Service Oriented Architecture

Project Report

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5 ISS - B1

Requirement specification

Web application to manage INSA’s rooms, including :

- Windows management
- Door management
- Heating management
- Lights management
- Alarm management

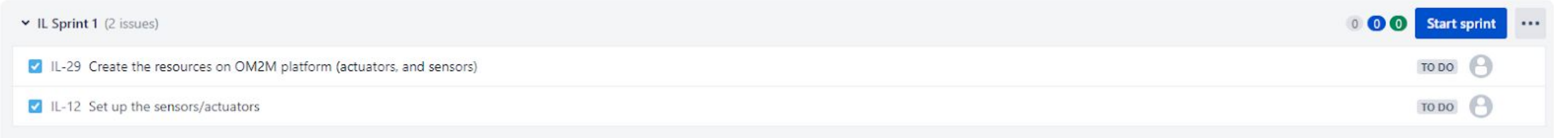
We had to set up the whole sensors and actuators architecture and realize web services to manage these objects.

Here are the specification for the automation of the room :

- Indoor temperature inferior at 12°C triggers the heating system.
- Outdoor temperature between 18 a 27*C triggers the opening of doors and windows.
- If there is movement :
    - If the hour is between 8 and 20, lights are turned on.
    - If the hour is outside of the 8 to 20 range, an alarm is triggered.
- If the hour is outside of the 8 to 20 range, doors are closed and lights are turned off (otherwise, doors are openned and lights are turned on).

Sprints

Sprint 1 : Creation of virtual sensors using oneM2M.

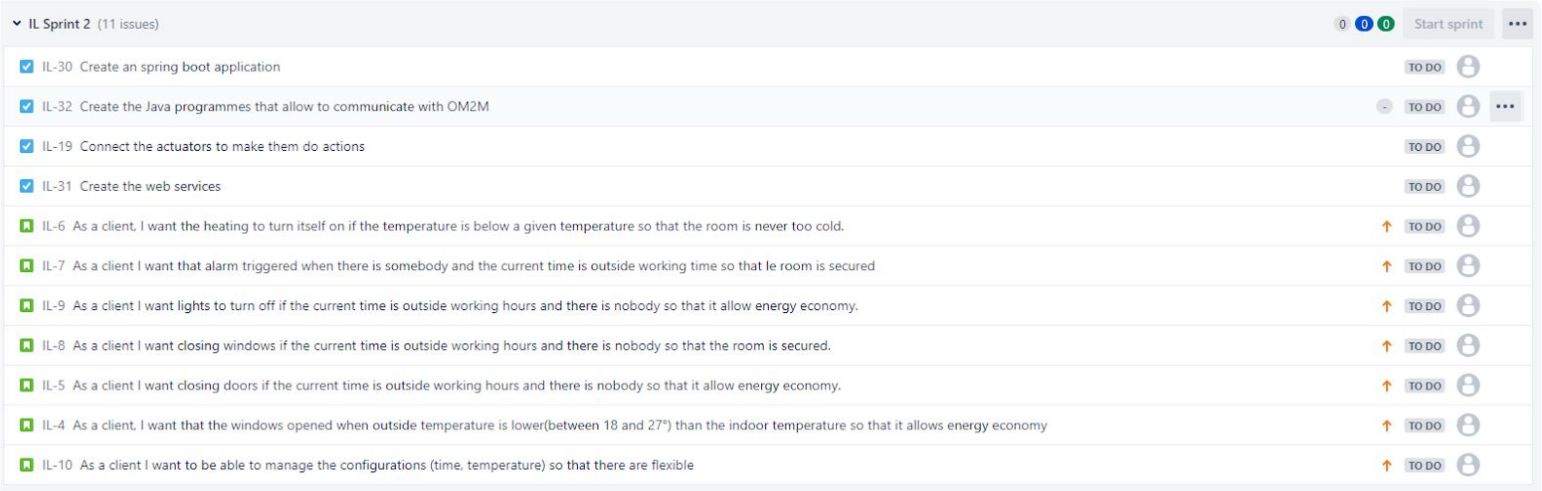


IL Sprint 1 (2 issues)

☑ IL-29 Create the resources on OM2M platform (actuators, and sensors) TO DO

☑ IL-12 Set up the sensors/actuators TO DO

Sprint 2 : Create spring boot application to deploy our webservices.
Be able to communicate with our previously created oneM2M architecture.
Creation of webservices for each sensor/actuator.



