ThalesAlenia Space
a Thales / Leonardo company

IoT predictive maintenance

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2019-2020

Background of the project & issues to solve

Test bench rack

Test bench racks make radiofrequency tests

Some parts might break down
⇒ unusable rack during a period

Anticipate the need for maintenance by monitoring all the components of the test bench

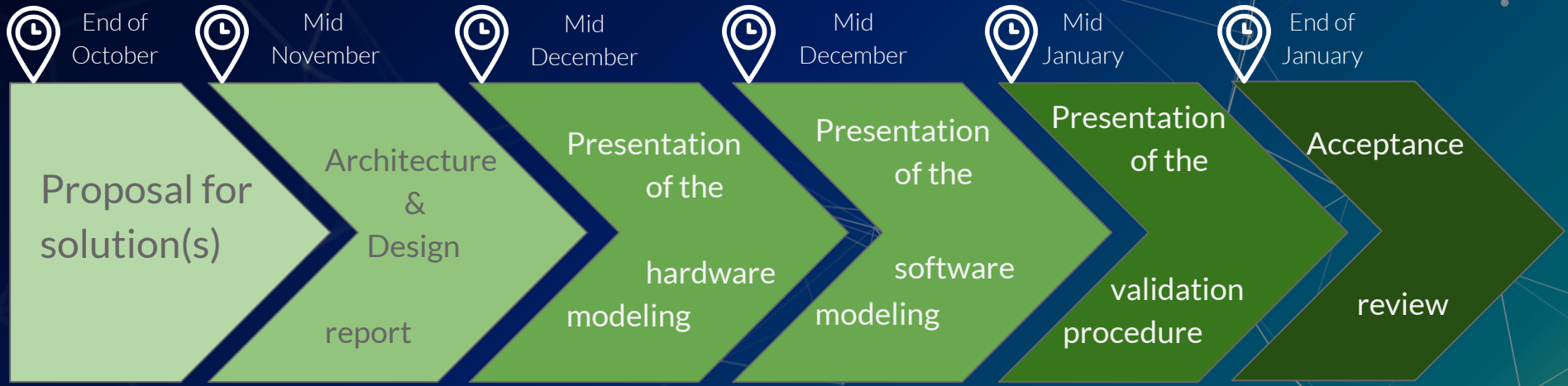
Solution: build an IoT System

Collect data from the rack thanks to sensors

