SPS PORTAL

Mohd Azfar Shahir B Ishak
(Multimedia Computing)
Abu Rashidin B Mohidin
(Software Engineering)
Norhayati B Ahmad Rosli
(Software Engineering)

Bachelor of Computer Science with Honours
2004

MOHD AZFAR SHAHIR B ISHAK
(MULTIMEDIA COMPUTING)
ABU RASHIDIN B MOHIDIN
(SOFTWARE ENGINEERING)
NORHAYATI B AHMAD ROSLI
(SOFTWARE ENGENEERING)

This project is submitted in partial fulfilment of
the requirements for the degree of Bachelor of Computer Science with Honours

Faculty of Science Computer and Information Technology
UNIVERSITI MALAYSIA SARAWAK
2004

ACKNOWLEDGEMENT

First of all, we dedicated our thanks to our supervisors Mr. Nazim B. Jambli for his kindness and to others lecturers as well in sharing their wisdom and useful suggestions. We extend our sincere thanks for the cooperation made by the every group member, Mohd Azfar Shahir B Ishak, Abu Rashidin B. Mohidin, Norhayati Bt. Abu Bakar. We also indebted to the Dr. Jane Labadin, the coordinator for the Final Year Project I and II, semester 1 and 2, 2003/2004, who provided us with helpful hands and providing us guidance to write this report. A special thanks to Mrs. Seleviawati, the examiner for this report. We also thank several people, who agreed to be part of the questionnaire session for this report. A special thanks to our parents and siblings, who were always there, encouraging and supporting. This report would not have been possible without the support they provided throughout the whole process.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

This portal is design for the e-government that includes the information about the organization. Realizing the needed of portal in government organization, we searching for organization that want the portal build in their organization. The portal for government has its own policies, standards and guideline. The use of this portal would help user such as citizen and employees to find to useful information and services. It also provides us the ability dealing with real client in real world.

ABSTRAK

Portal ini direka untuk pejabat kerajaan yang melibatkan penghantaran data tentang organisasi tersebut. Menyedari pentingnya akan kewujudan portal dalam institusi kerajaan, kami mensasarkan objektif kajian kepada bangunan kerajaan yang menginginkan sebuah portal. Lazimnya, portal untuk organisasi kerajaan mempunyai polisi, piawai dan rujukannya tersendiri. Portal ini akan membantu pelanggan seperti orang awam dan pekerja kerajaan dalam mencari informasi atau perkhidmatan tentang organisasi tersebut. Portal ini juga memberi kami latihan untuk berhadapan dengan pelanggan IT dalam dunia sebenar.

CHAPTER 1: INTRODUCTION

E-services is a division with the mammoth responsibility of transforming the way Government conducts business, from the traditional visits to Government offices to being able to render services to the citizens via innovative technologies that allow citizens access to Government from home or any other nearest point of contact like kiosks. *The transformation of Government business, however, needs to take place in an environment that allows departments' and provinces' systems to "talk" to each other* [7].

SPS Portal will adapt e-services concepts in it website and will be function as a medium of communication between users and government, in this case Sarawak Government. SPS Portal is an abbreviation of 'Setiausaha Persekutuan Sarawak Portal'.

Government agencies under 'Pejabat Setiausaha Persekutuan Sarawak' (SPS) control are selected. Since the SPS controls the entire departments in the building, therefore, any problems or information needed will have to refer to the SPS. All of these government departments are operate at Building of Sultan Iskandar, Simpang 3, Kuching, Sarawak.

1.1 Purpose of the Report

The main objective of this report is to fulfill the requirement of Final Year Project (TMP 3012) subject. Each group has to produce a report based on the project. This report must be well defined and be able to explain the entire project in theory. Then, a system or website must be developed to express the idea practically.

The objective of the report being carried out is to propose an idea of developing a new electronic services website. Since the client has none background in Information Technology field, something practical has to be done. In order to make this website a reality, we have chosen to develop an evolutionary prototype as a way of showing the idea to the client.

In this type of prototype, the developer will produce a prototype to the client to give a rough idea of the website being developed. Furthermore, the prototype can be used as a tool to measure either all the requirements from the client is met. After the client verify the prototype, and then only the evolutionary prototype will be used as a basis in developing the final system.

1.2 Research Problems

References that are being used in this project are similar websites that are available on the Internet and raw materials from the relevant departments in the Government Agencies.

There are several websites have been recognized suitable to be referred for this project. Most of the websites involved government agencies in the country. Generally, the websites provide information about a particular department and seldom load enough information and services in the websites. *In fact, there is a website that requires users to sign up as a member before they can surf the website* **[7]**. Maybe the website needs to do that to ensure security to every member of the website. Sometimes this act may bring difficulties to the users. Since all the websites are only applicable online, there are sometimes those websites are hard to access. Furthermore, websites that offer services from the government agencies are so few on the

Internet. If there are, the services provide are insufficient and design of the websites are not user-friendly enough for those users that are fresh in this technology.

On the other hand, the conventional way that is being practiced currently in most departments in the Government Agencies in the country has not changed since then. The problem that was faced is selecting government departments that most civilians dealing with. Besides, difficulty to meet the person in-charge also slows the development process.

1.3 Research Project Significant

The significant of this project is to make any business that involved selected government departments easier and faster with a minimum cost. Cost in this context refers to cash, material and time.

1.3.1 Cash

Currently, every single business must involved money. In fact, users have to make payment before they can get intended form. Therefore, a new technology will be introduced as an experiment to test the ability of users to cope with it via this website. They can get the forms free.

1.3.2 Material

This website will make a change in the conventional way as this website will make any application paperless. Every single process will be held online. Users will be given a serial number that is unique to a person. This number then will be used as a reference in their application when dealing with on duty staff.

1.3.3 Time

Since all the process done online, time can be saved obviously. Users do not have to rush to a particular department anymore. Everything can be done at the end of the fingertips. Users also can get anything at anyplace there are at that particular time.

1.4 Research Project Potential Outcomes

Potential outcomes of the project is a website that enable to be a portal for selected government departments to park their services and provide relevant information in it. This website also hopefully can be a medium for users to interact with representatives from every government departments in it.

Meanwhile, the most important outcome of this project is that this website can be useful to the users and manage to solve their problems. This is important because any websites or systems that is finely built without fulfill all its requirements are useless. Therefore, every step in implementation phase should be study carefully so that unwanted things would not occur.

This websites also hopefully can be accessed in a split of second and free from hidden errors that may occur during the downloading time.

1.5 Research Project Approaches

Different people have different ways in thinking. In this project, approaches that are practiced are by analyzing current websites and refer to the existing sources that are available in the library and the domain experts themselves.

In order to develop this website, knowledge acquisition from the domain experts is important. This is due to lack of knowledge and expertise in the intended domain. Every domain has its own experts. The domain experts play a very vital role in determining the success of this project. Approaches that have been used are through the interview sessions, questionnaires and several meetings with them.

In meeting we have five times appointment with Assistant State Secretary, Encik Wan Fadillah who is in charge in provide the requirements.

1.6 Outline of the Report

Generally, this report is written as a guideline and to brief users about the project in progress. This report provides complete information about the project and users can use this report as a reference on the outer look of the website in the future.

CHAPTER 1: INTRODUCTION

This chapter will give an overview about the portal. This will include purpose of report, research problems, research project significant, research project potential outcomes, and research project approaches.

CHAPTER 2: LITERATURE REVIEW

This chapter will review the necessary term and concept that being used. Review the existing portal for government, and the comparison between them. This chapter will also review some of the technology that will be used in this project.

CHAPTER 3: METHODOLOGY

This chapter will be focusing on the overall methodology used in developing the proposed system. This will include research methodology and system methodology.

CHAPTER 4: SYSTEM ANALYSIS AND DESIGN

The architecture and the component of the proposed online resource are discussed in this chapter. This chapter also discussed about the program design which, consist of the context diagram, data flow diagram and entity relationship diagram.

CHAPTER 5: IMPLEMENTATION PHASE

This chapter will cover the entire system where each component in the online resource will be presented in detail.

CHAPTER 6: TESTING AND EVALUATION

For this chapter, it will discuss about the website testing, where the target user will be the one who doing this testing. The evaluation of the project and the user acceptance test will be included in the chapter.

CHAPTER 7: CONCLUSION AND FUTURE WORKS

In this chapter, all the achievement of the online resource website will be credited and the future work will be stated for improvement of the weakness that found in the design of the proposed online resource. The conclusion of this topic will be included here.

CHAPTER 2: LITERATURE REVIEW

In the growth of ICT world, government or private sector took several initiatives. Government's aim to create a country based on electronic technology can be seen with the existence of facilities found in Internet. Such application that has been widely used is the e-service. Basically e-services by origin were a group of several service of facility that was provided through the website for the user to use in the Internet. E-services have become one of the important mediums that this service has saved customer's time.

E-services would give user much benefit without limit, time and distance (area). Through this service, every information, procedure, and only Internet based processes can do news and even forms. The way to store all in formations, news, event/ activities, opportunity (job, quarters and etc) and complaint are Internet portal. "*The portal can provide all basic information and knowledge support to accomplish all jobs within planning commission. Electronic document sharing and management, event management, announcements, discussion and news services, web mail checking and a bundle of services can be provided through intranet portal. It can be used as a common connection point from where a list of services can be made available for all employees*" **[19]**. The topic below will explain more detail about portal. SPS Portal one of e-government site are using Internet portal. E-services and portal will create a very dynamic and functional e-government web site.

2.1 Introduction to E-Services

E-services are a system where a combination of several services that could give benefits especially to the Sarawak community. Such components found in e-services are search engine, download form, online form, procedure, services and information that useful to the user.

There many of benefits using e-services model, one of many its benefit is about the costs. Everyone who used Internet realized that Internet very cheap. Internet uses will be more cheaper if Internet usage within a big organization in Malaysia then its usage domestically. This is because the charge for such service (for example ISDN) for any organization is nearly the same as the charge for a cyber cafe ISDN connection. User will certainly benefit from such implementation as transaction could be done without having to queue up those long lines.

In other factor is widely deployment, now with e-services model, the new user easily to obtain the form and simply fills out a setup form and is then provided a user id and password. After that, they can access anything and everything that they are authorized to access. End users can now access information directly when they need it and they get the answers instantly.

Wider ranges of services are available which include job searching, loan applications, quarter's applications, one of system that in SPS Portal and also the public complaint. Information could also obtain much easier. The most important in develop an e-government website or other application web site is about a security.

With e-services model, security measure could be improved. There different type of security measure that can be implemented such as SSI. SSI uses RSA/ SSI and commercial firewall to protect data. SSI includes a very strict policy and limits the access to and from the Internet. This limitation is done through the implementation of different level. Different level will enable different type access. ID, password and authorization are needed in order to fill up, edit or to update any particular data. SSI could log down and trace any activity within the e-services web site.

Traditional communication uses a one-way communication. This is different from the currently used communication technique, where as all the information is put info a single portal. The inclusion of search and also online advertisement will enable more users to access the portal.

The last benefit in using e-services model is real time. SSI e-services are a real- time model. In other words, with SSI technology, information in the website could always be updated from time to time.

2.2 What is E-Government Web Portal?

Nowadays, it is obvious that more and more governmental organizations are already using this medium to enable citizens, state employees and government officials to explore and interact online with their local agencies. A standard paradigm is the use of portals. Major starting sites that users tend to visit as anchor points.

However, the e-Government web portal answers an increasing desire, driven by need, for government organizations at all levels local, state and federal to improve communication and interactivity internally and externally. The Internet is the road, but government administrators prefer as many businesses do turnkey interactive systems as the on and off ramps. The e-Government portal demonstrates new technologies and highly available failover features that outdistance previous approaches to this ongoing need.

How good or bad is the systems, there should have the benefits. Same like e-government web portal, the four main user groups will get the benefits of e-government web portal:

Citizens- The taxpayers or citizens at large of the government unit applying e-Government benefit through a free online community with anonymous/registered access anywhere, anytime and from enabled devices.

Employees- The government employees benefit from an easy-to-use separate access gateway, helping enable them to work from any location with access to necessary information.

Government officials/leaders- This class of user can gain from internal access to information on-site or at remote locations.

Businesses- Businesses working with, or supplying, government contracts can utilize the system to perform supply chain and inventory management.

2.3 Review of existing E-Government Website

In this chapter, review of existing system that familiar with project is very important. Gerbang Mesra and @ccess Perak

2.3.1 Gerbang Mesra

Gerbang Mesra Selangor (www.gerbang.selangor.gov.my) is one of many official website for government state Selangor. Gerbang Mesra Selangor also known as a electronic Public Services (ePS). This website is belonging and implement by Selangor state government. The purpose of the web site is to provide the popular government services for citizens in Selangor. This web site actually using a concept web portal where all the information, data and the apply form put into one space in database what we call portal. The website provides e-services such as tax payment, school transfer applications, public complaint, job vacancy and court rental application. Gerbang Mesra website has functionality that familiar with SPS Portal requirements. Other e-government web site is @cces Perak where will describe detail below.

2.3.2 @ccess Perak

@ccess Perak (www.perak.gov.my) is official website for Perak state government. This official was implementing by Technology and information system office, which allocated in Setiausaha Kerajaan Negeri Perak building. The purposes the web site is more to give information, to inform what the monthly activities or event and about the building. Besides

that the website provide services who those want to check their attendant which who working in the building. SPS portal is combination with e-government and portal

2.3.3 SPEED eServices Malaysia

SPEED eServices Malaysia (www.eservices.com.my) is working with three suppliers:

- Road Transport Department or Jabatan Pengangkutan Jalan (JPJ)
- Tenaga Nasional Berhad (TNB)
- Telekom Malaysia Berhad (TMB)

SPEED e-eServices give many facility who those fighting through traffic jams, searching for parking space and waiting in long queues just to pay bills. SPEED eServices is using a concept of web portal. The following are the services to be delivered through these Service Suppliers

- **Jabatan Pengangkutan Jalan (JPJ)**
  - Summon information and payment
  - KEJARA information
  - Tentative test cancellation
  - New license
  - Lost / damaged license
  - License renewal
  - Add class to license
  - Update license details

- License information
- New registration

- **Tenaga Nasional Berhad (TNB)**
  - Bill payment
  - Account and bill information inquiry

- ***Telekom Malaysia Berhad (TMB)***
  - Bill payment
  - Account and bill information inquiry

These three web sites have different features, table below showing more detail about these three website. The features are the scope in this project.

Features	**Gerbang Selangor**	**@ccess Perak**	**SPEED eServices**
Lists of office and department	✓	✓	
Online registration			✓
Public complaint	✓		
Job vacancy	✓		
Calendar event		✓	

Update database	✓	✓	✓
Languages	**English and Malay languages**	**English and Malay languages**	**English**
Portal	✓	✓	✓
Link to other web sites	✓	✓	✓
Address & Phone information	✓	✓	✓
Server scripting	**PHP**	**PHP**	**ASP**

Table 2.1 Comparisons features between three websites **[4, 5, 6, and 12].**

For example, email is an interactive feature that allows ordinary citizens to pose questions to government officials or request information or services. In our study, we found that 73% of government websites offered email contact material, so that a visitor could email a person in a particular department other than the webmaster **[6]**. Table below show more detail about government website offering public outreach.

Percentage of Government Websites Offering Public Outreach	
	%
Email	73
Search	38
Comments	8
Email Updates	6
Broadcast	2

Table 2.2 Global E-Government Survey **[6]**.

The vast majority of sites provide their department's telephone number (70%) and mailing addresses (67%). This is material that would help an ordinary citizen needing to contact a government agency reach that office. In addition, features such as a subject area index that organize a site and tell a citizen how to navigate the site were abundant. Some 85% of government sites had subject indices **[6]**. Table below show more detail about percentage of websites offering publications and databases.

Percentage of Websites Offering Publications and Databases	
	%
Phone Contact Info.	70
Address Info	67
Links to Other Sites	42
Publications	71
Databases	41
Index	85
Audio Clips	4
Video Clips	4

Table 2.3 Global E-Government Survey **[6]**.

2.4 Conclusion E-Government Portal

In looking towards the future, it is important that all nations create government portals that serve as the gateway to a particular country's websites and offer a "one-stop" web address for online services **[5]**. A number of countries have adopted portals and put services for citizens, businesses and government agencies in one place. This is a tremendous help to citizens interested in making use of online resources. Portals are helpful from the citizen standpoint because they offer more uniform, integrated and standard navigational features. One of the weaknesses of many national websites has been their inconsistency in terms of design features. Government agencies guard their autonomy very carefully, and it has taken a while to get agencies to work together to make the tasks of citizens easier to undertake. Common navigational systems help the average citizen make use of the wealth of material that is online.

2.5 Software Overview

In develop a government web site such as SPS Portal, the software must be determined first. In develop a dynamic website, normally developers have to choose what kind web server will be use, what sever scripting will be use and what software want to use can make dynamic website more interactive. All this issues will describe briefly in topic below.

2.5.1 Web Server

Web server is known as a file server. Nowadays many of web servers are publish in Internet. There are dividing in two types, open source and close source. Web servers allow you to display your contents over the Internet by using the Hyper Text Markup Language (HTML). *Web browser such as Netscape Communicator, Internet Explorer at client computer is communicating with each other using a set of command known as Hypertext Transfer Protocol (HTTP). HTTP is a standard protocol for communication between browser and web server* **[18]**.

In implement an e-services and e-government system, choosing a suitable web server id very important to make sure that server have ability to provide the facilities, functionality and information needed. SPS portal has decided to choose Apache Web server become a web server because Apache Web server is merge with PHP. Below will explain more detail why using Apache Web server

2.5.2 Why Use Apache Web Server?

The most interesting about Apache Web server because it is free (open source). Apache is one web server that most popular within web developers. Apache have two closest competitors, Netscape SuiteSpot and Microsoft IIS. In fact, the latest survey (http://www.netcraft.com/survey) showing that the freeware Apache is the top between the Netscape SuiteSpot and Microsoft IIS.

Apache Software Foundation is the team that is responsible in developing apache server. It is one of the most successful open-source software projects.

