ThalesAlenia Space
a Thales / Leonardo company

IoT predictive maintenance

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2019-2020

Context of the project & issues to solve

Test bench rack

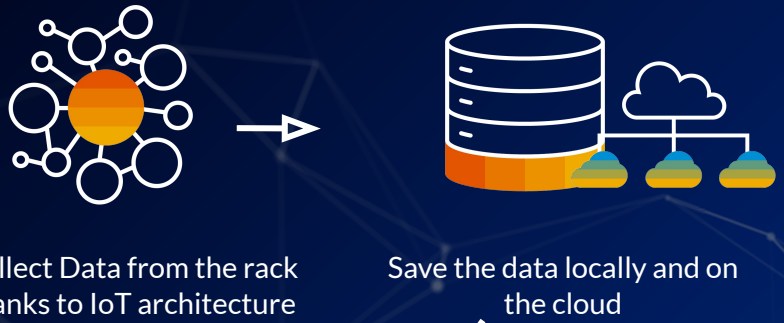
Test bench racks make radiofrequency tests

Some parts might break down

⇒ unusable rack during a period

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

Method chosen : build an IoT System



Collect Data from the rack thanks to IoT architecture

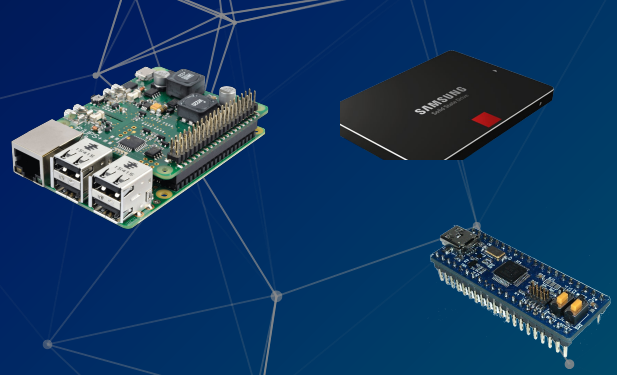
Save the data locally and on the cloud

Display all the data on a dashboard

Build an IoT system for radiofrequency test bench

- Monitor in real time the condition of the tested equipment
- Detect anomaly
- Anticipate the need for maintenance
- Keep a history of equipment life

Expected results



A working prototype that can :

Collect

Store

Display

But also …

- Fit in a rack
- Be easily configurable
- Be modular
- Work with Thales network
- User friendly to deploy and to use

What has already been done

Completed

Structure of the dashboard
Data visualization (charts)

