Techplement - Week 1 Tasks

I have attached the screenshots related to my works at the end of the document.

Overview

This document provides a detailed description of the steps I followed to deploy WordPress and MySQL on AWS using EC2 instances in both monolithic and microservices architectures. Additionally, it includes instructions on setting up a welcome page in WordPress.

Prerequisites

Before starting, I ensured the following prerequisites were met:

1. Created a free-tier AWS account.
2. Installed AWS CLI on my local machine and configured it with my AWS credentials.
3. Generated an SSH key pair for secure access to the EC2 instances.

Task Breakdown

Monolithic Architecture

Step 1: Launch an EC2 Instance

1. **Open the AWS Management Console** and navigated to the EC2 dashboard.
2. **Launch Instance**:
    - **AMI**: Selected an Ubuntu AMI (`ubuntu/images/hvm-ssd/ubuntu-focal-20.04-amd64-server-2023`).
    - **Instance Type**: Chose `t2.micro`.
    - **Key Pair**: Selected my previously created key pair.
    - **Security Group**: Created a new security group with the following rules:
        - Allowed SSH (port 22) from my IP.
        - Allowed HTTP (port 80) from anywhere.
3. Launched the instance.
4. Created Elastic IP and associated with the instance to ensure the IP doesn't change after every reboot.

Step 2: Install WordPress and MySQL

1. Connected to the EC2 instance via SSH:

```
2. ssh -i /key-pair.pem ubuntu@ 3.209.28.142
```

3. Updated the package list:

4. `sudo apt update`
5. Installed Apache, MySQL, PHP, and related packages:
6. `sudo apt install apache2 mysql-server php libapache2-mod-php php-mysql -y`
7. Secured MySQL installation:
8. `sudo mysql_secure_installation`
9. Created a MySQL database and user for WordPress:
10. `sudo mysql -u root -p`
11. `CREATE DATABASE wordpress;`
12. `GRANT ALL PRIVILEGES ON wordpress.* TO 'wordpressuser'@'localhost' IDENTIFIED BY 'password';`
13. `FLUSH PRIVILEGES;`
14. `EXIT;`
15. Installed WordPress:
16. `cd /tmp`
17. `wget https://wordpress.org/latest.tar.gz`
18. `tar -xzvf latest.tar.gz`
19. `sudo mv wordpress /var/www/html/`
20. `sudo chown -R www-data:www-data /var/www/html/wordpress`
21. `sudo chmod -R 755 /var/www/html/wordpress`
22. Configured Apache:
23. `sudo nano /etc/apache2/sites-available/wordpress.conf`

    Added the following content:

    ```
    <VirtualHost *:80>
        DocumentRoot /var/www/html/wordpress
    </VirtualHost>
    ```

    Enabled the configuration and rewrite module:

    ```
    sudo a2ensite wordpress.conf
    sudo a2enmod rewrite
    sudo systemctl restart apache2
    ```

24. Completed the WordPress installation by navigating to `http://3.209.28.142` in my web browser and following the setup instructions.

Microservices Architecture

Step 1: Launch EC2 Instances

Repeated the instance launch process for two instances, one for WordPress and one for MySQL, with the same configurations but different names to identify them.

Created Elastic IP and associated with the instances to ensure the IP doesn't change after every reboot.

Step 2: Configure Security Groups

1. **MySQL Instance Security Group**:
    - Allowed SSH (port 22) from my IP.
    - Allowed MySQL (port 3306) from the WordPress instance's private IP address.
2. **WordPress Instance Security Group**:
    - Allowed SSH (port 22) from my IP.
    - Allowed HTTP (port 80) from anywhere.

Step 3: Install MySQL on MySQL Instance

1. Connected to the MySQL EC2 instance via SSH:
2. `ssh -i /path/to/your-key-pair.pem ubuntu@54.197.61.78`
3. Updated the package list and installed MySQL:
4. `sudo apt update`
5. `sudo apt install mysql-server -y`
6. Secured MySQL installation:
7. `sudo mysql_secure_installation`
8. Created a MySQL database and user for WordPress:
9. `sudo mysql -u root -p`
10. `CREATE DATABASE wordpress;`
11. `GRANT ALL PRIVILEGES ON wordpress.* TO 'wordpressuser'@'wordpress-ec2-private-ip' IDENTIFIED BY 'password'; *`
12. `FLUSH PRIVILEGES;`
13. `EXIT;`
14. Updated MySQL configuration to allow remote access:
15. `sudo nano /etc/mysql/mysql.conf.d/mysqld.cnf`

    Changed `bind-address` to `0.0.0.0`:

    ```
    bind-address = 0.0.0.0
    ```

    Restarted MySQL:

    ```
    sudo systemctl restart mysql
    ```

Step 4: Install WordPress on WordPress Instance

1. Connected to the WordPress EC2 instance via SSH:
2. `ssh -i /key-pair.pem ubuntu@54.156.198.64`
3. Updated the package list:
4. `sudo apt update`

5. Installed Apache, PHP, and related packages:

```
sudo apt install apache2 php libapache2-mod-php php-mysql -y
```

7. Installed WordPress:

```
cd /tmp
wget https://wordpress.org/latest.tar.gz
tar -xzvf latest.tar.gz
sudo mv wordpress /var/www/html/
sudo chown -R www-data:www-data /var/www/html/wordpress
sudo chmod -R 755 /var/www/html/wordpress
```

14. Configured Apache:

```
sudo nano /etc/apache2/sites-available/wordpress.conf
```

Added the following content:

```
<VirtualHost *:80>
    DocumentRoot /var/www/html/wordpress
</VirtualHost>
```

Enabled the configuration and rewrite module:

```
sudo a2ensite wordpress.conf
sudo a2enmod rewrite
sudo systemctl restart apache2
```

16. Configured WordPress to connect to MySQL:

```
sudo nano /var/www/html/wordpress/wp-config.php
```

Updated the database settings:

```
define('DB_NAME', 'wordpress');
define('DB_USER', 'wordpressuser');
define('DB_PASSWORD', 'password');
define('DB_HOST', 'mysql-ec2-private-ip');
```

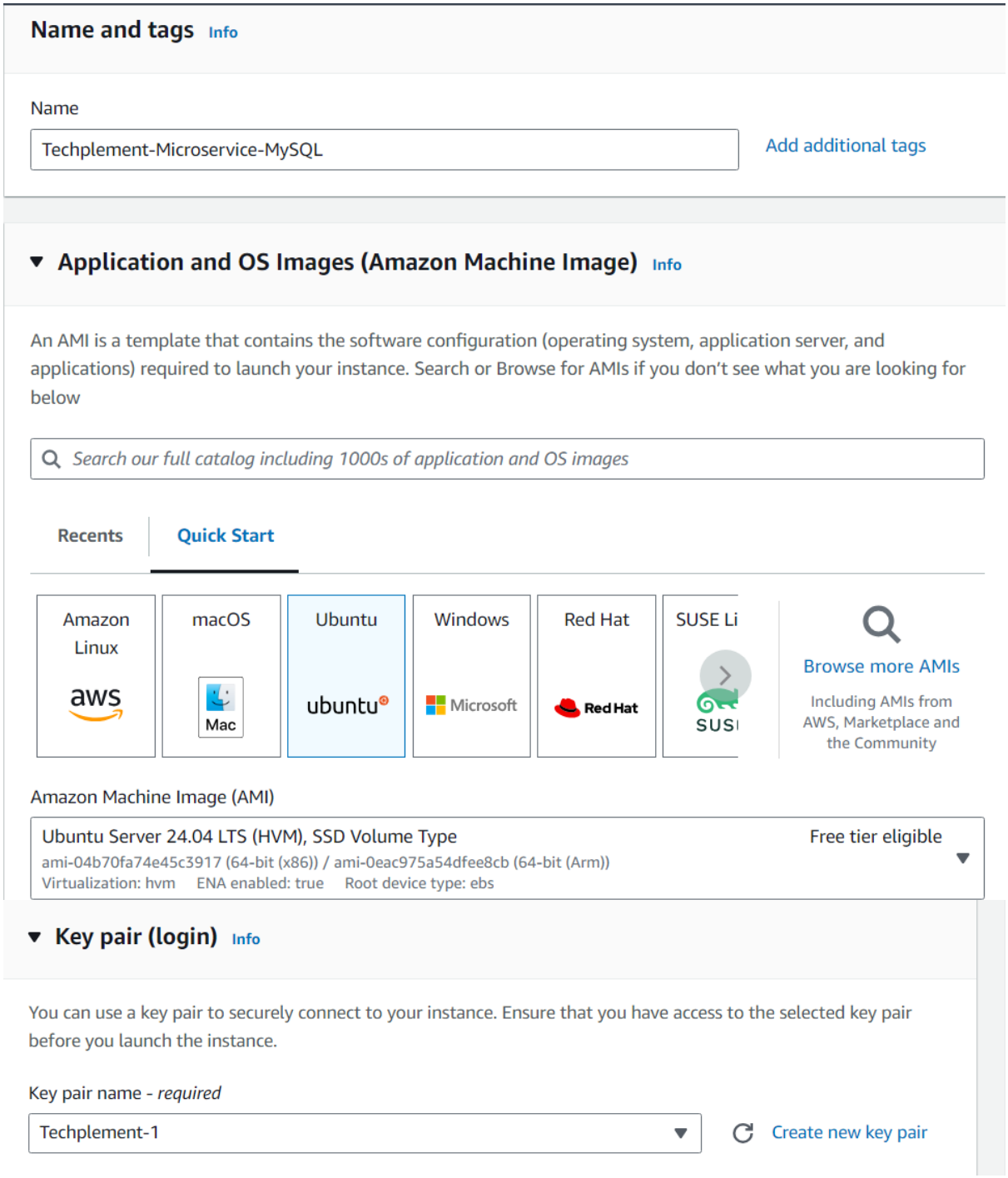
18. Completed the WordPress installation by navigating to `http://54.156.198.64` in my web browser and following the setup instructions.

