Automated Project Assignment Tool
APAT

By

Mark E. Reverman

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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Acknowledgements

I would like to thank ZoomTown.com for giving me the opportunity to work on a real world project like this. It was a tremendous learning opportunity that will benefit me in all future projects. I would also like to thank my co-worker, Marc Tribbe for leading me in the right direction while working on this project. Most importantly, I would like to thank my parents, Donald and Joyce for their support during my tenure here at the University of Cincinnati.

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Abstract

The purpose of this project is to provide an Automated Project Assignment Tool (APAT) for companies. APAT allows super users, administrators, and users to log on to APAT website. Each member that logs into the Project Management Tool belongs to his/her own group. Administrators can assign tasks to employees within their respective groups. When an employee logs into APAT they will only see tasks that were assigned by their Administrator. The user can then start and stop each task until they have completed the task in full. This will allow managers to track tasks for each of the company's employees. APAT is written using PHP with MySQL as database management system. APAT is hosted on a Linux operating system and Apache web server that is running openSSL.

1. Statement of Problem

ZoomTown.com has a great demand of projects and tasks that need to be completed on time every month. The number of projects and tasks are overwhelming the managers and employees at ZoomTown.com. This has caused management to search for a more efficient way to distribute and track the projects and tasks that need to be completed for each group.

ZoomTown.com currently does not have a system to track current projects. Management does not have a clear way of tracking what projects are currently being dealt with. Such as, ones that are on hold, projects that have been cancelled and most importantly projects that have been completed on time. This has lead to miss-use of employee time and money.

1.1 Product Descriptions and Intended Use

The product that has been developed is a web-based Automated Project Assignment Tool (APAT). Managers are able to assign projects and tasks to customers over the Internet. Once they have assigned a project to a company, managers can then develop tasks and jobs that need to be done by a qualified employee.

Communication between the web and database is done through PHP. PHP is a server side scripting language designed specifically for the web. PHP is an Open Source product.

The managers are allowed to view, update, and delete, projects, tasks, and jobs. The employees are also allowed to update and inform the manager of where they stand on each project. The users will be able to login to the site using a secure socket layer so data will not be compromised.

2. Description of Solution

2.1 User Profile

The users of this product are ZoomTown.com employees. They are all advanced users in the IT field and there should be no difficulty in using this product. There are three levels of access to APAT and they are as followed:

2.1.1 Root Users

Root users are in charge of maintaining the APAT Tool at all three levels. The root user can create new groups as needed. The root user can assign administrators and users to each of these groups. The root user can create customers for each of these groups as needed, and they can update customers as they see fit. The Root user can update all projects, tasks, and jobs that have been created by each administrator and user of each group. The root user in essence has control of all aspects of the APAT Tool.

2.1.2 Administrator Users

Administrator users are in charge of keeping track of all employees within their respective group. They have all of the same permissions as the root user, the only difference is that they can only change information within their given group. They are responsible for assigning tasks and jobs to each of their employees. They are responsible for keeping track of all customer information, user information, and project information for each of the customers.

2.1.3 Regular Users

Regular Users have minimal access to APAT. They are able to update jobs and tasks that have been assigned by their Administrator and that need to be completed. They are

also able to view their own reports, on the jobs that they have completed. These users are also permitted to view users within their own group.

2.2 Design Protocols

The design of this project uses all four areas within the Information Engineering Technology program. The focus of the senior design project is programming and database design. Multimedia is used to support the programming and database design. Networking is used to setup the database and programming language to be used within the web server.

2.2.1 PHP-4.0.6 Programming

PHP is a server side scripting language designed specifically for the web. PHP is an Open Source product. PHP is easy to maintain and friendly programming language to use. PHP is used to communicate with the MySQL database.

PHP is used to generate dynamic HTML pages for APAT. Other emphasis of programming is done with HTML. Both of these together are used to create the interface for APAT.

2.2.2 MySQL-3.23.40-1

MySQL has many attractive features. MySQL is about the fastest database you can get. MySQL is a high-performance and a relatively simple database system and is not difficult to set up. MySQL is Open Source, which means it is free. MySQL understands Structured Query Language (SQL), the language of choice for all database systems.

A database has been created with MySQL to store all of the APAT data. This has a high level of sophistication that shows many-to-many relationships. This database is also accessible through the Internet. Which means that, it can be accessed from anywhere on

the Internet, so you can share the data with anyone, anywhere. Although, MySQL has access control so that people shouldn't see the data they are not authorized to see.

2.2.3 Networking

The networking aspect of this project is what makes the whole Project Management Tool possible. An Apache web server has been set up on a Linux operating system. Not only does Apache need to be installed but the following software packages need to be installed with Apache to make the internet site secure: apache_1.3.20, MOD_SSL-2.8.4-1.3.20, OPENSSL-0.9.6, PHP-4.0.6, and MySQL. These need to be installed together in order for the apache web server to function correctly. MODSSL and OPENSSL will allow user to login to a secure site for data encryption. In addition, PHP and MySQL need to be compiled together so that PHP can connect to the MySQL database.

2.2.4 Multimedia

The multimedia component of APAT is seen by the layout of the web pages. Several navigational buttons and images make APAT easier to browse. The multimedia design is more functional than anything. There are no extravagant graphics that slow down the pages while users are accessing the web page. This project is designed to open and close web pages in a fast and efficient manner.

