

# WEB BASED MANAGEMENT INFORMATION SYSTEM FOR SRI LANKA PORTS AUTHORITY

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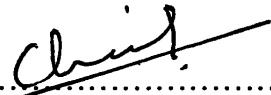
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# DECLARATION

I certify to the best of my knowledge that this dissertation does not incorporate without acknowledgement, any material previously submitted for a degree or diploma in any university, and does not contain any material previously published or written or orally communicated by another person except where due references are made in the text.

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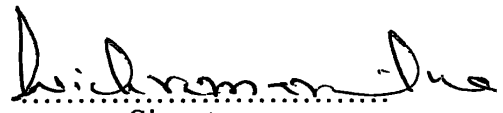
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**Affectionately Dedicated To My Parents**

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## ABSTRACT

There were more than eighteen divisions inside the Sri Lanka Ports Authority, which carry out several management activities such as Operational Management Information, Finance Management Information Systems. These activities were carried out manually.

Handling those activities manually was difficult and time consuming. Also the SLPA had to assign several laborers for those purposes.

Therefore a software project was proposed to develop a web-based management information system for Sri Lanka Ports Authority. The Linear sequential model (waterfall approach) was used for the system development process.

First feasibility study and then requirement analysis were done. At this phase information were collected by interviews with potential users and going through day today documents. In the designing stage the intranet & user interfaces of the system were designed according to the user requirements. After designing phase the system was implemented using sever side scripting technology called Active Sever Pages (ASP), JScript & VBScript as the scripting languages and manipulated data using Structured Query Language (SQL). The database was implemented using Microsoft Access. User Interfaces, links and images were created using Macromedia Flash, Fireworks and Dreamweaver. Next the components were tested individually and finally the integrated system was tested.

The result of this software product was a user friendly organizational web based management information system to handle information related to the Operational Management and Finance Management sections for Sri Lanka Ports Authority.

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# Chapter 1

## INTRODUCTION

### 1.1 Sri Lanka Ports Authority (SLPA)

#### 1.1.1 Background

The Sri Lanka Ports Authority (SLPA) was set up by an Act of Parliament in 1979 and administers and operates all specified commercial Ports in Sri Lanka. The specified Port now includes Colombo, Galle, Trincomalee, Kankasanturai and Point Pedru. The Port of Colombo being the premier Port in the country has naturally become the focal point of the all port development activities in Sri Lanka since the formation of the SLPA.

### 1.2 Project

#### 1.2.1 Background

##### 1.2.1.1 Management Information System (MIS)

Planning, development, management and use of information technology tools to help people perform all tasks related to information processing and management; an information system that provides information to support managerial decision making; can be an information reporting system, executive information system or decision support system; a system that provides periodic, predetermined reporting capabilities called Management Information System.

## 1.2.1.2 Management Information System for Sri Lanka Ports Authority

There are many divisions inside the Sri Lanka Ports Authority, which carry out several management activities such as Operational Management Information, Finance Management Information Systems. Those activities were carried out manually. Handling those activities manually was difficult and time consuming. Also the Sri Lanka Ports Authority had to assign several laborers for these purposes. Therefore a software project was proposed to develop a web-based information management system for Sri Lanka Ports Authority.

### 1.2.2 Objectives

a. Overall Objective:

Develop a Web Based Information Management System for Sri Lanka Ports Authority.

b. Specific Objectives:

1. Develop an Intranet for Sri Lanka Ports Authority.
2. Develop the Information System for Operational Management of;
  - 2.1 SLPA Performance review (Monthly)
  - 2.2 Container Handling (Daily)
  - 2.3 Berthing Schedule

3. Develop the Information System for Finance Management of;
  - 3.1 SLPA Profit & Loss (Monthly)
  - 3.2 Jaya Container Terminal (Monthly)
  - 3.3 Divisional Expenditure (Monthly)
  - 3.4 Divisional Overtime Expenditure (Monthly)

# Chapter 2

## LITERATURE REVIEW

### 2.1 Web Based Information System

#### 2.1.1 Web Server

To develop and test dynamic web pages, you need a web server. A web server is software that serves web pages in response to requests from web browsers.

#### 2.1.2 Application Server

To process dynamic web pages, need an application server. An application server is software that helps a web server to process web pages containing server-side scripts or tags. When such a page is requested from the server, the web server hands the page off to the application server for processing before sending the page to the browser.

#### 2.1.3 Internet Information Services

Internet Information Services (IIS) makes it easy to publish information on the internet or intranet. IIS includes a broad range of administrative features for managing web sites and web server. With programmatic features like Active Server Pages (ASP), can create and deploy scalable, flexible web applications.

## 2.1.4 Intranet

A network designed for information processing within a company or organization. Its uses include such services as document and software distribution, access to databases, and training. An intranet is so called because it usually employs applications associated with the internet, such as Web pages, Web browsers, FTP sites, e-mail, newsgroups and mailing lists accessible only to those within the organization.

## 2.2 Coding

### 2.2.1 HTML & CSS

#### HTML

HTML stands for Hyper Text Markup Language, the standard for describing the contents and appearance of pages on the World Wide Web. HTML consists of pairs of opening and closing tags, with attributes and values in between. The tags describe each element on a web page, such as a paragraph of text, a table, or an image.

#### Working with Cascading Style Sheets (CSS)

Cascading style sheets give more control over the appearance and presentation of web pages. Using Cascading Style Sheets can extend the ability to precisely specify the location and appearance of elements on a page and create special effects. Also make site more accessible for visitors with specialized browsers or output devices.

