

# **INTERNET MAPPING**

by

**AHMAD FAIZ MUSTAPHA KAMAL**

Dissertation submitted in partial fulfillment of  
the requirements for the  
Bachelor of Technology (Hons)  
Information System

July 2004

Universiti Teknologi PETRONAS  
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# CERTIFICATION OF APPROVAL

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A project dissertation submitted to the  
Information System Programme  
Universiti Teknologi PETRONAS  
In partial fulfillment of the requirement for the  
BACHELOR OF TECHNOLOGY (Hons)  
(INFORMATION SYSTEM)

Approved by,



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(JUSTIN DINESH DEVARAJ)

UNIVERSITI TEKNOLOGI PETRONAS

TRONOH, PERAK

July 2004

## **CERTIFICATION OF ORIGINALITY**

This is to certify that I am responsible for the work submitted in this project, that the original work is my own except as specified in the references and acknowledgements, and that the original work contained herein have not been undertaken or done by unspecified sources or persons.



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AHMAD FAIZ MUSTAPHA KAMAL

## ABSTRACT

Geographical Information System (GIS) are methods to visualize, manipulate, analyze, and display spatial data. GIS application software such as Arc View or MapInfo allows the integration of such GIS maps with programming language software such as Visual Basic. As we all know, internet has been a major information distribution channel. If we could integrate both GIS map and serves it in a web browser medium, we could provide GIS applications online, the users could manipulate and handle each map with their own choice. In order to create the Internet map that allows GIS map, Arc IMS will be use. ArcIMS runs in a distributed environment and consists of both client and server components. The ArcIMS HTML Viewer and ArcIMS Java Viewers are client-side components. The ArcIMS Spatial Server, ArcIMS Application Server, ArcIMS Application Server Connectors, and ArcIMS Manager are server-side components. As a conclusion, Internet mapping benefits the user by clearly indication GIS data to them.

## ACKNOWLEDGEMENT

First of all, I would like to express my gratitude to Allah s.w.t. for His blessings, giving me the opportunity to complete this final year project.

I would like to express my appreciation to Mr. Justin Dinesh Devaraj, as my supervisor for his guidance and advice. I would also like to thank Mr. Shuib Basri as the coordinator for final year project for IT and IS students. I would also like to thank my parents for their blessing and moral support.

To Mr. Mathavan and JUPEM crew that support my research. They have provided me with the data as the backbone of my research. Their guidance and advice was a major factor in completion of this project.

Not forgetting my companion Mr. Shahrman a fellow student under the supervision of Mr. Justin. His help in attending ArcIMS is the key factor in completion of the project. This is due that the project focuses on the development of Malacca Map concentrating on website applications. This is made possible the Mr. Shariman that have countless time help me attending the complicated software, from installing to understanding the functionality of the software.

Last but not least I would like to thank my roommate, Mr. Azlan Norzan as the financial benefactor that provided me with the financial capacity which allowed me to complete the tasks and problems faced during the completion of the project.

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## **ABBREVIATIONS & NOMENCLATURES**

<b>GIS</b>	Geographical Information System
<b>Arc IMS</b>	Software that allows Map Browsing through internet
<b>SARS</b>	Severe Acute Respiratory Syndrome
<b>JUPEM</b>	Jabatan Ukur dan Pemetaan Malaysia

# CHAPTER 1

## INTRODUCTION

### 1.0 BACKGROUND OF STUDY

Geographical Information Systems (GIS) enables the interaction between users and the map itself. The map enables search functions that help the users to identify the location and spatial data of their geographical interest. Currently the GIS applications are stand alone software that is very not practical for international market, because it lacks the web accessibility through the Internet decreasing its user friendliness.

This projects target to overcome the problem by enabling a web based GIS. The web site will be integrated with multimedia elements that increase the user friendliness, which are essential factor in attracting tourist to our country. Multimedia elements will be included in the map by using Macromedia products such as Macromedia Flash and Macromedia Dreamweaver.

The study will also focus on the Arc IMS and its usage. The functionality of the Arc IMS is that it allows the administrator to provide and determined the needs and wants of the users. Applications can be simple, with only a few viewing and navigation tools, or more sophisticated, with tools for advanced query and analysis. A full suite of functionality, from panning and zooming to buffering and editing, can be included in the Web site. The map could customization to each viewer's toolbar, providing a level of functionality appropriate to the users' needs and expertise.

An Internet GIS application can contain more than one Image or Feature Service. This gives the flexibility to divide data layers into logical groups. Each group constitutes a single service. Dividing data layers into separate services can improve the organization of the site. The following list describes several ways to organize data layers into logical groups.

1. *Reusable.* Maps often contain layers that are primarily used for reference. These referential data layers are used over and over again in different applications.
2. *Domain-specific.* When data is specialized, it should be allocate to its own service. Corporate data, data requiring extensive analysis, and data to which are restricted accesses all fall into this category.
3. *Application-specific.* Some data layers are always used together to support a specialized application—for example, waterlines, valves, and meters—and should be kept together in the same service.
4. *Frequently changing.* Data layers that are frequently updated should be kept separate from layers that change infrequently. This prevents frequent updates from affecting data layers that only need infrequent changes.
5. *Detailed.* Layers containing detailed information could be grouped together in the same service.

## **1.1 PROBLEM STATEMENT**

Nowadays Malaysian government is focusing their effort into enhancing the Internet capabilities. A crystal clear of their efforts is building the Multimedia Super Corridor (MSC). They are hoping that Malaysian citizens will take this opportunity to enrich their knowledge in the technological industry.

Among the new branches of Internet capabilities is Internet Mapping. Internet mapping is to show and allow map manipulation through the Internet. Maps are pictures that show information usually of geographical terms.

Geographical Information System (GIS) applications allow this kind of manipulation. GIS applications are systems that allow the manipulation of spatial data through the use of digital format. GIS has many unexplored potentials. Usually, the applications are developed on a stand-alone program basis. These programs lack the user friendliness of current software and the distribution medium is installation CD's.

The integration of Internet Mapping idea and GIS could provide a good impact. This is because users all over the world could use the GIS application maps, to better understand the geographical structure of the data shown.

## **1.2 Objectives**

The objective of this project is to develop an application with the following characteristics:

- i. Creating a GIS map that is accurate according to the real map.
- ii. Integrating the GIS map with Web base medium.
- iii. Creating a Web-site that is accessible through the internet.

## **1.3 Scope of Study**

Scope of study is the tourism part of Malacca as it is the heart of our nation's historical value. Melaka or Malacca or Malaqua (as it was known to the Europeans in the 1500's) began its humble existence as a fishing village and grew into the region's most important entrepot. For years, Malacca flourished under the watchful eyes of the Malay Sultans, until the struggle of power among the Europeans finally led to its slow and painful demise.

Its initial success under the governance of a Sumatran prince and his descendants was based on the model of an old entrepot called Srivijaya that ruled the straits for centuries before the 'discovery' of Malacca. There is still much debate amongst historians as to the exact period of this once great maritime empire, which ruled the trading routes in the straits. The agreement lies somewhere between the 7th to the 13th century. But many believe that the nucleus of the kingdom may have been in Palembang. (Palembang, Sumatra - across the straits of Malacca in Indonesia).

Through years of perseverance, Malacca finally regained a small fraction of its old days of fortune when a tapioca planter, Tan Chay Yan converted his tapioca plantation into rubber plots. Today, Malacca is swarming with visitors from all over the world, looking for a historical city that tells a tale of

merchant traders and European conquerors. Among the target parts of the Malacca tourism spots that will be targeted for the project are;

- Melaka Sultanate palace
- St. Paul's Church.
- A'Famosa.
- The Stadthuys
- Bukit China
- Kampung Keling Mosque
- Cheng Hoon Teng temple
- Baba and Nyonya Heritage Museum.
- Hang Jebat and Hang Kasturi's mausoleum.
- Hang Tuah's well
- Jonker's Street
- Maritime Museum
- Memorial hall
- Portuguese Square
- Sam Po Kong Temple
- St. Francis Xavier's Church
- St. John's Fort
- St. Peter's Church

All of the tourism spots have been pointed out by the Malacca state Government, through their website.

## CHAPTER 2

### LITERATURE REVIEW / THEORY

#### 2.0 Literature Review

#### 2.1 Arc IMS Overview

In recent years the Internet has emerged as an extremely popular and effective means of sharing information, data, and technology. The tremendous growth in Internet use has resulted in an increased demand for the delivery of geographic data, maps, and applications over the Internet. Arc IMS was developed by ESRI to meet this growing demand. Arc IMS is rooted in ESRI's proven Internet map publishing technology and development. Arc IMS was developed to meet a number of challenges including:

- i. Ease of use at a variety of skill levels
- ii. Out-of-the-box usability, while providing a highly customizable environment
- iii. Comprehensive suite of administration tools
- iv. Open and scalable architecture

Arc IMS is designed for novice and expert Web developers alike who seek the advantage of dynamic, accessible maps and interactive tools for information viewing, query, and exchange. Arc IMS is a GIS solution that allows user to centrally build and deliver maps, data, and tools over the Internet. Arc IMS takes advantage of the Internet technology that makes it possible to share information and data with many users, either locally or around the world. Using Arc IMS, your organization can author maps and publish them to a Web site of your own creation, complete with map navigation and query tools. Using the Arc IMS security features allows you to regulate access to the services you deliver over the Internet.

