Electrónica Digital
Clase 16

Internet de las Cosas

UNIVERSIDAD EAFIT®

Contenidos

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3. Tendencia del IoT
4. Hardware para IoT (Sistemas Embebidos)
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6. Elementos esenciales de Thingworx
7. Ejemplo Thingworx envio con POSTMAN
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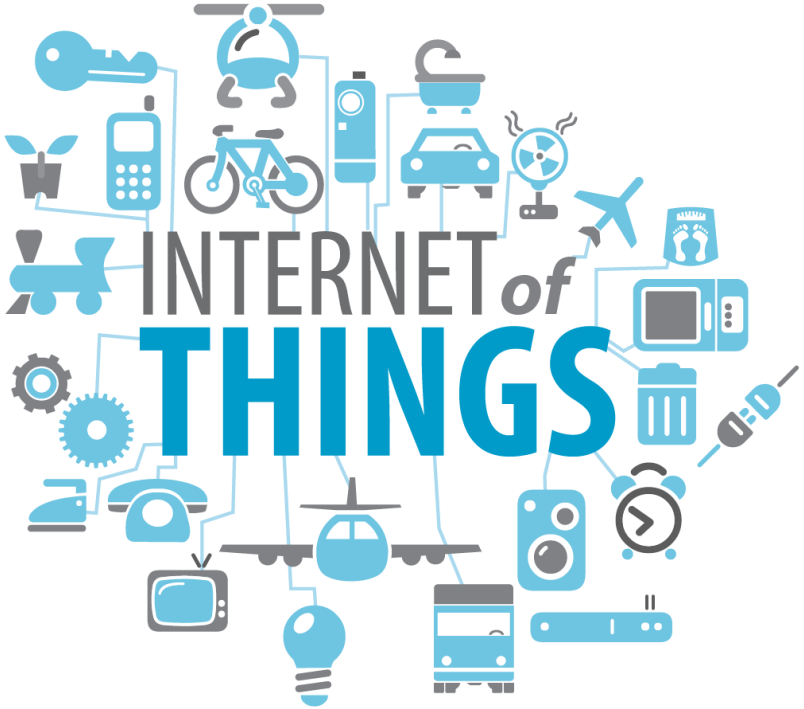
What is IoT?

Source: EconocomTV [1]

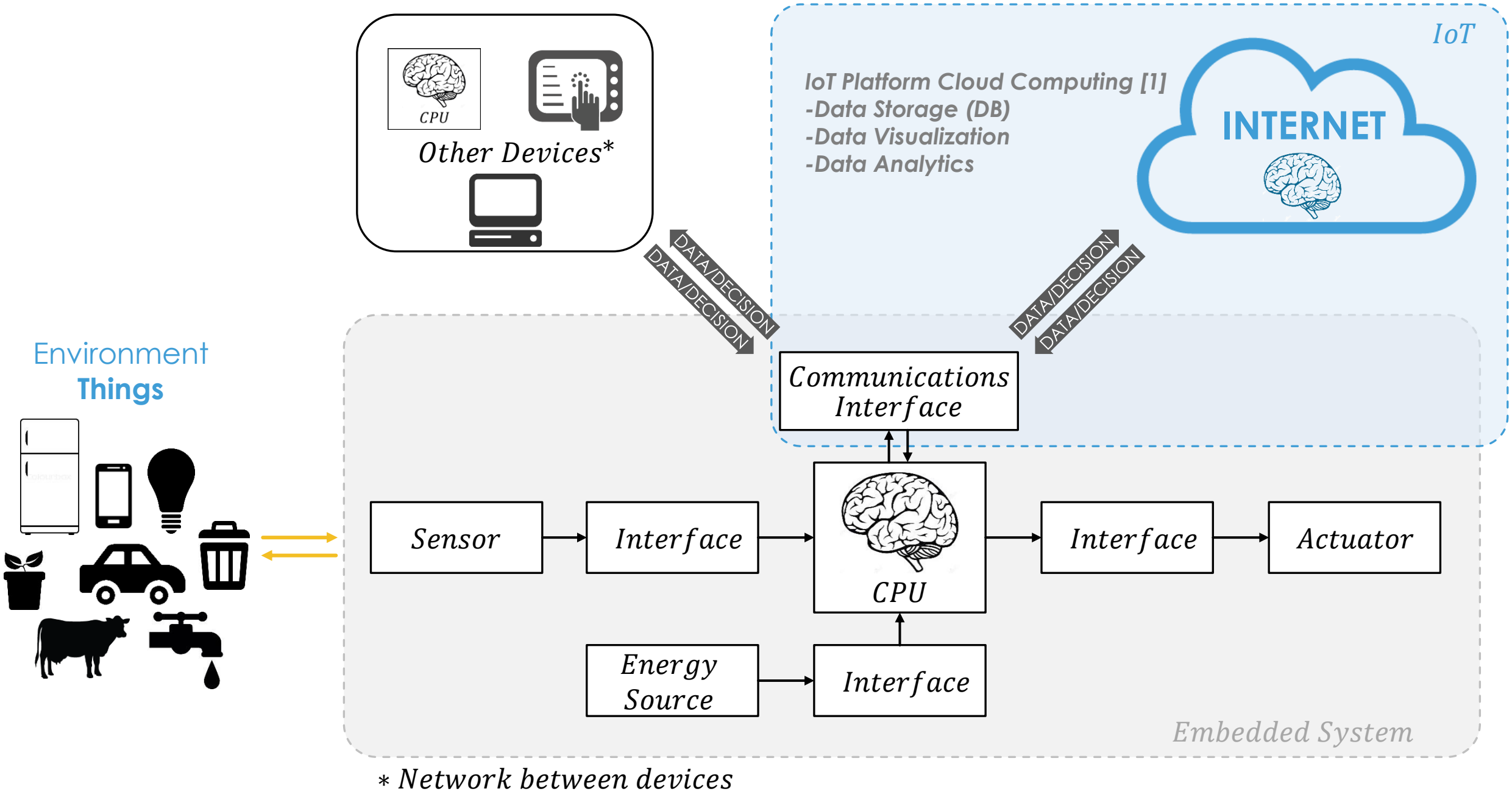
Que es IoT?

