First Name: SaiGopi

Last Name: Pachipala

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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-SaiGopi)
- 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 (Machine1-Pachipala)

insta	inces (2) info			C	Conne	instance stat	e 🔻 🛛 Actions	۳
Q. /	ind instance by attribute or tag	(case-sensitive	ð					
0	Name	v	Instance ID	Instance state	e = 1	Instance type v	Status check	1 A
	Machine2-Pachipala		i-00b18d04262498416	@ Running	99	t2.micro	 Initializing 	N
	Machine1-SaiGopi		1-0cc10b04ffdd17ed9	@ Running	00	t2.micro	 Initializing 	3N

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-Saigopi instance running

BC2-HIPEUPLT2-B2-9/1430+
Microsoft Windows [Version 10.0.72000.1098] (c) Microsoft Corporation. All rights reserved.
C:\Users\Sai Gopi\Uowmloads>ssh -i "TOKYO.pem" ec2-user@ec2-13-231-69-107.ap-northeast-1.compute.amazonaws.com The authenticity of host 'ec2-13-231-69-107.ap-northeast-1.compute.amazonaws.com (13-231.69.107)' can't be established. ECDSA key fingerprint is SHAZ56.x001MebMP30KaJTYIbdZ93yr0bAsuBFEREA.DQCalpM4. Are you sure you want to continue connecting (yes/ino/[fingerprint])? yes Warning: Permanently added 'ec2-13-231-69-107.ap-northeast-1.compute.amazonaws.com,13.231.69.107' (ECDSA) to the list of known hosts.
IL_I Response in the second secon
https://aws.amazon.com/amazon-linux-2/ 13 package(s) needed for security, out of 16 available Run "sudo yum update" to apply all updates. [ec2-user@ip-172-31-0-121 -]\$

Fig2.Machine1-SaiGopi

Fig3.Machine2-Pachipala

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 SaiGopi-Machine A and SaiGopi-Machine B in sydney region.

Inst	ances (2) Info			C	Conn	ect Instance stat	te 🔻 Actions 🤊	1
Q,	Find instance by attribute or tag	g (case-sensitiv	ic)					
0	Name	v 1	Instance ID	Instance state	v	Instance type 🛛 🖉	Status check	Ala
0	SaiGopi-Machine A		1-0d68361db575ccbe4	@ Running	ଜ୍ୟ	t2.micro	Ø 2/2 checks passed	No
Ċ)	SaiGopi-MachineB		i-0a59b7ab5c4c28d0f	@ Running		t2.micro	 Initializing 	No

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)
- 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.

Q	Search								
	Name	∇	Volume ID 🛛 🗸	Туре	⊽	Size	⊽	IOPS	
	-		vol-0c6587eaa8c9a76a6	gp2		8 GiB		100	
	SaiGopi-EBS		vol-028550c673eb755d3	gp2		1 GiB		100	
	-		vol-02269764fa5037ee8	gp2		8 GiB		100	

Fig5: EBS volume of 1GB

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

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

	ndows [Version 1) t Corporation. A	0.0.22000.1098j 11 rights reserve	d.
The authentic ECDSA key fir Are you sure	city of host 'ec; ngerprint is SHA you want to com manently added 'n)	2-3-25-72-20.ap-s 256:rQ/xEyjYNLejz tinue connecting	em" ec2-user@ec2-3-25-72-20.ap-southeast-2.compute.amazonaws.com outheast-2.compute.amazonaws.com (3.25.72.20)' can't be established. b4t29Q6ByEeR9nbvuBtB+2jydZ/IdV. (yes/no/[fingerprint])? yes -southeast-2.compute.amazonaws.com,3.25.72.20' (ECDSA) to the list of known hosts.
13 package(s Run "sudo yum [ec2-user@ip [root@ip-172 NAME MA3: xvda 202:0 L-xvda 202:0 xvda 202:1 xvda 202:1	m update" to app -172-31-7-91 -]≸ -31-7-91 ec2-user MIN RM 5IZE RO TV 8 0 8G 0 d 1 0 8G 0 p	urity, out of 16 / sudo su r]# lsblk vPE MOUNTPOINT isk art / isk	available
Filesystem		r]# d+ -hi e Used Avail Use	% Mounted on
devtmpfs tmpfs	devimpfs 4740 tmpfs 4830		% /dev % /dev/shm
tmofs			x / nerv/ston X / nerv
tmpfs	tapfs 483		\$ /sys/fs/cgroup
/dev/xvda1	xfs 8.00	G 1.66 6.56 20	a persona de la companya de la compa
trefs	tapfs 97		% /run/user/1000
		r]# ekdir SaiGopi	Storage
	-31~7-91 ec2-use	r]# 1s	
Salfoni Story		r]# økfs -t xfs /	den / sust
meta-data-/de		isize=512	agcount=4, agsize=65536 blks
		sectsz=512	attr=2, projid32bit=1
-		crc=1	finobt=1, sparse=0
data =		bsize=4096	blocks=262144, imaxpct=25
nameri Eve		sunit⊶0	swidth-0 blks
	rsion 2	hsize=4096	ascii-ci-0 ftype=1
log -int	ternal log	bsize=4096 sectsz=512	blocks=2560, version=2 sunit=0 blks, iazy-count=1
- realtime -nor		extsz=4096	sunit=0 biks, iazy-count=1 blocks=0, rtextents=0
			/dev/xvdf /home/ec2-user/SaiGopi-Storage/
			en an an anna an an an an an an an an an

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

					efs /o	dev/xvdf /home/ec2-user/SaiGopi-Storage/
root@ip-172						
ilesystem	Туре					Mounted on
devtmpfs	devtmpfs			474M		/dev
mpfs	tepfs	483M	0	483M		/dev/shm
mpfs	tmpfs	483M	412K	482M		/run
mpfs	tmpfs	483M	9	483M		/sys/fs/cgroup
dev/xvda1	xfs	8.0G	1.66		20%	
mpfs	tmpfs	9714	6	97M		/run/user/1000
dev/xvdf		1014M	34M	981M	-4%	/home/ec2-user/SaiGopi-Storage
root@ip-172		2-user]	# pwd			
home/ec2-use						
root@ip-172-	-31-7-91 ec2	l-user]	# 1s			
root@ip-172-	-31-7-91 ec2	l-user]	# cd 9	saiGop:	-Stor	rage/
root@ip-172-	-31-7-91 Sai	Gopi-S	torage	:]# to:	ich (:	110).txt
root@ip-172-	-31-7-91 Sai	Gopi-S	torage	:]# 1s		
0.txt 1.txt	t 2.txt 3.	txt 4	. txt	5.txt	6.t	xt 7.txt 8.txt 9.txt
root@ip-172	-31-7-91 Sai	Gopi-S	torage	-]# und	unt	-t xfs /dev/xvdf /home/ec2-user/SalGopi-Storage/
mount: /home	e/ec2-user/S	aiGopi	-Stora	age: ta	arget	is busy.
mount: /home	e/ec2-user/S	aiGopi	-Stora	ge/: 1	target	t is busy.
root@ip-172-	-31-7-91 Sai	Gopi-5	torage	=1# cd		
						/dev/xvdf /home/ec2-user/SaiGopi-Storage/
mount: /home						
						c2-user/SaiGopi-Storage/
mount: /home		100 C 100				
root@ip-172.					2.1	
ilesystem	Type				Use%	Mounted on
evtmpfs	devtmpfs			474M		/dev
mpfs	tapfs	483M	ö			/dev/shm
mpfs	tmpfs	483M	412K	482M		/run
mpfs	tmpfs	483M	-+12k	483M		/sys/fs/cgroup
dev/xvda1	xfs	8.0G	1.6G		20%	
mofs		8.00 97M	1.00	0.50 97M		/ /run/user/1000
	tmpfs			370	0,è	/run/user/1000
root@ip-172	21-1-21 605	-user_	# sat			

