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Building the WAMP Platform

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Abstract

WAMP is the abbreviation of the package: Apache, MySQL, and one of Perl, PHP, or Python in Microsoft Windows operating system. Apache HTTP server is web server software. PHP stands for Hypertext Preprocessor. It is a kind of HTML embedded language which executed on the server. MySQL Server is a small relational database management system. Initially, they are the entire independent program from each other, however, they are always used together, and have increasingly high compatibility degrees. So, these packages formed a powerful web application platform.

So, how to build a WAMP platform on our own computer? How to modify the configuration of Apache HTTP Server, PHP and MySQL Server? How does the WAMP platform work? How to build a simple working entity to prove that the WAMP platform can work? These are the questions I concentrate on in this thesis. Finding out the answers can help users understand the main principle of WAMP platform.

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WAMP, MySQL Server, PHP, Apache HTTP Server

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1   INTRODUCTION

The word WAMP is the abbreviation of the package: Apache, MySQL, and one of Perl, PHP, or Python in Microsoft Windows operating system. It is a kind of open source software that can be used to build dynamic websites or servers. They are all independently-created programs, however, it has increasingly high compatibility degree because they often be put together to use. Therefore, they formed a powerful web applications platform.

Furthermore, what is the package of Apache, MySQL and Perl, PHP or Python? Apache HTTP server is web server software which ranked the first over the world. The pronunciation of "Apache" is from the word "A patchy server", which means that the program has patch. There are continuously people to develop its new function and modify the original defects by its open community. Initially, Apache is just used in small or text internet work. Then, it gradually expanded to all sort of UNIX system, especially for Linux system, the Apache support it pretty perfect. Apache has a variety of products.   It can support both SSL technologies and multiple virtual hosts.

PHP stands for Hypertext Preprocessor. It is a kind of HTML embedded language which executed on the server. PHP mixed with C language, java, Perl and PHP self-created language. And the language style is similar to C language. PHP is embedded into the procedure in HTML documents to execute. It can also perform the compiled code. This kind of compiler can achieve encryption and optimizing code running in order to make code running faster. PHP has very powerful function and support almost all popular databases and operating systems.

MySQL is a small relational database management system. Because of the small size, fast speed, low cost and especially, the open source, it really fits for many small and medium-sized websites to choose MySQL as their database in order to reduce the overall cost. Furthermore, MySQL has many characteristics, firstly, it uses C and C++ to write, and uses a variety of compiler testing so that it can guarantee the source code of portability. Secondly, it supports many operating systems, such as AIX、 FreeBSD、 HP-UX、 Linux、 Mac OS、 Novell Netware、 OpenBSD、 OS/2 Wrap、 Solaris、 Windows etc. Thirdly, it provides API for a variety of programming languages, which including C, C ++, Java, Perl, Python, PHP, Eiffel, Ruby and Tcl, etc. besides, it supports multithread and

can take full use of the CPU resources. Lastly, it also provides some database connection access, such as TCP/IP、ODBC or JDBC, and it has some management tools so that you can easily manage, check or optimize the database operation.

Perl is a kind of dynamic programming language, the most important characters is the function of regular expression and the great third party code library-CPAN. In short, Perl is as strong as C programming language, as handy as description language script. Besides, Perl commonly be known as "Practical Extraction and Report Language". On the other hand, Python is an object-oriented, literal translation type computer programming language. It is a powerful and well-size-fits-all language and has been more than a decade of development, maturity and stability.

The structure of this thesis is as follows: in chapter 2, I will give an overview of about the WAMP platform, describe the development history and components. In chapter 3, I will introduce the principle of building the WAMP platform. In chapter 4, I will show how to build the WAMP platform, the results, as well as analysis the problem and solution during my work. In chapter 5, I will analysis the problems based on my work and also give the conclusion.
.

2 OVERVIEW

2.1 What is the WAMP platform

WAMP are the packages of independently-created programs installed on computers that use a Microsoft Windows operating system (WAMP [referred 10.4.2011]).

Under the Windows operating system, it is a kind of open source software to build the dynamic websites or server by Apache, MySQL and PHP or Perl or Python. Initially, they are the entire independent program from each other, however, they are always used together, and have increasingly high compatibility degrees. So, these packages formed a powerful web application platform.

With the booming trend of open source, the LAMP, which is the open source, has been the three pillars of business software with J2EE and .Net. What's more, the software development project cost is low. Therefore, it is concerned by the entire IT industry.

LAMP is based on Linux, Apache, MySQL and PHP open source web development platform. PHP sometimes can be used instead of a Perl or Python programming language. This term comes from Europe, where these procedures have been used as a standard development environment. The name comes from the first letter of each program. The ownership in each program is in line with the standard open source: Linux is an open system. Apache HTTP Server is the most common web server. The MySQL Server is a network management with additional tools based on relational database. PHP is a popular scripting language object, which contains most of the outstanding features of the other languages to make web development more effective. The developers in the Windows operating system environment to use these tools for Linux is called using WAMP (LAMP [referred 11.4.2011]).

At present, the mainly WAMP platform integrated environment are Digast WAMP Server, WAMPServer 2.0g-1, XAMPP, and AppServ.

Digast WAMP Server is developed by a company from HangZhou, China. It is a process that automatic configures the WAMP (Apache Server + MySQL Server + PHP under Windows operating system). This program can be directly extracted to the user specified directory. There is no complicated installation process, and the system will automatically identify the user's installation directory, and then configure WAMP platform environment by itself so that the beginners can learn it fast. Digast WAMP Server is the most convenient, fastest and intelligent WAMP environment configuration tool at present.

WAMP Server is an integrated installation environment with Apache, MySQL and PHP under the Window operating system. The PHP extension, you can easily start and stop the Apache modules, no longer have to go and modify the configuration files by yourself. The WAMP Server will do it.

XAMPP is a kind of integrated environment. It also has the description in Chinese. XAMPP is not only for Windows, but the one for Linux, Windows, Mac OS X and Solaris. It is easy to install Apache distribution. The package of Apache Server contains MySQL, SQLite, PHP, FileZilla FTP Server, Tomcat etc. Besides, the default

installation opens the entire functions. And about the security problem, the users need to set it by themselves.

AppServ integrated the Apache HTTP Server, PHP, MySQL Server and PhpMyAdmin. In general, these are basically several WAMP environments for the beginners to modify the configuration. However, it is more complex, and the beginners cannot figure it out in a short time. Like the Digast WAMP Server, because of the new environment of configuration, the configuration files is stringent, what's more, the program size is moderate, and you can customize any directory, the system will automatically configure the parameters. So it is fit for the beginners.

2.2 History and Function

2.2.1 WAMP and LAMP

LAMP is an acronym word. Typically, it refers to a set of free software running dynamic websites or server. It is commonly used by Linux operating system, Apache HTTP Server, MySQL Server and PHP scripting language (sometimes instead by Perl or Python.) (LAMP [referred 10.4.2011]).

While the open-source program itself is independent from each other, however, because of the low cost and commonly, this group becomes popular around the world. Even most Linux operating system distribution bundled with this software. When they work together, it looks like a dynamic solution package. And other options package with Apple's WebObjects, which is an application server initially, Java/J2EE and. NET framework that published by Microsoft.

The components of the LAMP package include a script CGI web interface, which became popular in the early 90s. This technology allows web browsers to execute a program on the server, and receive the dynamic content as well as the static content. The programmer uses a scripting language to create these programs because they can easily control the text streams effectively, even the text flows are not from the program itself. It is for this reason the designers often called the scripting languages as glue language.

Michael Kunze wrote an article which he used the abbreviations LAMP in the computer magazine c't in German (1998, No. 12,230 pages) (LAMP [referred12.4.2011]). This article is intended to show a series of free software into a commercial package alternative. Because of the well-known hobby to acronym in the IT world, Kunze came up with LAMP and popularized the use of free software.

After that, O'Reilly and MySQL AB popularized the term in English world. Indeed, the promotion of MySQL AB marketing is based on the promotion of LAMP partly. And other projects or vendors to implement some variants of the term, including:

LAPP refers to PostgreSQL alternative to MySQL.

LAMP, the last two letters refer to Middleware and PostgreSQL.

LNMP, Nginx replaced by Apache HTTP Server.

WAMP, the operating system is Windows instead of Linux.

LAMJ, refers to JSP / Servlet instead of PHP.

BAMP, the BSD replaced Linux operating system.

WIMP, refers to Microsoft Windows, Microsoft IIS, MySQL and PHP.

AMP means that Apche HTTP Server, MySQL Server and PHP.

XAMP used XML replaced by Linux operating system.

Furthermore, some people borrowed LAMP to describe a class of customized systems, but not to create a series of new words, and used it to illustrate the difference between the page system and a unified development environment package. Such as ASP, .NET and J2EE.

For example, Wikipedia, a free encyclopedia on internet, run a range of software on LAMP environment with the same characteristics. And Wikipedia use the Media Wiki software, it is developed mainly in the Linux operating system, and provides the contents by Apache HTTP Server, stored in the MySQL Server database, it uses the PHP to implement the application logic.

So, what is the deference between LAMP and WAMP? What are the advantages and disadvantages?

Firstly, we talk about the installation complexity. In the past few years, installing a LAMP platform was more complex. Along with the popularity of Linux operating system, now installing a LAMP system becomes relatively simple. In addition, many Linux distributions, such as Redhat, Debian, can automatically configure Apache HTTP Server, PHP, and MySQL Server. Instead, the installation of WAMP platform is more complicated. However, there are many WAMP platform software packages you can download and install on Windows server. Traditionally, AMPP, which means Apache HTTP Server, MySQL Server, PHP and Perl, is in the form of installing and configuring separately. It is more competitive for open source to integrate them into the commitments than J2EE application development. It includes the following software:

WAMP5: This software can automatically install the Apache HTTP Server, PHP5 and MySQL database on your system. It comes with a system tray icon to run the service manager, and a plug-in. Now it allows you to run on the same server PHP4.3.9 and PHP5.0.2. The official website is http://www.wampserver.com/.

AppServer: It is a web elevated tool which combined the PHP packages. An author from Thailand repackaged some resources of the internet free of charge elevated into a single installer so that it is more easy for beginners to complete build the platform. AppServ 4.0 software included: PHP 4.3.8, Apache HTTP Server 1.3.31, MySQL 4.0.20 and Zend Optimizer 2.5.3. Zend Performace is software which optimization PHP, and it relies on the most well-known companies of Zend PHP. The official website is http://appserv.sourceforge.net/

XAMPP: XAMPP is a full-featured AMPP, which includes Apache HTTP Server, MySQL Server, PHP and Perl packages. It is one of the non-commercials AMPP middleware that can be used on both Linux and Windows operating systems. With this tight integration, XAMPP can run any program: from a personal home page to feature comprehensive product site.

WAPM: WAPM is running on the Windows operating system. It contains the following components: Apache HTTP Server 2, which is the most popular internet services and can provide the basic function of web service. It also supports SSL, GZIP, LIC. PHP 4 or PHP is the most popular dynamic web language. PHP language which provides web application development, and support ZendOptimizer optimization and Zend encryption,

or Turck MMCahe for PHP acceleration, optimization, encryption, dynamic caching. Tomcat 4 provides the server of JSP (JavaServer Pages) and Servlet (Java Servlet). Besides, the MySQL version 4 provides the function of SQL database.

