

Task - 1

Web Application Deployment on AWS EC2 using RHEL

1. Project Overview

This project involves deploying a web application on an AWS EC2 instance running Red Hat Enterprise Linux (RHEL). The deployment includes setting up a web server, installing required packages, configuring, and hosting the application. This setup demonstrates basic cloud infrastructure and Linux server management skills.

2. Objectives

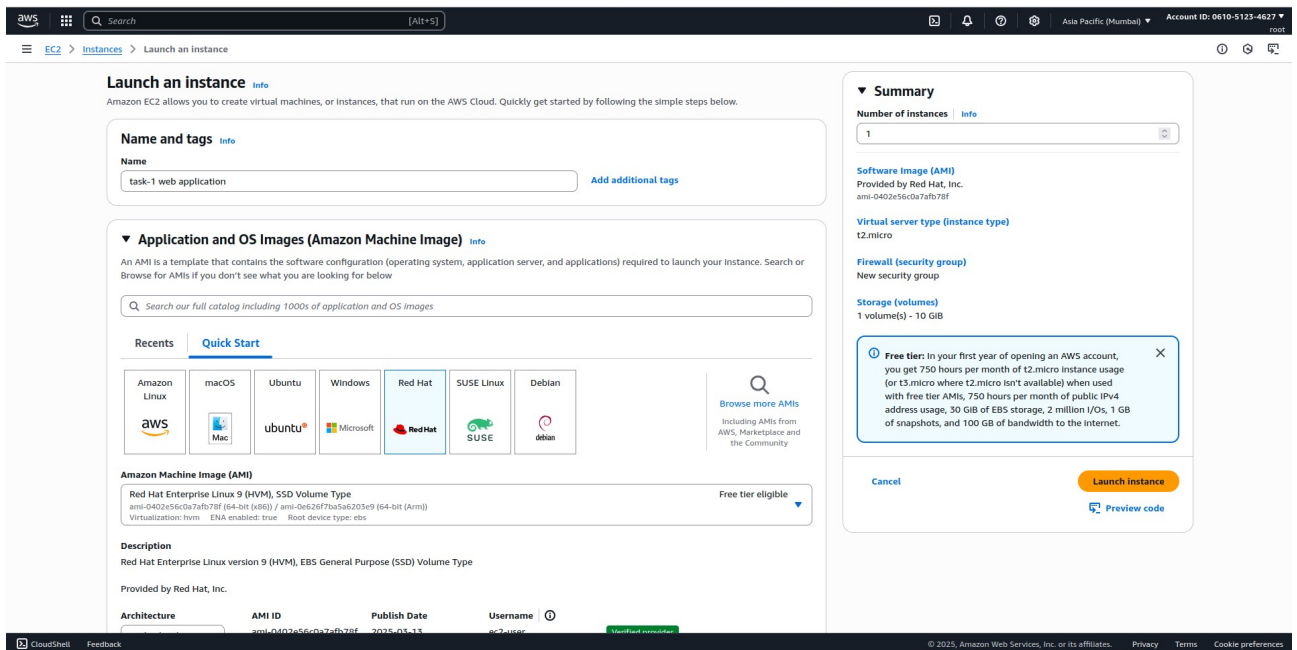
- Launch an EC2 instance with RHEL OS on AWS
- Install and configure a web server
- Deploy a sample or custom web application
- Ensure accessibility via a web browser

3. Tools & Technologies Used

Component	Tool/Tech
Cloud Platform	AWS (Amazon Web Services)
OS	Red Hat Enterprise Linux 9
Web Server	Apache
App Language	PHP
Database	MariaDB (for PHP apps)