Fig7: Created 10 files in SaiGopi-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.SaiGopi-MachineB EBS volume contains all the ten txt files.



https://aws.amazon.com/amazon-linux-2/ 13 package(s) needed for security, out of 16 available Run "sudo yum update" to apply all updates. [ec2-user@ip-172-31-8-108 ~]\$ sudo su [root@ip-172-31-8-108 ec2-user]# lsblk MAJ:MIN RM SIZE RO TYPE MOUNTPOINT NAME 8G 0 disk xvda 202:0 0 └─xvda1 202:1 0 8G 0 part / 202:80 0 1G 0 disk xvdf [root@ip-172-31-8-108 ec2-user]# df -hT Size Used Avail Use% Mounted on Filesystem Type devtmpfs 474M 0% /dev devtmpfs 0 474M tmpfs 483M 0% /dev/shm tmpfs 0 483M tmpfs tmpfs 483M 412K 482M 1% /run 0 483M 0% /sys/fs/cgroup tmpfs tmpfs 483M /dev/xvda1 8.0G 1.6G 6.5G 20% / xfs tmpfs 97M 97M 0% /run/user/1000 tmpfs 0 [root@ip-172-31-8-108 ec2-user]# ls [root@ip-172-31-8-108 ec2-user]# fdisk -1 Disk /dev/xvda: 8 GiB, 8589934592 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: 2330CCC2-270B-42AA-8CB6-AB640F80B1B4 Device End Sectors Size Type Start /dev/xvda1 4096 16777182 16773087 8G Linux filesystem /dev/xvda128 2048 4095 2048 1M BIOS boot Partition table entries are not in disk order. Disk /dev/xvdf: 1 GiB, 1073741824 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-172-31-8-108 ec2-user]# mkdir SaiGopi-Attach [root@ip-172-31-8-108 ec2-user]# mount -t xfs /dev/xvdf /home/ec2-user/SaiGopi-Attach/ [root@ip-172-31-8-108 ec2-user]# cd SaiGopi-Attach/ [root@ip-172-31-8-108 SaiGopi-Attach]# ls 10.txt 1.txt 2.txt 3.txt 4.txt 5.txt 6.txt 7.txt 8.txt 9.txt [root@ip-172-31-8-108 SaiGopi-Attach]# cat

Fig8:SaiGopi-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 (SaiGopi-EBS) in Sydney 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

2.04			[Alt+5]							0 4 0	- Syr	dney *
-	ccessfully created snapshot pshots (1)	сору злар	PO4C12303114808567.					C	🛛 Recycle Bin	Actions ¥	Gri	ate snap
Ow	ned by me 💌 🛛 Q. Search	ń.										(1.)
	Name	*	Snapshot ID	Ŧ	Size	*	Description	-	Storage w	Snapshot status	Ψ.	Starte
ű,	SaiGopi-Snapshot		snap-0839d650d06d3237c	9	1 Gið		SaiGopi-Snapshot		Standard			2022/1

Fig 9: Snaphot created in Tokyo region from SaiGopi-EBS volume

Voli	imes (2)									C Ad	tions 🔻 Grea
Q.	Search										0
	Name	Volu	*	Ψ.	S v			Snapshot v		Availability Zo 👻	Volume state 🗵
	S.	vol-0419.	1	g	8 GiB	1	1	snap-03f58d3d918e5	2	ap-northeast-1c	⊗ In-use
	SaiGopi-SnapshotCopyVolume	vol-0265.		g	1 GiB	·		snap-04c7e3b5f14e6	2	ap-northeast-1c	@In-use

Fig 10: volume created from copy snapshot in Tokyo region

10.Create a SaiGopi-Machine C in Tokyo region and attachthe EBS volume created from Snapshot copy

11.Now connect to SaiGopi-Machine C and create a new storage directory named SaiGopi-SnaphotVolume and mount it.

12.switch to the SaiGopi-SnaphotVolume directory and check the list of files in it.

```
Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
13 package(s) needed for security, out of 16 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-172-31-9-249 ~]$ sudo su
root@ip-172-31-9-249 ec2-user]# lsblk
        MAJ:MIN RM SIZE RO TYPE MOUNTPOINT
NAME
        202:0 0 8G 0 disk
xvda
        202:1 0 8G 0 part /
202:80 0 1G 0 disk
 -xvda1 202:1
cvdf
               Type Size Used Avail Use% Mounted on
devtmpfs 474M 0 474M or
[root@ip-172-31-9-249 ec2-user]# df -hT
ilesystem
devtmpfs
tmpfs
                tmpfs
                          483M
                                   @ 483M
                                               0% /dev/shm
tmpfs
                tmpfs
                          483M 412K 482M
                                               1% /run
                tmpfs
                          483M
                                       483M
                                              0% /sys/fs/cgroup
tmpfs
                                  6
/dev/xvda1
               xfs
                          8.0G 1.6G 6.5G 20% /
               tmpfs
                                               0% /run/user/1000
mpfs
root@ip-172-31-9-249 ec2-user]# fdisk -1
Disk /dev/xvda: 8 GiB, 8589934592 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
isklabel type: gpt
Disk identifier: 2330CCC2-2708-42AA-8C86-A8640F808184
Device
             Start
                         End Sectors Size Type
/dev/xvda1
              4096 16777182 16773087 8G Linux filesystem
/dev/xvda128 2048
                        4095
                                  2048 1M BIOS boot
Partition table entries are not in disk order.
Disk /dev/xvdf: 1 GiB, 1073741824 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-172-31-9-249 ec2-user]# mkdir SaiGopi-SnapshotVolume
root@ip-172-31-9-249 ec2-user]# mount -t xfs /dev/xvdf /home/ec2-user/SaiGopi-SnapshotVolume/
root@ip-172-31-9-249 ec2-user]# cd SaiGopi-SnapshotVolume/
root@ip-172-31-9-249 SaiGopi-SnapshotVolume]# ls
10.txt 1.txt 2.txt 3.txt 4.txt 5.txt 6.txt 7.txt 8.txt 9.txt
   at@in-172-21-0-240 SaiGoni-SnanshatVolume]#
```

Fig 11: SaiGopi-Machine C SnapshotVolume

4.AMI

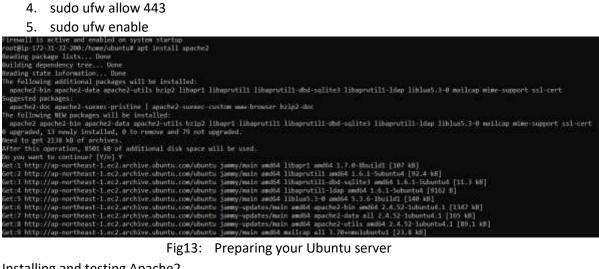
An Amazon Machine Image (AMI) is a template that contains a software configuration (for example, an operating system, an application server, and applications). From an AMI, you launch an instance, which is a copy of the AMI running as a virtual server in the cloud.

