UNIVERSITI PUTRA MALAYSIA

DEVELOPMENT OF ONLINE FACILITIES BOOKING SYSTEM

TAN YI YEIN

FSKTM 2003 14

DEVELOPMENT OF ONLINE FACILITIES BOOKING SYSTEM

TAN YI YEIN

FACULTY OF COMPUTER SCIENCE AND INFORMATION TECHNOLOGY
UNIVERSITI PUTRA MALAYSIA
SERDANG, SELANGOR DARUL EHSAN
2003

DEVELOPMENT OF ONLINE FACILITIES BOOKING SYSTEM

By

TAN YI YEIN

A Project Paper submitted in partial fulfillment of the requirement for the degree of
Master of Science (Information Technology) in
Faculty of Computer Science and Information Technology
Universiti Putra Malaysia
2003

ACKNOWLEDGEMENT

I wish to express my deepest appreciation and profuse thanks to Pn. Norhayati Mohd. Ali for her advice, support, insightful guidance that made it possible for me to successfully completes the study.

I would also like to dedicate my gratitude to my friends for their encouragement and help in the programming; and also my family for their advice, support, concern and understanding throughout my life.

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

The purpose of this project is to develop an online system that manages company resources by using web technology. By using this system, the author hopes to reduce the workload of employees, cut the cost of resources and people and enable the booking of resources to be done quickly. The system is operated in Windows environment and supported by IIS or PWS web server and Microsoft Access database. VB Script and Java Script with ASP of server side technology are used to write the whole system. As this system is web-based, employees can access to this system at anytime and any place that have internet access. Bookings done are easily to monitor and track from the Bookings Calendar.

ABSTRAK

Tujuan projek ini adalah untuk mereka dan membentuk satu sistem yang menguruskan sumber-sumber dalam organisasi dengen menggunakan teknologi web. Dengan menggunakan sistem ini, pengarang berharap ia dapat mengurangkan beban kerja pekerja, mengurangkan kos sumber dan manusia, dan juga membolehkan penempahan sumber dijalankan dengan cepat. Sistem ini boleh dioperasi di bawah Windows dan disokong oleh pelayan IIS atau PWS dan Microsoft Access. VB Script dan Java Script dengan teknologi pelayan, iaitu ASP telah diguna untuk menulis sistem ini. Oleh kerana sistem ini berdasarkan web, pekerja boleh mencapai ke sistem ini pada bila-bila masa dan di mana saja tempat yang mempunyai kemudahan internet. Penempahan yang telah dibuat boleh diawasi and dikesan dengan mudah dari Kalendar Penempahan.

TABLE OF CONTENTS

CHAPTER 1

INTRODUCTION

1.1 Overview

Facilities Booking System is a web-based scheduling system that replaces 'pen & paper'. The Facilities Booking application efficiently manages shared resources, such as meeting rooms, equipment and parking spaces. From the desktops, the employees can quickly view availability of suitable facilities and select an available time window to book the facilities. In this project, a web-based Facilities Booking System is developed to manage the shared facilities available in organization. Any user of the network, via the organization intranet or browse online through internet, can use very simple forms to enter a Booking Request and look for a suitable time slots in real time Facilities Diaries.

By using this system, it can help the company to minimize inventory losses as we can easily track or monitor the usage of the resources. It also saves time as bookings can be done with simple clicks and approval will be notified through email.

1.2 Problem Statement

Facilities available in an organization are inventory for the company. Without proper management of these shared resources, they will be misused, misplaced or not being shared out among the users in an organization. This mean that the facilities are under utilizes. There have been a few cases in AAG where the equipment was misplaced or spoilt by the users after used. When the next person would like to use it, the equipment could not be found and company has to buy new unit to replace the lost unit. If this trend continues, it will be costly to the company as most of the equipments are expensive.

Besides the poor maintenance of resources in AAG, there is also no proper procedure to record the bookings done. Therefore, overlapping in bookings occurred where a few users booked the same facility at the same time. This will disrupt the working process of staffs in the company and they will not be able to get their job done well accordingly.

With the traditional way of booking facilities, the time consumes to getting an approval from manager for booking the resources are also long. This is due to the routing of document from one personnel to another personnel. If the personnel have overlooked the booking request, the applicant will end up waiting for ages.