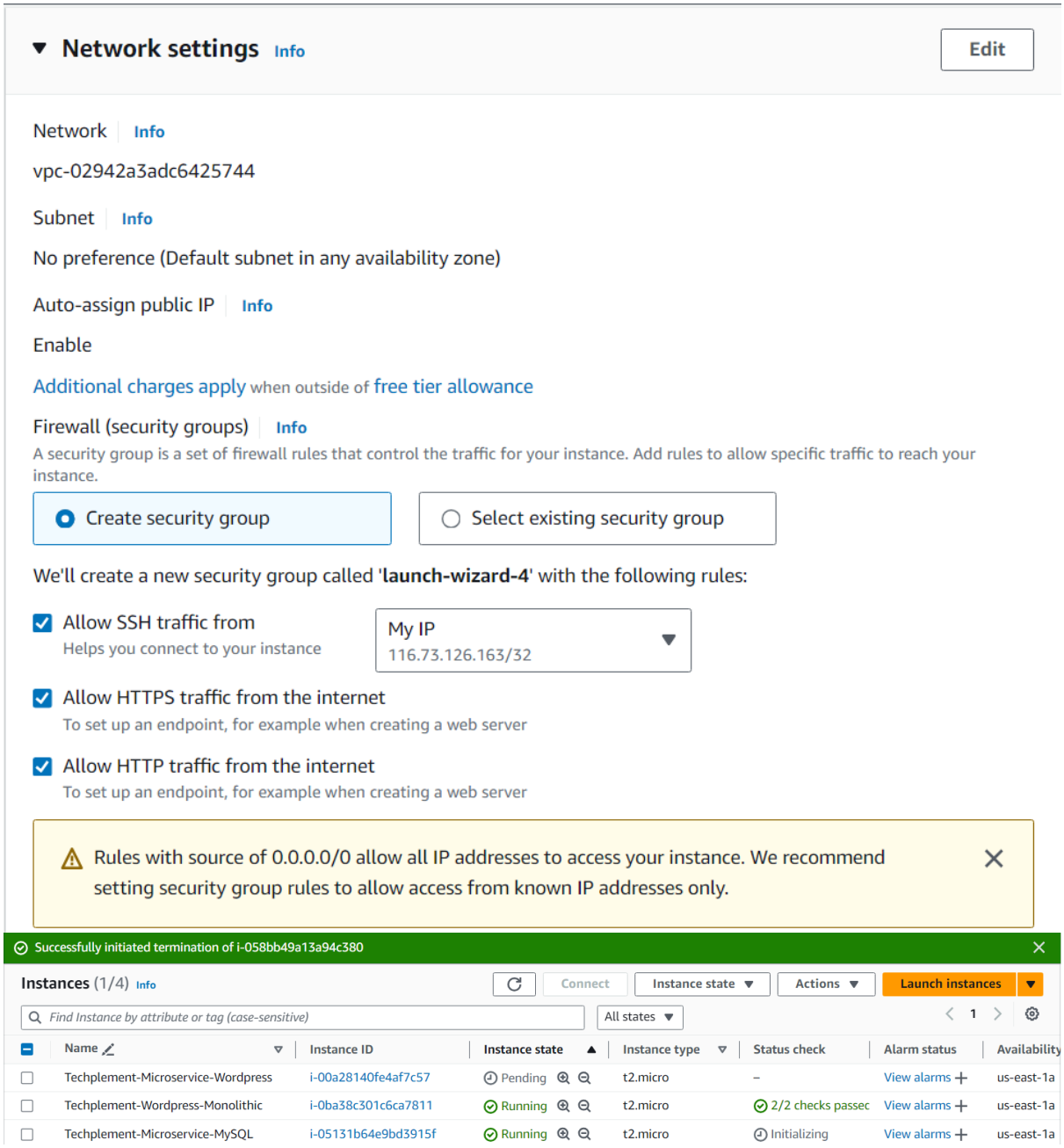
Create a Welcome Page in WordPress

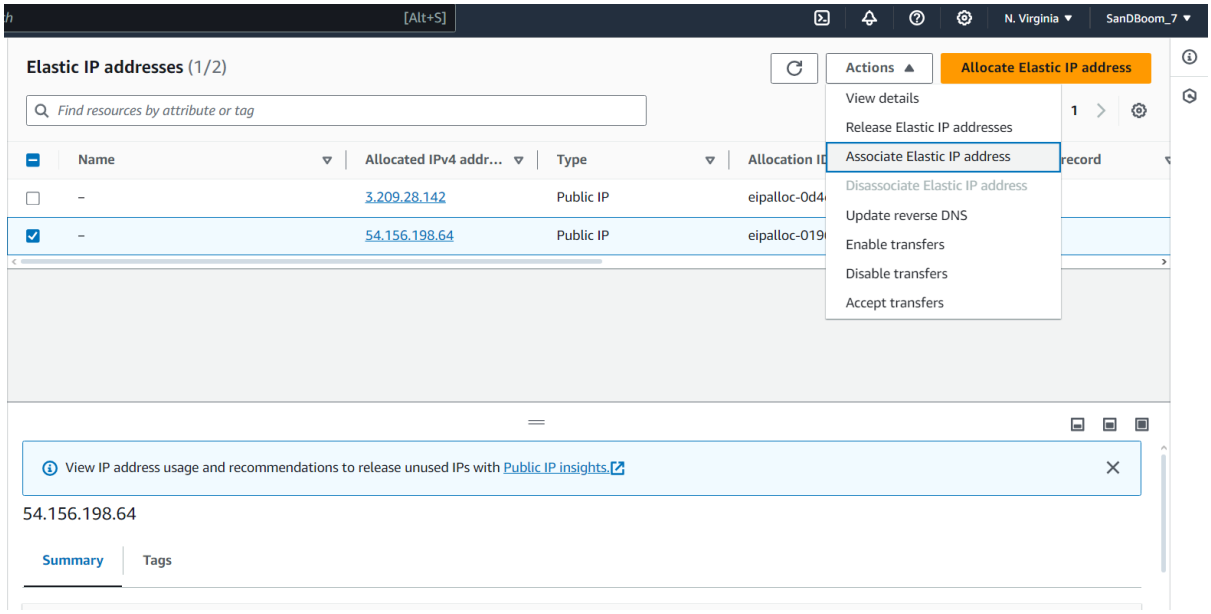
1. Logged into the WordPress admin dashboard.
2. Created a new page named "Welcome".