Steps:

- Created an SaiGopi-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

	Name	.w.	Instance ID	1	Instance state 🛛 🗢 🗌	Instance type IN	8	Status check	Alarm state	is:
	SaiGopi-Machine1		i-03b981391c8f996bf		@Running @Q	t2.micro		Ø 2/2 checks passet	No alarms	+
0	SaiGopi-Machine1	-	i-0b22d7ee72260d012		⊖ Terminated @Q	t2.micro		-	No alarms	+
Insta	ance: i-03b981391c8f996bf (!	SaiGo	pi-Machine1)		=					
Detai	s. Security Networking	Sto	rage Status checks		Monitoring Tags					
v 10	stance summary Info									
leistar Ø i-	ice ID 03b981391c8f996bf (SaiGopi-Machine	e1)	Public IPv4 ad		open address 🗹			rivate IPv4 addresses Ø 172.31.32.200		
			Fig12: S	ai	Gopi-Machine:	1				

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



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

root@ip-172-3	are running outdated hypervisor (qemu) binaries on this host. 1-32-200:/home/ubuntu# systemctl status apaché2 vice - The Apache HTTP Server	
Loaded: Active: Docs: Main PID: Tasks: Memory: CPU:	<pre>loaded (/lib/systemd/system/apache2.service; enabled; vendor preset: active (running) since Sun 2022-11-13 17:35:41 UTC; 15s ago https://httpd.apache.arg/docs/2.4/ 2463 (apache2) 55 (limit: 1143) 4.94</pre>	enabled)
Nov 13 17:35:	41 ip-172-31-32-200 systemd[1]: Starting The Apache HTTP Server 41 ip-172-31-32-200 systemd[1]: Started The Apache HTTP Server. 11-32-200:/home/ubuntu#	

Fig 14: Testing apache2

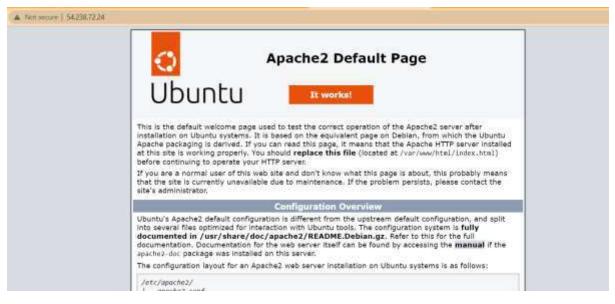


Fig 15: Testing apache2 on browser

• Installing and testing PHP

A Not secure | 54.

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

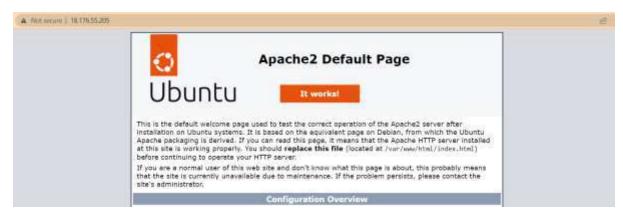
PHP Version 8.1.2-Jubuntu2.8	Php
System	Linux (p. 172-31-32-200 % 15-0-1019 weiii 828-Linutia SMP Weid Aug 17-18-33-18-815-2022 A80_04
Build Date	Nex 2 2022 13 26 25
Build System	ina
Server API	Apache 2.0 Hander
Artual Directory Support	dnutžet .
Configuration File (php.ini) Path	Wr.shp/E https://www.shp/E https://www.shp/E https://www.shp/E https://www.shp/E https://www.shp/E https://www
soded Configuration #ile	weichteiß hierschritighte m
Scan this dir for additional Jni files	securpt Maache 2 confit
Additional ini Ries parant	Interstell, Napachezhani al 15-apachezhani in interstelli Tapachezhani al 20-polaini, Interstelli Napachezhani al 15-apachezhani in interstelli Tapachezhani al 20-polaini, interstelli na interstelli Napachezhani al 20-bit interstelli Napachezhani al 20-bit interstelli na Hanna interstelli Napachezhani al 20-bit interstelli Napachezhani al 20-bit interstelli na Hanna interstelli Napachezhani al 20-bit interstelli Napachezhani al 20-bit interstelli na Hanna interstelli Napachezhani al 20-bit interstelli Napachezhani al 20-bit interstelli Napachezhani Hanna interstelli Napachezhani al 20-bit interstelli Napachezhani al 20-bit interstelli Napachezhani Hanna interstelli Napachezhani al 20-bit interstelli Napachezhani al 20-bit interstelli Napachezhani Heropopeli Napachezhani al 20-bit vylosen interstelli Napachezhani di 20-bit vylosen interstelli Napachezhani i
PHP API	20210902
PHP Extension	20240302
Cend Estension	4282/10000
Dend Extension Build	APA00210602.NTB
PHP Extension Build	AP120210962.NT6
Debug Build	fa:
Thread Safety	Dial Art

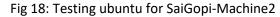
Fig 16: Testing PHP on browser

- Now create AMI from existing instance
- 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

<pre>\Users\Sai Gopi\Downloads>ssh -i "TOKYO.pem" root@ec2-18-176-55-205.ap-northeast-1.compute.amazonaws.com he authenticity of host 'ec2-18-176-55-205.ap-northeast-1.compute.amazonaws.com (18.176.55.205)' can't be established. D25519 key fingerprint is SHA256:oryzIHyJXsD6kCy2RyngHZuEapjSR/kq34hFYFz4bIM. his key is not known by any other names re you sure you want to continue connecting (yes/no/[fingerprint])? yes arning: Permanently added 'ec2-18-176-55-205.ap-northeast-1.compute.amazonaws.com' (ED25519) to the list of known hosts. lease login as the user "ubuntu" rather than the user "root".</pre>
sh -1 "TOKYO.pem" root@ec2-18-176-55-205.ap-northeast-1.compute.amazonaws.comConnection to ec2-18-176-55-205.ap-northeast-1.comp
:\Users\Sai Gopi\Downloads>ssh -i "TOKYO.pem" ubuntu@ec2-18-176-55-205.ap-northeast-1.compute.amazonaws.com elcome to Ubuntu 22.04.1 LTS (GMU/Linux 5.15.0-1019-aws x86_64)
* Documentation: https://help.ubuntu.com * Nanagement: https://landscape.cemonical.com * Support: https://ubuntu.com/advantage
System information as of Sun Nov 13 18:57:58 UTC 2022
System load: 0.3046875 Processes: 112 Usage of /: 22.4% of 7.5268 Users logged in: 0 Memory usage: 21% IPv4 address for eth0: 172.31.32.196 Swap usage: 0% 0% 0%
 Ubuntu Pro delivers the most comprehensive open source security and compliance features.
https://ubuntu.com/aws/pro
4 updates can be applied immediately. 4 of these updates are standard security updates. o see these additional updates run: apt listupgradable
ast login: Sun Nov 13 17:33:41 2022 from 175.101.107.225 buntullip-172-31-32-196:- \$ sudo su pot@ip-172-31-32-196:/home/ubuntu# cat

