DATA AGGREGATION
AND ANALYTICS
ThingSpeak™

MATLAB®

SMART CONNECTED DEVICES

ALGORITHM DEVELOPMENT
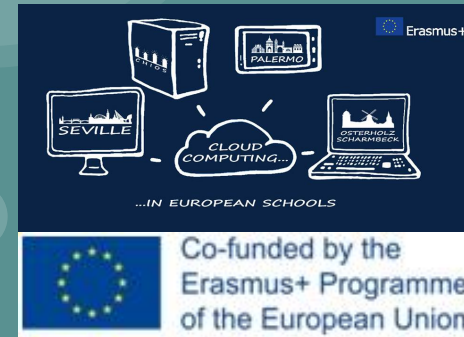SENSOR ANALYTICS

PaaS (**P**latform **a**s **a S**ervice) study.

- The platform that we studied was **Thingspeak**.
- We made a **Temperature Humidity logger** which is an **IOT** (**I**nternet **O**f **T**hings) application.

Erasmus+

PALERMO

SEVILLE

CLOUD COMPUTING...

OSTERHOLZ SCHARMBECK

...IN EUROPEAN SCHOOLS

Co-funded by the
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What is **ThingSpeak ?**

It is PaaS solution that :

- Collect Data   Send sensor data privately to the cloud.
- Analyze Data   Analyze and visualize your data with MATLAB.
- Act   Trigger a reaction.

ThingSpeak uses :

- **MATLAB** software in background and
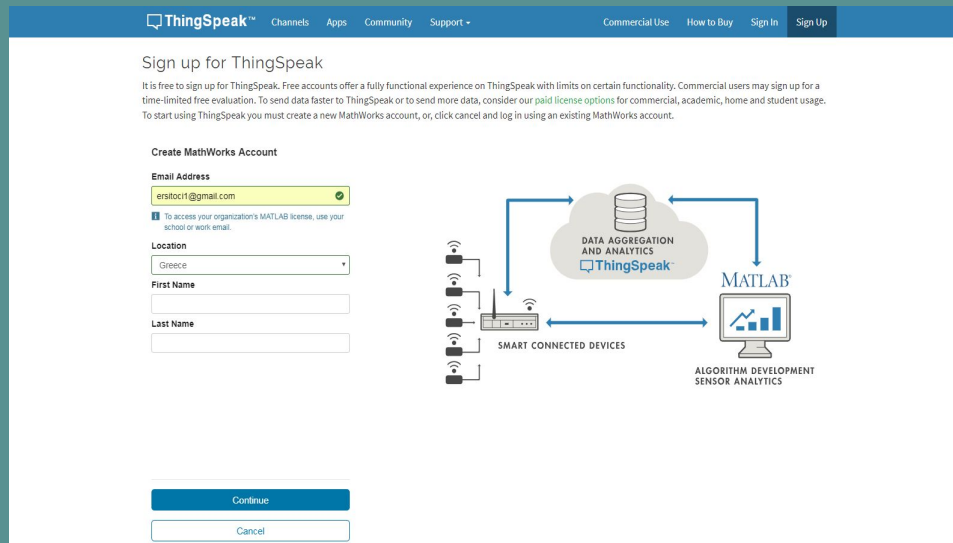- **Mathworks inc.** servers.

Our Study on PAAS ThingSpeak

We discussed how :

- to Sign up
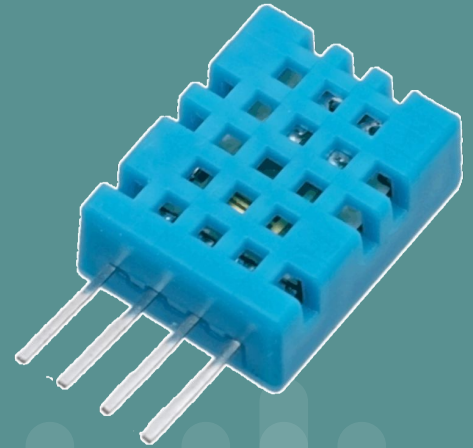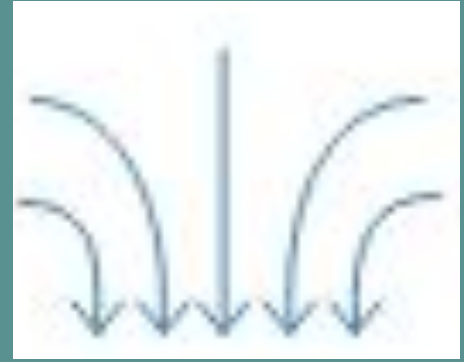- **API** (**A**pplication **P**rogramming **I**nterface) works.
- Basic examples.

