Web Server & APP server

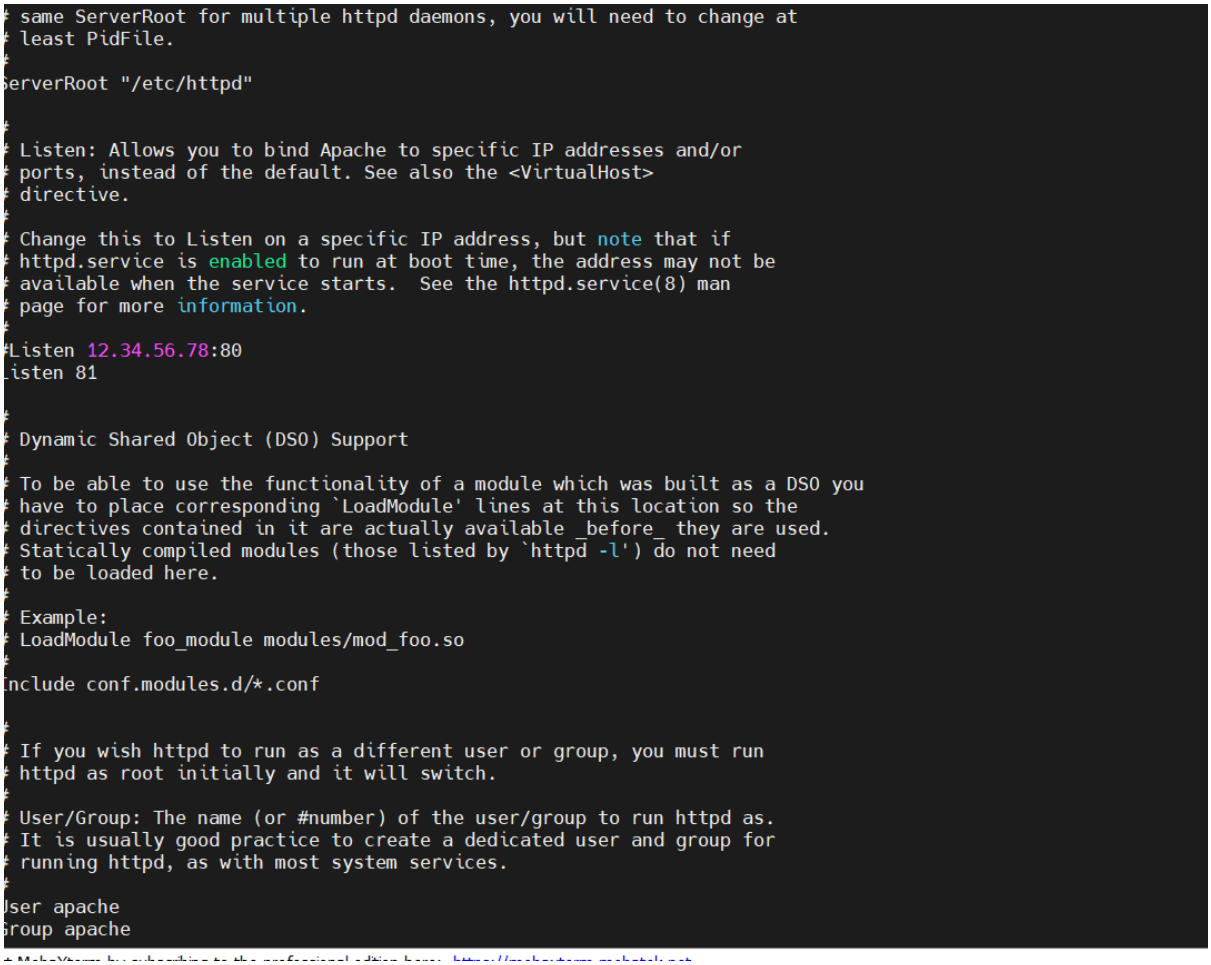
(TASK)

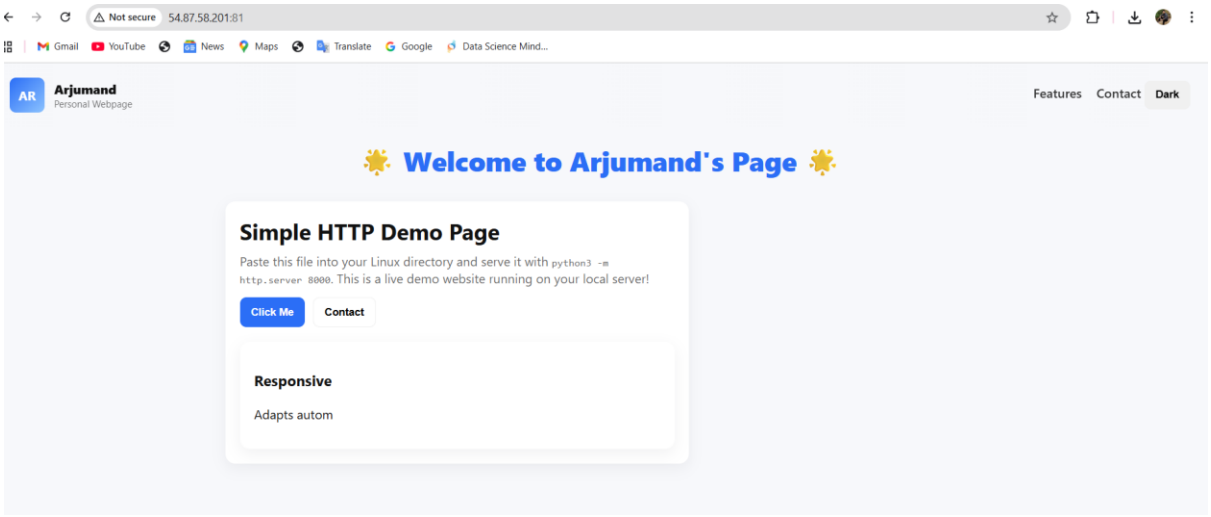
1. Install Apache and run Apache on port number 82

Installed apache using command sudo apt install then systemctl start then systemctl status. Changed the port : find the path using command ‘find / -n httpd.conf then ‘vi path then chage the port number

2. Deploy a sample index.html file on Apache.

After changing the port number copy public id and paste it on web along with the code. Then created file in this mention ed path ‘/var/www/html, then vi index.html edit webserver html code close it then restart apache using systemctl restart httpd. Then refresh the page.

