Introduction to PHP PDO

PHP is an open-source general-purpose scripting language, which is widely used for creating dynamic and interactive web pages. PHP can access a large range of relational database management systems such as **MYSQL, SQLite**, and **PostgreSQL**. The **PHP 5.1** version offered a new database connection abstraction library, which is **PHP Data Objects** (PDO).

What is PDO?

PDO refers to **PHP Data Object**, which is a PHP extension that defines a lightweight and consistent interface for accessing a database in PHP. It is a set of PHP extensions which provide a core PDO class and database-specific driver. Each database driver can expose database-specific features as a regular extension function that implements the PDO interface.

> Note: We cannot perform any type of database function by using the PDO extension itself. To access a database server, we must use a database-specific PDO driver.

PDO mainly focuses on data access abstraction rather than database abstraction. It provides **data-access abstraction layer**, which means, regardless of which database we are using, we have to use the same functions provided by that database to issue queries and fetch data. PDO does not provide data abstraction, as it does not rewrite the SQL or emulate missing features.

Advantage of PDO

PDO provides various ways to work with objects and retrieves prepared statements that make work much easier. It is a database access tool in PHP through which we enable uniform access across several databases.

PDO allows comparatively seamless switching between different databases and platforms, which can be easily done by changing the connection string. It does not support database-specific syntaxes.

There are some advantages of PDO as follows:

- **Database support**
  The PDO extension can access any database which is written for PDO driver. There are several PDO drivers available which are used for **FreeTDS, Microsoft SQL Server, Sybase, IBM DB2, Oracle Call Interface, Firebird/Interbase 6**, and **PostgreSQL** databases, among many more.

The drivers are not available in every system automatically, so we have to find our available drivers and add ones when we need them.

- **Database connecting**
  There are different syntaxes available to establish the database connection. These syntaxes depend on specific databases. While using PDO, operations must be wrapped in try/catch blocks and utilize the exception technique.
  Usually, only a single connection needs to create, and these connections are closed by programming the database to set as a null.

- **Error handling**
  PDO permits to use exceptions for error handling. To produce an exception, PDO can be forced into a relevant error mode attribute.
  There are three error modes, i.e., **Silent** (default), **Warning**, and **Exception**. Warning and Exception are more useful in DRY programming.

  a. **Silent** - It is a default error mode.

  b. **Warning** - It is useful for debugging.

  c. **Exception** - This mode allows graceful error handling while hiding data that a person might use to exploit your system.

- **Insert and Update**
  PDO reduces the commonly used insert and update database operation into a two-step process, i.e.
  Prepare >> [Bind] >> Execute.
  Through this method, we can take full advantage of PDO's prepared statements, which protect against malicious attacks through SQL injection.
  Prepared statements are pre-compiled SQL statements that can be executed multiple times by sending this data to the server. This data, which is used within the placeholder, is automatically protected from the SQL injection attack.

Benefits of using PDO

PDO is the native database driver. There are some benefits of using PDO that are given below:

- **Usability** - It contains many helper functions to operate automatic routine operations.
- **Reusability** - It offers the unified API to access multiple databases.
- **Security** - It uses a prepared statement which protects from SQL injection. A prepared statement is a pre-compiled SQL statement that separates the instruction of the SQL statement from the data.

PDO Classes

There are three PDO classes, which are given below:

- **PDO -** It represents a connection between PHP and the database.
- **PDOStatement** - It represents the prepared statement and after the execution of the statement, sets an associated result.
- **PDOException -** It represents errors raised by PDO.

Databases supported by PDO

1. MySQL
2. PostgreSQL
3. Oracle
4. Firebird
5. MS SQL Server
6. Sybase
7. Informix
8. IBM
9. FreeTDS
10. SQLite
11. Cubrid
12. 4D

Comparison between PDO and MySQLi

To access the database by using PHP, we have mainly two options **- MySQLi** and **PDO** (PHP Data Object). MySQLi is a native for PHP that provides faster performance, whereas, most of the experienced developers prefer to work with PDO as it supports a wide variety of database drivers. There are some differences between PDO and MySQLi listed below based on their features.

Features	PDO	MySQLi
DB Support	12 different drivers	MySQL only
Connection	Easy	Easy
API	OOP	OOP + Procedure
Performance	Fast	Fast
Named Parameter	Yes	No
Object mapping	Yes	Yes
Stored Procedure	Yes	Yes
Client-Side Prepared Statements	Yes	No
Security	More secure than MySQLi.	Secure but not more than PDO.

Which should be preferred between PDO or MySQLi?

