University of Lleida

Master's Degree in Informatics Engineering

Higher Polythecnic School

Sprint 3 Documentation

Ubiquitous Computing and Embedded Systems

Francesc Contreras

Albert Pérez

Marc Visa

December 10, 2021

Table of contents

List of Figures

1 Introduction

The purpose of this document is to explain how the 3rd sprint of the project has been developed.

First of all, it will introduce the sprint backlog tasks picked from the product backlog of the project, along with the total story points for this sprint. Furthermore, it will be mentioned the sprint goal and the user stories the team has been worked with during the sprint.

Finally, it will show the sprint review, which will contain the percentage of the sprint tasks completion, along with the sprint retrospective and the burn-down and burn-up reports. Additionally, it will define the next sprint as the new modules to be working on, new user stories and the sprint goal.
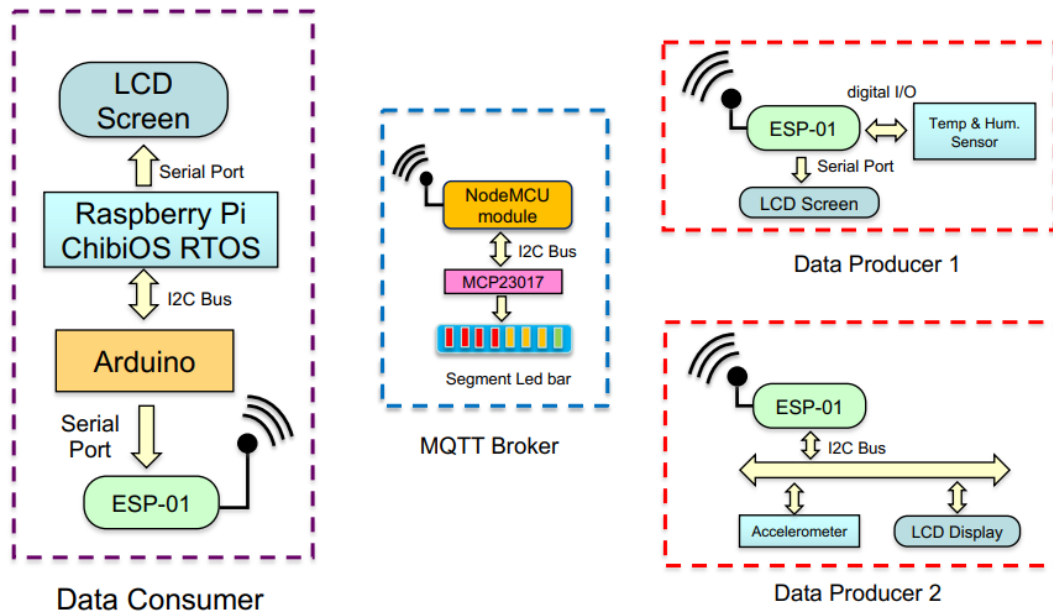

Figure 1: Wind turbine generator prototype schema

2 Sprint Backlog

For this sprint, the total story points is 86 points. This may seem too much compared to the previous sprints, but we wanted to get focused on all task related to the Supervision Station as the last step to conclude the project.

In this way, for the last sprint we expected to finish the remaining tasks if any, and work on the integration of all project parts.

Task	Label	Story Point
Prepare Raspberry Pi environment	Learning	3
Install ChibiOS to Raspberry Pi	Enhancement	2
Arduino interaction with R.Pi	Enhancement	13
Connect Raspberry Pi to LCD Screen via serial port	Enhancement	8
Arduino interaction with ESP-01	Enhancement	8
Test Supervision Station	Testing	13
Data Consumer: Data log and Screen representation	Enhancement	13
Sprint 3 documentation	Documentation	13
Supervision Station documentation	Documentation	13

3 Sprint 3 Definition

The goal for this sprint is to have a working version of the Supervision Station, which corresponds to the Data Consumer module of the project. The user stories that we have worked on during this sprint are the following:

3.1 User stories

1. As a Maintenance manager I would like to represent graphically the obtained sensor data, within the last 24h, in the Supervision Station.