3. Set the "Welcome" page as the homepage:
    - Went to `Settings` > `Reading`.

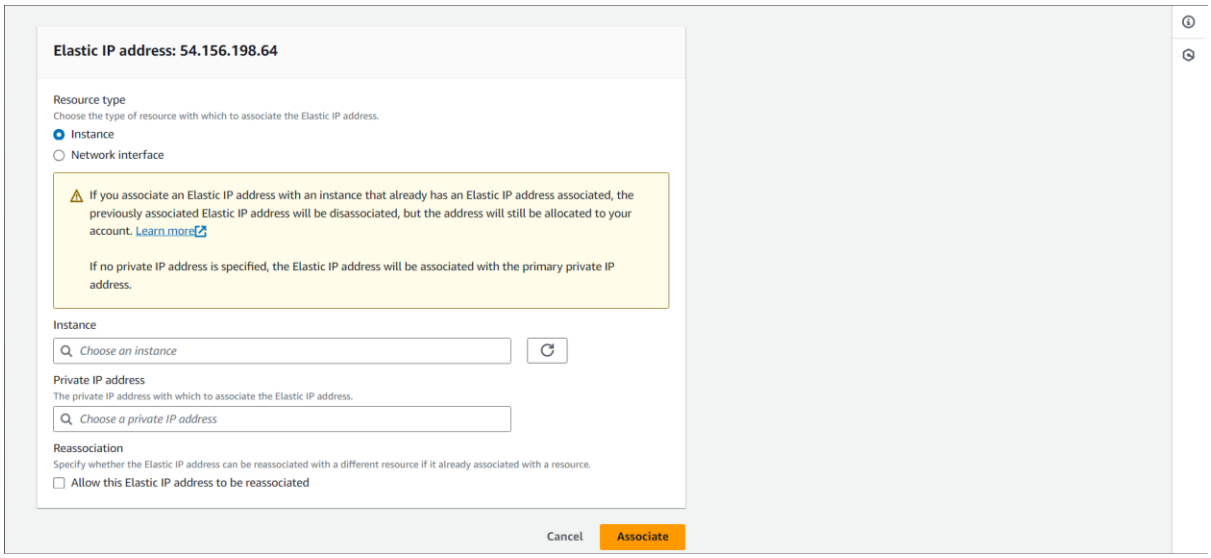
- Selected `A static page` and chose "Welcome" from the dropdown menu.

