Module 8: Terraform
Assignment - 5

Tasks To Be Performed:

1. Destroy the previous deployments
2. Create a script to install Apache2
3. Run this script on a newly created EC2 instance
4. Print the IP address of the instance in a file on the local once deployed

aws **Services** Q *Search* [Option+S]

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EC2

EC2 > Instances > Launch an instance

Launch an instance Info

Amazon EC2 allows you to create virtual machines, or instances, that run on the AWS Cloud. Quickly get started by following the simple steps below.

Name and tags Info

Name

Terraform-server

Add additional tags

▼ Application and OS Images (Amazon Machine Image) Info

An AMI is a template that contains the software configuration (operating system, application server, and applications) required to launch your instance. Search or Browse for AMIs if you don't see what you are looking for below

Q *Search our full catalog including 1000s of application and OS images*

Recents   **Quick Start**

▼ Summary

Number of instances   Info

1

Software Image (AMI)

Amazon Linux 2023 AMI 2023.5.2...read more
ami-0ba9883b710b05ac6

Virtual server type (instance type)

t2.micro

Firewall (security group)

New security group

Storage (volumes)

1 volume(s) - 8 GiB

ⓘ **Free tier:** In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is

✕

Cancel   **Launch instance**

Review commands

>_ CloudShell   Feedback

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EC2

Recents | **Quick Start**

Amazon Linux	macOS	Ubuntu	Windows	Red Hat	SUSE
aws	Mac	ubuntu	Microsoft	RedHat	SU

Browse more AMIs
Including AMIs from AWS, Marketplace and the Community

Amazon Machine Image (AMI)

Ubuntu Server 22.04 LTS (HVM), SSD Volume Type   Free tier eligible
ami-0a0e5d9c7acc336f1 (64-bit (x86)) / ami-070f589e4b4a3fece (64-bit (Arm))
Virtualization: hvm   ENA enabled: true   Root device type: ebs

Description

Ubuntu Server 22.04 LTS (HVM),EBS General Purpose (SSD) Volume Type. Support available from Canonical (http://www.ubuntu.com/cloud/services).

Architecture

64-bit (x86) ▼

AMI ID

ami-0a0e5d9c7acc336f1

Verified provider

▼ **Summary**

Number of instances   Info

1

Software Image (AMI)

Canonical, Ubuntu, 22.04 LTS, ...read more
ami-0a0e5d9c7acc336f1

Virtual server type (instance type)

t2.micro

Firewall (security group)

New security group

Storage (volumes)

1 volume(s) - 8 GiB

ⓘ **Free tier:** In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is

Cancel   **Launch instance**

Review commands

▼ **Instance type**   Info | Get advice

Instance type

aws   Services   Q Search   [Option+S]   N. Virginia ▼   rsujithsri16@gmail.com ▼

EC2

▼ Key pair (login) Info

You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.

Key pair name - *required*

sujithohio   ▼   C Create new key pair

▼ Network settings Info   Edit

Network   Info

vpc-06a980b08a54688af

Subnet   Info

No preference (Default subnet in any availability zone)

Auto-assign public IP   Info

Enable

Additional charges apply when outside of free tier allowance

Firewall (security groups)   Info

A security group is a set of firewall rules that control the traffic for your instance. Add rules to allow specific traffic to reach your instance.

○ Create security group   ● Select existing security group

▼ Summary

Number of instances   Info

1

Software Image (AMI)

Canonical, Ubuntu, 22.04 LTS, ...read more
ami-0a0e5d9c7acc336f1

Virtual server type (instance type)

t2.micro

Firewall (security group)

default

Storage (volumes)

1 volume(s) - 8 GiB

ⓘ **Free tier:** In your first year includes 750 hours of t2.micro (or t3.micro in the Regions in which t2.micro is   ✕

Cancel   **Launch instance**

Review commands

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EC2

○ Create security group   ● Select existing security group

Common security groups **Info**

Select security groups   ▼

default   sg-06d9c74e80448682b ✕   ↻   **Compare security**
VPC: vpc-06a980b08a54688af   **group rules**

Security groups that you add or remove here will be added to or removed from all your network interfaces.

▼ **Configure storage** **Info**   Advanced

1x [8] GiB [gp2   ▼]   Root volume (Not encrypted)

ⓘ Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic   ✕
   storage

[Add new volume]

The selected AMI contains more instance store volumes than the instance allows. Only the first 0 instance store
volumes from the AMI will be accessible from the instance

🕐 Click refresh to view backup information   ↻
The tags that you assign determine whether the instance will be backed up by any
Data Lifecycle Manager policies.

