Supporting tool for Agile software development

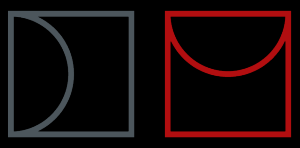
Experience from a real use case

Bachelor's degree thesis

Candidate: Ciprian Stefan Voinea

Supervisor: Armir Bujari

Accademic Year 2018 - 2019



DIPARTIMENTO
MATEMATICA

Università degli Studi di Padova

Department of Mathematics "Tullio Levi Civita"

Bachelor Thesis in Computer Science

Supporting tools for agile software development: experience from a real use case

Supervisor
Armir Bujari

Candidate
Ciprian Stefan Voinea

Accademic Year 2018 - 2019

This is a dedication

Abstract

la crescita in base al numero di dipendenti necessità di avere un tool complesso e sofisticato per gestione della parte di sviluppo sw non è il solito gestionale, ma sono tool specifici che considerano i trend a livello di sviluppo

raccontare risultato ottenuto dello stage il lavoro di questa tesi è stato ... tool più conosciuto dal mercato ... installare / config ... ottenere approvazione da management .. migrazione dei sistemi in uso nel nuovo gestionale

Sommario

LA CRESCITA IN BASE AL NUMERO DI DIPENDENTI NECESSITÀ DI AVERE UN TOOL COMPLESSO E SOFISTICATO PER GESTIONE DELLA PARTE DI SVILUPPO SW non è il solito gestionale, ma sono tool specifici che considerano i trend a livello di sviluppo

raccontare risultato ottenuto dello stage il lavoro di questa tesi è stato ... tool più conosciuto dal mercato ... installare / config ... ottenere approvazione da management .. migrazione dei sistemi in uso nel nuovo gestionale

Contents

Listing of figures

Listing of tables

1 Introduction

introduzione a significato di way of working (in SW) cercare articoli da blog per spiegare martin fowler

fare tracking delle isssue / bug è diventato difficile / complesso molti tool open source che fanno anche documentazione e code review (altri aspetti)

l'evoluzione negli ultimi anni nelle aziende IT necessità di organizzazione delle azienda e la necessità di avere una gerarchia (o simil gerarchia)

ho sperimentato questo approccio in athonet, mostrata interessata all'utilizzo di un gestionale sw di tipo agile per la gestione dei processi di sviluppo sw interni

I have sperimented ...

1.1 Premise

Questo documento rappresenta la tesi e il report dello stage conclusivo al percorso di laurea ...

contiene la descrizione dello stage curricolare + introduzione all'ambito in cui è stato fatto, insieme ad un'introduzione dell'argomento geerale, in questo caso la metodologia Agile...

Per introdurre alcuni concetti della metodologia Agile e come intercalare per facilitare la lettura del documento, verranno utilizzati comic strip di Dilbert, disegnato da Scott Adams, un famoso ...

To introduce some concepts of the Agile methodology and other correlated way of working approaches, I will use some comic strips of the character Dilbert, written and illustrated by Scott Adams.

It satirically represents the problems that can be present in a small or big company of software development.

This thesis contains the description of my work done at Athonet, under the supervision of my tutor Fabio Giust. This internship is part of the requirements for obtaining my Bachelor's Degree in Computer Science.

1.2 The company

Athonet may still be a small company but it's story is on the interesting side Per quanto piccola possa ancora essere ha una storia degna del suo nome, che deriva dal dio egizio del sole Aton

breve paragrafo in cui descrivo l'azienda quando è stata fondata con che visione di cosa si occupa scrivere che ha vinto tot premi e per cosa (link ad articolo) dove sono adesso (in via di crescita e sviluppo) cosa pensano di fare di buono nel mondo e per il futuro

Athonet nasce dall'idea di Gianluca e Karim che hanno saputo vedere oltre la tecnologia del momento proiettandosi sul futuro ....

