ONLINE AIRLINE CUSTOMER MANAGEMENT SYSTEM
CASE STUDY: EAGLE AIR UGANDA LIMITED

BY

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DECLARATION

We, the undersigned do hereby declare, that the project report is an original paper of our research findings and has been compiled by us to the best of our knowledge and that any credit, mistakes and shortcomings about the paper are duly accountable to us.

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SUPERVISOR APPROVAL

This project report entitled: Customer management system, a case study Eagle Air Uganda Limited was written and constructed under the supervision and approval of;

MENTOR: .... SEMPEBWA RONALD

Signature: ....

Date: .... 19 / 09 / 2013

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We extend our special thanks to our supervisor, who tirelessly guided us on how to do our research.

May the lord our God bless them all.

ACRONYMS

API	Application Programming Interface
HTML	Hyper Text Markup Language
PHP	Hypertext Preprocessor
RAM	Random Access Memory
SOA	Service Oriented Architecture
SQL	Structured Query Language
SPSS	Statistical data Package for Social Scientists
UML	Unified Modeling Language
WAMP	Windows + Apache + MySQL + PHP
DBMS	Database management System
RPC	Remote Procedure Call

DEDICATION

We dedicate this research to our dear parents, siblings and relatives for their moral, emotional and material support.

ABSTRACT

The Online Airline Customer Management System is basically derived from the GDS (Global Distribution System) also known as CRS (Computer Reservation System). The Online Reservation System has its database centrally located which is accessed through an Application Programming Interface (API).With the invent of Online Reservation System the traveler and the airline have the freedom to book a seat anywhere at any time at their convenience. The traveler books a ticket at a click of a mouse saving the time and money for the traveler. It is also a hassle free transaction for both the airline and the traveler. The Online Airline Customer Management System involves three main actors; the database, online operator and a database scheduler. The database scheduler updates the database, the online operator accepts and confirms the booking and updates the data. The new online airline customer management system maintains the database centrally giving the clients the information required from anywhere in the world whenever required. This system requires the use of an API through which it extracts the data from a central database. The central database monitors all the data changes that are made at the client side to it and updates it automatically.

In conclusion, the new Online Airline Customer Management System is advantageous in various ways; through online airline customer management system passenger are able to book & purchase the ticket from their home/office conveniently as it does not require the passenger to go to the airline or an agent to purchase a ticket thus saving time & money for the customer and an airline/agent.

As the information is stored centrally the passenger never loses their ticket as in the previous system.

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CHAPTER ONE

INTRODUCTION

1.0 Introduction

The modes of transport within Uganda had always been road, railway and water. There had been little use of air as a mode of transport except in the army and police departments. Public air transport was unheard of within the country.

The traditional modes of transport are falling short of public demands and expectations for which reason Eagle Air Uganda Limited decided to introduce a flight company within Uganda.

Customers who wish to travel by air nowadays have a wide variety of airlines and a range of timings to choose from. Nowadays competition is so fierce between airlines that there are lot of discounts and a lot of luxuries given to customers that will give an edge to that particular airline. The World Wide Web has become tremendously popular over the last four years, and currently most of the airlines have made provision for online reservation of their flights. The Internet has become a major resource for people looking for making reservations online without the hassle of meeting travel agents. This research intends to come up with an Online Airline Management System with which a traveler can request all flight information as per their journey dates. They can get information regarding time, cost, etc all at the same time and place.

Eagle Air Uganda Limited is a privately owned air company that is located on Adam house, plot 11 on Portal Avenue, Kampala Uganda and its operations office is at Entebbe International Air Port. It was registered in 1994.

The number of customers that Eagle Air Uganda limited registers is tremendously increasing day in day out. This is beause it has established itself as an efficient, reliable and safe aviation company.

Eagle Air is owned by professional pilots who have a combined flying time of over 29,000 hours, over 20 years of aviation experience and more than ten years management both in the airline and the air charter business.

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1.1 Problem statement

The past reservation system was Microsoft Access database enabled system that had a lot of shortcomings that included; very slow unbearable response speed when accessed by more than 20 users simultaneously, the need to invest heavily in upgrading the Microsoft Office Suit every few years, quite insecure, and the considerably smaller data storage capacity as compared to other Relational Database management Systems (RDMS). It was due to the above shortcomings that the researchers proposed an Online Airline Customer Management System that would greatly improve transaction speed, eliminate the need to invest heavily in the database upgrades, and also greatly improve on security.

1.2 Objectives

1.2.1 Main Objectives

To develop an Online Airline Customer Management System for Eagle Air Uganda Limited.

1.2.2   Specific Objectives

i)   To collect data about the existing Customer Management System

ii)   To investigate and analyze the existing Customer Management System so as to identify the problems which are associated with it.

iii) To Design the new Online Airline Customer Management System

iv) To Implement the new Online Airline Customer Management System

1.3   Research questions

i)   Does Eagle Air Uganda Limited need a commercial database?

ii)   What information pieces are collected from customers by Eagles Air Uganda Limited?

iii)   What will be the best development platform for the new Online Airways Customer management System?

1.4 Scope

The researchers collected data about the previous system from the following departments; Administration, finance, and booking departments. The information gathered from these people vastly contributed to functional requirements for the new system.

The other group of respondents was the potential customers who were interviewed such that they could give their ideas on how helpful the new system would be for them.

1.5 Justification

The implementation of the new Online Airline Customer Management System will improve the company in a number of ways;

The customers are able to book for their flights from anywhere anytime provided they had Internet access.

With the new system, it is easier for them to make changes to their bookings as it is no longer necessary to contact the ticketing agent.

The customers are also able to check in up to 24 hours before their flight, select their seat and print their boarding passes from home and so skip long lines at the airport. If they have carry-on luggage only, they can go straight to their gate with their boarding pass. If they are checking luggage, they can skip the ticketing and boarding pass lines by checking their bags at a kiosk at the airport.

The new system saves customers a lot of money as they no longer need to pay ticket agent commissions and telephone calls to the airline companies in order to book for flights.

Eagle Air Uganda Limited benefits from having a share of the online market that enables the flight booking easily regardless of their geographical location.

1.6 Conceptual framework

The conceptual framework shows how customer information flows between data entrants' interfaces and the database.

User's Web Browser
(like Netscape or Explorer)

HTTP requests and data

Web pages, etc.

HTML files
Include files
Stylesheets

Apache Web Server
with the PHP
scripting language, etc.

RAM files

Log files
etc.

SQL commands
and data

Data

Database
tables

Old data

New data

MySQL Relational Data
Base Management Server

RAM data
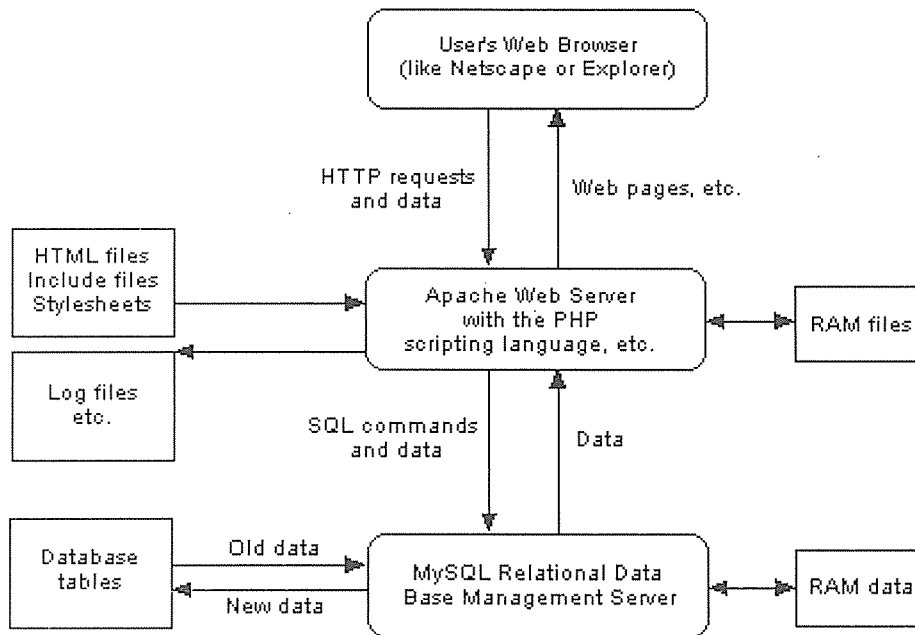
ESA, Aalborg, 2000/03/13

Figure 1-0-1 A conceptual framework showing the Customer's database management system in a client/server setting.

The researcher thinks of the system in terms of a system consisting of a web server system (like Apache) as an entity that from the web files can interpret a programming language (like PHP) and thus can access a database management system (like MySQL). Such a system may look rather complicated as shown in the figure above.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

This chapter equipped the researchers with the knowledge relevant to designing and implementing Online Airline Customer Management Systems, graphics design, and database design and implementation.

