

FACULTY OF ENGINEERING OF THE UNIVERSITY OF PORTO



FEUP

Web-based Bug Tracking Solutions
Applied to Business

Project's Paper

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Project Report within the
Master in Informatics and Computing Engineering

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Summary

This document features the developments carried out during the whole of the final academic internship from the Faculty of Engineering of the University of Porto at Wipro Retail, the retailing Division of Wipro Technologies.

The aim of this project was to provide a more user friendly, reliable and scalable solution with focus on performance, accessibility and costs for error management to the Wipro Retail's Testing Services Team and use it as pilot-run on the implementation of an Oracle Retail System module, the Warehouse Management System, at Vetura, a French wholesale textile company.

This document provides detailed information about the methods and main decisions, especially referring to requirement analysis, solutions available, comparison and technologies used.

Assertive information about this project results and predictive evolution are all also enclosed in this document.

The initial requirements and objectives have been fully accomplished, being the system currently used on a production environment by the Testing Services Team, enabling them to provide a better service for their clients, as well as for all the Team Members working on-site.

The internship has also granted an excellent opportunity to initiate a closer contact with the business world, especially in such a complex and multi-faced area as retail is. Undoubtedly, replacing the university atmosphere with the everyday working environment, along with the gratification and stress of constantly facing new challenges. It was a hard, demanding experience. The process has indeed meant a fulfilment, not only on technical and business levels, but also on the level of professional relationships.

Abstract

This document features the developments carried out during the whole of the final academic internship from the Faculty of Engineering of the University of Porto at Wipro Retail, the retailing Division of Wipro Technologies.

Quality Assurance (QA) ensures the software product is completed based on the previously agreed specifications, standards and functionality, without defects or future problems. With software testing being a discipline from QA, it furnishes a criticism or comparison, comparing the state and behaviour of the product against a specification.

One of the phases of software testing consists in test reporting, describing if the various results of the testing effort were analysed and communicated. This is used to determine the current status of project testing, as well as the overall level of quality of the application or system.

The testing effort produces a great deal of information. From this information we will extract metrics, which will define, measure and track quality goals for the project. These quality metrics then need to be passed on to whatever communication mechanism is used for the rest of the project metrics.

The aim of this project was also that of providing a more user-friendly, reliable and scalable address of the testing information management with focus on performance, accessibility and costs for error management to the Wipro Retail's Testing Services Team, as well as using it as pilot-run on the implementation of an Oracle Retail System module, the Warehouse Management System, at Vetura, a French wholesale textile company.

We started out by surveying the existing open-source bug-tracking solutions and downing them to two possibilities, Mantis and BugZilla. Due to its large complexity, Perl as language scripting and costing installation set-up of BugZilla, we decided Mantis would be the platform suffering the implementations.

Mantis is a web-based open-source bug tracking system, written in PHP, serving the most common databases. Because of its simplicity on customizations, speed and an always-evolving enthusiastic community, detecting bugs and adding patches constantly, this was an unmatched solution.

Enabler Mantis, the customized version of Mantis for Wipro Retail, needed to be adapted to the companies process and therefore requirements were set in order to have a fully operational solution at the end.

The main requirements had to do with the integration necessity of the bug tracker with the Test Management File, an MS Excel file keeping important statistical data from the Test Plan. This web-based tracker suffered deep customizations on the reporting system, bug work flow, issue numeration, refinements on the user access level, let alone much more work in other minor areas.

Furthermore, additional requirements have been added, following the Iterative Software Development, such as adapting the Portuguese localisation, bug notes integration, flexible issue dates, exporting preferences and a more performant bug export on Comma-Separated Values (CSV).

The pilot-run took place with VetLog's project, on the implementation of Oracle Warehouse Management System, an Oracle Retail integrated module, at which I have been a Testing Team member and Enabler Mantis administrator.

The main goal of the system, main requirements and additional ones were fully achieved, being the system currently used on production environment by the Testing Services Team, working both inside the network or abroad.

VetLog's management decided to allow Vutura's collaborator to use Enabler Mantis on the User Acceptance Tests, which took place in Paris, thus broadening the possibilities of this project to be used across Wipro Retail Tests Vertical's upcoming and ongoing projects.

The results of this project will provide Test Team vertical with a centralized, coherent and easy-accessible information repository including all developments made along the Test Phases.

Apart from this, once it is based on Mantis open-source philosophy, this system can at any time be integrated in another information system easing up the information sharing along all companies structure.

The internship and the actual development of the project have granted a vital opportunity to set off towards a closer contact with the business world, especially in such a complex and multifaceted area as retail is. It was most rewarding to actually understand that a large, complex information system can be put at the service of small retailers, aiding them in their daily business and entrepreneurial management, due to its high adaptability.

Finally, and in technical terms, the project has allowed me to deepen my technical skills on PHP scripting language, MySQL and LAMP administration and ERP deal with business.

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Ao meu Pai, Mãe, Irmã, Avós e àqueles que acreditam.

July, 2008,
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Acronyms

OWMS/WMS	Oracle Warehouse Management System
ORS	Oracle Retail System
KPI	Key Performance Indicators
PO	Purchase Order
SO	Stock Order
MS	Microsoft

1 Introduction

The retailing industry is supported by a billion-dollar multinational conglomerates, sometimes with a revenue higher than the GDP of some countries, setting huge supply distribution chains, inventory management systems, financing pacts and wide scale of marketing plans.

An effective supply chain is the key for having the right product in the right place at the right time, unbalancing the different retailers, maximizing service levels and in-stock positions while minimizing inventory and operational costs is complicated by the lack of timely information and flexible execution systems necessary for adapting the rapidly changing business conditions. This is the very point at which Wipro Retail comes in.

1.1 The Company

Knowledge, innovation and pragmatism are the key words that best describe Enabler*.

It was created in 1997 by António Murta. At that time, Enabler activities essentially consisted of constructing and implementing systems composed by a number of best of breed solutions that were customised and integrated, using the most modern technologies of systems of integration and project management.

The company's target were the medium and large retailers and deliverers at a worldwide level, with sales superior to 1,000 million Euros. They basically carried out all the necessary work of the system architecture of a retailer: Retail ERP, Data Warehousing and Business Intelligence, e-Business and Enterprise Application Integration. Retailer companies were now able to optimize the process of systems information, thus converting complex infrastructures into support tools for the business.

Enabler's portfolio includes projects for Tesco and Nisa Today's (United Kingdom), AVA and Esprit (Germany), Continent Model (Portugal), Despar (Italy), Renner (Brazil), Galleries Lafayette, Vetura and Eram (France), Sabeco (Spain), Fortress (Hong Kong), Dubai Duty Free (Dubai), Ahold, Super value and Albertsons (EUA).

More recently, Enabler Wipro or Wipro Enabler, has signed a multi-million business with Morison which is the fourth largest chain of supermarkets in the United Kingdom's with a revenue of £12,462 million on 2007.

1st of July 2008, set up a milestone at Enabler and Wipro's history, with the loss of an important part of Enabler's identity by finally changing its name to Wipro Retail (A division of

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Wipro Technologies) as one last step of the US \$53.3m acquisition by Wipro Technologies, which represented one more commitment to the Retail sector, a staff vertical with more than 4000 people, reinforcing their competitive advantage, in Europe, America and APAC (Asia & Pacific).

With more than 90.000 employees, 300 customers, 50 of them on Fortune, 500, over \$5 billion US in revenue, Wipro Tech is leading IT services in India.

As a way of making a statement on the competitive and aggressive IT business, Wipro was the World's first CMMi Level 5 certified software services company and the first outside USA to receive the IEEE Software Process Award and is now a global service provider, delivering technology driven business solutions that meet the strategic objectives of its clients.

*Before July 1st, Enabler's name became Wipro Retail. For easier understanding I will use Wipro Retail whenever mentioning the company.

1.1.1 Personnel Management

As far as I am concerned, Personnel Management constitutes an interesting topic, so I will now present some of Wipro's Retail policies.

Wipro Retail withholds a strong Human Resources policy. Recruitment is highly regarded and only in this first semester of 2008 the company has taken in more than 20 trainees from recognized Portuguese Universities, especially from the Faculty of Engineering of University of Porto (FEUP) and University of Minho (UM).

Career support is provided by specialized Human Resources personnel, focused on getting the highest performance possible from each individual and from all the organization. An ongoing, twice per year appraisal method reviews their collaborator's last year's "Goals and Objectives", assessing their performance and providing feedback accordingly.

Apart from this individual appraisal, a collective one is raised, based on all Wipro's Retail last year's performance.

Managers and personnel on higher bands have ad-hoc reviews, through which they assess their team's performance and provide them with the necessary feedback.

TED, a talent engagement and development application, available across Wipro Corporate records all this info.

As most of Wipro Retail's collaborators are on constant movement, either on client-site or in "development factories" compensations are given accordingly, namely daily allowances, telecommunications and portable computers.

All travelling expenses, such as lodging, food and flights are addressed by in-house personnel, especially assigned to this matters.

1.2 Project

Firstly, the project scope comprised the selection and customization of a suitable bug tracking system according to the Testing Team Services methodology and its customization and user acceptance tests.

The tool was meant to be used as a pilot run for the at Wipro Retail's VetLog project, an implementations of one integrated module of Oracle System, the Warehouse Management

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System. The solution would be used to store all the testing development and create upon request, those reports.

1.2.1 Motivation

The retailing business, the company's position as an IT giant and, also important, the inherent workload and responsibility of working on a top consultant company was a deep motivation during all this enterprise.

1.2.2 Open Source

I am a big open source enthusiast. I first started enjoying the GPL with Open Office, and currently most of my software applications in use are open source.

From advanced text editors, PHP as favourite scripting language, FireFox as browser, Copernic as my internal search engine, GIMP as image editor, and so forth.

I rely firstly on Open source projects whenever I need a new piece of software, acknowledging the fact that it is possible for me to customise the source code in order to meet any of my requirements whenever needed.

- From my point of view, the Open source concept allows some synergistic effects:
- Low initial cost: Open source software can generally be acquired free of charge;
- Easier international collaborative work;
- Easier evolution and customization of software;
- Feedback from users (having access to sources), e.g. bug fixes;
- Reliability and sociability: Problems found and repaired quickly;

Honestly, I was surprised to find out that most of my time at Wipro Retail would be programming in PHP over Mantis an open source project.

1.2.3 The company

The final academic internship, which basically represents the the first or the most important contact with the job market, is definitely an important step on our professional and personal career, which we should plan accordingly.

Wipro Tech, with its powerful workforce presence in the world's IT industry has captivated me. It has allowed me to get in contact with a mature organization, with very well defined structures and matured processes, while experiencing tighter restrictive policies in very different areas.

Furthermore, as one of the top consultant companies on the retail world, Wipro Retail fostered my personal and professional growth, through their result oriented philosophy, their constant responsibility demand and their multi million euro projects management experience.

The company clients and projects size, supported by a large team and powerful infrastructure, were definitely a paramount.

1.3 Context

The Testing Services Team at Wipro Retail is using the legacy tool PVCS Tracker, which is, by default, a client-based copyrighted tool. Due to the constant mobility of Wipro Retail's personnel, the only available way of accessing the error management information was via its web module with limited features.

A new solution was required, permitting quick, easy accessible, reliable to manage the testing developments and periodic reports, for internal and external use. Furthermore, the solution needed to adapt the existing standards of the Testing Services Team and Quality regulations existing in the house.

1.4 Objectives

Given this context several objectives and goals had already been covered over the first introductory meeting. Even if the starting date of the pilot run was unknown, the requirements and obligations of the error management tool were very clear:

- Getting a clear view of the project's scope, its aims and aspirations;
- Analysing the existing possibilities solutions for bug tracking management and their fitness to the early given necessities;
- After selecting, providing a comparative analysis between that proponent solution and the current legacy system and documenting it;
- Examining the matching possibilities of the selected tool, targeting the most prominent customizations to be made according to the previous requirements analysis and subsequently based on the system's capability;
- Hands on in the development of the functionalities and customizations required;
- Training and tests to the system according to its necessity following another cycle of development;
- Final load/ volume/ performance/ scalability/ accessibility tests;
- Stabilization;
- Pilot run for Wipro Retail Vature's WMS team (development/testing/management) and Vature's personnel. I have assumed all the responsibilities as a tester and administrator of the bug tracking tool during this process;
- Final evaluation of all WMS Testing stage by the Testing Team leader, reporting to Testing Services Responsible;
- Accordingly to its success, the possibility of transversed use of the project on all Wipro's Retail domain.

1.5 Development Process

Multiple developments took place, especially concerning the constant new requirements from the Testing Team members, making the life cycle a "multi-waterfall" cycle. Each iteration passes through the requirements, design, implementation and testing phases.

The first working version of Enabler Mantis was produced in the first iteration featuring the main functionalities, so it had a working platform since the first iteration.

This way of developing software has advantages, as it produces working software earlier and quicker, it is more flexible, easier to test and debug and each iteration is easier to manage. The problems over this methodology are the rigidity of their iterations (they do not overlap over each other) and not all requirements are gathered beforehand which may lead to architectural problems.