Figure 1.1: Athonet's logo

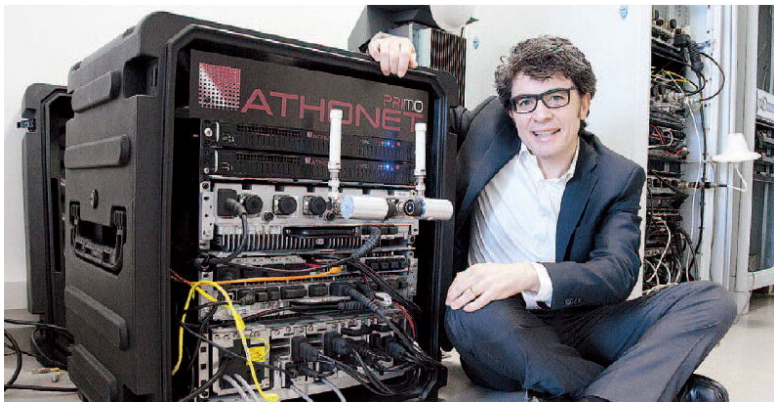


Figure 1.2: The CTO, *Gianluca Verin*, with Athonet's main product ***PriMo***

Athonet is a telecomunication company headquartered in Vicenza that was born from the idea that broadband networking should be easier to access and more available for people in rural areas and for companies that work in special environments (like shipping or mining companies).

The main product is PriMo ()

They tested this product for the first time on the field in Emilia Romagna, in 2012 after the disastroso terremoto che ha causato un

Lately they have migrated some of their functions to the cloud .... bubble cloud

This company may still be small but has much to offer, considering that some of it's competitors are giants like Nokia and Ericson.

1.3 The project

cosa mi ha portato a scegliere questo stage rispetto ad altri breve descrizione del progetto, da riprendere successivamente

1.4 Document organization

This document is organized as follows:

- Chapter 1 or *Introduction*: describes the overall content of this document
- Chapter 2 or *The internship project*: describes in detail the objectives and planning of the internship project
- Chapter 3 or *Agile processes and methodologies*: an introduction to the Agile software development
- Chapter 4 or *Jira and Confluence: the essentials*: describes the most valuable functionalities of Jira and Confluence
- Chapter 5 or *Project implementation*: details how the project has been implemented by dividing it into time periods
- Chapter 6 or *Conclusions*: contains the retrospective of the project, future developments and personal considerations

Nulla facilisi. In vel sem. Morbi id urna in diam dignissim feugiat. Proin molestie tortor eu velit. Aliquam erat volutpat. Nullam ultrices, diam tempus vulputate egestas, eros pede varius leo.

Quoteauthor Lastname

2 The internship project

This chapter is all about the discussions and planification that has been made prior to the beginning of the internship.

It includes the results of the discussions with the tutor (Dr. Fabio Giust) and the creation of the piano di lavoro document che spiega in maniera più dettagliata questo capitolo

In here is also described how a resolution for the problem was first thought and how it was

2.1 The company's needs

che cosa sta utilizzando athonet adesso per la gestione del lavoro e del tracking
come issue tracking system, gestore di wiki interno, ecc –> tanti tool scorrelati tra loro
perchè athonet ha la necessità di utilizzare tool differenti
(+ stabili, meglio documentati, miglior UI / UX etc.)

2.2 Planning

in base a cosa ho pianificato come ho parlato con il tutor per fare capire i loro bisogni, lo scopo finale, e come arrivarci step da fare
parlare poi di chi avrà bisogno del tool e con chi interagirò durante lo stage
fase preliminare di pianificazione insieme ad altre figure (aree diverse, managemeng, product

ownership...)

2.3 Approaching the problem

After the discussion with the tutor I have studied the arguments that we have talked about and formalized the requirements into some objectives

2.4 The work plan

To formalize the previous discussions and create a followable roadmap, I have created a work plan document that contains a Gantt diagram and a table that describes the hours spent per task.

This document, formally called "Piano di lavoro"

This document tries to be an

2.5 Time suddivisione

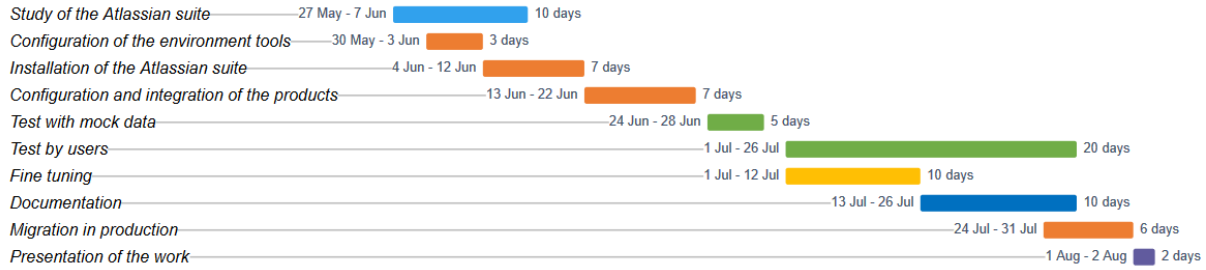


Figure 2.1: Gantt diagram contained in the "*Piano di Lavoro*" document

Spiegare che in questo documento viene quindi spiegato che è stato deciso di fare lo stage della durata di 10 settimane

2.6 Requirements

Definizione dei requisiti, messa in un piano di lavoro, mettere in appendice

If a team couldn't be fed with two pizzas, it was too big.

