

Cloud Assignment

Koganti Ramya

1. EC2 Instances

Steps:

1. Open AWS and under search box select EC2
2. Click on launch instance
3. Now enter name of your machine (Machine1-Ramya)
4. Under AMI select Amazon Linux
5. under instance type select t2.micro
6. Under key pair >> create a new key pair (TOKYO.pem)
7. Under firewall security group click on create security group
8. And click on launch instance
9. Repeat the same process and create one more instance (Machine2-Koganti)

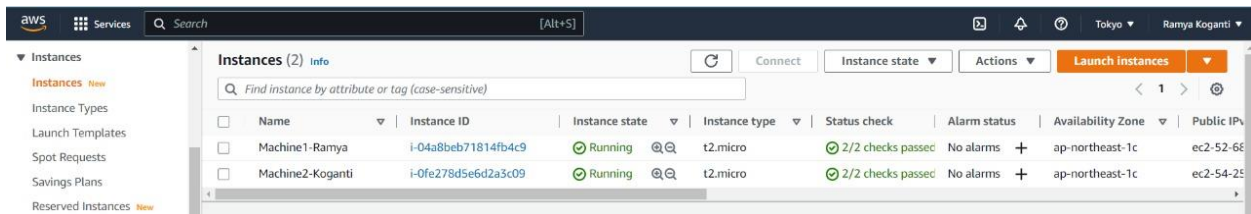


Fig1:Ec2 instances

10. Steps to connect to ec2 machines.

- Select machine1 under instances tab and click on connect.
- Under connect to instance select SSH client
- Now copy the ssh command shown under example
- Now go to the .pem file location directory and open command prompt terminal
- Now paste the ssh command and click on enter
- Type yes to connect and you can see your Machine1-Ramya instance running

Cloud Assignment

Koganti Ramya

```
root@ip-172-31-12-162/home/ec2-user
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\WINDOWS\system32> cd "C:\Users\Krish\Desktop\key"
PS C:\Users\Krish\Desktop\key> ssh -i "Ramya.pem" ec2-user@ec2-52-68-236-67.ap-northeast-1.compute.amazonaws.com
The authenticity of host 'ec2-52-68-236-67.ap-northeast-1.compute.amazonaws.com (52.68.236.67)' can't be established.
ECDSA key fingerprint is SHA256:EvkPm/C8ya5ZhlPvWjMpb1713EoX3uc4V/mxuzw.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-52-68-236-67.ap-northeast-1.compute.amazonaws.com,52.68.236.67' (ECDSA) to the list of known hosts.

  _   _          _
 | | | |        | |
 | |_| |       | |
 |  _  |       | |
 | |_) |       | |
 |___|_|       |_|
              _/ _/
             /_/_/

Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
1 package(s) needed for security, out of 1 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-12-162 ~]$ sudo su
[root@ip-172-31-12-162 ec2-user]#
```

Fig2.Machine1-Ramya

```
root@ip-172-31-3-121/home/ec2-user
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\WINDOWS\system32> cd "C:\Users\Krish\Desktop\key"
PS C:\Users\Krish\Desktop\key> ssh -i "Ramya.pem" ec2-user@ec2-54-250-171-159.ap-northeast-1.compute.amazonaws.com
The authenticity of host 'ec2-54-250-171-159.ap-northeast-1.compute.amazonaws.com (54.250.171.159)' can't be established.
ECDSA key fingerprint is SHA256:nly2010X30g059Uzup4R14310a1bwC0SKW.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-54-250-171-159.ap-northeast-1.compute.amazonaws.com,54.250.171.159' (ECDSA) to the list of known hosts.

  _   _          _
 | | | |        | |
 | |_| |       | |
 |  _  |       | |
 | |_) |       | |
 |___|_|       |_|
              _/ _/
             /_/_/

Amazon Linux 2 AMI

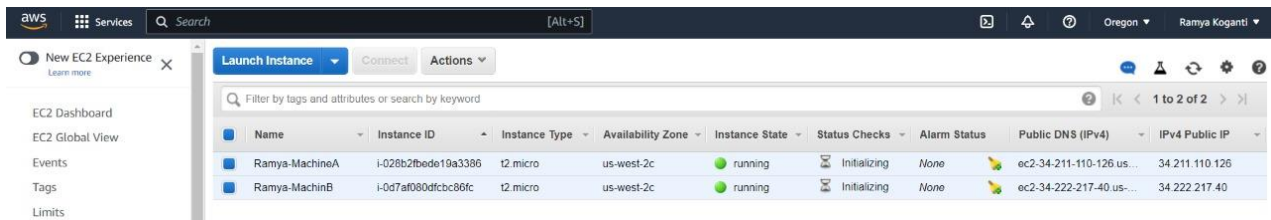
https://aws.amazon.com/amazon-linux-2/
1 package(s) needed for security, out of 1 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-3-121 ~]$ sudo su
[root@ip-172-31-3-121 ec2-user]#
```

Fig3.Machine2- Koganti

2. EBS volume

Steps:

1. When Ever you want to provide an extra storage to your machine you opt for this Elastic Block store (EBS).
2. Created Two machines Ramya-Machine A and Ramya-Machine B in Oregon region.



Name	Instance ID	Instance Type	Availability Zone	Instance State	Status Checks	Alarm Status	Public DNS (IPv4)	IPv4 Public IP
Ramya-MachineA	i-028b2fbede19a3386	t2.micro	us-west-2c	running	Initializing	None	ec2-34-211-110-126 us...	34.211.110.126
Ramya-MachinB	i-0d7af080dfbc86fc	t2.micro	us-west-2c	running	Initializing	None	ec2-34-222-217-40 us...	34.222.217.40

Fig4: Instances for EBS

3. Under EBS select volumes and you can see default storage allocated for your EC2 machines.

4. Now click on create volume

- Under volume type select any type you want (General purpose SSD (gp2))
- Under size select the amount of GB (1GB)

Cloud Assignment

Koganti Ramya

- Under Availability zone you can select available zone in which your instance got created.
- Now click on create volume.
- Now click on volumes and you can see all volumes and newly created EBS.
- Now select the EBS and click on actions and click on attach volume.
- Under Basic details select your instance and click on attach volume.

