OpenPi

A OpenWSN-ready distribution for the Raspberry Pi

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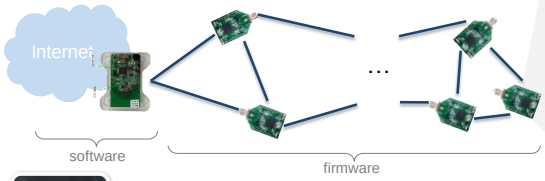
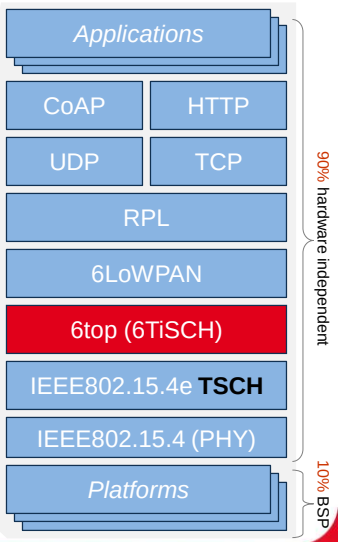
www.OpenWSN.org

- Open-source implementation of the state-of-the-art standardized protocol stack for the IoT
  - Running on 11 popular platforms
- Over 60 direct contributors, catalyst for research around TSCH networks
- State-of-the-art software project management tools: Atlassian, Jenkins, Travis-CI, GitHub, Doxygen
- Open-source (BSD license)





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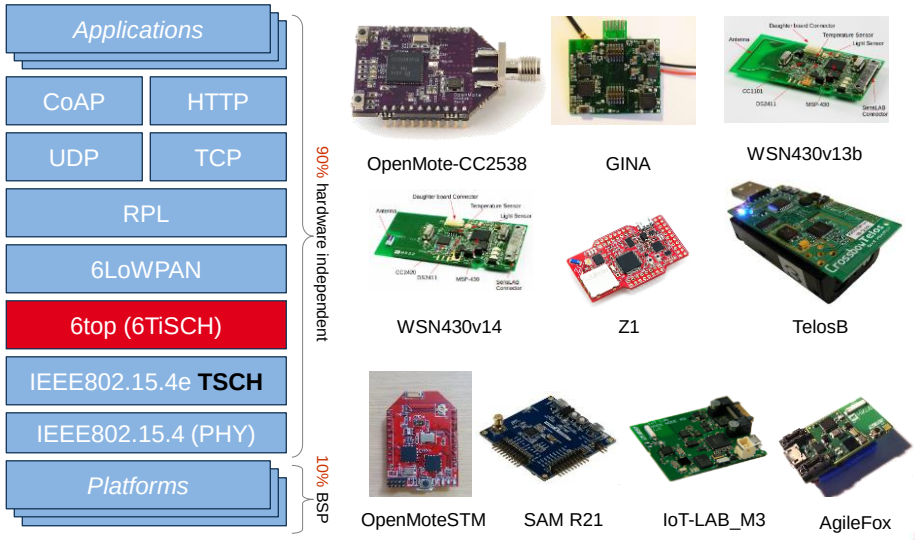
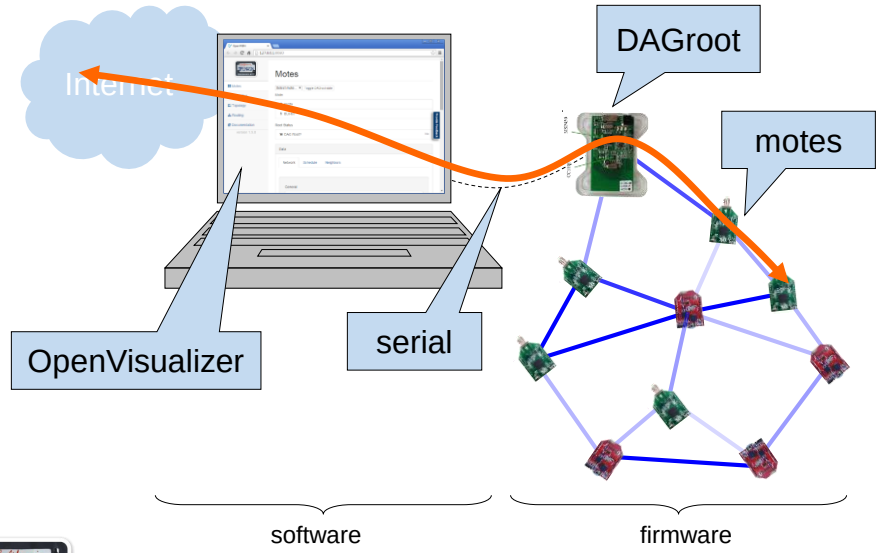
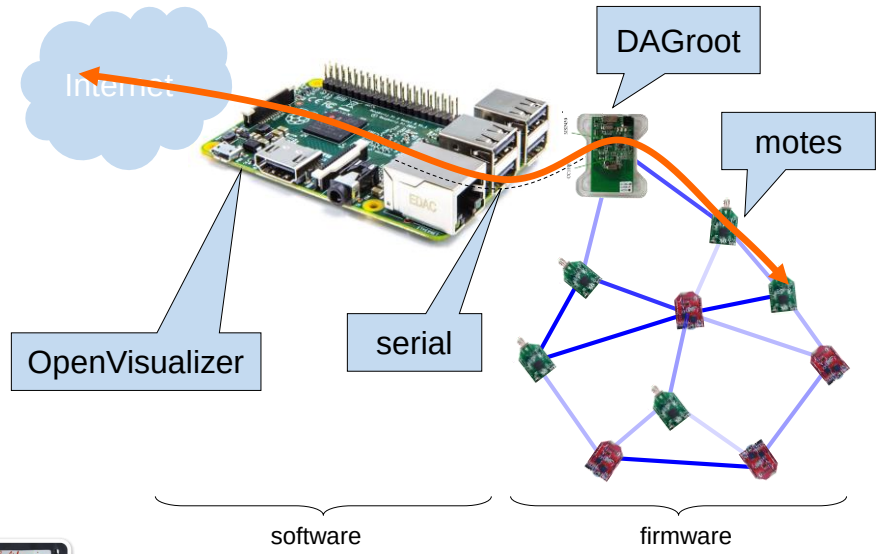