The results of Netcraft Web Server Survey research responses to its August and September 2003 are as follows:

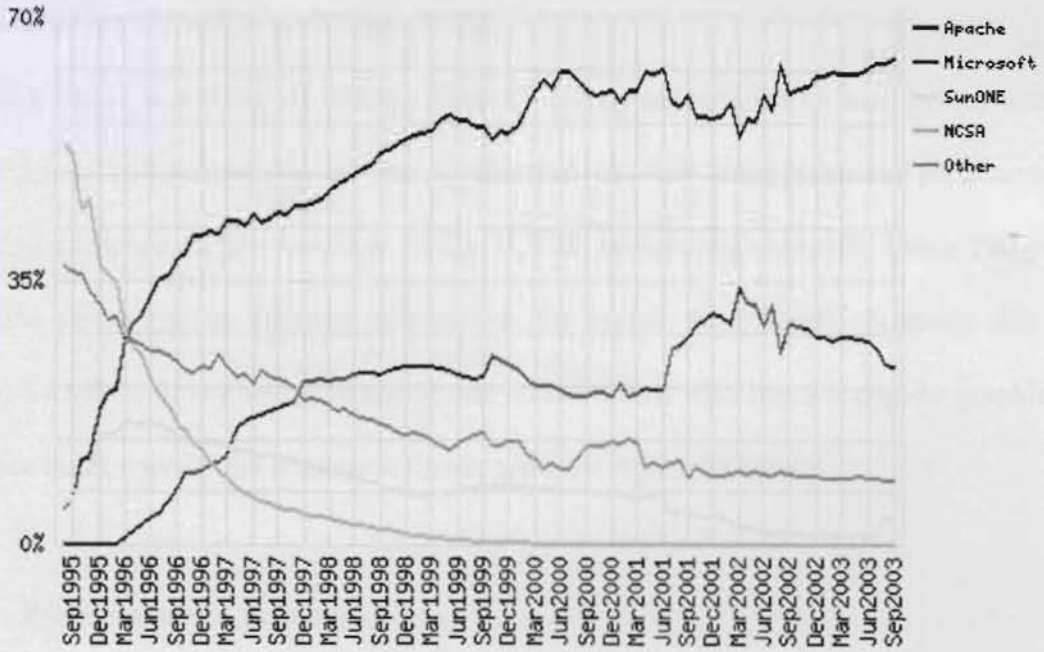


Figure 2.1 Graph for Survey Web server from Netcraft.com **[5]**.

Developer	August 2003	Percent	September 2003	Percent	Change
Apache	27388860	63.98	27836622	64.52	0.54
Microsoft	10165745	23.75	10156289	23.54	-0.21
SunONE	1534586	3.58	1501241	3.48	-0.10
Zeus	746240	1.74	742950	1.72	-0.02

Figure 2.2 Survey Web servers August and September 2003 from Netcraft.com **[5]**.

2.5.3 Linux

Linux is an operating system for several types of computer platforms, but primarily for Intel-Based. The system has been designed and built by hundred of programmers scattered around the world. The goal has been to create a UNIX clone, free of any commercially copyrighted software, which the entire world can use **[1]**.

Basically Linux is a clone of UNIX, where if anyone using a Linux may get advantages of UNIX. Linux is the most popular free system that can easy to upgrade and maintains. Linux comes in complete implementation of the TCP/IP networking protocol. Linux can provides complete server system include web server, ftp server, mail server, Network file system (NFS), SAMBA, Proxy server, security and others. Linux also has a complete graphical user interface but for server the command line is good for any maintenance.

2.6 Programming Language

Generally, the web programming language divides into 2 types. Client side, executing on the client-side and another one is server-side, executing on the server side. Compare to the application created by client-side scripting, the server- side scripting yields more powerful feature. Combination between client-side and server side ca make any web application powerful and dynamic. Client-side programming has using less a bit of CPU to browse. Client-side also helps to reduce and quicken the process in server. In other hand server-side can switch the web from static to dynamic by creating a two-way connection between client and server. In other words it is suitable for creating dynamic web pages for e-government and

other web applications. A dynamic Web page is a page can interacts with the user, so each user visiting the page can sees customized information.

2.6.1 Server-Side Programming Technology

There are many existing server-side technology that available on the market. Common language are used are Active Server Pages (ASP) from Microsoft, LiveWire from Netspace, Perl, Zope, Java Servlet from Sun, Hypertext Preprocessor (PHP) and Common Gateway Interface (CGI). Python, Perl, Zope and PHP are an open source serve-side scripting language. This section below will compare and discuss about four major different combinations of web technology as followed:

- Java Servet from Sun, running on independent Operating System which supporting Java.
- Common Gateway Interface or CGI, running on UNIX, Linux or Windows server platform.
- Active Server Pages (ASP) from Microsoft, running only on Windows Server platform. AN example of an electronic e- services site that use this technology is Hotmail.com (http://www.hotmail.com)
- Hypertext Preprocessor (PHP), running on Unix, Linux and Windows Server platform, open source and good combination with Apache web server and can be support from any database such as Oracle, MYSQL Etc.

2.6.2 PHP: Hypertext Preprocessor

PHP in other words Hypertext Preprocessor is open source service- side scripting most popular nowadays. Many web developers are using this server side to creating dynamic web applications. Developers have literally flocked to PHP, with its modest learning curve, free and open development, native database connectivity, stability and availability for variety of platforms **[1].**

PHP syntax is familiar to the C and Perl programming so that can make easy to learn for everyone with basic programming. SPS Portal using PHP language because it is free. PHP can combine with query by using task and just done in three or four lines code.

Syntax Example:

```
//connect to database
<?php
$dserver = "localhost";
$dDb="content";
$dUser="azfar";
$dPass="azfar123";
?>
```

2.6.3 Microsoft's Active Server pages

Microsoft's Active Server Pages (ASP) technology provides a framework for building dynamic HTML pages, which enable Internet and intranet application to be interactive. ASP's

are implemented using server side scripting that can be performed in any language such as Visual Basic, Microsoft's Jscript, Java or C.

ASP is developed in a text file just like an HTML page. Developers can use any text editor to create an ASP. Microsoft's front Page product supports inserting server-side scripts and saving files as ASP.

	PHP Technology	**ASP Technology**
Web Server	Any web server, including Apache, Netscape and IIS	Microsoft IIS or Personal Web Server
Platform	Most popular platforms, including the Solaris Operating Environment, Microsoft Windows, Mac OS, platform implementations	Microsoft Windows Family
Connection with Database	Support many database including SQL database, Oracle and MySQL,	Database support Limit
Source Code	Free under GNU	Microsoft ©
License	Open source code. Anyone can freely add or modify	

Table 2.4 Comparisons between PHP and ASP **[13]**.

CHAPTER 3: METHODOLOGY

Methodology is a set of methods and principles used to perform a particular activity [1]. Methodology used is vital in every project because it is a backbone in developing the right project. Methods used will be discussed in sense of research methodology and system methodology. Research methodology is different from system methodology.

3.1 Research Methodology

Research is a carefully study or investigation, especially in order to discover new facts or information [7]. Therefore, research methodology is a process of using a set of methods and principles to perform a particular activity in order to discover new facts. Researcher has used several methods in gathering information and raw material needed for the project. The methods used are interview, distribute questionnaire, analyze current websites, conducting a survey and observing the work process.

3.1.1 Interview

Interview is a meeting between two people to discuss important matters usually rather formal [7]. In this case, researcher had a serial of interview with the domain expert for knowledge acquisition. The domain expert meant is the Assistant State Secretary, Encik Wan Fadillah B. Wan Ahmad. Researcher asked related questions during the interview sessions. The domain expert is the crucial source of information because the Assistant State Secretary provides lots

of information about all the departments in Sultan Iskandar Building since 'Setiausaha Persekutuan Sarawak 'has the power to control all the departments.

3.1.2 Questionnaire

A set of questionnaire has been distributed to the related staffs to gain levels of satisfaction on the current system. Normally, questionnaire consists of simple questions that need to be answering either yes or no. The purpose of making those easy questions is to make respondents comfortable with the questions and respondents can answer those questions within ten minutes. Questions asked in the questionnaire touch the performance and satisfaction of staff with the current system.

3.1.3 Analyze current websites

There are several websites that similar with the websites that is going to be built. Those website are about government agencies that offer services from that particular department online. Those websites were analyzed to get rough idea on the design and structure of the websites. The strengths and deficiencies of each of the website were analyzed. Then the strengths from every website were finalized and will adapt to the new website. Irrelevant features will be omitted and new features that think needed in the website will be added.

3.1.4 Conducting a survey

Survey is an action to look carefully at all of something especially from the distance **[18]**. Therefore, conducting a survey is to look at the offices as general. Researcher will conduct a survey at the related department to look for the structure of the building, to look at the physical of the building and locate the server room in the building.

3.1.5 Observing the work process

Observing the work process is to monitor the flow of the routine in the office. This part is crucial to keep track of the work and follow the progress of the routine. Besides, observing work process is vital to familiar the team member on the works done daily in every department so that the entire team member will understand on the work process.

3.2 System Methodology

System is defined as a group of things or parts that work together as a whole **[7]**. Therefore, system methodology can be defined as process of using a set of methods in order to integrate a group of things to work together as whole. The most common product life cycle in IT is the Systems Development Life Cycle (SDLC), which represents the sequential phases or stages on information system follows throughout its useful life. The SDLC establishes a logical order or sequence in which the system development activities occur and indicates whether to proceed from one system development activity to the next (McConnell 1996). There are five

basic phases in SDLC, which are planning, analysis, design, implementation and maintenance and support.

3.2.1 Planning

- **Goal** : To develop a portal for e-government
- **Scope** : Government departments under SPS control.
- **Budget** : Fully sponsored by team members
- **Schedule** : Will be completed approximately in 8 months
- **Technology** : Involve client-server, applicable online
- **Tools** : PHP language, MySQL Database

3.2.2 Analysis

Meet with client to learn more about the domain of the project. Meet supervisor to get his approval and guidance for success of the project. Identify and document the requirements; requirements can be developed through interviewing, observing work processes, conducting a survey and analyze the requirements.

3.2.3 Design

In this phase, teamwork will be working on user interfaces design. Besides, the teamwork also will configure the best network should be use, hardware configuration, database and application programs related to the website.

3.2.4 Implementation

Develop the system from the scratch by transferring the handmade design into computerized layout. During this phase, process of designing user interfaces starts. After all of the interfaces done, the next step is insert the scripting to make all interfaces function. Lastly, the website will be linked to the database. After all of the features functions as well as the database have been connected, testing phase will proceed. The entire website will be tested in form of interface testing and functional testing. The interface testing is to test the visual organization and the suitability. On the other hand, the functional testing is to make sure that all of the features function well. The documentation of this website will also be produce in this phase. The documentation will provide help and explanations of the website. Lastly, staff will undergo training session if required.

3.2.5 Maintenance and support

The progress of the final website will be monitored. Changes or consultation will be provided regarding the final version of the website. Maintenance of the website will be done if errors (i.e.: bugs) discovered within the system. Final touch will be done if required in order to make the website suitable and incorporate with the business environment

CHAPTER 4: SYSTEM ANALYSIS AND DESIGN

4.1 Introduction

System design is the phase where all the specifications and requirements that agreed by the programmer and client brought together to develop a system. After making agreement with the client, the Portal will be developed by programmer based on the requirement and specification. Before developing the portal, programmer must do the system design first. It is the basic step before implementing the portal. The system design phase will include a logical and physical design of the portal [1]. The system design phase will go through the database, output, input, user interface and procedures of the system. The five components will be figure in this phase, so it will be easy when implementing the system.

The system design is very important because of some reasons. In this phase, programmer can get a view of the portal. The programmer can plan how the portal will work and define all the problems will be arising. Moreover, the programmer can also solve the problems and it will help them on the next phase. This phase will create an abstraction of the whole portal and helped the programmer in the implementing phase.

4.2 Portal Guidelines

The objective in designing this portal is to design an interactive portal that suitable for government organization. This portal should provide a single point of access to diverse information and applications, secure interactions, a suitable interface and much more [9]. In

designing this portal, we should know first the definition of portal. Portal is a tool for managing company's intellectual assets, information's content and data. The portal will take the huge and unmanaged data and it will be organizes, categories, personalizes and present it to the user at the right time in the right context [9]. In publishing the information about the organization, we should follow the governmental policies and publishing issues. The portal must be convenient and easy to use. In designing the portal, we should design in such a way as to minimize download times base on server capacity.

4.3 Portal Targets

In this section, we would identify the user of this portal. There are two types of users that will be using this portal.

4.3.1 Government to Citizens (G2C)

G2C portal connect the government with their customers. We should use portal technology to combine content, commerce, and community for customers easy of use. The G2C portal will offer the following benefits to both government and citizens:

- Attract and retain users by delivering integration and convenience on information access that relates to the customers activities with the government [9].
- Increase user satisfaction and maintain customer relationship by integrating citizen relationship information with the government services and information offerings [9].

4.3.2 Government to Employees (G2E)

G2E portal are kind of fast emerging portals that targets the government employees. G2E portal offer the following benefits to the government and their employees:

- Leverage knowledge within the organization by sharing information resources **[9].**
- Provide employees with organization tools and environment for their daily work and life **[9].**

4.4 Portal Requirements

The requirements of this portal can be addresses by the following dimensions:

- User and Applications
  - Defines type of user that will be for the specific type of portal and the applications they will look for.
- Access point and client type
  - Address the access method that the user will use to obtain information and service. The type of software will be using
- Information source and applications
  - The nature of information that the user will be looking for.
- Security and availability
  - The basic security and the availability for the portal
- Size and performance
  - Defines the estimate of size and the performance requirement

- Portal capabilities
  - Basic capabilities of the portal

The table below outlines these dimensions of the requirement for each kind of portal application.

	G2C	G2E
User and Applications	• Customers of organization • Customer relationship applications	• Corporate employees and business partners
Access point and client type	• Via internet using web browsers • Different level of browsers	• Via intranet • Web browsers client • Same level browsers
Information source and applications	• Services related information sources • ECommerce involving customer and one corporation	• Large amount of information sources • Sharing • Update
Security and availability	• Require network security to protect the portal from illegal access • High availability (24 hour / 7 days)	• Intranet security • Availability is differs on different information

Size and performance	• Medium numbers of users • Large portal service	• Small numbers of users • Performance differs by applications.
Portal capabilities	• Presentation • Application integration • Transaction • Catalogue service	• Presentation • Workflow integration • Application integration • Information • Connectors

Table 4.1 Requirements for each type of portal **[9].**

4.5 Portal Architecture

It is important to select and understand the right architecture to drive the portal. The selection of the right architecture allows the effective and efficient connection from client to back end servers. The first step in decision finding process is to decide on portal's configuration. It is based on the type of client selected to solve a business case requirement. Type of client selected can also depend on different criteria such as:

- Number of connections to deploy
- Number of different formats to display
- Workstation capabilities
- Number of back end systems

After making some research and observations, we decide the most suitable portal architecture is 'Thin Clients'. It is the easiest way to deploy an application for a large number of clients.

[9]. It will develop an application that runs on a web browser. The web application can be either a Java applet or an application with pure HTML output using a web application server. The benefit of this architecture is the fast deployment of the client, where it only requires the installation of a web browser [4]. If the process of converting images does not take place on the web server or middle server, then the additional viewers to display the content of back end system needed. The application server should be located near the back end systems and the client only talks to the application server. This configuration will reduce the communication protocol to the HTTP between the client and the application server.

4.6 Designing Portal

The system design phase will be described by using: -

- Entity Relationship Diagram (ERD)
- Data Flow Diagram (DFD)
- Data Dictionary (DD)

4.6.1 Entity Relationship Diagram (ERD)

The basic step in designing a portal is creating the Entity Relationship Diagram (ERD). ERD is very important because it defines all related entities, and how the different entities related with each other [1]. The ERD will help the programmer in creating a database for the system. Before creating the ERD, programmer must define all entities related to the system. Entities are any objects that represented in a database such as items, processes, people and transaction. It also corresponds to a table and not to a row in the relational environment. It is representing

by the rectangle and the name is always noun **[8]**. After identified the entities, the relationship between the entities must be defined. Ideally, the relationship name is an active verb or passive verb. The next step is identified the connectivity between the entities. The term connectivity used to describe the relationship classification **[8]**. There are three types of connectivity, which are one-to-one, one-to-many and many-to-many relationship. Finally, defines the cardinality between the entities, which is to specify number of entity occurrences associated with one occurrence of the related entity **[8]**. The entities that defined are list below:

- Administrator
- User
- Quarters form
- Activity
- Database

After making a research methodology, we found that the portal will have five ERD. Figure 4.1 illustrated registration for quarters. When there are vacancies quarters or new quarters, the administrator will be informed. Administrator will inform to the user through the portal and provides the online form for the user. The ERD is below:

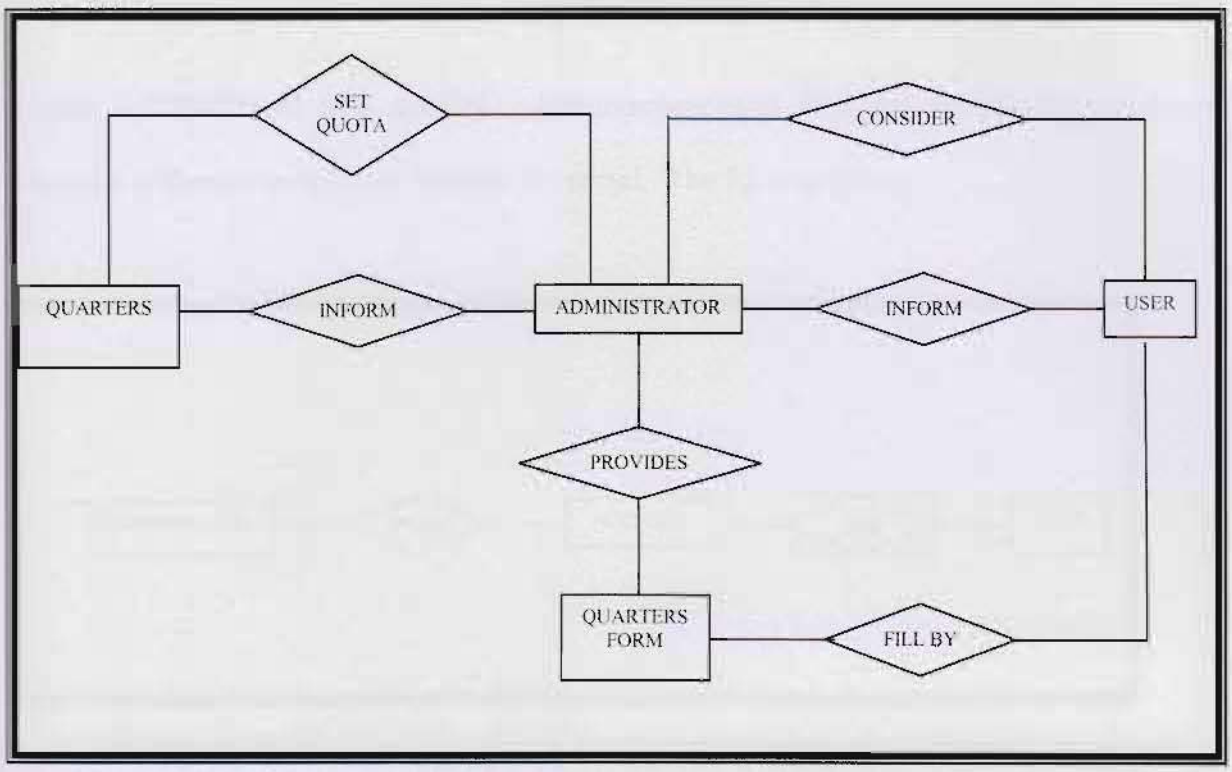


Figure 4.1 ERD for Registration for Quarters

Figure 4.2 illustrated public complaint. User can write their complaint, comment, compliment or suggestion in the portal. The administrator will publish it after making look into it. The ERD is below:

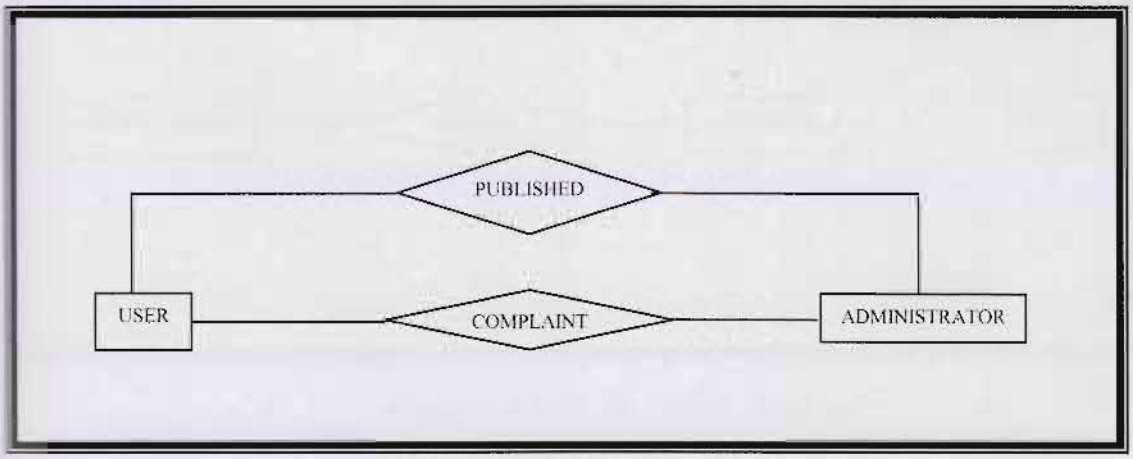


Figure 4.2 ERD for Public Complaint

Figure 4.3 illustrated SPS activity. Administrator will plan the activity for employees annually and employees know through the portal. The ERD is below:

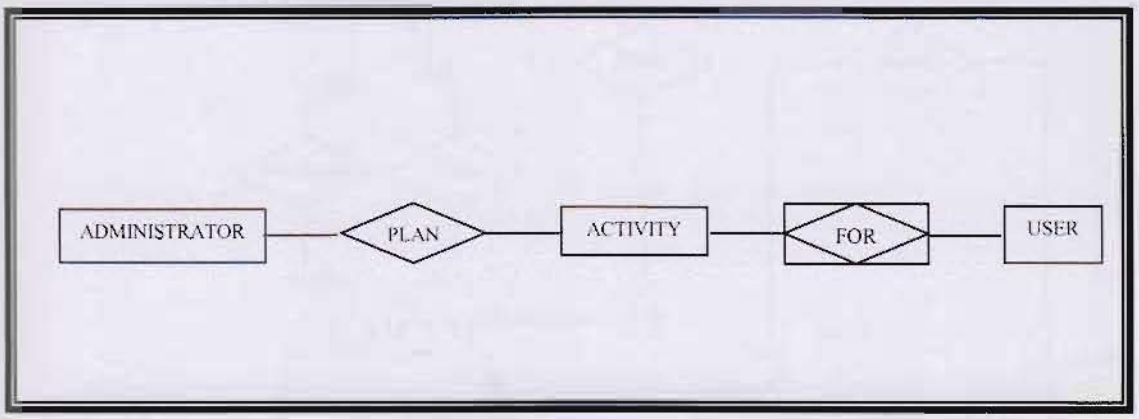


Figure 4.3 ERD for SPS Activity

Figure 4.4 illustrated update database. Administrator monitor database and update it when needed. User will always view the updated database. The ERD is below:

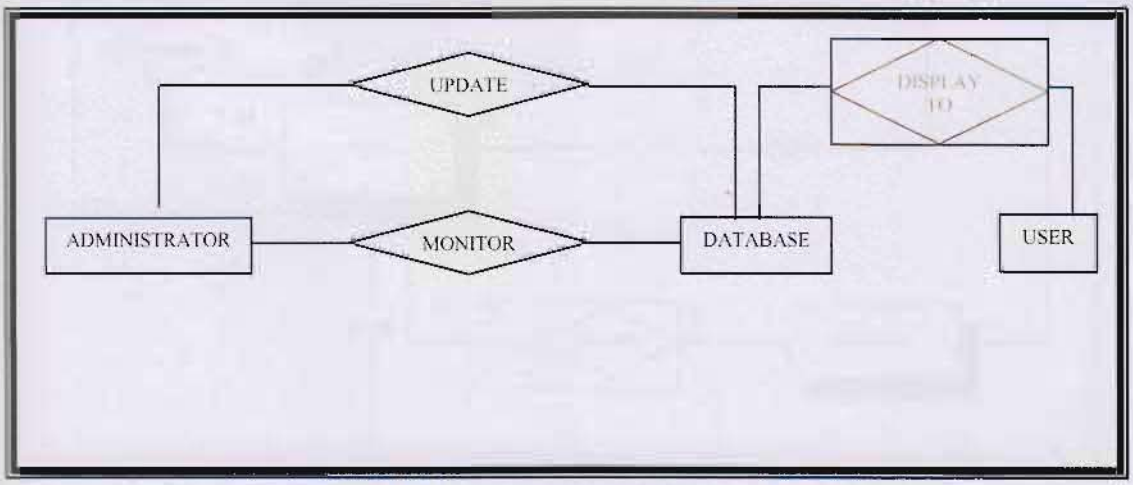


Figure 4.4 ERD for Update Database

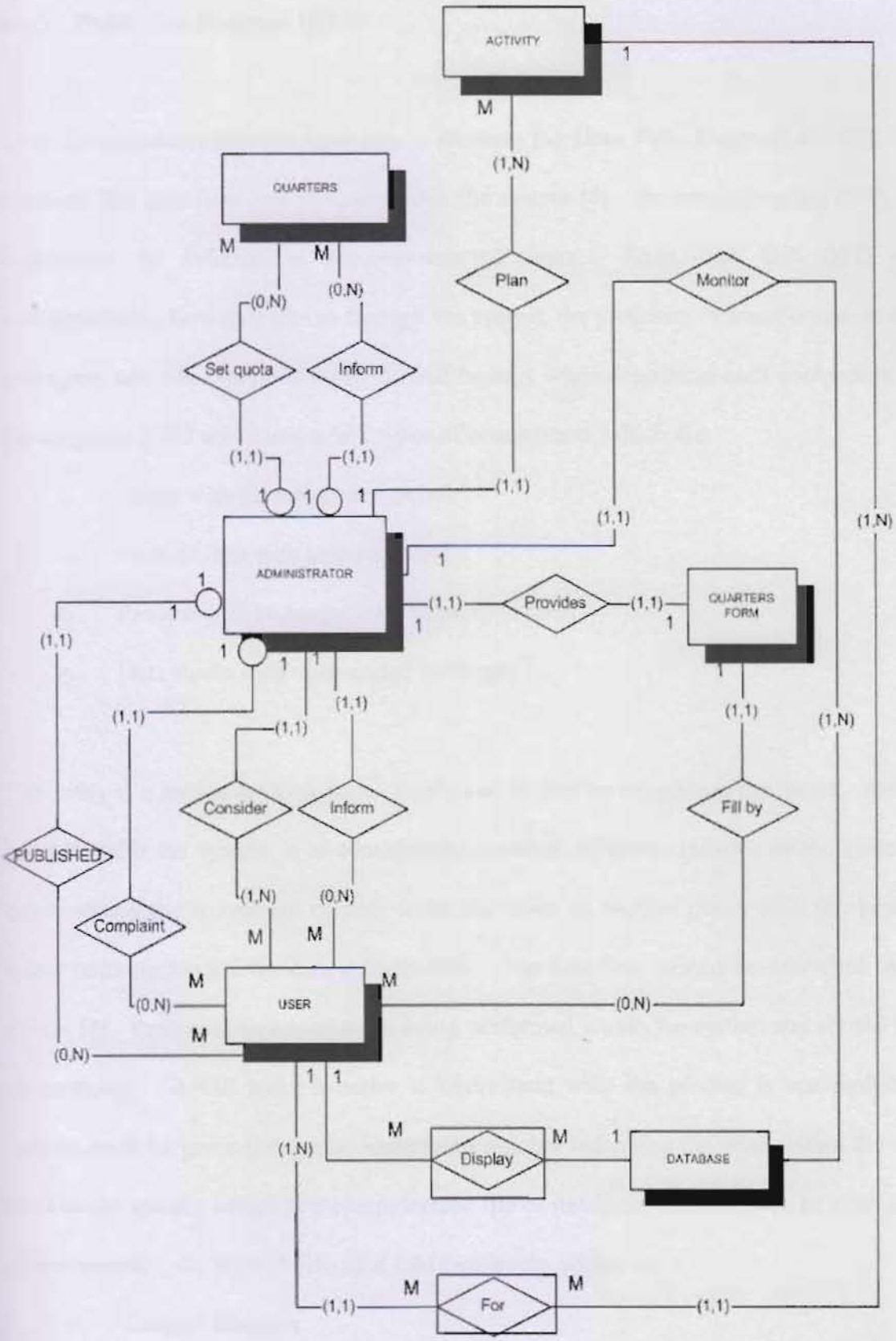


Figure 4.5 ERD for SPS Portal

4.6.2 Data Flow Diagram (DFD)

After creating the ERD, the next step is creating the Data Flow Diagram or DFD. It is to represent the data flow and process within the system **[8]**. By developing the DFD, we can understand the information requirements of users. From that, this DFD will be conceptualizing how data moves through the system, the processes or transformation that data undergoes and what output are **[8]**. It will be easy when describing each component used in the diagram. DFD will contain four types of components, which are: -

- Entity with the rectangle symbol
- Flow of data with arrow symbol
- Process with rectangle with rounded corners
- Data stores with open-ended rectangle.

The entity is a source or destination of data and it label by the appropriate name. Although it interacts with the system, it is considered as outside of the boundaries of the system. The arrow shows the movement of data from one point to another point, with the head of the arrow pointing toward the data's destination. The data flow should be described by a noun phrase **[8]**. Processes represent work being performed within the system and should be name appropriately. It will make it easier to understand what the process is accomplishing. A process must be given the unique identifying number indicating the level within the diagram. Data stores usually represent a computerized file or database. It also name as noun and store data temporary. DFD can be divided into two levels, which are: -

- Context Diagram
- Level 0 Diagram

Figure 4.6 illustrate the Context Diagram for the SPS Portal System. It will represent an overview of the entire system within the SPS Portal System. The next step is creating Level 0 Diagram based on Context Diagram as shown on figure 4.8. This diagram will include the process within the system with greater view and the database involved.

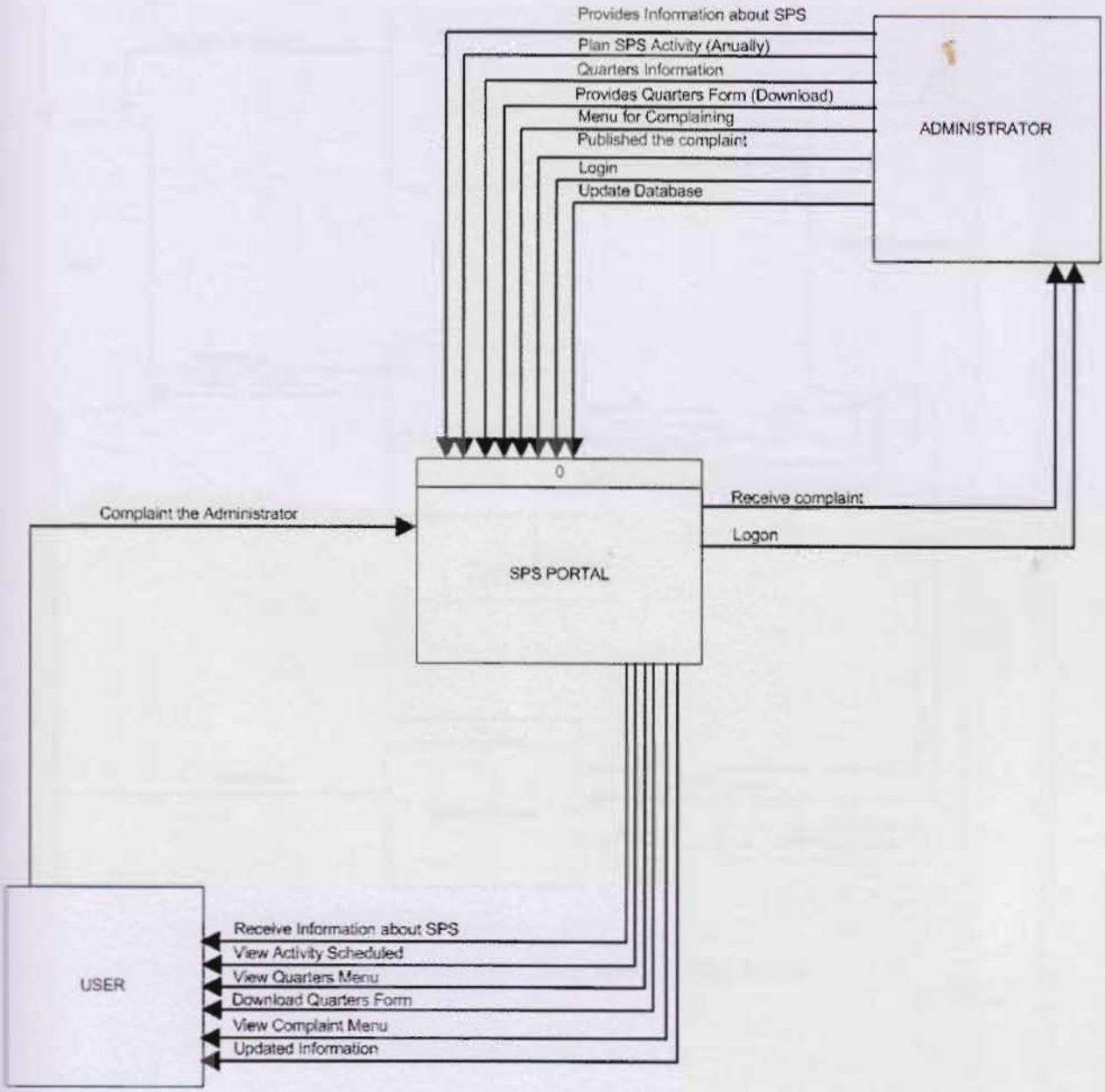


Figure 4.6 Context Diagram for SPS Portal

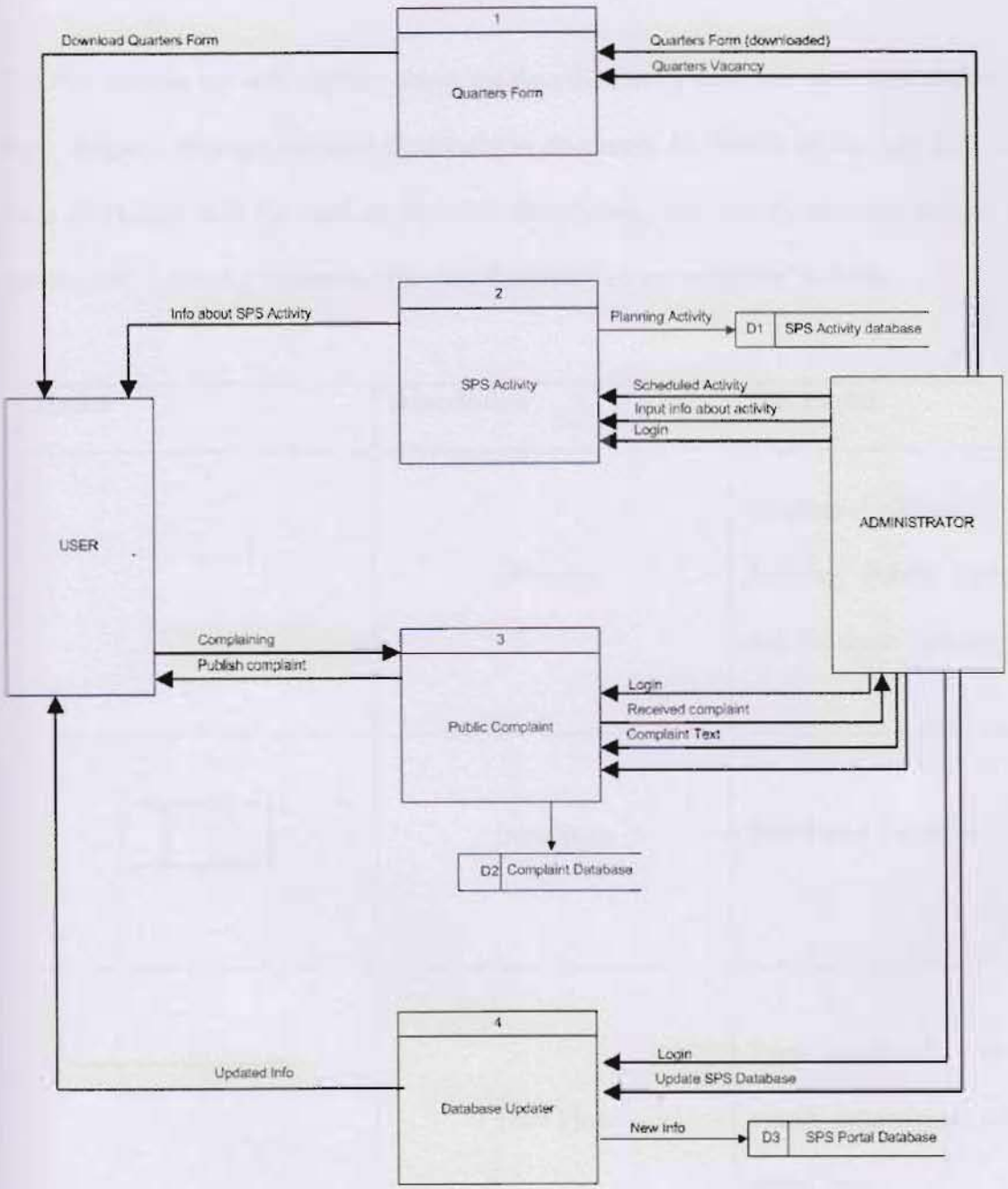


Figure 4.7 Levels zero Diagrams for SPS Portal

4.6.3 Data Dictionary

For this section, we will explain about the data dictionary that was used to organize the data flow diagram. We use the data dictionary to document all details of the data flow diagram. Data dictionary will be used to describe data flows, data stores, external entities and the process **[8]**. Table 4.2 represents the data dictionary of our proposed website.

