Chapter 4

Using technologies expanding IPS-IRD

4.1 Introduction

More technologies which can be used for IPS –IRD system were identified in the previous chapter. This chapter presents a practical application of technologies for IPS-IRD system.

4.2 Initial approach to the proposed system

The approach to IPS-IRD system started from analysis of tax-information collection, discussed in chapter 2. Then the developer identified that what technologies can be used to achieve the required product as to background knowledge. According to the setup and the environment of the project, the design can be done on user activities as use-cases. Object oriented method was selected as most suitable method to design the system on objects.

IPS-IRD system will be designed on identified user requirements. The entities are reflected by the objects and the operations are associated with the problem solved. The entities are reflected to activities done by users in manual tax-information handling process and the operations should be implemented to solve occurred problems in existing system.

According to the system environment and to developer's knowledge of learned technologies, the following technologies and models were selected to design and implement the proposed solution for the problems identified.

- Software model – waterfall model
- Designing tool - UML
- Programming language – PHP
- Database query language – MySql
- Sever – Apache
- Browser – fire fox / internet explorer
- Network – Intranet (LAN)
- Topology – Bus topology

4.3 Technologies used for IPS-IRD system

4.3.1 Designing Model

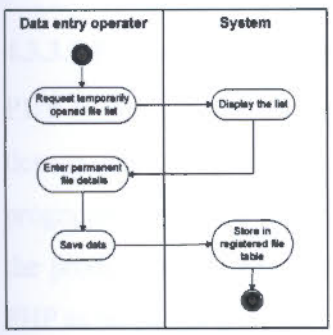
Waterfall model was selected that because of it was only the experienced path to design a software project by the developer as example group assignment under the Software Engineering subject during the learning period. Using this model, the works have to be done on use cases and activities were identified on user requirements. The software product had to be developed using software processes, one by one. So, the waterfall model is the most suitable one for the IPS-IRD system. One advantage of the waterfall model identified is, the developer may not have to face for large mistakes while he using the user and software requirements. Using this methodology, software requirement specification, use case diagrams and descriptions, activity diagrams, grammatical analysis, sequence diagrams and class diagram were designed in a sequential order. It reduced time and risk of the product.

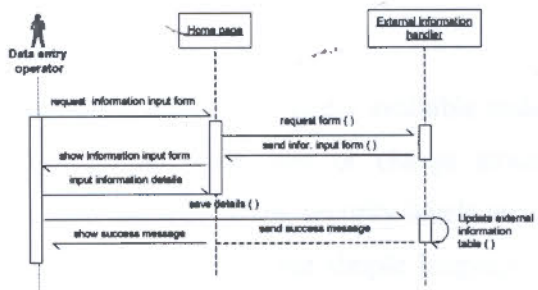
4.3.2 Designing Tools

4.3.2.1 UML (unified modeling language)

UML was used as the designing tool beyond to the end of documentation including interface designing. Since UML provides a range of notations which can be used to document an object-oriented design, design was described using different object models like class model, sequence model, relational data model illustrated under this chapter. The best advantage of using UML was a simplified system.

Microsoft-Visio tool was used to design diagrams. Usage of a design tool also was an new experience to the developer. The highlighted design diagrams in above, UML provided different views as below.





