LAB 2

Popular Cloud Computing Services

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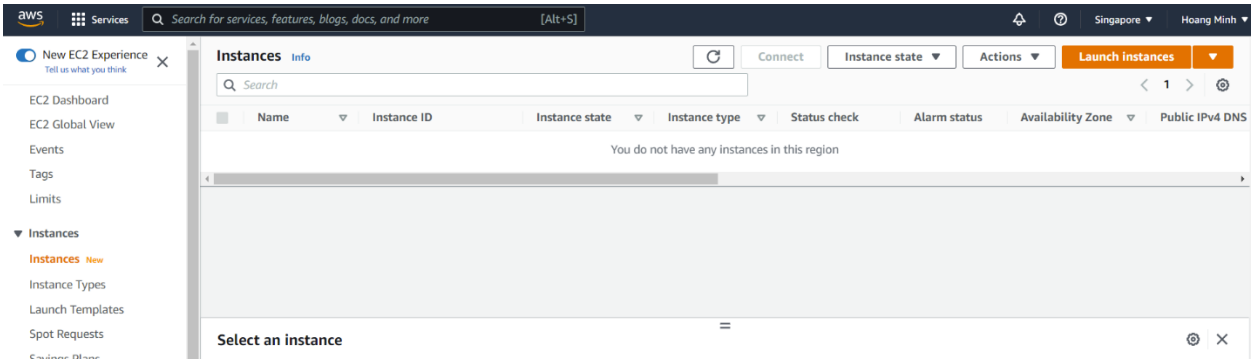
1. Amazon Web Services (AWS)

1.1. Launch a Linux Virtual Machine using EC2

To launch an instance

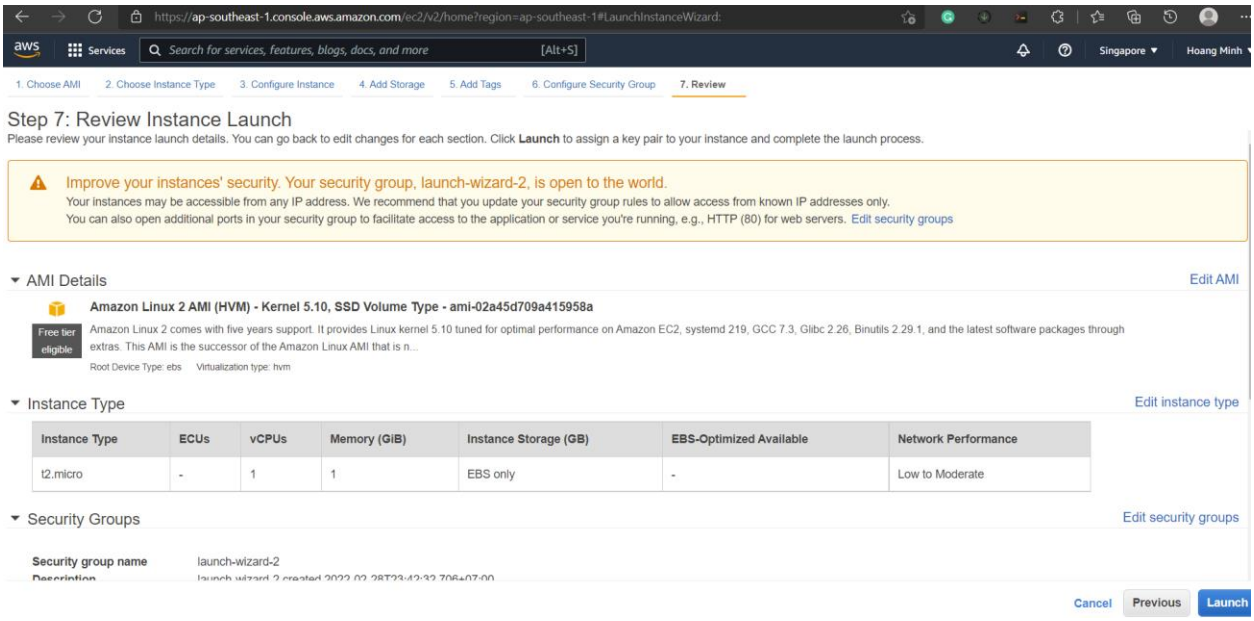
From the console dashboard, choose Launch Instance



Choose an Amazon Machine Image (AMI)

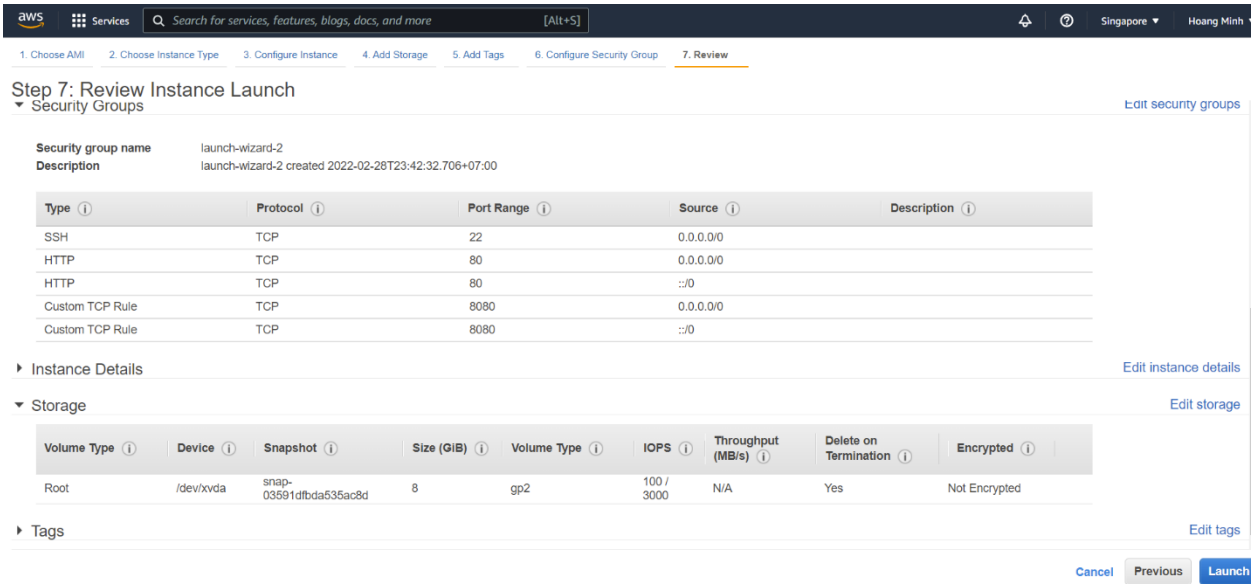
Choose an Instance Type

Choose Review and Launch to let the wizard complete the other configuration settings.