2.1. Online Airline Customer Management Systems (Airline Reservation Systems)

According to David J. Wardel,1991, before the electronic age, reservation were managed manually using records books and manifest and other printed media, many reservation systems in today's world are still met this way. He added that today, Airline Reservation systems are the primary form of travel computerizations in the world and that these systems manage the millions of business transactions. The author further emphasized that the computer reservation system function is extremely powerful and valuable distribution and marketing tool for their online owners. Today's travel agency is largely defined and controlled by Airline Computer Reservation Systems.

According to Dick Pere Ilaye, 2010, Airline Reservation System (ARS) used to be a standalone system whereby every airline had its own system disconnected from other Airline Reservation system or ticketing agents and makes uses of only a designated numbers of airline employees. He adds that during the 1970s Travel Agency pushed for the access to the Airline systems and also that today's air travel information is linked, stored and retrieved by a network of computer Reservation Systems (CRS), Which are accessible by multiple airlines and travel agents. Dick Pere Ilaye observed that the American Airline was the first to establish an automated booking system in the year 1946 using a system to track information and improve efficiency. This automated booking system endured years of development and alterations. The Next booking systems were developed in the year 1953 by a Trans- Canada airline, this Trans Canada Airlines developed a computer based system with remote terminals that eventually took over operations in 1953. In the same year that the Trans Canada company developed their computer based system, the American Airlines worked closely with IBM to develop an improved system and the Airline Reservation System (ARS) and the semi- Automated

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Business Research System (SABRE), which was launched thereafter in 1960.The development ARS was completed in 1964 and has been recognized as the largest data processing system in existence. From the 1960s to 1970s Airline Industries invented a lot on research on how to improve the Airline Reservation System any towards the end of the 1970s Airlines have been able to own their private Airline Reservation System. The United Airlines were responsible for the development of the Apollo Reservation system and shortly after the development of the Apollo Reservation system travel agents were given access to make the use of the system. Nevertheless several airlines started developing their own systems, Delta Airlines Launched the Delta Automated Travel Account Systems (DATAS) in 1968, United Airlines and Tran's world Airlines followed in 1971 with the Apollo Reservation system and Programmed Airline Reservation System (PARS). Later on travels agents began pushing for a system that could automate their side of the princess by accessing the Airline Reservation System directly to make reservations. Because of the assessment of the Travel to agent to make reservation directly the Airline industry provided an Airline deregulation rule, this Airline deregulation occurred in the year 1978, it deals with the magnifying the importance of the computerized airline reservation systems and their accessibility.

The main purpose of the 1978 Airline Deregulation Act in the U.S was to eliminate government control over commercial aviation and ensure competitive behavior and fair business practices in the Airline Industry.

Before defining the term Airline Reservation System, terms such as System, computerized, Airline Industry, And reservation should be define.

According to Nwabrije Ugochukwu Emmanuel, the above terms are defined as follows:

System: can be defined as a set of detailed method or procedure which is used to carry out a duty or a task.

Computerized: this has to do with the entering of a process, or store information in a computer information system,

Reservation: Simply means the act of keeping back, with held. In terms of records and data it also means a written record or promise of an arrangement by which the task or data are secured in advance.

Airline Industry: can be define as the type of industry which is responsible for the transportation of passengers such as peoples, cargos, good and service from on destination to another through air by means of Helicopter or Aero-plane in other to make profit

Airline Reservation System: Airline Reservation system could be defined as a computerized system which allows users to store, retrieve, Reserve, information and also conduct business transaction related to air travel.

2.2 Airline Reservation system Design Architecture.

There are two main Airline Reservation Design Architecture and they are

    i.   Service oriented Architecture

    ii.   Traditional software oriented Architecture

Service Oriented Architecture

This type of architecture is used in a distributed system, where by ticketing agents are referred to as services, this architecture is usually implemented using XML (extensible Markup Language), WSDL (Web service description Language), SOAP(Simple object access protocol) and UDDI (Universal Description Discovery and Integration).In this architecture the designed web service that was implemented to follow this architecture would be uploaded to the service registry using UDDI so that client or customer can access the web service from their local operating system. By so doing the customer can access the implemented web service from their various homes, they can reserve flights with ease, search for seats and make payment with ease without going to the airport to do it the old fashioned way.

Traditional Software Oriented Architecture

This type of architecture is the type of architecture that involves ticketing agent desktop application software that is not connected to the web service and it requires customers to move down to the ticketing reservation place to book or reserve flight. Most undeveloped nations still make use of architecture, but this ticketing reservation architecture requires a lot of time and effort from both the ticketing agent and the customer, while in the service oriented architecture you can reserve flight with just a click away.

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2.3 Merits and Demerits of Online Airline Customer Management Systems

Anything that has an advantage also has a disadvantage, people log into the Airline reservation system based on the pros of the system and most times over looks the cons of the system.

The Merits include:

Convenience

This advantage simply means that users of the proposed system can book or reserve ticket anytime they want, be it at day or at night, also the proposed Airline reservation system has no geographical boundary.

Easy changes

This advantage allows user to change flight any time they want, if they want to postpone the date of their journey. Most existing Airline reservation site allows users to make changes before log in.

Early check in

Airline Reservation system allows users to check in up to 24 hours before their flight, select seat and print boarding passes from home, by doing so users of the Airline reservation system can skip long line at the Airport.

The demerits include:

Live Help

When users of Airline reservation system reserve seats online , and they have any worries or Question, this worries and Question can't be attended to online, they need an administrative advice to help them solve their problem.

Customization

Most Airline Reservation system Advertise cheap Tickets, but add taxes and surcharge to make it expensive.

Special Need

Users of the Airline Reservation system can't confirm any special need at the time of their online reservation, such as requesting a wheel chair

2.4 Online Management Information Systems (MIS).

According to Date C.J, 2000, an Introduction to Database Systems 4th edition Addison Wesley, a DBMS is software that handles all accesses to the databases. A database management system is special software that is used to create and maintain a database. It also allows one to use a computer to create a database, add records, change them, and also delete them from the database. A database is a file of data that is structured such that many applications can use it and update it. It constitutes tables made of rows (records) and columns (fields).

Ann Destrehan, 2001, points out that a file contains information concerning one aspect of the organization's data such as financial accounts and debtors details. She says that a record consists of information about a given person, product or event.

Earl M.J, 1989, looks at a field as containing a specific piece of information within a record.

Schmidt and Swenson, 1975, define a primary key as a field in which any value entered will appear in only one record in a table. Primary keys are useful when it comes to linking of tables in a database that has to be normalized so as to eliminate redundancies.

Elmasri and Navathe, 1994, define normalization as a technique for producing a set of relations with desirable properties given the data requirements of an enterprise.

According to Howe D, 1989, an entity is an item such as a person. Thomas m. Connolly, 1985, defines an attribute as a characteristic of an entity.

Codd E. F, 1971, defines database as a set of interacting elements that interact with each other to achieve a set of predetermined objectives. The linkages between the tables in a database are defined in terms of the above relationships. He further points out that relational database are split between different dimensional tables which are linked via a set of unique keys.

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2.5 Development methodology.

According to a document by Office of information Services for Center of Medicare Services, A System Development Methodology refers to the framework that is used to structure, plan, and control the process of developing an Information System. The researchers will use the Waterfall model.

Initial Investigation

Requirements
Definition

System Design

Coding, testing....

Implementation

Operation &
Support
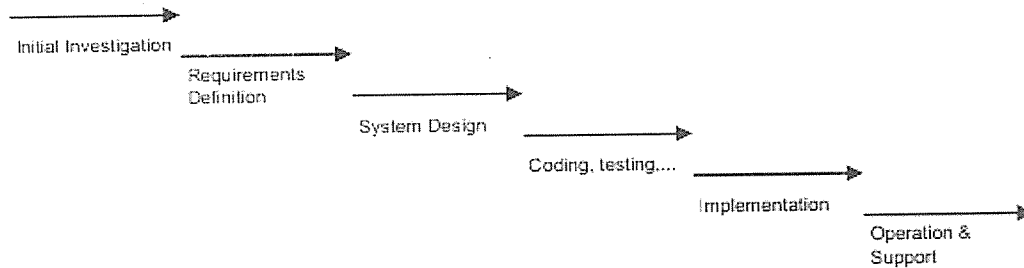
Figure 1-2 Water fall model

Framework Type: Linear

Initial Investigation: The researchers analyzed the existing system fully with close attention given to the demerits of the system.

Requirements Definition: The researchers then document the functional and non functional requirements for the new system.

System Design: Database and other system models were then designed to provide a blueprint for the new system.

Coding and testing: The blueprint was then translated into a system that was later tested for errors. Errors were debugged until the system was completely error free.