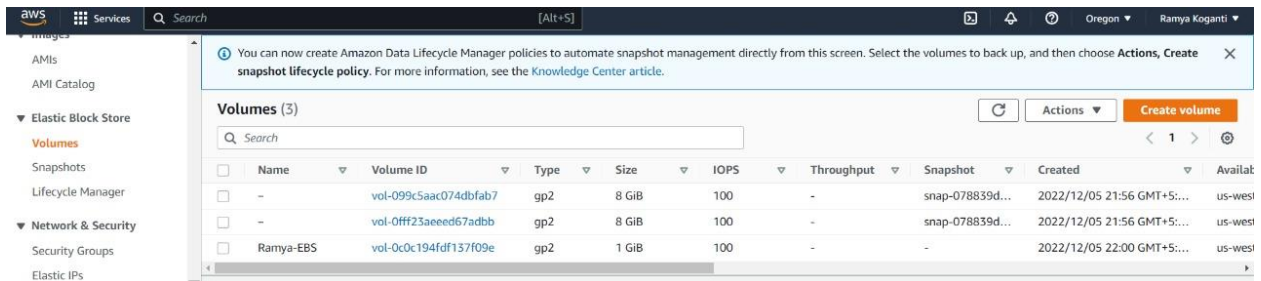


Fig5: EBS volume of 1GB

6. Now log on to Ramya-MachineA and make a file system and mount it.

- lsblk – to list all file systems
- mkdir to create a storage directory
- mkfs -t xfs /dev/sdf
- mount -t xfs /dev/sdf storage
- created a storage directory named Ramya-Storage
- mounted it to file system and created ten .txt files in it
- umounted the file system.

```

root@ip-172-31-7-187:/home/ec2-user
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\WINDOWS\system32> cd %USERPROFILE%\Documents\Win
PS C:\Users\Kishu\Documents> Key> ssh -i /home/ec2-user/.ssh/ec2-user@ec2-34-211-110-126.us-west-2.compute.amazonaws.com
The authenticity of host 'ec2-34-211-110-126.us-west-2.compute.amazonaws.com (34.211.110.126)' can't be established.
ECDSA key fingerprint is SHA256:1540B4Wzoa5FCZCKbn43B0xtK9TCL1r2FghdMica.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-34-211-110-126.us-west-2.compute.amazonaws.com,34.211.110.126' (ECDSA) to the list of known hosts.

  ____  __
 / ___/  / /
/ /   /  / /
/ /___/  / /
\____/___/ /

   Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
1 package(s) needed for security, out of 1 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-7-187 ~]$ sudo su
[root@ip-172-31-7-187 ec2-user]# lsblk
NAME        MAJ:MIN RM  SIZE RO  TYPE  PARTITION
xvda        202:0    0   8G  0  disk
└─xvda1     202:1    0   8G  0  part /
xvdf        202:80   0    1G  0  disk
[root@ip-172-31-7-187 ec2-user]# df -ht
df: option requires an argument -- 't'
[try 'df --help' for more information.]
[root@ip-172-31-7-187 ec2-user]# df -ht
Filesystem      Type      Size  Used Avail Use% Mounted on
devtmpfs        devtmpfs  474M   0  474M   0% /dev
tmpfs           tmpfs     483M   0  483M   0% /dev/shm
tmpfs           tmpfs     483M  41K  483M   1% /run
tmpfs           tmpfs     483M   0  483M   0% /sys/fs/cgroup
/dev/xvda1      xfs       8.0G  1.6G  6.5G  20% /
tmpfs           tmpfs     97M   0   97M   0% /run/user/1000
[root@ip-172-31-7-187 ec2-user]# mkdir Ramya-Storage
[root@ip-172-31-7-187 ec2-user]# ls
Ramya-Storage
[root@ip-172-31-7-187 ec2-user]# mkefs -t xfs /dev/xvdf
mkefs: data=/dev/xvdf
        -               isize=512    agcount=4, agsize=65536 blks
        -               sectsz=512   attr=2, projid32bit=1
        -               crc=1       finobt=1, sparse=0
        -               bsize=4096  blocks=262144, inact=25
        -               sunit=0     swidth=0 blks
        -               naming      version 2   bsize=4096   ascii-ci=0 ftype=1
        -               log         internal log bsize=4096   blocks=2560, version=2
        -               extsz=512   sunit=0 blks, lazy-count=1
        -               realtime   none
        -               extents    none
        -               flexfiles  off
        -               opflags    0

```

Fig 6: File system created for Ramya-MachineA and mounted it

```

root@ip-172-31-7-187:/home/ec2-user
[root@ip-172-31-7-187 ec2-user]# mount -t xfs /dev/xvdf /home/ec2-user/Ramya-Storage/
[root@ip-172-31-7-187 ec2-user]# df -ht
Filesystem      Type      Size  Used Avail Use% Mounted on
devtmpfs        devtmpfs  474M   0  474M   0% /dev
tmpfs           tmpfs     483M   0  483M   0% /dev/shm
tmpfs           tmpfs     483M  41K  483M   1% /run
tmpfs           tmpfs     483M   0  483M   0% /sys/fs/cgroup
/dev/xvda1      xfs       8.0G  1.6G  6.5G  20% /
tmpfs           tmpfs     97M   0   97M   0% /run/user/1000
/dev/xvdf       xfs      1014M  34M  981M   4% /home/ec2-user/Ramya-Storage
[root@ip-172-31-7-187 ec2-user]# pwd
/home/ec2-user
[root@ip-172-31-7-187 ec2-user]# ls
Ramya-Storage
[root@ip-172-31-7-187 ec2-user]# cd Ramya-Storage
[root@ip-172-31-7-187 Ramya-Storage]# touch (1..10).txt
bash: syntax error near unexpected token `1..10'
[root@ip-172-31-7-187 Ramya-Storage]# touch (1..10).txt
bash: syntax error near unexpected token `1..10'
[root@ip-172-31-7-187 Ramya-Storage]# touch 1.txt
[root@ip-172-31-7-187 Ramya-Storage]# ls
1.txt
[root@ip-172-31-7-187 Ramya-Storage]# umount -t xfs /dev/xvdf /home/ec2-user/Ramya-Storage/
umount: /home/ec2-user/Ramya-Storage: target is busy.
umount: /home/ec2-user/Ramya-Storage/: target is busy.
[root@ip-172-31-7-187 Ramya-Storage]# cd ..
[root@ip-172-31-7-187 ec2-user]# umount -t xfs /dev/xvdf /home/ec2-user/Ramya-Storage/
umount: /home/ec2-user/Ramya-Storage/: not mounted.
[root@ip-172-31-7-187 ec2-user]# df -ht
Filesystem      Type      Size  Used Avail Use% Mounted on
devtmpfs        devtmpfs  474M   0  474M   0% /dev
tmpfs           tmpfs     483M   0  483M   0% /dev/shm
tmpfs           tmpfs     483M  41K  483M   1% /run
tmpfs           tmpfs     483M   0  483M   0% /sys/fs/cgroup
/dev/xvda1      xfs       8.0G  1.6G  6.5G  20% /
tmpfs           tmpfs     97M   0   97M   0% /run/user/1000
[root@ip-172-31-7-187 ec2-user]# cat