3. Deliverables:

Deliverables	Date
Install Linux	9/20/2001
Install Apache	9/21/2001
Install ModSSL	9/21/2001
Install OpenSSL	9/21/2001
Install PHP	9/21/2001
Install MySQL	9/21/2001
Design Database	10/28/2001
Create Button icons for page	10/5/2001
Create Login Page	10/8/2001
Create Logout Page	10/9/2001
Add User Page for Root Access	11/10/2001
Add User Page For Admin Access	11/11/2001
Add User Page for User Access	1/1/2002
Add Customer Page for Root Access	11/15/2001
Add Customer Page for Admin Access	11/16/2001
Add Customer Page for User Access	1/2/2001
Add Projects Page for Root Access	11/17/2001
Add Projects Page for Admin Access	11/18/2001
Add Projects Page for User Access	1/3/2001
Add Change Password form	11/1/2001
Add Jobs Page for Root access	1/4/2001
Add Jobs Page for Admin access	1/7/2001
Add Jobs Page for User Access	1/8/2001
Add Stats Page for Root access	1/15/2001
Add Stats Page for Admin Access	1/17/2001
Add Stats Page for User Access	1/19/2001
Add group page for Root Access	1/20/2001
Add https to the whole web site	1/27/2001
Design backgrounds	1/29/2001
Design color scheme for site	1/30/2001
Create informative icons for web page	2/1/2001

4. Design and Development

4.1 Budget

4.1.1 Hardware

Hardware	Cost
Dell Dimension 8100 Series Pentium 4 Processor at 1.7 GHz	**$3,437.00**

Software

Software	Cost	Website
MySQL	**Free**	**http://www.mysql.com/dowloads**
PHP	**Free**	**http://www.php.net/download**
OpenSSL	**Free**	**http://www.openssl.org/download**
ModSSL	**Free**	**http://www.modssl.org/download**

4.2 Timeline

Senior Design I Spring 2001

Weeks 1-5

- Install the following operating system and software
  - Linux
  - Apache Web Server
  - ModSSL
  - OpenSSL
  - PHP
  - MySQL
  - Design the preliminary database
  - Design a basic layout of the user interface

Weeks 6-10

Continue to develop the database for the Project Management Tool
Finalize Proposal for faculty advisor
Finalize presentation for faculty and students

Senior Design II Fall 2001

Weeks 1-5

- Develop rough draft of design freeze
- Create and finish user interface design in PHP
- Finalize MySQL database design

Weeks 6-10

Add Login and logout pages in the user interface
Add Users page for all three levels of access
Add Customers page for all three levels of access
Add Projects page for all three levels of access
Add change password form for all users
Complete Final Draft of the Design Freeze
Demonstrate working copy of the Project Management Tool

Senior Design III Winter 2002

Weeks 1-5

Complete the following web pages:
Jobs Web Page
Tasks Web Page
Stats Web Page
Complete product testing and troubleshooting
Submit final project documentation

Weeks 6 -10

Complete final documentation and demonstrate the Project Management Tool.

4.3 Hardware Needed for Project

The hardware used for this project is a Dell Dimension 8100 Series with a Pentium 4 Processor. This system can support a vast majority of users. This system needs a large hard drive to hold the enormous amount of data that will be stored on the system. The system has a fast processor and a lot of memory to execute hundreds of processes and programs every day. The system also has a built in backup drive to save the databases and program every evening. This system that I used is as followed:

1. Dell Dimension 8100 Series Pentium 4 Processor at 1.7Ghz
2. 1024MB PC800 RDRAM
3. 60GB Ultra ATA Hard Drive (7200RPM)
4. Limited 1 year warranty
5. Monitor 19 Inch (18.0 Inch Viewable)
6. 48x Max Variable CD-ROM Drive
7. 250MB Iomega Zip BUILT-IN Drive with One Disk
8. 3.5 Inch Floppy Drive
9. Dell 2 Button Mouse
10. New Dell Enhanced Quiet Key Keyboard
11. Integrated 3Com Etherlink 10/100 Ethernet Controller

4.4 Software

4.4.1 Operating System

The operating system that I used for APAT is Linux Red Hat 6.2. When I asked myself the question about installing a NT server and installing a Linux server, I chose the Linux solution because I come from the Unix world and I have a strong tendency to prefer and appreciate Unix systems.

Something else that I appreciated when I explore an operating system is to have the source code that goes with it. This is something you cannot find anywhere else. With Microsoft, naturally the source code is not provided. With Sun, they do not provide the source code either. When something is not working properly, it is very nice to have the source code available to you.

Even more vital is reliability. The high reliability of the Linux OS is of paramount importance for this project. Internet services, and most important of all email services, are a mission-critical tool for this project to be a success.

4.4.2 Apache HTTP Server Version 1.3 on Linux

Apache is a general web server, which is designed to be correct first, and fast second. Even so, its performance is quite reasonable. Most sites have less than 10Mbits of outgoing bandwidth, which Apache can fill using only a low end Pentium-based web server. Apache on NT has not been tuned for performance yet; in fact, it probably performs very poorly because NT performance requires a different programming model. Apache users have come to rely on the server's rock-solid reliability, outstanding performance, and rich set of features. Apache Server Version 1.3.0, now in official release, is already being touted as the most stable and fastest versions of Apache ever.

Apache's overall security, performance, and robustness are unquestionable. Many, if not most accessed sites in the world run Apache. Apache also has a quick tech support via Usenet newsgroup.

4.4.3 MySQL

MySQL is more or less a free popular SQL server. MySQL is noted mainly for its speed, reliability, and flexibility. Because it is open source, anyone can download MySQL and tailor it to their needs in accordance with the general public license. An extremely popular web page that uses MySQL is Yahoo's news web site.

4.4.4 PHP 4.0

PHP is an Open Source server-side scripting language for creating dynamic web content. With version 4.0, the functional difference is actually quite staggering the server actually compiles the code on the fly, and then executes the code, with dramatic improvements in speed, as you can guess. PHP can also be easily used with the Apache Web Server.