Jeff Bezos

3 Agile processes and methodologies

Before getting into the implementation and adaptation of Jira and Confluence, let's back up a little and understand the concept of Agile and where it comes from.
This chapter describes the most fundamental points of the Agile methodology, how it came to be and the adaptations that derived from it. At the end, it also explains how Athonet's adaptation of the Agile life cycle works.

3.1 Why the need for another software lifecycle

cosa c'era prima dell'agile
quando dove e perchè c'era la necessità
modelli di cicli di vita (itemize)
modelli di ciclo di vita iterativo vs incremetale

3.2 The Agile manifesto

i 4 punti fondamentali del manifesto agile

3.3 Agile's little big cousins

kanban, scrum, etc.

3.4 Concrete application of Agile and it's derivates

modello spotify (+ altre grandi aziende)
riprendere citazione di jeff bezos e come viene applicato in amazon
e le piccole aziende come athonet come fanno? (misto)

3.5 The advantages and disadvantafes of Agile

l'agile può andare a completamente sostituire il resto
cosa ne pensano gli utenti

3.6 What Agile variant will Athonet use

misto a causa dei pochi dipendenti che hanno ancora una responsabilità ampia all'interno dell'azienda ma pensano che si possa incorporare agile
processi di business

Nulla facilisi. In vel sem. Morbi id urna in diam dignissim feugiat. Proin molestie tortor eu velit. Aliquam erat volutpat. Nullam ultrices, diam tempus vulputate egestas, eros pede varius leo.

Quoteauthor Lastname

4

Jira and Confluence: the essentials

Now that we have understood the concept of Agile, let's get to know the Jira and Confluence, the software used to implement it. These are proprietary tools are developed and maintained by the Australian company Atlassian.

Figure 4.1: The logos of *Atlassian*, *Jira*, *Confluence* and *Jira Service Desk*

Jira is a proprietary Issue Tracking System that was first released in 2002, this product's name is a truncation of Gojira, the Japanese word for Godzilla. This is a reference to another ITSs that was dominating the market at the time, Bugzilla. Now the competitors of Jira are other software like, for example, Redmine, VersionOne, PivotalTracker, Workzone or integrated ITSs in repositories like GitHub's or GitLab's issue trackers. Athonet's previous choice was Redmine because it's open source (this implies it's free of commision), it has a medium large community of people that use it and maintain it behind and the plugins allow

the integration with other tools used internally like repositories or software for reporting customer requests, for example.

Figure 4.2: *Redmine*'s logo

Confluence, on the other hand, is designed as a collaboration platform for sharing knowledge like internal documents, product specifications, meeting notes and can be used as an internal wiki for the company and even for the public. Atlassian released the first version of Confluence in 2004, saying its purpose was to build "*an application that was built to the requirements of an enterprise knowledge management system, without losing the essential, powerful simplicity of the wiki in the process*".

Since the first releases of these products, Atlassian has developed and acquired new tools like Bamboo, Clover, Crowd, Crucible, and FishEye, all orientated towards collaboration, content sharing, issue tracking, time scheduler, etc.

Both Jira and Confluence are written in Java.

4.1 Understanding what they can do

These tools are made to be integrated with one another, not only because they are made by the same company but they are strictly correlated. Integrating an issue tracker with a platform able to share documents and thoughts allows a more granular analysis of the problem. This means that in the company they can store meeting notes and documents related to the project in Confluence, then convert them to Issues in Jira.

Even though there is a license to pay to use these tools it is worth it.

Plugins can extend by far the usage and integration with other tools and the Atlassian Marketplace is full of them.

Let's understand them better.

