

Implementation

6.1. Introduction

The previous chapter elaborates in details how the Object Orient Analysis and Design approach was followed in order to analyze the existing system and model the proposed system,

The implementation of the proposed system is discussed in this chapter.

6.2. Software installation and configuration

Since the proposed system is a web based system, following open source software were installed and configured as follows at the first point of Implementation of the proposed system:

Apache



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.ho.mrt.ac.lk

As the first step of setting up the system environment, Apache 2.0.54 was installed and configured as the web server by following the installation instructions. After the installation process, the symbolic icon that indicates the running of Apache services was appeared in the status bar.

Then the web server was tested by pointing the web browser to the URL `http://127.0.0.1`.

Once the web browser was pointed to the above URL, the page given in the installation instructions appeared confirming the installation was successful

All the development files like html, php, css, javascripts are kept in a folder called 'CIIS' in the 'htdocs' folder of Apache installation path.

PHP

PHP 5.1.0 RC1 is used as a server side scripting language.

Installation and configuration were carried out manually according to the installation instructions of PHP. At First, all the zipped files in the downloaded PHP package were extracted into a folder called `C:\PHP`. Secondly the directory `C:\PHP` was added to `PATH` variable to integrate PHP with Apache2. After that 'php.ini-dist' file was

copied into C:\windows directory. In order to bind the PHP installation with Apache2, Apache's httpd.conf file was edited as per the configuration instructions. After these configuration settings Apache server was restarted.

To test whether PHP has been successfully setup and integrated with Apache2, the following simple script named "phpinfo.php" was created and placed in the Apache's "htdocs" directory. After that the output of the script in the web browser, by pointing to http://127.0.0.1/phpinfo.php is observed.

MySQL

MYSQL version 5.0.51a was used as the database management system software. To data definition and data manipulation purpose MySQL Administrator and Query Browser tool version 1.2.12 software were used to expedite the development process as this tool makes the environment very convenient to work with MySQL .

Microsoft dream weaver 8.0

For Graphical User Interface (GUI) Designing Macromedia Dream Weaver 8.0 was used. All the web interfaces were designed using Hyper Text Markup Language (HTML).  

Java script language

This is used as the client side scripting language. This is heavily used for the data entry validation purposes and to enable the user to perform Add, Edit & Delete operations in the same user interface. E.g. maintenance of Item List and Importer registration.

6.3 Testing of database connectivity

Connecting to the database is established in PHP script via three contRoleed classes. These classes are included to the PHP script using statement and this include statement includes and evaluates the file.

1 **'config.php'** class is used to initialize connection variables

```
<?php
//connetion variables
$dbhost='localhost'; $dbuser='root'; $dbpass='123'; $dbname='ciis';
?>
```

2. **'opendb.php'** class is used to connect to the data base using variables defined in config.php

```
<?php

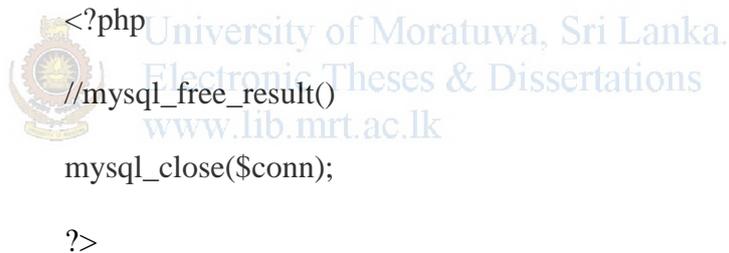
$conn=mysql_connect($dbhost,$dbuser,$dbpass) or die('I can not
connect to the database because:'.mysql_error()); mysql_select_db
($dbname);

?>
```

3. **'closedb.php'** is used to close the database connection once it is not required.

```
<?php
//mysql_free_result()
mysql_close($conn);

?>
```



The way that these classes are included in to php files is given below. Include 'config.php'; include 'opendb.php';

When no longer the database connectivity is required, include 'closedb.php';

6.4 Security measures implemented

6.4.1 Password encryption

To protect passwords being made accessible to un-authorized people, all the passwords are encrypted. When creating a new user, the password provided will be encrypted and stored in “staff” table or “importer” or “customStaff” table depending on the user type. When a user enters the password for log in to the system, the login controller (Main_Home_Page_Process.php) encrypts the password and compares

with the encrypted password in relevant “user” table and if both passwords are matching only then access to the system is granted.

