OpenplacOS : Automate your DIY system

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Plan

Introduction

OpenplacOS

Automation for DIY systems

Examples

Aquariums, Indoor garden :

- Lights
- Pumps
- Watering
- Nutriement, pH
- Temperature, CO_2

DIY Brewery :

- Temperature
- Process control

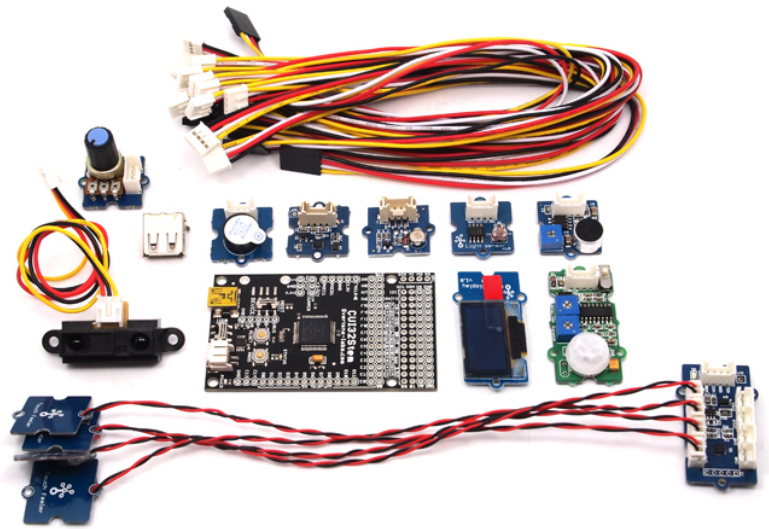
Hardware Solutions

Commercial products :

- ☺ Ready to use
- ☹ Expensive
- ☹ Closed & No Fun !

DIY / Open Hardware :

- ☺ Flexible
- ☺ Fun but Time Consuming
- ☹ Require electronic and programming skills



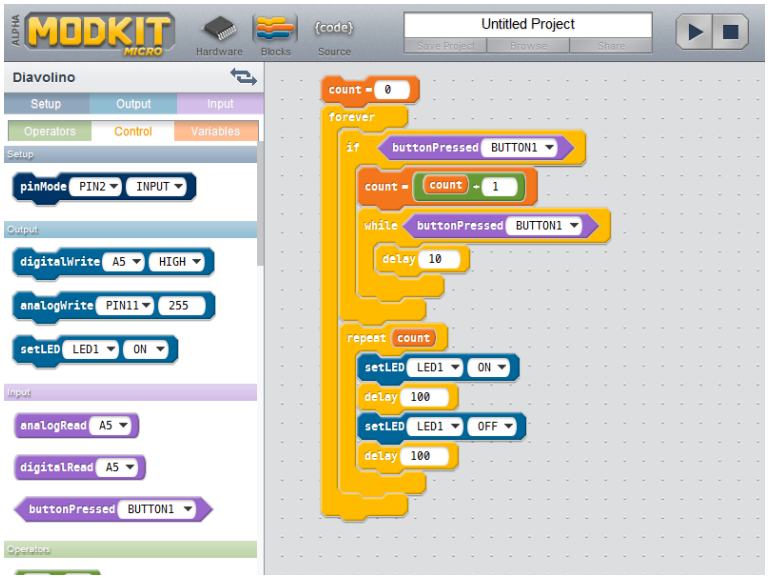
Software Solutions

Home Automation software :

- ☺ User friendly
- ☹ Application specific

Embed software Framework :

- ☺ Customizable
- ☹ Hardware specific
- ☹ Low level



OpenplacOS :

Flexibility of Open Hardware with the power of home Automation.

- ☺ Usability of an high level home automation software
- ☺ Application agnostic
- ☺ Customizability
- ☺ Fun !