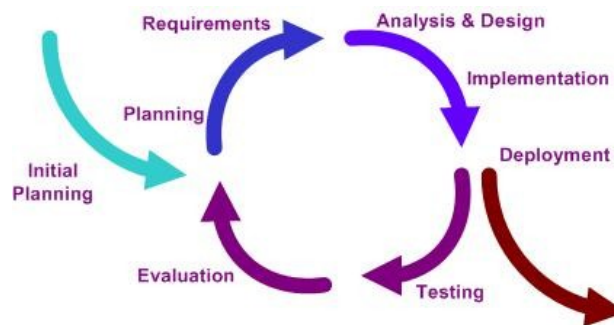


Illustration 1.1: Iterative Development Process

1.6 The Client

Vetura Group (Fabio Lucci – Tati – Tony Boy), is one of the pioneers of the “non food hard-discount” retail industry in France, with a turnover exceeding €350 million. With over 1500 employees, the group is present in France and Portugal and will soon be opening in Spain, to give it in an excess of 130 owned stores.

In June 2003, one of the major players in the clothing and shoe industry, the ERAM Group, joined Vetura in order to expand the business and their market offer. This was part of Vetura’s strategic development using both organic or non organic growth. One of the best examples is Vetura’s acquisition of TATI, in August 2004.

The total group revenues represent some €2 Billion.

In September 2005, Vetura selected Enabler to perform an analysis of its IT systems and to start a “fit & gap analysis” with regard to the Oracle Retail solution. As a result of this gap analysis they confirmed at the end of 2005 that they had selected both the Oracle Retail Solution and, at the time, Enabler.

1.6.1 History

The major goal of Vetware’s project is to provide Vetura with an integrated system which should be able to meet the company’s following objectives:

- Maintain growth by the adoption of the world’s best retail practices
- Increase its capacity to “push” sales and internal process
- Keep the pace with its future organic and non organic growth

The scope includes the end to end commercial process (buying, trading, inventory, distribution and sales audit) with the complete change of the internal legacy system running under AS400. The RMS, RTM, Allocations, ReSA and RIB modules are part of this first project, which was kicked off in January 2006.

Introduction

After the first project named “Mission de Définition des Systèmes d’Information ERAM pour la Distribution” (Mission to define ERAM’s IS for Retail), held in the 1st semester of 2007, ERAM has approved the 1st phase of the ORPAS implementation.

Some months after this project kick off after the WMS CRP took place, Vutura signed off the second phase of the VetLog project – the ORWMS implementation. This has been a difficult sales process but we beat Oracle at the “final stage”.

1.7 Structure

This document comprises seven chapters.

The first introduces the hosting institution where the internship took place, project's context and objectives and gives an overview about the institution client and its history.

On the second, insights are given about the state-of-the-art of the technologies and software used.

The next two, explain the main developments accomplished in non technical explanations.

Before the annexes containing the produced documentation supporting the project a big focus is given to the achieved results and conclusions.

2 State of the Art

2.1 Web Tracking Solutions

Development budgets are always sparse these days but it is not an excuse to skimp on bug tracking.

To keep track of the reported software bugs you can use a bug tracking system which is extremely valuable on software development, and they are used extensively by companies developing software products, recording all sort of facts about known bugs, including reporting time, severity, who reported it, etc.

Common systems have the capability to adapt to the company's bug life cycle and allow the administrators to configure permissions, notifications, and how a bug can be moved to, as well as many other parameters.

In a corporate environment, a bug tracking system may be used to generate reports on the productivity of programmers at fixing bugs. However, this might sometimes yield to inaccurate results because of different bugs complexity.

At Wipro Retail, after systems specifications, the solution had to be free, open source and easily customizable.

According to this, there are several well designed, mature, free open source tools which can help the company debugging on an organized and easy to access manner. On top of all options, there is Bugzilla and Mantis systems, which were those most deeply analysed.

2.1.1 PVCS Tracker

The error management tool currently in use at Wipro Retail is the PVCS Tracker, a product from Merant's software, which constitutes an essential part of the PVCS Professional Suite for configuration management. It is, therefore, a copyrighted software, updating itself, which involves purchasing a new license.

Being a fat client is highly flexible and scalable, providing team cooperation and multi platform integration. It does much of its process in the machine, passing only data for communication to the server.

2.1.2 Mantis

Almost any browser can run the light weighted Mantis, a free popular web-based bug tracking system, written in PHP scripting language and working with MySQL, MS SQL, and PostgreSQL databases and any of following servers: Windows, Linux, Mac OS, OS/2, and, possibly, others. The highlights on this system are extremely easy to deploy and customise, apart from its simple and clean interfaces. Furthermore, it fully supports multiple projects and email notifications and it is localized for 68 languages. It has an impressive feature list, including built-in graphic reports, wiki integration and SOAP web services connection. Being a free open source solution it gathers a constant growing community devoted on supporting Mantis helping it to reach its current mature state. Mantis is currently under General Public License, GPL. By the time of this writing Mantis the last stable version of Mantis is 1.1.2 and the development version 1.2.0a1.

2.1.3 Others

No other existing web based bug tracking solutions met the initial requirements or had the development potential, provided by the BugZilla or Mantis projects. This made it unnecessary for me to further investigate deeper bug tracking solutions.

2.1.4 Technologies

PHP over LAMP are the technologies in more for the Mantis platform customizations therefore I will write present them in short the following sections.

2.1.4.1 PHP

In the early days, PHP stood for "Personal Home Page" supporting the display of Rasmus Lerdorf's CV and recording his page web traffic.

This was in 1995 and PHP was only at a very green stage by then. Now PHP, or "Hypertext Preprocessed", is a widely used open source general-purpose scripting language, represented over 20 million websites and 1 million web servers.

This language runs on most web servers and on almost every operating system which takes the PHP code as an input and creates dynamically generated web pages as output. All this quickly and free.

PHP Group serves as a *de facto standard* for PHP leaving their project under the PHP License, which is considered by the Free Software Foundation as free software.

Beginners feel comfortable working on this language which offers many other advanced features for a professional programmer, whose syntax is drawn upon C, Java and Perl, enable even Object Oriented programing.

PHP most recent version is 5.2.6 released on May 1, 2008 being supported by Zend Framework.

```
<html>  
<head>  
<title>Example</title>  
</head>  
<body>  
  
<?php  
    echo "Hello, Mars!";  
&nbsp; ?>  
  
&nbsp; &nbsp; &nbsp;    </body>  
</html>
```

Illustration 2.1: PHP code Example

2.1.4.2 LAMP / XAMPP

Becoming popular from 1990 the IT jargon LAMP refers to a three stack of different software which represent its acronym:

- Linux, as operating system
- Apache, the nowadays standard Web server
- MySQL, a very popular database management system
- PHP, or any other two scripting languages: Perl or Python.

This combination gets most of its popularity from being free, open source and largely distributed.

For development purposes, an easy-to-to install software distribution containing MySQL, PHP and Perl which is available for Linux and Windows, was used.

2.2 Quality Management

In order to make the reader understand the covered subject, a composition with some theories foundation will be presented next. The motivation for the existence of software tests and other types of tests will be analysed.

We can define these tests as an activity. It aims at verifying if the constructed software is in accordance with its specifications and if it satisfies the expectations of the client or the system's user. Without them, the right software functioning would rarely be reached.

It is extremely important the beginning of tests processes in an initial phase of the project development, It will allow possible errors to be detected as soon as possible. Minimizing the costs of its correction as well as the existence of them. One on top of the other.

2.2.1 Software Issues

Ideally, these tests would not be necessary, taken the developed software built as a form to prevent errors. However, a list of factors will not allow such to occur. Some of these factors will be presented next.

The lack of participant elements of communication between various reasons of the project, about a clear specification of what the application must or must not do .

The complexity of the current applications leads to an increasing difficulty to understand the project as a whole.

The delivery time of a developing software is hard to calculate in a very competitive universe, with deadlines with a tendency to diminish. This takes pressures to carry through deliveries, which normally takes to negligence and errors.

A frequent complication consists in the alteration of requirements for the project throughout. Improper use of codes, redesign and the creation of new goals for the project are among some of the problems generated by alterations of the requirements cut by half in a project.

Programming errors on the part of the programmers, which after all, are inclined to errors as any human being.

State of the Art

Developing environments, libraries, compilers, among several other tools used for the development can lead them to make errors, spreading them to the created software.

The lack of the good communication, or its confusing writing, may lead to a lack of understanding.

2.2.2 Test Phases

Enabler is not as mature a company as Wipro. Even so, in 2002 it achieved an ISO 9001:2000 certification on their quality development processes and, after the implementation of quality management system, an ISO 9001:2000 certification.

To assure a correct testing several planned testing phases should take place.

They start by the test request validation by the Test Pool leader, taking into account information such as activities, results, resources and workload.

On every change to the initial proposal should be renegotiated.

The test preparation takes place, using the given documents, by the Test Manager and at least one of the following documents needs to be prepared: the Short Test Definition, for smaller projects with a workload of less than 20 days, and the the Test Definition, for bigger projects.

These documents help to define the general objectives of the project as well as how to achieve them, and are prepared using the respective templates.

Result Product \ Activity	Scope Preparation	Test Design	Test Coordination
Test Definition	X		
Test Plan	X	X	
Detail Tests Scenarios		X	
Test Management		X	X

Table 2.1: Influence of the given documents to the Test Preparation

	Severity Level	Criteria	Impact on Project
1	Critical	Doesn't work; Avoid normal use; Originate critical errors.	Product cannot be released / promoted to Production (Take-off)
2	Severe	Doesn't perform as required; Doesn't avoid use, but has impacts on processes.	Project cannot be closed, but product can be released.
3	Annoyance	Doesn't affect normal use, but has to be solved.	Doesn't have any impact on Project Take-off.
4	Improvement	New request. Interface improvement.	Option: Evolutive maintenance, next release.

Table 2.2: KPI's explanatory table

State of the Art

The criteria for Test Success are based on Key Performance Indicators (KPI) metrics, are the following, by default:

- KPI1 = 0 (No critical “Level 1” issues);
- KPI2 = 0 (No serious “Level 2” issues);
- KPI4 = 100% (All critical tests “Critical Level 1” carried out successfully);
- KPI7 > 90% (More than 90% of non-critical tests “Critical Level 2 or 3” carried out successfully).

Normally, Test Management is necessary, where a big visibility is given to the “Test Management File”, a Excel file, whose first sheet, the “Issues Management” is directly fed by the bug tracker currently in use. The other sheets represent the “Plan carried out”, “Daily Balance”, “KPI's by Process”, etc

A test plan is created containing information on how to carry out the test and identifies numerically each of the test.

The way in which issues/improvements are registered must be defined for each project. Normally, they are done on PVCS Tracker of, directly into, the Excel Template (the Test Management File)

After checking the environment accuracy the tests are carried out by the Tester, guided by the given documentation as Test Plans, Functional/Tecnical Requirements Documentation, always reporting to the Test Manager.

Whenever is necessary to register an issue, it should be done in a appropriate manner, using the selected method above, always given the maximum amount of information in order to assist the development team in charge of the correction. The Test Manager should update the Test Management file from the bug-tracker as a part of his responsibility.

Retesting is done to ensure the success of the corrections and that they did not had impacts on other areas of the application. On the case of a successful retest the issue is closed.

The Test Manager whenever necessary should keep all testing developments registered on the several sheets of Test Management File, manage the people involved in the tests and keep all parties in the project up-to-date with the testing progress.

2.2.3 Types of Testing

During the testing phases several types of tests are performed, with especially focus on the non-unitary ones.

The next section will give an overview about the types of test carried out on Wipro Retail projects.

2.2.3.1 Unitary

Unitary are the 'most' micro scale of testing such a fact takes that the unitary tests are only efficient when used in combination with other types of tests.

Unitary tests verify portions of codes to validate its good functioning and are typically done by the programmer and not by testers, as it requires detailed knowledge of the internal programme design and code. Ideally, the unitary tests would test the functioning of all functions

and methods, with all possible inputs. That way, some individual parts of the programmes could have a liability product warranty and robustness. However, this is not possible, due to the impossibility of such methodology in a real context, being less exhausting to carry through these tests. Thus, the unitary tests can discard the presence of errors, but they cannot assure that they do not exist.

2.2.3.2 Integration

Integration tests follow the unitary tests when testing the functioning of groups of software modules. The modules, previously checked by the unitary tests, are grouped in components for the system. The interactions between some modules are tested, as well as their answers for the use of partitioned resources. This way, the level of functioning is verified, performance and robustness of some components of the system, without caring on how these factors are taken care of.

2.2.3.3 Functional

The functional tests verify the complete answers to the described functionality in specification for the product to be created. Joining some tested components to the integration tests, as well as integrating them in the appropriate hardware, it is looked to detect inconsistencies with the project requirements. The functioning of various components is not observed, being only evaluated the answers of the system as a whole.

The functioning tests occur when the system is complete, being the last analysis done before the delivery to the client and tests acceptance.

2.2.3.4 Regression

Re-testing after fixes or modifications of the software or its environment;

It can be difficult to determine how much re-testing is needed, especially near the end of the development cycle;

Automated testing tools can be especially useful for this type of testing.