Secondly, in terms of the management complexity, typically, it is complex both on LAMP and WAMP management. With the emergence of many management suite, the management tended to simple. Comparison is as follows: (Figure 1. Figure 2.)

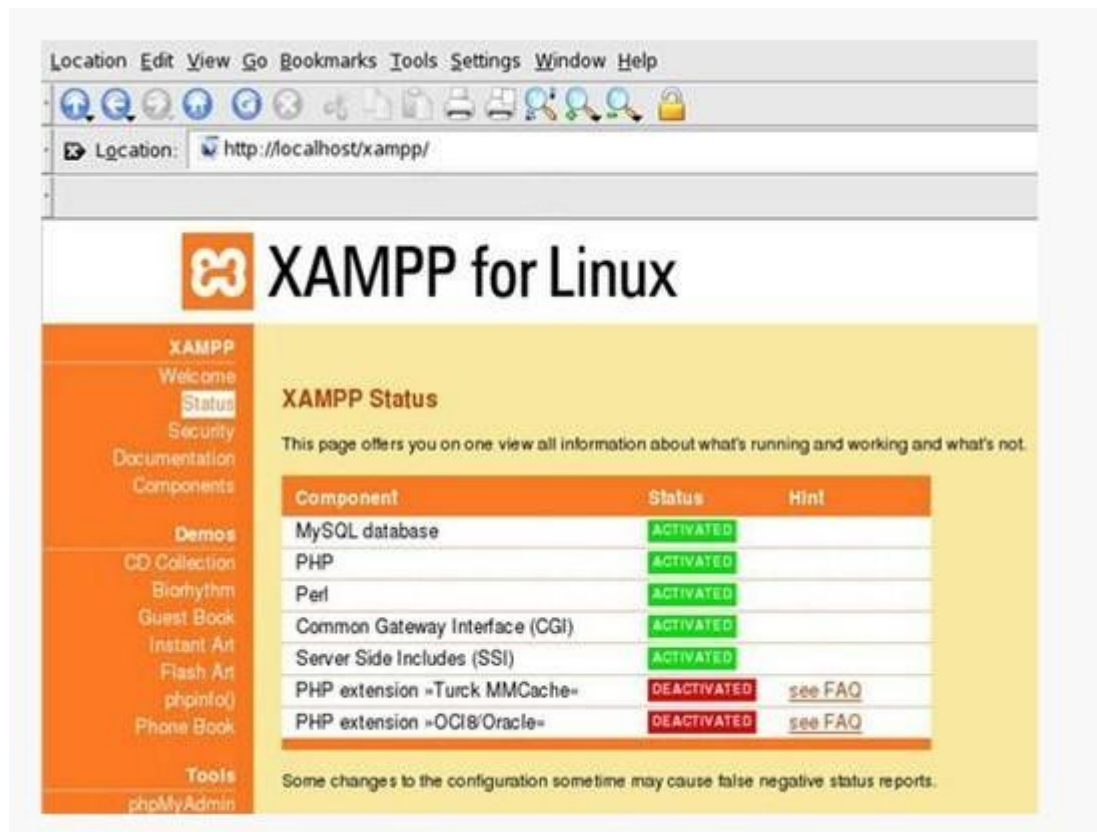**Figure 1**. The management interface of WAMP 5 under Windows oprating system

Figure 2. The management interface of XAMPP under Linux operating system

Lastly, we talk about the safety performance and executive performance. Personally, I think the LAMP is better than WAMP in safety performance. At present, only few WAMP software supports the SSL connection, including the WAMP and XAMPP. So for security reasons, XAMPP is also not suitable for using in products on the server.

However, in terms of the executive performance, the LAMP is better than WAMP. The WAMP platform needs some tools such as Cygwin to simulate the environment. The Cygwin is UNIX running on Windows platform simulation environment. Firstly, Cygnus improved the GCC, GDB and GAS etc., and made them generate and interpret the target Win32 files. And then, they transplanted these tools into Windows operating system. Based on the Win32 API, it wrote an emulation layer of the UNIX system library. Thus, you only need to connect the source code and the shared library together, you can use UNIX platform to generate the cross compiler running on Windows platform tool set. In this way, run the BASH under Windows platform and development tool, user tools, it feels like working on the UNIX.

Since the Microsoft released MSDE, it not only does not contain LAMP development momentum, but has evolved into WAMP and WIMP (Windows + IIS + MySQL + PHP)

and MMAP (MacOS + Apache + MySQL + PHP). However, as a user, we welcome that the emergence of WAMP provides more choices for us (The comparison between LAMP and WAMP [referred 15.4.2011]).

2.2.2 PHP

PHP was created by Rasmus Lerdorf in 1994. Initially, PHP was used to calculated the number of visitors to his own website. After that, it was re-written by C language, it also had an access to the database. In 1995, it was published the first version by Personal Home Page Tools (PHP Tools). Lerdor wrote some documentation for his program, and issued a PHP1.0. In earlier versions, PHP provided for visitors the guest book, visitor counter and some other simple functions. After more and more websites using PHP and strongly requesting for additional features such as loop and the array of variables, PHP published the version 2.0 in 1995. The second version was named PHP/FI (Form Interpreter). PHP/FI added the support for MySQL. Since then, PHP established the status of dynamic web development. To the end of 1996, there were 15,000 websites using PHP/FI. And in 1997, the beginning of the third edition of the development plan, its team joined Zeev Suraski and Andi Gutmans. The third edition called PHP 3. In 2000, PHP 4.0 came out, which added many new characteristics than before.

The original short for PHP was Personal Home Page. In order to maintain personal web pages, Rasmus Lerdorf use C language developed some CGI tools for the assembly to replace the Perl program. These tools program used to display the original Rasmus Lerdorf's resume and website traffic statistics. He integrated these programs and some interpreter, which is known as PHP/FI. PHP/FI, and produced simple dynamic web applications. On June 8, 1995, Rasmus Lerdorf released to the public, and hoped to speed up the process through community development and to find errors. The release version named PHP 2. PHP 2 had a number of prototype as today's, such as variable naming like Perl, forms processing and embedded in HTML. The program syntax is similar to Perl, even if there were more restrictions, but it is simpler and more flexible.

In 1997, two programmers who are from Israeli: Zeev Suraski and Andi Gutmans, rewrote the PHP parser, as the basis of PHP 3. While, PHP change the name into PHP: Hypertext Preprocessor. After several months of texting, the team released the PHP/FI 2 in November, and followed by the opening texting PHP 3 to public. Finally, it was

released PHP 3 in June, 1998. After that, Zeev Suraski and Andi Gutmans began to rewrite the PHP's core which released in 1999, and this parser is called Zend Engine. They also set up Zend Technologies in Israel's Ramat Gan to manage the development of PHP.

On the May 22, 2000, based on the Zend Engine 1.0, PHP 4 was published. After that, on July 13, 2004, PHP 5 was published. PHP 5 used the second generation of Zend Engine (Figure 3.). PHP contains a lot of new features, such as enhanced object-oriented features, the introduction of PDO (PHP Data Object, an extension library to access the database.), and many performance enhancements. Currently, PHP 4 did not continue to be updated so that it encouraged users to use PHP version 5.

Figure 3. The logo of Zend PHP Company

PHP version 5.3 will add the function of Late Static Binding and some other enhanced functions. PHP version 6 developments are on the way, the major improvements have removed register_globals, magic quotes and safe mode functions (PHP [referred 15.4.2011]).

2.2.3 MySQL Server

The original developer of MySQL connected the form by using the mSQL and ISAM. Anyway, after some testing, the developers concluded that mSQL is not as fast as they need. This needed a mSQL using almost the same API interface for their database SQL

interface of the new generation, so that, the API is designed to allow for using mSQL and third-party code easier to write portable to MySQL.

However, how the name of MySQL came from is not clear. The Basic Guide and a large number of libraries or tools shows that the prefix "my" has been more than 10 years. In any case, one of the founder of MySQL AB company Monty Widenius is also named My. who give the name remain a mystery and we also do not know who was the developers.

MySQL Server dolphin logo called sakila (Figure 4.), it is selected by the founder of MySQL AB from the user recommend in the "dolphin named" competition. The winner's name is from an open source developer Ambrose Twebaze in Africa Swaziland Ambrose. It is said that Sakila SiSwati from Swaziland called dialects, but also in Ambrose's home Arusha Tanzania, Uganda, near a small town's name (MySQL [referred 10.4.2011]).

Figure 4. The logo of MySQL

2.2.4 Apache HTTP Server

Apache is the top web server software over the world. It can run on almost all operating systems.

Apache originated in NCSAhttpd server, after several times revisions, it became the most popular web server software in the world. Apache is from the pronunciation of "a patchy server". It means that the server is full of patches, because it is a free software, so people

keep to add new features, new functions and modify the original errors. The features of Apache are simple, fast and stable.

Initially, Apache HTTP Server only was used for small or pilot internet networks. Then it expanded gradually to a variety of UNIX systems, particularly Linux support for quite perfect. Apache has a variety of products, and it can support SSL technology and multiple virtual hosts. Apache is a process-based structure, the process consumes more system than the expenditure of the thread. So it is not suitable for multi-processor environment. In addition, the expansion of Apache Web site is usually to increase or expand the server cluster node rather than increasing processor. Apache is still the most used web server in the world, the market share of around 60%. Many of the world famous sites such as Amazon, Yahoo, W3 consortium, Financial Times, are all the products of Apache. The success is based on the open-source code, and it has a development team to support cross-platform application. Besides, the portability is also good.

The birth of Apache HTTP Server is very dramatic. When NCSAWWW server project stalled, people who used the NCSAWWW server began to exchange their patch for the server, they quickly realized that the establishment of a forum for management these patches are very necessary. Therefore, the Apache Group born up, and based on the NCSA, they created the Apache HTTP Server.

Apache web server software has the following features:

Firstly, it supports the latest HTTP/1.1 telecommunication protocol. Secondly, it has the most simple and powerful file-based configuration process. Thirdly, it supports the common gateway interface. Besides, it also supports IP and name-based virtual hosts. The HTTP authentication supports a variety of ways. It has the integrated Perl processing module, and proxy server module. It supports real-time monitoring server status and custom server logs. It supports the server-side include directive SSI, and the Security Socket Layer SSL. Furthermore, it provides the process of tracking user sessions and supports FastCGI. Through the third-party modules, it can support the Java Servlets.

In conclusion, if you are ready to select the web server, there is no doubt that Apache HTTP Server is your best choice (Apache [referred 15.4.2011]).(Figure 5.)