Implementation: The complete new system was commissioned to Eagle Air Uganda Limited and it is waiting hosting so that it can be used.

Operation and support: The researchers finally trained the staff on how the new system is used. Any system maintenances are to be done by the researchers.

Basic Principles:

1. Project is divided into sequential phases, with some overlap and splash back acceptable between phases.

2. Emphasis is on planning, time schedules, target dates, budgets and implementation of an entire system at one time.

3. Tight control is maintained over the life of the project through the use of extensive written documentation, as well as through formal reviews and approval/signoff by the Office of Information Services 1user and information technology management occurring at the end of most phases before beginning the next phase.

Strengths

1. Ideal for supporting less experienced project teams and project managers, or project teams whose composition fluctuates.

2. The orderly sequence of development steps and strict controls for ensuring the adequacy of documentation and design reviews helps ensure the quality, reliability, and maintainability of the developed software.

3. Progress of system development is measurable.

4. Conserves resources.

Weaknesses

1. Inflexible, slow, costly and cumbersome due to significant structure and tight controls.

2. Project progresses forward, with only slight movement backward.

3. Little room for use of iteration, which can reduce manageability if used.

4. depends upon early identification and specification of requirements, yet users may not be able to clearly define what they need early in the project.

5. Requirements inconsistencies, missing system components, and unexpected development needs are often discovered during design and coding.

6. Problems are often not discovered until system testing.

7. System performance cannot be tested until the system is almost fully coded, and under capacity may be difficult to correct.

8. Difficult to respond to changes. Changes that occur later in the life cycle are more costly and are thus discouraged.

9. Produces excessive documentation and keeping it updated as the project progresses is time-consuming.

10. Written specifications are often difficult for users to read and thoroughly appreciate.

11. Promotes the gap between users and developers with clear division of responsibility.

Situations where most appropriate:

1. Project is for development of a mainframe-based or transaction-oriented batch system.

2. Project is large, expensive, and complicated.

3. Project has clear objectives and solution.

4. Pressure does not exist for immediate implementation.

5. Project requirements can be stated unambiguously and comprehensively.

6. Project requirements are stable or unchanging during the system development life cycle.

7. User community is fully knowledgeable in the business and application.

8. Team members may be inexperienced.

9. Team composition is unstable and expected to fluctuate.

10. Project manager may not be fully experienced.

11. Resources need to be conserved.

12. Strict requirement exists for formal approvals at designated milestones.

2.6 Software documentation.

Organizations should maintain detailed documentation for each application. Thorough documentation enhances an organization's ability to understand functional, security, and control features and improves its ability to use and maintain the software. The documentation should contain detailed application descriptions, programming documentations, and operating instructions. Standards should be in place that identify type and format of the required documentation such as system narratives, flow charts, and any aspects such as coding, internal controls, or file layouts identified within individual application documentation.

For internally developed programs and externally required products, management should maintain documentations. In the case of acquired software, management should ensure either through internal review or third party certification prior to purchase, that an acquired product's documentation meets their organization's minimum document standards.

CHAPTER THREE
METHODOLOGY

3.0 Methodology

The methodology acts as a strategy or plan of action that links methods to outcomes. This chapter describes the methods and procedures that were followed in order to achieve the objectives of the study.

3.1 Requirements elicitation and analysis.

3.1.1 Data collection methods.

The researcher used several techniques in the elicitation and analysis of the requirements needed to build the system all of which are described below;

3.1.1.1 Interviews

Interviews were between the researchers and the management of Eagle Air Uganda Limited.

Advantages of interviews

1. Interviews are useful for identifying possible areas for more detailed analysis.
2. They are easy to conduct and direct. The structured interview can generate interesting points, statistical analysis can run on users' answers.

Disadvantages of interviews

1. Respondents are not committed to give correct answers and may often be influenced by what they believe the interviewer requires.
2. The interviewer may need to acquire domain knowledge in order to know the questions he will ask.

3.1.1.2 Observation

According to Newman (2003), observation is described as the only technique that allows a system analyst to obtain first hand information about how the activities are carried out.

Advantages of observation

1. It gives first hand and accurate information.
2. System issue are better understood when you observe them than when you simply hear about them.

Disadvantages of observation

1. It is a time consuming activity because you have to watch and see before u understand.
2. Some people just don't want to be observed.

3.1.2 Requirements analysis

The researchers used SPSS to analyze the data they had collected from the potential tourists.

3.2 System design

The system was designed based on the Service Oriented Architecture (SOA) and mesh topology for connecting all the branches to one centralized database, The researchers proposed to use SOA architecture because this type of architecture or approach was the most efficient, flexible and reliable approach used in Airline Reservation System today. Another reason is because it requires clients to make reservation from their different location at any given time and date, as long as there is an available flight and the clients as enough finances in his or her debit card. Also it has no geographical boundary. So therefore the proposed system was implemented using SOA Architecture and mesh topology because it supported wireless networking. The two methods would be useful.

3.3 Implementation of the system

The following software will be used in the implementation of the system;

1. Windows 7 professional (Operating system)
2. PhotoScape V3_6 (3) (Graphics application)
3. Mozilla Firefox 22 (Browser)
4. Mozilla Web Developer tool bar (Mozilla Firefox add-on)
5. WAMP 2.0 (three in one package of Apache (Server), MYSQL (DBMS), PHP (language) for windows platforms).

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3.4 Testing and validation of the system

The Evaluation of this system was done using Remote Procedure Call (RPC); the researchers used the remote procedures call to evaluate the system because it deals with the distributed nature of service between the client and a server. In order to evaluate this system the ten basics step of Remote Procedure Call (RPC), put into consideration.

CHAPTER FOUR
DATA, ANALYSIS AND PRESENTATION

4.1 Introduction

This chapter presents, analyses, and discusses the findings of the research. The data that is analyzed here is from the questionnaires that were issued to the management and staff of Eagle Air Uganda limited, and from the potential customers of the company.

4.2 Data representation

The different representations of the research outcomes are below;

Manager's responses

4.2.1　Need for a new system

Statistics

Is there need for a new system?

N	Valid	6
	Missing	0

v)

Source: primary data

Is there need for a new system?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	83.3	83.3	83.3
	No	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Table 4-0-1 Need for a new system

Source: primary data

Is there need for a new system?

■ Yes
■ No
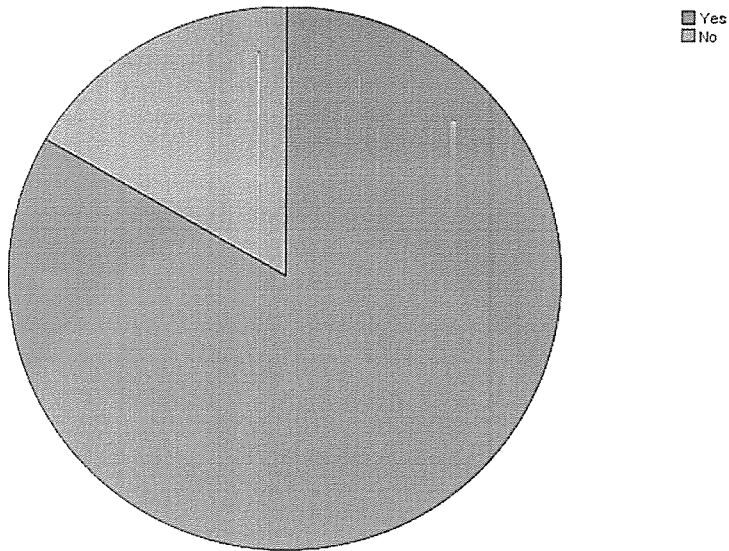
Figure 4-0-1 Need for a new system

Source: Primary data

Five out of six managers agreed that a new system was needed.

4.2.2 Nature of system needed; offline/online

Statistics

Do you need an offline or
online system?

N	Valid	6
	Missing	0

Source: Primary data

Do you need an offline or online system?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Online	6	100.0	100.0	100.0

Table 4-0-2 Online/offline frequency table

Source: Primary data

Do you need an offline or online system?
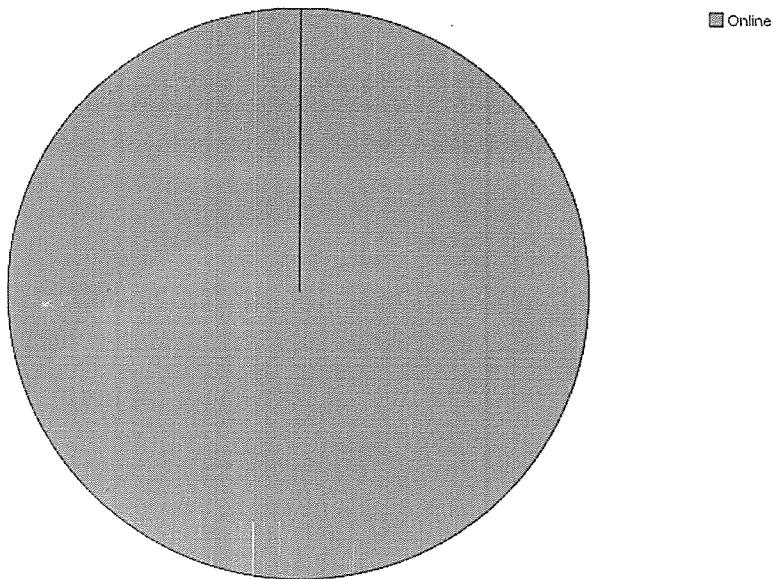
☐ Online

Figure 4-0-2 Nature of system needed

Source: Primary data

All six managers required that an online system was needed.