## **2.2 Metadata**

Metadata is the description about the subject. There's metadata for a wide variety of things, with varying levels of detail. The nutritional information on the label of a can of soup is metadata. A department store catalog is metadata. The price sticker on a new car is metadata. Anything that describes something else can be thought of as metadata.

Metadata is useful because it tells about something without having that something. For example, we might browse through a store catalog before deciding to make a purchase. The metadata about the items in the catalog give us valuable information—such as price, size, and material—to help us determine whether the item is right.

Metadata for geographic data is often described as data about data. Metadata for geographic data typically describes the content, quality, type, collection date, and spatial location of the actual data. Looking at metadata can help you determine whether a particular dataset is appropriate for use. In fact, it's often easier to judge the suitability of the data from its metadata than by examining the actual data itself. This is because metadata is generally much smaller and easier to share than the actual data.

## **2.3 Arc IMS Virtual Servers**

Virtual Servers group a number of Spatial Servers together and define the types of requests that will be processed by them. Six Virtual Servers install with Arc IMS—Image, Feature, Metadata, Geocode, Query, and Extract. There are two additional servers ArcMap Server and Route Serve which can be added as optional extensions to Arc IMS.

Image, ArcMap, and Feature Servers are used to publish maps over the Internet. Image and Feature services may appear similar in a Web browser; however, an Image Server sends a “snapshot” of a map to the client, while a Feature Server streams map features.

### **2.3.1 Image Server and ArcMap Server**

Both of the Image Server and the ArcMap Server support shapefile, ArcSDE, and image data. ArcMap Server also supports versioned geodatabases. Both servers use information about data layers to create complete map images. Configuration files contain information about map content and symbology. Creation of an Image Service involves registration of a configuration file with the Arc IMS Application Server.

ArcMap documents and ArcReader published map files contain similar information to Arc IMS configuration files. Map documents and published map files are registered with the Arc IMS Application Server to create ArcMap Image Services.

When a user requests an Image or ArcMap Image Service, a map image is created on the Arc IMS Spatial Server and sent back to the client. A new map image is generated each time user requests new information. For example, if a user zooms in on an area of a map, a message is sent from the client to the server. A new map image of the zoom extent is generated by the server and sent back to the client, replacing the old image. The image is sent to the client in one of three formats—as a JPEG, GIF, or PNG file.

# CHAPTER 3

## METHODOLOGY / PROJECT WORK

### 3.0 Overview

The methodology that would be used for this web is “The Waterfall Model”. Among the widely used methodology in the world, the waterfall model is a linear style methodology that states phases cascades each other. The model was developed by Royce, in 1970. The principle stages of the model map onto fundamental development activities.

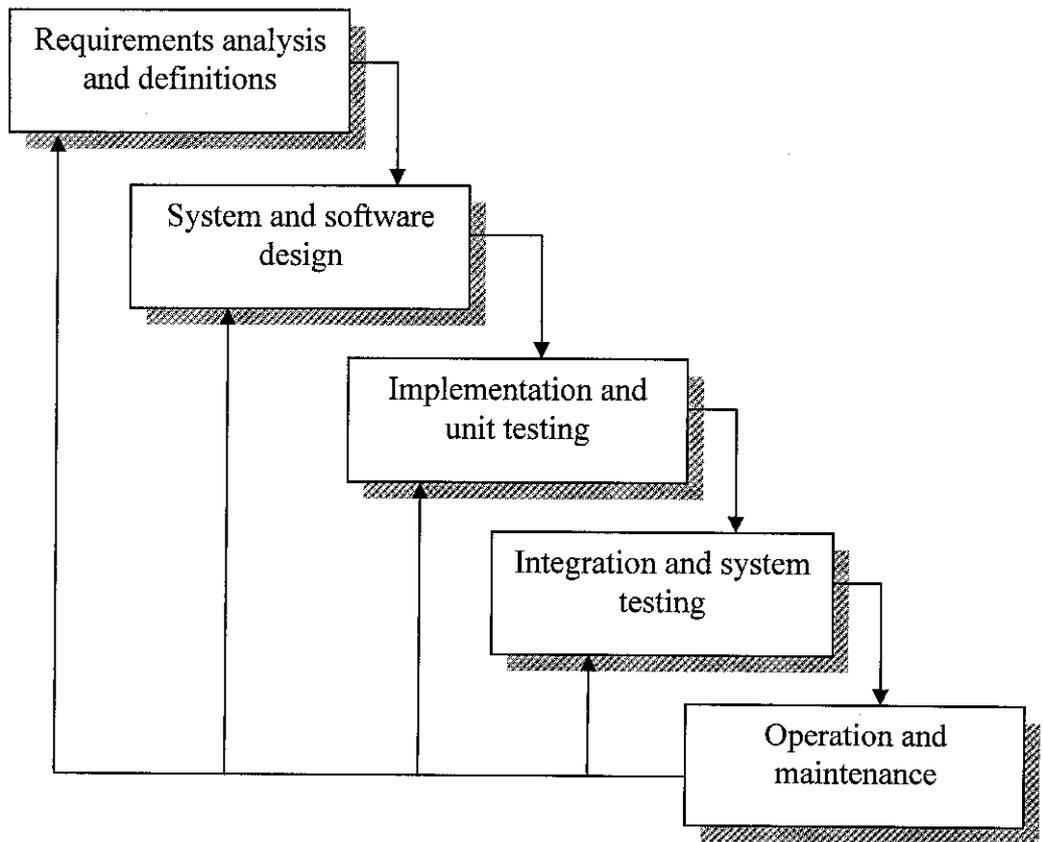


Figure 1.0: The Waterfall Model

### 3.1.1 Requirements and analysis phase.

#### 3.1.1 Arc IMS

- **Installing Arc IMS**

The Arc IMS was installed and it is running properly. The platform used was Windows 2000 as discussed previously. Below are the descriptions on how to install Arc IMS:

- **Install Virtual Drive 7.0**

This software is installed to allocate the Arc IMS virtual CD that was taken from Mr. Shariman.

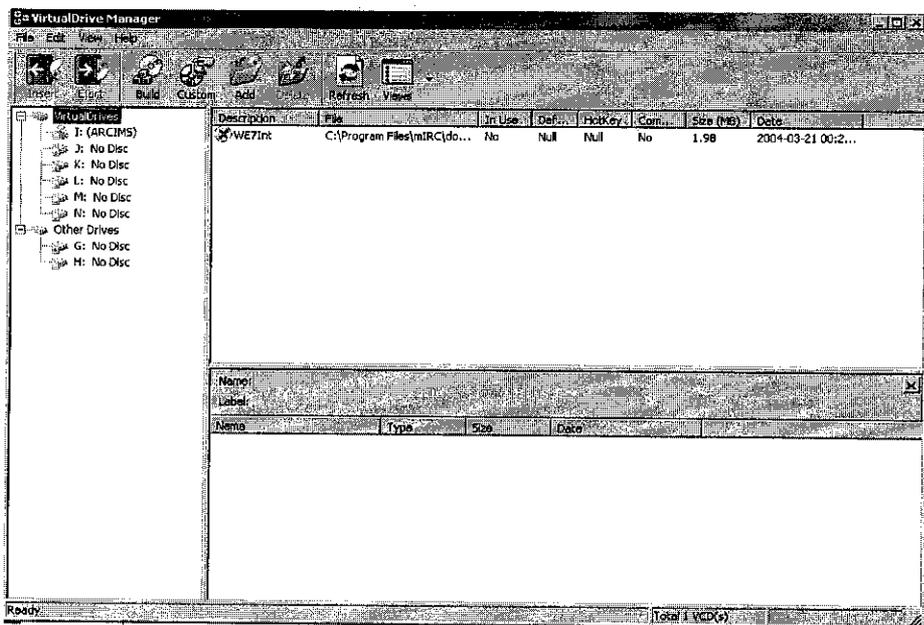


Figure 2.0: Virtual Drive 7.0

- **Installed Java Applet 4.0.1**

This is to enable Map viewing using Java Applet. This is an Object Oriented Procedure and is successful in installation.

