

XII CÁTEDRA INTERNATIONAL DE INGENIERÍA

The Internet of Things?



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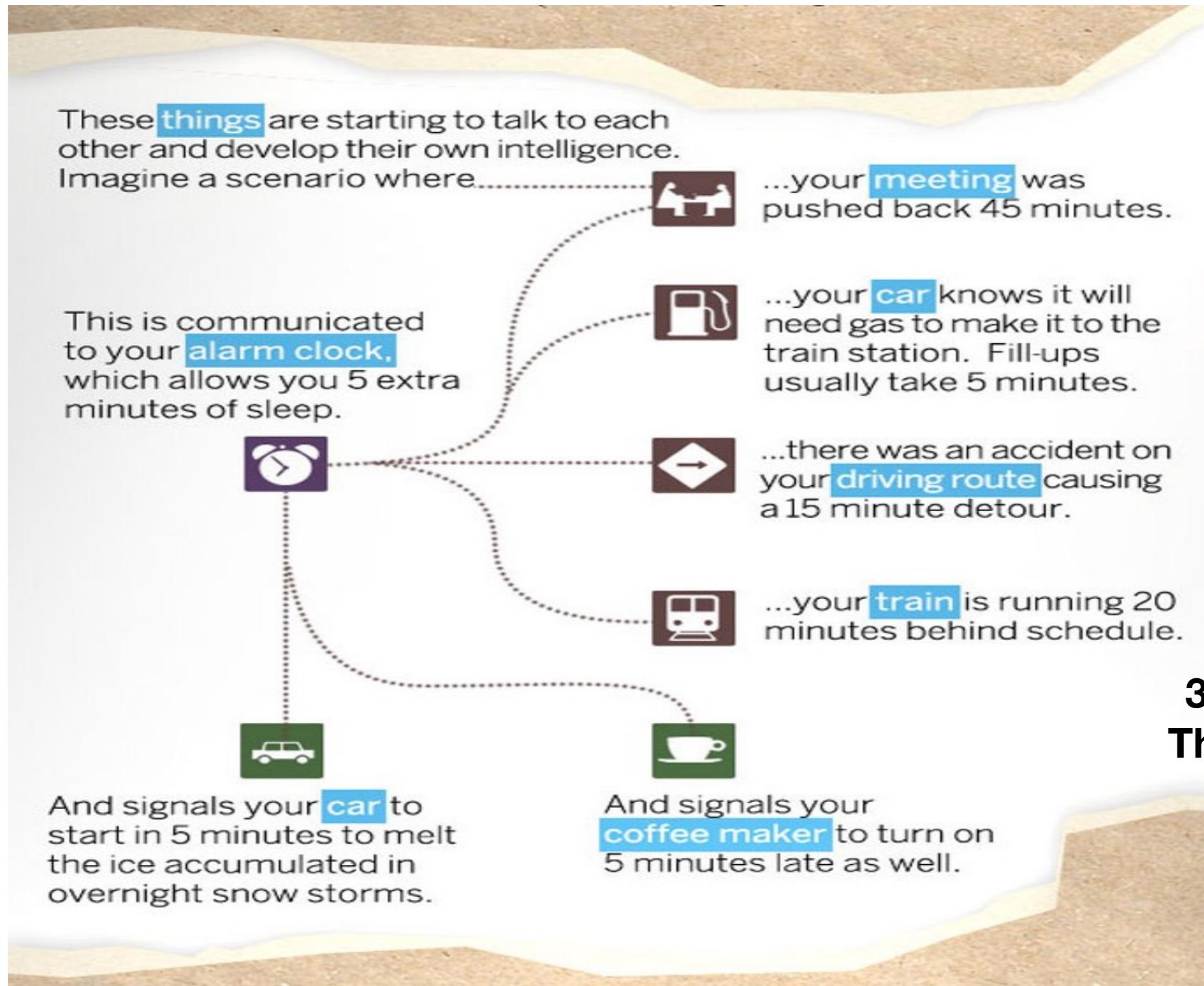
Session 5

