WiFi Networks Research Testbed for Commodity Routers

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WiFi Testbeds

- NITOS, Orbit, w-ilab.t, Bowl, etc.
- Hard to access to them (not really open)
- Most of them are not realistic
- They are expensive and complex platforms

WiBed

- Are you into networking?
- Do you want to do realistic experiments?
- Are you sick of the virtualization?
- Are you desperate to perform L2 or lower experiments?

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Then you need:

What is WiBed?

WiBed is:

- A software platform aimed at deploying WiFi testbeds
- It is free and open (GPL)
- Designed to run on commodity (cheap) IEEE802.11 routers

What is WiBed?

but WiBed is also:

- An effort started by "hackers" in the WBMv6 (BattleMesh.org)
- Complement Community-Lab.net testbed (Low Cost, Low layer Experiments)
- Fast-installed self-organized mesh network

Architecture Overview

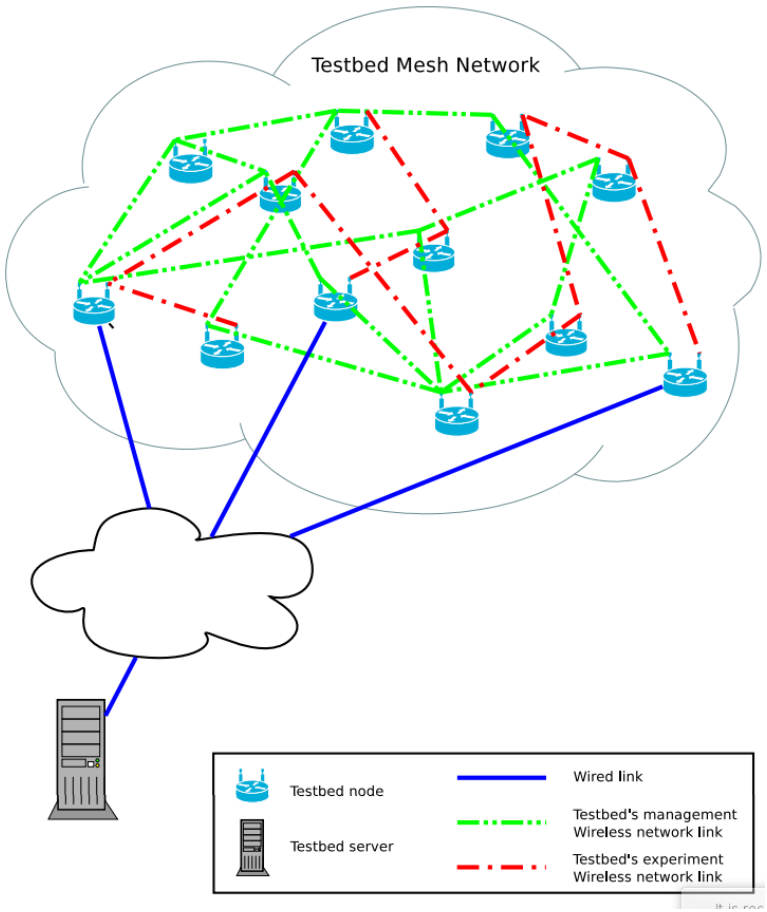

Figure: WiBed Architecture

Design Overview

- Nodes behave like FSM (idle-prepare-deploy-run-finish-idle)
- Communication with server through management mesh network
- REST-API pulling mechanism: every N seconds nodes pull state info and orders from server
- Node access mainly from the server web-UI
- Based on OpenWrt trunk
- Organized in packages, OpenWRT-compatible feed
- Management Network based on batman-adv

Hardware

- Node must be compatible with OpenWRT Linux (minimum 4MB flash)
- Node must have at least two radios (one for mgmt, one for experiments)
- Node must have at least one USB port (to store the overlay)