Fig 17: SaiGopi-Machine2





A.1

PHP Version 8,1.2-1ubuntu2.8	php
System	Lanux (p. 172) 31: 32: 196 5: 15: 11: 10: 197 ann: 423-Utranta SMP Viet Avg. 17: 18: 53: 12: UTC 2023 x88; 54
Build Date	14xx 7 3013 13 15 25
Build System	Lifex
Server API	Apache 2.0 Handler
Virtual Directory Support	diamen
Configuration File (php.int) Path	(vicipipi)8. Napache2
Loaded Configuration File	wophp/E Sepachelitytp in
Scan this dir for additional (ni files	b ImmiGentangel Englishi
Additional Ini files parsed	Hoppurit Trapachedroni di Hoppache Jai, Woppurit Trapachedroni d'IO-poolei, into physit Trapachedroni di Hoppache Jain, incurping Trapachedroni d'20-chpie ne Medopet Trapachedroni di Deala ne, vechopet Trapachedroni di Dia recopetati Trapachedroni di Di Rento as, vectorpoli Trapachedroni d'20-bain, vectorpoli Trapachedroni d'20-chpienni. Netophysit Trapachedroni d'20-easies, interpretati Trapachedroni d'20-phiers, vectorpoli Trapachedroni di pressie, vectorpoli Trapachedroni d'20-easies ne, vectorpoli Trapachedroni d'20-phiers, vectorpoli Trapachedroni di pressie, vectorpoli Trapachedroni d'20-easies ne, vectorpoli Trapachedroni d'20-phiers, vectorpoli Trapachedroni d' pressies, vectorpoli Trapachedroni d'20-easies ne, vectorpoli Trapachedroni d'20-phiers, vectorpoli Trapachedroni d' especies d'approximati d'20-easies ne, vectorpoli Trapachedroni d'20-phiers, vectorpoli Trapachedroni d' especies d'approximati d'20-easies ne, vectorpoli Trapachedroni d'20-phiers, vectorpoli d'20-phiers,

Fig 19: Testing ubuntu for SaiGopi-Machine2

5. Load Balancer

Steps:

- Create a EC2 machine (SaiGopi-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.

Q.	Find instance by	attribu	te or tag (case-sensitive)							
	Name	V	Instance ID	Instance state	-	Instance type 🛛	Status check	Alarm status	14	wailability Zone
~	SaiGopi-A		i-04b05bf28e24549cd		QQ	t2.micro	Ø 2/2 checks passed	No alarms	+ 4	is-west-2c
1	SaiGopi-2		1-09cb0533eaccd3a27	@ Running		t2.micro	⊘ 2/2 checks passed	No alarms	+3 30	zs-west-2c
0	SalGopi-1	-	I-OcOfddef876af708e		ଭ୍ୟ	t2.mkro	Ø 2/2 checks passed	No alarms	+ 4	rs-west-Zc
Inst	tance: i-04b(05bf2	8e24549cd (SaiGopi-A)			=				
Deta	eits Securi	ty	Networking Storage	Status check	s M	onitoring Tags				
w li	nstance summa	ry info								
				101.7 (a) 101.7 (101.7 a)	Conduction of		Priv	ate IPv4 addr	esses:	
Inista	iote ID i-04b05bf28e24	549cd (SaiGopi-A)	Public IPvi D 34,223		open address 🗹		172.31.0.166		
Insta		549cd (SaiGopi-A)	Ö 34,22	2.88.140	open address 🖸 aiGopi-A		172.31.0.166		
insta	i-04b05bf28e24		ala ni erik tenar, an rarrari	₫ 34.22. Fig	2.88:140 g20: S	aiGopi-A	o			availability 2
insta	-04b05bf28e24		Instance ID	 Fig Instance stat 	2.88:140 g20: S te ♥	aiGopi-A	C • Status check	Alarmstat	145	- en
insta	-04b05bf28e24 Name SaiGopi-A		ala ni erik terasi sarananan	S4.22 Fig	2.88.140 g20: S ଜ୍ଲ 💌 ଜ୍ଲ୍	aiGopi-A	 Status check 2/2 checks passed 	Alarm stat	us +	Availabílity Z us-west-2c us-west-2c
insta	-04b05bf28e24		Instance ID 1-04b05bf25e24549cd	 Fig Instance stat 	2.88:140 g20: S te ♥	aiGopi-A Instance type t2.micro	C • Status check	Alarm stat No alarms	uis + +	
	-04b05b128e24 Name SalGopi-A SalGopi-2		Instance ID I-04b05bf28e24549cd I-09cb0535eaccd3a27	S4.22 Fig Instance stat O Running Running	2.88.140 g20: S ଜ୍ର ଜ୍ର ଜ୍ର	aiGopi-A Instance type 1 12.micro 12.micro	 Status check 2/2 checks passed 2/2 checks passed 	Alarm stat No alarms	uis + +	us-west-2c us-west-2c
	-04b05bf28e24 Name SalGopi-A SalGopi-1 SalGopi-1	• 1	Instance ID I-04b05bf28e24549cd I-09cb0535eaccd3a27 I-0c0fddef875af708e	S4.22 Fig Instance stat O Running Running	2.88.140 g20: S ଜ୍ର ଜ୍ର ଜ୍ର	aiGopi-A Instance type 1 12.micro 12.micro	 Status check 2/2 checks passed 2/2 checks passed 	Alarm stat No alarms	uis + +	us-west-2c us-west-2c
	-04b05bf28e24 Name SalGopi-A SalGopi-1 SalGopi-1	• 1	Instance ID I-04b05bf28e24549cd I-09cb0535eaccd3a27	S4.22 Fig Instance stat O Running Running	2.88.140 g20: S ଜ୍ର ଜ୍ର ଜ୍ର	aiGopi-A Instance type 1 12.micro 12.micro	 Status check 2/2 checks passed 2/2 checks passed 	Alarm stat No alarms	uis + +	us-west-2c us-west-2c
	I-O4b05bf28e24 Name SalGopi-A SalGopi-2 SalGopi-1	♥	Instance ID I-04b05bf28e24549cd I-09cb0535eaccd3a27 I-0c0fddef875af708e	S4.22 Fig Instance stat O Running Running	g20: S @QQ @QQ	aiGopi-A Instance type 1 12.micro 12.micro		Alarm stat No alarms	uis + +	us-west-2c us-west-2c
insta C Inst Oeta	I-O4b05bf28e24 Name SalGopi-A SalGopi-2 SalGopi-1	♥ fddeft	Instance ID I-04b05bf25e24549cd I-09cb0535eaccd3a27 I-0c0fddef875af708e 876af708e (SaiGopi-1) Networking Storage	S4.22 Fig Instance stat O Running O Running O Running	g20: S @QQ @QQ	aiGopi-A Instance type 1 t2.micro t2.micro 12.micro		Alarm stat No alarms	uis + +	us-west-2c us-west-2c

Fig21: SaiGopi-1

-94	чта таатсе ву	attrico	ne or rag (case-sensitivity)								
	Name	Ψ	Instance ID	Instance state		Instance type	v	Status check	Alarm statu	s	Availability Zor
	SaiGopi-A		i-04b05bf28e24549cd	@ Running	QQ	t2.micro		⊘ 2/2 checks passed	No alarms	+	us-west-2c
	5aiGopi-2		H09cb0533eaccd3a27		QQ	t2.micro		Ø 2/2 checks passed	No alarms	+	us-west-2c
0:	SaiGopi-1		F-0c0fddef876af708e	@ Running	ଉଦ	t2.micro		⊘ 2/2 checks passed	No alarms	+	us-west-2c
						=					
Inst	ance: i-09cb	0533	eaccd3a27 (SaiGopi-2)								
Deta	is Securit	y	Networking Storage	Status check	s I	tonitoring	Tags				
w la	stance summar	y info									
	nce 10			Public IPv					ivate IPv4 add		
0	09cb0533eacc	13a27 (SaiGopi-2)	6 34-22	3.247.11	open address [2	0	172.31.10.2	22	
				Fig	g22: S	aiGopi-22					
Am	azon Mach	nine	Images (AMIs) (1) in	fo			C	🖸 Recycle Bin		EC2 Ir	nage Builder
			Q Find AMI by attribute	or tag							
	ned by me 🦄		and the second second second second second								
	ned by me 🖪 Name		V AMI ID		∀ 4	MI name		v 5	ource		

