

# Introducing Dynamic Web Sites

Today's World Wide Web (WWW) is a dynamic, interactive environment for transactions of many types — commerce, research, forums, and so on. In dynamic Web sites, HTML forms collect information that is used to build additional Web pages or is stored, or both. If the Web site stores information, a back-end database is required. For example, most online catalogs are databases of product information. Customers select

the type of product that interests them via an HTML form, and the Web page displays only the requested product information. HTML alone does not provide the functionality needed for dynamic Web sites. The most popular dynamic Web site technology is the PHP scripting language with the MySQL database. PHP is currently installed in over 20 million domains, as shown at [www.php.net/usage.php](http://www.php.net/usage.php).

## PHP

PHP is a scripting language, with many of the same features found in any scripting language and syntax similar to C. PHP can output text, execute conditional actions, perform repeated actions, and so on. However, because PHP was developed specifically for use on Web sites, it includes features that simplify building dynamic Web sites.

PHP is open-source software, which means that you can download and use it without paying a fee. PHP runs on almost every operating system, including Windows, Linux, Mac OS, and most flavors of UNIX. PHP is particularly strong in its capability to interact with databases and has built-in features for working with MySQL.

PHP works in partnership with your Web server software, which is required on every Web site to deliver Web pages to users. PHP code is embedded in HTML source files, enclosed by the PHP tags, `<?php` and `?>`. The Web server sends the code enclosed in PHP tags to PHP, which executes the code and returns the output to the Web server, which in turn sends the HTML code and the output from the PHP code to the browser. The browser displays the Web page.

## MySQL

MySQL is a small, fast RDBMS (relational database management system) that is popular for use on dynamic Web sites. The term *database* refers to a file or group of files that contains the information needed by your Web site. The database can contain information that you want to display on your Web site, can store information collected from users, or both.

You can download an open-source version of MySQL, called the *Community* version, which you can use without paying a fee. An *Enterprise* version of MySQL is also available with a commercial license. MySQL, like PHP, runs on almost every operating system, including Windows, Linux, Mac OS, and most flavors of UNIX.

The MySQL software consists of the MySQL server, several utility programs, and some supporting software. The MySQL server handles all your database requests. You send SQL (structured query language) instructions, called *queries*, to the server, which creates databases, stores information, retrieves information, or performs other operations according to the instructions in the query.

Before you can send queries to MySQL, the server must be running and waiting for requests. When used as a back-end database on a Web site, the MySQL server is set up so that it starts when the computer boots and runs all the time, listening continuously for queries. The MySQL server does not need to be installed on the same computer with PHP. PHP can send queries across a network.

## How PHP and MySQL Work Together

PHP includes functions designed specifically to access MySQL databases. You use functions to connect to the MySQL server, select a database, execute a SQL query that saves or retrieves data, and perform other needed database operations. The PHP functions handle the details of accessing the data in your MySQL databases. You do not need to know the details.

MySQL can store very complex information. PHP can perform complicated manipulation of data. Together, PHP and MySQL can be used to build a complex and sophisticated Web site.

## Help for PHP and MySQL

Both PHP and MySQL provide very comprehensive manuals on their Web sites. The first place to look for answers is the online documentation at <http://dev.mysql.com/doc/refman/5.0/en/index.html> or [www.php.net/manual/en/](http://www.php.net/manual/en/).

Open-source software, such as PHP and MySQL, does not provide a phone number that you can call when you have a question. Instead, open-source software users help each other through discussion lists and forums. Because PHP and MySQL are popular, discussion lists hosted on their Web sites include hundreds of people who are experts. When you post a question on a list, the answer often shows up in your email box within seconds. You can join discussion lists at [www.php.net/mailling-lists.php](http://www.php.net/mailling-lists.php) and <http://forums.mysql.com>. You can search archives of the discussion lists to see if your question has been asked and answered previously.

## PHP and MySQL Versions

Because PHP and MySQL are open-source software, new versions are released often and sometimes without much warning. Sometimes new releases include changes in the way the software works or the installation procedure that require changes to your application — not often, but occasionally. Consequently, you need to be aware of versions and keep informed about PHP and MySQL versions, changes, and problems.

The PHP Web site [www.php.net](http://www.php.net) currently provides PHP 4 and PHP 5 for download. When PHP 6 is added, three versions will be offered for a period of time. The MySQL Web site [www.mysql.com](http://www.mysql.com) currently provides three version of MySQL — 4.1, 5, and 5.1. Version 5 is currently the stable version recommended for most users. If you are creating a new Web site, install the newest version of PHP. PHP 4 does not support some of the features added in MySQL 4.1 and newer versions.

PHP communicates with MySQL using functions. Beginning with PHP 5, PHP provides two sets of functions for interacting with MySQL — the `mysql` extension and the `mysqli` (MySQL Improved) extension. If you are using PHP 4, the `mysqli` functions are not available. You can interact with MySQL 4.1 or newer versions using the `mysql` functions, but you may not be able to use some of the advanced MySQL features added in newer versions. With PHP 5, you can use the `mysqli` functions that better support MySQL 4.1 and later. When you install PHP 5, you activate `mysql` or `mysqli` functions. PHP and MySQL installation instructions are provided later in this chapter.

# Set Up Your Development Environment

A Web site is basically a collection of files, stored in a location that visitors can access from the WWW. You can locate your Web site on a computer provided by someone else, such as a Web hosting company or your employer, or you can install and administer the Web site yourself, on your own computer. Each solution has advantages and disadvantages. Housing your Web site on a computer administered by someone else is much easier, in terms of work and knowledge. You do not need to know how to install or administer any Web site software. You just upload your

Web site source files. The disadvantage is that you lack control over your environment. The administrator of the computer where your Web site is located provides the environment that works best from his or her point of view, which may not be the environment you prefer. When you run your own computer to house your Web site, you can install hardware and software with your preferred configuration and settings. However, running your own Web site requires more work and more knowledge.

## Design Your Development Environment

Whether you build your Web site on someone else's computer or your own, you need to set up an environment that facilitates your development. In most cases, you want to build your Web site in a test location — a site that you can view but the public cannot. You need to view the work in progress, but you do not want visitors to see your half-built pages, with coding errors and design flaws. So, you need two Web sites — a development site and the final site where the Web pages are available to the public.

Your test site can be located on the same computer with your public Web site or on a different computer. Many people who

use a Web hosting company set up a test site on their own computer, installing PHP and MySQL locally for the test Web site. Only the finished Web pages are copied to the hosting company computer.

If you locate your development test site on the same computer with your public Web site, you can set up a subdirectory in your Web space where you develop Web pages. You can access the URL, such as [www.mywebsite.com/testsite](http://www.mywebsite.com/testsite), to test Web pages, but the test site is not available for public access.

## Select a Web Hosting Company

A Web hosting company provides everything you need, including computer space and Web site software. You create the Web site files and move them to the location indicated by the Web hosting company. This is the easiest way to publish a Web site, but you need to choose your Web hosting company wisely.

Many companies offer Web hosting services for a reasonable monthly fee, which usually depends on the resources provided. For example, a Web site with 1 megabyte of Web space would cost less than a Web site with 20 megabytes. To build a dynamic Web site, as described in this book, you need a Web hosting company that offers PHP and MySQL. The reliability of the Web hosting company, the speed at which Web pages download, and the availability of backups are important considerations. You want access to technical support when problems arise. Other factors to consider are

the MB/GB of disk space you need for your Web site, whether the hosting company charges for sending Web pages to users, how many email accounts you receive with your Web site, what supporting software the hosting company provides, and whether you can collect statistics on Web site traffic.

If you search with Google for “**Web hosting company**”, you will get several million hits. You cannot research this many Web hosting companies. Asking for recommendations from peers and colleagues is a better approach. You can compile a list of recommended and to-be-avoided Web hosting companies, based on the experience of others. You can then research the recommended companies to find the host that best suits your needs. As of this moment, GoDaddy.com is the world's largest Web hosting company, according to the Netcraft survey at [www.netcraft.com](http://www.netcraft.com).

## Register a Domain Name

Every Web site needs a unique address on the Web, called a *domain name*. A system of registering domain names ensures that no two locations use the same domain name. Anyone can register any domain name as long as the name is not already taken. Many Web sites, including most Web hosting company Web sites, provide a form that you can use to register a domain name. The standard cost is \$35.00 per year, but bargains can be found.

Some Web hosting companies assign a domain name to you, rather than allowing you to use your own domain name. Some assign domain names that are subdomains of the company Web site, such as `yourcompanyname.webhostingcompanyname.com` or `webhostingcompanyname.com/~yourcompanyname`. In most cases, you want to find a Web hosting company that allows you to register and use your own domain name.

## Find Supporting Software

Your work environment includes the software that you use to create your Web pages. Although you can certainly code in a simple text editor, such as WordPad on Windows, an editor with more features makes your life easier. Programming editors and IDEs, which have features that help programmers, are described in Appendix A.

Software for administering your MySQL databases is also useful. The MySQL Web site provides two packages on the download page: MySQL Administrator for database management and MySQL Query Browser for adding or retrieving data. PhpMyAdmin, written in PHP, is another popular database management tool and is available at [www.phpmyadmin.net](http://www.phpmyadmin.net).

## Run a Dynamic Web Site on Your Own Computer

To host a public Web site, your computer must be connected to the WWW. The ISP account that you currently use to access the Web may not be fast enough to provide access to a Web site, or it may not provide domain name service (DNS), which is needed to allow the public to access your Web site using your domain name. Contact your ISP and discuss your Web site needs. Your ISP may be able to provide the services you need, or you may need to find a new ISP.

A Web server is required for every public Web site. If you are hosting your Web site on a Web hosting company computer, the Web host handles the Web server and WWW access. However, if you host the public Web site on your own computer or if you want to develop the Web site on your local computer and upload only the final files, you must install a Web server on your own computer.

The most popular Web server is Apache, which powers almost 70% of the domains on the Web. Apache is open-source software that you can download and install for free. Obtaining and installing Apache is described later in this chapter. Microsoft Internet Information Services (IIS) is the second most popular Web server, powering slightly over 20% of the domains. IIS is included with Windows 2000/XP.

You must install PHP on the same computer where your dynamic Web site resides, including your local development and testing computer. Your dynamic Web site must also have access to MySQL, either on the same computer or on a computer that can be accessed via a network. Instructions for obtaining and installing PHP and MySQL are provided in this chapter.



