



Project
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**ENPI
CBCMED**
CROSS-BORDER COOPERATION
IN THE MEDITERRANEAN

FruitFlyNet

A Location-aware System for Fruit Fly Monitoring and Pest Management Control

Wireless Sensor Network architecture and Web Services



Agricultural
University
of Athens



CRA
CONSIGLIO PER LA RICERCA
E LA SPERIMENTAZIONE
IN AGRICOLTURA



Universitat de les
Illes Balears





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The 2007-2013 ENPI CBC Mediterranean Sea Basin Programme is a multilateral Cross-Border Cooperation initiative funded by the European Neighbourhood and Partnership Instrument (ENPI). The Programme objective is to promote the sustainable and harmonious cooperation process at the Mediterranean Basin level by dealing with the common challenges and enhancing its endogenous potential. It finances cooperation projects as a contribution to the economic, social, environmental and cultural development of the Mediterranean region. The following 14 countries participate in the Programme: Cyprus, Egypt, France, Greece, Israel, Italy, Jordan, Lebanon, Malta, Palestine, Portugal, Spain, Syria (participation currently suspended), Tunisia. The Joint Managing Authority (JMA) is the Autonomous Region of Sardinia (Italy). Official Programme languages are Arabic, English and French (www.enpicbmed.eu).

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The project FruitFlyNet total budget is 1.662.872,32€ and it is financed, on an amount of 1.496.585,09€ (90 %), by the European Union (ENPI CBC Mediterranean Sea Basin Programme) through the European Neighbourhood and Partnership Instrument.

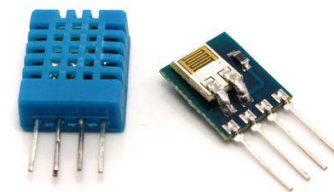
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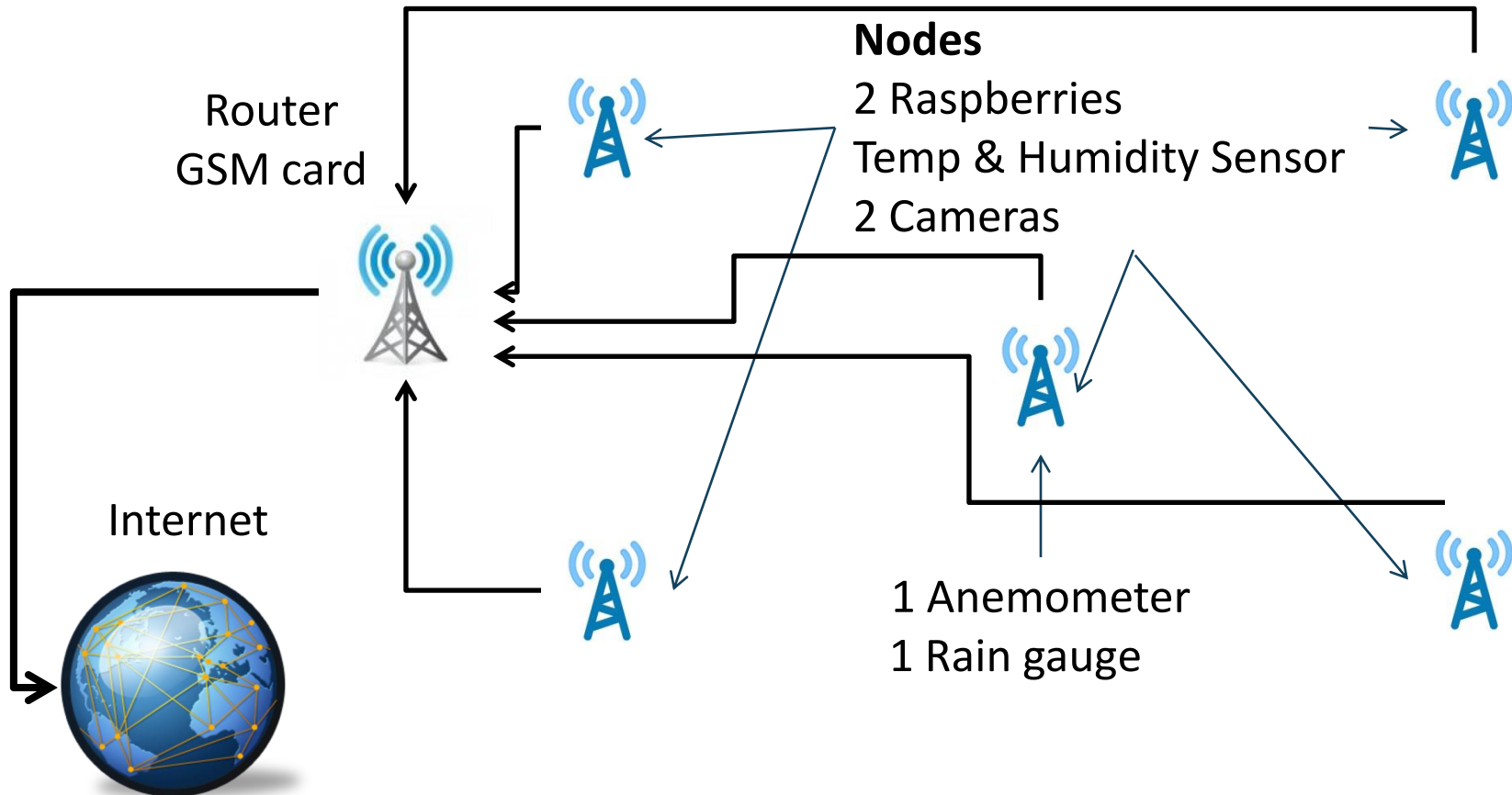
AUA Olive Fruit Fly Net LAS Components