Figure 5. The logo of Apache HTTP Server

3   WORKING PRINCIPLLE OF PHP

In this part, I will introduce some useful knowledge which relate to building the working entity in my practical work.
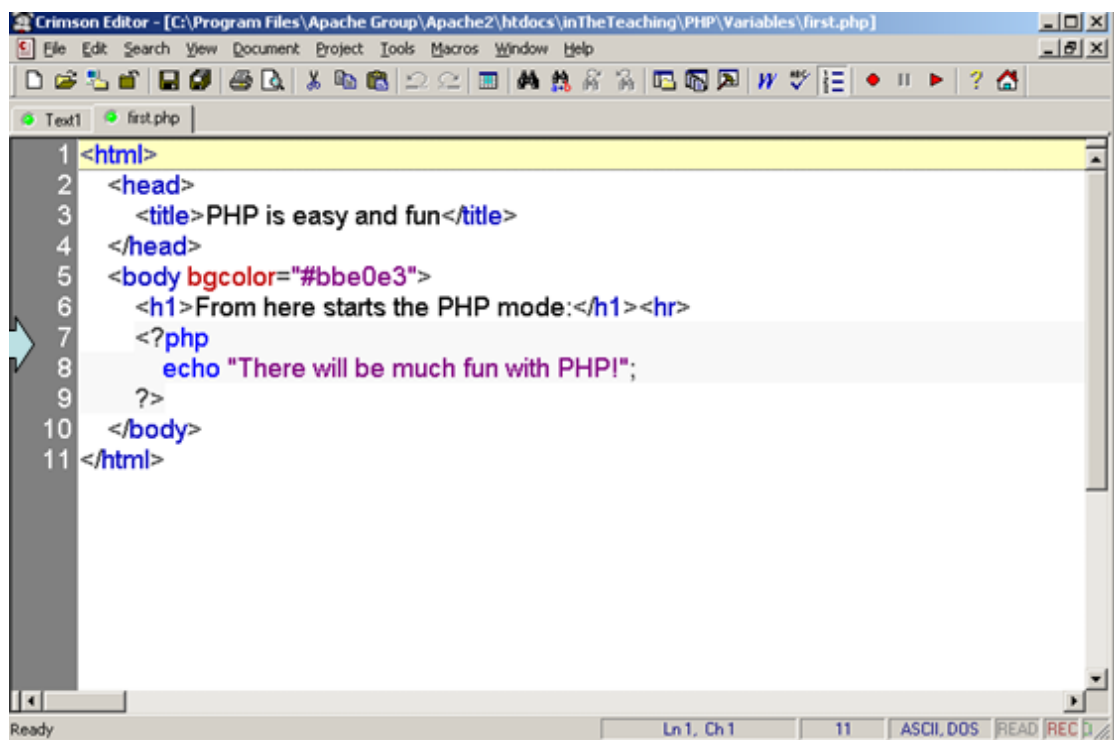
3.1 PHP and HTML

After configuring the WAMP platform, it is time for you to write the PHP language. However, firstly, I will make a simple introduction of HTML language.

HTML stand for Hyper Text Mark- up Language. It is the most widely used web language, but also constitutes the main language of web documents. HTML command text is composed of descriptive text. The HTML commands can describe the text, graphics, animation, sound, tables, and links. There are two main parts of HTML: head and body. The head shows the information of the browser, while the body contains the specific content (HTML [referred 15.4.2011]).

For example, there is some files of PHP and HTML code, how does it work? Firstly, the file must be the extension of .php, which the web browser and Apache HTTP Server can execute. Secondly, the PHP file needs to be parsed. So send the request on to the PHP parser. Thirdly, after the PHP parser has recognized the PHP code, it will execute the code and then save the result. Then, the new output will be send to the web server. After

that, the web server will send the result into the web browser. Lastly, the web browser displays the result. There are two kinds of codes: one is called server-side code, which means that the PHP code is parsed on the server. The other one is called client-side code. It means that the code is executed in a web browser, such as JavaScript.

So what is the relationship between PHP code and HTML code? The PHP code must be set apart from the HTML (Julie, 2004, 58).Here is a simple example to show the basic function of PHP and HTML (Mynttinen 2011,3).


```
1  <html>
2    <head>
3      <title>PHP is easy and fun</title>
4    </head>
5    <body bgcolor="#bbe0e3">
6      <h1>From here starts the PHP mode:</h1><hr>
7      <?php
8        echo "There will be much fun with PHP!";
9      ?>
10   </body>
11 </html>
```

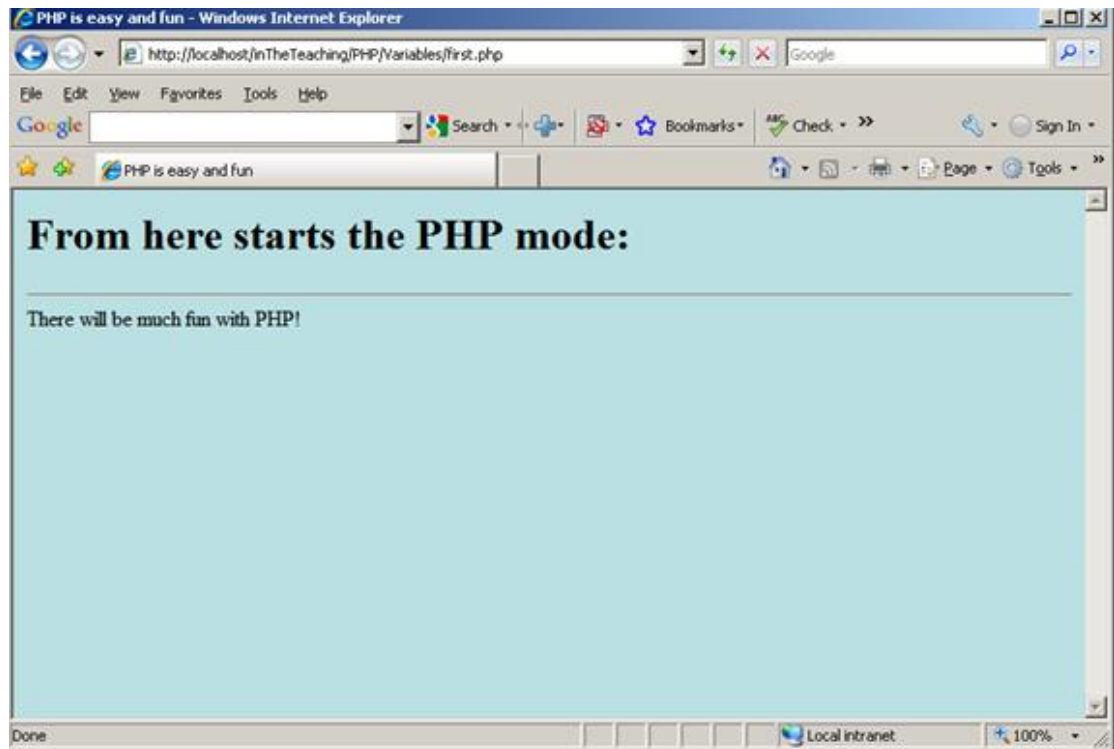**Figure 6**. The example of PHP file

Figure 7. The result of the example.

3.2 Creating the database table and inserting the data into the table

The SQL commands have been reasonably simple. However, it takes a more complicated command to create. Here is an example: (Mynttinen 2011,5).

Figure 8. How to create a table in the database

The first line is fairly simple; it means that we want to create a table named Branch. And the second line says that the table needs a column called branchNo that will contain an integer (INT) that means the whole number. The rest of this line describes some special details of the column. Firstly, this column is not allowed to be left blank which is showed by NOT NULL. Next, the AUTO_INCREMENT means that if we do not specify any value in particular when we add a new entry to the table, we want the MySQL Server to pick a value that is one more than the highest value in the table.

The third, fourth and fifth line shows that we want three column called street, city and postcode, which will support text form.

The PRIMARY KEY in the last line means that this column is to act as a unique identifier for the entries in the table, so the value in this column must be unique. (Kevin, 2004, 35) Furthermore, how to insert the data into the table? Here is the example: (Mynttinen 2011,5).

Figure 9. Inserting data into the table

The basic form of insert command has shown above. Note that the order in which you list the columns must match the order in which you list the values. Otherwise, the order of the columns does not matter, as long as you provide values for all required fields. The result is shown in Figure 10.

Figure 10. The result of inserting data into a table

3.3 Selecting and displaying data

The command that we use to view the data, SELECT, is the most complicated command in the SQL language. The reason for this complexity is that the chief strength of a database is its flexibility in data retrieval and presentation. The general form of the command SELECT is as follows:

SELECT [DISTINCT|ALL] {*|[columnExpression [AS newName]] [, …]}
FROM TableName [alias][, …]
[WHERE condition]
[GROUP BY columnList][HAVING condition]
[ORDER BY columnList]

And there are several sequences of processing in the SELECT statement.

FROM specifies the table or tables to be used.
WHERE filters the rows subject to some condition.
GROUP BY forms groups of rows with the same column value.
HAVING filters the groups subject to some condition.
ORDER BY specifies the order of the output.
(Mynttinen 2011,3).

For example, assumed that we have created a table and inserted some information here. Now when I input the command SELECT * FROM staff; it will execute as follows:
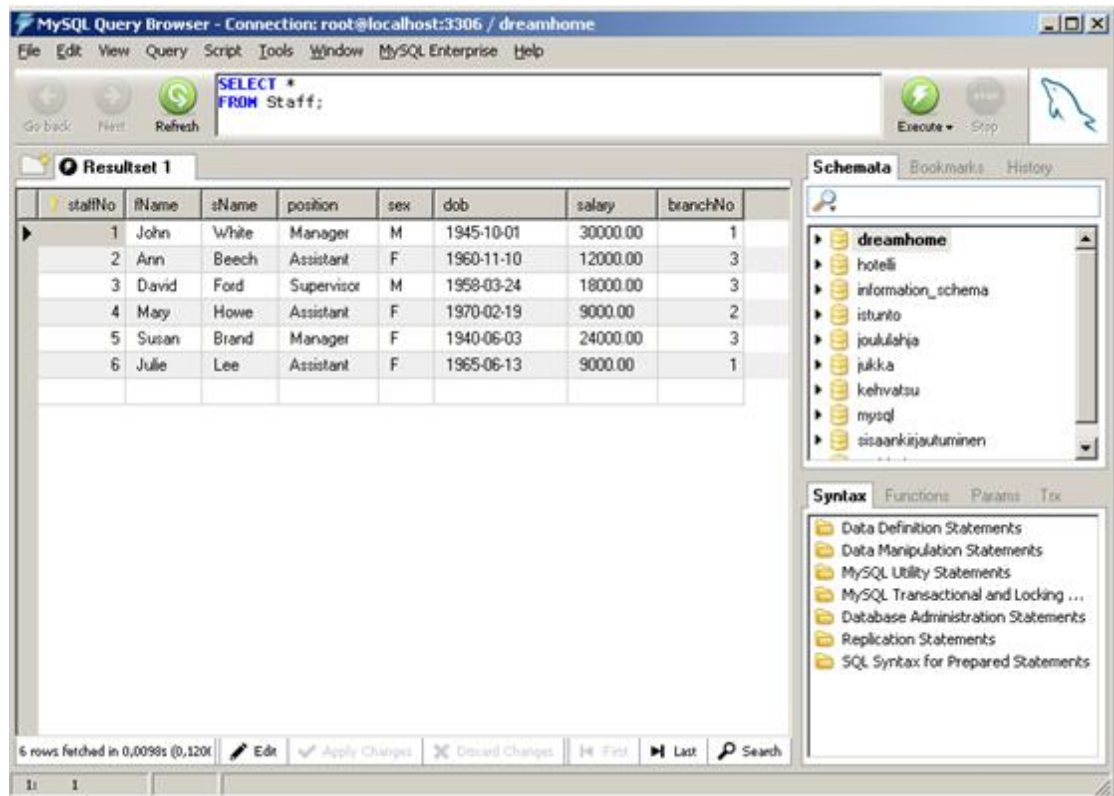
Figure 11. The result of command: SELECT

3.4 Connecting PHP with MySQL Server

The command mysql_connect ( ) function is the first function we must call when utilizing a PHP script to connect to MySQL.