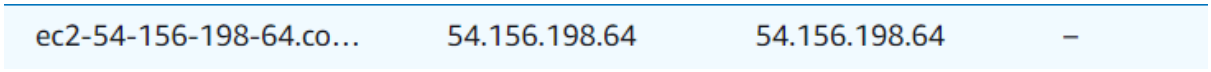
Screenshots:




Network settings Info
Edit
Network Info
vpc-02942a3adc6425744
Subnet Info
No preference (Default subnet in any availability zone)
Auto-assign public IP Info
Enable
Additional charges apply when outside of free tier allowance
Firewall (security groups) Info
A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.
Create security group
Select existing security group
We'll create a new security group called 'launch-wizard-4' with the following rules:
Allow SSH traffic from
Helps you connect to your instance
My IP
116.73.126.163/32
Allow HTTPS traffic from the internet
To set up an endpoint, for example when creating a web server
Allow HTTP traffic from the internet
To set up an endpoint, for example when creating a web server
Rules with source of 0.0.0.0/0 allow all IP addresses to access your instance. We recommend setting security group rules to allow access from known IP addresses only.
Successfully initiated termination of i-058bb49a13a94c380
Instances (1/4) Info
Connect
Instance state
Actions
Launch instances
Find Instance by attribute or tag (case-sensitive)
All states
Name
Instance ID
Instance state
Instance type
Status check
Alarm status
Availability
Techplement-Microservice-Wordpress
i-00a28140fe4af7c57
Pending
t2.micro
View alarms
us-east-1a
Techplement-Wordpress-Monolithic
i-0ba38c301c6ca7811
Running
t2.micro
2/2 checks passec
View alarms
us-east-1a
Techplement-Microservice-MySQL
i-05131b64e9bd3915f
Running
t2.micro
Initializing
View alarms
us-east-1a








```
ubuntu@ip-172-31-28-254:~$ sudo apt update
Get:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble InRelease [256 kB]
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble-backports InRelease [126 kB]