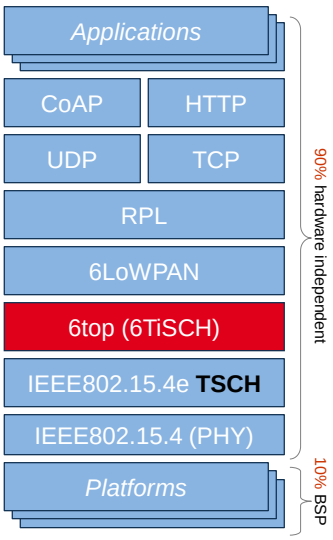
Architecture



Architecture

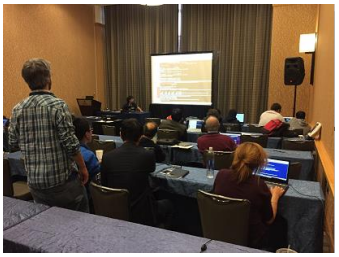


Standardization



Easy-of-use Effort

- Integrated Scons build system
- OpenVM – Virtual Machine
  - run with (free) vmware/VirtualBox
  - all toolchains pre-installed
- Teaching Material
  - OpenWSN|OpenMoteutorial, GLOBECOM, December 2015



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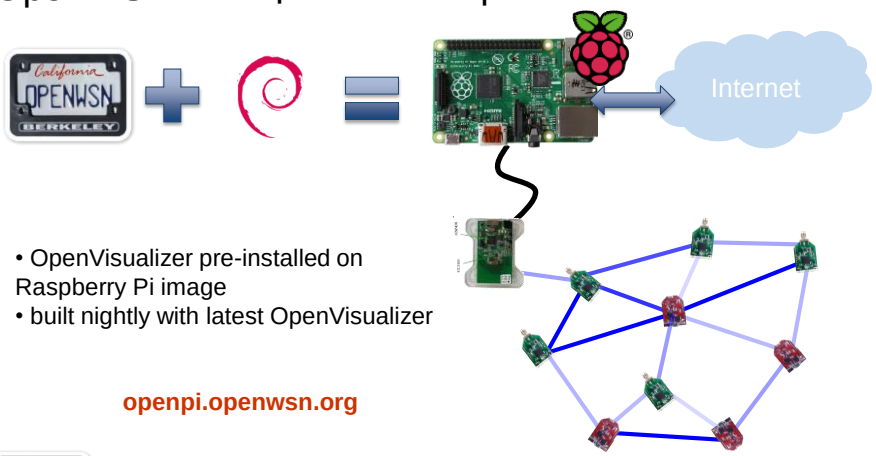
OpenWSN RaspBian OpenPi