# Obtain Apache

The Apache Web server is open-source software that you can download and use for free from <http://httpd.apache.org>. For Windows, you can download the Microsoft Installer file, which has an .msi extension. Most Mac and Linux computers come with Apache already installed. However, you probably need to start the Apache server, which is described in the section “Install Apache.”

Apache is available in three versions: Apache 1.3, Apache 2, and Apache 2.2. All three versions are supported and upgraded. Apache 2 changed considerably from Apache 1.3; Apache 2.2 changed from Apache 2. Third-party modules that run on 1.3 will not work correctly with Apache 2, and modules that work on Apache 2 may not work correctly with Apache 2.2. Therefore, only modules that have been modified for Apache 2 or 2.2 can run on Apache 2 or 2.2.

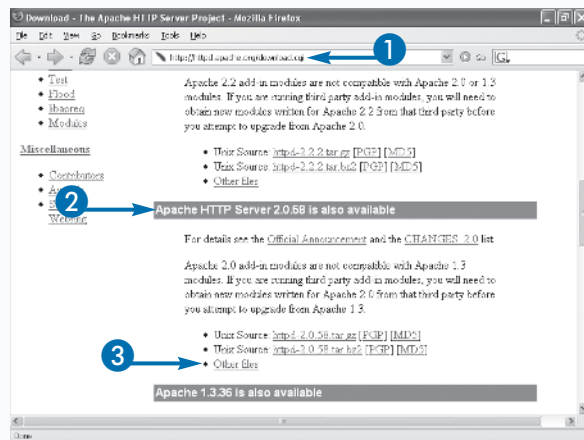
PHP runs with Apache 2 or 2.2. However, some PHP third-party modules may experience problems. If you plan a simple Web site without third-party PHP software, use the most recent version of Apache 2. Apache 2 runs better on Windows than Apache 1.3. However, if you plan a large, complicated Web site, on which you may use a variety of third-party PHP software, it may be best to stick with Apache 1.3.

Apache runs on almost all operating systems. It runs on Windows 95/98/ME/NT 4/2000/XP. However, running a production server on Windows 95/98/ME is not recommended. For Windows XP, you need to download and install Service Pack 1 before you install Apache. The Apache Windows installer file requires version 1.10 or later of the Microsoft Installer (MSI). MSI is built into Windows XP/2000/NT, but you may need to upgrade it by downloading it from the Microsoft Web site.

## Obtain Apache

- 1 Type <http://httpd.apache.org/download.cgi>.
- 2 Scroll down to the Apache version that you want.
- 3 Click Other Files.

**Note:** For Apache 1.3 on Windows, click Win32 Binary and skip to step 7.

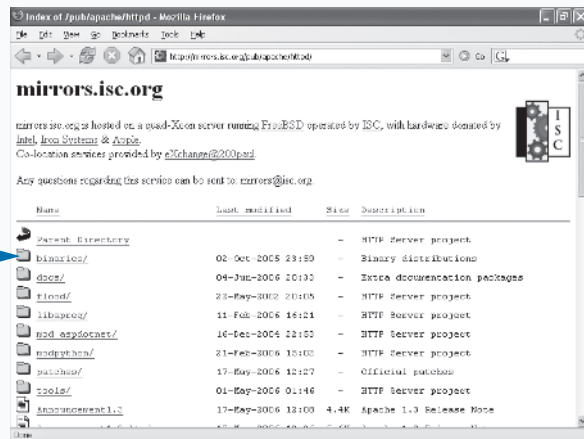


A list of download links opens.

- 4 Click the link for the binaries/subdirectory.

**Note:** The appearance of this page may vary with different mirror Web sites, but the list of links will contain a link to binaries/.

The binary download page opens.



- 5 Click the link for your operating system.

A list of files available for download is displayed.

- 6 Click the file that you want to download.

In this example, the Windows Binary Installer, with the filename `apache_2.0.58-win32-x86-no_ssl.msi`, is selected.

The file download dialog box opens.

- 7 Click Save to Disk.

- 8 Click OK.

The Save As dialog box opens.

- 9 Navigate to the folder where you want to save Apache.

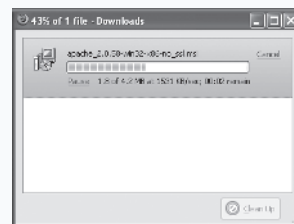
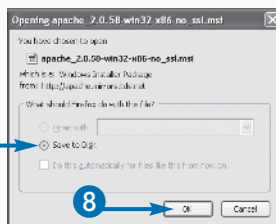
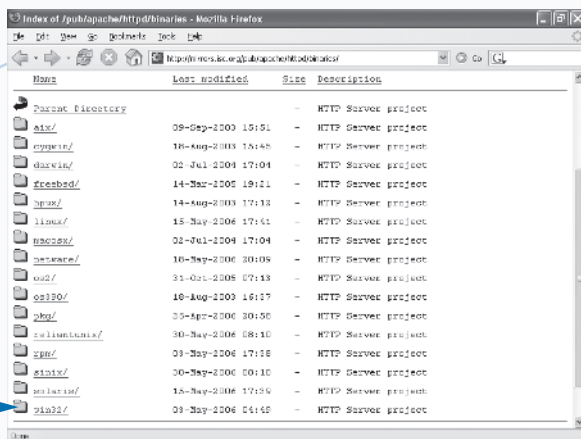
- 10 Click Save.

The Downloads dialog box opens and reports the downloading progress.

A message appears when the downloading finishes.

**Note:** Your browser may or may not close the download dialog box when finished downloading, depending on its setting. You can change this option in your browser.

**Note:** After downloading Apache, scroll down the Download page to the Verify the Integrity of the Files section and follow the instructions.



## Extra

The Apache Web site provides a method to verify the Apache software after you download it. Because Apache is provided on many mirror Web sites, it is possible that the legitimate Apache file has been replaced with one that has been altered. Verifying the downloaded file is a security precaution to make sure that the file is the correct file.

Most Apache files must be verified using the PGP method. The PGP software is installed by default on Linux and Mac. On Windows, you must download and install the software. For more information on PGP software, see [www.gnupg.org](http://www.gnupg.org).

To verify with the PGP method, you must download the file named KEYS and the file that ends with `.asc`, as well as the file containing the Apache software. The KEYS file is the same for all operating systems, so it is in the binaries directory, not in the individual operating system directories.

### TYPE THIS

```
pgpk -a KEYS
pgpv apache_2.0.58.win32-x86-no_ssl.msi.asc
or
pgp -ka KEYS
pgp apache_2.0.58.win32-x86-no_ssl.msi.asc
```



### RESULT

An output line that contains a line similar to the following:

```
httpd-2.0.58. win32-x86-
no_ssl.msi is signed by
William Rowe 10FDE075
```

The MD5 verification method is simpler. This method is available for the Apache 1.3 Windows installer on the download page — the first page that opens in the steps in this section. The MD5 method, as well as the PGP method, is also available to verify MySQL and PHP files. The MD5 method of verification is described in the Extra area of the section “Obtain MySQL.”

# Install Apache

**A**pache is installed when Linux or Mac OS X is installed, but not when Windows is installed. On Windows, you must download and install Apache by running an installer file that you download from the Apache Web site, <http://httpd.apache.org>. Downloading Apache is discussed in the previous section, "Obtain Apache."

When you double-click the downloaded installer file from Windows Explorer, an installation procedure starts. You see several screens, one after another, that request required information, including your domain name, your server name, the email address of the Apache administrator, and the folder where you want to install Apache. Then, when you have provided the information, Apache is installed.

The Apache Web server must be both installed and started. Apache can be set up so that it starts automatically whenever the computer boots or so that

you must start it manually. During installation, select For All Users, on Port 80, As a Service to set up Apache to start automatically.

On Mac, Apache is usually installed, but you need to start it. Open System Preferences and click the Sharing folder. On the Services tab, check Personal Web Sharing.

On Linux, Apache is usually installed, but may not be started. To start the Apache server, type

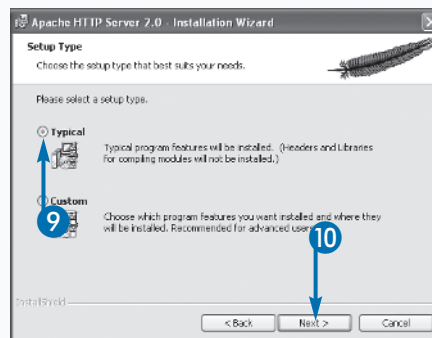
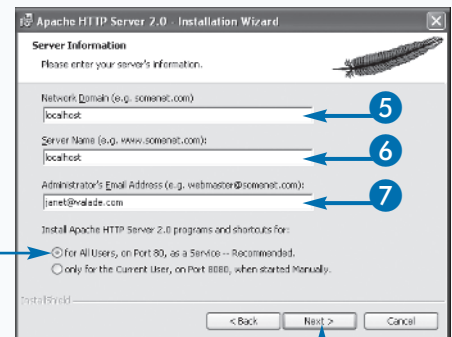
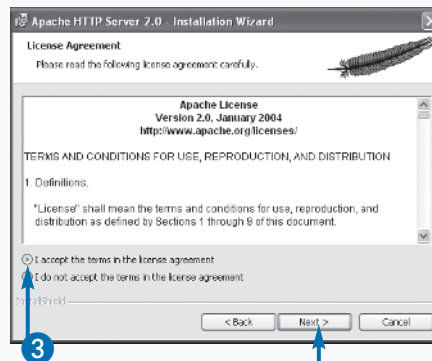
```
/usr/local/apache2/bin/apachectl start
```

At times, you will need to stop or restart the Apache Web server. For example, when you change Apache or PHP settings, you need to restart Apache before the new settings go into effect. On Windows, you can start and stop Apache from a menu item in the Start menu. On Linux, use the `apachectl` script, as shown above, with `restart` or with `stop`.

## Install Apache

- 1 Double-click the Apache installer that you downloaded.
- 2 On the Welcome screen, click Next.
- 3 On the License Agreement screen, click I Accept . . .
- 4 Click Next.
- 5 On the Server Information screen, type your domain name.
- 6 Type your server name.
- 7 Type your email address.
  - Leave this selection to have Apache installed as a service that starts automatically.
- 8 Click Next.
- 9 On the Setup Type screen, click Typical.
- 10 Click Next.

