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Experiment No: 6

Implementation

A. Creating docker image using terraform

1) Download and Install Docker Desktop from https://www.docker.com/

Step 1: Check the docker functionality

```
PS C:\Users\praja> docker

Usage:  docker [OPTIONS] COMMAND

A self-sufficient runtime for containers

Common Commands:
  run         Create and run a new container from an image
  exec        Execute a command in a running container
  ps          List containers
  build       Build an image from a Dockerfile
  pull        Download an image from a registry
  push        Upload an image to a registry
  images      List images
  login       Log in to a registry
  logout      Log out from a registry
  search      Search Docker Hub for images
  version     Show the Docker version information
  info        Display system-wide information

Management Commands:
  builder     Manage builds
  buildx*     Docker Buildx
  compose*    Docker Compose
  container   Manage containers
```

```
PS C:\Users\praja> docker --version
Docker version 27.0.3, build 7d4bcd8
PS C:\Users\praja>
```

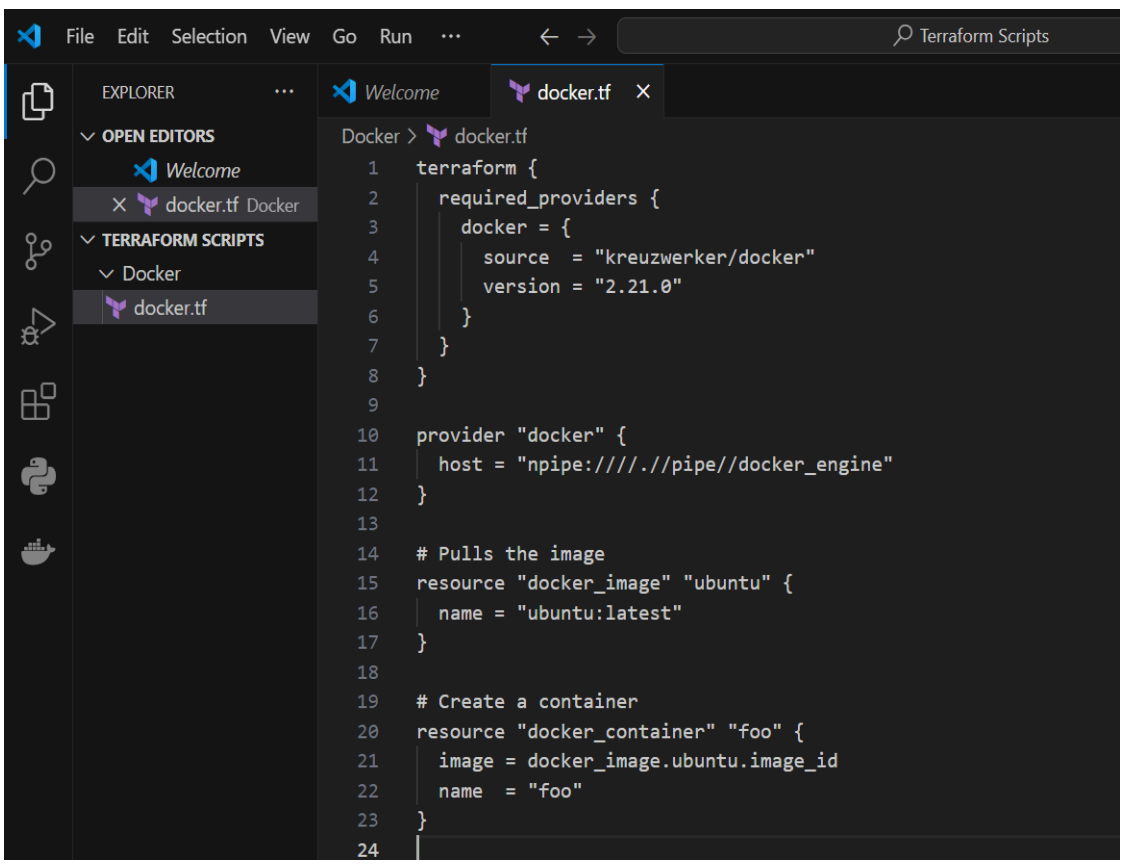
Now, create a folder named 'Terraform Scripts' in which we save our different types of scripts which will be further used in this experiment.

Step 2: Firstly create a new folder named 'Docker' in the 'TerraformScripts' folder. Then create a new docker.tf file using Atom editor if you are using linux or else use VS code in windows and write the following contents into it to create a Ubuntu Linux container.