Regression test is a type of test that tries to find elements that do not function correctly due to alterations on the program. Software alterations might occur from various sources, from a solution of a detected problem until an extra inclusion of new functions, passing, even for the adaptation of an application on the creation of a new version. Such alterations frequently cause reappearance problems previously dealt with or even new, never-before found situations.

Common regression tests consist in the repetition of executed tests, where the detected problems have already been detected and resolved, whenever alterations will be added to the software.

2.2.3.5 Load and performance

The performance and load tests try to analyse the answers of the system when it is subjected to a raised volume or work. Such analysis may give some answers about the system. These can also be multiple, so as to verify if the system answers according to the specified standards of performance, to compare the performance between two systems, or even to detect which part of the system is harming its performance. It is therefore common to include in functional system testing.

2.2.3.6 Acceptance

Acceptance tests normally have a place in the development environment, that is , they are usually carried through in a place where the software is foreseen to be worked on its replica. They try to discover some imperfections to correct the form to create an installation on the developed software. They also verify if the functionalities offered by the developed software answer to the necessities and objectives of the clients.

In these types of tests, the system is tested with data supplied by the final user. The acceptance tests reveal errors and omissions in the definition of the requirements, because the use of real data system is exercised in a variety of forms.

A software installation, although apparently simple, may raise serious problems, as in the case of distributed systems, in systems of elevated availability or those already active, with all the inherent synchronization questions . The possibility to regain its previous installation state just in case it encounters problems might be necessary.

2.3 Enterprise Resource Planning

The roots of ERP lie in Material Requirements Planning (MRP), which evolved into Manufacturing Resources Planning (MRPII). Demand for increased functionality led to the current avatar ERP.

Enterprise resource planning (ERP) is a term used to describe a software system providing multiple application modules to run a business in the areas of Financial Management, Logistics, Manufacturing, Human Resources and extended supply chain operations.

The term Enterprise Resource Management came from the concept that inventory, time, and people are all the resources of the company and an integrated software solution should be a tool to manage their resources provide increased flexibility, modularity, understandability, connectivity and different business models and simulation.

The primary providers of ERP Software are SAP, Oracle, Microsoft, Infor, QAD, and Epicor, while hundreds of smaller strive to conquer market share.

Companies have to clearly know what enterprise resource they are planning, before thinking of implementing them. Their focus is on speed, the faster it is implemented the quicker and better are the advantages and delivery in terms of results.

Formerly Business process re-engineering played a vital role with respect to implementation as a way of closing gaps between the companies methodologies and ERP. Nowadays, tuning ERP as per the whims and fancies of the practices followed in the company became a routine affair, sometimes slogging and dragging beyond them to the time limits permitted.

State of the Art

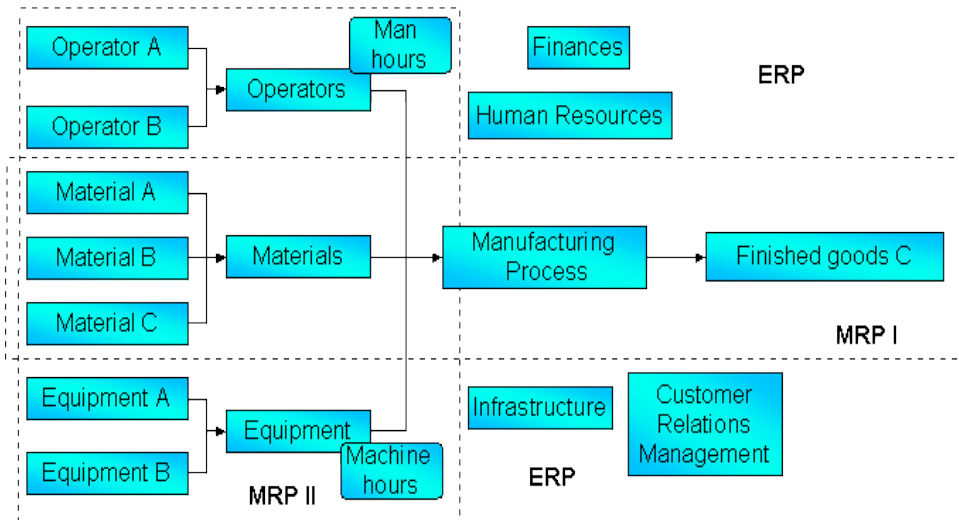


Illustration 2.2: ERP's evolution

Wipro Retail, as we know, plays a major role in straightening the relations between what companies needed and what ERPs can provide.

The project on which Enabler Mantis had its pilot based on the implementations over Oracle Retail Warehouse Management which I will introduce here.

2.3.1 Introduction

The module Oracle Warehouse Management System (OWMS) is a part of the Oracle Retail Supply Chain Planning and Execution which is a part of Oracle Retail, the ERP Enabler (and now a part of Wipro Retail division) always focused their retailing solutions.

In a nut shell, Oracle Retail Supply Chain Planning and Execution, is focused on deliver, replenishment planning, replenishment optimization, and collaborative inventory management capabilities to retailers.

OWMS provides all the necessary tools for efficiently managing and controlling a complex distribution center. Leveraging a process based application framework, Oracle Retail Warehouse Management provides the functional flexibility and timely, accurate information you need for consistently managing and improving distribution operations. The results are improved service levels, reduced inventory and lead-times, increased productivity, and reduced labor costs.

Further enhancing the advanced functionality of Oracle Retail Warehouse Management are the labor management and operations management features.

2.3.2 Key Features

OWMS provides management with an insight on distribution trends, costs, and performance, by using warehouse metrics captured and reported labor management. Puts timely information into the hands of warehouse operators, with powerful labor reporting that combines user defined labors specifications and standards for all warehouse activities.

State of the Art

Its main functionalities are the following:

- Trailer/yard management. Provides visibility into merchandise within trailers at the distribution center, allowing the user to prioritize hot purchase orders and merchandise.
- Inbound shipping scheduling. Provides advanced visibility into inbound shipments, resource and facility planning, and SKU and quantity data, for up to the minute previous receipt allocations for efficient flow—thus, eliminating distribution conflicts.
- Receiving and redistribution with inbound processing. Supports the ability to receive inbound receipt information with allocation and value-added service information to improve merchandise movement.
- Cross-docking, flow-through, and stock. Reduces handling and replenishment lead-times, both previous and post receipt allocated flow-through, providing visibility into cross-docked and stock merchandise.
- Full advance shipment notification functionality. Provides the ability to receive advance shipment notification to ensure accuracy and improve receiving efficiencies.
- Inventory control. Manages merchandise in the distribution center via module-containing system and radio-frequency screens for general inventory functions, directed put-away, and movement of inventory, inventory adjustments, returns processing, and cycle counting.
- SKU maintenance, management, and profiling. Provides the ability to manage the movement and slotting of items to ensure proper placement and pick face utilization.
- Value-added services. Provides user-defined, value-added service functionality, including the automatic routing of service merchandise, paperless tracking of activity and costs, and definition of radio-frequency task queue for visibility and management.
- Distribution and resource planning. Provides prioritization and management of operator work flow.
- Task management. Promotes a dramatic increase in labor efficiency by controlling the delegation of work to individuals in a real-time, interactive manner.
- Shipping and EDI manifesting. Provides visibility and direction for the loading and shipping of trailers via fluid and staged loading, for conveyable and non-conveyable items.

2.3.3 Benefits

- Increased productivity. Standardization, measurement, and reporting on operations performance decrease labor overlap and increase productivity.
- Reduced labor costs. Better resource planning, along with increased productivity, decreases labor costs.
- Improved space utilization. Optimizing physical space usage, reduces distribution center operating constraints.
- Reduced inventory. Efficient product flow helps cut down on excess inventory.
- Improved customer service. Efficient inventory processing enables the right product to be in the right place at the right time, allowing you to increase service levels and customer satisfaction.

2.4 Conclusions

The bug-tracker Mantis is a much lighter system, based in a faster scripting language (even if not so mature) that its comparative Bugzilla, a more robust and complex system written in Perl.

Buzilla loses advantage on its difficult setup and its large configurations needs.

Nevertheless, Wipro Retail has already a long history with Bugzilla which is used as help-desk tool by the IT system, available for solving all type of issues with infrastructure (from computer fixes to desk repairing).

Testing Services presents a defined Testing Methodology even if their Information Systems in use for sharing and storing information is not the most efficient and flexible mostly based on, very customised, Excel templates.

3 Enabler Mantis

The Enabler Mantis specifications began with the introductory meeting at Wipro's Retail where scope and goals of the overall system were given.

The main requirements were set and soon I started evaluating the best and more suitable available tools for this project.

After selecting Mantis as the platform to suffer the customizations, more detailed and specific details were provided.

Many new requirements were added along the project, according to the interactive software development. Small requirements were added after small cycles of testing, managed directly by a team member working closely with me and more complex requirements were given by more complex system testing by the available in-house testing team on the two full day training/testing.

3.1 Infrastructure

In early development stages, XAMPP was used in my local machine, for a faster installation and overview of the Mantis system.

Developments were always made on a local machine and, before the first Mantis Training session, migrated to a LAMP server.

This server was set up by Wipro's IT Services and, I made configuration modifications on the Apache and PHP for the system to achieve the required performance.

3.2 Bug Tracking Tool Requirements

The main purpose of this project was to provide a better solution for the Testing Team for error management, setting them free from the legacy PVCS Tracker system, by addressing its

Enabler Mantis

main problems such as: costs, flexibility, performance and accessibility issues, according to the following arguments:

- PVCS Tracker is a copyrighted software whose shipping updates are expensive, which does not fit well in budgetary restrictions.
- For the same reason, it is impossible to customise PVCS Tracker to match the exact desires of Wipro's Retail. Nevertheless, being a fat client, it offers much more built-in configuration and parametrization options, that Mantis difficultly will match.
- With the constant working on-site necessities of Wipro's collaborators this system needed to be available from anywhere, anytime and hazard-free. Once more, PVCS Tracker addresses this issue with a poor featured web-based module with a “poor performance on heavy-load operations”.

Before selecting Mantis as a platform where customizations would be implemented a comparative documentation, presenting drawbacks and advantages of Mantis over the current solution, was made in order to provide an overview about the possibilities and workload of the project.

Enabler Mantis

Functionality	PVCS Tracker	Mantis
Create new project	Y	Y
Create new from existing project	Y	Copying from existing project
Custom fields	Y	Y
Make fields mandatory	Y	Y : custom fields N : for defaults
Create Queries	Y	N
Access control	Y	Y
Record and update issues	Y	Y
Keep historic information	Y	Y
Write improvements asked from customer	Y	Y
Select Project	Y	Y
Attach file to the issue	Y	Y
Add notes to the issue	Y	Y
Export files	Y	Y
Define fields to be exported to the export file	Y	Y
Create graphs	Y	~Y (not mature yet)
Assign user to the issue	Y	Possible but not mandatory
Unique numeration for each project	Y	N
Delete issues	N	Y

Table 3.1: PVCS Tracker vs. Mantis

Afterwards, the main requirements were defined:

- Bug Listings Reports
- Bug Work-Flow Change
- Fields/Forms customizations
- Project's Issue ID
- Refined User Access Levels

Enabler Mantis

- Simultaneous accesses lock

Following the Iterative Software Development Process, after addressing the main requirements, further necessities arose:

- Localization to Portuguese
- Bug Notes Integration
- Flexible Issue Dates
- Exportation Preferences
- CSV Export

The development of these customizations brought impacts on the system's front-end, needing to be customised accordingly.

There were many other small customizations and implementations, which derived directly from others or are not sufficiently important to be extensively mentioned in this document.

Furthermore, as on all software systems, they are never bug-free and some efforts were made to provide solutions to core Mantis system.

Some system administration of the LAMP structure had to be made by me, and sometimes, with the help of the IT Team, in order for the system to achieve the needed performance, security and reliability.

3.2.1 Bug Listings Reports

The Test Management File is one of the important documents present in the Testing Phases and its content is normally directly fed by the Test Manager or, in this case, fetched from the Error management tool.

This is a vital procedure for all the testing cycle, keeping all parts involved in the project (project management/pool leader/client) updated about the current projects situation.

Before, PVCS Tracker in combination with a recorded MS Excel 2003 VB Macro provided a very rigid and hard export method.

The aim of this customization was to enable a simple, integrated and fast solution for reporting all the bug listings information.

Several refinements take place in order to achieve the reports of the required issues:


- Views Issues - You will only access the reports of the issues currently listed, accordingly to your Project's selection;
- The View Issues Filter - The filter is used for you to select a listing of bugs based on several parameters and variables present on the system
- Unitary Issue Report removal - Before asking your browser to submit your report request you can select which issues you do not want to be present on your report. This is accomplished by individual check boxes for each issue.

To address this matter a PHP Excel Export was used which directly injected indications in the browser to enable the user to download the report (in MS Excel 2003 format (.xls) as any normal download would take place.

The restrictions imposed by the rigid format of the Test Management had to be taken in consideration, which led to some options such as: data mapping to satisfy Excel formulas, date formats, field ordering and sequence, etc.