Save the data locally

Display all the data on a dashboard

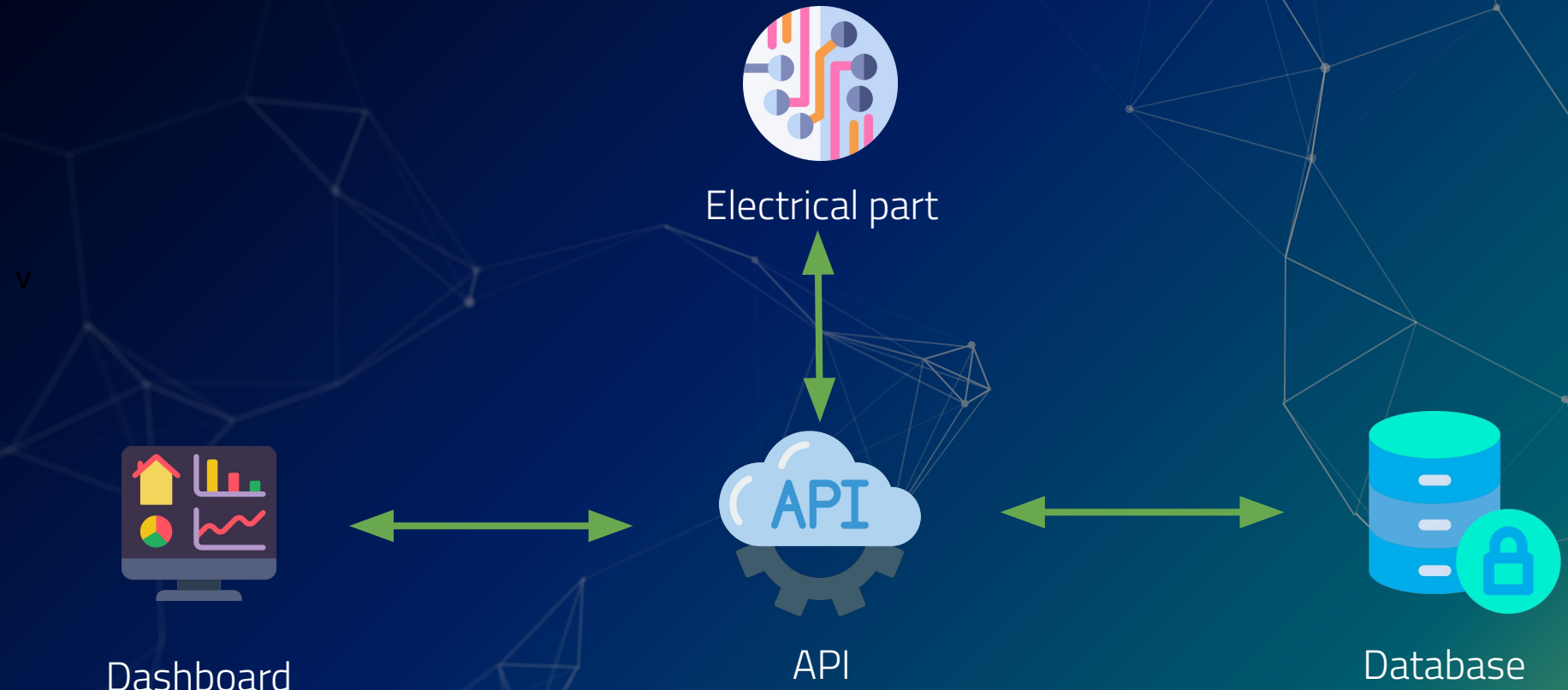
Organization - Behind Schedule



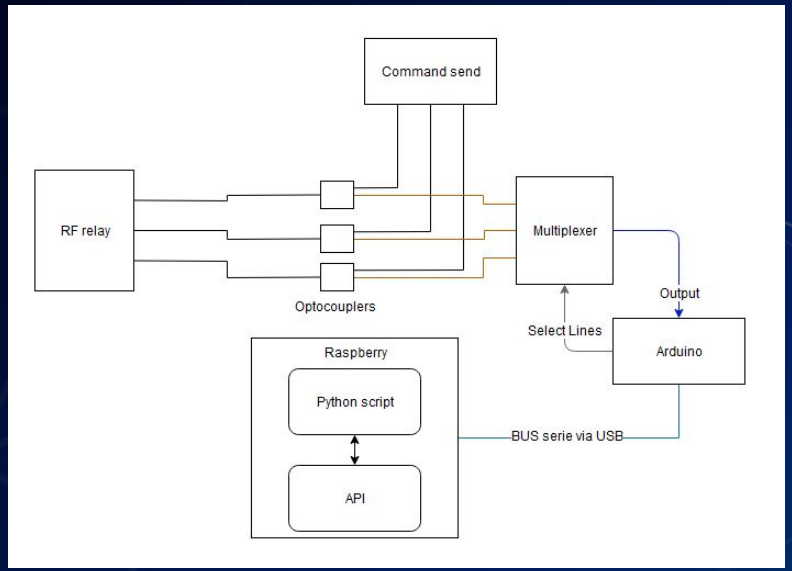
Organization - Efficient communication

- Technical Management
- 3 sprints
- Good communication with Thalès
- Organisation in features of 61 Thales Uses cases.
- Weekly review with mails or Skype calls on Wednesdays
- Meeting at Thales on Thursdays as often as possible

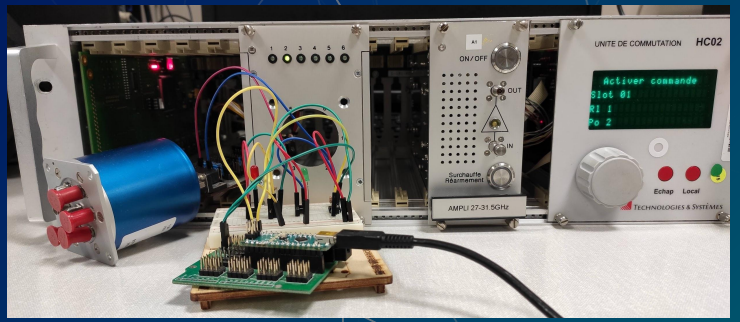
Organization - A centralized architecture