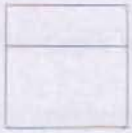
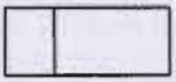
Model	**Description**	**SPS Portal**
	Process	Quarters Form, SPS Activity, Public Complaint and Database Updater
	Data Store	SPS Portal Database
	Data Flow	Type keyword, provides, search information within a portal, etc.

Table 4.2 Data Dictionary of the Data Flow Diagram **[8]**.

4.7 Conceptual Modeling of SPS Portal System

Data flow diagrams are dividing into Context diagram and Level 0 diagrams is to give a greater view about the entire system. The function flows in SPS Portal System is very clear describe by those diagrams. A Context diagram is depicted in figure 4.7, which shows the entire process within the system generally. It show the data flows move in or out from the SPS Portal System to the Entities. The conceptual model describes each of the components system, which describes in Level 0 diagram. This information will be used as a reference in implementing the system later. Level 0 diagram is shown in figure 4.7. From the diagram, there are five major modules in the system that has been described. The first module is online form. This module enables users or workers to apply quarters by online. The system provides online form that can be changed from database if there are some changes. The second module is job vacancy. This module will provide an advertisement about job vacancy to the user. If there are vacancies at any department under SPS, it will be advertised in this module. The third module is public complaint, this module will enable user to complaint to the administrator about the weakness of the system or anything else. It will help the administrator discover their weakness and provides the best services. The forth module is SPS Activity. This module will provide all workers or user information about SPS Activity and planning. It will help user can join the activity without missing any of them. The Last module is database updater. This module will enable the administrator to make changes due to the database. All of the information that shown in SPS Portal system is stored in a database and it is not store as a plain text. Any changes due to the portal do not affect the system. The administrator needs to monitor the portal and maintain the data update to the time. All of five major modules within the portal build the SPS Portal system.

4.7.1 Conceptual Design of Quarters Process Module

The quarter's module is a menu for user to view the available quarters under SPS services. The quarter's form can be downloaded in this menu. First, administrators must input their own password to access in the SPS Portal system as an administrator. It will provide them an advantage to update the data. The password is a security of the system, so it will not be hack by others. The system will check the password from the password database. If password matches, the user will login as an administrator. If the users enter the password more than three times, the user will enter the system as a user only. When a user access in the quarters menu, they will get information about new quarters available. They can download quarter's form from this menu. Figure 4.8 shows a detail about quarter's process module.

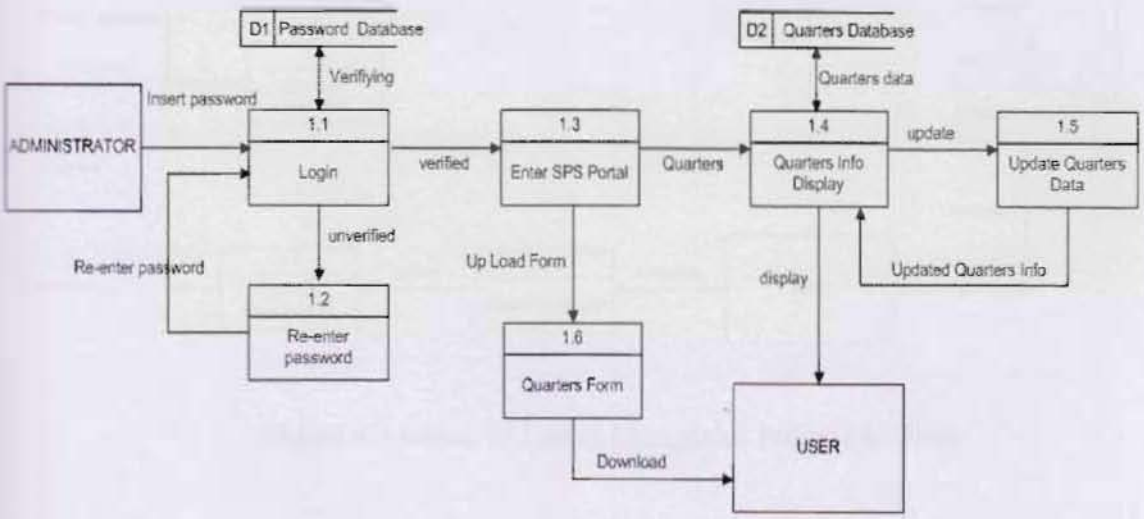


Figure 4.8 Detail of Quarters Process Module

4.7.2 Conceptual Design of Public Complaint Process Module

This module is the interaction site between users and the organization. The module created in order to define the weakness of the portal or service provided. The users can submit their objection through this public complaint form. The administrator will publish the comments in this menu. This module also has a password to login and make changes in database. The administrator can read all of the complaint submitted by the user from complaint database. This module can help the organization to discover their weakness in serving the users.

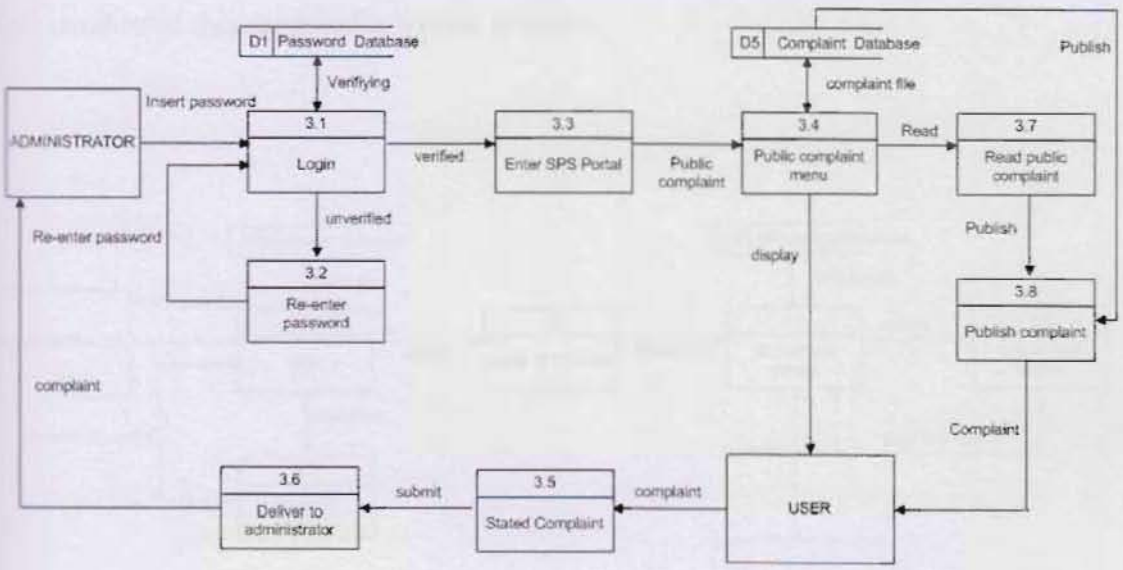


Figure 4.9 Detail of Public Complaint Process Module

4.7.3 Conceptual Design of SPS Activity Process Module

This module provides an information about the SPS activity from the beginning of the year until the end if the year. This menu will show all of the scheduled activity that plan by the administrator. This module also has a password to login and enable administrator to make a changes due to the SPS activity. This menu will help all of employees to understand about their organization's planning till the end of the years. The SPS activity will be discuss on the meeting annually and this module will show the activities that have been decided by the administrator. The users only can read the data but cannot write in this menu. Administrator will conducted this module for further changes.

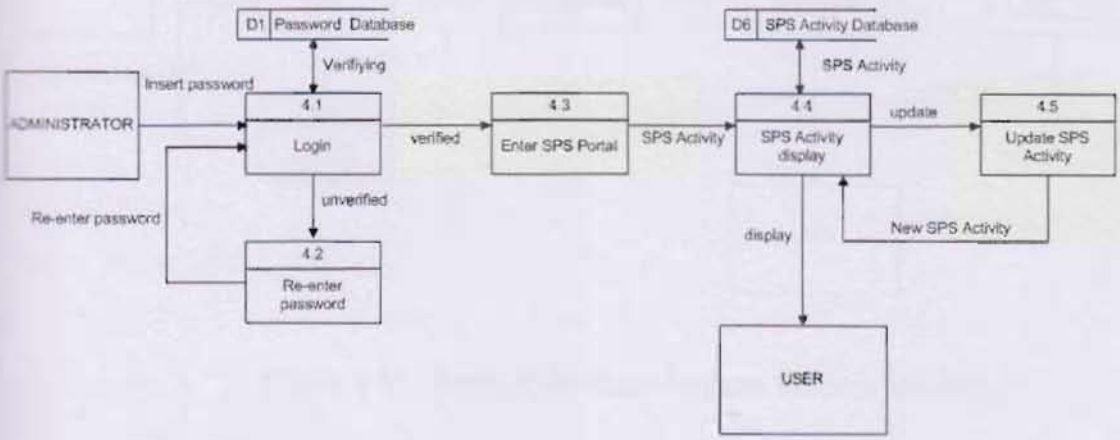


Figure 4.10 Detail of SPS Activity Process Module

4.7.4 Conceptual Design of Database Updater Process Module

This module is for maintaining the SPS Portal database. As we know before, all data in this portal is not only store as a plain text but also stored in SPS database. This option will maintain the portal's data validation due to any changes. The administrator will monitor the database and it also has its own security such as firewall. They have to insert the password before can make any changes. This module is very important because it can update the database and maintain the data deal with the time. The administrator will change any expired data, so that the data within the system is updated.

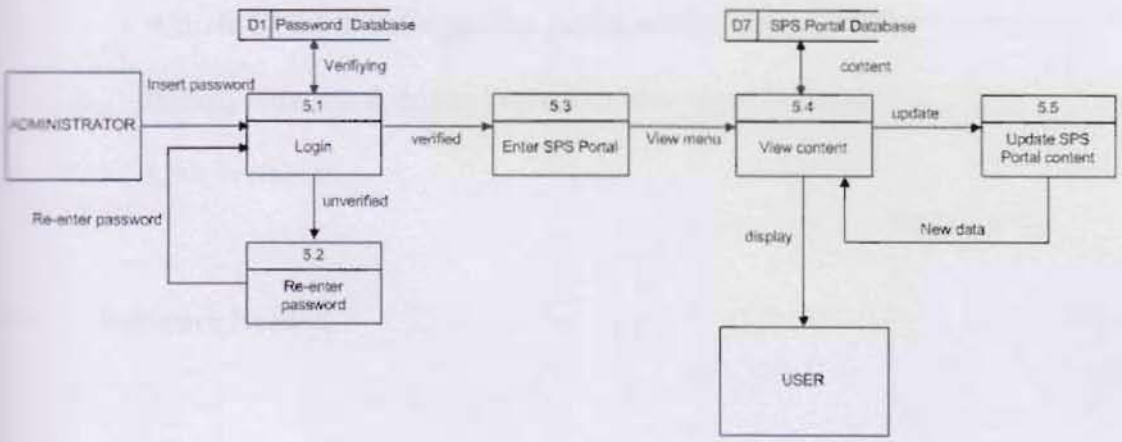


Figure 4.11 Detail of Database Updater Process Module

4.8 Suggestion Main Menu

Our client SUP also has some suggestion about this portal. The suggestion menu in the portal is list below:

- Profil SUPS
- Bekas SUPS
- Kuarters Persekutuan
- Bangunan Persekutuan / Kompleks
- Jabatan Persekutuan / Agensi Badan Berkanun
- Aktiviti SPS (tugas bergambar perlaksanaan fungsi SUPS)
- Borang Kuarters & aduan kerosakan (download borang)
- Link Portal

4.9 Software Needed

In designing this portal, we should understand what are we going to do and how we do it. This phase also called planning phase because we try to figure out what should we do. After making some planning for this portal, we decided to use some software in implementing this portal. The software's needed are:

- Macromedia Dreamweaver MX (For scripting)
- Macromedia Firework (Design logo and menu)
- Swish 2.0

- MySQL Admin (Database server)
- MySQL Server (Database server)
- PHP (Server)
- Apachee web server (Server)
- Acrobat Distiller (Convert text)

4.10 Conclusion

In this phase, we should get a clear view about the portal and its functionality. This phase is for planning and designing the portal. Before design the portal we should know the target user using the portal in order to ensure the effectiveness of the portal. The portal architecture must be decided in this phase because the implementation is based on this architecture. The architecture that selected is suitable to the customer equipments. The Entity Relationship Diagram gives the overview about the whole portal. Data Flow Diagram describes the data flow within the portal and its functionality. The functionality describe briefly in conceptual model. From this step, the system is well defined and described. Any weakness of the system can be defined at this phase and it can turn ease in the implementation of the system. We also have decided the software that must be used in implementing this portal.

CHAPTER 5: IMPLEMENTATION PHASE

5.1 Objective

In this phase, the system are installed and made operational in a production environment. The phase is initiated to implement a portal for government. Activities in this phase include briefly description about system, capture picture, implementation support such as hardware, software and network. In order to fulfill the user's need, the interaction between programmer and user must be constantly. The tasks that we should do in this phase are notification of implementation to end users, data entry or conversion, and post implementation review. This phase continues until the system is operating in production in accordance with the defined user requirements.

5.2 Portal Overview

This section provides a brief overview of the system to be implemented, including a description of the system and its organization.

5.2.1 Portal Description

The system is according to implementing a portal for government. This portal is the official website for the Pejabat Setiausaha Negeri Sarawak. This portal consist a plain text that shows the data about the organization. There are some of data will be stored in database. The portal will have some features for customers and their own employees. The portal will serve citizen

the information about the organization, and the government workers under this federal department the quarters and it available. Finally, this portal will serve its own employee under this department. This portal will provide the interaction between the organization and its users. The goal of this system is to provide the communication between the organization and its users. The users of this portal maybe do not have much knowledge about IT. In implementing the portal, we should remember that the portal must be user friendly and can be understand by the user. Although the manual will be provided, the portal also must be easy to understand and the flow of the portal can be understand by the user. This is among goals that we should achieve in implementing this portal.

5.2.2 Portal Organization

The portal consist some menu that tell users about this organization and others functions. As suggested before, the menus are:

- Profail PSUPS
- Aktiviti PSUPS
- Jabatan Persekutuan / Agensi Badan Berkanun
- Kuarters
- Gelari Gambar
- Aduan
- Link Berita
- Link Portal

The menu for SPS Portal is explained briefly in this phase including the screenshot of the Portal prototype. We will explain every menu in this portal by using some illustration. Figure 5.1 below is the layout interface for SPS Portal. Every menu in this portal has its own sub menu and will also be explaining later.

