Software Development Project
Team Leadership

João Pinho

Activities Report

Abstract—Time management and coordination of tasks is a complicated subject. This complexity grows exponentially when it involves software development teams. This document gives insights about two software projects that went wrong, breaking every deadline, all because the lack of a proper management of the projects and the people working on them. A set of useful tools for software development teams are also detailed. We finish this document demonstrating that the best tools money can buy are not the wheel behind large software development teams, people are. And without motivation behind those people, no tool will ever be good enough for doing the right job.

Index Terms—Software Project, Team Management, Play2 Framework, Java, Portfolio III

Is this term meaningful in the context of this document?

You should better use LaTeX package ACRONYM for this purpose (exemplified in the Template)

1 Introduction

This activity started in the last week of July and ended in October 31, 2014. The developed activity was sponsored by the IST Professor Paulo Carreira who invited me to work with him in the Smart Campus Project [1], from now on referenced as SC.

This work was performed in the office room 1-42 of IST TagusPark, hereafter referenced as R142. In my first weeks I focused mainly in knowing the team, their goals, their position in terms of accomplished versus postponed tasks and their diverse set of systems.

The team of the SC located at the R142 is composed by 2 students with a scholarship grant. They are responsible for maintaining R142 development and production servers up and running. Those machines are used for development purposes, related with the SC Project and other external projects contracted to INESC-ID also located at R142. Besides this system administration component, my colleagues and I were responsible for the software development tasks needed to support the SC project.

The SC project targets energy efficiency in buildings through a set of techniques. Upon my arrival, SC team had already developed a platform to collect data from diverse Building Automation Systems (BASs)—which include KNX/EIB, INOV Metering System and EG2/iLight, —a system to enable actuation, scenarios, alarm configurations and an web-based platform to preview building data.

Ref?

Inside R142 was also rolling another software development project, contracted to INESC-ID, with supervision and mentoring of Professor Paulo Carreira. The project was being developed by scholarship grant students from IST mainly. The team was made of three developers and a team leader/developer. Their project was called BIMK as of BIM (Building Information Modelling) and K is some differential factor connected to marketing strategies of the external company, named arencK (Architecture Engineering BIM Consulting). In short words, their product was about an eBay alike system of BIM-able products, this is, an online store where industrial architecture components and parts can be consumed in terms of their specifications—including 3D models and BIM files—by third-party softwares by AutoCAD, AutoDesk, and so on. According to their mis-

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1. http://greensmartcampus.eu/2012/12/the-smart-campus-pilot-in-lisbon-portugal/

Avoid using footnotes in these documents

(1.0) Excelent (0.8) Very Good (0.6) Good (0.4) Fair (0.2) Weak	ACTIVITY					DOCUMENT						
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sion, this system suppresses a need for top quality information regarding that business sector, involving different interested entities, forming all together a vortex of interest that leads ultimately into money income.

Both teams managed to work within the same room very well, despite the added amount of decibels (dBs) produced by two software development teams working frenetically to reach daily goals. A schematics of the room to better illustrate the scenario is depicted at Figure 1.

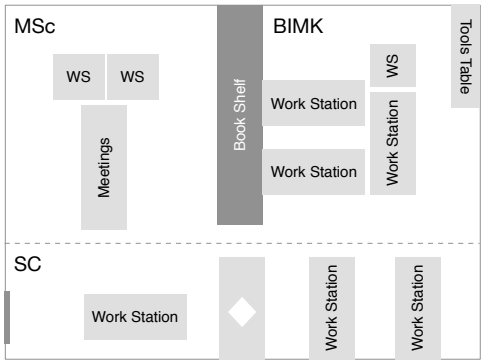


Figure 1. Room schematics - The room is divided in 3 zones aimed at: (i) MSc Students (MSc), (ii) BIMK space, and (iii) Smart Campus space (SC). The white diamond depicts my spot.