4.2.3 Knowledge of open source DBMS

Statistics

Have you ever heard of open source database solutions?

N	Valid	6
	Missing	0

Source: Primary data

Have you ever heard of open source database solutions?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	5	83.3	83.3	83.3
	No	1	16.7	16.7	100.0
	Total	6	100.0	100.0	

Source: Primary data

Table 4-0-3 Open source DBMS knowledge frequency table

Have you ever heard of open source database solutions?

☐ Yes
☐ No
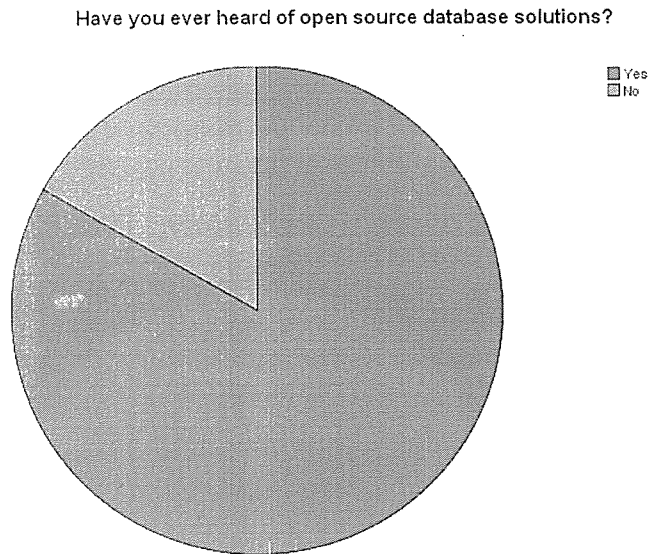
Figure 4-0-3

Source: Primary data

Five out of six managers have ever heard of open source database solutions.

4.2.4 Commercial or open source database needed?

Statistics

Do you need an open
source or commercial
DBMS

N	Valid	6
	Missing	0

Source: Primary data

Do you need an open source or commercial DBMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Open Source	4	66.7	66.7	66.7
	Commercial	2	33.3	33.3	100.0
	Total	6	100.0	100.0	

Table 4-0-4 Commercial/open source database choice

Source: Primary data

Do you need an open source or commercial DBMS

Open Source
Commercial
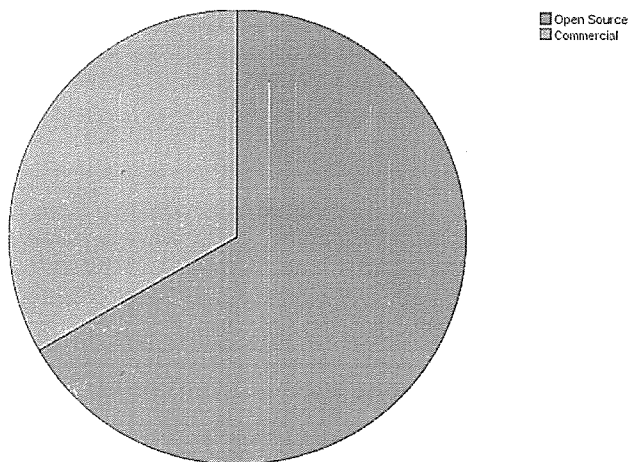
Figure 4-0-4

Source: Primary data

Four out of six preferred an open source RDBMS.

Potential Customer responses

4.2.5 Gender distribution

Statistics

Sex

N	Valid	20
	Missing	0

Source: Primary data

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	13	65.0	65.0	65.0
	Female	7	35.0	35.0	100.0
	Total	20	100.0	100.0	

Table 4-0-5 Gender distribution

Source: Primary data
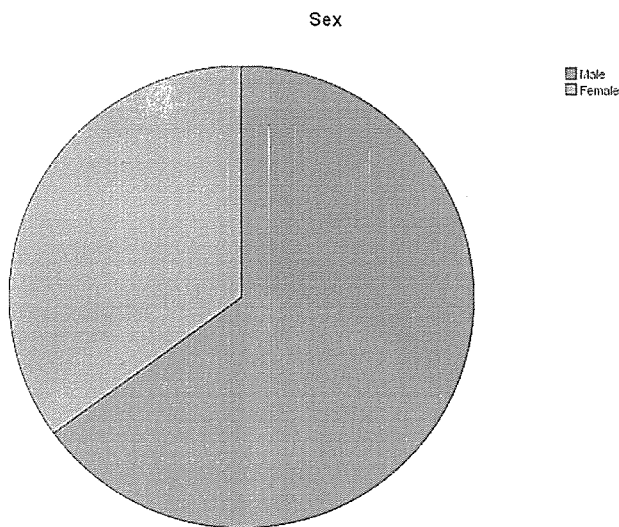
Figure 4-0-5 Gender distribution

Source: Primary data

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Thirteen potential customers were males and seven were females. It indication was that the company should expect more male customers than females.

4.2.6 Internet users

Statistics

Do you use Internet?

N	Valid	20
	Missing	0

Source: Primary data

Do you use Internet?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	17	85.0	85.0	85.0
	No	3	15.0	15.0	100.0
	Total	20	100.0	100.0	

Table 4-0-6 Internet use

Source: Primary data
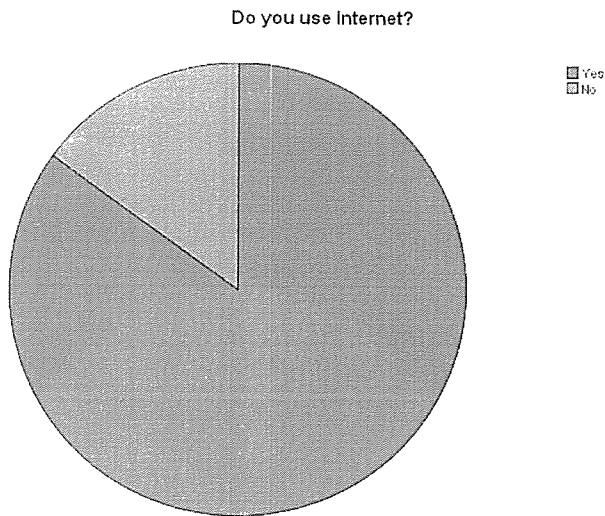
Do you use Internet?

Figure 4-0-6 Internet users

Source: Primary data

Seventeen out of twenty respondents use internet. Only three did not use Internet. It was safe to develop a web based system therefore as the majority would access it via the Internet.

4.2.7 Willingness to book online

Statistics

Would you be comfortable
booking online?

N	Valid	20
	Missing	0

Source: Primary data

Would you be comfortable booking online?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Yes	15	75.0	75.0	75.0
No	5	25.0	25.0	100.0
Total	20	100.0	100.0	

Table 4-0-7 Willingness to book online

Source: Primary data

Would you be comfatable booking online?
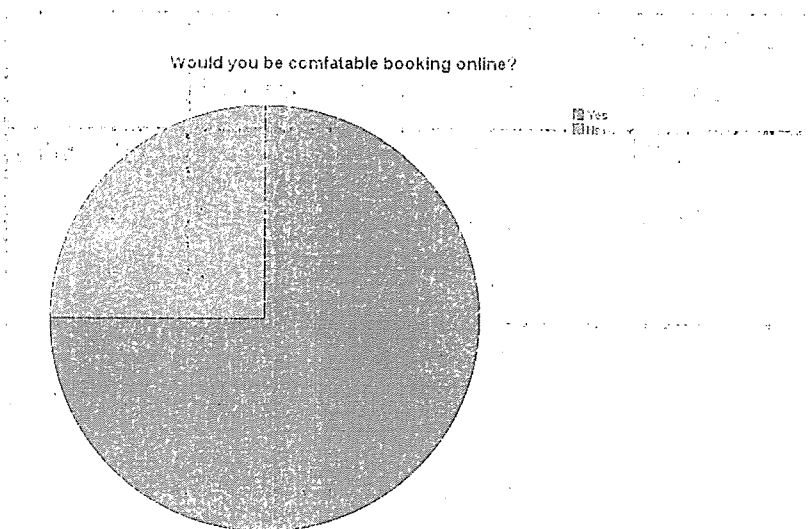
Figure 4-0-7 Willingness to book online

Source: Primary data

Fifteen out of twenty respondents were okay with booking online for which reason the system supports an online booking module.