```

Fig7: Created 1 file in Ramya-Storage and unmounted it

7. Now detach the EBS volume from machine A and attach it to Machine B
8. Now connect to Machine B, create a new directory and mount the same to it.
9. Ramya-MachineB EBS volume contains all the one txt files.

Cloud Assignment

Koganti Ramya

```
root@ip-172-31-2-105/home/ec2-user/Ramya-Storage
├── (
├── /
└── Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
1 package(s) needed for security, out of 1 available
(Run "sudo yum update" to apply all updates.)
[ec2-user@ip-172-31-2-105 ~]$ sudo su
[root@ip-172-31-2-105 ec2-user]# lsblk
NAME        MAJ:MIN RM  SIZE RO  TYPE MOUNTPOINT
xvda        202:0    0   8G  0  disk
└─xvda1    202:1    0   8G  0  part /
xvdf        202:00   0   1G  0  disk
[root@ip-172-31-2-105 ec2-user]# df -hT
Filesystem      Type      Size  Used Avail Use% Mounted on
devtmpfs        devtmpfs  476M   0  476M   0% /dev
tmpfs           tmpfs     483M   0  483M   0% /dev/shm
tmpfs           tmpfs     483M  412K  483M   1% /run
tmpfs           tmpfs     483M   0  483M   0% /sys/fs/cgroup
/dev/xvda1      xfs       8.0G  1.6G  6.5G  20% /
tmpfs           tmpfs     97M   0   97M   0% /run/user/1000
[root@ip-172-31-2-105 ec2-user]# ls
.
..
[root@ip-172-31-2-105 ec2-user]# fdisk -l
Disk /dev/xvda: 8 GiB, 858934592 bytes, 16777216 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disklabel type: gpt
Disk identifier: 0898A095-8C11-40AC-9157-C48213FB4D0C

Device            Start      End  Sectors  Size Type
/dev/xvda1        4096 16777182 16773087   8G Linux filesystem
/dev/xvda120       2048    4095     2048   1M BIOS boot

Partition table entries are not in disk order.

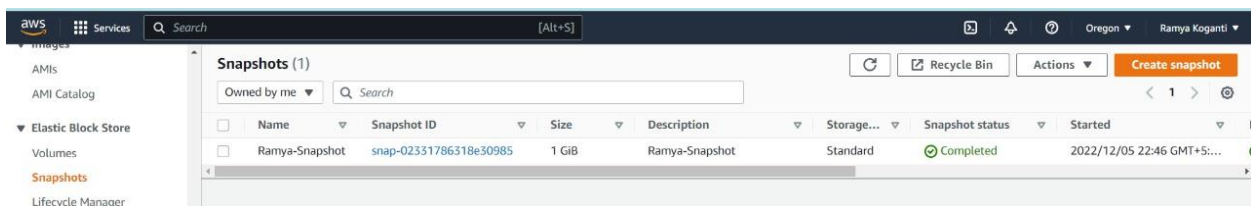
Disk /dev/xvdf: 1 GiB, 1073741024 bytes, 2097152 sectors
Units: sectors of 1 * 512 = 512 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
[root@ip-172-31-2-105 ec2-user]# mount -t xfs /dev/xvdf /home/ec2-user/Ramya-Storage
[root@ip-172-31-2-105 ec2-user]# cd Ramya-Storage
[root@ip-172-31-2-105 Ramya-Storage]# ls
1.txt
[root@ip-172-31-2-105 Ramya-Storage]# cat
```

Fig8:Ramya-MachineB EBS

3 . Snapshot

Steps:

1. Under EC2 Elastic Block store click on Snapshot
2. Click on create snapshot
3. Under volume id select your volume (Ramya-EBS) in Oregon region
4. Under description enter name of snapshot
5. Now click on create snapshot
6. Now click on snapshots and you can able to see your created snapshot
7. Select your snapshot and click on actions and click on copy snapshot
8. In settings page of copy snapshot , under Destination region select the region where you want to create Tokyo (ap-northeast1)
9. Now click on copy snapshot