Enabler Mantis

Initially the fields required in the export were provided and all the other optional were also printed, by user request, sequentially after the mandatory ones.

						
File_Identifier		TP_ENBSITSTMGMT				
Version Number		2.0				
Issue Nr.	Project	Area	Process	Test Id	Short Description	Cycle
10		Sécurité	Profile Form Association - DMS Error	60	On the Profile Form Association when selecting Details from a Profile a DMS Error is raised. The form's path: Module > Support Functions > Administration Setup > Profile Form Association	1
17		Modification des documents de transport	Lettre de Voiture Form Title	70	"Outbound Quality Audit Report" is shown as the "Lettre de Voiture" Form's title.	1
9		Réception en surplus	Receiving Labels	110	On printing the "Receiving Labels" a FRM-32100 error is raised and disconnects the client from the server. To replicate the error: from the main menu, select Receiving Allocation > Reports > ASN Receiving Package Audit List. Enter an appointment number e.g. 107.	1
13		Sécurité	New user creation	60	It is not possible to create a new user on the form Modules > Support Function > User/Task Setup > User Table Editor due to a DMS Error. Check the attached file.	1

Cycle	Status	Severity	Registry Date	Delivered Date	Assigned To	Priority	Expected Date	Closed Date
1	C	3	03-Jun-08	18-Jun-08	Rui Manuel Rodrigues Castro	Medium		25-Jun-08
1	C	3	20-Jun-08	20-Jun-08	Sara Raquel Sousa Marques	Low		25-Jun-08
1	C	2	30-May-08	18-Jun-08	Rui Manuel Rodrigues Castro	Medium		25-Jun-08
1	C	2	09-Jun-08	13-Jun-08	Rui Manuel Rodrigues Castro	High		16-Jun-08

Illustration 3.1: Part of the Test Management File for VetLog's WMS project fed by Enabler Mantis

3.2.2 Bug Work-Flow Change

Wipro Retail's required a profound change on the issue life cycle, also called work flow, reflecting what happens after their creation.

The diagram shows us the possible transitions between the different status and in the blue boxes the required input fields for each change.

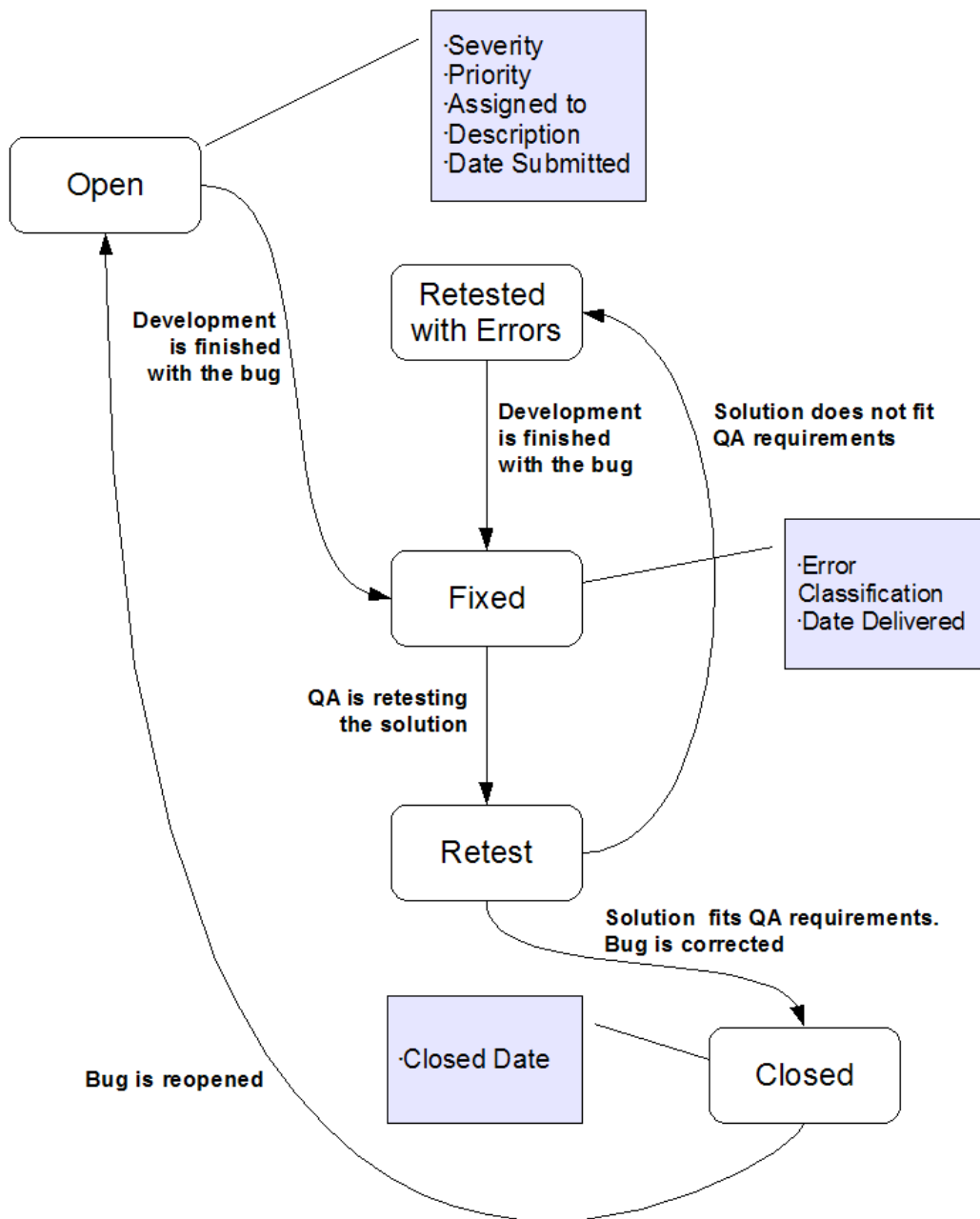


Illustration 3.2: Final Enabler Mantis Bug Work-Flow

The description of the various stages:

- **Open** – The tester reported a bug and automatically assigns the bug the corresponding developer or development team;

Enabler Mantis

- Fixed – Once someone fixes the bug, he has to assign the bug to the testing team for a next round of testing. It specifies that the bug has been fixed and is released to testing team;
- Retest – The correction was received and the bug is currently being retested. It specifies that the bug will be possibly released for the developers to re fix or will be closed;
- Retested with Errors – The correction attempt did not succeed in the retests. The bug is delivered again to the development team;
- Closed – The bug is closed which is the ending point of the Enabler Mantis issue life cycle. It means that the bug is currently fixed and does not present any further risk;

3.2.3 Fields/Forms Customizations

Some exiting fields on Mantis "vanilla" installation and to be changed.

The field "Severity" indication how severe the problem was reduced to the following options:

- Critical – Does not work; Avoid normal use; Originate critical errors;
- Severe – Does not perform as required; Does not avoid use, but has impacts on processes;
- Annoyance – Does not affect normal use, but has to be solved;
- Improvement – New request. Interface improvement.

This importance given to an issue, normally because it needs fast resolution due to being hierarchical superior to other bugs depending on him, was also reduced to the following:

- High;
- Medium;
- Low.

The state of the bug in the system, from "open", when it is created, to "close", when its was successfully tested and does not represent any problem, is given by different status:

- Open – The bug is open;
- Retest – The bug is waiting for being retested;
- Retested with Errors – The bug was retested and presents still errors;
- Fixed – The developer attempted a correction for the bug;
- Closed – The bug is closed.

3.2.4 Project's Issue ID

On PVCS Tracker, each ID number is unique to a project, starting from number 1. On Mantis, this does not happen, especially for the interaction that many project need in form of relationships (child, parent, duplicate and others).

As the most expose part of all Test Management is the Test Management File, which is fed by project issues' information, it was necessary to implement an unique ID number for each different project.

Taking in consideration its impact on all Mantis structure which is dependent on this important variable, this customization led to several other smaller modifications on Mantis source code, e.g. "jump to issue" functionality, relationships, front-end,etc

3.2.5 Refined User Access Levels

Requirements were made in order Mantis to complete remake user accessibility to the system.

They required two main user levels:

- Developer
- Tester

The Developer has the possibility to view all issues, assign an issue to another person who seems more prone to solve the error, to select the error classification (what type of error it was) and update any personal commentary useful to other understand what we made. Most importantly, he can only change the bug status to "Fixed"

The Tester has most possibilities on viewing, creating and updating fields, including updating issue-related dates.

The Manager, in the person of the Test Manager, can control the projects resources, as well as configurations and its user access.

On the top of all these users, there is the Admin and, on the extreme opposite, the guest account associated with the lowest user access level, the viewer.

3.2.6 Simultaneous Access Lock

In case two people are simultaneously updating any Mantis issue, after their submission only the last person submitting will get his work saved.

Until the present moment, this problem was still not addressed by the Mantis Project so a new solution needed to be designed and implemented.

Viewing Issue Details [[Jump to Notes](#)]

ID
3 [LOCKED: Tiago Duarte Tavares Matos]
Reporter
Assigned To
Priority
Status

Illustration 3.3: Issue Locked

One issue is locked to one user when he is editing the update submission form for less than 15 minutes, meanwhile this issue is read-only for other users. If he browses away this page or let his lock expire the issue becomes writeable for other users.

Administrator overcomes this lock and on logout, all locks are reset.

3.2.7 Localization to Portuguese

Having a "development factory" in Brazil and also many Test templates in Portuguese, the adaptation of the Portuguese Mantis localization to Wipro's Retail and our customizations needed to be made.

Presently, Mantis can be used both in English and Portuguese without hazard.

3.2.8 Bug Notes Integration

On every Testing Iteration, there is a cycle of bug fixes carried out by the development team and re-tests are performed by the testing team. Some extra information about what has been made needs to be recorded.

Before, on PVCS Tracker, this was accomplished by editing a "Commentary" field by the following syntax:

(User Acronym) - dd/mm/yy : (Message)

e.g.

TDM - 22/02/02 : Character set problem solve.

Mantis Project uses a better system as standard tracking notes between users, the bug notes which advantages I tried to be noticed by the Pool Leader and Testing Team.

I have integrated the bug notes system, apart from the "commentary field", on the Enabler Mantis in case they would like to use instead.

3.2.9 Flexible Issue Dates

Some controversy arose on the setting of this requirement.

The objective is to make possible to users with Tester Level to update all issue's relevant dates according to the following logic:

- Expected Date is always bigger than Submitted Date
- Delivered Date is always bigger than Submitted Date;
- Closed Date is bigger than the Delivered Date or Expected Date.

where:

- Submitted Date is the date when the bug was reported;
- Expected Date is the date when we are expecting the bug to be fixed;
- Delivered Date is the date the bug was set to Fixed;
- Closed Date is date the bug was set as closed.

3.2.10 Exportation Preferences

Mantis features a rather simple export method: given a list of fields you can select some of them which will be Export exactly in that order.

A more complex, export preferences solution was required, adding:

- User Unique Preferences;
- Mandatory Export Fields
- Field Export Order

This requirement had severe implications on how the Export is made because of its early rigidity. A complete new architecture was performed for both, Excel and CSV Export enabling a much more dynamic and flexible approach to Export. This can bring further advantages if changes are made to Wipro Retail's business process, especially the Test Management File.

3.2.11 CSV Export

After the second training/ tests session, Testing Team members were concerned with the performance on the download of a thousand row Excel file, especially on localizations with slow bandwidth, such as in Brazil.

They required CSV Export functionality, as an extra possibility to the MS Excel.

3.2.12 Performance

Preventing further problems from occurring, before systems migration to the production server, Mantis "vanilla" installation and the LAMP server was extensively tested with volume and load tests.

Dozens of projects were created with thousands of issues in each, in order to recognize its ability to deal with big volume of data.

No problems were found and only during development some tunings were made to PHP, especially increasing its memory use and timeouts, to display big amounts of data of uploading/exporting big files.

3.3 Conclusions

Its was very rewarding to gain more experience on PHP development and LAMP administration along all Mantis project.

Some of the required features as the CSV Export and the update lock, will not be used so extensively, at least at a near future. The first will only be needed in extreme low bandwidth conditions and the second, only in projects with a larger number of users.

4 VetLog's Project

Concerning Vetura's WMS, they decided to implement Oracle Retail Warehouse Management System (ORWMS) to improve their manual warehouse business processes.

The new module will be integrated with their existent Oracle Retail Merchandise System (ORMS), Oracle Retail Trade Management (ORTM), Oracle Retail Allocation (ORA), Oracle Retail Sales Audit (OReSa), Oracle Retail Integration Bus (ORIB) and AS400.

The implementation of the ORWMS has also the main objective to replace gradually Vetura's warehouse management system AS400.

In January 2008, Vetura has selected Enabler to become its system implementer with the main goal to perform a test pilot in one of Vetura's warehouses. This pilot will test all functionalities of the logistic processes in all areas and will prepare Vetura for the future challenge of implementing Oracle Retail Warehouse Management System (ORWMS) as the Vetura warehouse management system.