**Note:** Custom should only be selected by users with system administration experience.



The Destination Folder screen opens.

- A default destination folder is selected.
- You can change the destination folder if you want.

**Note:** Maintaining and upgrading Apache is easier if you install in the default directory.

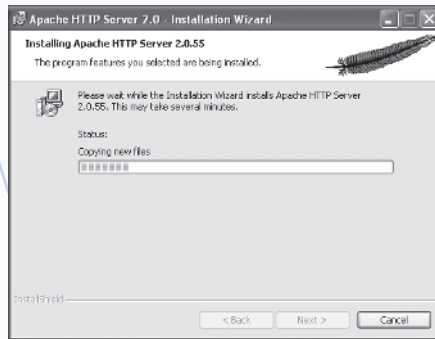
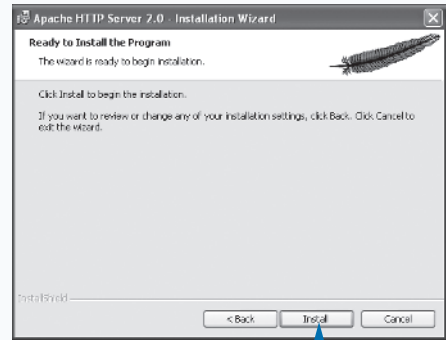
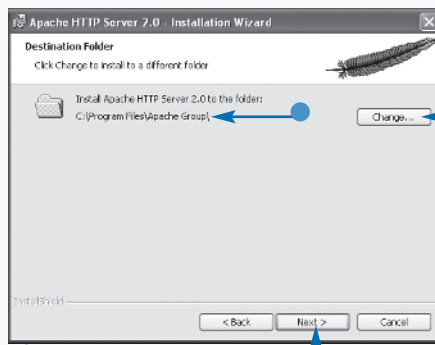
11 Click Next.

The Ready to Install the Program screen appears.

12 Click Install.

The wizard shows the progress of the installation.

A message appears when Apache is finished installing.



## Extra

You can determine whether Apache is running on Windows by checking whether it appears in the list of services on your computer. Click Start → Control Panel → Administrative Tools → Services. An alphabetical list of services is displayed. If Apache is listed, it is installed as a service, but it may not be turned on. Check whether its status is Started and its type is Automatic. If you need to, you can click Apache in the services list and change its status and/or type.

If Apache is not listed, it is not installed as a service and will not start automatically when your computer boots. To install Apache as a service, first open a command prompt window.

### TYPE THIS

```
cd c:\Program Files\Apache Group\apache2\bin
apache -k install
```

If you did not install Apache in the default directory, substitute the path to the directory where Apache is installed.

### RESULT

The Apache Web server is installed as a service. It will automatically start whenever your computer boots.

**M**ySQL is a small, fast database, particularly well suited for use with a Web site. MySQL provides open-source software, which you can download and use without paying a fee. MySQL also provides an Enterprise version that you can purchase.

MySQL currently offers versions 4.1, 5, and 5.1. Version 5.1 is not stable and should be used only for trying things out, not for production. The current stable version is 5, which is the version most people should download.

The MySQL free download is available in binaries — machine files that are already compiled for specific operating systems. If a binary file is available for your operating system, you should download the binary. MySQL may be already installed on your Macintosh or Linux computer. If not, it may be available for installation

from the operating system discs, although you may want to install a more recent version. Binaries may not be available for older operating systems, such as versions of Mac OS X older than 10.2, in which case you can download source code that you can compile and install.

The Windows download is available with an installer. You can download Windows Essentials — a smaller file and sufficient for most needs — or Windows Complete, a larger file with more optional software, such as the embedded server and benchmark suite.

The Linux download is available in an RPM file for downloading and installation using the RPM command. RPMs specifically for Red Hat Linux and SuSE Linux and a general RPM for other Linux flavors are available. The Macintosh download is a disk image in PKG format, available for specific versions of OS X.

## Obtain MySQL

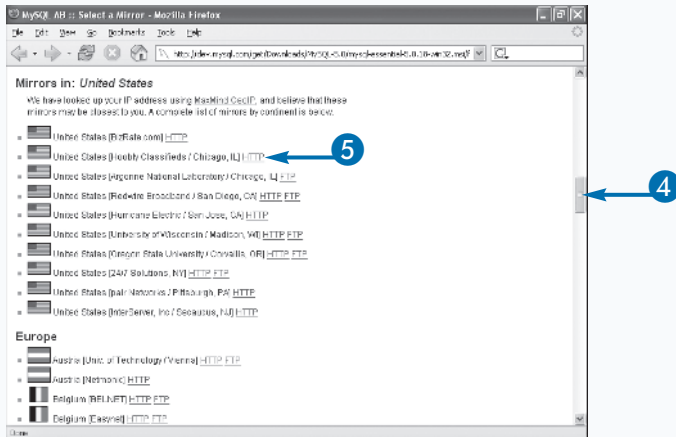
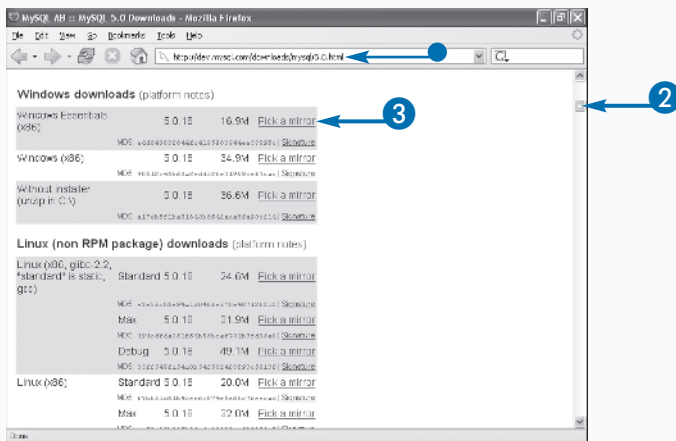
- 1 Type **www.mysql.com/downloads** and click the link for the version that you want to download.

The download page opens.

- Here, the link for version 5 was clicked.
- 2 Scroll down to the section for the operating system that you need.
- 3 Click the Pick a Mirror link by the version to download.

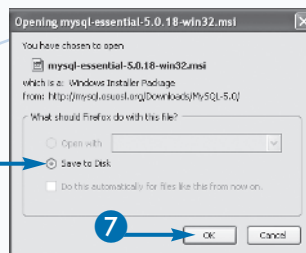
Here, Windows Essentials is clicked.

- 4 Scroll down to the list of mirrors.
- 5 Click HTTP by the mirror that you want to use.



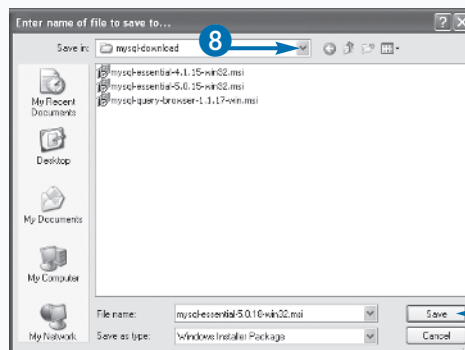
The File Download dialog box opens.

- 6 Click Save to Disk.
- 7 Click OK.



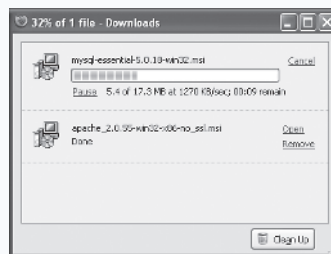
The Save As dialog box opens.

- 8 Click here and navigate to the folder where you want to save the file.
- 9 Click Save.



A window shows the downloading progress.

A message is displayed when the download completes.



**Note:** Your browser may or may not close the download window when finished downloading, depending on its setting. You can change this option in your browser.

## Extra

The MySQL Web site provides methods to verify the software after you download it, as a security precaution to make sure that the file has not been altered. You can verify using either the md5 method or the PGP method. The md5 method is simpler. The PGP method is described in the Extra area of the section “Obtain Apache.”

On the download page by the file that you downloaded, a long string, called a *signature*, is displayed, similar to the following:

MD5: 6112f6a730c680a4048dbab40e4107b3

### TYPE THIS

At a command-line prompt, such as in a command prompt window in Windows, type

```
md5 mysql-essential-5.0.22-win32.msi
```

Use the name of the file that you downloaded.

### RESULT

A signature is displayed. The signature here should be the same signature displayed by the filename on the download page of the MySQL Web site.

You can verify the downloads for Apache and PHP with a similar procedure.

If md5 is not installed on your computer, you can download and install it from [www.fourmilab.ch/md5/](http://www.fourmilab.ch/md5/).



# Install MySQL

MySQL may be already installed on Linux or Macintosh, but must be downloaded and installed on Windows. Downloading is discussed in the previous section. You can start an installation wizard by double-clicking the file that you downloaded. The example in this section shows installing MySQL on Windows.

In general, the MySQL defaults are the best choices for beginners. The default folder where MySQL is installed is similar to C:\Program Files\MySQL\MySQL Server 5.0. You can change the default, but do not change it without a compelling reason.

MySQL also needs to be configured. You can start the configuration wizard directly from the final installation window or from the MySQL menu item at any time; for more information, see the following section, “Configure MySQL.”

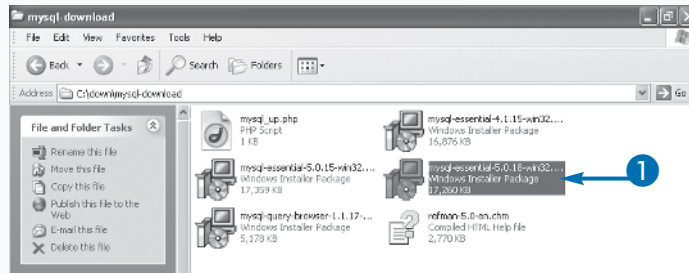
For Linux, if MySQL is not already installed or you want to install a newer version, use the `rpm` command to install the RPM files downloaded from the MySQL Web site. You need to install the server, client, and headers and libraries RPM packages. MySQL is installed in `/var/lib/mysql`. The RPM creates entries in `/etc/init.d/` so that the MySQL server starts automatically. A login account named `mysql`, required to run the MySQL server, is created if it does not already exist.

