



## CHAPTER I

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# Introducing LAMP

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- What is LAMP?
- Why LAMP?

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If you are a webmaster, a web developer, or a company that is interested in running your own web server, look no further: LAMP is here. *LAMP*, which stands for *Linux, Apache, MySQL, and PHP*, is a robust combination of applications driven on the powerful Linux operating system. This combination of technologies has a proven track record of being efficient, secure, and always on the leading edge of the ever so popular Internet.

The goal of this book is to teach you how to install and configure a web server by using the LAMP technology. You can rest assured that by the time you are finished reading this book, you will have a strong, powerful, and efficient web server to host your personal websites, powerful e-commerce or business-based websites, and anything in between.

The software used in this book is completely free to use and will not cost you any money in licensing or purchasing, unless you choose to purchase discs. Additionally, all of the software is easily downloaded through the Internet.

If you are ready to save yourself time and money by running and managing your own server, then read on!

## What Is LAMP?

LAMP is a proven, efficient set of software that works well as a system. The open architecture of each of these elements allows for smooth and seamless integration with one another and results in a powerful combination. Early adopters of these technologies back in 1997 were seen as radical, but today the open source movement is on the rise, and both large and small enterprises are adopting the LAMP method of development. Steering away from the high costs of implementing licensed server and client software is becoming increasingly beneficial because the stability of each application is surpassing that of its far more expensive brethren. In recent events, some governments have decided to make the jump to open source software, touting its reliability, efficiency, and substantial cost savings over proprietary solutions.

Besides reaching this dependability level capable of being embraced by entire governments, the major advantage seen by LAMP adopters is *speed*. Each component of LAMP exhibits benchmarks that far exceed those of their competitors, and as with any equation the sum is much more than its parts. Let's take a look at just the Linux/Apache combination for a moment. This outstanding combination is capable of serving more pages to its users than any other commercial or open source solution. "What about MySQL?" you might ask. MySQL is the fastest open source database available, with speed comparable to that of Oracle's. This fact alone pushed NASA (the National Aeronautics and Space Administration) to switch to MySQL in 2000. With MySQL, the level of functionality offered to its consumers grows in leaps and bounds—most notably by offering *stored procedures*, a system found only in mature databases.

Which brings us to the power of PHP. PHP is the fastest server-side scripting program on the planet. Faster than a one-legged chicken on a downhill slope, PHP whisks by Active Server Pages (ASP), Java, .Net, and ColdFusion, allowing a greater maximum user count per server while providing the same amount of functionality—taking into account proper programming methods of course.

Now that we've touched on a few of the major advantages of choosing LAMP, let's take a brief look at each of its elements.

### **L—Linux Operating System**

*Linux* is the operating system that runs the applications. It is specifically noted for its speed, minimal hardware requirements, security, and remote administration. Another great key point about Linux is that it's free! Linux is a fully featured operating system that doesn't cost you anything to use. You can download it directly from the Internet, install it, and use it without ever spending a dime (except for your own hardware of course). If you're curious about how this is possible, see the "Why LAMP Is Free" section later in this chapter.

Another major advantage of Linux is its ability to run with or without a graphical user interface (GUI), depending on your needs. (The non-GUI interface could almost be related to DOS mode for those Windows users who are not yet familiar with Linux.)

Linux is a project that began as a hobby by mastermind Linus Torvalds while he was a student at the University of Helsinki in Finland. Torvalds, originally working with Minix (a small Unix system), decided to create an operating system that would exceed the Minix standards. He began his development in 1991, and his first public release was version 0.02. Development of Linux continues even now with updates released as enough major changes are made to justify a new *version* release. Now that Torvalds has gained a much larger development team, releases are becoming more and more frequent. He is also the one who chose Tux (the penguin) to be the mascot of Linux.

Because Linux is published under the GNU (GNU stands for *GNU's Not Unix*) General Public License (GPL), many companies and individuals have taken the source code and adapted it to their needs. Some (most notably Red Hat) have turned huge profits by offering support for their releases and are now closing their source to commercialize their distributions.

