Host your Application in the Amazon Cloud with XAMPP and Bitnami

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v1.0

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Introduction

If you're a PHP developer building a public-facing Web application, there are a number of good reasons why the cloud should be on your radar. It's highly scalable, allowing you to quickly scale up if you application turns out to be a hit. It's cost-efficient, because you only pay for the resources - bandwidth, CPU cycles, memory - you use. And it's secure, because cloud providers have invested a great deal of time and thought into ring-fencing applications and user data.

However, if you're new to the cloud or do most of your development locally, getting your PHP application from your local XAMPP box to the cloud can be a bit challenging. That's where this tutorial comes in. Over the next few pages, I'll walk you, step by step, through the process of deploying a PHP/MySQL application running on your local XAMPP server, to a cloud server running LAMP packaged by Bitnami. Keep reading!

What You Will Need

Before we begin, a few quick assumptions. This tutorial assumes that you have a XAMPP installation with a working PHP/MySQL application. It also assumes that you're familiar with the MariaDB command-line client and that you have a working knowledge of transferring files between servers using FTP.

> If you don't have a custom PHP/MariaDB application at hand, use the example application included with this tutorial: it's a simple to-do list, created with Twitter Bootstrap and PHP. You can download it from here.

Now, if you're new to the cloud, you might be wondering what Amazon Web Services and Bitnami are. Very briefly, Amazon Web Services is a cloud platform, which allows you to easily create Windows and Linux virtual servers online. Bitnami provides pre-packaged server images for these cloud servers, so that you can become productive with them the moment they come online. In short, Amazon provides the cloud infrastructure, and Bitnami provides the server images and software. And since both Amazon and Bitnami have a free tier, you can run and manage a full-featured PHP server for free for 1 year.

For this tutorial, I'll be using LAMP packaged by Bitnami, which is Linux-based and bundles PHP, MariaDB and Apache, together with key applications and components like phpMyAdmin, SQLite, Memcache, OpenSSL, APC and cURL. LAMP packaged by Bitnami also includes a number of common PHP frameworks, including the Zend Framework, Symfony, CodeIgniter, CakePHP, Smarty and Laravel.

To deploy your application to the Amazon cloud with LAMP packaged by Bitnami, here are the steps you'll follow:

- Register with Amazon Web Services (AWS)
- Register with Bitnami
- Connect your AWS and Bitnami accounts
- Provision an AWS cloud server with LAMP packaged by Bitnami

- Validate the cloud server
- Deploy and test your application on the cloud server

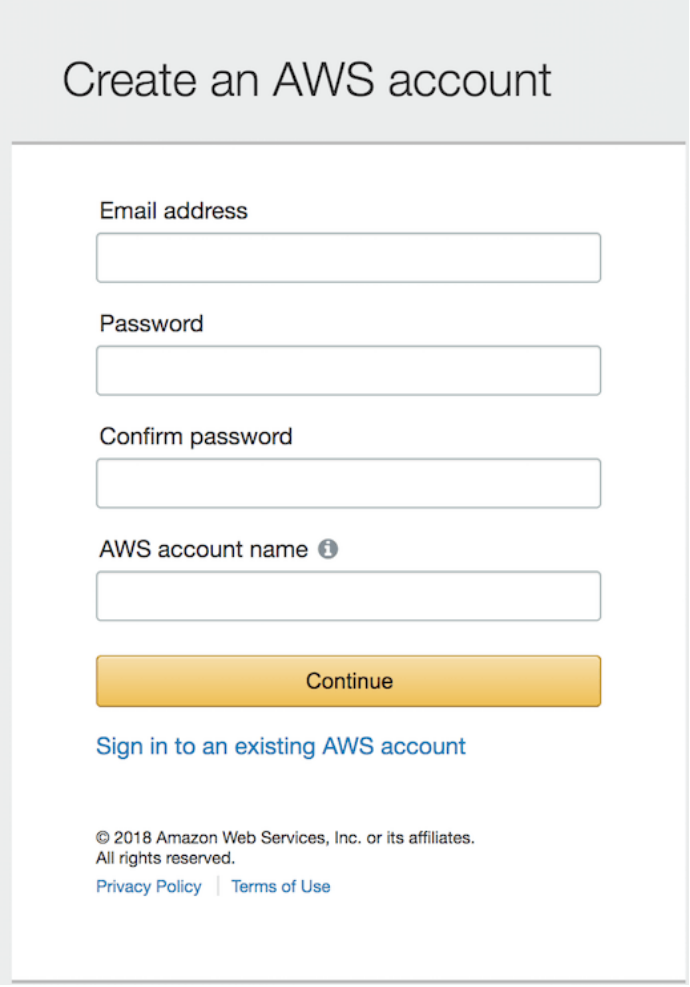
The next sections will walk you through these steps in detail.

Step 1: Register with Amazon Web Services

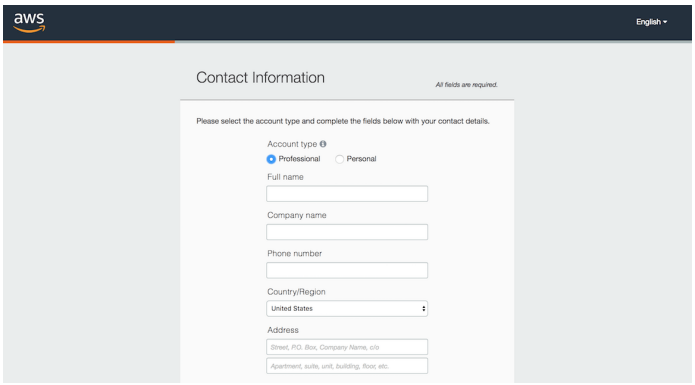
> At the end of this step, you will have signed up for the Amazon Web Services free tier. If you already have an Amazon Web Services account, you may skip this step.

You will need an existing Amazon account to log in and sign up. To create it, follow these steps:

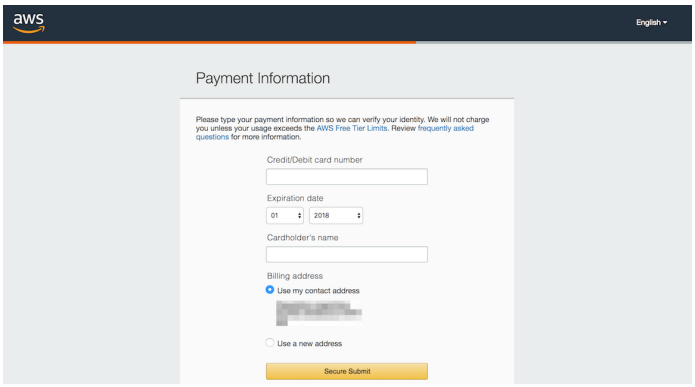
- Browse to https://aws.amazon.com and click the "Create an AWS account" button at the top of the page.
- In the resulting page, enter an email address, a password, and an AWS account name. Then, click "Continue" to start the registration process.



- Once you've signed in to Amazon, sign up for AWS by selecting the account type and providing some basic contact information and your mobile phone number.



- Once that's done, proceed to the next stage by entering your credit card information. Click the "Secure Submit" button to continue with the account creation.



If you're worried about how much you'll be billed for services, relax. When you first sign up for AWS, you get automatic access to the AWS Free Tier, which entitles you to 12 months of free usage up to certain limits. This includes 750 hours per month of free usage of Amazon EC2 micro servers, which are just right for development or low-traffic website hosting. So long as your usage falls within the limits of the free tier, your credit card will never be billed. However, Amazon still needs your credit card information for security purposes, to avoid service misuse and to confirm your identity.

IMPORTANT	You should fully understand the limits of the AWS free tier to avoid being unduly charged for service usage.

- Amazon will now verify your identity, by making an automated call to your mobile phone number and prompting you to enter the PIN number displayed on the screen.
- Once your identity is verified, choose the "Basic" support plan (also free) and confirm your account.

NOTE	At this point, make sure that you have subscribed a plan, even if you decide to register for the free tier or "Basic" support plan.

The AWS account registration machine will churn away for a minute or so, and you will then be redirected to a welcome page, which includes a link to the AWS management console. You should also receive an account confirmation email, which tells you that your account is good to go.