Both PDO and MySQLi have their own advantages:

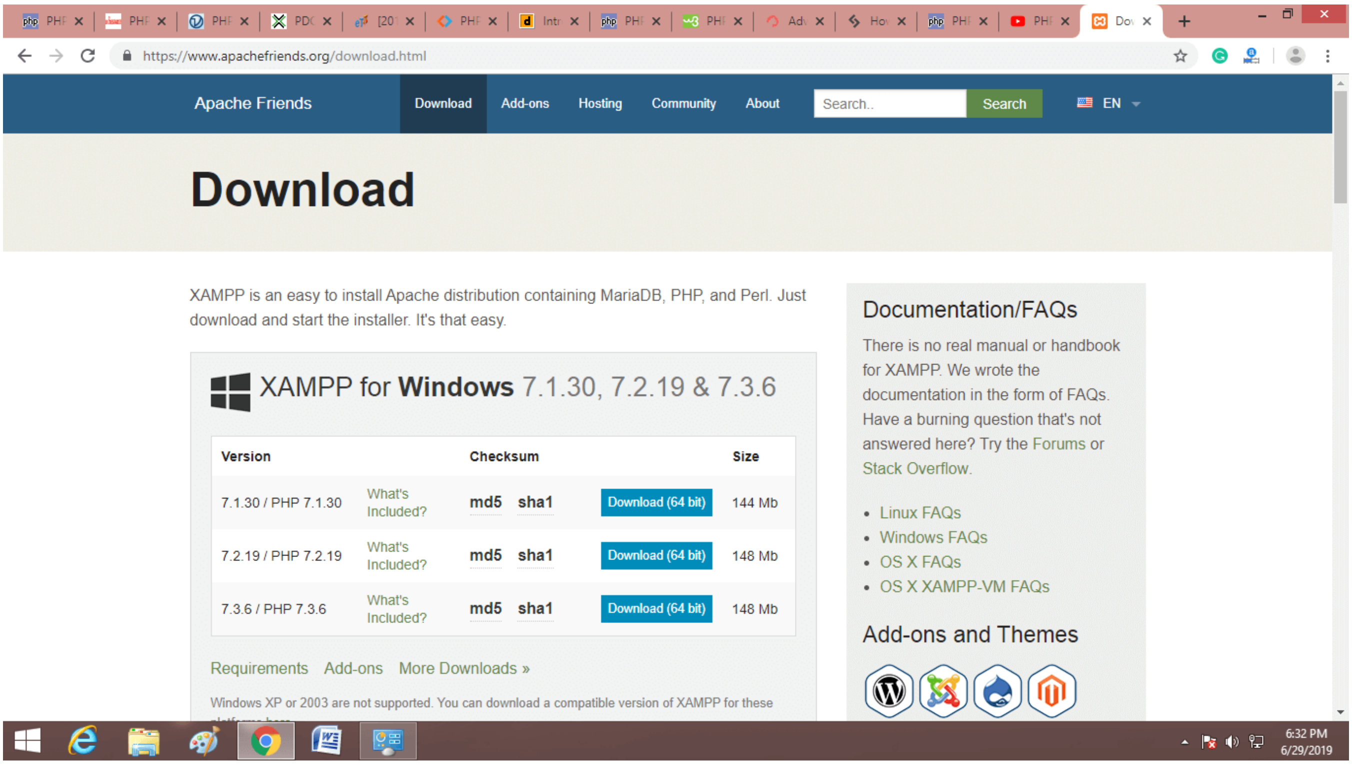
- As we have seen earlier that PDO works on 12 different database systems, whereas MySQL can work only with MySQL database. So, if we want to switch our project to another database, PDO makes it easy. In MySQLi, we have to rewrite the entire code.
- PDO and MySQLi both are Object-Oriented, but MySQLi also offers procedural API. Both support Prepared Statements. Prepared Statements are important for web application security, as it protects from SQL injection.

Requirement

There is no need of external libraries to build this extension.

Installation Process

Step 1: Download the latest XAMPP server from here https://www.apachefriends.org/download.html for different platforms like Windows, Linux, and MacOS.



Download

XAMPP is an easy to install Apache distribution containing MariaDB, PHP, and Perl. Just download and start the installer. It's that easy.

XAMPP for **Windows** 7.1.30, 7.2.19 & 7.3.6

Version		Checksum			Size
7.1.30 / PHP 7.1.30	What's Included?	md5	sha1	Download (64 bit)	144 Mb
7.2.19 / PHP 7.2.19	What's Included?	md5	sha1	Download (64 bit)	148 Mb
7.3.6 / PHP 7.3.6	What's Included?	md5	sha1	Download (64 bit)	148 Mb

Requirements Add-ons More Downloads »

Windows XP or 2003 are not supported. You can download a compatible version of XAMPP for these