FIT / IoT - Lab

FIT / IoT-LAB

An experimental platform for the Internet of Things

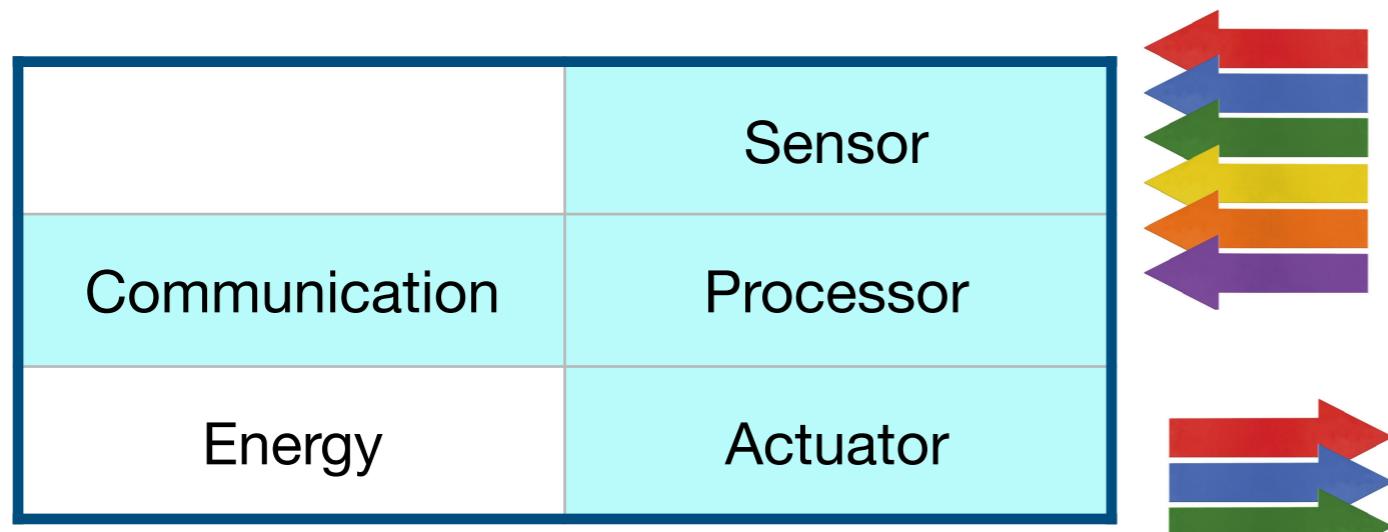
A futuristic panorama



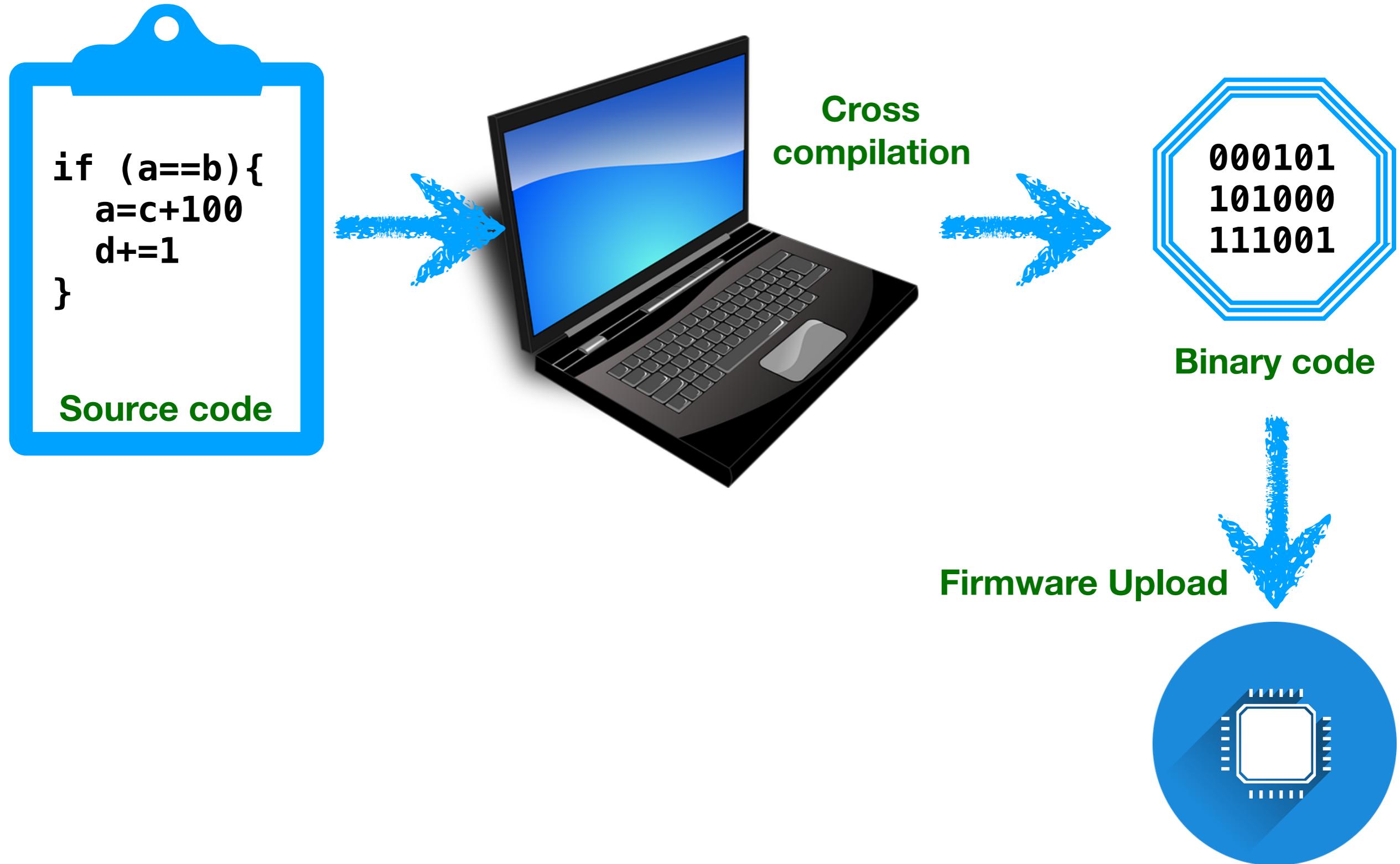
Challenges and Risks

- "Scaling up": communication, data, ... Communication standards
- Hardware / software miniaturization, power consumption
- Security
- Protection of privacy - "The right to silence of chips"

A connected device



Embedded Software (Firmware)