Fig23: AMI

- 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 (SaiGopi-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 (SaiGopi-APLBTG) and include your target machines under it.
- Now connect your Target Group to your Load balancer and click on create.

	get groups (1/1) 🖬							(1.2		Create targ	
۹	Search or fliter target gro	supe.									< 1	> @
	Name	∀ ARN			Port		Protocol		arget type	ii ¥	Load bala	ncer
2	SaiGopi-APLBTG	đa	n:aws;elasticloadbal	ancin	80		нттр	In	stance		SaiGopi-A	PLB
arget	t group: SaiGopi-Al	PLBTG				2						>
Reg	istered targets (2)							E	C	Deregister	Register t	argets
Q.	Filter resources by prope	g er value									< 1	0
	Instance ID		Name =	Port		Zone	.92	Health stat	18	♥ Healt	h status details	
	+09cb0533eaccd3a2	7	SaiGopi-Z	80		us-west-2	0	() healthy				
			0.0000000000000000000000000000000000000									
	i-OcOfddef876af708e		SalGopi-1	80 Fig2	24: Ta	us-west-2 rget Gr		() healthy				
			SaiGopi-1		24: Ta			⊘ healthy				K
	+-OcOfddef876af708s éter by tags and attributes Name	ar bearch by Key • DNS ni	SailGopi-1 word	Fig2	24: Ta	rget Gr	oup vecio			Availability Zor		ie .
Q, F	+-OcOfddef876af708e (for by tags and attributes	or search by Key • DNS na SarGop	SaiGopi-1	Fig2	24: Ta	rget Gr	oup vecio			Availability Zor 16-west-2c, us-u		
Q, F	I-OcOfddef876af708e (fer by tags and attributes Name SarGopi-APLB	or search by Key • DNS na SarGop	SailGopi-1 word	Fig2 - State Active		rget Gr	oup vecio					ie .
Q, F	Octofedder876af708e Here by tags and attributes Name SaGopi-APL8 balancer: SalGopi-AP cription Listeners	or search by Key • DNS na SarGop	SailGopi-1 word me IAPLB-1166845986	Fig2 - State Active		rget Gr	oup vecio					ie .
Q, F	Octofiddef876af708e Mame SarGopi-APLB balancer: SarGopi-APLB cription Listeners sic Configuration	or search by Key • DNS na SarGop LB Monitoring	SailGopi-1 word IAPLB: 1186845986 Integrated service	Fig2 - State Active		rget Gr	oup vecio					ie .
Q, F Coad I Desi	Octofedder876af708e Here by tags and attributes Name SaGopi-APL8 balancer: SalGopi-AP cription Listeners	ar search by Key DNS ni SarGop SarGop-A SarGop-A	SailGopi-1 word word hAPLB-1166845986	Fig2 State Active Tags		rget Gr	oup vecito vecitori	Ob118b/492549.	5 i	15 west 2c, us i		ie .
Q, F Load I Desi	OctOfddef876af708e Mame SaGop-APLB balancer: SalGopi-APL cription Listeners sic Configuration Name	ar search by Kry DNS na SarGop LB Monitoring SarGopi-A arri.aws;el	SailGopi-1 wind APLB-1166845966 Integrated service PLB asticloadbalancingue	Fig2 State Active es Tags s-west-2011	36202083	rget Gr	oup vecito vecitori	Ob118b/492549.	5 i	15 west 2c, us i		ie .

Fig25: Load Balancer

- 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 Load balancer

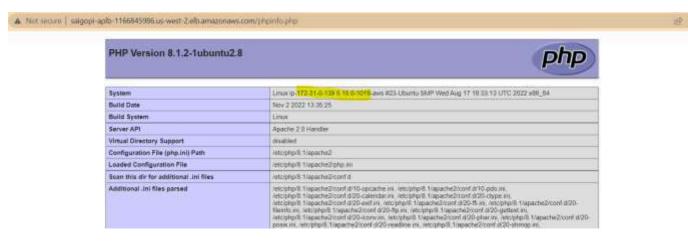


Fig 27: Connecting to Machine1 using LB

A

PHP Version 8.1.2-1ubuntu2.8	Php
System	Unux ip-172-31-10-222 5-15 0-1019-ews #23-Ubuntu SMP Wed Aug 17-18-33-13 UTC 2022 x88_64
Build Date	Nov 2 2022 13 35 25
Build System	Linue
Server APt	Apache 2.0 Handler
Virtual Directory Support	dsabled
Configuration File (php.ini) Path	Jetciphp/8, tispachie2
Loaded Configuration File	http://www.ingache2/php.mi
Scan this dir for additional .ini files	/etclphp% Napache2/conf d
Additional .ini files parsed	Jetolphpiß Napache2/conf d10-opcache.im, /etciphpiß Napache2/conf d10-pdo.im, /etciphpiß Napache2/conf d20-casimilar.im, /etciphpiß Napache2/conf d20-film, /etciphpiß Napache2/conf d20- filende.im, /etciphpiß Napache2/conf d20-estim, /etciphpiß Napache2/conf d20-film, /etciphpiß Napache2/conf d20- filende.im, /etciphpiß Napache2/conf d20-estim, /etciphpiß Napache2/conf d20-period.im, /etciphpiß Napache2/conf d20-estim, /etciphpiß Napache2/conf d20-period.im, /etciphpiß Napache2/conf d20-estim, /etciphpiß Napache2/conf d20-period.im, /etciphpiß Napache2/conf d20-ackets.im, /etciphpiß Napache2/conf d20-eyewineg in, /etciphpiß Napache2/conf d20-askets.im, /etciphpiß Napache2/conf d20-system.im, /etciphpiß Napache2/conf d20-askets.im, /etciphpiß Napache2/conf d20-system.im,

Fig 28: Connecting to Machine2 using LB

6. VPC with 2 public subnets & 2 private subnet having Internet gateway and NAT gateway

Steps:

- Create a VPC with 192.168.0.0/16 range.
- Create an Internet Gateway and attach it to the VPC created

Name	4	VPC ID	V	State	Ψ.	IPv4 CIDR
SaiGopi-VPC A		vpc-0d69682daf9b795	a0	⊘ Available	¢.	192.168.0.0/16
-		vpc-0ebc6663e8377ae	b3	@ Available	8	172.31.0.0/16
	SaiGopi-VPC A	SaiGopi-VPC A	SaiGopi-VPC A vpc-0d69682daf9b795	SaiGopi-VPC A vpc-0d69682daf9b795a0	SaiGopi-VPC A vpc-0d69682daf9b795a0 O Available	SaiGopi-VPC A vpc-0d69682daf9b795a0 O Available

Fig 29: VPC

- Create Two private and two public subnets with the range:
 - 1. SaiGopi-VPCA- PRVSN1 >> 192.168.0.0/24
 - 2. SaiGopi-VPCA- PRVSN2 >> 192.168.1.0/24
 - 3. SaiGopi-VPCA- PUBSN1>> 192.168.2.0/24
 - 4. SaiGopi-VPCA- PUBSN2 >> 192.168.3.0/24