### **A—Apache Web Server**

Developed by the Apache Software Foundation (ASF), *Apache* is an open source web server solution that is packed with features, is extremely fast, and works well with the Linux operating system. With the Apache web server, you can create *virtual hosts* that enable you to run multiple websites on a single server, and it has many more awesome features. The Apache web server is available for the Windows environment as well; however, your system will suffer from decreased

performance because of Microsoft's memory management (a.k.a. *leaks*) and architectural differences. Therefore it is *highly* recommended that you use Linux for all your web serving needs.

A quick overview of Apache's features would include items such as enhanced logging, bandwidth throttling, directory access protection, Common Gateway Interface (CGI) support, Secure Sockets Layer (SSL) support, and a handful of other built-in modules that enable you to do all sorts of neat things with your website.

Apache is rapidly growing in popularity and is currently the number one web server solution according to Netcraft ([www.netcraft.com](http://www.netcraft.com)) surveys. It has held the number one position, with a large margin, for eight years. Taking the number one spot in 1996, Apache has grown to dominate the market with more than a 69 percent saturation. Coming in a rough second place is Microsoft, with 20 percent, which has stayed about the same since 1997. Next is Sun ONE with 3 percent.

**NOTE**

If you are interested in more statistics about Apache, take a look at the current Netcraft Web Server Survey located at [http://news.netcraft.com/archives/web\\_server\\_survey.html](http://news.netcraft.com/archives/web_server_survey.html).

## M—MySQL Database Server

*MySQL* is a powerful, robust database manager that enables you to store and retrieve data with a scripting language such as PHP. You can store various types of data, such as Boolean operators, text, integers, images, binary digits, and BLOBs (binary large objects) quickly and efficiently with minimal effort. Using a database is important for creating dynamic sites. The term “dynamic site” is derived from being able to utilize a single page of code to display different information based on a user's interaction. This would be virtually impossible without the use of a database and a scripting language such as PHP to manipulate the data.

MySQL is packed full of features such as data replication, table locking, query limiting, user accounts, multiple databases, persistent connections, and—as of MySQL 5—stored procedures, triggers, and views. These features will be explained in more detail later, but for now you should be aware of some of the benefits you will enjoy from implementing such a great database manager.

MySQL, developed by MySQL AB, originated from a need for the founders to use *mSQL* to connect to their own fast, low-level (Indexed Sequential Access Method, or ISAM) routines. After testing these procedures and functions, they were found to be neither fast nor flexible enough and so MySQL was born: a new system from almost the same Application Protocol Interface (API) as *mSQL*, so that any third-party code that might be written for *mSQL* could easily be ported to MySQL. The mascot for MySQL is the dolphin seen in their logo. Her name is Sakila, and she was given her name from a Name the Dolphin contest held by MySQL.

## P—PHP Scripting Language and Engine

*PHP* is a recursive acronym that stands for *PHP: Hypertext Preprocessor*. This widely used general-purpose scripting language is especially suited for Web development and can be embedded into HTML. What this means to you is that it's a simple scripting language that can greatly enhance your website. You simply learn the code, apply the logic, and create a dynamic website that can interact with your users on many levels greater than the traditional "flat file" HTML methods of the Internet.

PHP's initial inception in 1995 was a simple set of Perl scripts for tracking Rasmus Lerdorf's online résumé. As time went on, Lerdorf began to write a much larger C implementation to handle the increased amount of functionality he needed, including database connectivity. Lerdorf then decided to send out an initial release, open source style, called PHP/FI for anyone to use and to improve upon. Back in the day, this stood for Personal Home Page/Forms Interpreter. By 1997, the second release was distributed (PHP/FI 2.0) and had started to gain a following of several thousand from around the globe. Although several individuals were contributing code, it was still Lerdorf who continued the majority of all development.