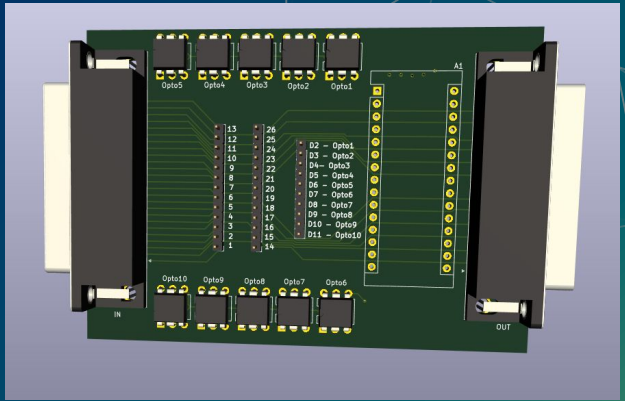


Electrical part - PCB to detect switches

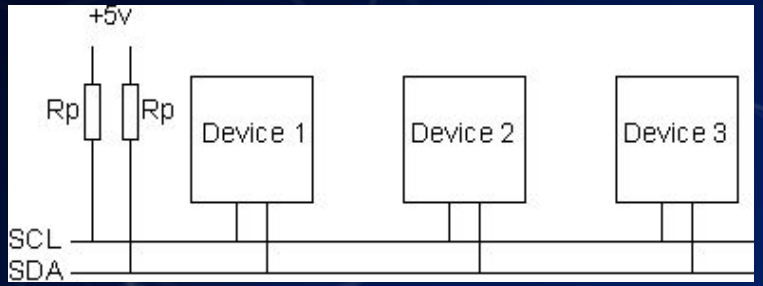


Result





Electrical part - Issues to address sensors



Same address for each similar sensor type

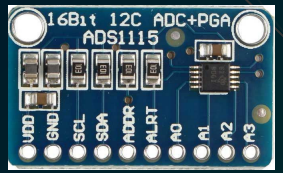
Solution

OneWire :

- Each device have their own address
- Less choice for components

ADC I2C:

- Add new address
- One component in addition



API - A bridge between components

Request

/db/getMeasurement?sensor=Temp_plky

Python

Flask Pymongo Connexion

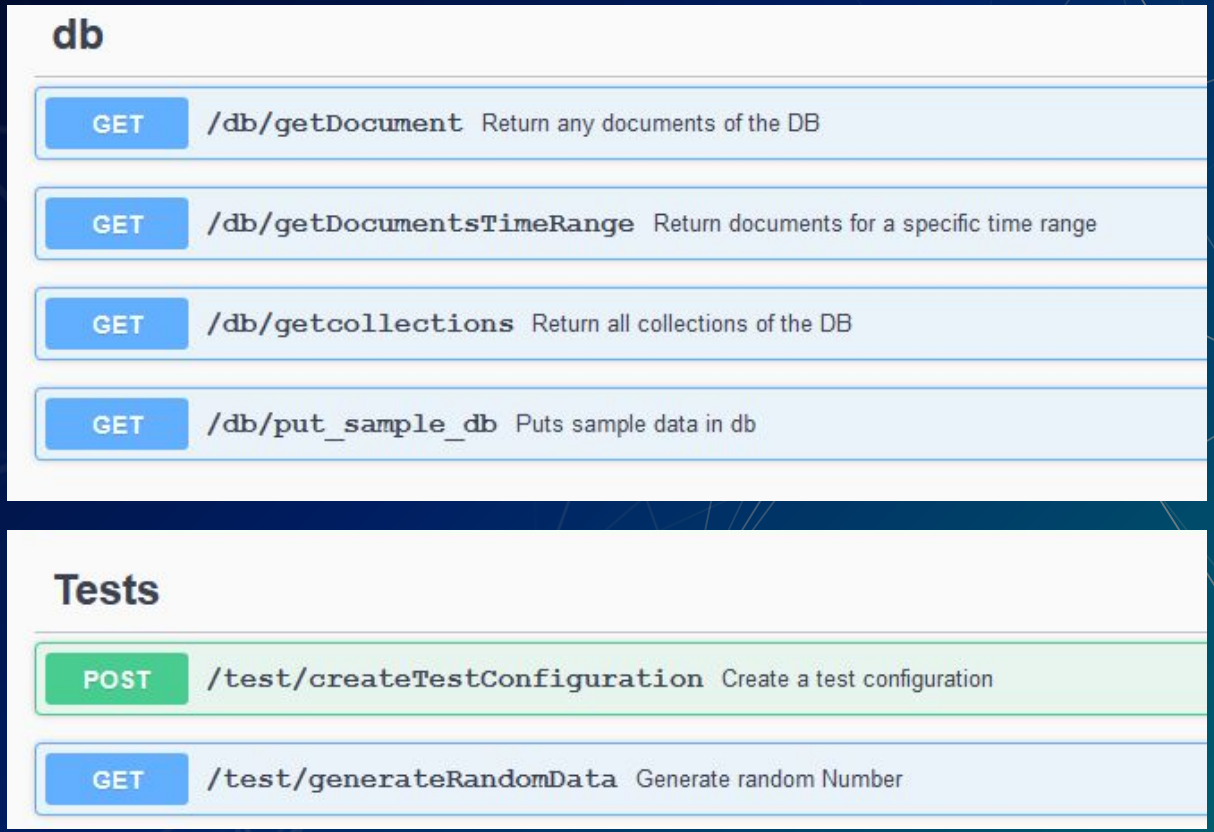
Function call

Retrieve value from dB

Answer

{TimeStamp : 1579384937, Value : 23.5}

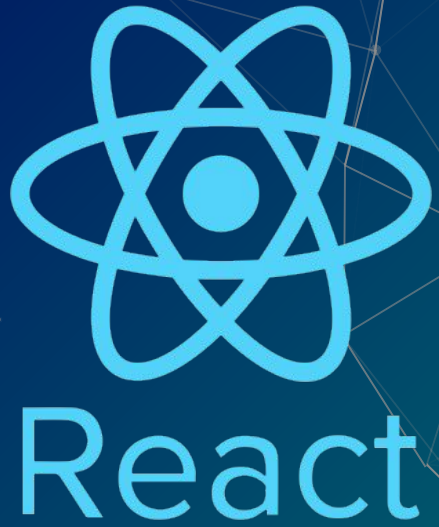
API - A helpful documentation



Dashboard - React: most adapted language

Requirements

- Modular
- User friendly
- Easy to access

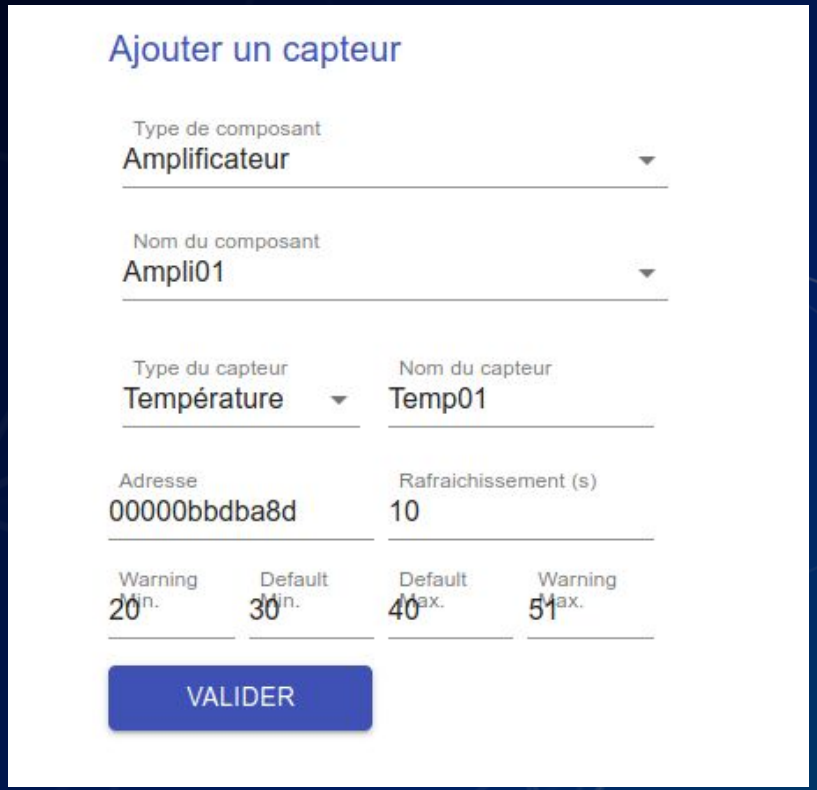


Dashboard - Efficient layout

One tile per device

displays essential information

Dashboard - Easy to configure



Device

Name
Type (amplifier or switch)
ADD/REMOVE

Sensor

Linked device
Name
Parameters
ADD/REMOVE

Database - A flexible storage

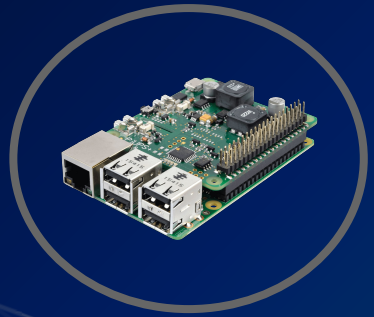
- Oriented Object Database using NoSQL with MongoDB
- Hosted on a SSD Drive