Step 2: Register with Bitnami

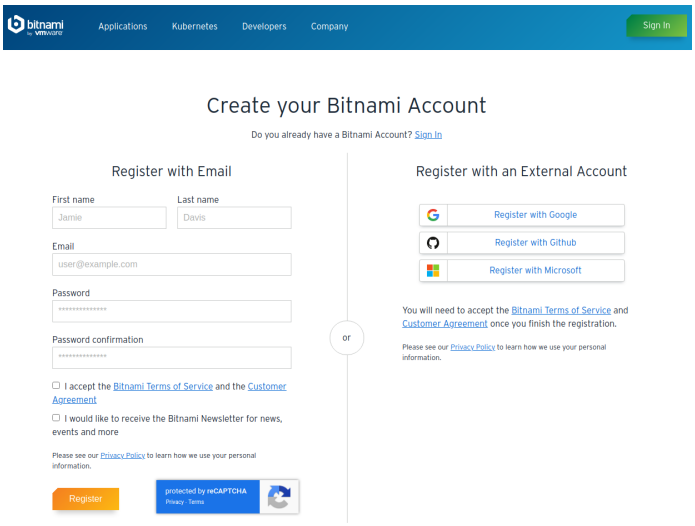
> At the end of this step, you will have created a Bitnami account.

The next step is to create a Bitnami account, so that you can launch a cloud server with LAMP packaged by Bitnami image. If you have a Google, Microsoft or Github account, you can use your credentials from those services with Oauth to create your Bitnami account.

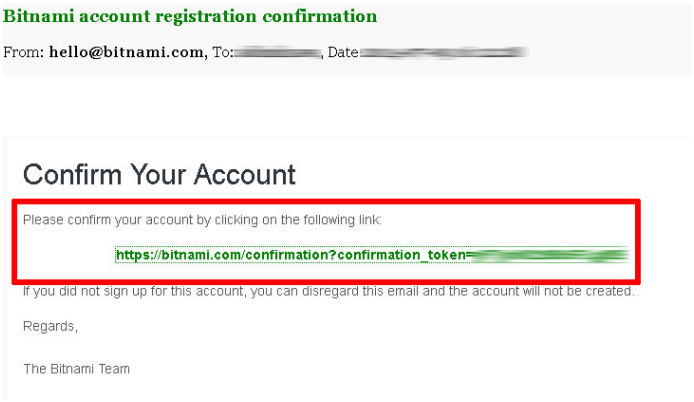
If you don’t have accounts with those services (or you don’t want to use them), you can use your email address and password to create a Bitnami account, as described below:

- Head to the Bitnami sign-up page.
- Enter your name and email address.
- Choose a password.
- Review and agree to the Bitnami terms of service.

Then, use the "Sign up" button to create your account.



Bitnami will send you an email with a verification link which you’ll need to click or browse to, to activate your account. This will also sign you in to your Bitnami account.



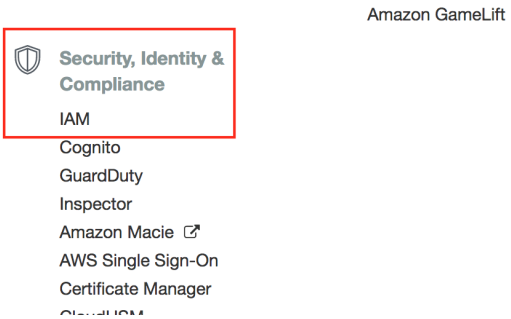
Step 3: Connect your AWS and Bitnami Accounts

> At the end of this step, your Bitnami Launchpad for AWS Cloud will be configured and you will be ready to provision a cloud server.

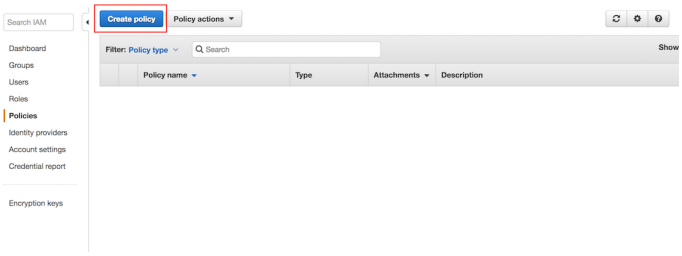
The easiest way to set up your AWS cloud server with LAMP packaged by Bitnami is via Bitnami Launchpad for AWS Cloud, which gives you a simple control panel to provision, start, stop and check status of your AWS cloud servers. However, to use it, you must first connect your AWS and Bitnami accounts, by obtaining security credentials for your AWS account and saving those credentials in your Bitnami Launchpad account.

Once your AWS account has been activated, the next step is to create an AWS Identity and Access Management (IAM) user and generate an AWS Access Key ID and Secret Access Key. You will need this to connect your AWS account with Bitnami. To do this:

- Log in to the AWS Console.
- In the AWS services menu, scroll down until you see the "Security, Identity & Compliance" section. Select the IAM service.



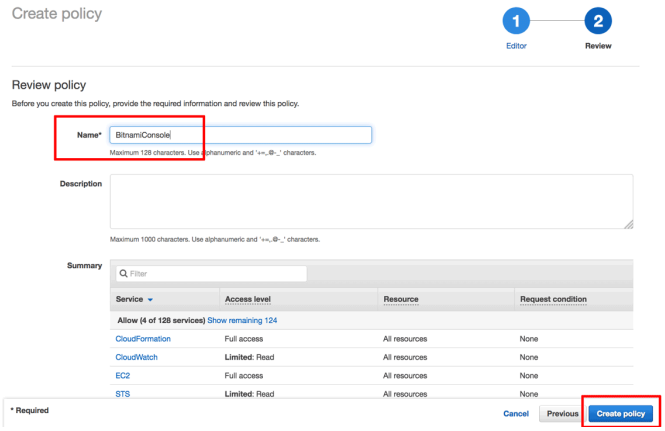
- Select the "Policies" section in the left navigation bar and click the "Get Started" button.
- Click the "Create Policy" button.



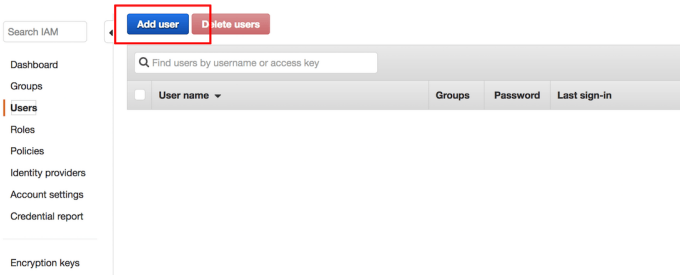
- On the next page, select the JSON tab and enter the following content:

```
{
  "Version": "2012-10-17",
  "Statement": [{
    "Effect": "Allow",
    "Action": [ "sts:GetFederationToken", "ec2:*", "cloudwatch:GetMetricStatistics", "cloudformation:*" ],
    "Resource": [ "*" ]
  }]
}
```

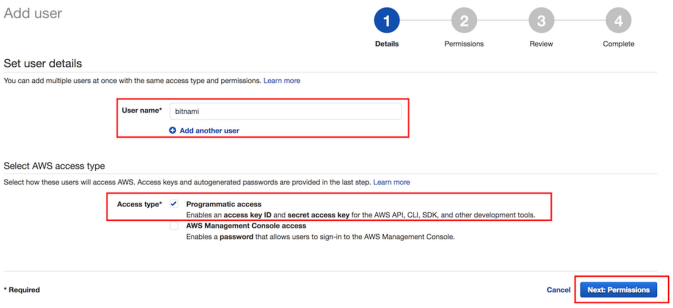
- Click "Review Policy" to proceed.
- Set the policy name to "BitnamiConsole" and click "Create Policy" to save the new policy.



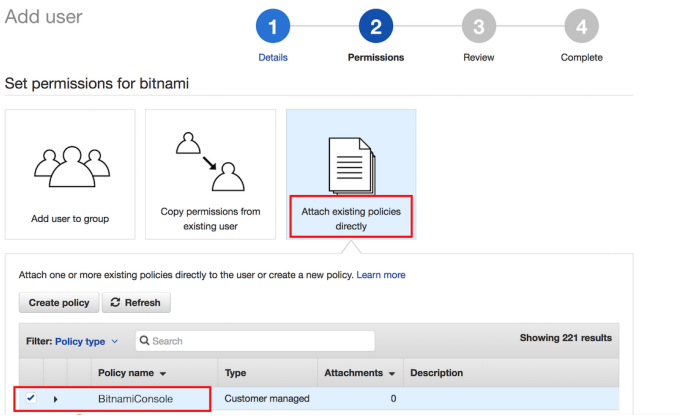
- Select the "Users" section in the left navigation bar and click the "Add user" button.