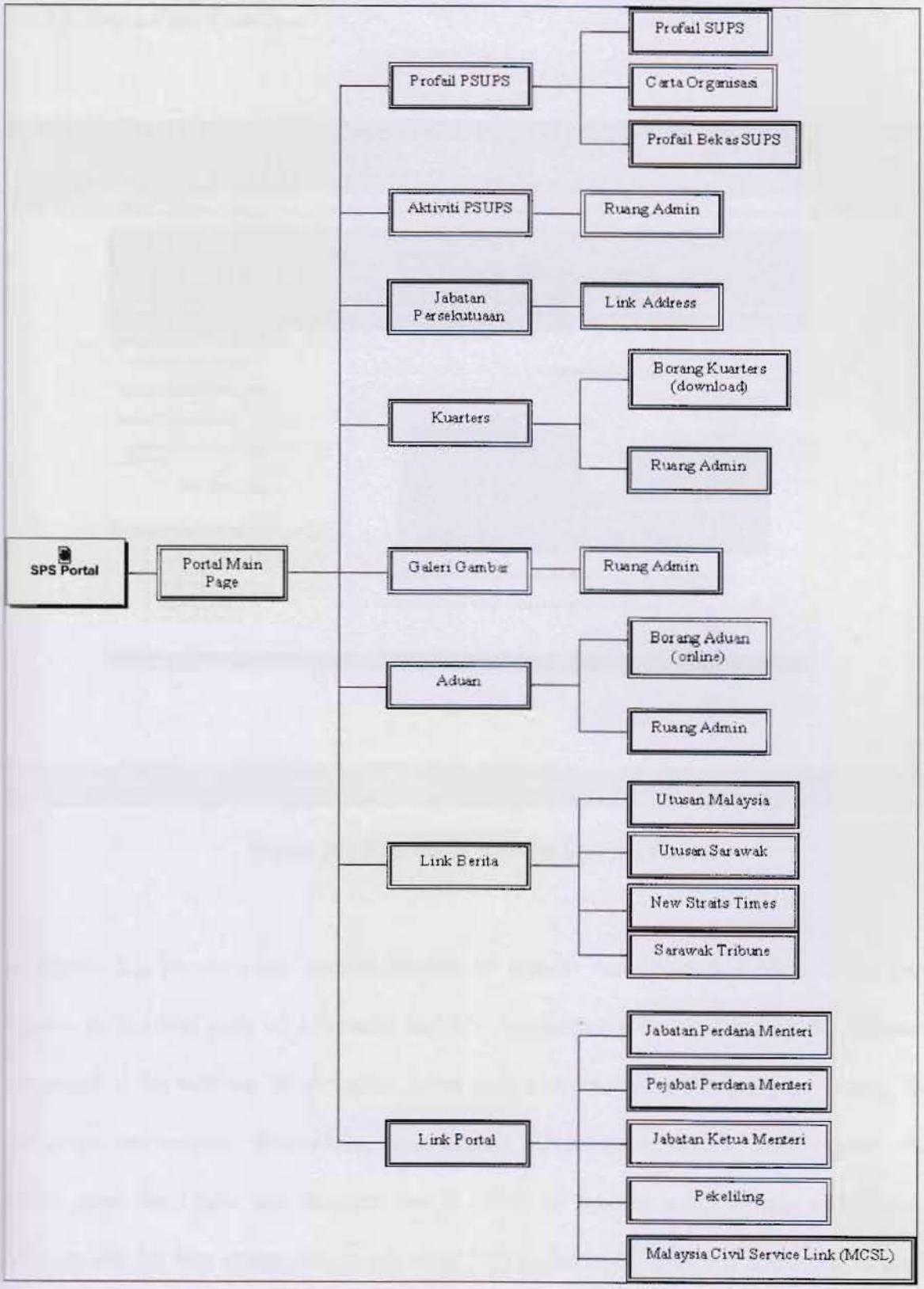


Figure 5.1 Menus for SPS Portal

5.2.2.1 Index Page Interface

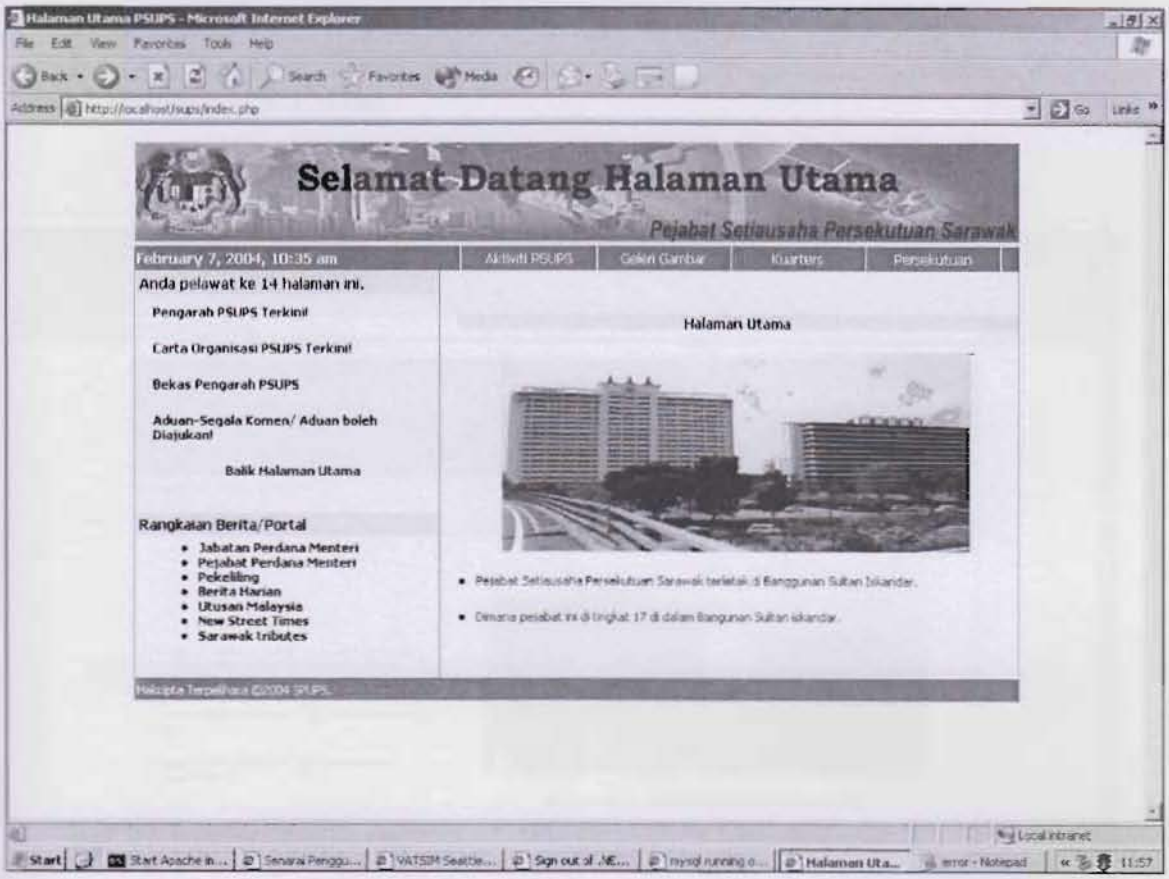


Figure 5.2 SPS Portal website layout interface

In Figure 5.2, its show the implementation of website functionality model. Index page is known as the first page of a website and it's summarizing the contents of the information presented in the website. Sometimes, Index page also known as Default page. Using Swish 2.0 made the banner. Meanwhile, Macromedia Fireworks edited the Jata Negara. In the index page, there have one function that is called hit counter using by php and mysql. Hit counter will tell how many visitors are enter SPS Portal and it uses a IP Detection to track all unique hits and then stores everything in a MySQL database. The menus are made by macromedia Flash MX. There have six links that is Profile PSUPS, PSUPS's Activities,

Persekutuan Department, Quarters, PSUPS Picture Gallery and Public Complaint. We will discuss about the six links later on.

5.2.2.2 Profile PSUPS Menu

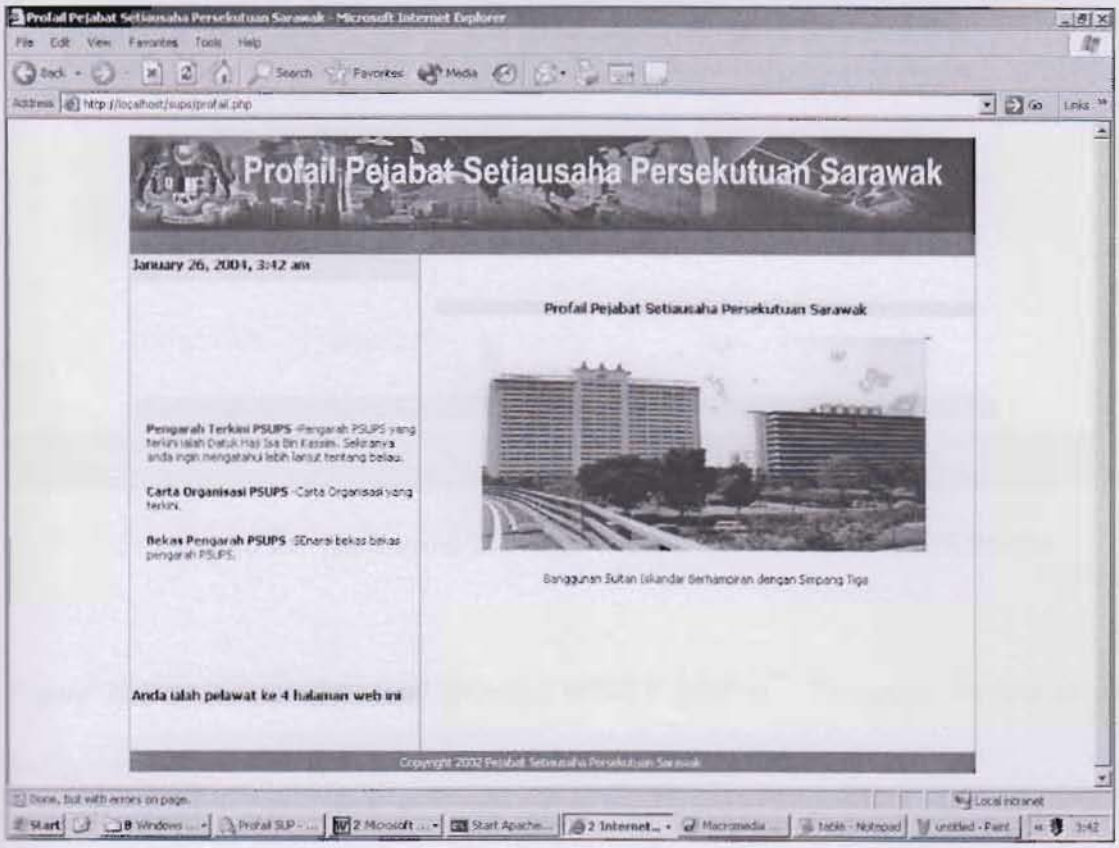


Figure 5.3 The Layout Interface of Profile PSUPS Page

This page describe about mission, vision and objective PSUPS. Other links are the latest director of PSUPS, Organization Chart of PSUPS, and Ex-director of PSUPS. The picture in this page actually where the PSUPS are located. The PSUPS are located in Sultan Iskandar Building.

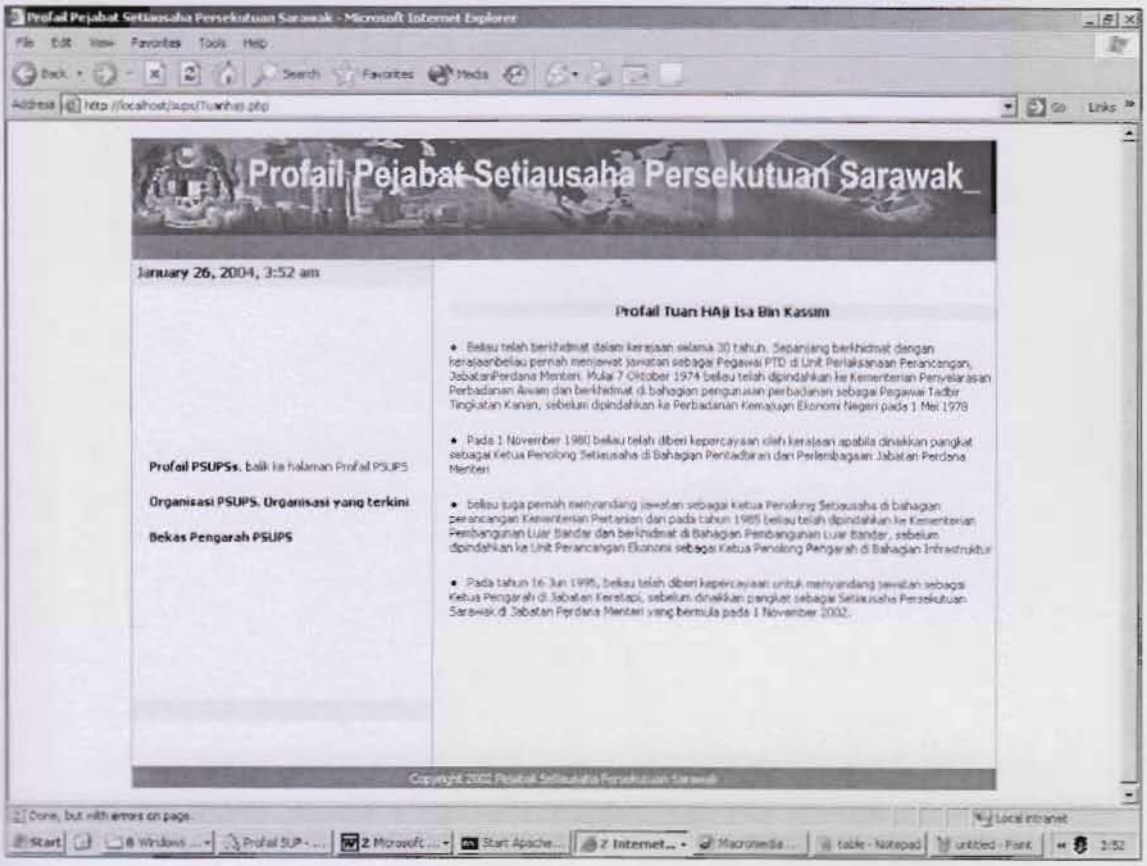


Figure 5.4 The Layout Interface of the latest Director PSUPS Profile

Figure above is a snapshot of Director PSUPS profile. The page content is about the background and achievements of current director of SPUPS before posting.

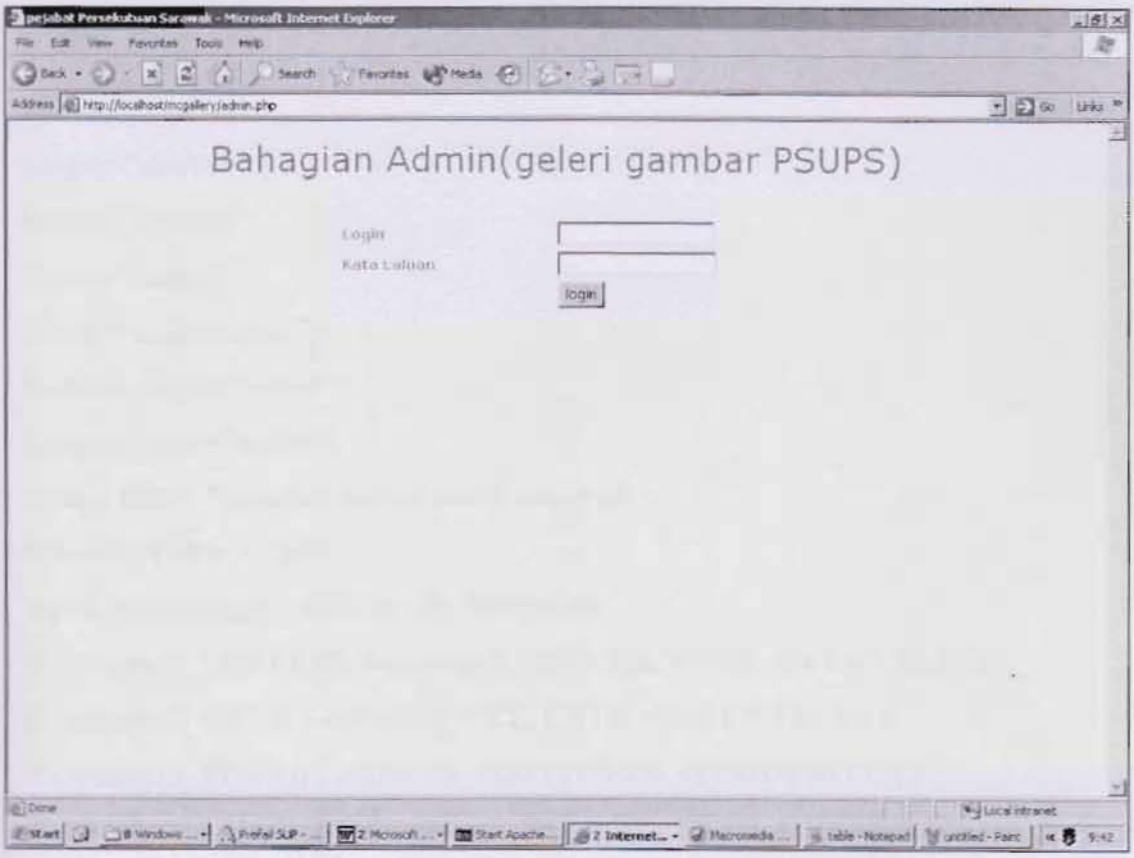


Figure 5.5 The Layout Interface of Administrator Page

This figure shows layout interface of Administrator page. The Administrator has to key in login name and password before entering the picture gallery database.

```
<?php
$host="localhost";
$login="az6009";
$pass="az6009";
$base="table";
$lang="english.php";
$admin_login="azfar";
$admin_pass="azfar";
$page_title = "pejabat persekutuan sarawak";
$thumb_width = "100";
error_reporting(E_ALL & ~ E_NOTICE);
if (!empty($_SERVER)) { extract($_SERVER, EXTR_OVERWRITE); }
if (!empty($_GET)) { extract($_GET, EXTR_OVERWRITE); }
if (!empty($_POST)) { extract($_POST, EXTR_OVERWRITE); }
if (!empty($_COOKIE)) { extract($_COOKIE, EXTR_OVERWRITE); }
if (!empty($_SESSION)) { extract($_SESSION, EXTR_OVERWRITE); }
?>
```

Figure 5.6 Scripting Connect to Mysql database

Figure above (figure 5.6) is a scripting used to connect between the website and the database. The scripting is a php language.

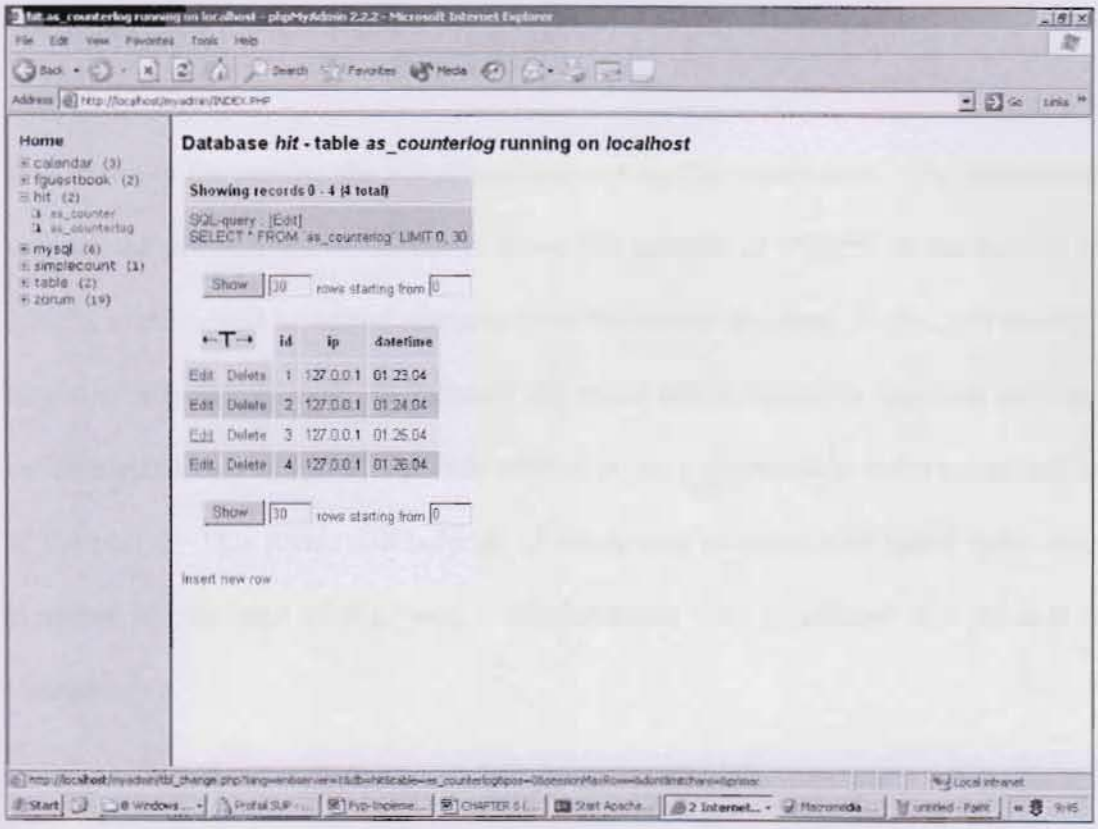


Figure 5.7 Mysql Database

After entering this menu, the portal will show some information about PSUPS. It will include some information about PSUPS background, objective, role and responsibilities. This information will give a good view to the customer about this organization. This menu divided in some sub menus, which are 'Profail SUPS', 'Carta Organisasi' and 'Profail Bekas SUPS'. In 'Profail SUPS' menu, the portal will provide the information about the current SUPS that responsible to this organization. It will provide some information about SUPS's education background and his achievement. The 'Carta Organisasi' menu will show the current PSUPS hierarchical positions. The 'Profail Bekas SUPS' menu provides information about ex-SUPS from the beginning of this organization. The information is including name, achievement, and service time.