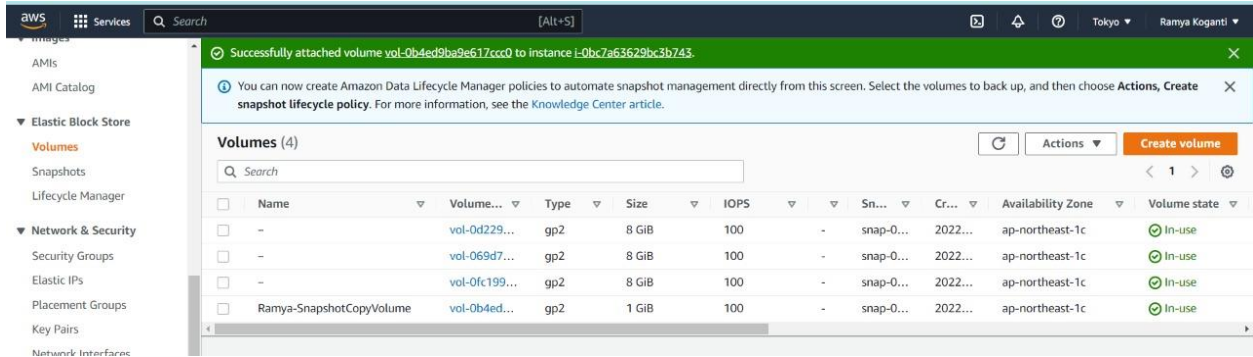


Fig 10: volume created from copy snapshot in Tokyo region

10. Create a Ramya-Machine C in Tokyo region and attach the EBS volume created from Snapshot copy
11. Now connect to Ramya-Machine C and create a new storage directory named Ramya Snapshot Volume and mount it.
12. Switch to the Ramya-SnaphotVolume directory and check the list of files in it.

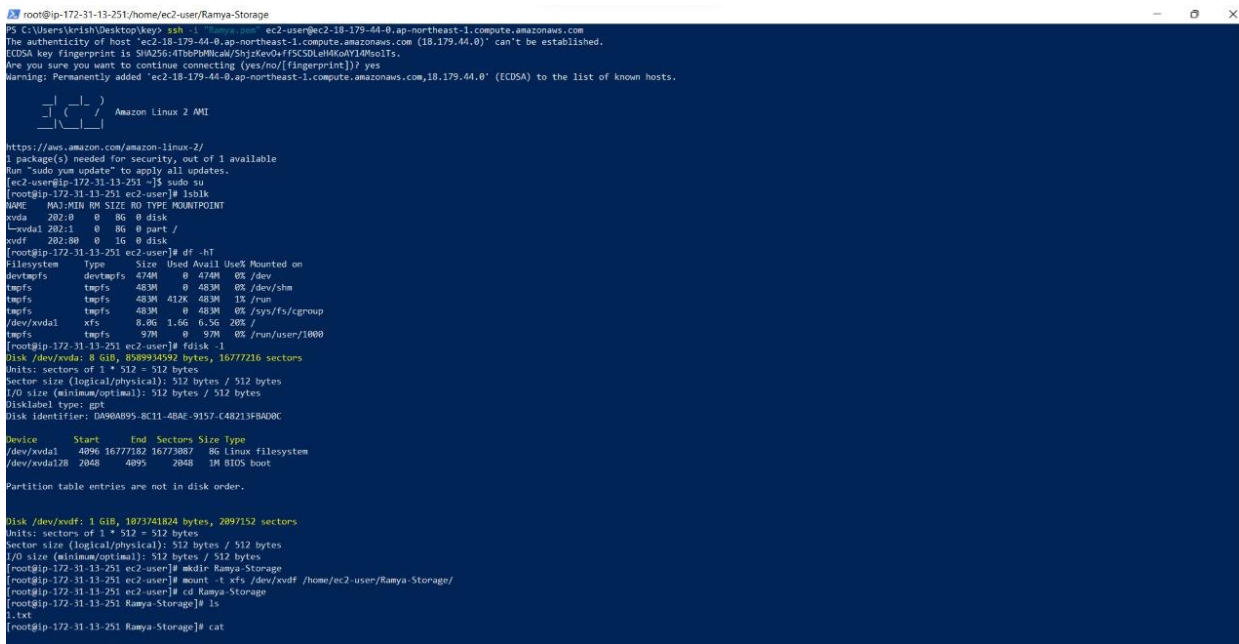


Fig 11: Ramya - Machine C Snapshot Volume

4. AMI

An Amazon Machine Image (AMI) is a template that contains a software configuration (for example, an operating system, an application server, and applications). From an AMI, you launch an instance, which is a copy of the AMI running as a virtual server in the cloud.

Steps:

Cloud Assignment

Koganti Ramya

- Created an Ramya-Machine1 Instance and in the security-groups add inbound rule http port 80 for this machine.
- Connect to the above instance and perform the below commands

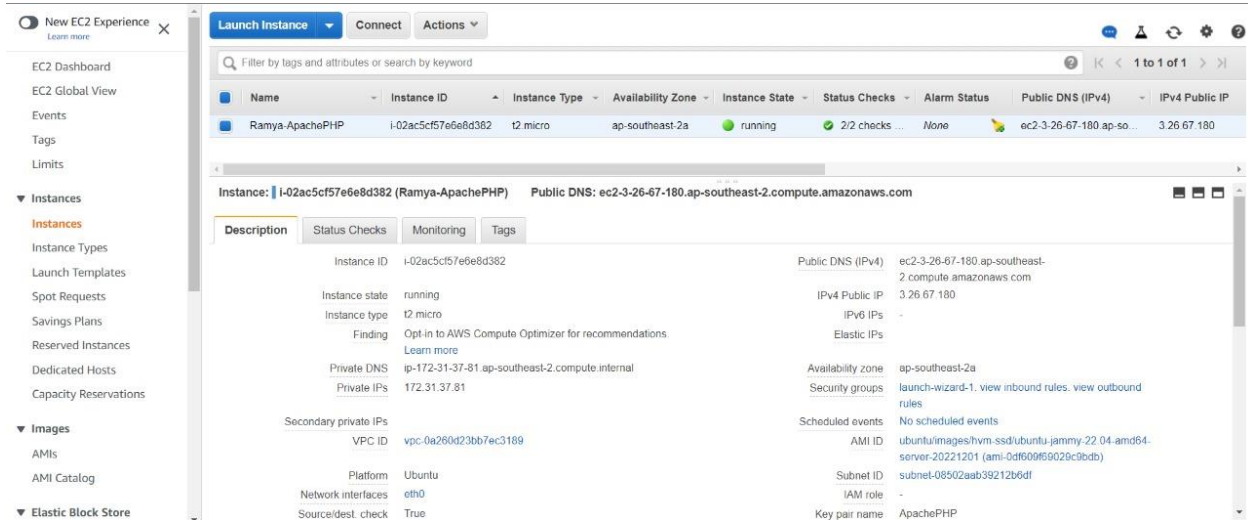


Fig12: Ramya-Machine1

- Preparing your Ubuntu server
 1. sudo apt update
 2. sudo ufw allow ssh
 3. sudo ufw allow 80
 4. sudo ufw allow 443
 5. sudo ufw enable