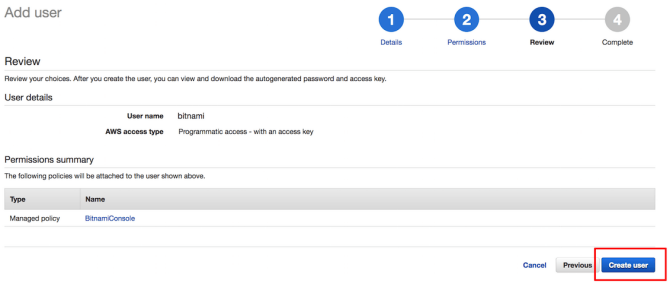
- On the "Details" page, enter a user name for use with Bitnami. Ensure that the "Programmatic access" checkbox in the "Select AWS access type" section is selected. Click the "Next: Permissions" button to proceed.



- On the "Permissions" page, select the option to "Attach existing policies directly". From the list of policies, find the new "BitnamiConsole" policy. Select it and click the "Next: Review" button.

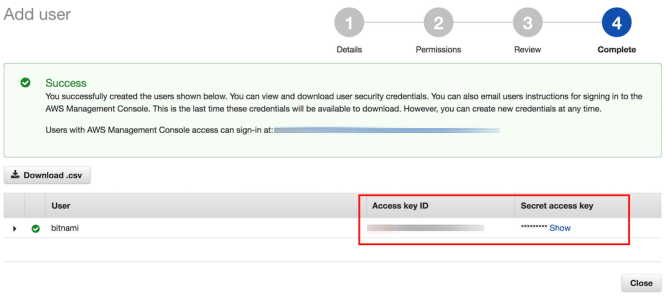


- On the "Review" page, review the selected options and click the "Create user" button.



- A new user and corresponding key pair, consisting of an "Access Key ID" and "Secret Access Key", will be generated and displayed. The "Secret Access Key" value will not be displayed again, so it is important to

accurately note down the "Access Key ID" and "Secret Access Key" values displayed on the screen at this point.

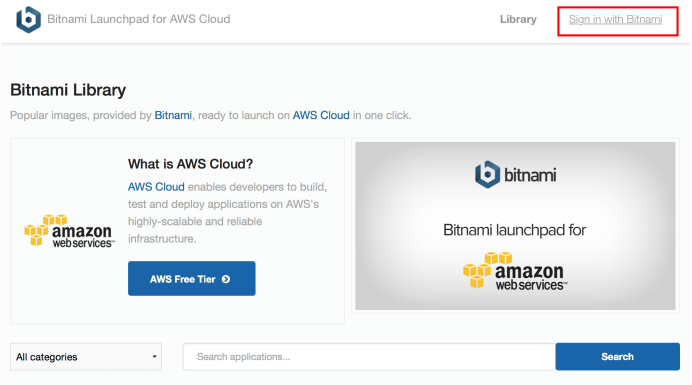


Your IAM user account and access keys are now ready for use.

- Note the Access Key ID and Secret Access Key.

You're now ready to connect AWS with Bitnami. To do this:

- Log in to your Bitnami account if you're not already logged in.
- Browse to https://aws.bitnami.com/.
- Select the "Sign in with Bitnami" link in the top right corner.

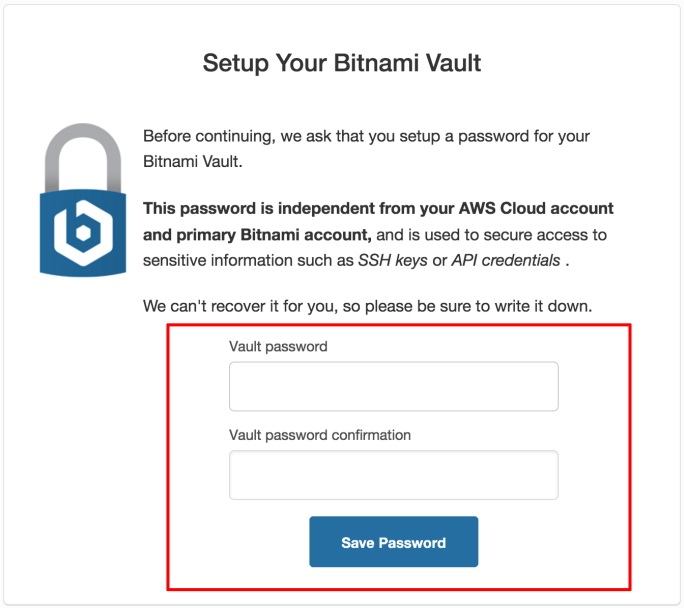


The Launchpad will recognize your Bitnami credentials and automatically sign you in.

The next step is to set up an administrative password and connect your AWS cloud account with your Bitnami account. To do this:

- Select "Virtual Machines" in the Launchpad menu.

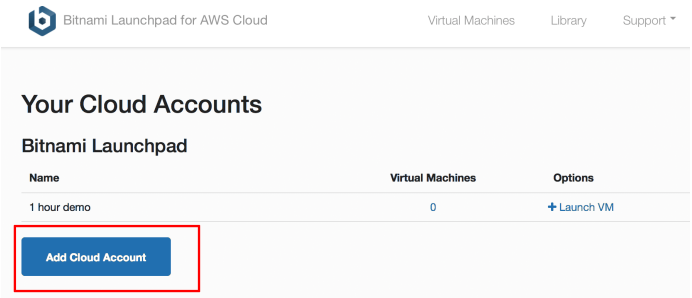
Since this is your first time, you'll be prompted to set up your Bitnami Vault password by entering an administrative password. Enter a hard-to-guess password.



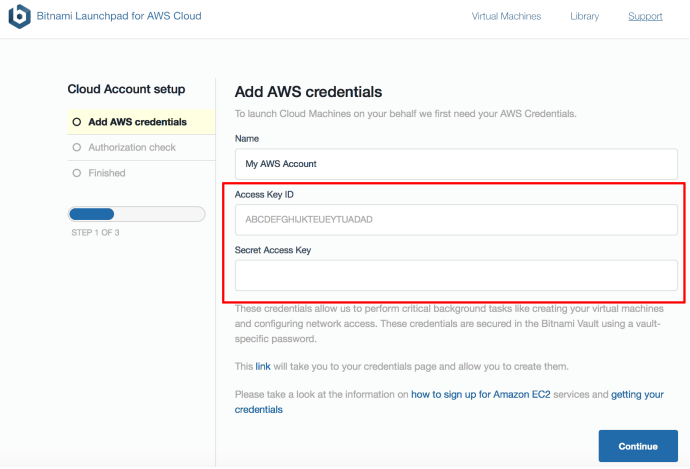
The Bitnami Vault password offers an additional level of protection against misuse: you'll need to enter it when performing certain operations, such as creating new cloud servers. Again, make sure you note it down for future reference.

IMPORTANT Your Bitnami Vault password is different from your Amazon Web Services password.

- Once your password has been accepted, you'll be redirected back to the Launchpad page. Select "Accounts _ Cloud Accounts" in the Launchpad menu.
- Click the "Add Cloud Account" button.



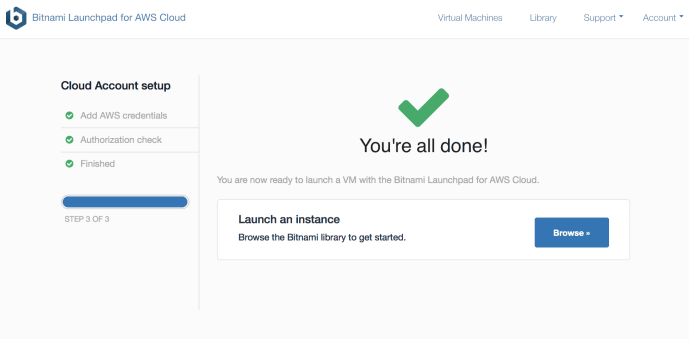
- You'll be transferred to an authorization page, where you will need to enter the Access Key ID and Secure Access Key. Enter this information and click "Continue" to proceed. An authorization check will now be performed.



NOTE

If you are using a recently-created AWS account, you may need to wait until your account is verified by AWS before you can complete the process of connecting your AWS Cloud and Bitnami accounts.

Your AWS and Bitnami accounts will now be connected.