Get:4 http://security.ubuntu.com/ubuntu noble-security InRelease [126 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main amd64 Packages [1401 kB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/main Translation-en [513 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe amd64 Packages [15.0 MB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu noble/universe Translation-en [5982 kB]
Get:9 http://security.ubuntu.com/ubuntu noble-security/main amd64 Packages [182 kB]
```

```
ubuntu@ip-172-31-28-254:~$ sudo apt install apache2 mysql-server php libapache2-mod-php php-mysql -y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils libapache2-mod-php8.3 libapr1t64 libaprutil1-dbd-sqlite3 libaprutil1-ldap libaprutil1t64 libcgi-fast-perl
  libcgi-pm-perl libclone-perl libencode-locale-perl libevent-pthreads-2.1-7t64 libfcgi-bin libfcgi-perl libfcgi0t64 libhtml-parser-perl libhtml-tagset-perl
  libhtml-template-perl libhttp-date-perl libhttp-message-perl libio-html-perl liblua5.4-0 liblwp-mediatypes-perl libmecab2 libprotobuf-lite32t64
```

```
ubuntu@ip-172-31-28-254:~$ sudo mysql_secure_installation

Securing the MySQL server deployment.

Connecting to MySQL using a blank password.

VALIDATE PASSWORD COMPONENT can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD component?

Press y|Y for Yes, any other key for No:
```

```
VALIDATE PASSWORD COMPONENT can be used to test passwords
and improve security. It checks the strength of password
and allows the users to set only those passwords which are
secure enough. Would you like to setup VALIDATE PASSWORD component?

Press y|Y for Yes, any other key for No: y

There are three levels of password validation policy:

LOW    Length >= 8
MEDIUM Length >= 8, numeric, mixed case, and special characters
STRONG Length >= 8, numeric, mixed case, special characters and dictionary                  file

Please enter 0 = LOW, 1 = MEDIUM and 2 = STRONG: 0

Skipping password set for root as authentication with auth_socket is used by default.