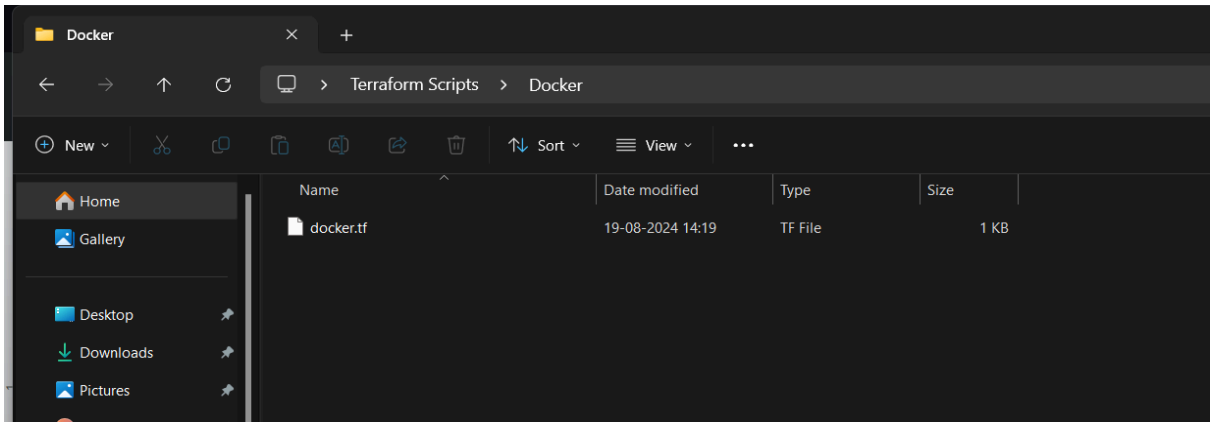
Script:

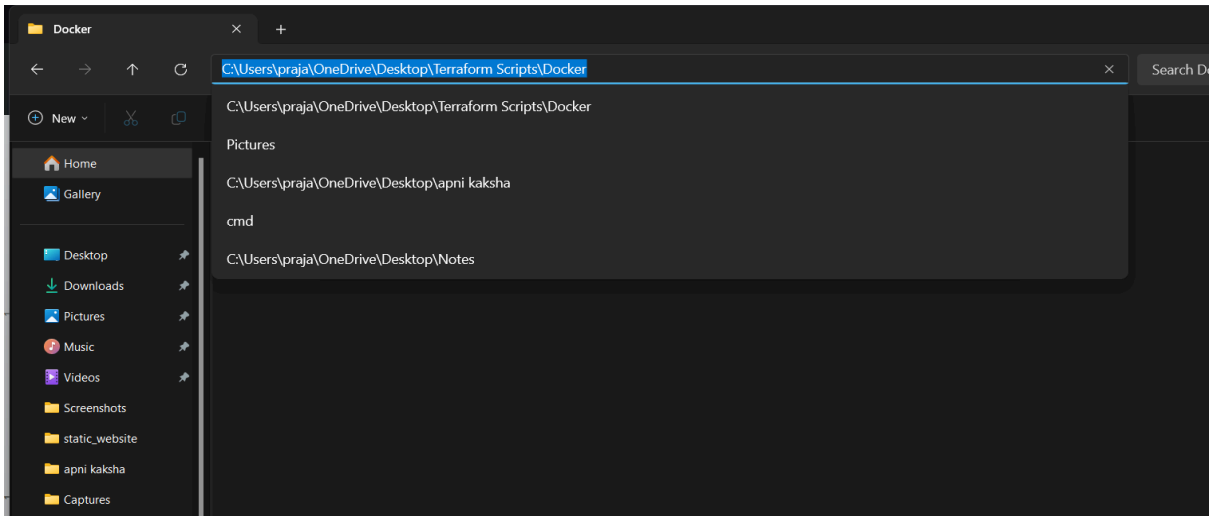
```
terraform
  { required_providers
  {docker = {
     source = "kreuzwerker/docker"
    version = "2.21.0"
   }
  }
```