## 2.2.2 Overview of Web Applications

A web application is a website that contains pages stored on a web server with partly or entirely undetermined content. The final content of a page is determined only when the user requests a page from the web server. Because the final content of the page varies from request to request based on the user's actions, this kind of page is called a dynamic page. (Powell, 2000)

### 2.2.2.1 Common Uses for Web Applications

Web applications have many uses for both users and developers; including the following:

- Let users find information quickly and easily on a content-rich website.

This kind of web application gives users the ability to search, organize, and navigate content as they see fit. Examples include company intranets, Microsoft MSDN, and Amazon.com.

- Collect, save, and analyze data provided by users.

In the past, data entered in HTML forms was sent as e-mail messages to employees or CGI applications for processing. A web application can save form data directly into a database and also extract the data and create web-based reports for analysis. Examples include online banking pages, store check-out pages, surveys, and user-feedback forms.

- Update websites that have constantly changing content.

A web application frees the web designer from continually updating the site's HTML. Content providers such as news editors provide the web application with content and the web application updates the site automatically.



### 2.2.2.2 How a Web Application Works?

A web application is a collection of regular and dynamic web pages. A regular web page is one that does not change when a user requests it: the web server sends the page to the requesting web browser without modifying it. In contrast, a dynamic web page is modified by the server before it is sent to the requesting browser. The changing nature of the page is why it's called dynamic.

For example, could design a page to display fitness results and leave certain information (such as employee name and results) to be determined when the page is requested by an employee.

### 2.2.2.3 Processing Regular Web Pages

A regular website comprises a set of related HTML pages and files hosted on a computer running a web server.

A web server is software that serves web pages in response to requests from web browsers. A page request is generated when a user clicks a link on a web page, chooses a bookmark in a browser, or enters a URL in a browser's Address text box and clicks Go. The final content of a regular web page is determined by the page designer and doesn't change when the page is requested.

Here's an example:

```
<html>
<head>
<title>Call Department</title>
</head>
<body>
<strong>Call Department</strong><br>
Talk to someone in Sales.
</body>
</html>
```

Every line of the page's HTML code is written by the designer before the page is placed on the server. Because the HTML doesn't change once it's on the server, this kind of page is called a static page.

A "static" page may not be static at all. For example, a rollover image or a Flash movie can make a static page come alive. However, this system refers to a page as static if it is sent to the browser without modifications.

When the web server receives a request for a static page, the server reads the request, finds the page, and sends it to the requesting browser, as shown in the following figure:

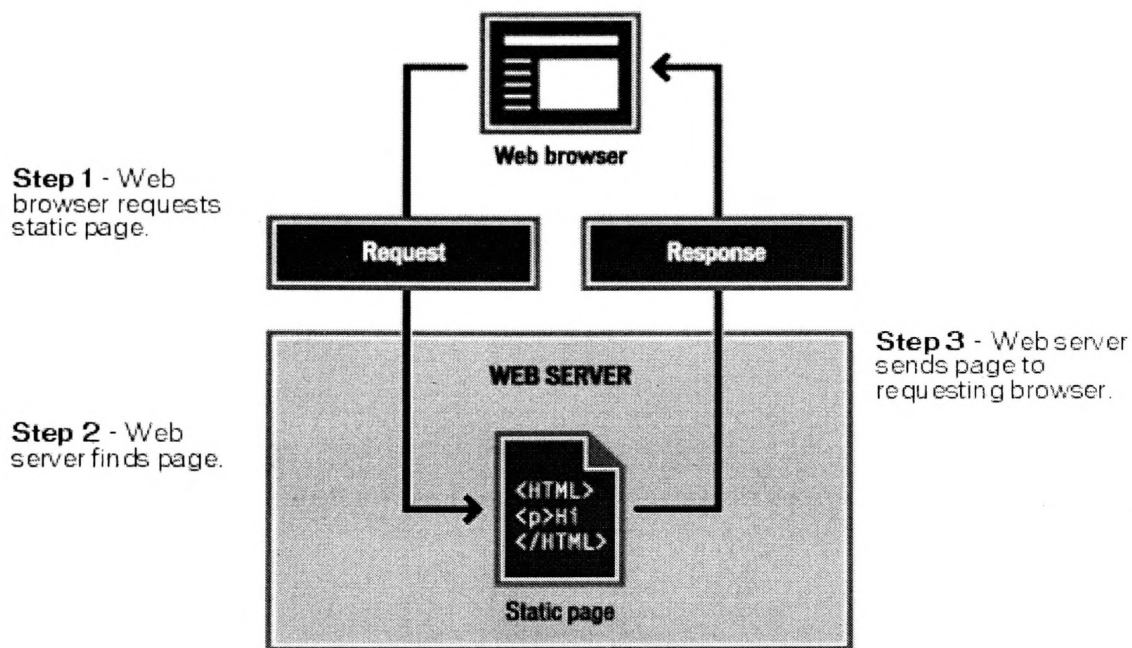


Figure 2.1 Web server handles a request for a static page

#### 2.2.2.4 Processing Dynamic Pages

In the case of web applications, certain lines of code are undetermined when the user requests the page. These lines must be determined by some mechanism before the page can be sent to the browser. The mechanism is discussed in the following section.

When a web server receives a request for a regular web page, the server sends the page to the requesting browser without further ado. The web server reacts differently when it receives a request for a dynamic page: it passes the page to a special software extension responsible for finishing the page. This special software is called an application server.