Cloud Assignment

Koganti Ramya

```
root@ip-172-31-37-81:/home/ubuntu
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\Users\Krish> cd "C:\Users\Krish\Desktop\ApacheKey"
PS C:\Users\Krish\Desktop\ApacheKey> ssh -i "ApacheKey.pem" ubuntu@ec2-3-26-67-180.ap-southeast-2.compute.amazonaws.com
The authenticity of host 'ec2-3-26-67-180.ap-southeast-2.compute.amazonaws.com (3.26.67.180)' can't be established.
ECDSA key fingerprint is SHA256:c07-00hpqUmkasG4:tpD7MhRcVrgI8tPPpckTaf.
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added 'ec2-3-26-67-180.ap-southeast-2.compute.amazonaws.com,3.26.67.180' (ECDSA) to the list of known hosts.
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1026-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon Dec  5 17:52:35 UTC 2022

System load: 0.0556640625   Processes:            102
Usage of /:  19.8% of 7.57GB   Users logged in:     0
Memory usage: 22%           IPv4 address for eth0: 172.31.37.81
Swap usage:   0%

0 updates can be applied immediately.

The programs included with the Ubuntu system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*/*copyright.

Ubuntu comes with ABSOLUTELY NO WARRANTY, to the extent permitted by
applicable law.

To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.

ubuntu@ip-172-31-37-81:~$ sudo su
root@ip-172-31-37-81:/home/ubuntu# sudo apt update
Hit:1 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [114 kB]
Get:3 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [99.8 kB]
Get:4 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [16.1 MB]
Get:5 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5592 kB]
Get:6 http://security.ubuntu.com/ubuntu jammy-security InRelease [110 kB]
Get:7 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:8 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:9 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:10 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [6372 B]
Get:11 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [735 kB]
Get:12 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [169 kB]
Get:13 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [11.3 kB]
Get:14 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [484 kB]
```

Fig13: Preparing your Ubuntu server

- Installing and testing Apache2
 1. sudo apt install apache2
 2. sudo systemctl status apache2
 3. <http://YOURSERVERIPADDRESS/>

Cloud Assignment

Koganti Ramya

```
root@ip-172-31-37-81:/home/ubuntu
3 packages can be upgraded. Run 'apt list --upgradable' to see them.
root@ip-172-31-37-81:/home/ubuntu# sudo ufw allow ssh
Rules updated
Rules updated (v6)
root@ip-172-31-37-81:/home/ubuntu# sudo ufw allow 80
Rules updated
Rules updated (v6)
root@ip-172-31-37-81:/home/ubuntu# ufw allow 443
Rules updated
Rules updated (v6)
root@ip-172-31-37-81:/home/ubuntu# ufw enable
Command may disrupt existing ssh connections. Proceed with operation (y/n)? y
Firewall is active and enabled on system startup
root@ip-172-31-37-81:/home/ubuntu# sudo apt install apache2
Invalid operation install
root@ip-172-31-37-81:/home/ubuntu# sudo apt install apache2
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  apache2-bin apache2-data apache2-utils bczip2 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 mailcap mime-support ssl-cert
Suggested packages:
  apache2-doc apache2-suexec-pristine | apache2-suexec-custom www-browser bczip2-doc
The following NEW packages will be installed:
  apache2 apache2-bin apache2-data apache2-utils bczip2 libapr1 libaprutil1 libaprutil1-dbd-sqlite3 libaprutil1-ldap liblua5.3-0 mailcap mime-support ssl-cert
0 upgraded, 13 newly installed, 0 to remove and 3 not upgraded.
Need to get 2136 kB of archives.
After this operation, 8505 kB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libapr1 amd64 1.7.0-8build1 [107 kB]
Get:2 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libaprutil1 amd64 1.6.1-Subunit4 [92.4 kB]
Get:3 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libaprutil1-dbd-sqlite3 amd64 1.6.1-Subunit4 [11.3 kB]
Get:4 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 libaprutil1-ldap amd64 1.6.1-Subunit4 [2162 B]
Get:5 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 liblua5.3-0 amd64 5.3.0-1build1 [140 kB]
Get:6 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 apache2-bin amd64 2.4.52-1ubuntu4.2 [1344 kB]
Get:7 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 apache2-data all 2.4.52-1ubuntu4.2 [165 kB]
Get:8 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 apache2-utils amd64 2.4.52-1ubuntu4.2 [89.3 kB]
Get:9 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 mailcap all 3.70+nmu1ubuntu1 [23.8 kB]
Get:10 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 mime-support all 3.66 [3696 B]
Get:11 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 apache2 amd64 2.4.52-1ubuntu4.2 [97.9 kB]
Get:12 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 bczip2 amd64 1.0.8-5build1 [34.8 kB]
Get:13 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 ssl-cert all 1.1.2 [17.4 kB]
Fetched 2136 kB in 8s (24.4 MB/s)
Preconfiguring packages ...
Selecting previously unselected package libapr1:amd64.
(Reading database ... 63911 files and directories currently installed.)
Preparing to unpack .../00-libapr1_1.7.0-8build1_amd64.deb ...
Unpacking libapr1:amd64 (1.7.0-8build1) ...
Selecting previously unselected package libaprutil1:amd64.
Preparing to unpack .../01-libaprutil1_1.6.1-Subunit4_amd64.deb ...
Unpacking libaprutil1:amd64 (1.6.1-Subunit4) ...
Selecting previously unselected package libaprutil1-dbd-sqlite3:amd64.
Preparing to unpack .../02-libaprutil1-dbd-sqlite3_1.6.1-Subunit4_amd64.deb ...
Unpacking libaprutil1-dbd-sqlite3:amd64 (1.6.1-Subunit4) ...
```