The basic form of mysql_connect ( ) is as follows:

mysql_connect ("hostname", "username", "password");

This function returns a connection index if the connection is successful or returns false if the connection fails.

Here is an example to show how the PHP connects to the MySQL database.

```html
1.   <html>
2.   <head>
3.   <title>Welcome!</title>
4.       <script src="./jquery.js"></script><!--注意:这里引入Jquery-->
5.   </head>
6.   <body>
7.   <h1>Search our Phone Directory</h1>
8.       <form id="searchform" method="post">
9.   <div>
10.          <label for="search_term">Search name/phone</label>
11.          <input type="text" name="search_term" id="search_term" />
12.  <input type="submit" value="search" id="search_button" />
13.  </div>
14.      </form>
15.      <div id="search_results" style = "display:none"></div>
16.  </body>
17.  </html>
18.
```

```javascript
19.  <script type='text/javascript'>
20.  $(document).ready(function(){
21.  $("#search_results").slideUp();
22.      //点击搜索按钮
23.      $("#search_button").click(function(e){
24.          e.preventDefault();
25.          ajax_search();
26.      });
27.      //输入以后进行搜索
28.      $("#search_term").keyup(function(e){
29.          e.preventDefault();
30.          ajax_search();
31.      });
32.
33.  });
34.  function ajax_search(){
35.       $("#search_results").show();
36.       //获取表单数据
37.       var search_val=$("#search_term").val();
38.       //jquery    post提交
39.       $.post("./find.php", {search_term : search_val}, function(data){
40.           if (data.length>0){
41.               //在结果显示区域添加data数据
```

```php
1.  <?php
2.      //数据库连接常量
3.      define(HOST,"localhost");
4.      define(USER,"root");
5.      define(PW,"lijian");
6.      define(DBNAME,"notbook");
7.      //数据库连接
8.      $conn = mysql_connect(HOST, USER, PW) or die('Could not connect to mysql server.' );
9.      mysql_select_db(DBNAME) or die('Could not select database.');
10.     //接收保单数据
11.     $term = strip_tags(substr($_POST['search_term'],0, 100));
12.     $term = mysql_escape_string($term);
13.     //sql语句
14.     $sql = "select name,phone from directory where name like '%$term%' or phone like '%$term%' order by
    name asc";
15.     //执行语句
16.     $result = mysql_query($sql);
17.     //初始化string变量
18.     $string = '';
19.
20.  if (mysql_num_rows($result) > 0){
21.      while($row = mysql_fetch_object($result)){
22.          $string .= "<b>".$row->name."</b> - ";
23.                $string .= $row->phone."</a>";
24.                $string .= "<br/>\n";
25.                $data[] = $row;
26.          }
27.        echo "<pre>";
28.      var_dump($data);
29.      }else{
30.            $string = "No matches!";
31.  }
32.
33.      echo $string;
34.
35.      ?>
```

```sql
1.  CREATE TABLE `directory` (
2.  `id` INT NOT NULL AUTO_INCREMENT ,
3.  `name` VARCHAR( 64 ) NOT NULL ,
4.  `phone` VARCHAR( 16 ) NOT NULL ,
5.  PRIMARY KEY ( `id` )
6.  ) TYPE = MYISAM ;
7.
8.  insert into `directory` (name,phone) values ('Tom Smith', '512-555-0111');
9.  insert into `directory` (name,phone) values ('Bill Smith', '512-555-0112');
10. insert into `directory` (name,phone) values ('John Smith', '512-555-0113');
11. insert into `directory` (name,phone) values ('Jane Smith', '512-555-0114');
12. insert into `directory` (name,phone) values ('Sara Smith', '512-555-0115');
```

Figure 12. An example shows connect the MySQL.
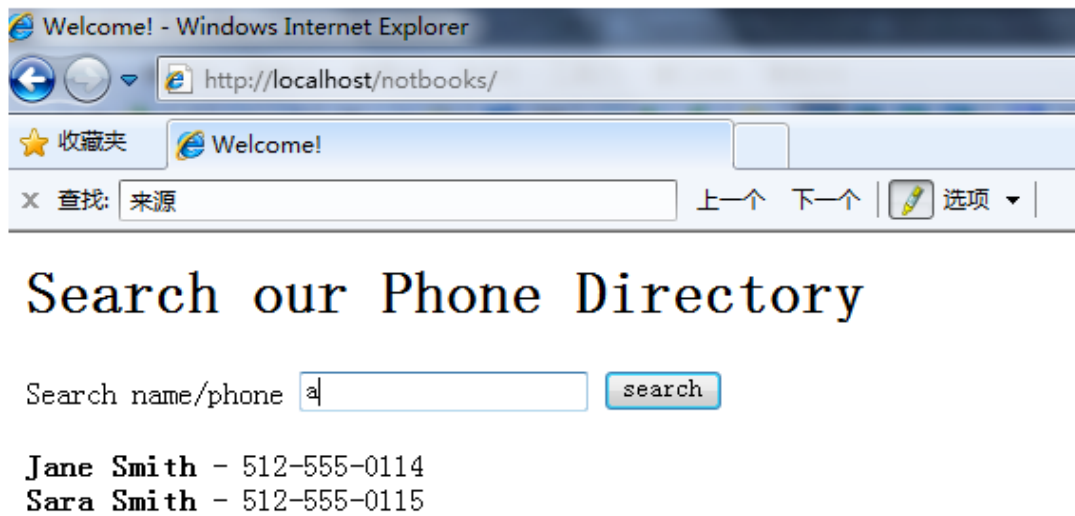
The result is as follows:

Figure 13. The result of the example

In conclusion, to connect to MySQL Server with PHP, you must know the MySQL username, password and database name which installed in your own computer. And then, use the command mysql_connect ( ) and mysql_select_db ( ), you can connect to and select a database used throughout the life of the script.

Since connected, it can be issued standard SQL commands with the command mysql_query ( ) function. If there is a SELECT command, you can use mysql_numrows ( ) to count the records returned in the result set. And if you want to display the data found, you can use the command mysql_fetch_array ( ) to get all the output during a loop and display them on screen. (Julie C, 2003, 157)

4   EXPERIMENTS

4.1 Building the WAMP platform

I first build the WAMP platform on my own computer.

4.1.1 The aim of the experiment

The WAMP is a web application platform, it is used to build dynamic website. In Windows operating system, I use the Apache, PHP and MySQL to complete building the working platform. Obviously, it includes the following three parts: Apache, PHP and MySQL. So I must install them respectively, and then modify some of the configuration.

Firstly, I build the WAMP platform. It is an environment which the working entity, such as a webpage.

4.1.2 Installing and configuring MySQL

First of all, I download the MYSQL from the official website. The installation instructions are based on the 5.5.10 version of MySQL server.

There is everything I want in one zip file with the setup program from the official website. So I can download the package and then find the application named setup.exe. After that, double-click the file so that it starts the installation. The first screen is shown as Figure 14. Following the guide, I can complete install the MySQL Server.

Figure 14. The first step of MySQL Server setup wizard.

Secondly, it will be shown that what function you want to do. It can be selected Change, Repair and Remove. Here, I select the first one: Change, and click the next button. (Figure 15.)
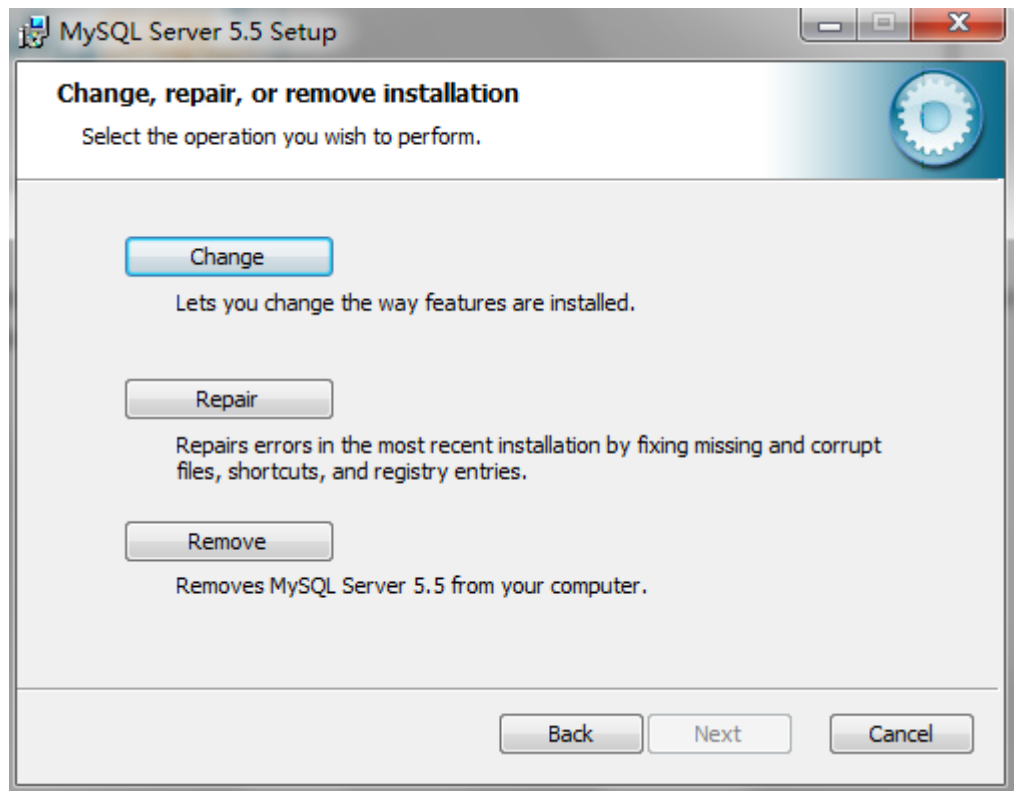

Figure 15. The second step of MySQL Server setup wizard.