However, by using the Facilities Booking System, the problems stated above can be solved. Among the benefits of this system are as below:

- Saves money as we can track resources and people costs
- Helps minimize inventory losses
- Helps reduce operational workload as system will analyze the availability of facilities or time-slots that was previously done by Manager.
- Saves time as the system reduces problem turn-around time and helps minimize down time

1.3 Objective

In view of the problems with traditional way of managing facilities , the objectives of this project is to develop an online Facilities Booking System which serve the following functions:

i) As a database of facilities available

ii) Ability to let users check the availability of facilities for their booking.

iii) Display real time Facilities Calendar for scheduling each resources

iv) Quick notification to users on the outcome of their request for booking.

1.4 Scope of Project

In this project, a web-based application, namely Facilities Booking System is developed. There are three main components in the system architecture:

- Web server and server-side technology – responds to client (e.g., Web browser) requests by providing resources (e.g., XHTML documents)
- Client-side scripting language
- Database management system (DBMS) – to allow users to access and store data without addressing the internal representation of databases.

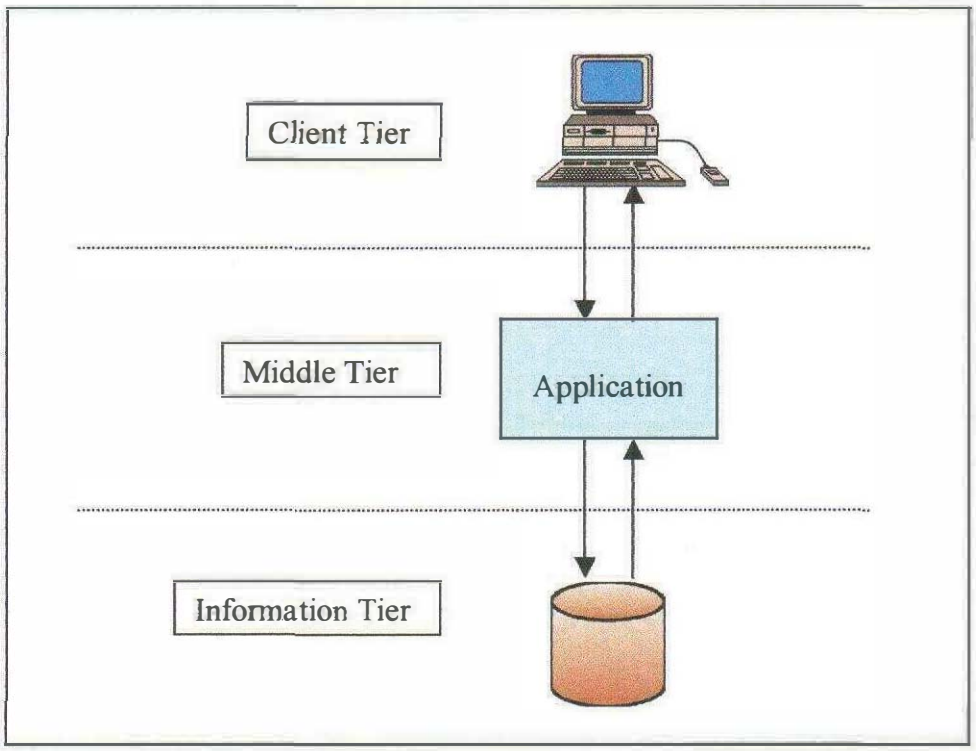

Figure 1.1 System architecture of Facilities Booking System

1.4.1 Web server and server-side technology

Active Server Page (ASP) is a server side technology which will be used in this system. It displays dynamic content on the web pages. It is web page that contains server-side scripts in addition to the usual mixture of text and HTML (Hypertext Markup Language) tags. Server-side scripts are special commands we put in Web pages that are processed before pages are sent from our Personal Web Server (PWS) to the Web browser of someone who's visiting our website. ASP itself isn't a language actually; instead it uses VBScript or JavaScript to display dynamic content. ASP is more of a technology used by VBScript / JavaScript on the server side.

To run an ASP page, we will need the following system requirement:

- Minimum Windows 95 and above
- Personal Web Server (PWS) for Win95 & Win98 or Internet Information Server (IIS) for WinNT on the PC.

How ASP works? ASPs are processed by an ActiveX component (i.e., a server-side ActiveX control) called a scripting engine. An ASP file has the file extension .asp and contains XHTML tags and scripting code. When a server receives a client's HTTP (HyperText Transfer Protocol) request, the server loads the document (or page) requested by the client. XHTML document are static documents – all client see the same content when the document is requested. The ASP processes the request (which often includes interacting with a database) and returns the results to the client – normally in the form of an XHTML document, but other data formats (e.g., images, binary, data, etc) can be returned.