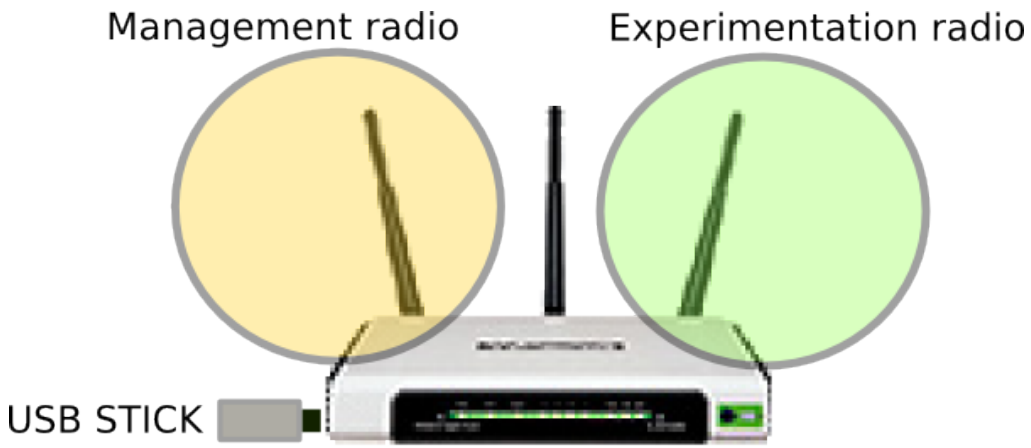

Figure: WiBed Node hardware

File System

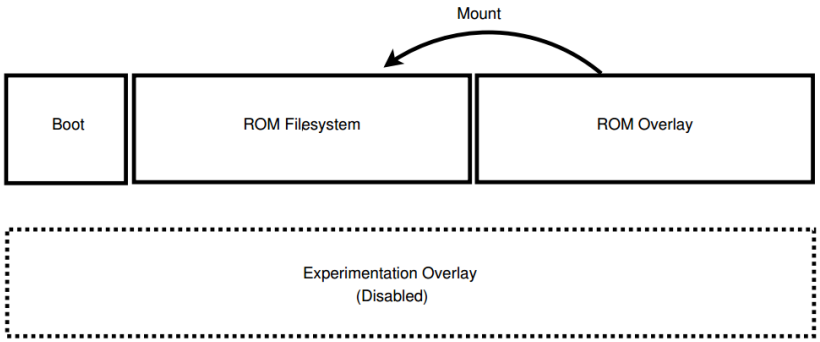

Figure: Node in IDLE state

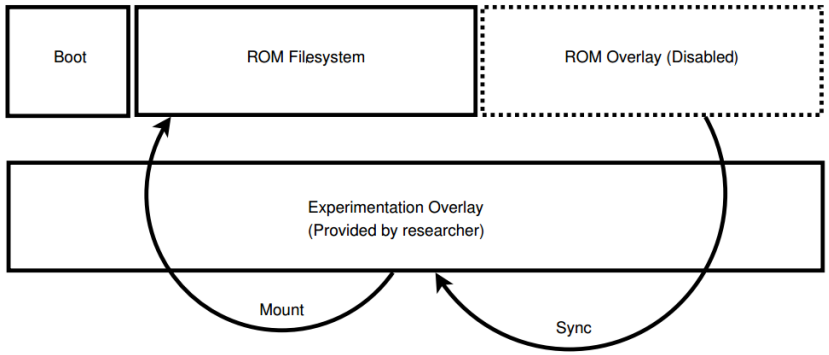

Figure: Node performing experiment

Diagram

- Nodes self-configure during the first boot
- IP address, hostname, ssid, etc. based on MAC address
- Experiments are overlays which are installed in the nodes
- Once an experiment finish, the overlay is removed and node goes back to initial state

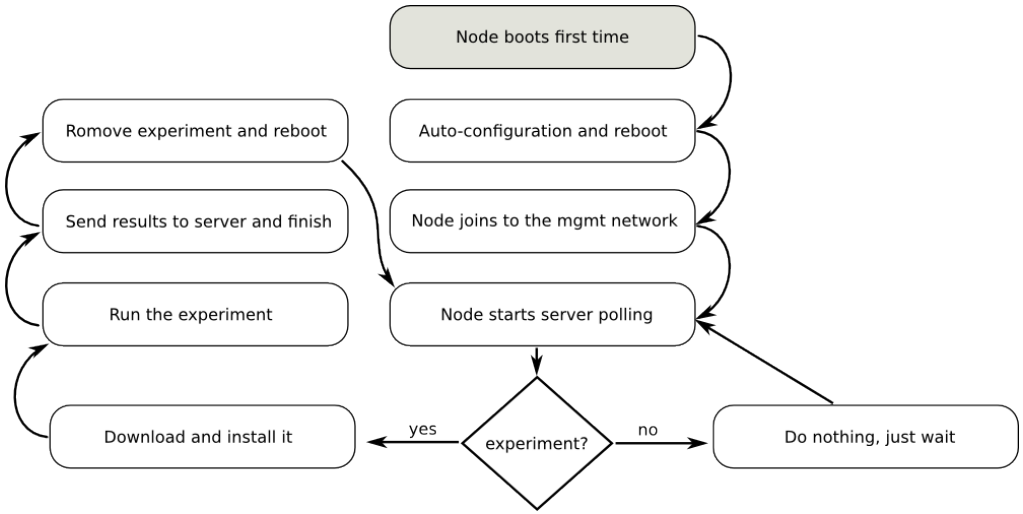

Figure: WiBed Node functional diagram

Wibed at UPC

- 25 nodes deployed in Barcelona
- Two wired nodes (gateways)
- 2.4Ghz radio for management and 5Ghz for raw experimentation
- Several experiments have been peformed in this WiBed deployment

Conclusions

- WiBed brings you the possibility to deploy your own testbed
- It uses cheap hardware and no wires are required
- WiBed is easy to use, a testbed can be deployed in few minutes
- You can access to low layers, there is not virtualization
- There is a WiBed testbed of 25 nodes part of Community-lab.netf

More info

- http://wiki.confine-project.eu/wibed:start
- http://wiki.confine-project.eu/_media/wibed:wibed-7pages.pdf
- http://redmine.confine-project.eu/projects/wibed
- http://github.com/battlemesh/wibed

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