The FIT Platform

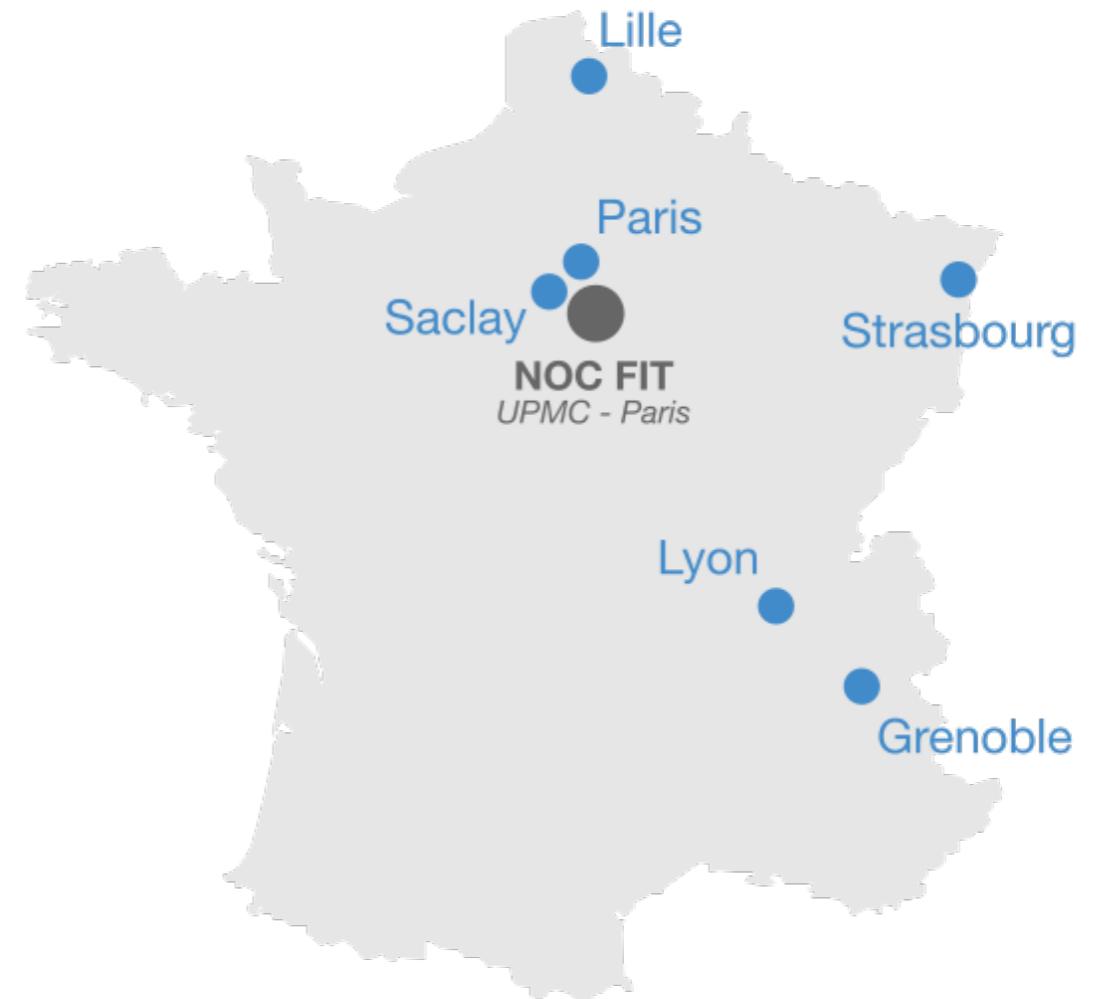
- 5 partners:



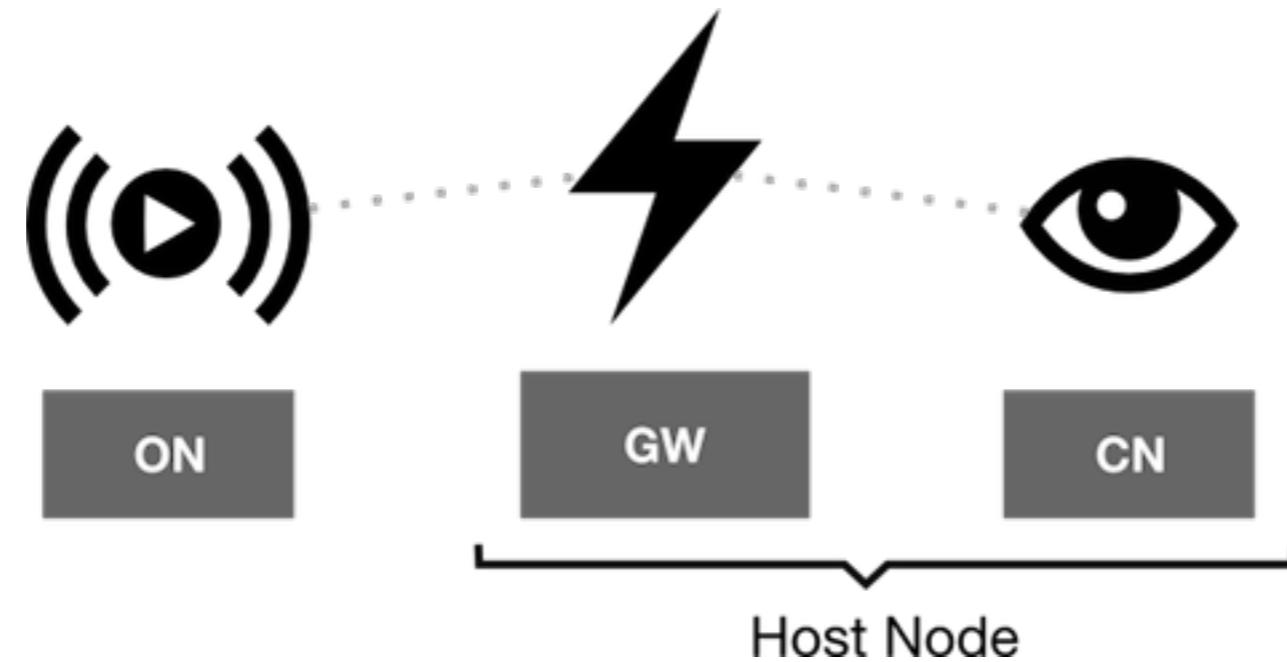
- Ambition: create a platform to experiment with results of research in the field of the Internet of Things.
- Distributed platform, heterogeneous and complementary objects distributed on different sites
- 9 sites: Paris (2), Evry, Rocquencourt, Lille, Strasbourg, Lyon, Grenoble, Sophia Antipolis.
- 4 types of platforms: Operational Center, Intelligent Radio, Communicating Objects (IoT-LAB), Wifi OneLab
- Large loan: € 5 million investment

Experimentation on a scale

- Wifi OneLAB = 50 orbit nodes in Sophia and 70 at UPMC
- Cognitive Radio: 30 nodes in Lyon
- IoT-LAB:
 - Inria Grenoble – Rhône-Alpes (640)
 - Inria Lille – Nord Europe (640)
 - ICube – Strasbourg (400)
 - Inria Saclay – Île-de-France (230)
 - Institut Mines-Télécom – Paris (160)
 - CITI Lab – Lyon (29)



What is a node in IoT Lab ?



OPEN NODE

It is made available to the user during his experimentation. This node is totally open and the user is granted a full access to the memory. on any node.

GATEWAY

It offers a connection to the global infrastructure to control and monitor the open node. The gateway also handles the open node serial link if the node is set to be a sink node.

CONTROL NODE

It is used to interact, passively or actively, with the Open Node. It monitors consumption and sensors values during experiments, selects power supply.

An IoT Lab Node



WSN430 Node

based on MSP430F1611 MCU
and communication with a
802.15.4 PHY Layer (800 MHz or
2.4 GHz)



M3 Node

based on STM32F103REY MCU
and communication with a
802.15.4 PHY Layer (2.4 GHz)



A8 Node

based on TI SITARA AM3505
(ARM Cortex A8) allows to run
Linux. This node embeds also a
M3 Node with 802.15.4 comm.

How can you use it?

- Creating a single user account on FIT
 - Central portal of all components
- Reservation of necessary resources
 - Sensor nodes (Cortex A8 / Cortex M3 / TI MSP430)
 - Resources on other machines on the Internet / OneLab
- Description of the experience
 - Association firmware/nodes
 - Monitoring data
- Automatic launch of batch or on-line experiences
- Recovery of all monitoring data

What kind of experiments?

- Communication (routing protocols)
- Security (data encryption)
- Operating system
- Tuning before the true application Efficiency Criteria:
 - Consumption
 - Memory footprint, calculation Scaling

Hands on: IoT Lab

- Accounts already created (ask your monitor)
- <https://github.com/ocrozo/iot-unal/tree/master/iot-lab>

Questions ?