    (a) **Acceptable Criteria:**
        i. The Arduino UNO connects to the ESP-01 in order to get the data produced by the Data Producers
        ii. The Raspberry Pi connects to the LCD Screen in order to represent the data from the Data Producers
        iii. The Arduino UNO and the Raspberry Pi are linked by an I2C Bus where the Raspberry Pi will be the master and the Arduino UNO will be the slave.
        iv. The ESP-01 receives the data obtained from the MQTT Broker, which has the data from Data Producer 1 and Data Producer 2.

    (b) **Related Task:**
        i. Supervision Station Development.

The user story corresponds to the work-block named Data Consumer, which components related to are the following:

- ESP-01

- I2C Bus (Raspberry Pi and Arduino communicatino)

- Arduino UNO

- Raspberry Pi

- LCD Screen

3.2 Story Points

Regarding the estimation story point for each task, we would like to remark that we used **the Scrum Poker technique** via the next webpage https://scrumpoker.online/.

Thus, we assure each of the sprint participants may weigh each task without interference and anonymously. In this way, the influence is none and we obtain realistic story points for each task.

4 Sprint Review

The goal for this sprint got centered on finishing the Data Consumer module. **The Sprint 3 lasted 14 days, from 26 of November to 10 of December**.

4.1 Percentage Of Sprint Completion

The following are specified the percentage of completion for each task of the Sprint 3 Backlog, as well as an estimated dedication time in hours for the whole team.

Task	Completion (%)	Team dedication time (h)
Prepare Raspberry Pi Environment	100	1h
Install ChibiOS to Raspberry Pi	100	1h
Arduino interaction with R.Pi	80	3h
Connect Raspberry Pi to LCD Screen via serial port	100	2h
Arduino interaction with ESP-01	50	2h
Test Supervision Station	80	5h
Data Consumer: Data log and Screen representation	70	4h
Sprint 3 documentation	100	3h
Supervision Station documentation	25	1h

The total dedication time for the Sprint 3 is **22 hours**.

The dedication time to this sprint was not as much compared to the others as you may observe. About **1.5 hours per day**. Basically, due to some issues encountered which slowed-down the development, and a short vacation period in mid-sprint.

On the other hand, the main purpose of the sprint is accomplished, as we got a working version of the Data Consumer, but waiting to test it all.

The main reason is that we got issues with some failing wires when treating with the SDA connection between the Raspberry Pi and the Arduino when building the component schema for the I2C BUS. And also, with the LCD Screen, the one needed multiple testing because we couldn't work properly on it as it was failing. Thus, implying not being able to work fairly on the graphics representation, not even see the values received from the Arduino.

Hence, you may observe the "Arduino interaction with R.Pi" task and the "Test Supervision Station" task are not completely finished, specifying a symbolic 80 percent.

In this way, we should work on finishing and testing the graphics representation on the LCD Screen. Moreover, remains to conclude the Arduino interaction with the ESP to get dynamically the data (this corresponds to the project parts integration), because we could not dedicate so much time due to the problems above mentioned.

