An Overview of open-ZB.net

an open-source toolset for IEEE 802.15.4/ZigBee

Ricardo Severino, Anis Koubâa, Petr Jurčik, Mário Alves, Eduardo Tovar
{rars,aska,petr,mjf,emt}@isep.ipp.pt
http://www.open-zb.net/

Introduction

IEEE 802.15.4 and ZigBee are leading technologies for Wireless Sensor Networks. An exponentially increasing of hardware and applications have been based on these communication protocols. More recent protocols such as WirelessHART, ISA100, and 6loWPAN, also build upon subsets of the IEEE 802.15.4 /ZigBee protocol stack. The open-ZB framework aims at:

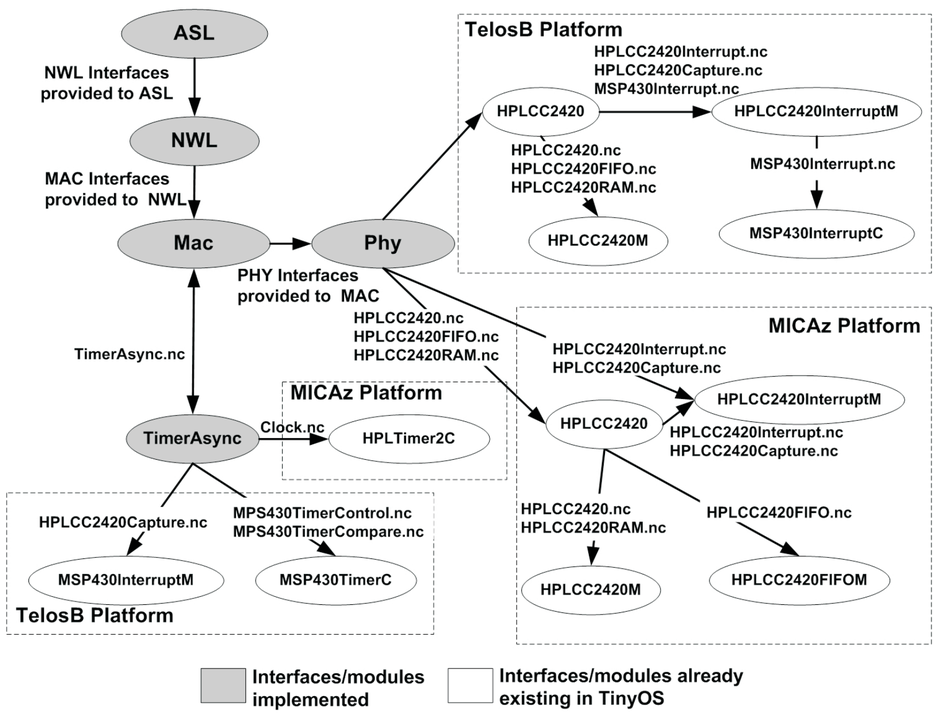
(1) Fostering innovative contributions to these protocols, specially in what concerns their quality of service improvement;
(2) Providing an open-source toolset to the community, to enable the simulation, dimensioning and engineering of WSNs.

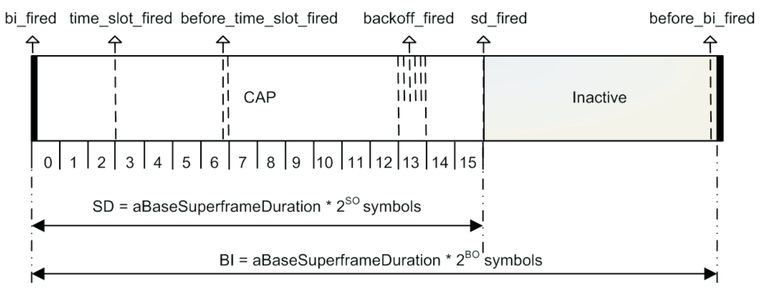
The open-ZB.net already witnessed over 60 000 visits and 4 000 downloads.

Experimental Tools

The open-ZB implementation features:

(1) beacon-enabled mode of the IEEE 802.15.4 protocol developed in nesC, under TinyOS v1.1.15 and v2.0 for the MICAz and TelosB motes;
(2) ZigBee Network Layer (including IEEE 802.15.4) supporting the Cluster-tree network model and our Time Division Beacon Scheduling mechanism.