- 5 Nodes
- 10 Raspberry Pi 2+
- 10 Cameras
- 1 Router
- 1 GSM SIM card
- 5 Temperature Sensors
- 5 Humidity Sensors
- 1 Anemometer
- 1 Rain gauge



AUA Olive Fruit Fly Net LAS Sensor Architecture



Greece Athens December, 2015



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AUA Olive Fruit Fly Net LAS Network Issues



- Equipment malfunctions
- Router loss of internet connectivity
- Corrupt photos
- Raspberry loss of wireless connectivity
- Data loss due to connectivity issues
- Raspberry OS freeze
- Need for remote management



AUA Olive Fruit Fly Net LAS Network Issues - Resolution



- Router loss of internet connectivity
 - Communication with provider to fine tune connection parameters
 - Scheduled router to restart daily
- Corrupt photos
 - Increased the sampling ratio of photos
- Raspberry loss of wireless connectivity
 - Scheduled wi-fi reset prior to data transmission
 - Scheduled raspberry soft reset



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Steps for issue resolution



- Data loss due to connectivity issues
 - Each raspberry keeps its own set of scalar data and photo
 - Each raspberry stores failed transmissions and attempts to upload them to the server with the next data upload
- Raspberry OS freeze
 - Scheduled raspberry soft reset
- Remote management
 - Used a free VPN solution, that provides a direct secure tunnel connection to the raspberries.



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Web Services – Server Communication



Each raspberry is scheduled to take photos and sensors readings at specified intervals.

The raspberry then proceeds with uploading the scalar data using web services and the photos with the use of ftp.