4.1.1 Jira

Over the years Jira has become such a big software that Atlassian had to separate it in three different components, each with it's own scope. A more complete comparison can be found

at

Jira Core

Jira Core's main purpose is to handle business processes. It is designed to

Jira Software

Jira Software's main purpose is to ho handle software projects

Jira Service desk

Jira Service desk's main purpose is to handle customer requests

Jira Portfolio Plugin

Jira Portfolio was first designed as a plugin from ... then it was acquired by atlassian becaues It's main purpose is to visualize project roadmaps

4.1.2 Confluence

As described earlier, Confluence is a collaboration platform. It allows to create spaces of different categories that can be associated with Jira projects.

4.2 Key concepts for Jira

4.3 How they can satisfy Athonet's needs

Athonet has chose Atlassian's Jira and Confluence because...

The most important feature they needed was the roadmap and allowing this to be easily integrated with the other tools.

The roadmap is a key element for a company, specially for a software one, since it allows to tenere d'occhio release / andamento del progetto

Con i tool attuali non è possibile avere una tale visione dei progetti

Un altro grande vantaggio di questi tool inoltre è quello di poter avere una wiki centralizzata (adesso sono utilizzati altri tool)

4.4 How will Athonet use these tools

These tools are very complex, it is necessary to understand the scenario they can be used in and how the

4.4.1 Development

Better tracking of inte

4.4.2 Management

A

4.4.3 Client interaction

A

4.4.4 Internal documentations

To be used as a wiki containing all the information for the employees

4.4.5 The difference between these and other internal tool

Sharepoint, otrs, office 365

impossibile sostituire certi tool come word per la creazione di documenti per la condivizione con clienti / utenti ma sì per documentazione e wiki interna

riprendere necessità dell'azienda

fare un paio di uml con le varie figure aziendali e con cosa si andranno ad interfacciare

4.5 The Atlassian Community

Choosing Jira and Confluence over other tools and implementing a brand new solution aka internally built software (reinventing the wheel) because of the large community behind these tools. Atlassian offers a dedicated blog for Q&A There are projects open in Jira online dedicated for Jira and Confluence, allowing users to open tickets and request for new features, report bugs etc. This allowed me to find information faster and

EXAMPLES OF COMPANIES THAT USE JIRA AND CONFLUENCE CANONICAL + QUELLA CHE TI HA MANDATO FABIO

Nulla facilisi. In vel sem. Morbi id urna in diam dignissim feugiat. Proin molestie tortor eu velit. Aliquam erat volutpat. Nullam ultrices, diam tempus vulputate egestas, eros pede varius leo.

Quoteauthor Lastname

5 Projet implementation

This chapter is the core of this document and describes the way that this project has been implemented according to the work plan described in Chapter 2.

It is structured in four main sections, each representing a time period:

1. Learning stage - RIVEDERE NOME
2. Implementation
3. Testing
4. Feedback

5.1 Learning stage - CAMBIARE NOME

This phase corresponds to the first two weeks of the internship. As described in the work plan in this first period the main task was to understand what the tools are. At first I have started to search information about Jira and Confluence on Google. The first tools I have started researching was Jira, and the official documentation is very well organized.