Plan

Hardware

User devices

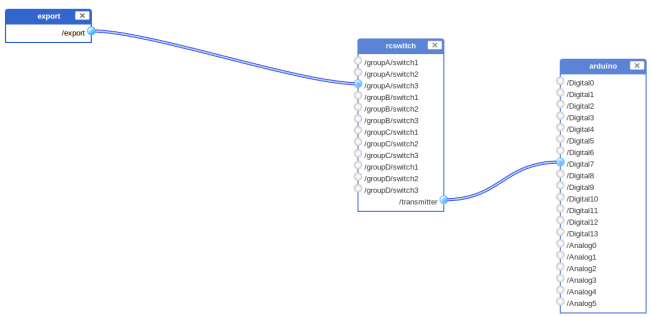
Host (raspi)

arduino

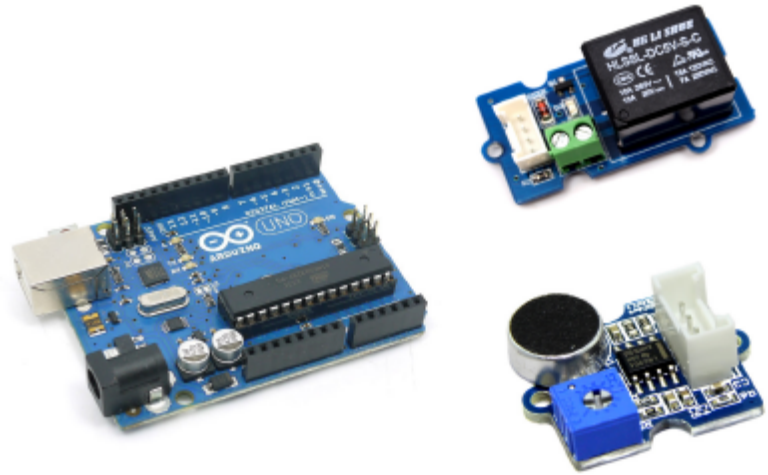
sensors

Hardware Abstraction

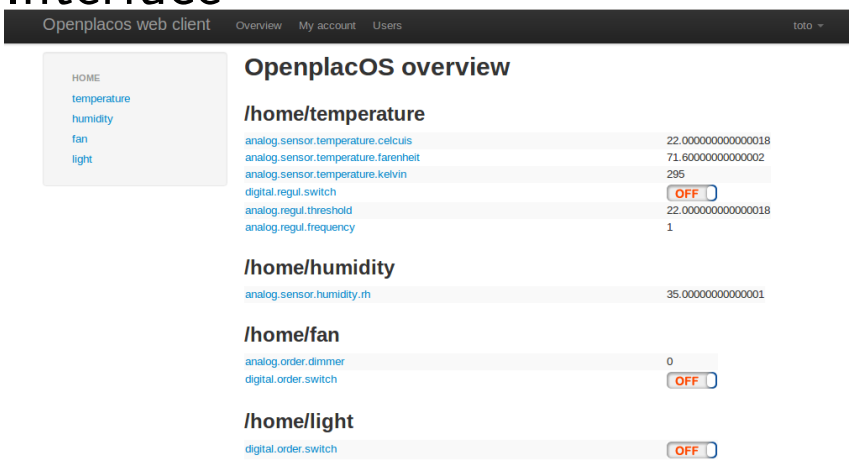
Openplacos



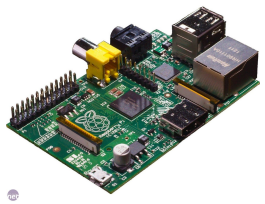
Real World



Interface



Openplacos



Plan

Software architecture

3 kind of programs :

1. Components
   - ⇒ Abstract Hardware (Arduino, Sensors)
   - ⇒ Process control (PID controller, Automation)
2. Clients
   - ⇒ User Interfaces (Web, CLI)
3. Core Server
   - ⇒ Component glue
   - ⇒ API for clients

Components

A component is a program which has a specific target. It has inputs and outputs. For example :

