

TestTrack Pro 7.0 French Edition

By

Peter N. Jackson

Submitted to
the Faculty of the Information Engineering Technology Program
in Partial Fulfillment of the Requirements for
the Degree of Bachelor of Science
in Information Engineering Technology

University of Cincinnati
College of Applied Science

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TestTrack Pro 7.0 French Edition

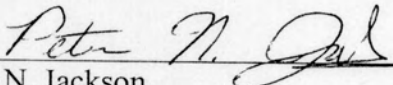
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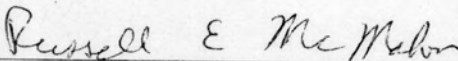
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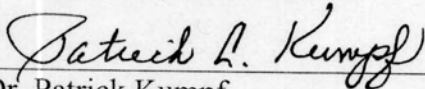
Peter N. Jackson

June 2, 2005
Date



Professor Russell McMahon

June 5, 2005
Date



Dr. Patrick Kumpf

6-2-05
Date

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I would like to acknowledge the work done by Seapine Software in the initial creation of the TestTrack Pro software suite. TestTrack Pro is property of Seapine Software and this project was done while working for and modifying the source code which is Seapine Software's intellectual property.

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Table of Contents

List of Figures	4
Abstract	5
1.1 - Introduction	6
1.1.1 - Area of Need (Problem)	6
1.2 - Proposal for TestTrack Pro 7.0 French Edition	8
2.1 - Technical Details	13
3.1 - Product Description and Intended Uses	17
3.2 - User Profiles	19
4.1 - Design Protocols	21
4.1.1 - Organizational Scheme	21
4.1.2 - Components	22
5.1 - Testing	28
6.1 - Financial Details	29
7.1 - Deliverables & Assumptions	30
8.1 - Proof of Design	32
8.1.1 - Components	32
8.1.2 - Defect Tracking	37
8.1.3 - Database Conversion	39
9.1 - Conclusions & Recommendations	43
Appendix A: Project Logistics	45
Appendix B: References	46

List of Figures

Figure 1 - Screenshot of TestTrack Pro Client (English)	9
Figure 2 - Screenshot of TestTrack Pro Web Client (English)	12
Figure 3 - TestTrack Pro Architecture	21
Figure 4 - Hardware Budget for TestTrack Pro French	29
Figure 5 - Software Budget for TestTrack Pro French	30
Figure 6 - French Web based defect tracking system	33
Figure 7 - French Web based server administration utility	33
Figure 8 - French Windows based defect tracking system	34
Figure 9 - French Windows based server administration utility	34
Figure 10 - French Visual Studio Add-in utility	35
Figure 11 - Add-in Manager Window	35
Figure 12 - French registry editing utility	35
Figure 13 - SoloBug utility	36
Figure 14 - SoloSubmit Webpage	36
Figure 15 - Customizable Workflow Report	37
Figure 16 - Add RDBMS Connection Window	40
Figure 17 - Project Listing	41
Figure 18 - Create new tables	42
Figure 19 - Defect attachment storage options	42
Figure 20 - SQL Server Enterprise Manager	43
Figure 21 - Timeline for 2004	45
Figure 22 - Timeline for 2005	45

Abstract

The TestTrack Pro French project involves the design and process of porting the current English TestTrack Pro software to allow for both English and French versions of the software to be created from the same source code. TestTrack Pro is a software suite designed to aid software developers in tracking, logging, and efficiently handling and solving defects in software. TestTrack Pro has been used in various environments where an all-inclusive and stable information tracking system is necessary such as hospitals and government offices, although the software was originally developed with programming environments in mind.

TestTrack Pro 7.0 French Edition

1.1 Introduction

Seapine Software, Inc. is a market-leading provider of adaptable application lifecycle management (AALM) solutions for enterprise-level software development. Each tool in the Seapine product line is built on innovative technology and is designed to help customers streamline complex business and development processes.

All Seapine products feature seamless integration with each other as well as with a wide variety of other popular software development tools. It is this kind of flexibility that has allowed Seapine to flourish as a powerful company in the AALM solutions marketplace.

Since its inception in 1995, Seapine Software, Inc. has experienced rapid growth, not only domestically, but in international sales as well. Recent sales indicate that Seapine Software, Inc. now has over 175,000 users in over 6,000 companies from 52 different countries worldwide (9).

1.1.1 Area of Need (Problem)

Due to this rapid growth and popularity in non-domestic markets, potential clients are showing rising interest in multiple-language support for products that Seapine Software, Inc. offers. This interest is particularly strong for Seapine's TestTrack Pro 7.0 software suite (1).

A large portion of Seapine's foreign accounts are in Canada, as well as France and certain areas in South Africa. Based on this feedback from current foreign clients, as well as information given to Seapine by overseas marketing and sales departments and resellers, Seapine Software, Inc. as a company would have much to gain from the development of a French version of TestTrack Pro 7.0. Initial research indicates that up to a 20% increase in foreign sales could be reached should Seapine Software, Inc. decide to release a French version of TestTrack Pro 7.0 (4).

This poses a problem, however due to the complexity of the TestTrack Pro software suite it will be relatively time consuming to ensure the validity and quality of any non-English version of the software. Should a French version of the software be produced that either performs worse than the original English version, or is improperly translated, it will be bad for Seapine Software's image as a presence in the AALM marketplace. However, if too much time is taken in developing the foreign version of the software, it will take a longer time to realize financial gains from the project, making it an unnecessary burden on Seapine's financial standing in the near future.

Seapine Software, Inc. has built a reputation in the marketplace for producing high quality, stable, and scalable solutions for developers worldwide. Any move that could jeopardize this standing that Seapine has earned for itself would be ultimately bad for the company. Therefore, this project will need careful evaluation, planning, and implementation to ensure quality and performance parallel with what is expected of Seapine Software's products in the marketplace.

1.2 Proposal for TestTrack Pro 7.0 French Edition

This proposal outlines the process to create a French version of TestTrack Pro 7.0. It will describe the present English version of the product, and then go into further detail on what this project will require in physical and financial resources.

TestTrack Pro is a software suite designed to aid software developers in tracking, logging, and efficiently handling and solving defects in software. TestTrack Pro has been used in other environments where an all-inclusive and stable information tracking system is necessary such as hospitals and government offices, although the software was developed with programming environments in mind. The TestTrack Pro suite employs various internet programming, software development, and database skills and technologies. All of these skills and technologies will be needed to complete the project.

Through the years, TestTrack has embraced new technologies in an effort to reach out to a greater number of users. It has become compatible with various operating systems including Windows, Apple, and Linux systems, conformed to the client-server style of data storage, has developed a Web-based interface which mirrors the functionality of the client software, and now supports various non-native server database options such as Oracle and SQL server. It is this kind of flexibility that has made Seapine one of the forerunners of the AALM marketplace. A French version of TestTrack also aids in this flexibility, and will open doors to new users who were unreachable in the past.

A screen capture of the English version of TestTrack Pro 7.0 Client can be found in Figure 1. It shows the general layout of the program, as well as the main defect window in the background, and the editing window for one of those defects. Various different options are available to the user based on his permission level, which is controllable from a separate TestTrack Pro Server Administration program which will also need to be modified for the French version.

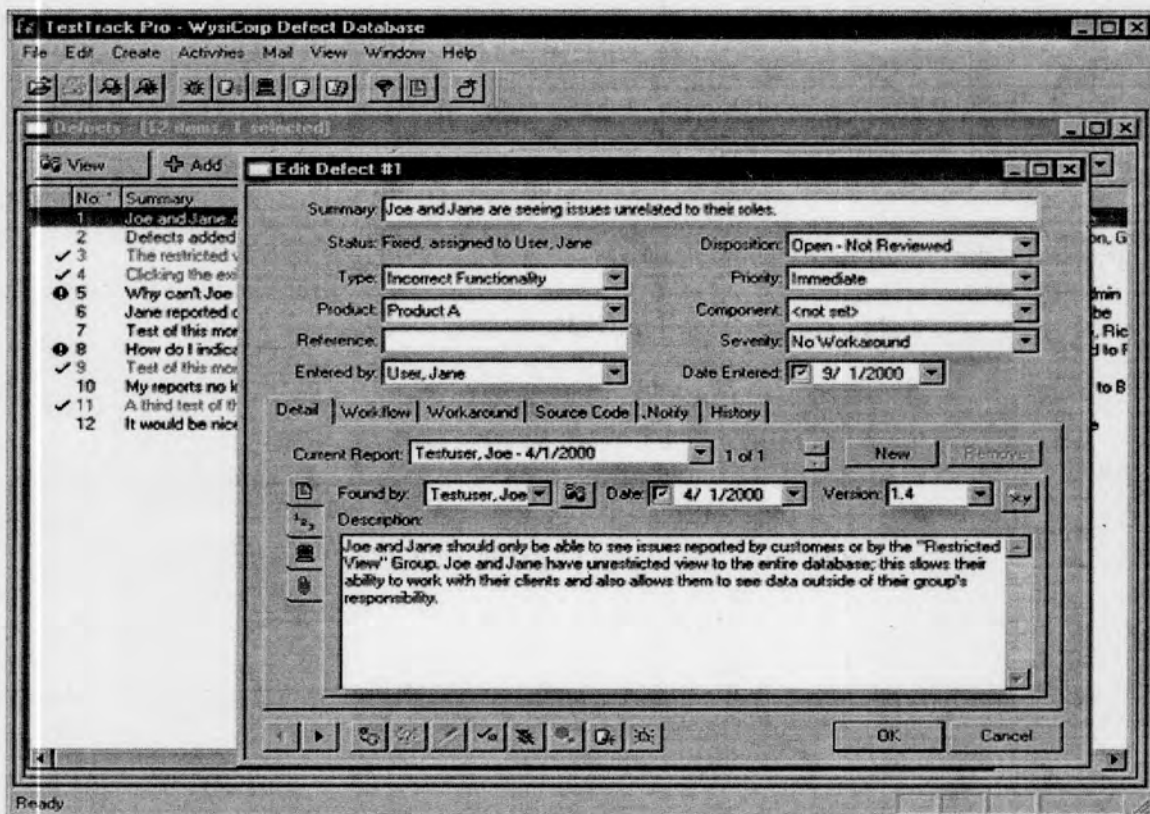


Figure 1. Screenshot of TestTrack Pro Client

TestTrack Pro allows the user a wide variety of options for controlling the organization, workflow, and handling of defects. Some of these available functionalities include:

- *Defect linking options:* Allows a user to more easily track and close related defects, and allows the user to set policies for how those linked defects are handled.
- *Customizable Workflows:* Enables an administrator to design the steps which the users must go through in order to close a defect.
- *E-mail Options:* TestTrack allows users to set up automatic notification services for any user(s) at any point in the workflow cycle. Users can be notified when a defect has been assigned to them, when that defect is open for review or testing, or TestTrack can notify superiors when an important defect has been closed.
- *File Attachments:* A user can choose to append files to a defect, such as attaching a new segment of code onto the defect for future reference.
- *Workbook:* Defects assigned to each user are stored in that person's workbook, that way a user can quickly access open defects. The user can also create tasks to insert in their workbook as a reminder.
- *Defect Filtering:* For efficient navigation in larger defect databases, advanced filtering options are available in TestTrack Pro, speeding up the time it takes to find a particular defect.