Mid-1997 saw the dawn of a new age of PHP: PHP 3. This version was a complete rewrite of PHP/FI 2.0 by Andi Gutmans and Zeev Suraski, who needed more juice than was previously available for a university project they had been working on. To capitalize on PHP's growing user base, Lerdorf, Gutmans, and Suraski decided to release this new creation under the PHP name and so started what we know today as PHP. In the winter of 1998, PHP 4 development was begun by Gutmans and Suraski. They released the first official version in May of 2000. PHP 4 boasted much higher performance and pushed new technologies to its ever growing fan base with HTTP sessions, output buffering, and more secure ways of handling user input.

We believe that PHP 5 will knock the butterfly off its flower when it hits. A new object-oriented model coupled with the Zend Engine 2, stack tracing, and exception handling is expected to push a wider acceptance across the planet. At the same time, an introduction of integration with external object-oriented models, such as COM and Java, will throw a wildcard into the mix. For the first time, the ability of other communities to integrate seamlessly with PHP will be available. This means that prewritten APIs will be able to be much more easily integrated with PHP, destroying the last remaining reasons for these other communities to *not* use PHP.

**NOTE**

Don't worry if you do not yet have a complete understanding of the LAMP technologies from these brief descriptions. Throughout the rest of the book, we will cover in depth how to install, configure, and utilize them.

## Why LAMP?

If you are wondering, “Why choose LAMP?” then the answer is something you must consider for yourself. The combination has been proven on many popular websites, and the technology is free to use. These factors are why many people and businesses have chosen this combination for launching their production-based websites.

With LAMP, you have full control over your server. Most important, you have remote access, which enables you to easily administer your Linux server from anywhere in the world. Linux enables you to run the services required without running a GUI, and therefore it uses less system resources—resources that could be used to speed up the process of delivering web pages to your audience.

## Why LAMP Is Free

The core of the Linux operating system (the kernel) is under the GNU General Public License (GPL). The reason Linux is licensed under the GPL is simple: you are authorized to make modifications of the software, and in turn, release your version to the public, as long as you release the source code along with it. This keeps everything under the GPL “open source” and allows other people to modify the work that you have done, and so on.

Although it is not necessary to license any open source software under GPL, the GPL does prevent the code from becoming closed to the public. Others cannot capitalize on an open source code foundation by improving upon it and then close the source, thereby making it difficult if not impossible for the open source community to develop the same functionality. This is a “remember your roots” type license and it is how great operating systems such as Linux and most of the open source software evolve. This type of peer review is the basis for what’s called the *Open Source Movement*.

The GPL is written and maintained by the Free Software Foundation. If you are interested in learning more about GPL, you can visit the Free Software Foundation’s website at [www.gnu.org/copyleft/gpl.html](http://www.gnu.org/copyleft/gpl.html).

Apache, MySQL, and PHP are some of the other free software applications we will be using throughout this book. Although they are not licensed under the GPL, each of these applications is under a similar license. This enables us to not only share in the work of countless numbers of developers across the globe but also to freely use and distribute these applications as we choose. From our basic Linux installation all the way to our mail server (the application responsible for sending and receiving our e-mail on our server), we will be using free software brought to us by those who love to do one thing: write software.

**NOTE**

Some fees might be associated with free software—for example, for tech support—but these fees can be avoided by making use of the open source community itself. There are hundreds of forums and thousands of sites devoted to helping you find answers to questions that might arise, and these sites can be accessed for free. Although these sites might not answer your questions *immediately*, they should become an invaluable resource for your newfound, or newly rekindled, love of open source.

It's a safe bet that on any given day you use at least one piece of free software, even if you don't know it. In fact, this book was written on free word processing applications that come with Linux. Now, you have the opportunity to learn more about free software that you will use by following the examples we set for you in this book to create your own LAMP solution.

**LAMP versus Other Solutions**

Other solutions such as Microsoft's Internet Information Server (IIS) are popular. However, the lack of security and potential higher cost of hardware and maintenance keep them out of reach of many small companies. Rather than spend millions in licenses and administrative costs for an inferior product, we choose to run a Free Software solution.