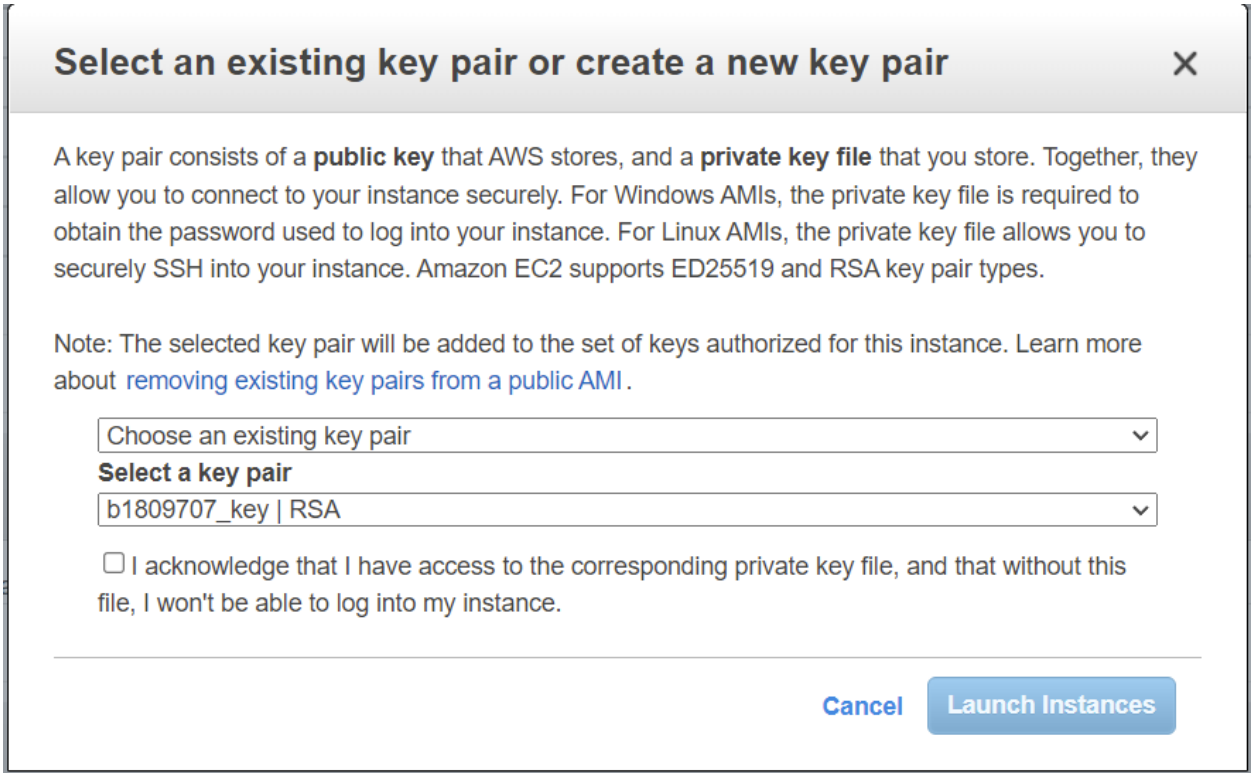


Choose Edit security groups.

Finally, choose Launch.

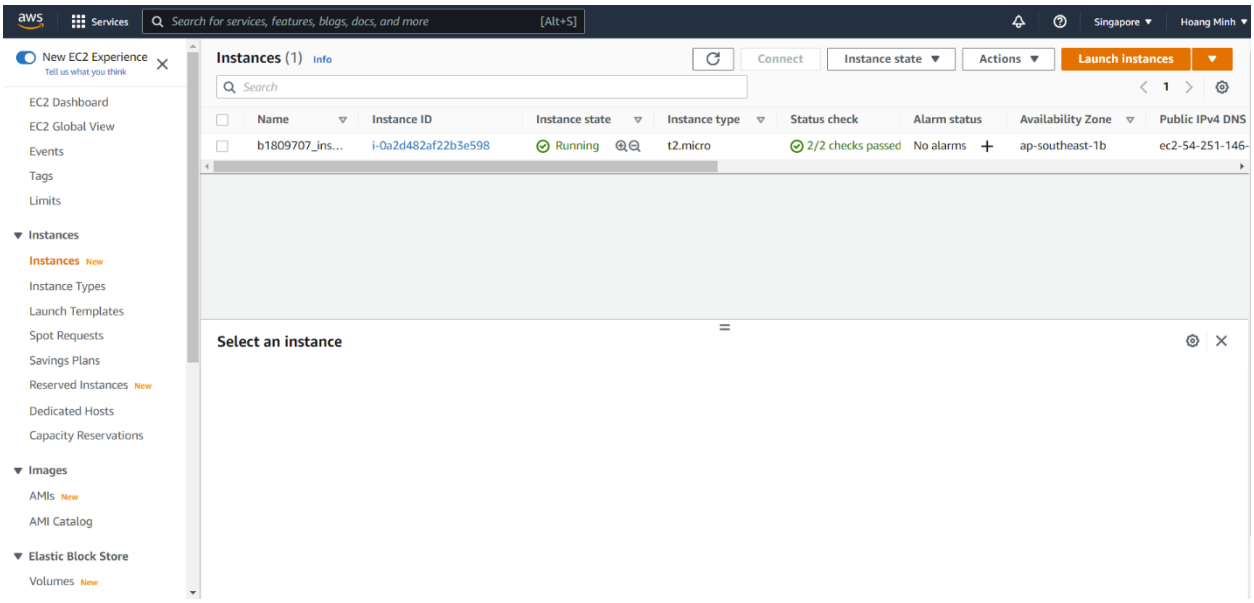


When prompted for a key pair, select Choose an existing key pair, then select the key pair that created.



When ready, select the acknowledgement check box, and then choose Launch Instances.

On the Instances screen, view the status of the launch.



