WordPress Deployment on AWS using Microservices Architecture

Project Overview

To deploy a WordPress website using microservices architecture on AWS. The architecture separates the web server and database server for modularity and scalability.

Goals:

- Launch two EC2 instances:
    - One for WordPress + Apache + PHP (Web Server)
    - One for MySQL (Database)
- Use Ubuntu 22.04 AMI with t2.micro instance type
- Configure appropriate Security Groups
- Create a Welcome Page as the WordPress homepage
- Secure the WordPress site with HTTPS (SSL Certificate)

Architecture Overview

Internet
↓
Route 53 (DNS / Domain)
↓
EC2 Instance (WordPress Server)

- Apache + PHP + WP Site
- Public IP + Elastic IP
  ↓
  RDS MySQL Database (Private Subnet)

Security Group Configuration

1. **EC2 WordPress Instance (Web Server)**

Type	Protocol	Port Range	Source
SSH	TCP	22	My IP (recommended)
HTTP	TCP	80	0.0.0.0/0

Type	Protocol	Port Range	Source
HTTPS	TCP	443	0.0.0.0/0

2. **RDS MySQL Instance**

Type	Protocol	Port Range	Source
MySQL/Aurora	TCP	3306	EC2 Instance's Security Group

Step-by-Step Implementation

Step 1: Launch EC2 for WordPress

1. Log into AWS Console > EC2 > Launch Instance
2. Choose:
    - AMI: Ubuntu Server 22.04 LTS
    - Instance Type: t2.micro
3. Configure networking:
    - Select VPC and Subnet
    - Attach a Security Group with ports 22, 80, and 443 open
    - Optionally assign an Elastic IP
4. Launch the instance using a selected SSH key
5. Connect to EC2:

```
ssh -i /path/to/key.pem ubuntu@<public-ip>
```

Step 2: Create RDS Instance (MySQL)

1. Go to RDS Dashboard > Create Database
2. Choose MySQL and Standard Create
3. Configure:
    - Instance class: db.t2.micro
    - Set username and password
4. Network Settings:
    - Same VPC as EC2
    - Disable public access
    - Use security group that allows port 3306 from EC2's security group

5. Save RDS Endpoint and credentials

Step 3: Configure LAMP Stack on EC2

sudo apt update && sudo apt upgrade -y

sudo apt install apache2 -y

sudo apt install -y php libapache2-mod-php php-mysql php-curl php-gd php-mbstring php-xml php-xmlrpc php-soap php-intl php-zip

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Step 4: Apache Virtual Host Setup

sudo mkdir /var/www/your_domain

sudo chown -R $USER:$USER /var/www/your_domain

sudo nano /etc/apache2/sites-available/your_domain.conf

Paste the following configuration:

```
<VirtualHost *:80>
    ServerName your_domain
    ServerAlias www.your_domain
    ServerAdmin webmaster@localhost
    DocumentRoot /var/www/your_domain
    ErrorLog ${APACHE_LOG_DIR}/error.log
    CustomLog ${APACHE_LOG_DIR}/access.log combined
    <Directory /var/www/your_domain>
        AllowOverride All
    </Directory>
</VirtualHost>
```

Enable the site and reload Apache:

sudo a2ensite your_domain

sudo a2dissite 000-default

sudo a2enmod rewrite

sudo apache2ctl configtest

sudo systemctl reload apache2

Step 5: Connect to MySQL (RDS)

Install MySQL client:

sudo apt install mysql-client -y

Connect to RDS:

mysql -h <rds-endpoint> -u <username> -p

Inside MySQL:

CREATE DATABASE wordpress;

exit;

Step 6: Download and Configure WordPress

cd /tmp

curl -O https://wordpress.org/latest.tar.gz

tar xzvf latest.tar.gz

touch /tmp/wordpress/.htaccess

mkdir /tmp/wordpress/wp-content/upgrade

sudo cp -a /tmp/wordpress/. /var/www/your_domain

Set permissions:

sudo chown -R www-data:www-data /var/www/your_domain

sudo find /var/www/your_domain/ -type d -exec chmod 750 {} \;

sudo find /var/www/your_domain/ -type f -exec chmod 640 {} \;

Step 7: WordPress Web Setup

- Open the domain in a browser
- Enter MySQL database details:
    - Database: wordpress
    - Username/Password: as per RDS
    - Host: RDS endpoint
- Complete admin setup
- Set the Welcome Page as homepage in WordPress:
  Go to Dashboard > Settings > Reading

Step 8: Setup SSL Certificate (HTTPS)

Install and run Certbot:

sudo apt install certbot python3-certbot-apache -y

sudo certbot --apache

Follow the prompts to:

- Select domain
- Redirect HTTP to HTTPS automatically

Final Outcome

- WordPress deployed successfully on EC2 with Apache, PHP
- MySQL database hosted on RDS securely
- Welcome Page configured as homepage
- HTTPS SSL enabled with Let's Encrypt

References

- WordPress Installation: https://wordpress.org/support/article/how-to-install-wordpress/
- AWS RDS Docs: https://docs.aws.amazon.com/AmazonRDS/latest/UserGuide/Welcome.html
- Apache Virtual Hosts: https://httpd.apache.org/docs/2.4/vhosts/
- Certbot SSL Setup: https://certbot.eff.org/instructions
- AWS Security Groups: https://docs.aws.amazon.com/vpc/latest/userguide/VPC_SecurityGroups.html