6.4.2 Sessions

When a user is granted access to the system based on a valid Role, a session variable is created as follows.

```
session_start();
if (isset($_SESSION['user_logged']) && $_SESSION['user_logged'] !="" &&
$_SESSION['user_Role']=="2" )
{
//Do Nothing
}
else
{
header("Refresh: 6; URL= Main_Home_Page.php");
echo"<font size=7 color=red><p align=center> you are not authorized to view this
page!</p></font> <br>";
echo"<font size=6><p align=center> you are being redirected to the login
page</p></font> <br>";
echo"<font size=6 color=yellow><p align=center> PLEASE WAIT</p></font>
<br>";
die();
}
```

The user will be checked in every page and if found to be not entitled the user will be re-directed to the log-in page (Main_Home_Page.php). Session variable ‘user_logged’ is introduced for this purpose in ‘Main_Home_Page_Process.php’.

6.4.3 Password protection and system login

A user has to log-in to the system at the first place before using any system facility. All the users of the system are provided with a UserID, a Password and roles by the System Administrator. All the UserIds , the Passwords and Roles created by the system Administrator are stored in a separate database tables called “staff” and “staff_Role” and password is encrypted. To encrypt the password md5 () php function is used. This method protects the password from hacking. Also UserIds and Passwords, created by the Counter clerk for Importers are stored in a database table called “importer” and the passwords are encrypted in a similar way as described above. Since, an importer has only a single role there is no requirement to define the role in the database and it is defined in Main_Home_Page_Process.php and verified during login process.

When a user submits UserId, Password and Role, the system establishes a connection with the database and checks the validity of the entered user information. If UserId, Password and Role are correct then the system grants the permission to access the relevant home page. If in case the user logs in for the first time using the password given by System Administrator or Counter Clerk , the user will be directed to password change for his own to minimize security issues. After the password is changed, the user will be redirected to the login page to login with the new password.

Please refer to appendix I – Important implementation codes (I.1) for checking UserId, Password and Role hence granting the access to home page.

6.4.4 System user management

Only the system administrator has been granted the right privileges to manage user accounts for staff members. System administrator can define Roles for users. When creating a user account, administrator should specify the user designation and supervisor Employee Number if applicable. Also the System Administrator should assign all the roles the user can bear in addition to his designation. User privileges have been defined for the Roles assigned. System Administrator can assign any Role to a user by using ‘Staff_Role.php’ unit.

When a user is logged into the system using correct UserID, Password and Role, the system will prompt him the appropriate user interface, that enables the user to perform the relevant duties of the Role.

6.5 Implementation of the system

There are 4 sub systems, 12 modules in the system.(Please refer Chapter 5 System Architectural Design)

The following section will discuss how sub systems, modules, units are implemented.

6.5.1 Importer Facility sub system

This sub system comprises of 2 modules.

6.5.1.1 Request Approval module

There are three major units have been implemented in this module. They are Notification submission, Acknowledge submissions and Follow-up submissions. This module serve the Importer for all the functions related to Notification submission.

Notification submission unit

One of the major requirements of this system is to enable the Importer to submit Notifications online (electronically) along with scanned copies of supporting documents in PDF format. All specific information of individual products in the Invoice (e.g. Product Name, FoB Value, quantity, HS code etc) and covered by a single standard needs a separate Notification submitted. Therefore, it is possible to submit more than one Notification from an Invoice.

This objective is achieved through the implementation of this unit. Only the registered importers are allowed to interact with the system via this unit. This unit comprises of three sub units called Consignment details, Add new Exporter & Add new Manufacturer to facilitate the importer's task.

Add Consignment Details sub unit

Common details of the relevant consignment (e.g. Exporter, Manufacturer, Importer, B/L Number, Invoice Number etc) are entered into the system using this unit. So that these information can be shared among all the Notifications submitted from the particular invoice.

Add Exporter sub unit

Before entering the new consignment details, Importer has to select the exporter who exported the consignment. If the consignment is not from an Exporter who is not already available in the system, the Importer has to add his details first in the system. By clicking on the “New Exporter” in the Consignment page, the user can open the Exporter Detail page. Using this single interface the user can add new Exporter’s details and edit in case changes are required to the added information. Once the details are saved they are displayed at the bottom of the form for verification. In case any change is required in the information, the user can click on the information displayed and then the system will load these information again in the form enabling the user to edit them. Once edited, it has to be resaved.

Using form validation technique, it has been ensured that user enters all the required information of the Exporter.