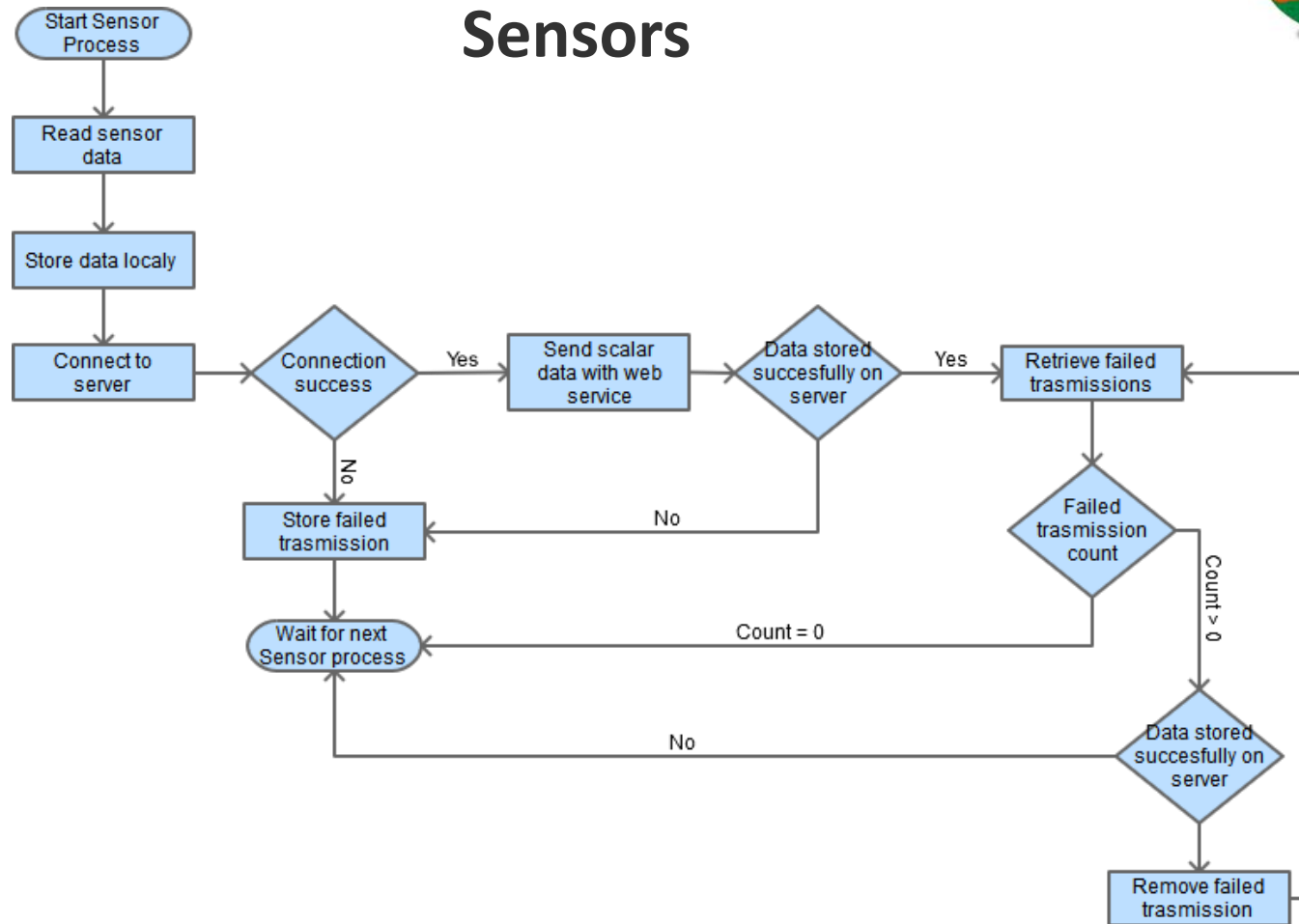
In order to mitigate network traffic load, the schedule of each raspberry varies slightly from the others.

```
50 0,3,6,8,10,12,14,16,18,20,22 * * * /home/pi/SensorData.py
0 7,10,14,16 * * * /home/pi/CaptureuploadPhoto.sh
55 6,9,13,15,21 * * * sudo /sbin/shutdown -r now
```