Documentation/FAQs

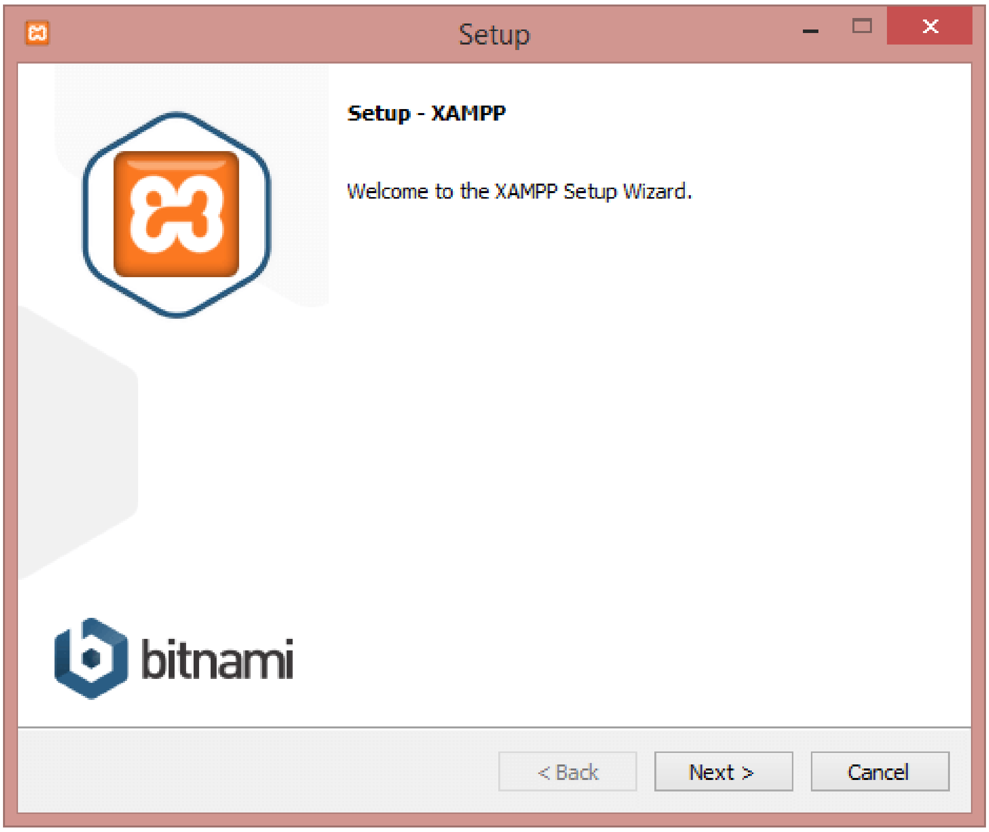
There is no real manual or handbook for XAMPP. We wrote the documentation in the form of FAQs. Have a burning question that's not answered here? Try the Forums or Stack Overflow.

- Linux FAQs
- Windows FAQs
- OS X FAQs
- OS X XAMPP-VM FAQs

Add-ons and Themes

> Note: Here we will discuss the installation process for Windows OS only.

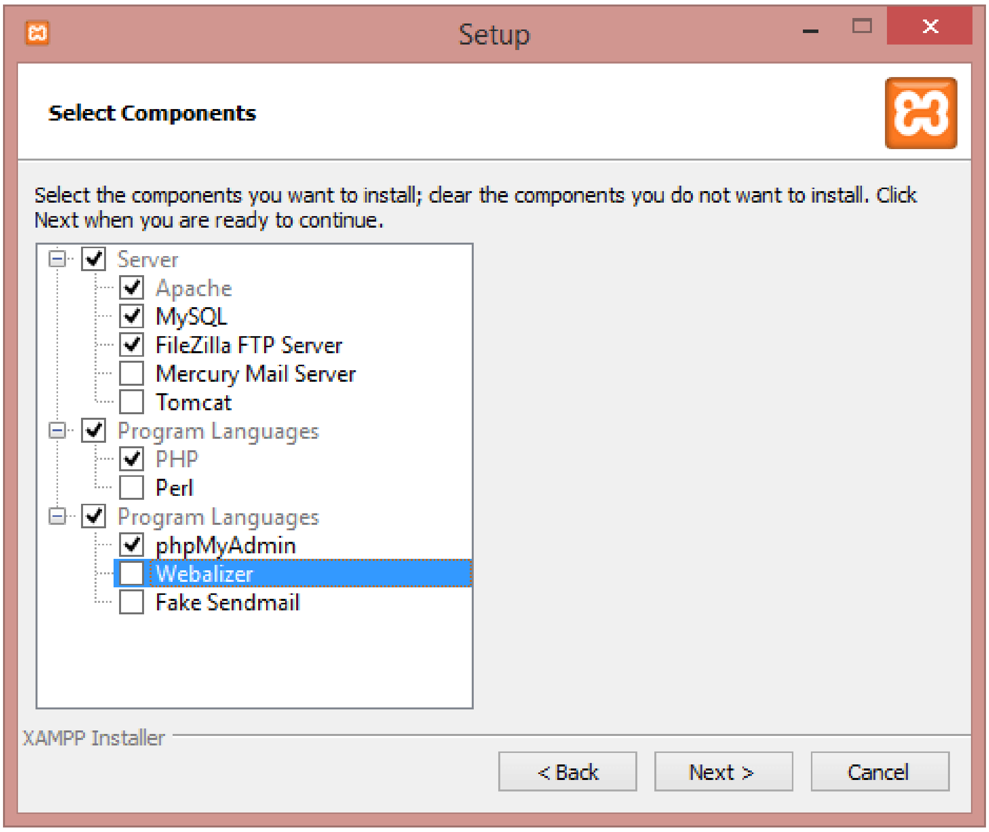
Step 2: Install the XAMPP Server on your system by following these steps.