	Name	φ.	Subnet ID	Ψ.	State	4	VPC	Ψ.	IPv4 CIDR
•	SalGopi-VPCA-PUB5N1		subnet-045b29723e2b0186a	1	 Available 		vpc-0d69682da19b795a0 Sa	hier.	192.168.2.0/24
	SaiGopi-VPCA-PUB5N2		subnet-De9ee3e03e21580ed		⊘ Available		vpc-0d69682daf9b795a0 5a	hin -	192,168.3.0/24
			subnet-0426a3f3a7ede3100		⊘ Available		vpc-Debc6663e8377aeb3		172.31.16.0/20
	SaiGopi-VPCA-PRVSN1		subnet-0329b24ec6e173b7b	γ.	 Available 		vpc-0d69682da19b795a015a	644 S	192,168.0.0/24
10	24		subnet-00549a52040bbed36		⊘ Available		vpc-Oebc6663e8377aeb3		172.31.0.0/20
	SaiGopi-VPCA-PRVSN2		subnet-007b8487b82f840ce		@Available		vpc-0d69682daf9b795a015a	(Sp)	192,168.1.0/24
	- E - ¹⁰		subnet-06444667cZef027e4		⊘ Available		vpc-Debc6663e8377aeb3		172.31.32.0/20

Fig 30: Subnets

- Create Two route tables i.e one public and one private
 - 1. SaiGopi-VPCA-PUBRT
 - 2. SaiGopi-VPCA-PRVRT

	Name	v	Route table ID	V	Explicit subnet associat	Edge associations	Main	3
1	5		rtb-059c7bca3f0d09da6			<i>a</i>	Yes	
8	SaiGopi-VPC/	A-PUBRT	rtb-0e92b9434c306719e		2 subnets	14	No	
ĺ.	SaiGopi-VPC/	A-PRVRT	rtb-0c593935f03f6a2b6		2 subnets	10	No	
ĺ.	÷		rtb-0d1f9c94e43390491		э.	>	Yes	
Sul	bnet ID		v	IP	v4 CIDR	Ψ	IPv6 CI	DR
sub	net-043b29723	e2b0186a /	SaiGopi-VPCA-PUBSN1	19	2.168.2.0/24		-	
			SaiGopi-VPCA-PUBSN2		2.168.3.0/24			

Fig 31: Public Route Table

- Associate the private route table to the existing private subnets
- Associate the public route table to the existing public subnets and the Internet Gateway

	- 6			55N
)	SaiGopi-VPCA-PUBRT	rtb-0e92b9434c306719e	2 subnets	-
2	SaiGopi-VPCA-PRVRT	rtb-0c593935f03f6a2b6	2 subnets	-
]	1 11	rtb-0d1f9c94e43390491	-	776
C	\ Find subnet association		=	
			IPv4 CIDR	
Su	bnet ID		IPv4 CIDR	
Su sut		SaiGopi-VPCA-PRVSN1	== IPv4 CIDR 192.168.0.0/24	

Fig 32: Private Route Table

- Create a New Security Group and add rules in the Inbound Traffic allowing SSH, All ICMP IPV4 and All TCP types .
- Now create Two EC2 instances with the newly created security group and under network edit option choose the Newly created VPC and the corresponding subnets
 - 1. SaiGopi-PRVSN1
 - 2. SaiGopi-PUBSN1

	Name	4	Instance ID	10	Instance stat	e 🛛	Instance type	Ø	Status check	Alarm stat	us
0	SaiGopi-PUBSN1		i-003f12cd7885a	idd34	⊘ Running	QQ	t2.micro		@ 2/2 checks passed	No alarms	
3	SaiGopi-PRVSN1		i-0b569355d39e0	0184d	⊖ Terminate	0 @ Q	t2.micro		1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 - 1411 -	No alarms	
~	SaiGopi-PRVSN1		-0bb3e64ea7a67	7e822	@ Running	QQ	t2.micro		Ø 2/2 checks passec	No alarms	
	SaiGopi-PUBSN1		I-02a69528bd264	496c6	⊖ Terminate	d Q Q	t2.micro		-	No alarms	
nst	ance: i-0bb3e64ea7	a67e822	(SaiGopi-PRV	/SN1)		-					
			20 110022400000111	1							
Deta	ils Security N	a67e822 etworking	(SaiGopi-PRV Storage	/SN1) Status che	ecks Moni	= toring	Tags	ØP	rivate IPv4 address.cop		
v Ir	ils Security No		20 110022400000111	Status che				Ø P led			
Deta ▼ Ir rista	ils Security N	etworking	Storage	Status che Public IP	ecks Moni Py4 address 206.95.247 op	toring	Tags	led.	rivate IPv4 address.cop	ri 3585	
v Ir ristar Øi	ils Security Ni Instance summary into Ince ID	etworking	Storage	Status che Public IP	Pv4 address 206.95.247 op	toring	Tags	led.	s Johns of e-t loans		

Fig 33: EC2 machines

- Now connect to the EC2 Public machine from SSH client and ping from it
- We can able to ping from this machine
- Now connect to the EC2 Private machine from SSH client and try to ping
- We can see we are not able to connect to the machine and also we are not able to ping from it.

```
CDSA key fingerprint is SHA256:qpuztVrAP7t8YS/bTzN1JN/Dkcoz/lm/4dUFAKEoDW8
CDSA key fingerprint is MD5:71:3f:e7:f5:0f:78:32:d0:ca:47:4a:9a:b1:54:86:db.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added '192.168.0.150' (ECDSA) to the list of known hosts.
                         Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
ec2-user@ip-192-168-0-150 -]$ sudo su
root@ip-192-168-0-150 ec2-user]# ping google
ping: google: Name or service not known
root@ip-192-168-0-150 ec2-user]# ping google.com
PING google.com (142.250.207.14) 56(84) bytes of data.
 -- google.com ping statistics --
17 packets transmitted, 0 received, 100% packet loss, time 16360ms
root@ip-192-168-0-150 ec2-user]# ssh -i "SaiGopi.pem" ec2-user@43.206.95.247
Marning: Identity file SaiGopi.pem not accessible: No such file or directory.
[root@ip-192-168-0-150 ec2-user]# ping google.com
PING google.com (142.250.207.14) 56(84) bytes of data.
54 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=1 ttl=102 time=4.78 ms
54 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=2 ttl=102 time=4.11 ms
54 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=3 ttl=102 time=4.05 ms
i4 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=4 ttl=102 time=4.03 ms
54 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=5 ttl=102 time=4.02 ms
54 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=6 ttl=102 time=4.04 ms
4 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=7 tt1=102 time=4.01 ms
54 bytes from nrt13s54-in-f14.1e100.net (142.250.207.14): icmp_seq=8 ttl=102 time=4.03 ms
 -- google.com ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7008ms
tt min/avg/max/mdev = 4.019/4.137/4.780/0.246 ms
[root@ip-192-168-0-150 ec2-user]# cat
```