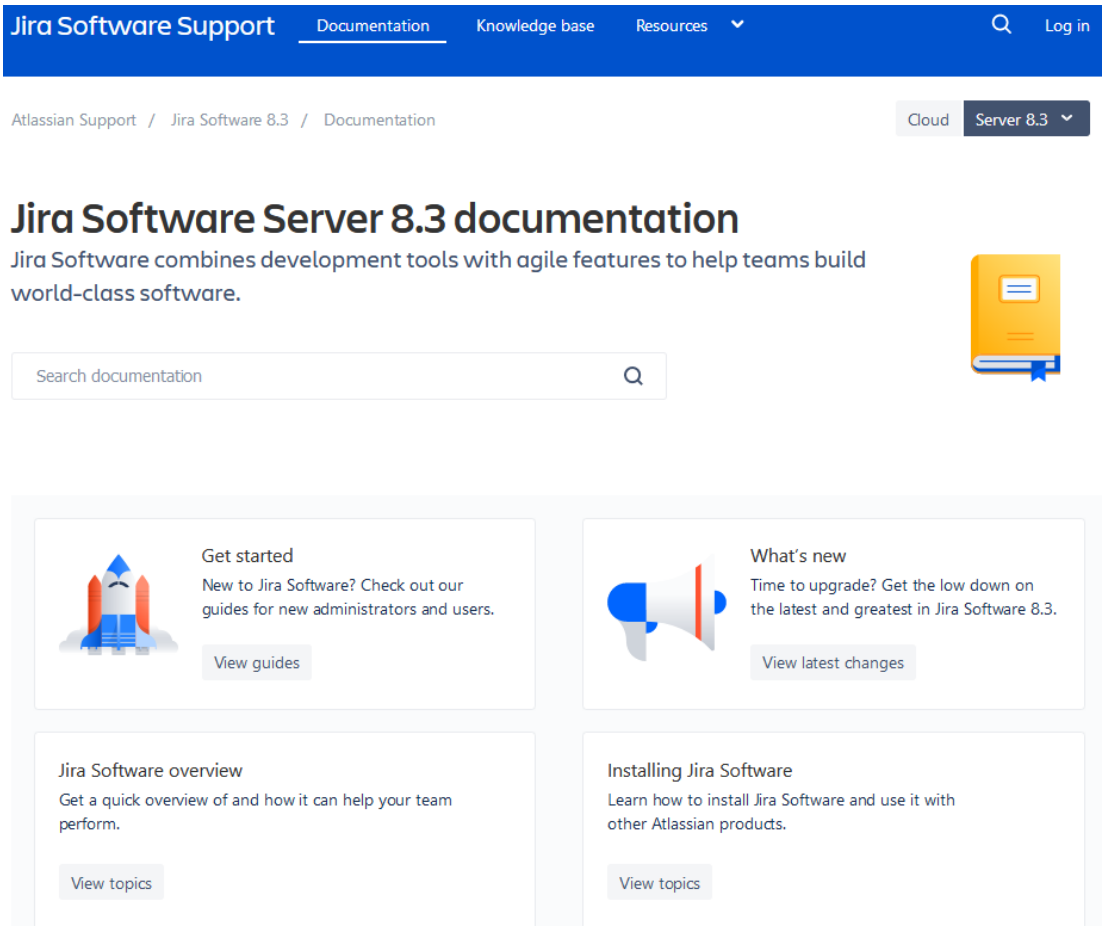


Figure 5.1: Screenshot of the Jira Documentation homepage from the Atlassian Support website

This documentation is very easy to navigate because it versioned for each release, major and minor, of the software, plus it contains links to related pages. If there is a reference about a Confluence webpage, this is added as a link. Vice versa on the Confluence documentation, if there is a Jira reference, it links to the latter's documentation. Both Jira and Confluence have a bug reporting and issue tracking section in their documentation.

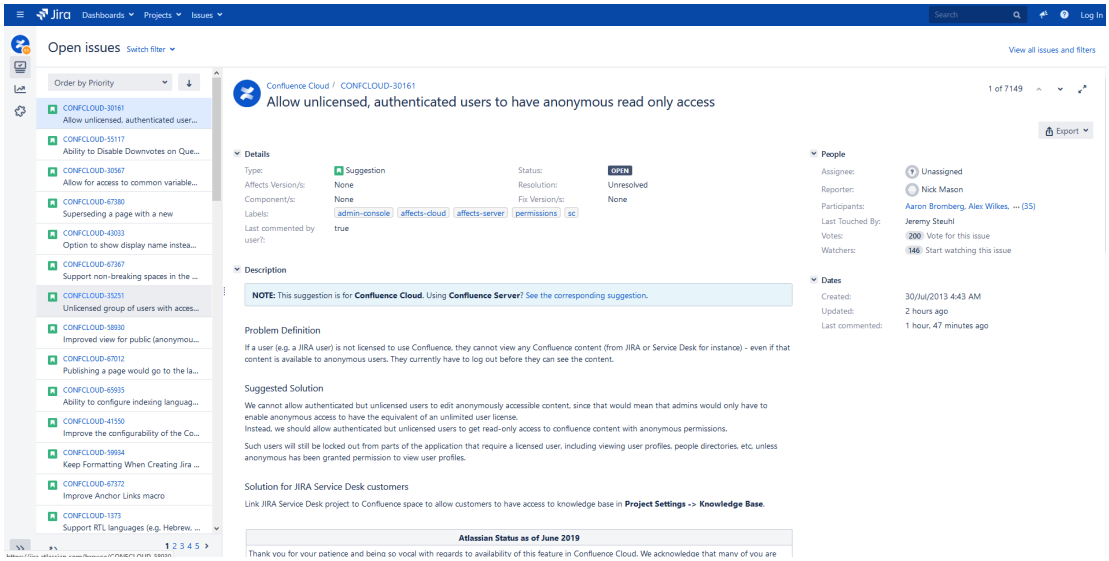


Figure 5.2: The issues related with Jira and Confluence are handled by a dedicated Jira Cloud instance

If a webpage in the documentation is related to an issue, the latter is showed at the end of the page with its status and a link to its dedicated section. The Confluence and Jira documentation are both written and hosted using Confluence, showing how powerful can be this tool for handling a wiki for such a complex software that has a large userbase. Confluence's documentation is structured like Jira's, very easy to access and consult. Another bonus is that it is public and free to consult, despite the software is not. This may seem like an obvious choice but not all vendors do it: RedHat for example let's you consult their documentation only if you log into the website.