Setup - XAMPP

Welcome to the XAMPP Setup Wizard.

Step 3: Select the components which you want to install and click on the Next button.



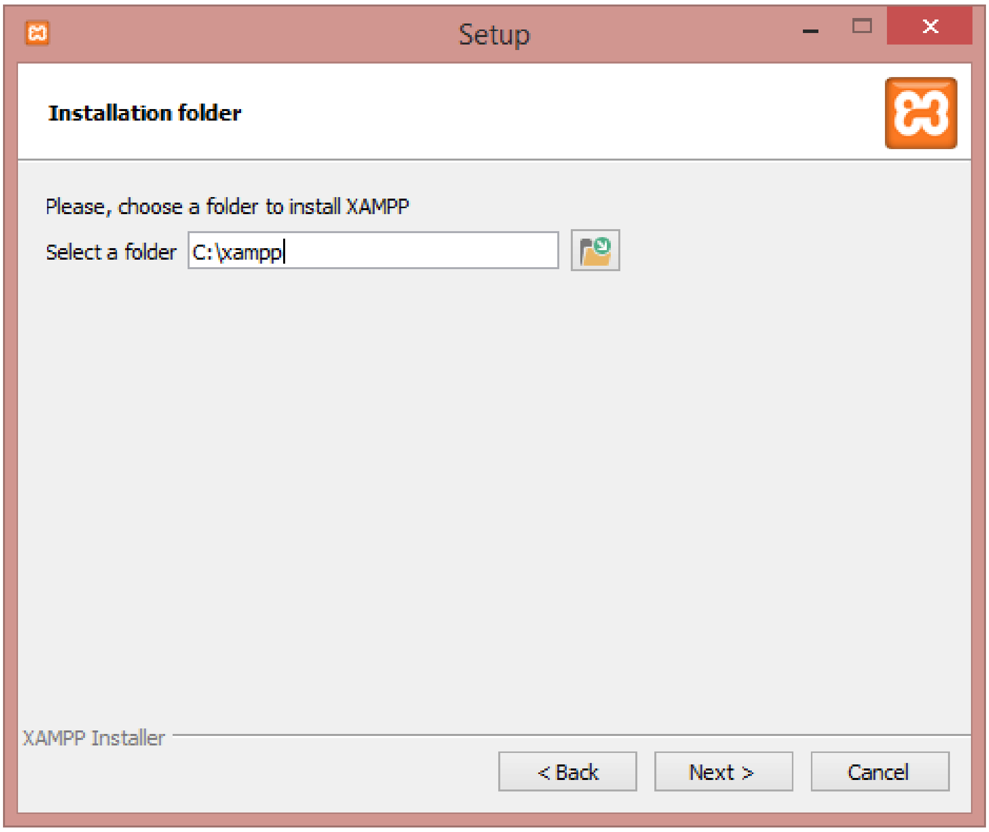
Setup

Select Components

Select the components you want to install; clear the components you do not want to install. Click Next when you are ready to continue.

- ☑ Server
  - ☑ Apache
  - ☑ MySQL
  - ☑ FileZilla FTP Server
  - □ Mercury Mail Server
  - □ Tomcat
- ☑ Program Languages
  - ☑ PHP
  - □ Perl
- ☑ Program Languages
  - ☑ phpMyAdmin
  - □ Webalizer
  - □ Fake Sendmail

Step 4: Create the new folder with the name xampp at the location where you want to install XAMPP.