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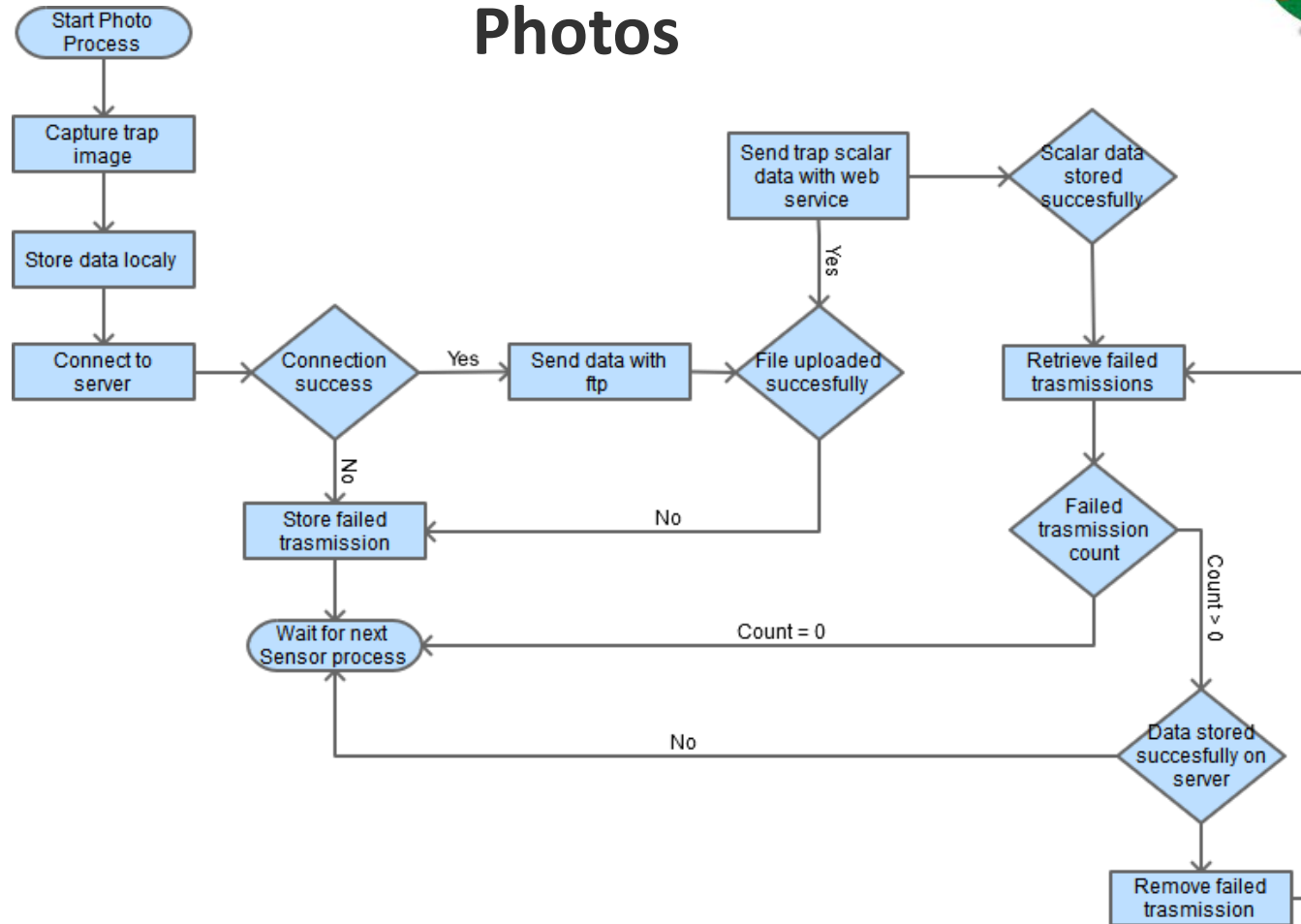
Web Services – Server Communication Sensors



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Web Services – Server Communication

Photos





FruitFly Net

Thank you!!!



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