1.4.2 Client-side scripting language

In this system, the client-side scripting language that will be using is Visual Basic Script (VBScript). VBScript is a subset of Microsoft Visual Basic® used in World Wide Web HTML documents to enhance the functionality of a web page displayed in a Web browser. Microsoft's Internet Explorer Web browser contains a VBScript scripting engine (i.e., an interpreter) that executes VBScript code.

VBScript is particularly valuable when used with Microsoft Web servers to create Active Server Pages (ASP). Although other scripting languages can be used, VBScript is the de facto language for ASP.

1.4.3 Database Management System (DBMS)

A database is an integrated collection of data. Many companies maintain databases to organize information. Many strategies exist for organizing data to facilitate access and manipulation. A DBMS provides mechanisms for storing and organizing data in a manner consistent with the database's format. In this system, Microsoft SQL Server will be function as the DBMS to store and organize the database.

CHAPTER 2

LITERATURE REVIEW

2.1 Facilities Booking System

Managing resources in a company have not always been considered as an important issue by most of the organization. Even though these resources might be use daily, many do not realized that they are part of the company asset. And because of this, many organizations do not have any procedures in recording the usages of their resources, and even worst is that some of them do not even have any records of what they have! This is very bad, as company will end up paying extra costs to replace the lost unit. It will also wasting people costs when employees need to search for the unit, especially when they are in a rush.

There might also be some exception where some organizations do keep record of what they own and who have used them. However, these were all done in paper and it take longer time. The study has shown that whenever employee needs to book or use any of the resources, they will need to fill in a requisition form in seven days advance and send it to the administrator. Administrator will then check on the availability of resources and send the request to the manager to approve the bookings of resources. The whole process takes a long time and if the administrator overlooks the request, requestors will be waiting for ages.

In view of this and also the easy-to-get facilities of internet, they are many Facilities Management System being developed in the market with the objective of reducing workload, save times and save costs. There are basically two ways in using the system, as a stand-alone product or a web-based system. The stand-alone product has the disadvantage of user need to install the system to their computer and all execution needs

to be done from the computer installed. However, web-based system provides a more flexible environment where user can access to the system at anytime and from any place that have internet access. This is very useful especially for sales person who needs to travel a lot.

This is why web-based system is gaining popularity for most organization while developing system.

2.2 Active Server Page (ASP)

ASP is the latest server-based technology from Microsoft, designed to create interactive HTML pages for a World Wide Web (WWW) site, or corporate internet. It is just of an all encompassing concept called the Active Platform which has been developed along with Microsoft Windows NT Server and Microsoft Internet Information Server (IIS). In this project, Microsoft Windows 98 platform and Personal Web Server (PWS) were used for a small-scale application instead of Microsoft NT server and IIS.

ASP is an open standard web enhancement tool that was developed and distributed by Microsoft. As such, ASP scripting host is distributed within Microsoft's web specific products – its web server, IIS and PWS and its specific HTML editors.

ASP is supplied with ActiveX Data Objects (ADO) that provides a high performance interface to databases that are Open Database Connectivity (ODBC) or OLE DB compliant.

The beauty of ASP is that ASP scripting host is language-independent. However, VB Script is the most preferred scripting language for ASP. Another popular scripting language in the market is Java Script. In order to get the most out of the ASP technology, combination of both scripting language most probably used. Of course, combination of more than two scripting language is also allowed.

A web application is really no more than a collection of ASP pages and server components and a website can contain several. The distinction between them is made by the definition of the application's starting point or root directory within the site. All the content within this directory and the physical directory structure underneath it is considered to be part of the application until another application root directory is found. Each application has its own set of variables and attributes that define its current state, and these are maintained throughout the lifetime of the application from the moment it is first run until the end of the last session is closed.

2.3 Database Server

Database Server plays a vital role in internet application development. The database server is used to store, search and retrieve information that is stored in a database. This same database that distributes information to web servers can also be accessed and maintained from corporate walls.

When using the HTTP server as a connection utility to Database Server, there is a shift in architecture that differs from traditional application development. The new architecture consists of three components, namely the requesting web browser, the web server and the Database server, as illustrated in Figure 2.1. The browser is responsible for submitting query requests and displaying the results from the database.

The web server is responsible for accepting the query from the browser, creating a connection to the database, querying the database, formatting the results into HTML and delivering the HTML back to the requesting browser. The Database Server is responsible for accepting requests from the web server and delivering the results back to the web server.