The Java script code segment used to achieve this objective is given in appendix I – Important implementation codes (I.2) for form validation

Add Manufacturer sub unit

Before entering the new consignment details, the Importer has to select the Manufacturer who manufactured the consignment. If the consignment has been manufactured by a manufacturer who is not already available in the system, the Importer has to add his details first in the system. By clicking on the “New Manufacturer” in the Consignment page, the user can open the Manufacturer Detail page. Using this single interface the Importer can add new Manufacturer’s details and edit in case changes are required to the added information. Once the details are saved they are displayed at the bottom of the form for verification. In case any change is required in the information the user can click on the information displayed and then the system will load this information again in the form enabling the user to edit them. Once edited, it has to be resaved.

Using form validation technique as in above “Exporter Detail” process, it has been ensured that the user enters all the required information of the Manufacturer. .

Acknowledge submissions unit

This is an auto responder that sends an acknowledgement Email which consists of necessary submission details like Entry No, Name of the responsible Assistant

Director Etc. to the Importer as soon as he submits the Notification. Using the information contained in this acknowledgement Email, the Importer can follow up the progress of the Entry processing. In order to develop this module, the 'mail ()' function of PHP was used.

Follow up submission unit

Once the notification is submitted the importer needs to check the progress of Entry processing from time to time. This unit gives a feedback to the importer about the current stage of the processing with relevant information. For example, if the processing is in the stage of payment to be settled, the importer's feed back is comprised of payment details.

6.5.1.2 Change Importer password module.

This module of the system is implemented due to the following reasons

- The security and the stability of the system are very important to successfully implement the scheme. Therefore, it is very important to prevent false submissions and unknown users using the system.
- To safeguard the confidentiality of the submission details, for example, viewing of Entry progress details are allowed only to the authorized importer who has logged in to the system with a valid UserId and password.

6.5.2 QA (Quality Assurance) facility subsystem

This section comprises of five modules and eight major units.

6.5.2.2 Entry Processing Module

This module comprises of six units. All key requirements of Entry Processing are achieved by implementing these five units.

Entry Allocation unit

All received Entries are nominated to perusing officers for perusal based on the number of current-day allocations that he or she is having. The current-day allocations are displayed on the AD's Home page and the display is dynamically updated when a nomination is done. Therefore, this feature helps the AD to consider the current work

load of the perusing officer when allocating Entries for perusal. In order to query the database to get the desired output here, a special MySQL function called “count ()” was used. Following php code segment explains how the “count ()” function has been used in this unit to get the desired result efficiently from the database.

Please refer to appendix I – Important implementation codes (I.3) for the SQL code segment that uses special MySQL function “count ()”.

Perusing Unit

The perusing unit facilitates the perusing officer to give his perusing results after reviewing the information given in the Invoice, Packing List and Bill of Lading against the submitted information by the Importer at the time of Notification submission. The perusing officer’s results will be used by all other users in the next stages of processing in making their decisions about the Entry.

Decide Method of Approval Unit

The Decide Method of Approval Unit facilitates the Assistant Director, to decide the following methods of approval, for an Entry based on the perusing results

- Approve after testing of samples while keeping the consignment at the port
- Approve after testing of samples while keeping the consignment at the Importer’s warehouse
- Approve the consignment for sale after taking samples
- Approve the consignment without taking samples

D (QA) Approval unit

The D (QA) Approval unit facilitates the Director-Quality Assurance to make his recommendations about the Entry based on the perusing results and the Assistant Director’s recommendation. His recommendation would either be approving the Assistant Director’s recommendation or he can select one of the following alternative recommendations that supersedes the Assistant Director’s recommendation.

- Release
- Release to Warehouse
- Release to Warehouse for Sampling
- Release to Warehouse for Rectifications

Charges calculation unit

The charges calculation unit facilitates the Chief clerk to calculate the charges considering the method of approval given on the Entry and the tests to be performed. The system automatically calculates charges as the Chief clerk enters relevant fees in the system.

Please refer to appendix I – Important implementation codes (I.4) for JavaScript Code segment that is used for the calculation of charges.

Publish method of Approval unit

This unit facilitates the Counter Clerk to publish the method of approval given on the Notification (Entry) once the importer produces the receipt of payment.

Process Monitoring unit

The relevant progress information of Entry processing according to the user-logged is displayed and dynamically updates when the processing goes to next steps. For Example the Assistant Director who is handling electrical items will be able view the processing progress of Entries submitted for electrical items only. Also the Director will be able to view the progress of Entries submitted for every items since he has the overall responsibility. By this means every user is updated when the processing arrives at the respective user's part. Also the management can monitor the delay of Entry Processing by quickly locating the responsible user.