This project includes:

- Integration with existing Vetura systems:
- Development of the requirements identified in the CRP sessions
- Acceptance Tests using a real environment;
- Perform data setup/data migration tools to facilitate the implementation
- Prepare Vetura super user to operate with the new warehouse management system.
- Dry run

During the CRP (Conference Room Pilot) sessions, some requirements were identified in order to accomplish the ORWMS system functionalities with the current business process.

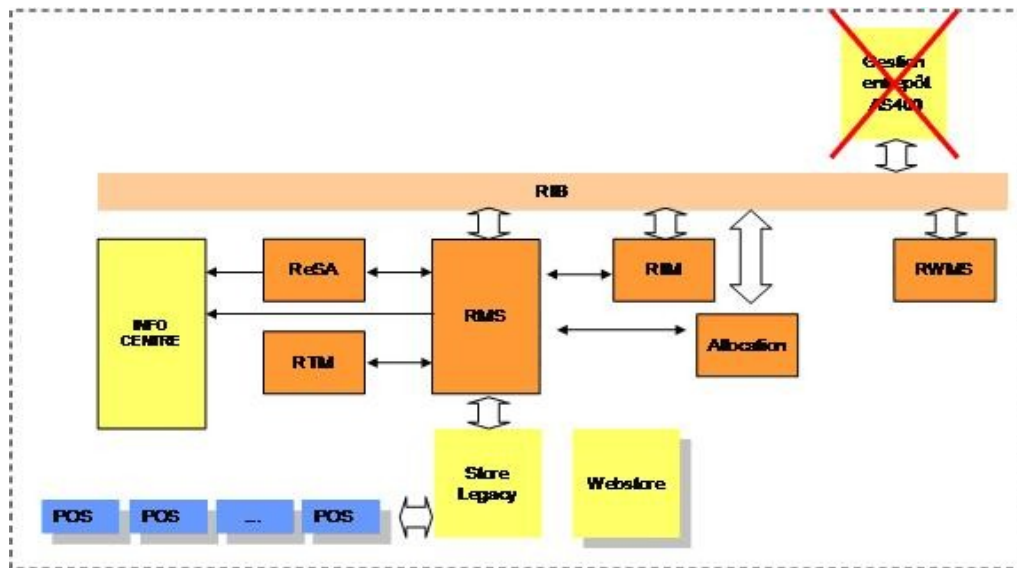


Illustration 4.1: Vetura IS Architecture

The following customization were those assigned by the Test Manager to me, which I will describe their business process.

4.1 Customization "Modification des allocations sur commande"

In ORWMS the process of receiving is planned using an Appointment. The appointment is no more than a logical structure that will identify when a Purchase Order (PO) or set of POs will be received in the Distribution Center and through which receiving door.

The process of Appointment creation will go through the following stages:

1. Appointment header creation. This stage will identify all the information that will apply to all Purchase Orders inside this appointment.
2. Appointment detail creation. This step assigns a PO or PO lines to an appointment.
3. Assignment of a receiving door to the appointment. This step will identify the receiving door that will be used to receive the merchandise. After this assignment, the system will change the appointment status from the unscheduled status to scheduled status.
4. Printing of the receiving labels. These labels will be attached to each container and not to each box inside the container. This case label is printed outside ORWMS.

This document will give detailed changes made in the Appointment header creation:

VetLog's Project

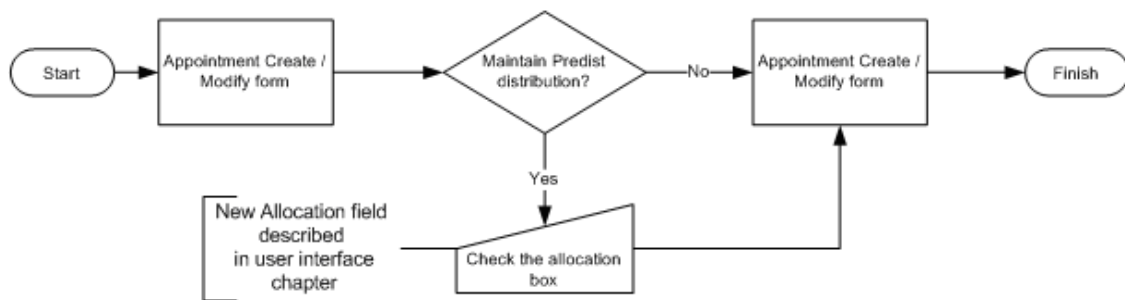


Illustration 4.2: Action sequence on a pre-dist allocation after the modifications

The previous diagram states that after customization the user will be able to break the link between the Stock Order (SO) and a PO. This link is created in the Allocation module when the Commercial users say that a particular PO from a supplier will be allocated to a particular Stock Order.

Even after this link is broken, the PO will be received in the Distribution Center (DC) and the Stock Order will be manually distributed in the DC.

This customization will not bring any kind of impacts to manual SO. This table illustrates the details of the different types of stock orders.

Stock Order	Order	Type	Impacts
PO Allocation	ORA (Allocation)	Pre-dist	Yes
Stock Allocation	ORA (Allocation)	Manual	No
Manual Transfer	ORMS	Manual	No

4.2 Customizations "Modification des documents de transport"

Vetura requested three types of documents:

- Bon Livraison;
- Bon de Transport;
- Lettre Voiture.

The shipping process has to be changed in order to generate three reports which correspond to the three documents required by Vetura.

The Shipping process is the main process associated with the creation/ printing of the transportation documents.

The Shipping process has three steps:

1. Opening the trailer;
2. Loading the containers into the trailer;
3. Closing the trailer.

VetLog's Project

When the user closes the trailer there is a process responsible for generating and printing the Bill of Lading (BOL) and the Container Manifest. This process will be changed in order to print the Bon de Livraison and the Bon de Transport instead of printing BOL and the Container Manifest. These two documents should be adapted to fit all the information required in the Bon de Livraison and in the Bon de Transport. The Lettre de Voiture should be a completely new document, and should only be printed when the user chooses to.

The work flow of the shipping process in the ORWMS standard version is represented in the following picture:

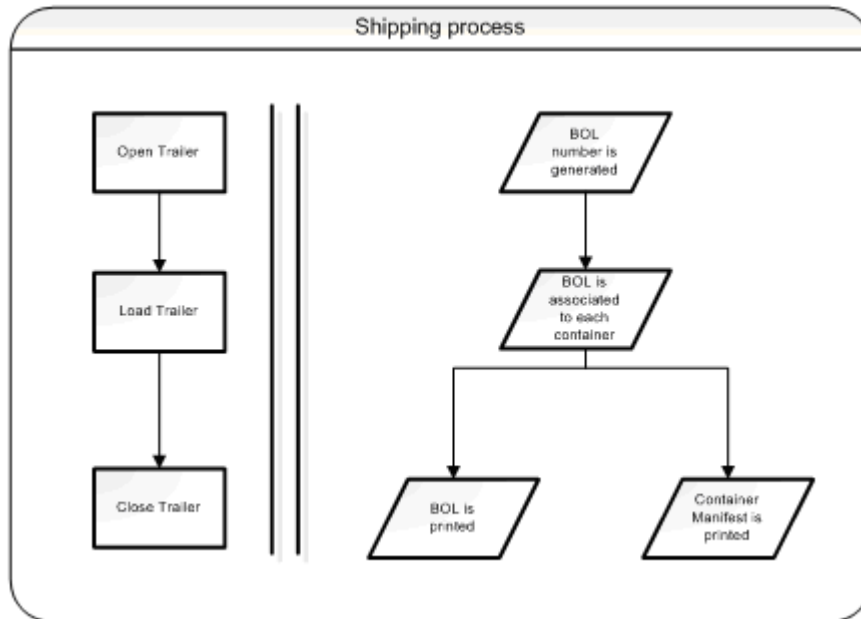


Illustration 4.3: Current shipment process work-flow

The new work flow of the shipping process is represented bellow, as you see, when the trailer is closed ORWMS will generate the transportation documents. The Lettre de Voiture is printed only if the user chose to print it.

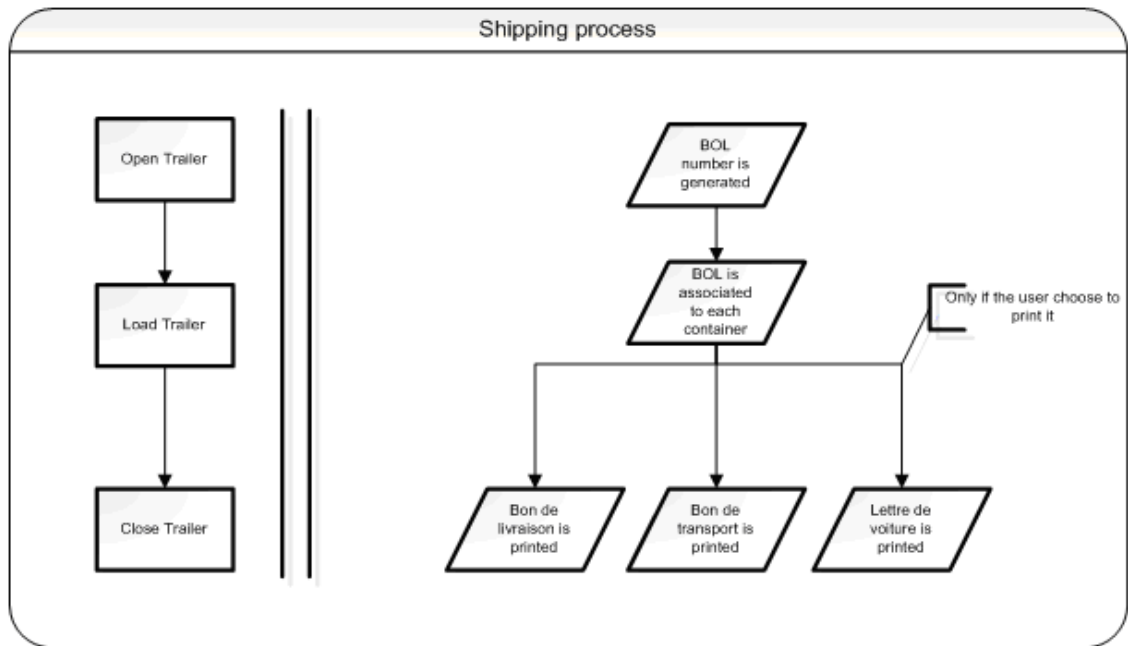


Illustration 4.4: New shipment process after the modifications

4.3 Customization "Sécurité"

Security is the process that controls an user's access to the different ORWMS functionalities will be changed in order to implement an access restricted by Profile. This process which is going to be described, will improve ORWMS security.

The main process associated with Security request is the definition of profiles that will be assigned to users. Vanilla ORWMS comes with its own security validation process. When creating a new user in ORWMS it is associated a level of privilege (1 to 8) where the level 8 is the highest. This privilege levels are also associated with ORWMS forms, so when an user tries to access a form, the security process validates for that user to be able to access the form. To access a form an user must have a privilege level equal or higher to the form's privilege. Since the security approach is insufficient for Vetura, these privileges levels will be substituted by profiles.

With the new Security process when an user is being created in ORWMS, or when his information is being edited, it will be possible to associate one or more profiles to the user. It is assumed that the definition of the different profiles is Vetura's responsibility, as well as the attachment of the different profiles for each user.

ORWMS security is applied to two distinct clients, GUI and Radio Frequency terminals. The security will prevent an user to see/access a menu entry or a form.

With the profile development, the old procedure that would validate user privilege against menu/form privilege will be replaced by a new validation. Basically, the system will make available only the menu entries and forms that are identified in user profile. ORWMS does not allow partial access to the forms (view mode or edit mode), meaning that if an user has access to the form then he is able to perform all the functionalities allowed in the form. If an user is selecting a form that hasn't access, then ORWMS will show a message saying the user hasn't access.

4.4 Customization "Reception en surplus"

This requirement changes the receiving process in order to allow the over receiving quantities of the expected order quantity

The normal receiving process in ORWMS verifies the total received quantity for an item is greater than total quantity ordered. In this situation, the system will check quantities and displays a message saying "More than expected" and do not accept that quantity.

The new process will validate if the user has permission to do an over receiving through the checking of the value assigned to a user attribute which defines this permission.