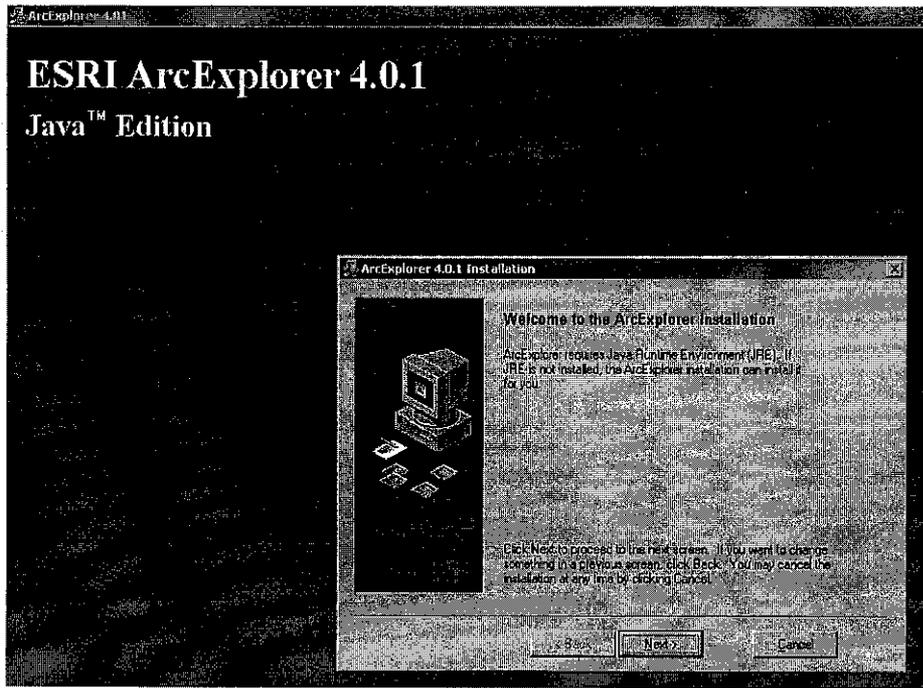


Figure 3.0: Arc Explorer 4.0.1 Java Edition

- **Installed ServletExec 4.1.1**

ServletExec enables the system to deploy servlets and JSP on Microsoft Internet Information Server (IIS), Netscape Enterprise Server (NES), iPlanet Web Server (iWS), and Apache HTTP Server in a standard, robust, high-performance environment

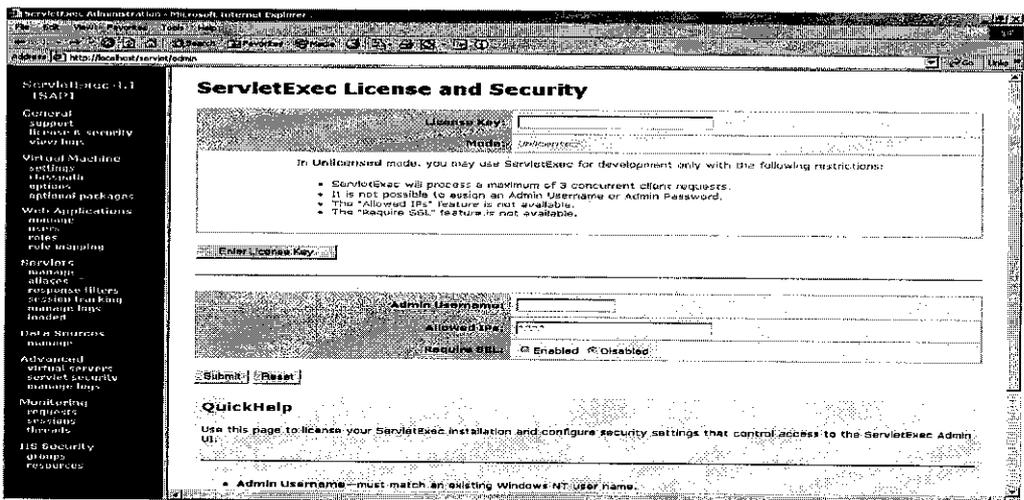


Figure 4.0: ServletExec 4.1.1

There are five steps required to get Arc IMS running:

1. Verify that site meets Arc IMS system requirements.
2. Determine Arc IMS site configuration.
3. Install Arc IMS. This includes the installation and post installation setup.
4. Configure your Web server.
5. Configure Arc IMS.

### **Step 1: Verify that site meets Arc IMS system requirements**

#### **Hardware configuration**

1. Memory requirements
2. Disk space

#### **System software**

1. Operating system
2. Web server
3. Servlet engine
4. Java 2 Platform Standard Edition Runtime Environment (J2SE JRE)
5. Web browser

### **Step 2: Determine Arc IMS site configuration**

1. Arc IMS Typical Configuration—All on a single computer
2. Arc IMS Custom Configuration—Arc IMS Application Server Connectors
3. Arc IMS Custom Configuration—Arc IMS ArcMap Server (Windows only)
4. Arc IMS Custom Configuration—Arc IMS Manager Applications
5. Arc IMS Custom Configuration—Arc IMS Service Administrator
6. Arc IMS Custom Configuration—ArcSDE Services Monitor

7. Arc IMS Custom Configuration—Arc IMS Spatial Servers
8. Arc IMS Custom Configuration—Metadata Explorer

### Step 3: Install Arc IMS

Step 3a - Complete the installation for the features selected

Step 3b - Complete the post installation setup for the features installed

### Step 4: Configure Web server

Step 4 is required if no reconfiguration of the Web server, using the Web Server-Servlet Engine Configuration option, in the post installation (Step 3b).

1. Configure Web server and servlet engine.
2. Create virtual directories.

### Step 5: Configure Arc IMS

Set environment parameters.

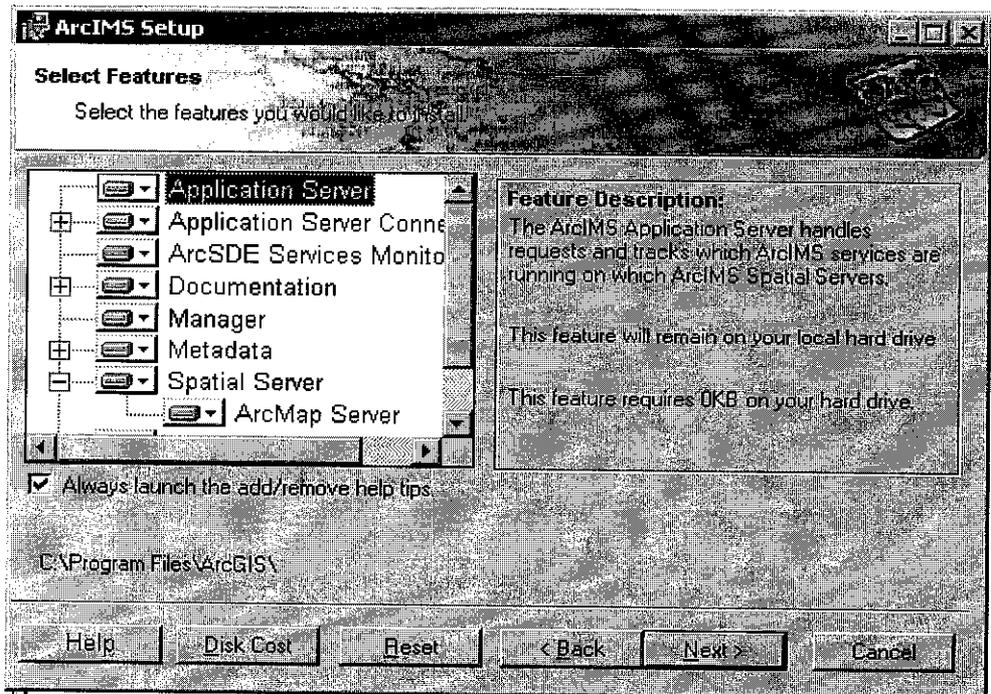


Figure 5.0: Arc IMS Installer

### **3.1.2 Hardware Requirements**

1. Intel Pentium 4 2.2 GHz (socket 478)
2. MSI 845E Max motherboard
3. Kingston 256MB DDR RAM
4. Sound Blaster Audigy2 Platinum
5. GeForce4Ti 4600-VTD (128MB DDR)
6. Western Digital 80G 7200 rpm
7. Sony CRT monitor 17"
8. Casing MEC 318R2/ 2F Extreme 919
9. Altec Lansing Ultimate 621
10. 52X ASUS CD-ROM S520
11. 16x48x Asus DVD ROM E-616
12. 40x12x48x Yamaha CD-Rewritable Drive
13. Sony 1.44MB Floppy Disk Drive
14. Logitech Multimedia Keyboard
15. Logitech Optical Mouse

### **3.1.3 Software Requirements**

1. Macromedia Dreamweaver MX
2. Macromedia Flash 5.0
3. Adobe Photoshop 7.0
4. ArcView GIS 3.2
5. Arc IMS 4.0
6. ACDsee 5.1

### **3.2 System and/or software design**

This is the designing the **layout and the functionality** of the website. I have identified two aspects that are going to be separated. The first is Arc IMS and the later is the design of the website using Macromedia Dreamweaver.