5.2 Initial installation and configuration

During the second week, while studying the documentation I went ahead and started configuring the software.

In order to install the Atlassian tools I was given a CentOS VM with 512GB of storage and 32GB of RAM.

To connect with the remote machine, which was in a controlled testing environment, I used Remmina, a remote desktop client for Linux operating systems. This allowed me to easily connect to the machine to install software or to troubleshoot it in case of a failure.

As for the documentation phase, the first software I installed was Jira, by following the official documentation.

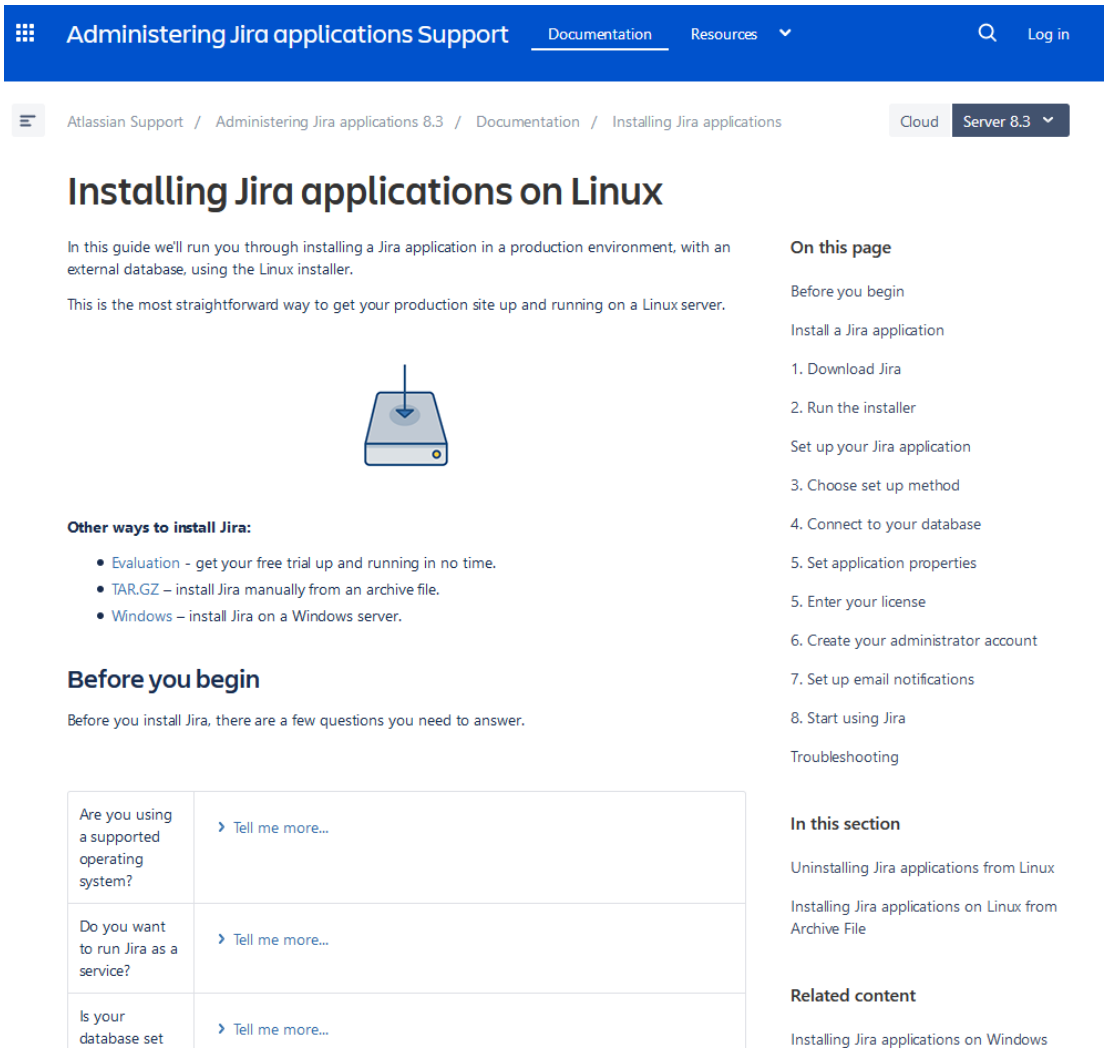


Figure 5.3: The issues related with Jira and Confluence are handled by a dedicated Jira Cloud instance

As told in ... Jira requires a database to work properly. For the first installation, which was made for testing purposes, the embedded H2 database was enough.