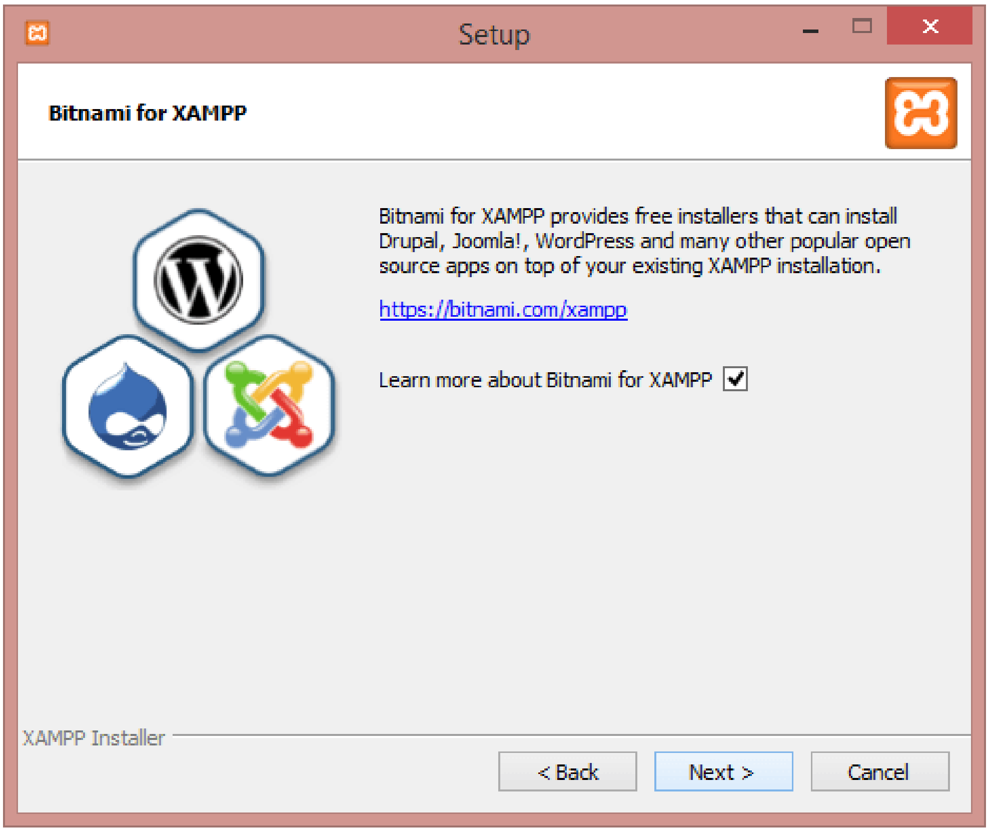
Setup

Installation folder

Please, choose a folder to install XAMPP

Select a folder C:\xampp

Step 5: Click on Next here and move forward. Installation of the XAMPP server will start from here.

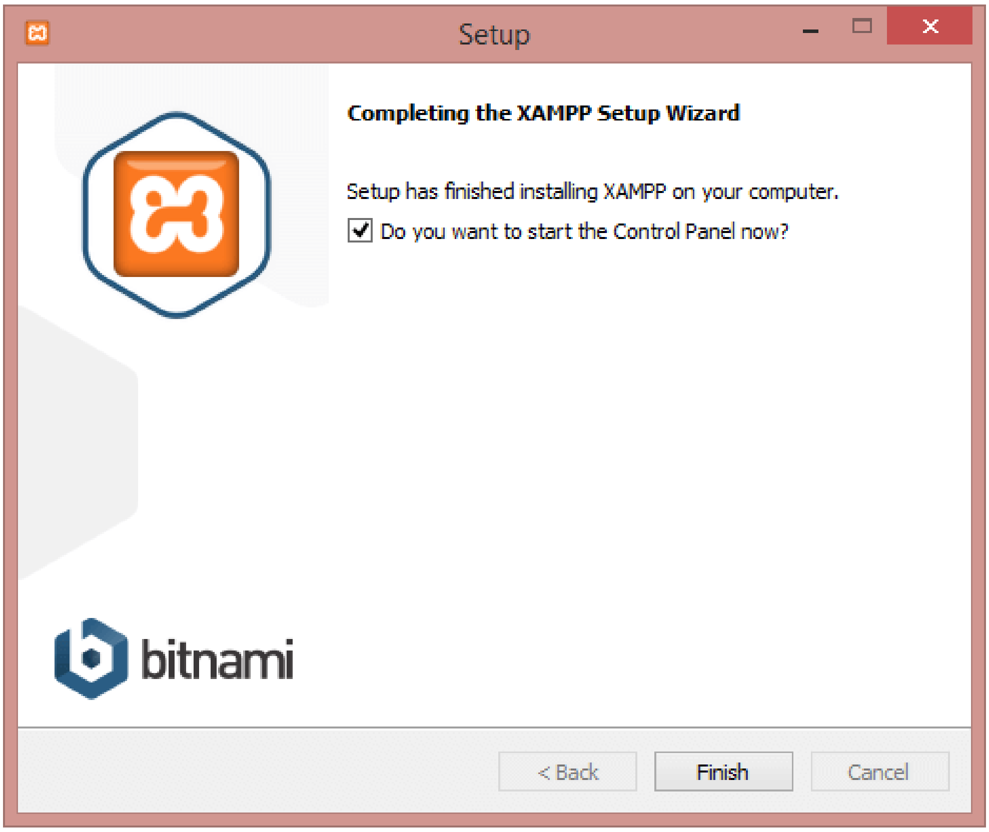


Bitnami for XAMPP provides free installers that can install Drupal, Joomla!, WordPress and many other popular open source apps on top of your existing XAMPP installation.

https://bitnami.com/xampp

Learn more about Bitnami for XAMPP ☑

Step 6: XAMPP is installed successfully. Click on Finish button.