6.5.2.3 Importer Registration Module

The system allows only the registered Importers to use the system facilities for online submission of Notifications. This module facilitates the Counter Clerk to enter importer's information in the system.

6.5.2.4 Change Staff passwords Module.

This system is used by both internal and external users. A user is granted the access to the system by a password belonging to the user Id. Using a single password a user can login for different roles authorized to him. Also a common login interface is used for both internal and external users. Therefore regular password change is required to

prevent the unauthorized access of staff's accounts by other users. This module enables all staff members to change their existing passwords at any time.

6.5.2.5 Information Module

There are two units coming under this module

Importer-Product Information unit

It is often a requirement to find importers and their referred items for SLSI approval in many investigations conducted by Sri Lanka Customs. Also there will be from time to time amendments for product standards proposed by the SLSI. Then it is necessary to identify the importers who import the particular item and inform them about the revisions as early as possible for the compliance of their shipments with new requirements, so that relevant importers are quickly updated preventing unnecessary issues in future consignments. This module is developed to facilitate this information search purpose.

Importer-Manufacturer Information unit.

In case of registered manufactures, it is necessary to find total invoice values importer wise for products covered in the scope of registration at the end of each year. This is a very tedious task in the existing system. Therefore, the purpose of this module is to provide the requested total invoice value along with other details of Individual consignments (Entry No, Date of submission, Quantity, Invoice value).

6.5.3 Administration sub system

This section comprises of two modules and two major units.

6.5.3.1 User (Staff) Management module

This module comprises of two units

Manage user Accounts unit

This unit enables the System Administrator to add all the users, those who are in the decision making process including the Custom officers, in the system.

Manage User Roles unit

This unit enables the System Administrator to assign different roles to a user who has been added to the system, under Manage user Accounts unit. So that particular user can login to the system for assigned roles using the same User ID and password at a time.

6.5.3.2 Manage Item List module

This module enables the System Administrator to perform Add, Edit, Delete activities on the list of Items (items table) maintained in the database. Data maintained in items table are heavily used in other critical areas such as Notification submission, Email Auto responder, and user wise display of registered Entries in the Process Monitoring. A single user interface is used in this module for Add, Edit, Delete activities to improve the user friendliness and efficiency. The user interface has three modes (Add, Edit & Delete) and one mode is enabled at a time. In order to give this behavior at the user interface, Java Scripts were used.

6.5.4 Customs Implementation sub system

This sub system comprises of two modules



University of Moratuwa, Sri Lanka.
Electronic Theses & Dissertations
www.lib.mrt.ac.lk

6.5.4.1 Verify decisions module

This module facilitates the Custom officer to verify the SLSI decision given on a notification that the importer produced at the Customs. There by submission of forged notification forms at the Customs is prevented.

6.5.4.1 Change customs passwords

The system has a common User Interface for all the users for Login purpose. Since the Custom Officers are allowed to view any Entry processed in the system, the confidentiality of the Entry information from other importers should be assured. Therefore, the change of custom officers' passwords from time to time enhances the system's security.

6.6 Relationship between system architectural design and PHP files

All the subsystems and units of the architectural diagram with relevant PHP file(s) are listed in appendix J - Relationship between system architectural design and PHP files.

6.7 Relationship between classes and PHP files

All the entity, interface and controlled classes with relevant PHP file(s) are listed in appendix K - Relationship between classes and PHP files.

6.8 Issues faced during the implementation

During the initial stage of system configuration, manual configuration of php and MySQL server was challengeable and difficult. Even though, the given instructions in the book were followed for configuring the system, binding PHP with Apache server to get the MySQL service extension has continuously failed, as such connection to the Database too has failed. Therefore, a considerable time was spent to study the PHP and Apache configuration issues.

The other critical issue faced during the implementation is that the risk of being replaced the uploaded scanned copies of invoice, packing list & BL of an Importer by secondly uploaded copies of the same type of documents by another Importer because of same filenames are given to the scanned copies by both parties (e.g. invoice.pdf). However, this issue was resolved by concatenating the filename with the BL number which is unique for the consignment during the file upload process, to give unique file names to each document uploaded by different importers.

In general, experience in working with PHP, MySQL and JavaScripts was lacking and it needed a lot of self study and guidance from colleagues.

6.9 Summary

In this chapter the discussion was focused on the implementation of the system and the issues faced during the implementation. The next chapter will be focused on how the evaluation and testing is carried out.