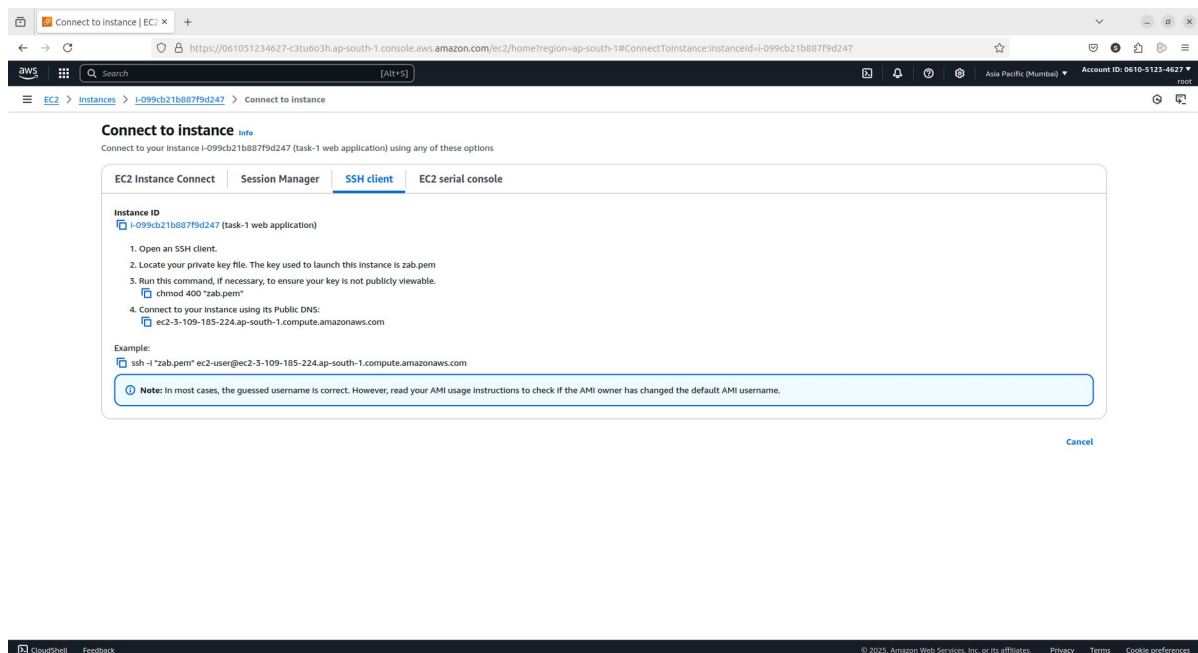
4. Implementation Steps

1. Launch EC2 Instance
 - AMI: RHEL 9 (x86_64)
 - Instance Type: t2.micro
 - Key Pair: zab.pem
 - Security Group: Allow ports 22, 80, 443
 - Storage: 10GB (default)



2. Connect to EC2

ssh -i "zab.pem" [ec2-user@ec2-3-109-185-224.ap-south-1.compute.amazonaws.com](https://ec2-3-109-185-224.ap-south-1.compute.amazonaws.com)



```
root@ip-172-31-46-14:~  
shani@shani:~$ ssh -i "zab.pem" ec2-user@ec2-3-109-185-224.ap-south-1.compute.  
amazonaws.com  
The authenticity of host 'ec2-3-109-185-224.ap-south-1.compute.amazonaws.com (64  
:ff9b::36d:b9e0)' can't be established.  
ED25519 key fingerprint is SHA256:uDJa4JkSDI/000S/+oCma3HqtKSljZffSdyA+GNG1zI.  
This key is not known by any other names.  
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes  
Warning: Permanently added 'ec2-3-109-185-224.ap-south-1.compute.amazonaws.com'  
(ED25519) to the list of known hosts.  
Register this system with Red Hat Insights: rhc connect  
  
Example:  
# rhc connect --activation-key <key> --organization <org>  
  
The rhc client and Red Hat Insights will enable analytics and additional  
management capabilities on your system.  
View your connected systems at https://console.redhat.com/insights  
  
You can learn more about how to register your system  
using rhc at https://red.ht/registration  
[ec2-user@ip-172-31-46-14 ~]$ sudo -i  
[root@ip-172-31-46-14 ~]#
```

3. Update Packages

```
# sudo dnf update -y
```

```
root@ip-172-31-46-14:~  
[root@ip-172-31-46-14 ~]# dnf update -y  
Updating Subscription Management repositories.  
Unable to read consumer identity  
  
This system is not registered with an entitlement server. You can use "rhc" or "  
subscription-manager" to register.  
  
Red Hat Enterprise Linux 9 for x86_64 - AppStream 67 MB/s | 59 MB 00:00  
Red Hat Enterprise Linux 9 for x86_64 - BaseOS 71 MB/s | 57 MB 00:00  
Red Hat Enterprise Linux 9 Client Configuration 27 kB/s | 2.3 kB 00:00  
Last metadata expiration check: 0:00:01 ago on Thu 15 May 2024 02:26:03 PM UTC.  
Dependencies resolved.  
=====
```

Package	Arch	Version	Repository	Size
Installing:				
kernel	x86_64	5.14.0-570.16.1.el9_6	rhel-9-baseos-rhui-rpms	1.8 M
kernel-core	x86_64	5.14.0-570.16.1.el9_6		

```
=====
```