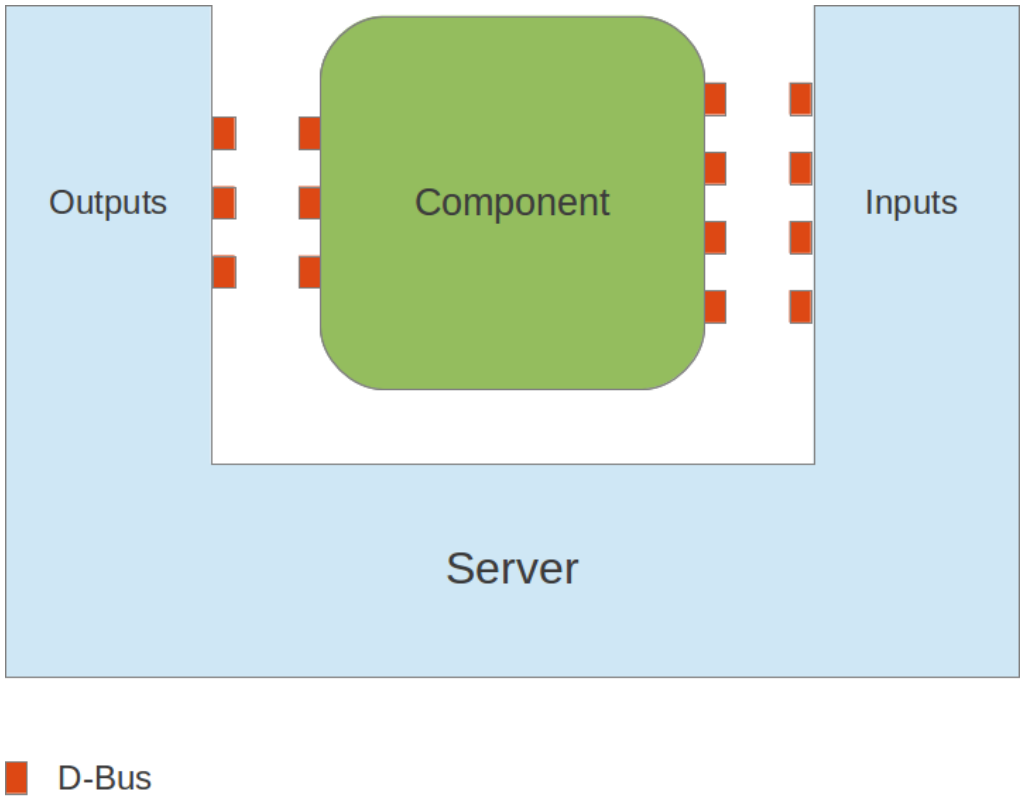
- ⇒ Temperature component : convert raw analog value to celcius
- ⇒ PID controler : control an actuator according to a consign
- ⇒ RF relay : manage RF remote switch protocol and mapping

Components

Component inputs and outputs are bind with OpenplacOS server using D-Bus.

⇒ Can be written in any langage

⇒ Can run standalone (easy debug)