IL Sprint 2 (11 issues)

☑ IL-30 Create an spring boot application TO DO

☑ IL-32 Create the Java programmes that allow to communicate with OM2M - TO DO

☑ IL-19 Connect the actuators to make them do actions TO DO

☑ IL-31 Create the web services TO DO

IL-6 As a client, I want the heating to turn itself on if the temperature is below a given temperature so that the room is never too cold. ↑ TO DO

IL-7 As a client I want that alarm triggered when there is somebody and the current time is outside working time so that le room is secured ↑ TO DO

IL-9 As a client I want lights to turn off if the current time is outside working hours and there is nobody so that it allow energy economy. ↑ TO DO

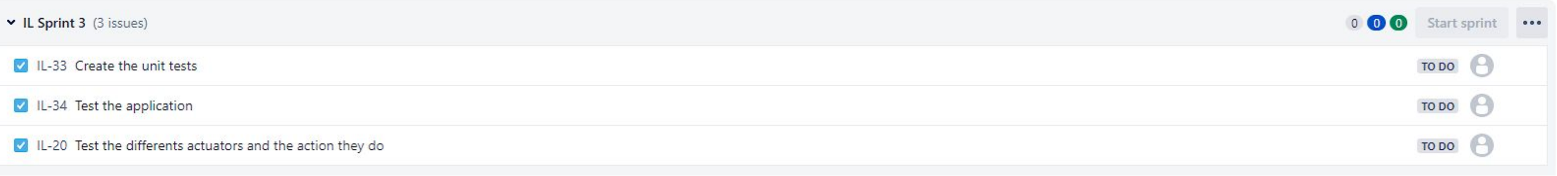
IL-8 As a client I want closing windows if the current time is outside working hours and there is nobody so that the room is secured. ↑ TO DO

IL-5 As a client I want closing doors if the current time is outside working hours and there is nobody so that it allow energy economy. ↑ TO DO

IL-4 As a client, I want that the windows opened when outside temperature is lower(between 18 and 27°) than the indoor temperature so that it allows energy economy ↑ TO DO

IL-10 As a client I want to be able to manage the configurations (time, temperature) so that there are flexible ↑ TO DO

Sprint 3 : JUnit test writting to test everything is working as expected.



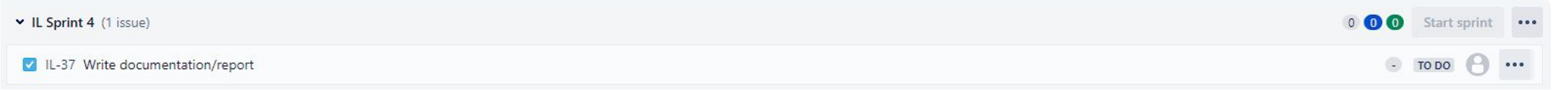
IL Sprint 3 (3 issues)

☑ IL-33 Create the unit tests TO DO

☑ IL-34 Test the application TO DO

☑ IL-20 Test the differents actuators and the action they do TO DO

Sprint 4 : Writting of the report.

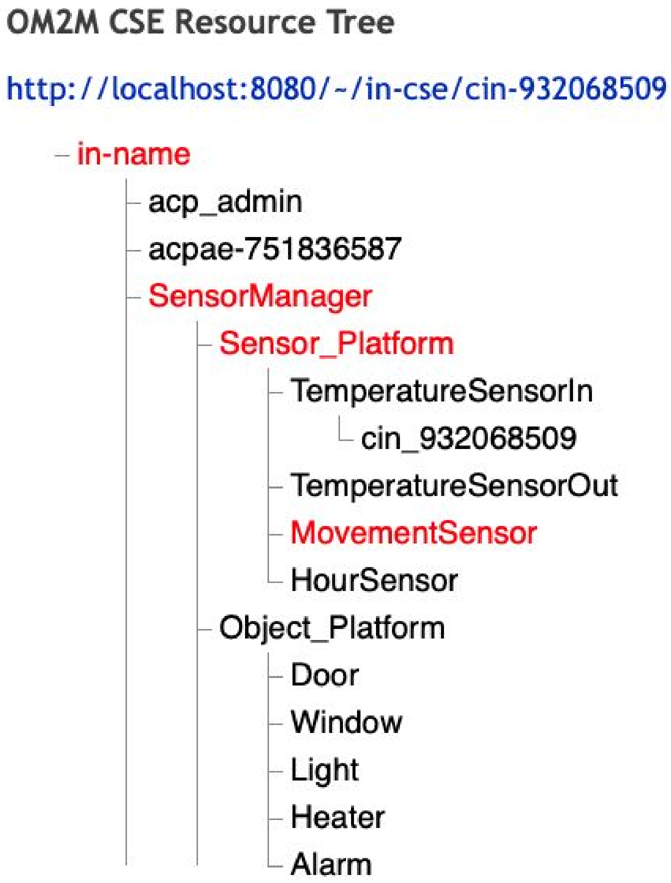


IL Sprint 4 (1 issue)

☑ IL-37 Write documentation/report - TO DO

Architecture

The architecture of our oneM2M resource tree can be seen here.
We have a Sensor_Platform for every sensor we need (temperature, movement, and an hour sensor to simulate the detection of hour. We could have used the hour of the system but it would have not worked for testing purposes).

