



Deploying Smart City services in Messina with #SmartME

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MDSLlab research team

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- Dr. **Giovanni Merlino**
- Prof. **Antonio Puliafito**





The #SmartME project

- **collaboration** of ***MDSL*****Lab** team with **key** actors
 - ***Arduino*** Labs, municipality, university branches
- successful **crowdfunding** initiative
- a **platform** for experimental **testbeds**





Project timeline / roadmap

- I Nov. 2014: **brainstorming**, first idea of #SmartME
- II Dec. 2014 - Jan. 2015: aims and goals, first **draft architecture**, **identification** of hardware and software **technologies**
- III Feb. - April 2015: **crowdfunding** initiative
- IV April 2015 - Dec. 2015: equipment and **device design** and assembly
- V Sept. 2015 - June 2016: **software** platform **development**
- VI March 2016 - Dec. 2016: **initial** infrastructure **deployment** and operation
- VII June 2016 - Dec. 2017: **service development** and deployment



Crowdfunding campaign: tiers

Categories of contributions:

- 1st-tier supporter (no active role, **name inclusion** in the list)
- 2nd-tier supporter (as 1st + “thank you” **postcard**)
- 3rd-tier supporter (2nd + **t-shirt**)
- user (3rd + privileged/**preliminary access** to 1st year **data**)
- developer (3rd + 1-year **access** to **infrastructure**)
- adopting-a-sensor (3rd + user-provided **location** for **deployment**)
- brand sponsorship (3rd + 1-month **advertisement** on project **site**)



Crowdfunding campaign: results

Successfully terminated after **2** months:

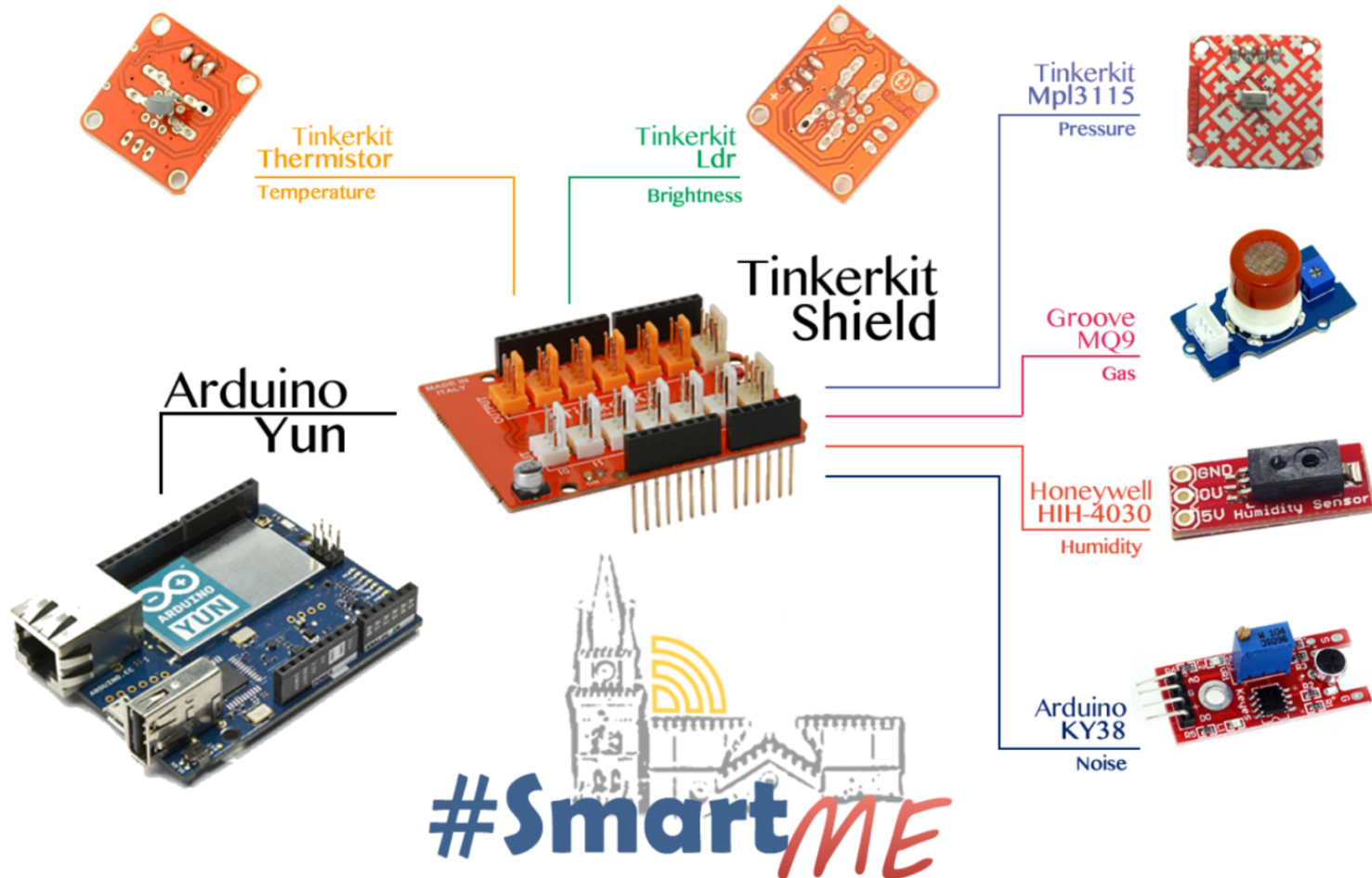
- collecting in total Euro **34132** Euros
 - more than **twice** the **target** of Euro 15000
- involving **84** backers
 - **16** 1st-tier supporters
 - **9** 2nd-tier supporters
 - **25** 3rd-tier ones
 - **14** users
 - **1** developer
 - **3** sensor adopters
 - **10** brand advertisers