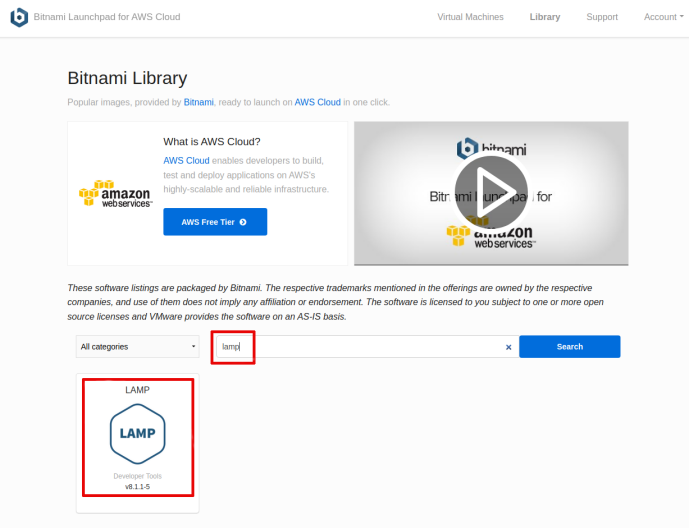


Step 4: Provision an AWS Cloud Server

At the end of this step, your AWS cloud server will be running and you will be able to access it through your Web browser.

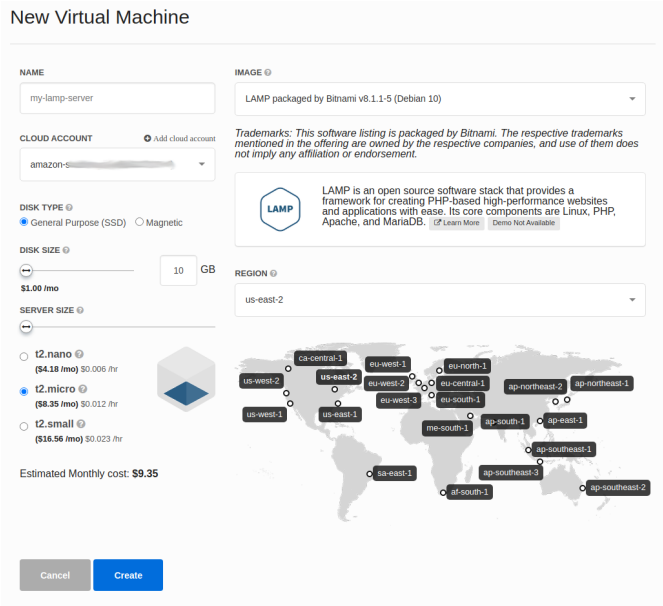
To provision your AWS cloud server:

- Select "Library" in the Launchpad menu.
- Look through the list of applications available in Bitnami until you find LAMP Stack. Select it and click "Launch". If required, enter your administrative password.



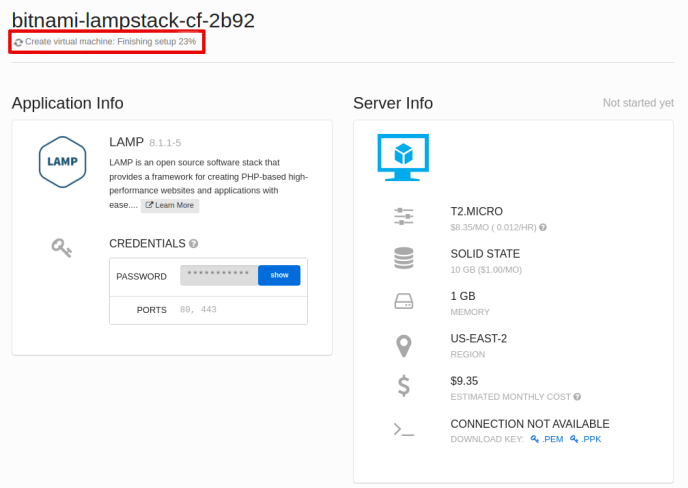
- Define a name and domain name for your AWS server. The default server configuration is a "Micro" serveR, 1000 MB RAM and 10 GB EBS storage, which is eligible for the AWS free tier.
- Define a name, size and region for your cloud server. You can choose from a "micro" server, which uses a shared CPU to a "high CPU" server, which has 16 dedicated virtual cores. For more information, refer to the AWS pricing sheet. The default server configuration is a "Micro" server, 1GB RAM and 10 GB EBS storage, which is eligible for the AWS free tier.

TIP A "micro" server will work just fine for most PHP application development tasks.

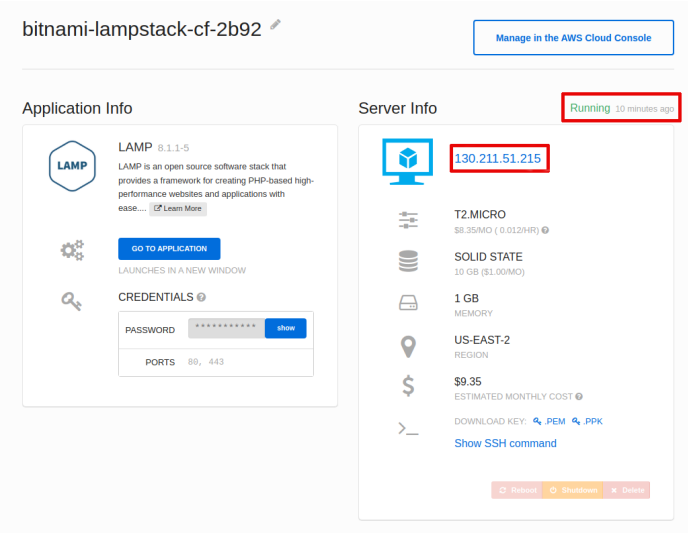


- Confirm your selection by hitting the "Create Virtual Machine" button at the end of the page.

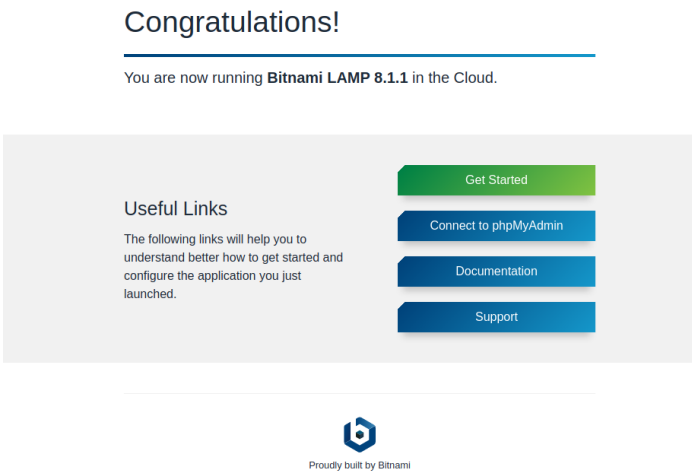
The Bitnami Launchpad will now begin spinning up the new server. The process usually takes a few minutes: a status indicator on the page provides a progress update.



Once the cloud server has been provisioned, the status indicator will show that it's "running", and the Bitnami Launchpad page will display the server details, including its IP address.

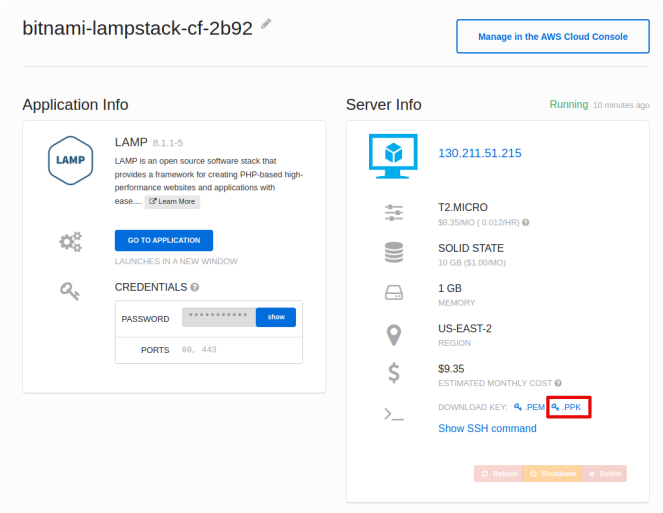


At this point, you should be able to browse to the cloud server, either by clicking the link in the Bitnami Launchpad (a new browser tab will open) or entering the cloud server IP address directly into your browser's address bar. You should see a welcome page like the one below (just so you know, it's served up by Apache, which is part of LAMP packaged by Bitnami).