Fig 14: connecting to apache2

```
root@ip-172-31-37-81:/home/ubuntu
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-37-81:/home/ubuntu# sudo systemctl status apache2
Unknown command verb status.
root@ip-172-31-37-81:/home/ubuntu# sudo systemctl status apache2
● apache2.service - The Apache HTTP Server
   Loaded: loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: enabled)
   Active: active (running) since Mon 2022-12-05 18:04:32 UTC; 39s ago
     Docs: https://httpd.apache.org/docs/2.4/
   Main PID: 2435 (apache2)
    Tasks: 55 (limit: 1143)
   Memory: 5.4M
      CPU: 32ms
   CGroup: /system.slice/apache2.service
           └─2435 /usr/sbin/apache2 -k start
             └─2437 /usr/sbin/apache2 -k start
               └─2438 /usr/sbin/apache2 -k start

Dec 05 18:04:32 ip-172-31-37-81 systemd[1]: Starting The Apache HTTP Server...
Dec 05 18:04:32 ip-172-31-37-81 systemd[1]: Started The Apache HTTP Server.
root@ip-172-31-37-81:/home/ubuntu#
```

Fig 15: Testing apache2

Cloud Assignment

Koganti Ramya



Fig 16: Testing apache2 on browser

Installing and testing PHP

1. `sudo apt install php8.1`
2. `php --version`
3. `sudo systemctl restart apache2`
4. `echo " | sudo tee -a /var/www/html/phpinfo.php > /dev/null`
5. <http://YOURSERVERIPADDRESS/phpinfo.php>

PHP Version 8.1.2-1ubuntu2.9	
System	Linux ip-172-31-37-81 5:15:0-1026-aws #30-Ubuntu SMP Wed Nov 23 14:15:21 UTC 2022 x86_64
Build Date	Oct 19 2022 14:58:09
Build System	Linux
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.1/apache2
Loaded Configuration File	/etc/php/8.1/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/8.1/apache2/conf.d
Additional .ini files parsed	/etc/php/8.1/apache2/conf.d/10-opcache.ini, /etc/php/8.1/apache2/conf.d/10-pdo.ini, /etc/php/8.1/apache2/conf.d/20-calendar.ini, /etc/php/8.1/apache2/conf.d/20-ctype.ini, /etc/php/8.1/apache2/conf.d/20-curl.ini, /etc/php/8.1/apache2/conf.d/20-iconv.ini, /etc/php/8.1/apache2/conf.d/20-intl.ini, /etc/php/8.1/apache2/conf.d/20-ldap.ini, /etc/php/8.1/apache2/conf.d/20-mbstring.ini, /etc/php/8.1/apache2/conf.d/20-openssl.ini, /etc/php/8.1/apache2/conf.d/20-phar.ini, /etc/php/8.1/apache2/conf.d/20-posix.ini, /etc/php/8.1/apache2/conf.d/20-readline.ini, /etc/php/8.1/apache2/conf.d/20-shmop.ini, /etc/php/8.1/apache2/conf.d/20-sockets.ini, /etc/php/8.1/apache2/conf.d/20-sysvmsg.ini, /etc/php/8.1/apache2/conf.d/20-sysvsem.ini, /etc/php/8.1/apache2/conf.d/20-sysvshm.ini, /etc/php/8.1/apache2/conf.d/20-tokenizer.ini
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API20210902.NTS
PHP Extension Build	API20210902.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	available, disabled

Fig 17: Testing PHP on browser

Now create AMI from existing instance

Cloud Assignment

Koganti Ramya

- From this AMI create a new instance and in the security-group add inbound rule for http port 80
- Connect to this instance and try to access the ubuntu and php on browser

```
root@ip-172-31-37-81:/
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS C:\WINDOWS\system32> cd "C:\Users\Krish\Desktop\ApacheKey"
PS C:\Users\Krish\Desktop\ApacheKey> ssh -i "ApachePIP.pem" ubuntu@ec2-3-26-67-180.ap-southeast-2.compute.amazonaws.com
Welcome to Ubuntu 22.04.1 LTS (GNU/Linux 5.15.0-1020-aws x86_64)

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon Dec 5 18:18:28 UTC 2022

 * Documentation:  https://help.ubuntu.com
 * Management:    https://landscape.canonical.com
 * Support:       https://ubuntu.com/advantage

System information as of Mon Dec 5 18:18:28 UTC 2022

System load:  0.0          Processes:    109
Usage of /:   22.3% of 7.57GB    Users logged in: 1
Memory usage: 25%          IPv4 address for eth0: 172.31.37.81
Swap usage:   0%

3 updates can be applied immediately.
3 of these updates are standard security updates.
To see these additional updates run: apt list --upgradable

Last login: Mon Dec 5 17:52:37 2022 from 157.48.68.89
ubuntu@ip-172-31-37-81:~$ sudo su
root@ip-172-31-37-81:/home/ubuntu# php --version
Command 'php' not found, but can be installed with:
apt install php8.1-cli # version 8.1.2-1ubuntu2.9, or
apt install php-cli # version 2:8.1-19ubuntu1
root@ip-172-31-37-81:/home/ubuntu# apt install php8.1
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
libapache2-mod-php8.1 php-common php8.1-cli php8.1-common php8.1-opcache php8.1-readline
Suggested packages:
  php-pear
The following NEW packages will be installed:
libapache2-mod-php8.1 php-common php8.1-cli php8.1-common php8.1-opcache php8.1-readline
0 upgraded, 7 newly installed, 0 to remove and 3 not upgraded.
Need to get 5123 kB of archives.
After this operation, 21.3 MB of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy/main amd64 php-common all 2:92ubuntu1 [12.4 kB]
Get:2 http://ap-southeast-2.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 php8.1-common amd64 8.1.2-1ubuntu2.9 [1126 kB]
```