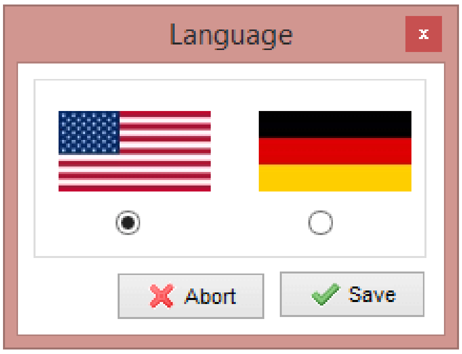


Completing the XAMPP Setup Wizard

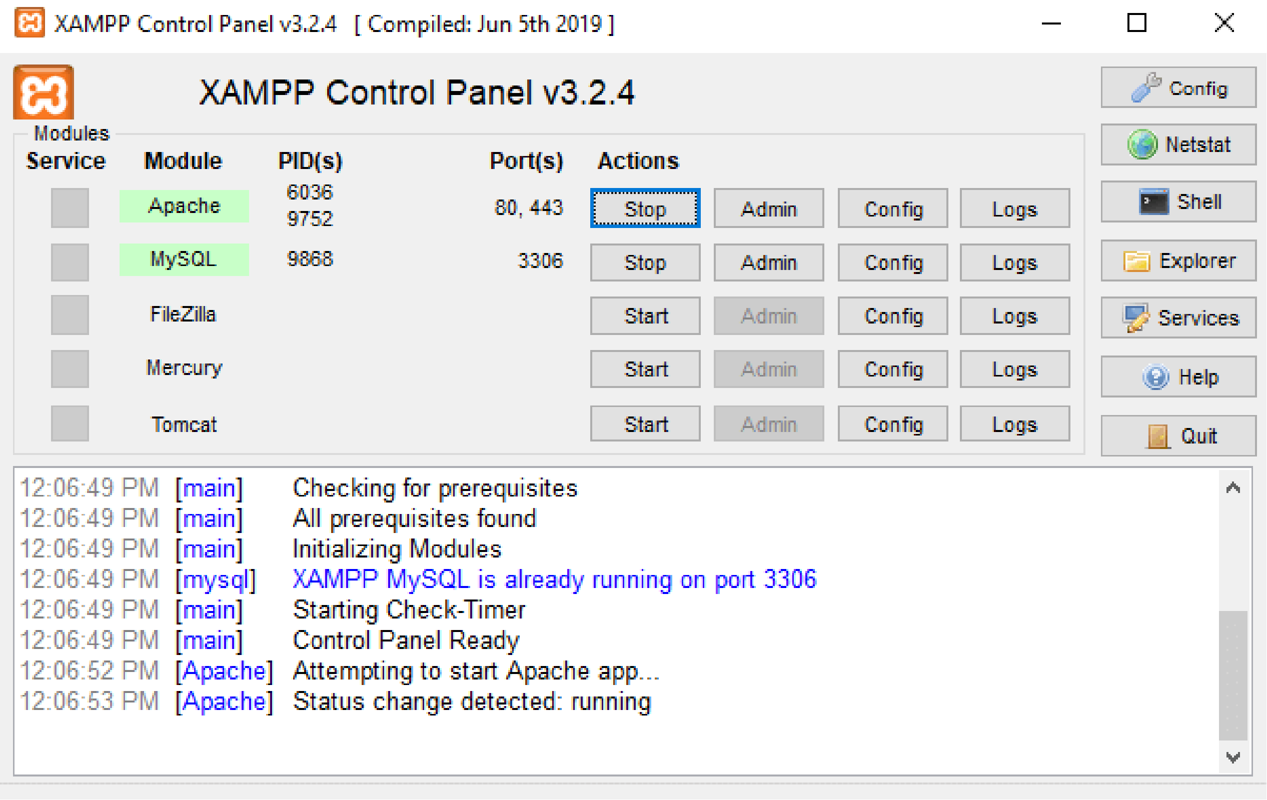
Setup has finished installing XAMPP on your computer.

☑ Do you want to start the Control Panel now?

Step 7: Select the preferred Language.



Step 8: Run the Apache server and MySQL from here (as per the given screenshot).


XAMPP Control Panel v3.2.4 [Compiled: Jun 5th 2019]
XAMPP Control Panel v3.2.4
Config
Netstat
Shell
Explorer
Services
Help
Quit
Modules

