Terraform

Introduction

1) IAC

1) IAC (Infrastructure as a code) IAC is a widespread terminology among Devops professionals.
2) It is the process of managing and provisioning the complete IT infrastructure (comprises both physical and virtual machines) using machine readable definition files.
3) It is a software engineering approach towards operation.
4) It helps in automating the complete data enter by using programming scripts.

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2) Infrastructure as a code has multiple challenges

Need to learn to code.
Don't know the change impact
Need to revert the change.
Cannot track changes.
Cannot automate a resource
Multiple environments for infrastructure.
Terraform has been created to solve these challenges.

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3) Terraform is an open-source infrastructure as code software tool developed by HashiCorp. It is used to define and provision the complete infrastructure using easy to learn declarative languages.
Terraform v1.3.6 9 (Version)
Command – terraform --version

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4) Benefits of using terraform:

1) Supports multiple providers such as AWS, Azure, GCP, digital motions and etc.
2) Provides immutable infrastructure where configuration changes smoothly
3) Uses easy to understand language HCL (HashiCorp configuration language)
4) Easily portable to any other provider.
5) Supports client only architecture. So, no need of additional configuration management on a server.

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5) Terraform core concepts:

Below are the core concepts/terminologies used in Terraform:
1) Variables: Also used as input-variables, it is key-value pair used by Terraform modules to allow customization.
2) Provider: A provider in Terraform is a plugin that enables interaction with an API (Application Programming Interface)
3) Module: It is a folder with Terraform templates where all the configurations are defined.
4) State: It consists of cached information about the infrastructure managed by

Terraform and the related configurations.
5) Resources: It refers to a block of one or more infrastructure objects (compute instances, virtual networks, etc.), which are used in configuring and managing the infrastructure.
6) Data Source: It is implemented by providers to return information on external objects to terraform.
7) Output Values: These are return values of a terraform module that can be used by other configurations.

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6) Lifecycle

1) Terraform init : which initializes the working directory which consists of all the configuration files.
2) Terraform Plan is used to create and execute the plan to reach desire state of the infrastructure. Changes in the configuration files are done in order to achieve the desired state.
3) Terraform Apply : The Terraform apply command executes changes to the actual environment. Apply will look for a Terraform configuration and create an execution plan based on the desired state. By default it should be executed after Terraform plan
4) Terraform destroy command is the opposite to Terraform apply, in which it terminates all the resources specified in Terraform state.

5) Terraform core performing all API calls to the providers (Access key or roles from IAM)

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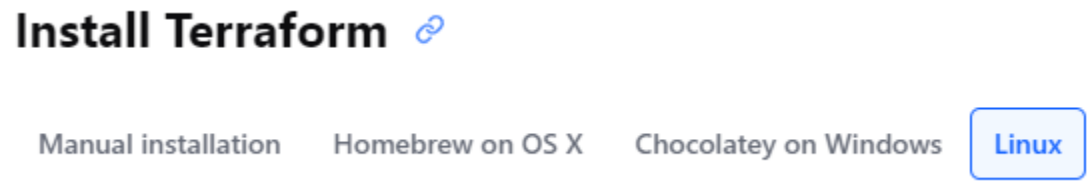
7) Difference between Ansible and Terraform

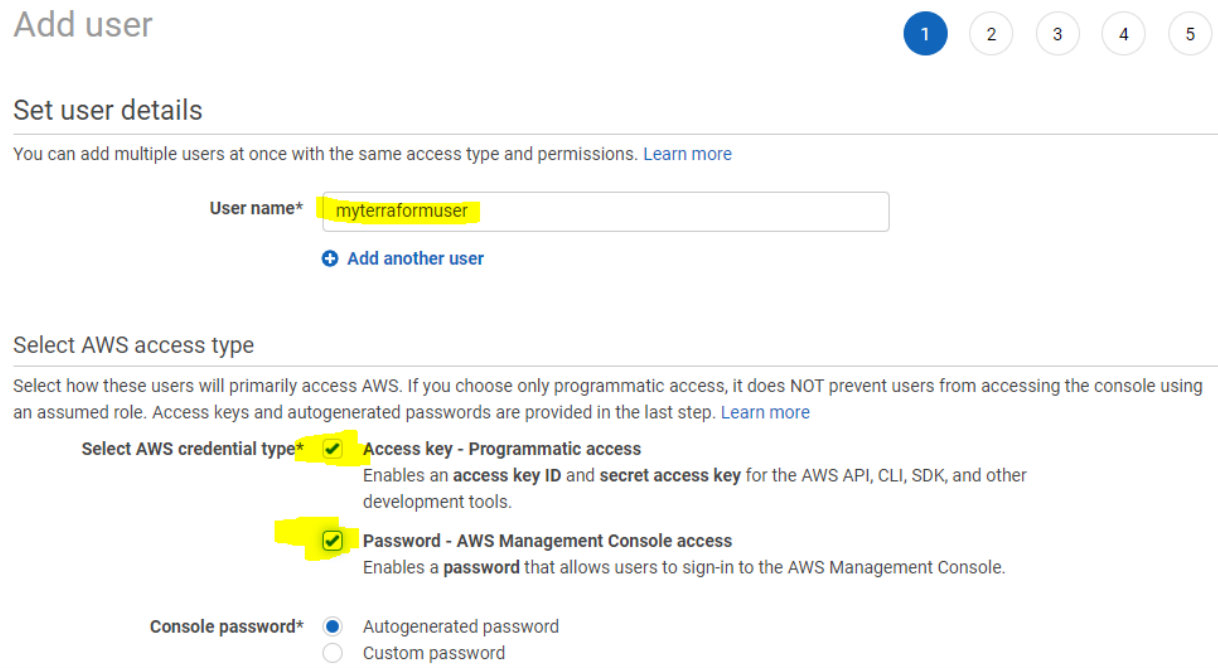
Ansible is an multi-purpose automation tool, whereas Terraform is an infrastructure as code tool.

Steps:

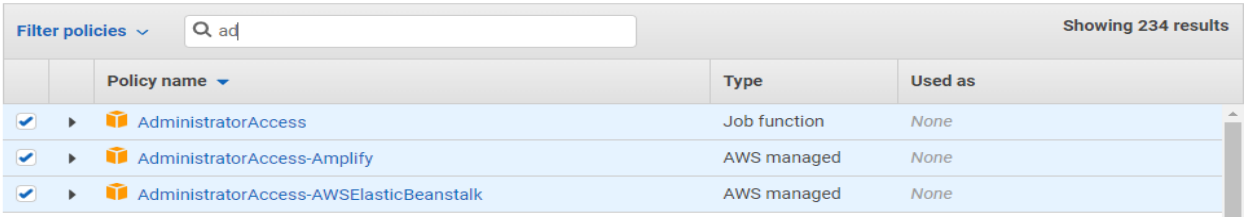
1) Installation - https://developer.hashicorp.com/terraform/tutorials/aws-get-started/install-cli
Follow the link steps to install Terraform