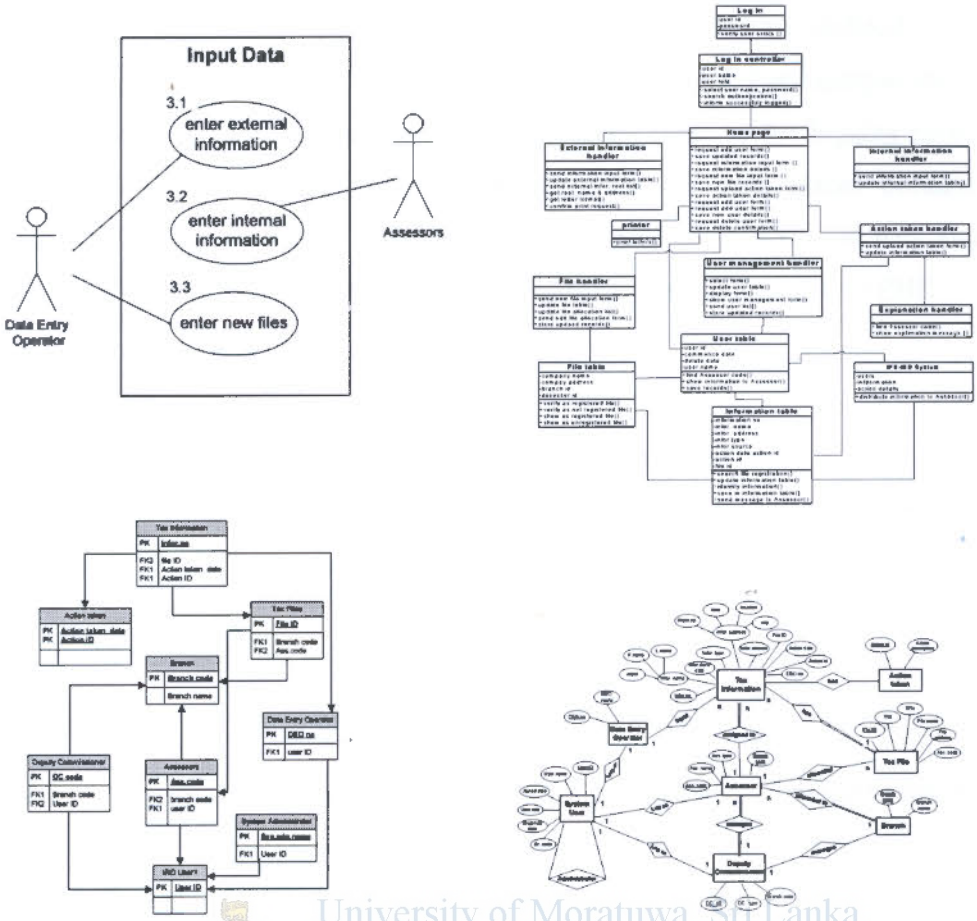


Figure 4.1 : UML design views

4.3.2.2. Macromedia Dream weaver as Interface designer

Macromedia dream weaver was used as the tool for interface design in the system. Dream Weaver is common web development software which supports to HTML / PHP.

4.3.3 Development Environment

4.3.3.1 Programming language

PHP & Eclipse was used as the programming tool. It was freely available under PHP license and Eclipse Public license1.0. So no more cost or charge aroused on programming. Since the product was a web based program, security levels required to the product could be easily developed on this advanced but simple language. Using PHP as an object oriented language, easy to determine whether the web script satisfies

the policies, because the interface to each query was explicitly defined. In our scripting language, inputs were represented as trusted variables. For example, the root password could be modeled as a secret and unstained input to the logging process. PHP technology takes more programming resources for such places because it refreshes the screen with each individual record submission in a normal way. But it also was a challenge to the developer, because of the lack of knowledge on PHP.

4.3.3.2 Database management

The comparison of some of available DBMS s features as given below.

DBMS	(1) MYSQL	(2) ORACAL	(3) SQL Server
Licenses	Not applicable, Freely available	Applicable	Applicable
Cost of the product	No Cost	Very high	Very high
Upgrades	Free of charge	With a charge	With a charge
Security	Similar to others	Similar to others	Similar to others

Table 4.1: Comparison of adapted available dbms.

MySql was selected as the database design tool and the query language that because of it was the most suitable tool which was freely available under GPL license at no cost as a structured query language for commercial relational databases to use with PHP language. As an information–flow program, it was necessary to specify the policies directly at the very end of the system namely at the database level. MySql quires can be run on apache server easily. It was the advantage given to the developer. This was also a new experience to the developer.

4.3.3.3 Background technologies

Server - Apache HTTP which was freely available under the apache license 2.0, was used as the server, It provided an environment for web code to run. It was used as a tool for configuration and management. Apache was freely downloadable and easy to configure.

Browser - The user interfaces were to be connected with the DBMS using a browser that can be act as internet service. So, fire fox or internet explore can be used as the web browser.

Platform - Windows 2003 was used for server PC and Widows XP for clients. As per the current system environment it can be easily developed.

Network - It is planned as a LAN which can be worked as an intranet. The network not be extended to internet level in first stage of the system, because as the scope of the project it is limited to the inner building of the head office. It could be planned at no further cost that because of the existing LAN in the department. The network was connected to the system by **RJ 45** cable and the servers in each floor were connected with the terminals by twisted codes. Especially LAN was the most suitable for IPS-IRD system that it runs confidential data.

Topology - IRD system uses the bus topology in the network. A linear **bus topology** consists of a main run of cable with a terminator at each end. All nodes (server, workstations, and peripherals) are connected to the linear cable. Advantages of the Bus Topology are easy to connect a computer or peripheral to a linear bus at any time and require less cable length than a star topology. But it has a disadvantage as well as the advantages. The entire network shuts down if there was a break in the main cable. But in this stage couldn't solve this problem.

4.3.4 Summery

Selected technologies on design and implementation for the software project were discussed in this chapter as basic for the next chapter. The developer has to face for lots of problems during selection of technologies; because the developer is a new one for software engineering field with lack of knowledge on technology.