Fig 34: Connecting to Public machine

- So We try to ping the Private machine from public machine , which will give an error of key not exists.
- So we copy the pem file into the Public machine using secure copy Scp -i .\SaiGopi.pem -r .\SaiGopi.pem ec2-user@public machine private ip address :/present working directory of Public machine.
- Grant the permission to the pem file chmod 700
- Now you can able to connect the private machine from the public machine.
- Now you are able to connect to the private machine but still you are not able to ping since its not connected to any internet Gateway.
- So for this purpose we use Nat Gateway in order to provide internet for the private machines.
- Create a Nat Gateway and allocate an elastic Ip .
- Now go to the Private route table and under routes add the Nat Gateway and now connect to this machine and ping from it

```
C:\Users\Sai Gopi\Downloads>ssh -i "SaiGopi.pem" ec2-user@35.77.9.139
The authenticity of host '35.77.9.139 (35.77.9.139)' can't be established.
ED25519 key fingerprint is SHA256:Z6JctaKbnoMbU8zSUSOi4sgSpj0Tde1Dq7Jg1LL1fes.
This key is not known by any other names
Are you sure you want to continue connecting (yes/no/[fingerprint])? yes
Warning: Permanently added '35.77.9.139' (ED25519) 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-192-168-2-140 ~]$ sudo su
[root@ip-192-168-2-140 ec2-user]# ping 192.168.0.150
PING 192.168.0.150 (192.168.0.150) 56(84) bytes of data.
64 bytes from 192.168.0.150: icmp_seq=1 ttl=255 time=0.983 ms
64 bytes from 192.168.0.150: icmp_seq=2 ttl=255 time=0.511 ms
64 bytes from 192.168.0.150: icmp_seq=3 ttl=255 time=0.485 ms
64 bytes from 192.168.0.150: icmp_seq=4 ttl=255 time=0.567 ms
64 bytes from 192.168.0.150: icmp_seq=5 ttl=255 time=0.557 ms
64 bytes from 192.168.0.150: icmp_seq=6 ttl=255 time=0.561 ms
64 bytes from 192.168.0.150: icmp_seq=7 ttl=255 time=0.499 ms
64 bytes from 192.168.0.150: icmp_seq=8 ttl=255 time=0.537 ms
64 bytes from 192.168.0.150: icmp_seq=9 ttl=255 time=0.603 ms
64 bytes from 192.168.0.150: icmp_seq=11 ttl=255 time=0.422 ms
64 bytes from 192.168.0.150: icmp_seq=12 ttl=255 time=0.532 ms
64 bytes from 192.168.0.150: icmp_seq=13 ttl=255 time=0.528 ms
64 bytes from 192.168.0.150: icmp_seq=14 ttl=255 time=0.525 ms
64 bytes from 192.168.0.150: icmp_seq=15 ttl=255 time=0.650 ms
64 bytes from 192.168.0.150: icmp seq=16 ttl=255 time=0.505 ms
64 bytes from 192.168.0.150: icmp seq=17 ttl=255 time=0.524 ms
^С
--- 192.168.0.150 ping statistics ---
17 packets transmitted, 17 received, 0% packet loss, time 16348ms
rtt min/avg/max/mdev = 0.422/0.558/0.983/0.118 ms
```

Fig 35: Connecting to Private machine

7. VPC Peering

- 10	GW 🔵	VPC A 10.100.0.0/16			VPC B 10.200.0.0/
ublic IP, tivate IP	EC2-A- Public	Public Subnet A 10.100.0.0/24			3
		AZ1	VPC Peering	THERE	AZ1
rivate IP	ECS.4	Private Subnet B 10.100.1.0/24	ssh or ping	Private IP	Private Subnet B 10.200.1.0/24
rivate IP	EC2-A- Private		ssh or ping	EG	2-В

Steps:

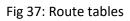
- 1. Creation of two VPC's
 - VPC A >> 10.100.0.0/16
 - VPC B >> 10.200.0.0/16

0
۲
DHCP
dopt-0
dopt-0
dopt-0
•



- 2. Creation of Route Tables
 - VPC A-PUB RT
 - VPC A-PRV RT
 - VPC B PRV RT

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tables (6) 🔐	nto					C	Actions *	Greate	route tab	le C
tter roote tables								<	1 >	۲
Name	Ψ	Route table ID	Ψ	Explicit subnet associat	Edge associations	Main 🔻	VPC		Ŷ	Ov
		rtb-0eda5f763882d0	f9f	a	57.5	Yes	vpc-01967f324	4d98789fa	VPCB	01
VPC A PUB RT		rtb-05386b6632bb3e	194	subnet-0d23e2ebfb7b8		No	vpc-02621604	991505e5c	VP	01
VPC B PRV RT		rtb-0c2309b38Sa6b1	a34	subnet-025F688bd2b8c	243	No	vpc-01967f324	4d98789fa	VPC B	01
3		rtb-0693d6f4583bd5	2e3	-	-	Yes	vpc-Dac981ac0	la3e73fc3		01
VPC A PRV RT		rtb-01d7c305c2e606	4f8	subnet-0295007b1f1b5		No	vpc-02621604	991505e5c	VP	01
i		rtb-07fb64939e0d75	998	-		Yes	vpc-02621604	991505e5c	VP	01.+
									Colonia Coloni	



3. Creation of Subnets

- VPC A-PUBSN A >>10.100.0.0/24
- VPC A-PRVSN B >>10.100.1.0/24
- VPC B PRV B >>10.200.1.0/24

ets (6) Info		id more [Ait+	<u> </u>					C Actions V	0) Tokyo * Create subne	saigo
ilter subnets									<	(1)	0
Name	v	Subnet ID	v	State	v	VPC	v	IPv4 CIDR	V	IPv6 CIDR	1
		subnet-01a99032e38138ede		⊘ Available		vpc-Oac981ac0a3e73fc3		172.31.16.0/20			
VPC A-PUBSN	A	subnet-0d23e2ebfb7b8bbcc		⊘ Available		vpc-02621604991505e5c 1	/P	10.100.0.0/24		<i>.</i>	
VPC A -PRVSN	В	subnet-0295007b1f1b59cb4		⊘ Available		vpc-02621604991505e5c 1	/P	10.100.1.0/24			
		subnet-00e93c3650aae642c		⊘ Available		vpc-0ac981ac0a3e73fc3		172.31.0.0/20		-	
		subnet-0f3d187ba70710d24		⊘ Available		vpc-0ac981ac0a3e73fc3		172.31.32.0/20		2	
VPC B PRV B		subnet-025f688bd2b8c1aec		⊘ Available		vpc-01967f324d98789fa V	PCB	10.200.1.0/24		2	

Fig 38: Subnets

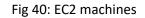
- 4. Creation of Internet Gateway
 - VPC A IGW

fới san	vises, features, blog	is, docs, an	id more [Att+S						۵ ¢	0	Tokyo 1		aigopi
0 In	iternet gateway igv	v-089f032	8c752eae80 successfully attached	to vpc-0c5a	8f48e4bdea45	b						x	0
Inte	rnet gateways	; (1/1) i	nto					C Actions V	Grea	te intern	et gatew	ay .	
Q	Filter externet gate	wiijis:								K	1 >	0	
	Name	¥.	Internet gateway ID	Ψ	State	ų.	VPC ID	v	Owner			v	
	VPC A IGW		igw-089f0326c752cae80		Attache	d	vpc-0c5a8f48	še4bdea45b VPC A	0136202	19347			Ť

Fig 39: Internet Gateway

- 5. Attaching the subnets to corresponding route tables.
 - VPC A-PUBSN A to VPC A-PUB RT
 - VPC A-PRVSN B to VPC A-PRV RT
 - VPC B PRV B to VPC B PRV RT
- 6. Attaching Internet gateway to VPC
 - VPC A IGW to VPC A
- 7. Attaching route table to internet gateway
 - VPC A PUB RT to VPC A IGW
- 8. Creation of EC2 instances
 - OPEN EC2 instances and click on launch instance
 - Give EC2 instance a name and create a new key pair and select t2.micro instance type.
 - Under Network settings select the related VPC ,subnet and enable the public IP
 - Create a new security group and later edit the inbound and outbound rules to enable all IPV4 addresses.
 - And click on create instance.
 - ➢ EC2 VPCA-PUB
 - EC2 VPCA-PRV
 - EC2 VPCB-PRV

Q	Find instance b	y attribi	ite or tag (case-sensitive)					2000 B	214		
	Name	V	Instance ID	Instance state	v	Instance type	▼	Status check	Alarm statu	as i	Avail
0	EC2-VPCA-P	UB	i-00d07574c709e4ef0	⊖ Terminater	0.0	t2.micro		ž.	No alarms	+	ap-ni
D)	EC2-VPCA-P	RV	i-0c7b91d5960903217		QQ	t2.micro		Ø 2/2 checks passed	No alarms	+	ap-ni
	EC2-VPCA-P	UB	I-0019ff7968d023900	@ Running	QQ	t2.micro		⊘ 2/2 checks passed	No alarms	+	ap-n
~	EC2-VPC B F	RV	i-03b3e5267aa132403	@ Running	QQ	t2.micro		2	No alarms	+	ap-n