The first thing that I have done after the installation was getting acquainted with the interface and understanding how Jira's components interconnect with each other. To do this I have created some mock projects that I filled with issues, it is here that I understood the concept of Board in Jira. Experimenting with workflows was one of the most important things to do, because these are fundamental in an issue tracking system's configuration and are strictly connected to the concept of Board.

After understanding the fundamentals of this software and getting to know it's basic fea-

tures, I went ahead and installed Portfolio.

This plugin, as told in ... helps visualizing the issues on a roadmap, which was one of the most important requirements.

Installing Portfolio was easy, I just followed the instructions on the documentation to install the latest version of the plugin.

After installing portfolio and creating plans for my mock up projects, I have chosen to install Service Desk, to complete the configuration of the Jira instance. As earlier I have followed the documentation on Jira's website.

As described in ... this piece of software is used to communicate with the clients and having a portal from which a client can find information and request assistance with a product. The first thing I tested after installing this software was creating a portal and see from the point of view of a client how this can be able to open an issue and what type of issues he may have access to.

Not long after I have installed Confluence, and like Jira, I have used it's embedded database.

Both software run on the same system, and their services are offered on port 8080 and 8090 respectively for Jira and Confluence.

At this point I connected the software together and I tested it out by creating a knowledge base for a Service Desk project and a documentation space for a Software project.

Confluence was easier to get familiar with, so after creating some mock spaces related to the projects that were in Jira at the time, I moved on.

At this point there was a change in the requirements that were given to me by the tutor. Contrary to what he said, the IT department opted to use GitLab instead of BitBucket because the developer know it better and for their usage tier there is no billing. So it's free.

This meant that there would be a tool less that needed to be installed, but I had to understand how to link Jira's functionalities to those offered by GitLab.

Connecting these tools together means that a developer can interact with Jira's issues in a project by typing it's ID in the messages that he uses for commits, comments, merge requests and so on.

Fortunately GitLab's documentation had a dedicated page that allowed me to configure both tools.

This functionality though allows GitLab to interact with Jira's default workflows. If the licence for GitLab's hosted version is not Premium (or Silver for the online one) there is no interaction from Jira to GitLab.

There is no 1:1 project mapping from GitLab to Jira, a commit message in the repository may reference multiple Jira issues from different projects.

Later ... I will talk about installing a plugin that allows these tools to be better connected.

After understanding the potentiality of this connection I went on and set up a small demo that touched all the things that I have covered in the first two weeks of the internship. The tutor wasn't available for a few days so I took the liberty to customize the environment by changing the colors and logos in the interface, putting Athonet's.

During the meeting I have taken with the tutor, he said that he liked the work I have done and that it was time for more elaborate mock projects in order to present the tools' functionalities to other company figures.

After that I have deleted the mock projects from Jira and the related spaces in Confluence to ask the IT department for a snapshot of the VM I was working on.

This allowed me to have a milestone / baseline. A deliverable that I was able to use as a secure point in time in which I could go back if anything after went wrong.

5.3 First realistic mock projects and feedback

FASE 2 PARLARE DI DIVERSE UTENZE E SICUREZZA

————————————————

understanding what an issue is, what a project is, how a project is different than a product, understanding what a workflow is and how it applies to different projects

Installation of Service desk.

Installation of Confluence, using H2 database.

Interconnecting Jira and Confluence. Creating a first knowledge base.

first requirement change, using gitlab connecting gitlab utilizzare gitlab (con account personale su server aziendale e progettini di mock) per effettuare transizioni automatiche delle issue (spiegare correlazione tra progetti in gitlab e in jira)

customizing the user interface while waiting for a meeting with the tutor

snapshotting the machine parlare di milestone / baseline

Before installing anything thought it was necessary to correctly set up a database. This was discussed with the tutor and the IT department, which opted for the latest stable distribution of PostgreSQL.