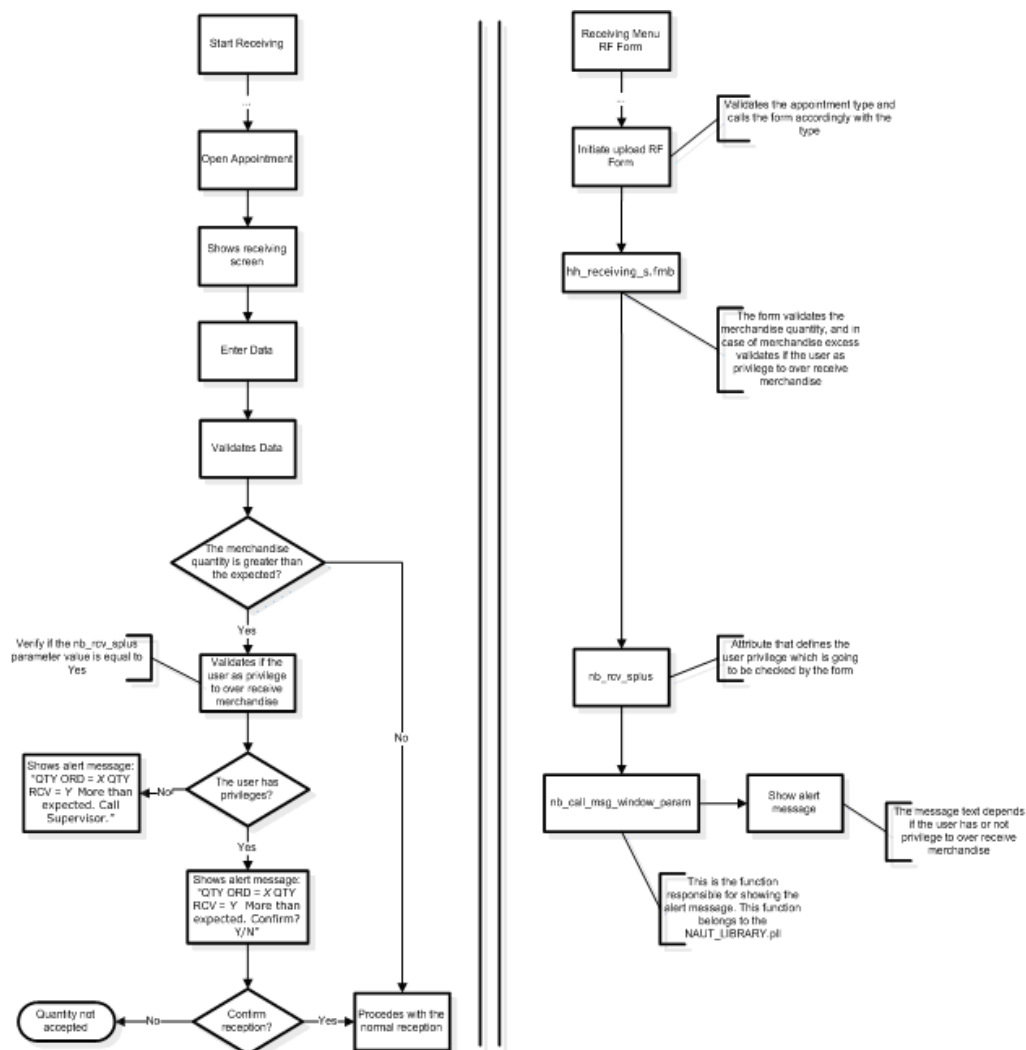


Illustration 4.5: Comparative digrams between the current and future workflow

4.5 Report "Article Prevus En Zone Picking Urgent"

I was assigned, extra my default tasks, to create the report "Article Prevus En Zone Picking Urgent" under supervising and guidance of B. Silva.

This report will be used has a planning tool to determine the stock necessary to satisfy the requirements of a set of stock orders. Using this report, the planning management team will get feedback on stock items necessities until a certain date.

ITEM	DESCRIPTION	UNIT QTY	CASE QTY	NBR. PALETTES	AVAIL CASE	AVAIL PALETTES	MISSING PALETTES
------	-------------	----------	----------	---------------	------------	----------------	------------------

Illustration 4.6: Report example from the Technical Documentation (TRD)

4.6 Conclusions

The role of Tester at Vetura introduced me to the world of ERP's which I found complex, robust and with no space for user friendliness.

As far as I could notice, performance was a key factor all over WMS, and probably over all of ORS suite, and a constant effort to keep it this way while doing all customizations.

As a tester I understood WMS mostly from its business processes and how ERP adapt to business requirements.

Especially the "sécurité" customization has required repetitive, dull actions due to the necessity of checking all WMS operable, after the new form validation algorithm.

All testing was manual which repetitive re-tests could be easily performed by a automating testing tool avoiding hindering human resources that could be testing other applications elements. Although its set up would more likely consume more time and resources than a manual test, HP Quick Test could be a solution for this issue, being a automation framework designed mainly for Windows and web based applications and working with Oracle GUI Forms. HP acquired WinRunner and incorporated its functionalities on QuickTest suite.

VetLog's Project

60	Sécurité								99%
	User Creation	TDM			1	1			100%
	Profile Creation	TDM			1	1			100%
	Profile to user association	TDM			1	1			100%
	Particular permissions association to a User	TDM			1	1			100%
	Profile Edition/Deactivation	TDM			1	1			100%
	Forms Association to Profile	TDM			1	1			100%
	Validation process at GUI	TDM			1	1			95%
	Validation process at RF terminals	TDM			1	1			100%
70	Documents de transport								98%
	Forms and menus for documents usage	TDM			1	1			100%
	Bon de Livraison Creation/Edition/Printing	TDM			1	1			97%
	Bon de Transport Creation/Edition/Printing	TDM			1	1			97%
	Lettre de Voiture Creation/Edition/Printing	TDM			1	1			97%
80	Définition de l'affectation des palettes								2%
	Pallets Request (FRM)	HMM/TDM			1	1			10%
	Recv. Items (FRM)	HMM/TDM			1	1			0%
	Pallets Request Modify (FRM)	HMM/TDM			1	1			0%
	Add by PO (FRM)	HMM/TDM			1	1			0%
	Article Prevus En Zone Picking Urgent (RPT)	HMM/TDM			1	1			0%
90	Modification des allocations sur commande								100%
	Appointment header creation/modification	TDM			1	1			100%
	Appointment detail creation/modification	TDM			1	1			100%
	Assign a receiving door to the appointment	TDM			1	1			100%
	Print the receiving labels	TDM			1	1			100%
110	Réception en surplus								100%
	New User Attribute allowing/denying receptions over request	TDM			1	1			100%
	Over requested Reception allowed/denied for:				1	1			99%
	PO Receiving - (Generic Labels for the pallets).	TDM			1	1			98%
	Receiving - (Pré-printed labels for palletes).	TDM			1	1			100%

Illustration 4.7: Part of the Executed Plan from VetLog's Test Management File

5 Results

There were four milestones in this project corresponding to its most delicate phases.

Firstly, by the end of March the first appearance of Mantis on a production server available Wipro Retail domain and its following all-day session, including an introduction to the Mantis system, training on his use and preliminary tests, was without doubt the most vital step on the projects development cycle, especially due to the Testing Services Team contribution on further requirements analysis and system failures detection. Everybody, recognized Mantis' potential but further developments were needed in order the system to be fully adapted to Wipro's Retail processes.

Secondly, another training session with the all the on-site available Testing Services Team, more focused, this time, on volume/load/performance tests was scheduled for 15th of April. This session had extra importance, more confidence and support over the tool was needed and, after a big cycle of development and tests, I felt this was the best opportunity to guarantee the recognition of our project.

The session ended with a supportive thumbs-up from all team members who tested the entire system, with especial focus in the areas directly affected by the developments. Mainly improvements were proposed, which were fully achieved in the final development cycle before my and Enabler Mantis joining VetLog Project.

The pilot run at Vetlog Project was also an important date, requiring some final refinements and, the natural, project set up of Enabler Mantis system. Before this happening, a morning presentation session took place with all Vetura VetLog Team enabling them to contact the new tool and receive some training over its use. This morning meeting, ended up with the some resistance and my respective resilience accordingly.

Finally, the project management decided to use Enabler Mantis at the client's site and, therefore, public accesses to Mantis directly through Internet were granted by the IT Services and myself.

This final milestone provided a crucial predictability that this project can have a greater impact on how Wipro's Retail faces error management.

Currently the system is being used by 15 people, including VetLog's Team, Test Services Team and Vetura's collaborators, with users being added to the system almost every week. Till

Results

the present moment, none of them reported any bug, failure or difficulty on the use of the system.

It is very rewarding to see the result of roughly four months of work on production environment used by a Wipro Retail Team, from management to development elements, and, even more, with the perspective of being used as default error management information system by all Testing Vertical.

Concerning my participation at VetLog's project, I must say it was completely different challenge apart from Enabler Mantis, where I had to focus on a smooth and fast integration on the Tests procedures and, specially, on the use of WMS. From which my knowledge, was merely theoretical.

The hardest obstacle to the testing was clearly testing the environment which did not reflect the real system, as well as nonconformity in the available data, which brought severe implications on the normal testing procedures. Nevertheless, all the tests assigned to me have been conducted.

Personally, the most rewarding aspect during all the test phase was the possibility of acquiring a deeper understanding of how an ERP supports the business, this time warehouse management. Most of the overviews given to me about WMS business logic and processes were given by the head of the Vetlogs WMS development team.

5.1 Personal

From the starting point, this project did not seem extremely ambitious but especially after the first training session with the addition of many new requirements and extra functionalities Enabler Mantis became a much larger enterprise.

In addition, I soon had to learn and fully understand Mantis user interface layer, business logic and database layers. There is few documentation about this open source project, until this present moment, there is not even an official Mantis' database diagram. Nevertheless, Mantis development community is very active and I have learnt directly from them, either by direct contact or on Mantis forums. Being an open source fan I also gave my contribution whenever possible.

I have been attentive and tried to follow the development directives as much as possible, even if they were sometimes contradictory, taking in consideration, for example, coding guidelines.

I had to put a big effort on the Excel Exportation and most of the customizations required were made in order to adapt the Enabler Mantis to the Test Management File, referred on the Test Phases section, which is an MS Excel File with five different sheets. This is the most visible part for the client side, containing a detailed report of all projects activity.

This necessity has to do with the, on my point of view, to deprecated Information Management still present on, according to my experience, most of our companies. This has to do with the lack of time and resources to accomplish permanent solutions for keeping, sharing and retrieving information. I will discuss further on my view about possible solutions on this matter.

Without doubt, the export was the most customised functionality, which led to a complete new set of functionalities and, as I said, influenced most of Mantis with special concern on the bug cycle and testing work flow.

Results

From the functional side, the life bug cycle currently in use at Wipro Retail, following severe quality regulations, was also one of the main concerns of all project, considering it is the base of the system and most of Mantis functionalities depend on them. Once more, it suffered changes during the development stage.

VetLog's management required an easier solution, enabling Vetur's personnel to directly access the bug tracker. This required the prompt help of the IT Services setting up a network translation (NAT-Basic) from the external address to the internal and the necessary firewall modifications. Enabler Mantis is now public on the Internet.

I had not a large experience on Wipro's Retail Testing Methodology. Therefore, it was a challenge, especially during the several requirements analysis, to gather and understand the information provided about how the Mantis system should behave and perform. In the end, I think the result is very positive, and Enabler Mantis mimics most of the testing methodology and is fully operational to feed Test Management File.

5.2 Limitations

The first real limitation of the system was the impossibility to have a list of different error areas unique to a project, they are horizontal to all projects. The lack of this feature on the Mantis "vanilla" installation and its necessity for Wipro's Retail processes, was not perceived in the early Mantis Tests and due to my limited experience on the Testing phases I was not able to detect it either.

Apart from this, seamless technical impossibilities were not solved related with string formatting for Excel Export. As you can imagine, the possibilities of creating MS Excel Spreadsheets directly from PHP are still very limited.

One limitation of this software is, due to the suffered deep customizations, the upgrade to more recent versions.

No further problems were found in the developments made.

5.3 Evolution

One of the most problematic issues in this project was the rigidity of MS Office 2003 binary formats in use for all Testing Team documentation and, as seen during the VetLog's project, and on other verticals. After questioning if it was possible to use new Office 2007, which is architecturally different from their predecessors, I soon understood exporting binary files was all I could get.

In my opinion, I understand that the Test Management could move one (or several) step further if one of the following solutions was adopted:

- Using open-standard formats for their documents, either by OpenXML (for Microsoft Office 2007 suite), Open Office, or any other. This would lead to a incredible boost on the sharing flexibility between their information systems.
- Using Visual Studio Tools for Office 2007 (VSTO) as the way of creating on the fly reports fetching data directly from Enabler Mantis MySQL database, with all the reliability and robustness of a Visual Studio Application. In short, VSTO enables to develop an integrated "add-on" over any Office 2007.
- The PHP possibilities are immense and Enabler Mantis currently features an under-development "Summary" section, fulfilling most basic management necessities, such as statistical information and graphs. This section could be customised and developed in order to print a report, with no further hazard on having another

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application (the Test Management File) between the IS and the Test Manager, Testing Team Pool leader and the client.

- Using MS Office 2003 Macros in VB to fetch data directly from the Enabler Mantis database, even if I cannot confirm this possibility due to my inexperience with VB and Office 2003. Nevertheless, I would never advise spending time and resources on deprecated systems.

One of the points Mantis “vanilla” installation also features is a simple, friendly and mature notification system built over PHPMailer informing users about important updates on the bug tracking system, especially if they are directly concerning them.

Due to past Wipro's Retail bad experiences with PVCS Tracker emailing system it the complete deactivation of all email system was required. So currently the only possible interaction between Enabler Mantis and its users happens only via browser access.