4.4.5 OpenSSL and ModSSL

OpenSSL and ModSSL will allow the web server to be a secure site. They offer 128-bit encryption that is necessary for this type of project. There will be highly sensitive source code and documents that we will not want viewable to the world. These two packages will allow for the best security for this project.

4.4.6 JavaScript

JavaScript is a scripting language that functions with both Internet Explorer and Netscape's browsers. JavaScript requires no special plug-ins, and it works transparently within an HTML page. JavaScript is used for error checking within the APAT tool.

4.4.7 Cascading Style Sheet

Cascading style sheets, when linked to an HTML document, define the properties of tag elements in that document. With CSS, web designers can control the look of a site from one central document. CSS is supported by Internet Explorer 3.01 or higher and Netscape 4.0. Cascading Style Sheets will be is used to create the unique look and feel for APAT.

5. Proof of Design

5.1 Database Design:

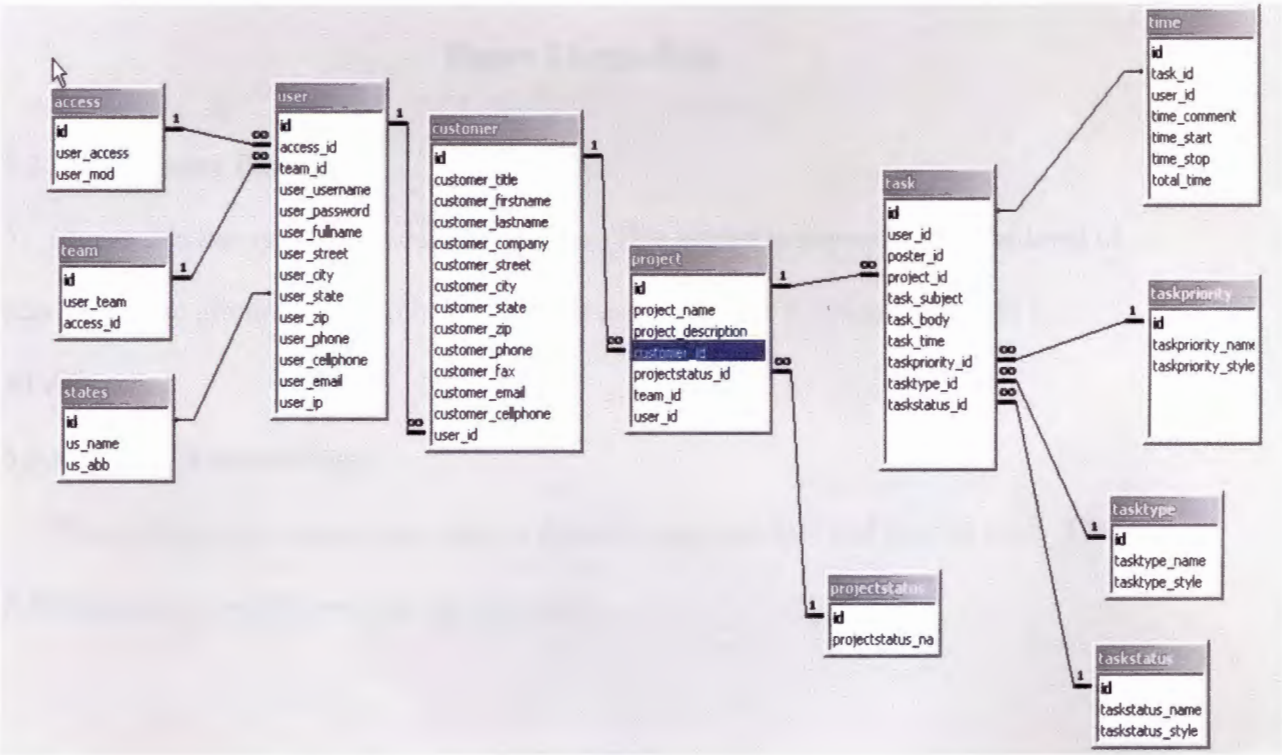

Figure 1 Database Design

5.2 Login Page:

Figure 1 is the main page that contains two text boxes, which are the users login and password. When the user supplies the correct username and password, they will be

authenticated through the MySQL database. Once the authentication process has been completed, the users will be sent to a members page. If the user enters in an incorrect login or password, they will be redirected back to the login page. This page looks as followed:

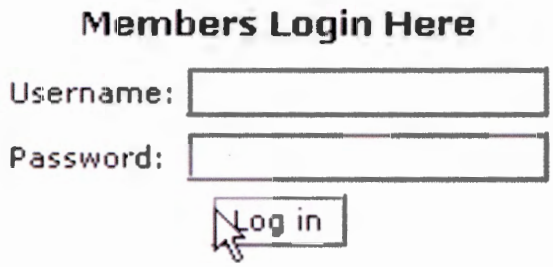

Figure 2 Login Page

5.3 Welcome Page:

Figure 2 is the member's welcome screen. This screen is dependent on the level of access you are granted by the root user. Each user will have a welcome note to the APAT tool.