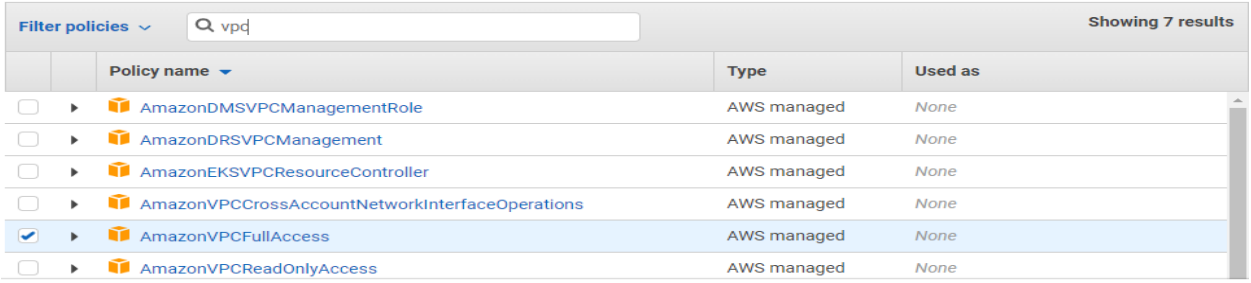


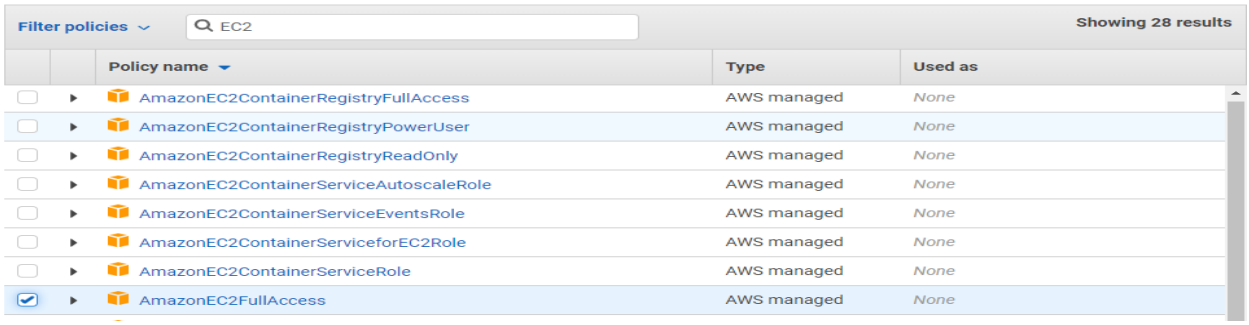
2) Create terraform folder
3) cd terraform and terraform init (commands)
4) create a user in AWS (IAM) by clicking on add user



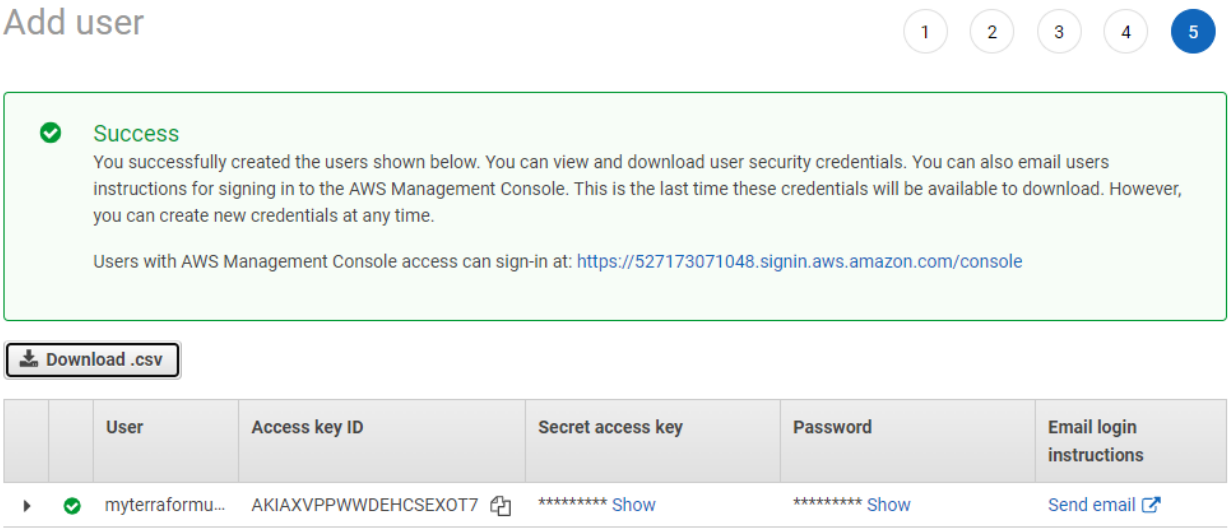
5) Give **Administrator access, VPC full access, EC2 access**







6) Excel file will get download for username and password



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2) Steps - To create IAM role

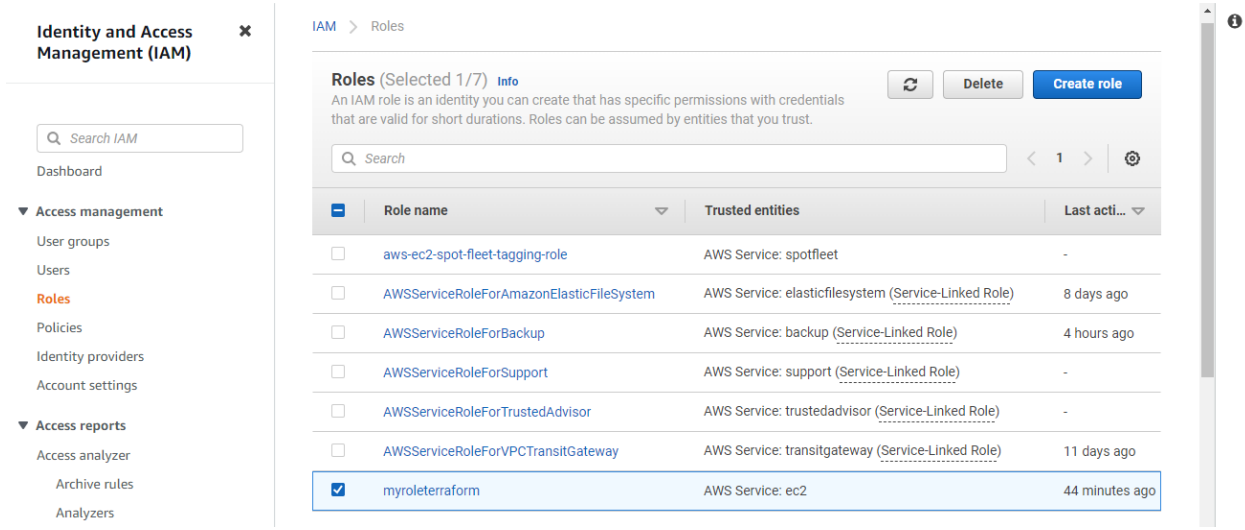
1) Link for Terraform:

https://registry.terraform.io/providers/hashicorp/aws/latest/docs - Full details

Note: In IAM allow IAMallow permission and attach to the instances

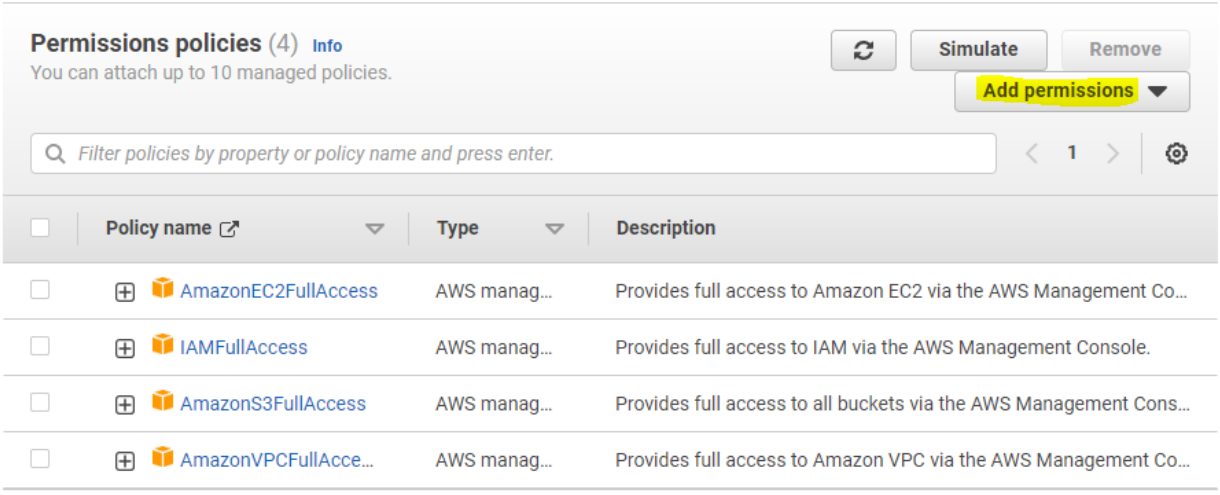
Steps:

1) In IAM click on myterraform

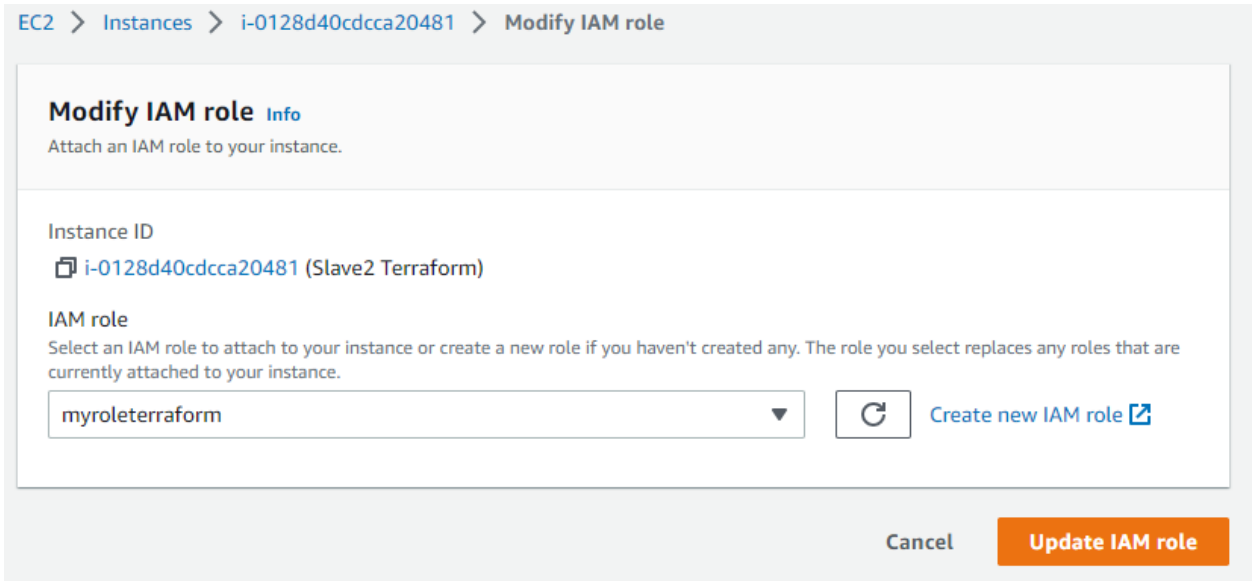


2) Click on add permissions and Attach Policies

Later Add permission and click on attach



3)



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3) Steps

If want to use other providers than I need to use **alias**

```
terraform {
  required_providers {
    aws = {
      source  = "hashicorp/aws"
      version = "~> 4.0"
    }
  }
}
provider "aws" {
  region      = "ap-south-1"
}
provider "aws" {
 alias = "tokyo"
 region = "ap-northeast-1"
}
```

```
resource "aws_vpc" "myvpc" {
  cidr_block           = var.vpc_cidr_block
  enable_dns_hostnames = true
  enable_dns_support   = true
  tags = {
    Name = "myvpc"
  }
}

resource "aws_vpc" "myvpc2" {
  provider   = aws.tokyo
  cidr_block = var.vpc_cidr_block
  tags = {
    Name = "myvpc2"
  }
}
```

---

4) Steps

1) Providers

```
terraform {
  required_providers {
    aws = {
      source  = "hashicorp/aws"
      version = "~> 4.0"
    }
  }
}
provider "aws" {
  region     = "ap-south-1"
}
```

2) To Create VPC. Variables are saved in variable tap

```
resource "aws_vpc" "myvpc" {
  cidr_block           = var.vpc_cidr_block
  enable_dns_hostnames = true
  enable_dns_support   = true
  tags = {
    Name = "myvpc"
  }
}
```

Variables

```
variable "vpc_cidr_block" {
  default = "200.20.60.0/24"
}
```

3) To Create Internet Gateway, subnet, route table, route and associates route table. Variables is saved in variable tap

```
resource "aws_internet_gateway" "ig" {
  vpc_id = aws_vpc.myvpc.id
  tags = {
    Name = "myig"
  }
}
```

```
resource "aws_subnet" "pub_subnet" {
  vpc_id     = aws_vpc.myvpc.id
  cidr_block = var.pub_subnet
  tags = {
    Name = "pub_subnet"
  }
}
```

Variables

```
variable "pub_subnet" {
  default = "200.20.60.0/25"
}
```

```
resource "aws_route_table" "public" {
  vpc_id = aws_vpc.myvpc.id
  tags = {
    Name = "mypub_route"
  }
}
```

```
resource "aws_route" "public_internet_gateway" {
  route_table_id         = aws_route_table.public.id
  destination_cidr_block = var.destination
  gateway_id             = aws_internet_gateway.ig.id
}
```

Variables

```
variable "destination" {
  default = "0.0.0.0/0"
}
```

```
resource "aws_route_table_association" "public" {
  subnet_id      = aws_subnet.pub_subnet.id
  route_table_id = aws_route_table.public.id
}
```

4) To Create NAT Gateway, subnet, route table, route and associates route table.

