Terraform Task1

VAIBHAV BENGADE

ROLL NO : 01

EMAIL : vaibhavb2016@gmail.com

1. Notes on Terraform

a. What is Terraform?

Terraform is an open-source infrastructure as code (IaC) tool developed by HashiCorp. It allows users to define and provision data center infrastructure using a high-level configuration language called HashiCorp Configuration Language (HCL). Terraform manages external resources (such as public cloud infrastructure, private cloud infrastructure, network appliances, software as a service, and platform as a service) with a modular and efficient approach.

b. Why Terraform?

Terraform is widely used for several reasons:

1. **Platform Agnostic**: Terraform supports multiple service providers, including AWS, Azure, Google Cloud, and others, making it versatile for various cloud environments.
2. **Infrastructure as Code**: Enables writing and managing infrastructure through code, which promotes version control, collaboration, and automation.
3. **Declarative Language**: Users describe the desired state of their infrastructure, and Terraform takes care of achieving that state.
4. **Modular and Reusable**: Supports modular configurations, making it easy to reuse code for different projects and teams.
5. **State Management**: Keeps track of infrastructure state, ensuring updates and changes are applied correctly and safely.

c. Benefits of Terraform

1. **Scalability**: Simplifies scaling infrastructure up or down by modifying configuration files.
2. **Consistency**: Ensures consistent environments across different deployments by using the same configuration files.
3. **Collaboration**: Facilitates teamwork through shared configuration files and version control.
4. **Automation**: Automates the provisioning and management of infrastructure, reducing manual intervention and errors.
5. **Cost-Effective**: Optimizes resource management and minimizes unnecessary expenditures.

2. Launching Two EC2 Instances

To launch two EC2 instances named "myapp-1" and "myapp-2" using Amazon Linux OS in the `ap-south-1` region, follow these Terraform steps:

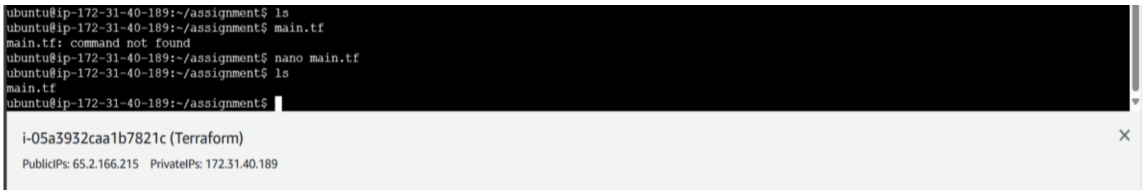
1. **Create a Terraform Configuration File**: create a new file named `main.tf`.

```
provider "aws" {
  region     = "ap-south-1"
  access_key = "AKIA4MTTRYQCL6HZ"
  secret_key = "Ad9jTGv4evN511/JCb3qfYdqn/bhRIt"
}


resource "aws_instance" "myapp_1" {
  ami           = "ami-0e1d0622679bc1c5"  # Replace with the latest Amazon Linux 2 AMI ID
  instance_type = "t2.micro"
  tags = {
    Name = "myapp-1"
  }
}


resource "aws_instance" "myapp_2" {
  ami           = "ami-0e1d06225679c1c5" # Replace with the latest Amazon Linux 2 AMI ID
  instance_type = "t2.micro"
  tags = {
    Name = "myapp-2"
  }
}
```

After creating this file use terraform init command for iniatialization

Then use terraform plan and after terraform apply

nano main.tf

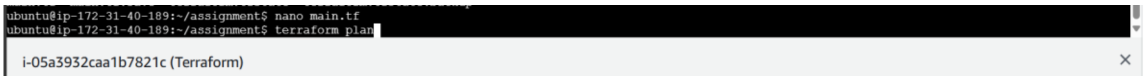


```
ubuntu@ip-172-31-40-189:~/assignment$ ls
ubuntu@ip-172-31-40-189:~/assignment$ main.tf
main.tf: command not found
ubuntu@ip-172-31-40-189:~/assignment$ nano main.tf
ubuntu@ip-172-31-40-189:~/assignment$ ls
main.tf
ubuntu@ip-172-31-40-189:~/assignment$
```

i-05a3932caa1b7821c (Terraform)

PublicIPs: 65.2.166.215 PrivateIPs: 172.31.40.189

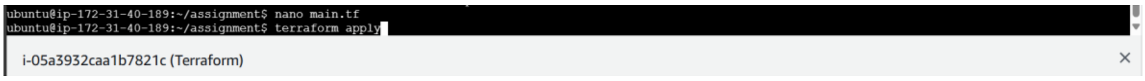
terraform plan



```
ubuntu@ip-172-31-40-189:~/assignment$ nano main.tf
ubuntu@ip-172-31-40-189:~/assignment$ terraform plan
```

i-05a3932caa1b7821c (Terraform)

