

TJHSST Computer Systems Lab Senior Research Project Automated System Testing 2008-2009

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Abstract

Around the world, many companies require testing for various project. This process can take numourous hours of manual labor, which in turn costs a lot to the company. Some companies, such as Innovative Defense Technologies (IDT), commit themselves to automating tests for other companies. With software automated, the company does not need to spend human resources to manuelly test. With business being a large component of the United States, there is not much room for time or money to be wasted. This project reduces the time spent in testing. It sets up a system in which one client system can test multiple applications on many server systems. In this project, two or three systems were used. The one client system implements various automation tools to accomplish the task. The practical use of this project is to reduce the time spent on testing. The project

will show that the manuel testing that originally takes hours to test on the one or two other systems can be reduced to just minutes using one system.

Keywords: automation, client, server

1 Introduction

1.1 Scope of Study

In the process of testing, this project implemented a few significant applications. TightVNC, VNCRobot, and STAF/STAX play critical roles within the project. I have set up the TightVNC, which will create either a server or a client onto the system. The server will make available the server's desktop for the client machine. When the client opens up a viewer, the client will be able to access all of the servers that it is connected to. This lets the VNCRobot, which is an automation tool used to automate simple actions, control

the server systems.

Although the STAF/STAX framework can hold many systems, this project will be limited to a maximum of three systems. This is to not overwhelm the project as setting up systems may take a long time. In addition, because the ability to automate on different operating systems, only three would be needed to show variety.

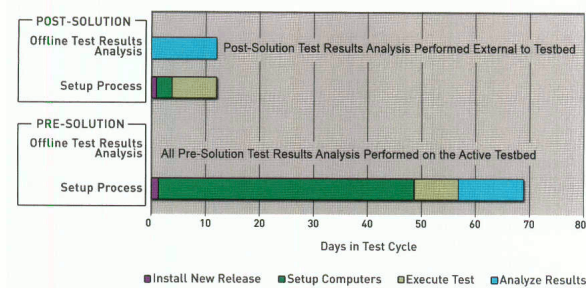
1.2 Expected results

The project is expected to result in a computer that will be able to control a system of computers. Since the ultimate purpose of this project is to reduce testing time, the project will have applications running on some systems but automated by the client computer. The testing time for manual testing can be shown to take a very long time. After that, the client will test all of the systems at the same time, showing a major reduction in testing time. This idea can be presented in the data showing the effectiveness of automation.

This project may be later extended to a large-scale system. If the client were to control a hundred servers, instead of two, it may change the outcome of the project. Therefore, the testing of systems through automation can prove to have even more purposes.

2 Background and review of current literature and research

Companies have been trying to implement automated testing within their companies for years. Many common problems that halt the continuation of this is a lack of knowledge in the area and the long time that it takes to set up automation. Years ago, automated testing was not practical for use due to the long times it took to set up an automation system. Currently, there are many tools for automation that makes automated system testing not only simple but extremely quick to set up. The increased knowledge and simplicity of the automation process is key in automated system testing.



Often people do not realize the significance of automation and overlook it. Unfortunately, when people get around to test-

ing there are many obstacles that may occur. The paper titled "Heuristics-based infeasible path detection for dynamic test data generation" realizes the importance of automated tests and its role in reducing cost and increasing reliability of software testing. It also states that there is a large challenge with path-oriented test data generation. The goal of the experiment was to find a way to solve the issue of infeasible program path detection for dynamic test data generation. A key player in solving the issue is the fact that many of the infeasible program paths have similar properties. They use this fact to try and solve the problem by knowing what signs would most likely lead to an infeasible path. This way, the path can be detected with fairly high accuracy.

Another paper titled "Building test cases and oracles to automate the testing of web database applications" explains how many organizations use web applications with databases to store data but manual testing of these applications can take an impractical amount of time. The solution to this is to automate the testing but this can even prove to fail due to poor test cases, even if the automation code is perfect. Therefore, the Automatic database Tester was created to generate functional test cases that would be used for database updates. The project that I am doing uses a test case to set direction in the project.

3 Procedures and Methodology

Various applications were implemented in the automation of the systems. In addition, there were applications that were tested to prove that the automation worked correctly. For example, SeaClear, which is a navigation tool, was used. There are many drop down menus and well as places where values can be input. For example, known valid values were plugged in. Later, known invalid values were plugged in to see if an error menu will appear. After testing this applications manually, the client system will then attempt to recreate the process at a faster speed. Also, the project will be tested by observing if the different systems interact correctly with each other. If the applications can not even be tested, it means the framework was not correctly set up.

The client system will use TightVNC to connect to the server systems. This will create a relationship between one client and one server. STAF/STAX will be used to connect the client to multiple servers and create the system. Later, VNCRobot will receive the orders from STAF/STAX and proceed with the testing. VNCRobot will automatically access TightVNC and the server systems. The SeaClear application will be tested and the results will be sent back to the client. The operator, will then be able to view the results within minutes of starting the testing.

The project's accuracy will be tested by first manually testing the application. After the results have been recorded, the client

will attempt to recreate the results using the same testing process. If the results match, the project was successful. This process will be repeated with different types of inputs, such as valid versus invalid inputs, to show that any input will produce correct results.

4 Expected Results

This project is expected to create a system in which applications on many servers can be tested through the use of one client. Although this can be done manually, the project is expected to reduce testing time from hours to minutes. In addition, the automation of the testing will not compromise the accuracy of the testing in any way.

This project can be expanded by the use of more servers. If the project were to be put on a grander scale, nothing should change but there is a possibility.

5 Analysis

The data collected was in the form of different tests. The main objective was first to have everything running properly. After setting up the environment that was needed to have everything working, I started to test different applications before settling for the one that would mainly be used for the project.

One of the simple tests was to see how the automation would work with a word processor. To test this, I had the program open up Microsoft Word and type out the log that was due that day. Through this test I learned that

the program could work for a long period of time. This was shown through the fact that I had a full-page log and the program successfully complete it.

Another simple test that was used was to take a screenshot of the stocks and email them to myself then check it. I went to BigCharts.com to check a random stock then took a screenshot. Then, I entered my email and sent the file of the picture to myself. I did this multiple times. I learned from this that the program could be used to repeat tasks, which was good because that was one of the projects main goals.

Image of the SeaClear Program

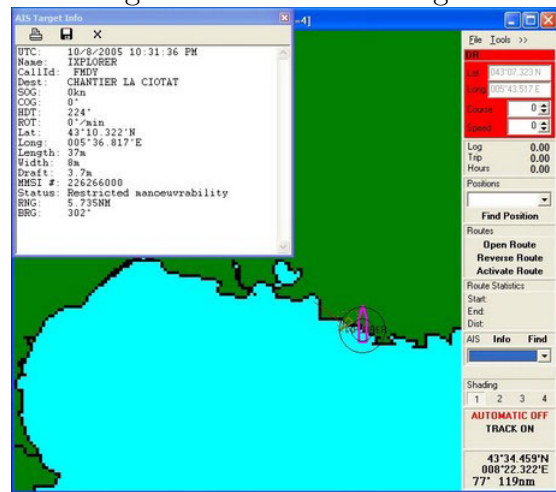


Figure 2

6 Discussion and Conclusion

The results that were expected of this project were for the most part true. A system for multiple platforms was created using a VNC

Server, VNC Client, and VNC Robot. The main issue was trying to implement the VNC Server and VNC Client with Linux. At first it seemed as if Linux would not be compatible with it but it was later determined that it could be. It was particularly interesting to see Windows and Linux being used to automate the other.

7 Referances

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