

Wireless Technologies on Internet of Things in Partnership with Thought Creator

The approach used in this document is more on Technical Skills than "Soft" skills. (but softer) João Quintas
Learning Report

Abstract—The conducted activity for Portfolio was done in partnership with Thought Creator. The activity has taught me several key aspects on researching and choosing hardware components for a specific project. It has also taught me how to compare different technologies, how to choose the most appropriate one, and how to present the findings. In the end I feel like I have more knowledge for future projects involving hardware components.

NOT SOFT-SKILLS!

Index Terms—Internet of Things, Low Consumption Wireless Technologies, IEEE standard 802.15.4, low-rate WPANs, LaTeX, paper.

in terms of SOFT-SKILLS these terms are irrelevant

ACRONYMS MUST be expanded in first usage in the text body.

1 INTRODUCTION

BUILDING a hardware board from scratch takes a big amount of time and effort to find out the best and most economical solution. A study of available technologies for the intended solution has to be made. After finding the most appropriate technology, the hardware components have to be chosen. There is a wide range of manufactures, components, specs, and prices so a meticulous study and comparison has to be made before any development stage. When both have been figured out it is time to start developing a working prototype along with a PBC designed.

At university courses, even though we have hardware design classes, does not compare to having direct contact with a real company trying to develop new solutions for real customers. Different emphasis are made and a budget has to be followed with really small maneuver margins. This activity gave me a whole different perspective on how hardware related projects are conducted at an enterprise level.

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Manuscript received Month Day, 2015.

2 STUDY OF TECHNOLOGIES

Finding out the correct technology for the project is a crucial step. The chosen technology will dictate the rest of the project and a mistake at this step can have great impacts on price and deadline dates since the entire project depends on this decision. This activity taught me the importance of choosing the right technology along with how to choose the appropriate one.

2.1 Choosing the Right Technology

As mentioned before, this is one of the most important steps on the development of a new hardware solution. Thought Creator needs a low consumption wireless communication solution for future projects. This activity taught me the necessary steps to find multiple technologies for a given requirement and how to choose the most appropriate one. It also taught me that when studying and comparing different technologies, it is essential to find out all the strong and weak points of a certain technology and common usage for them to figure out which one fits best with the presented requirements.

2.2 Presenting the Chosen Technology

After conducting the study and deciding on the appropriate technology it is necessary to

(1.0) Excelent	LEARNING					DOCUMENT						
(0.8) Very Good	CONTEXT x2	SKILLS x1	REFLECT x4	S+C x1	SCORE	Structure x0.25	Ortogr. x0.25	Gramm. x0.25	Format x0.25	Title x0.5	Filename x0.5	SCORE
(0.6) Good												
(0.4) Fair												
(0.2) Weak												
	1.8	0.8	3.2	0.7	6.5	0.25	0.2	0.2	0.2	0.5	0.1	1.45

present to the project leader for approval. The not adequate method is using a presentation. This activity gave me the opportunity to make a presentation for the Thought Creator's board and team. I learned how to present for a team and how to pitch my ideas. It also taught me how to pitch my opinion in at a professional level. The presented results had to have great scientific fundamentals and the final decision had to be explained thoroughly.

3 CHOOSING THE MICROCHIPS

With the chosen technology a suitable microchip for Thought Creator's needs has to be studied. The market of microchips is vast and very competitive, so a meticulous study was conducted to find out the best possible solution. In this activity I've learned how to choose the appropriate hardware for specific requirements.

3.1 Different Manufactures

There are many different hardware suppliers. This activity taught me the major players on the market. I've also learned the importance of choosing the right manufacturer and its impacts on the project. It is important to choose a prestigious manufacture that supplies good documentation and offers good customer support for any problems that may occur during the development stage. With good documentation and good costumer support the chances of having a successful project increases dramatically. This point was very emphasized by Thought Creator and they gave me examples where they opted for less prestigious brands and things that went wrong with that decision. I've also learned that sometimes is better to spend two or three more euros on a hardware component with a great documentation and customer support because if any problems appear we can rely on the manufacture for help.

3.2 Different Models

Like other industries, each manufacture offers different solutions for the same problem. What I have learned with this activity is that choosing a model entirely depends on the

project's requirements. To make a correct hardware choice, different factors have to be taken into account. For Thought Creator's needs several factors had to be taken into account to decide on the most appropriate hardware solution. These factors include radio's frequency band, the receiver's sensitivity, unitary price and computational power. This activity also taught me that to choose the right component several factors have to be taken into account beyond those mentioned above. Compatibility with current Thought Creator's solutions is a plus, since it gives the opportunity to build the solution with already used hardware by the company. Having compatibility issues can be very time consuming, making the entire project fall behind.

3.3 Different Vendors

Just like there are different manufactures, there are also many different vendors. After choosing the manufacture and model of the hardware component it is time to start looking at prices in different vendors. In this activity, Thought Creator has shown me their goto vendors. I've also learned that, just like it happens in almost every kind of industry, that the prices vary from vendor to vendor. This implies a thorough search on the different vendors to make sure that we buy the components for the cheapest price. A good factor to take into account is the delivery time. I did not know this factor to be as important as Thought Creator taught me to be. When a project has a tight schedule, it is of greatest importance to have all the components ready on time. If the vendor takes one to two months delivering a product, this will impact the entire project if the team is not counting on it.

3.4 How to Choose a Microchip

This activity has taught me how to choose a hardware component based on set requirements. It is not as simple as I thought it to be. Several factors beyond the typical price and processing power have to be taken into account to make sure that the entire project works. Several notions of compatibility, delivery times,

*do not use
contractions in
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among others are as important and need to be studied carefully.

3.5 Presenting the Chosen Microchip

The way I presented the study results was through a spread sheet. This was suggested by Thought Creator. Presenting different component's characteristics side by side in a spread sheet is the most effective because differences can be spotted out quickly and efficiently.

4 CONCLUSION

This activity has taught me several key aspects on choosing adequate hardware that meets all the requirements imposed by the project's nature. I have learned different aspects of several low consumption wireless communication technologies, compare them, choose the most appropriate one, and present the results in a professional manner. I have also learned how to choose the ideal hardware component, the most important factors to be taken into account, best vendors, and how to present the studied results. It has been a great experience that made me realize all the hard work behind choosing the most appropriate hardware components.

In this type of document (technical), the conclusion should start with a summary of the subject addressed and then should highlight the results.

ACKNOWLEDGMENT

I would like to thank professor Rui Cruz for the amazing suggestion of doing Portfolio's activity along side with a wonderful company. I would also like to thank Thought Creator for all the things they taught me along this semester and for the amazing opportunity of working in my area of specialization (Embedded Systems).

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