4.2.8 Customer handling department responses

Statistics

Sex

N	Valid	11
	Missing	0

Source: Primary data

Sex

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	7	63.6	63.6	63.6
	Female	4	36.4	36.4	100.0
	Total	11	100.0	100.0	

Table 4-0-8 Gender distribution

Source: Primary data
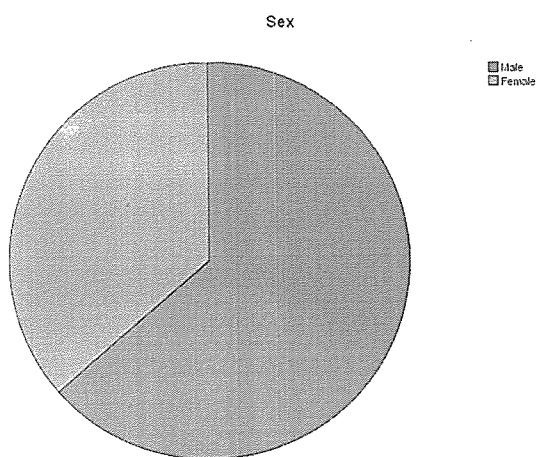
Figure 4-0-8 Gender distribution

Source: Primary data

Seven of the staffs were males and 4 were females.

4.2.9 Relational database Management system Used

Statistics

rdbms used

N	Valid	11
	Missing	0

Source: Primary data

rdbms used

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Ms Access	11	100.0	100.0	100.0

Table 4-9 Relational database Management system Used

Source: Primary data

All eleven respondents use Ms Access.

4.2.10 System nature

Statistics

Do you use an online or offline system?

N	Valid	11
	Missing	0

Source: Primary data

Do you use an online or offline system?

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid Offline	11	100.0	100.0	100.0

Table 4-0-10 System nature

Source: Primary data

Do you use an online or offline system?
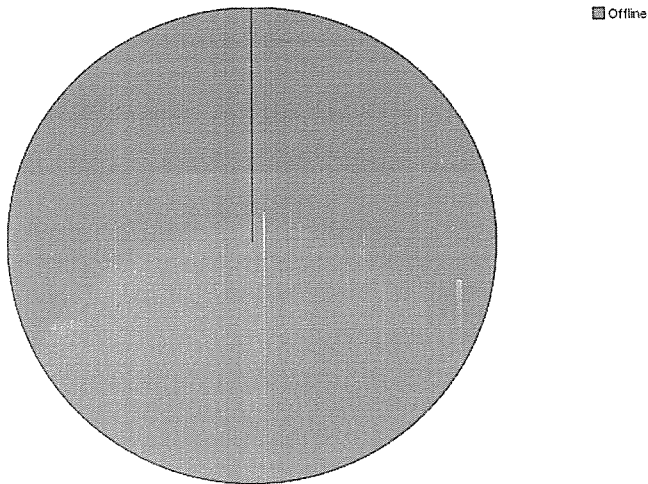
⬜ Offline

Figure 4-0-9 Do you use an online or offline system

Source: Primary data

The system under use is offline.

4.3 Systems Analysis

According to Jeffrey Whitten and Lonnie Bentley (2001), Systems Analysis is a problem solving technique that breaks down a system into its components with the aim of studying how well these components interact to accomplish a common goal. It's System Analysis phase that all the functional and non functional requirements are identified for the new system.

4.4   Feasibility study

This phase analyses the ability of developing the desired system. It can be broken down into three sections;

4.4.1   Technical feasibility

The question answered here was whether the researchers had the skills and technical ability to design and implement the new system.

4.4.2 Operational feasibility

During this phase, all external factors needed to ensure that the system would operate well were investigated e.g., Power supplies, good servers, and technical people to ensure the system runs well.

4.4.3 Economic feasibility

Here, the researchers investigated the company's economic power to support the development and maintenance of the new system.

4.5 Merits of the system

Convenience

This advantage simply means that users of the proposed system can book or reserve ticket anytime they want, be it at day or at night, also the proposed Airline reservation system has no geographical boundary.

Easy changes

This advantage allows user to change flight any time they want, if they want to postpone the date of their journey. Most existing Airline reservation site allows users to make changes before log in.

Early check in

Airline Reservation system allows users to check in up to 24 hours before their flight, select seat and print boarding passes from home, by doing so users of the Airline reservation system can skip long line at the Airport.

4.6   The demerits of the system:

Live Help

When users of Airline reservation system reserve seats online , and they have any worries or Question, this worries and Question can't be attend to online, they need an administrative advice to help them solve their problem.

Customization

Most Airline Reservation system Advertise cheap Tickets, but add taxes and surcharge to make it expensive.

Special Need

Users of the Airline Reservation system can't confirm any special need at the time of their online reservation, such as requesting a wheel chair.

4.7   System specification

4.7.1   System requirements

The following hardware and software specifications are required for the system to efficiently perform;

Hardware requirements

Hardware	Minimum requirement
Processor	Pentium III or higher
Random Access Memory	128 MB or higher
Hard Disk	20 GB

Table 4-0-11 Hardware requirements

Software requirements

Software
Windows platforms/UNIX/LINUX/Mac OS
WAMP/LAMP server
Web browsers
Flash player plug-ins

Table 4-0-12 Software requirements

4.7.2 Functional requirements

They are as follows;

i.   Provide a way for the administrator to log into the system.

ii.   Allow the administrator to create other users and assign rights and privileges.

iii.   Allow the administrator to customize system templates.

iv.   Provide interfaces for the company users to author, edit and publish articles

v.   Should allow users to create accounts with the system

vi.   Allow customers to book for flights online.

4.7.3 Non-functional requirements

They include;

   i.   Ease of system installation.

  ii.   The customers should find it easy to use the system

 iii.   The system should be efficient at using bandwidth

 iv.   The system should be highly reliable with a very low failure rate

  v.   The system should be able to run on a wide range of operating systems

CHAPTER FIVE
SYSTEM DESIGN AND IMPLEMENTATION

5.1   Introduction

This chapter is a description of the functional components of the system. It also describes the relationship between the various functional system components and the users and how the information flows and also describes the communication links between the various components of the system.
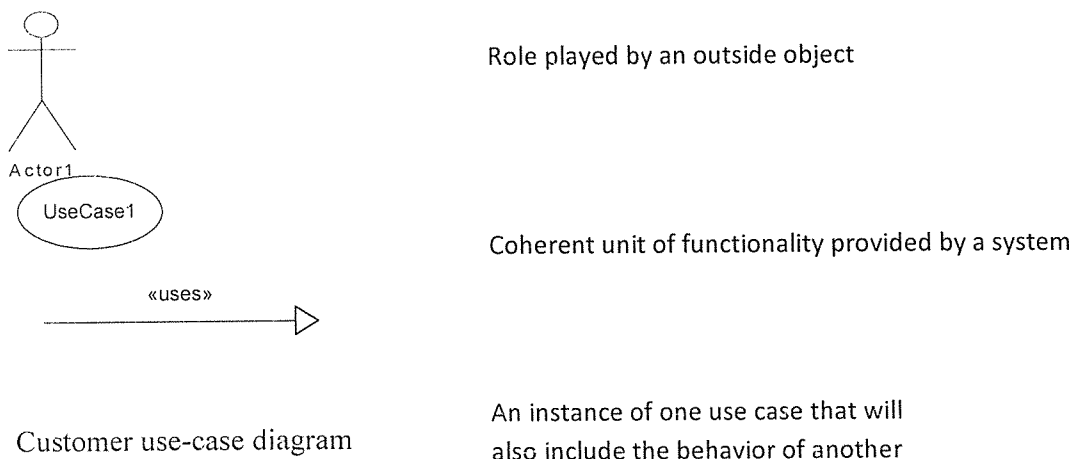
5.2   Data Modeling

A data model is a description of how data should be used to meet the requirements given by the end user. Data modeling helps to understand the information requirements. Data modeling differs according to the type of the business, because the business processes or each sector is different, and it needs to be identified in the modeling stage. Initial step is the analyzing the situation, gather data. Data modeling process starts with requirement gatherings. When developing the proper data model it is important to communicate with the stakeholders about the requirements. Data modeling is the act of exploring data oriented structures. This can be used for variety of purposes. One of the important functions of data modeling is that, it helps to understand the information requirements. Especially this makes both developers and end users lives easier.

5.3 System Design

System designs are described in this section including Data Flow Diagrams (DFD) which depict the functionalities of the system.