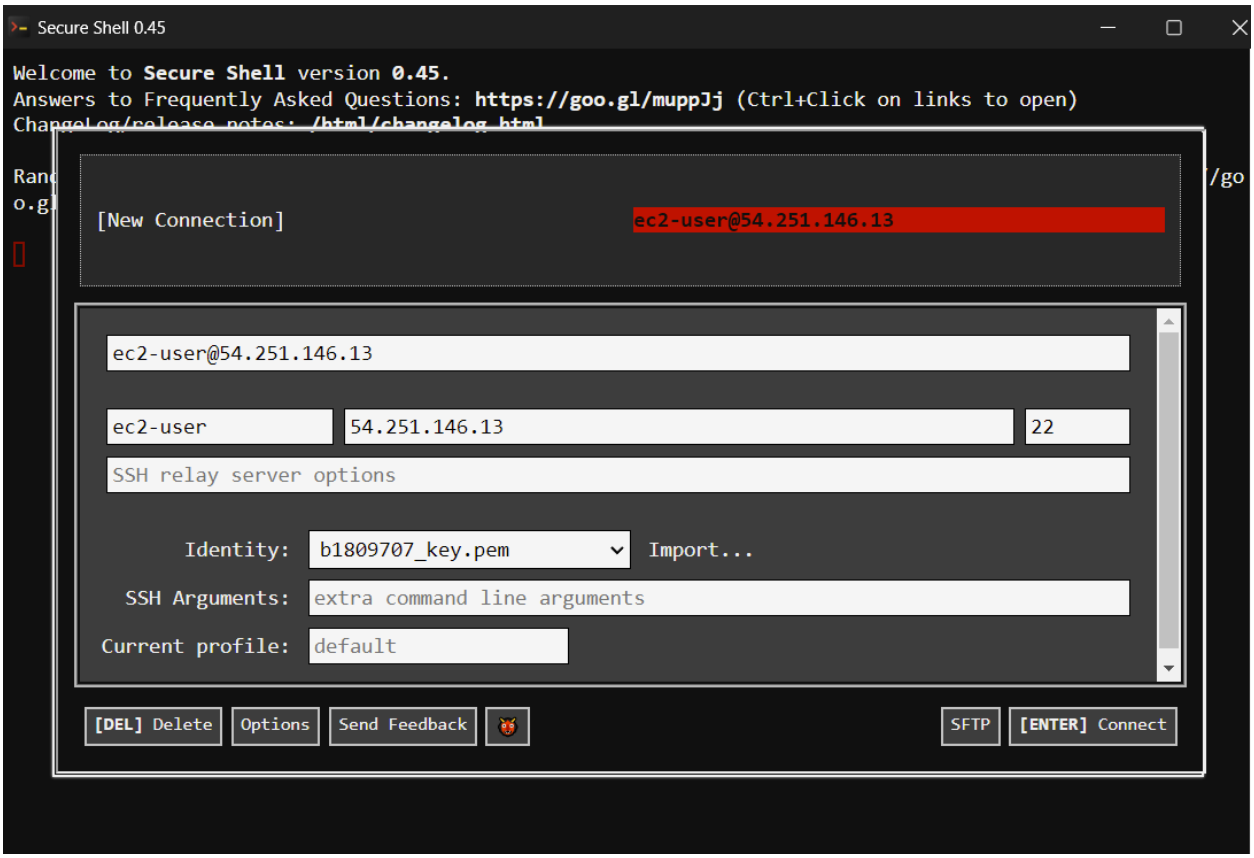
To connect to an instance

Get the public DNS name and user name to connect to instance

Locate the private key

Installing the Secure Shell Chrome Extension

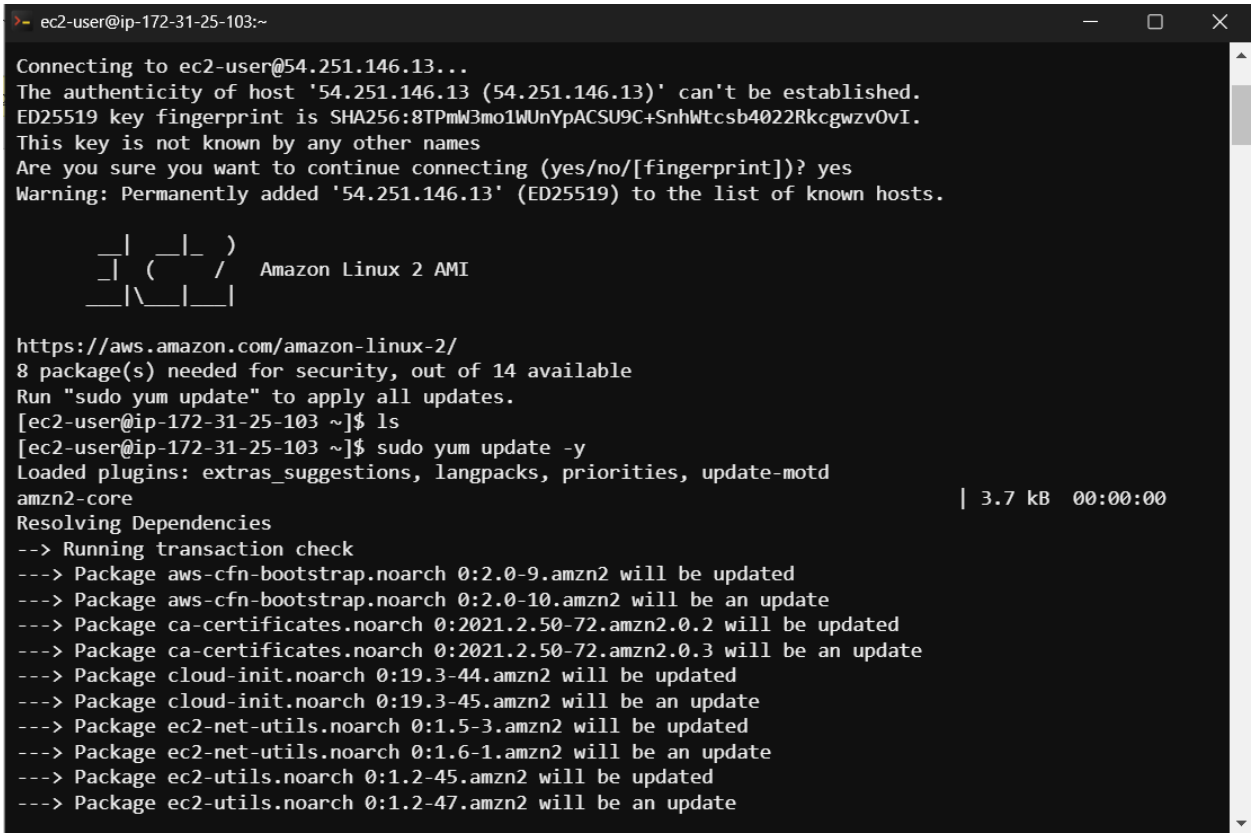
https://chrome.google.com/webstore/detail/secure-shell/iodihamcpbpeioajjeobimgagajmlibd



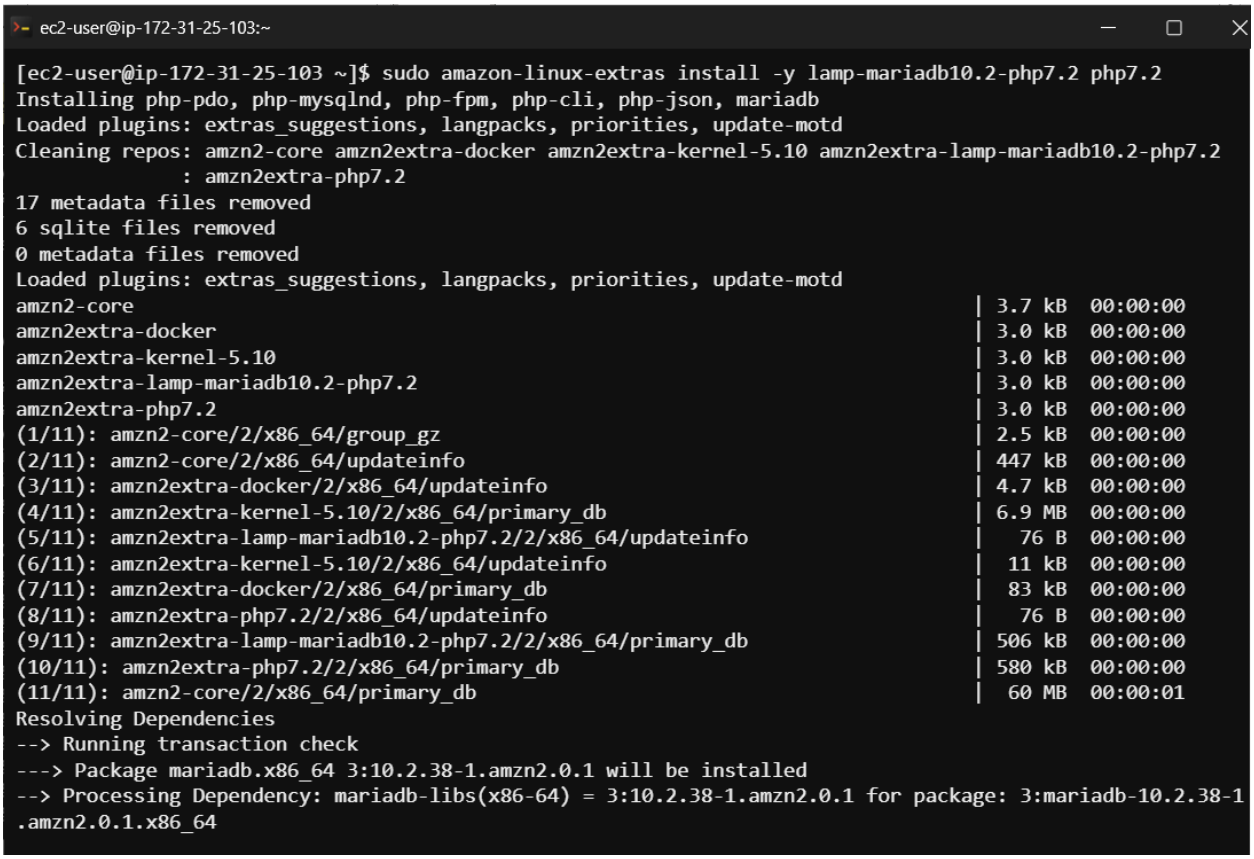
1.2. Install a LAMP Web Server with the Amazon Linux 2 AMI