Variables is saved in variable tap

```
resource "aws_nat_gateway" "nat" {
  connectivity_type = "private"
  subnet_id         = aws_subnet.pub_subnet.id
}
```

```
resource "aws_subnet" "pvt_subnet" {
  vpc_id     = aws_vpc.myvpc.id
  cidr_block = var.pvt_subnet
  tags = {
    Name = "private_subnet"
  }
}
```

Variables

```
variable "pvt_subnet" {
  default = "200.20.60.128/25"
}
```

```
resource "aws_route_table" "private" {
  vpc_id = aws_vpc.myvpc.id
  tags = {
    Name = "mypvt_route"
  }
}
```

```
resource "aws_route" "private_nat_gateway" {
  route_table_id         = aws_route_table.private.id
  destination_cidr_block = var.destination
  nat_gateway_id         = aws_nat_gateway.nat.id
}
```

Variables

```
variable "destination" {
  default = "0.0.0.0/0"
}
```

```
resource "aws_route_table_association" "private" {
  subnet_id      = aws_subnet.pvt_subnet.id
  route_table_id = aws_route_table.private.id
}
```

5) Creating Instances

sg - Name given for Security Group

```
resource "aws_instance" "ec2_public" {
  count                       = var.instance_count
  ami                         = var.amis[var.region]
  associate_public_ip_address = true
  instance_type               = var.instance
  key_name                    = var.key
  subnet_id                   = aws_subnet.pub_subnet.id
  vpc_security_group_ids      = ["${aws_security_group.sg.id}"]
  tags = {
    "Name" = "yetish_instance"
  }
}
```

```
variable "instance_count" {
  default = "3"
}
variable "instance" {
  default = "t2.micro"
}
variable "key" {
  default = "Mumbai_Yetish"
}
```

```
variable "amis" {
 type = map
 default = {
 "ap-northeast-1" = "ami-0590f3a1742b17914"
 "ap-south-1" = "ami-07ffb2f4d65357b42"
 }
}
variable "region" {
 default = "ap-south-1"
}
```

6) Adding Security groups

Ingress is inbound

egress is outbound

sg - Name given for Security Group

```
resource "aws_security_group" "sg" {
  vpc_id = aws_vpc.myvpc.id
  ingress {
    from_port = "0"
    to_port   = "0"
    protocol  = "-1"
    self      = true
  }

  egress {
    from_port = "0"
    to_port   = "0"
    protocol  = "-1"
    self      = "true"
  }
  tags = {
    "Name" = "My Security_group"
  }
}
```

Later

Terraform Plan

Terraform apply

Terraform destroy

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4) Terraform State File : The state file is used by Terraform to keep track of resources information about the infrastructure **or** Statefile will have current state of the infrastructure created from the Terraform.

```
Subcommands:
    list                List resources in the state
    mv                  Move an item in the state
    pull                Pull current state and output to stdout
    push                Update remote state from a local state file
    replace-provider    Replace provider in the state
    rm                  Remove instances from the state
    show                Show a resource in the state
```

State file will have existing infrastructure (Note: never modify the state file, that

holds the current infrastructure)

Question: Have u modified state file?

Ans: No, terraform state file should not modify in general, we have commands to replace and remove the resources

Commands

1) terraform state list - The terraform state list command is used to list resources within a Terraform state.

```
root@ip-172-31-44-245:~/provisioner# terraform state list
aws_instance.ys-instance
aws_security_group.z1security
null_resource.my_null
```

2) terraform state show aws_vpc.myvpc - The Terraform state show command is used to show the attributes of a single resource in the Terraform state.

```
root@ip-172-31-44-245:~/provisioner# terraform state show null_resource.my_null
# null_resource.my_null:
resource "null_resource" "my_null" {
    id = "6771193588441867380"
}
```

(aws_vpc.myvpc – resources name)

3) terraform state rm aws_vpc.myvpc - The Terraform state rm command is used to remove items from the Terraform state.

(aws_vpc.myvpc – resources name)

4) terraform fmt filename - will formate the file

5) In order to destroy specific resource

a) Command: terraform state list

b) Command: Terraform destroy --target resource name

6) Command: when = destroy - command will execute, whenever we are destroying the particular resource.

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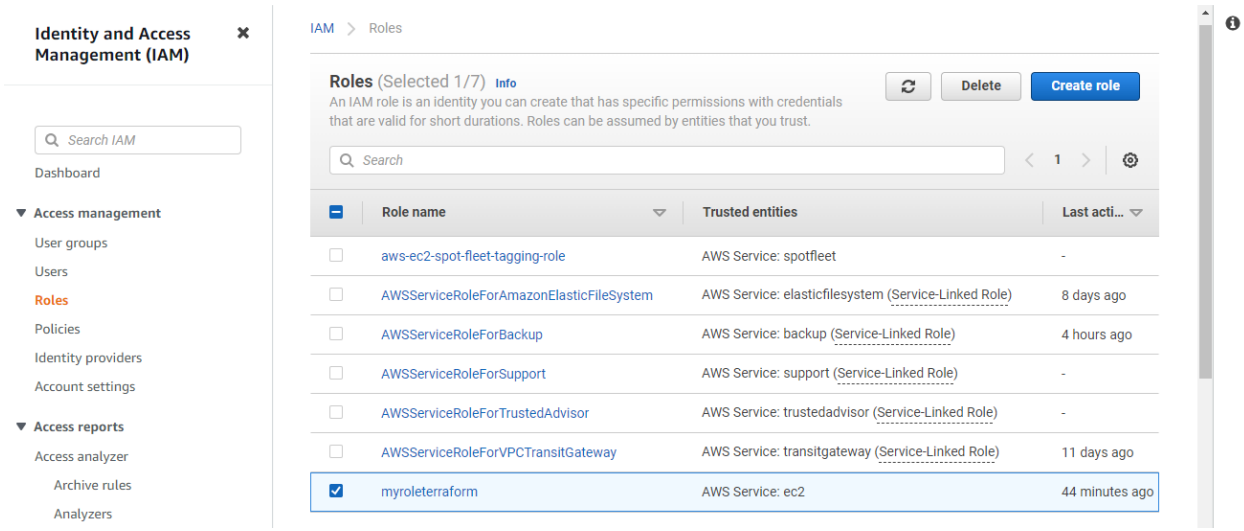
5) To create IAM role

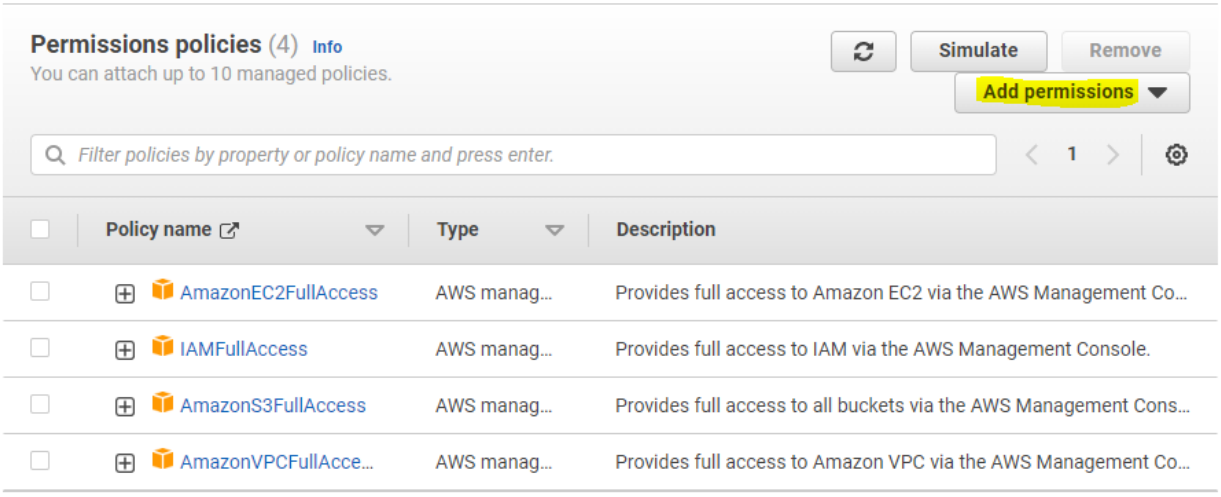
Note: In IAM allow IAMallow permission and attach to the instances