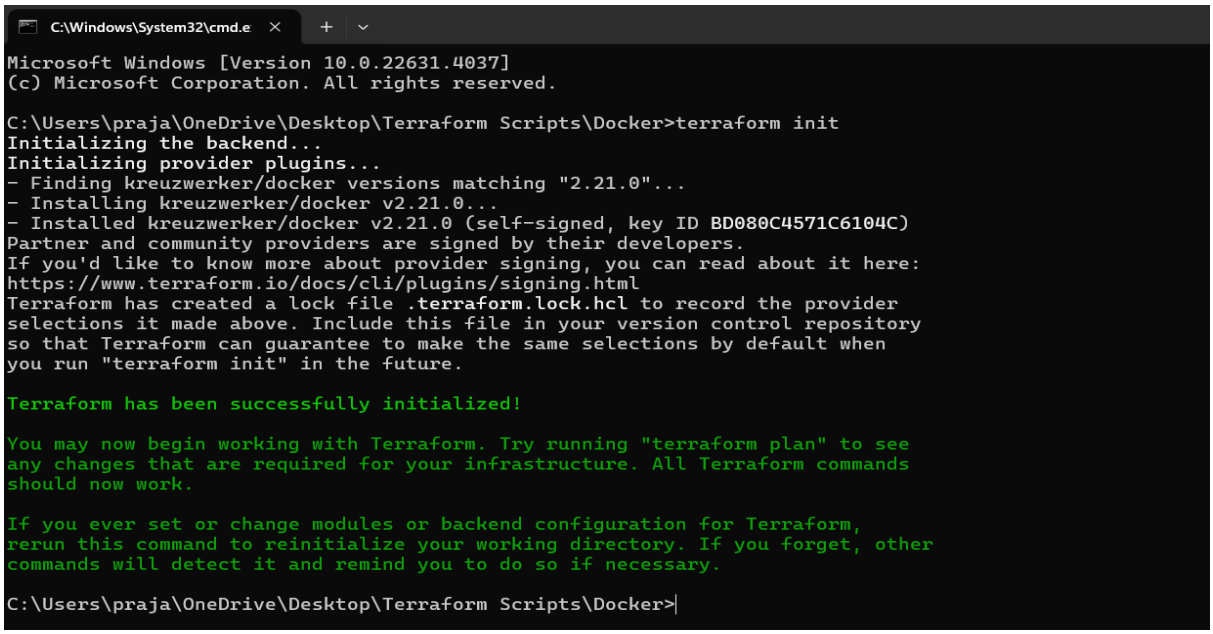
```
 }

provider "docker" {
  host = "npipe:////.//pipe//docker_engine" }

# Pulls the image
resource "docker_image" "ubuntu"
    {name = "ubuntu:latest"
 }

# Create a container
resource "docker_container" "foo" {
    image =
  docker_image.ubuntu.image_idname = "foo"
 }
```



Step 3: Execute Terraform Init command to initialize the resources .Now for this go to file manager ->Open Terraform script folder then open Docker folder ->Click on the path of these folder and type cmd this will open Command Prompt window







Step 4: Execute Terraform plan to see the available resources

```
C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>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:

  # docker_container.foo will be created
  + resource "docker_container" "foo" {
      + attach           = false
      + bridge           = (known after apply)
      + command          = (known after apply)
      + container_logs   = (known after apply)
      + entrypoint       = (known after apply)
      + env              = (known after apply)
      + exit_code        = (known after apply)
      + gateway          = (known after apply)
      + hostname         = (known after apply)
      + id               = (known after apply)
      + image            = (known after apply)
      + init             = (known after apply)
      + ip_address       = (known after apply)
      + ip_prefix_length = (known after apply)
      + ipc_mode         = (known after apply)
      + log_driver       = (known after apply)
      + logs             = false
      + must_run         = true
```

```
      + shm_size         = (known after apply)
      + start            = true
      + stdin_open       = false
      + stop_signal      = (known after apply)
      + stop_timeout     = (known after apply)
      + tty              = false

      + healthcheck (known after apply)

      + labels (known after apply)
    }

  # docker_image.ubuntu will be created
  + resource "docker_image" "ubuntu" {
      + id          = (known after apply)
      + image_id    = (known after apply)
      + latest      = (known after apply)
      + name        = "ubuntu:latest"
      + output      = (known after apply)
      + repo_digest = (known after apply)
    }

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

Note: You didn't use the -out option to save this plan, so Terraform can't guarantee to take exactly these actions if
you run "terraform apply" now.

C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>
```

Step 5: Execute Terraform apply to apply the configuration, which will automatically create and run the Ubuntu Linux container based on our configuration. Using command : "**terraform apply**"

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```
C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>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:

  # docker_container.foo will be created
  + resource "docker_container" "foo" {
      + attach           = false
      + bridge           = (known after apply)
      + command          = (known after apply)
      + container_logs   = (known after apply)
      + entrypoint       = (known after apply)
      + env              = (known after apply)
      + exit_code        = (known after apply)
      + gateway          = (known after apply)
      + hostname         = (known after apply)
      + id               = (known after apply)
      + image            = (known after apply)
      + init             = (known after apply)
      + ip_address       = (known after apply)
      + ip_prefix_length = (known after apply)
      + ipc_mode         = (known after apply)
      + log_driver       = (known after apply)
      + logs             = false
      + must_run         = true
      + name             = "foo"
```

This will ask You to enter a value so Type “Yes”.

```
      + id          = (known after apply)
      + image_id    = (known after apply)
      + latest      = (known after apply)
      + name        = "ubuntu:latest"
      + output      = (known after apply)
      + repo_digest = (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

docker_image.ubuntu: Creating...
docker_image.ubuntu: Creation complete after 7s [id=sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c25
98aubuntu:latest]
docker_container.foo: Creating...