4. Apache (LAMP Stack for PHP Apps)

```
# sudo dnf install httpd php php-mysqldb mariadb-server.x86_64 -y
```

```
# sudo systemctl enable --now httpd mariadb
```

```
# sudo systemctl start httpd mariadb
```

```
root@ip-172-31-46-14:~  
[root@ip-172-31-46-14 ~]# sudo dnf install httpd php php-mysqldb mariadb-server.x86_64 -y  
  
Updating Subscription Management repositories.  
Unable to read consumer identity  
  
This system is not registered with an entitlement server. You can use "rhc" or "subscription-manager" to register.  
  
Last metadata expiration check: 0:02:23 ago on Thu 15 May 2024 02:32:04 PM UTC.  
Dependencies resolved.  
=====
```

Package	Arch	Version	Repository	Size
Installing:				
httpd	x86_64	2.4.62-4.el9	rhel-9-appstream-rhui-rpms	51 k
mariadb-server	x86_64	3:10.5.27-1.el9_5	rhel-9-appstream-rhui-rpms	9.8 M
php	x86_64	8.0.30-3.el9_6	rhel-9-appstream-rhui-rpms	5.2 k
php-mysqldb	x86_64	8.0.30-3.el9_6	rhel-9-appstream-rhui-rpms	151 k

```
=====
```

```
root@ip-172-31-46-14:~  
php-cli-8.0.30-3.el9_6.x86_64  
php-common-8.0.30-3.el9_6.x86_64  
php-fpm-8.0.30-3.el9_6.x86_64  
php-mbstring-8.0.30-3.el9_6.x86_64  
php-mysqldb-8.0.30-3.el9_6.x86_64  
php-opcache-8.0.30-3.el9_6.x86_64  
php-pdo-8.0.30-3.el9_6.x86_64  
php-xml-8.0.30-3.el9_6.x86_64  
redhat-logos-httpd-90.4-2.el9.noarch  
  
Complete!  
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]# sudo systemctl enable --now httpd mariadb  
Created symlink /etc/systemd/system/multi-user.target.wants/httpd.service → /usr/lib/systemd/system/httpd.service.  
Created symlink /etc/systemd/system/mysql.service → /usr/lib/systemd/system/mariadb.service.  
Created symlink /etc/systemd/system/mysqld.service → /usr/lib/systemd/system/mariadb.service.  
Created symlink /etc/systemd/system/multi-user.target.wants/mariadb.service → /usr/lib/systemd/system/mariadb.service.  
[root@ip-172-31-46-14 ~]# sudo systemctl start httpd mariadb  
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]#
```

5. Deploy PHP App

This step involves uploading or creating PHP application files and placing them in the Apache web root directory.

- Clean the Default Web Root

```
# sudo rm -f /var/www/html/index.html
```

- Create a Sample PHP Page /Upload PHP Files

```
# echo "<?php phpinfo(); ?>" | sudo tee /var/www/html/index.php
```

- Set Correct Permissions

```
# sudo chown -R apache:apache /var/www/html/
```

```
# sudo chmod -R 755 /var/www/html/
```

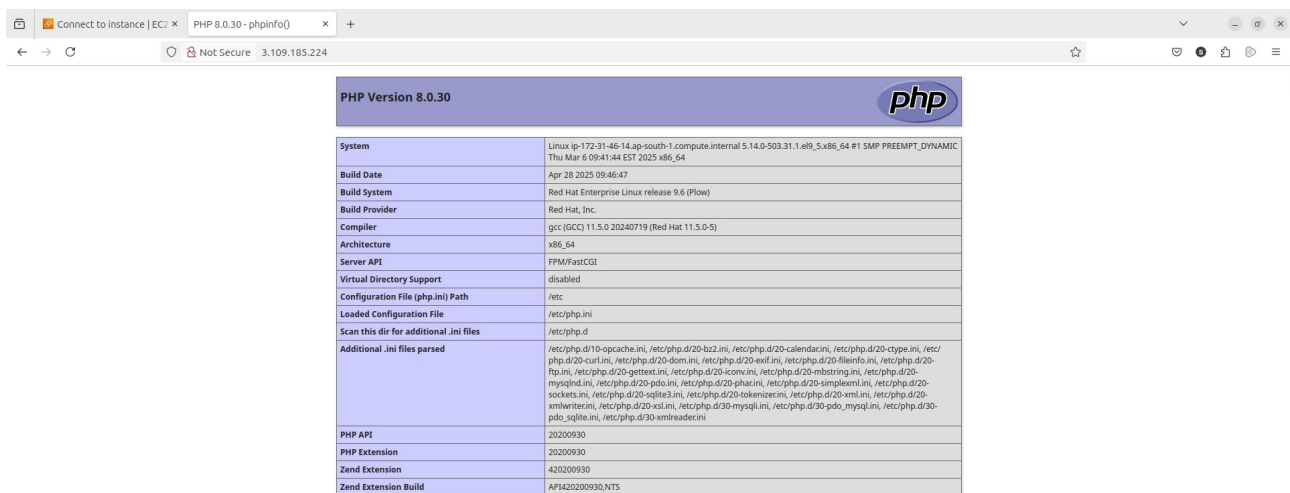
- Restart Apache

```
# sudo systemctl restart httpd
```

```
root@ip-172-31-46-14:~  
[root@ip-172-31-46-14 ~]# sudo rm -f /var/www/html/index.html  
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]# echo "<?php phpinfo(); ?>" | sudo tee /var/www/html/index.php  
<?php phpinfo(); ?>  
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]# sudo chown -R apache:apache /var/www/html/  
[root@ip-172-31-46-14 ~]# sudo chmod -R 755 /var/www/html/  
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]# sudo systemctl restart httpd  
[root@ip-172-31-46-14 ~]#
```

