

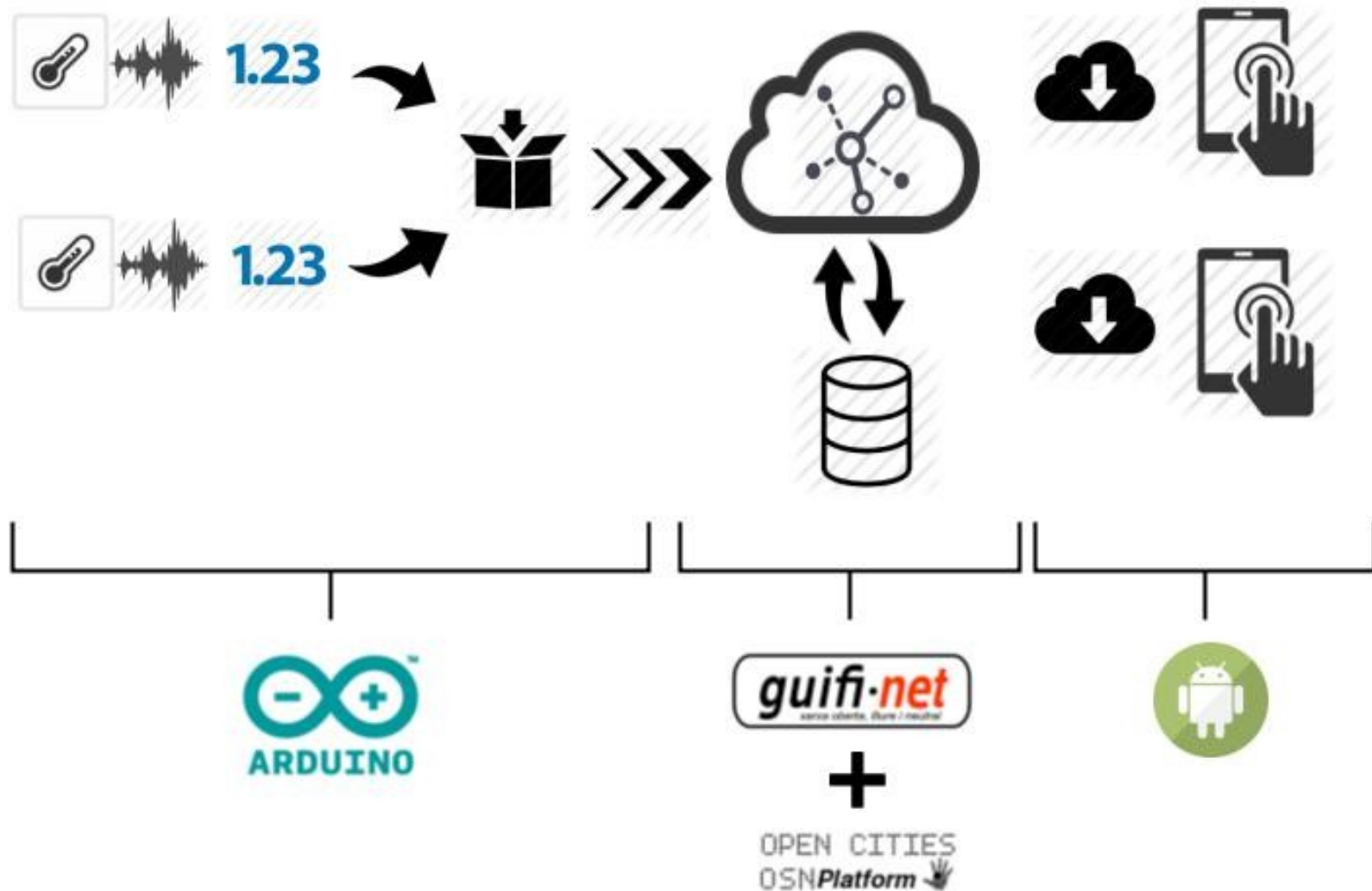
A BOTTOM UP SENSOR TESTBED

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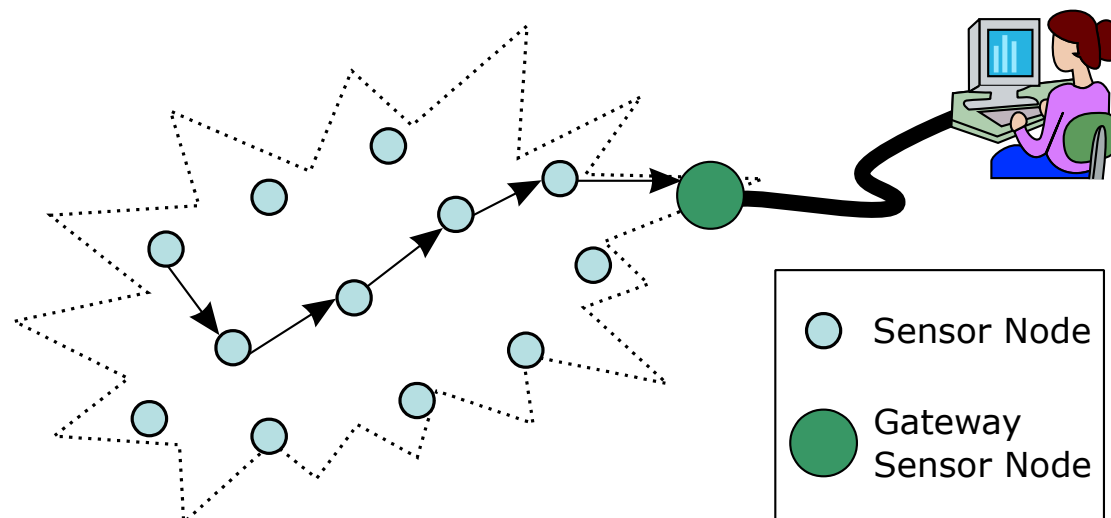
Outline

INTRODUCTION



Wireless Sensor Networks

- A network composed of nodes.
- A node:
 - Is composed of a computer and sensors.
 - A node has equipped wireless technology to create ad-hoc networks.



Bottom Up Broadband (BuB)

- BuB defines network design, deployment and operation initiatives driven by end user needs.
- These end users can be individuals, companies or institutions.
- In BuB, those that need the network are the ones that take the initiative and participate in the organization and funding of the project



<http://bubforeurope.net/>

State of the Art Smartcities

- A city capable of having real-time information.