2 Support Systems

To support and manage two development teams, the following tools were required: *(i)* JIRA, for project management, *(ii)* Confluence, for documentation management, *(iii)* GitHub, for source control, *(iv)* Nexus, the artifacts—.jar files used in projects—repository system, and *(v)* Bamboo, for continuous integration of all the source code. In turn over of the following sections, a brief explanation of all the supporting systems used at R142 will be given.

2.1 Confluence

Confluence [2], enables both teams to document everything into a centralized system. Its aim is to promote knowledge sharing among teams and also serve as a knowledge database where new team members can quickly catch up on how things work.

2.2 JIRA

Project Management is done through JIRA [3]. Some of its main features include Agile Boards—similar to Trello,—Issue Tracking and Resource Allocation. This tool is fundamental to allocate tasks to all team members and have also an integrated view of the produced work. This tool also enables connection with Confluence.

2.3 GitHub

The source control system used was GitHub. Being a distributed system for source control, GitHub is awesome.

2.4 Bamboo

Bamboo [4] is a continuous integration server, this means that for every push that arrives at GitHub a compilation of all project modules of that repository are performed. If the compilation succeeds the project is deployed to the development server automatically. This workflow is known by continuous integration.

2.5 Nexus

An artifacts repository consists of a service for consolidating software dependencies. Every software project needs at some point external libraries, Nexus [5] keeps track of those dependencies locally so that development teams can pull their dependencies from a trustworthy server anytime they need to compile.

3 Problematic Situations

Before my collaboration a set of problems were tearing apart both projects and their teams. During the following sub sections an overview will be given concerning each topic.

2. https://www.atlassian.com/software/confluence
3. https://www.atlassian.com/software/jira
4. https://www.atlassian.com/software/bamboo
5. http://www.sonatype.org/nexus/

3.1 Project Management

The complete lack of project management, lead everybody into concerning about their own problems, not thinking or coordinating their work and efforts with anyone else.

The best tools money can buy at the end of the day still require someone to orchestrate them while managing people. Unfortunately, like in many companies, there are still people that think that micro managing is the same as managing and that delegating means a responsibility free pass bonus to give them more time, without any posterior consequences of course.

3.2 Team Leadership

A poor leadership of both teams, caused distrust on the leadership, thus leading to a complete lack of focus on the projects main goals.

Smart Campus team was completely in auto pilot mode with two developers doing what needed to be done, without sense of priorities or coordination.

BIMK team was being lead by a under graduated student, without the technical expertise required for the job.

3.3 Technical Guidance

The technical guidance on both projects was left in the hands of over-allocated developers and inexperienced university students, causing noise and generalized confusion for performing simple development tasks.

SmartCampus project, deals with BASs, those BASs were being accessed by means of works performed by students in the own context of their thesis. Therefore, all knowledge regarding those systems reused for SmartCampus project relied on these students knowledge. Moreover, the work performed by them was not tightly supervised, thus most of the code was a complete disgrace.

BIMK project's architecture was entirely developed base on hunches of the lead developer, with very arguable and opinion-based mentoring on those hunches, ultimately leading into a huge delay with proportions of months, regarding deadlines.

3.4 Moral and Motivation

The compilation of situations regarding lack of project management, leadership of the teams and technical guidance teared down moral and motivation of my colleagues.

Due to all circumstances, team members get used to be late on schedule, never capable of achieving deadlines or being worthy of recognition from their mentor/client.

Therefore, not being the one's responsible for the situation and without notion of why was the project being such a pain, they focused on working mainly, with low moral and no motivation.

4 Activities and Collaboration

My collaboration on R142 was solicited for helping on Smart Campus project and to put JIRA working *properly*. By *properly*, it was meant, schedule and allocate work on JIRA that people would actually use and care about.

During my stay, I focused on getting to know all systems being used. Also I helped fixing some problems on a system designed to abstract BASs. My activities were mainly related with KNX [6], a protocol for actuation and sensing of building devices. This activity involved solving problems related with software modules running over an OSGi platform. Those modules were written in Java code and their features were related with information retrieval from building devices.

