GENERAL

apache mysql and php installation and configuration

Published: September 19, 2026 | Index ID: #-

Apache, MySQL, and PHP Installation and Configuration: A Complete Guide

Building a dynamic, database backed website or application requires a reliable stack of server software. The trio of Apache, MySQL, and PHP—commonly referred to as the LAMP stack (Linux, Apache, MySQL, PHP)—provides a proven foundation for web development. Whether you're setting up a local development environment, launching a production site, or learning how web servers work, mastering the installation and configuration of these components is essential.

In this article we'll walk through the entire process from scratch, covering multiple operating systems, key configuration steps, and best practice tips for security, performance, and maintainability. By the end you'll have a fully functional web stack ready for your projects.

Understanding the LAMP Stack

The LAMP stack is a classic combination of open source software:

- Linux – the operating system (Ubuntu, CentOS, Debian, etc.)
- Apache – the HTTP server that serves web pages
- MySQL – the relational database management system storing data
- PHP – the server side scripting language that generates dynamic content

Apache and PHP work together to process requests, while MySQL stores and retrieves data. Properly configuring each component ensures that they communicate efficiently and securely.

Prerequisites

Before diving into installation, make sure you have:

1. A server or local machine running a supported OS (Linux, Windows, or macOS).
2. Administrative/root privileges to install packages and modify configuration files.
3. Internet connectivity to download software packages.
4. A text editor (nano, vim, Notepad++, VS Code) for editing config files.

We'll use the command line for Linux/macOS and graphical installers for Windows. The steps below can be adapted to your environment.

Installing Apache

Ubuntu/Debian

1. Update package lists:\nsudo apt update
2. Install Apache:\nsudo apt install apache2 -y
3. Enable the service to start on boot:\nsudo systemctl enable apache2
4. Start Apache now:\nsudo systemctl start apache2
5. Verify installation by visiting http://localhost in a browser. You should see the default Apache welcome page.

CentOS/RHEL

1. Install Apache (httpd):\nsudo yum install httpd -y
2. Enable and start the service:\nsudo systemctl enable httpd\nsudo systemctl start httpd
3. Open port 80 in the firewall:\nsudo firewall-cmd --permanent --add-service=http\nsudo firewall-cmd --reload
4. Check the default page at http://localhost.

macOS (Homebrew)

1. Install Homebrew if you haven't already:\n/bin/bash -c "$(curl -fsSL https://raw.githubusercontent.com/Homebrew/install/HEAD/install.sh)"
2. Install Apache:\nbrew install httpd
3. Start Apache:\nsudo brew services start httpd
4. Verify by visiting http://localhost.

Windows (XAMPP)

Windows users often prefer XAMPP, which bundles Apache, MySQL, PHP, and more. Download from Apache Friends and follow the installer wizard. Once installed, launch the XAMPP Control Panel and start the Apache service.

Configuring Apache

After installation, tweak Apache to suit your needs. Configuration files are usually located in /etc/apache2 (Ubuntu) or /etc/httpd/conf (CentOS). On Windows, they reside in the XAMPP directory.

Virtual Hosts

Virtual hosts allow you to host multiple sites on a single server. Create a new configuration file in /etc/apache2/sites-available/your-site.conf (Ubuntu) or /etc/httpd/conf.d/your-site.conf (CentOS). Example:

<VirtualHost *:80>\n ServerName example.com\n ServerAlias www.example.com\n DocumentRoot /var/www/example.com/public_html\n ErrorLog ${APACHE_LOG_DIR}/example.com_error.log\n CustomLog ${APACHE_LOG_DIR}/example.com_access.log combined\n</VirtualHost>\n\nEnable the site and reload Apache:

1. Ubuntu:\nsudo a2ensite your-site.conf\nsudo systemctl reload apache2
2. CentOS:\nsudo systemctl reload httpd

Modules and Security

- Enable essential modules:\nsudo a2enmod rewrite\nsudo a2enmod ssl\nsudo systemctl reload apache2
- Disable unused modules to reduce attack surface. Use apache2ctl -M (Ubuntu) or httpd -M (CentOS) to list loaded modules.
- Set ServerTokens Prod and ServerSignature Off in apache2.conf to hide server details.

Installing MySQL

Ubuntu/Debian

1. Install the server:\nsudo apt install mysql-server -y
2. Secure installation:\nsudo mysql_secure_installation
3. Follow prompts: set root password, remove anonymous users, disallow remote root login, delete test database, reload privilege tables.

CentOS/RHEL

1. Install the community repository and MySQL server:\nsudo yum install https://dev.mysql.com/get/mysql80-community-release-el7-3.noarch.rpm\nsudo yum install mysql-community-server
2. Start and enable service:\nsudo systemctl start mysqld\nsudo systemctl enable mysqld
3. Retrieve temporary root password:\nsudo grep 'temporary password' /var/log/mysqld.log
4. Run mysql_secure_installation and follow prompts.

macOS (Homebrew)

1. Install MySQL:\nbrew install mysql
2. Start the service:\nbrew services start mysql
3. Secure installation:\nmysql_secure_installation

Windows (XAMPP)

MySQL comes bundled with XAMPP. Start the MySQL service from the XAMPP Control Panel. You can access phpMyAdmin at **http://localhost/phpmyadmin** for a web interface.

Securing MySQL

- Use strong passwords for all accounts.
- Grant the minimum privileges necessary. Example: GRANT SELECT, INSERT, UPDATE, DELETE ON dbname.* TO 'user'@'localhost' IDENTIFIED BY 'strong_password';
- Regularly update MySQL to patch vulnerabilities.
- Configure the firewall to allow MySQL only from trusted hosts.
- Enable SSL/TLS for remote connections if needed.

Installing PHP

Ubuntu/Debian

1. Install PHP and common extensions:\nsudo apt install php libapache2-mod-php php-mysql php-xml php-mbstring -y
2. Verify installation:\nphp -v
3. Reload Apache to load PHP module:\nsudo systemctl reload apache2

CentOS/RHEL

1. Enable the EPEL and REMI repositories for newer PHP versions:\nsudo yum install epel-release yum-utils\nsudo yum-config-manager --enable remi-php81
2. Install PHP and extensions:\nsudo yum install php php-mysqlnd php-xml php-mbstring -y
3. Restart Apache:\nsudo systemctl restart httpd

macOS (Homebrew)

1. Install PHP:\nbrew install php
2. Start PHP-FPM service:\nbrew services start php

Windows (XAMPP)

PHP is already bundled with XAMPP. Ensure the PHP module is enabled in httpd-xampp.conf and that Apache is restarted.

Configuring PHP

PHP’s behavior is governed by the php.ini file. Locate it using php --ini. Typical paths:

- Ubuntu: /etc/php/8.1/apache2/php.ini
- CentOS: /etc/php.ini
- macOS: /usr/local/etc/php/8.1/php.ini
- Windows: xampp/php/php.ini

Key Settings

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