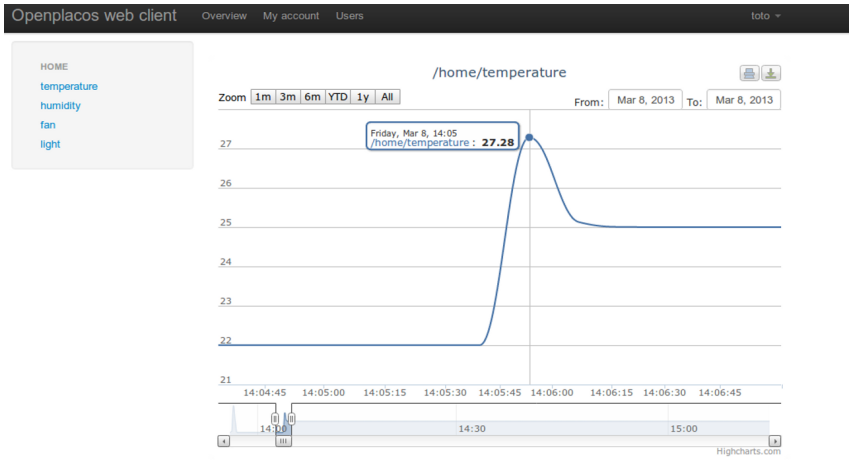


Components

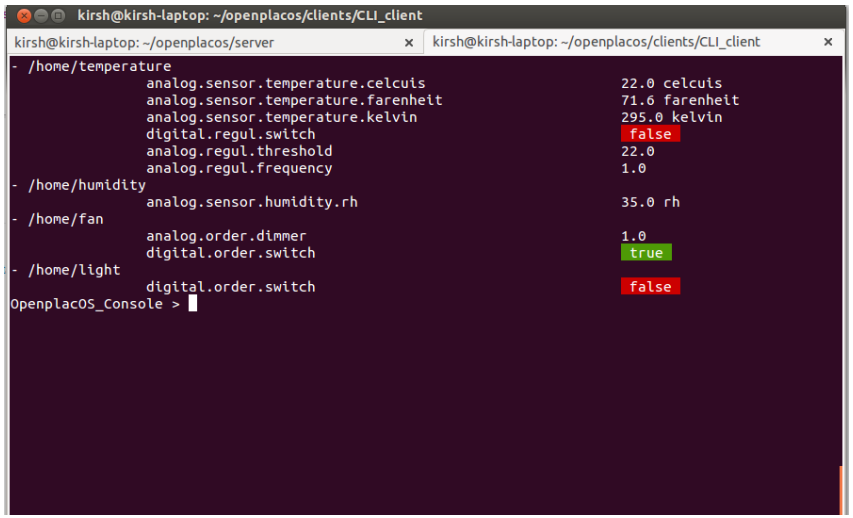
Code review

Client can access to serveur with an API REST and an OAuth2 authentification.

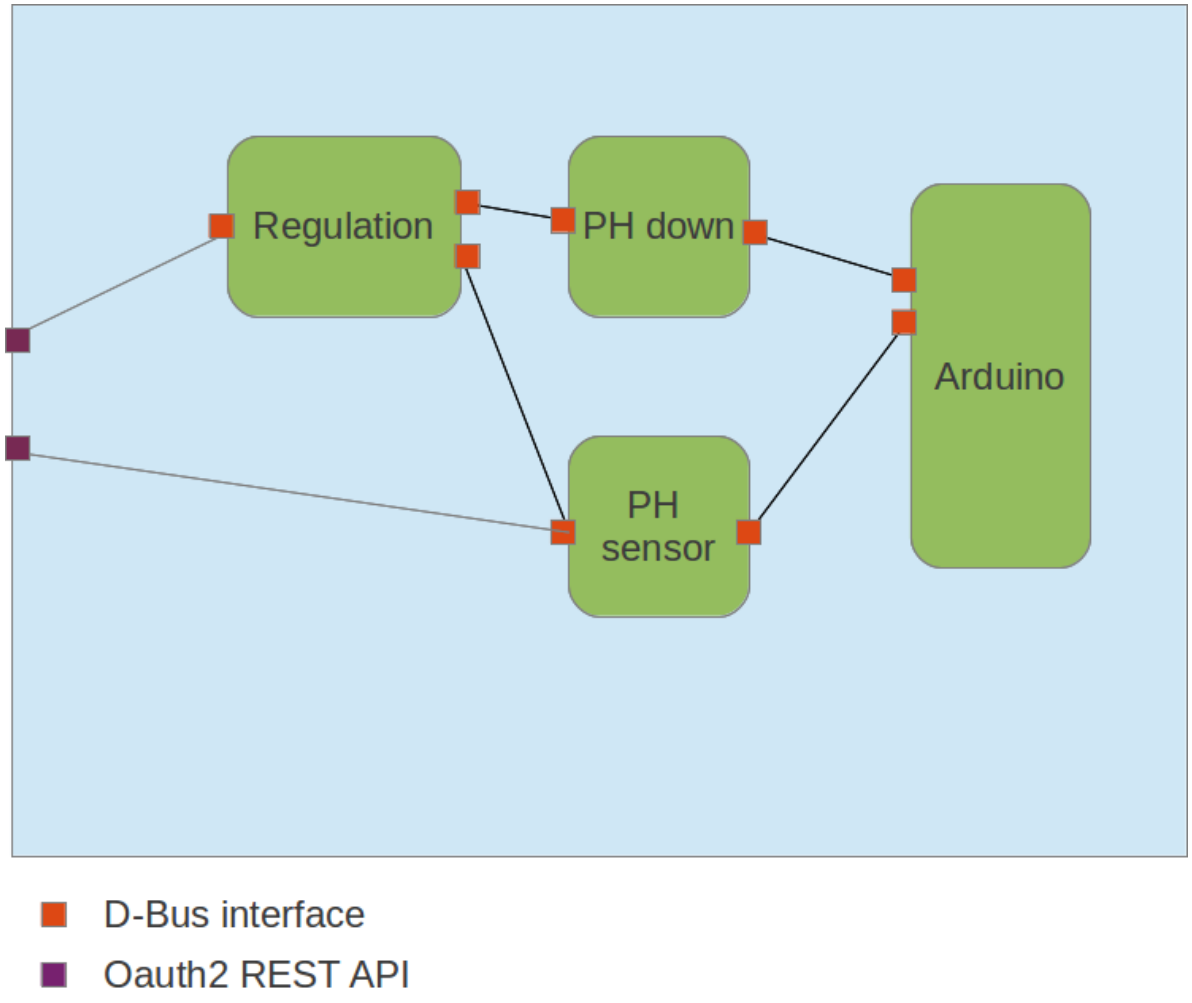
Web Interface :



