Towards a ZigBee Device specification for OSGi

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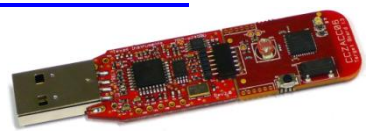
Outline

- ZigBee4OSGi project
- Technology aspects
- Scenarios
- Requirements
- IPR concern

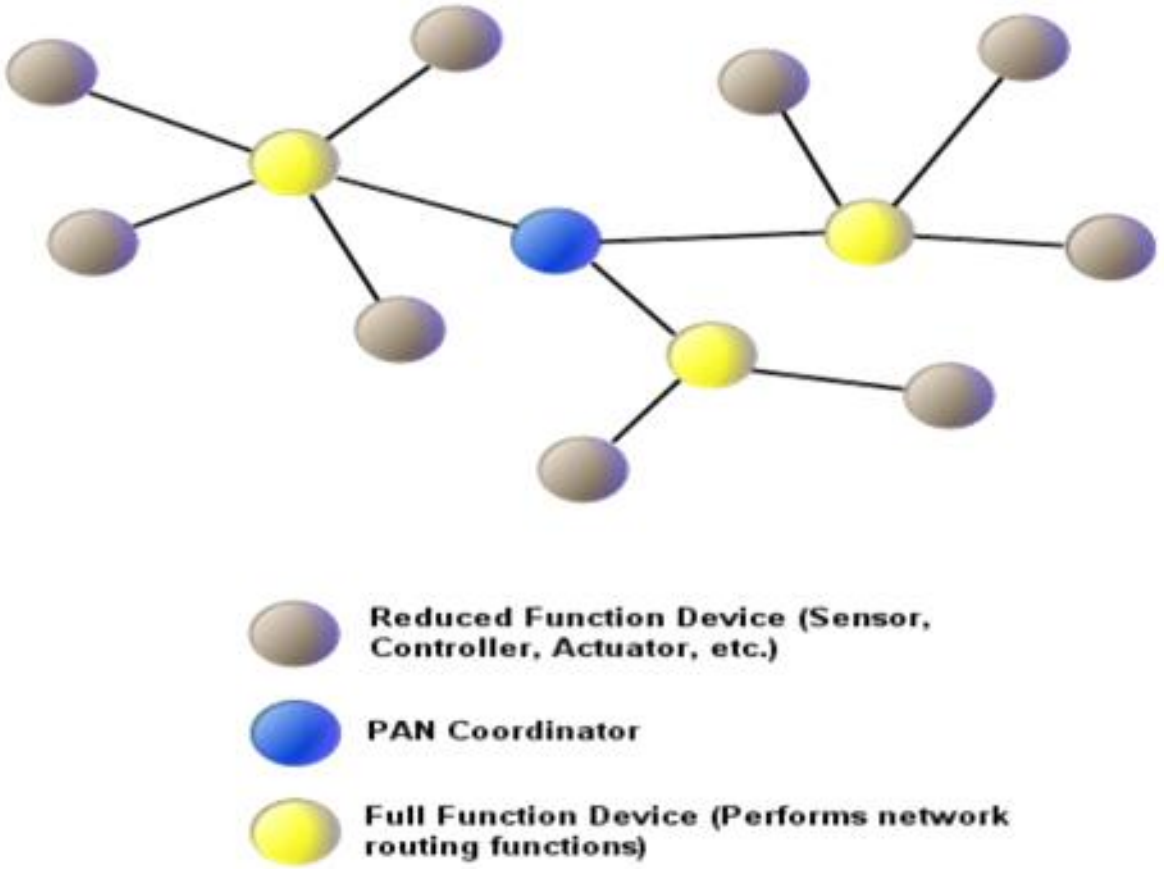
Zigbee4OSGi project

http://zb4osgi.aaloa.org

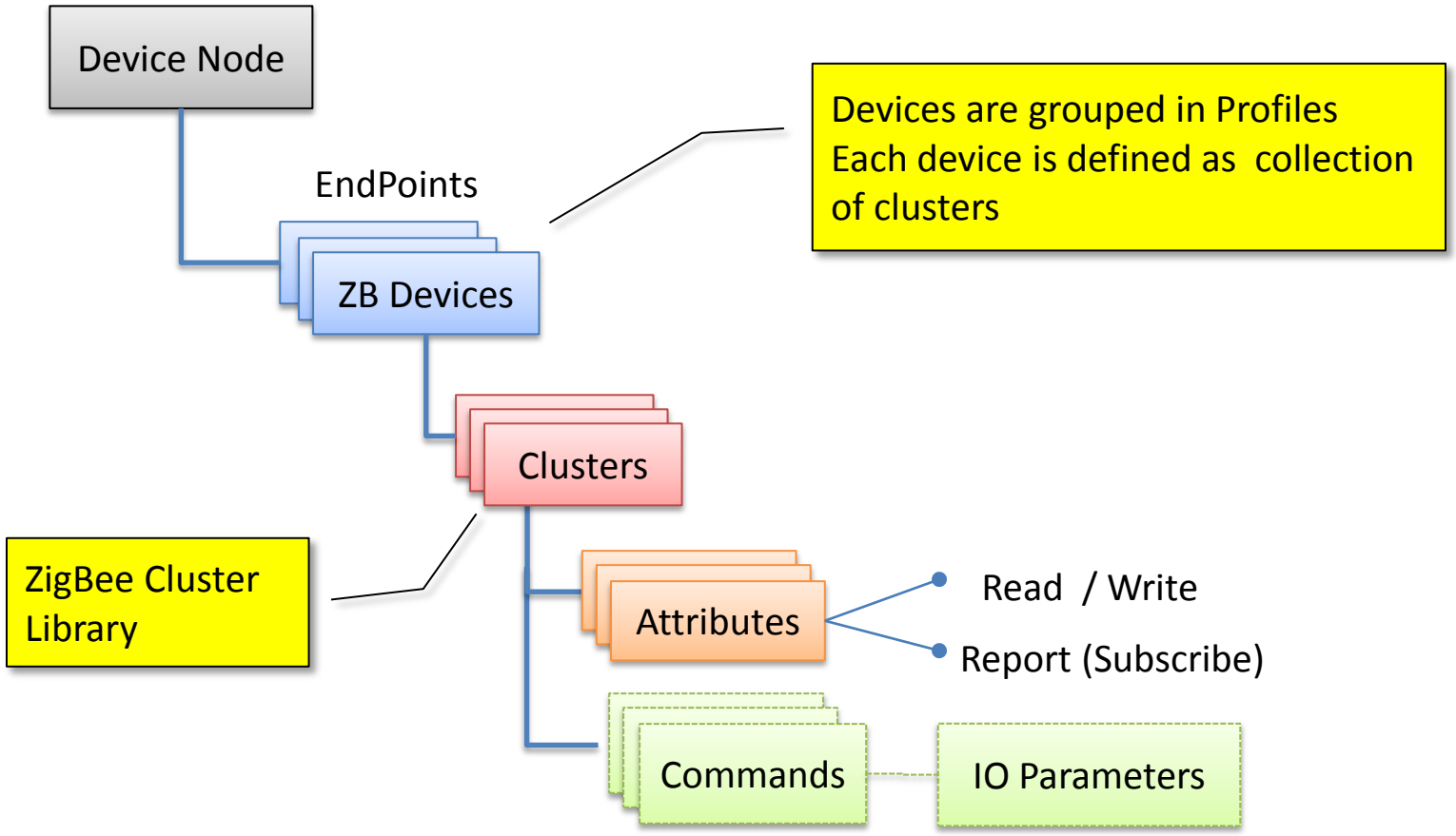
- Open Source project
  - Apache Software License 2.0
  - implementation
    - ZigBee Base Driver compliant to the Device Access Spec.
    - Home Automation (profile) refinement driver
    - Tools : Zigbee Cluster Library and Network Browser
  - supported from
    - CNR-ISTI and TSB (Valencia, Spain) outcome of the PERSONA project and reused in universAAL project
      - Texas Instrument technologies (CC2480 → CC2530)
    - ongoing discussion for the support from University of Zaragoza (Electronic and Comm. Engineering Dep. , MonAMI project)
      - Ember technologies
  - subscribe developer mailing list at: http://zb4osgi.aaloa.org/mailman/listinfo/dev