Prepare the LAMP server

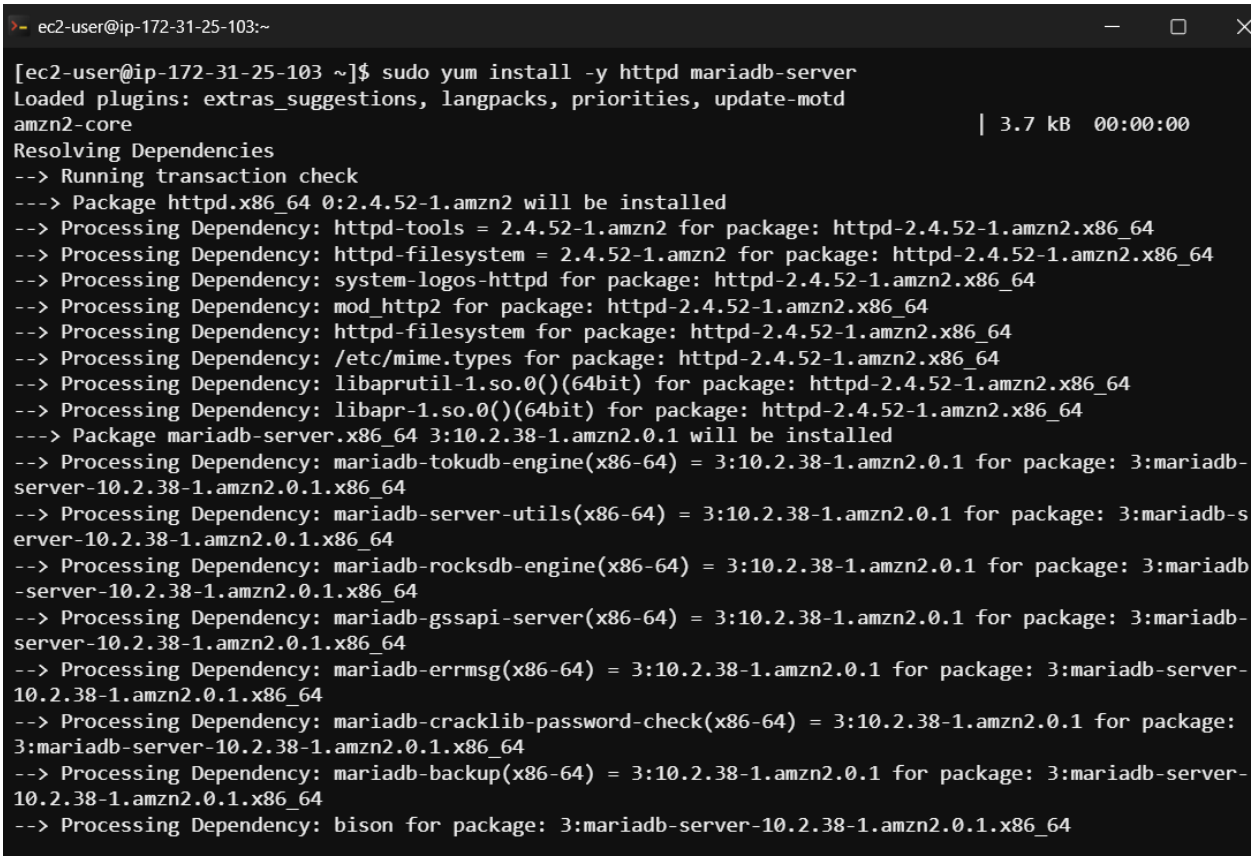
sudo yum update -y



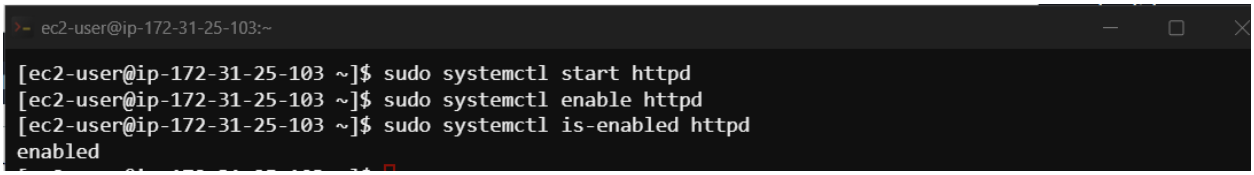
sudo amazon-linux-extras install -y lamp-mariadb10.2-php7.2 php7.2



sudo yum install -y httpd mariadb-server

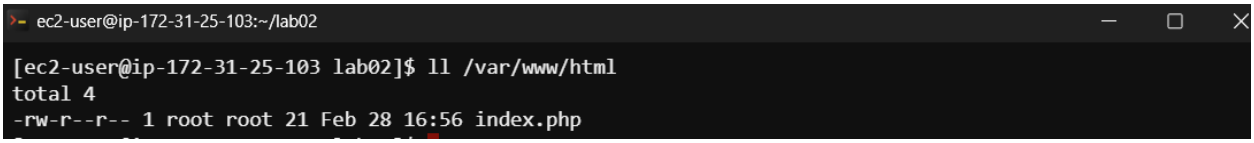


sudo systemctl start httpd
sudo systemctl enable httpd
sudo systemctl is-enabled httpd