Fig 18: Connecting to PHP

Cloud Assignment

Koganti Ramya

```
root@ip-172-31-37-81: /
Creating config file /etc/php/8.1/mods-available/sysvshm.ini with new version

Creating config file /etc/php/8.1/mods-available/tokenizer.ini with new version
Setting up php8.1-readline (8.1.2-1ubuntu2.9) ...

Creating config file /etc/php/8.1/mods-available/readline.ini with new version
Setting up php8.1-opcache (8.1.2-1ubuntu2.9) ...

Creating config file /etc/php/8.1/mods-available/opcache.ini with new version
Setting up php8.1-cli (8.1.2-1ubuntu2.9) ...
update-alternatives: using /usr/bin/php8.1 to provide /usr/bin/php (php) in auto mode
update-alternatives: using /usr/bin/phar8.1 to provide /usr/bin/phar (phar) in auto mode
update-alternatives: using /usr/bin/phar.phar8.1 to provide /usr/bin/phar.phar (phar.phar) in auto mode

Creating config file /etc/php/8.1/cli/php.ini with new version
Setting up libapache2-mod-php8.1 (8.1.2-1ubuntu2.9) ...

Creating config file /etc/php/8.1/apache2/php.ini with new version
Module mpm_event disabled.
Enabling module mpm_prefork.
apache2_switch_mpm Switch to prefork
apache2_invoke: Enable module php8.1
Setting up php8.1 (8.1.2-1ubuntu2.9) ...
Processing triggers for man-db (2.10.2-1) ...
Processing triggers for php8.1-cli (8.1.2-1ubuntu2.9) ...
Processing triggers for libapache2-mod-php8.1 (8.1.2-1ubuntu2.9) ...
Scanning processes...
Scanning linux images...

Running kernel seems to be up-to-date.

No services need to be restarted.

No containers need to be restarted.

No user sessions are running outdated binaries.

No VM guests are running outdated hypervisor (qemu) binaries on this host.
root@ip-172-31-37-81:/home/ubuntu# cd /
root@ip-172-31-37-81:/# php --version
PHP 8.1.2-1ubuntu2.9 (cli) (built: Oct 19 2022 14:58:09) (NTS)
Copyright (c) The PHP Group
Zend Engine v4.1.2, Copyright (c) Zend Technologies
    with Zend OPcache v8.1.2-1ubuntu2.9, Copyright (c), by Zend Technologies
root@ip-172-31-37-81:/# sudo systemctl restart apache2
root@ip-172-31-37-81:/# echo '<?php phpinfo();?>' | sudo tee -a /var/www/html/phpinfo.php > /dev/null
root@ip-172-31-37-81:/#
```

Fig 19: Ramya-Machine2



Fig 20: Testing ubuntu for Ramya-Machine2

PHP Version 8.1.2-1ubuntu2.9	
System	Linux ip-172-31-37-81 5 15.0-1028-aws #30-Ubuntu SMP Wed Nov 23 14:15:21 UTC 2022 x86_64
Build Date	Oct 19 2022 14:58:09
Build System	Linux
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.1/apache2
Loaded Configuration File	/etc/php/8.1/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/8.1/apache2/conf.d
Additional .ini files parsed	/etc/php/8.1/apache2/conf.d/10-opcache.ini, /etc/php/8.1/apache2/conf.d/10-pdo.ini, /etc/php/8.1/apache2/conf.d/20-calendar.ini, /etc/php/8.1/apache2/conf.d/20-ctype.ini, /etc/php/8.1/apache2/conf.d/20-enchant.ini, /etc/php/8.1/apache2/conf.d/20-ffi.ini, /etc/php/8.1/apache2/conf.d/20-fileinfo.ini, /etc/php/8.1/apache2/conf.d/20-ftp.ini, /etc/php/8.1/apache2/conf.d/20-gettext.ini, /etc/php/8.1/apache2/conf.d/20-iconv.ini, /etc/php/8.1/apache2/conf.d/20-phar.ini, /etc/php/8.1/apache2/conf.d/20-posix.ini, /etc/php/8.1/apache2/conf.d/20-readline.ini, /etc/php/8.1/apache2/conf.d/20-shmop.ini, /etc/php/8.1/apache2/conf.d/20-sockets.ini, /etc/php/8.1/apache2/conf.d/20-sysmsg.ini, /etc/php/8.1/apache2/conf.d/20-sysvsem.ini, /etc/php/8.1/apache2/conf.d/20-sysvshm.ini, /etc/php/8.1/apache2/conf.d/20-tokenizer.ini
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API420210902.NTS
PHP Extension Build	API20210902.NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	available, disabled

Fig 21: Testing PHP for Ramya-Machine2

5. Load Balancer

Steps:

- Create a EC2 machine (Ramya-A) and add security group with inbound rule allowing SSH and HTTP port.
- Prepare your ubuntu server and install and test apache2
- Install and test PHP8.1
- Create an AMI and create two instances from AMI with security group allowing inbound rule for SSH and HTTP port.