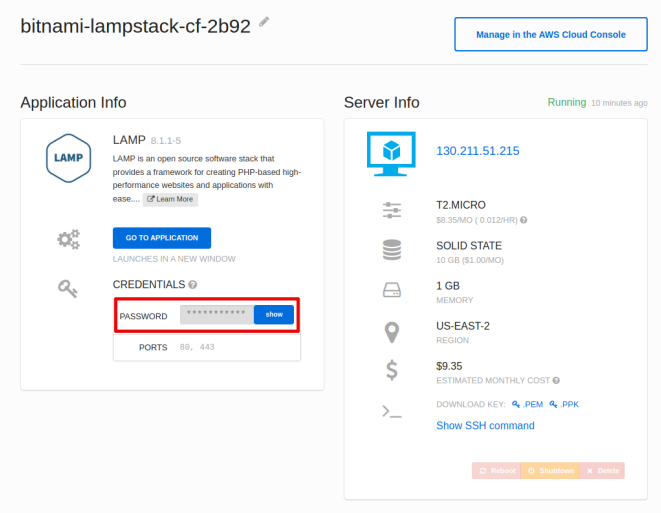


Once the server is provisioned, you need to gather the security credentials you will need to begin using it. To do this:

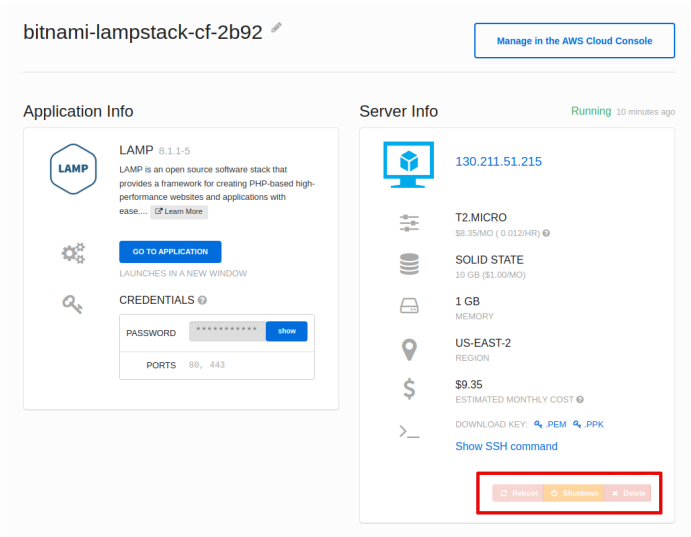
- Go back to the Bitnami Launchpad for AWS Cloud page and in the "Virtual Machines" section, select the running server. This will launch the server information page.
- From the server information page, download the *.ppk* file which contains the SSH access credentials you will need to connect to the server. Typically, this file is named using the format *bitnami-[google-project]-[nn].ppk*. If you're using Mac OS X or Linux, you should instead download the corresponding *.pem* file.



- By default, Bitnami Launchpad creates a user account named 'user' and an auto-generated password when a new server is provisioned. You will need this password when accessing Bitnami-supplied applications (including MySQL). Go back to the server information screen, look in the "Credentials" section of the "Application Info" panel, and display and make a note of the application password.



The Launchpad page also includes controls to reboot, shut down or delete the server.



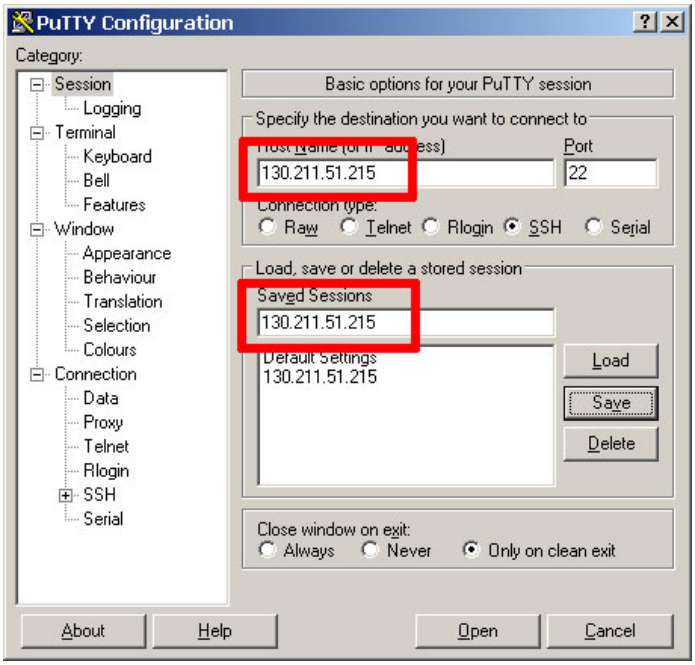
Step 5: Test PHP and MariaDB

> At the end of this step, you will have logged in to your cloud server and verified that PHP, MariaDB and phpMyAdmin are working correctly.

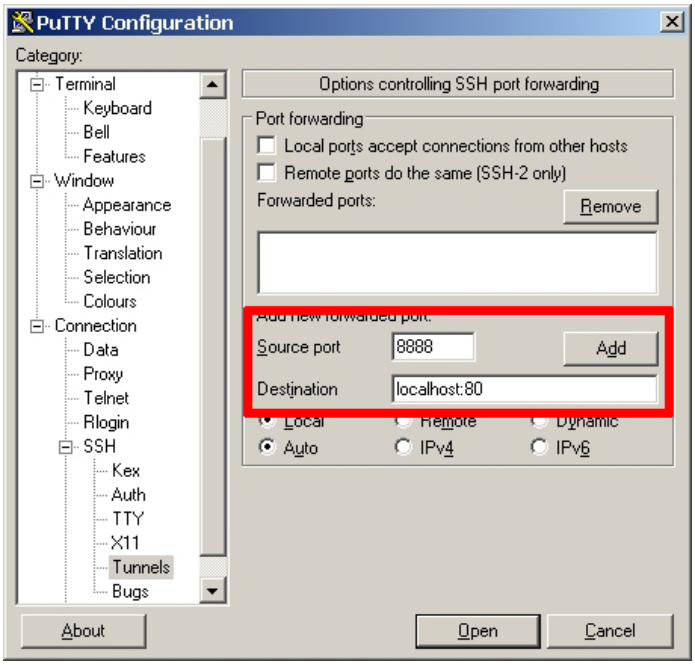
You can now connect to the cloud server and test PHP to make sure it's working correctly and has all the extensions you need. The easiest way to do this is with PuTTY, a free SSH client for Windows and UNIX platforms.

- Download the PuTTY ZIP archive from its website.
- Extract the contents to a folder on your desktop.
- Double-click the *putty.exe* file to bring up the PuTTY configuration window.

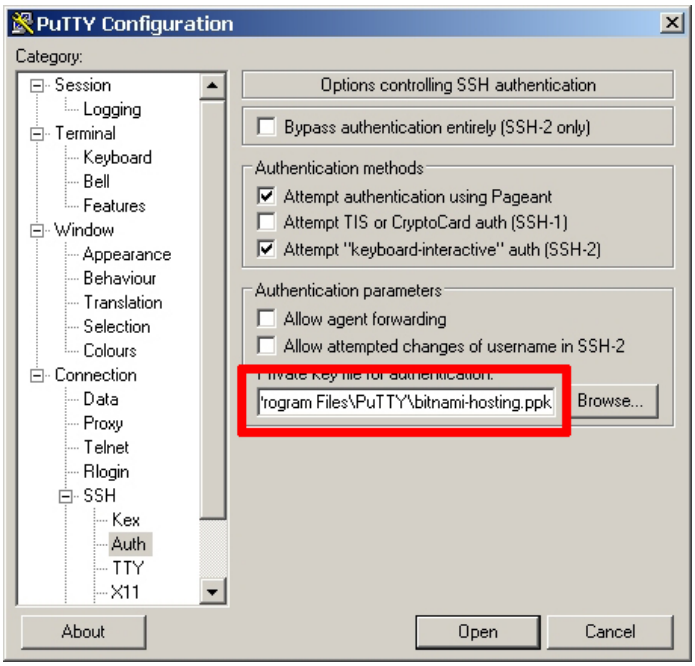
- Enter the host name of your cloud server into the "Host Name (or IP address)" field, as well as into the "Saved Sessions" field.
- Click "Save" to save the new session so you can reuse it later.