Campaign link:

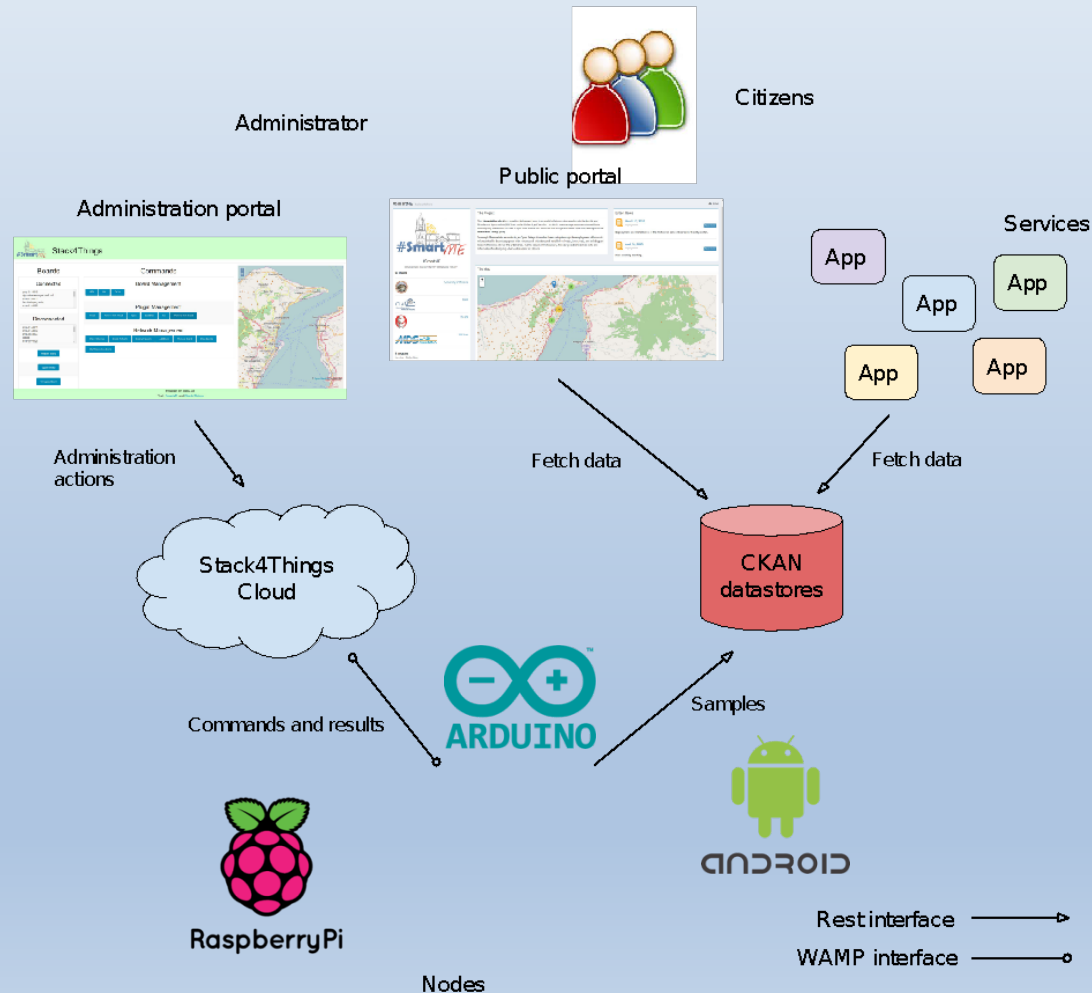
- <https://www.eppela.com/en/projects/5787-smartme-la-messina-del-futuro>