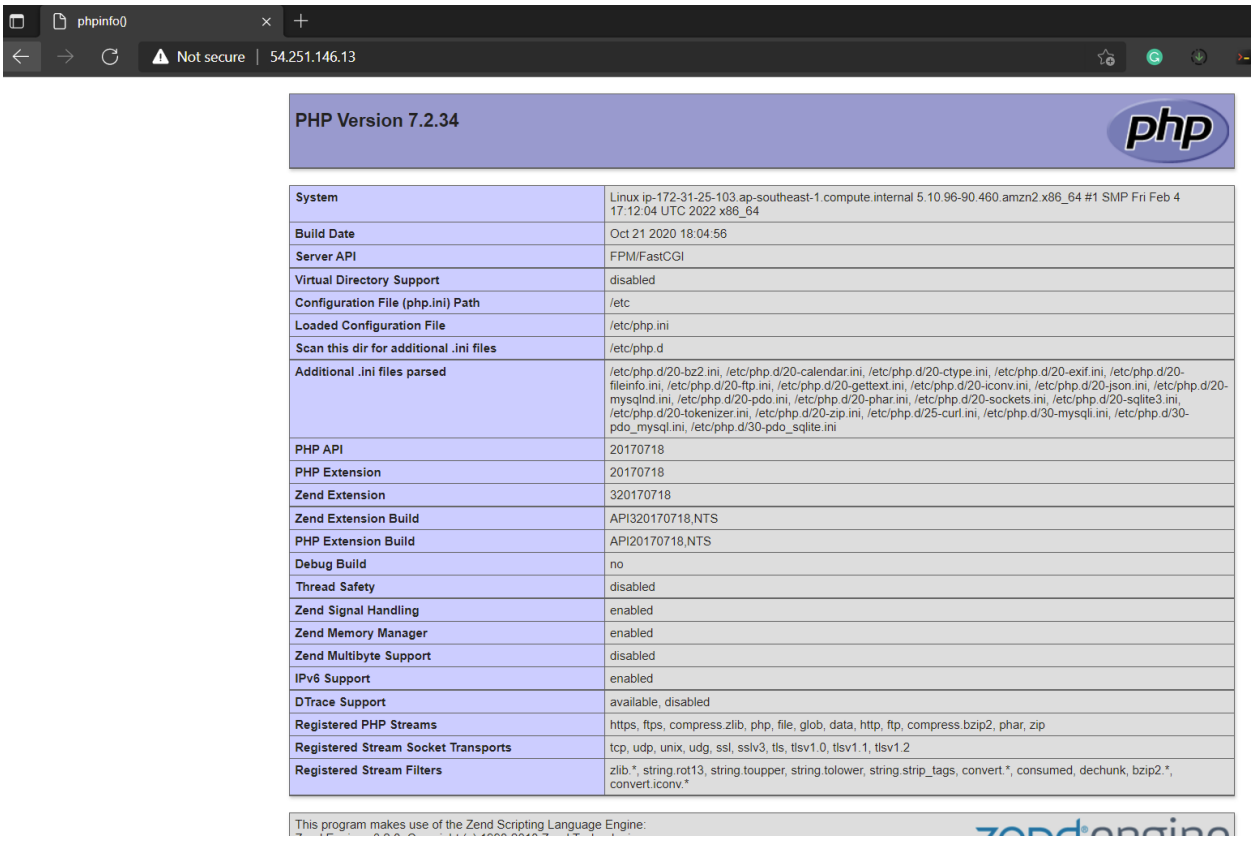


Test the LAMP server

echo "<?php phpinfo(); ?>" > /var/www/html/index.php



In a web browser, type the URL of the file that just created.



System	Linux ip-172-31-25-103.ap-southeast-1.compute.internal 5.10.96-90.460.amzn2.x86_64 #1 SMP Fri Feb 4 17:12:04 UTC 2022 x86_64
Build Date	Oct 21 2020 18:04:56
Server API	FPM/FastCGI
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc
Loaded Configuration File	/etc/php.ini
Scan this dir for additional .ini files	/etc/php.d
Additional .ini files parsed	/etc/php.d/20-bz2.ini, /etc/php.d/20-calendar.ini, /etc/php.d/20-ctype.ini, /etc/php.d/20-exif.ini, /etc/php.d/20-fileinfo.ini, /etc/php.d/20-ftp.ini, /etc/php.d/20-gettext.ini, /etc/php.d/20-iconv.ini, /etc/php.d/20-json.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-pdo.ini, /etc/php.d/20-phar.ini, /etc/php.d/20-sockets.ini, /etc/php.d/20-sqlite3.ini, /etc/php.d/20-tokenizer.ini, /etc/php.d/20-zip.ini, /etc/php.d/25-curl.ini, /etc/php.d/30-mysqli.ini, /etc/php.d/30-pdo_mysql.ini, /etc/php.d/30-pdo_sqlite.ini
PHP API	20170718
PHP Extension	20170718
Zend Extension	320170718
Zend Extension Build	API320170718,NTS
PHP Extension Build	API20170718,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	available, disabled
Registered PHP Streams	https, ftps, compress.zlib, php, file, glob, data, http, ftp, compress.bzip2, phar, zip
Registered Stream Socket Transports	tcp, udp, unix, udg, ssl, sslv3, tls, tlsv1.0, tlsv1.1, tlsv1.2
Registered Stream Filters	zlib.*, string.rot13, string.toupper, string.tolower, string.strip_tags, convert.*, consumed, dechunk, bzip2.*, convert.iconv.*

This program makes use of the Zend Scripting Language Engine:

1.3. Hosting a WordPress Blog with Amazon Linux 2 AMI

To download and unzip the WordPress installation package

wget https://wordpress.org/latest.tar.gz

tar -xzf latest.tar.gz

```
[ec2-user@ip-172-31-25-103 lab02]$ ls
latest.tar.gz
[ec2-user@ip-172-31-25-103 lab02]$ tar -xzf latest.tar.gz
[ec2-user@ip-172-31-25-103 lab02]$ ls
latest.tar.gz  wordpress
```

To create a database user and database for the WordPress installation

sudo systemctl start mariadb

sudo mysql_secure_installation

```
ec2-user@ip-172-31-25-103:~/lab02
[ec2-user@ip-172-31-25-103 lab02]$ sudo systemctl start mariadb
[ec2-user@ip-172-31-25-103 lab02]$ sudo mysql_secure_installation

NOTE: RUNNING ALL PARTS OF THIS SCRIPT IS RECOMMENDED FOR ALL MariaDB
      SERVERS IN PRODUCTION USE!  PLEASE READ EACH STEP CAREFULLY!

In order to log into MariaDB to secure it, we'll need the current
password for the root user.  If you've just installed MariaDB, and
you haven't set the root password yet, the password will be blank,
so you should just press enter here.

Enter current password for root (enter for none):
OK, successfully used password, moving on...

Setting the root password ensures that nobody can log into the MariaDB
root user without the proper authorisation.

Set root password? [Y/n] n
 ... skipping.

By default, a MariaDB installation has an anonymous user, allowing anyone
to log into MariaDB without having to have a user account created for
them.  This is intended only for testing, and to make the installation
go a bit smoother.  You should remove them before moving into a
production environment.

Remove anonymous users? [Y/n] y
 ... Success!

Normally, root should only be allowed to connect from 'localhost'.  This
```