ThinkSpeak **Collects** data:

I. Be able to collect data from your sensors.
II. Send it to the cloud in a secure way.
III. Use the data you collected for processing.

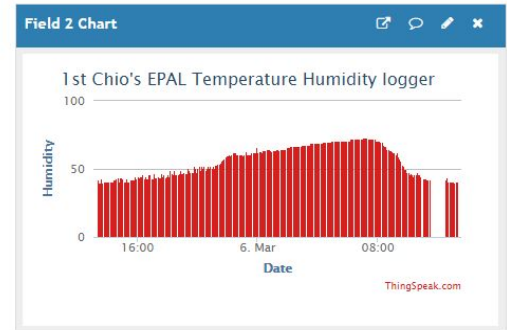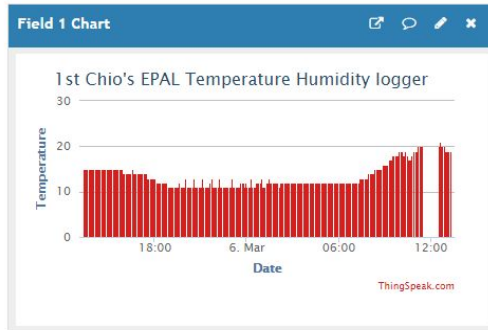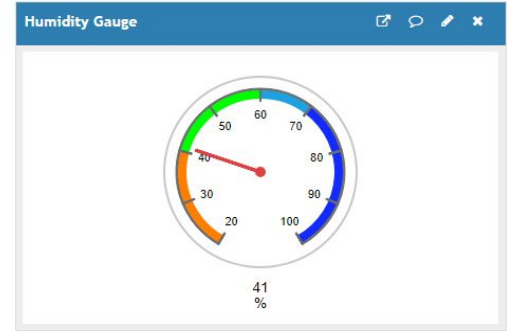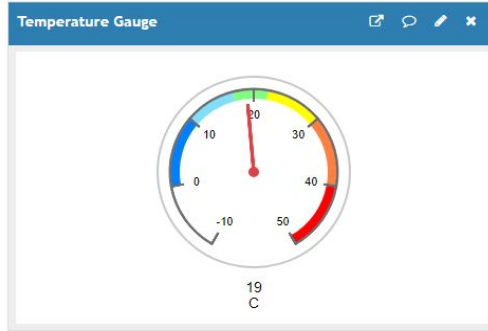**In our case the sensor is DHT11
and microcontroller is ESP8266**

Analyze:

I. Have access to your data anywhere through the cloud.
II. Process your data.
III. Visualize the outcome.

In Our case :

Gauges and histograms are **Thingspeaks API** examples.

In classroom we discussed matcad and the way that it is programming as a PAAS example.

Act:

React to data which means that commands are executed as a result.

As an example we discussed **IFTTT**

If **T**his **T**hen **T**hat

(example **If temp >= 30 then send email**)