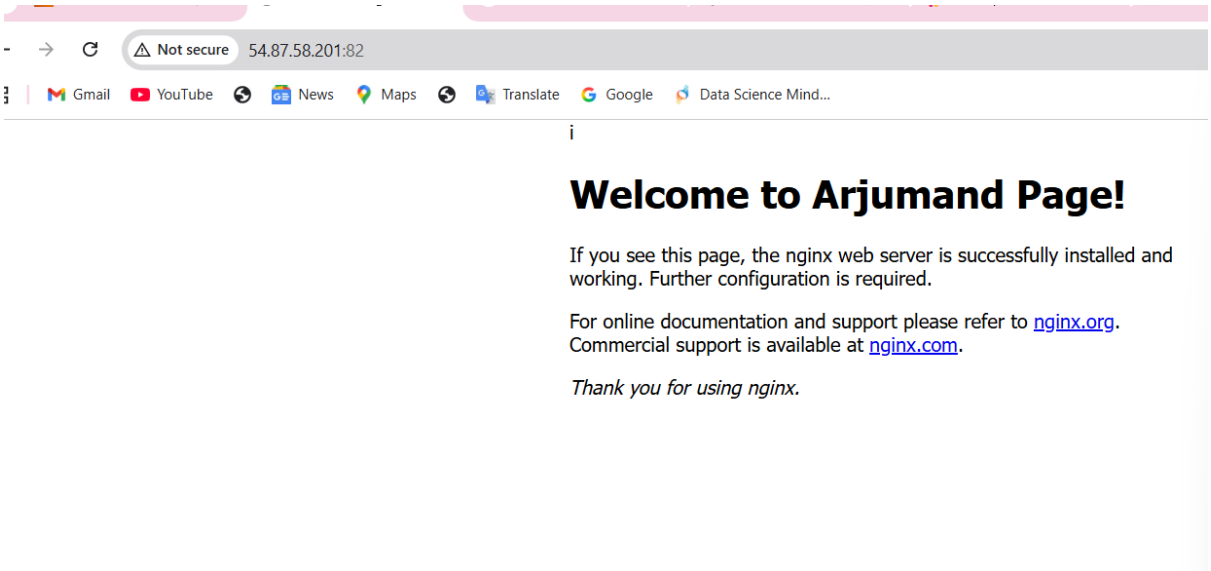


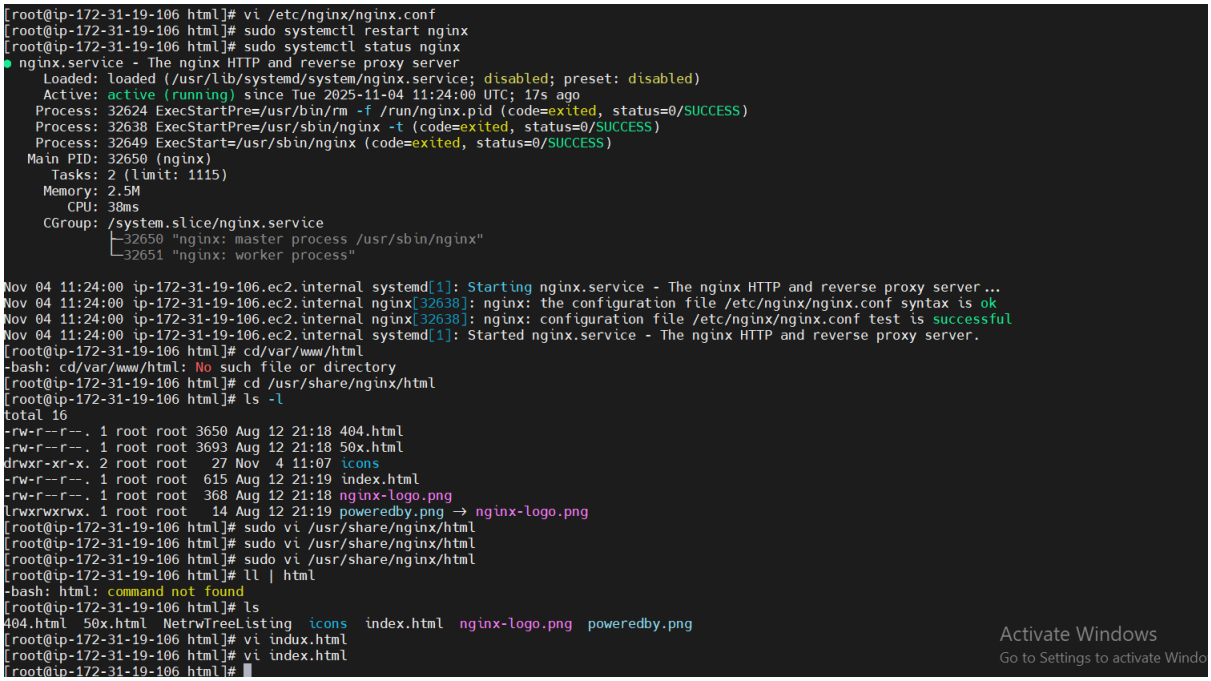


1. Install nginx and run nginx on port number 81.
2. Installed nginx using command sudo apt install then systemctl start then systemctl status. Changed the port : find the path using command ‘find / -n httpd.conf then ‘vi path then change the port number

3. Deploy a sample index.html file on nginx.

After changing the port number copy public id and paste it on web along with the code. Then vi index.html edit webserver html code close it then restart nginx using systemctl restart httpd. Then refresh the page.