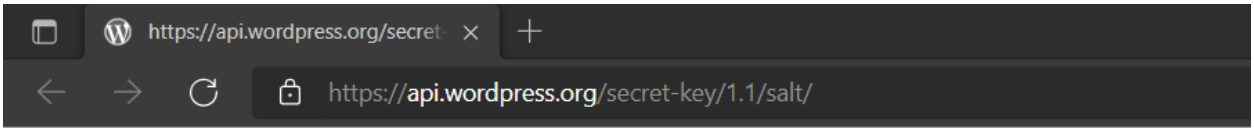
mysql -u root -p
CREATE USER 'wordpress-user'@'localhost' IDENTIFIED BY 'wordpress_password';
CREATE DATABASE `wordpress-db`;
GRANT ALL PRIVILEGES ON `wordpress-db`.* TO "wordpress-user"@"localhost";
FLUSH PRIVILEGES;
exit

```
MariaDB [(none)]> CREATE USER 'wordpress-user'@'localhost' IDENTIFIED BY 'wordpress@2022';
Query OK, 0 rows affected (0.00 sec)

MariaDB [(none)]> CREATE DATABASE `wordpress-db`;
Query OK, 1 row affected (0.00 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON `wordpress-db`.* TO "wordpress-user"@"localhost";
Query OK, 0 rows affected (0.00 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.00 sec)
```

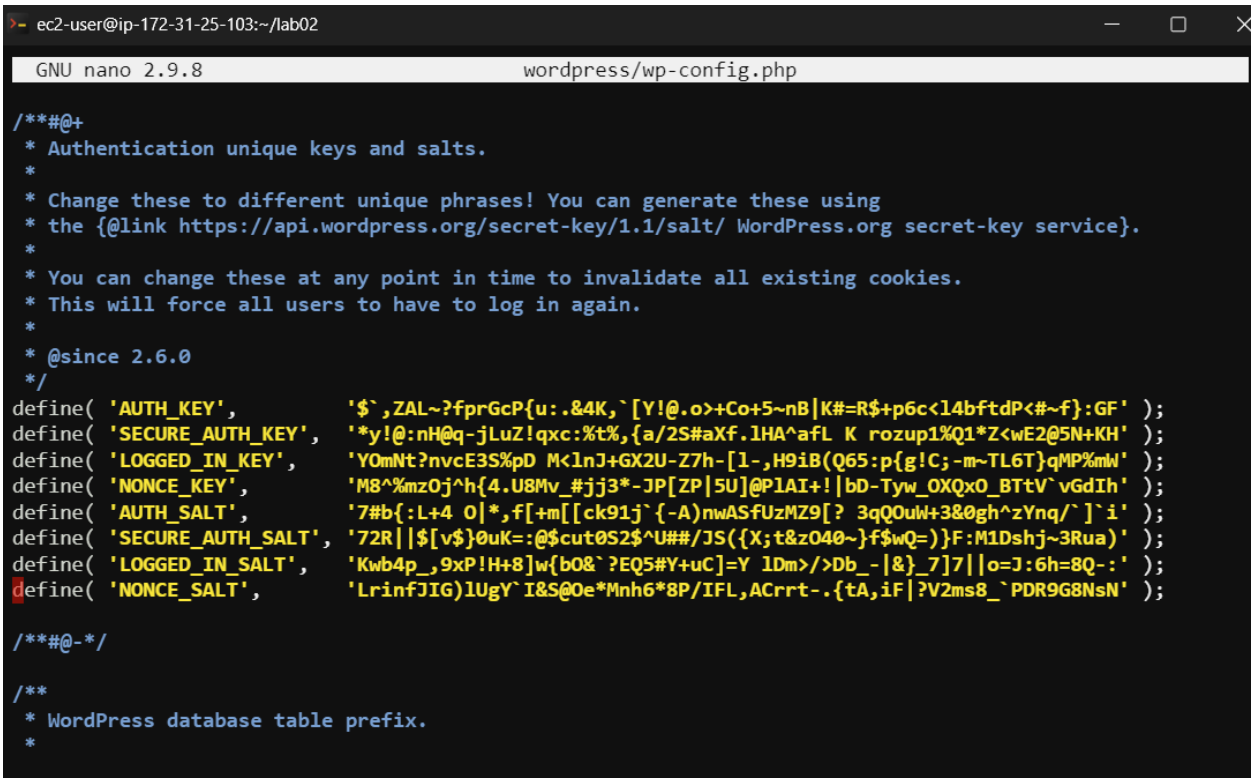
To create and edit the wp-config.php file
cp wordpress/wp-config-sample.php wordpress/wp-config.php
nano wordpress/wp-config.php

```
ec2-user@ip-172-31-25-103:~/lab02
 GNU nano 2.9.8                    wordpress/wp-config.php

 * * ABSPATH
 *
 * @link https://wordpress.org/support/article/editing-wp-config-php/
 *
 * @package WordPress
 */

// ** Database settings - You can get this info from your web host ** //
/** The name of the database for WordPress */
define( 'DB_NAME', 'wordpress-db' );

/** Database username */
define( 'DB_USER', 'wordpress-user' );

/** Database password */
define( 'DB_PASSWORD', 'wordpress@2022' );

/** Database hostname */
define( 'DB_HOST', 'localhost' );

/** Database charset to use in creating database tables. */
define( 'DB_CHARSET', 'utf8' );

/** The database collate type. Don't change this if in doubt. */
define( 'DB_COLLATE', '' );
```

Visit https://api.wordpress.org/secret-key/1.1/salt/ to randomly generate a set of key values that copy and paste into wp-config.php file.




```
define('AUTH_KEY',         '$`,ZAL~?fprGcP{u:.&4K,`[Y!@.o>+Co+5~nB|K#=R$+p6c<l4bftdP<#~f}:GF');
define('SECURE_AUTH_KEY',  '*y!@:nH@q-jLuZ!qxc:%t%,{a/2S#aXf.lHA^afL K rozup1%Q1*Z<wE2@5N+KH');
define('LOGGED_IN_KEY',    'YOmNt?nvcE3S%pD M<lnJ+GX2U-Z7h-[l-,H9iB(Q65:p{g!C;-m~TL6T}qMP%mW');
define('NONCE_KEY',        'M8^%mzOj^h{4.U8Mv_#jj3*-JP[ZP|5U]@PlAI+!|bD-Tyw_OXQxO_BTtV`vGdIh');
define('AUTH_SALT',        '7#b{:L+4 O|*,f[+m[[ck91j`{-A)nwASfUzMZ9[? 3qQOuW+3&0gh^zYnq/`]`i');
define('SECURE_AUTH_SALT', '72R||$[v$}0uK=:@$cut0S2$^U##/JS({X;t&zO40~}f$wQ=)}F:M1Dshj~3Rua)');
define('LOGGED_IN_SALT',   'Kwb4p_,9xP!H+8]w{bO&`?EQ5#Y+uC]=Y lDm>/>Db_-|&}_7]7||o=J:6h=8Q-:');
define('NONCE_SALT',       'LrinfJIG)lUgY`I&S@Oe*Mnh6*8P/IFL,ACrrt-.{tA,iF|?V2ms8_`PDR9G8NsN');
```