9. Connecting to first EC2 machine >> EC2 VPCA-PUB

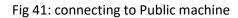
ec2-user@ip-10-100-0-154:~

Microsoft Windows [Version 10.0.22000.1098] (c) Microsoft Corporation. All rights reserved. C:\Users\Sai Gopi\Downloads≻ssh -i "TOKYO.pem" ec2-use

C:\Users\Sai Gopi\Downloads>ssh -i "TOKYO.pem" ec2-user@3.113.5.151 The authenticity of host '3.113.5.151 (3.113.5.151)' can't be established. ECDSA key fingerprint is SHA256:2JIm1u6LQbhvTDhfQ644Ih5E/NWQU/CJ5ewRU/WfYgY. Are you sure you want to continue connecting (yes/no/[fingerprint])? YES Warning: Permanently added '3.113.5.151' (ECDSA) to the list of known hosts.

Amazon Linux 2 AMI

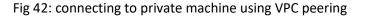
https://aws.amazon.com/amazon-linux-2/
13 package(s) needed for security, out of 16 available
Run "sudo yum update" to apply all updates.
[ec2-user@ip-10-100-0-154 ~]\$ _



10. Now trying to ping the EC2 VPCA-PRV machine from EC2 VPCA-PUB machine by using private IP of EC2 VPCA-PRV machine

root@ip-10-100-0-154:/home/ec2-user

```
[root@ip-10-100-0-154 ec2-user]# ping 10.100.1.226
PING 10.100.1.226 (10.100.1.226) 56(84) bytes of data.
64 bytes from 10.100.1.226: icmp_seq=1 ttl=255 time=0.425 ms
64 bytes from 10.100.1.226: icmp_seq=2 ttl=255 time=0.544 ms
64 bytes from 10.100.1.226: icmp_seq=3 ttl=255 time=0.416 ms
64 bytes from 10.100.1.226: icmp_seq=5 ttl=255 time=0.382 ms
64 bytes from 10.100.1.226: icmp_seq=6 ttl=255 time=0.446 ms
64 bytes from 10.100.1.226: icmp_seq=7 ttl=255 time=0.446 ms
64 bytes from 10.100.1.226: icmp_seq=8 ttl=255 time=0.449 ms
64 bytes from 10.100.1.226: icmp_seq=8 ttl=255 time=0.4471 ms
^C
--- 10.100.1.226 ping statistics ---
8 packets transmitted, 8 received, 0% packet loss, time 7128ms
rtt min/avg/max/mdev = 0.382/0.723/2.656/0.732 ms
[root@ip-10-100-0-154 ec2-user]# _
```



- 11. I am unable to ssh the machine as it requires the .pem file .so copying the .pem file to EC2 VPCA-PUB 10-100-0-151 ec2user.
 - scp -i .\TOKYO.pem -r .\TOKYO.pem ec2-user@publicmachine ip address :/Present working direcorty.
 - Connect to the machine and ping from it.

```
64 bytes from 10.100.1.226: icmp_seq=2 ttl=255 time=0.487 ms
64 bytes from 10.100.1.226: icmp_seq=4 ttl=255 time=0.532 ms
^C
--- 10.100.1.226 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3049ms
rtt min/avg/max/mdev = 0.392/0.500/0.589/0.072 ms
[root@ip-10-100-0-154 ec2-user]# ssh -i "TOKYO.pem" ec2-user@54.178.163.32
^C
[root@ip-10-100-0-154 ec2-user]# ls -1
total 4
-rw-rw-r-- 1 ec2-user ec2-user 1674 Oct 27 18:26 TOKYO.pem
[root@ip-10-100-0-154 ec2-user]# chmod 700 TOKYO.pem
[root@ip-10-100-0-154 ec2-user]# ls-1
bash: 1s-1: command not found
[root@ip-10-100-0-154 ec2-user]# ls -1
total 4
-rwx----- 1 ec2-user ec2-user 1674 Oct 27 18:26 TOKYO.pem
[root@ip-10-100-0-154 ec2-user]# ^Ch -i "TOKY0.pem" ec2-user@54.178.163.32
[root@ip-10-100-0-154 ec2-user]# ssh -i TOKY0.pem ec2-user@10.100.1.226
                       Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-100-1-226 ~]$ _
```

	Name	V	Peering connection ID 🛛 🕫	Status	4	Requester VPC	Accepter VPC
0	Peering VPC		pcx-0a10168be305db0ae	@ Active		vpc-02621604991505e5c / VP	vpc-D1967f324d98789fa / VP

Fig 43: VPC Peering

12.Now connecting to the private EC2 machine from VPC peering

```
64 bytes from 10.100.1.226: icmp_seq=2 ttl=255 time=0.487 ms
64 bytes from 10.100.1.226: icmp_seq=3 ttl=255 time=0.589 ms
64 bytes from 10.100.1.226: icmp_seq=4 ttl=255 time=0.532 ms
^C
--- 10.100.1.226 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3049ms
rtt min/avg/max/mdev = 0.392/0.500/0.589/0.072 ms
[root@ip-10-100-0-154 ec2-user]# ssh -i "TOKYO.pem" ec2-user@54.178.163.32
^C
[root@ip-10-100-0-154 ec2-user]# ls -1
total 4
-rw-rw-r-- 1 ec2-user ec2-user 1674 Oct 27 18:26 TOKYO.pem
[root@ip-10-100-0-154 ec2-user]# chmod 700 TOKYO.pem
[root@ip-10-100-0-154 ec2-user]# ls-1
bash: 1s-1: command not found
[root@ip-10-100-0-154 ec2-user]# ls -1
total 4
-rwx----- 1 ec2-user ec2-user 1674 Oct 27 18:26 TOKYO.pem
[root@ip-10-100-0-154 ec2-user]# ^Ch -i "TOKYO.pem" ec2-user@54.178.163.32
[root@ip-10-100-0-154 ec2-user]# ssh -i TOKYO.pem ec2-user@10.100.1.226
                      Amazon Linux 2 AMI
https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-100-1-226 ~]$ sudo su
[root@ip-10-100-1-226 ec2-user]# ping google
ping: google: Name or service not known
[root@ip-10-100-1-226 ec2-user]# ping 10.200.1.12
PING 10.200.1.12 (10.200.1.12) 56(84) bytes of data.
64 bytes from 10.200.1.12: icmp_seq=1 ttl=255 time=2.23 ms
64 bytes from 10.200.1.12: icmp_seq=2 ttl=255 time=1.88 ms
64 bytes from 10.200.1.12: icmp_seq=3 ttl=255 time=1.88 ms
64 bytes from 10.200.1.12: icmp_seq=4 ttl=255 time=1.96 ms
64 bytes from 10.200.1.12: icmp_seq=5 ttl=255 time=1.95 ms
64 bytes from 10.200.1.12: icmp_seq=6 ttl=255 time=1.99 ms
^C
--- 10.200.1.12 ping statistics --
6 packets transmitted, 6 received, 0% packet loss, time 5006ms
rtt min/avg/max/mdev = 1.880/1.985/2.234/0.118 ms
[root@ip-10-100-1-226 ec2-user]# _
```

Fig 44: EC2 machine by VPC peering