Command Line :



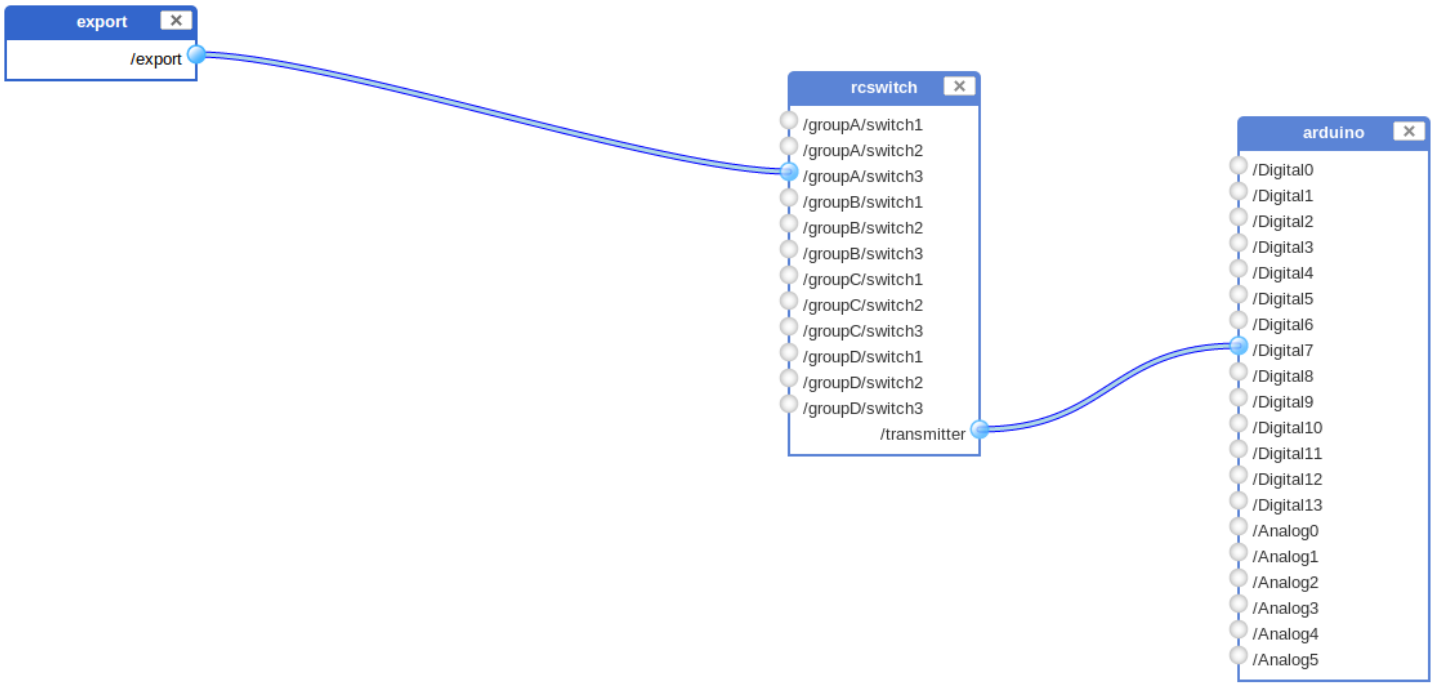
Core server



Core Server binds all components and expose them to a REST API.