If you would like to use password authentication instead, this can be done with the "ALTER_USER" command.
See https://dev.mysql.com/doc/refman/8.0/en/alter-user.html#alter-user-password-management for more information.

By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL 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? (Press y|Y for Yes, any other key for No) :
```

```
By default, a MySQL installation has an anonymous user,
allowing anyone to log into MySQL 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? (Press y|Y for Yes, any other key for No) :

 ... skipping.


Normally, root should only be allowed to connect from
'localhost'. This ensures that someone cannot guess at
the root password from the network.

Disallow root login remotely? (Press y|Y for Yes, any other key for

 ... skipping.
By default, MySQL comes with a database named 'test' that
anyone can access. This is also intended only for testing,
and should be removed before moving into a production
environment.


Remove test database and access to it? (Press y|Y for Yes, any other
```

```
ubuntu@ip-172-31-28-254:~$ sudo mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 8
Server version: 8.0.37-0ubuntu0.24.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql>
```

```
ubuntu@ip-172-31-28-254:~$ sudo mysql -u root -p
Enter password:
Welcome to the MySQL monitor.  Commands end with ; or \g.
Your MySQL connection id is 11
Server version: 8.0.37-0ubuntu0.24.04.1 (Ubuntu)

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affiliates. Other names may be trademarks of their respective
owners.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

mysql> CREATE DATABASE wp;
Query OK, 1 row affected (0.00 sec)

mysql> GRANT ALL PRIVILEGES ON wp.* TO 'Techplement-Wordpress'@'localhost' IDENTIFIED BY 'password';
```
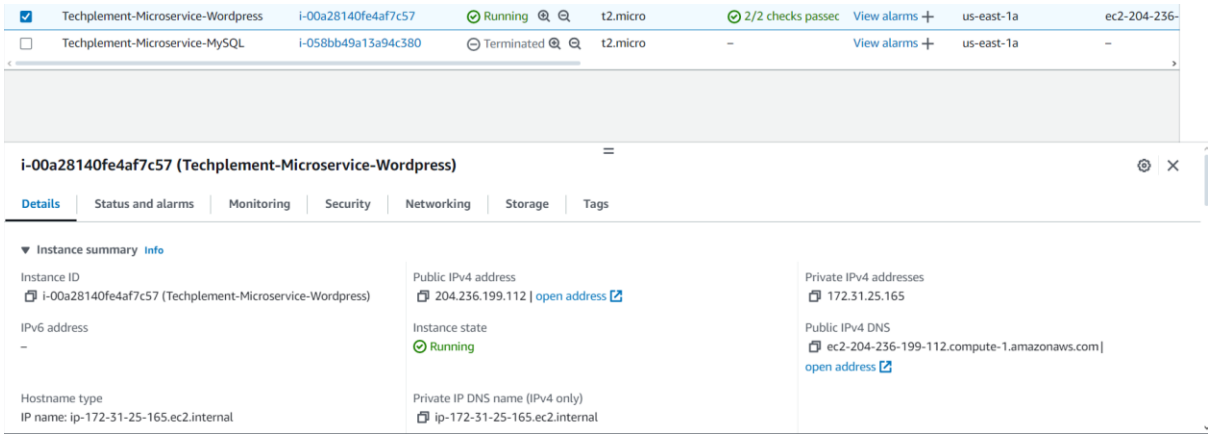
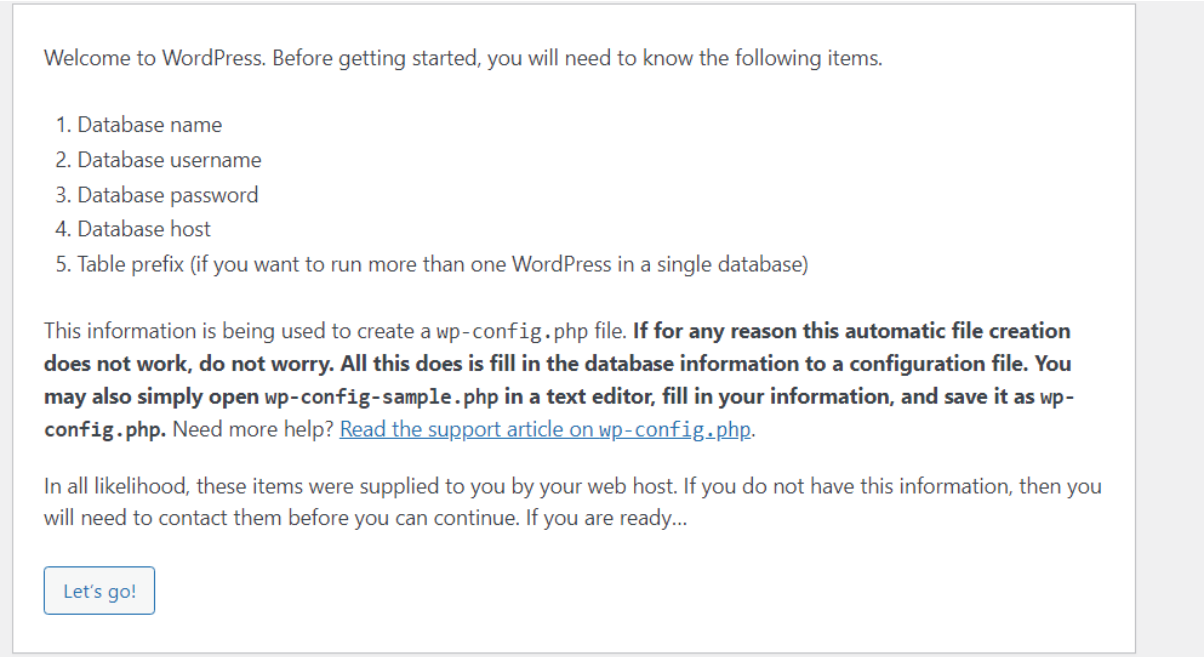
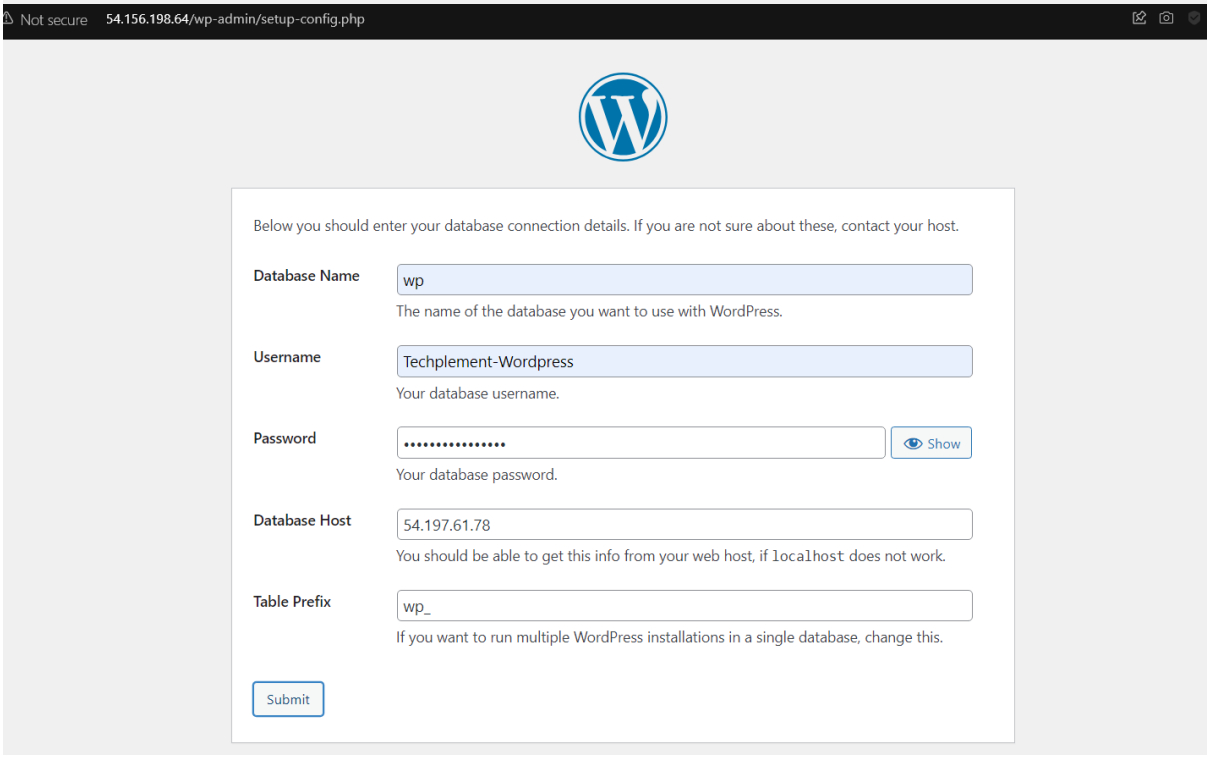