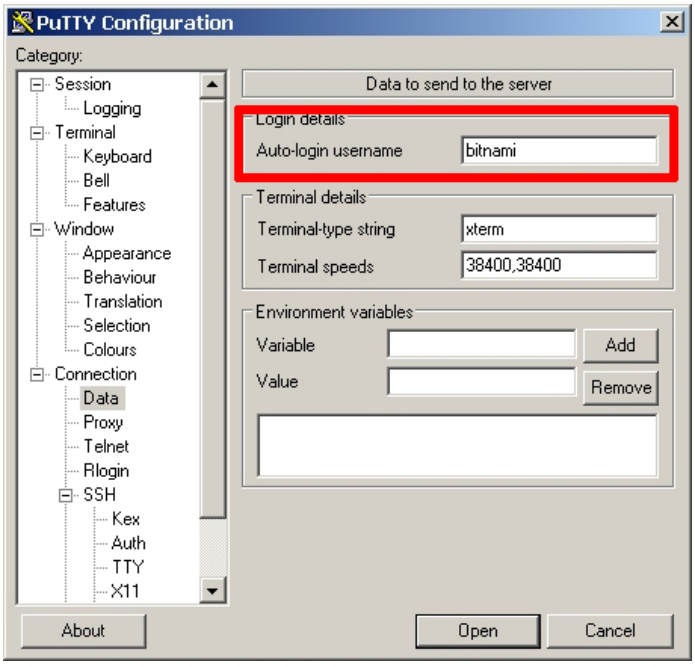
- In the "Connection _ SSH _ Tunnels" section, create a secure tunnel for the phpMyAdmin application by forwarding source port "8888" to destination port "localhost:80".
- Click the "Add" button to add the secure tunnel configuration to the session.



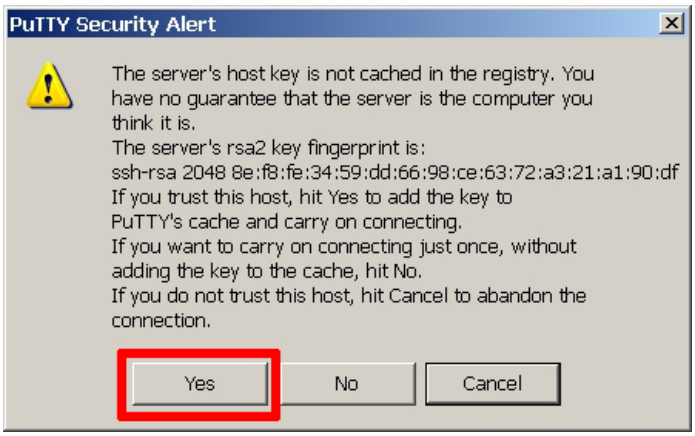
- In the "Connection _ SSH _ Auth" section, select the private key file (*.*ppk*) you saved in the previous step.



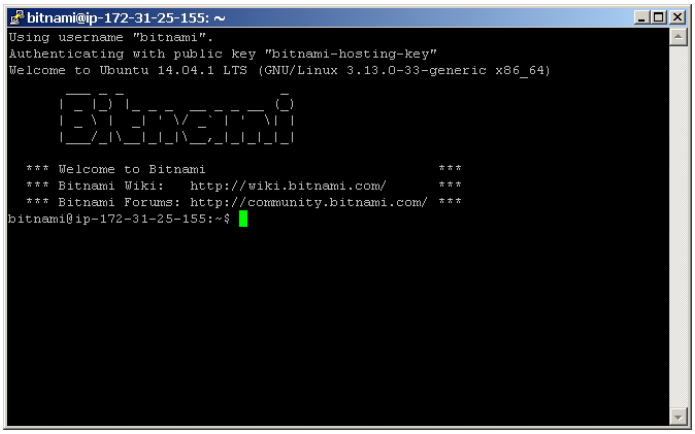
- In the "Connection _ Data" section, enter the username 'bitnami' into the "Auto-login username" field.



- Go back to the "Session" section and save your changes by clicking the "Save" button.
- Click the "Open" button to open an SSH session to the server.
- PuTTY will first ask you to confirm the server's host key and add it to the cache. Go ahead and click "Yes" to this request.



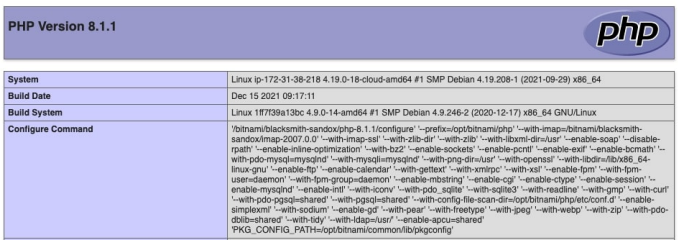
You should now be logged in to your cloud server.



By default, LAMP packaged by Bitnami includes running Apache and MariaDB servers, and all the packages that come with the stack are located in the */opt/bitnami* directory. Your first step should be to create a *phpinfo.php* file in the Apache web server root at */opt/bitnami/apache2/htdocs* directory to verify PHP's capabilities.

```
shell> cd /opt/bitnami/apache2/htdocs
shell> echo "<?php phpinfo(); ?>" > phpinfo.php
```

Once the file has been copied, browse to *http://[your-cloud-server-hostname]/phpinfo.php* and you should see the output of the *phpinfo()* command.

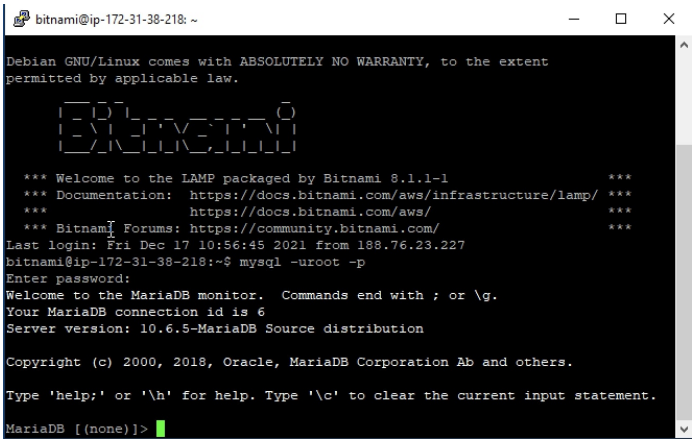


With this, you know that your PHP installation is configured and working correctly.

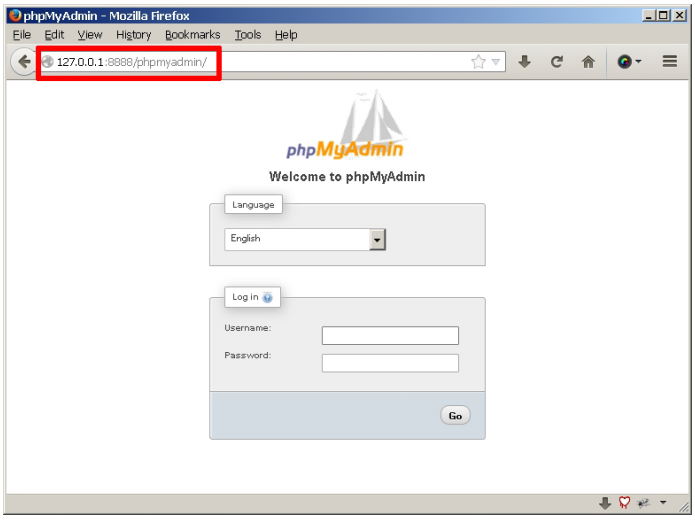
You can also check that MariaDB is working by launching the MariaDB command-line client at the shell prompt.

```
shell> mysql -u root -p
```

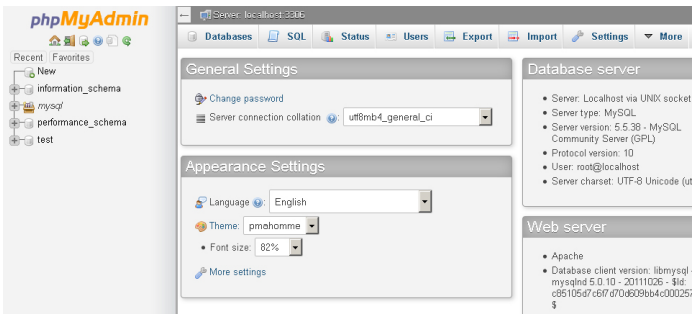
When prompted, enter the application password retrieved in the previous step. The client should start up and connect to the local MariaDB server, displaying a welcome message as shown below.



You should also be able to access phpMyAdmin through the secure SSH tunnel you created, by browsing to http://127.0.0.1:8888/phpmyadmin.



To log in, use username 'root' with the application password from the previous step.



