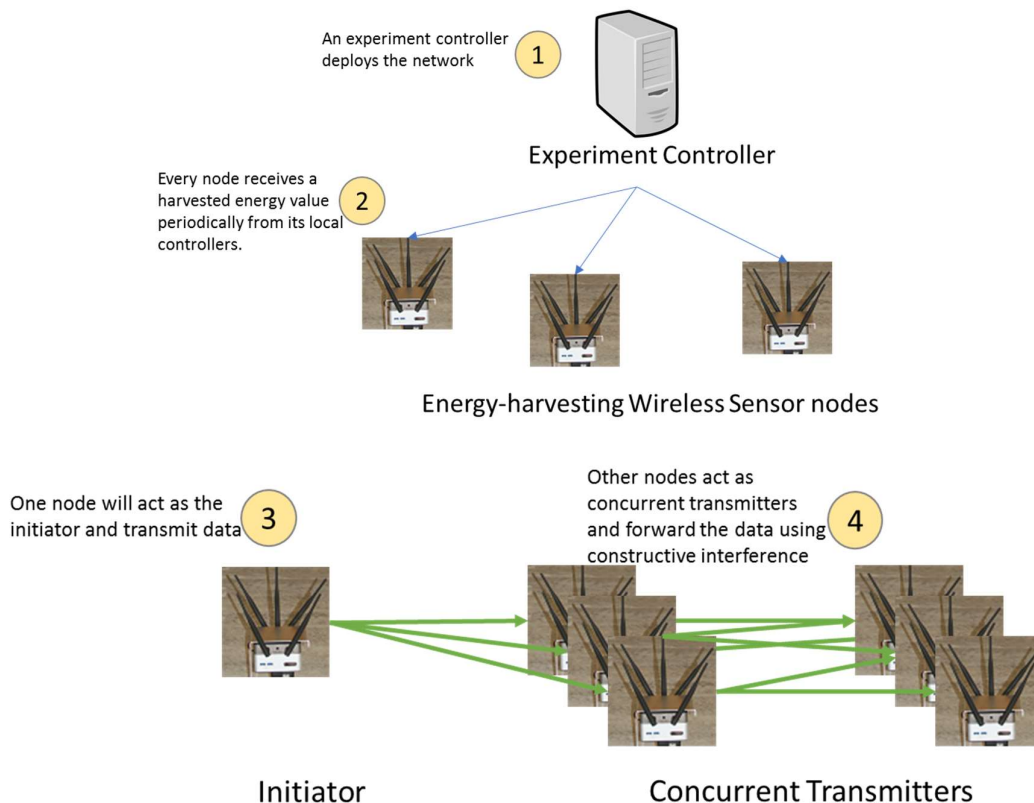
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Goal: Many Internet of Things (IoT) applications require low latency and high reliability to enable closed-loop control. Although IoT devices are required to last for a long time, batteries limit the lifetime of the devices. We aim to enable energy-harvesting wireless sensor networks (EH-WSN) experimentation for IoT, and to provide a low-latency and reliable protocol, EH-LWB, based on constructive interference for EH-WSNs.

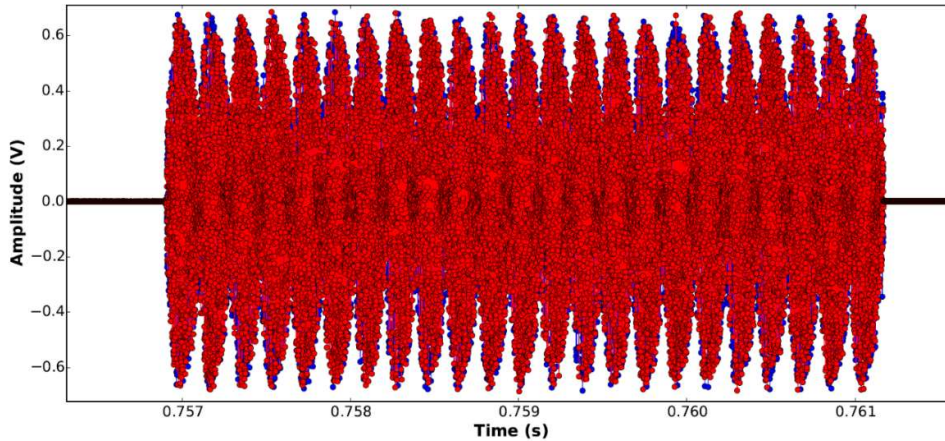
Challenges: Implementing a battery-model that can easily be changed according to the scenario of experimentation (e.g., indoor lights, solar, ..) with real-data and realize a true energy-harvesting wireless sensor networks (EH-WSN) is difficult.

Implementing constructive interference to work reliably on WiSHFUL testbed, which can be extended to low latency and highly reliable protocol such as EH-LWB for EH-WSN.

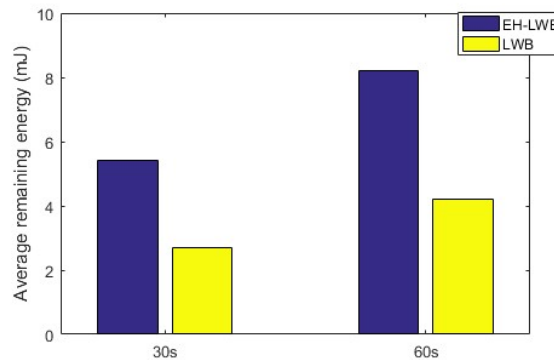


Results:

1. We could create an energy-harvesting profile for any dataset or synthetic generation of data. Each node can have its own profile.
2. With concurrent transmitters, we could realize the constructive interference. The signals interfering constructively can be seen in the figure.
3. We find that an energy-aware energy utilization policy can result in better performance



(packet reception ratio) for a periodic data application using EH-LWB.



Conclusions:

We have demonstrated that an energy-harvesting WSN based experiments can be performed on the testbed. Furthermore, we also demonstrated the working of CI using WISHFUL TAISC framework and implemented EH-LWB protocol, which outperforms a greedy LWB protocol. The WISHFUL testbed, particularly w-iLab.t testbed, has been useful for us to setup a platform for conducting EH-WSN experiments.

Feedback:

Thanks to the software tools and hardware provided to me by WISHFUL, we were able to setup a platform for repeatable and reliable experimentation of energy-harvesting WSN. W-iLab.t and WISHFUL testbeds will help us validate and demonstrate our research to the world.