- Internet of Things es una **nueva tendencia**.
- Propuesta en **1999** por **Kevin Ashton** del **MIT** Auto-ID Center [2].
- Busca **conectar** cada "**thing**" al **internet**.
- Añade **ubicuidad** a nuestros dispositivos cotidianos.
- **Recolecta** "**data**" del "objeto" usando **sensores**.
- **Los datos recolectados** de los objetos pueden ser **analizados** para tomar **acciones**.
  - EJ: Nevera automaticamente ordena leche antes de que se acabe.

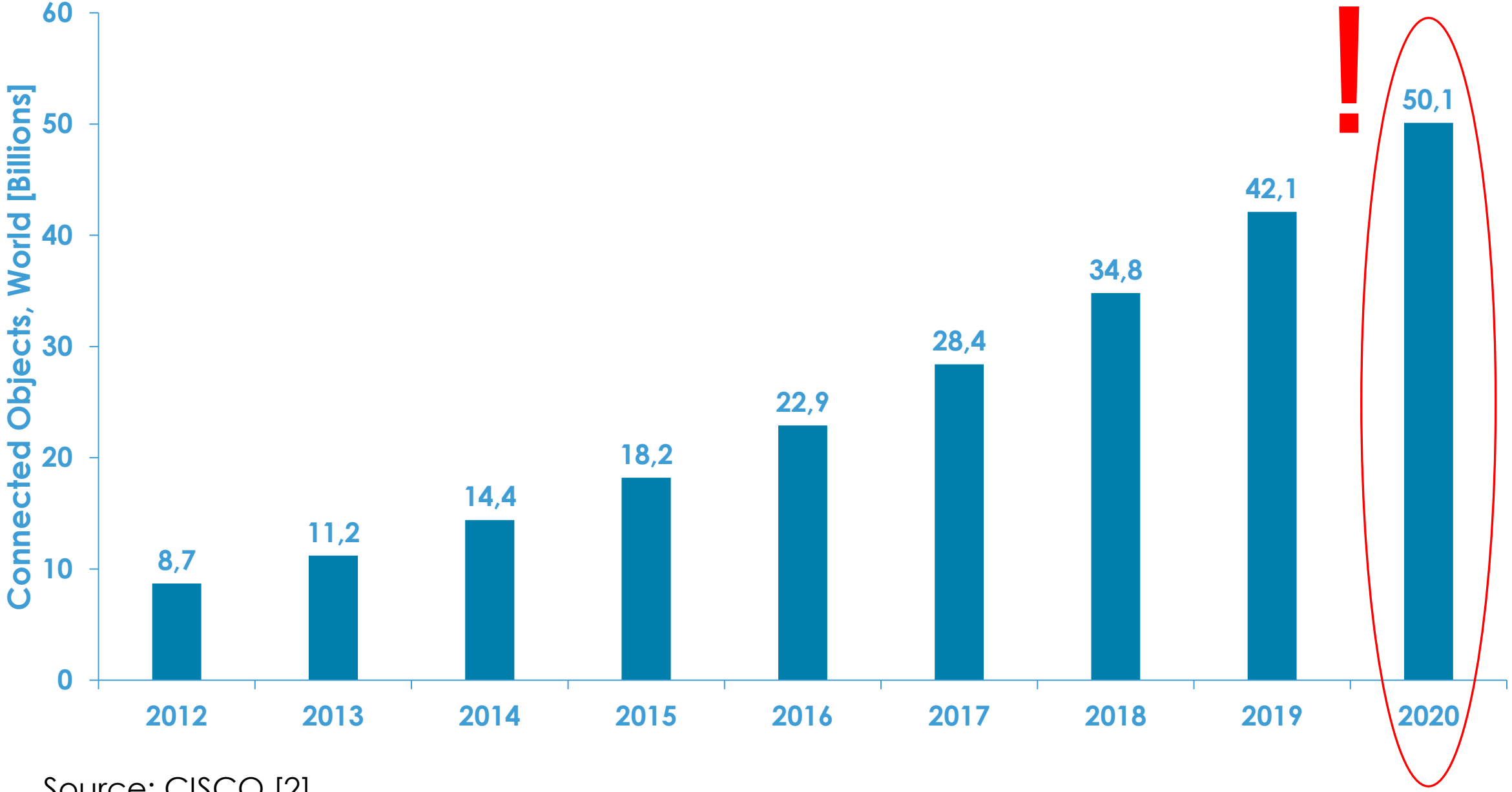


Tomado de [3].