In case you'd like to troubleshoot errors or modify the configuration for Apache, PHP or MariaDB - for example, adjusting the maximum upload file size in PHP or changing the path to the MariaDB data directory - here are the locations for key configuration and log files in LAMP packaged by Bitnami:

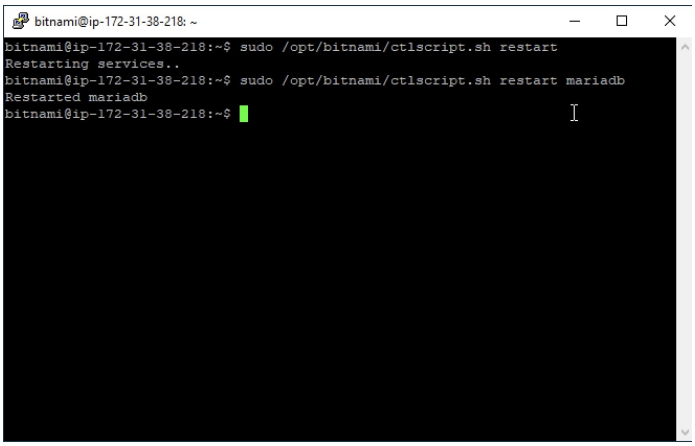
	Configuration file(s)	Log file(s)
Apache	*/opt/bitnami/apache2/conf/httpd.conf*	*/opt/bitnami/apache2/logs/error_log*
PHP	*/opt/bitnami/php/etc/php.ini*	-
MariaDB	*/opt/bitnami/mariadb/conf/my.cnf*	*/opt/bitnami/mariadb/logs/mysqld.log*

Usually, you'll need to restart your server(s) for your changes to take effect. LAMP packaged by Bitnami includes a control script that lets you easily stop, start and restart Apache, MariaDB and PHP. The script is located at */opt/bitnami/ctlscript.sh*. Call it without any arguments to restart all services:

```
shell> sudo /opt/bitnami/ctlscript.sh restart
```

Or use it to restart a specific service only by passing the service name as argument - for example 'mariadb':

```
shell> sudo /opt/bitnami/ctlscript.sh restart mariadb
```



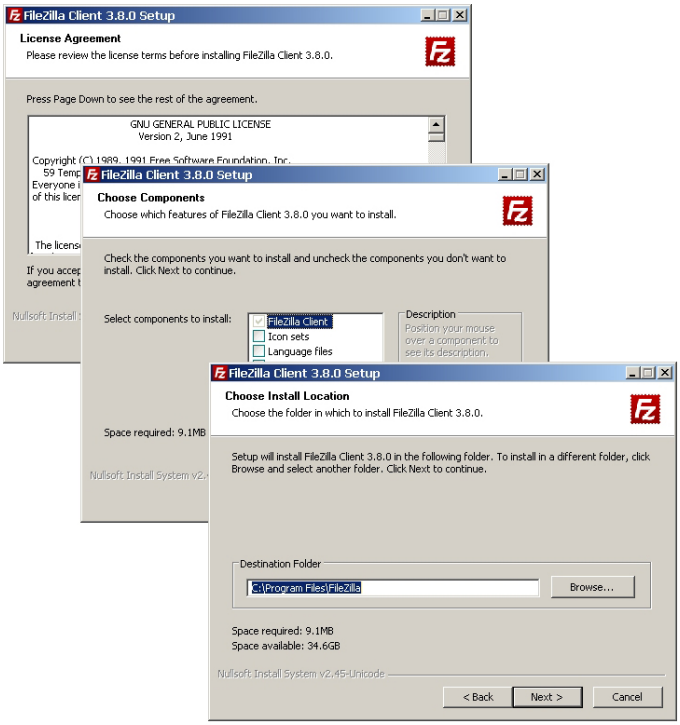
Step 6: Deploy the XAMPP Application to the Cloud Server

> At the end of this step, your PHP/MariaDB application will be running in the cloud.

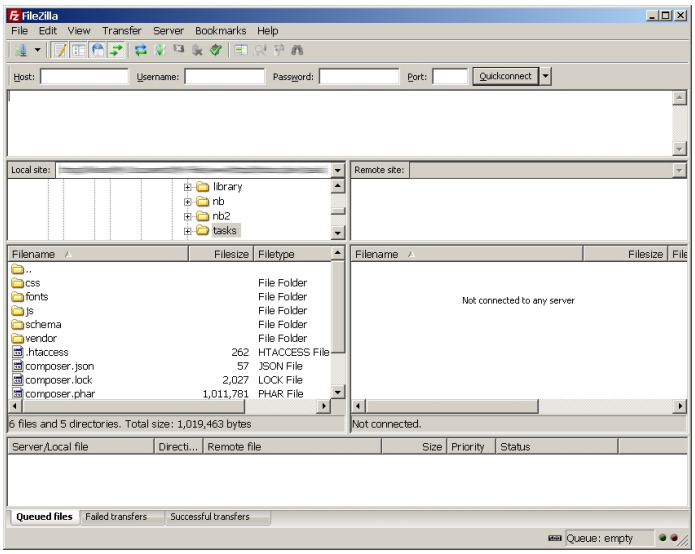
Your cloud server is now provisioned, secured and has a functional PHP/MariaDB environment. All that's left is for you to transfer your application code from your local XAMPP environment to your cloud server and set up the database.

The easiest way to transfer files to the server is with FTP or SFTP. Although you can use any FTP/SFTP client, I like FileZilla, a cross-platform, open source and feature-rich client. Download it from the FileZilla website and install it using the automated installer - it's a quick process, only requiring you to agree to the license, choose

the components (the default selection is usually fine) and specify the installation directory.

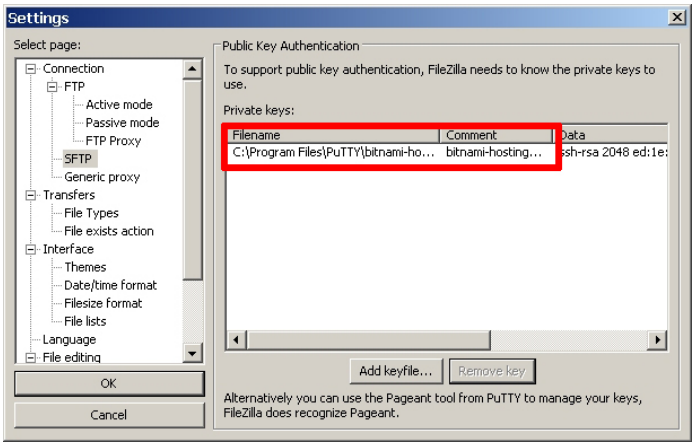


Once FileZilla is installed, launch it and you'll arrive at the main split-screen interface, one side for your local directories and the other for remote directories.

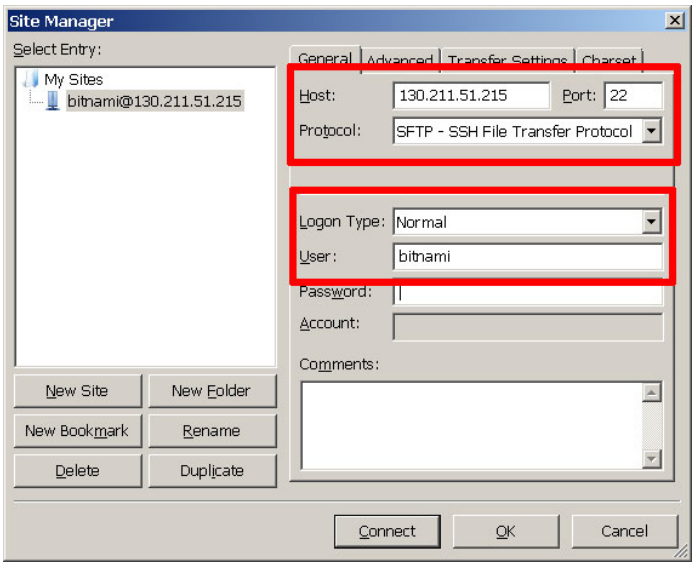


To connect to the cloud server and deploy your application, follow these steps:

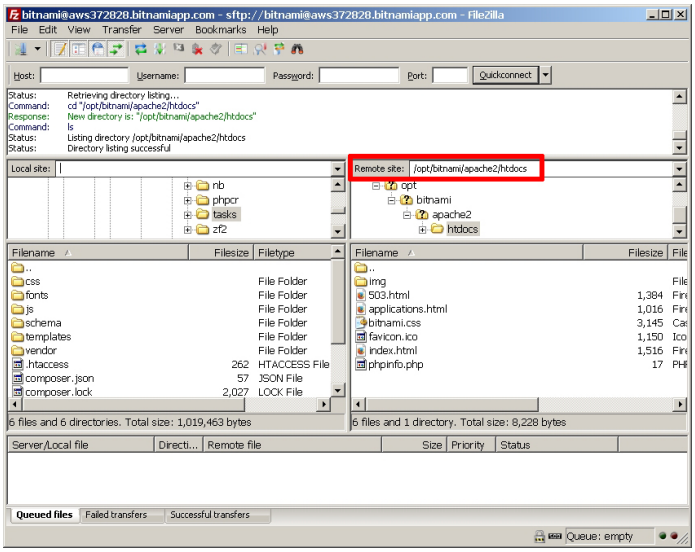
- Use the "Edit _ Settings" command to bring up FileZilla's configuration settings.
- Within the "Connection _ SFTP" section, use the "Add keyfile" command to select the private key file for your server. FileZilla will use this private key to log in to the cloud server.