Besides coding, due to past professional experience, I also helped managing the Smart Campus project, as depicted on Attachment A.

During my activities regarding SC project I had the opportunity to observe closely the working methods of BIMK's team. That helped me understand their problems and let me think about solutions to solve them. Even though it was not my main concern, I felt compelled to help them, since they were so desperate with problems that I am more than use to.

After speaking with the project supervisor, who asked for my help on BIMK's project, I decided to step into the team as a Developer. Because I couldn't work without organization,

6. http://www.knx.org/knx-en/index.php

my first action was to question what were the planned tasks for the month. I soon figured out that not even for the day, such plan existed.

I realized earlier that I needed to take leadership. However, leadership is only true if you are seen as leader by the entire team, otherwise, you can do more evil than good by demoralizing an already demoralized team.

To prepare my leadership, I started by doing what I always do, lead by example. Therefore, I helped all my colleagues on their daily work, by recommending libraries, refining their system structure—simplifying it, —suggesting techniques known to me as good to haste development. Moreover, I ask them what were wrong and what would they do improve. I also suggested and implemented daily scrum meetings which helped me track the work.

Two weeks later, team members started asking me questions about their problems. With that came guidance, and before they notice, they were asking me what to do. I never in any time assumed myself as their leader through words. It took me about a month to assume command over the project. Hours were spent programming at their side, fixing erratic thoughts, recommending design patterns and simplifying their implementations.

After that, I decided to "cut weight", since the system architecture configured in the project was too complex. That complexity was created to address problems that they didn't even had in the first place.

In the beginning of September, two senior developers were hired to replace me, since my involvement was only temporary. The team they found couldn't even communicate until few time before their arrival, and at that moment they were working like a clock. Respecting deadlines, communicating among them effectively, everybody knew what was the direction and what were the objectives of the project.

5 Conclusion

The activities performed in this portfolio were related with software development and coordination of teams. I found the performed activities to be more related with project management and team leadership, due to the huge amount of work involved in those subjects.

Coding software on the end of the day was the easy part. Managing was hardest, because it involved deep knowledge about a lot of different topics. For instance, I had no previous experience with building automation technology, and yet I ended up developing software and fixing bugs against KNX Gateways to actuate and sense building devices.

Also with BIMK project, which involved deep knowledge in Java and Play2 [7], I had some difficulty in managing between learning those technologies and coordinating an entire team on how should they do their system. Notice that, I was not as expert in Java before this little challenge.

In overall, I enjoyed the experience. I accepted the job more for the fun of working with the people in room R142, and specially because I felt that I really could help them. The payment for my effort was merely an appreciation nothing much, could had been better payed by the triple working with clients as freelancer. But I would miss the entire experience of what I did, and that pays for it self, I think.

Acknowledgments

On this experience I must thank and acknowledge the dedication of my colleagues on guiding me. Teaching and supplying me with the knowledge I needed to guide them later. I thank because they did it with hearth without any guarantees of future results.