Steps:

1) In IAM click on myterraform



2) Click on add permissions and Attach Policies
Later Add permission and click on attach



3)

```
#Create an IAM Role
resource "aws_iam_role" "yetish" {
  name = "ec2_role"

  assume_role_policy = jsonencode({
    Version = "2012-10-17"
    Statement = [
      {
        Action = "sts:AssumeRole"
        Effect = "Allow"
        Sid    = "RoleForEC2"
        Principal = {
          Service = "ec2.amazonaws.com"
        }
      },
    ]
  })
}

resource "aws_iam_policy_attachment" "yetish_attach" {
  name       = "yetish_attachment"
  roles      = [aws_iam_role.yetish.name]
  policy_arn = aws_iam_policy.policy.arn
}
resource "aws_iam_instance_profile" "usr_yetish" {
```

```
resource "aws_iam_instance_profile" "usr_yetish" {
  name = "usr_yetish"
  role = aws_iam_role.yetish.name
}

resource "aws_instance" "import_Terraform1"{
  ami= "unknown"
  instance_type= "unkonwn"
}

resource "aws_instance" "import_Terraform2"{
  ami= "unknown"
  instance_type= "unkonwn"
}
```

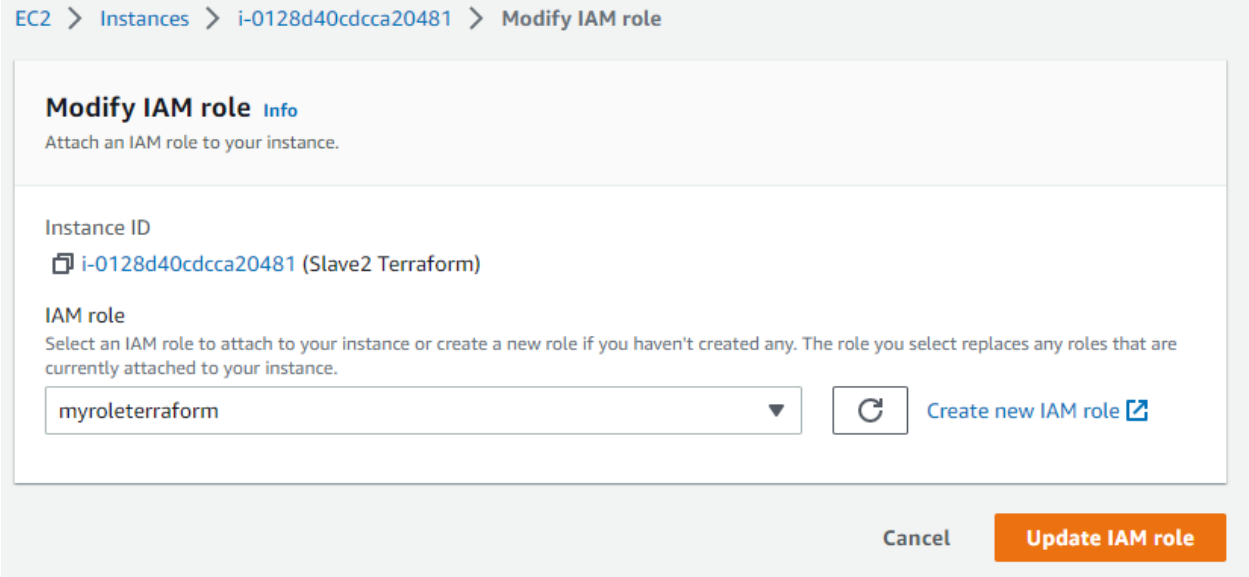
4) terraform plan

5) terraform apply

6) In Instances

1) Click on actions and security

Later roles will be attached



7) terraform destroy

---

6) Terrafrom Taint – **used to destroy and recreate the resource** (If the resource as been created long back or resource changed due to some issue, if I want to recreate the instances) than I will use **Taint command**

Command – Terraform taint resource name

1) Question: I want restart the resources, which are created?

Answer: First we will list and use taint command

a) terraform state list

b) terraform taint resource name

c) terraform Plan

4) terrafrom Apply

```
root@ip-172-31-44-245:~/provisioner# terraform taint null_resource.my_null
Resource instance null_resource.my_null has been marked as tainted.
root@ip-172-31-44-245:~/provisioner# terraform plan
aws_security_group.z1security: Refreshing state... [id=sg-0868b532623b00052]
aws_instance.ys-instance: Refreshing state... [id=i-06394d9fe66c080e6]
null_resource.my_null: Refreshing state... [id=6771193588441867380]
root@ip-172-31-44-245:~/provisioner# terraform apply
aws_security_group.z1security: Refreshing state... [id=sg-0868b532623b00052]
aws_instance.ys-instance: Refreshing state... [id=i-06394d9fe66c080e6]
null_resource.my_null: Refreshing state... [id=6771193588441867380]

Terraform used the selected providers to generate the following execution pl
-/+ destroy and then create replacement

Terraform will perform the following actions:

  # null_resource.my_null is tainted, so must be replaced
-/+ resource "null_resource" "my_null" {
      ~ id = "6771193588441867380" -> (known after apply)
    }

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

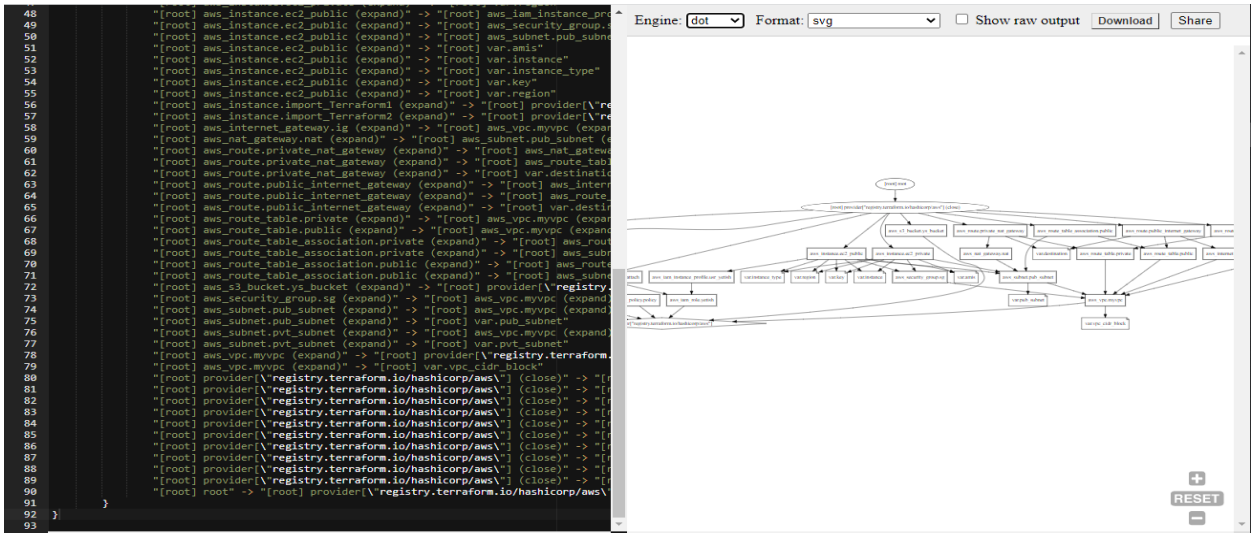
---

7) Terraform Group – What all we create will be in form of graph.

Command - terraform graph

Link -
https://dreampuf.github.io/GraphvizOnline/#digraph%20G%20%7B%0A%0A%20%20subgraph%20cluster_0%20%7B%0A%20%20%20%20style%3Dfilled%3B%0A%20%20%20%20color%3Dlightgrey%3B%0A%20%20%20%20node%20%5Bstyle%3Dfilled%2Ccolor%3Dwhite%5D%3B%0A%20%20%20%20a0%20-%3E%20a1%20-%3E%20a2%20-%3E%20a3%3B%0A%20%20%20%20label%20%3D%20%22process%20%231%22%3B%0A%20%20%7D%0A%0A%20%20subgraph%20cluster_1%20%7B%0A%20%20%20%20node%20%5Bstyle%3Dfilled%5D%3B%0A%20%20%20%20b0%20-%3E%20b1%20-%3E%20b2%20-%3E%20b3%3B%0A%20%20%20%20

Later copy the contents in **terraform graph** to above mentioned link



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8) Terraform Import – it is used bring exiting infrastructure to Terraform.

Command - terraform import aws_instance.import_Terraform1 i-07dcebf96350f76e4

1) Terraform 1 is the instances

2) i-07dcebf96350f76e4 is ID of the instances