- *Auto-Assignment:* TestTrack can be configured to automatically assign defects to appropriate users, ensuring that all users are working on the defects which are a part of the project which they are either already familiar with or are most qualified to handle.
- *Integration into Visual Studio IDE:* Seapine Software, Inc. is a certified Visual Studio Integration Partner (VSIP) and Microsoft Certified Partner (MCP), and TestTrack Pro has the ability to seamlessly integrate with any of Microsoft's Visual Studio IDE suites.
- *Integration into other Seapine Products:* All of Seapine's products interact with one another, to aid the user in more effectively managing the development and refinement of a product (8).

It is this type of functionality which makes TestTrack Pro one of the leading defect-tracking solutions in the marketplace today. During this project, all of this functionality must be kept intact, along with the stability that is inherent in the English version and in all of Seapine's products.

Another part of TestTrack Pro's flexibility stems from the ability to access the server through the use of a Web site provided with the software suite. Through the use of various scripting technologies, TestTrack Pro Web Client has maintained all of the functionality of the regular executable client software, while being able to offer access from a secure computer anywhere at anytime. Seapine also offers a Web-based

solution for administration which mirrors the TestTrack Pro Server Administration software.

The layout shares some similarities in form with the non-Web client software; however it will be more complex to create a French version of the Web client. Many of the buttons and links are actually graphics files which will need to be recreated using the proper French translation, while maintaining a similar look to the Web site.

For example, Figure 2. shows a screenshot of TestTrack Pro's Web interface. All of the main controls, the links on the left, and buttons are graphical images. They will need to be recreated to display French text and commands.

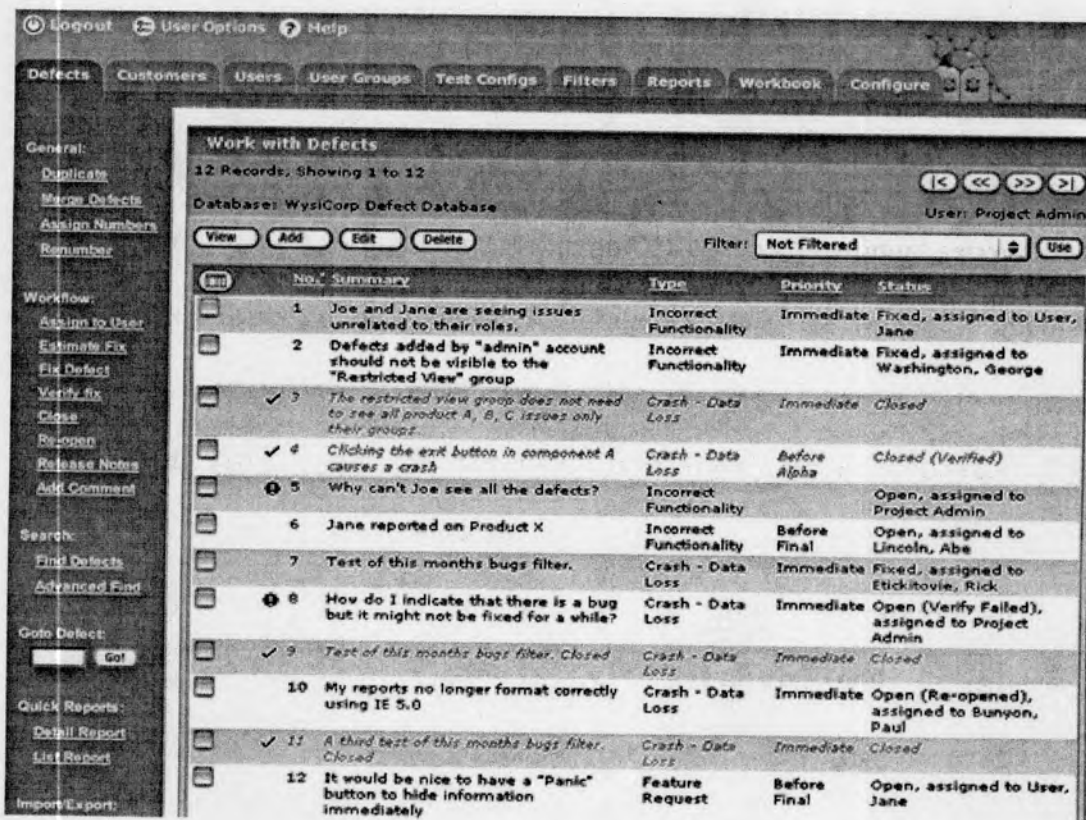


Figure 2. Screenshot of TestTrack Pro Web Client

2.1 Technical Details

2.1.1 Hardware Server:

While the software can be run on a local machine for things such as unit testing, to fully test the solution to ensure that it has maintained full functionality, both a server and a client computer will be needed for the project. A server is currently available for use on the project in the area of testing the software's functionality. This server's details are listed below and the server's value is accounted for in the financial section of this document.

<i>Processor:</i>	Dual Intel Pentium 4 2.0 GHz Processor (Quad Pumped)
<i>Motherboard:</i>	SE7505VB2 / INTEL Motherboard for Dual Intel Xeon Processors
<i>RAM:</i>	2048MB Micron DDR – To allow future server use
<i>Video Processor:</i>	Onboard ATI Rage XL 8MB – Server environment no graphics
<i>Hard Drives:</i>	3x Maxtor 30GB SCSI Hard drives – 3 drives will be mirrored
<i>RAID Controller:</i>	Promise SCSI Raid Controller – for redundancy
<i>NIC Card 1:</i>	Onboard Intel 82540EM 10/100/1000 – Gigabit speed
<i>NIC Card 2:</i>	3Com 10/100/1000 – Redundant Gigabit speed

2.1.2 Software Server:

Microsoft Windows 2000 Server:

The majority of Seapine Software's clients use a Windows server environment when hosting the server program on a network. It is this popularity which makes Windows the optimal environment for testing TestTrack Pro 7.0 French edition. Furthermore, the Web client can also be hosted in this same environment using Microsoft's IIS software.

Microsoft SQL Server:

While TestTrack Pro 7.0 ships with a native database, it must be tested in various test case scenarios. One of which is using SQL server to store database data (7).

Oracle 9i:

While TestTrack Pro 7.0 ships with a native database, it must be tested in various test case scenarios. One of which is using Oracle to store database data (7).

Seapine Software, Inc. TestTrack Pro, Surround SCM, and QA Wizard software:

Because Seapine Software, Inc. develops tools to help the software developer, it is only natural that the company's own products will be used in the production of TestTrack Pro 7.0 French Edition. The English version of TestTrack Pro will be used both in the tracking of defects with the French version, as well as in

comparison to the finished French version to ensure similar quality in the GUI as compared to the original. Surround SCM will be used to manage and protect the source code, and QA Wizard will be used in automated testing for both the debugging and release builds (1).

2.1.3 Hardware Client:

Because TestTrack Pro is designed around a client-server environment, a client machine will be needed to test the connection with the server. This machine will also be used in the development and building of the finished project.

<i>Manufacturer:</i>	HP
<i>Processor:</i>	Intel Pentium 4 1.6 GHz Processor
<i>RAM:</i>	768 MB
<i>Video Processor:</i>	Onboard Graphics controller 64 MB shared memory
<i>Hard Drives:</i>	40GB Hard drive
<i>NIC Card 1:</i>	Onboard NIC card

2.1.4 Software Client:

Microsoft Windows XP Professional:

While the software does currently support Apple and Linux operating systems, a Windows environment will be used on the client machine. The majority of Seapine's clients use Windows XP environments when using the TestTrack Pro Client

software, so this will afford the most frequent test case scenario. Furthermore, the use of a Windows XP environment will permit the use of Microsoft's Visual Studio IDE software suite for the development and building portion of this project.

Microsoft Visual Studio:

This versatile IDE will be used in the development and production of the project.

Microsoft Internet Explorer 6.0/Netscape/Mozilla Web Browsers:

Because the current English software is compatible with many different browsers for the Web based portion of the program, the French version will need to be tested on various different browsers (8).

Seapine Software, Inc. TestTrack Pro, Surround SCM, and QA Wizard software:

Because Seapine Software, Inc. develops tools to help the software developer, it is only natural that the company's own products will be used in the production of TestTrack Pro 7.0 French Edition. The English version of TestTrack Pro will be used both in the tracking of defects with the French version, as well as in comparison to the finished French version to ensure similar quality in the GUI as compared to the original. Surround SCM will be used to manage and protect the source code, and QA Wizard will be used in automated testing for both the debugging and release builds (8).

3.1 Product Description and Intended Uses

TestTrack Pro is a software suite designed to aid software developers in tracking, logging, and efficiently handling and solving defects in software. TestTrack Pro has been used in various environments where an all-inclusive and stable information tracking system is necessary such as hospitals and government offices, although the software was originally developed with programming environments in mind.