Zigbee networks



ZigBee Device Hierarchy

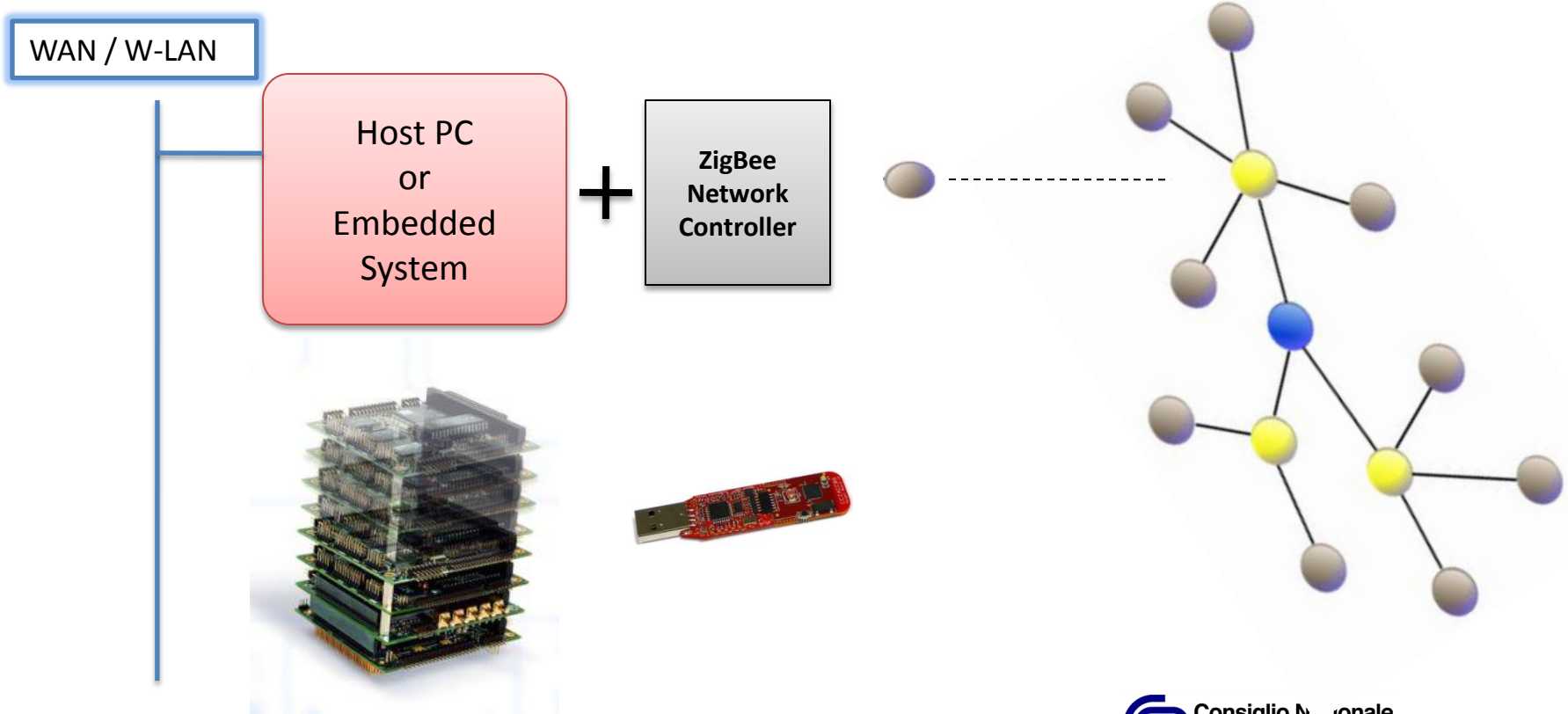


Scenarios

- Zigbee can be used in different application domains
  - Home Automation
  - eHealthcare
  - Remote Control 4 CE
  - Energy Saving
  - many others ...
- Use cases and requirements may be different depending on the application domain (profile)

Scenarios (cont.)

- A PC or an embedded system augmented with a *ZigBee Network Controller* that joins pre-existing ZigBee Networks



Scenarios (cont.)

- Home Automation
  - Network devices installed at Home with a coordinator and some control panels
  - Applications using HA configuration should join existing networks
- Tele-healthcare solutions
  - The patient uses gateways and devices selected from the caregiver to monitor some biomedical parameters
  - The gateway creates a network and acts as coordinator

Scenarios (cont.)