Arquitectura Ecosistema IoT

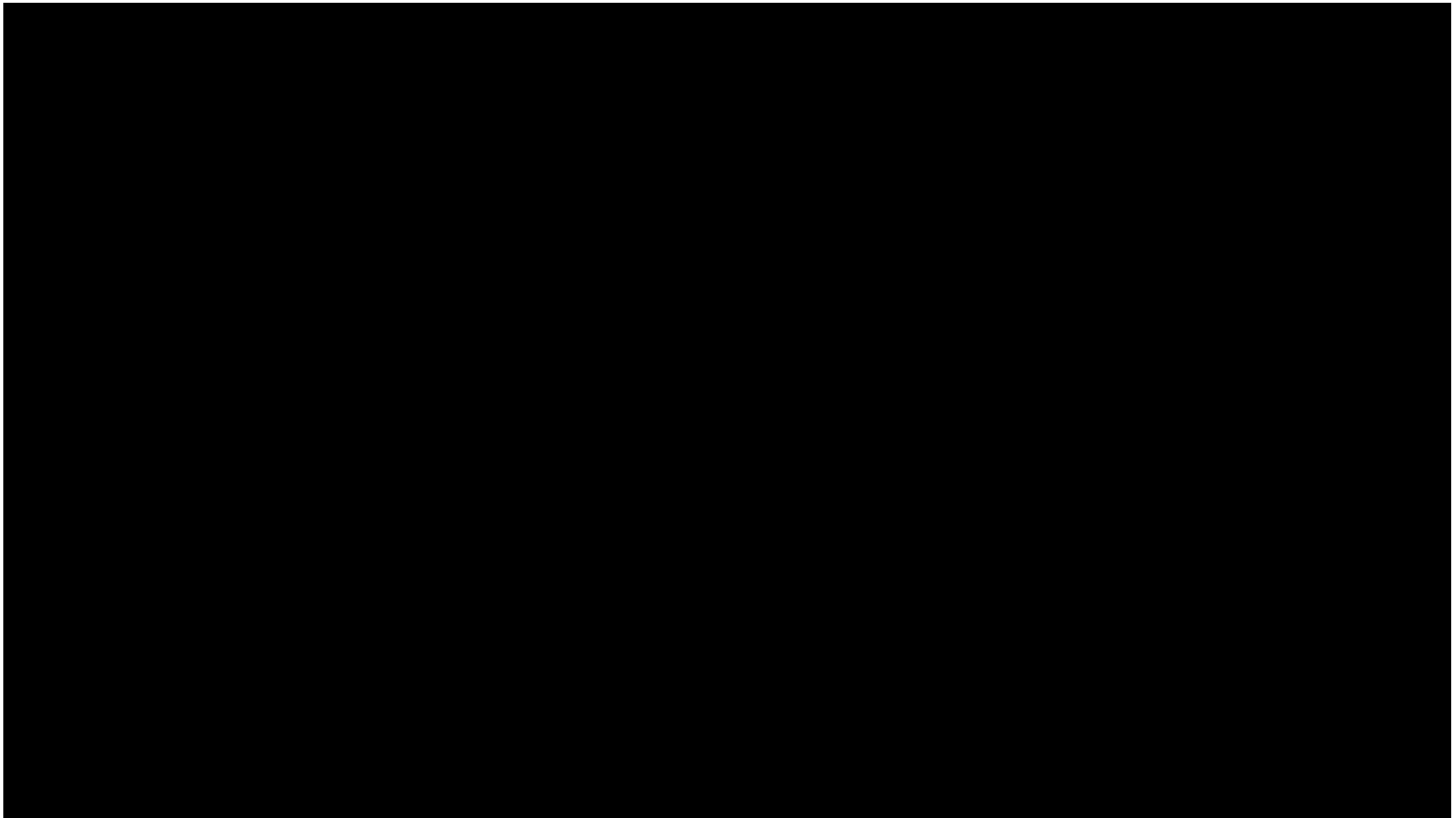


IoT Future



Source: CISCO [2]

IoT application example video

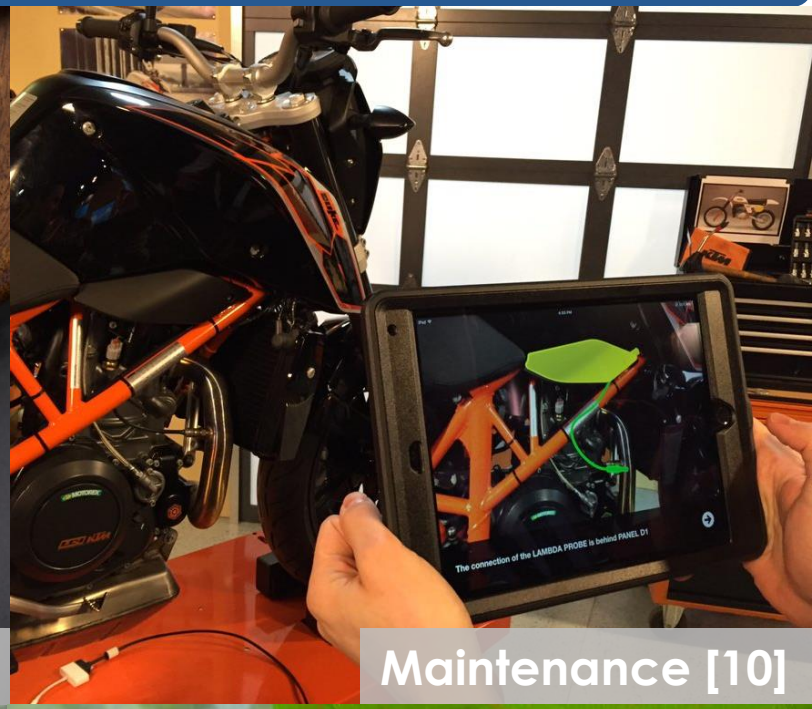


Source: Corning [7]

IoT Applications

Home automation [8]

Wearables [9]



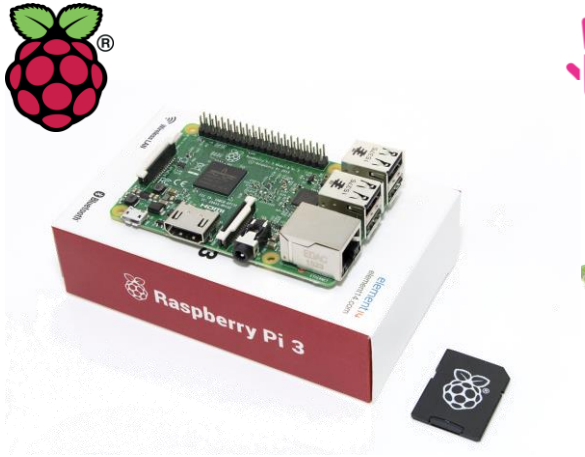
Maintenance [10]

Big Data – Smart Cities [11]