The application server reads the code on the page, finishes the page according to the instructions in the code, then removes the code from the page. The result is a static page that the application server passes back to the web server, which then sends the page to the requesting browser. All the browser gets when the page arrives is pure HTML. Here's a view of the process:

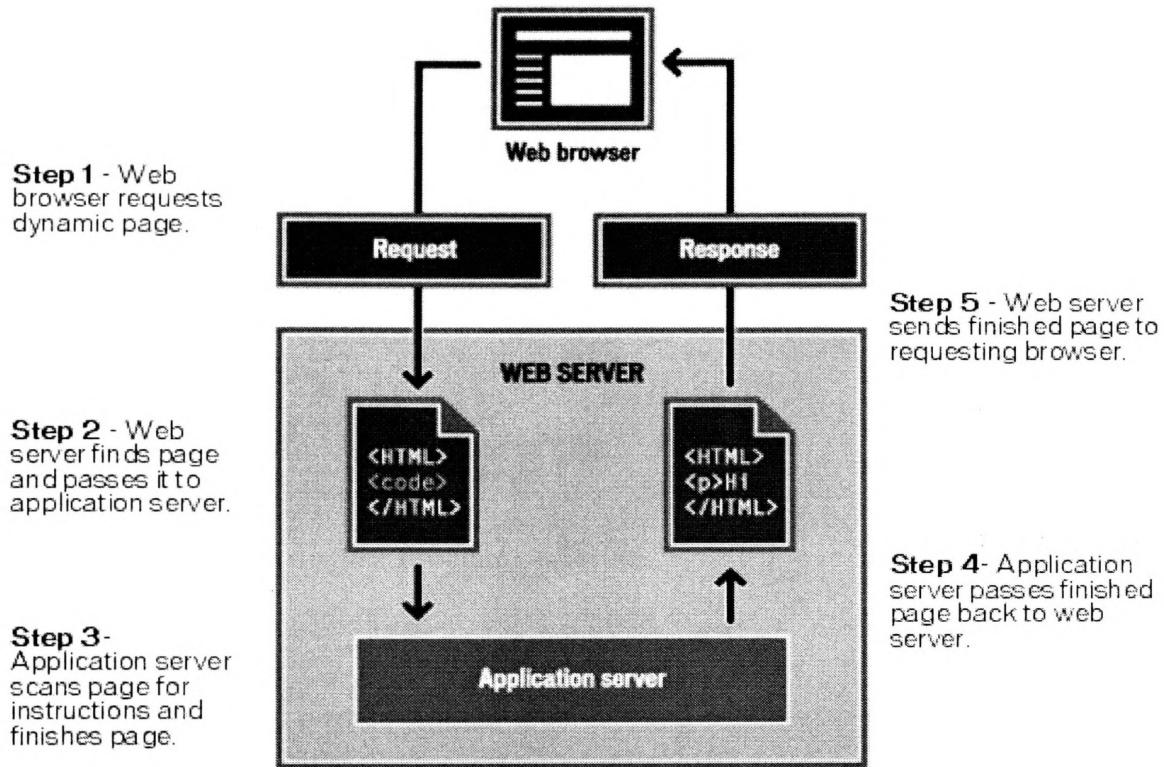


Figure 2.2 Web server handles a request for a dynamic page

### 2.2.2.5 Accessing a Database

An application server lets work with server-side resources such as databases. For example, a dynamic page may instruct the application server to extract data from a database and insert it into the page's HTML.

The instruction to extract data from a database is called a database query. A query consists of search criteria expressed in a database language called SQL (Structured Query Language). The SQL query is written into the page's server-side scripts or tags.

An application server cannot communicate directly with a database because the database's proprietary format renders the data undecipherable in much the same way that a Word document opened in Notepad is undecipherable. The application server can

communicate only through the intermediary of a database driver. A database driver is software that acts like an interpreter between the application server and the database.

After the driver establishes communication, the query is executed against the database and a recordset is created. A recordset is a subset of data extracted from one or more tables in a database. The recordset is returned to the application server and the data used in the dynamic page.

Here's a simple database query written in SQL:

```
SELECT lastname, firstname, fitpoints  
FROM employees
```

This statement creates a three-column recordset and fills it with rows containing the last name, first name, and fitness points of all employees in the database. Here's an illustration of the process of querying a database and returning data to the browser:

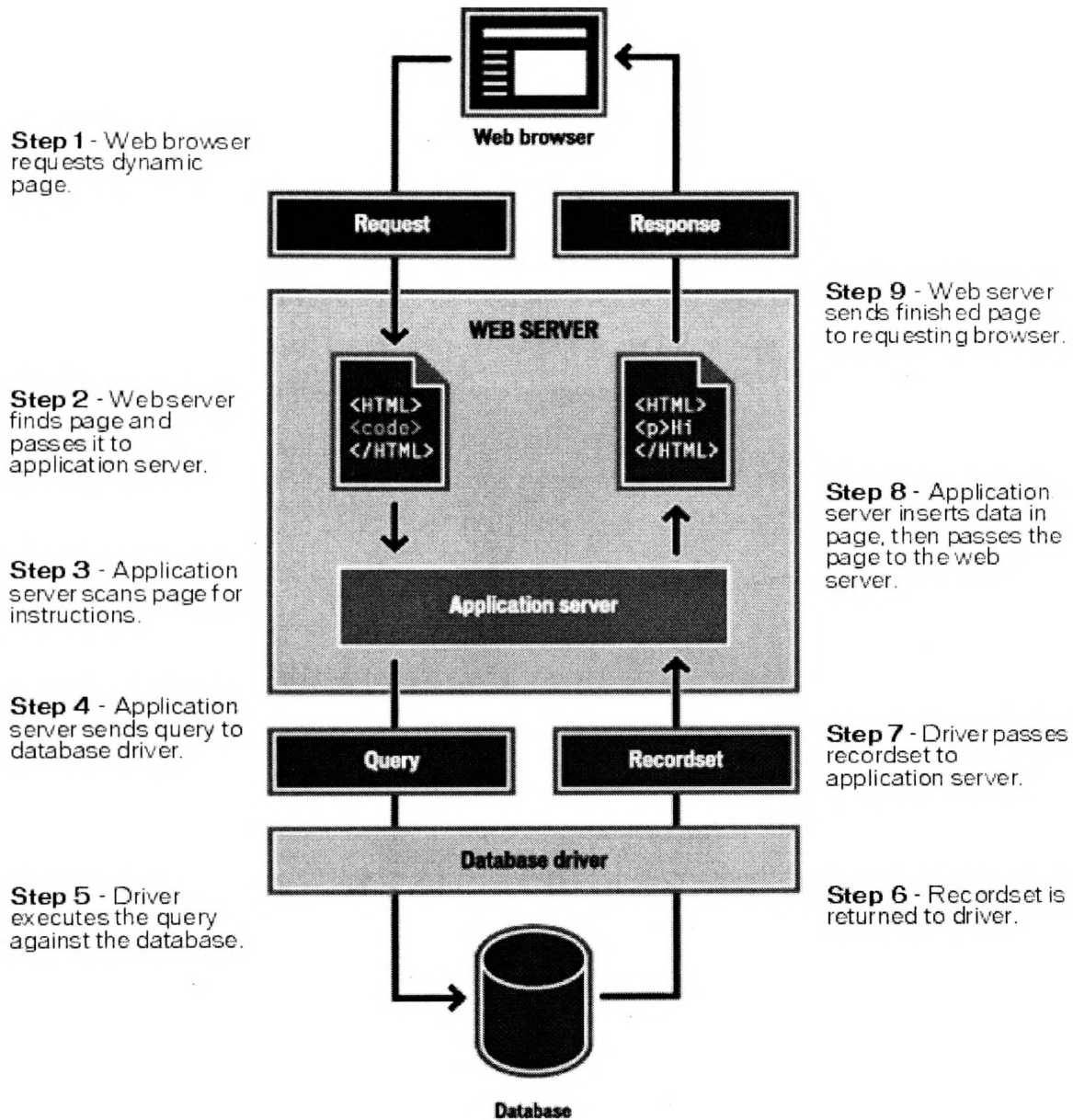


Figure 2.3 Web server interacts with a database when a dynamic page is requested.

Can use almost any database with the web application, as long as have the appropriate database driver for it.

If plan to build small low-cost applications, can use a file-based database, such as one created in Microsoft Access. If plan to build robust, business-critical applications, can use a server-based database, such as one created in Microsoft SQL Server, Oracle 9i, or MySQL.

If the database is located on a system other than the web server, make sure to have a fast connection between the two systems so that the web application can operate quickly.

### 2.2.3 Server Technologies for Web Applications

The scripting or tag-based language used depends on the server technology. Here are the most popular languages for the five server technologies.

<b>Server Technology</b>	<b>Language</b>
ColdFusion	ColdFusion Markup Language (CFML)
ASP.NET	Visual Basic C#
Active Server Pages (ASP)	VBScript JavaScript
JavaServer Pages (JSP)	Java
PHP	PHP

Table 2.1 Most popular languages for server technologies

#### 2.2.3.1 Active Server Pages (ASP)

Active Server Page (ASP) is a document that contains embedded server-side scripting. ASP compatible web servers can execute these scripts. On the client side, an ASP is a standard HTML document that can be viewed on any platform using any web browser. (Weissinger, 2000)

### 2.2.3.2 Testing the ASP Engine of IIS

1. In Dreamweaver or any text editor, create a plain text file called timetest.asp.
2. In the file, enter the following code:  

```
<p>This page was created at <b>  
<%= Time %>  
</b> on the computer running ASP.</p>
```

This code displays the time the page was processed on the server.
3. Copy the file to the Inetpub\wwwroot folder of the Windows computer running IIS.
4. In your web browser, enter the URL of your test page, then press Enter.  
If IIS is running on your local computer, you can enter the following URL:  
<http://localhost/timetest.asp>

The test page should open and display a time of day, as follows:

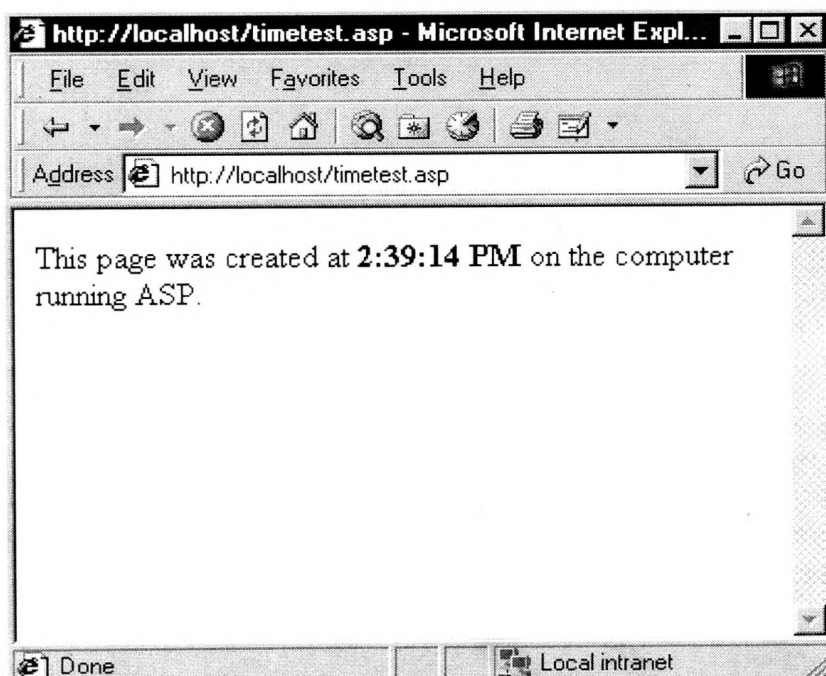


Figure 2.4 A test page



The time specified is known as dynamic content because it changes every time when request the page. Click Refresh on the browser to generate a new page with a different time.

Note: Looking at the source code (View > Source in Internet Explorer) will confirm that the page does not use any client side JavaScript to achieve this effect.

If the page doesn't work as expected, check for the following possible errors:

- The file does not have an .asp extension.
- The page's file path (c:\Inetput\wwwroot\timetest.asp), not its URL (for example, http://localhost/timetest.asp) is entered in the browser's address text box. If type a file path in the browser (as you might be used to doing with normal HTML pages), bypass the web server and the application server. As a result the page never gets processed by the server.
- The URL contains a typing mistake. Check for errors and make sure the filename is not followed by a slash, such as http://localhost/timetest.asp/.
- The page code contains a typing mistake.

### 2.2.3.3 JavaScript

A scripting language developed by Netscape Communications and Sun Microsystems, Inc. Compared to Java, JavaScript is limited in performance because it is not compiled before execution. Basic online applications and functions can be added to web pages with JavaScript, but the number and complexity of available application programming interface functions are fewer than those available with Java. JavaScript code, which is included in a web page along with the HTML code, is generally considered easier to write than Java, especially for novice programmers. A JavaScript-compliant web browser, such as Microsoft Internet Explorer or Netscape Navigator, is required to interpret JavaScript code.

#### 2.2.3.4 VBScript

VBScript is a subset of the Visual Basic for Applications programming language, optimized for web related programming. As with JavaScript, code for Visual Basic, Scripting Edition is embedded in HTML documents. This version is included with Microsoft Internet Explorer.

### 2.3 Understanding Database Connections

If plan to use a database with the web application, need to create at least one database connection. Without one, the application won't know where to find the database or how to connect to it. Create a database connection in Dreamweaver by providing the information or the "parameters" the application needs to establish contact with the database.

#### 2.3.1 Interfacing with the Database

Data stored in a database is normally in a proprietary format in the same way text in a word-processor file is in a proprietary format. For example, here's what data looks like in Microsoft Access:



Three common interfaces let applications communicate with databases. The first is called Open Database Connectivity or ODBC; the second is called OLE DB (object linking & embedding database); and the third is called Java Database Connectivity or JDBC.

The job of these interfaces is to act like interpreters. For example, when a speech is given in English at the United Nations, one interpreter translates for French-speaking delegates while another interpreter translates for German-speaking delegates. Similarly, use one interface for OLE DB-speaking applications, another interface for ODBC-speaking web applications, and still another interface for JDBC-speaking applications. ColdFusion MX and JSP applications are JDBC speakers, ASP and ASP.NET applications speak OLE DB, and ColdFusion 4 or 5 applications speak ODBC and OLE DB.

ASP applications (but not ASP.NET applications) are fluent ODBC speakers thanks to a built-in OLE DB/ODBC interpreter. For example, suppose the application want to communicate with a Microsoft Access database by using an ODBC interface. In ASP, if specify only the ODBC interface and no OLE DB interface, by default the application will use an OLE DB/ODBC interpreter to translate the OLE DB into ODBC, then it will use the ODBC/Access interpreter that specified to translate the ODBC into something Access can understand.

The following illustration gives you an idea of the process:

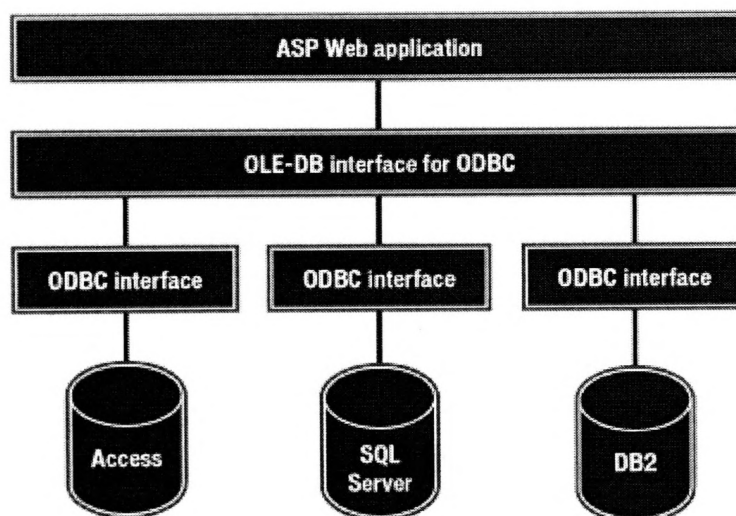


Figure 2.7 Process of Accessing data

Here are the database interfaces for each type of web application and some common database drivers for each:

<b>Web application</b>	<b>Database interface</b>	<b>Common drivers</b>
ColdFusion MX JSP	JDBC	Sun JDBC-ODBC driver i-net Sprinta JDBC driver for SQL Server Oracle Thin JDBC driver
ColdFusion 4 or 5	ODBC or OLE DB	ColdFusion native drivers Microsoft Access Driver Microsoft SQL Server Driver
ASP	ODBC or OLE DB	Microsoft Access Driver Microsoft SQL Server Driver Microsoft SQL Server Provider Microsoft ODBC for Oracle
ASP.NET	OLE DB	Microsoft Jet Provider Microsoft SQL Server Provider Microsoft Oracle provider
PHP	MySQL specific	MySQL driver

Table 2.2 Database interfaces for web application

### 2.3.2 Understanding ASP Database Connections

An ASP application must connect to a database through an open database connectivity (ODBC) driver or an object linking and embedding database (OLE DB) provider. The driver or provider acts as an interpreter that lets the web application communicate with the database. The following table shows some drivers that can use with Microsoft Access, Microsoft SQL Server and Oracle databases:

Database	Database driver
Microsoft Access	Microsoft Access Driver (ODBC)
Microsoft SQL Server	Microsoft SQL Server Driver (ODBC) Microsoft SQL Server Provider (OLE DB)
Oracle	Microsoft Oracle Driver (ODBC) Oracle Provider for OLE DB

Table 2.3 Microsoft SQL Server and Oracle databases

Can use a connection string to connect to the database.

Use a connection string to create the connection. A connection string combines all the information the web application needs on the server to connect to a database.

Here's an example of a connection string:

```
Driver={Microsoft Access Driver (*.mdb)};
DBQ=C:\inetpub\wwwroot\Academy\curriculum.mdb
```

Here's a second example:

```
Driver={SQL Server};Server=Socrates;Database=MedCenter;
UID=mwelby;PWD=realme
```

## 2.4 Software Development Methods

There are several methods available to develop the system. Following are the basic popular models used to this purpose.

1. Linear Sequential Model (Waterfall Approach)
2. Prototyping Model
3. Rapid Application Development Model
4. Component Assembly Model

All these different software development models have their own advantages and disadvantages. Nevertheless, in the contemporary commercial software development world, the fusion of all these methodologies is incorporated. Timing is very crucial in software development. If a delay happens in the development phase, the market could be taken over by the competitor. Also if a bug filled product is launched in a short period of time (quicker than the competitors), it may affect the reputation of the company. So there should be a tradeoff between the development time and the quality of the product. Customers don't expect a bug free product but they expect a user-friendly product.

### 2.4.1 Linear Sequential Method (Waterfall Approach)

The Linear Sequential Model consists following phases,

1. Software Requirements Analysis
2. Systems Analysis and Design
3. Code Generation
4. Testing
5. Maintenance

### 2.4.1.1 Software Requirements Analysis

This is also known as feasibility study. In this phase, the development team visits the customer and studies their system. They investigate the need for possible software automation in the given system. By the end of the feasibility study, the team furnishes a document that holds the different specific recommendations for the candidate system. It also includes the personnel assignments, costs, project schedule, and target dates. The essential purpose of this phase is to find the need and to define the problem that needs to be solved.

### 2.4.1.2 System Analysis and Design

In this phase, the software development process, the software's overall structure and its nuances are defined. In terms of the client/server technology, the number of tiers needed for the package architecture, the database design, the data structure designs etc. are all defined in this phase. A software development model is created. Analysis and Design are very crucial in the whole development cycle. Any glitch in the design phase could be very expensive to solve in the later stage of the software development. Much care is taken during this phase. The logical system of the product is developed in this phase.

### 2.4.1.3 Code Generation

The design must be translated into a machine-readable form. The code generation step performs this task. If the design is performed in a detailed manner, code generation can be accomplished without much complication. Programming tools like Compilers, Interpreters, and Debuggers are used to generate the code. Different high-level programming languages like C, C++, Pascal, Java and different web development techniques such as Active Server Pages (ASP), Java Server Pages (JSP) are used for



coding. With respect to the type of application, the right programming language is chosen.

#### 2.4.1.4 Testing

Once the code is generated, the software program testing begins. Different testing methodologies are available to unravel the bugs that were committed during the previous phases. Different testing tools and methodologies are already available. Some companies build their own testing tools that are tailor made for their own development operations.

#### 2.4.1.5 Maintenance

Software will definitely undergo change once it is delivered to the customer. There are many reasons for the change. Change could happen because of some unexpected input values into the system. In addition, the changes in the system could directly affect the software operations. The software should be developed to accommodate changes that could happen during the post implementation period. (Sommerville, 1996)

### 2.5 Structured Query Language (SQL)

Structured Query Language (SQL) is a standard interactive and programming language for getting information from and updating a database. Although SQL is both an ANSI and an ISO standard, many database products support SQL with proprietary extensions to the standard language. Queries take the form of a command language that lets select, insert, update, find out the location of data, and so forth. There is also a programming interface.

# Chapter 3

## METHODOLOGY

The requirements were well defined. Therefore the system could be used for a long time without modifications. Therefore the Linear Sequential modal (Waterfall approach) was used to develop the system.

### Major Phases of the development process

1. Requirements Analysis
2. Systems Analysis and Design
  - 2.1 Data and Database Design
  - 2.2 Interface and User Interface Design
3. Coding and Implementation
4. Testing
  - 4.1 Unit Testing
  - 4.2 System Testing

## 3.1 Requirements Analysis

Identified what the program has to do and also identified Inputs Outputs and the type of the process required.