- Companies may develop customised/new ZigBee devices (e.g. wind station)
  - Zigbee extendibility allows
    - To customise profiles by:
      - Adding new device id
    - To customise devices by:
      - Adding new cluster messages
      - Extending clusters with new attributes
- Ad hoc device interfaces should be instantiated for customised devices

Requirements I

- [R1] Base Driver configurability
  - The parameters used to configure the operational mode of the network controller (USB Dongle) should be standardized
    - Selection of the network (pan ID, channel,...)
    - Coordinator vs End Device operation mode

Note:

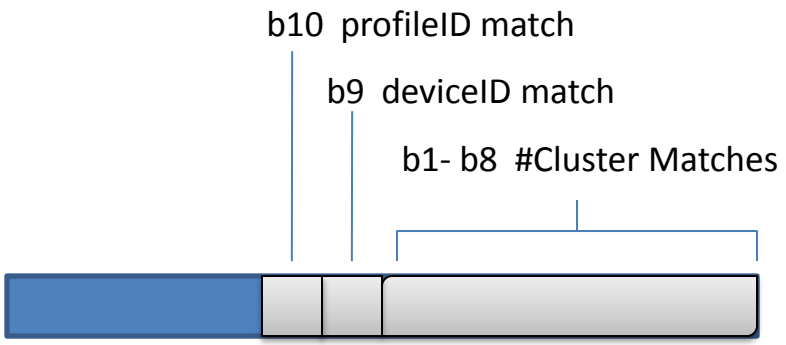
- [R1] it should be taken into account even for the OSGi/UPnP spec.
- To think about the definition of a Base Driver interface

Requirements II

- [R2] Device Access Specification conformance
  - A matching algorithm should be defined for the refinement process

Note:

- The Zigbee4Osgi project does not use a Device Access Manager, but we defined a possible matching algorithm



Requirements III

- [R3] support for the ZigBee Profiles
  - The specification should standardise the device refinement process by defining API for the ZigBee Cluster Library
    - ZCL API should be reused by the ZigBee Refinement Drivers

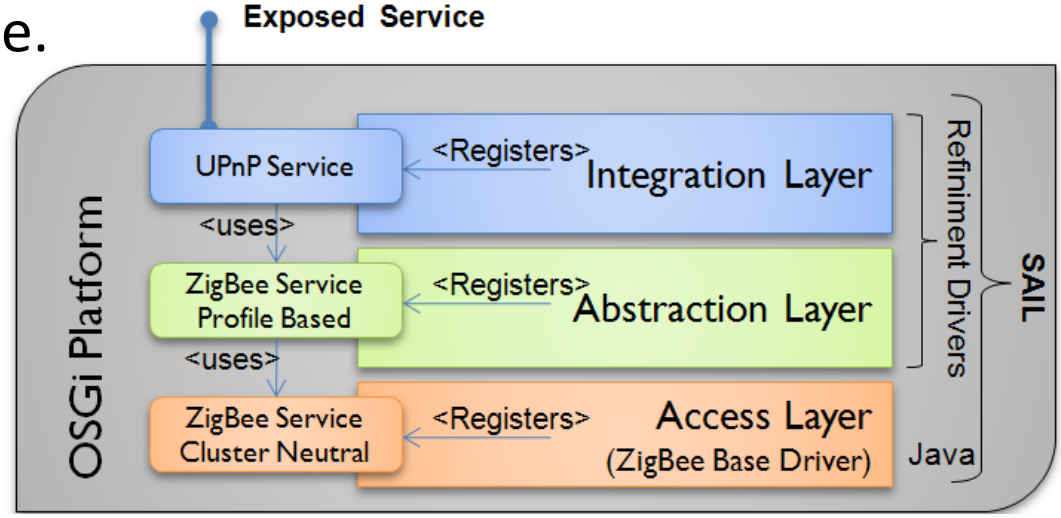
Requirements IV

- [R4] support for the ZigBee extendibility
  - The extension capabilities of ZigBee should be mapped to the component-oriented architecture of OSGi for enabling reuse of components and automatic provisioning of new drivers
    - Customised devices should be discovered and eventually partially refined
    - Service proxies for non-standard Zigbee devices /clusters should be discovered, downloaded, and dynamically installed

Requirements V

- [R5] support for the ZigBee Gateway Device spec.
  - The two layered gateway device standardised by ZigBee defines SOAP, Rest and GRIP interfaces to access the gateway functionalities
    - OSGi platform is a perfect candidate to implement the ZigBee Gateway Device.

OSGi approach is very modular



Concerns

- Licensing model used by ZigBee is not clear (to me)
  - Zigbee specifications are free for non-commercial use
  - Each Zigbee Document has a slightly different disclaimer
  - http://freaklabs.org/index.php/Blog/Zigbee/Zigbee-Linux-and-the-GPL.html

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Thank you!

Customised device Refinement

- Supposing the EndDevice (0x0041) is a non-standard device, by using **getComplexDescription()** we can get the URL of a Profile/Device/Cluster Extension that will install the refined service for the custom ZigBee Device.