Mac OS X 10.2 and later includes MySQL. If you want to install on an older Mac OS X or upgrade to a newer version of MySQL, download the PKG file from the MySQL Web site and double-click the package icon. The Mac OS X Package Installer guides you through the installation.

The RPM package installs MySQL in `/usr/local/mysql-versionnumber` with a symbolic link — `/usr/local/mysql`. If a directory named `/usr/local/mysql` exists, it is renamed to `/usr/local/mysql.bak` first.

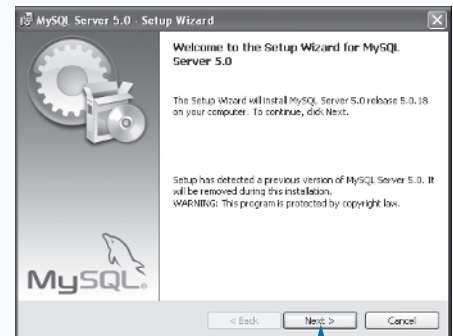
## Install MySQL

- 1 Double-click the MySQL installer.



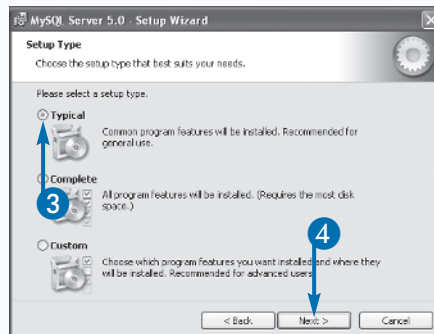
The Welcome screen for the installer opens.

- 2 Click Next.



The Setup Type screen opens.

- 3 Click the type of installation that you want.
- 4 Click Next.



A summary of the settings is displayed.

- 5 Click Install.

A window shows the progress of the installation.

When the installation is complete, the Sign-Up screen opens.

- 6 Click Skip Sign-Up.

- 7 Click Next.

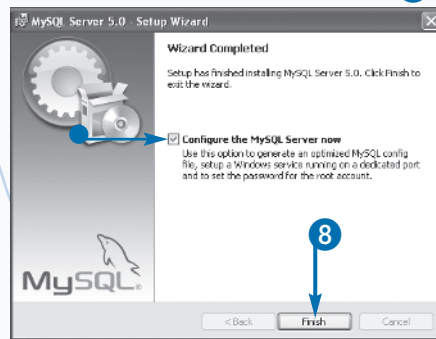
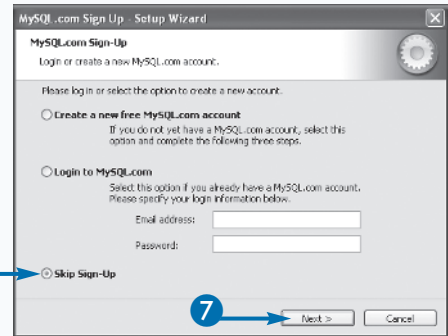
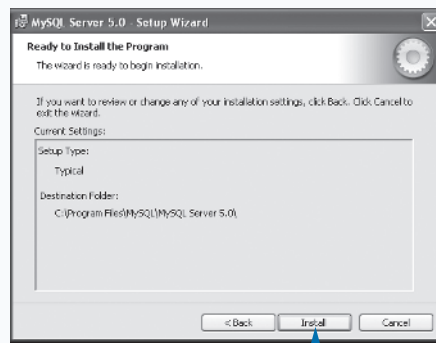
A message states that the wizard is complete.

- Check **Configure the MySQL Server now** to begin the configuration now.

**Note:** Configuration is discussed in the following section, “Configure MySQL.”

- 8 Click Finish.

The Configuration Wizard starts.



## Extra

The MySQL server must be both installed and started. In some cases, the server does not automatically start after it is installed. In such cases, you can start the server manually.

To check whether the server is started in Windows, check your list of running services, as described in the Extra area of the section “Install Apache,” earlier in this chapter. To check whether the server is running in Linux and Macintosh, check your processes for the MySQL server process.

To start the server in Windows, open a command prompt window and change to the bin directory in the directory where MySQL is installed. Type `mysqld`. To start the server in Linux or Mac, run the script `mysqld_safe`.

### TYPE THIS

To start the server on a Mac from the shell:

```
cd /usr/local/mysql
sudo /bin/mysqld_safe
(Cntrl-Z)
bg
```



### RESULT

The MySQL server starts running, waiting for queries.

# Configure MySQL

On Windows, MySQL must be configured after it is installed. If MySQL is installed from an RPM file or a Macintosh PKG file, the configuration is performed during installation. Otherwise, MySQL on Linux and Mac must also be configured.

MySQL on Windows includes a Configuration Wizard that you can use. You can configure many details of your server operation, such as the number of simultaneous users, or you can accept a MySQL typical installation setup. If you accept typical options, your configuration only involves some account settings and startup settings.

MySQL includes a security system that protects your data. No one can access the data without a valid username and password. An account is created when you install MySQL called *root*. You should use this for your major

administrative account because it is installed with all privileges. You need to set a password for this account. Also, installing MySQL sets up the software on your system, but does not start the MySQL server. You can start it manually whenever you want to use it, or you can set it up to start when the computer starts.

The Configuration Wizard starts immediately after installation if you check Configure the MySQL Server Now on the final installation screen. You can also start the Configuration Wizard at any time using a Start menu item.

On Linux and Mac, if you did not install MySQL from an RPM or a PKG file, you must run the script `mysql_install_db` to set up the initial privileges and accounts.

## Configure MySQL

**Note:** If the Configuration Welcome screen is already open because you started it at the end of the installation procedure, go to step 5.

1 Click Start → All Programs.

2 Click MySQL.

3 Click MySQL Server *versionnumber*.

4 Click MySQL Server Instance Config Wizard.

The Configuration Wizard starts.

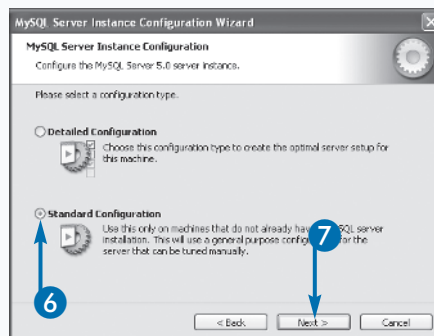
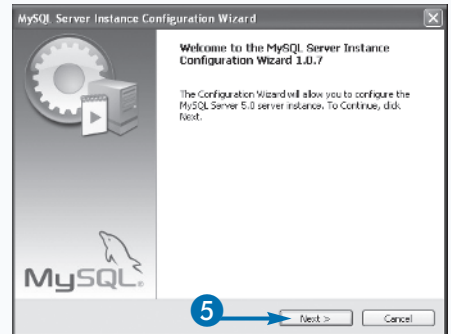
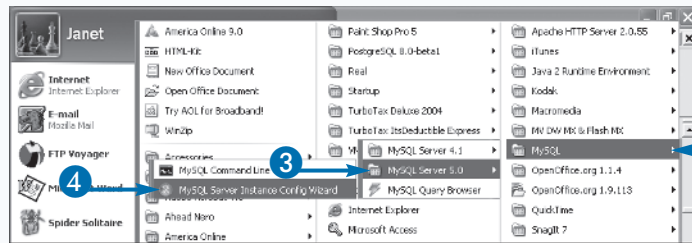
5 Click Next.

The configuration type screen opens.

6 Click Standard Configuration.

7 Click Next.

The Instance Configuration Windows options screen opens.



8 Click Install As Windows Service.

9 Click here and select a service name.

10 Click Launch the MySQL Server Automatically.

11 Click Next.

12 Click Modify Security Settings.

13 Type a password for your root account in both fields.

14 Click Create An Anonymous Account.

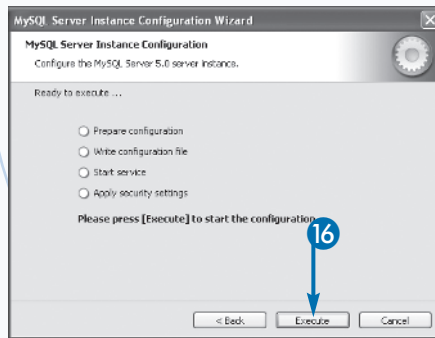
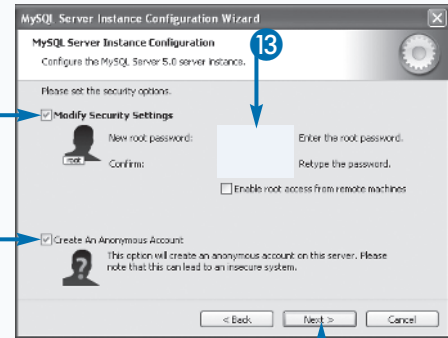
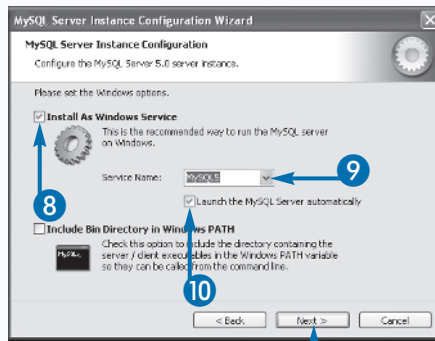
**Note:** If this MySQL server is going to be used in a production environment, do not create an anonymous account.

15 Click Next.

16 Click Execute.

The window reports the configuration progress.

A message is displayed when the configuration is complete.



**Note:** You may need to unblock port 3306.

## Extra

In most cases, you want MySQL to start when your computer boots and continue running all the time. On Linux, you can add the script `mysql.server` to the directory that your system runs at startup. The MySQL RPM does this for you during installation.

On Mac, you can install a separate MySQL Startup Item package. The Startup Item starts the server by invoking `mysql.server` whenever your computer boots. The Startup Item needs to be installed only once, not during MySQL version upgrades.

The Windows Configuration Wizard can set up MySQL as a Windows service, or you can install it as a service yourself.

### TYPE THIS

```
cd \Program Files\MySQL\MySQL Server 5.0\bin
mysql --install
```

### RESULT

The MySQL server is now a Windows service. Its type is automatic, so it starts when the computer boots.