5.3.1 Root Welcome Page

The root user has more menu options than the administrator and regular user. The following screen will appear for the root user:

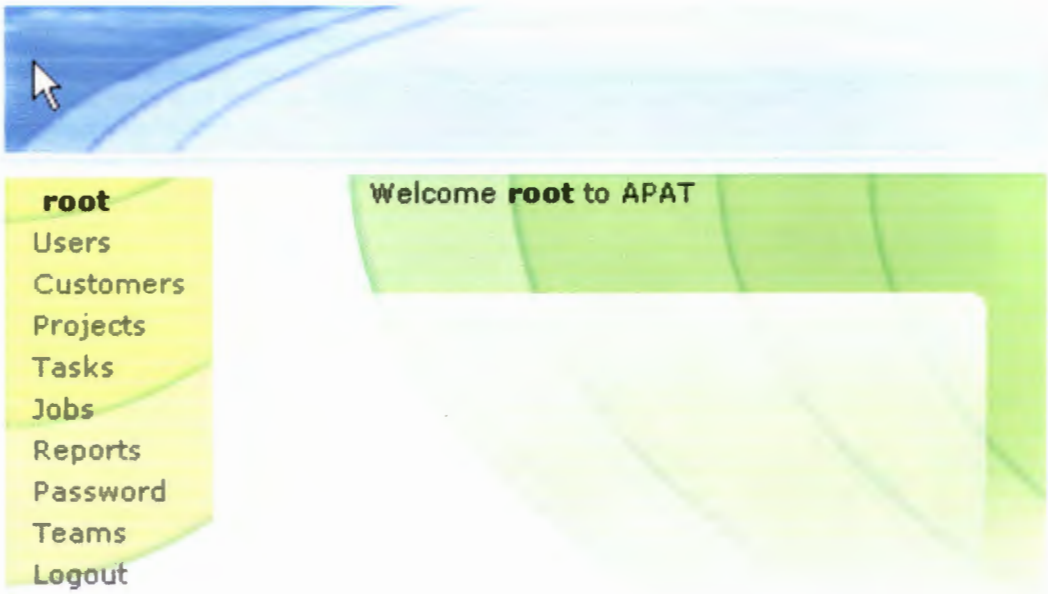

Figure 3 Root Welcome Page

5.3.2 Administrator Welcome Page

The administrator does not have the same options as the root user or the regular user.

The following screen will appear for the administrator:

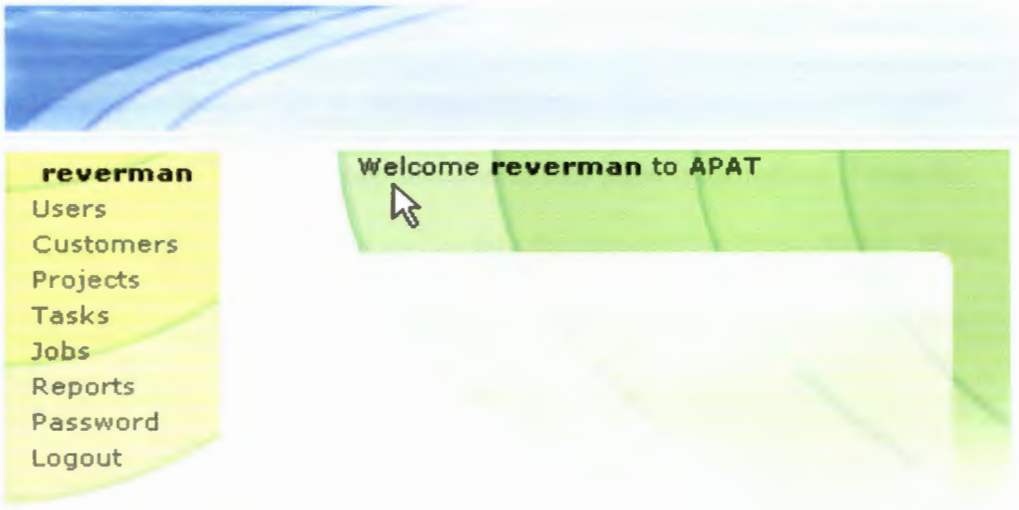

Figure 4 Administrators Welcome Page

5.3.3 Regular Users Welcome Page

The regular user can see the following options when they log on to APAT:

Figure 5 Regular Users Welcome Page

5.4 Users Page

5.4.1 Root and Administrator Users Page

The users page has three levels of access, root, administrator, and user. The root user is allowed to create and update users and administrator from all groups. The administrator is allowed to create and update users and administrators from their group only. A list of the entire current users is listed below the insert user data. To view a user simply select the update button next to the email address. When you select the update button, the text fields from above are populated with that users information. From this you can view all of the user information and update the information if you desire. If you select the e-mail address, it automatically launches your default email so you can send them an email. The root user and administrator can see the following:

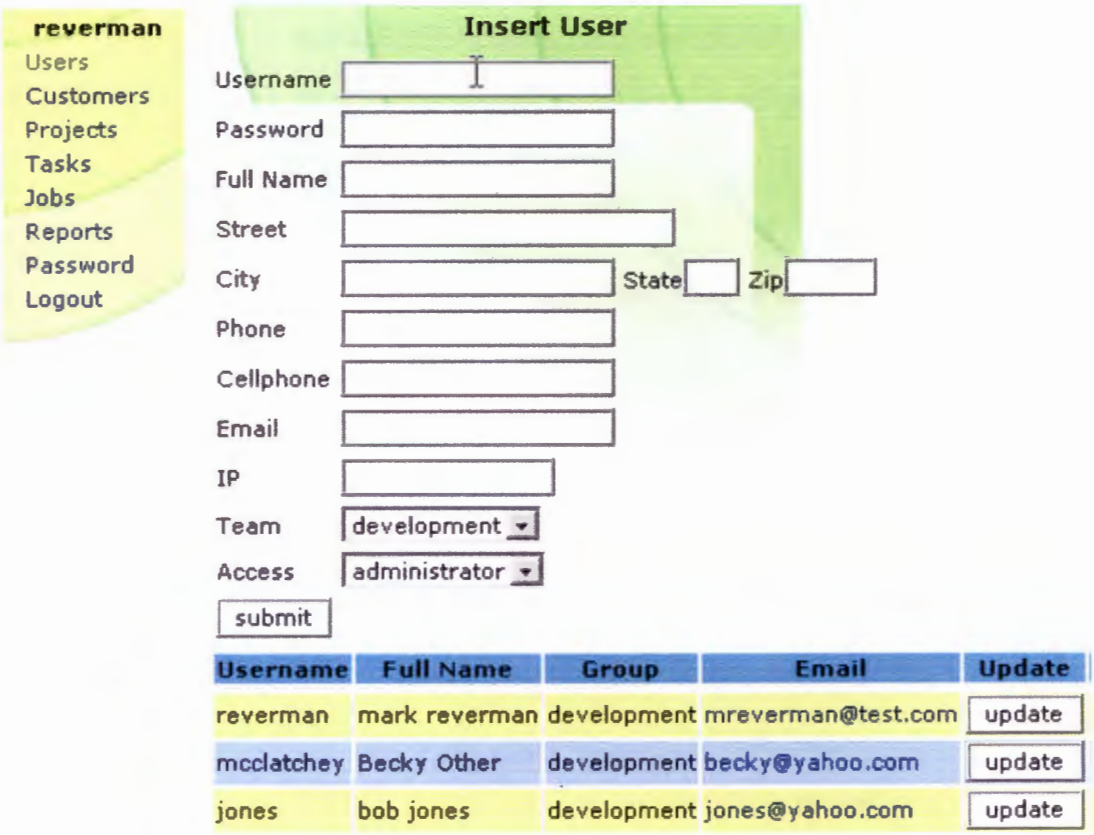

Figure 6 Root and Administrator User Page

5.4.2 Regular Users Page

Finally, the regular users are allowed to view all other administrators and users within their group only. The information that can be seen is:

Username
Full Name
Phone Number
Cell Phone
IP
Email

Again, you are able to launch your email if you select the email address for a user and send that person a message. Regular users can see the following

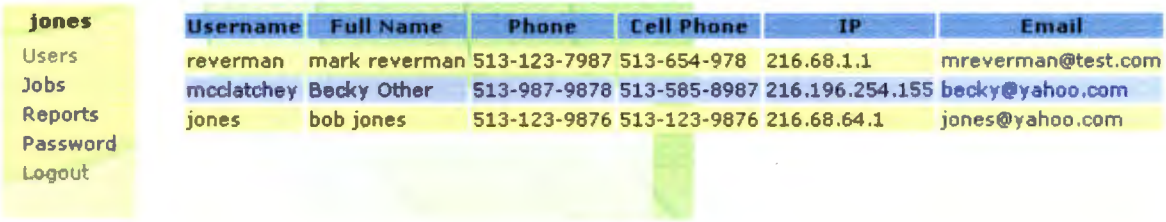

Figure 7 Regular Users Page

5.4.3 Users Page Error

To enter a user into APAT you must supply the correct information. If you do not enter the following data, you will receive an alert message:

Username
Password
Full name
Email address

If you neglect to enter in any of the following, the cursor focus will be set to that textbox. The following error message will appear if you do not enter one of the above.

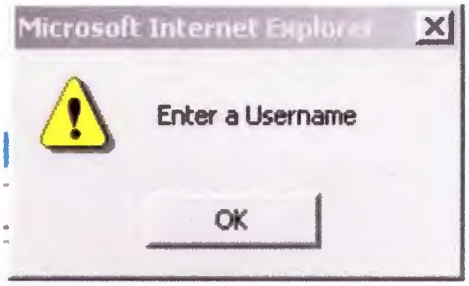

Figure 8 Enter a Username Error Alert

5.5 Customers Page

5.5.1 Customer Page: Root and Administrator

5.5 Customers Page

5.5.1 Customer Page: Root and Administrator

The customers page has two levels of access, root and administrator. The root user is allowed access to create and update customers from all groups. The administrator is only allowed to create and update customers within their own group. A listing of all the customers is shown below the insert customer form. To view a customer select the update button next to the email address. Once you have selected a customer, the text fields in the above form are populated with that customers information. Once the data has been populated, you can view and update the customer information. The root and administrator can see the following about each customer:

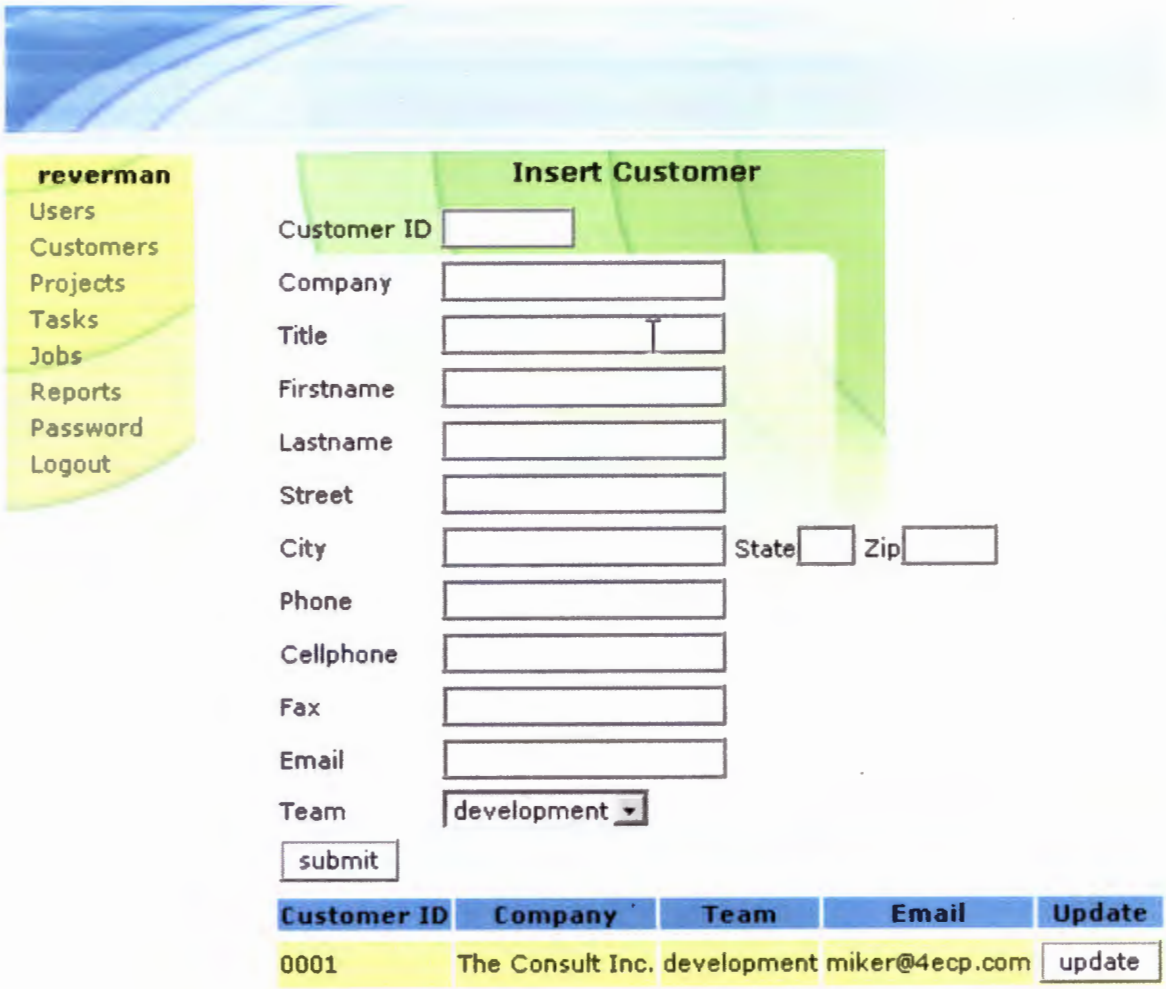

Figure 9 Customers Page

5.5.2 Customer Page Errors

To enter a customer into APAT you must supply the following data:

A valid Customer ID
A Company Name

If you do not supply this information, you will not be able to enter the customer into the database. You will get an alert message that will notify you that you have not entered in any data. After you select the O.K. button, it will bring you back to the text box that you did not enter in valid data. You will get the following error:

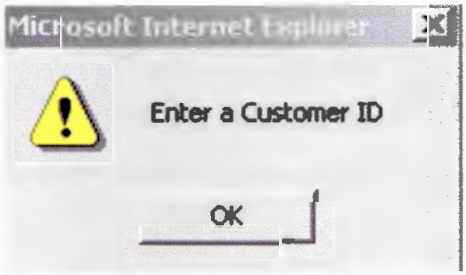

Figure 10 Customer Page Errors

5.6 Project Page

5.6.1 Project Page: Root and Administrator

The project page has two levels of access, root and administrator. The root user is allowed to create and update projects for all groups. The administrator is only allowed to create and update projects in their own group. A listing of all of the projects is listed below the insert project form. To view a project select the update button next to the description. Once you have selected the project, the fields in the insert project form are be populated from the project you selected. From here, you are able to update and view each project. The users can see the following:

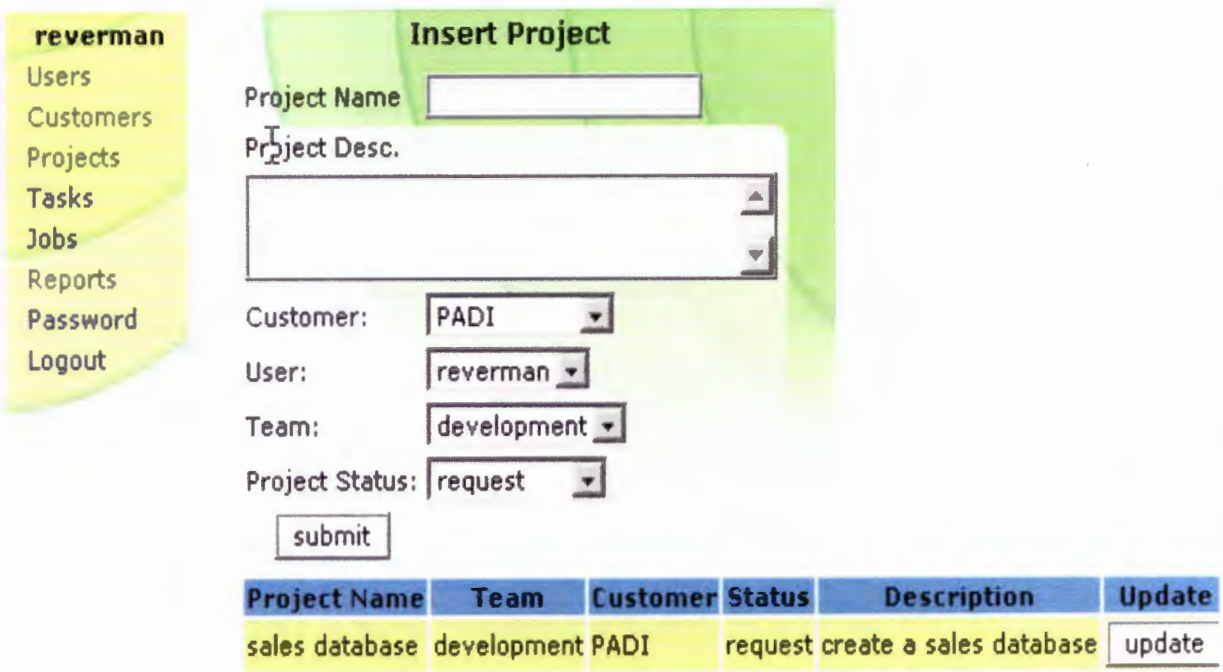

Figure 11 Project Page

5.6.2 Project Page Errors

To enter a Project into APAT you must supply the following data:

Project Name
Project Description

If you do not supply the above information, you will not be able to insert the project into the database. You will get an alert message that will notify you that you have not entered in valid data. After you select the O.K. button, it will bring you back to the text box that you did not enter in any data. You will get the following error:

Figure 12 Project Page Errors

5.7 Tasks Page:

5.7.1 Tasks Page Root and Administrators

The tasks page has two levels of access. The root user is allowed to assign tasks to all users and update those tasks. The administrator is only allowed to assign tasks to users within their group and update those tasks. To view a task select the update button next to status. Once you have selected the task, the text boxes are populated with the task you have selected. From here, you can view and update the task. The following data can be seen:

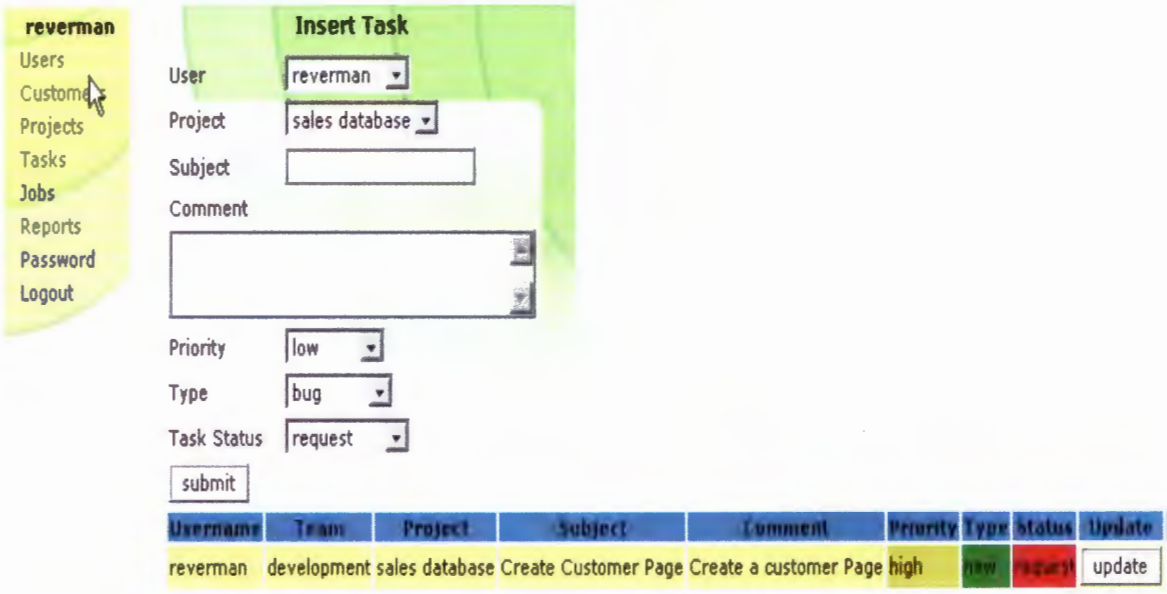

Figure 13 Tasks Page

5.7.2 Task Page Errors

To enter a task into APAT you must supply the following data:

Subject
Comment

If you do not supply the above information, you are not able to insert the task into the database. You will get an alert message that will notify you that you have not entered in valid data. After you select the O.K. button, it will bring you back to the text box that you did not enter in any data. You will get the following error:

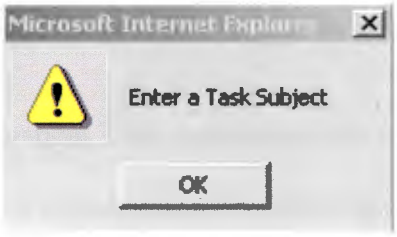

Figure 14 Tasks Page Errors

5.8 Start Jobs Page

All users in APAT can see the Jobs page. The Jobs page shows all requested tasks for the current user. The users can see all of their current running jobs in a list below the Create Job Form. There are no data requirements for this page. Therefore, no error message appears if you do not enter in any notes. The jobs page has the following items:

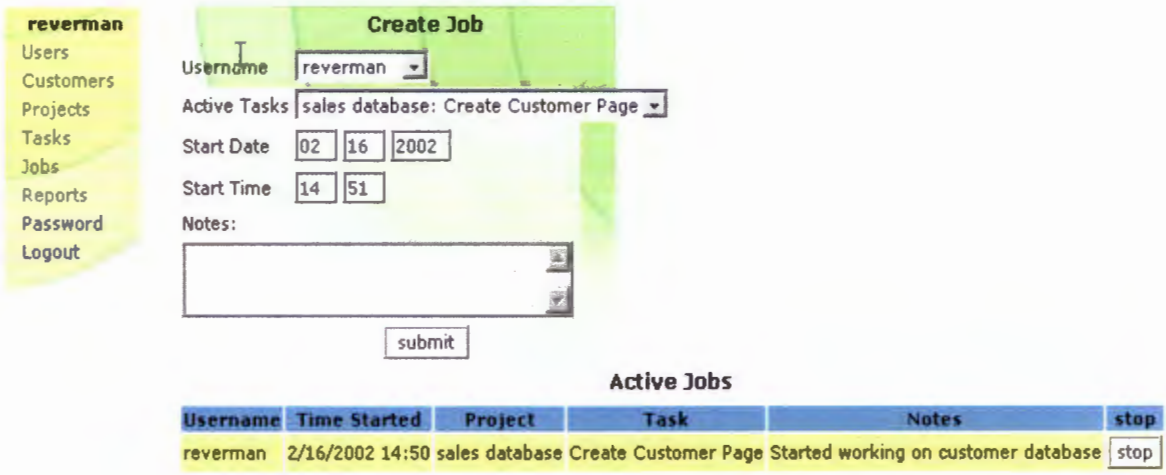

Figure 15 Create Job Page

5.9 Stop Jobs Page

All users in the Project Management Tool can see the stop jobs page. The Stop Jobs page will allow you to stop the job and complete the task if it is done. The stop jobs page has the following items:

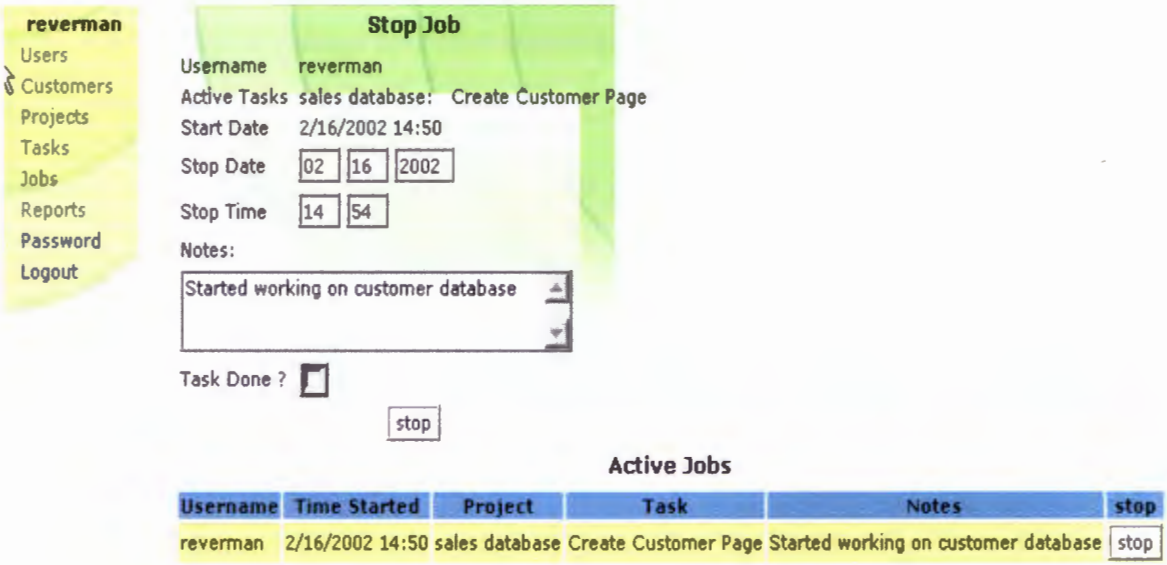

Figure 16 Stop Job Page

5.10 Reports Page

All users are allowed to view the reports page. The Reports page has three levels of access. The root user is able to view reports for all groups. The administrator is able to view all reports for their group only. Finally, the users are allowed to view only their own reports. This is a screen shot of how the reports page looks:

Project Name	Project Description	Task Subject	Task Comment	Job Comment	Time Start	Time Stop	Total Time
Sales Database	Create an online sales database	create username table	create a username table		2/18/2002 23:35	2/18/2002 23:35	0
Sales Database	Create an online sales database	create username table	create a username table		2/18/2002 23:35	2/18/2002 23:36	0.0166666666666
Credential Database	Create a credentialing database	Doctors	Create a doctors table	asdfasdf	2/19/2002 19:24	2/19/2002 19:26	0.0333333333333
Sales Database	Create an online sales database	Customer Table	Create customers table		2/18/2002 23:24	2/18/2002 23:24	0
Sales Database	Create an online sales database	Customer Table	Create customers table		2/18/2002 23:24	2/18/2002 23:24	0

Figure 17 Reports Page

5.11 Change Password

All users are allowed to change their own password at anytime. The password length must be between 6 and 20 characters. The user must supply their old password first and then type their new password correctly twice. If they fail to meet these requirements, the password will not be changed. This page has the following items:

Figure 18 Change Password Page

5.12 Insert Group/Team

The following page can only be seen by root users. They are allowed to view all groups or teams within the APAT tool. They are also allowed to insert new groups into the database. This page has the following items

Figure 19 Insert Teams Page

6. Conclusions and Recommendations

Future recommendations for this project would be to greatly improve the reports page. There is so much that you can do with that reports data alone it could be a project within itself. There are still a few pages that need tweaking such as the customers page has a few minor bugs with the customer id field. This project has been the biggest learning experience I have ever had in school or at work. I started this project with little knowledge of Apache, PHP, MySQL, and cascading style sheets. I will take the knowledge from this project and hope to become a more valuable asset to companies in the future.

References

1. DuBois, Paul. MySQL. Indiana: New Riders Publishing 2000
2. Welling, Luke and Thomson, Laura. PHP and MySQL Web Development. Indiana: Sams Publishing 2001
3. http://www.echoecho.com/javascript.htm
4. http://www.modssl.org/
5. http://www.mysql.com/documentation/index.html
6. http://www.openssl.org/
7. http://www.php.net/
8. http://www.phpbuilder.com/
9. http://www.redhat.com/