Example of a #SmartME node



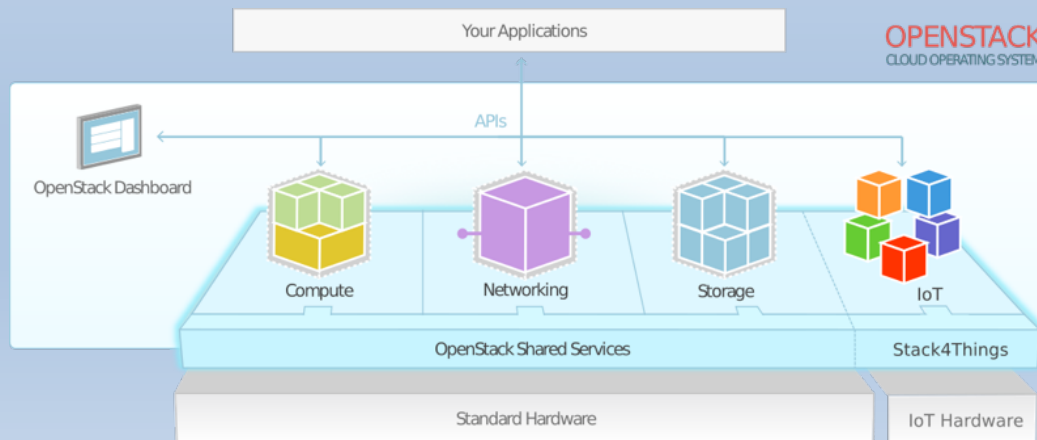
Architecture of the #SmartME framework





IoT-Cloud engine: Stack4Things

- an **OpenStack**-based Internet of Things framework developed by the Mobile and Distributed Systems Lab (MDSLab)
- an **open source** project helping administrators to manage IoT device fleets without caring about their physical location, their network configuration, their underlying hardware/software setup
- a **Cloud-oriented horizontal** solution providing IoT object virtualization, customization, and orchestration
- enables an **out-of-the-box** experience on several of the most **popular** embedded and mobile systems