React

Next

Dynamic display

python

Flask
web development, one drop at a time

OPENAPI INITIATIVE

Completed

Define the structure
Implement debug & test services

Next

Implement more services

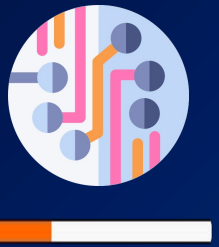
What has already been done

Completed

Design the circuit
Choose components

Next

Realize physical implementation



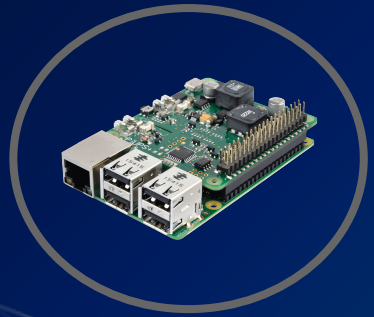
Completed

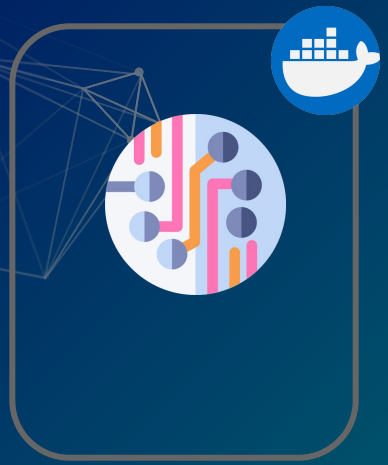
Define the structure
Add simulated data

Next

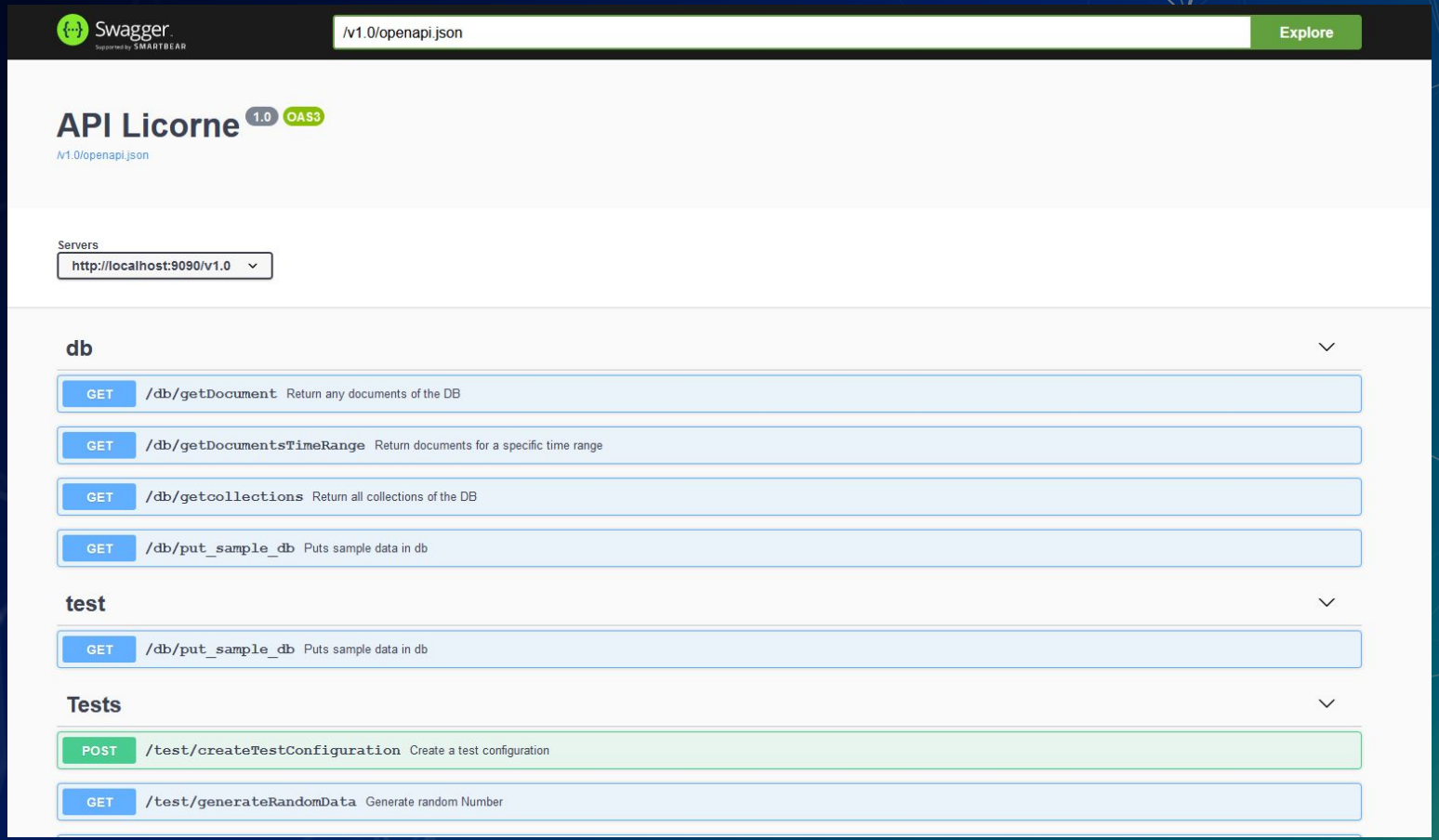
Store sensor measurements

What has already been done

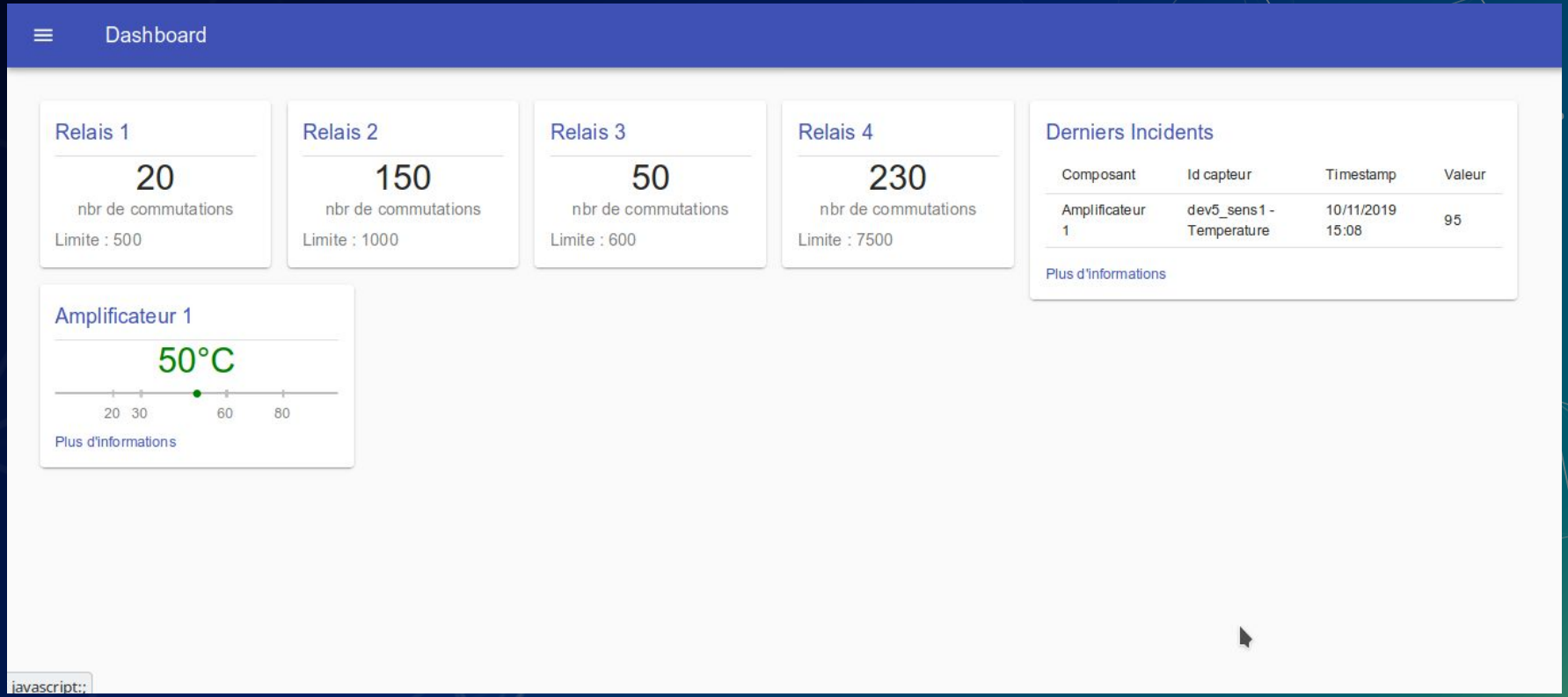