5.Install Apache tomcat on port number 8082

change port in server.xml

Go to the Tomcat configuration directory

cd /opt/apache-tomcat-9.0.111/conf

Open the server.xml file using vi

vi server.xml

Search for the Connector port line

Inside vi, type:

/Connector port

and press Enter to jump to the port line.

You will see something like:

<Connector port="8080" protocol="HTTP/1.1"

Edit the port number

Move the cursor to 8080

Press i to enter insert mode

Change 8080 → 8082

<Connector port="8082" protocol="HTTP/1.1"

Save and Exit

Press Esc

Then type:

:wq

Press Enter

Restart Tomcat to apply changes

cd /opt/apache-tomcat-9.0.111/bin

./shutdown.sh

./startup.sh

Verify Tomcat is listening on new port

ss -tulpn | grep 8082

or open in browser:

http://<SERVER_PUBLIC_IP>:8082

start

/opt/apache-tomcat-9.0.111/bin/startup.sh

- Deploy a sample app on webapps

Procedure: Deploy a Sample Application on Tomcat Webapps

Go to the Tomcat webapps directory

cd /opt/apache-tomcat-9.0.111/webapps

Create a new application folder

mkdir sample

Move inside the newly created application directory

cd sample

Create an index.jsp file using vi

vi index.jsp

Press i to enter insert mode and paste sample JSP content**

<!DOCTYPE html>

<html>

<body>

<h1>Tomcat Application Running Successfully</h1>

</body>

</html>

Save and Exit the file

Press Esc

Type:

:wq

Press Enter

Restart Tomcat to load the new application

cd /opt/apache-tomcat-9.0.111/bin

./shutdown.sh

./startup.sh

Verify the application in browser

http://<server-public-ip>:8082/sample/

- Create a tomcat.service file for tomcat.

Procedure: Create & Enable tomcat.service File

Create a new service file for Tomcat

sudo vi /etc/systemd/system/tomcat.service

Press i to enter insert mode, then paste the following:

[Unit]

Description=Apache Tomcat Server

After=network.target

[Service]

Type=forking

Environment=CATALINA_HOME=/opt/apache-tomcat-9.0.111

Environment=CATALINA_BASE=/opt/apache-tomcat-9.0.111

Environment=CATALINA_PID=/opt/apache-tomcat-9.0.111/temp/tomcat.pid

ExecStart=/opt/apache-tomcat-9.0.111/bin/startup.sh

ExecStop=/opt/apache-tomcat-9.0.111/bin/shutdown.sh

Restart=on-failure

[Install]

WantedBy=multi-user.target

Save and exit

Press Esc

Type:

:wq

Press Enter

Reload systemd to recognize the new service

sudo systemctl daemon-reload

Enable Tomcat to start on boot

sudo systemctl enable tomcat

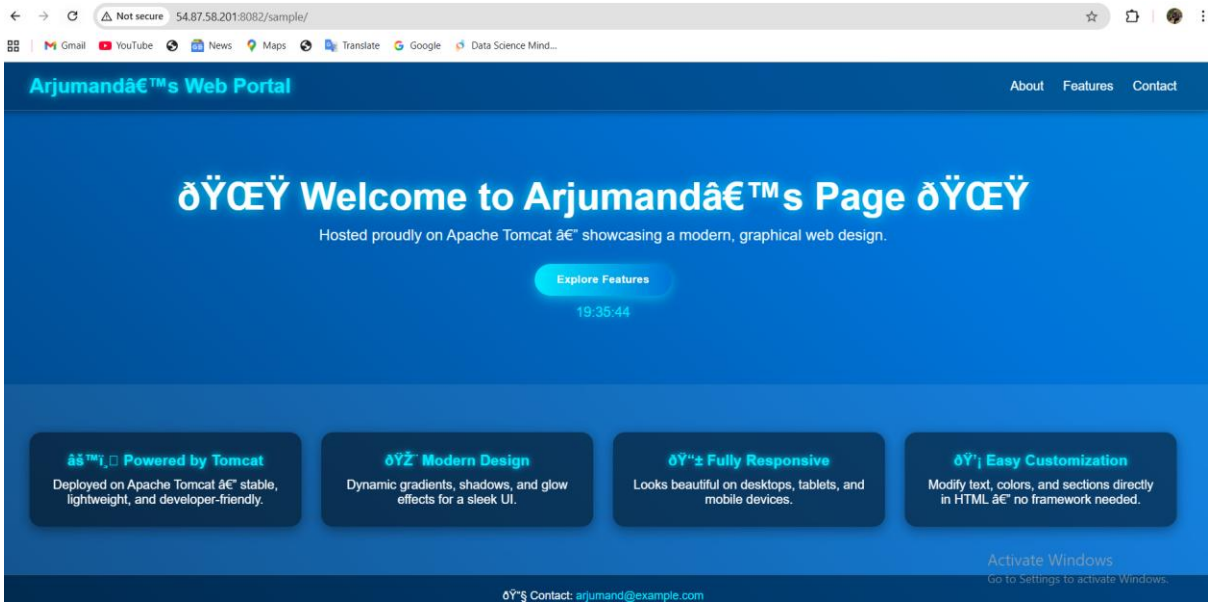
Start Tomcat service

sudo systemctl start tomcat

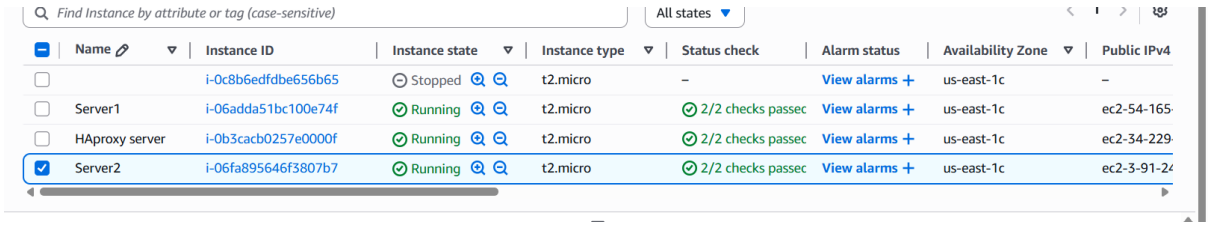
Check service status

sudo systemctl status tomcat

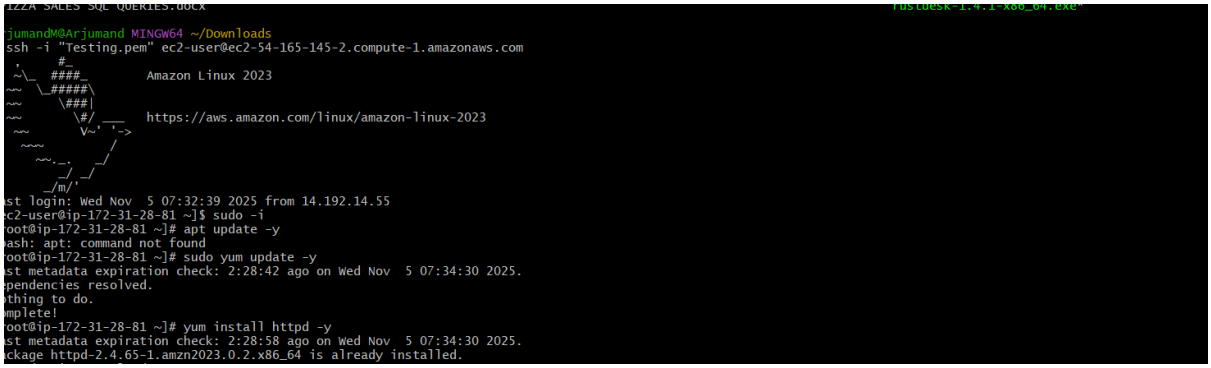
```
Tomcat started.
[root@ip-172-31-19-106 bin]# cd ..
[root@ip-172-31-19-106 apache-tomcat-9.0.111]# ls
BUILDING.txt  CONTRIBUTING.md  LICENSE  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  bin  conf  lib  logs  temp  webapps  work
[root@ip-172-31-19-106 apache-tomcat-9.0.111]# cd webapps
[root@ip-172-31-19-106 webapps]# ls -1
ROOT
docs
examples
host-manager
manager
sample
[root@ip-172-31-19-106 webapps]# cd sample
[root@ip-172-31-19-106 sample]# ni index.jsp
-bash: ni: command not found
[root@ip-172-31-19-106 sample]# vi index.jsp
[root@ip-172-31-19-106 sample]# cd ..
[root@ip-172-31-19-106 webapps]# ls
ROOT  docs  examples  host-manager  manager  sample
[root@ip-172-31-19-106 webapps]# cd ..
[root@ip-172-31-19-106 apache-tomcat-9.0.111]# ls
BUILDING.txt  CONTRIBUTING.md  LICENSE  NOTICE  README.md  RELEASE-NOTES  RUNNING.txt  bin  conf  lib  logs  temp  webapps  work
[root@ip-172-31-19-106 apache-tomcat-9.0.111]# cd bin
[root@ip-172-31-19-106 bin]# ls
```



- **8. Configure HA Proxy server**
  Launch 3 ec2 instances name as Server1, Server-2, HA-Proxy-Server.