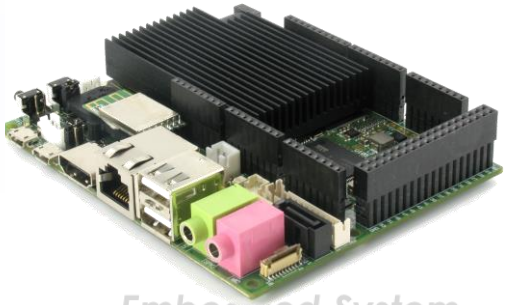
Smart Vehicles [12]

Telemedicine [13]

IoT Hardware Embedded System Devices



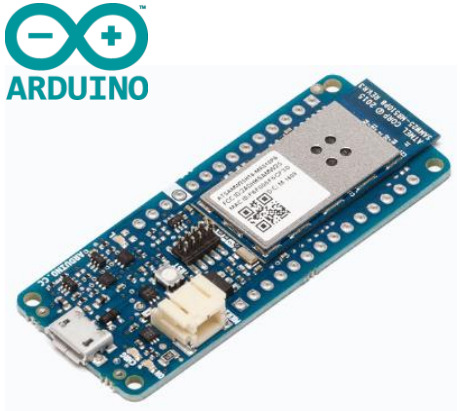
RASPBERRY Pi 3



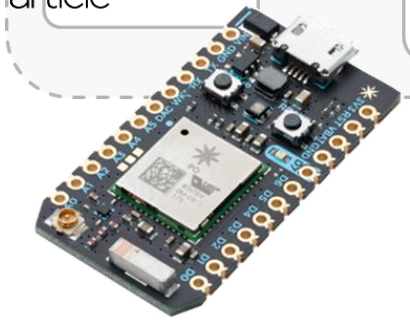
UDOO QUAD

NVIDIA JETSON TK1

NXP HEXIWEAR

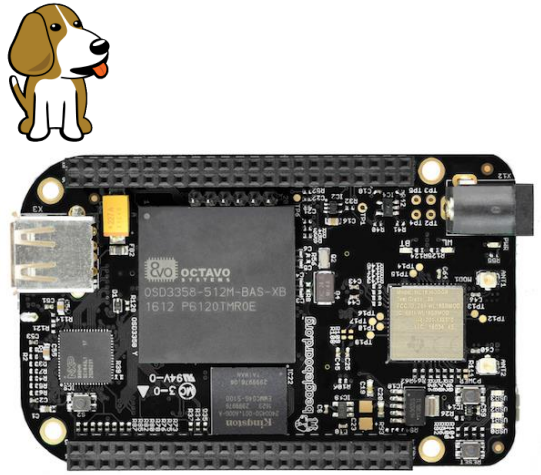


ARDUINO MKR1000



PARTICLE PHOTON

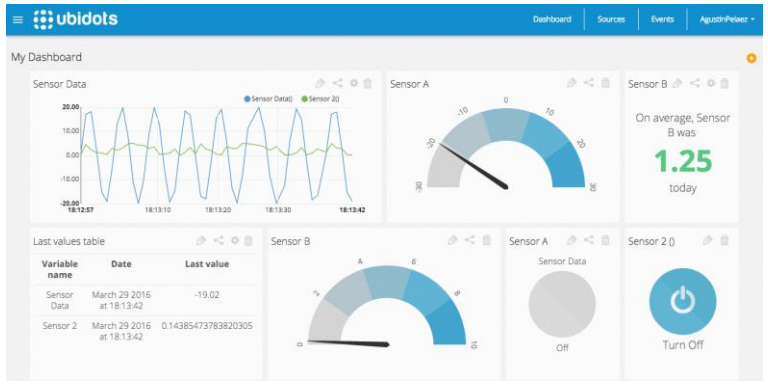
DIGILENT ANALOG DISCOVERY 2



BEAGLEBOARD BEAGLEBONE BLACK WIRELESS

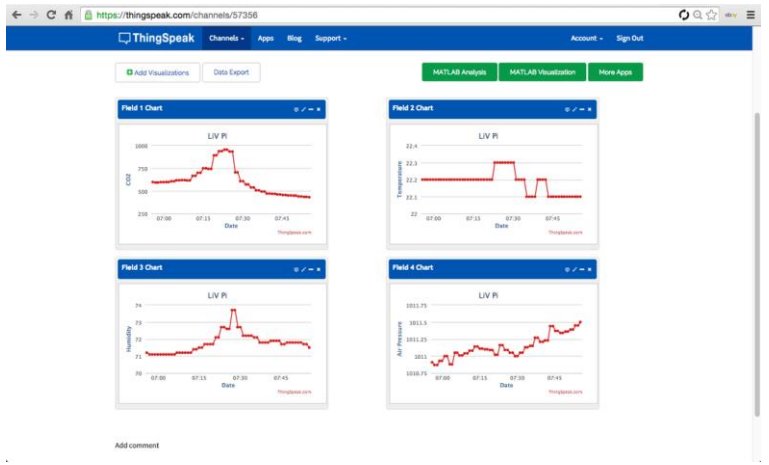
Comparison between commercial platforms for IoT