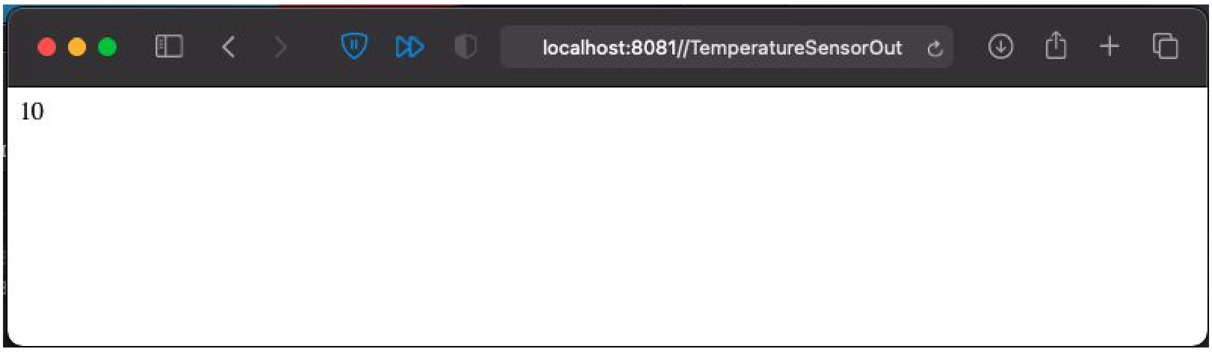


OM2M CSE Resource Tree

http://localhost:8080/~/in-cse/cin-932068509

- in-name
  - acp_admin
  - acpae-751836587
  - SensorManager
    - Sensor_Platform
      - TemperatureSensorIn
        - cin_932068509
      - TemperatureSensorOut
      - MovementSensor
      - HourSensor
    - Object_Platform
      - Door
      - Window
      - Light
      - Heater
      - Alarm

When we use the webservice /[name of the sensor], we get the last data he gets (meaning the last data we pushed).



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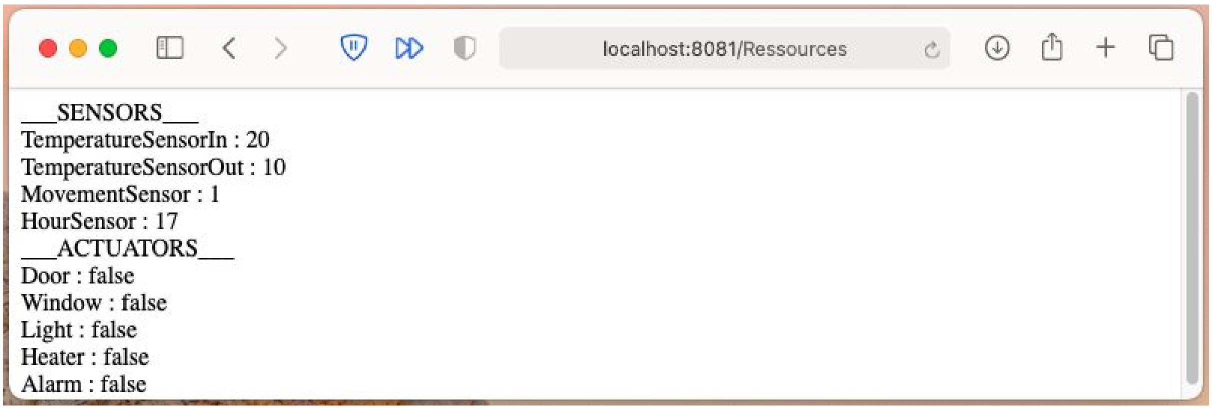
Using /[name of the actuator], we can see the state of it.
For example, /door will show if the door is open (true) or closed (false).

Every ressources, sensor and actuator, can be seen using /Ressources.



```
___SENSORS___
TemperatureSensorIn : 20
TemperatureSensorOut : 10
MovementSensor : 1
HourSensor : 17
___ACTUATORS___
Door : false
Window : false
Light : false
Heater : false
Alarm : false
```