The core of this software suite is a series of databases. These databases can permanently retain all of the defect data, along with data regarding users, settings, customizable fields, project options, server options, and much more. These databases can either be created as TestTrack Pro's native databases, or can be converted by the software suite into an Oracle or Microsoft SQL Server environment. The data stored in these databases can be recalled from various different client environments for viewing, modifying, and printing various reports. TestTrack Pro can operate in a single-user environment as well as in a multiple-user server-centric network environment, and even multiple-user, multiple-server environments.

There are several main elements to this software suite, all of which fall into the categories of databases and their various user interfaces. The user interfaces are links to the database. The various databases are for the licensing server; the central server database which controls global options, users, settings, and the various project databases; and the project databases themselves wherein defect data and project-specific information such as defect workflow is archived.

The various interfaces include License Server and TestTrack Pro Server Administration interfaces, which give TestTrack Pro administrators the ability to

configure, maintain, customize, and control the software and database information; a stand-alone client interface, a Visual Studio add-in client, and a Web-client, all for modifying and adding defect data and project-specific information and settings to the individual project databases; a stand-alone dialog and a Web page for reporting single defects to a project database; and a Registry Editing utility to allow administrators easier access to modifying TestTrack Pro specific registry settings.

Once the software suite is properly installed and configured to suit the environment, users log into a project on whatever server they desire, so long as they have been granted access to that project. Once logged into the client, they can add, view and modify defects through the client interface. Depending upon what access they are granted within the project, they also can set events to defects, effectively moving the defect through its lifecycle or "workflow". The databases track all of this information as each defect moves through its workflow, and the workflow design is customizable on a project-to-project basis. All of this information can be accessed by multiple users simultaneously, while still maintaining proper data integrity.

The server software can also notify users via Email when a defect reaches a certain point in the workflow, is assigned to them, or through various other circumstances. Also the server can keep track of a detailed Audit Log for events and changes within project databases, along with asking for Electronic Signatures. Reporting options are also given to the users through the client interface, and reporting is completely customizable by the user.

3.2 User Profiles

There are three categories of application users. The three levels include customers, users, and administrators.

3.2.1 Customers

Customers are often indirect users of TestTrack Pro. Customers are people who are responsible for submitting defects they find into an appropriate project; however they have no rights to view or make changes to any items in a project database. Customers are not given authorization to log into any TestTrack Pro client, but they are able to interact using the SoloBug executable and any SoloSubmit webpage.

Customers come from various sources and are not necessarily employees. Customers include beta-testers, partners, resellers, and clients. Therefore not all of the customers are experienced computer users. However, customers are only expected to know how to use the Solobug and SoloSubmit clients that come packaged with TestTrack Pro. The main difference between Customers and Users is that Customers are not directly involved with the workflow of repairing a defect. Customers are only responsible for entering single defects into a database, and verifying that changes to the associated product have repaired the defect. They are given no access to modify or view defects that they do not enter through Solobug or a SoloSubmit Web page.

3.2.2 Users

These employees are the primary users of TestTrack Pro. Users are the people who are responsible for entering and modifying defect information as the defects move

through the workflow. They also can be granted or denied the ability to accomplish some of these tasks based on their role in the company and their role in defect repair.

The users are often yearly employees. These employees include software developers, quality analysis experts, and often sales, support and documentation personnel. All of the users are experienced computer users. However, no knowledge of third-party software is necessary for users to successfully use TestTrack Pro.

3.2.3 Administrators

Administrators are the highest level of users of TestTrack Pro. Administrators are responsible for maintaining licenses, the server database, individual project databases, and security groups. Administrators are often also responsible for configuring Email notifications, Web clients, servers, and the Users and Customers that use the software.

Administrators usually consist of yearly employees. All of the administrators can be considered advanced computer users. Administrators should have training in many various technologies. Depending upon the environment, they may also need to be capable of editing TestTrack Pro Native, Microsoft SQL Server, or Oracle databases using the appropriate database management program.

4.1 Design Protocols

4.1.1 Organizational Scheme

TestTrack Pro is implemented with a client/server architecture. However, there are many components in this application, not just the client and server. The following diagram shows the various executables that are shipped to TestTrack Pro customers.

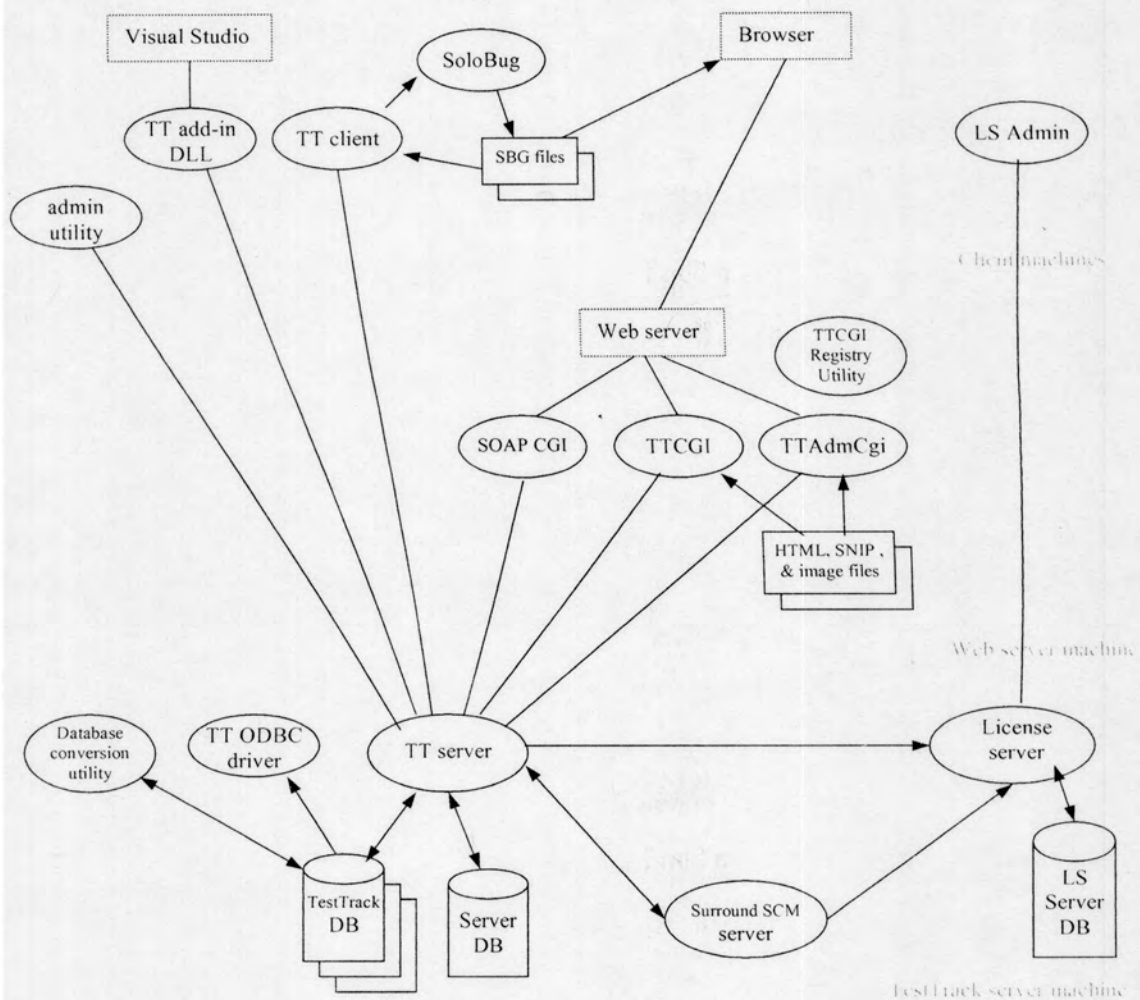


Figure 3. TestTrack Pro Architecture

In Figure 3, all Seapine executables are shown as ovals. All 3rd party executables are shown in a rectangle with a dotted line. All Seapine generated files (non-executables) are shown in a rectangle with a solid line. CodeBase database files are shown with a cylinder shape.

Some of the TestTrack components can only run on a specific platform, while other components can run on a variety of platforms. The French version of TestTrack Pro will consist of Windows-only components. However, a user will still be able to access the server through the Web client interface.

The following sections will describe each major component shown in the diagram which will need to be modified for the French version of TestTrack Pro. A brief description is also given for each component.

4.1.2 Components

TestTrack Pro Server Administration Utility

The TestTrack Pro Server Admin Utility is used to configure the TestTrack server. All changes made in this utility are independent of a specific TestTrack database and thus apply to all TestTrack databases. Any data shown in this utility is either stored in the Server Database or in the Windows registry.

The admin utility UI allows a user to add/edit/delete TestTrack databases and server users. It allows monitoring of the outgoing mail queue and server error log. It also provides a way to set server options for logging, sending mail, adding

RDBMS connections, converting the server database to SQL or Oracle, and Web behavior.

TestTrack Pro Add-in Library

The TestTrack Pro add-in library (.dll file) works very similar to the TestTrack Pro Client component, except the functionality is more limited. The add-in library allows a user to access TestTrack functionality from within Visual Studio .NET, Visual C++ 6.0, and/or Visual Basic 6.0. The user can configure Visual Studio to display a TestTrack toolbar. When toolbar buttons are pressed, TestTrack dialog boxes are shown (unlike the MDI interface in the TestTrack client executable).

TestTrack Pro Windows Client

The TestTrack Pro Client executable provides an OS native GUI to display and edit TestTrack data. This is the component most familiar to TestTrack users. The users can add/edit/delete defects, users, customers, filters, reports, user groups, test configurations, and tasks (these are the eight main business objects). The user can also configure various options/settings.

The TestTrack Pro Client executable can be configured to always connect to the same TestTrack Server or to prompt the user to determine which TestTrack Servers to connect to. After connecting to a server, the user must select which database to open and provide a username and password. All changes made in this client executable are specific to a single TestTrack database.

The TestTrack Pro Client has an MDI interface allowing one list window for each of the eight main business object types, but it allows an unlimited number of add/edit/view windows for each of these objects.

The TestTrack Pro Client can be configured to communicate with a SCC application, providing a way to associate code changes with a specific defect.