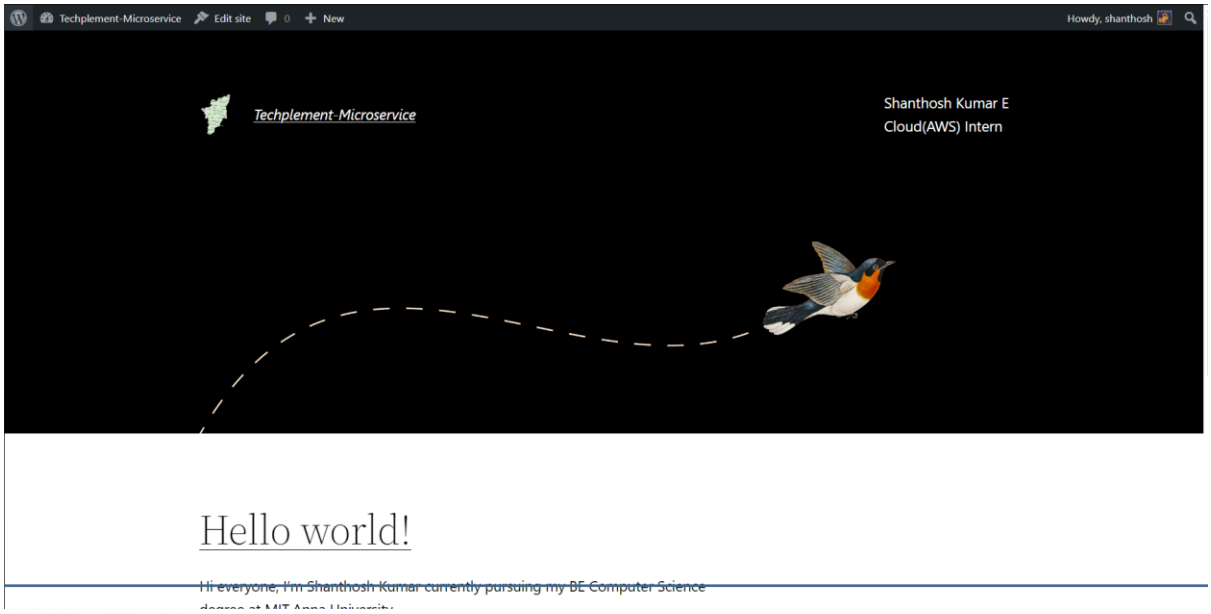

```
mysql> CREATE USER 'Techplement-Wordpress'@54.197.61.78 identified by 'Testpassword@123';
Query OK, 0 rows affected (0.02 sec)

mysql> use wp;
Database changed
mysql> Grant all privileges on wp.* to 'Techplement-Wordpress'@54.197.61.78;
Query OK, 0 rows affected (0.00 sec)

mysql> Grant all privileges on wp.* to 'Techplement-Wordpress'@54.197.61.78;^C
mysql> exit
Bye
```

```
ubuntu@ip-172-31-25-165:/var/www/html$ sudo chown -R www-data:www-data /var/www/html/wordpress
ubuntu@ip-172-31-25-165:/var/www/html$ sudo chmod -R 755 /var/www/html/wordpress
ubuntu@ip-172-31-25-165:/var/www/html$ sudo nano /etc/apache2/sites-available/wordpress.conf
ubuntu@ip-172-31-25-165:/var/www/html$ cd /etc/apache2/sites-available/
ubuntu@ip-172-31-25-165:/etc/apache2/sites-available$ ls
000-default.conf  default-ssl.conf
ubuntu@ip-172-31-25-165:/etc/apache2/sites-available$ nano 000-default.conf
ubuntu@ip-172-31-25-165:/etc/apache2/sites-available$ sudo nano 000-default.conf
ubuntu@ip-172-31-25-165:/etc/apache2/sites-available$ sudo systemctl restart apache2
```


Welcome to WordPress. Before getting started, you will need to know the following items.
1. Database name
2. Database username
3. Database password
4. Database host
5. Table prefix (if you want to run more than one WordPress in a single database)
This information is being used to create a wp-config.php file. If for any reason this automatic file creation does not work, do not worry. All this does is fill in the database information to a configuration file. You may also simply open wp-config-sample.php in a text editor, fill in your information, and save it as wp-config.php. Need more help? Read the support article on wp-config.php.
In all likelihood, these items were supplied to you by your web host. If you do not have this information, then you will need to contact them before you can continue. If you are ready...
Let's go!


Not secure 54.156.198.64/wp-admin/setup-config.php
Below you should enter your database connection details. If you are not sure about these, contact your host.
Database Name
wp
The name of the database you want to use with WordPress.
Username
Techplement-Wordpress
Your database username.
Password
Show
Your database password.
Database Host
54.197.61.78
You should be able to get this info from your web host, if localhost does not work.
Table Prefix
wp_
If you want to run multiple WordPress installations in a single database, change this.
Submit

SHANTHOSH KUMAR E - CLOUD(AWS) intern



***Note:** I have concealed the private information like my private ip address and have placed placeholders instead.