5.2.2.3 Aktiviti PSUPS Menu

This menu is for serving the PSUPS employees in this department. The functionality of this menu is to provide the information about the activity of PSUPS in the current year. The PSUPS activity will be edited annually after the annual meeting. It also can be edit whenever a new activity is proposed. The data of this menu will be stored in database and can be access by authorized user only. The admin will be given a password in order to ensure the security of the portal. This menu will help all of employees to understand about their organization's planning till the end of the years. Administrator will conducted this module for further changes

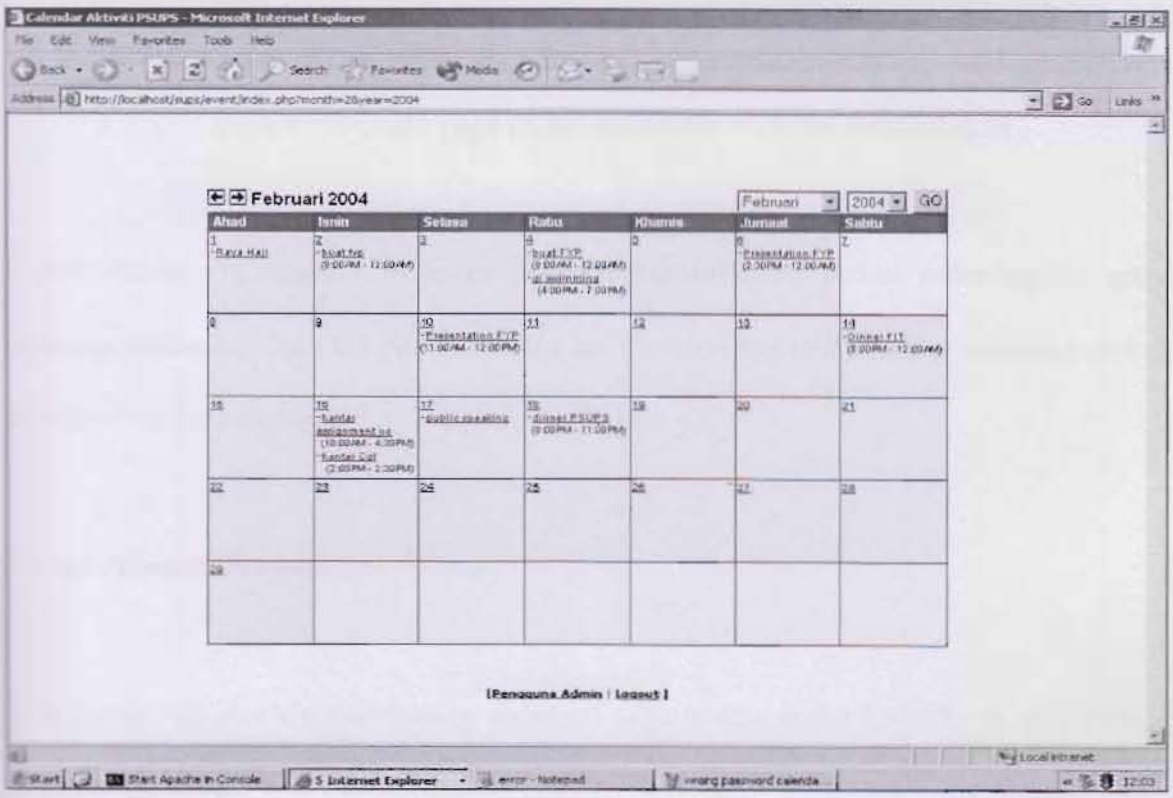


Figure 5.8 Activities Calendar of PSUPS

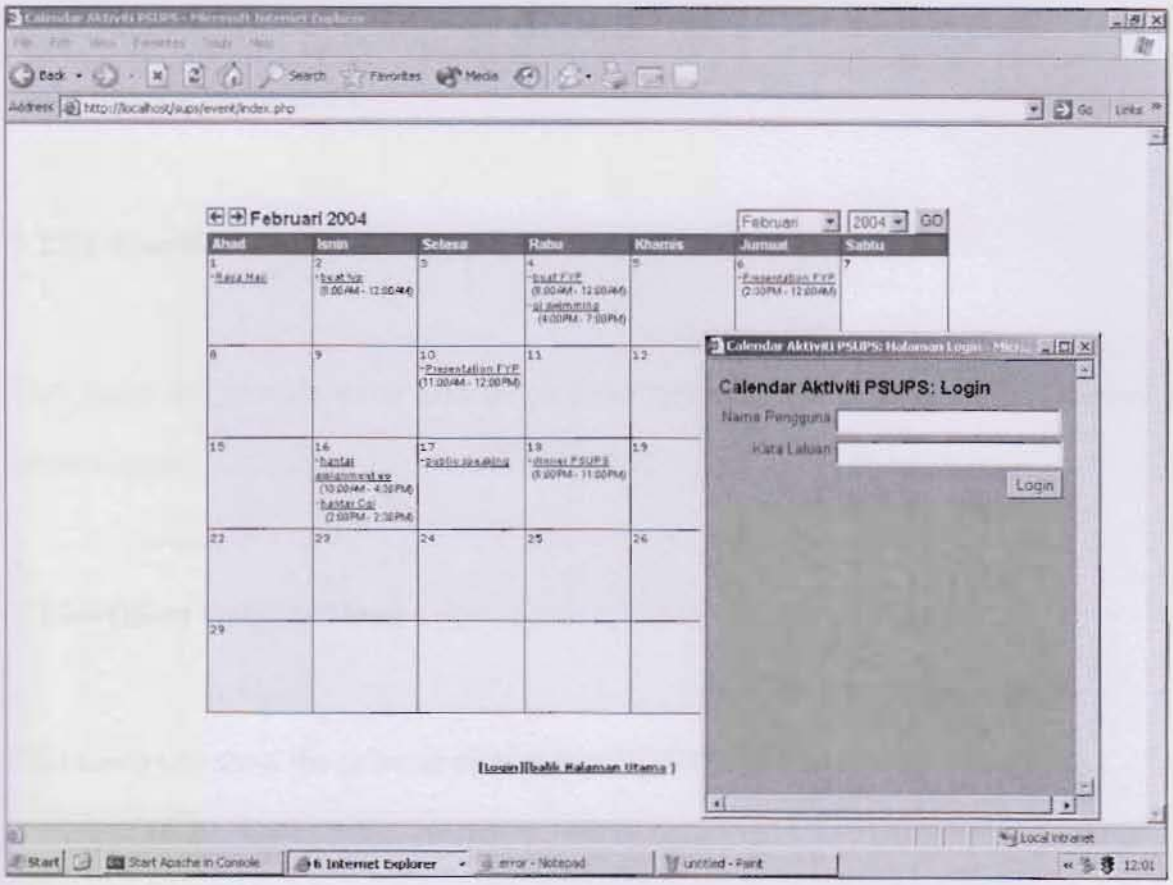


Figure 5.9 Login page of Administrator of Activities Calendar

Figure above is a snapshot of login page for Administrator before accessing the activities calendar database. Only the Administrator has the privilege to make any alteration and delete activities on the calendar.

5.2.2.4 Jabatan Persekutuan Menu

This menu will provide information about all departments under PSUPS. It will include the information about:

- Director
- Address

- E-mail
- Link to the Website

5.2.2.5 Kuarters Menu

This menu will provide some description about quarters. It also provides the Quarters form (downloaded).

5.2.2.6 Geleri Gambar Menu

This menu will show the galleries picture about PSUPS.

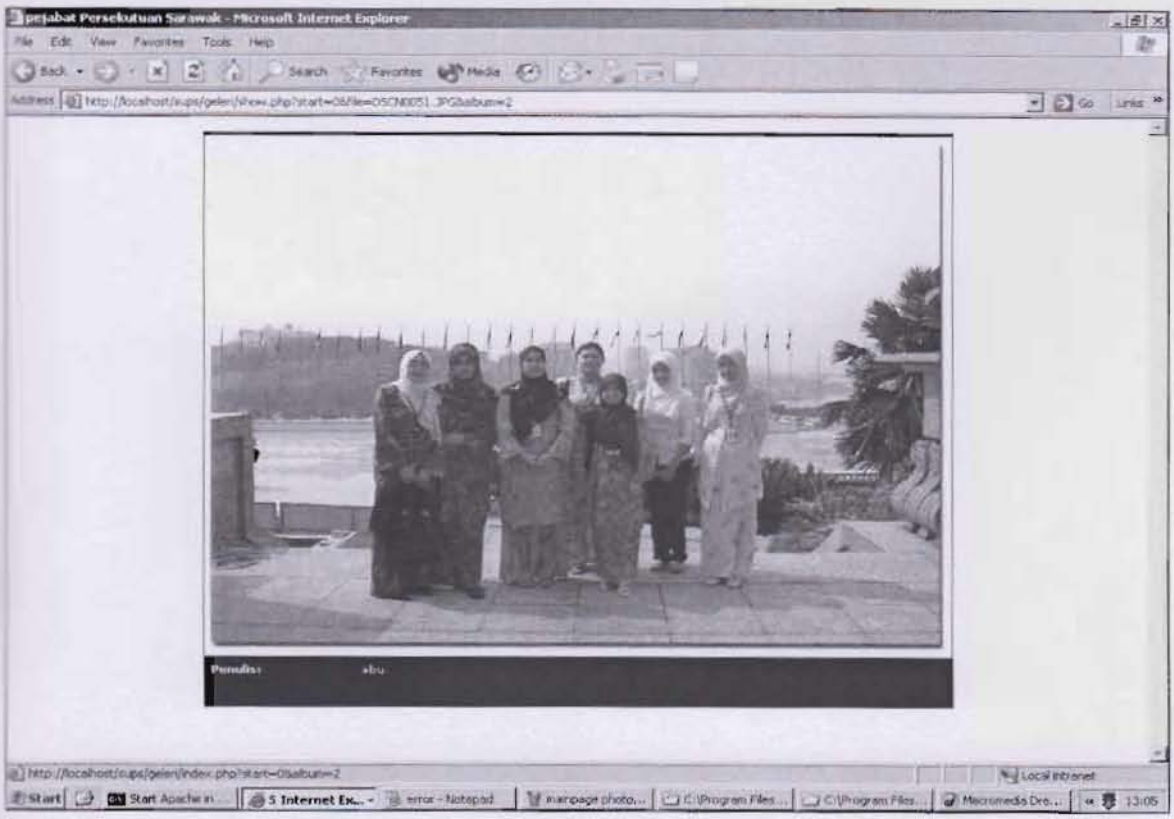


Figure 5.10 Instance of Actual Image inside the Picture Gallery

Figure 5.10 shows an actual image in the Photo Gallery menu. This is an instance of actual images inside the photo album in the Photo Gallery. Double clicking on the image can enlarge this actual image.

5.2.2.7 Aduan Menu

The target user for this menu is customer that using this portal. It is like the forum room that enable customer to comment about this portal. The objective of this menu is to define the weakness of portal service or the organization. Moreover, user can also give their suggestion about this portal and discuss to others in this menu. All of comment will be publish at this menu. However, to ensure the effectiveness of this menu, the admin will monitor the comment or suggestion before published. Any comment or suggestion that unsuitable will be thrown away.

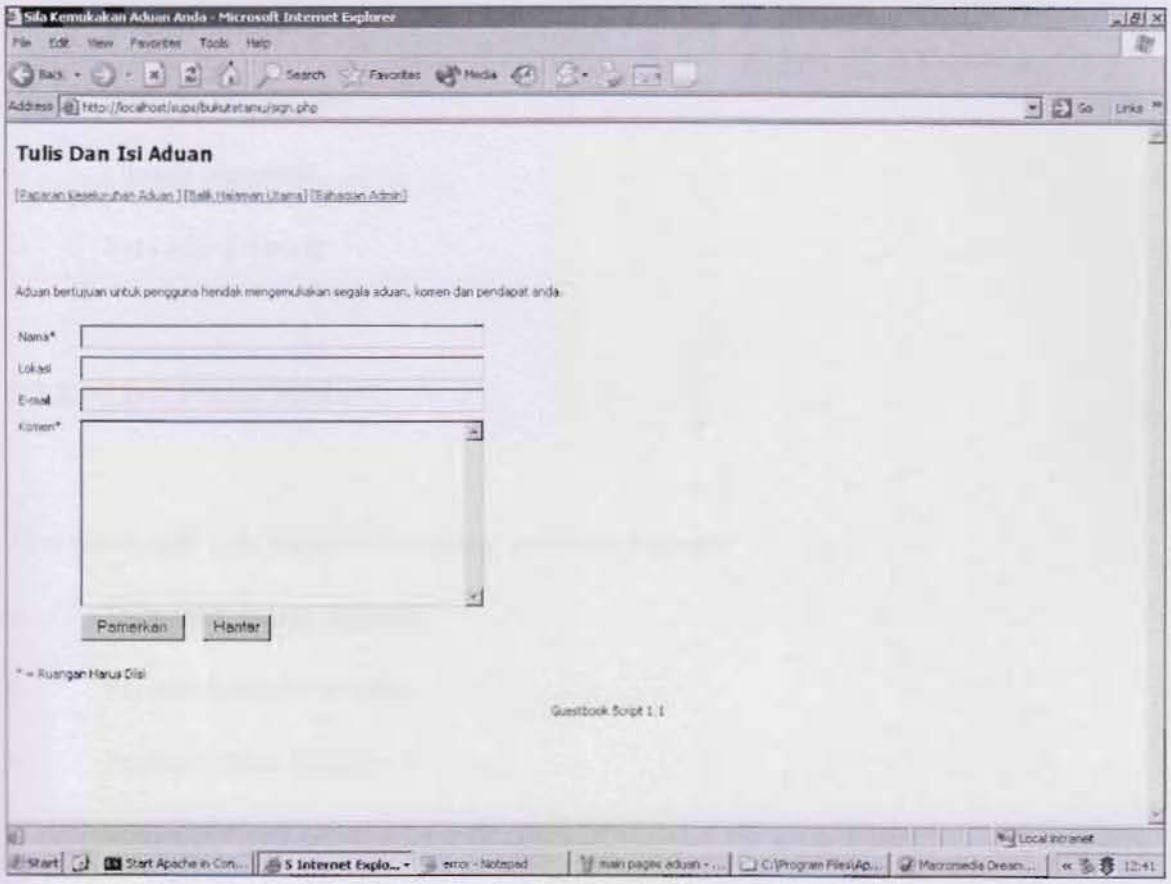


Figure 5.11 Public Complaint Form

The figure above (figure 5.11) is a snapshot of a public complaint form. Is any users want to comment or complaint regarding any issues about any departments, they can forward their comments or complaint by filling in the form. Columns indicate by asterisk (*) such as name and comment are columns that must be filled before submitting. Neither of those columns can be left blank otherwise an error message will be displayed.

5.2.2.8 Link Berita Menu

This menu will link the portal to others website that provides news in Malaysia. The selected websites are:

- Utusan Malaysia
- New Straits Times
- Utusan Sarawak
- Sarawak Tribune

5.2.2.9 Link Portal Menu

This menu will link the portal to some websites that are:

- Jabatan Perdana Menteri
- Pejabat Perdana Menteri
- Pejabat Ketua Menteri
- Malaysia Civil service Link (MCSL)
- Pekeliling

5.3 Implementation Support

This section describes the technology used to support the website development in sense of client hardware, client software, network and security controls.