### 3.2.1 Create the Map Services

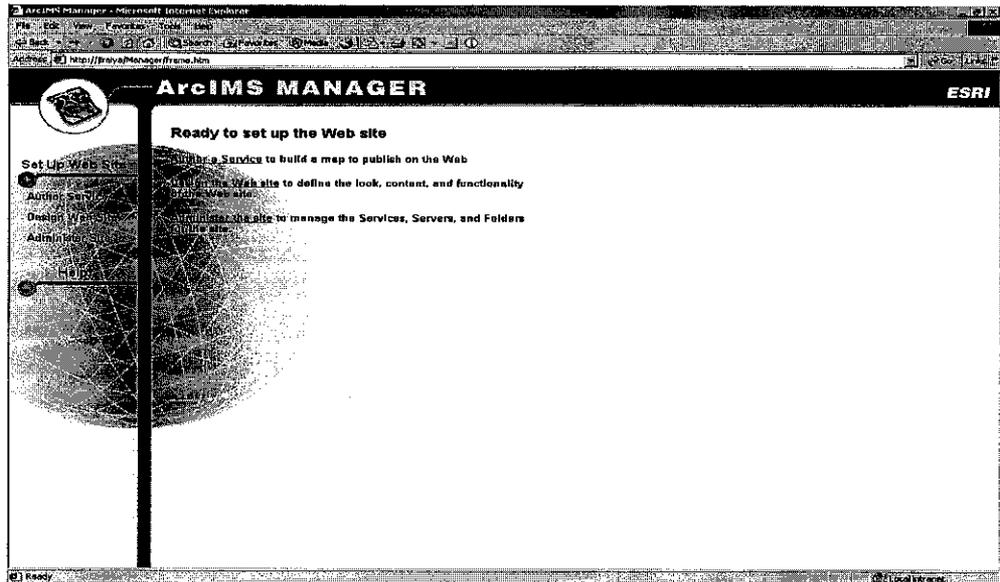


Figure 6.0: Arc IMS Manager – Create Services

The software used to create the map services is Arc IMS Manager. There are three options, Author Service, Design the Web Site and Administer the Site. Author the service lets the user define the type of layers. Afterwards, the user creates the service which means the user sets the map into the server.

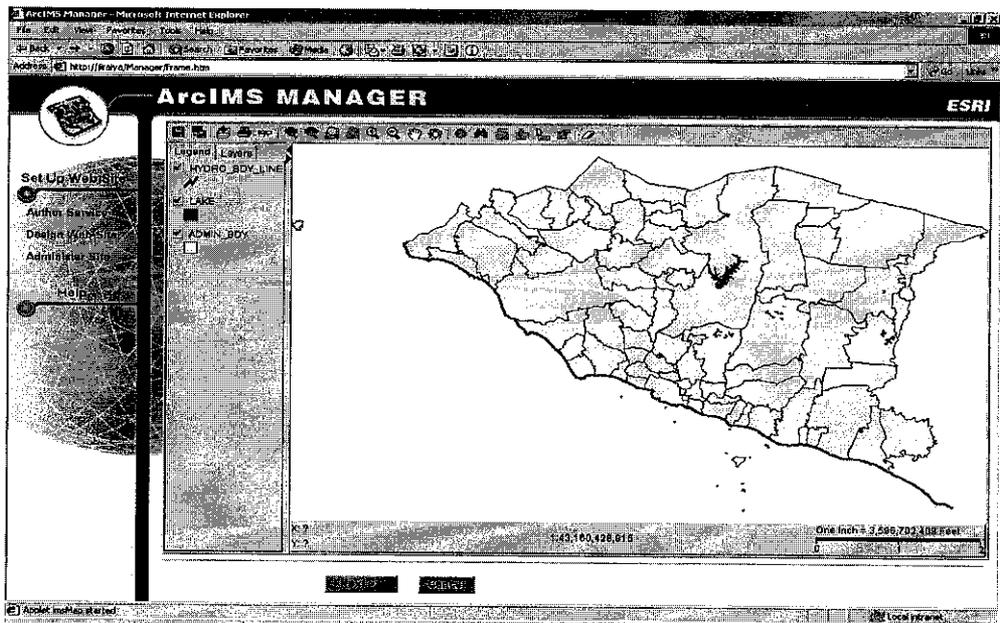
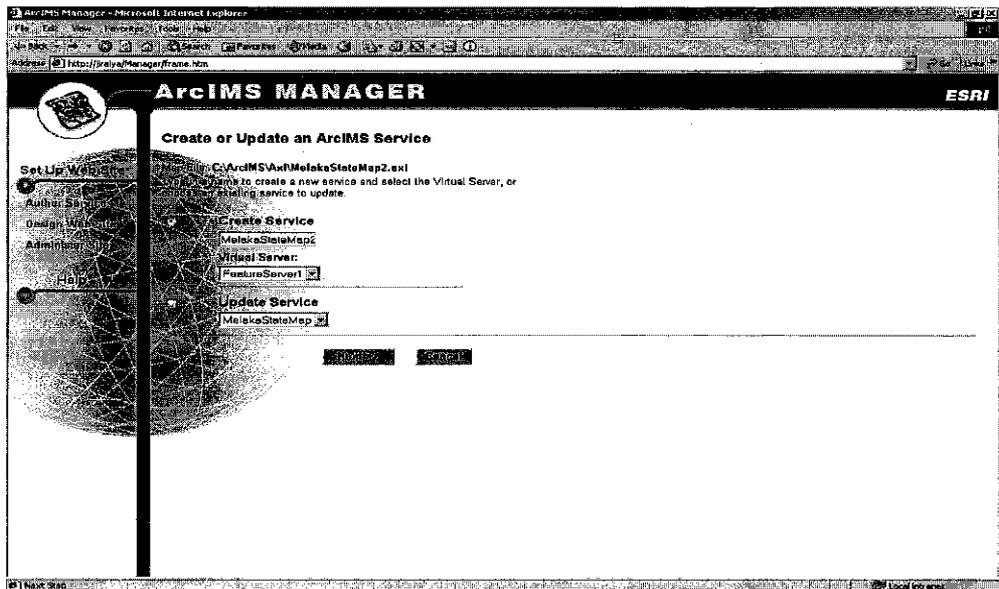
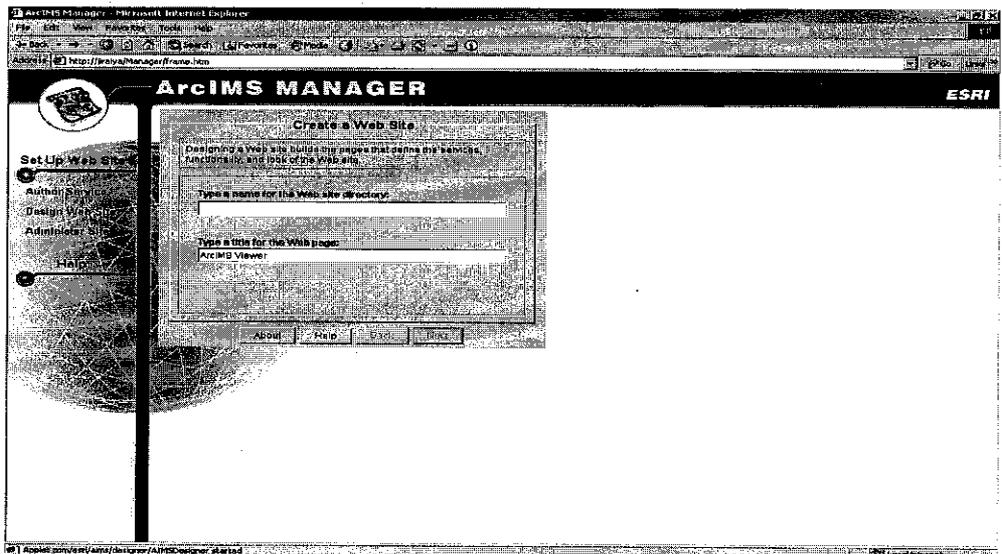


Figure 7.0: Arc IMS Manager – Website Overview



**Figure 8.0: Arc IMS Manager – Website Services Confirmation**

The next step is to define the web site accordance to the server administrator's requirement. This is to make sure that the only the necessary tools that are need to view the map are laid out in the website.



**Figure 9.0: Arc IMS Manager – Manage the Website**

The last Phase is to administer the website. The administrators are allowed to stop the services if they wish to, for updates and future enhancement.