ubidots



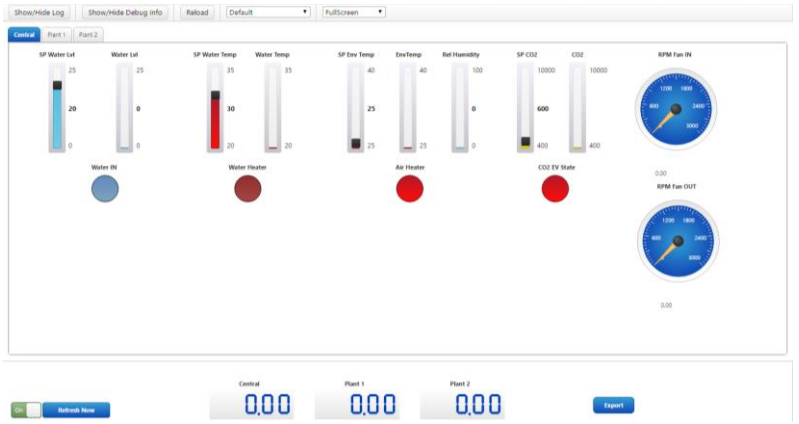
- Free **limited access** (max 5 devices – 0.5M dots/mo).
- **Cheap:** From $9 USD/mo.
- **Simple real time data visualization** with **predefined gadgets**.
- **Very limited data analysis** (average and email or SMS alerts).
- **Bidirectional** (Send and receive data from/to IoT device).

ThingSpeak



- **Free** (max 8 variables per channel).
- **Advanced real time data visualization** with MATLAB predefined visualizations.
- **Advanced data analysis** with MATLAB.
- Javascript **plugin extensions.**
- **Limited Bidirectional** (Can receive data but cannot send data continuously).

thingworx



- Free **limited access** (30 days trial – unlimited with EAFIT academic license).
- **Advanced real time data visualization** with predefined and custom gadgets.
- **Advanced data analysis** with Thingworx Analytics Extension.
- **Multiple plugin extensions** through Thingworx Marketplace**.**
- **Bidirectional** (Send and receive data from/to IoT device).
- Easily connect with CAD/CAM/CAE through PTC products.
- Augmented Reality support with Vuforia.

Other IoT Commercial Platforms

Source: Postscapes [3]