```
resource "aws_instance" "import_Terraform2"{
  ami= "unknown"
  instance_type= "unkonwn"
}

#Create an IAM Role
resource "aws_s3_bucket" "ys_bucket" {
  bucket = "mys3-bucket113"
```

```
root@ip-172-31-44-245:~/myterraform# terraform import aws_instance.import_Terraform1 i-07dcebf96350f76e4
aws_instance.import_Terraform1: Importing from ID "i-07dcebf96350f76e4"...
aws_instance.import_Terraform1: Import prepared!
  Prepared aws_instance for import
aws_instance.import_Terraform1: Refreshing state... [id=i-07dcebf96350f76e4]

Import successful!

The resources that were imported are shown above. These resources are now in
your Terraform state and will henceforth be managed by Terraform.
```

---

9) Terraform output - Manage sensitive data in state file. Output used to extract the value from the state file.

---

10) Module: It is a folder with Terraform templates where all the configurations are defined.

Steps:

1) Create a new folder new_module and move main.tf, provider.tf and variable.tf files

```
root@ip-172-31-44-245:~/myterraform# cd new_module/
root@ip-172-31-44-245:~/myterraform/new_module# ls
main.tf  provider.tf  variable.tf
```

2) create **main.tf** file for module

```
module "services" {
  source = "./new_module"
}
```

3) Terraform init
4) Terraform plan
5) Terraform apply
6) Terraform destroy

---

11) Create Tomcat using Terraform

Steps:

1) Create tomcat folder

2) create main.tf file **(In 6 lines are instance details)**

```
resource "aws_instance" "my-instance" {
  ami = "ami-0ecc74eca1d66d8a6"
  instance_type = "t2.micro"
  key_name = "test_terraform"
  vpc_security_group_ids = [aws_security_group.z1security.id]
  user_data = <<-EOF
```

Shell script for tomcat

```
  #! /bin/bash
  sudo apt update -y
  sudo apt install default-jre -y
  sudo wget https://dlcdn.apache.org/tomcat/tomcat-10/v10.0.27/bin/apache-tomcat-10.0.27.tar.gz
  sudo tar -xvzf apache-tomcat-10.0.27.tar.gz
  sudo rm -rf apache-tomcat-10.0.27.tar.gz
  sudo mv apache-tomcat-10.0.27 tomcat
  sudo sh tomcat/bin/startup.sh
  sudo rm -rf conf-and-webapps-file
  sudo git clone https://github.com/syedwaliuddin/conf-and-webapps-file.git
  sudo rm -rf tomcat/conf/tomcat-users.xml
  sudo cp conf-and-webapps-file/tomcat-users.xml tomcat/conf/
  sudo sh tomcat/bin/startup.sh
  sudo rm -rf tomcat/webapps/manager/META-INF/context.xml
  sudo cp conf-and-webapps-file/context.xml tomcat/webapps/manager/META-INF/
  sudo rm -rf tomcat/webapps/host-manager/META-INF/context.xml
  sudo cp conf-and-webapps-file/contexthm.xml tomcat/webapps/host-manager/META-INF/
  sudo sh tomcat/bin/startup.sh
  EOF
  tags = {
    Name = "Tomcat"
  }
}
```

3) Create security.tf file **(From and to traffic is 0)**

```
resource "aws_security_group" "z1security" {
  ingress {
    from_port   = 0
    to_port     = 0
    protocol    = "-1"
    cidr_blocks = ["0.0.0.0/0"]
  }
  egress {
    from_port   = 0
    to_port     = 0
    protocol    = "-1"
    cidr_blocks = ["0.0.0.0/0"]
  }
}
```

4) Terraform init
5) Terraform plan
6) terraform apply
7) New Instance will be created, so we can launch Tomcat and Jenkins
8) Terraform destroy

---

12) Create Jenkins using Terraform

Steps:

1) Create jenkins folder
2) create main.tf file **(In 6 lines are instance details)**

Shell script for Jenkins

```
resource "aws_instance" "my-instance" {
  ami = "ami-0ecc74eca1d66d8a6"
  instance_type = "t2.micro"
  key_name = "test_terraform"
  vpc_security_group_ids = [aws_security_group.z1security.id]
  user_data = <<-EOF
  sudo apt update
  sudo apt install -y openjdk-11-jdk
  wget -q -O - https://pkg.jenkins.io/debian-stable/jenkins.io.key | sudo apt-key add -
  sudo sh -c 'echo deb http://pkg.jenkins.io/debian-stable binary/ > /etc/apt/sources.list.d/jenkins.list'
  sudo apt update
  sudo apt -y install jenkins
  sudo systemctl start jenkins
  sudo systemctl enable jenkins
  EOF
  tags = {
    Name = "Jenkins"
  }
}
```

3) Create security.tf file **(From and to traffic is 0)**

```
resource "aws_security_group" "z1security" {
  ingress {
    from_port   = 0
    to_port     = 0
    protocol    = "-1"
    cidr_blocks = ["0.0.0.0/0"]
  }
  egress {
    from_port   = 0
    to_port     = 0
    protocol    = "-1"
    cidr_blocks = ["0.0.0.0/0"]
  }
}
```

4) Terraform init
5) Terraform plan
6) terraform apply
7) New Instance will be created, so we can launch Tomcat and Jenkins
8) Terraform destroy

---

13) Terraform Provisioners

When a resource is created, we may have some scripts or operations that need to be performed locally, so at this time Terraform provisioners are used.

There are two types in provisioners

1) local-exec provisioner
2) remote-exec provisioner

1) local-exec provisioner

(own words)

we have created a instances or resources, if I want to print a private or public IP address of the instances. Private IP will create in local machine.