Plan

Demo1


export
/export
rcswitch
/groupA/switch1
/groupA/switch2
/groupA/switch3
/groupB/switch1
/groupB/switch2
/groupB/switch3
/groupC/switch1
/groupC/switch2
/groupC/switch3
/groupD/switch1
/groupD/switch2
/groupD/switch3
/transmitter
arduino
/Digital0
/Digital1
/Digital2
/Digital3
/Digital4
/Digital5
/Digital6
/Digital7
/Digital8
/Digital9
/Digital10
/Digital11
/Digital12
/Digital13
/Analog0
/Analog1
/Analog2
/Analog3
/Analog4
/Analog5

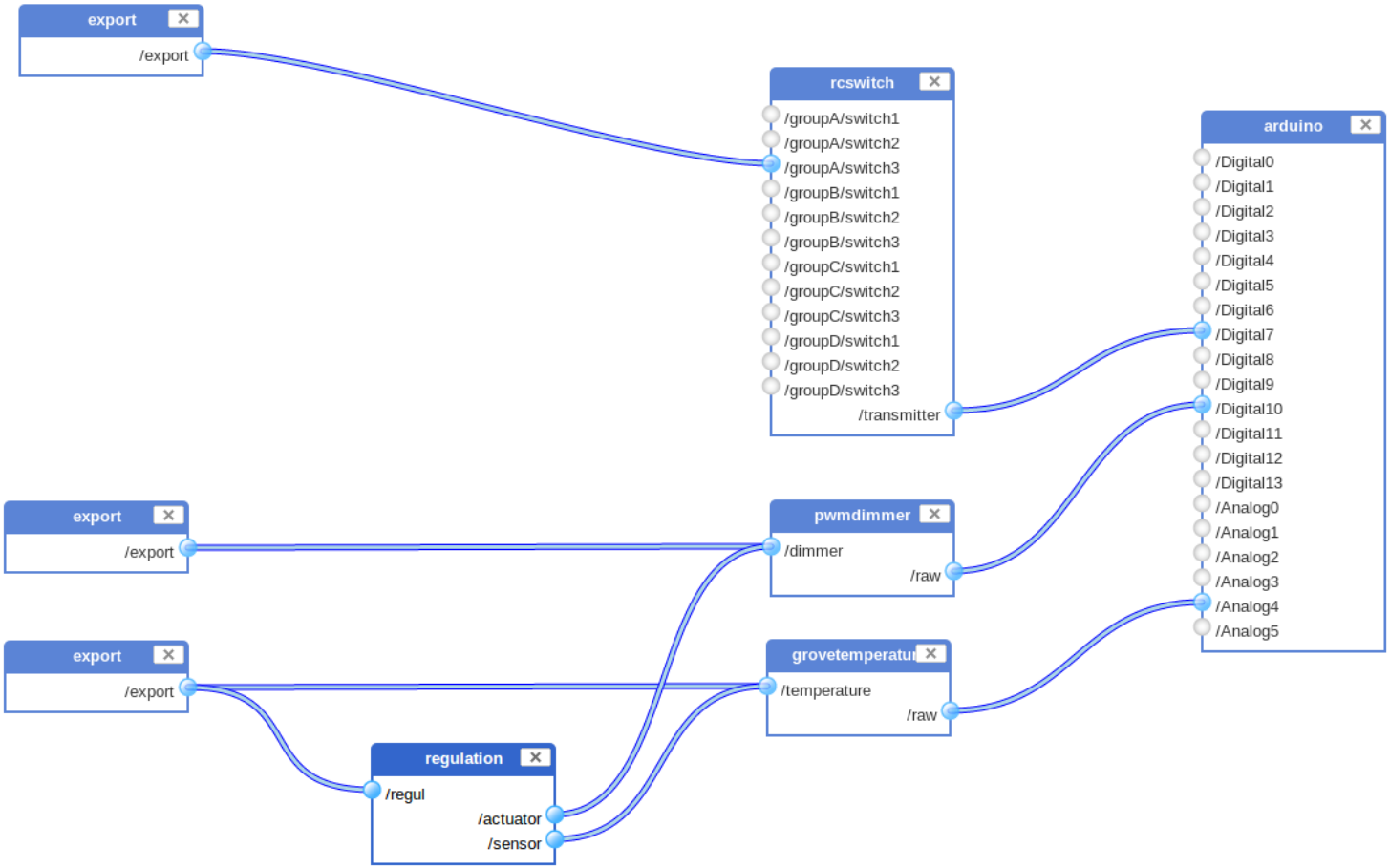
Demo2


export
/export
rcswitch
/groupA/switch1
/groupA/switch2
/groupA/switch3
/groupB/switch1
/groupB/switch2
/groupB/switch3
/groupC/switch1
/groupC/switch2
/groupC/switch3
/groupD/switch1
/groupD/switch2
/groupD/switch3
/transmitter
arduino
/Digital0
/Digital1
/Digital2
/Digital3
/Digital4
/Digital5
/Digital6
/Digital7
/Digital8
/Digital9
/Digital10
/Digital11
/Digital12
/Digital13
/Analog0
/Analog1
/Analog2
/Analog3
/Analog4
/Analog5
export
/export
/temperature
/raw

Demo3


export
/export
rcswitch
/groupA/switch1
/groupA/switch2
/groupA/switch3
/groupB/switch1
/groupB/switch2
/groupB/switch3
/groupC/switch1
/groupC/switch2
/groupC/switch3
/groupD/switch1
/groupD/switch2
/groupD/switch3
/transmitter
arduino
/Digital0
/Digital1