To install WordPress files under the Apache document root

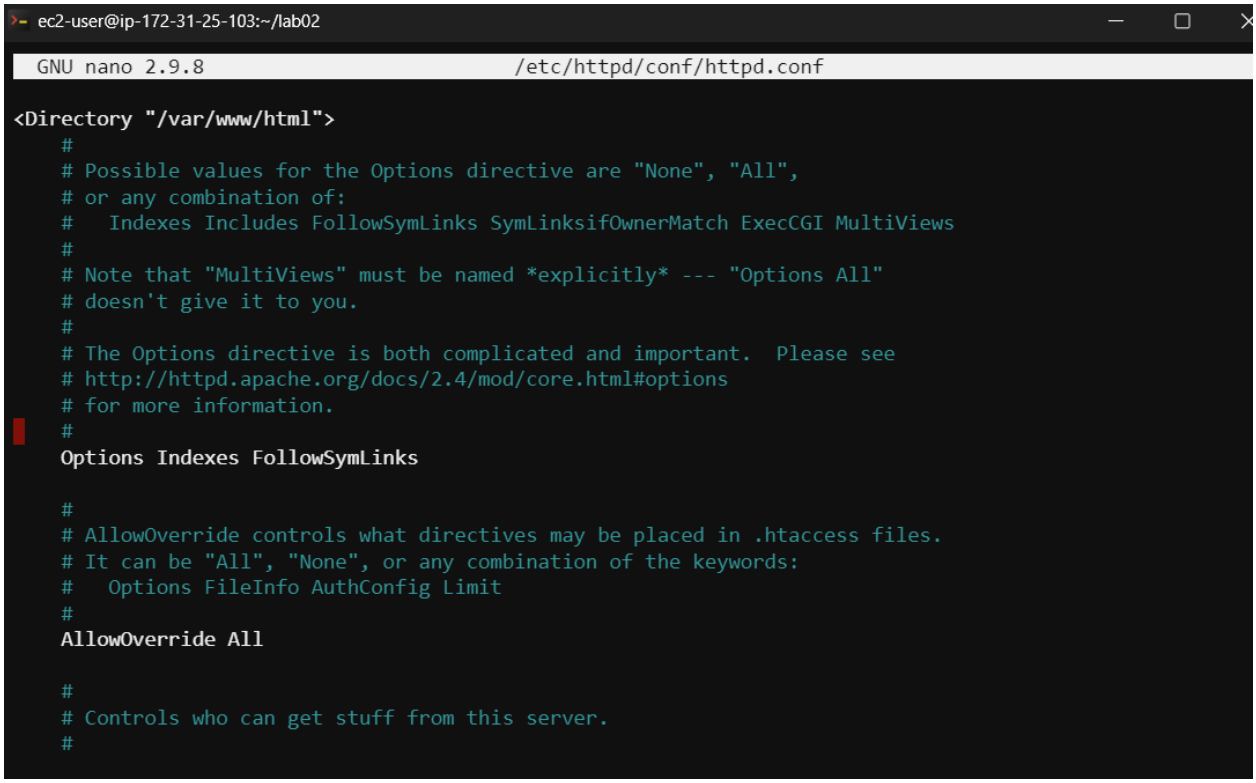
sudo mkdir /var/www/html/blog

sudo cp -r wordpress/* /var/www/html/blog/

```
[ec2-user@ip-172-31-25-103 lab02]$ sudo mkdir /var/www/html/blog
[ec2-user@ip-172-31-25-103 lab02]$ sudo cp -r wordpress/* /var/www/html/blog/
```

To allow WordPress to use permalinks

Change the AllowOverride None line in the <Directory "/var/www/html"> section to read AllowOverride All.



To install the PHP graphics drawing library on Amazon Linux 2

sudo yum install php-gd

```
ec2-user@ip-172-31-25-103:~/lab02
[ec2-user@ip-172-31-25-103 lab02]$ sudo yum install php-gd
Loaded plugins: extras_suggestions, langpacks, priorities, update-motd
amzn2-core                                                  | 3.7 kB  00:00:00
amzn2extra-docker                                           | 3.0 kB  00:00:00
amzn2extra-kernel-5.10                                      | 3.0 kB  00:00:00
amzn2extra-lamp-mariadb10.2-php7.2                          | 3.0 kB  00:00:00
amzn2extra-php7.2                                           | 3.0 kB  00:00:00
Resolving Dependencies
--> Running transaction check
---> Package php-gd.x86_64 0:7.2.34-1.amzn2 will be installed
--> Processing Dependency: libXpm.so.4()(64bit) for package: php-gd-7.2.34-1.amzn2.x86_64
--> Processing Dependency: libX11.so.6()(64bit) for package: php-gd-7.2.34-1.amzn2.x86_64
--> Running transaction check
---> Package libX11.x86_64 0:1.6.7-3.amzn2.0.2 will be installed
--> Processing Dependency: libX11-common >= 1.6.7-3.amzn2.0.2 for package: libX11-1.6.7-3.amzn2.0.2.x86_
64
--> Processing Dependency: libxcb.so.1()(64bit) for package: libX11-1.6.7-3.amzn2.0.2.x86_64
---> Package libXpm.x86_64 0:3.5.12-1.amzn2.0.2 will be installed
--> Running transaction check
---> Package libX11-common.noarch 0:1.6.7-3.amzn2.0.2 will be installed
---> Package libxcb.x86_64 0:1.12-1.amzn2.0.2 will be installed
--> Processing Dependency: libXau.so.6()(64bit) for package: libxcb-1.12-1.amzn2.0.2.x86_64
--> Running transaction check
---> Package libXau.x86_64 0:1.0.8-2.1.amzn2.0.2 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================================================================
 Package               Arch           Version                      Repository                Size
```

sudo yum list installed | grep php-gd

```
[ec2-user@ip-172-31-25-103 lab02]$ sudo yum list installed | grep php-gd
php-gd.x86_64                        7.2.34-1.amzn2              @amzn2extra-php7.2
```

To set file permissions for the Apache web server

sudo chown -R apache /var/www
sudo chgrp -R apache /var/www
sudo chmod 2775 /var/www
find /var/www -type d -exec sudo chmod 2775 {} \;
find /var/www -type f -exec sudo chmod 0664 {} \;
sudo systemctl restart httpd

```
[ec2-user@ip-172-31-25-103 lab02]$ sudo chown -R apache /var/www
[ec2-user@ip-172-31-25-103 lab02]$ sudo chgrp -R apache /var/www
[ec2-user@ip-172-31-25-103 lab02]$ sudo chmod 2775 /var/www
[ec2-user@ip-172-31-25-103 lab02]$ find /var/www -type d -exec sudo chmod 2775 {} \;
[ec2-user@ip-172-31-25-103 lab02]$ find /var/www -type f -exec sudo chmod 0664 {} \;
[ec2-user@ip-172-31-25-103 lab02]$ sudo systemctl restart httpd
```