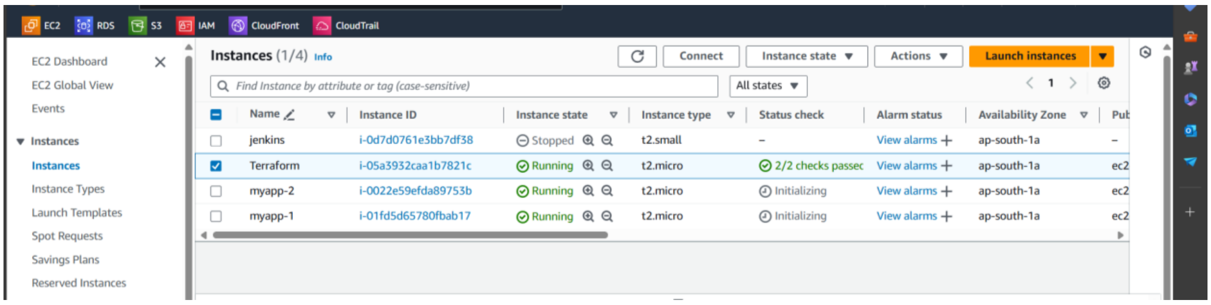
terraform apply



```
ubuntu@ip-172-31-40-189:~/assignment$ nano main.tf
ubuntu@ip-172-31-40-189:~/assignment$ terraform apply
```

i-05a3932caa1b7821c (Terraform)

This is output



Instances (1/4) Info

Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Pub
jenkins	i-0d7d0761e3bb7df38	Stopped	t2.small	–	View alarms	ap-south-1a	–
Terraform	i-05a3932caa1b7821c	Running	t2.micro	2/2 checks passec	View alarms	ap-south-1a	ec2
myapp-2	i-0022e59efda89753b	Running	t2.micro	Initializing	View alarms	ap-south-1a	ec2
myapp-1	i-01fd5d65780fbab17	Running	t2.micro	Initializing	View alarms	ap-south-1a	ec2

3. Installing Terraform, Integrating AWS, and Launching an EC2 Instance

Installing Terraform

1. **Download Terraform**: Download the Terraform binary from the Terraform website.
2. **Install Terraform**: Unzip the binary and move it to a directory included in your system's PATH.

```
$ unzip terraform_<VERSION>_linux_amd64.zip
$ sudo mv terraform /usr/local/bin/
$ terraform --version
```

Integrating AWS with Terraform

1. **Configure AWS CLI**: Install and configure the AWS CLI with your credentials.

```
$ aws configure
```

2. **Set Up VS Code**: Install the Terraform extension for Visual Studio Code.

Launching an EC2 Instance using VS Code

2. **Create a Terraform Configuration File**: In VS Code, create a new file named `main.tf`.

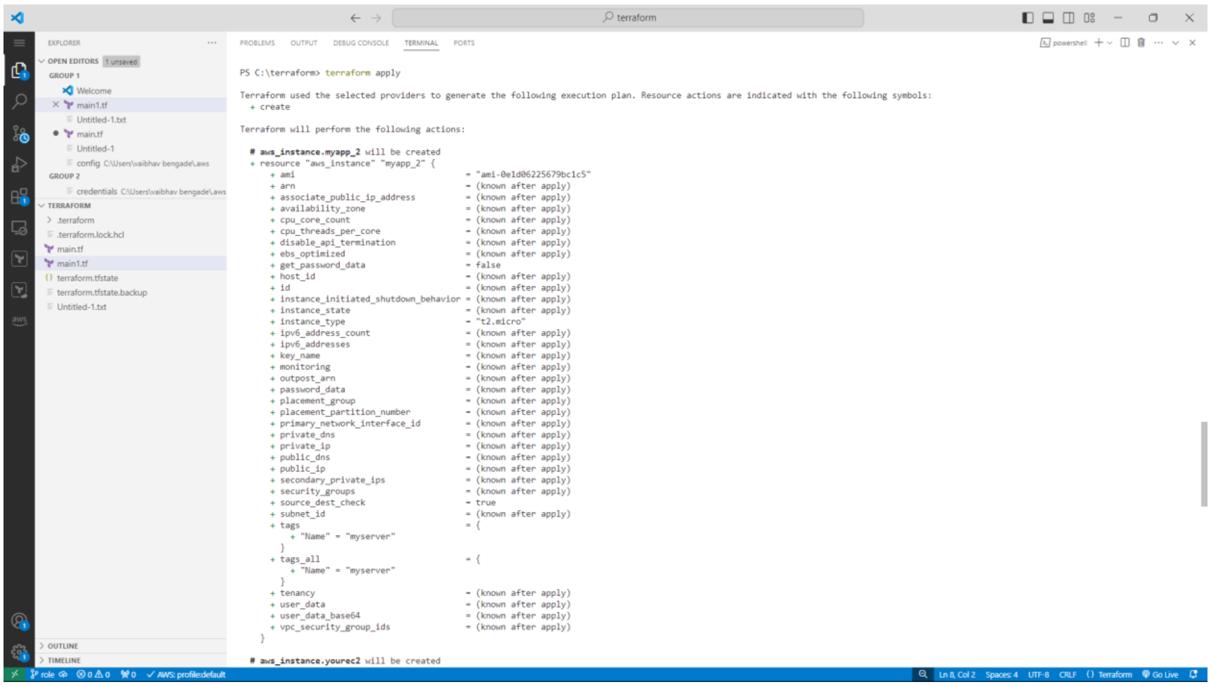
```
resource "aws_instance" "myapp_2" {
  ami           = "ami-0e1d06225679bc1c5"

  instance_type = "t2.micro"
  tags = {
    Name = "myserver"
  }
}
provider "aws" {
  region     = "ap-south-1"
  access_key = "AKIA4MTWNJ2TRYQCLZ"
  secret_key = "Ad9jTGv4evN511Nog/JCb3qfYdqn/bhRIt"
}
```