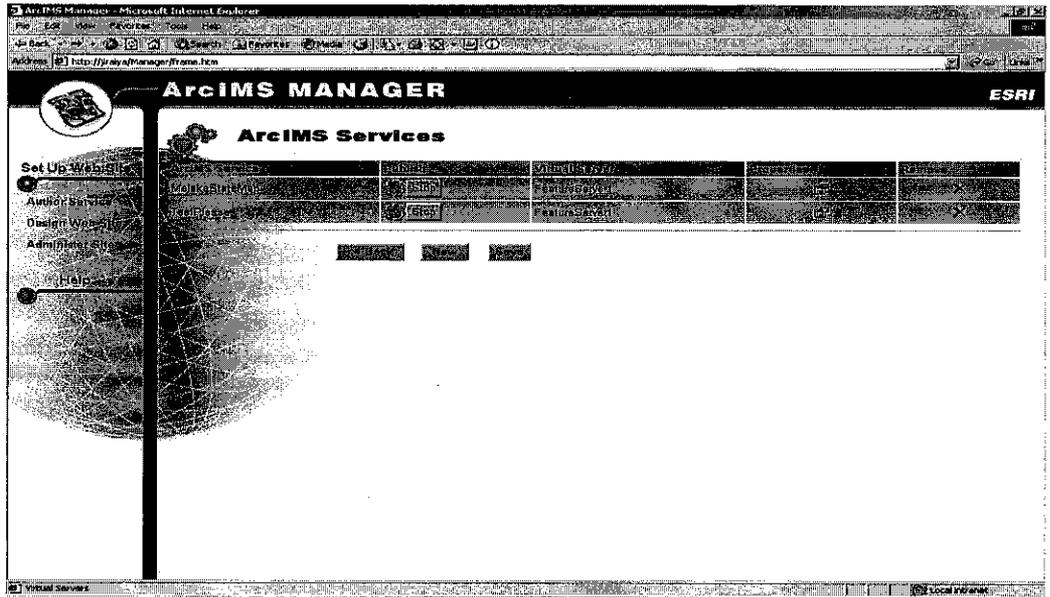


Figure 10.0: Arc IMS Manager –Administer the Website

### 3.2.2 Customizing the Arc Viewer

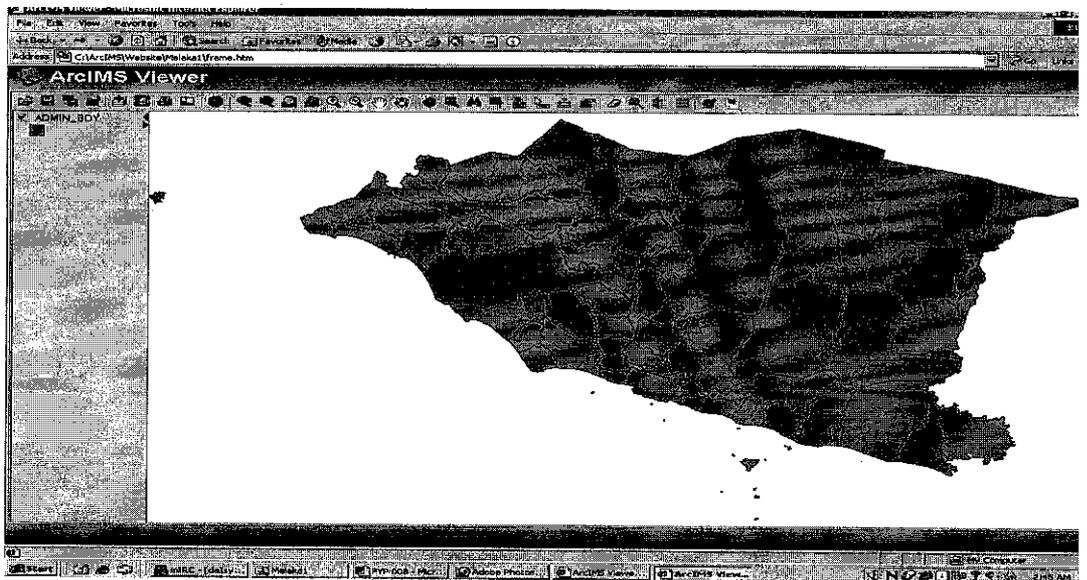
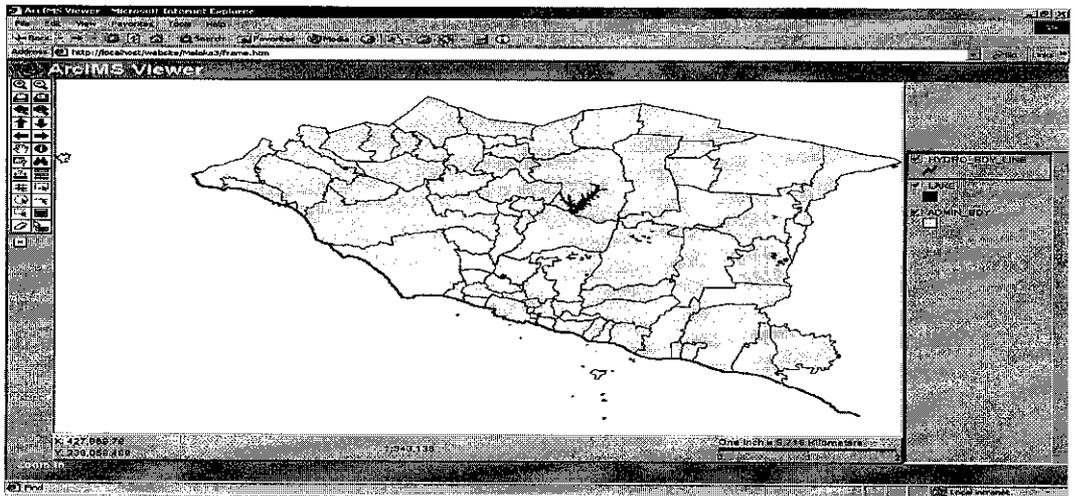


Figure 11.0: Arc IMS Viewer –Map Before

The ArcViewer allows the map to be viewed in web browsing applications software such as Internet Explorer or Navigator, but the system requires the

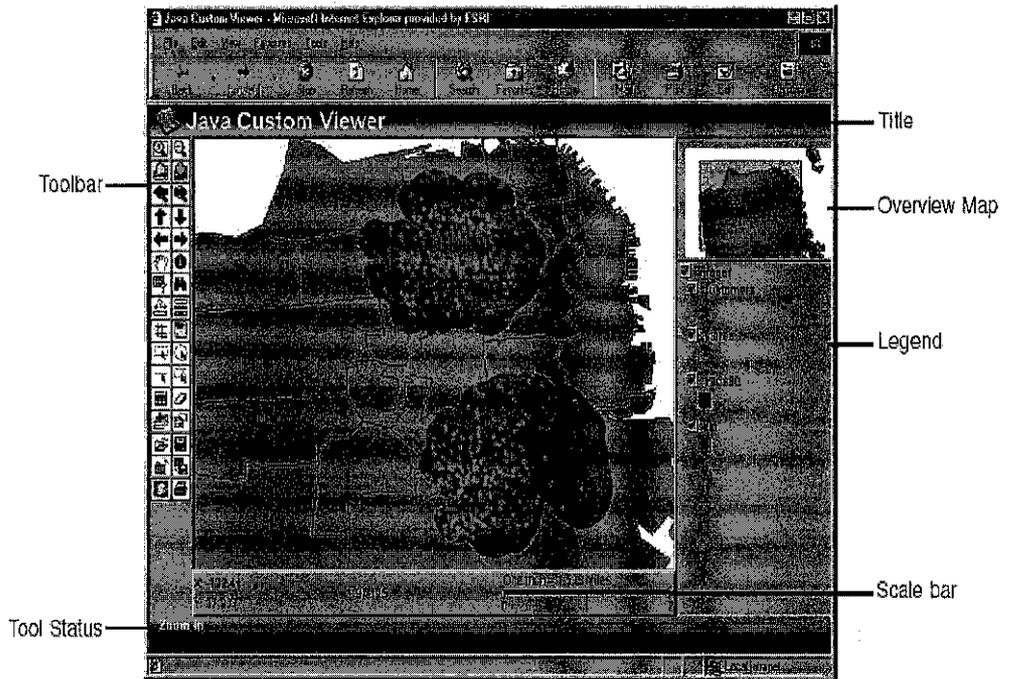
computer to install the java applet first. The ArcViewer are then modified using Macromedia Dreamweaver to look like the picture below



**Figure 12.0: Arc IMS Viewer –Map After**

### 3.2.3 JAVA Viewer

The Java Custom Viewer has the same elements as the Java Standard Viewer: a map display area, title, toolbar, legend, scale bar, and overview map. The primary differences are the organization of the elements and the contents of the toolbar.



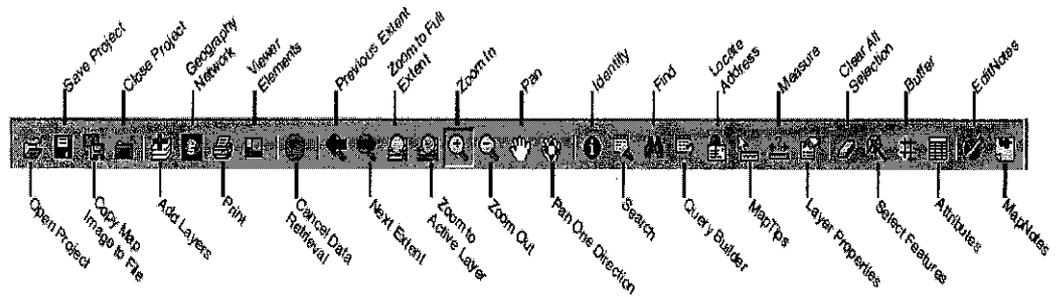
**Figure 13.0: Java Viewer**

The tool bar is to the left of, rather than above, the map display area. The legend is to the right of the map display area and the overview map appears above it rather than below it. The toolbar contains only the tools you specified when you designed your Web site. It does not include the Viewer Elements and Cancel Data Retrieval buttons found on the Java Standard Viewer toolbar. Also, instead of a Pan One Direction button, the Java Custom Viewer has four separate button for panning north, south, east, and west. Instead of a single Select Features tool, the Java Custom Viewer has four tools: Select by Rectangle, Select by Circle, Select by Line, and Select by Polygon.