Turn off that humidifier! It's above 60
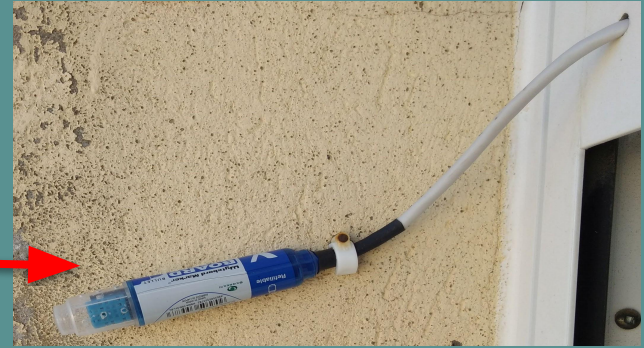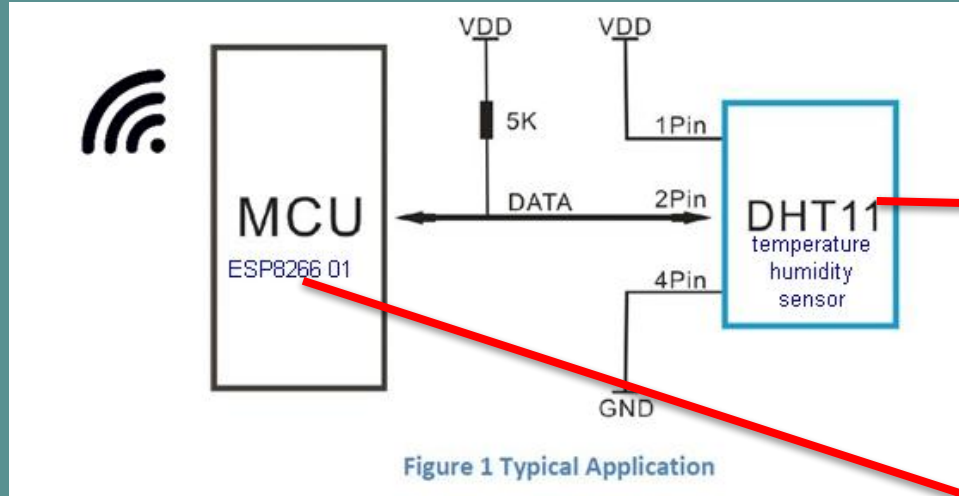
8 RETWEETS	11 FAVORITES	

1:36 PM - 3 Jun 2015 - via Twitter - Embed this Tweet

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Our hardware
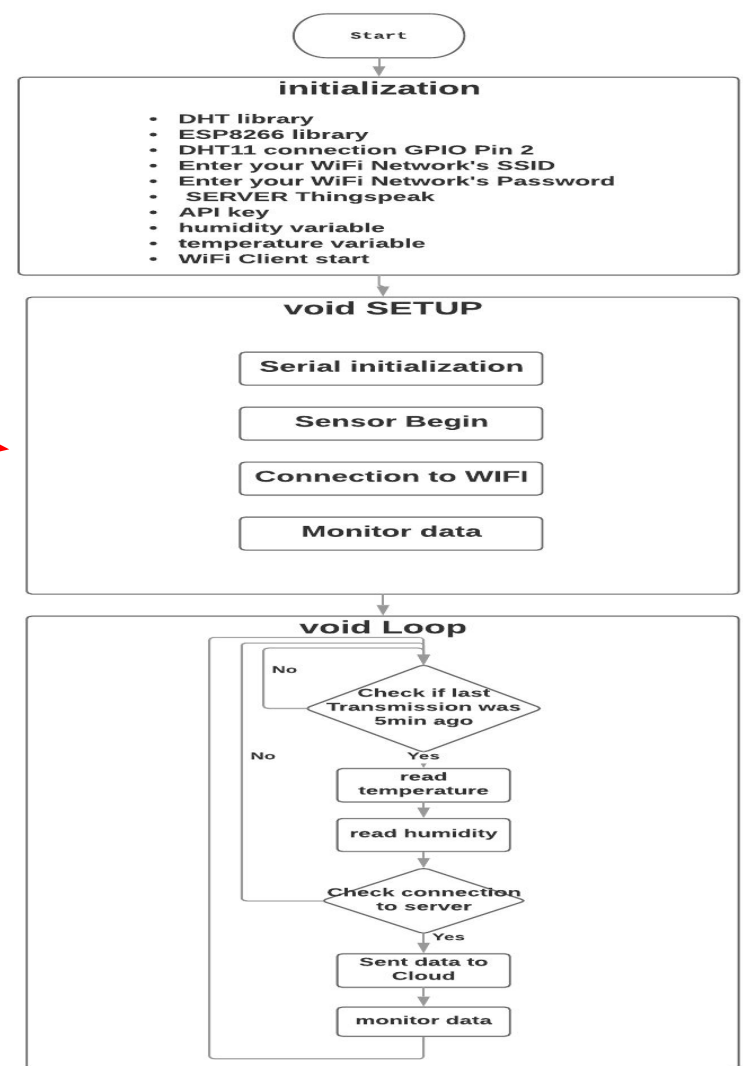