▼ Summary

Number of instances **Info**

[1]

Software Image (AMI)
Canonical, Ubuntu, 22.04 LTS, ...read more
ami-0a0e5d9c7acc336f1

Virtual server type (instance type)
t2.micro

Firewall (security group)
default

Storage (volumes)
1 volume(s) - 8 GiB

ⓘ **Free tier:** In your first year includes   ✕
   750 hours of t2.micro (or t3.micro
   in the Regions in which t2.micro is

Cancel   **Launch instance**

Review commands

aws :::: Services   Q Search   [Option+S]   N. Virginia ▾   rsujithsri16@gmail.com ▾

EC2

EC2 > Instances > Launch an instance

⊘ **Success**
Successfully initiated launch of instance (i-03bfc52da839d5347)

▶ **Launch log**

Next Steps

Q What would you like to do next with this instance, for example "create alarm" or "create backup"

‹ **1** 2 3 4 5 6 ›

Create billing and free tier usage alerts

To manage costs and avoid surprise bills, set up email notifications for billing and free tier usage thresholds.

Create billing alerts ⤢

Connect to your instance

Once your instance is running, log into it from your local computer.

Connect to instance ⤢

Learn more ⤢

Connect an RDS database

Configure the connection between an EC2 instance and a database to allow traffic flow between them.

Connect an RDS database ⤢

Create a new RDS database ⤢

Learn more ⤢

Create EBS snapshot policy

Create a policy that automates the creation, retention, and deletion of EBS snapshots

Create EBS snapshot policy ⤢

aws — Services — Search [Option+S]

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EC2

⚠ **All ports are open to all IPv4 addresses in your security group**
All ports are currently open to all IPv4 addresses, indicated by **All** and **0.0.0.0/0** in the inbound rule in
your security group. For increased security, consider restricting access to only the EC2 Instance Connect
service IP addresses for your Region: 18.206.107.24/29. Learn more.

Instance ID

📋 i-03bfc52da839d5347 (Terraform-server)

Connection Type

🔘 **Connect using EC2 Instance Connect**
Connect using the EC2 Instance Connect browser-based
client, with a public IPv4 address.

⚪ **Connect using EC2 Instance Connect Endpoint**
Connect using the EC2 Instance Connect browser-based
client, with a private IPv4 address and a VPC endpoint.

Public IP address

📋 18.205.234.44

Username

Enter the username defined in the AMI used to launch the instance. If you didn't define a custom username, use the default username,
ubuntu.

🔍 ubuntu   ✕

ⓘ **Note:** In most cases, the default username, ubuntu, is correct. However, read your AMI usage instructions
to check if the AMI owner has changed the default AMI username.

Cancel   **Connect**

aws ▦ Services Q Search [Option+S] ⊡ ⬠ ⑦ ⚙ N. Virginia ▼ rsujithsri16@gmail.com ▼

⬛ EC2

```
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-172-31-23-15:~$ sudo apt update
Hit:1 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy InRelease
Get:2 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates InRelease [128 kB]
Get:3 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports InRelease [127 kB]
Get:4 http://security.ubuntu.com/ubuntu jammy-security InRelease [129 kB]
Get:5 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 Packages [14.1 MB]
Get:6 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe Translation-en [5652 kB]
Get:7 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/universe amd64 c-n-f Metadata [286 kB]
Get:8 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 Packages [217 kB]
Get:9 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse Translation-en [112 kB]
Get:10 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy/multiverse amd64 c-n-f Metadata [8372 B]
Get:11 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [1902 kB]
Get:12 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main Translation-en [339 kB]
Get:13 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/main amd64 c-n-f Metadata [17.7 kB]
Get:14 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 Packages [2259 kB]
Get:15 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted Translation-en [388 kB]
Get:16 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/restricted amd64 c-n-f Metadata [604 B]
Get:17 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1110 kB]
```