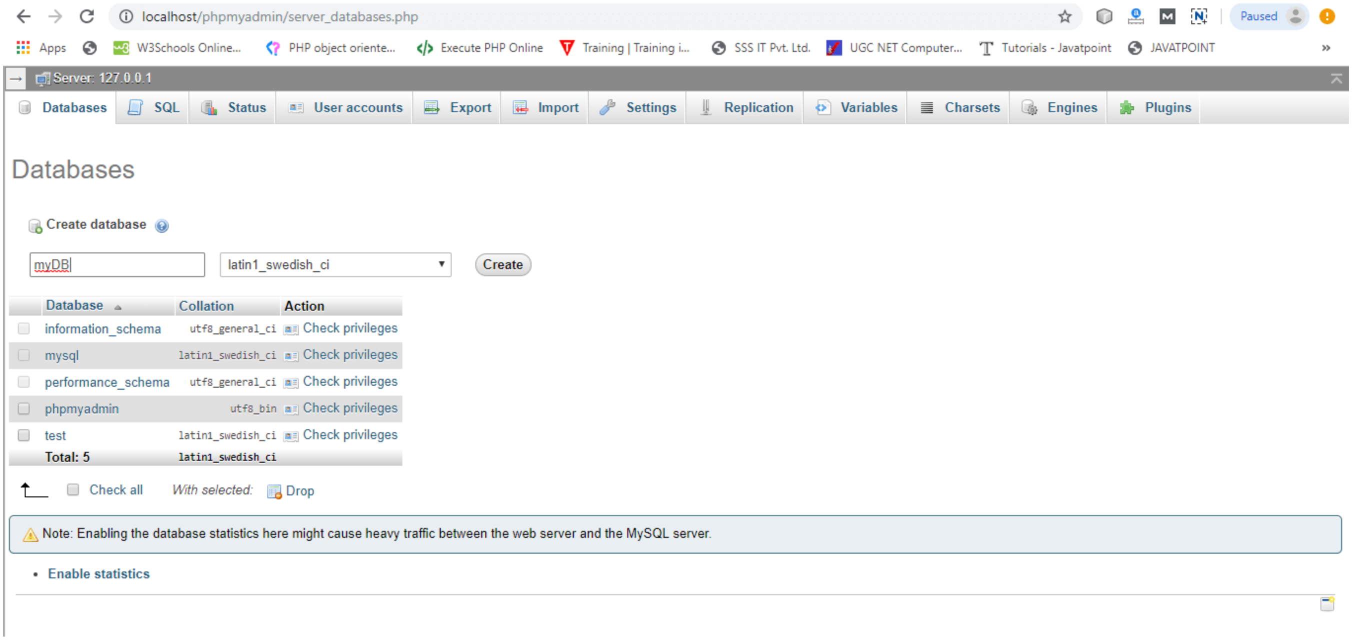
Service	Module	PID(s)	Port(s)	Actions			
	Apache	6036 9752	80, 443	Stop	Admin	Config	Logs
	MySQL	9868	3306	Stop	Admin	Config	Logs
	FileZilla			Start	Admin	Config	Logs
	Mercury			Start	Admin	Config	Logs
	Tomcat			Start	Admin	Config	Logs

```
12:06:49 PM  [main]     Checking for prerequisites
12:06:49 PM  [main]     All prerequisites found
12:06:49 PM  [main]     Initializing Modules
12:06:49 PM  [mysql]    XAMPP MySQL is already running on port 3306
12:06:49 PM  [main]     Starting Check-Timer
12:06:49 PM  [main]     Control Panel Ready
12:06:52 PM  [Apache]   Attempting to start Apache app...
12:06:53 PM  [Apache]   Status change detected: running
```

Step 9: Now, open php.ini from **C:/xampp/php/php.ini** (where you have installed your XAMPP) and uncomment the extension **"php_pdo_mysql.dll"** and **"php_pdo.dll"** (if you are working with MySQL database), or **"php_pdo_oci.dll"** (if you are working with Oracle database). Now, start working with the database. In PHP 5.1 upper version, it is already set.

Working with PDO

Firstly we need to create a database, so create a database by name myDB from here.



Databases

Create database

myDB | latin1_swedish_ci | Create

	Database	Collation	Action
□	information_schema	utf8_general_ci	Check privileges
□	mysql	latin1_swedish_ci	Check privileges
□	performance_schema	utf8_general_ci	Check privileges
□	phpmyadmin	utf8_bin	Check privileges
□	test	latin1_swedish_ci	Check privileges
	Total: 5	latin1_swedish_ci	

□ Check all *With selected:* Drop

Note: Enabling the database statistics here might cause heavy traffic between the web server and the MySQL server.

- Enable statistics

Database Connection

A database connection is always required to interact with the database. So, we need to know the identifier to access database, i.e., location of the database, database name, username, and password.

Now, create the database connection program using PDO in any text editor such as notepad or notepad++ and save it by coonection.php name. Run it on XAMPP server using localhost/80.

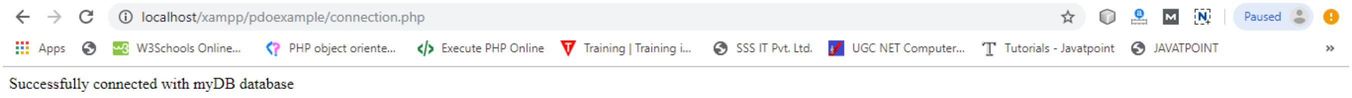
Example

```
<?php
  $dbHost="localhost";
  $dbName="myDB";
  $dbUser="root";     //by default root is user name.
  $dbPassword="";     //password is blank by default
  try{
    $dbConn= new PDO("mysql:host=$dbHost;dbname=$dbName",$dbUser,$dbPassword);
    Echo "Successfully connected with myDB database";
  } catch(Exception $e){
  Echo "Connection failed" . $e->getMessage();
  }
```

```
?>
```

Output

Run it on the server using following URL **localhost/Xampp/pdoexample/connection.php/** or where you have saved your program.



```
Successfully connected with myDB database
```