# Install MySQL Administration Programs

Two programs that you can use to administer your MySQL databases are available on the MySQL Web site: MySQL Query Browser and MySQL Administrator. These programs are not required for your development environment, but they provide features that facilitate the creation and use of MySQL databases. MySQL Administrator and MySQL Query Browser run on Windows, Mac OS X, and on any Linux system with the GNOME desktop.

MySQL Administrator provides the features that you need to manage your databases. You can add and remove MySQL accounts, add and manage passwords, add and remove permissions, start and stop the MySQL server, view MySQL logs, make and restore backups, and perform other administrative tasks.

MySQL Query Browser provides a graphical shell, designed to resemble a browser interface, where you can execute

SQL queries on your databases. You can build SQL queries using buttons and drag-and-drop features. The results are displayed in a tabbed window. You can compare the results from various queries. Queries are stored in a history list, so you can execute previous queries.

In Windows, the software is provided in Windows Installer files that you can download. After downloading, double-click the .msi file that you downloaded, and an installation wizard starts. For Linux, the software is provided in generic RPM files that you can download and install with the `rpm` command.

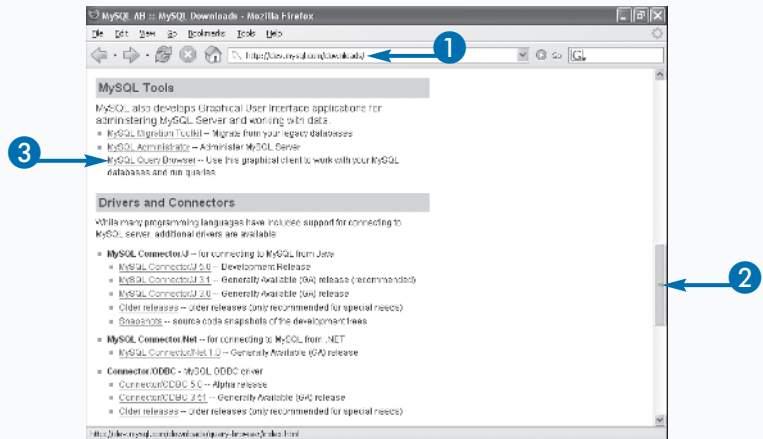
On Macintosh, the software is provided in Package format files that you can download. After downloading, double-click the .dmg disk image file and wait for it to be opened and attached. When a window containing the software icon opens, drag it to your Applications folder. After the copy is complete, you can eject the disk image.

## Install MySQL Administration Programs

### DOWNLOAD AN ADMINISTRATION PROGRAM

- 1 Type **www.mysql.com/downloads**.
- 2 Scroll down to the section labeled MySQL Tools.
- 3 Click the link for the software that you want to download.

The download page opens.



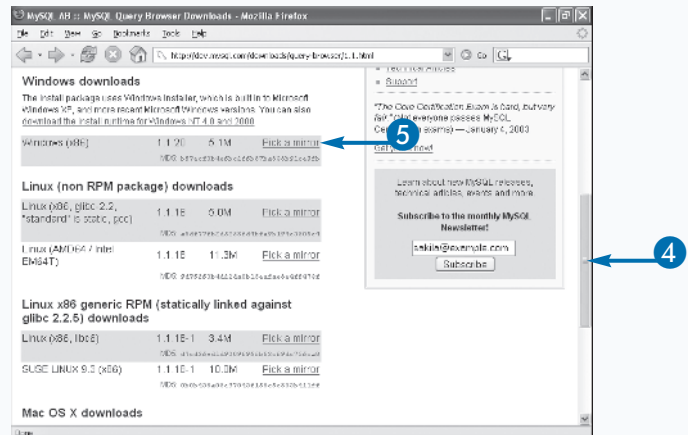
Here, the link for MySQL Query Browser was clicked.

- 4 Scroll down to the section for the operating system that you need.
- 5 Click Pick a Mirror by the version to download.

Here, the Windows file is clicked.

The Pick a Mirror page is displayed.

- 6 Finish downloading the file, as shown in steps 4 to 9 in the section "Obtain MySQL" in this chapter.



## INSTALL THE PROGRAM

7 Double-click the file you downloaded.

8 Click Next in the Setup Wizard Welcome dialog.

9 Click I Agree.

The Destination Folder screen opens.

10 Click Next.

- You can change the destination folder, but the default is preferable.

The Setup Type screen opens.

11 Leave Complete checked.

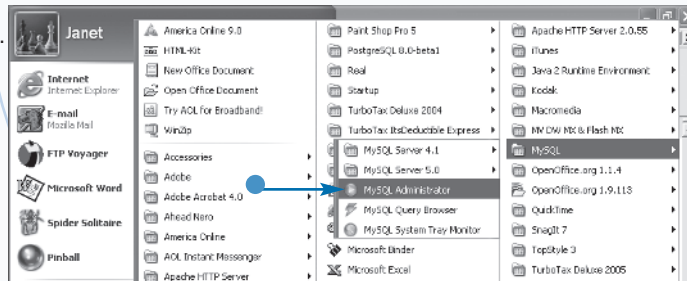
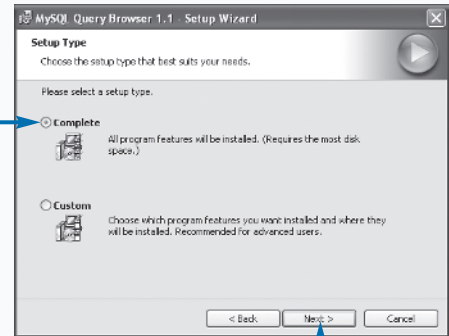
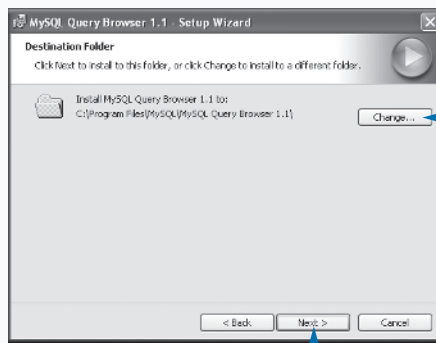
12 Click Next.

A Summary screen opens.

13 Click Install.

A message appears when installation is complete.

- An entry for the software is added to the Start menu.



## Extra

If you are unable to install from the RPM, you can download the installation tarball and install it.

### TYPE THIS

After downloading the file, in the directory where the file is located, type

```
tar --directory=/opt -xzf mysql-query-browser-nn-linux.tar.gz
```

or

```
tar --directory=/opt -xzf mysql-administrator-nn-linux.tar.gz
```

The *nn* string is the version number, such as 1.1.9.

### RESULT

The application binary is installed in /opt/mysql-query-browser/bin or /opt/mysql-administrator/bin. Change into that directory and run `mysql-query-browser` or `mysql-administrator` to start the application. You can install the software in a different directory by changing /opt to your preferred installation path.



# Create MySQL Accounts for Use in PHP Scripts

**M**ySQL provides a system of accounts, passwords, and privileges to protect your data. No one can access the data in your database without using a valid account. Each account has a set of privileges that define what the account can do — create a database, retrieve data, insert data, delete data, and so on. MySQL is installed with a default account called *root*. The root account may or may not be installed with a password. The root account is intended for MySQL administration and has all privileges. If the root account does not have a password, you need to add one immediately. The root account is powerful and access to it needs to be restricted.

To protect your data, you should not use the root account when a less powerful account can accomplish the task. In

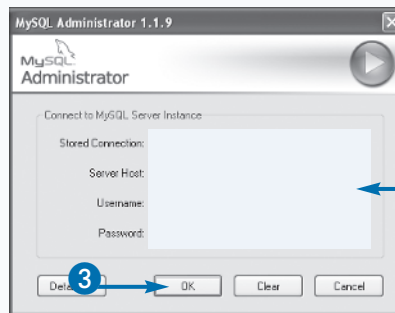
general, create accounts for specific purposes that have only the privileges required to perform the needed tasks.

When your dynamic Web pages need to access the MySQL server, the PHP script must provide a valid MySQL account and password. Using the root account for this purpose, in a script accessible from the WWW, is a major security risk. Consequently, your development environment should include one or more MySQL accounts created explicitly for the purpose of accessing the databases from PHP scripts.

You can create or remove accounts, add, change, or remove passwords, and add and remove permissions using a SQL `GRANT` query or using the MySQL Administrator software. SQL queries are explained in Chapters 7 and 8. The example in this section shows how to create a new account using MySQL Administrator.

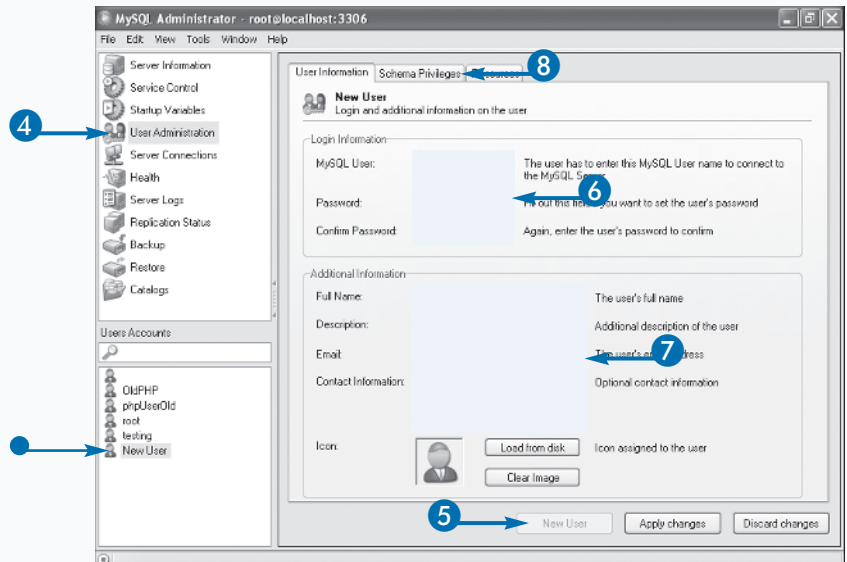
## Create MySQL Accounts for Use in PHP Scripts

- 1 Start MySQL Administrator.
- 2 Type the connection information.
- 3 Click OK.