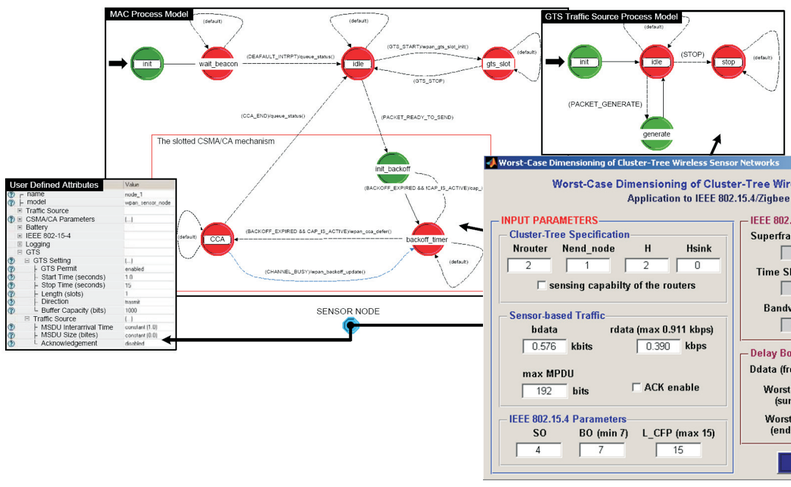




Simulation/Analysis Tools

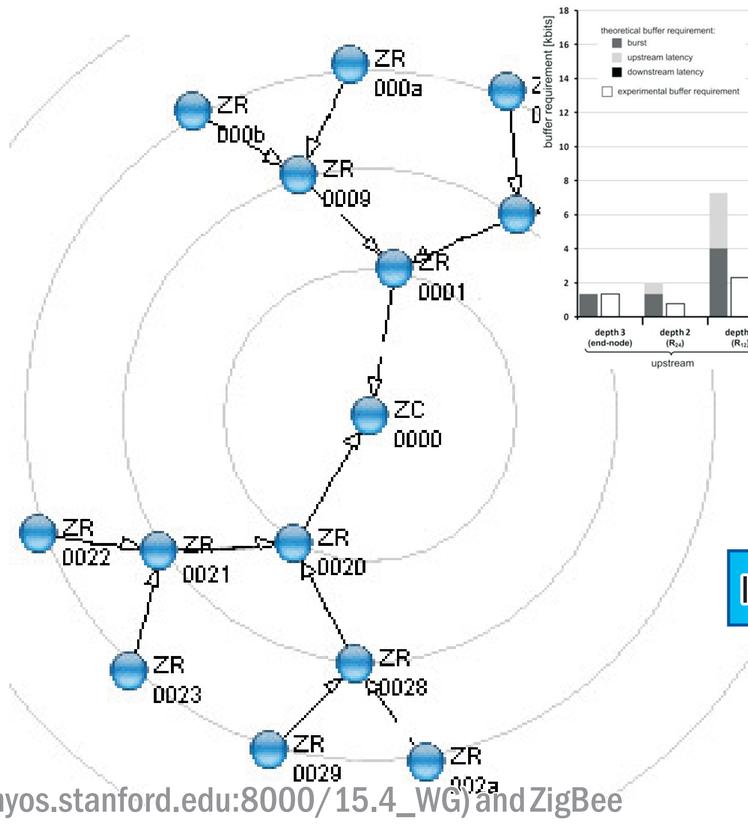
The open-ZB Framework also provides:

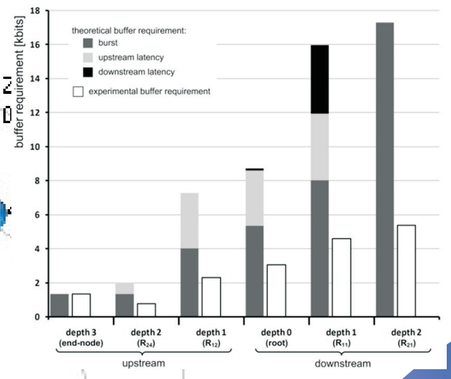
(1) a simulation model built using OPNET for the IEEE 802.15.4 beacon-enabled mode
(2) a Matlab tool for worst-case analysis and dimensioning of ZigBee Cluster-Tree WSNs



Research Contributions

Several contributions were already triggered around the open-ZB framework (more details at http://artwise.cister-isep.info/about.php)





Future Work

In the short/medium term the following actions are forecasted:

(I) Collaboration within the recently formed TinyOS 802.15.4 (http://tinyos.stanford.edu:8000/15.4_WG) and ZigBee (http://www.hurray.isep.ipp.pt/activities/ZigBee_WG) WGs.
(ii) Merging the open-ZB and TKN154 (TU Berlin) implementations
(iii) Providing mechanisms to improve QoS namely concerning reliability, mobility and security.

IPP Hurray!

IPP-Hurray! Group - ISEP/IPP
Rua Dr. Antº Bernardino de Almeida 431
4200-072 PORTO Portugal
tel: +351-228340502
fax: +351-228340509
http://www.hurray.isep.ipp.pt
hurray@hurray.isep.ipp.pt