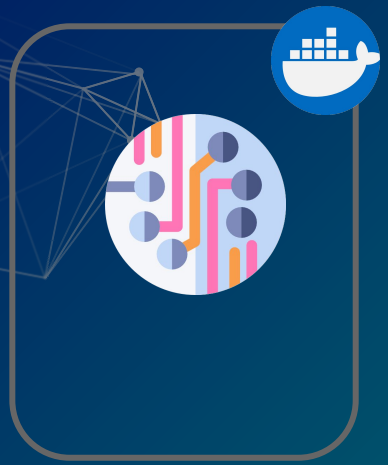
Database's Organization

LicorneDB

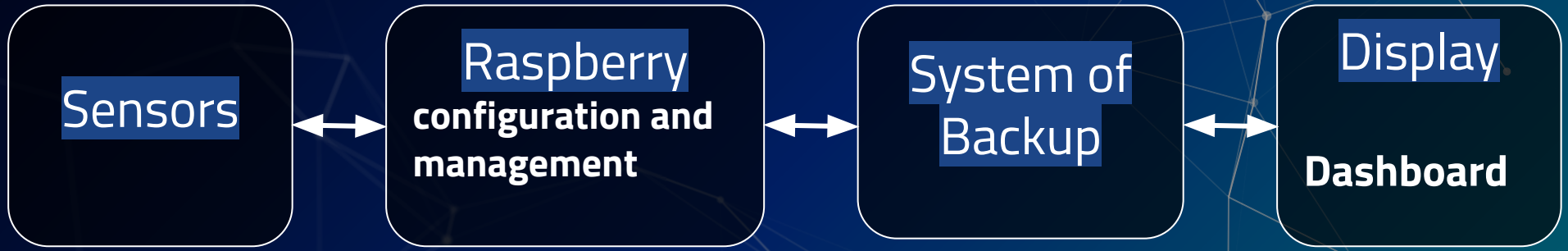
- A Configuration Collection
- A Collection created for each sensor

Deployment - An easy-to-deploy system





A functional chain:



BILAN				
DONE	IN PROGRESS	TO DO	TO DO By Thales	TOTAL
32	12	13	4	61

Further work

BILAN		
IN PROGRESS	TO DO	TO DO By Thales
12	13	4

- Configuration of IP address of the Rack manually
- Implementation of RTC Module
  - button battery with a long range life
- Improve the Technical documentation for Thalès
- Configuration of the Backup Server

Skills improvement on many subjects

Technical skills

Programming Languages (Python - React)

PCB (Printed Circuit Board) conception

Microservices Management (Docker)

Database management (MongoDB)

Technical documentation

Project management

Project planning & scheduling

Technical writing

Meeting with Thales team

Following specifications

Mixed review

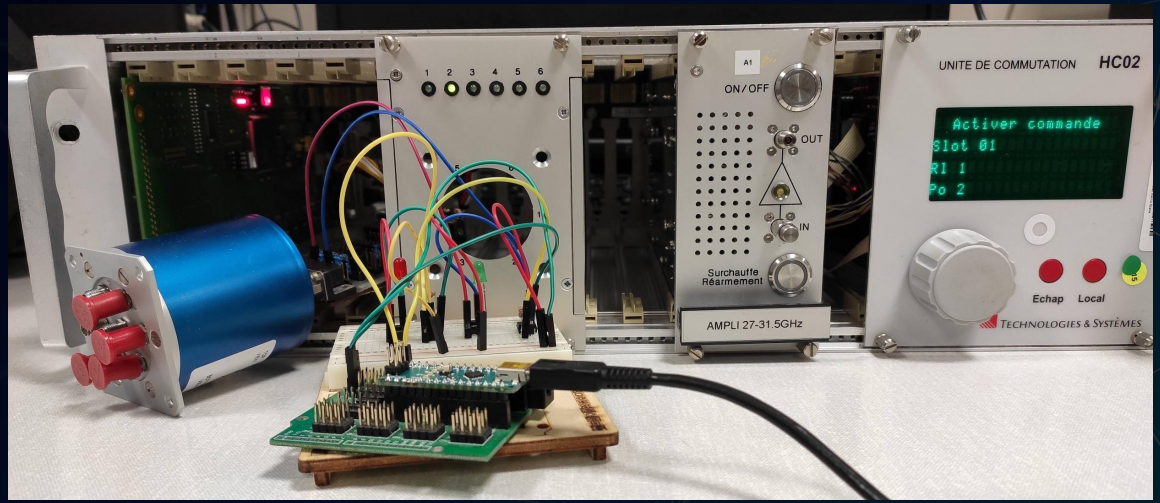
Good points:

- Good result about electronics
- PoC successfully realized
- Team organization

Bad points:

- Lack of time for technical choice
- Too free for technical choice
- Lack of time for test part

Let’s look at our System



Contact us:

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