- Access PHP App in Browser

<http://3.109.185.224/>



System	Linux ip-172-31-46-14.ap-south-1.compute.internal 5.14.0-503.31.1.el9_5.x86_64 #1 SMP PREEMPT_DYNAMIC Thu Mar 6 09:41:44 EST 2025 x86_64
Build Date	Apr 28 2025 09:46:47
Build System	Red Hat Enterprise Linux release 9.6 (Plow)
Build Provider	Red Hat, Inc.
Compiler	gcc (GCC) 11.5.0 20240719 (Red Hat 11.5.0-5)
Architecture	x86_64
Server API	FFPM/PassCGI
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/10-opcache.ini, /etc/php.d/20-bz2.ini, /etc/php.d/20-calendar.ini, /etc/php.d/20-ctype.ini, /etc/php.d/20-curl.ini, /etc/php.d/20-dom.ini, /etc/php.d/20-encoding.ini, /etc/php.d/20-fileinfo.ini, /etc/php.d/20-filter.ini, /etc/php.d/20-gettext.ini, /etc/php.d/20-iconv.ini, /etc/php.d/20-imagick.ini, /etc/php.d/20-ldap.ini, /etc/php.d/20-libxml.ini, /etc/php.d/20-mbstring.ini, /etc/php.d/20-mcrypt.ini, /etc/php.d/20-mysqlnd.ini, /etc/php.d/20-pdo.ini, /etc/php.d/20-phar.ini, /etc/php.d/20-simplexml.ini, /etc/php.d/20-sockets.ini, /etc/php.d/20-sqlite3.ini, /etc/php.d/20-tokenizer.ini, /etc/php.d/20-xml.ini, /etc/php.d/20-xmlwriter.ini, /etc/php.d/20-xsl.ini, /etc/php.d/30-mysql.ini, /etc/php.d/30-pdo_mysql.ini, /etc/php.d/30-pdo_sqlite.ini, /etc/php.d/30-xmlreader.ini
PHP API	20200930
PHP Extension	20200930
Zend Extension	42020930
Zend Extension Build	API42020930.NTS

- Custom PHP sample page

```
# sudo vi /var/www/html/index.php
```

-----code-----

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Brainwave Matrix Solutions - Internship</title>
  <style>
    body {
      font-family: Arial, sans-serif;
      background-color: #f5f7fa;
      color: #333;
      margin: 0;
      padding: 40px;
    }
    .container {
      background-color: #ffffff;
      padding: 30px;
      max-width: 800px;
      margin: auto;
      border-radius: 8px;
      box-shadow: 0 2px 8px rgba(0,0,0,0.1);
    }
    h1 {
      color: #0056b3;
    }
    .task {
      background-color: #eaf4ff;
      border-left: 6px solid #007acc;
      padding: 15px;
```

```
margin-top: 20px;
border-radius: 4px;
}
```

```
footer {
  text-align: center;
  margin-top: 40px;
  font-size: 0.9em;
  color: #777;
}
```

```
</style>
```

```
</head>
```

```
<body>
```

```
<div class="container">
```

```
<h1>Brainwave Matrix Solutions</h1>
```

```
<h2>Internship Program</h2>
```

```
<p>Welcome! This page is part of the initial setup for my internship at <strong>Brainwave
Matrix Solutions</strong>.</p>
```

```
<div class="task">
```

```
<h3>📌 First Task: Web Application Deployment</h3>
```

```
<p><strong>Objective:</strong> Deploy a simple web application on a Red Hat Enterprise
Linux (RHEL) EC2 instance hosted on AWS.</p>
```