Installing postgres wasn't written on the work plan but it was included in ...

The reason for it is because it's free and open source, besides, other members of the IT department have used it and are familiar with it.

After installing PostgreSQL I was able to make a clean installation of Jira.

5.3.1 First configuration

interconnessione tra i tool

5.3.2 Understanding the products

creazione di progetti di mock
interconnetterli
capire il workflow delle issue
utilizzare gitlab (con account personale su server aziendale e progettini di mock) per effettuare transizioni automatiche delle issue (spiegare correlazione tra progetti in gitlab e in jira)

5.3.3 Requirements change

non usare bitbucket ma gitlab
visto il grosso ammontare di elementi customizzabili è stato necessario scremare le cose e capire cosa si poteva facilmente aggiungere e cosa lasciare per dopo
abbellimento dell'environment

5.3.4 Customizing the user interface

a causa della poca disponibilità in questo primo periodo di marco e paolo che utilizzeranno questo tool in maniera intensiva rispetto al tutor, ho fatto un task secondario come quello della personalizzazione dell'interfaccia grafica

5.3.5 snapshot della macchina per salvare il lavoro svolto per ora

parlare di milestone / baseline
come le ho pensate nel piano di lavoro

5.4 First realistic mock projects and feedback

This phase corresponds to ... in the work plan

5.4.1 The projects

idee del tutor
prime demo con lui per capire se questo tool effettivamente copre le necessità di base dell'azienda

5.4.2 Integrating with GitLab

in questo periodo vista la scarista di opzioni di gitla nativo si è scelto di usare un plugin
(decontestualizzare il tempo, a posteriori, ragionando per milestone)
visto integrazione nativa
scelta di utilizzare un plugin
costa ma è migliore (descrivere da quale punto di vista)

5.4.3 First meetings to present the progress

primo feedback e discussioni di come può evolvere il progetto e come può essere applicato ai loro workflow
riflessioni personali: a questo punto sto rispettando il piano di lavoro iniziale? sono in ritardo / anticipo?

5.4.4 New requirements change

giustificare –> dopo fase di studio / riscontro
cosa può essere implementato subito, cosa no, come viene usato
campi e workflow custom
mapping tra processi jira e interni (sprint)

5.4.5 Documentation

scrittura della bozza di documentazione e passaggio della documentazione in confluence

5.4.6 New snapshot of the machine

nuova baseline / milestone

5.5 Transitioning to production

This phase corresponds to ... in the work plan

After the approval for using the tools by other departments (R&D) it's time to transition it / move it to production

5.5.1 Migrating data from Redmine

tool automatico di migrazione collegamento con redmine, lo fa in maniera automatica e se va male? c'è sempre lo snapshot

5.5.2 First non mock projects

5.5.3 Fine tuning of the final product

interazione con le persone in base alle necessità degli utenti e di come lo usano faccio minime modifiche in produzione miglioramento della documentazione

5.5.4 How are these tools being used

è veramente agile? è un dialetto? è un misto? perchè athonet lo sta usando in questo modo?

5.6 Final feedback and what else could be implemented in the future

This phase corresponds to ... in the work plan

5.6.1 Final feedback from the users

feedback da parte del tutor

feedback da responsabile strategia aziendale (gl) feedback da responsabile del prodotto (aka product ownner / hesham) feedback da responsabile sviluppo + testing

feedback da parte di tutti gli utenti

5.6.2 What Athonet plans to do with these new tools

arrivare ad utilizzare agile in maniera rigida? continuare a fare misto?

6 Conclusions

6.1 Improvement and future implementations

Now that all the work has been explained, let's see how it turned out and what can be done to improve it in the future

6.2 Final Gantt diagram

come si discosta da quello iniziale
cosa ha causato questo discostamento
ho pianificato male

6.3 Objectives achievement

6.4 What I have learned

principalmente il way of working aziendale
come funzionano questi tool
il loro scopo di "ordinare" un'azienda

6.5 Personal considerations

in un'azienda in crescita è molto utile darsi dei paletti
in athonet funzionerà una cosa del genere? software monolitico / complesso (service oriented architecture)
sta funzionando questo tool adesso per il breve tempo che l'ho visto io in produzione? valore aggiunto all'azienda, cosa vede il cliente

A

Appendix A: Piano di lavoro

Aggiungere schermate del piano di lavoro

B

Appendix B: The Agile manifesto

References