Figure 1 Typical Application

We collect and send data (temperature - humidity) to cloud platform with dht 11 sensor and ESP8266 microcontroller
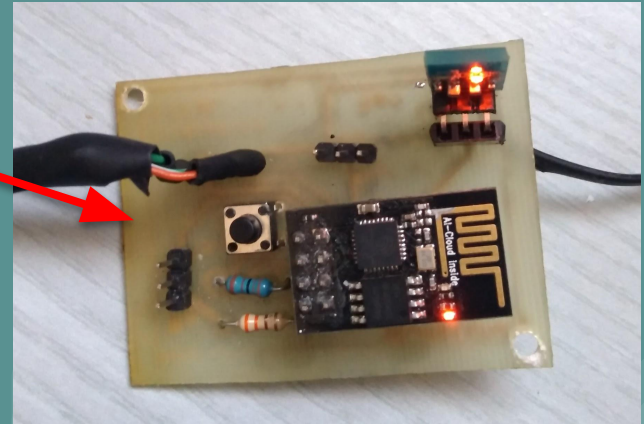
Our code

block diagram
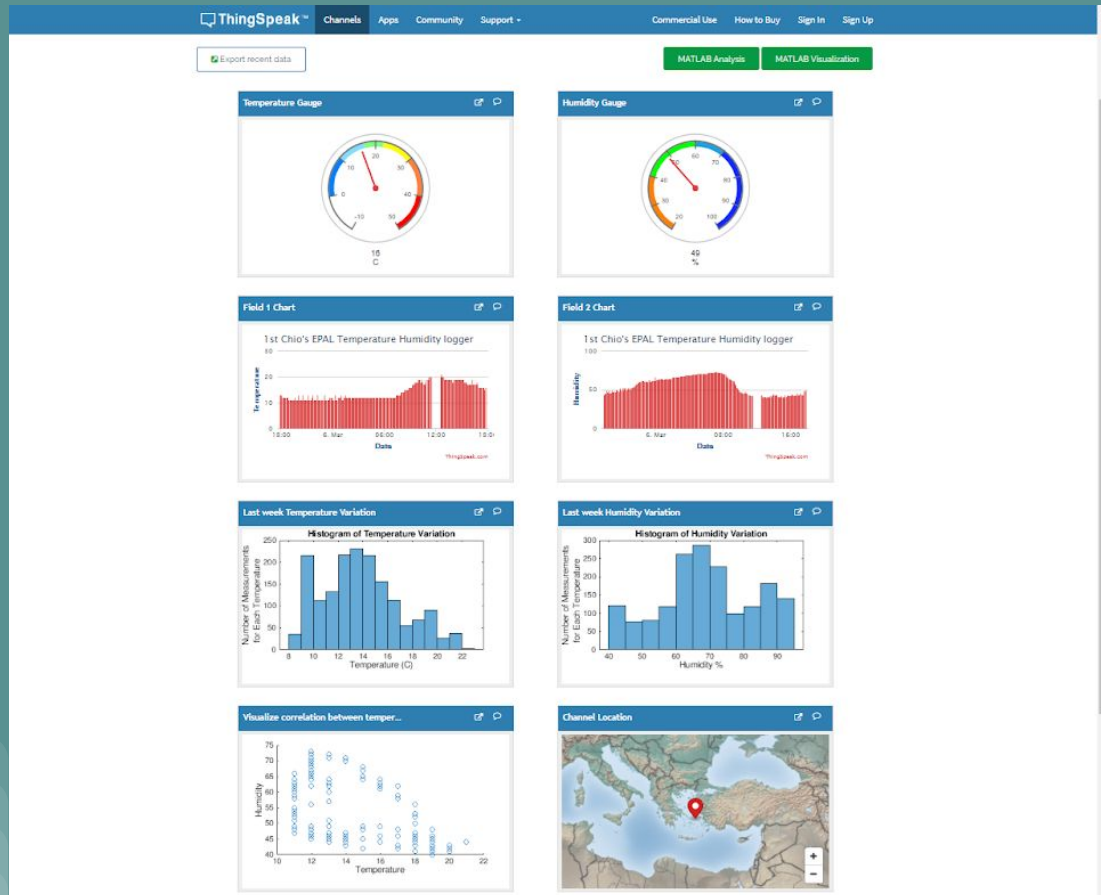
for the programming we used arduino IDE **more...**