```
<p><strong>Environment:</strong> RHEL 9, Apache, PHP, AWS EC2</p>
```

```
<p><strong>Status:</strong> ✅ Completed Successfully</p>
```

```
</div>
```

```
<p>This deployment includes setting up the EC2 instance, installing and configuring Apache
and PHP, deploying this PHP page, and ensuring public accessibility through the instance's public
IP.</p>
```

```
<footer>
```

```
&copy; <?= date('Y') ?> Shanil Ahmed – Brainwave Matrix Solutions Internship
```

```
</footer>
```

</div>

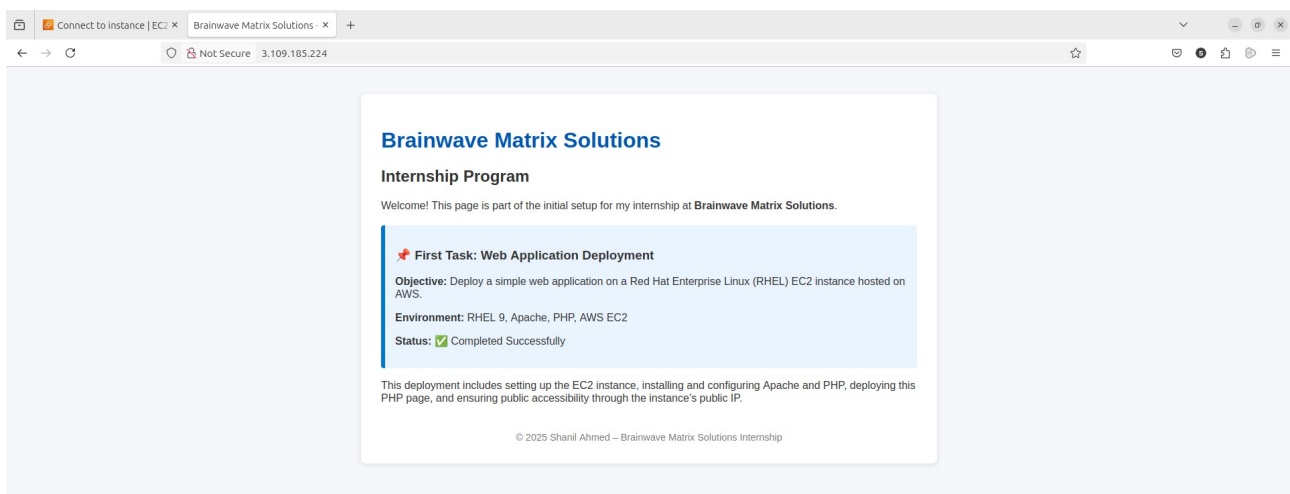
</body>

</html>

- Restart Apache
sudo systemctl restart httpd
- Access PHP App in Browser
<http://3.109.185.224/>

```
root@ip-172-31-46-14~  
!DOCTYPE html>  
<html lang="en">  
<head>  
  <meta charset="UTF-8">  
  <title>Brainwave Matrix Solutions - Internship</title>  
  <style>  
    body {  
      font-family: Arial, sans-serif;  
      background-color: #f5f7fa;  
      color: #333;  
      margin: 0;  
      padding: 40px;  
    }  
    .container {  
      background-color: #ffffff;  
      padding: 30px;  
      max-width: 800px;  
      margin: auto;  
      border-radius: 8px;  
      box-shadow: 0 2px 8px rgba(0,0,0,0.1);  
    }  
    h1 {  
      color: #0056b3;  
    }  
    .task {  
      background-color: #eaf4ff;  
      border-left: 6px solid #007acc;  
      padding: 15px;  
      margin-top: 20px;  
      border-radius: 4px;  
    }  
    footer {  
      text-align: center;  
      margin-top: 40px;  
      font-size: 0.9em;  
      color: #777;  
    }  
  </style>  
</head>  
<body>  
  <div class="container">  
    <h1>Brainwave Matrix Solutions</h1>  
    <h2>Internship Program</h2>  
    <p>Welcome! This page is part of the initial setup for my internship at <strong>Brainwave Matrix Solutions</strong>.</p>  
  </div>  
</body>
```

```
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]# vi /var/www/html/index.php  
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]# sudo systemctl restart httpd  
[root@ip-172-31-46-14 ~]#  
[root@ip-172-31-46-14 ~]#
```



5. Outcome

- The web app is accessible at <http://3.109.185.224/>
- Web server is running and starts automatically on boot

6. Conclusion

This project successfully demonstrates the deployment of a web application on a cloud-based RHEL instance. It covers essential cloud practices including server provisioning, package installation, configuration, and basic application deployment on AWS.