Handling Connection Error

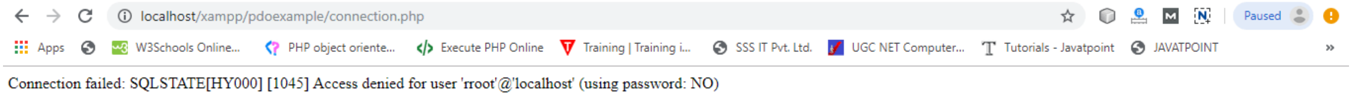
A PDOException object will be thrown if there is any connection error. We may catch the exception if we want to handle the error condition, or we can also leave it to global exception handler which can be set up by **set_exception_handler()** function.

Example

In this example, dbUser(user-id) is wrong, so it will throw an exception, as we can see in the output.

```
<?php
  $dbHost="localhost";
  $dbName="myDB";
  $dbUser="rroot";
  $dbPassword="";
  try{
    $dbConn= new PDO("mysql:host=$dbHost;dbname=$dbName",$dbUser,$dbPassword);

    //Set the PDO error mode to exception.
    $conn->setAttribute(PDO::ATTR_ERRMODE, PDO::ERRMODE_EXCEPTION);
    Echo "Successfully connected with myDB database";
  } catch(Exception $e){
  Echo "Connection failed" . $e->getMessage();
  }
?>
```

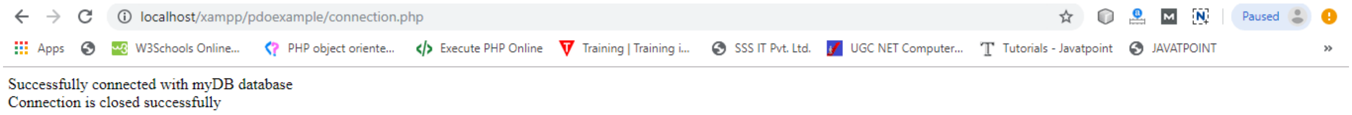


```
Connection failed: SQLSTATE[HY000] [1045] Access denied for user 'root'@'localhost' (using password: NO)
```

Closing the database connection

```
<?php
   $dbHost="localhost";
   $dbName="myDB";
   $dbUser="root";      //by default root is user name.
   $dbPassword="";     //password is blank by default
   try{
      $dbConn= new PDO("mysql:host=$dbHost;dbname=$dbName",$dbUser,$dbPassword);
      Echo "Successfully connected with myDB database";
   } catch(Exception $e){
   Echo "Connection failed" . $e->getMessage();
   }
// this command close the connection.
   $dbConn = null;
?>
```

Output



```
Successfully connected with myDB database
Connection is closed successfully
```

← Prev

Next →

Youtube For Videos Join Our Youtube Channel: Join Now

Feedback

- Send your Feedback to feedback@javatpoint.com

Help Others, Please Share

Learn Latest Tutorials

Splunk tutorial Splunk	SPSS tutorial SPSS	Swagger tutorial Swagger	T-SQL tutorial Transact-SQL
Tumblr tutorial Tumblr	React tutorial ReactJS	Regex tutorial Regex	Reinforcement learning tutorial Reinforcement Learning
R Programming tutorial	RxJS tutorial RxJS	React Native tutorial	Python Design Patterns

R Programming

React Native

Python Design Patterns

Python Pillow tutorial

Python Pillow

Python Turtle tutorial

Python Turtle

Keras tutorial

Keras

Preparation

Aptitude

Aptitude

Logical Reasoning

Reasoning

Verbal Ability

Verbal Ability

Interview Questions

Interview Questions

Company Interview Questions

Company Questions

Trending Technologies

Artificial Intelligence

Artificial Intelligence

AWS Tutorial

AWS

Selenium tutorial

Selenium

Cloud Computing

Cloud Computing

Hadoop tutorial

Hadoop

ReactJS Tutorial

ReactJS

Data Science Tutorial

Data Science

Angular 7 Tutorial

Angular 7

Blockchain Tutorial

Blockchain

Git Tutorial

Git

Machine Learning Tutorial

Machine Learning

DevOps Tutorial

DevOps

B.Tech / MCA

DBMS tutorial

DBMS

Data Structures tutorial

DAA tutorial

DAA

Operating System

Data Structures

Operating System

Computer Network tutorial

Compiler Design tutorial

Computer Organization and

Discrete Mathematics

Ethical Hacking

Ethical Hacking

Computer Graphics Tutorial

Computer Graphics

Software Engineering

Software Engineering

html tutorial

Web Technology

Cyber Security tutorial

Cyber Security

Automata Tutorial

Automata

C Language tutorial

C Programming

C++ tutorial

C++

Java tutorial

Java

.Net Framework tutorial

.Net

Python tutorial

Python

List of Programs

Programs

Control Systems tutorial

Control System

Data Mining Tutorial

Data Mining

Data Warehouse Tutorial

Data Warehouse