Start

initialization
- DHT library
- ESP8266 library
- DHT11 connection GPIO Pin 2
- Enter your WiFi Network's SSID
- Enter your WiFi Network's Password
- SERVER Thingspeak
- API key
- humidity variable
- temperature variable
- WiFi Client start

void SETUP
- Serial initialization
- Sensor Begin
- Connection to WIFI
- Monitor data

void Loop
- Check if last Transmission was 5min ago
  - No
  - Yes
- read temperature
- read humidity
- Check connection to server
  - No
  - Yes
- Sent data to Cloud
- monitor data

Our Channel 1st Chio's EPAL Temperature Humidity logger

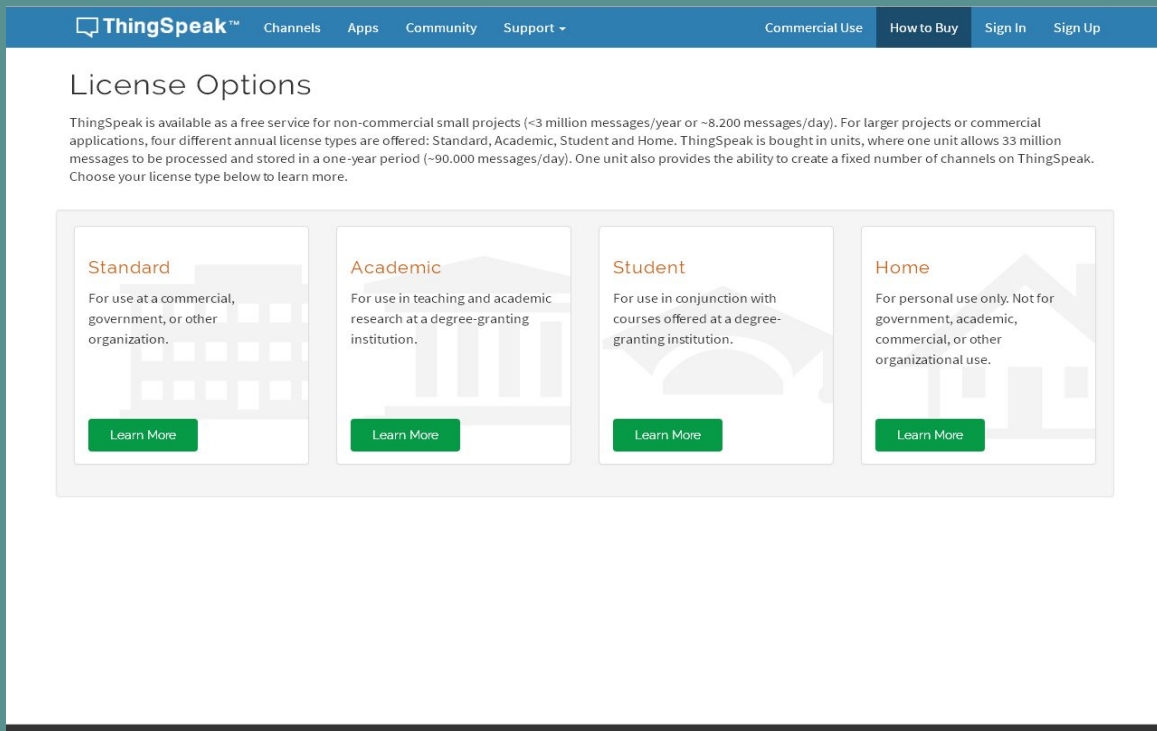# ThingSpeak is a commercial solution

licence options
- Standard
- Academic
- Student
- Home

In our case we used **free** Home licence

We encourage to try it.

This could be a cloud project for all schools and a way to show our work in cloud.

Thank You