i-03bfc52da839d5347 (Terraform-server) ✕

PublicIPs: 18.205.234.44 PrivateIPs: 172.31.23.15

```
Get:26 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/restricted amd64 c-n-f Metadata [116 B]
Get:27 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 Packages [28.8 kB]
Get:28 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe Translation-en [16.5 kB]
Get:29 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/universe amd64 c-n-f Metadata [672 B]
Get:30 http://us-east-1.ec2.archive.ubuntu.com/ubuntu jammy-backports/multiverse amd64 c-n-f Metadata [116 B]
Get:31 http://security.ubuntu.com/ubuntu jammy-security/main amd64 Packages [1684 kB]
Get:32 http://security.ubuntu.com/ubuntu jammy-security/main Translation-en [280 kB]
Get:33 http://security.ubuntu.com/ubuntu jammy-security/main amd64 c-n-f Metadata [13.1 kB]
Get:34 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 Packages [2184 kB]
Get:35 http://security.ubuntu.com/ubuntu jammy-security/restricted Translation-en [375 kB]
Get:36 http://security.ubuntu.com/ubuntu jammy-security/restricted amd64 c-n-f Metadata [572 B]
Get:37 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 Packages [888 kB]
Get:38 http://security.ubuntu.com/ubuntu jammy-security/universe Translation-en [173 kB]
Get:39 http://security.ubuntu.com/ubuntu jammy-security/universe amd64 c-n-f Metadata [18.9 kB]
Get:40 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 Packages [37.2 kB]
Get:41 http://security.ubuntu.com/ubuntu jammy-security/multiverse Translation-en [7588 B]
Get:42 http://security.ubuntu.com/ubuntu jammy-security/multiverse amd64 c-n-f Metadata [228 B]
Fetched 32.9 MB in 6s (5620 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
25 packages can be upgraded. Run 'apt list --upgradable' to see them.
ubuntu@ip-172-31-23-15:~$ mkdir assignment
ubuntu@ip-172-31-23-15:~$ cd assignment
ubuntu@ip-172-31-23-15:~/assignment$ sudo nano terra.sh
ubuntu@ip-172-31-23-15:~/assignment$ bash terra.sh
--2024-08-06 01:51:05--  https://apt.releases.hashicorp.com/gpg
Resolving apt.releases.hashicorp.com (apt.releases.hashicorp.com)... 99.84.108.40, 99.84.108.74, 99.84.108.3, ...
Connecting to apt.releases.hashicorp.com (apt.releases.hashicorp.com)|99.84.108.40|:443... connected.
HTTP request sent, awaiting response... 200 OK
```

i-03bfc52da839d5347 (Terraform-server)   ✕

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15

aws   ::: Services   Q Search   [Option+S]   N. Virginia ▼   rsujithsri16@gmail.com ▼

EC2

```
GNU nano 6.2                                    terra.sh *
wget -O- https://apt.releases.hashicorp.com/gpg | sudo gpg --dearmor -o /usr/share/keyrings/hashicorp-archive-keyring.gpg
echo "deb [signed-by=/usr/share/keyrings/hashicorp-archive-keyring.gpg] https://apt.releases.hashicorp.com $(lsb_release -cs) main" | sudo te
sudo apt update && sudo apt install terraform
```

```
^G Help        ^O Write Out   ^W Where Is    ^K Cut         ^T Execute     ^C Location    M-U Undo      M-A Set Mark   M-] To Bracket
^X Exit        ^R Read File    ^\ Replace    ^U Paste       ^J Justify     ^/ Go To Line  M-E Redo      M-6 Copy       ^Q Where Was
```

i-03bfc52da839d5347 (Terraform-server)   ✕

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15

us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?connType=standard&instanceId=i-03bfc52da839d5347&osUser=ubuntu&regio...

Relaunch to update

aws   Services   Q Search   [Option+S]   N. Virginia ▼   rsujithsri16@gmail.com ▼

EC2

```
Need to get 28.0 MB of archives.
After this operation, 89.0 MB of additional disk space will be used.
Get:1 https://apt.releases.hashicorp.com jammy/main amd64 terraform amd64 1.9.3-1 [28.0 MB]
Fetched 28.0 MB in 0s (73.7 MB/s)
Selecting previously unselected package terraform.
(Reading database ... 65320 files and directories currently installed.)
Preparing to unpack .../terraform_1.9.3-1_amd64.deb ...
Unpacking terraform (1.9.3-1) ...
Setting up terraform (1.9.3-1) ...
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.
ubuntu@ip-172-31-23-15:~/assignment$ sudo nano main.tf
ubuntu@ip-172-31-23-15:~/assignment$ terraform init
Initializing the backend...
Initializing provider plugins...
- Finding latest version of hashicorp/aws...
- Installing hashicorp/aws v5.61.0...
- Installed hashicorp/aws v5.61.0 (signed by HashiCorp)
```

i-03bfc52da839d5347 (Terraform-server)   ✕

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15

aws   Services   Q Search   [Option+S]   N. Virginia ▼   rsujithsri16@gmail.com ▼