### 3.2.3 Java Viewer toolbar

The toolbar is oriented horizontally in the Java Standard Viewer and vertically in the Java Custom Viewer. The Java Standard Viewer toolbar is shown here. Minor differences exist between the two toolbars and the Java Custom toolbar

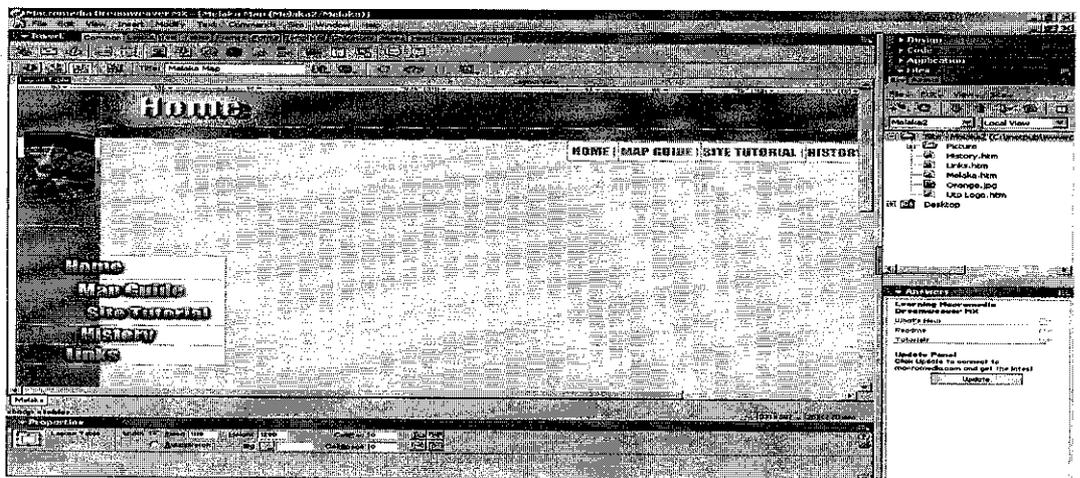
will contain only the tools you specified when you designed your Web site. Differences are noted in the following tool descriptions.



**Figure 14.0: Java Viewer Toolbars**

### 3.2.4 Website Development

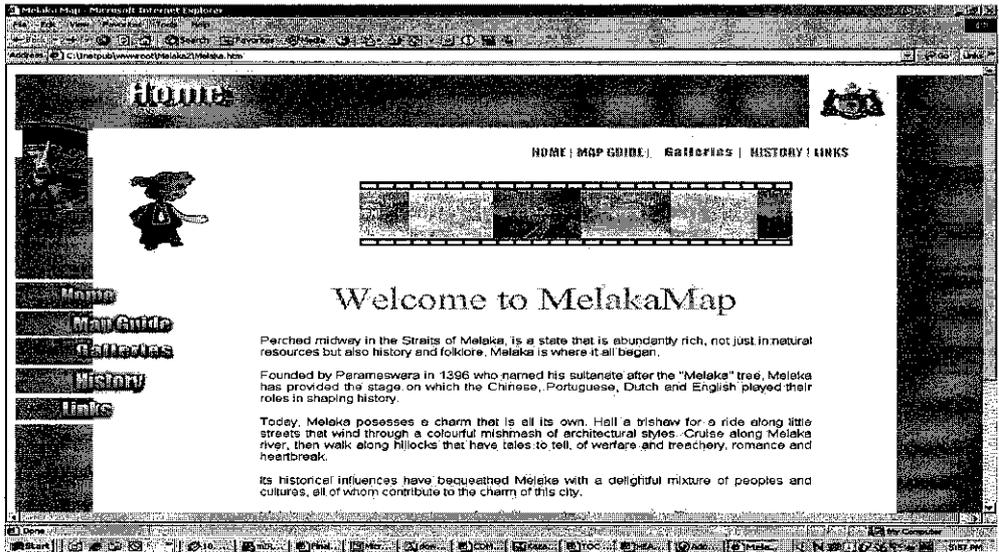
The website contains 5 directories, Home, Map guide, Site tutorial, history and links.



**Figure 15.0: Website Development**

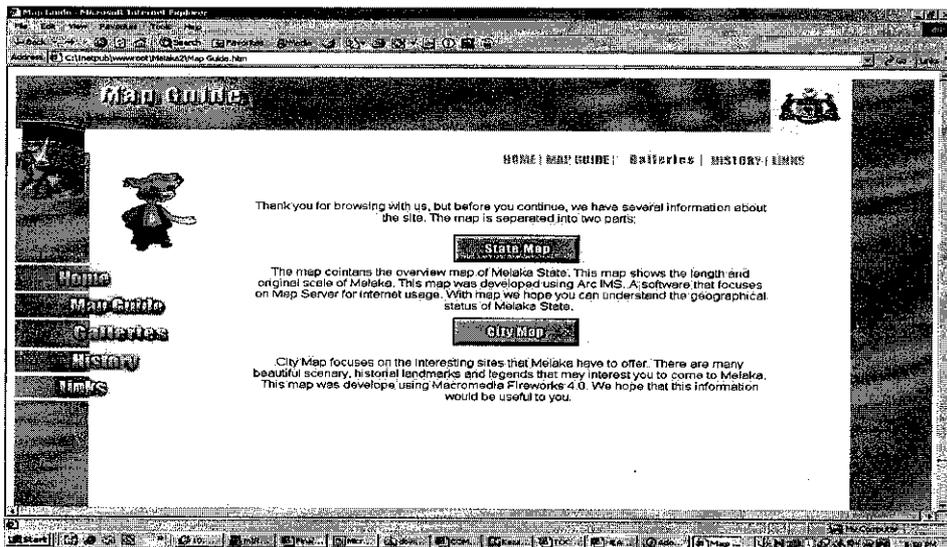
- **Home**

This directory contains welcome note and little description about the website and its functions.



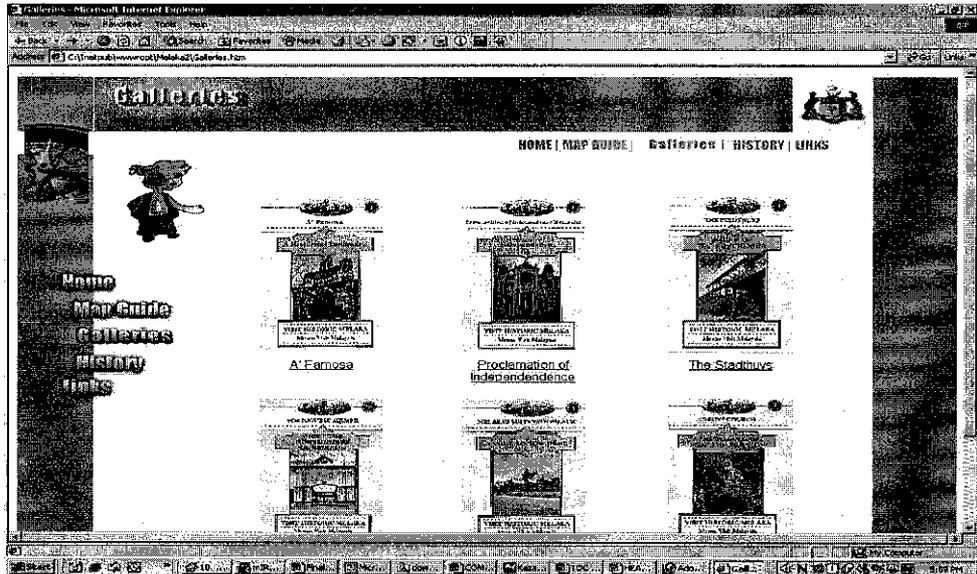
- **Map Guide**

The Map Guide is divided into 2 sub-websites. The first is State Map. This map shows the Malacca's state map. The map was developed using Arc IMS provided with JUPEM's data. The later is City Map. The City Map was developed using Macromedia Fireworks 4.0 the City Map shows the interesting tourism spots in Malacca city.