TestTrack currently supports integration with a variety of different SCC applications including Visual SourceSafe, PVCS, CVS, Perforce, StarTeam, CS-RCS, SourceOffsite Classic, and Seapine's own Surround SCM.

SoloBug

SoloBug is a small executable that Seapine's customers can distribute to their customers free of charge. If a company owns a single TestTrack license, then the company has unlimited distribution rights for SoloBug.

SoloBug is a bug entry UI that stores the input data in SBG files. These SBG files can then be imported into TestTrack. SoloBug does not require a login username. SoloBug only allows input of data, it does not allow a person to check on the status of a bug nor can they modify the defect after it has been imported into TestTrack.

SoloBug settings are configurable from the TestTrack Client executable. The unusual thing about SoloBug is that configuration settings are written directly to the SoloBug executable. Thus, you only need to distribute a single executable file (rather than an executable and configuration file).

TestTrack Pro Web Interface

The TestTrack Pro Web Interface consists of a CGI (common gateway interface) application that is used to access the TestTrack Pro project databases using a Web user interface. The TTCGI executable must be on the same machine as the 3rd party web server and the ttcgi.exe file resides in the scripts directory (cgi-bin directory for Apache).

The Web interface takes requests generated from the browser and passes it along to the TestTrack server. The TTCGI merges data from the TestTrack server with HTML, SNIP, and image files to generate the output displayed by the browser.

The Web Interface can only talk to a single TestTrack server. That TestTrack Pro server's IP address and port are retrieved from the Windows registry.

TestTrack Pro Server Administration Web Interface

The TestTrack Pro Server Administration Web Interface is very similar in design to the ttcgi executable, except that server administration functions are provided. The TTCGI executable provides a Web interface for the same functionality as the TestTrack Pro Windows Client component. The TTAdmCgi executable provides a Web interface for the same functionality as the TestTrack Pro Server Administration Utility component.

HTML, SNIP, & Image Files

These files reside by default in the TTWEB directory on the web. These files are used by the CGI executables. The HTML files contain field codes that are

replaced with either TestTrack data returned from the server or replaced with more HTML code retrieved from the SNIP files. For example, the %DESC% field code is replaced with a defect description. SNIP files are snippets of HTML code that are part of screens. Users can modify the HTML, SNIP, and image files to customize the look of TestTrack for their company.

TestTrack Pro Registry Utility

TTCGI, TTAdmCgi, and SOAP CGI settings are stored in the registry on the Windows platform. Some customers are leery of modifying registry entries, so a registry editing utility was created. This utility allows configuration of each CGI setting, does error checking, and then writes the values to the Windows registry.

TestTrack Pro Server

The TestTrack Pro Server is the central holder of all TestTrack data. The various client components (Server Administration Utility, add-in library, Windows client, TTCGI, and TTAdmCgi) talk to the TestTrack Pro Server via TCP/IP. The port used for communication with the TT Server is configurable (default is 99 on the Windows platform).

The TestTrack Pro Server reads and writes data to the CodeBase, Oracle, or SQL database. It is also responsible for maintaining the validity and integrity of the data. The TestTrack Server interfaces with an SMTP host or MAPI server to send email and optionally interfaces with a POP3 server to retrieve incoming email.

Under Windows, the TestTrack Pro Server can be configured to run as an application, 95/98 pseudo service, or an NT/2000 service. The TestTrack Pro Server executable runs as a multi-threaded application spawning a separate thread for each client socket connection.

Seapine License Server

The Seapine License Server is the central holder of all global user data. The various product servers within the Seapine suite talk to the license server to validate licenses, user logins, and administer global user information. The port used for communication with the License Server is configurable. The communication may also be encrypted and require a communication password which must be configured on the License Server and on the other product servers.

The License Server reads and writes user and license data to a CodeBase, Oracle, or SQL database. Under Windows, the License Server can be configured to run as an application, 95/98 pseudo service, or an NT/2000 service. The License Server executable runs as a multi-threaded application spawning a separate thread for each client socket connection.

Seapine License Server Admin Utility

The License Server Admin Utility is used to configure the TestTrack server and administer all license and global user information. All changes made in this utility are independent of a specific product and are shared across all products.

The admin utility UI was written in QT and allows a user to add/edit/delete licenses and global user information.

5.1 Testing

Testing includes both unit testing during project development, as well as regression testing once the project reached the alpha cycle. Testing was very important to this project as every dialog window, database entry, and error message had to be verified in every possible situation.

Unit testing is directly related to the section of the program currently being modified. It was used to ensure the proper modifications were made prior to the entire suite being built. Unit testing is very important; as each time the suite is built it enters into another regression testing phase. Regression testing is exceedingly time intensive testing, and errors which are caught in unit testing save much more time in the long run, as the software then needs to be built a fewer number of times, and therefore less regression testing is necessary.

Regression testing was done after each alpha and beta build was created for the project. Regression testing is a complete and thorough testing procedure, where each possible dialog combination is viewed, error messages are checked, and improper values are entered into dialogs to ensure that invalid entries are not being used. Regression testing is a full test of the project's functionality and appearance, and documentation of any known defects for repair before the next build.

6.1 Financial Details

On the following page there are invoices created to serve in budgeting the creation of TestTrack Pro French Edition. The actual perceived budget for the project will be far less than the listed amount as much of the equipment and software is already available for the creation of the project. These invoices show pricing under the assumption that the creation of TestTrack Pro 7.0 French Edition will be an independent venture. The cost of the hardware involved can be seen in Figure 3., while the cost for licensing the required software can be found in Figure 4.

6.1.1 Hardware Invoice

Quantity	Description	Unit Price	TOTAL
1	Rack-mount Server Dual P4 2.0 GHz 2048 MB RAM 3 - 30 GB SCSI Hard Drives	\$8,000.00	\$8,000.00
1	HP Personal Computer P4 1.6 GHz 768 MB RAM 40 GB Hard Drive	\$500.00	\$500.00
		Subtotal	\$8,500.00
		Shipping	
		Tax Rate(s)	
Comments:	This is an estimation of the cost involved in producing TTPro 7.0 French Edition.	TOTAL	\$8,500.00

Figure 4: Hardware Budget for TestTrack Pro French

6.1.2 Software Invoice

Quantity	Description	Unit Price	TOTAL
1	Microsoft Windows XP Professional	\$280.00	\$280.00
1	Microsoft Windows 2000 Server	\$835.00	\$835.00
1	Microsoft SQL 2000 Server	\$4,675.00	\$4,675.00
1	Microsoft Visual Studio .NET 2003	\$700.00	\$700.00
1	Oracle 9i	\$15,000.00	\$15,000.00
1	Seapine Software TestTrack Pro 7.0, Surround SCM, and QA Wizard	\$5,000.00	\$5,000.00
		Subtotal	\$26,490.00
		Shipping	
		Tax Rate(s)	
Comments:	This is an estimation of the cost involved in producing TTPro 7.0 French Edition.	TOTAL	\$26,490.00

Figure 5: Software Budget for TestTrack Pro French

7.1 Deliverables and Assumptions

The objective of this project is to modify the existing TestTrack Pro source code to allow for both French and English versions of the TestTrack Pro 7.0 software suite. This document has described estimated prices for all services needed to implement a solution which is cost-effective both now and for any future French versions of the software.

7.1.1 Deliverables

- This project will contain a Web based defect tracking system which manages and tracks defects for various projects on a TestTrack Pro server.

- b. This project will provide a dynamic common gateway interface written in C++ using HTML and SNIP files to create an interactive Web interface accessible by multiple users simultaneously.
- c. This project will contain a Web based server administration utility which allows for server data manipulation and database conversion between the native CodeBase databases, SQL databases, and Oracle databases.
- d. This project will provide a dynamic common gateway interface written in C++ using HTML and SNIP files to create an interactive server administration utility accessible from a Web interface.
- e. This project will contain a Windows based defect tracking system written in C++ which manages and tracks defects for various projects on multiple TestTrack Pro servers.
- f. This project will contain a Windows based server administration utility written in C++ which allows for server data manipulation and database conversion between the native CodeBase databases, SQL databases, and Oracle databases.
- g. This project will contain an add-in utility for accessing TestTrack Pro 7.0 French from within Visual Studio.
- h. This project will contain a Windows registry editing utility for modifying TestTrack Pro specific information in the registry.
- i. This project will contain a SoloBug executable and SoloSubmit Web page for use by the Customer user group.

- j. Completing this project will incorporate the use and knowledge of various technologies and third-party software, including:

- C++ and HTML programming
- Microsoft IIS and Apache Web servers
- Microsoft Visual Studio 6E, 2002, and 2003 .NET
- Microsoft SQL Server
- Oracle 9i and 10g Server
- Microsoft Visual Source Safe and various other SCC providers such as PVCS, CVS, Perforce, StarTeam, CS-RCS, and SourceOffsite Classic
- CodeBase
- Microsoft Visual FoxPro
- Seapine Surround SCM, TestTrack Pro, and QA Wizard

8.1 Proof of Design

8.1.1 Components

The following figures consist of screenshots displaying the separate components of the TestTrack Pro Software Suite which were included in the deliverables section of this document. Greater descriptions of the separate components are available in the Design Protocols section of this document, and descriptions of usage are available later in this section.