Meaning of symbols

Figure 5-0-1

Role played by an outside object

Coherent unit of functionality provided by a system

Customer use-case diagram

An instance of one use case that will also include the behavior of another
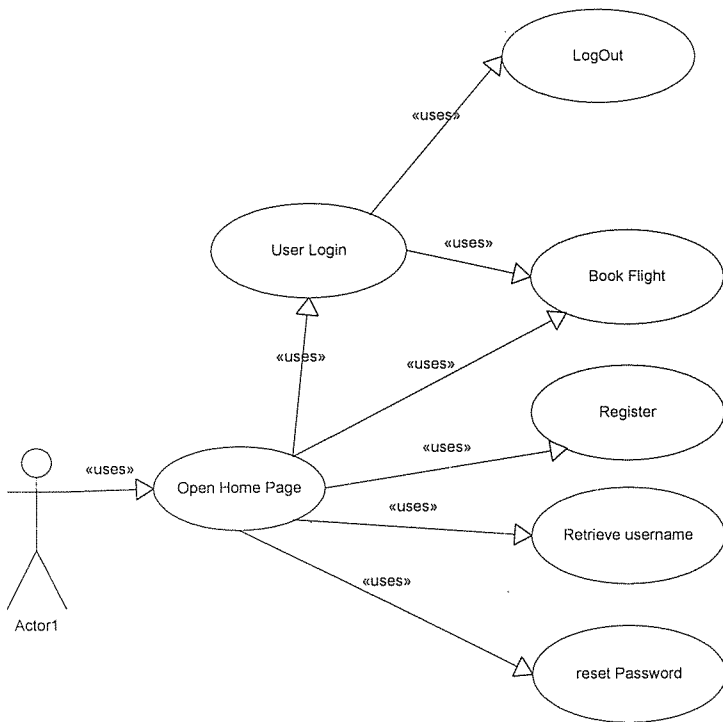
Figure 5-2

5.4 Physical database design

The database has 64 tables whose structures are shown below;

Browse Structure SQL Search Insert Export Impor

#	Column	Type	Collation	Attributes	Null
1	id	int(10)		UNSIGNED	No
2	asset_id	int(10)		UNSIGNED	No
3	title	varchar(255)	utf8_general_ci		No
4	alias	varchar(255)	utf8_bin		No
5	title_alias	varchar(255)	utf8_bin		No
6	introtext	mediumtext	utf8_general_ci		No
7	fulltext	mediumtext	utf8_general_ci		No
8	state	tinyint(3)			No
9	sectionid	int(10)		UNSIGNED	No
10	mask	int(10)		UNSIGNED	No
11	catid	int(10)		UNSIGNED	No
12	created	datetime			No
13	created_by	int(10)		UNSIGNED	No
14	created_by_alias	varchar(255)	utf8_general_ci		No
15	modified	datetime			No
16	modified_by	int(10)		UNSIGNED	No
17	checked_out	int(10)		UNSIGNED	No
18	checked_out_time	datetime			No
19	publish_up	datetime			No
20	publish_down	datetime			No
21	images	text	utf8_general_ci		No
22	urls	text	utf8_general_ci		No
23	attribs	varchar(5120)	utf8_general_ci		No
24	version	int(10)		UNSIGNED	No
25	parentid	int(10)		UNSIGNED	No
26	ordering	int(11)			No
27	metakey	text	utf8_general_ci		No
28	metadesc	text	utf8_general_ci		No
29	access	int(10)		UNSIGNED	No
30	hits	int(10)		UNSIGNED	No
31	metadata	text	utf8_general_ci		No
32	featured	tinyint(3)		UNSIGNED	No
33	language	char(7)	utf8_general_ci		No
34	xreference	varchar(50)	utf8_general_ci		No

Figure 5-0-3

Browse Structure SQL Search Insert Export

#	Column	Type	Collation	Attributes	Null
1	id	int(10)		UNSIGNED	No
2	parent_id	int(10)		UNSIGNED	No
3	lft	int(11)			No
4	rgt	int(11)			No
5	title	varchar(100)	utf8_general_ci		No

Figure 5-0-4

32

localhost ▸ eagleairug ▸ ek1jq_users

#	Column	Type	Collation	Attributes	Null
1	id	int(11)			No
2	name	varchar(255)	utf8_general_ci		No
3	username	varchar(150)	utf8_general_ci		No
4	email	varchar(100)	utf8_general_ci		No
5	password	varchar(100)	utf8_general_ci		No
6	usertype	varchar(25)	utf8_general_ci		No
7	block	tinyint(4)			No
8	sendEmail	tinyint(4)			Yes
9	registerDate	datetime			No
10	lastvisitDate	datetime			No
11	activation	varchar(100)	utf8_general_ci		No
12	params	text	utf8_general_ci		No

Figure 5-0-5

5.5   System Implementation

System Implementation deals with the building of the system, testing to ensure that all the functional requirements are met.

The system was implemented using a number of technologies. These were;

Joomla which was used as a Content Management System. The Content Management System uses PHP and MySQL as the core development technologies.
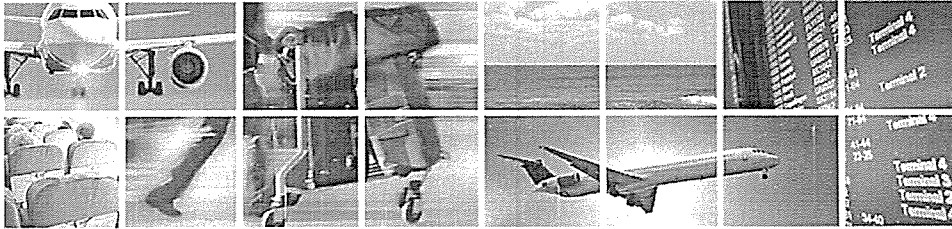
PHP was heavily used to connect the backend to the frontend and carry out any transactions between the two.

The MySQL was used to provide the required DBMS and server.

The system has two ends; the backend and the frontend.

Frontend

This is the website that the customers interface with. The home page is shown below

EAGLE AIR UGANDA LIMITED

Eagle Air Uganda Limited

Eagle Air Uganda Limited

Details

Category: Uncategorised
Published on Tuesday, 30 April 2013 15:46
Written by selena
Hits: 21

Introduction:

Over the years Eagle Air Ltd. has established itself as a reliable, efficient and safe
airline. The company was registered in June 1994. Eagle Air is not an associate of Eagle
Aviation (Kenya) Ltd. Eagle Aviation of America or any other similar aviation company.
Eagle Air has its Head office in the centre of Kampala, Uganda's capital, at Adam House.
Plot 11 Portal Avenue. Our Operations office is at Entebbe International Airport

Read more: Eagle Air Uganda Limited

Book Flight

Details

Category: BOOKING
Published on Tuesday, 30 April 2013 17:04
Written by Absolom
Hits: 61

Currently, we have flights coming from 5
districts:

1. Soroti
2. Mbale
3. Iganga
4. Jinja
5. Kampala

Fares

Flight Point Fares
Soroti $200
Mbale $150
Iganga $100
Jinja $70
Kampala $50
Please use the payment method below to
book.

Main Menu

- Eagle Air Uganda Limited
- Contact Us
- Our Fleet
- Book Flight
- Registered Member
  Details

Login Form

User Name

Password

Remember Me

Log in

- Forgot your username?
- Forgot your password?
- Create an account

Flight Payment

Enter Amount

$ [   ] USD [▼]

Pay Flight

Eagle Polls

Are our services effective?

Good - 33.3%

Very Good - 0%

Fair - 33.3%

Poor - 33.3%

Total votes: 3

The voting for this poll has
ended on: 28 Jul 2013 - 00:00

View details
read the related article >>

Flight Points
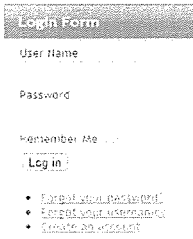
Soroti
Mbale
Iganga
Jinja
Kampala
All Flights destined for
Entebbe

Figure 5-0-6

Login Interface

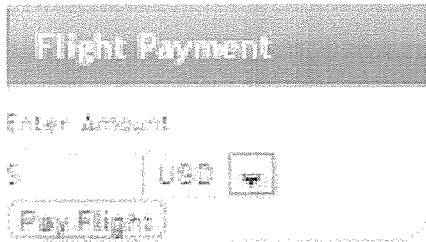The login interface below is used by registered users to access the website from the frontend.

Figure 5-0-7

Flight payment module

Figure 5-0-8

The customers use this interface to book flights. Upon filling in the flight fee, the form below opens and the users gives all the necessary information to effect the transaction.

Figure 5-0-9

Administrator Login form

The form is used by the administrator to get access to the backend of the system.

Joomla! Administration Login

Use a valid username and password to gain access to the administrator backend.