In the second step, it will be Custom Setup. There is MySQL Server, Development Component, Debug Symbols and Server data files. I want to install the MySQL Server, so I chose the first one: Mysql Server. (Figure 16.)
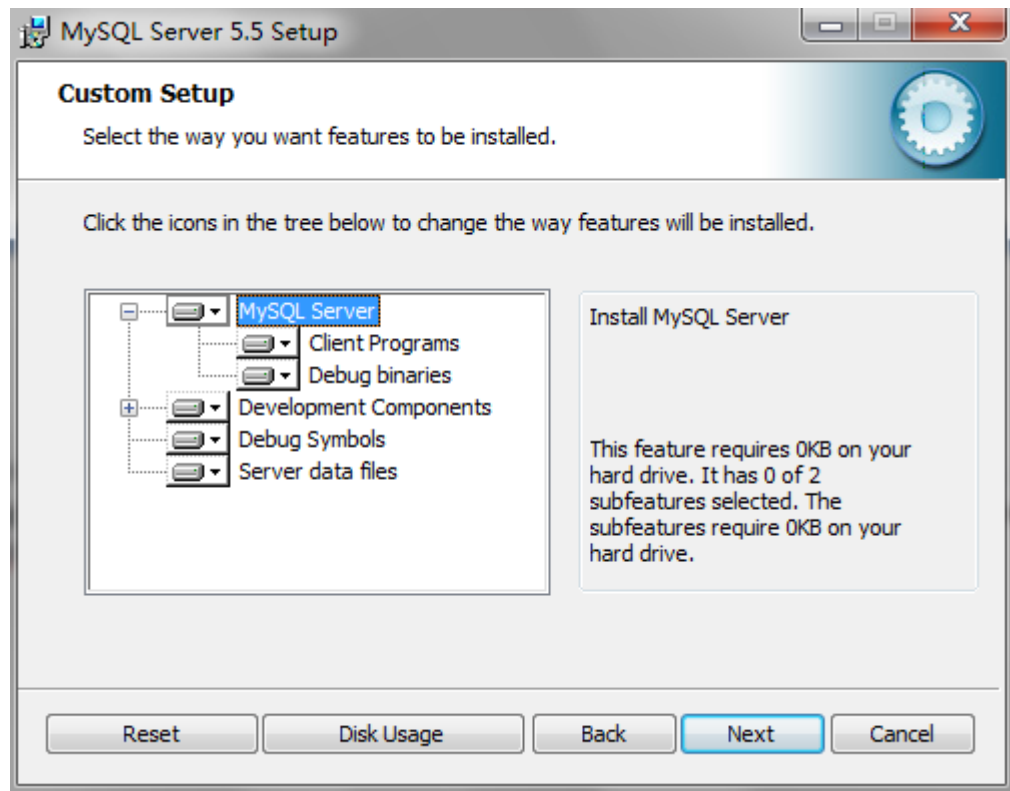
Figure 16. The second step of MySQL Server setup wizard.

After that, the setup wizard is ready to install the MySQL Server, so I just click the Change. It should be installed automatically.
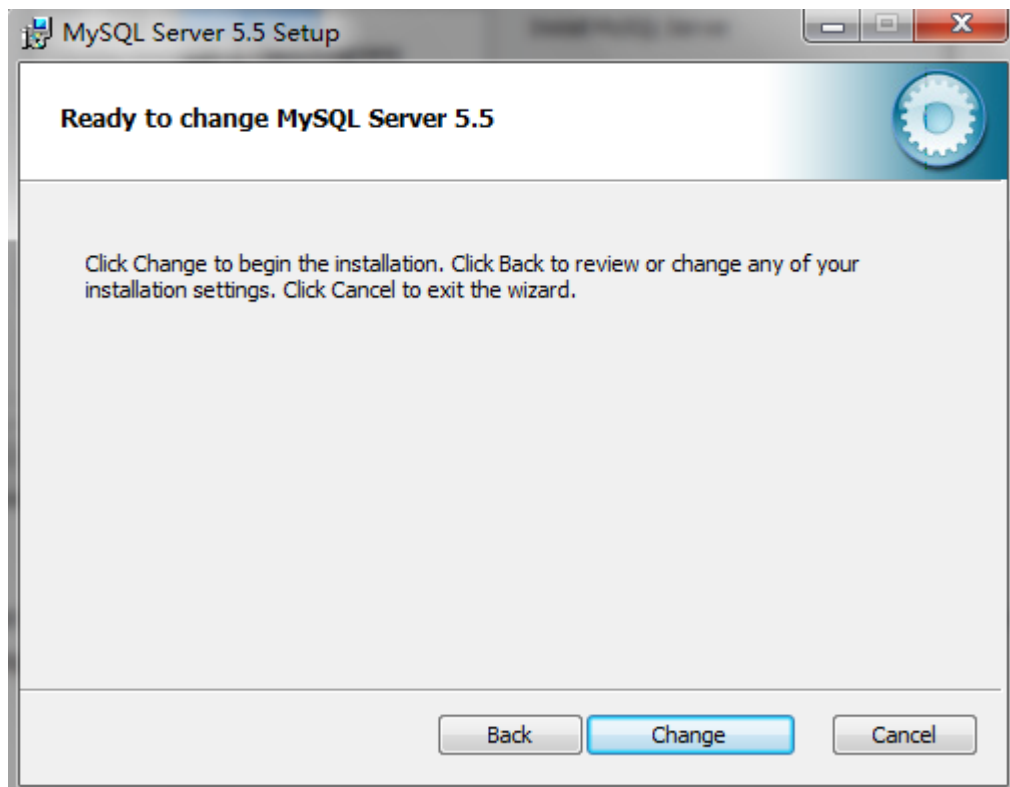

Figure 17. The fourth step of MySQL Server setup wizard.

When I successfully install the MySQL Server, I will go on the Configuration Wizard. There is nothing special, I only follow the default configuration and click the next button. However, the character set should be changed into utf8. (Figure 18.)
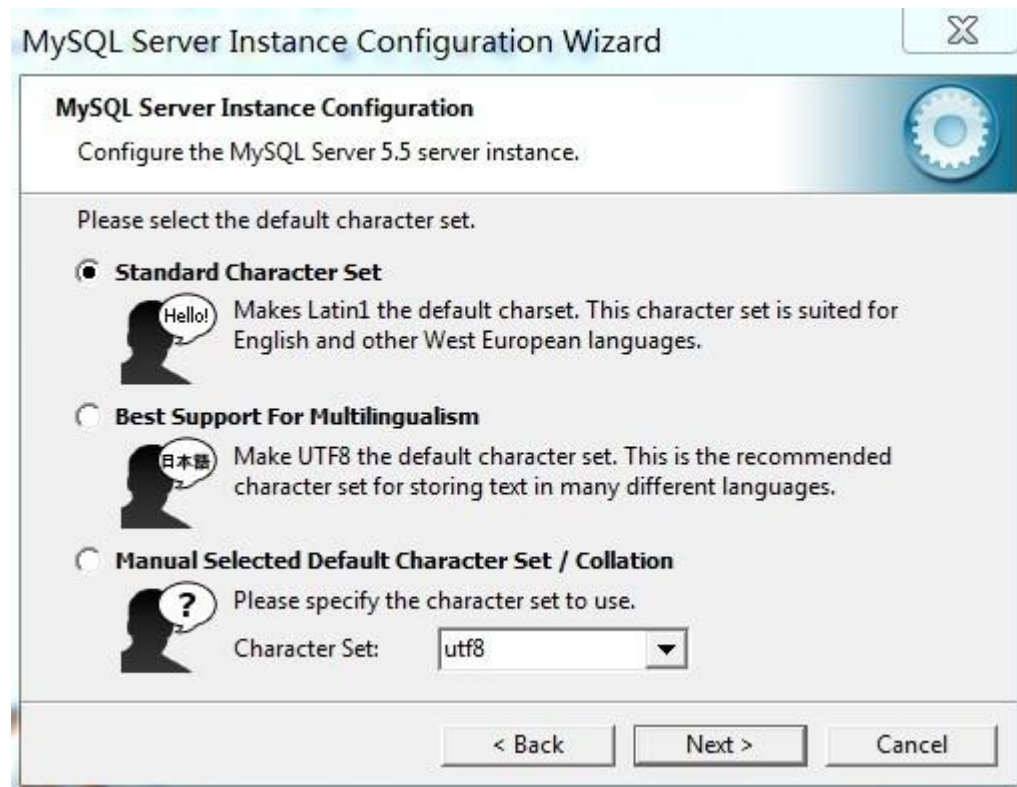

Figure 18. The fifth step of MySQL Server setup wizard.

Note that here should configure the password. I think it should be remembered carefully or it will cause some problem when I writing the coding of the webpage.

Click next and execute button. The configuration of MySQL Server is finished.

Open the folder of MySQL Server, and find the file called my.ini, it can show all the configuration of MySQL Server. I can check that the default character set has been changed into utf8 and the client port is 3306.

Above all, the part of installing and configuring the MySQL part has done. It is not too complex.

4.1.3 Installing and configuring PHP

Because I build the platform in the Windows operating system, so it requires nothing more than downloading the PHP from the official website. The newest major version is PHP 5.3.6, which was published in Mar 10, 2011. However, when I build the WAMP platform by using the PHP 5.3.6, it causes some problems. I would talk about it in chapter 5. So the work is based on PHP 5.2.5.

I can find PHP download link easily from internet. When I download the package, I unzipped it and rename the folder. The purpose is to avoid some writing mistake when I do change the configuration of PHP, because I need to write the file path. So the folder located C:\ PHP5. In addition, I need to create a new folder named phproot, it will be used to store the website files. The path of this folder is C:\ phproot.

Step 1: All documents in the folder of PHP5 arrange by type, and then select all the *.dll files, copy them to C:\Windows\System32. I use the Window 7 operating system, if the operating system is Windows 2000, it should be copied to C:\WINNT\System32.

Step 2: Select the file: php.ini- dist in C:\ PHP5, rename the file to php.ini and then copy it into C:\Windows. If the PHP version is PHP 5.3.6, the file name is php.ini − development.

Step 3: Start to modify the configuration file: php.ini. However, there should be paid special attention to the file of php.ini. It is the file which copied to C:\Windows but not the original php.ini.

Open the php.ini in C:\Windows , I can see the whole configuration of PHP which I setup in my own computer. To the start, find the extension_dir = "./", it is the path where store the extensions gallery of PHP. So I should add the correct path here that looks like this:
; The directory under which PHP opens the script using /~username used only
; if nonempty.
user_dir =
; Directory in which the loadable extensions (modules) reside.
extension_dir = "C:/php5/ext"

NB: it must be changed the \ into /.

Step 4: After that, find the doc_root, it is the root of PHP pages, I create a new folder at the beginning of installing the PHP. So I add the right path here that looks like this:

; The root of the PHP pages, used only if nonempty.

; if PHP was not complied with FORCE_REDIRECT, you SHOULD set doc_root

; if you are running php as a CGI under any web server (other than IIS)

; see documentation for security issues.   The alternate is to use the

; cgi.force_redirect configuration below

doc_root ="C:/phproot"

NB: it also must change the \ into /. Otherwise, the configuration will fail.

Step 5: find a section like this:

;extension=php_bz2.dll

;extension=php_curl.dll

;extension=php_dba.dll

;extension=php_dbase.dll

;extension=php_exif.dll

;extension=php_fdf.dll

;extension=php_gd2.dll

;extension=php_gettext.dll

;extension=php_gmp.dll

;extension=php_ifx.dll

;extension=php_imap.dll

;extension=php_interbase.dll

;extension=php_ldap.dll

;extension=php_mbstring.dll

;extension=php_mcrypt.dll

;extension=php_mhash.dll

;extension=php_mime_magic.dll

;extension=php_ming.dll

;extension=php_msql.dll

;extension=php_mssql.dll

extension=php_mysql.dll

extension=php_mysqli.dll

;extension=php_oci8.dll

;extension=php_openssl.dll

;extension=php_pdo.dll

Delete the ";" of php_mysql.dll and php_mysqli.dll. It means that if there is ";", the extension file is not in use, so we must delete it to make the extension files work. Here we use both php_mysql.dll and php_mysqli.dll extension files. Note that the php_mysqli.dll is a new extension file added after PHP version 5.1.