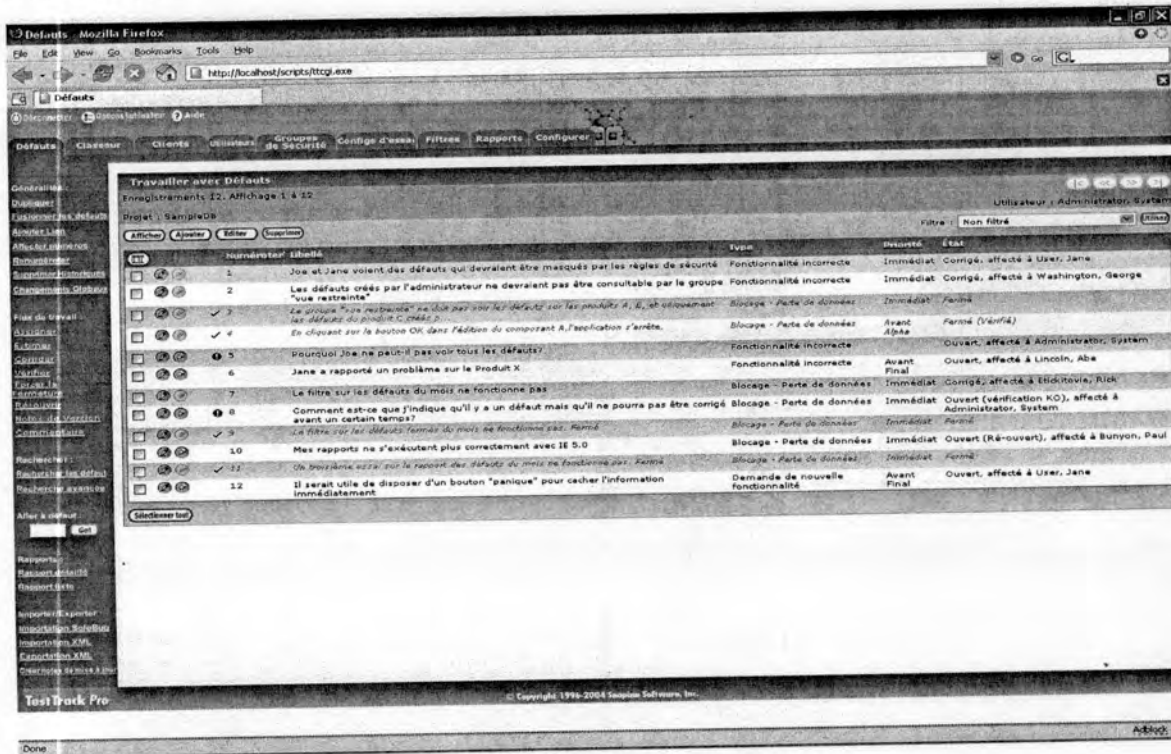


Figure 6. French Web based defect tracking system

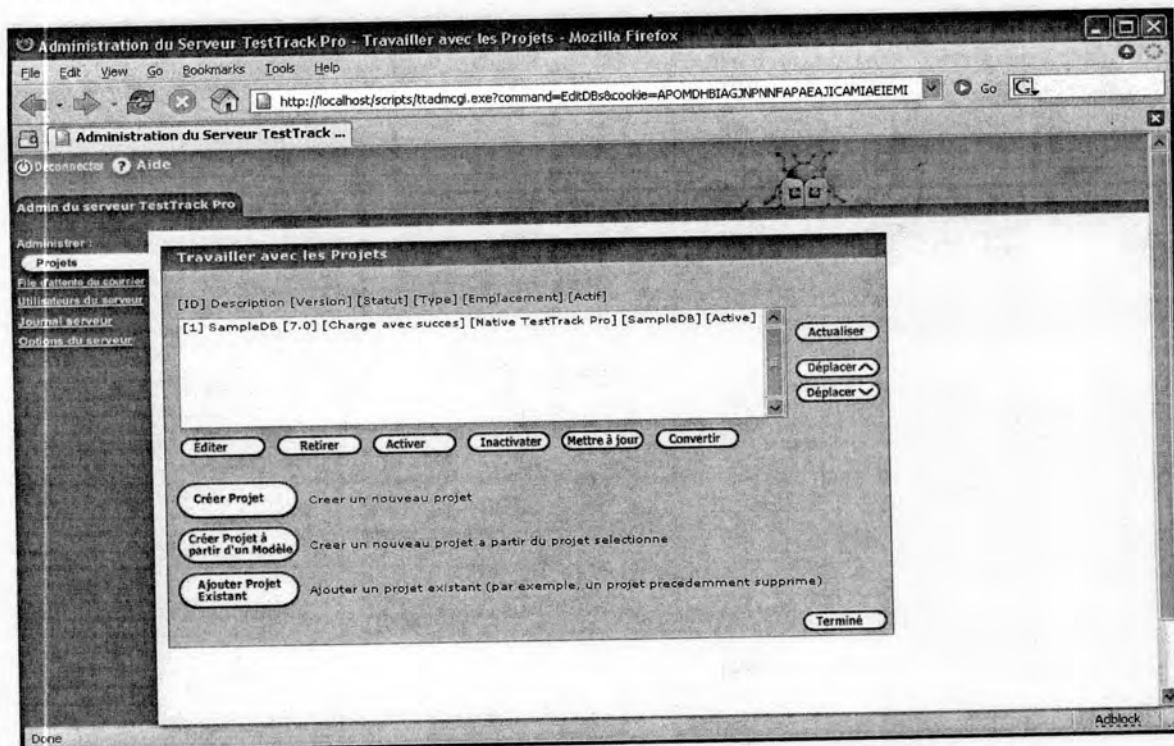


Figure 7. French Web based server administration utility

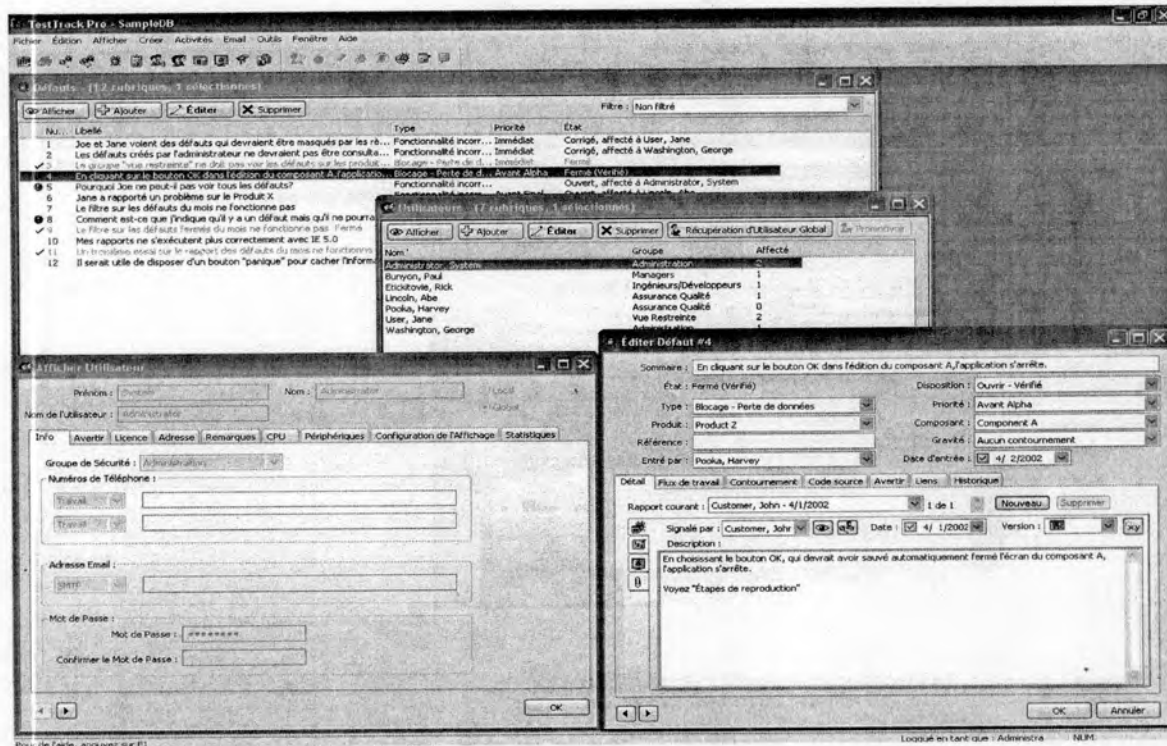


Figure 8. French Windows based defect tracking system

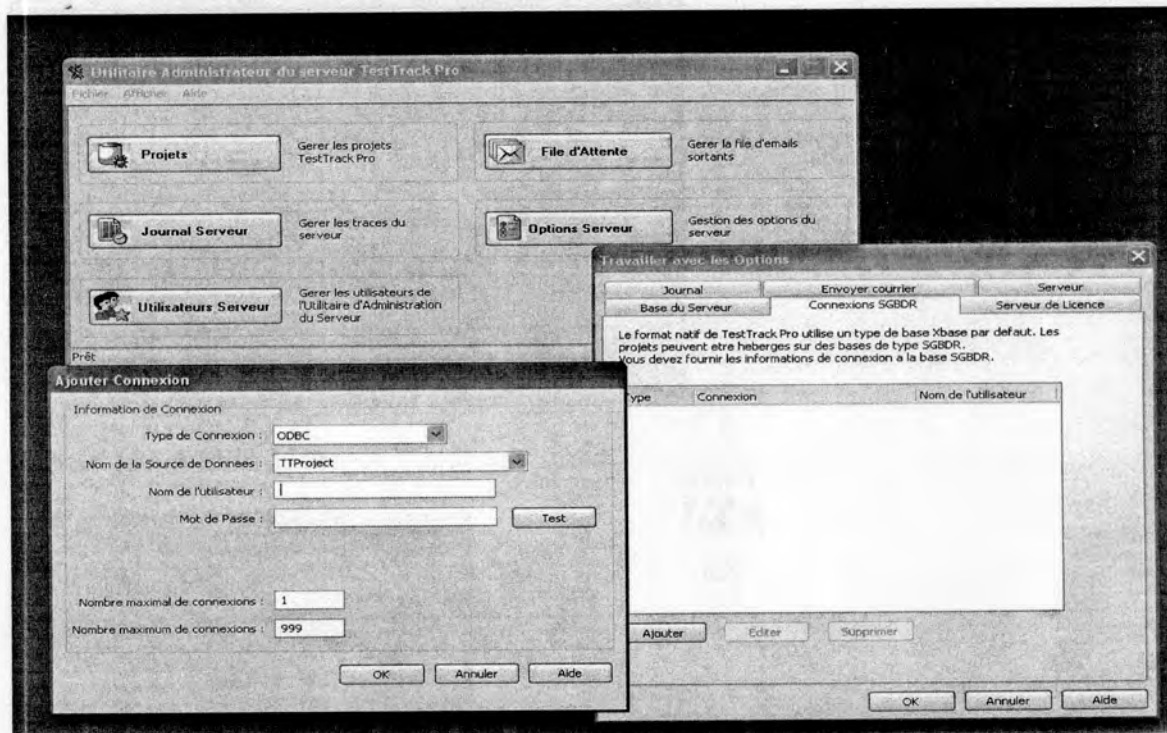


Figure 9. French Windows based server administration utility

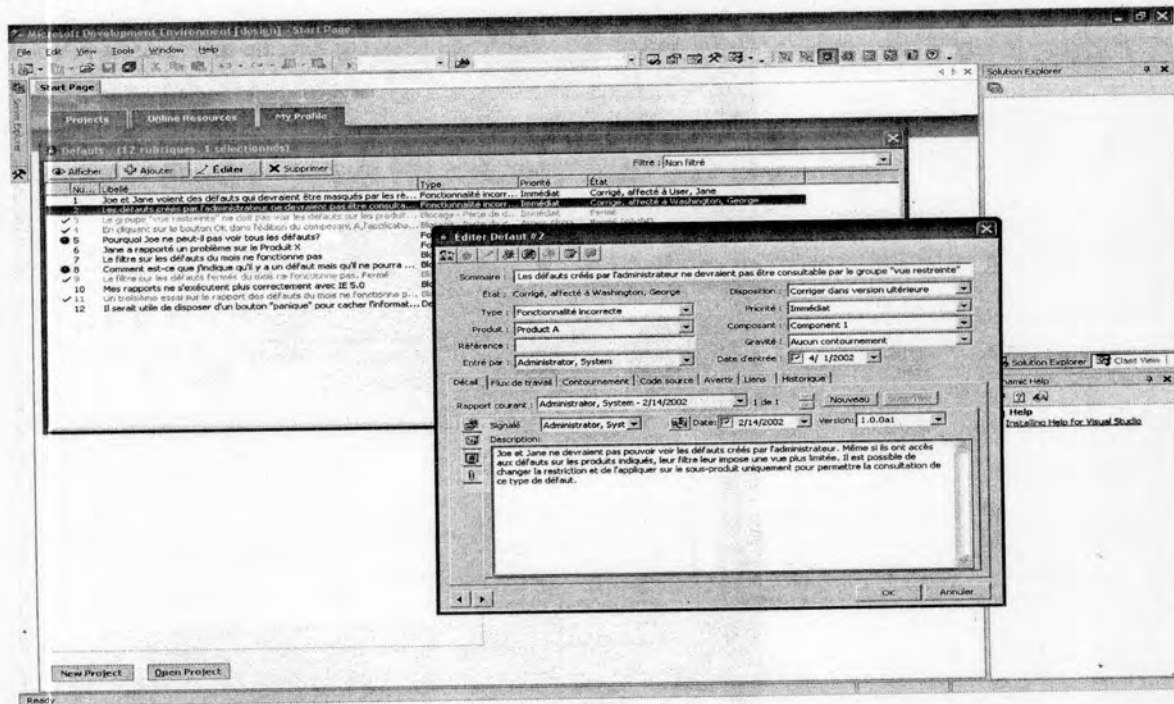


Figure 10. French Visual Studio Add-in utility

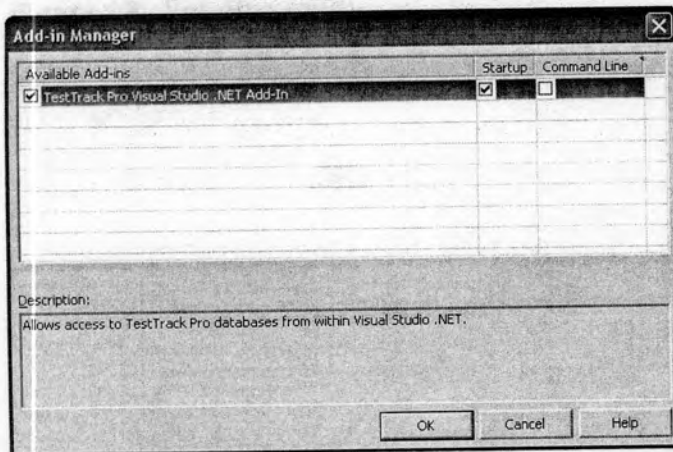


Figure 11. Add-in Manager Window

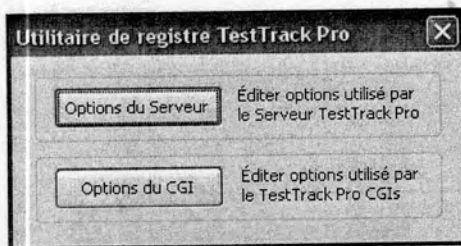


Figure 12. French registry editing utility

Figure 13. SoloBug utility

Figure 14. SoloSubmit Webpage

8.1.2 Defect Tracking

The defect tracking functionality functions in a way such that the entire defect lifecycle or “workflow” can be customized to suit the environment. Certain users can be either granted or denied access to adding certain events to a defect, which can make it so that it can only be moved from one point in the workflow to the next by certain users. For example, when a defect is in a state which can be classified as “Open” administrative users can be given access to immediately close the defect, while developers can be granted access to estimate or fix the defect which would release the defect back to testing in the default workflow design.

Figure 15 displays an XML report of the default workflow in the sample project database which ships with TestTrack Pro French. You will notice that the boxes contain what are known as “states”. These are different states available to a defect which is in the project database. Depending upon which state the defect is located in, one or more paths, or “events”, are available to move the defect into a different state.

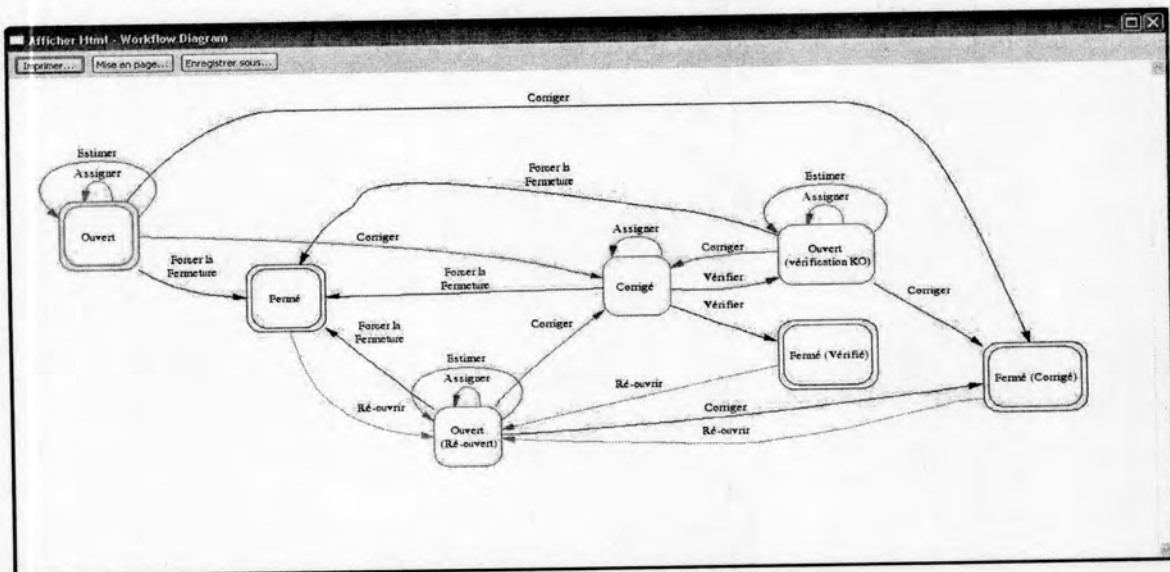


Figure 15. Customizable Workflow Report

It is this workflow structure combined with strict security settings which allow defects to be tracked and handled efficiently and easily. In a normal software development setting, all defects would be handled in a set and structured manner ensuring that no problem goes unnoticed or unfixed. It also ensures and tracks that the only users modifying the defects status are those who have significant rights and reasons to do so. Furthermore it allows those in management and administration roles to easily monitor office productivity, major problems, and to manage developers and QA specialists without having to do excess day-to-day micromanagement.