Go to site home page
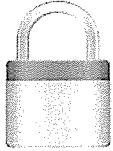
User Name

Password

Language   Default

Log in

Figure 5-0-10

Password retrieval menu item

The link below allows a user to reset their password.

- Forgot your password?

Figure 5-0-11

When clicked, the form below appears. User gives their email address and a verification code is sent to it. He then uses it to access the system and reset the password.

Please enter the email address for your account. A verification code will be sent to you. Once you have received the verification code, you will be able to choose a new password for your account.

Email Address: *

Submit

Figure 4-0-12

Username retrieval menu item

The link below allows a user to reset their password.

- Forgot your username?

Figure 5-0-13

When clicked, the form below appears. User gives their email address and the user name is sent to it.

37

Please enter the email address associated with your User account. Your username will be emailed to the email address on file.

Email Address: *   [   ]

[Submit]

Figure 5-0-14

User Account creation menu item

The link is used by a new user to create their user account.

● <u>Create an account</u>

Figure 5-0-15

When the above link is clicked, the form below opens and the user specifies their information and the clicks the register button.

User Registration

* Required field

Name: *   [   ]

Username: *   [   ]

Password: *   [   ]

Confirm Password: * [   ]

Email Address: *   [   ]

Confirm email
Address: *   [   ]

[Register] or <u>Cancel</u>

Figure 5-0-16

Administrator control panel

Upon successful administrator login, the interface below opens up. It allows the administrator to do various tasks on the system.
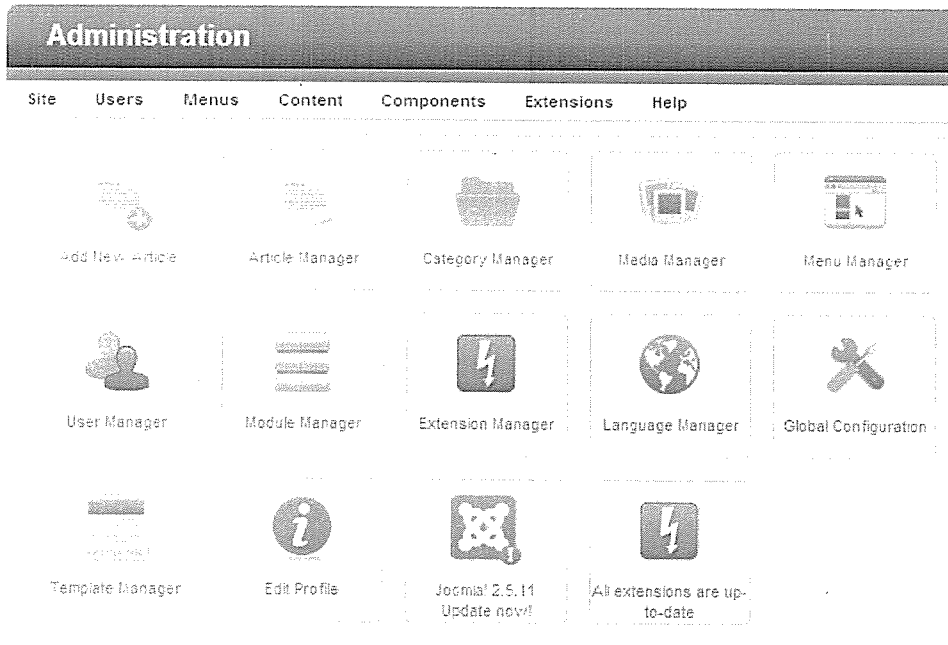
Figure 5-0-17

Article manager

The interface below allows the administrator to manage articles.

Figure 5-0-18

Add new article interface

The interface below is used in order to add a new article. Fill in the required field and then save to add a new article.

39

Article Manager: Add New Article

Save Save & Close Save & New Cancel Help

New Article

Title
Alias
Category   - Uncategorised
Status   Published
Access   Public
Permissions   Set Permissions
Featured   No
Language   All
ID   0
Article Text

B I U ABC Styles Paragraph

Path: p

Article   Image   Page Break   Read More   Toggle editor

Publishing Options

Created by   Select User
Created by alias
Created Date
Start Publishing
Finish Publishing

Article Options
Configure Edit Screen
Images and links
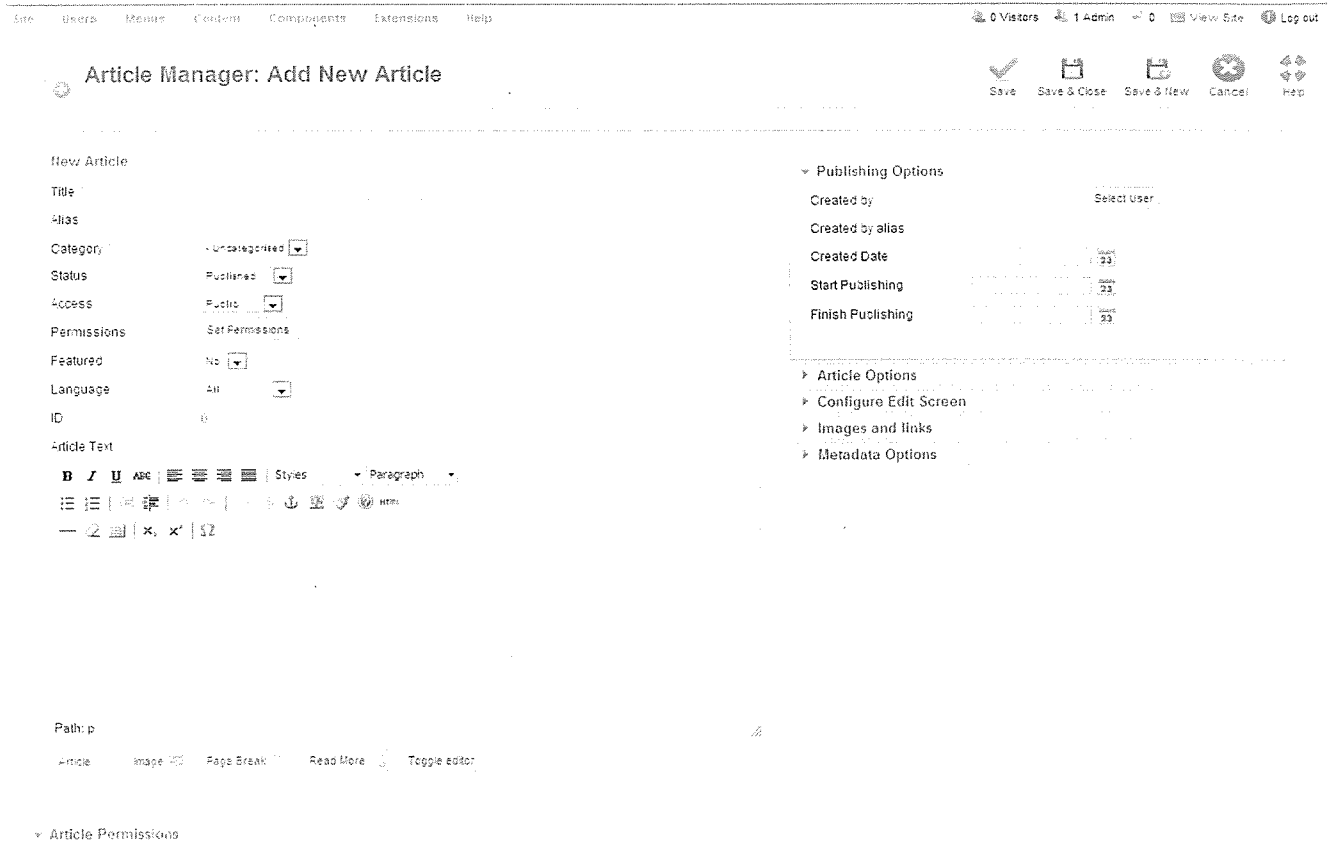Metadata Options