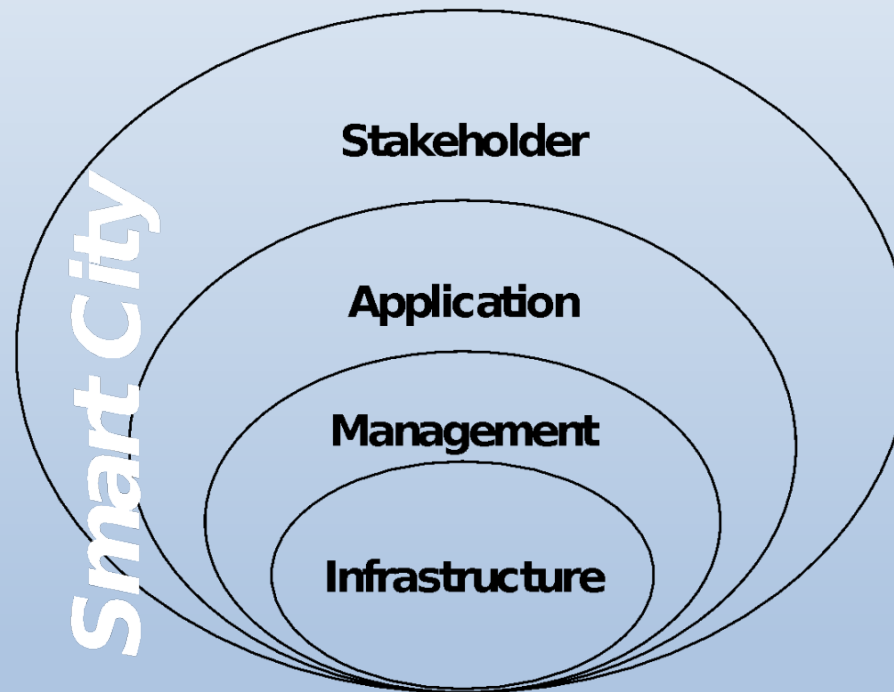


Stack4Things: features

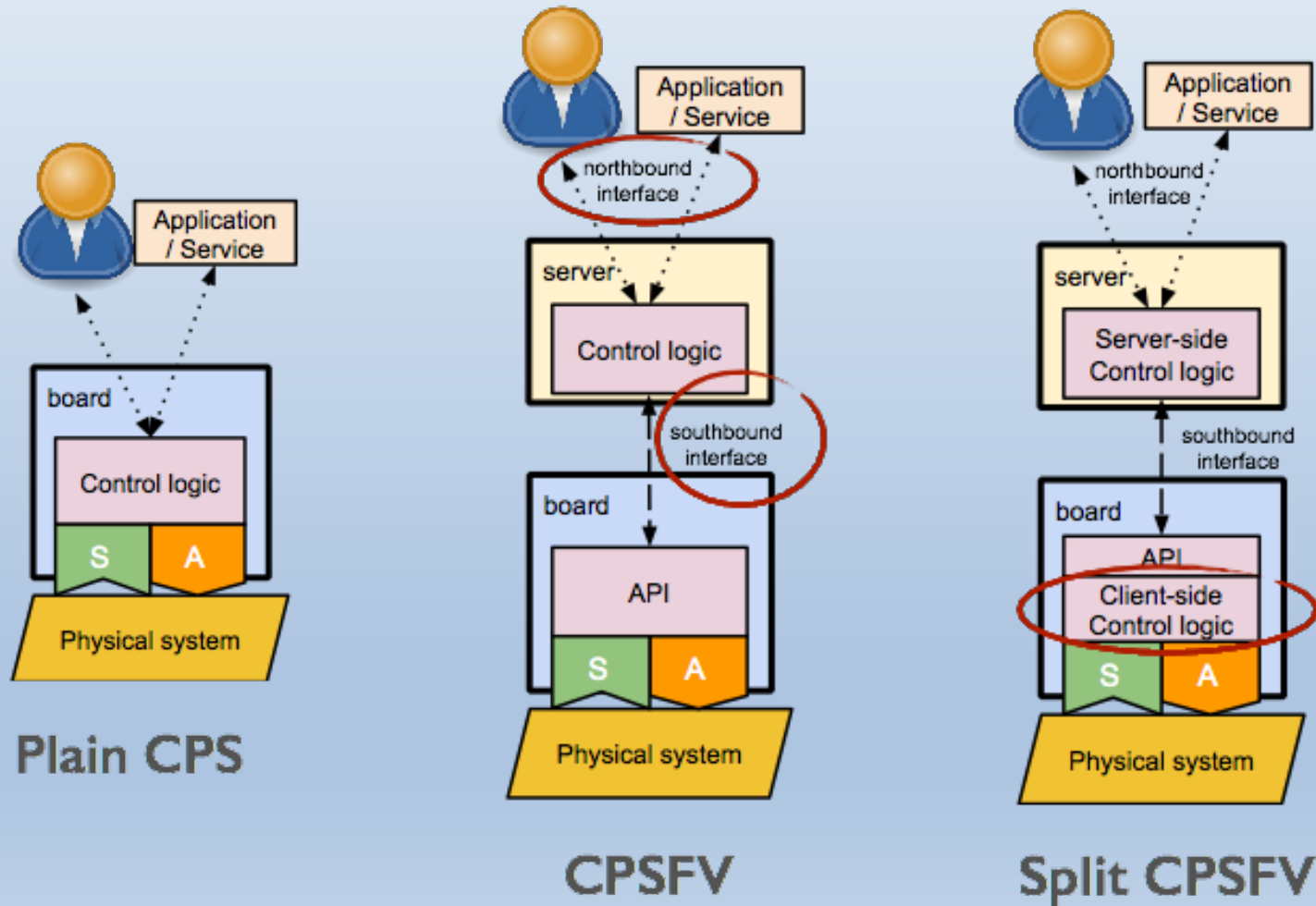
- **object virtualization** - interaction with IoT devices as entities in the Cloud through a uniform interface
- **overlay networks of things** - creation and management of Cloud-mediated virtual networks among remote objects
- **remote control and customization** - full customization of devices from low-level firmware/operating system configuration up to business logic
- **fleet management and delegation** - IoT objects can be organized in fleets and controlled hassle-free, coupled with a complex delegation model for a multi-tenant Cloud of objects
- **fog orchestration** - objects orchestrated by aggregating them in IoT ensembles, allowing to build and deploy new Fog-like applications