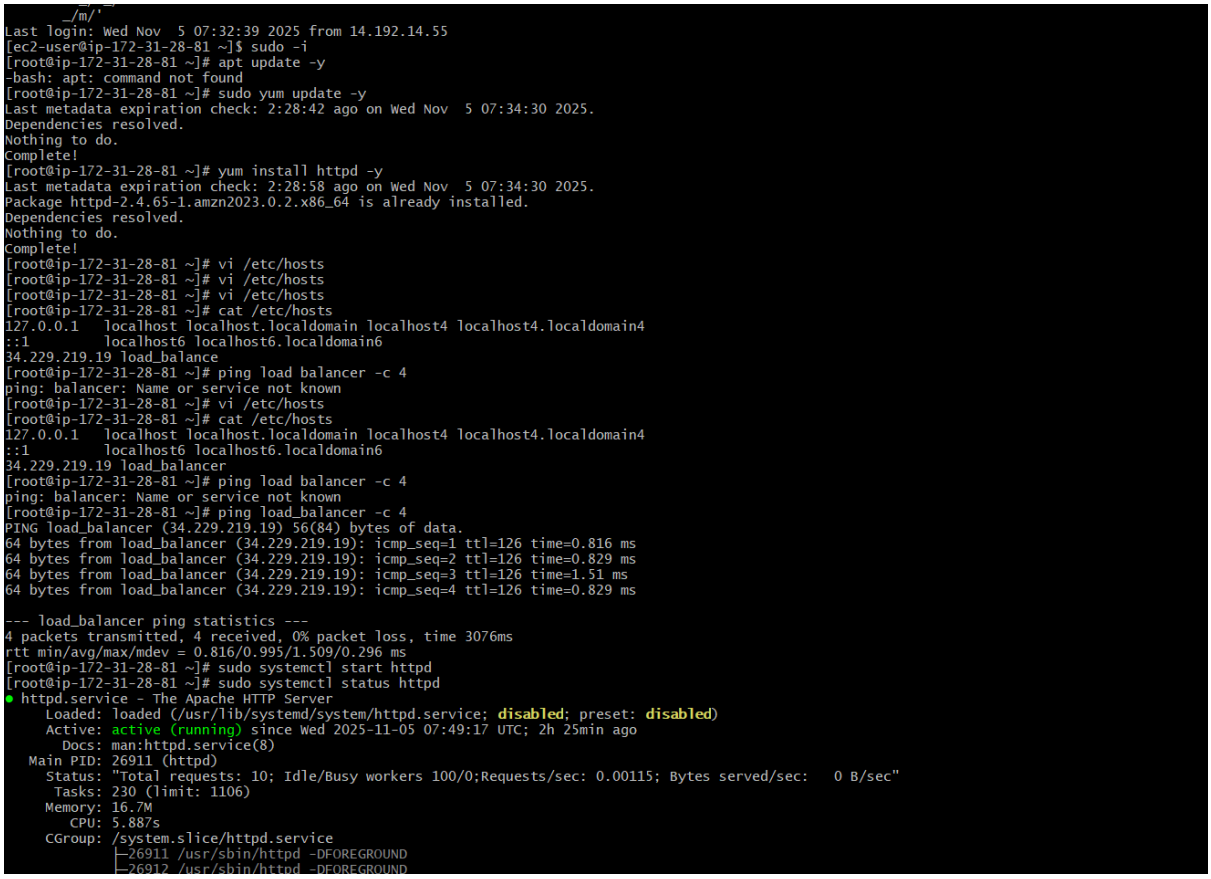
- Executed following command to Access the Server-1
- ssh -i your-key.pem ec2-user@Pubipaddress of Server-1 instance

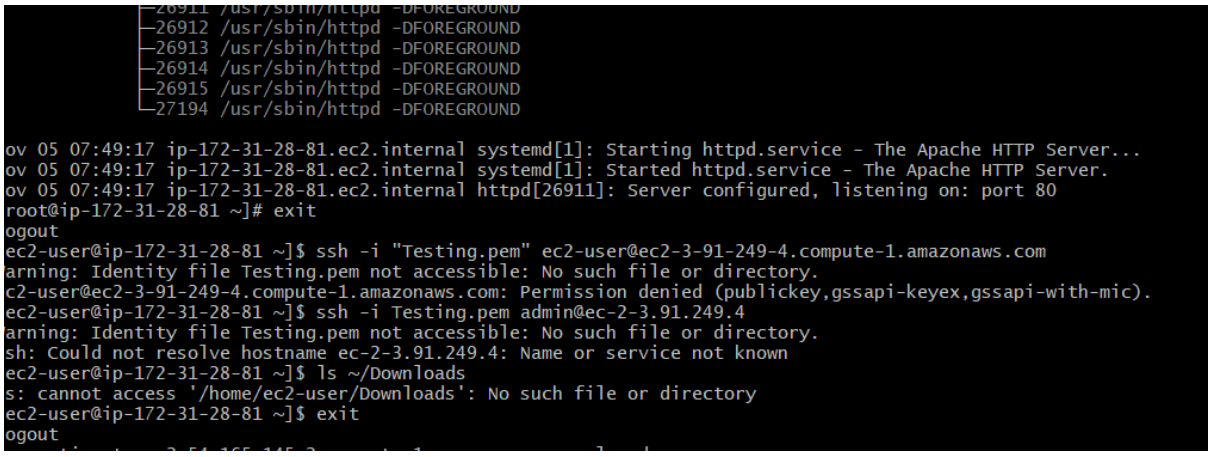


- sudo -i

- yum update -y
- Yum install httpd -y
- Vi /etc/hosts
- Add HA-Proxy-Server Pubic IP Address
- Run below command on Server-1
- ping load_balancer -c 4
- systemctl start httpd
- systemctl status httpd
- Browse with Server-1 Public IP address:80 it will work

  Server-2 Steps:





rowse with Server-1 Public IP address:80 it will work

Server-2 Steps:

Run following command to Access Server-2

- ssh -i your-key.pem ec2-user@Pubipaddress of Server-2 instance
- sudo -i

```
rjumandM@Arjumand MINGW64 ~/Downloads
$ ssh -i "Testing.pem" ec2-user@ec2-3-91-249-4.compute-1.amazonaws.com
The authenticity of host 'ec2-3-91-249-4.compute-1.amazonaws.com (3.91.249.4)' can't be established.
ED25519 key fingerprint is SHA256:4tS/M6NkIAR4XOpjN4JYObx1Qg4P7dylUVcZ9Gi3P8U.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-91-249-4.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
ast login: Wed Nov  5 08:05:52 2025 from 14.192.14.50
ec2-user@ip-172-31-19-195 ~]$ sudo n -i
udo: n: command not found
ec2-user@ip-172-31-19-195 ~]$ yum update -y
rror: This command has to be run with superuser privileges (under the root user on most systems).
ec2-user@ip-172-31-19-195 ~]$ sudo apt  update -y
udo: apt: command not found
ec2-user@ip-172-31-19-195 ~]$ sudo yum update -y
ast metadata expiration check: 2:11:03 ago on Wed Nov  5 08:16:29 2025.
ependencies resolved.
othing to do.
omplete!
```