EC2

```
  GNU nano 6.2                                    main.tf *
provider "aws" {
  access_key = "AKIAYYL4MR7SAH7N327O"
  secret_key = "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"
  region = "us-east-1"
}
resource "aws_instance" "a5-instance" {
  ami = "ami-0a0e5d9c7acc336f1"
  instance_type = "t2.micro"
  key_name = "sujithohio"
  user_data = "${file("install.sh")}"
  tags = {
     Name = "a5-instance"
     }
}
output "IPv4" {
value = aws_instance.a5-instance.public_ip
}
```

```
^G Help       ^O Write Out   ^W Where Is   ^K Cut     ^T Execute   ^C Location    M-U Undo   M-A Set Mark   M-] To Bracket
^X Exit       ^R Read File   ^\ Replace    ^U Paste   ^J Justify   ^/ Go To Line  M-E Redo   M-6 Copy       ^Q Where Was
```

i-03bfc52da839d5347 (Terraform-server)   ✕

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15

EC2

```
ubuntu@ip-172-31-23-15:~/assignment$ install.sh
install.sh: command not found
ubuntu@ip-172-31-23-15:~/assignment$ sudo nano install.sh
ubuntu@ip-172-31-23-15:~/assignment$ terraform init
Initializing the backend...
Initializing provider plugins...
- Reusing previous version of hashicorp/aws from the dependency lock file
- Using previously-installed hashicorp/aws v5.61.0

Terraform has been successfully initialized!

You may now begin working with Terraform. Try running "terraform plan" to see
any changes that are required for your infrastructure. All Terraform commands
should now work.

If you ever set or change modules or backend configuration for Terraform,
rerun this command to reinitialize your working directory. If you forget, other
commands will detect it and remind you to do so if necessary.
ubuntu@ip-172-31-23-15:~/assignment$ terraform plan

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
  + create

Terraform will perform the following actions:

  # aws_instance.a5-instance will be created
  + resource "aws_instance" "a5-instance" {
      + ami                          = "ami-0a0e5d9c7acc336f1"
      + arn                          = (known after apply)
```

i-03bfc52da839d5347 (Terraform-server)   ✕

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15

us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?connType=standard&instanceId=i-03bfc52da839d5347&osUser=ubuntu&regio...

aws   ::: Services   Q Search   [Option+S]   N. Virginia ▼   rsujithsri16@gmail.com ▼

EC2

```
GNU nano 6.2                                    install.sh *
#!/bin/bash
sudo apt update -y
sudo apt install apache2 -y
sudo su
echo "Custom html page" > /var/www/html/index.html
```

```
^G Help       ^O Write Out   ^W Where Is   ^K Cut       ^T Execute   ^C Location   M-U Undo   M-A Set Mark   M-] To Bracket
^X Exit       ^R Read File    ^\ Replace   ^U Paste     ^J Justify   ^/ Go To Line M-E Redo   M-6 Copy       ^Q Where Was
```

i-03bfc52da839d5347 (Terraform-server)   ✕

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15

```
    + network_interface (known after apply)

    + private_dns_name_options (known after apply)

    + root_block_device (known after apply)
  }

Plan: 1 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + IPv4 = (known after apply)

Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: yes

aws_instance.a5-instance: Creating...
aws_instance.a5-instance: Still creating... [10s elapsed]
aws_instance.a5-instance: Still creating... [20s elapsed]
aws_instance.a5-instance: Still creating... [30s elapsed]
aws_instance.a5-instance: Creation complete after 32s [id=i-042ab53bb6790cc3d]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

Outputs:

IPv4 = "52.201.240.154"
ubuntu@ip-172-31-23-15:~/assignment$
```

i-03bfc52da839d5347 (Terraform-server)

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15

aws   ⠿ Services   Q Search   [Option+S]   ⌨   🔔   ?   ⚙   N. Virginia ▾   rsujithsri16@gmail.com ▾

EC2

```
      + root_block_device (known after apply)
    }

Plan: 1 to add, 0 to change, 0 to destroy.

Changes to Outputs:
  + IPv4 = (known after apply)

Do you want to perform these actions?
  Terraform will perform the actions described above.
  Only 'yes' will be accepted to approve.

  Enter a value: yes

aws_instance.a5-instance: Creating...
aws_instance.a5-instance: Still creating... [10s elapsed]
aws_instance.a5-instance: Still creating... [20s elapsed]
aws_instance.a5-instance: Still creating... [30s elapsed]
aws_instance.a5-instance: Creation complete after 32s [id=i-042ab53bb6790cc3d]

Apply complete! Resources: 1 added, 0 changed, 0 destroyed.

Outputs:

IPv4 = "52.201.240.154"
ubuntu@ip-172-31-23-15:~/assignment$ terraform destroy
aws_instance.a5-instance: Refreshing state... [id=i-042ab53bb6790cc3d]

Terraform used the selected providers to generate the following execution plan. Resource actions are indicated with the following symbols:
```

i-03bfc52da839d5347 (Terraform-server)   ✕

PublicIPs: 18.205.234.44   PrivateIPs: 172.31.23.15