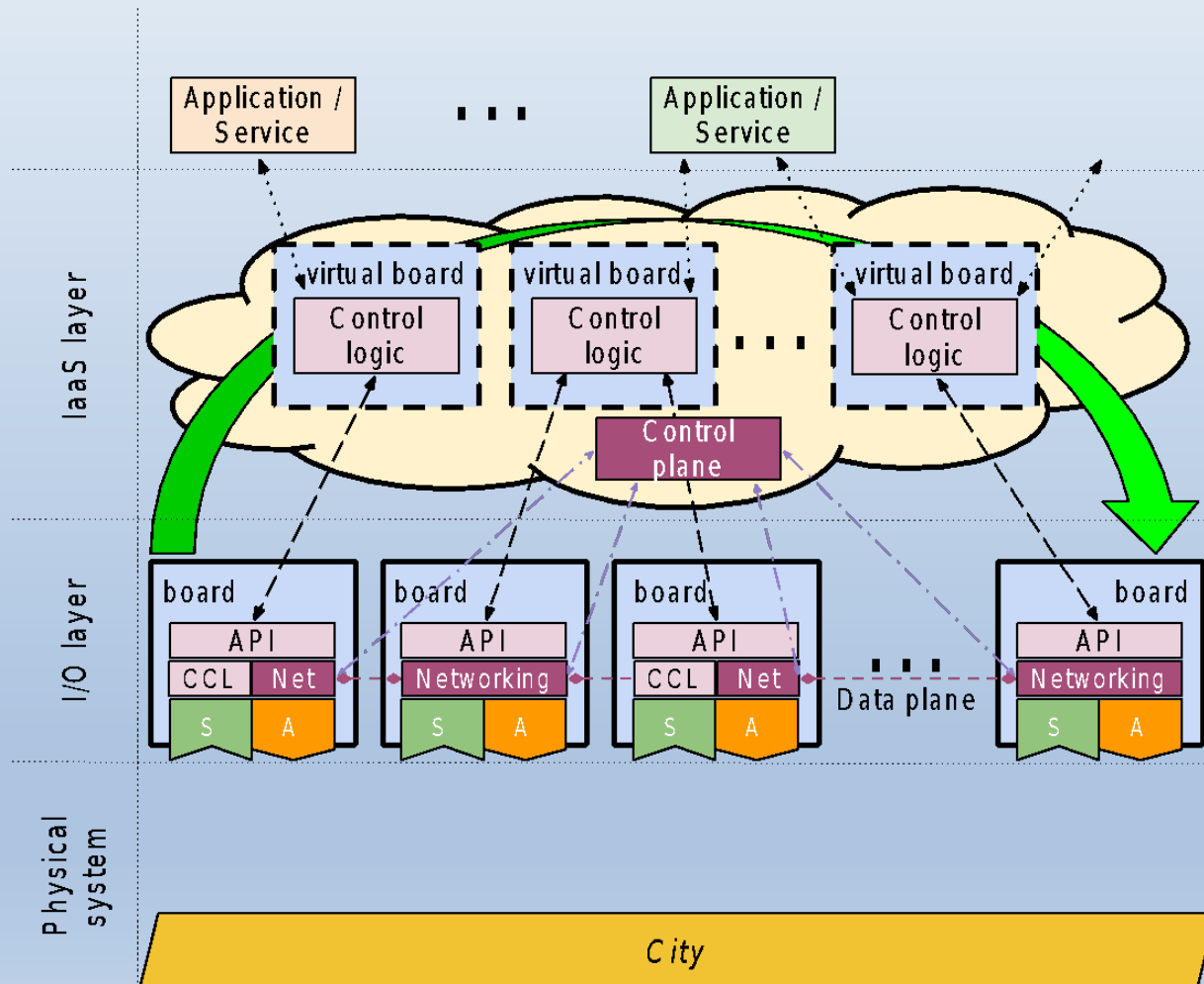
Smart City: layers model



Stack4Things: Cyber-Physical Systems



Stack4Things: Software-Defined Cities





Stack4Things: underlying technologies





Screenshot of the #SmartME portal

#SmartME Technologies Timeline Community

#SmartME it all starts here

#SmartME

Innovatively making the city of Messina "smart".

Credits

University of Messina

CIAM

DH Labs

MDSL Lab

Location

Messina - Sicily, Italy

Skills

[Open Data](#)
[Smart City](#)
[Arduino](#)
[Sensors](#)
[Internet of Things \(IoT\)](#)

The Project

The **#SmartME project** is a crowdfunded project born from a wish of a team of researchers in the Mobile and Distributed Systems Lab (MDSL) at the University of Messina. Its aim is to encourage a conversation with the municipality of Messina in order to spur the creation of a novel virtual ecosystem based upon the paradigm of the **Internet of Things (IoT)**.

To morph Messina into a smart city, an Open Data platform has been set up through the employment of low-cost microcontroller boards equipped with sensors and actuators and installed on buses, lamp posts, and buildings of local institutions, all over the urban area. Thanks to such infrastructure, it is now possible to collect data and information for designing advanced services for citizens.

Latest News

March 17, 2016

Deployment

Read more

Deployment and installation of the first seven sensor boards in the city center.

April 28, 2015

Deployment

Read more

First working meeting.