I have modified the entire PHP configuration. Furthermore, I would start to Apache configuration. What's more, I must ensure that PHP and Apache can get along with one another.

4.1.4 Installing and configuring Apache

Download the Apache HTTP Server 2.2 from Apache official website. Before installing Apache, you'll probably want to make sure that you are not currently running a Web server (for instance, a previous version of Apache, Microsoft Internet Information Server, or Microsoft Personal Web Server) in your machine. You might want to uninstall or otherwise disable existing servers. You can run several Web servers, but they will need to run in different address and port combinations. (Julie C, 2003, 25).

Follow the Apache HTTP Server setup program, I choose the default option and click the button. (Figure 19.)

Figure 19. Step1 of installing Apache HTTP Server

After that, it will be the Apache license. Typically, the license says that the users can modify everything. Make sure that you have read the entire license so that you can understand the terms. (Figure 20.)
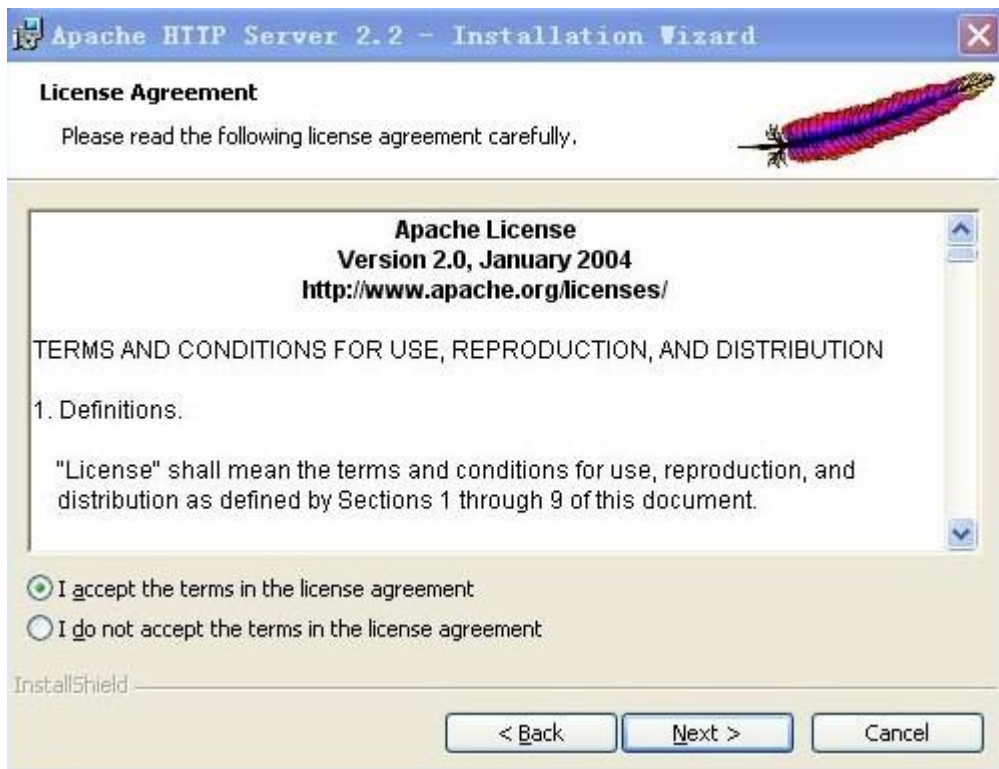

Figure 20. Step2 of installing Apache HTTP Server

When accepting the terms, click next button. You should add some server information here. It includes Network Domain, Server Name and Administrator's Email Address. You can fill the form whatever you want but must follow the right form. Then chose the option of for all users, on port 80, as a Server – Recommend. Note that, if the port 80 is occupied, I can change the configuration after I finish installing the Apache HTTP Server. So go on clicking next. (Figure 21.)
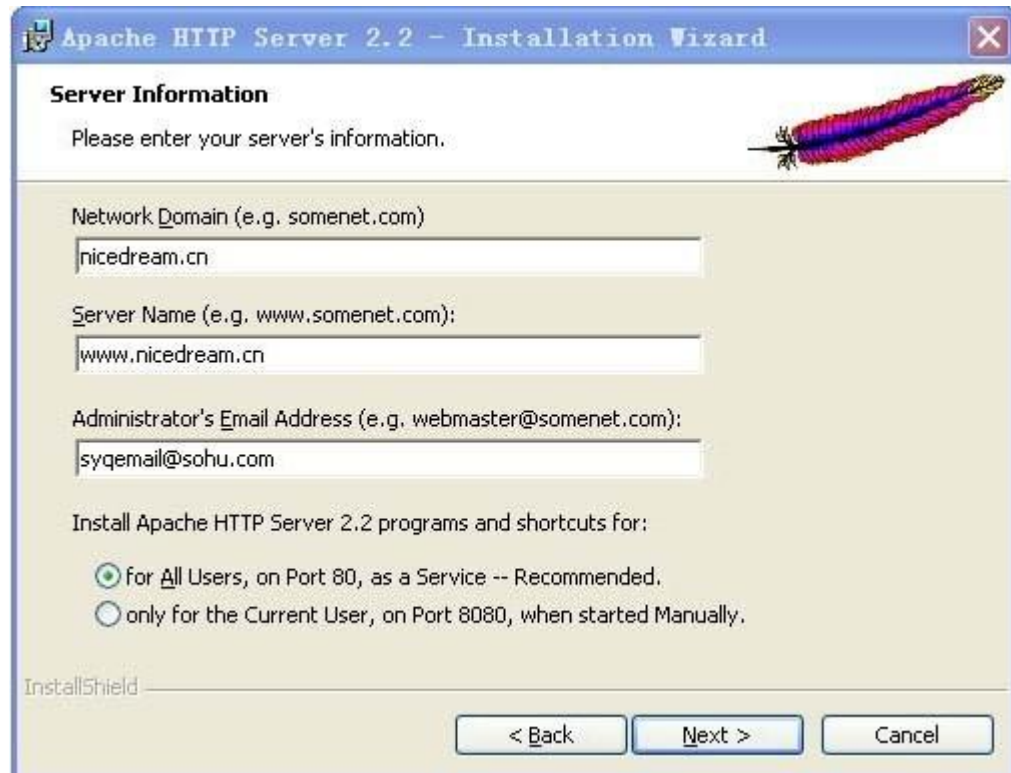

Figure 21. Step3 of installing Apache HTTP Server

Then, it is ready to install the Apache HTTP Server, click install button. (Figure 22.)
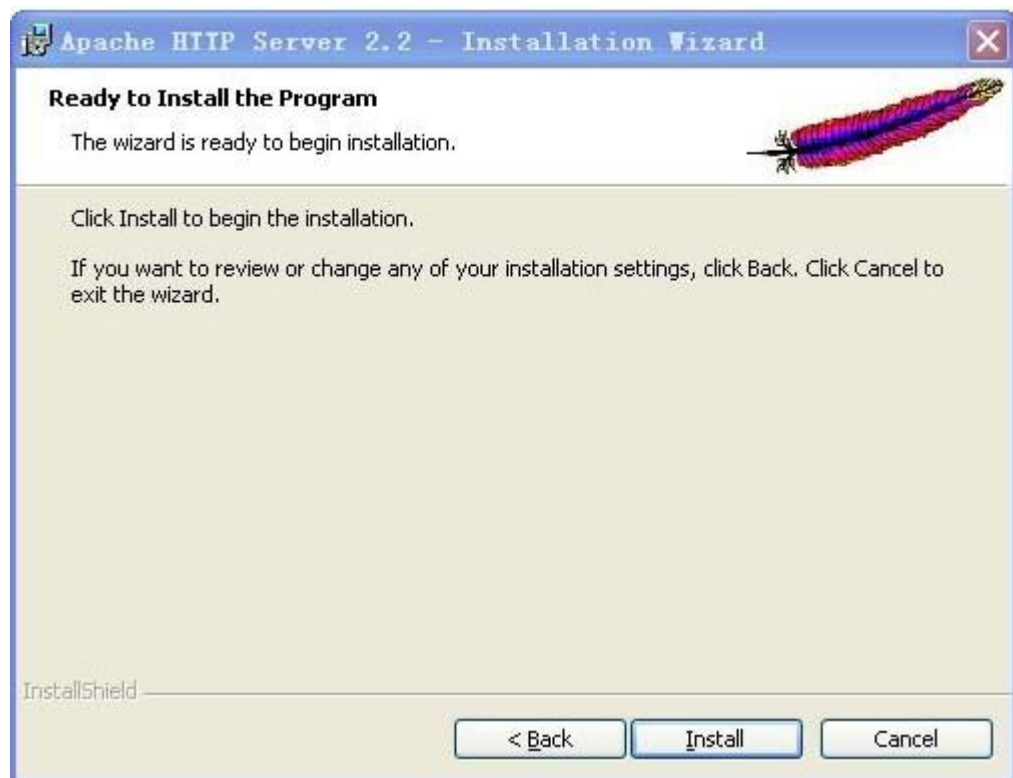
Figure 22. Step4 of installing Apache HTTP Server

When I finished installing the Apache HTTP Server, I can check the Internet Explorer.
However, I must modify the port number firstly. So follow this path: C:\Program
Files\Apache Software Foundation\Apache2.2\conf, I can find out the configuration file
called httpd.conf. Open this file and modify the listen port into 8088. Like this:

Listen: Allows you to bind Apache to specific IP addresses and/or
ports, instead of the default. See also the <VirtualHost>
directive.
#
Change this to Listen on specific IP addresses as shown below to
prevent Apache from glomming onto all bound IP addresses.
#
#Listen 12.34.56.78:80
Listen 8088