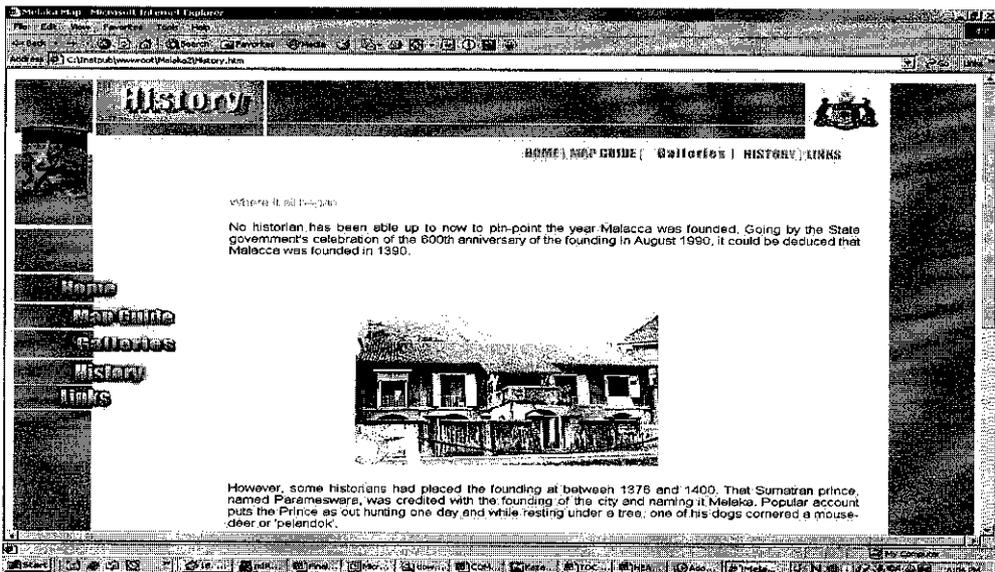
- **Galleries**

This site shows some pictures taken from Malacca. The picture shown is The Stadthuys, Malacca Sultanate Palace, Proclamation of Independence Memorial, Portuguese Square, Christ Church and the famous A' Famosa.



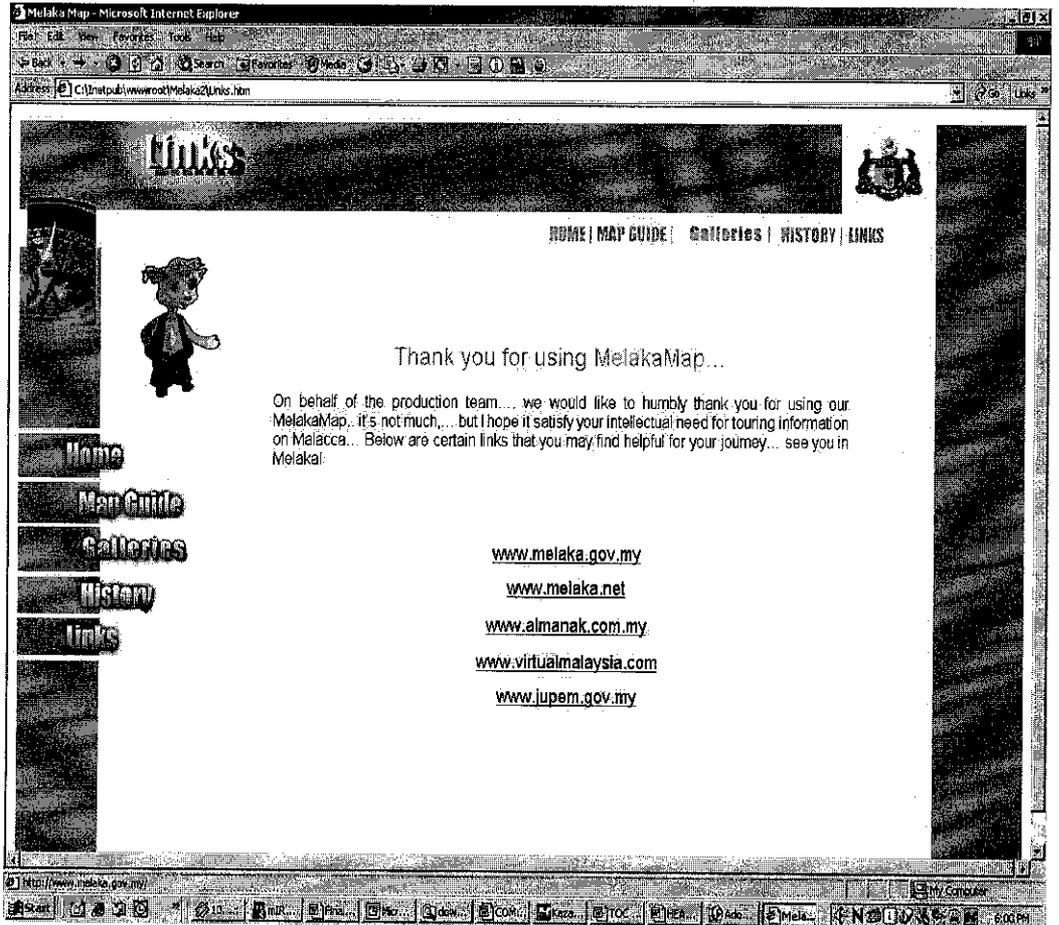
- **History**

Explain briefly about Malacca, and its origin.



- **Links**

Links page tell the users on any links and other information on the creation of the website.



### 3.3 Implementation and unit testing

The first testing is to test the linkage of the website. Making sure all the linkage and properties of the website is available for usage.

]

### **3.4 Integration and System Testing**

On these phase I have tested the linkage between the website and the usage of the Arc Viewer. I have also test the system usage on intranet with the address

<http://160.0.110.176>

#### **Remote Site testing**

#### **Results**

- |                               |                              |
|-------------------------------|------------------------------|
| 1. Own computer               | Success                      |
| 2. Roommate Computer          | Failed due to no Java Applet |
| 3. Housemate Computer         | Success                      |
| 4. Building 2 Programming Lab | Success                      |

### **3.5 Operation and Maintenance**

The operational of this system will be conducted after the fully integrated system have been completely installed and running. The maintenance of the product is to make sure the Windows IIS running smoothly.

## **CHAPTER 4**

### **RESULTS AND DISCUSSION**

#### **4.1 Data Gathering and Analysis**

All the data have been obtained through JUPEM. Letters have been sent to JUPEM requesting the data (see Appendix B). There are 5 levels of data. The website will only use 2 levels of data that will be extracted into 1 map. The data have analyzed and have resulted in results below:

- Negeri Melaka
- Bandar Melaka
- Jasin
- Ayer Keroh
- Alor Gajah

All the data are in \*.shp format which is the standard format for ArcView, by Esri. The software use to open the file is ArcView 3.2. Based on the scope, the project will only used data from Negeri Malacca, and Bandar Malacca files, as this is the central location of tourism spots.

##### **4.1.1 Negeri Melaka (Malacca State)**

There are 13 layers under Negeri Melaka

The layers are:

1. Road – Consist of all the roads in Malacca
2. River – Consists of all the rivers in Malacca
3. Rail\_line – The railroad in Malacca.
4. Named\_location – Name of all rivers and villages in Malacca
5. Lake – The geographical lakes in Malacca
6. Kaw\_state – Political map of Malacca

7. Kaw\_mukim – Mukim locations in Malacca
8. Inland\_water\_area – The rivers, rivers name that contributes to water supply in Malacca
9. Hidro\_bdy\_line – The line that separates land and sea in Malacca
10. Hidro\_bdy\_area - The islands in Malacca
11. Canals – The major pipes in Malacca for clear water distribution
12. Building – The government buildings in Malacca
13. Admin\_bdy – The state, and district political Map

#### **4.1.2 Bandar Melaka**

There are 16 layers for Bandar Melaka (Malacca City)

The layers are:

1. Road1 – Bituminous roads in Malacca City
2. Road – Street's name in Malacca City
3. Nilaikontor - The contour of Malacca City
4. Nama\_sungai - List of rivers name in Malacca City
5. Nama\_hydro\_lain – The names of Malacca City's hydro
6. Mukim – Names of mukim's in Malacca City
7. Jln – Graphics and names of the newest names in Malacca City
8. Frame – A square box that is used to draw the map
9. District – The name of the district which consist Malacca City
10. Canal – Major canal names in Malacca City
11. Building - The names and locations of buildings in Malacca City
12. Bgn – Newest buildings in Malacca City
13. Bg – Still graphics of the buildings
14. Bangunanlain – Uncertain description, still graphics of buildings
15. Bangunan\_lain - Uncertain description, still graphics of buildings
16. Bangunan - Uncertain description, still graphics of buildings

## 4.2 Results and Discussion

Data of the real map was taken from JUPEM. There is also no exact direction of interesting spots in Bandar Malacca. In order to get the proper interesting spots, a tourist map is taken from Malacca.

Arc IMS is designed for novice and expert Web developers alike who seek the advantage of dynamic, accessible maps and interactive tools for information viewing, query, and exchange. Arc IMS is a GIS solution that allows user to centrally build and deliver maps, data, and tools over the Internet. The pop up multimedia linkage from the map itself was unable to be done due to the lack of software available. To do is the server needed another application called Arc SDE, which costs approximately RM 60,000.

Arc IMS Image and Feature Servers serve maps over the Internet as Image and Feature Services. Information about map content and symbology is saved in a configuration file (.axl). The Image or Feature Service registers this file with the ArcIMS Application Server. ArcMap Image Services are like Image Services, except they are created using ArcMap documents (.mxd) or ArcReader™ published map files (.pmf) instead of configuration files. Metadata Services serve metadata over the Internet. Route Services serve routing directions

Site administration is essential to the success of any Internet GIS application. Use Arc IMS Administrator or Manager to manage Arc IMS services, servers, and folders. The objective of site administration is to make the most efficient and effective use of available resources.