A typical defect will pass through the following states. First it will be entered into the project database by either a support or QA specialist, who will enter as much information as possible about the defect. Then, either a manager will assign defects to specific team members along with a priority level, or the team members will assign defects to themselves if allowed. The process of assigning the defects ensures that there are never multiple people working simultaneously on the same problem, which increases productivity and lessens the chance of further problems. Then the assigned developer can investigate the problem, and either enter a fix event or estimate the fix for a later date. Then commonly the fix will place the defect in the "released to testing" status. It is at this point where the internal Quality Analysis department will review the defect to see if it has indeed been fixed and if any other problems have arisen because of the fix. Once it has been verified, it is up to the project manager to close the defect. Closing the defect removes it from the list of still open defects, but retains all of the information and event history for future review.

8.1.3 Database Conversion

TestTrack Pro ships with a native CodeBase database system which allows the software to directly interact with its own database tables as files stored securely on a server. However, some customers need the extra security, stability, and functionality which can be increased through other database management system software.

To remedy this problem, TestTrack Pro has the ability to create its table structure in either Microsoft SQL Server or Oracle, as well as the ability to convert existing databases between these three available database management options. This is true of the server databases as well.

This conversion functionality can be accessed in either of the server administration utilities. Project database conversion options lie under the Project settings, and server database conversion options lie under the Server Database tab of the Server Options settings.

In order to use the conversion abilities, RDBMS settings need to be entered into the server administration utility for each connection which is going to be used. The server will automatically populate any system DSN entries which are already set up in the system, and gives you the option to enter Oracle connection information as well. In figure 15 you can see that we are looking at the "Add Connection" window which was accessed from the RDBMS Connections tab of the Server Options button from within the server administration utility. You may also note the drop down menus in this window. The top drop down menu allows you to select from either adding an ODBC connection or an Oracle connection (selecting Oracle changes the window to reflect the

settings needed to create an Oracle connection); while the second drop down populates the current system DSN connections available when using ODBC.