The Map

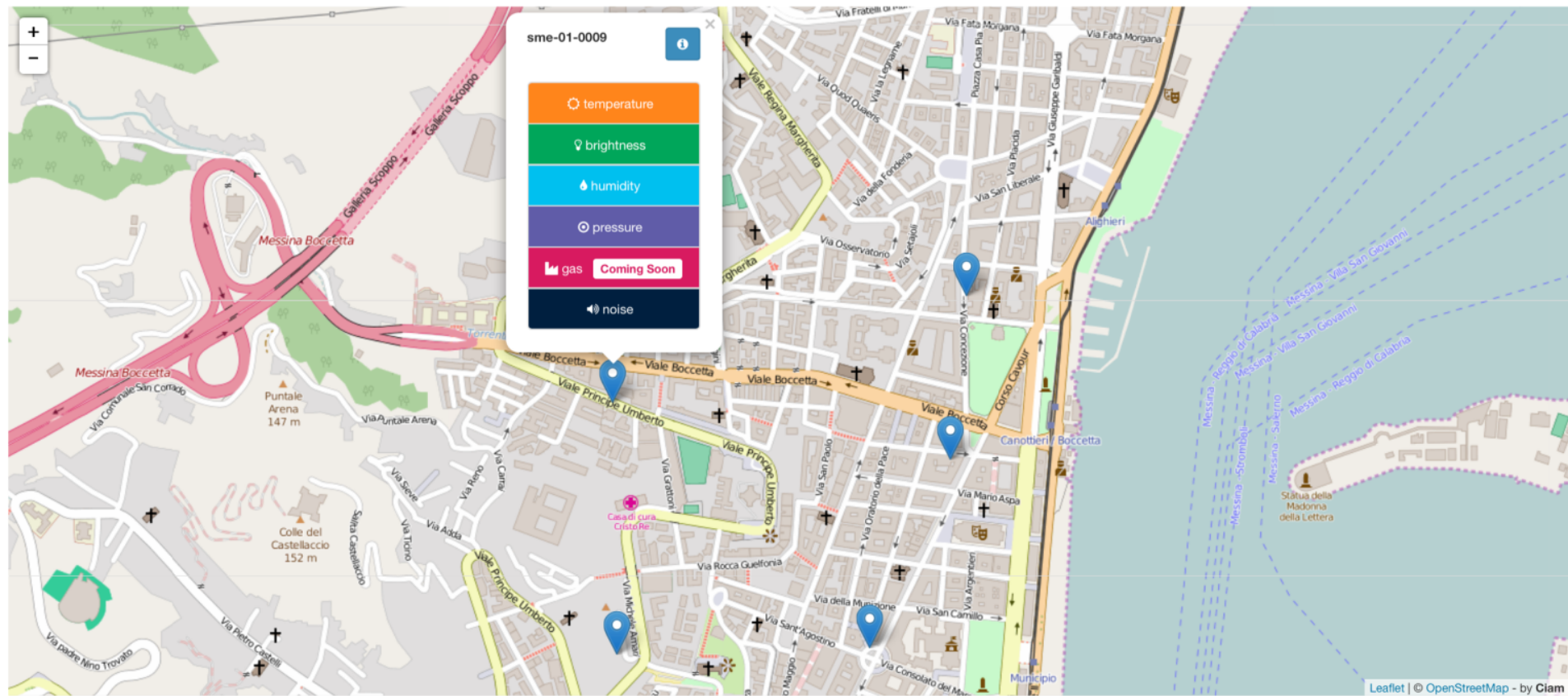
15

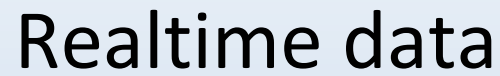
MDSL LAB MESSINA

G. Merlino

Map detail

The Map








Board details and datasets


Board Name: Sme-01-0012 [Arduino Yun]

[OpenData](#) on SmartMe-Data




Temperature
[TinkerKit](#) [Thermistor](#) [°C](#)

[OpenData](#)




Brightness
[TinkerKit](#) [LDR](#) [lux](#)

[OpenData](#)




Humidity
[Honeywell](#) [HIH-4030](#) [percent](#)

[OpenData](#)




Barometer
[TinkerKit](#) [mpl3115](#) [hPa](#)

[OpenData](#)



Gas
[Grove](#) [MQ9](#) [ppm](#)

[Coming Soon](#)




Sound_detect
[Keyes](#) [HY-038](#) [amplitude](#)

[OpenData](#)





Management dashboard

 Stack4Things

Boards

Connected

sme-01-0019
dip-sienze-co.psi.ped.cul
sme-01-0012
facolta-ingegneria
sme-01-0022

Disconnected

sme-01-0011
sme-01-0024
sme-00-0027
fablab
sme-00-0020

Register Board

Update Board

Unregister Board

Commands

Board Management

LEDSSHOKAN

Plugin Management

CreateRemove from CloudInjectStart/StopCallRemove from Board

Network Management

Show NetworksCreate NetworkDestroy NetworkAdd BoardRemove BoardShow Boards

Start Network on Board





Board registration

Add new board to the Cloud

Registration

Board Code

e11b821e-009e-8861-fc8a-d9e561d388e8

Label

Label

Latitude (example: 38.12345678)

Latitude

Longitude (example: 15.12345678)

Longitude

Altitude (example: 150.12345678)

Altitude

Net enabled

False

Sensors On Board

☐ temperature

☐ brightness

☐ humidity

☐ sound_detect

☐ gas

☐ barometer

Register



Plugins

Create Plugin

Plugin Management

Plugin Name

Plugin Name

async

Plugin Json

Insert here the json

Javascript Code

Scegli file | nessuno selezionato

Insert here the code

Send

Output





Networking

Create New Network



New Network

Network Name

IP Address

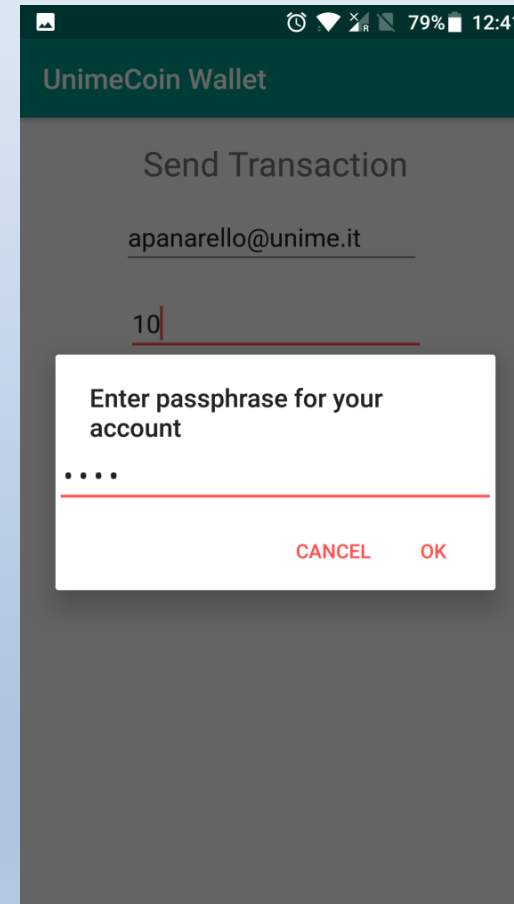
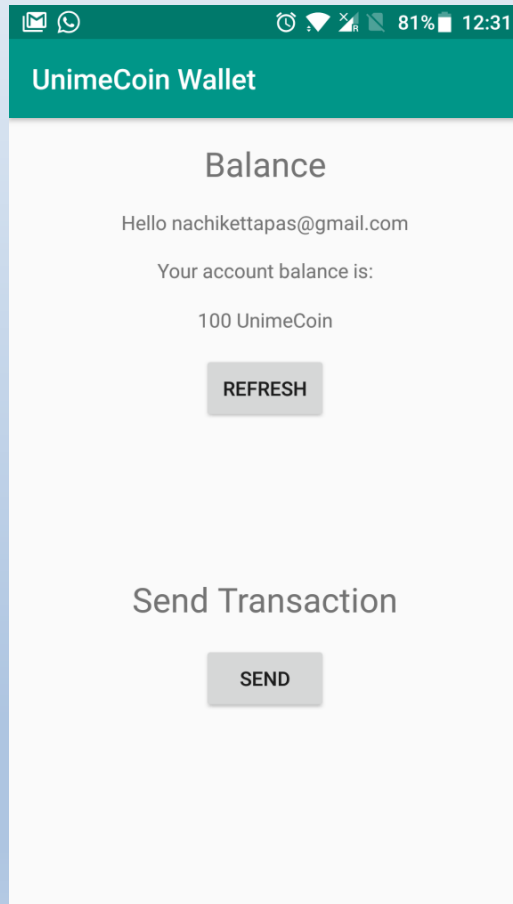
Send