Article Permissions

Figure 5-0-19

Add new user interface

The interface is used to add new users to the system. The users added using this interface are mostly administrators, Authors, editors and publishers.
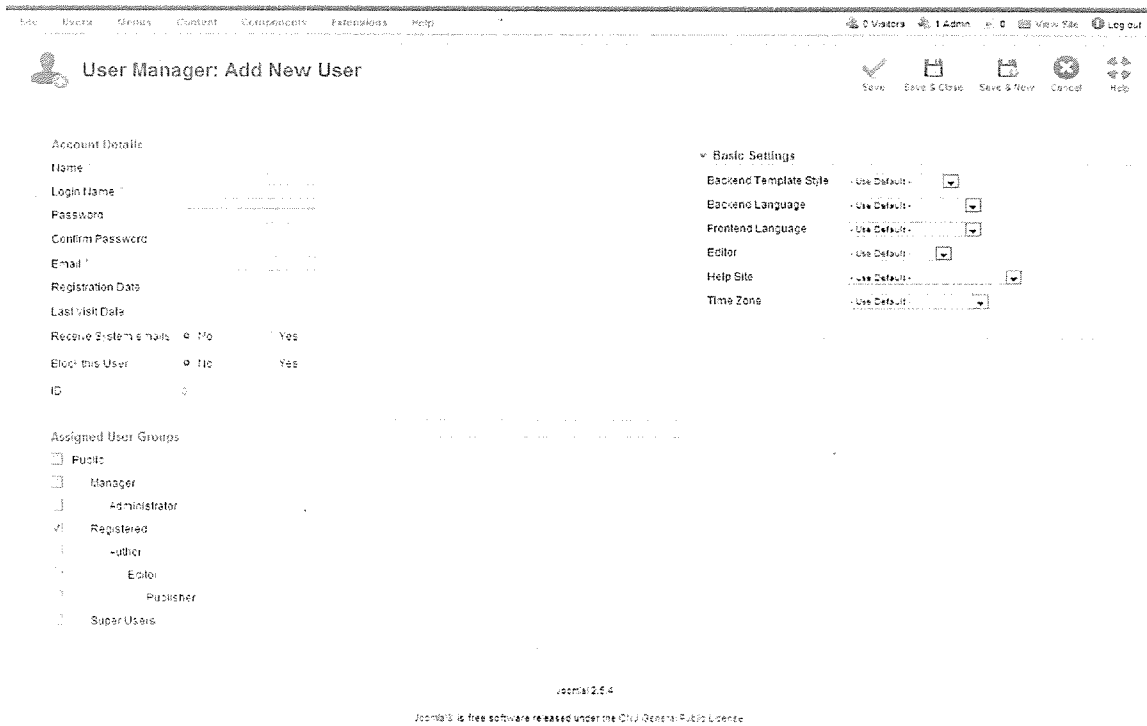
Figure 5-0-20

Edit user interface

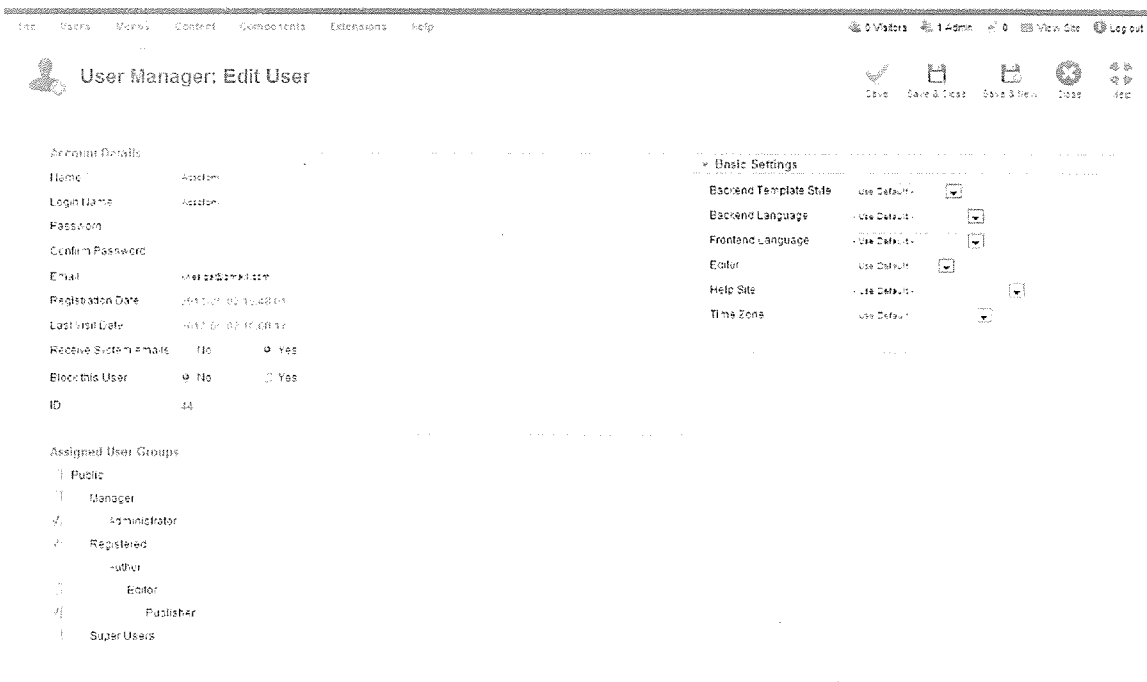The administrator edits users in the system using the interface below.

Figure 5-0-21

Extension manager interface

The Administrator uses the interface below to upload images, modules, plug-ins and templates for the system.

Extension Manager: Install

Install   Update   Manage   Discover   Database   Warnings

Upload Package File
Package File   Choose File No file chosen   Upload & Install

Install from Directory
Install Directory   C:\xamp\www\EagleAirUg\tmp   Install

Install from URL
Install URL   http   Install

Joomla! 2.5.4

Joomla!® is free software released under the GNU General Public License.

Figure 5-0-22

5.6   System testing

The researchers carried out two types of system testing; unit module testing and system testing.

5.6.1   Unit testing

Unit testing was used to test the proper functioning of the individual system modules to find out if they worked or not.

5.6.2   System testing

System testing was done after all the various system modules had been merged. It was aimed at ensuring that the system was running as expected.

5.6.3   System Adaptation

The researchers recommended that both the current system and new system run at the same time using the parallel approach. Parallel approach is safe as the new system might make errors resulting in the loss of information.

CHAPTER SIX
LIMITATIONS, CONCLUSION AND RECOMMENDATIONS

6.1 Introduction

This part of the research report concludes the research. It has outlined recommendations of how to use the system, suggesting ways of overcoming the limitations that the researchers encountered and finally, the researchers outline the methods and tools they found useful in their study.

6.2 Limitations

Many limitations were encountered during the study. These include:

The researchers had to spend a lot of time and effort learning new technologies such as Joomla.

The existing system only provides text-based interface, which is not as user-friendly as Graphical user Interface.

The transactions are executed in off-line mode, hence on-line data capture and modification is not possible.

Off-line reports cannot be generated due to batch mode execution

Some respondents were not always available making information gathering very hard.

6.3 Conclusion

The research has not been smooth due to a number of problems that will be explained shortly.

The study revealed that the online reservation system was far more superior than the offline system in a number of ways some of which are the ease and comfort of booking from anywhere.

The study also brought to the realization of the fact that in order to harvest a wider market, an organization really needs an online booking system that will eliminate the need for the customers looking around for agents.

All the shortcomings of the offline system such as slowing down when many users are accessing it the same time were eliminated.

The researchers were able to harvest a wide range of skills as a result ranging from interpersonal communication skills to programming skills.

6.4 Recommendations

The researchers recommend that further research should be done in Integrating Mobile money payment into the system.

Further research should be done in making the system accessible on mobile devices such as smart phones and mobile phones.

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APPENDICES

Appendix A

Questionnaires

EAGLE AIR UGANDA LIMITED

CUSTOMER HANDLING DEPARTMENT QUESTIONNAIRE

This questionnaire is designed to collect ideas of how the ideal Customer Management System for the company should be. Please, be free to give as much and correct information as possible.

1. What is your sex?

☐ Male

☐ Female

2. What Type of system does EAUL use for customer management?

☐ Non Computerized system

☐ Offline system

☐ Online system

3. What Relation Database Management System do you use?

☐ Microsoft Access

☐ MySQL

☐ SQL

☐ Oracle

☐ Other (Specify)..

4. What are the demerits of your current system if any?

☐ Slow

☐ Quite Insecure

☐ Need to upgrade to newer database application versions

☐ Not big enough

☐ Other (specify)

5. Do you really need a new system?

☐ Yes

☐ No

EAGLE AIR UGANDA LIMITED

POTENTIAL CUSTOMER

This questionnaire is designed to collect ideas of how the ideal Customer Management System for the company should be. Please, be free to give as much and correct information as possible.

1. What is your sex?

☐ Male

☐ Female

2. Which district do you come from? ....

3. Have you heard about Eagle Air Uganda Limited?

☐ Yes

☐ No

4. Do you use the Internet?

☐ Yes

☐ No

5. Would you be comfortable booking online?

☐ Yes

☐ No

EAGLE AIR UGANDA LIMITED

MANAGEMENT QUESTIONNAIRE

This questionnaire is designed to collect ideas of how the ideal Customer Management System for the company should be. Please, be free to give as much and correct information as possible

1. Is there need for a new Customer Management System?

☐ Yes

☐ No

2. Do you need an offline or online system?

☐ Offline

☐ Online

3. Have you ever heard of open source database solutions?

☐ Yes

☐ No

4. Would you want open source or commercial database solutions?

☐ Open Source

☐ Commercial solutions