- OpenVisualizer pre-installed on Raspberry Pi image
- built nightly with latest OpenVisualizer

openpi.openwsn.org

How to Cook an OpenPi

Ingredients
Recipe
Make them a lot

Ingredients

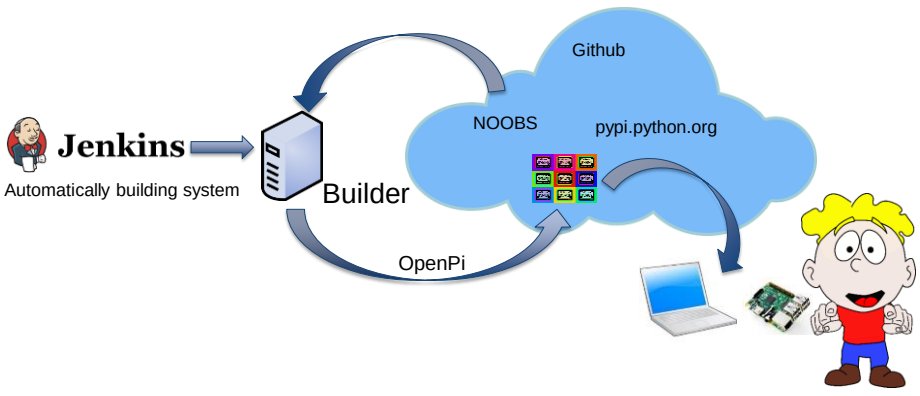
- **NOOBS.zip installation system for RaspberryPi**
  - https://www.raspberrypi.org/downloads/noobs/
- **Python Bottle**
  - https://pypi.python.org/packages/source/b/bottle/bottle-0.12.7.tar.gz
- **Python PyDispatcher**
  - https://pypi.python.org/packages/source/P/PyDispatcher/PyDispatcher-2.0.3.tar.gz
- **OpenVisualizer software**
  - https://github.com/openwsn-berkeley/openwsn-sw/archive/REL-1.8.0.zip
- **OpenWSN look-and-feel**
  - **OpenPi.png** https://github.com/openwsn-berkeley/openpi/blob/master/bits_n_pieces/OpenPi.png
  - **Slide** https://github.com/openwsn-berkeley/openpi/tree/master/bits_n_pieces/slides_vga

Recipe

- Extract build/os/OpenPi/root.tar.xz
- Update the background:
  - build/os/OpenPi/root/etc/alternatives/desktop-background
- Install python module dependcies:
  - Bottle: extract bottle-0.12.7 and dispatcher to build/os/OpenPi/root/usr/local/lib/python2.7/dist-packages/ and
  - build/os/OpenPi/root/usr/local/lib/bin/
- Install openwsn-sw
  - Copy openwsn-sw repository to build/os/OpenPi/root/home/pi/
- wrap everything into a zip ifle (OpenPi!)

Script: https://github.com/openwsn-berkeley/openpi
Run nightly on our build systems

Making lots of Pi



Abstract

- OpenWSN (http://www.openwsn.org/) is de-facto implementation of a standard-based protocols stack for the Industrial Internet of Thing (IoT). It implements standards such as IEEE802.15.4e Time Synchronized Channel Hopping, IETF RPL, 6LoWPAN and CoAP. To make it trivially simple to use OpenWSN, we created the OpenPi which turns any off-the-shelf Raspberry Pi into an OpenWSN gatewaye. OpenPi is a customized version of the RaspBian operating system which packs all the required OpenWSN features such as 6LoWPAN compaction/decompaction, RPL source source calculation, Internet connectivity and a web-bsed configuration interface. The OpenPi source code is fully published under a BSD license and availeble through the OpenWSN GitHub repositories. OpenPi allows a user to deploy an OpenWSN network without requiring ANY knowledge in programming or (constrained) networking.