- yum update -y
- yum install nginx -y
- sudo amazon-linux-extras install nginx1 -y

```
ec2-user@ip-172-31-19-195 ~]$ sudo n -i
udo: n: command not found
ec2-user@ip-172-31-19-195 ~]$ yum update -y
rror: This command has to be run with superuser privileges (under the root user on most systems).
ec2-user@ip-172-31-19-195 ~]$ sudo apt  update -y
udo: apt: command not found
ec2-user@ip-172-31-19-195 ~]$ sudo yum update -y
ast metadata expiration check: 2:11:03 ago on Wed Nov  5 08:16:29 2025.
ependencies resolved.
othing to do.
omplete!
ec2-user@ip-172-31-19-195 ~]$ sudo yum install nginx -y
ast metadata expiration check: 2:11:26 ago on Wed Nov  5 08:16:29 2025.
ackage nginx-1:1.28.0-1.amzn2023.0.2.x86_64 is already installed.
ependencies resolved.
othing to do.
omplete!
ec2-user@ip-172-31-19-195 ~]$ vi /etc/hosts
ec2-user@ip-172-31-19-195 ~]$ cd etc
ash: cd: etc: No such file or directory
ec2-user@ip-172-31-19-195 ~]$ ls
ec2-user@ip-172-31-19-195 ~]$ chmod 777 hosts
hmod: cannot access 'hosts': No such file or directory
ec2-user@ip-172-31-19-195 ~]$ cd /etc
ec2-user@ip-172-31-19-195 etc]$ ls
IR_COLORS              bashrc                  csh.cshrc      gcrypt              hosts          libaudit.conf  modprobe.d      pam.d       rc2.d       security      subuid-          vimrc
IR_COLORS.lightbgcolor bindresvport.blacklist  csh.login      gnupg               idmapd.conf    libibverbs.d   modules-load.d  passwd      rc3.d       selinux       sudo.conf        virc
EP_COLORS              binfmt.d                dbus-1         groff               image-id       libnl          motd            passwd-     rc4.d       services      sudoers          wgetrc
etworkManager          chkconfig.d             default        group               init.d         libreport      motd.d          pkcs11      rc5.d       sestatus.conf sudoers.d        xattr.conf
11                     chrony.conf             depmod.d       group-              inittab        libuser.conf   mtab            pkgconfig   rc6.d       shadow        sysconfig        xdg
pi                     chrony.d                dhcp           grub.d              inputrc        locale.conf    nanorc          pki         request-key.conf shadow-     sysctl.conf      yum.repos.d
ijtime                 chrony.keys             dnf            grub2-efi.cfg       issue          localtime      netconfig       pm          request-key.d shells         sysctl.d
liases                 cifs-utils              dracut.conf    grub2.cfg           issue.net      login.defs     networks        popt.d      resolv.conf   skel           system-release
lternatives            cloud                   dracut.conf.d  gshadow             kernel         logrotate.conf nfs.conf        printcap    rpc           ssh            system-release-cpe
mazon                  cron.daily              environment    gshadow-            keyutils       logrotate.d    nfsmount.conf   profile     rpm           ssl            systemd
mazon-linux-release    cron.hourly             ethertypes     gss                 krb5.conf      lsm            nginx           profile.d   rsyncd.conf   sssd           terminfo
mazon-linux-release-cpe cron.monthly           exports        gssproxy            krb5.conf.d    machine-id     nsswitch.conf   protocols   rsyslog.d     statetab.d     tmpfiles.d
.deny                  cron.weekly             exports.d      hibinit-config.cfg  ld.so.cache    magic          openldap        rc.d        rwtab.d       subgid         trusted-key.key
dit                    crontab                 filesystems    host.conf           ld.so.conf     man_db.conf    opt             rc0.d       sasl2         subgid-        udev
sh_completion.d        crypto-policies         fstab          hostname            ld.so.conf.d   mke2fs.conf    os-release      rc1.d       screenrc      subuid         update-motd.d
ec2-user@ip-172-31-19-195 etc]$ chmod 777 hosts
hmod: changing permissions of 'hosts': Operation not permitted
ec2-user@ip-172-31-19-195 etc]$ sudo chmod 777 hosts
```