/Digital2
/Digital3
/Digital4
/Digital5
/Digital6
/Digital7
/Digital8
/Digital9
/Digital10
/Digital11
/Digital12
/Digital13
/Analog0
/Analog1
/Analog2
/Analog3
/Analog4
/Analog5
export
/export
pwmdimmer
/dimmer
/raw
export
/export
grovetemperatur
/temperature
/raw

Demo4


export
/export
rcswitch
/groupA/switch1
/groupA/switch2
/groupA/switch3
/groupB/switch1
/groupB/switch2
/groupB/switch3
/groupC/switch1
/groupC/switch2
/groupC/switch3
/groupD/switch1
/groupD/switch2
/groupD/switch3
/transmitter
arduino
/Digital0
/Digital1
/Digital2
/Digital3
/Digital4
/Digital5
/Digital6
/Digital7
/Digital8
/Digital9
/Digital10
/Digital11
/Digital12
/Digital13
/Analog0
/Analog1
/Analog2
/Analog3
/Analog4
/Analog5
export
/export
pwmdimmer
/dimmer
/raw
export
/export
grovetemperatur
/temperature
/raw
regulation
/regul
/actuator
/sensor

Plan

Project status

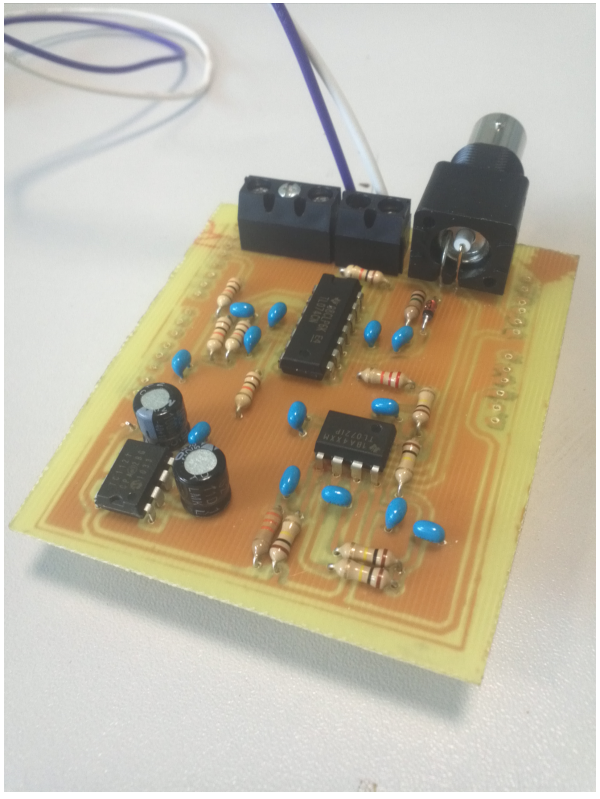
OpenplacOS is actually still in development :

- Core server is functional and stable. Usable in daily life.
- Still WIP in web interface and components library.
- Packages avalaibles for ubuntu, debian, archlinux.

Perspectives

2 active developments :

Arduino shield for pH EC and temperature :



Graphical interface for config :