```
provisioner "local-exec" {
   command = "echo ${aws_instance.my-instance.private_ip} >> privateip.txt"
}
```

```
resource "aws_instance" "ys-instance" {
  ami = "ami-07ffb2f4d65357b42"
  instance_type = "t2.micro"
  key_name = "Mumbai_Yetish1"
  vpc_security_group_ids = [aws_security_group.z1security.id]
  provisioner "local-exec" {
    when = destroy
    command = "echo ${self.private_ip} >> privateip.txt"
  }
```

Result: Privateip.txt

```
root@ip-172-31-44-245:~/provisioner# cat privateip.txt
172.31.47.66
172.31.40.45
172.31.43.219
```

when = destroy - command will execute, whenever we are destroying the particular resource.

---

2) remote-exec provisioner

remote-exec provisioner - remote-exec provisioner invokes a script on a remote resource after it is created.

we need connection block (its need to be connect to the remote server) and pem key (terraform.pem) should be used.

```
resource "aws_instance" "ys-instance" {
  ami = "ami-07ffb2f4d65357b42"
  instance_type = "t2.micro"
  key_name = "Mumbai_Yetish1"
  vpc_security_group_ids = [aws_security_group.z1security.id]
  connection {
      type     = "ssh"
      user     = "ubuntu"
      private_key = file("./terraform.pem")
      host = self.public_ip
  }
  provisioner "remote-exec" {
    inline = [
          "sudo apt update",
    ]
  }
```

---

3) Null_resource terraform

Null resource help to execute the provisioner (It will work only instances is up and running).

```
resource "aws_instance" "ys-instance" {
  ami = "ami-07ffb2f4d65357b42"
  instance_type = "t2.micro"
  key_name = "Mumbai_Yetish1"
  vpc_security_group_ids = [aws_security_group.z1security.id]
```

```
resource "null_resource" "my_null" {
  connection {
      type     = "ssh"
      user     = "ubuntu"
      private_key = file("./terraform.pem")
      host = aws_instance.ys-instance.public_ip
  }
}
```

---

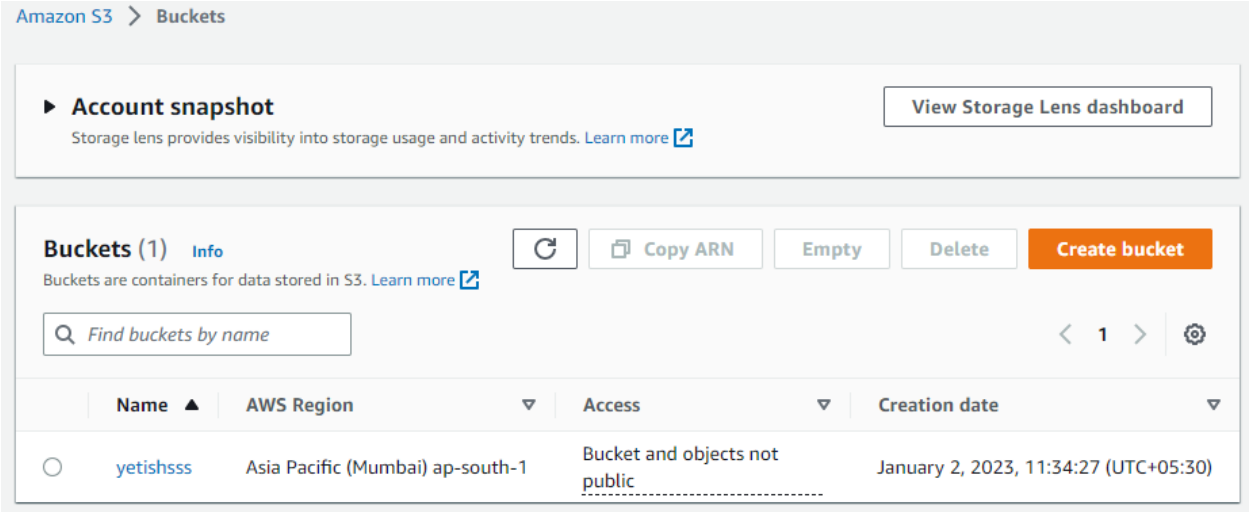
14) terraform.tfstate

It contains all sensitive information (ID of resource and other details), we cannot store in Github.

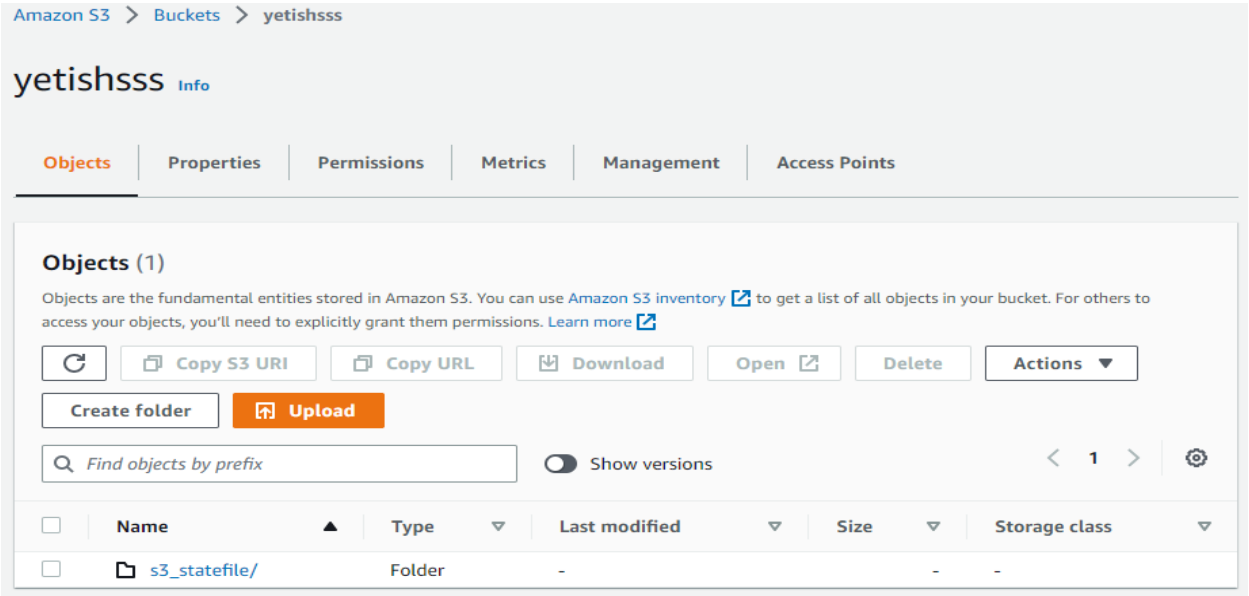
All the source code is stored in Github and **state file can be stored s3 bucket.**

Steps:

1) Create s3 bucket



2) Create a folder in yetishsss

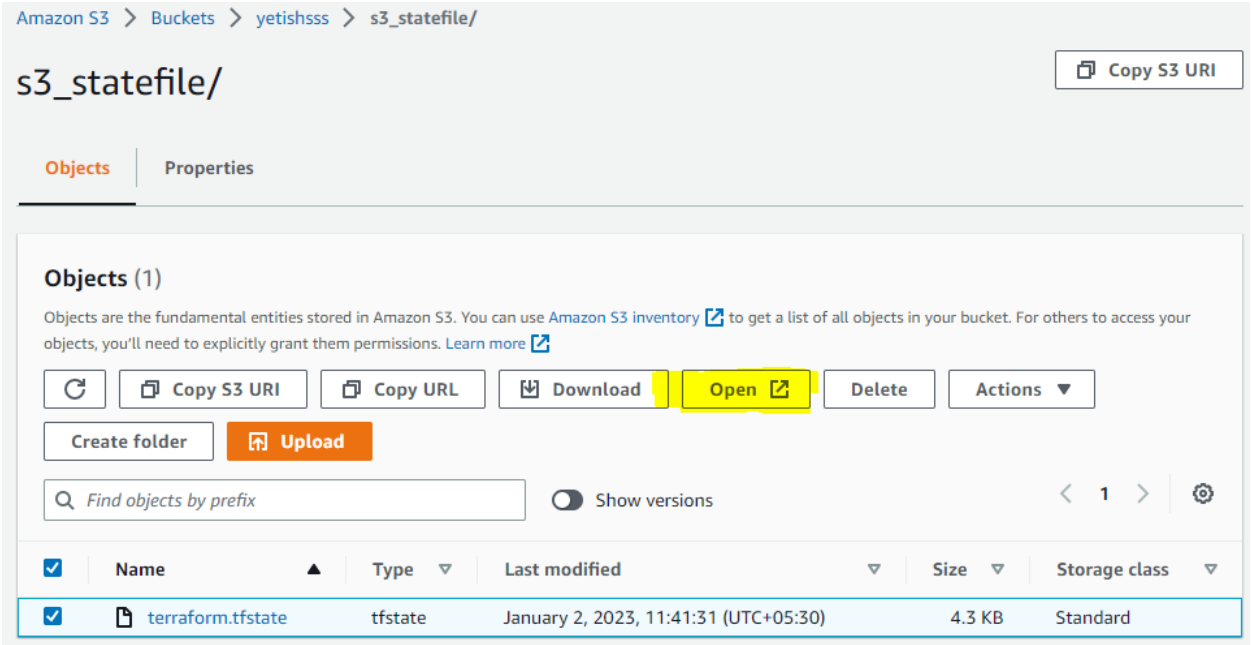


3) In instances under provider.tf.
mention below command