- vi /etc/hosts
- Add HA-Proxy-Server Pubic IP Address

Run below command on Server-2

ping load_balancer -c 4

- systemctl start nginx
- systemctl status nginx

Browse with Server-2 Public IP address:80 it will work

```
ec2-user@ip-172-31-19-195 ~]$ cd /etc
ec2-user@ip-172-31-19-195 etc]$ ls
OIR_COLORS                bashrc                  csh.cshrc      gcrypt             hosts          libaudit.conf  modprobe.d     pam.d      rc2.d            security
OIR_COLORS.lightbgcolor   bindresvport.blacklist  csh.login      gnupg              idmapd.conf    libibverbs.d   modules-load.d  passwd     rc3.d            selinux
REP_COLORS                binfmt.d                dbus-1         groff              image-id       libnl          motd           passwd-    rc4.d            services
etworkManager             chkconfig.d             default        group              init.d         libreport      motd.d         pkcs11     rc5.d            sestatus.conf
11                        chrony.conf             depmod.d       group-             inittab        libuser.conf   mtab           pkgconfig  rc6.d            shadow
cpi                       chrony.d                dhcp           grub.d             inputrc        locale.conf    nanorc         pki        request-key.conf  shadow-
djtime                    chrony.keys             dnf            grub2-efi.cfg      issue          localtime      netconfig      pm         request-key.d    shells
liases                    cifs-utils              dracut.conf    grub2.cfg          issue.net      login.defs     networks       popt.d     resolv.conf      skel
lternatives               cloud                   dracut.conf.d  gshadow            kernel         logrotate.conf nfs.conf       printcap   rpc              ssh
mazon                     cron.daily              environment    gshadow-           keyutils       logrotate.d    nfsmount.conf  profile    rpm              ssl
mazon-linux-release       cron.hourly             ethertypes     gss                krb5.conf      lsm            nginx          profile.d  rsyncd.conf      sssd
mazon-linux-release-cpe   cron.monthly            exports        gssproxy           krb5.conf.d    machine-id     nsswitch.conf  protocols  rsyslog.d        statetab.d
t.deny                    cron.weekly             exports.d      hibinit-config.cfg ld.so.cache    magic          openldap       rc.d       rwtab.d          subgid
udit                      crontab                 filesystems    host.conf          ld.so.conf     man_db.conf    opt            rc0.d      sasl2            subgid-
ash_completion.d          crypto-policies         fstab          hostname           ld.so.conf.d   mke2fs.conf    os-release     rc1.d      screenrc         subuid
ec2-user@ip-172-31-19-195 etc]$ chmod 777 hosts
hmod: changing permissions of 'hosts': Operation not permitted
ec2-user@ip-172-31-19-195 etc]$ sudo chmod 777 hosts
ec2-user@ip-172-31-19-195 etc]$ vi /etc/hosts
ec2-user@ip-172-31-19-195 etc]$ cat /etc/hosts
27.0.0.1   localhost localhost.localdomain localhost4 localhost4.localdomain4
:1         localhost6 localhost6.localdomain6
4.229.219.19 load_balancer
ec2-user@ip-172-31-19-195 etc]$ sudo systemctl start nginx
ec2-user@ip-172-31-19-195 etc]$ sudo systemctl satus nginx
nknown command verb satus.
ec2-user@ip-172-31-19-195 etc]$ sudo systemctl status nginx
● nginx.service - The nginx HTTP and reverse proxy server
     Loaded: loaded (/usr/lib/systemd/system/nginx.service; disabled; preset: disabled)
     Active: active (running) since Wed 2025-11-05 10:34:35 UTC; 39s ago
    Process: 31030 ExecStartPre=/usr/bin/rm -f /run/nginx.pid (code=exited, status=0/SUCCESS)
    Process: 31031 ExecStartPre=/usr/sbin/nginx -t (code=exited, status=0/SUCCESS)
    Process: 31032 ExecStart=/usr/sbin/nginx (code=exited, status=0/SUCCESS)
   Main PID: 31033 (nginx)
      Tasks: 2 (limit: 1106)
     Memory: 2.5M
        CPU: 40ms
     CGroup: /system.slice/nginx.service
             ├─31033 "nginx: master process /usr/sbin/nginx"
             └─31034 "nginx: worker process"

ov 05 10:34:35 ip-172-31-19-195.ec2.internal systemd[1]: Starting nginx.service - The nginx HTTP and reverse proxy server...
ov 05 10:34:35 ip-172-31-19-195.ec2.internal nginx[31031]: nginx: the configuration file /etc/nginx/nginx.conf syntax is ok
ov 05 10:34:35 ip-172-31-19-195.ec2.internal nginx[31031]: nginx: configuration file /etc/nginx/nginx.conf test is successful
ov 05 10:34:35 ip-172-31-19-195.ec2.internal systemd[1]: Started nginx.service - The nginx HTTP and reverse proxy server.
ec2-user@ip-172-31-19-195 etc]$ ping load_balancer -c 4
ING load_balancer (34.229.219.19) 56(84) bytes of data.
4 bytes from load_balancer (34.229.219.19): icmp_seq=1 ttl=126 time=0.413 ms
4 bytes from load_balancer (34.229.219.19): icmp_seq=2 ttl=126 time=0.751 ms
4 bytes from load_balancer (34.229.219.19): icmp_seq=3 ttl=126 time=0.856 ms
4 bytes from load_balancer (34.229.219.19): icmp_seq=4 ttl=126 time=0.609 ms
```

HA-Proxy-Server Steps:

Run following command to Access HA-Proy-Server

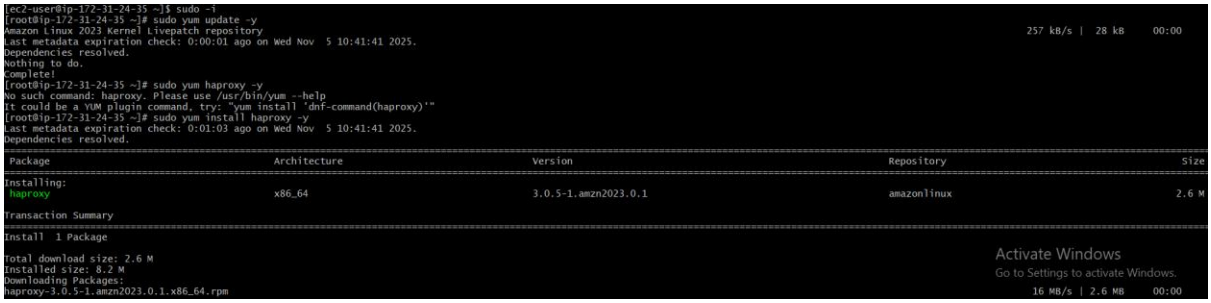
•ssh -i your-key.pem ec2-user@Pubipaddress of HA-Proxy-Server instance