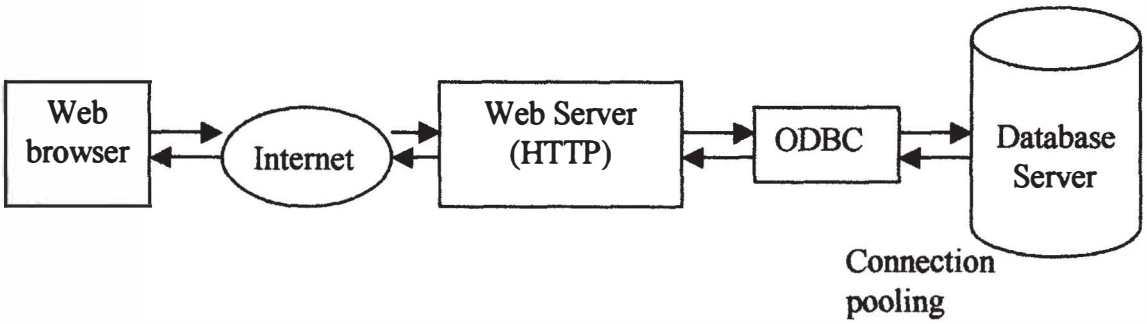

Figure 2.1 Database access via ODBC

CHAPTER 3

METHODOLOGY

3.1 Introduction

All software development can be characterized as a problem solving. To solve this problem, software engineer must incorporate a development strategy that encompasses the process, methods and tools and the generic phases. This strategy is often referred to as a process model. A process model for software engineering is chosen based on the nature of the project and application, the methods and tools to be used, and the controls and deliverables that are required.

Software development of Facilities Booking System is based on prototyping model. The prototyping approach to systems development is, in many ways, the very opposite of an old-style Software Development Life Cycle. Instead of spending a lot of time producing very detailed specifications, the developers find out only generally what the users want. The developers do not develop the complete system all at once. Instead they quickly create the prototype, which either contains portions of the system of most interest to the users, or is a small-scale working model of the entire system. After reviewing the prototype with the users, the developers refine and extend it. This process continues through several iterations until either the users approve the deign or it becomes apparent that the proposed system cannot meet their needs. If the system is viable, the developers create a fill-scale version that includes additional features. Figure 3.1 shows a flow-chart of then prototyping process.