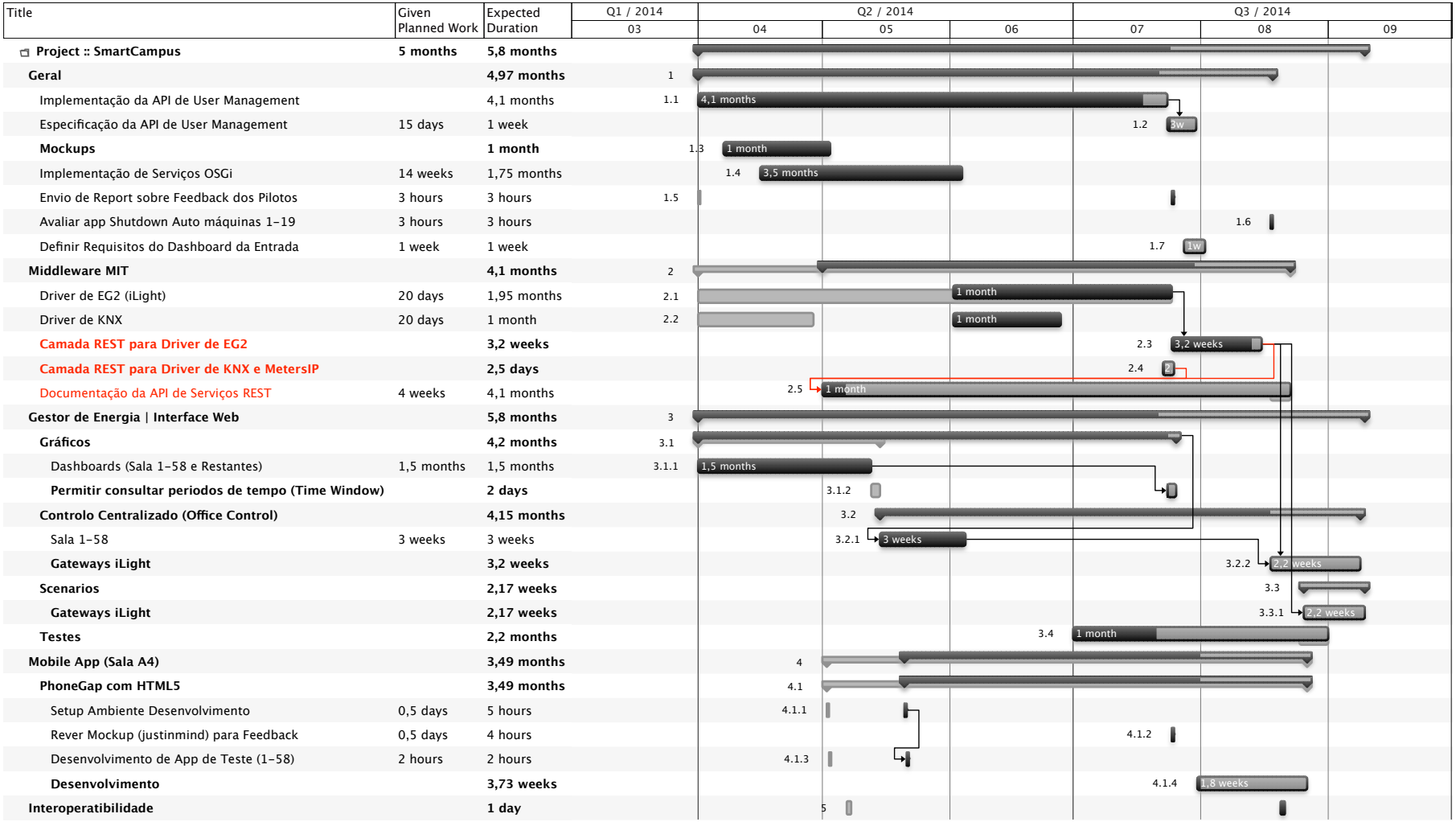
I did my best not to burden them, but explain how such complex Eco-system of subsystems work, is not an easy task and took my colleagues precious time.

My special thanks goes to Gonçalo Almeida, who guided me along the entire structure of R142 systems and servers, without his work, mine would not have been possible.

Also I must thank to Pedro Domingues, who helped me a lot understanding how building automation works, what are the trade-offs and what needs to be improved. With that knowledge I managed to develop an entire project which allowed me to perform great on a MSc discipline and also to start writing for my master thesis.

7. https://www.playframework.com

APPENDIX
SMART CAMPUS - GANTT PLAN



APPENDIX
CERTIFICATE OF EXECUTION

Herein, I acknowledge that the MSc Student, João Pinho n. 66047, has participated in the Smart Campus project, currently being developed in collaboration with MIT Portugal. Furthermore, I recognize his involvement on an external project contracted to INESC-ID, named BIMK.

In the aforementioned projects, he played the functions of software developer and project manager, helping the teams of both projects on their work since the end of July until October 31, 2014.

Oeiras, January 23rd, 2015,

Paulo Carreira

Assistant Professor DEI/IST