Test the WordPress installation

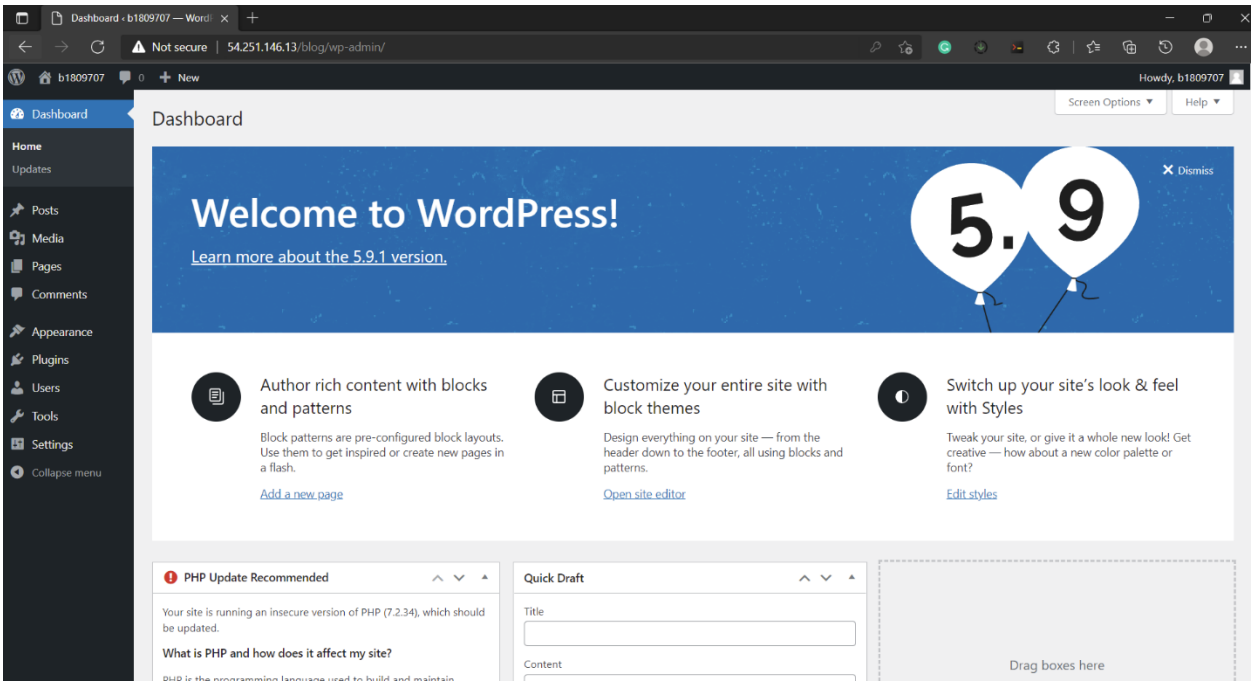
sudo systemctl start mariadb && sudo systemctl start httpd

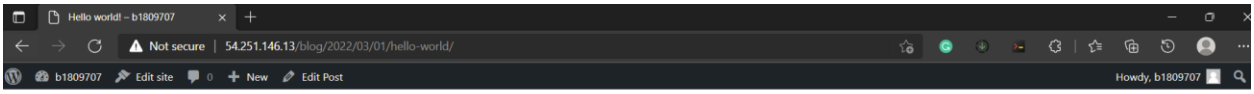
sudo systemctl status mariadb && sudo systemctl status httpd

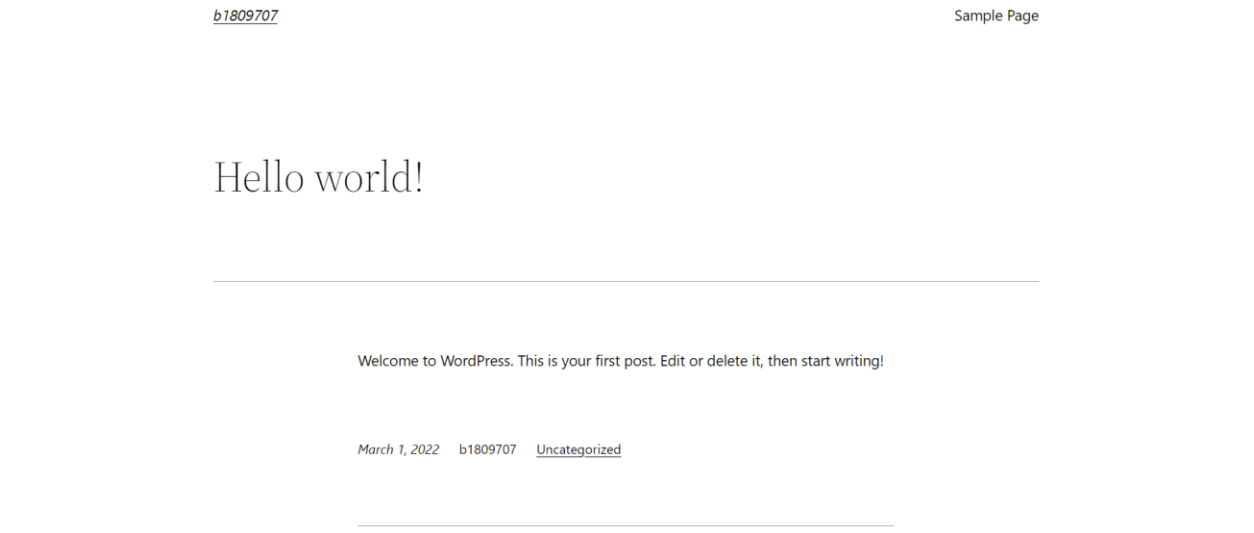
```
[ec2-user@ip-172-31-25-103 lab02]$ sudo systemctl enable httpd && sudo systemctl enable mariadb
Created symlink from /etc/systemd/system/multi-user.target.wants/mariadb.service to /usr/lib/systemd/sys
tem/mariadb.service.
[ec2-user@ip-172-31-25-103 lab02]$ sudo systemctl status mariadb
● mariadb.service - MariaDB 10.2 database server
   Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; vendor preset: disabled)
  Drop-In: /usr/lib/systemd/system/mariadb.service.d
           └─tokudb.conf
   Active: active (running) since Tue 2022-03-01 00:58:25 UTC; 33min ago
 Main PID: 4315 (mysqld)
   Status: "Taking your SQL requests now..."
   CGroup: /system.slice/mariadb.service
           └─4315 /usr/libexec/mysqld --basedir=/usr

Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal mysql-check-upgrade[4386]: ERROR: ld...
Mar 01 00:58:25 ip-172-31-25-103.ap-southeast-1.compute.internal systemd[1]: Started MariaDB 10.2 dat...
Hint: Some lines were ellipsized, use -l to show in full.
```

```
[ec2-user@ip-172-31-25-103 lab02]$ sudo systemctl start mariadb
[ec2-user@ip-172-31-25-103 lab02]$ sudo systemctl status httpd
● httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; vendor preset: disabled)
  Drop-In: /usr/lib/systemd/system/httpd.service.d
           └─php-fpm.conf
   Active: active (running) since Tue 2022-03-01 01:32:01 UTC; 1min 26s ago
     Docs: man:httpd.service(8)
 Main PID: 17034 (httpd)
   Status: "Total requests: 0; Idle/Busy workers 100/0;Requests/sec: 0; Bytes served/sec:   0 B/sec"
   CGroup: /system.slice/httpd.service
           ├─17034 /usr/sbin/httpd -DFOREGROUND
           ├─17035 /usr/sbin/httpd -DFOREGROUND
           ├─17036 /usr/sbin/httpd -DFOREGROUND
           ├─17037 /usr/sbin/httpd -DFOREGROUND
           ├─17038 /usr/sbin/httpd -DFOREGROUND
           └─17039 /usr/sbin/httpd -DFOREGROUND

Mar 01 01:32:01 ip-172-31-25-103.ap-southeast-1.compute.internal systemd[1]: Stopped The Apache HTTP ...
Mar 01 01:32:01 ip-172-31-25-103.ap-southeast-1.compute.internal systemd[1]: Starting The Apache HTTP...
Mar 01 01:32:01 ip-172-31-25-103.ap-southeast-1.compute.internal systemd[1]: Started The Apache HTTP ...
Hint: Some lines were ellipsized, use -l to show in full.
```

In a web browser, type the URL of the WordPress blog







--END--