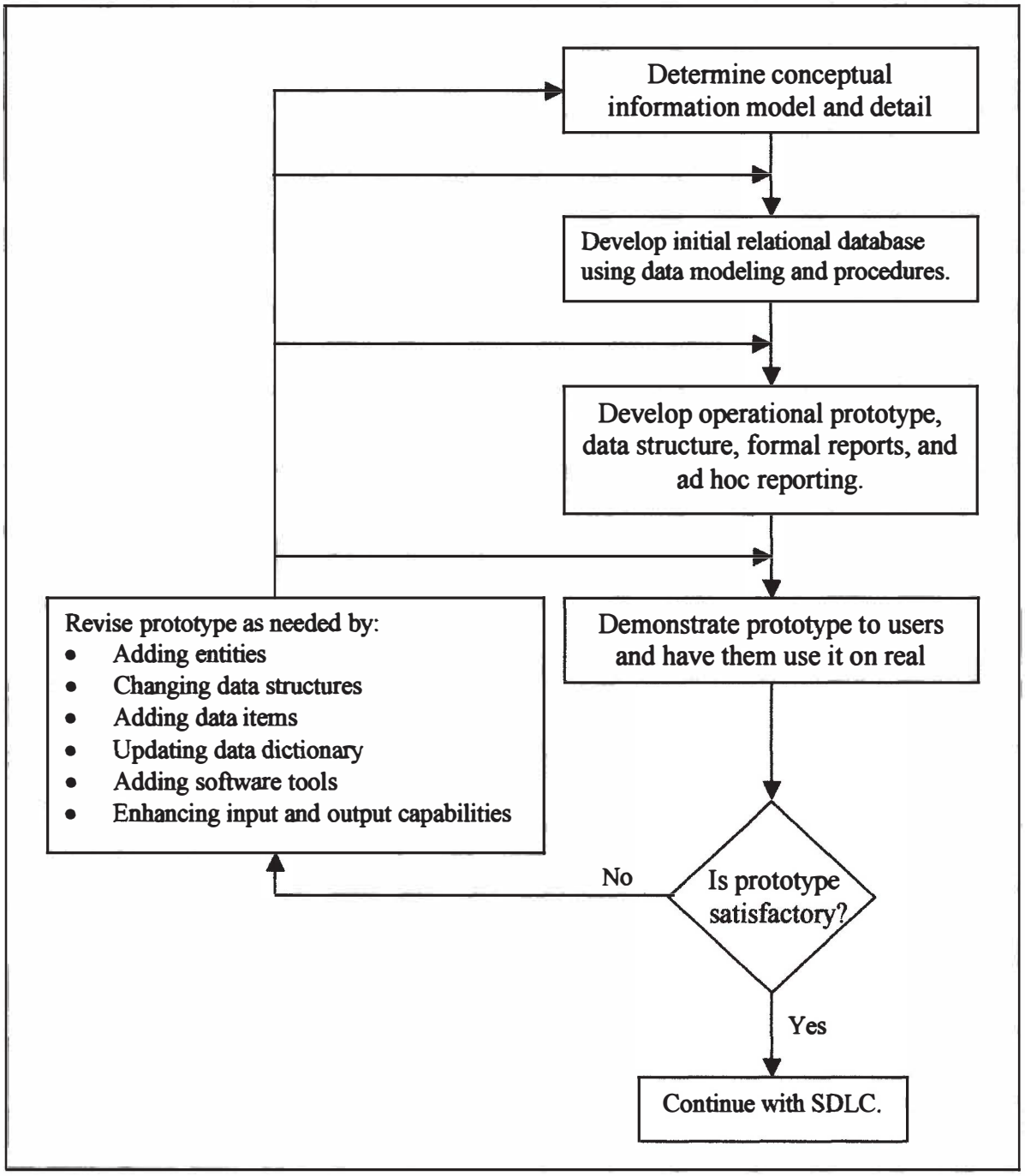

Figure 3.1 Model of prototyping process

In this prototyping process, there are six main phases:

i. Requirements analysis

ii. Modeling analysis

iii. System design

iv. Coding

v. Testing

vi. Implementation

3.2 Requirement Analysis

Before requirements can be analyzed, modeled or specified, they must be gathered through an elicitation process. The most commonly used requirement elicitation technique is to conduct a meeting or interview. As such, an interview has been conducted on the staff of organization.

To initiate the communication in an interview, a set of questions has been set to lead to a basic understanding of the problem, the people who want a solution, the nature of the solution that is desired, and the effectiveness of the first encounter itself. The set of the questions focused on the user, the overall goals and the benefits. Below are the questions set in the interview conducted for Facilities Booking System:

1. Who is behind the request for this work?
2. Who will use the solution?
3. What are the features require in the solution?
4. Describe the environment in which the solution will be used?
5. Will special performance issues or constraints affect the way the solution is approached?
6. What are the information require in the solution?

7. What will be the economic benefit of a successful solution?
8. What main tasks or functions require by user?
9. What system information will the user acquire, produce or change?
10. Does the user wish to be inform about the unexpected changes?

After the interview has been conducted, the requirements analysis was done and has identified the following aspects in Facilities Booking System:

- *Objectives:*
  - i) Increase the convenience and efficiency of reserving a facility.
  - ii) Reduce the workload of the facilities administrator.
  - iii) Maintain control of the booking of facilities by administrator.
- *Users:*
  - i) General users (staff) – person who book the facilities
  - ii) Administrator – person who update the database.
- *Requirements:*
  - ➢ Allowing users wishing to book a facility to browse the schedule, checking the status of a particular facility at various times, in order to decide upon a particular facility to reserve for a particular time.
  - ➢ Allowing users to submit electronically a reservation request for a particular facility at a particular time.
  - ➢ The system should have a graphical user interface and should require no training of requestors and only minimal training of administrators.
  - ➢ The system should be accessible through the web access.
  - ➢ The requestors should be able to create or delete any bookings. (It is assumes that this power will be used to correct mistakes).

- Any user should be able to delete any booking that was made or requested by that user.

3.3 Modeling Analysis

Upon identifying the system and user requirements, a combination of text and diagram were used to depict the requirements for data, function and behavior in a way that is easy to understand. The analysis model has three primary objectives:

i. To describe what the user required.

ii. To establish a basis for the creation of a software design.

iii. To define a set of requirements that can be validated once the software is built.

3.3.1 Entity Relationship Diagram

The entity relationship diagram (ERD) depicts relationships between data objects. The ERD is the notation that is used to conduct the data modeling activity. Data objects are represented by a labeled rectangle. Relationships are indicated with a labeled line connecting objects. The diamond at the connecting lines represents the relationship. Connections between data objects and relationships are established using a variety symbols that indicate cardinality and modality.

The ERD diagram for Facilities Booking System is illustrated in Figure 3.2.

3.3.2 Data Flow Diagram

As information moves through software, it is modified by a series of transformations. A data flow diagram (DFD) is a graphical representation that depicts