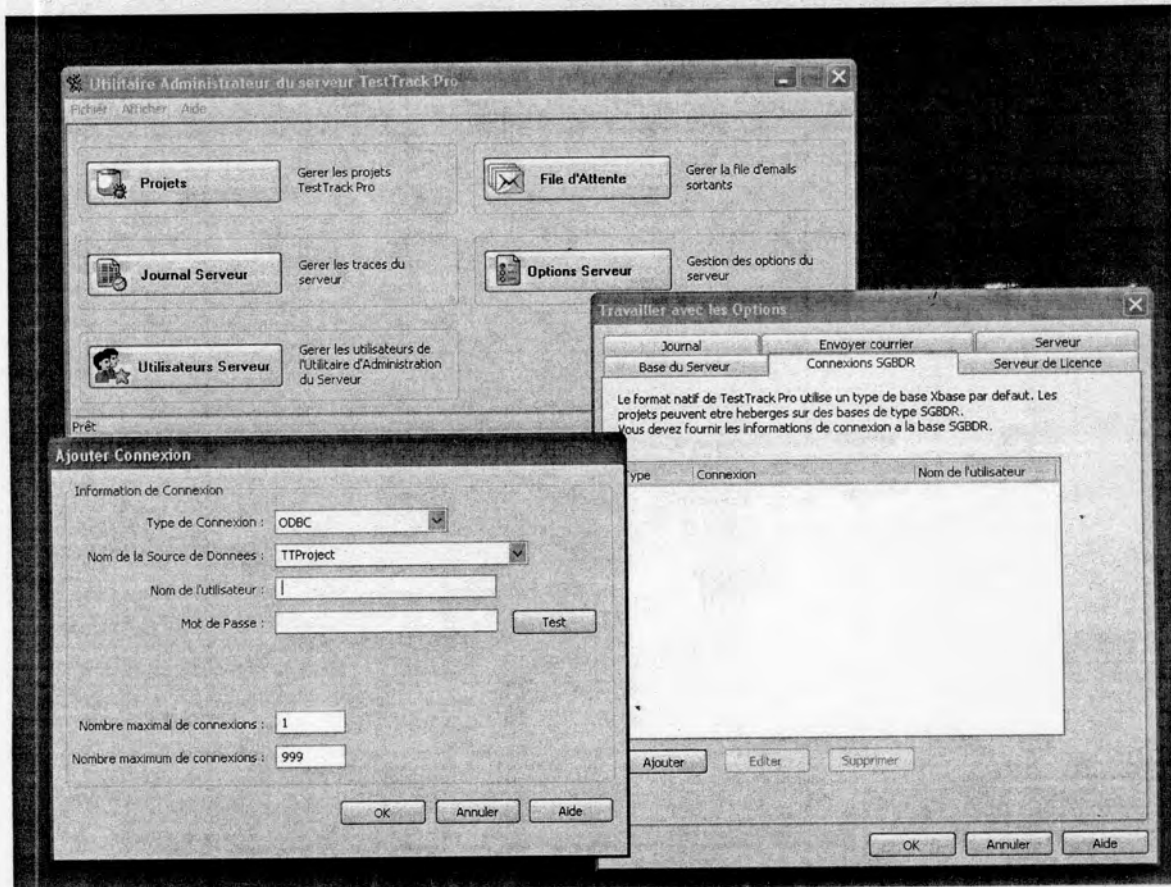


Figure 16. Add RDBMS Connection Window

After you have connections setup for the conversion process, you simply need to enter into the project listing, inactivate a project (users cannot be accessing the database while it is being converted), and then click the button to convert the project. This procedure is shown in figure 17 and can also be accessed from the Web server administration interface.

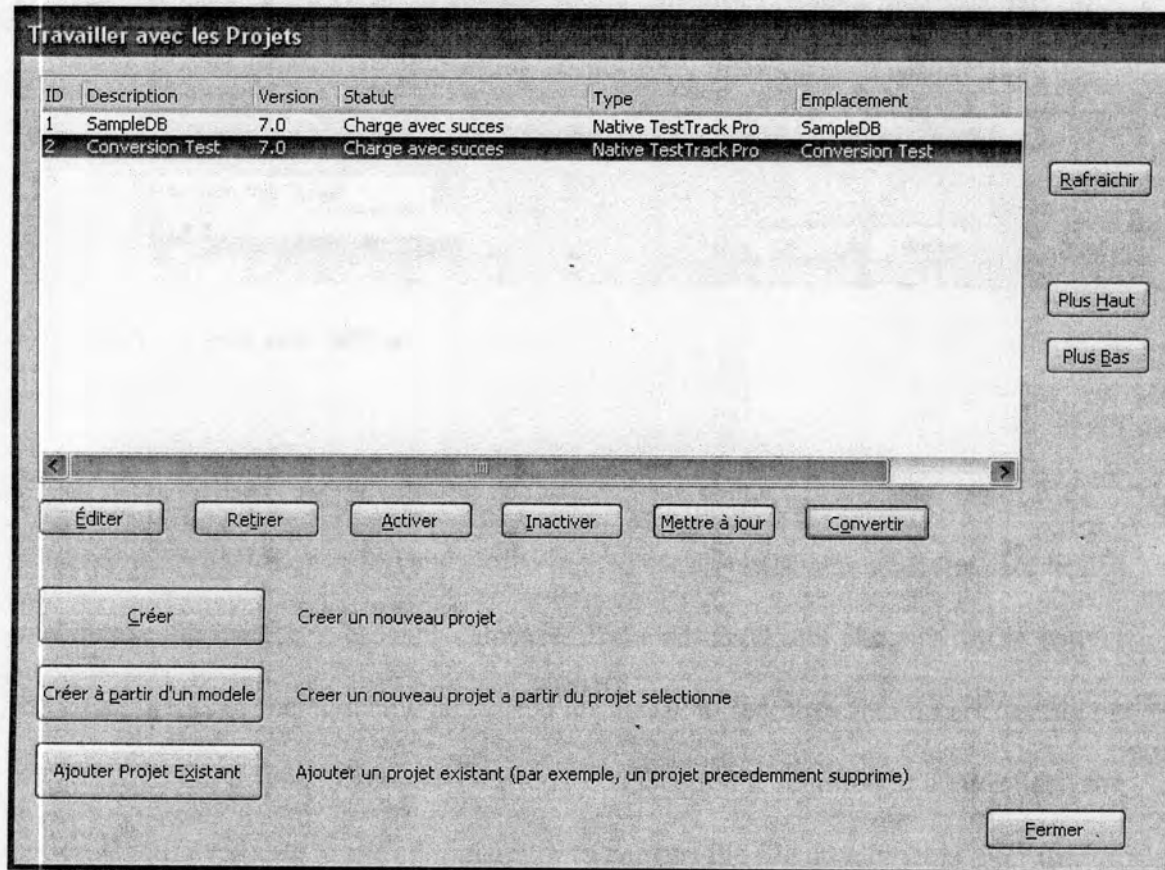


Figure 17. Project listing

When creating or converting a project into a SQL or Oracle database for the first time, the software needs to add the table structure for using TestTrack Pro, this is true for when converting both project and server databases. TestTrack Pro can do this automatically for the user, so that the tables do not need to be entered manually by an administrator.

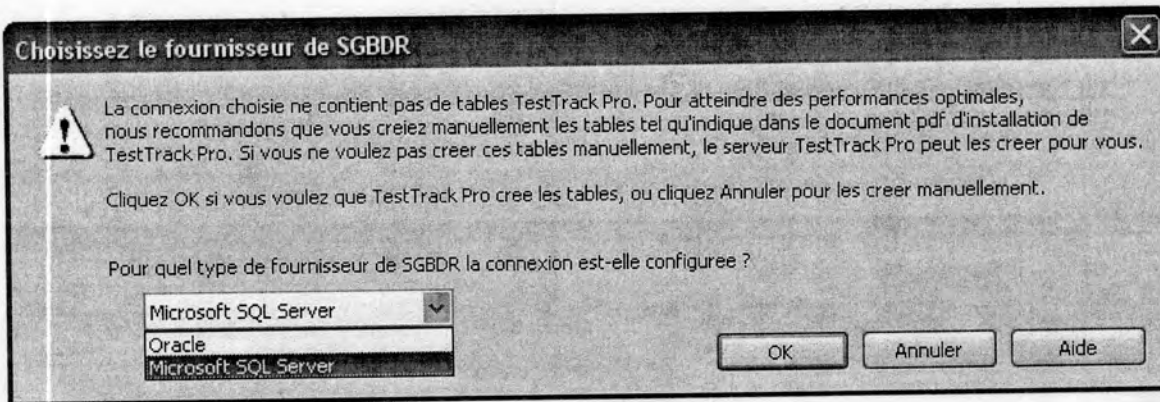


Figure 18. Create new tables

The software also allows the administrator to determine whether or not file attachments will be converted and stored in the new database and what file size limit will determine storage in the new database. If the administrator chooses not to convert the attachments or the attachments exceed the size selected, they remain accessible but are stored in the original database location. If relocation is required at a later date, the option is still available to the administrator to convert the file attachments over through another project option.

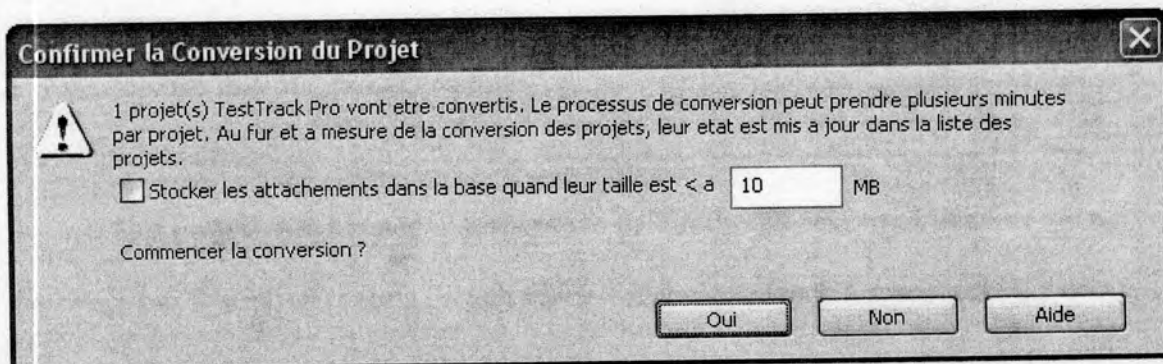


Figure 19. Defect attachment storage options

After conversion, you can see in the screenshot in figure 19 that the data transfer was successful. Our project database is now located in and accessible from our SQL server database.