- Amsterdam:
 - Flexible street lighting
 - Smart parking
- Santander:
 - Environmental monitoring
 - Traffic Intensity Monitoring



State of the Art Companies

- Smartcitizen is a platform that offers a sensor board based on Arduino to monitor the environment.
- Libelium is an Internet of things platform provider, which supplies an open source sensor platform for the Internet of things.



Libelium Smart Water

State of the Art

Open Data

- The term Open data pursues the fact that certain types of data should be available for anyone to use, without any control mechanism, e.g. copyright.
- Opencities, Xively and Sentilo are platform that allow the user to upload and download data.

State of the Art Sensor Boards

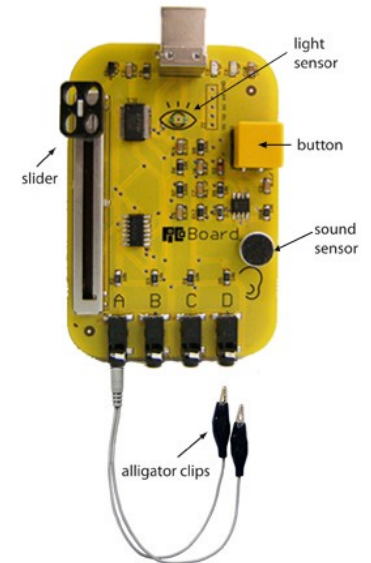
- Some options for the sensor node:



Arduino YUN



Raspberry Pi model B

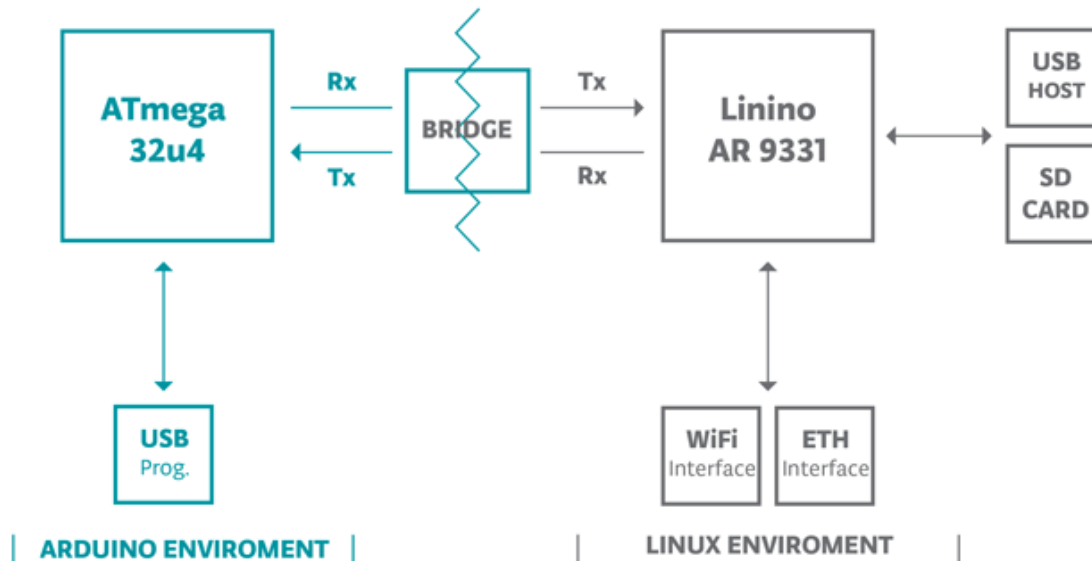


Picoboard

Technology

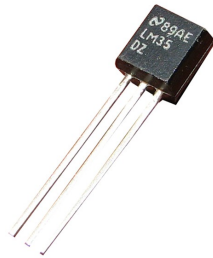
Arduino Yun

- Micro controller board with two processors.
- Has an Ethernet and WiFi module.
- Arduino sketches can communicate with the Linux processor through the Bridge library

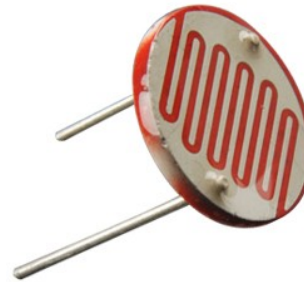


Technology Sensors

- The goal is to analyze the environment.
- These sensors measure the aspects that may be more useful for citizens:



Temperature



Light



Noise



Humidity



Air Quality

Technology

Upload Sensor Data

- Upload the data from the sensors to a platform so that everyone can access them.
- A GeoJSON message includes data from the 5 sensors.
- A Python script has been used to upload this message.

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{  
  "type": "FeatureCollection",  
  "name": "dummy",  
  "timeStamp": "2014-06-12T08:54:59.424Z",  
  "features": [  
    {  
      "type": "Feature",  
      "tags": [  
        "red",  
        "tall",  
        "cheap",  
        "upf"  
      ],  
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        "type": "Point",  
        "coordinates": [  
          2.18946,  
          41.403809  
        ]  
      }  
    }  
  ]  
}
```

Technology Community Network

Community Network

Technology

Storage Resource Broker

Technology

Visualization Platform (Android App)

Testbed

What is a Testbed

Testbed

Goals

Testbed

Map scenario

Testbed

Results

Conclusions

Future Work