  Error: container exited immediately

    with docker_container.foo,
    on docker.tf line 20, in resource "docker_container" "foo":
    20: resource "docker_container" "foo" {


C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>
```

Do the following changes in the last line of the code as follows to solve the error

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```
# Create a container
resource "docker_container" "foo" {
  image = docker_image.ubuntu.image_id
  name  = "foo"
  command = ["sleep","infinity"]
}
```

Now run the command again

```
C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>terraform apply
docker_image.ubuntu: Refreshing state... [id=sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c25
tu:latest]

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

Terraform will perform the following actions:

  # docker_container.foo will be created
  + resource "docker_container" "foo" {
      + attach           = false
      + bridge           = (known after apply)
      + command          = [
          + "sleep",
          + "infinity",
        ]
      + container_logs   = (known after apply)
      + entrypoint       = (known after apply)
      + env              = (known after apply)
      + exit_code        = (known after apply)
      + gateway          = (known after apply)
      + hostname         = (known after apply)
```

```
C:\Windows\System32\cmd.e

      + restart          = "no"
      + rm               = false
      + runtime          = (known after apply)
      + security_opts    = (known after apply)
      + shm_size         = (known after apply)
      + start            = true
      + stdin_open       = false
      + stop_signal      = (known after apply)
      + stop_timeout     = (known after apply)
      + tty              = false

      + healthcheck (known after apply)

      + labels (known after apply)
    }

Plan: 1 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

docker_container.foo: Creating...
docker_container.foo: Creation complete after 1s [id=978fd330ac1cbf3873e16f845ecd73e2645ec20209f1fb16c629b5db2314494b]

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

C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>
```

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Docker images, Before Executing Apply step:

```
C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>docker images
REPOSITORY                  TAG       IMAGE ID       CREATED        SIZE
docker/welcome-to-docker    latest    c1f619b6477e   9 months ago   18.6MB
```

Docker images, After Executing Apply step:

```
C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>docker images
REPOSITORY                  TAG       IMAGE ID       CREATED        SIZE
ubuntu                      latest    edbfe74c41f8   2 weeks ago    78.1MB
docker/welcome-to-docker    latest    c1f619b6477e   9 months ago   18.6MB
```

Step 6: Execute Terraform destroy to delete the configuration, which will automatically delete the Ubuntu Container.

```
C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>terraform destroy
docker_image.ubuntu: Refreshing state... [id=sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubun
tu:latest]
docker_container.foo: Refreshing state... [id=978fd330ac1cbf3873e16f845ecd73e2645ec20209f1fb16c629b5db2314494b]

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

Terraform will perform the following actions:

  # docker_container.foo will be destroyed
  - resource "docker_container" "foo" {
      - attach            = false -> null
      - command           = [
          - "sleep",
          - "infinity",
        ] -> null
      - cpu_shares        = 0 -> null
      - dns               = [] -> null
      - dns_opts          = [] -> null
      - dns_search        = [] -> null
      - entrypoint        = [] -> null
      - env               = [] -> null
      - gateway           = "172.17.0.1" -> null
      - group_add         = [] -> null
      - hostname          = "978fd330ac1c" -> null
      - id                = "978fd330ac1cbf3873e16f845ecd73e2645ec20209f1fb16c629b5db2314494b" -> null
```

```
      - tty               = false -> null
        # (8 unchanged attributes hidden)
    }

  # docker_image.ubuntu will be destroyed
  - resource "docker_image" "ubuntu" {
      - id          = "sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:latest" -> null
      - image_id    = "sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598a" -> null
      - latest      = "sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598a" -> null
      - name        = "ubuntu:latest" -> null
      - repo_digest = "ubuntu@sha256:8a37d68f4f73ebf3d4efafbcf66379bf3728902a8038616808f04e34a9ab63ee" -> null
    }

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

Do you really want to destroy all resources?
  Terraform will destroy all your managed infrastructure, as shown above.
  There is no undo. Only 'yes' will be accepted to confirm.

  Enter a value: yes

docker_container.foo: Destroying... [id=978fd330ac1cbf3873e16f845ecd73e2645ec20209f1fb16c629b5db2314494b]
docker_container.foo: Destruction complete after 0s
docker_image.ubuntu: Destroying... [id=sha256:edbfe74c41f8a3501ce542e137cf28ea04dd03e6df8c9d66519b6ad761c2598aubuntu:lat
est]
docker_image.ubuntu: Destruction complete after 0s

Destroy complete! Resources: 2 destroyed.

C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>
```

Docker images After Executing Destroy step

```
C:\Users\praja\OneDrive\Desktop\Terraform Scripts\Docker>docker images
REPOSITORY                  TAG       IMAGE ID       CREATED        SIZE
docker/welcome-to-docker    latest    c1f619b6477e   9 months ago   18.6MB
```