## **CHAPTER 5**

### **CONCLUSION AND RECOMMENDATION**

#### **5.1 Conclusion**

The objective of this project consists of three major objectives. The first is to creating a map that is accurate to the real map. To fulfill this objective, the Melaka Map was taken from JUPEM. The data is in \*.shp format which is in digital form. The data is accurate as train professionals in JUPEM did all the measuring.

The second objective is to integrate the map in a web-base medium. This requires a server provider that made my desktop as a server. The application used for this purposed was Microsoft IIS. The software requires, a Java Applet and server. The java applet was provided by Sun, and the servlet is ServletExec 4.1.1 ISAP, from New Atlanta.

The last and main objective of the project is to make sure that the website containing the GIS application map is accessible through the Internet. This objective isn't fully accomplished as the Internet was replaced by Intranet UTP campus. According to the system testing, the project has managed to serve the website through the Intranet accessibility in UTP campus.

## 5.2 Recommendations

During the time length of the project, I have encountered numerous problems. Among the major problems are installing Arc IMS, obtaining the data of Malacca Map, obtaining pictures and information about locations in Malacca. Several problems encountered have resulted in changing the structure of the program. Preliminarily, the software was supposed to have routing service and pop up menu for interesting places. Nevertheless these functions could not be put up in this project because lack of financial, expertise and software aid.

In order to make the necessary enhancement, the software Arc IMS, needed to be integrated with another Esri product called Arc SDE. This Arc SDE specialized in routing and map linkage. The software costs about RM 60,000. This amount is too high for one semester project; hence the functionality was dropped out of the program, which made the application lack of its original functionality. For these reasons I would like to recommend that these functionalities could be implemented for future usage of the product.

Another important part of the website is that the Arc Viewer that displays the map, lack the original website look. This makes the particular site different from other links. This happens due to my lack of expertise in Java programming to encode and customize the Arc Viewer. I also would like to recommend that for future enhancement that the product could obtain these customizations.

## REFERENCES

1. Arc IMS architecture  
<http://www.esri.com/software/arcims/architecture.html>
2. Arc IMS Overview  
<http://www.esri.com/software/arcims/overview.html>
3. Arc IMS Server  
[http://www.esri.com/software/arcims/arcmap\\_server.html](http://www.esri.com/software/arcims/arcmap_server.html)
4. Malacca Internet Map 1  
[http://www.almanak.com.my/mal\\_info/state/melaka/e\\_map1.html](http://www.almanak.com.my/mal_info/state/melaka/e_map1.html)
5. Website on Malacca  
<http://www.melaka.net>
6. Official Malacca Website  
<http://www.melaka.gov.my>
7. Official JUPEM Website  
<http://www.jupem.gov.my>
8. Spatial Information Clearinghouse, 2002, **“Components of a GIS”**, Mine Action Information Centre, James Madison University.
9. Chrisman, Nicholas, 1999, **“Exploring Geographic Information System”**, John Wiles and Sons Inc, New York.
10. Carver, Steve and Sarah Cornelius and Ian Heywood, 1998, **“An Introduction to Geographical Information Systems”**, Prentice Hall, New Jersey.
11. Michael Kofler, 1998, **“Object-Oriented Database Systems”**, Institute for Computer Graphics and Vision.

12. Shahshi Shekhar, Sanjay Chawla, 2003, "**Spatial Databases A tour**", Prentice Hall.
  
15. Guptill, S.C and J.L Morrison (eds.), 1995, "**Elements of Spatial Data Quality**", Elsevier Science, Oxford, New York.

⌘ APPENDIX A ⌘

: REPORT SUBMISSIONS GANTT CHART FOR INFORMATION SYSTEM FINAL YEAR PROJECT

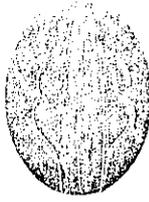
		YEAR 5 SEMESTER 1																	
		01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18
		19/01 - 25/01	26/01 - 01/02	02/02 - 08/02	09/02 - 15/02	16/02 - 22/02	23/02 - 29/02	01/03 - 07/03	08/03 - 14/03	15/03 - 21/03	22/03 - 28/03	29/03 - 04/04	05/04 - 11/04	12/04 - 18/04	19/04 - 25/04	26/04 - 02/05	03/05 - 09/05	10/05 - 16/05	17/05 - 23/05
Preliminary Report		•																	
Log Book Submission																			
Progress Report						•													
Supervisor's Final Draft Submission											•								
Final Draft submission												•							
Oral Presentation																			
Project Dissertation Submission																•			

5 JUN 2004



Week 16 - 18 : Exam Week

⌘ APPENDIX B ⌘



UTP-ACAD/PROG-IT/02-006

UNIVERSITI  
TEKNOLOGI  
PETRONAS

Untuk Perhatian:  
En. Mathavan  
Sekseyn Kartografi  
Jabatan Ukur Dan Pemetaan Malaysia  
Bangunan Ukur,  
Jalan Semarak,  
50578 Kuala Lumpur

27 Januari 2004

Tuan/Puan

**Lanjutan :Projek Akhir Tahun Bagi Pelajar Akhir Tahun UTP**

Dengan segala hormatnya saya merujuk kepada perkara diatas.

2. Kami disini ingin mengucapkan ribuan terima kasih terhadap pihak tuan kerana sudi meluangkan masa dengan pelajar kami.

3. Berdasarkan perbincangan di antara peiajar kami, Ahmad Faiz Mustapha Kamal, dengan En. Mathavan, pelajar kami memerlukan beberapa data dalam bentuk digital bagi melaksanakan projek beliau. Segala butiran data ada disertakan dalam lampiran.

Oleh itu kami pihak universiti berharap sudilah sekiranya tuan dapat memberikan segala data yang di perlukan bagi projek beliau.

Sekian. Terima kasih.

Yang Benar,

**Justin Dinesh Devaraj**

Penyelia Pelajar Projek Tahun Akhir  
Program Teknologi Maklumat dan Teknologi Sistem Maklumat  
Universiti Teknologi PETRONAS

Cc: En. Shuib B. Basri  
Penyelaras Projek Tahun Akhir

UNIVERSITI TEKNOLOGI PETRONAS

INSTITUTE OF TECHNOLOGY PETRONAS SDN. BHD.  
(Company No: 5528750) Wholly owned subsidiary of PETRONAS  
Bandar Seri Iskandar, 31750 Tronoh, Perak Darul Ridzuan, Malaysia

## BUTIRAN

1. Peta kartografi Negeri Melaka.
2. Peta kartografi bandar Melaka, Alor Gajah, Jasin dan Air Keroh, dan lokasi bangunan-bangunan berikut:
  - *Istana Kesultanan Melaka*
  - *Gereja St. Paul*
  - *A'Famosa*
  - *Bangunan Stadthuys*
  - *Bukit China*
  - *Masjid Kampung Keling*
  - *Tokong Cheng Hoon Teng*
  - *Muzium Baba and Nyonya*
  - *Makam Hang Jebat dan Hang Kasturi*
  - *Perigi Hang Tuah*
  - *Jalan Jonker*
  - *Muzium Maritim*
  - *Dataran Peringatan Portugis*
  - *Tokong Sam Po Kong*
  - *Kubu St. John*
  - *Gereja St. Peter*

Segala data yang diperlukan adalah dalam bentuk digital. Segala cadangan yang difikirkan bernas untuk menjayakan lagi projek ini adalah amat dihargai.

⋮ APPENDIX C ⋮



IBU PEJABAT GABUNGAN UKUR DAN PEMETAAN MALAYSIA  
BAHAGIAN PEMETAAN  
(SEKSYEN KARTOGRAFI)  
TINGKAT 6, BANGUNAN UKUR  
JALAN SEMARAK,  
50578 KUALA LUMPUR



Telefon : 03 - 2617 0600  
03 - 2617 0800  
Fax : 03 - 2697 0140  
Web : <http://www.jupem.gov>

Rujukan Kami : JUPEM.BP.K.02.5.6 Jld.2(88)

Tarikh : 5 Februari 2004

Penyelia Pelajar Projek Tahun Akhir ,  
Program Teknologi Maklumat dan Teknologi Sistem Maklumat,  
Universiti Teknologi PETRONAS,  
Bandar Seri Iskandar,  
31750 Tronoh, Perak Darul Ridzuan.

(u/p: En.Justin Dinesh Devaraj)

Tuan,

**DATA NEGERI MELAKA**

Adalah saya dengan hormatnya merujuk kepada perkara diatas.

2. Bersama-sama ini disertakan data-data Negeri Melaka dalam format .shp files sepertimana yang dipohon.
3. Diharap agar data ini dapat digunakan bagi tujuan pembelajaran sepertimana yang dibincangkan.

Sekian. terima kasih.

“ BERKHIDMAT UNTUK NEGARA ”

“ CINTAILAH BAHASA KITA ”

Saya yang menurut perintah,

(JOHN ELVIS KOH, PPT.)  
Pengarah Ukur  
Seksyen Kartografi