2. **Initialize Terraform**: Initialize Terraform in your working directory.

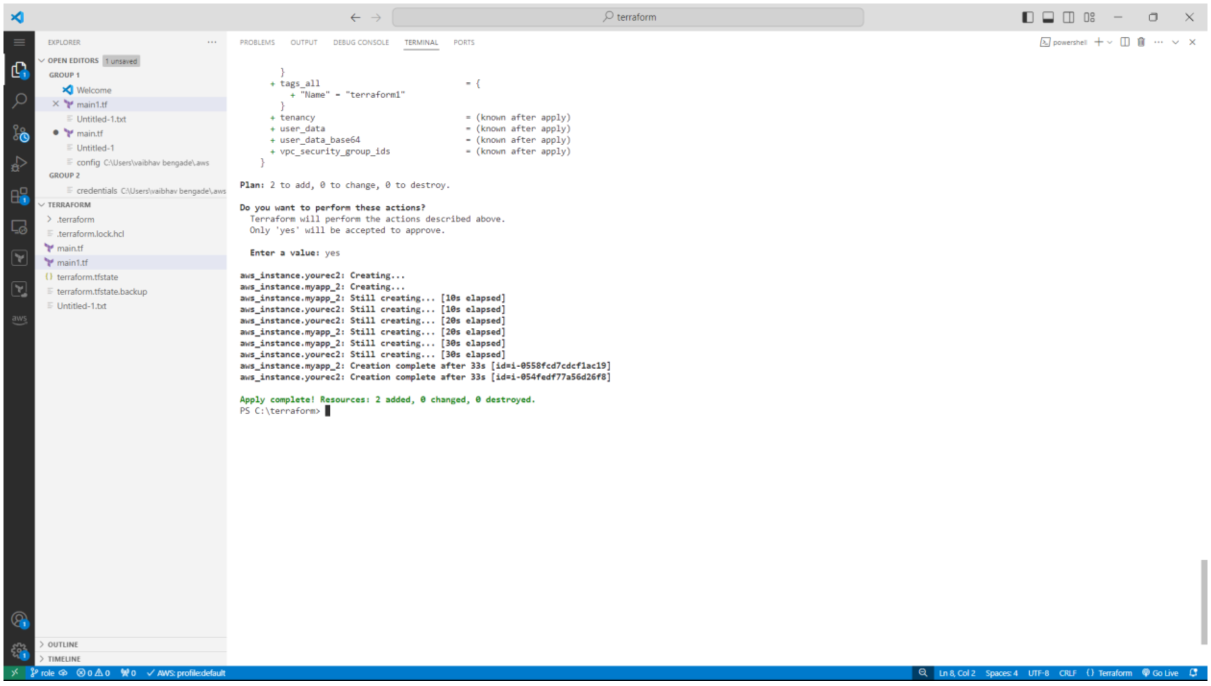
```
$ terraform init
```

3. **Apply the Configuration**: Apply the configuration to create the instance.