During the first Enabler Mantis training session, namely after many Mantis features (see annex), all the Team put their interest on the notification system via Web Services using SOAP architecture.

In short, it is a tool running in the background with just an icon on the task bar notification area (next to the clock). When an issue is reported into Mantis, this Mantis Notifier notifies the user via an MSN like notification message.

This feature overcomes spamming emails and results on more effective on-the-fly notifications.

Knowing the basics of this distributed technology I would recommend this approach for further developments, taking into account it would not take too much effort, as this is developed on top of Mantis by its own authors.

6 Conclusions

The purpose of this internship was to select and adapt an error management tool to Wipro's Retail testing processes and use it on a pilot-run at VetLog, an implementation of the Warehouse Management System, an Oracle Retail module, on several Vetur's warehouses and analyse the further appliance of this error management tool to all Wipro's Retail Tests vertical.

Therefore, this project comprised two, almost distinctive phases, both of which presenting different but equally stimulating challenges.

The first, having as key actors my team member, A. Batista, and I, acquired our own rhythm, that is, a specific software development routine, where after addressed the main early requirements by the Tests Pool Leader, C. Fernandes, most of the further requirements were headed by A. Batista, with the approval of other members and the Pool Leader.

This requirements were implemented and tested by A. Batista alone, or pushing other members to help, if a more complex test was required.

The entrance at VetLog's project as Tester and Administrator of the Error Management system was frankly positive. I was, since the beginning of the project, attentively directed and closely guided by the Tests Manager, H. Pereira. He provided overviews about the tests methodologies and shared his large experience in the testing team, being always available to solve any of my inexperienced questions.

R. Castro, as the head of the VetLog's WMS development team, supported me with his extensive retail business logic, with emphasis on Warehouse Management, which I directly applied to my tests and without who it would be extremely difficult to accomplished them, especially due to the non user friendliness of WMS module.

6.1 Motivations

My motivations in this internship were mainly centred on the understanding of the professional life at a multi-national company, with its mature processes, complex structure organisation and work methodology. I must admit I still do not retain a complete picture of it even if all my efforts were made in that away.

Furthermore, the understanding of relationship between enormous Information Systems applied to Business, such as the Oracle Retail, motivated me to always question everything on a

Conclusions

constant demand for information. unluckily, my allocation to a Wipro's Retail project has not been so extensive until this moment.

Managing big teams and projects has always arisen my interest during my academic year, and the possibility of playing a role and observe how it is done in the corporate world was one of the most rewarding experiences I had at Wipro Retail.

6.2 Final considerations

I truly believed in the positive, deep impact of these last six months in my starting career, both on a personal and professional level, and I consider Wipro Retail to be an excellent institution by being a young, open-minded and deeply motivated company, where success and flexibility are omnipresent.

7 References

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8 Anexxes

8.1 Enabler Mantis Manual

This Manual provided useful help topics for all Enabler Mantis users and is available on the tool itself.

8.1.1 Purpose

This is the User Manual of a customised version of Mantis, furthermore referred, to as Enabler Mantis, which is intended to replace the current used software by the Testing Services Team: the PVCS Tracker.

The Enabler Mantis was customised in order to suit the Testing Team requirements and processes.

8.1.2 Introduction

Mantis is a free popular web-based bug-tracking system. It is written in the PHP scripting language and works with MySQL, MS SQL, and PostgreSQL databases and a web-server. Mantis has been installed on Windows, Linux, Mac OS, OS/2, and others. Almost any web browser should be able to function as a client. It is released under the terms of the GNU General Public License (GPL).

The goals for the Mantis project are to produce and maintain a lightweight, simple bug tracking system. Additions of complexity/features are modular so that users can be shielded from unwanted clutter. Thus, much of the package has a simple version of the feature along with a more fully developed version.

8.1.3 Accessing Mantis

In order to access Enabler Mantis you need an account, accounts are created by the administration and given to you with a blank password which you can modify later on after logging in.

Anatomy of an Issue

An issue contains a multiplicity of fields filled up either by the user or the system itself and all this information is displayed on the View Issue Page which can be a good starting point to explain some of the Enabler Mantis concepts.

Looking at the View Issue Page you will be able to find this information:

- ID – The issue's unique identification number on a specific project;
- Sub-Project – A sub project inside the current project;
- Severity – This indicates how severe the problem is:
 - Critical – Does not work; Avoid normal use; Originate critical errors;
 - Severe – Does not perform as required; Does not avoid use, but has impacts on processes;
 - Annoyance – Does not affect normal use, but has to be solved;
 - Improvement – New request. Interface improvement. Date Submitted – Automatically registered date according to the issue's report;
- Last Update – Automatically registered date according to the latest issue's modification;
- Reporter – The person who filed the bug;
- View Status – The default viewing status for an issue;
- Assigned To – The person responsible for fixing the bug;
- Priority – The importance given to an issue:
 - High;
 - Medium;
 - Low.
- Status – These define exactly what state the bug is in:
 - Open – The bug is open;
 - Retest – The bug is waiting for being retested;
 - Retested with Errors – The bug was retested and presents still errors;
 - Fixed – The developer attempted a correction for the bug;
 - Closed – The bug is closed. Menu/Process – A one-sentence summary of the problem;
- Description – A detailed description of the problem;
- Commentary – Any extra information that you didn't put into the Description should go here;

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- Tags – Keyword defining the issue easing up its search;
- Area – Area on which the issue is included;
- Closed Date – Automatically registered date according to the issue's closing;
- Delivered Date – Automatically registered date according to the issue's fixation;
- Error Classification – Error's categorization provided by developers;
- Expected Date – An user filled up date according to expected resolution of the bug;
- System ID – The ID of system on which the problem occurred;
- Test ID – Testing Services Team Test ID;
- Attached Files – Files attached to bug in relation with it (screen shots, documents, etc).

8.1.4 Issue Life Cycle

The Enabler Mantis issue life cycle, also called work flow, reflects on what happens to all bugs after creation.

The following diagram show us the possible transitions between the different status and in the blue boxes the required input fields for each change.

The description of the various stages:

- Open – The tester reported a bug and automatically assigns the bug the corresponding developer or development team;
- Fixed – Once someone fixes the bug, he has to assign the bug to the testing team for a next round of testing. It specifies that the bug has been fixed and is released to testing team;
- Retest – The correction was received and the bug is currently being retested. It specifies that the bug will be possibly released for the developers to re fix or will be closed;
- Retested with Errors – The correction attempt did not succeed in the retests. The bug is delivered again to the development team;
- Closed – The bug is closed which is the ending point of the Enabler Mantis issue life cycle. It means that the bug is currently fixed and does not present any further risk;

Note: Upper Tester access level are not forced to follow this sequence and can change the issue's status to any status they want. Nevertheless, this diagram represents the “correct” life cycle a bug should have.

8.1.5 Main Areas

8.1.5.1 Login



Login [Login Anonymously]	
Username	<input type="text"/>
Password	<input type="password"/>
Save Login	<input type="checkbox"/>
<input type="button" value="Login"/>	

Mantis 1.1.1[[^]]
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Customized for Enabler | Wipro



Illustration 8.1: Enabler Mantis Login Page

This page will always be the first showing up on every new Enabler Mantis session or if your current session, eventually, expires.

Enter your username and password and hit the login button:

On a first login your password will be blank. You can set it later on My Account. Save Login for a permanent login between browser sessions;

Cookies need to be enabled to login;

On login error (non-existent/disabled account or incorrect password) you will remain on this page;

Login on an common anonymous account set by the administrator.

8.1.5.2 Main

The Main Page shows the latest news updates for the Enabler Mantis bug tracker keeping users updated about changes in the bug tracker or a project.

Postings can be specific to projects or global across all Enabler Mantis platform;

The Archive link will lead you to all news listed.

Anexxes

Open and assigned to me: 0 Open and reported by me: 987
Last Visit: 2008-07-20 14:53

New Number 2 - 2008-07-20 14:53 - tiago [Announcement]
This is the body message for New Number 2

New Number 1 - 2008-07-20 14:52 - tiago [Announcement]
This is the body message for New Number 1

[\[Archives \]](#)

Illustration 8.2: News on the Main Page

8.1.5.3 View Issues

This page is composed by three distinct parts, in the top the filters control the bug listings in the center and in the bottom the status color legend and statistics.

Viewing Issues (1 - 50 / 1010) [[Export](#)]

	Priority	ID	Test ID	#	Project
<input type="checkbox"/>	High	1001	100001	1	Alpha
<input type="checkbox"/>	High	1008	100	3	Alpha
<input type="checkbox"/>	High	1010	100		Alpha
<input type="checkbox"/>	Low	947	123		Alpha
<input type="checkbox"/>	Low	944	123		Alpha
<input type="checkbox"/>	Low	835	123		Alpha
<input type="checkbox"/>	Low	572	123	1	Alpha
<input type="checkbox"/>	Low	945	123		Alpha
<input type="checkbox"/>	Low	946	123		Alpha
<input type="checkbox"/>	Medium	1009	100		Alpha
<input type="checkbox"/>	Low	948	123		Alpha
<input type="checkbox"/>	Low	949	123		Alpha

Illustration 8.3: List of issues

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Reporter:	Monitored By:
any	any
Status:	Hide Status:
any	none
Show:	View Status:
50	any
Platform:	OS:
any	any
Area	Closed Date
any	any
Sort by:	Last Update Descending

Search:

Illustration 8.4: Part of the View Issue filters

Access the set of filters in the top by clicking on the plus signal;

Search Field will look for simple keyword matches in the Menu/Process, Description, Commentary, Bug ID and more, unfortunately, still not on bug notes;

Bugs are displayed on a table and the attributes are listed in the following order: Priority, ID, Test ID, number of bug notes, Project, Severity, Status and Menu/Process;

Each column's header can be clicked to sort by that column;

The default sort is the Update Date;

The bug ID is a link leading you to a more detailed report about the bug;

The text in the "Updated" column will be bold if the bug has changed in the last "Changed(hrs)" field which is specified in the viewing filters;

Each table row is color coded according to the bug status:

- Blue – Open;
- Yellow – Retest;
- Orange – Retested with Errors;
- Green – Fixed;
- Grey – Closed.

On the bottom of the page you can see the percentage of each status on all project.

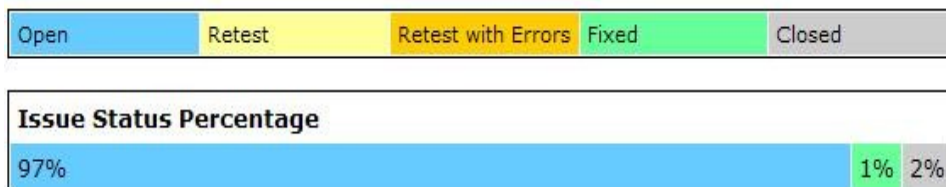


Illustration 8.5: Color legend

Still on the above page, View Issues, you have a link to the Export page presenting some options:

- Exclude the user selected bugs on the end of the page;
- Access to the Printing Options Page:
- Selection on the required fields;
- Select the desired export fields;
- Sorting order available;
- User specific preferences;
- It's required for the new user to set this parameters before export.
- Export in English or Portuguese;
- Export in Excel or CSV (usability against performance).

Note: For how to correctly handle the Export file check the annex.

[\[Export Excel\]](#) [\[Export Excel in PT\]](#) [\[Export CSV\]](#) [\[Export CSV in PT\]](#) [\[My View\]](#) [\[Printing Options\]](#) [\[View Issues\]](#)

Illustration 8.6: Export Page's Menu with underlined Export Functions

8.1.5.4 View Issue

Here is the simple listing of the bug report. Most of the fields are self-explanatory.



Illustration 8.7: Main Menu

Below the bug information there is a set of options for the user to work on the issue:

- A set of buttons defining and updating bug's behavior:
- Update Issue - brings up a page to edit all aspects of the issue;
- Assign to - shortcut to change the assignment of an issue;
- Change Status to - changes the status of an issue. Another page (Change Status) will be presented allowing the user to add notes or change relevant information;
- Monitor / Unmonitor Issue - allows the user to monitor any additions to the issue
- Create Clone - creates a copy of the current issue. This presents to the user with a new issue reporting form with all of the information issue filled in. Upon submission, a new issue, related to the current issue, will be created;
- Reopen Issue - Allows the user to re-open a closed issue.

A bug relationship panel where you can:

- Create a parent/child relationship;
- Create a peer relationship;
- Create a simple relation to other bug;
- View or delete them if you wish.
- An upload file's panel;
- A panel for viewing and adding bug notes;

Just above the panel you can:

Send a reminder to a recipient list requesting feedback on a specific issue. This recipient will also begin monitoring the issue unsubscription. This note will be store with the issue.;

Get a printer friendly version of the bug.

8.1.6 Bug Change Status

This page is used to change the status of an issue. A user can add a bug note to describe the reason for change. In addition, the following fields may be displayed for update:

- Issue Handler (Assigned to);
- Error Classification – Where the Developer will specify the nature of the bug;
- Description;
- Commentary.