amazon web services AWS IoT

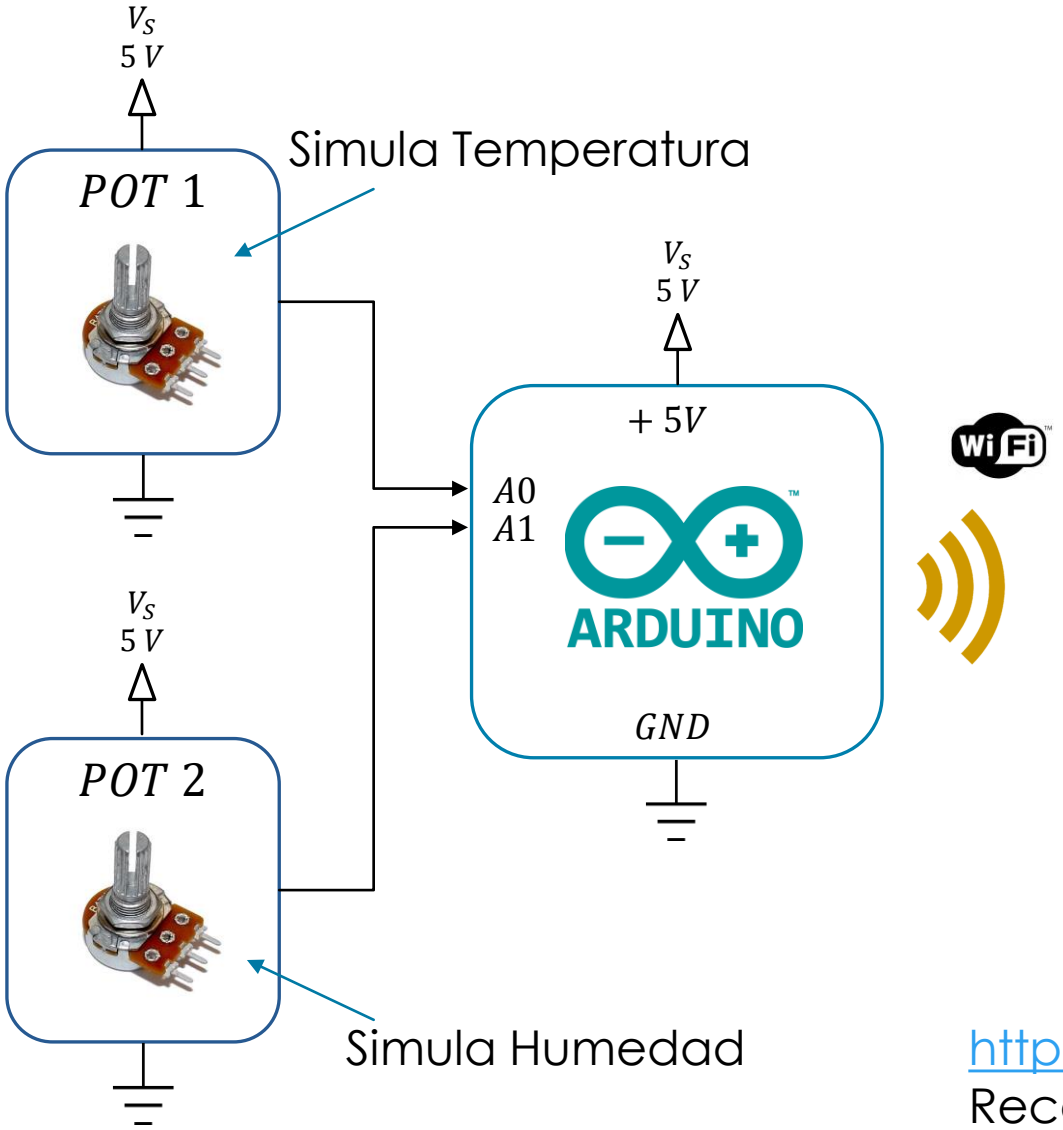
IBM Bluemix™ Watson IoT

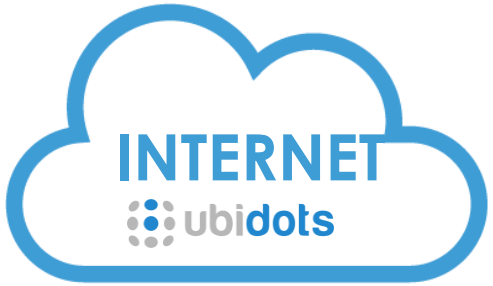
Microsoft Azure

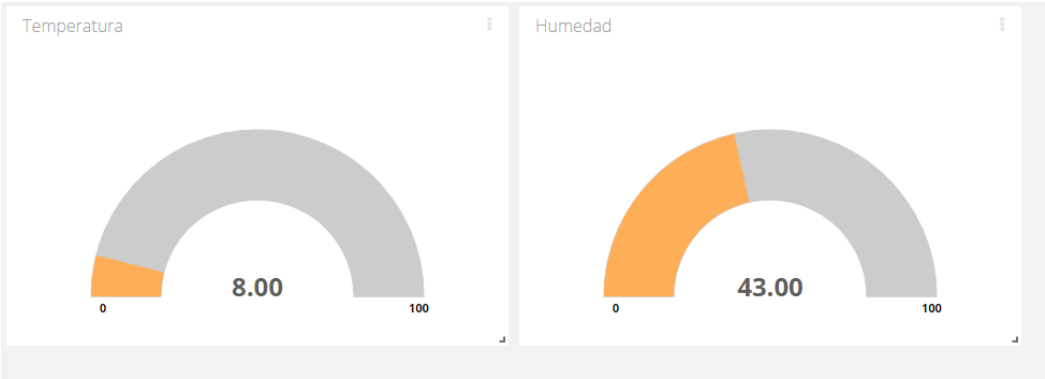
Google Cloud Platform

Monitorear valores MKR1000 - Ubidots

- Realice un programa en Arduino que permita monitorear dos entradas análogas (dos potenciómetros) y envíe el valor a Ubidots.