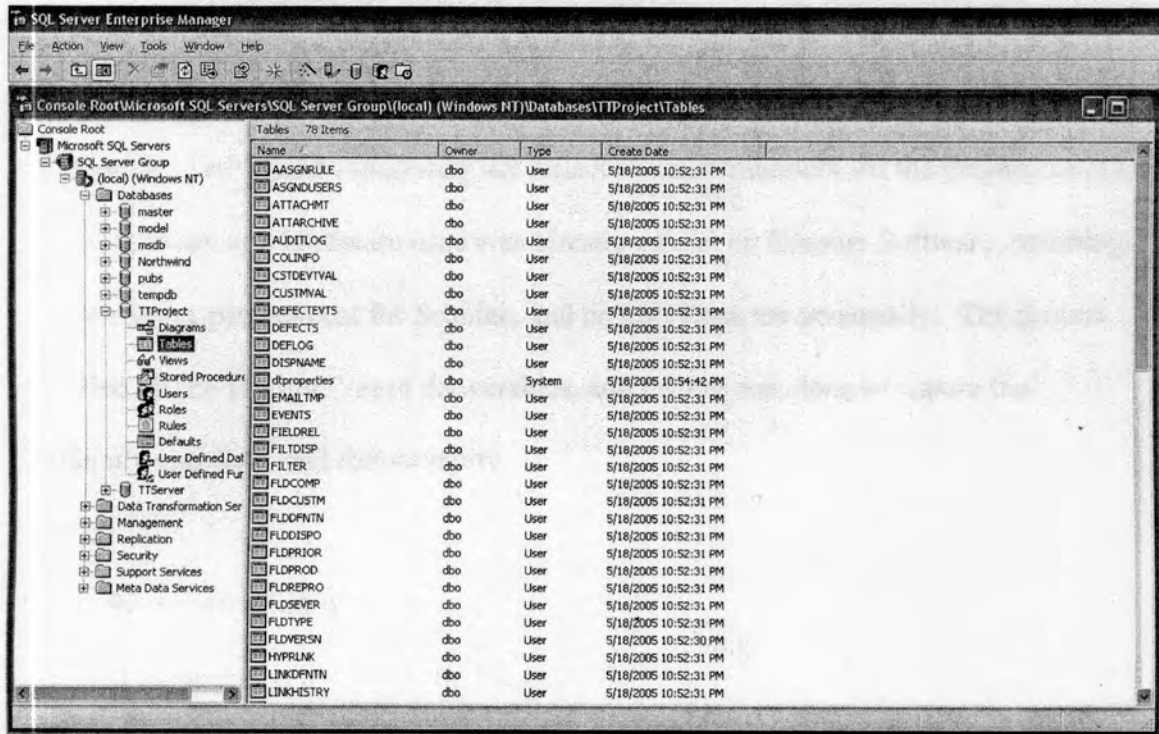


Figure 20. SQL Server Enterprise Manager

9.1 Conclusions and Recommendations

9.1.1 Conclusions

This project was created in response to the needs and desires of Seapine Software Inc.'s customers for a French version of the TestTrack Pro software suite. The solution was created by building code into the existing TestTrack Pro source code. Because it was built into the existing code, future French versions will be easier to create as new functionality will be inherent to the source code. TestTrack Pro was

designed with flexibility in mind which created some problems when testing as it was difficult to test every possible situation and use.

This project would have been increasingly difficult if it weren't for the presence of a good interpreter. The project was completed over the three quarter Senior Design sequence and during this time I received invaluable assistance from the senior design professors. The budgets used may not reflect accurate numbers for the project, as much of the software and hardware used was already owned by Seapine Software, resulting in a much lower project cost for Seapine, and no cost from me personally. The project fulfilled all the Design Freeze deliverables, and testing was done to ensure the product's usability, and functionality.

9.1.2 Recommendations

I recommend to anyone taking on Senior Design to do as much research as possible in his or her first quarter and get a full understanding of what kind of workload they are truly facing. I never anticipated that my project would be so involved and complex, and had a narrow view of what testing was involved from the onset of the project. If anyone is interested in doing a similar translational project, I would suggest spending as much time with the existing source code as possible in advance, studying its architecture. Also, I would suggest that they research who is doing translation, assuming they aren't doing them personally. No matter how good the final project looks, if it isn't understandable or is poorly translated, it will not be useful to anyone. Even though this is one of the most difficult projects I have accomplished, I consider the experience I gained to be well worth the time I invested.

Appendix A: Project Logistics

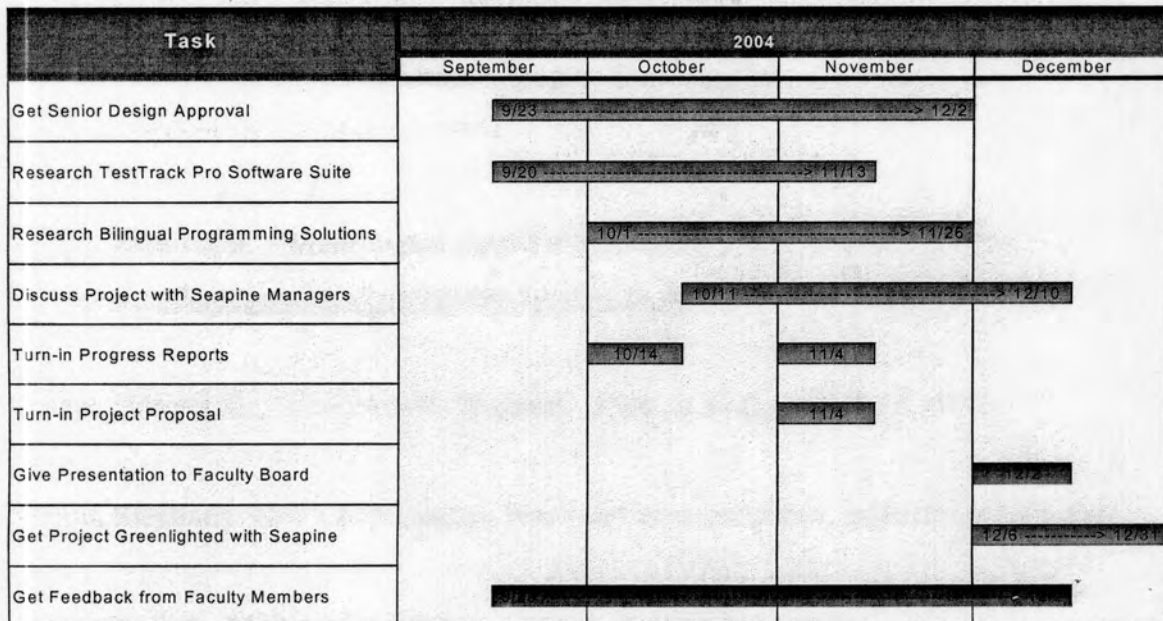


Figure 21: Timeline for 2004

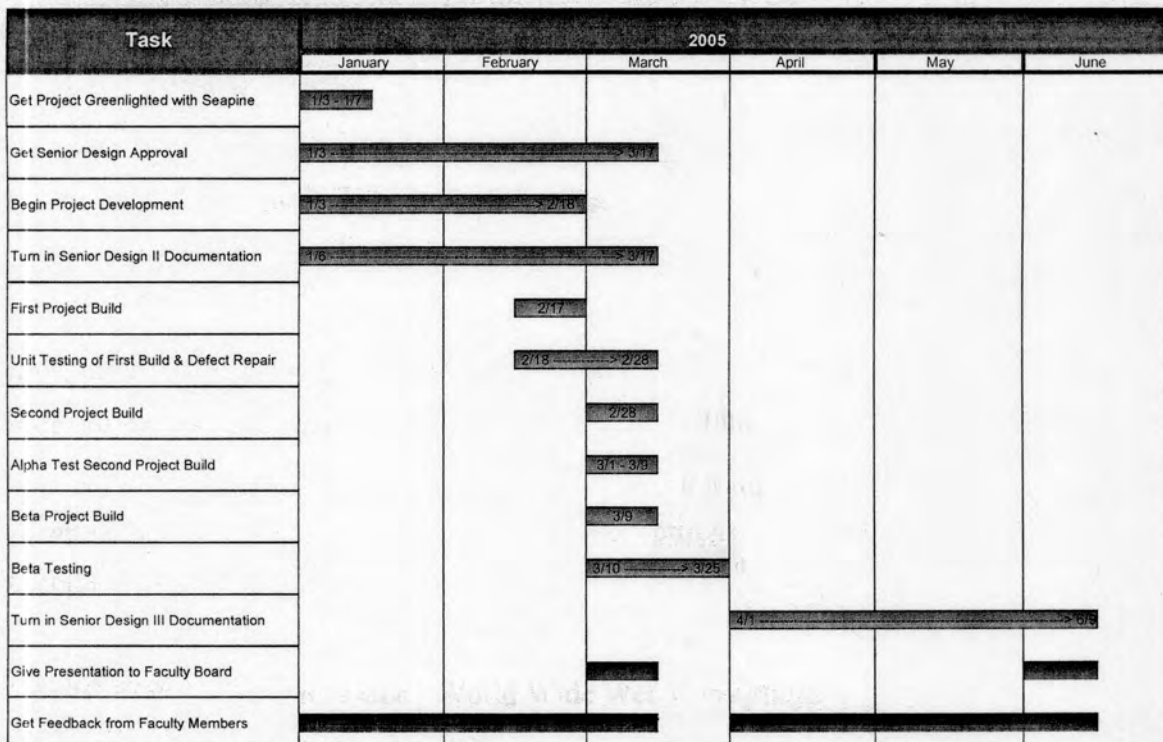


Figure 22: Timeline for 2005

Appendix B: References

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