The program opens.

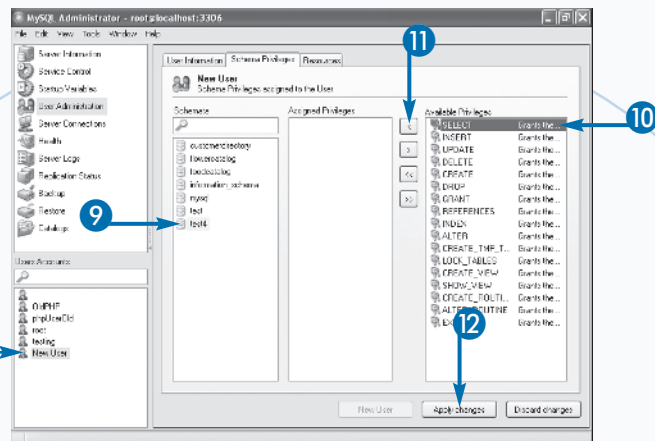
- 4 Click User Administration.
- The User Administration screen opens in the right pane.
- 5 Click New User.
    - New User is added to the account list.
  - 6 Type the new user account name and password.
  - 7 Type additional optional information.
  - 8 Click the Schema Privileges tab.



- The account is selected.
- 9 Click a database.
  - 10 Click one or more privileges.
  - 11 Click the add button.

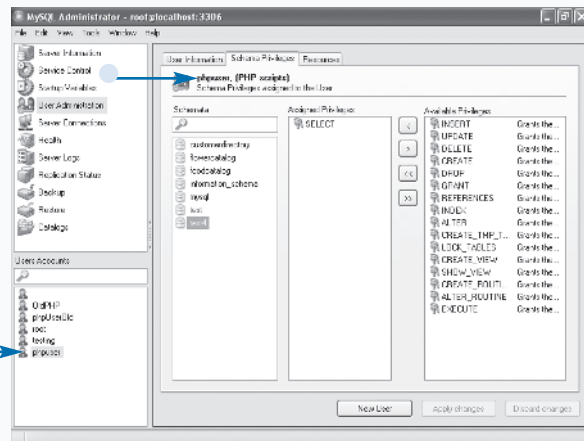
The selected privileges move to the middle pane.

- 12 Click Apply Changes.



- “New User” changes to the account name that you assigned.
- The username appears on the top of the pane.

The new account is created with only the privileges that you chose in step 10.



## Extra

You can create an account with a `GRANT` query. You can send the query to the MySQL server with the MySQL Query Browser. Using the Query Browser is described in Chapter 7.

You can also send the query from the `mysql` client, a command-line client that is installed automatically with MySQL.

### TYPE THIS

```
cd c:\Program Files\MySQL\MySQL Server 5.0\bin
mysql -u root -p
```

When the `mysql` client starts, it displays a prompt. Type the following `GRANT` query.

```
MYSQL>GRANT SELECT ON *.* TO 'php'@'localhost'
IDENTIFIED BY 'secret';
```

### RESULT

Creates a new MySQL account named `php` that has `SELECT` privileges on all databases.

# Obtain PHP

Two versions of PHP are available: PHP 4 and PHP 5. When PHP 6 is released, three versions of PHP may be available for a period of time. If you are installing PHP for the first time and creating your first Web site, you should download PHP 5, or PHP 6 if it is available at the time you read this book.

Although a Windows installer file is available for PHP 5, the installer is not the appropriate way to install PHP for this book. The installer does not activate MySQL support. Therefore, you need to download the zip file. The files that allow PHP to communicate with MySQL are in the zip file.

On Linux and Macintosh, PHP may already be installed. You can determine whether it is installed by testing your environment as discussed in the section “Test Your Development Environment” later in this chapter. Even if

PHP is installed, it may be an older version that needs an upgrade.

The easiest way to install PHP on Linux is with RPM files provided by your Linux distribution. Check your distribution Web site, using the procedures specific to your brand of Linux, to determine the most recent version of PHP available. If the latest version is older than you prefer, you can download the source file tarball from the PHP Web site to compile and install the most recent version from source.

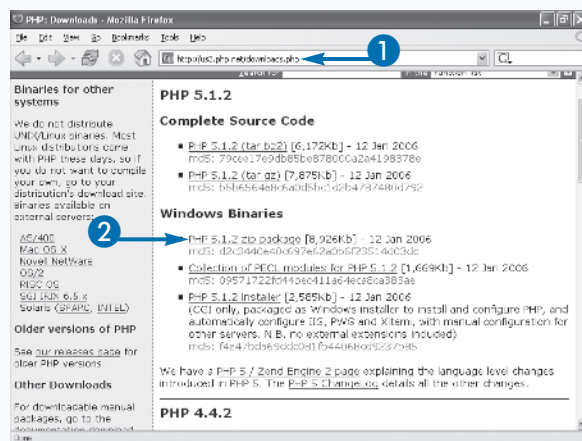
An up-to-date file for the Mac can be obtained from [www.entropych.com/software/macosx/php/](http://www.entropych.com/software/macosx/php/). The file is a Mac OS X Installer package that includes all the required libraries. The PHP package is designed to be installed on a Mac running the Apache software that comes installed on a Mac. If the Mac package does not work on your system, you can download the tarball and install from source.

## Obtain PHP

1 Type [www.php.net/downloads](http://www.php.net/downloads).

2 Click the file that you want to download.

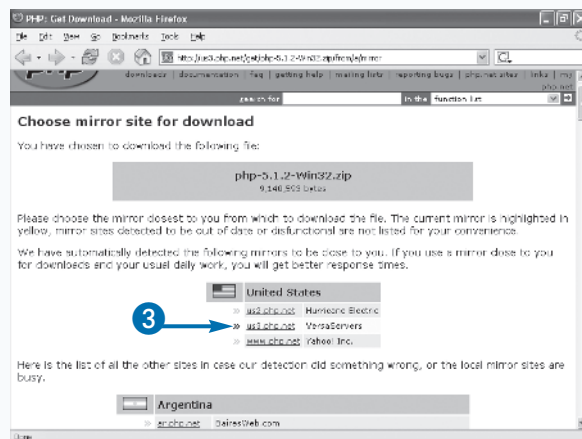
**Note:** For Windows, download the zip file.



The Choose Mirror Site for Download page is displayed.

3 Click the mirror site that you want to download from.

The site highlights a mirror, which is usually the best choice.



The file download dialog box opens.

- 4 Click Save to Disk.
- 5 Click OK.

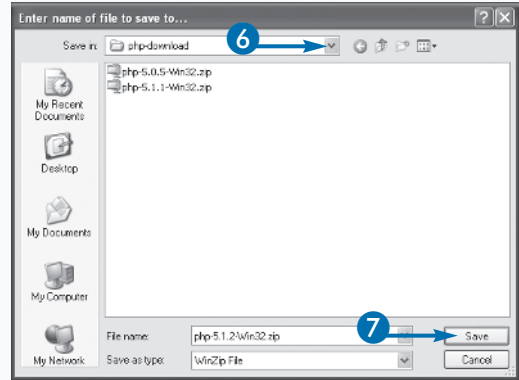
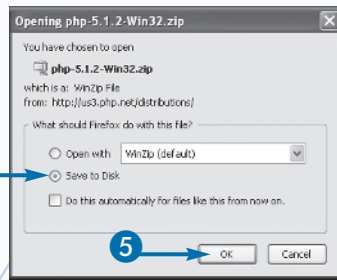
The Save As dialog box opens.

- 6 Navigate to the folder where the download should be stored.
- 7 Click Save.

A window shows the downloading progress.

A message appears when PHP is finished downloading.

**Note:** Your browser may or may not close the download window when finished downloading, depending on its setting. You can change this option in your browser.



## Extra

The PHP Web site provides a method to verify the file after you download it. Because PHP is provided on many mirror Web sites, it is possible for the legitimate PHP file to be replaced with one that has been altered. Verifying the downloaded file is a security precaution to make sure that the file is the correct file.

A long string is displayed below the filename, similar to the following:

```
md5: b5b6564e8c6a0d5bc1d2b4787480d792
```

The string is an *md5 signature*. You should test the *md5 signature* of the file after you download it. If the signature of the downloaded file does not match the *md5 signature* on the Web site, the file is not valid.

### TYPE THIS

In a command prompt window on your computer, type

```
md5 php-5.1.2-Win32.zip
```

Substitute the name of the file that you just downloaded.

### RESULT

A signature appears. The signature here should be the same signature displayed on the PHP Web site.

If *md5* is not installed on your computer, you can download and install it from [www.fourmilab.ch/md5/](http://www.fourmilab.ch/md5/).

# Install PHP

PHP may be already installed on your Linux or Macintosh computer. If not, you install PHP from files that you download from the PHP Web site or other Web sites. Obtaining PHP is discussed in the previous section.

Although you can install PHP on Windows from an installer file, the PHP 5 installer does not activate MySQL support. The files that allow PHP to communicate with MySQL are in the zip file. Therefore, you can install PHP more efficiently from the zip file when you want to use PHP with MySQL databases. The example in this section shows how to install PHP from the Windows zip file.

On Linux, if PHP is not already installed, you can install PHP from an RPM file downloaded from your Linux distribution Web site. However, be sure that the RPM

includes support for MySQL. For example, on Red Hat Linux, you need to install a package called `php_mysql1`. If you cannot obtain an RPM file for the PHP version that you want, you can download and install from the source code tarball.

On Mac, you can install PHP from the disk image file that you downloaded. If you are unsuccessful with the PKG file, you can download and install from source code.

PHP works together with your Web server. Therefore, your Web server needs to be configured to expect PHP code. Configuring is discussed in the section “Configure Apache to Process PHP Code,” later in this chapter.

PHP has many configurations settings, stored in a file named `php.ini`, which you can edit. Setting up and changing your `php.ini` file is discussed in the section “Configure PHP,” later in this chapter.

## Install PHP

- 1 Open the zip file in zip file software.

In this example, the software is WinZip.

- 2 Click Extract.

The Extract dialog box opens.

- 3 Type the path to the directory where you want PHP to be installed.