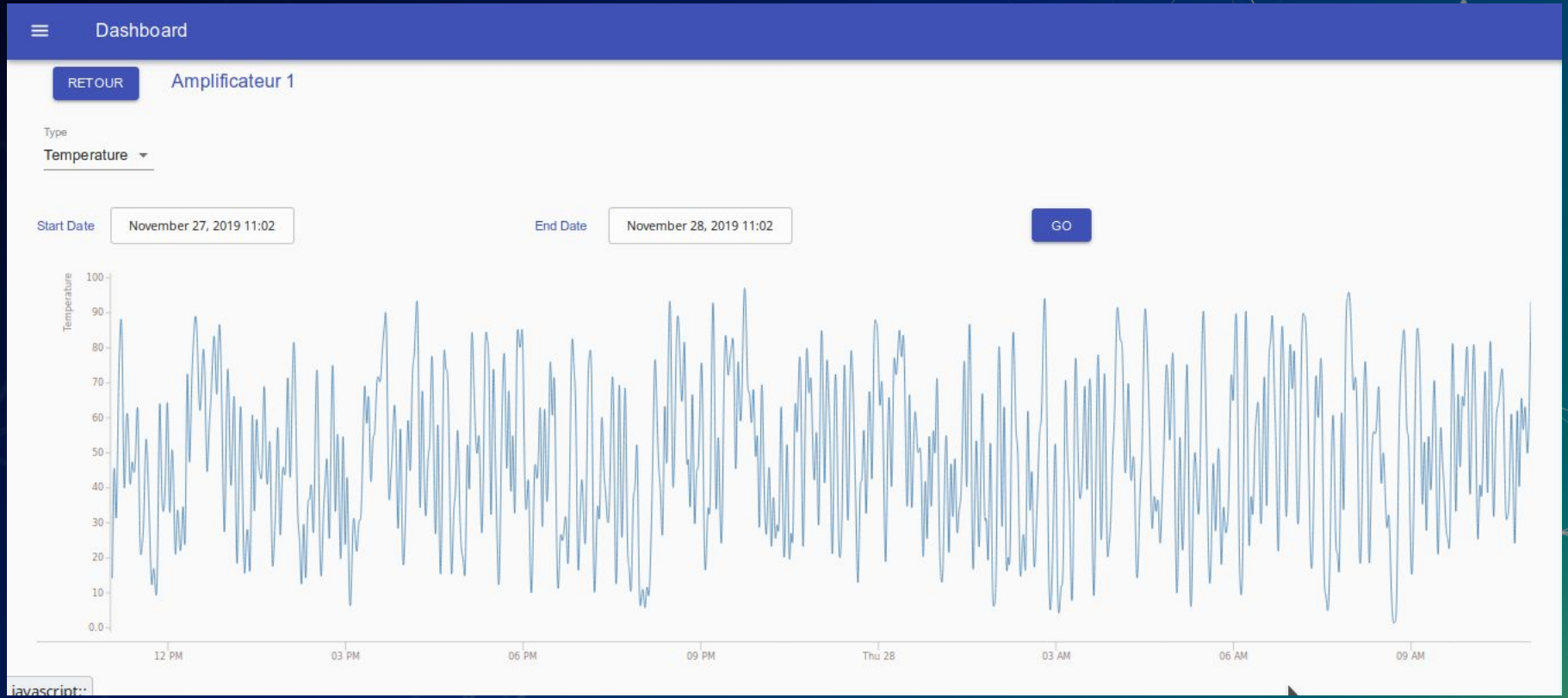
Current advancement - API



Current advancement - Dashboard



Current advancement - Dashboard



Organisation

Project Management -> Based on “Trello” Tool

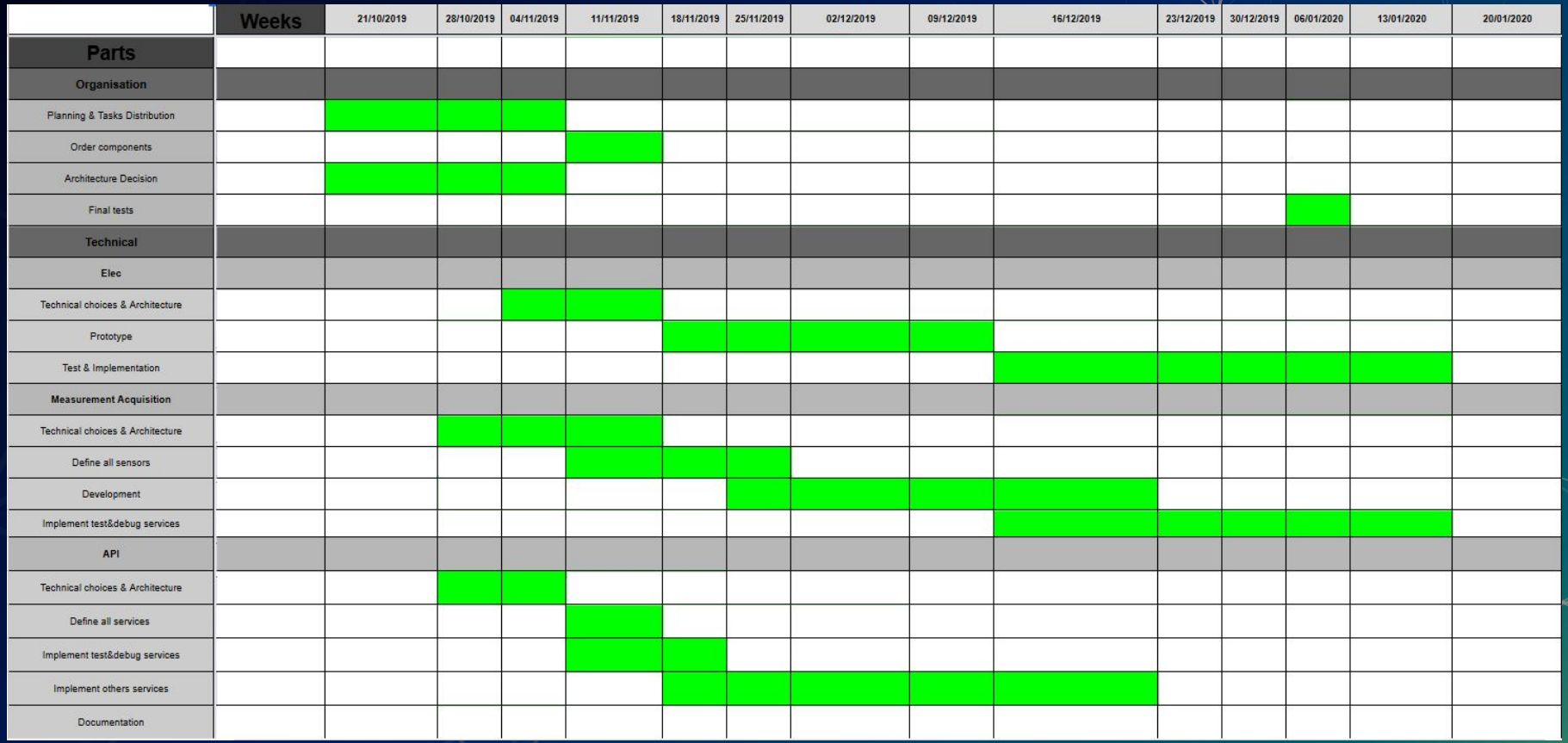
Manage some “post it” related to a Task

Technical Management -> Based on “Git” Tool

Manage the Programming version of our Project

	API	Dashboards	Cloud	Sensors
Djebar Loïc	X		X	
Ferrandi Emmanuel	X			X
Laurens Pierre	X	X		
Tissot Evan	X	X		

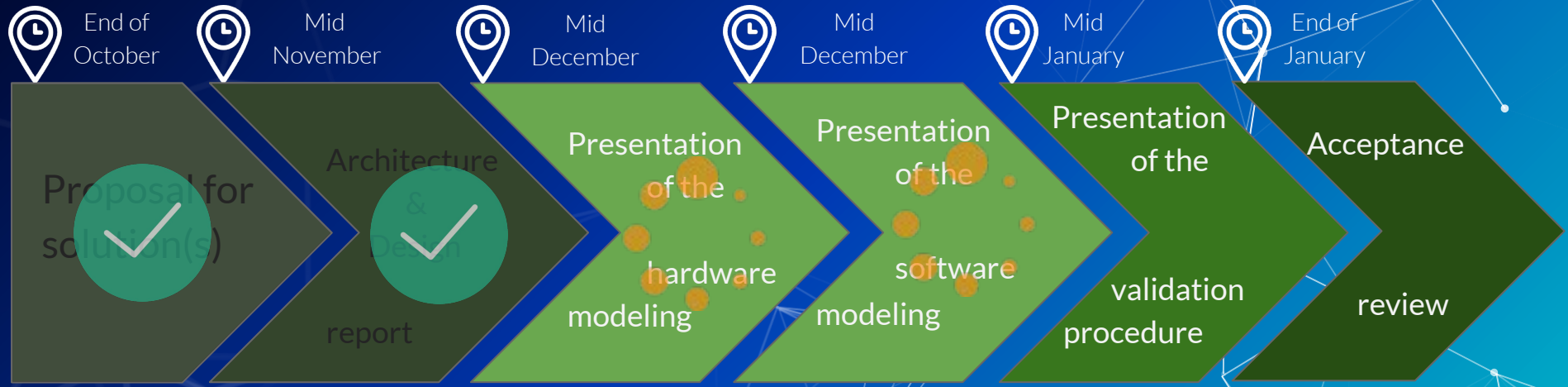
Project timeline



Current situation assessment

	Expected	Realized
Electrical	35%*	30%
Measurement acquisition	20%*	10%
API	45%*	50%
Dashboard Data Visualisation	40%*	65%
Dashboard Configuration Interface	20%*	15%
Data management	30%*	40%
Cloud	20%*	15%

Schedule



Weekly review with mails or Skype calls on Wednesdays
Meeting at Thales on Thursdays as often as possible

Risks

Lack of electrical knowledge

We can use the help of the electrical expert in the Thales Team and our INSA tutor

Work in real situation with the testbench

Thales can lend us a testbench

We can work on the Thales site (FabLab)

Bring the parts together

Test each part individually

Standardize the communication

Social Acceptance

Opposition can be faced if :

The cost of our solution is too high

Thales's engineer does not have the technical skills to maintain the IoT architecture

Raspberry's technology is too mainstream to be used in an industrial context

Conclusion

Technical Skills

Programming Languages (Python - React)

PCB (Printed Circuit Board) conception

Microservices Management (Docker)

Database management (MongoDB)

Technical documentation

Project Management

Planning gestion (Trello)

Technical writing

Meeting with Thales team

Following specifications

Project planning & scheduling

Contact us:

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