After that, open the Internet Explorer, and input: http://localhost:8088, then Enter. I can
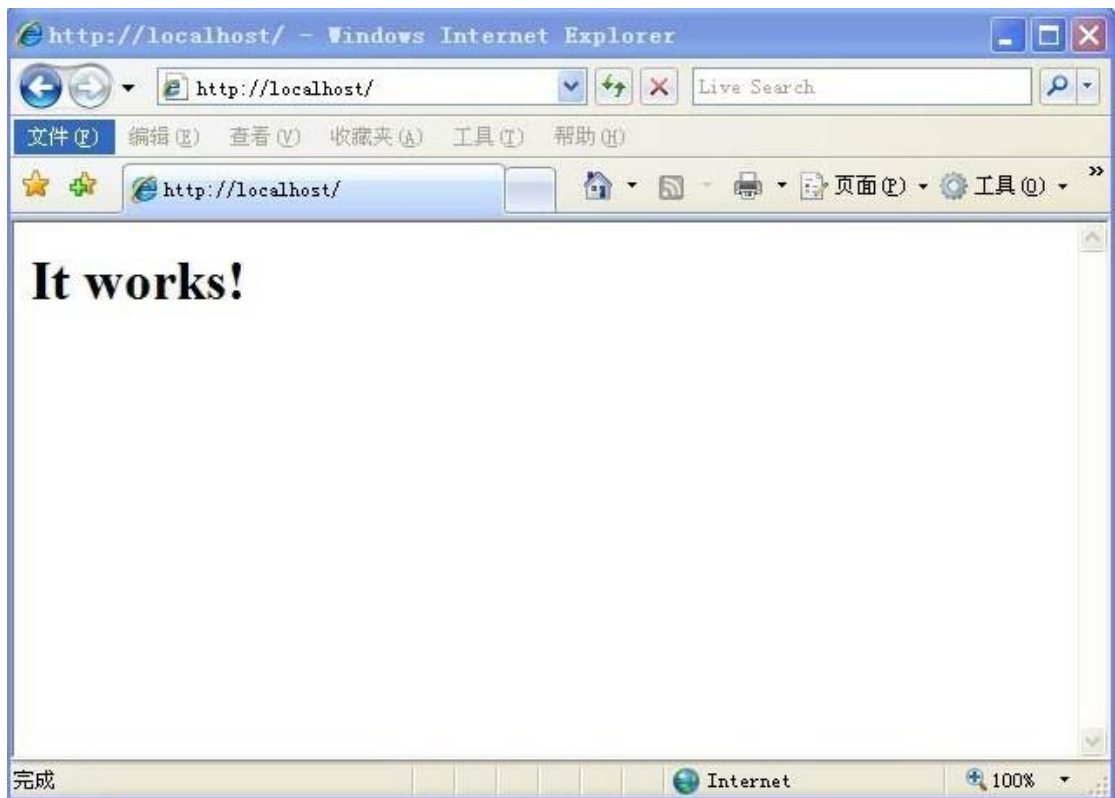check that my Apache HTTP Server works. (Figure 23.)

Figure 23. Check Apache HTTP Server works.

The next step is Apache configuration. The whole configuration of Apache HTTP Server is in the httpd.conf.

First of all, open the httpd.conf configuration file, find a section as follows:

Example:
LoadModule foo_module modules/mod_foo.so
#
LoadModule actions_module modules/mod_actions.so
LoadModule alias_module modules/mod_alias.so
LoadModule asis_module modules/mod_asis.so
LoadModule auth_basic_module modules/mod_auth_basic.so
#LoadModule auth_digest_module modules/mod_auth_digest.so
#LoadModule authn_alias_module modules/mod_authn_alias.so
#LoadModule authn_anon_module modules/mod_authn_anon.so
#LoadModule authn_dbd_module modules/mod_authn_dbd.so
#LoadModule authn_dbm_module modules/mod_authn_dbm.so
LoadModule authn_default_module modules/mod_authn_default.so

LoadModule authn_file_module modules/mod_authn_file.so

#LoadModule authnz_ldap_module modules/mod_authnz_ldap.so

#LoadModule authz_dbm_module modules/mod_authz_dbm.so

LoadModule authz_default_module modules/mod_authz_default.so

LoadModule authz_groupfile_module modules/mod_authz_groupfile.so

At the end of this section, add the sentence like this:

LoadModule php5_module "C:/php5/php5apache2_2.dll"

The php5apache2_2.dll is a file that support Apache HTTP server.

Next, add the following lines here:

AddType application/x-httpd-php .php

AddType application/x-httpd-php .htm

It means that I add the type of both .php and .htm application form.

After that, modify the documentroot, like this:

DocumentRoot: The directory out of which you will serve your

documents. By default, all requests are taken from this directory, but

symbolic links and aliases may be used to point to other locations.

#

DocumentRoot "C:/phproot"

It should be selected the folder which I create at the beginning of installing PHP.

Then , modify the dictionary like this:

This should be changed to whatever you set DocumentRoot to.

#

<Directory "C:/phproot">

And then save the file.

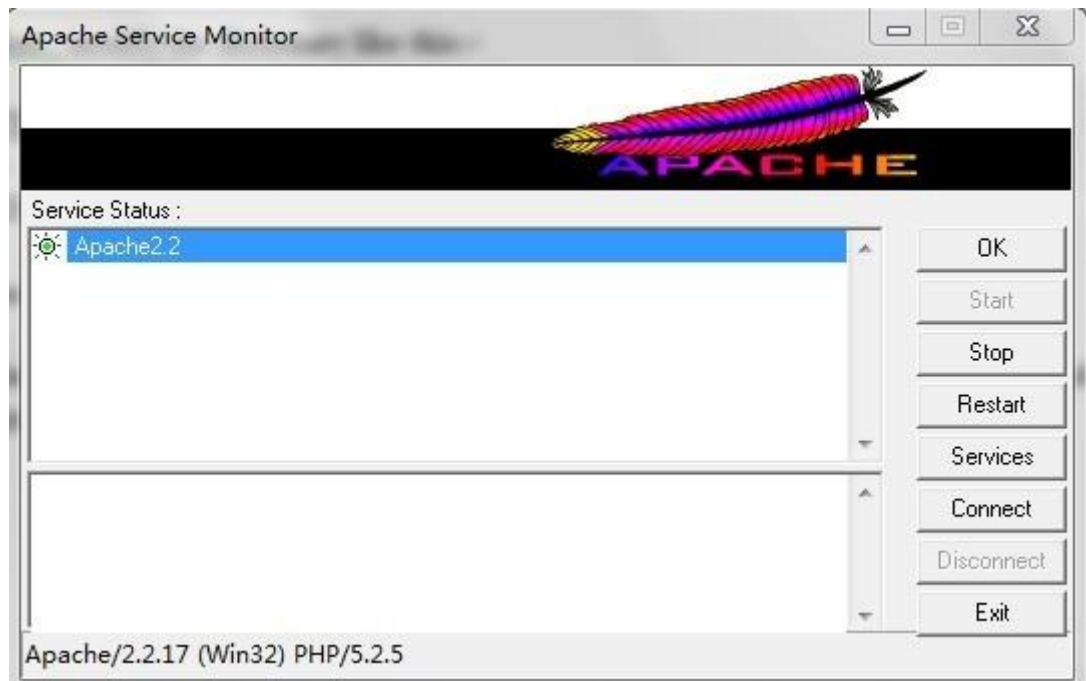Finally, restart the Apache HTTP Server and I can find that the PHP now is part of Apache HTTP Server. (Figure 24.)

Figure 24. Successful connect the Apache and PHP

4.1.5 Text

The most easiest method to check my PHP installation is to build a small test file by the function of phpinfo(). This coding will provide the whole configuration about my PHP in localhost.

So open a text editor and input the following sentence:

```
<?   phpinfo(); ?>
```

Save that file in C:/phproot where is the htdocs subdirectory of my Apache HTTP Server installation. Access this file through my Internet Explorer and I can see the information about my PHP like this: (Figure 25.)

Figure 25. The result of PHP configuration

Pay attention to the mysql module and mysqli module. It is the changes which I have done in PHP configuration. The mysql and mysqli module can show in the information of PHP configuration, it means that I have successfully connected the PHP and Mysql on my computer. (Figure 26. Figure 27.)

mysql

MySQL Support	enabled
Active Persistent Links	0
Active Links	0
Client API version	5.0.45

Directive	Local Value	Master Value
mysql.allow_persistent	On	On
mysql.connect_timeout	60	60
mysql.default_host	*no value*	*no value*
mysql.default_password	*no value*	*no value*
mysql.default_port	*no value*	*no value*
mysql.default_socket	*no value*	*no value*
mysql.default_user	*no value*	*no value*
mysql.max_links	Unlimited	Unlimited
mysql.max_persistent	Unlimited	Unlimited
mysql.trace_mode	Off	Off

Figure 26. mysql module in PHP configuration

mysqli

MysqlI Support	enabled
Client API library version	5.0.45
Client API header version	5.0.45
MYSQLI_SOCKET	/tmp/mysql.sock

Directive	Local Value	Master Value
mysqli.default_host	*no value*	*no value*
mysqli.default_port	3306	3306
mysqli.default_pw	*no value*	*no value*
mysqli.default_socket	*no value*	*no value*
mysqli.default_user	*no value*	*no value*
mysqli.max_links	Unlimited	Unlimited
mysqli.reconnect	Off	Off

Figure 27. mysqli module in PHP configuration

Furthermore, I can use a PHP scripts to prove that my platform can work.

The principle is that create a simple PHP script, whatever you want, and it should including the php file and the database file. Here, I use a php script which is showed as an example in my Internet Application Development lecture. Save the php scripts in C://phproot, and then access it by the web browser. (Figure 28.)

Figure 28. PHP text script

It is a simple example, and when I input the First name, Second name and Address, click the button: Add a friend, it should connect the MySQL, and the MySQL Server should follow the coding and give the answers. So, it can totally prove that the WAMP platform works well on my computer.

Here is the test result, there is no database named future on my computer, so my MySQL Server should feedback this sentence: what might have gone wrong?!
(Figure 29.)

Figure 29. MySQL feedback

4.2 Building the working entity

In this experiment, I will make a simple website as my working entity.

4.2.1 The aim of the experiment

I have built a WAMP platform on my own computer. Now I will build a website which can operate based on the WAMP platform.

I select the Manchester United League BBS as the main theme of the webpage, which is just for personal fun. And on this webpage, it will achieve the function of login, register or just view the webpage as guest.

4.2.1 Building the webpage

First of all, I write the main page by the HTML language. The design of the webpage is as follows:

I divided the whole page into two tables. At the top of the page is the title: Welcome to Manchester United League. And on the left of the title will show the logo of red devil. On the other side of the tile is the login box. Here you can input the username and password to login the BBS. Besides, you can also click the register button to input some personal information.

The code of the main page is as follows:

```html
<html>
  <head>
  <title>Welcome to Manchester United League</title>
  </head>
  <body>
    <a name="top">
  <table border="0" align="center" style="color:black;font-family:Comic Sans MS">
  <tr>
  <th height="94px" width="128px" rowspan="2" style="background-image:url('./title.png');background-repeat: no-repeat; background-position: center center"></th>
    <th height="64px" width="748px" rowspan="2" style="font-size:35px">Welcome to Manchester United League</th>
  <td height="64px" colspan="3">
    <form action="regist.php" method="post" style="font-variant: small-caps">
username: <input type="text" size="10" maxlength="16" name="username" /><input type="button" value="Regist" onclick="window.location.href='regist.php'"/><br>
password: <input type="password" size="9" maxlength="20" name="password" /><input type="submit" value="Login" />
</form>
</td>
</tr>
</table>
    </a>
  <hr style="color:RED" width="85%"><html>
  <br><br>
  <center><table>
```

```
<tr>
<td rowspan="5" colspan="4" align="center"> <img src="abc.jpg" > </td>
</tr>
</table></center>
```

And the view of the main page is like that: (Figure 30, Figure 31.)
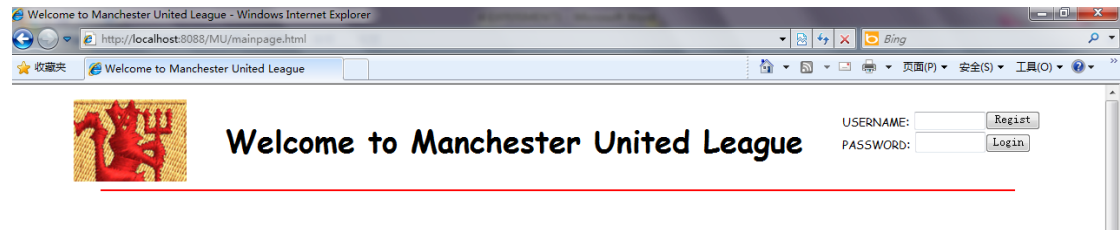

Figure 30. Main page view part 1

Figure 31. Main page view part 2

Secondly, I should make the PHP file that should be connected to the MySQL database, which can save the register information and give the answer when somebody input the information.