### 3.1.1 How Requirements Analysis Carried Out?

Interviewed the following employees to get an idea about the principal process and how the process was going on.

Heads of divisions

Senior systems analysts

Analyst programmers

Currently working documents and reports were also collected to get some details.

### 3.1.2 Functional Requirements Analysis

This describes the functionalities have to provide by the system. They were statements of services the system should provide how the system should react to particular inputs and how the system should behave in particular situation.

1. Users must have permission for enter to the Intranet (MIS)
  - 1.1 The user should be provided with facility to enter a user ID and a password.
  - 1.2 The user should be provided with facility to change user ID and a password.
    - 1.2.1 Inputs: User ID, Password, New Password, Re-Enter New Password.

2. The user should be provided with facility to have some links to the pages with in

2.1 Information System for Operational Management.

Linked Pages

SLPA Performance review (Monthly)

Container Handling (Daily)

Berthing Schedule

2.2 Information System for Finance Management.

Linked Pages

SLPA Profit & Loss (Monthly)

Jaya Container Terminal Profit & Loss (Monthly)

Divisional Expenditure (Monthly)

Divisional Overtime Expenditure (Monthly)

3. The user should be provided with facility to display information on SLPA Performance review (Monthly).

3.1 Inputs: Selected Month & Year.

3.2 Output: It should display the document for the selected Inputs.

4. Container Handling (Daily)

4.1 Inputs: Selected Month, Year, Day and Place.

4.2 The user should be provided with facility to manipulate (Insert, Retrieve, Update, Delete) data.

4.3 Output: It should display the daily information on Container Handling for the selected Month, Year, Day and Place.

5. The user should be provided with facility to display Monthly information on Jaya Container Terminal Profit & Loss.

5.1 Inputs: Selected Month and Year.

5.2 Output: It should display the relevant Jaya Container Terminal Profit & Loss document for the selected Inputs.

6. Divisional Expenditure (Monthly)

6.1 Inputs: Selected Month, Year and Division.

6.2 The user should be provided with facility to manipulate (Insert, Retrieve, Update, Delete) data.

6.3 Output: It should display the monthly information on Divisional Expenditure for the selected Month, Year and Division.

7. The user should be provided with facility to display Monthly information on Divisional Overtime Expenditure.

7.1 Inputs: Selected Month, Year and Division.

7.2 Output: It should display the relevant document on Divisional Overtime Expenditure for the selected Inputs.

## 3.2 System Analysis and Design

### 3.2.1 Data and Database Design

After requirement analysis entities, relationships and attributes were identified. The Databases and tables were created using normalization as well as keys were specified for relevant tables.

#### dbDivisionalExpenditure Database Tables

DateTab(Update,Division)

Divisions(DivName)

Table Description(Description)

Contracts and Design, Engineering, Electrical and Electronic Engineering, Finance, Human resource, Information Systems, Internal Audit, Legal, Logistics, Medical, Navigation, Operations, Planning and Development, Secretariat, Security, Supplies, Training Institute, Welfare and Industrial Relations (Description, Budget, Actual, Variance, VarianceP, Date)

#### dbContainerHandling Database Tables

South\_Asia\_Gateway\_Terminal(Date, NoOfShipH, Discription, Load)

Sri\_Lanka\_Ports\_Authority(Date, NoOfShipH, Discription, Load)

### 3.2.2 Interface and User Interface Designing

According to the user requirements Interfaces and User Interfaces were designed using relevant tools. Interfaces were build using scripting languages such as Vbscript and Jscript as well as user interfaces were built using Hyper Text Markup Language(HTML) and Cascading Style Sheets(CSS).

## 3.3 Coding and Implementation

### 3.3.1 Coding

Coding was carried out using Hyper Text markup Language as the interface designing language and Active Server Pages technology was used to create dynamic ASP pages. Structured Query Language (SQL) utilized as the tool for establishing the connection between the database and the respective interface. Before generate the coding pseudocodes ware implemented.

#### 3.3.1.1 Pseudocodes

This is a sample pseudocode, which was used in several pages for print a record set which was retrieve from a database.

Move to first record

While not end of file

If database field Date's Year equals to Year and database field Date's Month Equals to Month

Print the record

Move to the next record

After convert above pseudocodes in to Vbscript,

```
rs.MoveFirst
While not rs.eof
If year(rs.Fields("Date"))=Year AND month(rs.Fields("Date"))=Month then
Response.Write('rs.Fields("Description")')
End if
rs.movenext
Wend
```

### 3.3.1.2 Implementing Database Connection using Vbscript

Create an access data object data base connection object.

```
set conn=server.CreateObject("ADODB.Connection")
```

Open Container Handling database using the Microsoft access driver.

```
conn.Open "DBQ=" & server.MapPath("../..\\dbslpa\\dbContainerHandling.mdb") &
";driver={Microsoft Access Driver (*.mdb)};"
```

### 3.3.1.3 Opening Record Sets Using Vbscript

Create an access data object data base record set object

```
set rs=server.CreateObject("ADODB.Recordset")
```



SQL Command: Select all the fields from the table Sri Lanka Ports Authority order by date.

```
sql="SELECT Sri_Lanka_Ports_Authority.* FROM Sri_Lanka_Ports_Authority  
Order by Date"
```

Open the record set using above sql statement.

```
rs.Open sql,conn,3,3
```

### 3.3.2 Implementation

#### 3.3.2.1 Environment Used

The system was implemented using sever side scripting technology called Active Sever Pages. ASP/Jscript & Vbscript as the scripting languages and manipulate (Feed, Retrieve, store) data using Structured Query Language (SQL)). The database was implemented using Microsoft Access. User Interfaces, links and images were implemented using Macromedia Flash, Fireworks, Dreamweaver and Microsoft Front Page. Pages were created as xxx.htm and xxx.asp extensions. Those asp and html pages were saved in C:\Inetpub\wwwroot\. This is the place where asp pages or dynamic web pages run.