Fixed Issue	
Assigned To	antonio-developer ▾
Error Classification	▾
Description	test same time
Commentary	test same time ok
Add Note	
View Status	<input checked="" type="checkbox"/> private

Sub

Illustration 8.8: Bug Change Status Form

8.1.7 Bug Update

The layout of this page resembles the View Issue page, but here you can update all the various bug fields except View Status, Last Update and Status.

Developers are only able to edit the Assign to, Status and Commentary.

8.1.8 Report Issue

This is the page for bug reporting, for the upper Tester Access Level or :

You are required to fill in the required fields:

- Severity;
- Priority;
- Assign To;
- Description;
- and optionally:
- Area;
- Cycle;
- System ID;
- Test ID;
- Menu/Process;
- Commentary.
- Upload an optional file;
- Check the Report Stay or leaved it unchecked.

Report Stay displays a button that read "Report More Bugs" after you submit the bug. The button allows you to return to the report bug screen after submitting a bug and it will automatically fill in most of the most pertinent settings from the previous bug. This is useful when inputting multiple bugs at once.

Enter Report Details	
Project	(select) ▾
*Severity	▾
*Priority	▾
*Assign To	▾
Area	▾
Cycle	1 ▾
System ID	<input type="text"/>
Test ID	<input type="text"/>
Menu/Process	<input type="text"/>
*Description	<input type="text"/>
Commentary	<input type="text"/>
Upload File (Max size: 2,000k)	<input type="text"/>
View Status	private
Report Stay	<input type="checkbox"/> (check to report more issues)
* required	
<input type="button" value="Submit"/>	

Illustration 8.9: Report Issue's Form

8.1.9 My Account

This page changes user alterable parameters for the system.

All the following options are user specific: User can change his password, screen name, and email; Reports the user's access levels on the current and other projects. Clicking on Preferences you can set the following information: Default project - This is the project you are automatically logged into when you log in; Delay in minutes between refreshes of the view all bugs page;

Delay in seconds when redirecting from a confirmation page to the display page; Default language for the system. The additional setting of "auto" will use the browser's default language for the system. You can reset the defaults with the Reset Preference button.

Anexxes

Edit Account		[My Account] [Preferences]
Username	tester	
Password	<input type="password"/>	
Confirm Password	<input type="password"/>	
Email	tester@ena.com	
Real Name	<input type="text"/>	
Access Level	tester	
Project Access Level	tester	
Assigned Projects	Project 0 [tester] (private) Project 1000 [tester] (private) Project 1001 [tester] (private) Project 1002 [tester] (private) Project 1003 [tester] (private)	
<input type="button" value="Update User"/>		

Illustration 8.10: My account's form

8.1.10 Docs

This is where to find documentation for using the bug tracker and project specific documentation. The Project Documentation section displays project specific documentation. Developers, Testers, Managers, and Administrators can upload documentation for each project. This might have specific notes on known issues, product usage, API documentation, etc.

The User Documentation displays the last version of this document.

Project Documentation		[User Documentation] [Project Documentation] [Add File]
 Report Tracker vs Mantis (5 bytes) All Projects (13-05-2008 09:59)		
 Test Methodology v1 (530,944 bytes) All Projects (13-05-2008 09:53)	Presentation containing Enabler's Test Methodology	

Illustration 8.11: List of docs on the Docs' Page

8.1.11 Logout

By clicking on logout the user cookie is deleted and the browser is redirected to the login page.

8.2 How To

8.2.1 Report New Issue

- Click on Report Issue on the upper menu bar;
- Fill up the fields according to the section Report Issues;
- Optionally submit an issue related document file;
- Optionally check the Report Stay check box if you intend to submit similar issues ;
- Click Submit.



Illustration 8.12: Main Menu with underlined link for reporting issues

8.2.2 View Issue

Click on View Issues on the upper menu bar:

- The current project's bug list will be displayed. Click on the upper corresponding ID number regarding the issue you wish to view in detail;
- The detailed view of the bug will be displayed and also the options of this specific bug.
- Click on My View on the upper menu bar:
 - The bugs related somehow to you (Reported, Monitored by you, etc) will be displayed. Click on the corresponding ID number in regards to what you wish to view in detail;
 - The detailed view of the bug will be displayed and also the options of this specific bug.

8.2.3 Change Status

On the previous page, View Issue Page, select the next Issue's Status from the possibilities in the combo box;

The Change Status Page will be displayed and you can modify or add content to the most relevant fields;

Submit the form and you'll be back to the View Issue Page reflecting the changes you made.

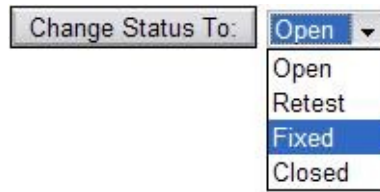


Illustration 8.13: Change Status Combobox

- Still in the View Issue Page, click the Update button to access the Update Page
- Now you are able to change the Date Submitted, Delivered Date and Expected Date according to the logic:
 - Submitted Date has always to be the older date;
 - Closed Date has always to be the newer date;
 - Delivered Date and Expected Date have to be between the above two;
 - Closed Date only exists on a closed issue.

8.2.4 Select Project

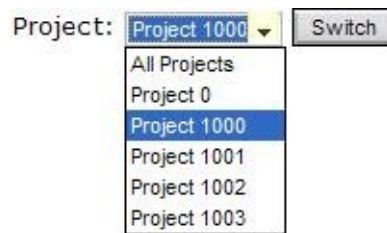


Illustration 8.14: Change Project Combobox

The easiest way to change between projects is selecting between all those you are assigned to in the combo-box above the upper menu
 If you are a new user and, by default, not assigned to any project a form will show up before you access any project related area.

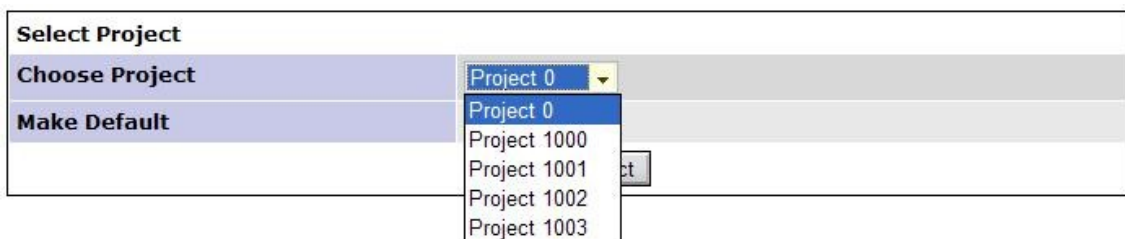


Illustration 8.15: Change Project Form

8.2.5 Export

- On the View Issues Page click on the Export Link;
- The Export Page will now be displayed;
- If you are a new user set up your Printing Preferences:
- Confirm the Required Fields;
- Optionally, add extra fields to the export;
- Optionally, order them;
- Click Update Preference to submit your selection.
- Download the file:
- If you are concerned about the download performance choose CSV if not Excel
- Select between the English and Portuguese version of the files
- You are done. For more information about how to handle the saved export file check the annex.

8.3 Miscellaneous

The following items do not fit in any of the other sections but are still features/restrictions of the Enabler Mantis.

- Files can be uploaded with a maximum of 2Mb;
- Test ID field is a number with a maximum of 6 digits [0-9];
- Issue Jump will lead you directly to the ID specified bug detailed view;
- Below the upper menu bar there is the most recently visited bugs links easing you the navigation between them;
 - On any editable text field if you add a cardinal character(#) followed by a number of any existing bug ID's on the current project you will create a direct link to its View Bug Page. e.g. #13 will direct you to the bug with ID number 13.
 - A issue user lock was implemented restraining the update of a specific issue to one user. This lock expires after 15min. or if the user navigates outside the Update Page.

8.3.1 Excel Format (.xls)

1. Save the Excel Export File;
2. Open it with MS Excel;
3. The data is not perfectly formatted because Excel doesn't not recognizes the text strings received as numbers. You will have to convert them into numbers to have affect on the Excel's formula calculations:
 1. Start by selecting an incorrectly formatted number (they have an green triangle in the left upper corner);
 2. Drag the selection area to all cells;
 3. Click the exclamation mark;
 4. Select Convert to Number between all the options;
 5. Now you can copy/paste the imported data.

8.3.2 CSV (Comma-Separated Values) Format (.txt)

1. Save the Text Export File;
2. Open MS Excel with a blank spreadsheet;
3. Click on Data > Import External Data > Import Data;
4. The Text Import Wizard will pop up;
5. On Step 1:
 1. Choose the radio button Delimited as the original data type;
 2. Choose the character encode type as 65001 : Unicode (UTF-8) avoiding problems with Latin characters;
 3. Click Next.
6. On Step 2:
 1. Tick Comma as the field delimiter;
 2. Choose Double Quotes (") as the text qualifier;
 3. Click Next.
7. On Step 3 just click Finish;
 1. Press OK the following dialog;
 2. You can now copy/paste the imported data.

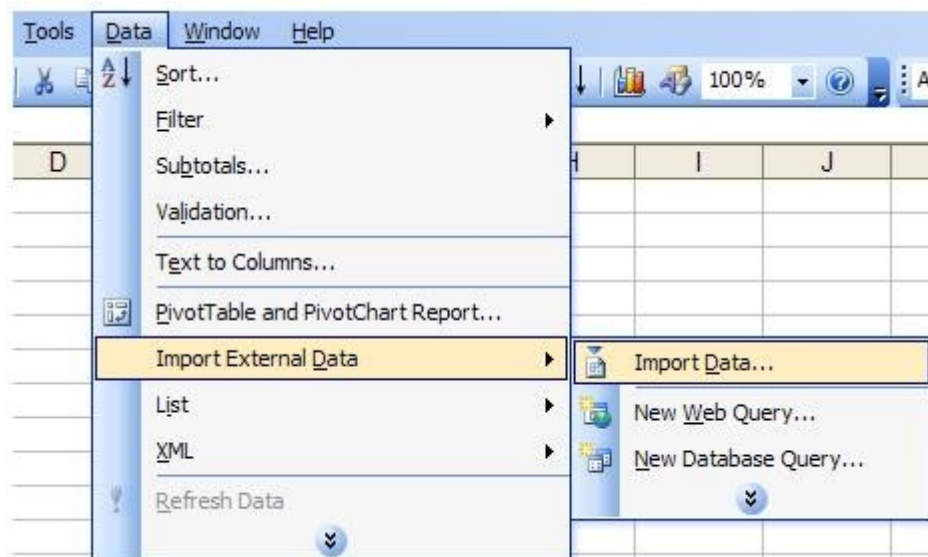


Illustration 8.16: Import CSV File on MS Excel 2003

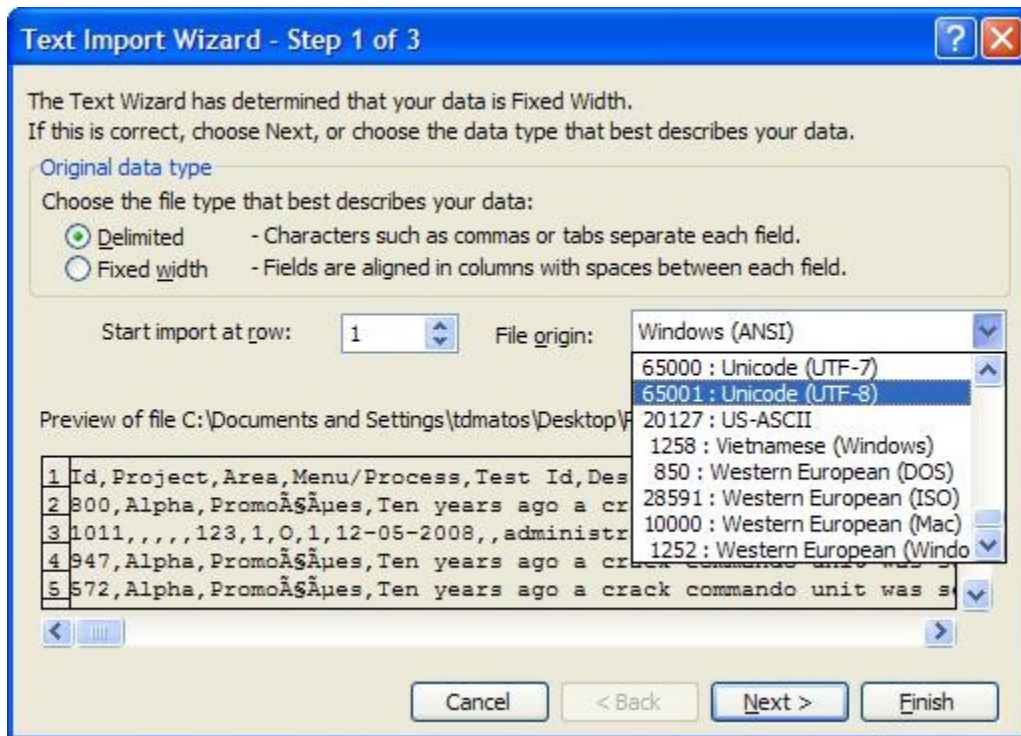


Illustration 8.17: Excel Wizard for CSV Import