4.2   Cummulative flow

The cumulative flow diagram is one of the most advanced analytics in Agile project management. It provides a concise visualization of the metrics of flow. It shows you how stable your flow is and helps you understand where to focus on making your process more predictable.
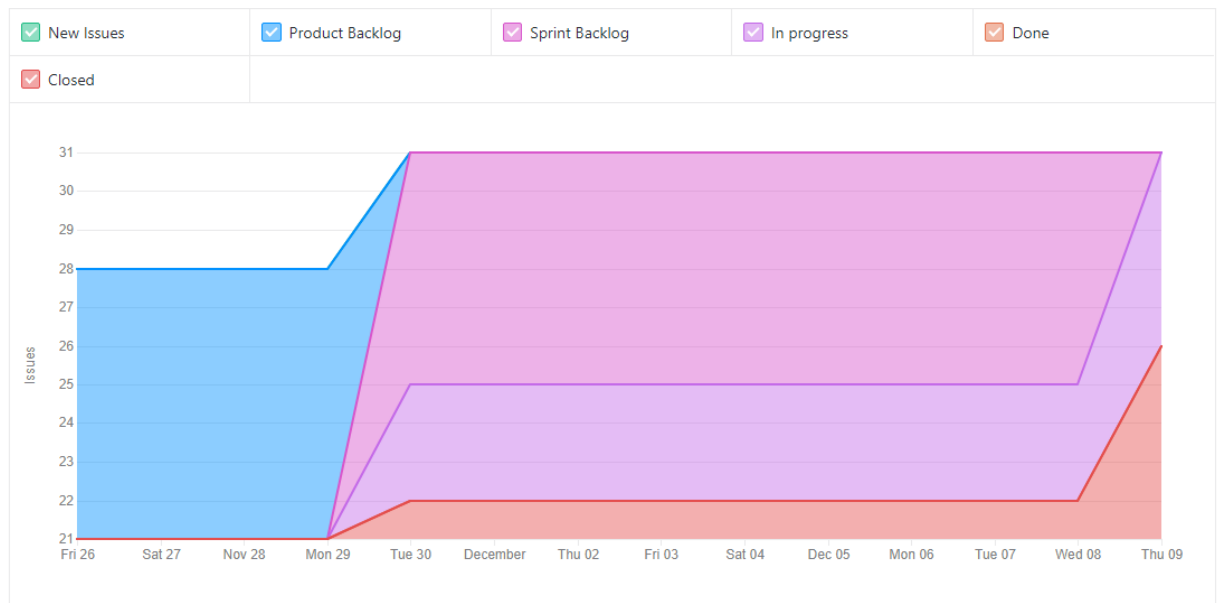

Figure 2: Cummulative-flow graph

This cummulative-flow graph shows how the sprint working lasted. But, you may observe an increase of the tasks on Monday 29. We remark this point, as here is when the sprint was redefined once we studied all the work to face-up.

This sprint has been the hardest in working terms, as new components used, but also the Data Consumer module realizes as the complex part of the whole project which the redefinition suits well as its complexity requires.

Completed issues and pull requests	Story points
⊘ Prepare Raspberry Pi Environment `learning` wind_turbine_generator #2 added 1 days ago ▯▯▯ Closed	③
⊘ Install ChibiOS to Raspberry Pi `enhancement` wind_turbine_generator #3 added 1 days ago ▯▯▯ Closed	②
⊘ Connect Raspberry Pi to LCD Screen via serial port `enhancement` wind_turbine_generator #29 added 10 days ago ▯▯▯ Closed	⑧
⊘ Sprint 3 documentation `documentation` wind_turbine_generator #30 added 10 days ago ▯▯▯ Closed	⑬

Incomplete issues and pull requests that were not completed by the end of the sprint	Story points
⊙ Arduino interaction with ESP-01 `enhancement` wind_turbine_generator #6 added 1 days ago ▯▯▯ In progress	⑧
⊙ Test Supervision Station `testing` wind_turbine_generator #8 added 10 days ago ▯▯▯ In progress	⑬
⊙ Data Consumer: Data log and Screen representation `enhancement` wind_turbine_generator #14 added 10 days ago ▯▯▯ In progress	⑬
⊙ Arduino interaction with R.Pi `enhancement` wind_turbine_generator #16 added 10 days ago ▯▯▯ In progress	⑬
⊙ Supervision Station documentation `documentation` wind_turbine_generator #31 added 10 days ago ▯▯▯ In progress	⑬

Figure 3: Cummulative-flow table

Regarding the tasks, at the top there are the four ones already full accomplished, and below the remaining. But taking into account that some are still close to get finished. We only need to solve the issues encountered explained on the **4.1 section**.

4.3 Burn-down report

The burn-down chart shows the amount of work that has been completed in a specific sprint, and the total work remaining. Burn-down charts are used to predict your team's likelihood of completing their work in the time available.

Figure 4: Burn-down graph

Specially in this graph, highlights the flow in the mid-sprint period. As in the beggining seems there are some closed tasks, as well as in the final period.

But, we wanted to remark this burn-down report the one shows clearly the vacation period in the mid-sprint.

5 Conclusions Next Sprint

The team worked well together and the sprint advanced smoothly, not counting the vacation period. Now we shall prepare the last issues and tasks to work on the last sprint and we think that if we keep working as we have done, we shall have the project finished at time.

We should get focused on solving the issues encountered on this sprint to last the remaining tasks and test them all. Mainly the Raspberry Pi and Arduino interaction. And finally, test the whole project parts integration, and realise the final project documentatio.