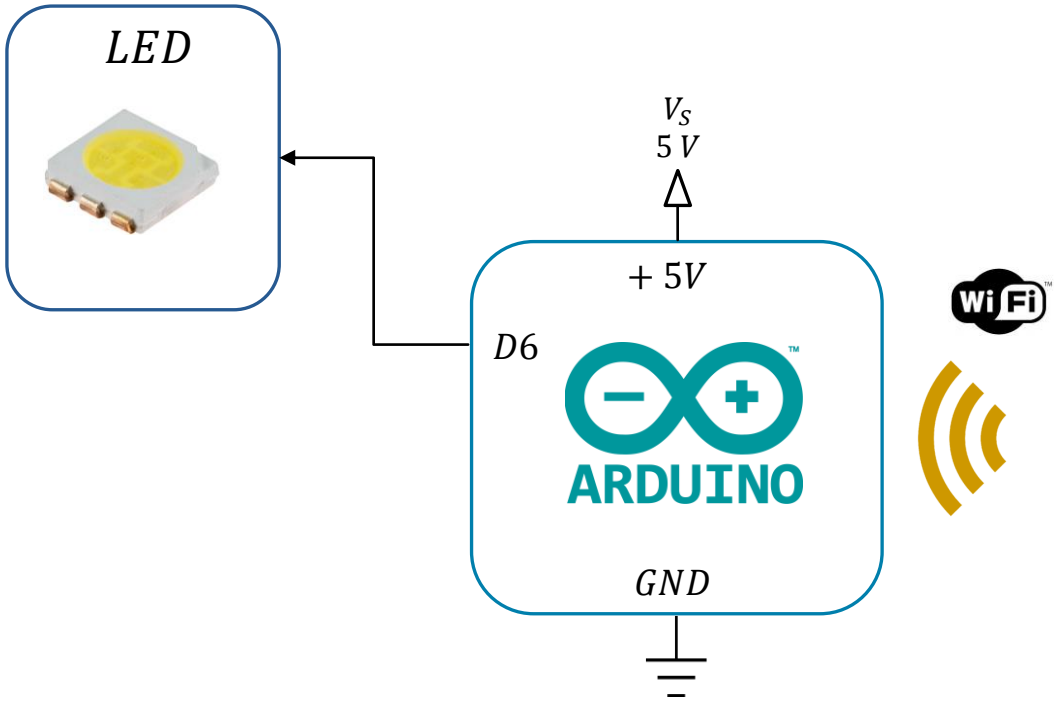


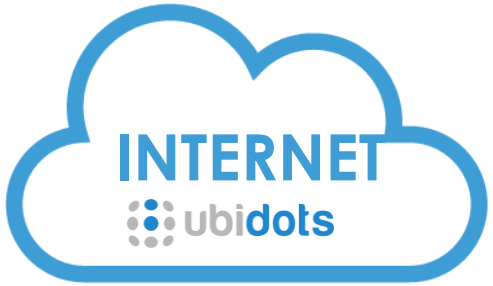
https://github.com/ubidots/ubidots-arduino-wifi

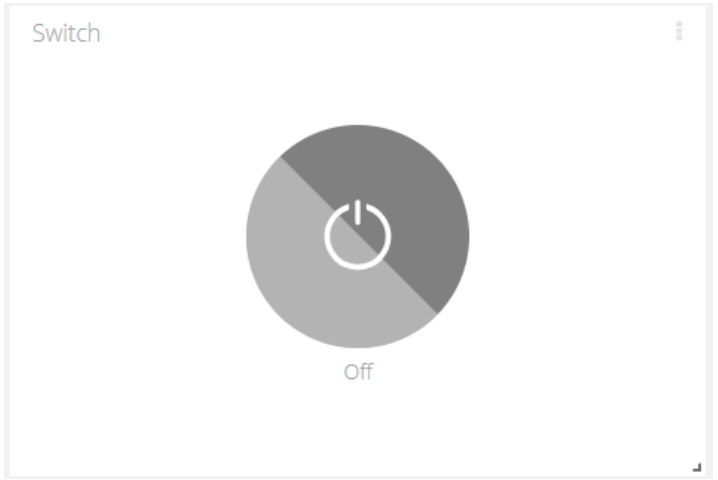
Recordar editar el .h de la lib para WiFi101.h

Recibir valores MKR1000 - Ubidots

- Realice un programa en Arduino que permita encender o apagar un LED desde ubidots.







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MUCHAS GRACIAS