$ terraform apply

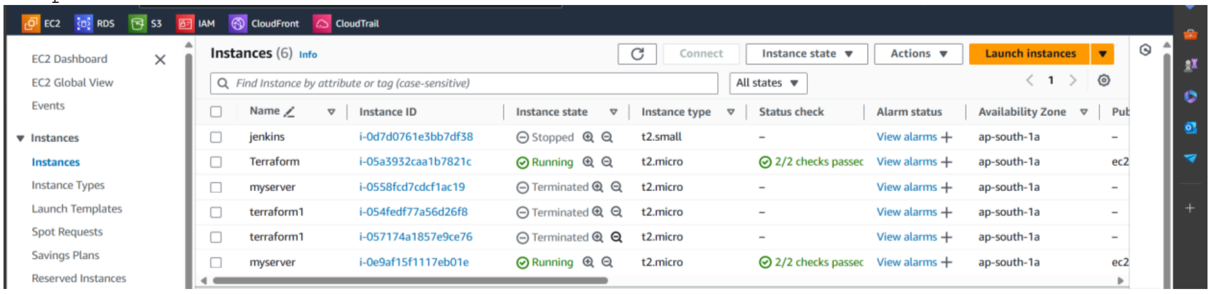


```
PS C:\terraform> terraform apply

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.myapp_2 will be created
  + resource "aws_instance" "myapp_2" {
      + ami                                  = "ami-0e1d06225679bc1c5"
      + arn                                  = (known after apply)
      + associate_public_ip_address          = (known after apply)
      + availability_zone                    = (known after apply)
      + cpu_core_count                       = (known after apply)
      + cpu_threads_per_core                 = (known after apply)
      + disable_api_termination              = (known after apply)
      + ebs_optimized                        = (known after apply)
      + get_password_data                    = false
      + host_id                              = (known after apply)
      + id                                   = (known after apply)
      + instance_initiated_shutdown_behavior = (known after apply)
      + instance_state                       = (known after apply)
      + instance_type                        = "t2.micro"
      + ipv6_address_count                   = (known after apply)
      + ipv6_addresses                       = (known after apply)
      + key_name                             = (known after apply)
      + monitoring                           = (known after apply)
      + outpost_arn                          = (known after apply)
      + password_data                        = (known after apply)
      + placement_group                      = (known after apply)
      + placement_partition_number           = (known after apply)
      + primary_network_interface_id         = (known after apply)
      + private_dns                          = (known after apply)
      + private_ip                           = (known after apply)
      + public_dns                           = (known after apply)
      + public_ip                            = (known after apply)
      + secondary_private_ips                = (known after apply)
      + security_groups                      = (known after apply)
      + source_dest_check                    = true
      + subnet_id                            = (known after apply)
      + tags                                 = {
          + "Name" = "myserver"
        }
      + tags_all                             = {
          + "Name" = "myserver"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + vpc_security_group_ids               = (known after apply)
    }

  # aws_instance.yourec2 will be created
```



```
        }
      + tags_all                             = {
          + "Name" = "terraform1"
        }
      + tenancy                              = (known after apply)
      + user_data                            = (known after apply)
      + user_data_base64                     = (known after apply)
      + vpc_security_group_ids               = (known after apply)
    }

Plan: 2 to add, 0 to change, 0 to destroy.

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.yourec2: Creating...
aws_instance.myapp_2: Creating...
aws_instance.myapp_2: Still creating... [10s elapsed]
aws_instance.yourec2: Still creating... [10s elapsed]
aws_instance.yourec2: Still creating... [20s elapsed]
aws_instance.myapp_2: Still creating... [20s elapsed]
aws_instance.myapp_2: Still creating... [30s elapsed]
aws_instance.yourec2: Still creating... [30s elapsed]
aws_instance.myapp_2: Creation complete after 33s [id=i-0558fcd7cdcf1ac19]
aws_instance.yourec2: Creation complete after 33s [id=i-054fedf77a56d26f8]

Apply complete! Resources: 2 added, 0 changed, 0 destroyed.
PS C:\terraform>
```

Output



Instances (6)

	Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availability Zone	Pub
☐	jenkins	i-0d7d0761e3bb7df38	Stopped	t2.small	–	View alarms +	ap-south-1a	–
☐	Terraform	i-05a3932caa1b7821c	Running	t2.micro	2/2 checks passec	View alarms +	ap-south-1a	ec2
☐	myserver	i-0558fcd7cdcf1ac19	Terminated	t2.micro	–	View alarms +	ap-south-1a	–
☐	terraform1	i-054fedf77a56d26f8	Terminated	t2.micro	–	View alarms +	ap-south-1a	–
☐	terraform1	i-057174a1857e9ce76	Terminated	t2.micro	–	View alarms +	ap-south-1a	–
☐	myserver	i-0e9af15f1117eb01e	Running	t2.micro	2/2 checks passec	View alarms +	ap-south-1a	ec2

4. Preparing Documentation and Pushing to GitHub

Pushing to GitHub

1. **Initialize Git Repository**: Navigate to your project directory and initialize a git repository.

```
$ git init
$ git add .
$ git commit -m "Initial commit with Terraform configuration and
documentation"
```

2. **Push to GitHub**: Push the local repository to GitHub.

```
$ git remote add origin <your-github-repository-url>
$ git push -u origin master
```

Example Repository Link

Here's an example repository link for reference: https://github.com/yourusername/terraform-ec2-setup