**Note:** Installation, maintenance, and upgrades are easier if you install in `C:\php`.

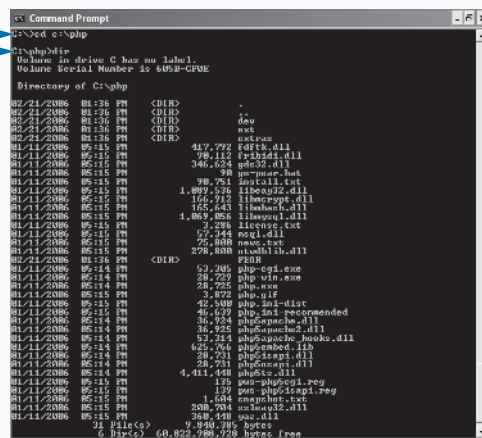
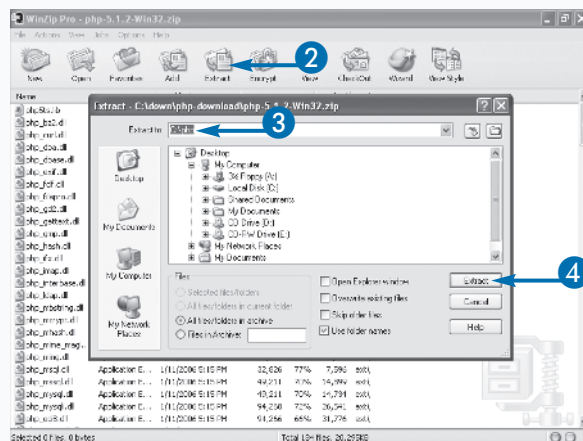
- 4 Click Extract.

Several files and directories are unzipped into the main PHP directory.

- 5 Navigate to the folder where PHP was installed.

- 6 View the PHP folder to see the folders and files installed.

**Note:** In this example, the files are displayed in a command prompt window. You can also use Windows Explorer to view the files.







# Configure Apache to Process PHP Code

**A**pache reads a configuration file when it starts. It will not start if it cannot find the file. The installation procedure for Apache creates the configuration file — `httpd.conf`. It may be located in the `/conf` folder in the folder where Apache was installed or in `/etc`. You can open the file in any text editor, or, on Windows, from a menu item created when Apache was installed.

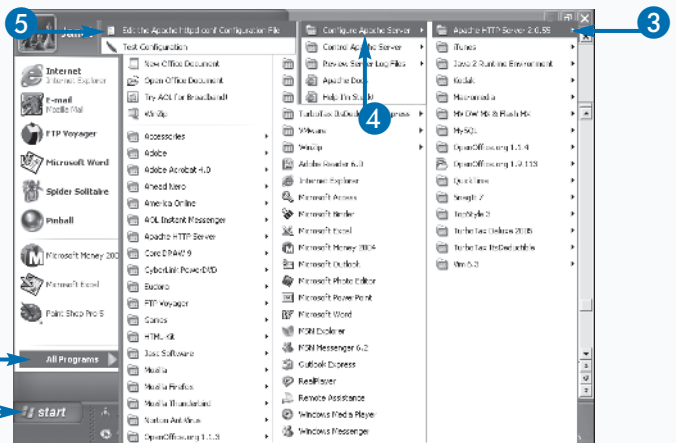
The Apache configuration file needs two lines to process PHP code correctly: a `LoadModule` directive and an `AddType` directive. The `LoadModule` directive links the PHP software to the Apache Web server. The `LoadModule` directive provides the path to the shared library that is loaded into Apache at runtime. The format is similar to the following:

```
LoadModule php5_module "c:/php/php5apache2
.dll" (for Windows)
```

```
LoadModule php5_module modules/libphp5.so
(for Linux and Mac)
```

## Configure Apache to Process PHP Code

- 1 Click Start.
- 2 Click All Programs.
- 3 Click Apache HTTP Server.
- 4 Click Configure Apache Server.
- 5 Click Edit the Apache `httpd.conf` Configuration File.



`httpd.conf` opens in a text editor.

- 6 Scroll down to the `LoadModule` directive section.
- 7 Add the `LoadModule` directive for PHP, `LoadModule php5_module pathtomodule`.

**Note:** The module name may also be `php4_module` or `php6_module`.

If the line is already in the file with a `#` at the beginning, remove the `#`.

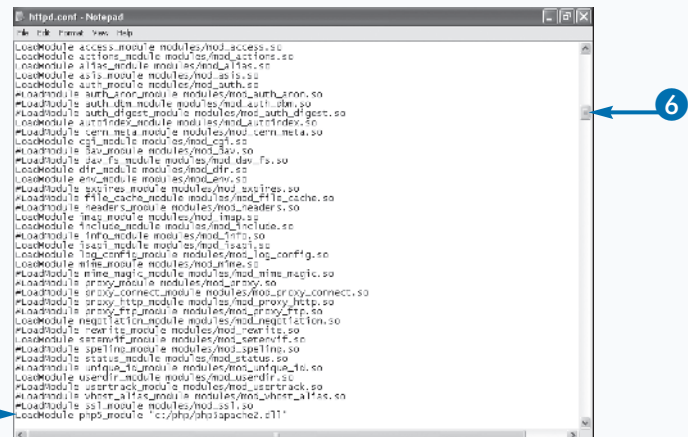
The module name is `php5_module`. When PHP 6 is released, its module name should be `php6_module`. The Windows shared library for Apache 1.3 is `php5apache.dll`. For Apache 1.3 on Linux, the PHP module is `libexec/libphp5.so`. In PHP 4, the PHP directory is organized a little differently.

The `AddType` directive maps one or more file extensions to the type of content that can be expected in the file — PHP code. The format is similar to the following:

```
AddType application/x-httpd-php .php
```

The `AddType` directive shown tells Apache to expect PHP code in files with a `.php` extension. You can set any extension for files containing PHP code, but the extensions most frequently used are `.php`, `.php4`, `.php5`, or `.php6`.

You must restart Apache after editing `httpd.conf`. Apache can be restarted on Windows from a menu item in the Start menu. On Linux, type `apachectl restart`.



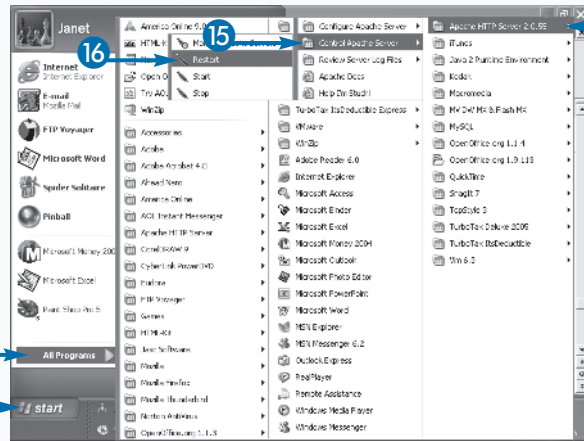
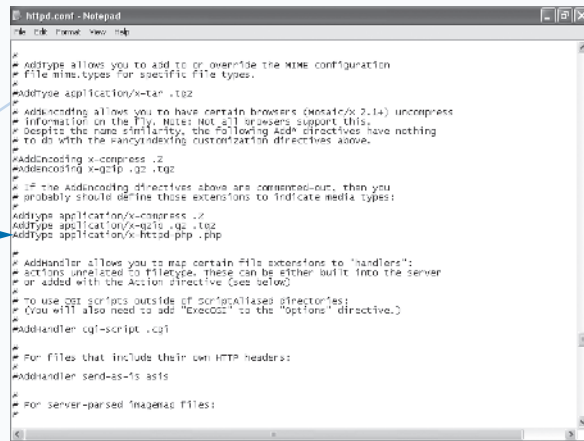
- 8 Scroll to the `AddType` directive section.
- 9 Type the `AddType` directive for PHP, **`AddType application/x-httpd-php .php`**.

If the line is already in the file with a `#` at the beginning, remove the `#`.

**Note:** You can use a different extension or set of extensions.

- 10 Save the file.
- 11 Close the file.
- 12 Click Start.
- 13 Click All Programs.
- 14 Click Apache HTTP Server.
- 15 Click Control Apache Server.
- 16 Click Restart.

A small window opens for a few seconds and then quickly closes.



## Extra

Whenever you change your Apache configuration, by editing `httpd.conf`, or your PHP configuration, discussed in the following section, you must restart Apache before the configuration goes into effect. You can restart Apache on Windows from the Start menu. How you restart Apache on a Linux system can vary. You may be able to restart from your `init.d` directory. You may also be able to start using a script named `apachectl` or `httpdctl`.

### TYPE THIS

```
/etc/rc.d/init.d/httpd restart
or
whereis apachectl
returns the path to apachectl
path/apachectl stop
path/apachectl start
```

### RESULT

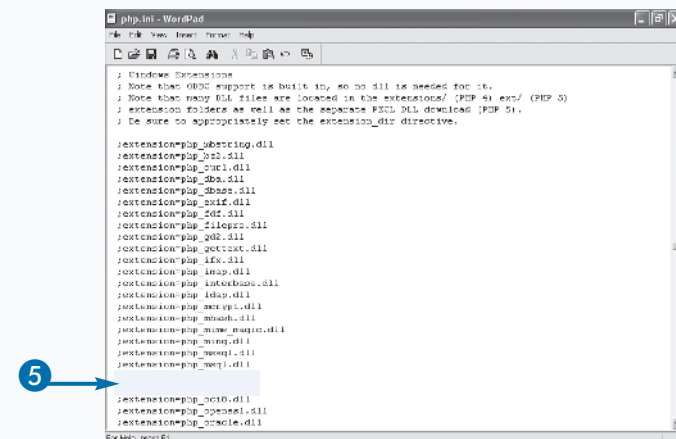
Apache restarts and the new Apache and/or PHP configuration goes into effect.

## An abstract geometric pattern on a blue background. It features various white circles of different sizes, some with smaller circles inside them. There are also white lines, some solid and some dashed, forming a grid-like structure. Symbols include three plus signs (+++) in the top left, a single plus sign (+) in the top right, and a right-angle symbol (L-shape) in the middle left. The overall composition is complex and layered.