```
terraform {
  backend "s3" {
    encrypt = false
    bucket = "yetishsss"
    region = "ap-south-1"
    key = "s3_statefile/terraform.tfstate"
  }
}
```

4) Terraform init
Terraform plan
Terraform apply

5) In S3 bucket Terraform.tfstate will be available (protected)
Click on open



6) Commands (Pull and Push)
Delete the state file in local machine
1) Command: terraform state pull > terraform.ftstate – pulling s3 bucket to our machine.
output should be redirect to new terraform.ftstate
2) Command: terraform state push filename – push to s3 bucket
filename (terraform.ftstate)

---

15) Locals
A local value assigns a name to an expression, so you can use the name multiple times within a module instead of repeating the expression.
Example: key_name="Mumbai_Yetish"

```
locals {
  key_name="Mumbai_Yetish"
}
module "ec2_instance" {
  source = "./new_module"
  region = "ap-south-1"
  key_name = "${local.key_name}"
  instance_type = "t2.micro"
}
```

---

16) Workspace – we will be creating multiple environment for our infrastructure, if want to test, before going to the production I will do in the local environment.

Commands

1) terraform workspace show

```
root@ip-172-31-44-245:~/s3bucket# terraform workspace show
default
```

2) To create new workspace

a) terraform workspace new qa

b) terraform workspace new prod

c) terraform workspace new dev

3) To check all workspace

a) terraform workspace list

```
root@ip-172-31-44-245:~/provisioner# terraform workspace list
  default
* dev
  prod
  qa
```

4) To switch to other workspace

a) terraform workspace select prod

```
root@ip-172-31-44-245:~/provisioner# terraform workspace select prod
Switched to workspace "prod".
root@ip-172-31-44-245:~/provisioner# terraform workspace list
  default
  dev
* prod
  qa
```

Note: Every workspace **(qa, dev, prod and default)** state file will be different, so this is the reason we will save in s3 bucket.

```
provider "aws" {
  region="ap-south-1"
}

locals {
  env="${terraform.workspace}"

  counts = {
    "default"=1
    "prod"=3
    "dev"=2
  }

  instances = {
    "default"="t2.micro"
    "prod"="t2.small"
    "dev"="t2.micro"
  }
```

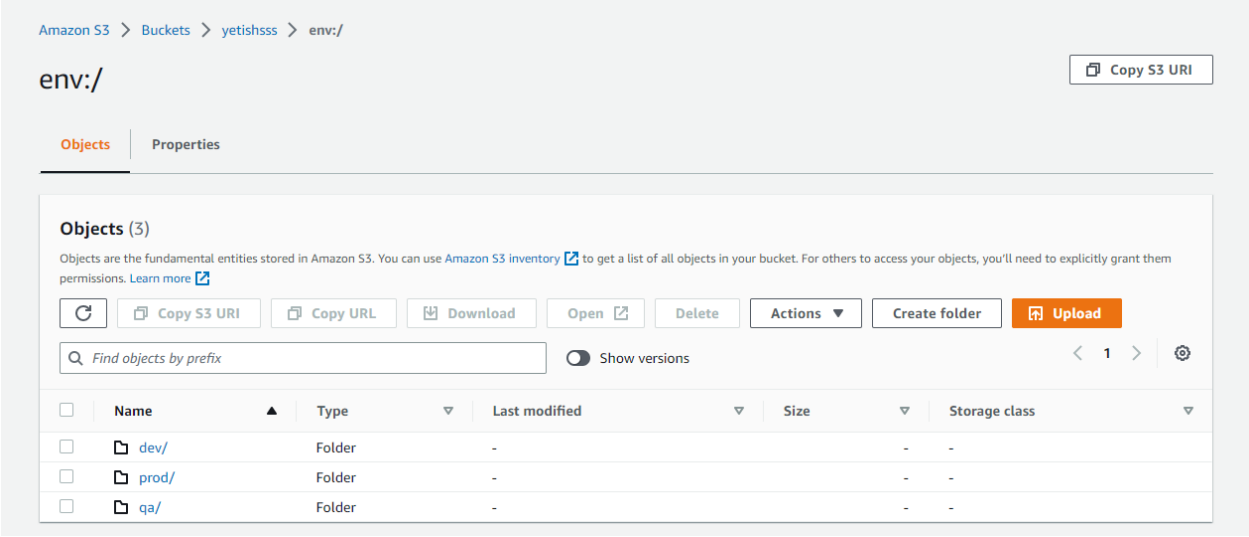
```
  tags = {
    "default"="default"
    "prod"="prod"
    "dev"="dev"
  }


  instance_type="${lookup(local.instances,local.env)}"
  count="${lookup(local.counts,local.env)}"
  mytag="${lookup(local.tags,local.env)}"

}
```

```
resource "aws_instance" "ys_instance" {
 ami="ami-0447a12f28fddb066"
 instance_type="${local.instance_type}"
 count="${local.count}"
 tags = {
    Name="${local.mytag}"
 }
}
```

later switch to other workspace and run 1) terraform init 2) terraform plan 3) terraform apply and later terraform destroy



---

17) State File Locking – (to protect the statefile from getting corrupted from writing)
Whenever you are performing write operation, Terraform would lock the state file. This is very important as otherwise during your ongoing Terraform apply operations, if others also try for the same, it can corrupt state file.