#### 3.3.2.2 Configuration of Internet Information Service (IIS)

Before starting the testing phase IIS was configured.

1. First IIS web server was installed.
2. Application server was already installed with the IIS web server.
3. Installation of IIS was tested.
4. Finally root folder was created.

## 3.4 Testing

### 3.4.1 Unit Testing

At this stage each interfaces were tested individually through the Internet Information Service (IIS). All asp and html pages were tested individually according to a test plan. In some cases there were used some dummy components for the testing process.

### 3.4.2 System Testing

Before testing the whole system Internet Information Service (IIS) in Win2000 server was configured and tested for a sample asp page. Then the integration of asp and html pages was done according to the required manner and was saved inside the Internet Information Services (IIS) www root folder.

- Client computer's web browser was used to check the system.
- Universal Resource Locator (URL): <http://IP address of the web server>.
- After entering above URL checked whether default htm page load or not. Then the system was checked according to the test plan.

# Chapter 4

## RESULTS & DISCUSSION

The out come of this software product was a user friendly organizational web based management information system to handle information related to the Operational Management and Finance Management sections for Sri Lanka Ports Authority. This was achieved by following the correct software development methodology. This system meets all the user requirements and overcome all the drawbacks of existing manual system.

Implementation of this system would important in such away:

- The system would enhance the efficiency.
- Very reliably handled data (Existing system was a manual file system).
- Less man works.
- Handling data through the Intranet courses less cost of money.

## Chapter 5

### CONCLUSION

Since the major objective of developing a Web Based Management Information System had been achieved in the view of the stakeholders, the project work can be regarded as up to the customer expectation and satisfaction. However continues monitoring must be done in order to check whether the system meets its goal in the long run.

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## APPENDIX I

### Tables

Table for the Engineering Division in SLPA database. Fields of all the tables in the database are same.

<b>Field Name</b>	<b>Data Type</b>
Description	Text
Budget	Number
Actual	Number
Variance	Number
VarianceP	Number
Date	Date/Time

Table for South Asia Gateway in Container handling database. Fields of all the tables in the database are same.

<b>Field Name</b>	<b>Data Type</b>
Date	Date/Time
NoOfShipH	Number
Dis	Number
Load	Number

## APPENDIX II

### User Interfaces

First screen for the display of Divisional Expenditure

The screenshot shows the Sri Lanka Ports Authority (SLPA) MIS-SLPA interface. At the top left is the SLPA logo. The main header reads "SRI LANKA PORTS AUTHORITY". Below the header is a navigation menu with tabs: "Finance MIS", "Operational MIS", "Tools", "Container Handling", "Divisional Expenditure", and "Home". The "Divisional Expenditure" tab is selected. Below the navigation menu is a banner image of a harbor with the text "MIS-SLPA" on the left. The main content area is titled "Divisional Expenditure >> Display". It contains two dropdown menus: "Select Month: \* January" and "Year: \* 2003". Below these is another dropdown menu: "Select Division: \* CONTRACTS & DESIGN". At the bottom right of the form area are two buttons: "Display" and "Cancel". At the very bottom of the page, there is a footer with the website "www.slpa.lk | info@slpa.lk" and the copyright notice "Copyright © 2005 SLPA All rights reserved."


Second screen for the display of Divisional Expenditure

The screenshot shows the second screen of the Sri Lanka Ports Authority (SLPA) MIS-SLPA interface. It features the same header and navigation menu as the first screen. The main content area is titled "Divisional Expenditure >> Display". It displays the selected data: "Division: CONTRACTS & DESIGN" and "Month: January Year: 2003". Below this information is a table with the following data:

Description	Budget	Actual	Variance	Variance%
Contract work for maintenance & repairs	4	4	4	4
Cost of water to ships	4	4	4	4
Total	8	8	8	8

At the bottom right of the table area are three buttons: "Print", "Back", and "Cancel". At the very bottom of the page, there is a footer with the website "www.slpa.lk | info@slpa.lk" and the copyright notice "Copyright © 2005 SLPA All rights reserved."

First screen for the update of Divisional Expenditure



**SRI LANKA PORTS AUTHORITY**

[Finance MIS](#) | 
 [Operational MIS](#) | 
 [Tools](#) | 
 [Container Handling](#) | 
 [Divisional Expenditure](#) | 
 [Home](#)

---

MIS-SLPA

Divisional Expenditure >> Update

> Division: **CONTRACTS & DESIGN**  
 > Month: **January** Year: **2003**  
 > Select a description:


- > [Contract work for maintenance & repairs](#)
- > [Cost of water to ships](#)

>> [Add New Description](#) >> [Cancel](#)

---

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Second screen for the update of Divisional Expenditure



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 [Divisional Expenditure](#) | 
 [Home](#)

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MIS-SLPA

Divisional Expenditure >> Update

> Division: **CONTRACTS & DESIGN**  
 > Month: **January** Year: **2003**  
 > Description: **Contract work for maintenance & repairs**

Budget	Actual	Variance	Variance%
4	4	4	4

>> [Update](#) >> [Cancel](#)

---

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