Output





Incentive mechanisms: UniMeCoin





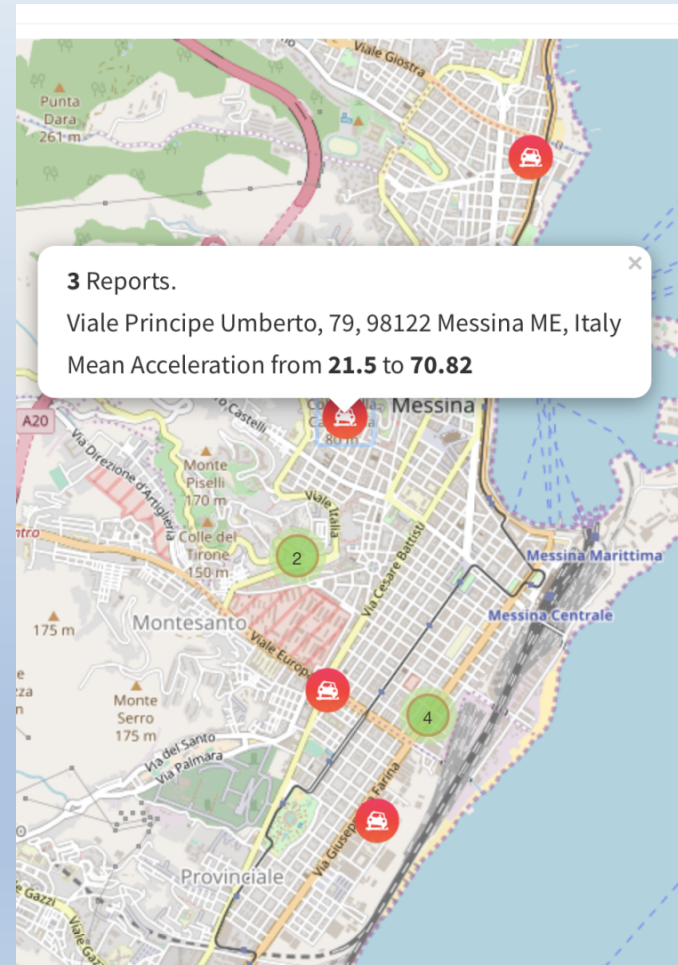
Carpooling@UniME



#SmartME Taxi



#SmartME Pothole





#SmartME Pothole: operator portal

[Home](#) [Dettagli segnalazioni buca](#) [Riparazione buca](#)

Intervallo intensità d'urto
Inizio: Fine:
[Filtro](#) [Reset](#)

[Map](#) [Satellite](#)

Id : 5a0584de64516b4a134ec918
Sito verificato dalle Google API
Indirizzo : Viale Principe Umberto, 8, 98122 Messina ME, Italy
Latitudine : 38.19390466149394
Longitudine : 15.546524985717744
Intensita' minima rilevata : 4.238405531165476
Intensita' massima rilevata : 4.238405531165476
Numero di segnalazioni : 1
Data di prima notifica : Fri Nov 10 2017 11:52:12 GMT+0100 (CET)
Data ultima notifica : Fri Nov 10 2017 11:52:12 GMT+0100 (CET)