•sudo -i

```
$ ssh -i "Testing.pem" ec2-user@ec2-34-229-219-19.compute-1.amazonaws.com
Warning: Identity file Testing.pem not accessible: No such file or directory.
The authenticity of host 'ec2-34-229-219-19.compute-1.amazonaws.com (34.229.219.19)' can't be established.
ED25519 key fingerprint is SHA256:JiPAg8PN9NnPOpEB/yt8OoLJyuP3UEtYOQp2U+oi6bg.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-34-229-219-19.compute-1.amazonaws.com' (ED25519) to the list of known hosts.
ec2-user@ec2-34-229-219-19.compute-1.amazonaws.com: Permission denied (publickey,gssapi-keyex,gssapi-with-mic).

ArjumandM@Arjumand MINGW64 ~
$ ls
-1.14-windows.xml                    Downloads/              'My Documents'@                                                                                  PDFEditor/      Te
AppData/                             Favorites/              NTUSER.DAT                                                                                       PrintHood@      Un
'Application Data'@                  IntelGraphicsProfiles/  NTUSER.DAT{b629523a-76c1-11f0-a434-b6a920bdc558}.TM.blf                                          Recent@         Un
Coffee_Shop_Sales_202508090205.csv   Links/                 'Local Settings'@        NTUSER.DAT{b629523a-76c1-11f0-a434-b6a920bdc558}.TMContainer00000000000000000001.regtrans-ms  'Saved Games'/  Un
Contacts/                            Microsoft/              NetHood@                 NTUSER.DAT{b629523a-76c1-11f0-a434-b6a920bdc558}.TMContainer00000000000000000002.regtrans-ms  Searches/       Un
Cookies@                             Music/                  OneDrive/                                                                                        SendTo@         Vi
Documents/                                                                                                                                                    'Start Menu'@   'Vi

ArjumandM@Arjumand MINGW64 ~
$ cd Downloads

ArjumandM@Arjumand MINGW64 ~/Downloads
$ ssh -i "Testing.pem" ec2-user@ec2-34-229-219-19.compute-1.amazonaws.com
   ,     #_
   ~\_  ####_        Amazon Linux 2023
  ~~  \_#####\
  ~~     \###|
  ~~       \#/ ___   https://aws.amazon.com/linux/amazon-linux-2023
   ~~       V~' '->
    ~~~         /
      ~~._.   _/
         _/ _/
       _/m/'
```

•yum update -y

•yum install haproxy -y



•vi /etc/hosts

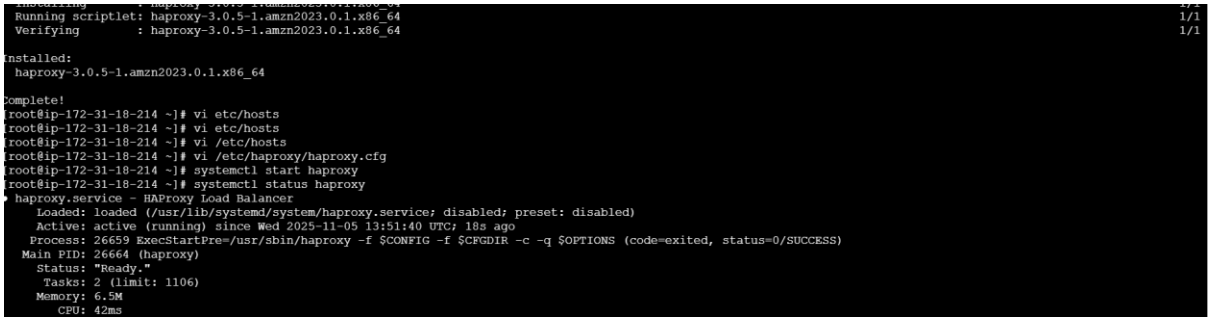
•Add Server-1, Server-2 Public IP's

•vi /etc/haproxy/haproxy.cfg

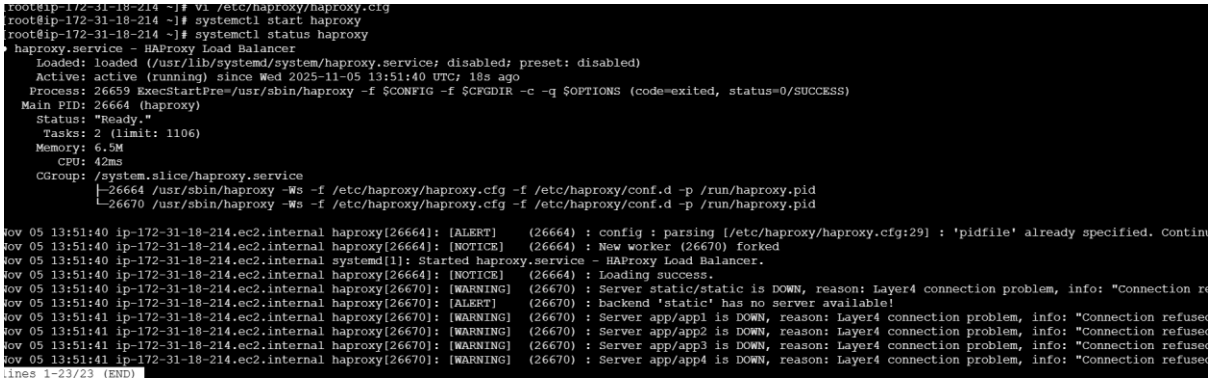
•Add Server-1, Server-2 public IP's

•systemctl enable haproxy

•systemctl start haproxy



•systemctl status haproxy



•now browse with HA-Proxy-Server PublicIP:80 it will distribute load to

Welcome to nginx!

If you see this page, the nginx web server is successfully installed and working. Further configuration is required.

For online documentation and support please refer to nginx.org.
Commercial support is available at nginx.com.

Thank you for using nginx.