In a recent study by the Robert Frances Group of Westport, Connecticut, it was found that the cost of running Linux was roughly 40 percent of that of Microsoft Windows and 14 percent of Sun Microsystems' Solaris operating systems. This alone will make any company think twice about deploying a Web-based application on Microsoft Windows. In that same study, it was also found that the typical Windows administrator managed an average of only 10 machines each, whereas Linux administrators managed many times that number.

Speed is another significant factor to most of us. We need our Web-based applications to respond quickly and remain snappy throughout the user's experience. With proper coding techniques, PHP is many times faster than Microsoft's ASP or Sun Microsystems' Java platform.

Another great feature of PHP is the ability to create command-line scripting that can perform tasks to your system at scheduled intervals by using CRON jobs within Linux. You can have PHP clean up your MySQL database weekly, or have it create backups of your website every few days, and so on. Although many PHP versus ASP debates could be spawned from these statements, the truth stands that ASP probably will never be as robust as PHP.

In the end, it's you that makes LAMP better than other platforms. Through the use of the LAMP combination, you directly contribute to the success of the software on your server.

## Who Else Is Using LAMP?

The question of “Who is using LAMP?” is often asked. Because of the size of the Internet and the number of servers out there, we do not have the ability to give you a full report; however, here’s a list of some of the more popular sites using LAMP:

**LinuxForum.com** A free Linux support website.

**ApacheFreaks.com** A free Apache web server support website.

**MySQLFreaks.com** A free MySQL database manager support website.

**PHPFreaks.com** A free PHP support website.

**Winamp.com** The Nullsoft Winamp site is built around PHP.

**DevShed.com** The open source development site Developer Shed is completely PHP driven.

**MP3.com** The single largest MP3 Web-based server is built using PHP.

**SpeedTV.com** SPEED TV, the television station owned by Fox, has been completely developed in PHP with a few Flash/ColdFusion elements thrown in.

**Yahoo.com** Even though Yahoo does not show the .php extension on their files, it has been confirmed by many sources that they are using it. Here’s our source: [public.yahoo.com/~radwin/talks/yahoo-phpcon2002.htm](http://public.yahoo.com/~radwin/talks/yahoo-phpcon2002.htm).

Nearly 70 percent of the websites you visit are using Linux as their operating system, and MySQL AB and Zend Technologies report that “over 10 million Web-based applications have been built using MySQL and PHP through low-cost open source software stacks such as LAMP” (see [www.mysql.com/press/release\\_2004\\_05.html](http://www.mysql.com/press/release_2004_05.html)). This number continues to grow as Linux and other open source projects gain momentum within the industry. Every passing year adds more credibility, more features, and more support to the LAMP solution.

If you’re curious to see how many domains are using PHP, you can check the Usage Stats for PHP at [www.php.net/usage.php](http://www.php.net/usage.php). At the time of this writing, according to SecuritySpace ([www.securityspace.com/s\\_survey/data/index.html](http://www.securityspace.com/s_survey/data/index.html)), the current usage is about 4.6 million domain names that are PHP enabled.



## Understanding LAMP Checklist

The following list indicates information from this chapter that you should understand. As you read this book, be sure to check out this section in each chapter and make sure you have a firm grasp of the elements within the list. Future chapters will build upon the techniques and/or information listed at the end of each chapter.

- Describe the four LAMP technologies and how they work together as a system.
- Understand the terms *open source* and *GNU General Public License*.
- Know the major reasons for choosing LAMP over another solution.
- Understand LAMP's huge impact on web development.

Although these points are not directly related to installing and configuring Linux, Apache, MySQL, and PHP, they provide a basic understanding that you can build upon to become a professional web developer for today's marketplace. Make sure you comprehend the philosophies and hard work put into these technologies that make this combination so great.

In the next chapter, we'll talk about the different Linux distributions, hardware requirements, obtaining Linux, and most important, we'll show you how to install Fedora Linux as your base operating system.