#SmartME Parking

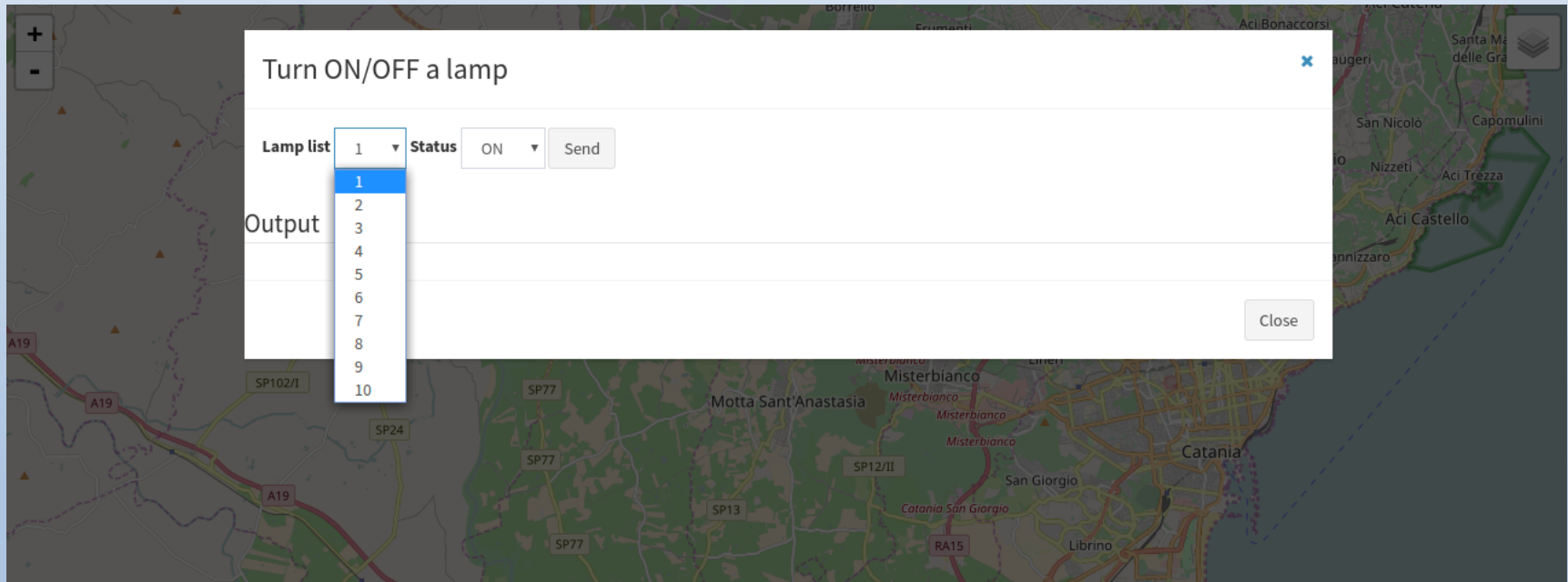




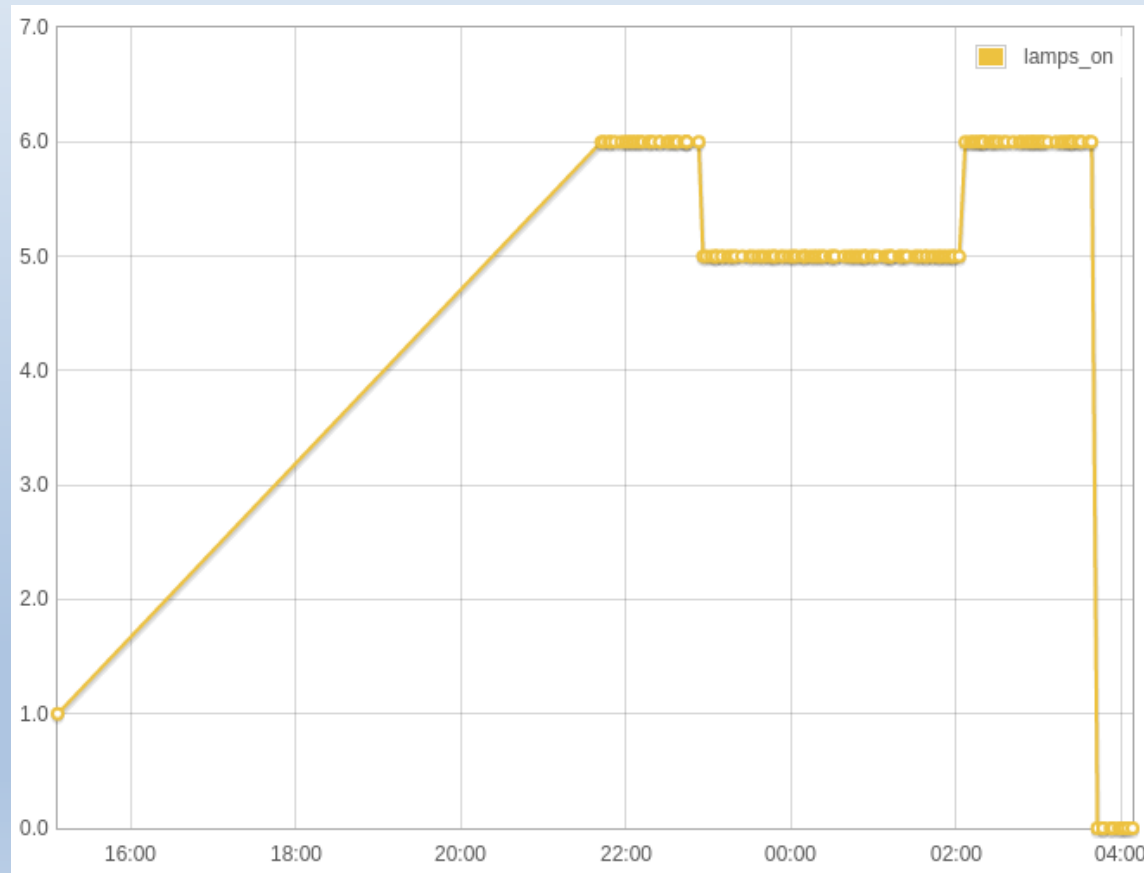
#SmartME Airport



#SmartME Lighting: remote control



#SmartME Lighting: monitoring



#SmartME Trashcan



#SmartME Art





Thank you!

<http://smartme.unime.it>

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