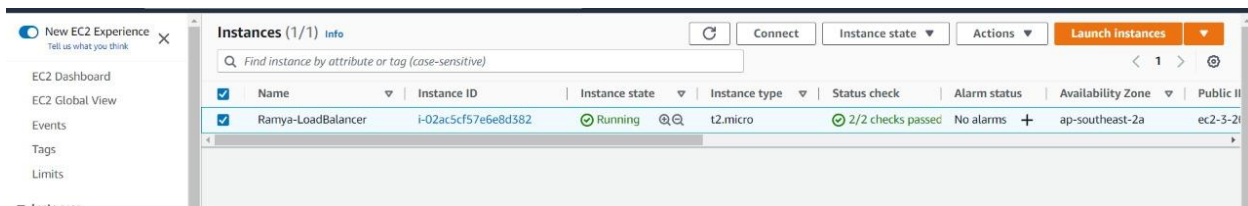


Fig22: Ramya-Load Balancer

Cloud Assignment

Koganti Ramya

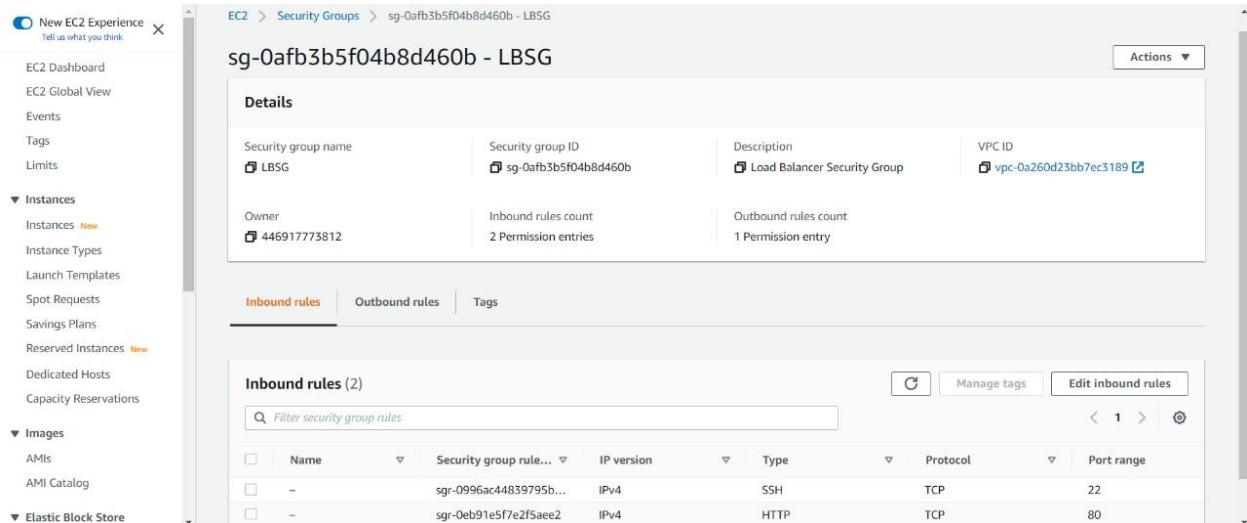
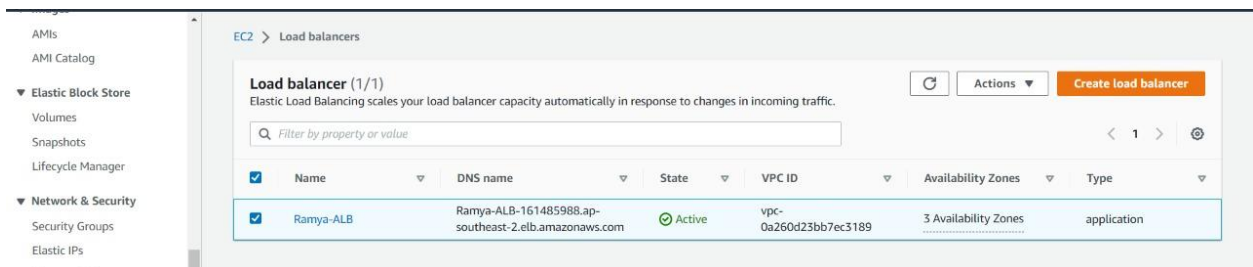


Fig23: Security Group-LBSG for Load Balancer

- Under Load balancing from EC2 service click on Load Balancer and click on create a load balancer.
- Click on create Application load balancer and Give name to your load balancer (Ramya-APLB) and select all mappings under Network Mapping.
- Under security groups create a new security group allowing inbound rules for SSH and HTTP port.
- Under Listeners and routing, need to create a new target group (APLBTG) and include your target machines under it.
- Now connect your Target Group to your Load balancer and click on create



Fig 24: Target Group



Cloud Assignment

Koganti Ramya

Fig25: Load Balance

- Now connect to your Load balancer by copying the DNS name and pasting in the browser.
- You can also check to which machine it is being connected using DNS name/phpinfo.php and you can check the ip address of your machine to which it is being connected



Fig26: Connecting to UBUNTU using Load balancer

Cloud Assignment

Koganti Ramya

PHP Version 8.1.2-1ubuntu2.9	
System	Linux ip-172-31-37-81.5.15.0-1026-aws #30-Ubuntu SMP Wed Nov 23 14:15:21 UTC 2022 x86_64
Build Date	Oct 19 2022 14:58:09
Build System	Linux
Server API	Apache 2.0 Handler
Virtual Directory Support	disabled
Configuration File (php.ini) Path	/etc/php/8.1/apache2
Loaded Configuration File	/etc/php/8.1/apache2/php.ini
Scan this dir for additional .ini files	/etc/php/8.1/apache2/conf.d
Additional .ini files parsed	/etc/php/8.1/apache2/conf.d/10-opcache.ini, /etc/php/8.1/apache2/conf.d/10-pdo.ini, /etc/php/8.1/apache2/conf.d/20-calendar.ini, /etc/php/8.1/apache2/conf.d/20-ctype.ini, /etc/php/8.1/apache2/conf.d/20-exif.ini, /etc/php/8.1/apache2/conf.d/20-ffi.ini, /etc/php/8.1/apache2/conf.d/20-fileinfo.ini, /etc/php/8.1/apache2/conf.d/20-ftp.ini, /etc/php/8.1/apache2/conf.d/20-gettext.ini, /etc/php/8.1/apache2/conf.d/20-iconv.ini, /etc/php/8.1/apache2/conf.d/20-phar.ini, /etc/php/8.1/apache2/conf.d/20-posix.ini, /etc/php/8.1/apache2/conf.d/20-readline.ini, /etc/php/8.1/apache2/conf.d/20-shmop.ini, /etc/php/8.1/apache2/conf.d/20-sockets.ini, /etc/php/8.1/apache2/conf.d/20-sysvmsg.ini, /etc/php/8.1/apache2/conf.d/20-sysvsem.ini, /etc/php/8.1/apache2/conf.d/20-sysvshm.ini, /etc/php/8.1/apache2/conf.d/20-tokenizer.ini
PHP API	20210902
PHP Extension	20210902
Zend Extension	420210902
Zend Extension Build	API420210902,NTS
PHP Extension Build	API20210902,NTS
Debug Build	no
Thread Safety	disabled
Zend Signal Handling	enabled
Zend Memory Manager	enabled
Zend Multibyte Support	disabled
IPv6 Support	enabled
DTrace Support	available, disabled

Fig27: Connecting to PHP using Load balancer