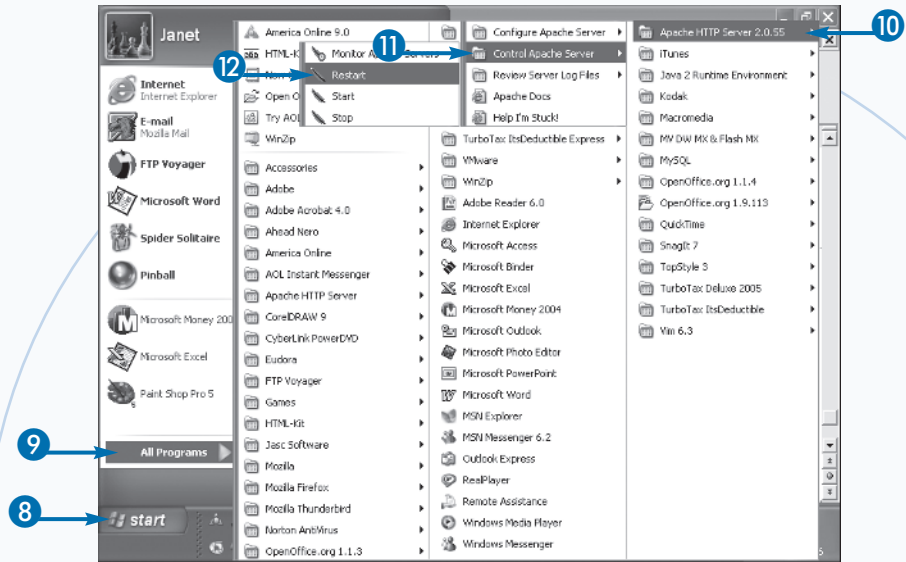
On Linux and Macintosh, if `php.ini` is not installed during installation, you need to install it. Copy `php.ini-dist` into `/usr/local/lib`, renaming it `php.ini`.

You must restart Apache after changing PHP settings before the new settings will go into effect.

- 6 Save the file.
- 7 Close the file.

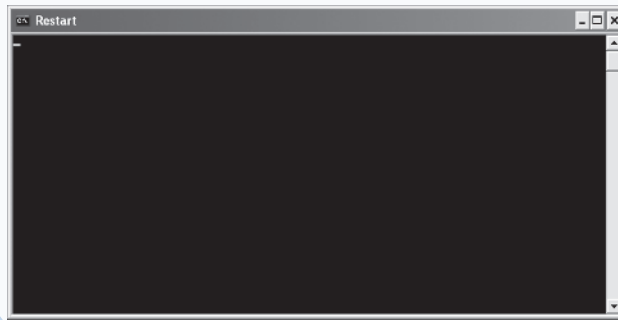


- 8 Click Start.
- 9 Click All Programs.
- 10 Click Apache HTTP Server.
- 11 Click Control Apache Server.
- 12 Click Restart.



The Restart window opens for a few seconds and quickly closes.

If Apache encounters any errors when restarting, the errors are displayed in the Restart window.



## Extra

PHP consists of a PHP core and PHP extensions. The `mysql` and `mysqli` extensions provide the `mysql` functions used to communicate with MySQL.

PHP offers many extensions, which provide hundreds of functions. Several core extensions are compiled into PHP and are always there by default. Other standard extensions are included in the PHP distribution, but you must activate them, such as the `mysql` and `mysqli` extensions. In addition, many extensions are written and made available by individuals. Many of the best of these are part of PEAR, the PHP Extension and Application Repository.

When you plan your Web site, you may want to look for an extension that offers the functionality that you need, rather than develop the code yourself from scratch. You can browse the standard extensions at the PHP Web site, [www.php.net/manual/en/](http://www.php.net/manual/en/). You can examine the PEAR extensions for helpful functionality at <http://pear.php.net>.

# Test Your Development Environment

**A**fter everything is installed, you can test your development environment by running a PHP script. A PHP script is a text file, which you can create in any text editor. The rest of this book explains the statements and functions of PHP that you can include in your PHP script. In this section, the example creates a simple PHP script, with one statement for testing your environment.

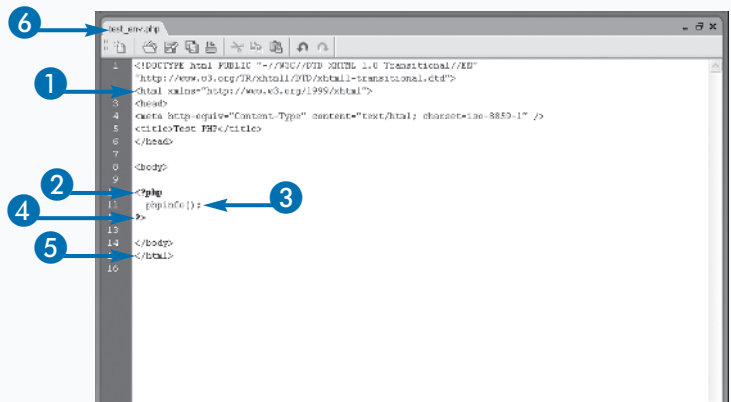
Your script must be located in your Web space — the directory and its subdirectories where your Web server expects to find the Web page source files. Apache calls this directory the *document root*. The default Web space for Apache is `htdocs` in the directory where Apache is installed. For Internet Information Services (IIS), it is

`Inetpub\wwwroot`. On Linux, it may be `/var/www/html`. The Web space can be set to a different directory by configuring the Web server. For example, you can change the path for `DocumentRoot` in `httpd.conf` to change the Web space for an Apache server. If you are using a Web hosting company, the staff will supply the directory name where you need to locate your Web page source files.

To run a PHP script, you need to access the Web page file through your Web server. You must type the name of the script into your browser address window, such as **`www.mywebsite.com/test.php`** or **`localhost/test.php`**. You cannot access the file by clicking File → Open File in your browser menu. If you do, the PHP script will appear as text, rather than run and display its output.

## Test Your Development Environment

- 1 Add the opening HTML code.
- 2 Type `<?php`.
- 3 Type `phpinfo();`
- 4 Type `?>`.
- 5 Type the closing HTML code.
- 6 Save the file with a `.php` extension.

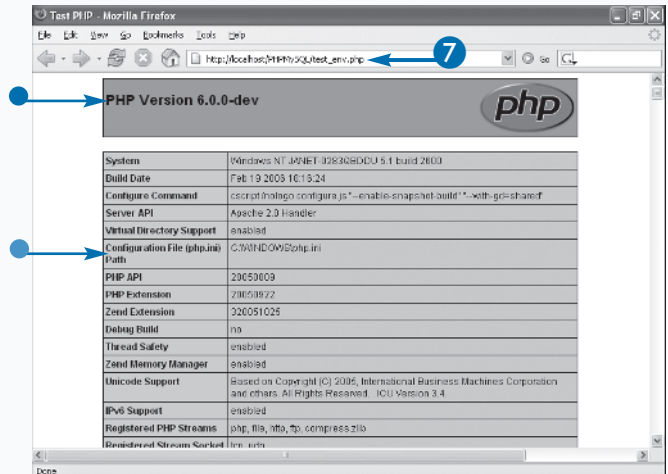


- 7 Open the file in your browser by typing the URL in the browser address field.

A long list of variables and settings is displayed.

- The PHP version is displayed.
- The output shows the path to the `php.ini` file that PHP is using.

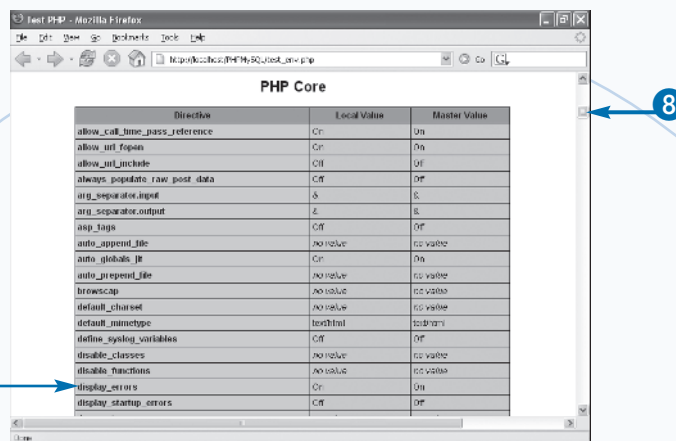
**Note:** If the path to a directory is shown, rather than a file, PHP is looking for the `php.ini` file in the specified directory but cannot find the file.



- 8 Scroll down to find the PHP core section.

PHP settings are displayed.

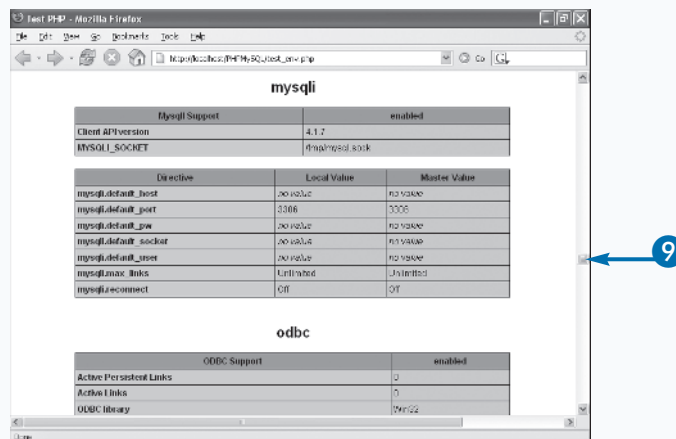
- `display_errors` is set to On. PHP errors are explained in Chapter 2.



- 9 Scroll down to the `mysql` or `mysqli` section.

A section is displayed for each extension that is activated.

**Note:** If no `mysql` section is displayed, then `mysql` support is not activated.



## Extra

You can change the location where Apache looks for your Web page source files by editing the `httpd.conf` file. Apache calls the location the `DocumentRoot` and sets it to `htdocs` in the directory where Apache is installed. When you define a new path, use forward slashes in the path, even if you are using Windows. You only need to enclose the path in quotes when it has special characters in it, such as a colon (:).

### TYPE THIS

Open `httpd.conf` in a text editor. Find the following line:

```
DocumentRoot "C:/Program Files/Apache Group/Apache2/htdocs"
```

Change it to the following:

```
DocumentRoot "C:/mywebsite"
```

### RESULT

Apache now looks for Web site files in `C:/mywebsite`. You need to locate your Web page files in that directory before Web visitors can see your Web pages.