- Use the "File _ Site Manager _ New Site" command to bring up the FileZilla Site Manager, where you can set up a connection to your cloud server.
- Enter your server host name or IP address and user name.
- Select "SFTP" as the protocol and "Normal" as the logon type.



- Use the "Connect" button to connect to the cloud server and begin an SFTP session.
- On the remote server side of the window, change to the */opt/bitnami/apache2/htdocs* directory
- On the local server side of the window, change to the directory containing your application code.
- Upload your XAMPP application code to the remote directory by dragging and dropping the files from the local server to the cloud server (you can back up the original contents of the directory if you wish, by downloading them first).

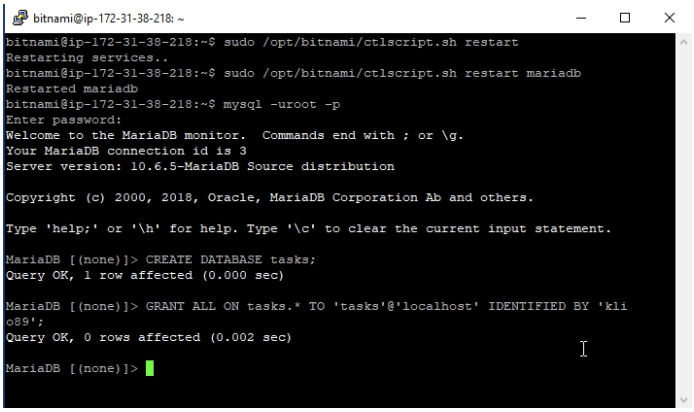


- Once the files are transferred, log in to the server console using PuTTY.
- Create a database for the application using the MariaDB command-line client (you can use phpMyAdmin if you prefer a graphical interface). For example, since the application is a to-do list, let's call the database 'tasks'.

```
mysql> CREATE DATABASE tasks;
```

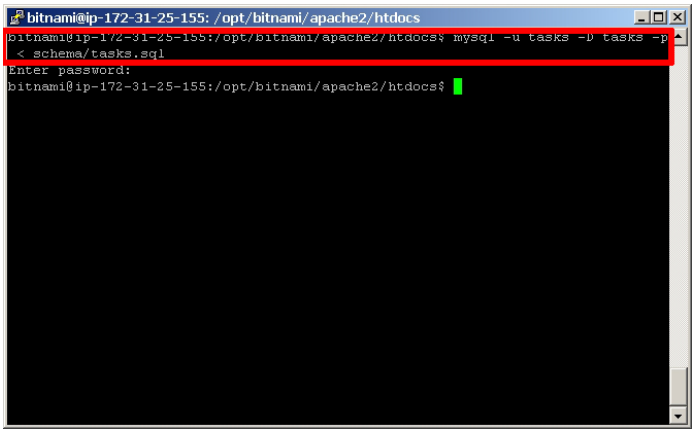
- Follow best practices and create a separate MariaDB user with privileges to access only this database.

```
mysql> GRANT ALL ON tasks.* TO 'tasks'@'localhost' IDENTIFIED BY 'klio89';
```

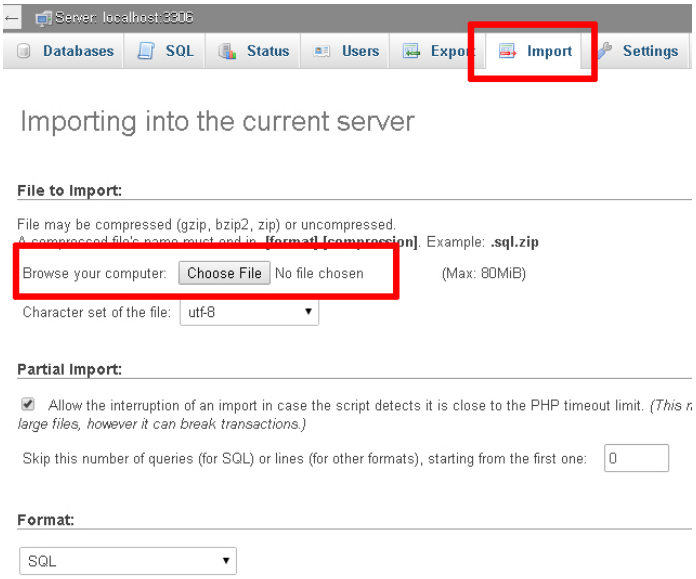


- If required, update database credentials in your application. Then, install the application schema in the new database (assuming you already uploaded it with the application code). For example, you can use the following command with the MariaDB command-line client:

```
shell> mysql -u tasks -D tasks -p < schema/tasks.sql
```

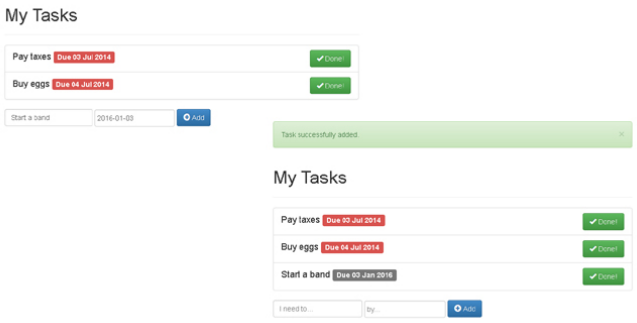


If you're logged in to phpMyAdmin, you can also import the database schema from your local XAMPP system. To do this, select the "Import" tab of the phpMyAdmin dashboard, select the file containing the schema, and click "Go" to have the tables created in your selected database.



You can also learn more about using phpMyAdmin to back up and restore databases.

Browse to your cloud server's host name and your application should be active. Here are a few screenshots of the example to-do list application running on the cloud server.



Congratulations! You've successfully deployed your XAMPP application in the cloud.

Improve Application Performance

Web application performance problems are hard to debug at the best of times, and more so when your server is in the cloud and running a pre-packaged stack. The responsiveness of your application at any given moment depends on numerous factors: server type, network bandwidth, cloud provider load, database load, caching system in use, application code structure, query structure and various other variables.

IMPORTANT	LAMP packaged by Bitnami already uses the Apache Event MPM and PHP-FPM for reduced memory usage and an increase in the number of simultaneous requests that the server can handle (more information). It also comes with the mod_pagespeed Apache module activated to rewrite pages on the fly and improve latency.

If you're finding that your PHP/MariaDB application's performance is not up to scratch, here are a few general tips you can consider:

- LAMP packaged by Bitnami includes APCu, a popular PHP bytecode cache. Usually, when a PHP script is executed, the PHP compiler converts the script to opcodes and then executes the opcodes. APC provides a framework for opcode caching, thereby speeding up PHP applications without needing any code changes. Make sure your APC cache has enough memory and a long TTL. Read more about APCu and how to use APC with PHP and Bitnami.
- LAMP packaged by Bitnami also includes the PHP memcache extension. Memcache is a high-performance, distributed memory object caching system. Consider using memcache to store frequently-accessed fragments of data in memory as arrays, thereby reducing the load on your MariaDB database server. Read more about memcache in PHP.
- Turn on MariaDB's slow query log and set MariaDB's 'long_query_time' variable to a low number. This lets you track which of your queries are performing inefficiently and adjust them, either structurally or by applying table indexes as needed, to improve performance. You can use tools like mysqldumpslow or mysql-slow-query-log-visualizer to parse and analyze the slow query logs generated.
- If your application is database-heavy, you'll gain performance by giving the MariaDB server more memory. You may use the MariaDB Optimization and Tuning guides, to identify which server parameters need tuning, and incrementally make changes to your server's cache and buffers to improve performance. For example, if your tables are all MyISAM, disable InnoDB in your *my.cnf* file to save further memory.
- Unload Apache modules which you don't need to save memory, and adjust the log level to errors only.
- Minify your JavaScript code, and consider using a CDN for static content like images.

Good luck, and happy coding!

Useful Links

- Amazon Web Services

- Bitnami Launchpad for AWS Cloud
- LAMP packaged by Bitnami
- LAMP packaged by Bitnami Documentation
- PuTTY
- FileZilla
- Example Project (.zip)

About the author

Vikram Vaswani is the founder of Melonfire, an open source software consultancy firm, and the author of seven books on PHP, MySQL and XML development. Read more about him at http://vikram-vaswani.in/.