5.3.1 Hardware

The hardware requirements for running this portal are based on the portal architecture. As we told before in previous chapter, the portal architecture for this portal is using the 'Thin Client' architecture. This architecture required all applications running in Web browser. The client

hardware that required in running this portal is minimum as long the web browser can run. The client hardware for this portal is the same as the previous portal that this organization have before. In implementing this portal, we should remember that we could not simply put the client hardware requirements for this organization because the agreement is just implementing the simple portal. After observing the previous client hardware, we should say that the minimum client hardware's for this portal are:

- An Intel Pentium II Processor or equivalent, 300 MHz or faster
- A 256-color monitor capable of 800 x 600 pixel resolution (millions of colors and 1024 x 768 pixel resolution recommended)
- 46 MB of available random-access memory (RAM) (64 MB recommended)
- Business ad logic and backend connectors
- Backend Systems

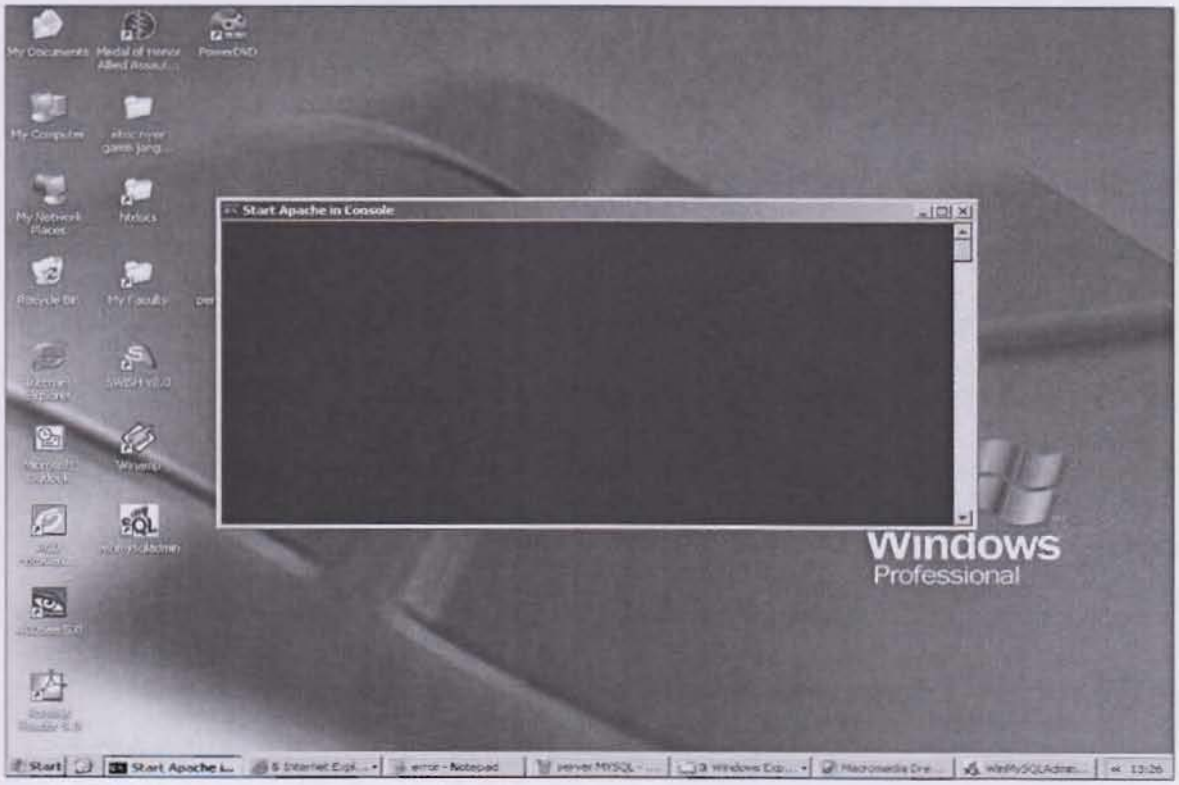


Figure 5.12 Showing that Apache Server is running

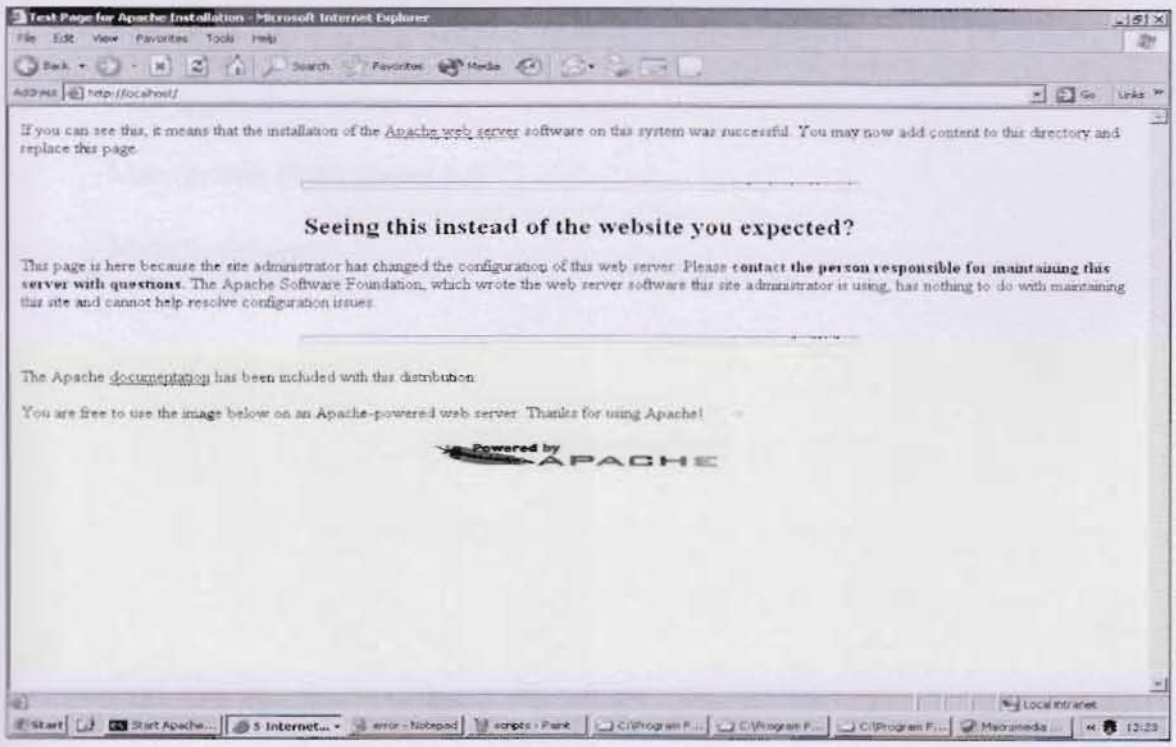


Figure 5.13 Showing that Apache Server is running succesfully

5.3.2 Software

The software requirements for running this portal also based on the portal architecture. It will addresses the software elements that are present to customers. The client software components are based on the user interface and document viewing. In presentating the user interface, the standard web browsers is needed. The operating system also needed in presenting the user interface and document viewing. The others viewer will be needed in viewing the documents. After makin a research, we finally find the software requirements that are:

- Windows 98, Windows 2000, Windows NT (with Service Pack 3 or later), Windows ME, or Windows XP
- Version 4.0 or later of Netscape Navigator or Microsoft Internet Explorer
- Web server (Install from chosen windows components)
- PHP application server
- Macromedia Flash player 6.0
- MySQL database

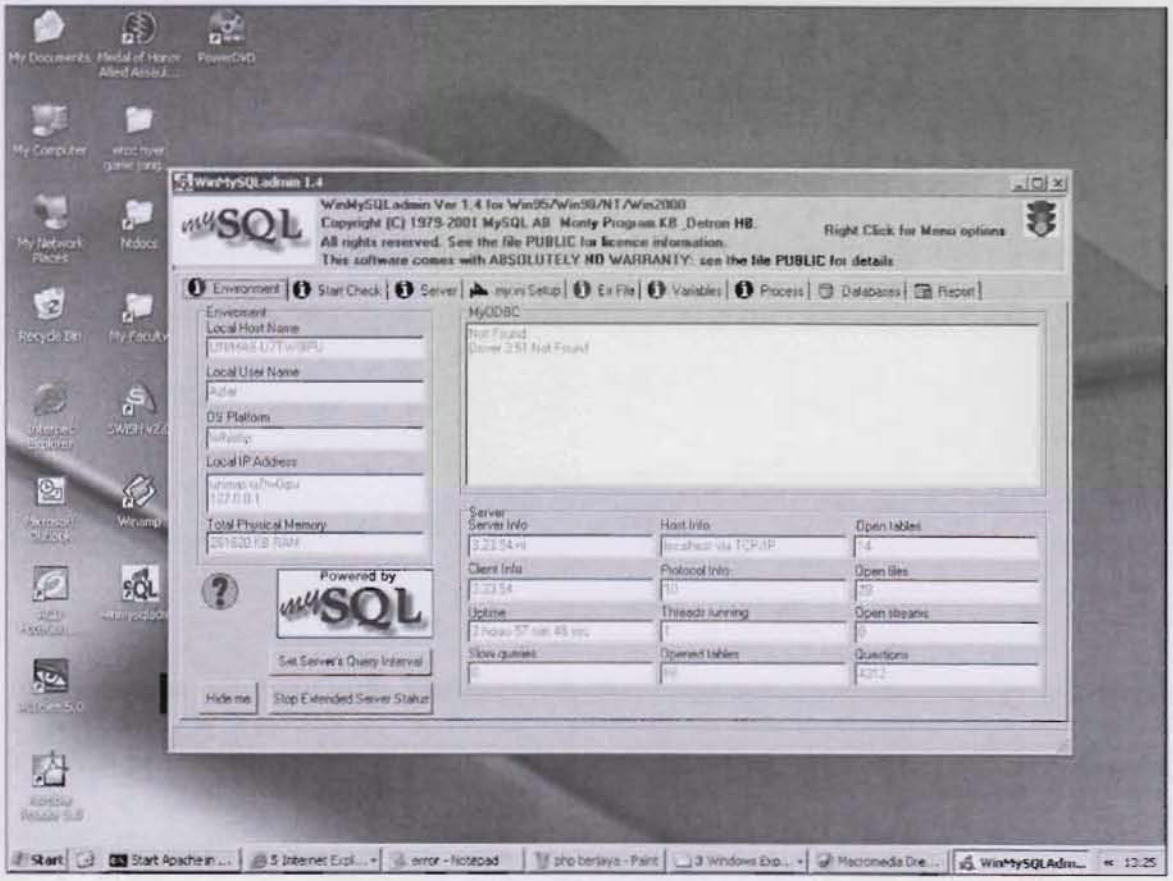


Figure 5.14 MySQL Database

5.3.3 Network

This section is will discuss about the connectivity that exists between the information provider of information and service (SUP) and the recipients (customers). The network application is based on the portal architecture. In describing the network applications, we will use two components that are protocol and the connectivity. In protocol requirements for the thin client architecture, it will need the HTTP protocol **[15]**. The connectivity requirement is only direct connection to the web server. These components will play an important role in effective delivery of information and services to the customers.

5.4 Security Controls

The security controls are very important to this portal in order to ensure the safety of this portal from unauthorized access. The key for manage the security of this portal lays on some keywords. The terms for managing the security control are authorization, asset protection and availability **[15]**.

5.4.1 Authorization

Authorization means only authorized users should be able to gain access in to the system, applications, and services, no matter where they are located **[9]**. There are two approaches to authorization, which are:

- Authentication
  - This is important step in building secure e-Government applications. Authentication is to define who can run the application, and ensure that the users are who that claims to be **[9]**.
  - In e-government portal, the portal must authenticate the employees who access internal system from remote location via the public Internet.
  - Authenticate the citizen who subscribe to the information and services
  - The authentication mechanism that we used is the simple one that is includes user ID and password.

- Access control
  - When the users identify has been authenticated, the user access privilege must be determined **[9]**. This will control the user from access or doing something outside his privilege.
  - Setting up Access Control Lists (ACLs) on a portal and evaluate some access requested can be done to determine if the requester has permission.

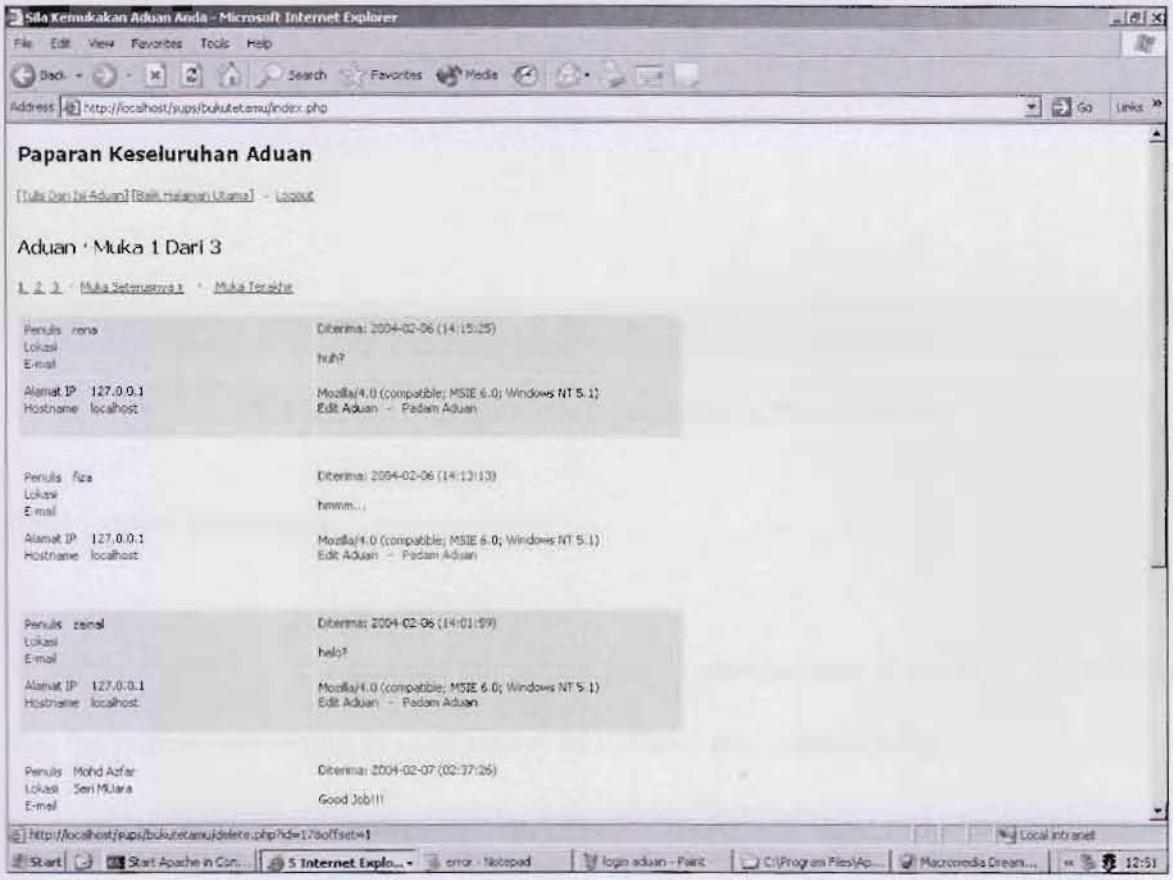


Figure 5.15 Administration Access of Public Complaint Menu

Figure 5.15 shows the administration access page. The Administrator has an authorization to edit, delete and update the database of Photo Gallery. The details of photos uploaded are summarized in table form.

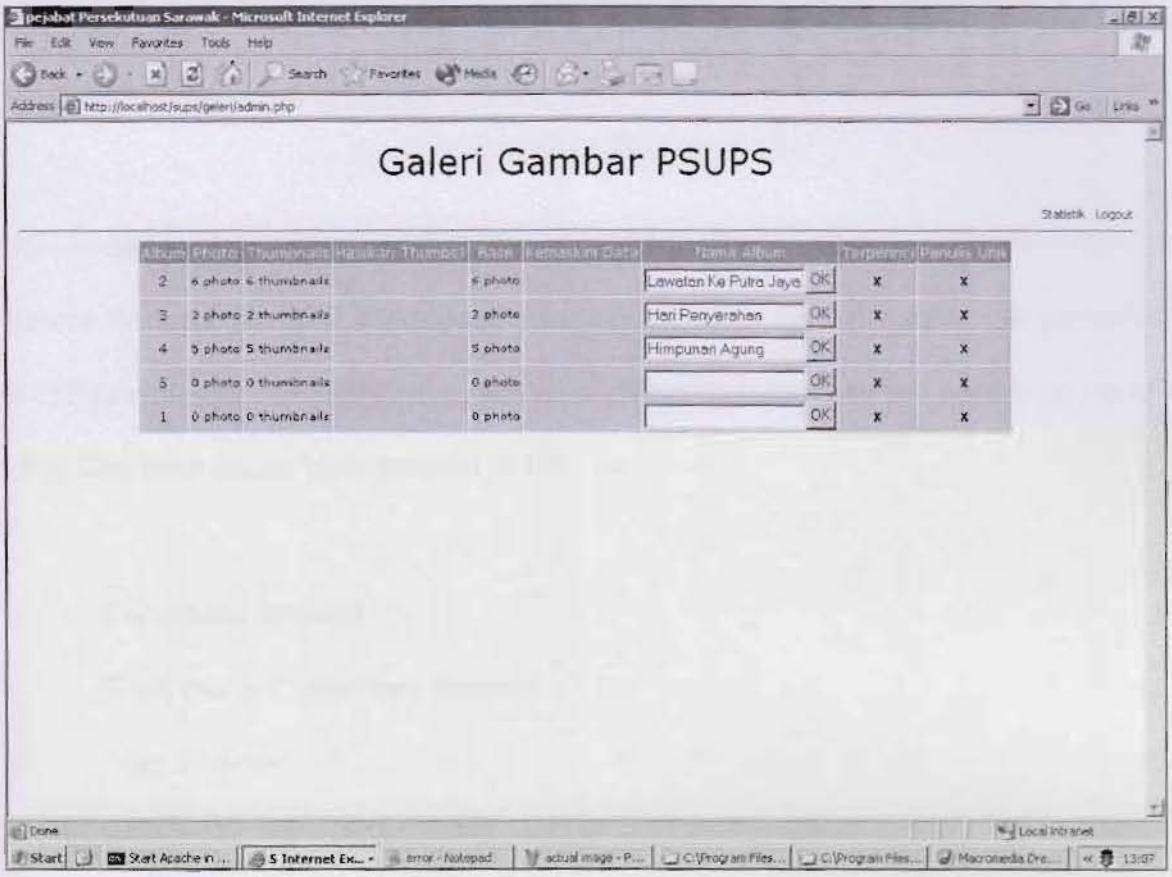


Figure 5.16 Administration Access of Photo Gallery

5.4.2 Asset Protection

When data must travel outside of the secure system environment, it needs to be protected so that the policies governing its used cannot be violated **[9]**. This includes:

- Secure communication, ensuring data privacy, data integrity and origin authentication
- Secure storage of data where physical security may not be in effect

In order to provide web security, the IP security is used because of its advantages, which are transparent to end users and applications, and provides a general-purpose solution. Furthermore, IP security includes a filtering capability so that only selected traffic need incur the overhead of IP security processing **[15]**. We use the Secure Socket Layer (SSL) for the

security. SSL can be embedded in specific packages, for example Netscape and Microsoft Explorer browser come equipped with SSL **[15]**.

SSL is designed to make use of TCP to provide a reliable end-to-end secure service. SSL Record Protocol provides basic security to various higher layer protocols. In particular, the HTTP provides the transfer service for web client/server interaction can operate on top of SSL **[15]**. The three higher layer protocol of SSL are:

- Handshake Protocol
- The Change Cipher Spec Protocol
- Alert Protocol

This protocol uses encryption and authentication technique to ensure communication between client and server remain private and to allow the client to identify the server and vice versa **[9]**.

5.4.3 Availabilty

Availability is the ability to access data and resources whenever you need them. When disaster occur, the portal must be quickly recover **[9]**. There are some technologies and product that support the availability which are:

- Load balancing request among the HTTP, FTP or other TCP-based servers and file systems
- Backup and Restore/Recovery for data system including files, ERP applications, e-mail and database

The portal must be always available in order to ensure the effectiveness of this portal.

CHAPTER 6: TESTING AND EVALUATION

6.1 Introduction

In this phase, we will try to detect the weakness or error for this portal. In order to implement a system, software development and all its activity including testing must be done iteratively. In order to build the system effectively and without wasting time, the testing should be done continuously. In this phase, the interaction with the client is very important in order to ensure the correctness of the system. The developer will verify the system according user requirements meanwhile client will validate the system either the system built satisfy them or not. The following section will explain about testing and evaluation.

