

ZigBee 4 OSGi Project Proposal

The **ZigBee 4 OSGi** project aims at facilitating the adoption of ZigBee networks in smart environments by providing a gateway solution based on the OSGi platform. The different markets addressed by Zigbee Alliance like Consumer Electronics, Health Care, Home Automation, Energy Management make Zigbee networks suitable for developing new context-aware solutions built by sensing the multitude of sensors deployed in the environment.

The objective is to provide a set of software components that ease the integration of a full featured sensing environment. Every research project needs to face the complexity of distributed and dynamic solutions, and an industrial oriented solution, like ZigBee, will allow an easier set up of pilot sites, thus enabling to focus on the validation of the service design, instead of being distracted by the technical concerns regarding the integration of the devices. In this respect, a consequence of ZigBee 4 OSGi project will be the evaluation of all the ZigBee profiles according to a different and wider perspective provided by the AAL domain, with new use cases that could be recognized by the ZigBee Alliance.

We believe this project is of interest not only for the research communities, but for industrial alliances too.

We highlight the relevance for the OSGi community, where a ZigBee Service Specification is still missing. A working prototype will be a good starting point and valuable input to work on a new specification.

The Eclipse community will benefit from the set of tools for configuring and commissioning ZigBee networks that can be designed and developed by exploiting the results of such project.

Technology providers will benefit from the important support we will provide by including their hardware artifacts in a richer ecosystem of application (e.g. Eclipse based).

We will contribute to the standardization efforts of Continua Healthcare Alliance in providing up and running solution for the Hosting Application Layer (already defined by Continua)

Description of the initial code base

The software is part of the results of the EU Project PERSONA (<http://www.aal-persona.org/>), developed by the CNR-ISTI and ITACA-TSB and released under the Apache Software License 2.0.

It consists of a set of OSGi bundles:

The ZigBee Home Automation Profile Driver (zigbee.ha.driver)

A Home Automation Profile refinement driver able to refine ZigBeeDevice service as defined by the ZigBee OSGi Base Driver (see OSGi Device Access Specification)

The ZigBee Common Cluster Library (zigbee.zcl.library)

A set of classes representing the ZigBee Common Cluster library used by the different Zigbee Profiles (i.e. Home Automation Profile)

The ZigBase Driver (zigbee.basedriver)

The bundle that discovers and accesses the ZigBee network

The CC2480 Data Link protocol library (zigbee.cc2480.datalink)

A set of classes that implements the Texas Instrument CC2480 Interface Specification. In particular, it provides the implementation of data link protocol over the serial port and a class model that represents the message defined by the specification

The ZigBee Interface Controller API (zigbee.dongle.api)

The API of the a generic dongle that allows to access to the ZigBee Network

The Zigbee Interface Controller for EZ430-RF2480 dongle (zigbee.ez430-rf2480.driver)

Implementation of the ZigBee Controller Interface API for the USB device designed by Texas Instrument called EZ430-RF2480. It can be used to interact with any device compliant with the protocol defined in the document "CC2480 Serial Interface".

The Zigbee Network Browser (zigbee.network.browser)**Zigbee Tester** (zigbee.testers)

Tools for testing and monitoring the ZigBee network

Roadmap and invitation to contribute

All the code base should be further tested and engineered. The list of the implemented ZigBee Profiles should be completed and tested (i.e Healthcare profile). More USB ZigBee dongles produced by other manufactures should be integrated (e.g Ember based). New features and tools should be added like commissioning tools, automatic provisioning of devices interface for extended Zigbee devices, declarative approach for the design of new Zigbee cluster extensions

Involved people

- Francesco Furfari (Project Leader), CNR-ISTI, Italy
- Stefano Lenzi, CNR-ISTI, Italy
- Stefano Chessa, University of Pisa, Italy
- Juan Pablo Lazarò, TSB, Spain
- Alvaro Fides, ITACA-UPV, Spain
- Michele Girolami, CNR-ISTI, Italy

We received an expression of interest from the following individuals:

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