The MySQL register code is as follows:

CREATE TABLE Regist

(frNum INTEGER UNSIGNED NOT NULL AUTO_INCREMENT,

userName VARCHAR(25) NOT NULL,

firstName VARCHAR(25) NOT NULL,

secondName VARCHAR(25) NOT NULL,

email VARCHAR(25) NOT NULL,

address VARCHAR(45) NOT NULL,

telephone VARCHAR(45) NOT NULL,

CONSTRAINT frPK PRIMARY KEY(frNum));

And the register page looks like that: (Figure 32.)

Figure 32. The view of register page

When people input the personal information here, and then click the register button, it can be seen that the information have saved into my database. (Figure 33.)

Figure 33. The result of database answer

Therefore, this webpage as a working entity to demonstrate that the PHP file has connected to the MySQL Server, and it works based on the Apache HTTP Server. The whole experiment succeeds.
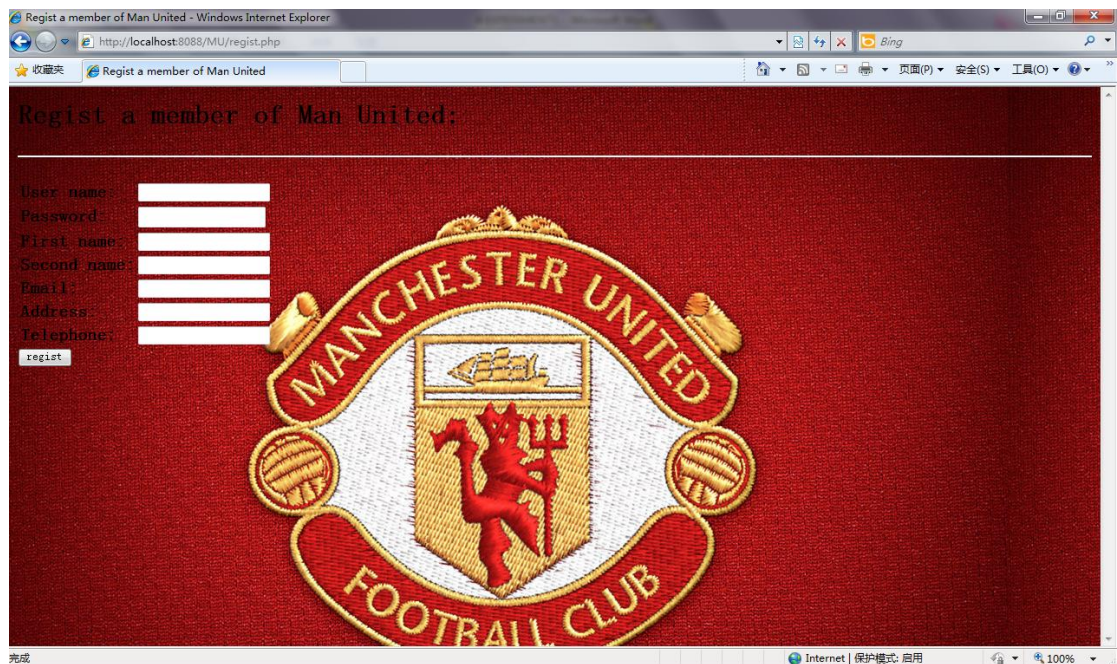
5   PROBLEMS ANALYSIS AND CONCLUSION

5.1 Problems analysis

During the whole process of my work, there is a challenge I cannot find the method to solve until I finish doing my final practical work. The problem is related to the PHP version.

At the beginning of building the WAMP platform, I want to choose the PHP 5.3.6 version, which is the newest PHP version. And then I download it from the official website to do modify the configuration. However, after I finished all the configuration of PHP, Apache HTTP Server and MySQL Server, PHP can connect with the Apache HTTP Server normally; however MySQL Sever cannot connect the PHP successfully.

Through the function of phpinfo(), I can check that there is no the mysql and mysqli module, there is only the module named mysqlnd. Besides, the Loaded Configuration File shows none. So it shows that the connection between PHP and MySQL Server failed.

What's more, the file of php.ini is not been loaded. In order to solve these problems, I find lots of ways by internet as follows:

Firstly, I have to check the configuration of PHP whether I have modified it correctly. Maybe there are some spelling mistakes causes the problem. And then make sure that the mysql.dll and mysqli.dll have been loaded.

Then, I find that there is a very important file of PHP is not in my PHP folder. The file is libmysql.dll. Libmysql.dll means Dynamic Link Library, which is a kind of system file. It is a practical way of achieving the concept of shared function library in Microsoft Windows Operating Systems. This kind of file encapsulates mass of the indispensable part of normal operation code. Typically, it is in the installation operating system process and automatically created for the normal operation of the system.

However, after I download the PHP version 5.3.6, the zip package have no the libmysql.dll file. It is so wired that I changed another download resource, it still have no that file. So I just find the file : mysql.dll, and download it into the PHP folder, it still does not work with the MySQL Server.

After that, I checked the configuration of MySQL Server. To be sure that there is no spelling mistakes and all the added path are correct. However, I find out there is a spelling mistake:

the code: PHPIniDir "c:/php" should be PHPIniDir "c:\php5".

Besides, make sure that the php.ini file is both in the path of C:/Widows and C: \PHP5.

Furthermore, I check the system path to make sure that the path of C:/PHP5 has been added. Enter My Computer and then click the properties. Then open the ADVANCED SYSTEM SETTINGS click the option of Environment Variables. In the section of System Variables, find the System Path. Before I modify it, the System Path looks like this:

C:\ProgramFiles\CommonFiles\MicrosoftShared\WindowsLive;%SystemRoot%\system3 2;%SystemRoot%;%SystemRoot%\System32\Wbem;%SYSTEMROOT%\System32\Wi

ndowsPowerShell\v1.0\;C:\ProgramFiles\CommonFiles\ThunderNetwork\KanKan\Codec s;C:\ProgramFiles\QuickTime\QTSystem\;C:\ProgramFiles\WindowsLive\Shared

So, add the path C: \PHP5 at the end of the System Path.

C:\ProgramFiles\CommonFiles\MicrosoftShared\WindowsLive;%SystemRoot%\system3 2;%SystemRoot%;%SystemRoot%\System32\Wbem;%SYSTEMROOT%\System32\Wi ndowsPowerShell\v1.0\;C:\ProgramFiles\CommonFiles\ThunderNetwork\KanKan\Codec s;C:\ProgramFiles\QuickTime\QTSystem\;C:\ProgramFiles\WindowsLive\Shared;C:\PH P5

Then, check the phpinfo, there is still not the mysql module and the Loaded Configuration Files still shows none.

I also check the registry of my computer, all the configuration seems like well.

Finally, I find the information about the PHP version 5.3.6, especially the difference between the early versions.

About the mysqlnd module, I thought that is same with the mysql module before I check some material on internet. However, it does not. Mysqlnd means that Mysql Native Driver. From the version 5.3.0, it becomes a part of official original code and it replaced the traditional libmysql (Mysql Client Library) file. Mysqlnd is a PHP extension which used the C language. Before the PHP version 5.3.0, we write the code mysql_connect, mysql_query etc. to communicate between MySQL and PHP by using the libmysql file. However, when the mysqlnd published, we have another choice: we can build the communication between PHP and MySQL through mysqlnd.

On the other hand, what is the mysqlnd cannot do?

Mysqlnd does not provide any PHP function, in another word, the API, even though mysqlnd is a kind of PHP extension. So we can also use the primary extension function, for example, mysql or mysqli or POD MySQL to control the databases. Besides, these functions can also communication with the database by the mysqlnd file. It is an interlayer between database and PHP functions.

Well then, why we use the function of mysqlnd?

To the start, it is relate to the license. Libmysql is developed by MySQL AB Company. But now the company is a part of Oracle. So it published by MySQL License. This ultimately led to MySQL support being disabled by default in PHP (configuration problem of PHP [referred 16.4.2011]). Mysqlnd is a part of PHP, and it published by PHP License. So it solve the problem of Licensing.

Secondly, the problem of compiled. When we use the libmysql file, if we want to compile the PHP normally, we must setup the MySQL Server firstly. But if we only have one web server, it seems like a kind of waste. Now, if we change it into using the mysqlnd, we can use it directly and no need to setup the MySQL Server.

Finally, it is relate to the problem of performance. Because that the mysqlnd file is a PHP extension file, and it uses the PHP Memory Management System, so it takes extremely high in memory use efficiency.

For instance, when we use the libmysql file, every line of the mysql execute result will store in the RAM twice times. However, if we use the mysqlnd file, the result will only store once in RAM. Besides, it also follows the settings of memory_limit, which is in php.ini file. Overall, using MySQL Native Driver leads to comparable or better performance than using MySQL Client Library.

There are several new features of the mysqlnd: firstly, it has the improved persistent connection. Secondly, there is a special function: mysqli_fetch_all() in the mysqli, which only can works after you setup the mysqlnd. Thirdly, there are Performance statistics calls:
mysqli_get_cache_stats(), mysqli_get_client_stats(), mysqli_get_connection_stats(), these functions are very useful when you analysis the performance bottlenecks. furthermore, mysqli can support the persistent connection by using mysqlnd. Besides, after the PHP version 5.3.3, mysqlnd support function SSL. After the PHP version 5.3.2, mysqlnd support function Compressed Protocol, and after PHP version 5.3.4, mysqlnd can support Named Pipes in Windows operating systems.

5.2 Conclusion

Through building the WAMP platform by myself, I have known the working principle of the WAMP platform and what happened during the whole working process in practical work. I also figure out how a website works in the daily life.

However, the biggest challenge during my work is interacting with MySQL using PHP. That is to say that if I send information to my database which I build in my own computer, the database can save and answer the information or the request. But the most important task in my final thesis is to build the WAMP platform, and the working entity just to prove that my WAMP platform can work normally. So about the connection between MySQL and PHP, I did not make it too complex, and maybe I will do some research for future study.

Nowadays, more and more investors, consumers and business increasingly recognize that, it is a kind of possibility and practical work after the individual components of the open source WAMP platform software used for building and running a variety of business application. Therefore, it may become more competitive and more attractive to the customers. WAMP, no matter the performance, quality or the price, will be the information technology platform for government or company considered.

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