6.2 Testing

In this section, the testing phases will covers two types of testing that are the interface test and the function test. Parties, the developer and the client will run a test on the new system. The testing operation also includes some people that try the portal. This is the beginning of this testing process before it finishes entirely. The explanation about testing phase divided into interface test and function.

6.2.1 Interface Testing

In order to design the interface, we must ensure that the interface is suitable with the customer requirement. The portal is about implementing e-government website that must be suitable

with them. They are some iterative way that we used in testing the interface. The first stage in designing the interface is to sketch. The interface for this portal will be sketch roughly and presented to customer. This step is ensure customer give us their ideas and opinion in designing the interface. After some discussion and suggestion from the customer, customer will decide the final interface. When this stage clears, we will begin the next step where we design the prototype of this portal. The prototype is about the user interface only. Other people that will be using this portal such as employees can do the testing of this portal. In this section, we do observation and distribute questionnaires to the tester. The interface will be more reliable and effective.

6.2.2 Function Testing

In this section, the testing phase is very important to ensure the correctness of the portal. It also determines the flow of the information of the portal. The portal correctness is based on its ability to send the information to user. This function testing is very important and must be done iteratively and effectively. There are some menus that we include it this portal. After making some testing, we discover that the database function is the very important things to do. They are some error detected in order to implement it. In order to safe the time and money, we implement the prototype with some key features that related to the system. After making some testing into the prototypes, there are some mistakes in PHP scripting. The error makes the features not function as planning before. In maintaining the database, the portal did not behave as planned and we were facing difficulties in maintaining the database. The portal failed to publish the menu correctly because of some problems in scripting. After making some research and testing, the problem configured.

The login function is use in the portal for a purpose to allow only those who register, as administrator is able to access the admin page. The login function is a simple Script file that protects the page that has the PHP extension from being viewed until the session available for a valid user. The administrator will have to enter the username and password to login to the database for any updating tasks. Our purpose of doing this is to provide security for the portal, and unauthorized user cannot access this database.

The menu for upload the data such as activity SUPS, galleries and public complaint facing the similar problems in scripting. The error is on uploading the data, can be settled by try to figure out in the scripting side. After making some research and coding the scripting error have been fixed and these menus run effectively. Once all the self-testing is done, the portal is ready to be tested by the user. The user testing will involve the real human user to test the portal in order to find any problem that was not seen in the self-testing phase. The evaluation will be described in the system evaluation section.

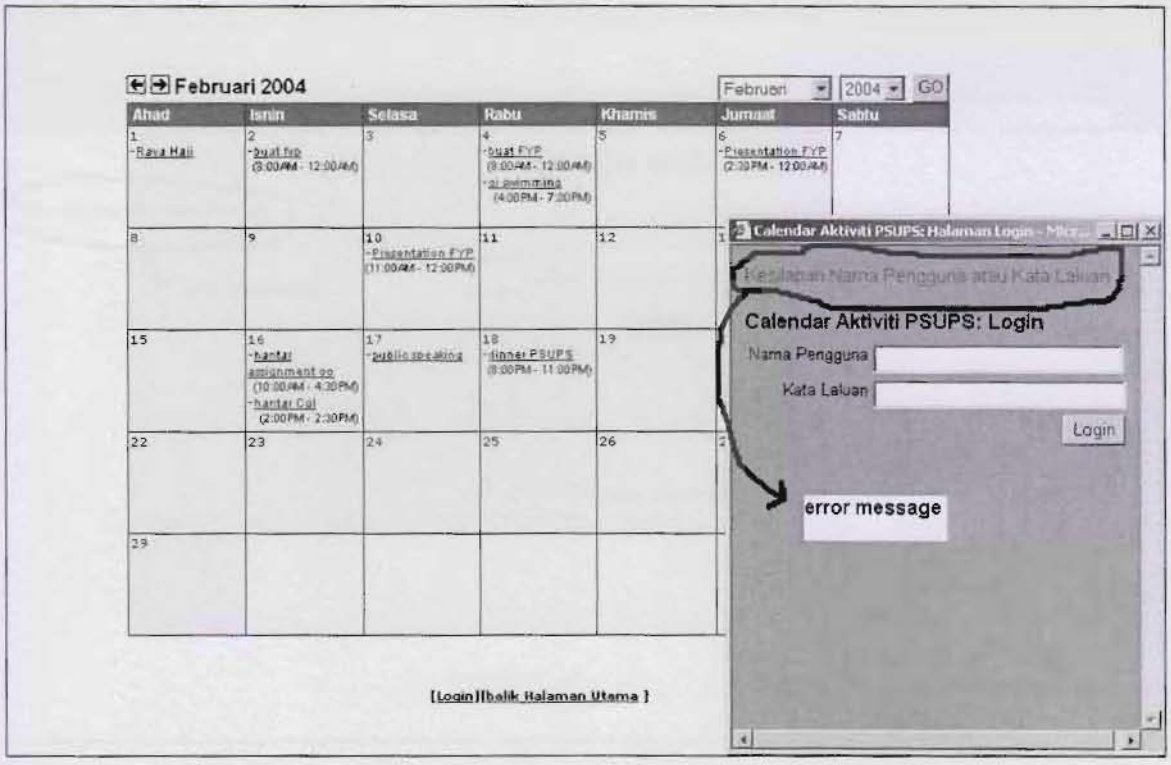


Figure 6.1 Error message for invalid password or username for PSUPS Activity Calendar

Figure 6.1 above indicates that error message displayed is the user insert wrong username or invalid password. The same error message also will be displayed if the username does not match with the password inserted.

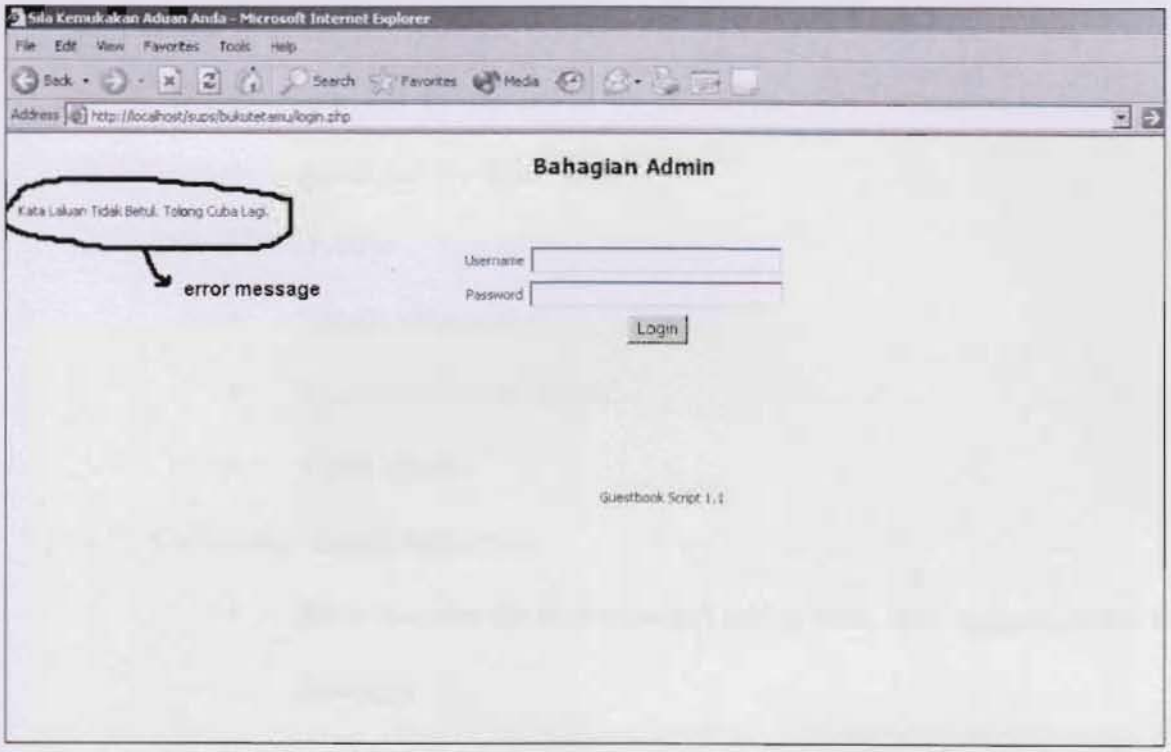


Figure 6.2 Error message for invalid password or username for Public Complaint

Figure 6.2 above indicates that error message displayed is the user insert wrong username or invalid password. The same error message also will be displayed if the username does not match with the password inserted.

6.3 Evaluation

This section is to improve the system by using all of the feedback and comment from various sources. It will be evaluated to justify the improvement of the current portal. The evaluation of this portal will be done by the qualitative evaluation technique. This stage will consist some step such as:

- Introspection
  - We will try the portal by ourselves. The evaluation is based on the result that we figure out
- Direct Observation
  - Simple observation
  - Constructive interaction
  - Think aloud
- Conceptual Model Extraction
  - Show the user the prototype and asking from their suggestion due to the prototype
- Querying User Via Interview
  - Questionnaire
  - Interview
- Continuous Evaluations
  - Done in every stage.

After making some evaluation, the results about some features are:

- Portal layout
  - Good design and layout
  - User friendly interface
  - Easy to understand
  - Explain Clearly
- Content
  - Good but need some improvement about data.

- Download form
  - Good and explain clearly
- Guest book
  - Working without any problems
- Public complaint
  - Good but need some scripting in order to ensure the effectiveness
- Galleries
  - Working and can upload the pictures
- Admin page
  - Working but need some improvement
- Security
  - Not very effectively, because the password cannot be changed rapidly.

CHAPTER 7: CONCLUSION AND FUTURE WORKS

7.0 Introduction

In this last chapter, the development of this SPS Portal is concluded based on the achievement that the system successfully fulfills. It also covers the further work to the portal in order to complete the portal

7.1 Achievement

In this section, the portal achievement in development is outline. The first scope in this portal is to develop contain information about PSUPS and some key features. The first idea is to implement the e-services website for government. After find the client of our portal, we decided to build the portal for the organization.

The next step is to conform to the client about the requirement of this portal. This phase need the commitment from both of us. After done some meeting, we finally decided the requirement of this portal from the client suggestion. We as the developer give some advice about the requirement that has been given.

In Designing phase, we must bring the user into the designing process. In order to designing the portal for government, we must know the standard policies and guidelines. First, we have done the sketch for the client. This step is intent to pull out the client ideas and suggestion. After that the prototype have been develop in order to ensure the correctness of the portal.

In implementation phase, we have used some software in implementing this portal. This phase is very difficult because of the programming and scripting. The prototype of some features is developed and the client has tried it.

The last phase is testing and it has been done iteratively in every step of development and designing phase. This is important to ensure the correctness of the portal.

7.2 Further Work

Although the portal was working at the end, some of the limitation and weaknesses of the system should be minimized. The improvement of this portal based on the testing and evaluation of the portal.

The first enhancement that will be done is improving the inefficiency of the current database function in the portal. The database security is not very good because only consist the user name and password that cannot be changed rapidly. The second one is about some publishing menu such as activity PSUPS, public complaint and galleries. This menu cannot upload the data effectively.

The portal actually is taking over by MAMPU, under the agreement with the PSUPS. The idea of our portal will be develop by them. They will configure the further work for this portal.

7.3 Conclusion

This chapter is summarized the entire previous chapter. We hope the portal will be functioning well and can be managed by the user as well. The implementation of this portal hopefully will be the first step for SUPS to generate their IT knowledge. We hope SUPS can SUPS will develop this portal with MAMPU as the future work. Hopefully the co-operation between us will be our experience and knowledge in future. This course is very important in generating the knowledge for it students. We can implement our knowledge for previous year in this final year project. The outcomes of this course cannot be denied and train us to be independent and hard working. We are indebted with all of people that contribute in our research and provide us the information and guidance. Finally we hope the portal will be useful for SUPS.

REFERENCES

[1] *Anuaruddin*, [1998], "MyBizz2u.com".

[2] *A Publication of the Haworth Political Press* [online], www.egovjournal.com [27 August 2003].

[3] *BizFront Sdn Bhd* [online], http://www.bizfront.com.my/ [25 August 2003].

[4] *e-government web portal iForce Solution Profile* [online], Available: www.sun.com/iforce [5 September 2003].

[5] *e-Service Journal* [online], http://www.iupressjournals.indiana.edu/eservice [4 September 2003].

[6] *Global e-government survey* [online], Available: www.worldmarketsanalysis.com [29 August 2003].

[7] Hornby AS, Oxford Advanced Learner's Dictionary of Current English, Oxford University Press, Fifth Edition, 1995, page 624, 734, 996, 1204, 1212.

[8] Kendall Kenneth E., *System Analysis & Design*, Fifth Edition, Prentice Halls, 2000.

[9] MAMPU, *Standards, Policies and Guidelines – Portal Guidelines* [Version 1.0].

[10] *MAMPU*, [online], http://mcsl.mampu.gov.my [3 August 2003].

[11] Moonkyu Lee, PhD [1997], *Developing International Customer Loyalty to an Internet Shopping Mall* [online], http://www.ciber.gatech.edu/workingpaper/ulgado.html [6 August 2003].

[12] *Perak official website*, [online], www.perak.gov.my [September 2003]

[13] *PHP freak dotcom*, [online], www.phpfreak.com [10 August 2003].

[14] *Public Complaint form* [online], http://www.sabah.gov.my/md.ppg/english/public_complaint.htm [5 September 2003].

[15] Stallings William, *Network Security Essentials (Application and Standards).* Prentice Halls, 2000.

[16] *SPEED eservices.* [online], http://www.eservices.com.my/eservices/english/common/home.asp [3 August 2003].

[17] *Victorian Government* [online]. http://www.zdnet.com.au/newstech/ebusiness/story/0,2000048590,20272229,00.htm [6 August 2003].

[18] *Web server survey*, [online], http://www.netcraft.com/survey [6 [September 2003].

[19] *Why e-Service Journal?* [online], http://iupjournals.org/eservice/es1-1.html [2 September 2003].

APPENDIX

Cadangan laman web dari Pejabat Setiausaha Persekutuan Sarawak

1.0 Setiausaha Persekutuan Sarawak

1) Profil Setiausaha Persekutuan Sarawak sekarang

   a. ringkas kelahiran

   b. pendidikan

   c. sejarah perkhidmatan

   d. gambar

2) Senarai Pejawat Awam yang pernah menyandang jawatan Setiausaha Persekutuan Sarawak. Terdapat 13 kesemuanya:

   a. nama

   b. gambar

   c. tempoh khidmat

   d. anugerah

   e. status/jawatan sekarang

3) Senarai Jawatankuasa & Organisasi yang dianggotai Setiausaha Persekutuan Sarawak di peringkat Persekutuan dan Negeri Sarawak

2.0 Pejabat Setiausaha Persekutuan Sarawak

1) Peranan & tanggungjawab
2) Visi/Objektif
3) Latar Belakang Penubuhan / Pekeliling Penubuhan
4) Carta Ogranisasi
5) Bidang Kuasa pejabat
6) Piagam Pelanggan
7) Etika Kerja
8) Gambar aktiviti sepanjang tahun (menjelaskan peranan SUPS)

3.0 Jabatan Persekutuan & Badan Berkanun di Sarawak

1) Senarai 110 jabatan di Sarawak
    a. Pengarah
    b. Alamat
    c. Contact no.
    d. E-mail
    e. Alamat laman web (akan di "link" kan ke Laman Web Masing-masing)

2) Perjawatan di Sarawak bagi jabatan Persekutuan
    f. Setiap jabatan /agensi /badan berkanun
    g. Ikut kategori (A, B, C, D) dan taraf perjawatan (Tetap / Sementara dan lain-lain)

    -Ikut kategori profesional

4.0 Kompleks Bangunan & Kuaters Gunasama Persekutuan

1) Senarai bangunan Persekutuan di Sarawak

   a. nama bangunan

   b. alamat

   c. gambar

   d. sejarah pembinaan

   e. pegawai bertanggungjawab di setiap bangunan

      - Contact no.
      - jawatan

2) Kuarters

   a. lokasi (map untuk setiap kuarters)

   b. alamat

   c. taburan kuarters ikut katogeri

   d. keupayaan menampung kakitangan/ jumlah penghuni

   e. kelayakan untuk memohon

   f. kreteria pemohon

   g. senarai penghuni / nama / jawatan / jabatan

   h. gambar kuarters setiap bahagian

   i. borang permohonan (download borang secara online)

   j. AJK Pemilihan kuarters (Carta)

   k. Contract person penjaga kuarters setiap bahagian.

5.0 Link Berita

1) Utusan Malaysia
2) New Straits Times
3) Utusan Sarawak
4) Sarawak Tribune

6.0 Link Portal

1) Jabatan Perdana Menteri
2) Pejabat Perdana Menteri
3) Pejabat Ketua Menteri
4) Malaysia Civil service Link (MCSL)
5) Pekeliling

Meeting with Client (Officially)

1.0 First Meeting

The student confirmation letter has been given to Encik Wan Fadillah to inform that each member of the group is from University Malaysia Sarawak (UNIMAS) and currently undergo subject Final Year Project 1 (TMP3012) for this semester. Encik Wan Fadillah agrees with our proposal that we have proposed to him. En Wan Fadillah kindly have wrote a confirmation letter to our supervisor, Encik Mohd Nazim Jambli to inform him that we have been assigned a task to develop a new portal for Pejabat Urusetia Persekutuan Negeri Sarawak.

2.0 Second Meeting

Encik Wan Fadillah has brief about the official web site that was develop by Silicon Technologies but last updated since 1999. Encik Wan Fadillah asks us to develop again the web site but there is many changes of data and must be a dynamic web site. We provide a questionnaire to Encik Wan about the project. The purpose of questionnaire is wanted to make the project progress running smoothly. We also make interview to Encik Wan Fadhillah.

3.0 Third Meeting

Team members gave a brief about the portal that going to be built. During the first meeting, we were discussed about the requirements and specification of the project with Encik Wan Fadillah. We suggested some requirements and features that we think might relevant with the portal. Encik Wan Fadillah gave us full trustworthy to build it.

4.0 Fourth Meeting

On the other hand, we made a follow up after we got approval from our supervisor regarding the content discussed in the first meeting. During this second meeting, we review the last result from the previous meeting and make some alteration. At this meeting also Encik Wan Fadillah distributed additional information to be added in the portal. We discussed requirements needed in the portal.

Beside that, journals and thesis's form the previous authors also drag our attraction. The purpose of referring journals is to familiar the team members with jargons that are used in the domain daily. Furthermore, the entire team member can be prepared and they can have a picture of entire departments.