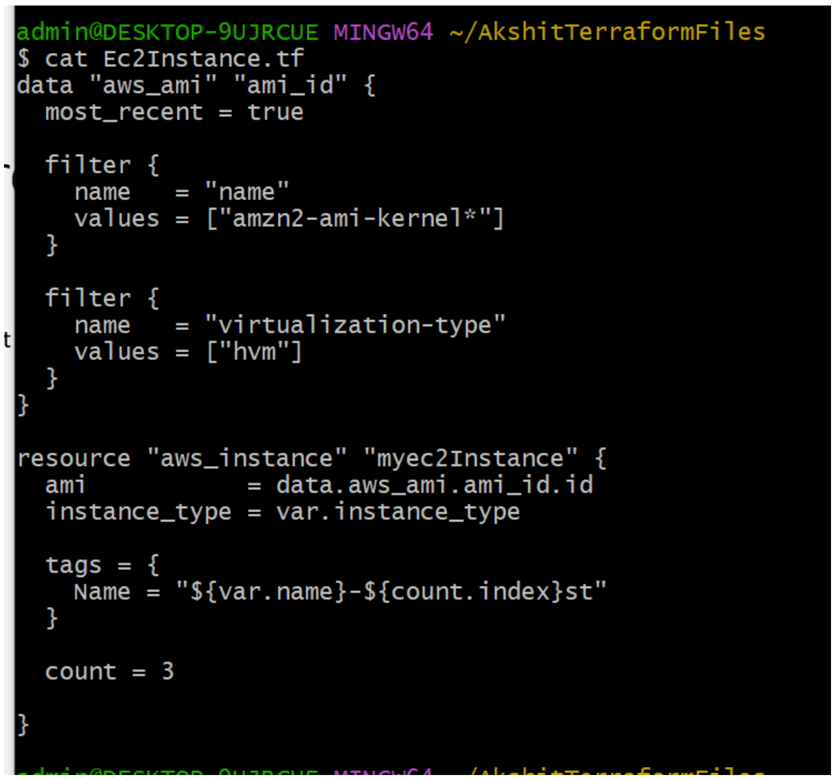
AWS Security Groups and Terraform Functions- foreach, if else, list, locals/variables

Links-:
aws_security_group | Resources | hashicorp/aws | Terraform | Terraform Registry

1. Defining different names for every instance created through count variable.
   As seen in the previous module, The count function creates the multiple EC2 instances at once, but with the same name. If we want to define every instance with the unique name, we can do it in the following way.



```
admin@DESKTOP-9UJRCUE MINGW64 ~/AkshitTerraformFiles
$ cat Ec2Instance.tf
data "aws_ami" "ami_id" {
  most_recent = true

  filter {
    name   = "name"
    values = ["amzn2-ami-kernel*"]
  }

  filter {
    name   = "virtualization-type"
    values = ["hvm"]
  }
}

resource "aws_instance" "myec2Instance" {
  ami           = data.aws_ami.ami_id.id
  instance_type = var.instance_type

  tags = {
    Name = "${var.name}-${count.index}st"
  }

  count = 3

}
```

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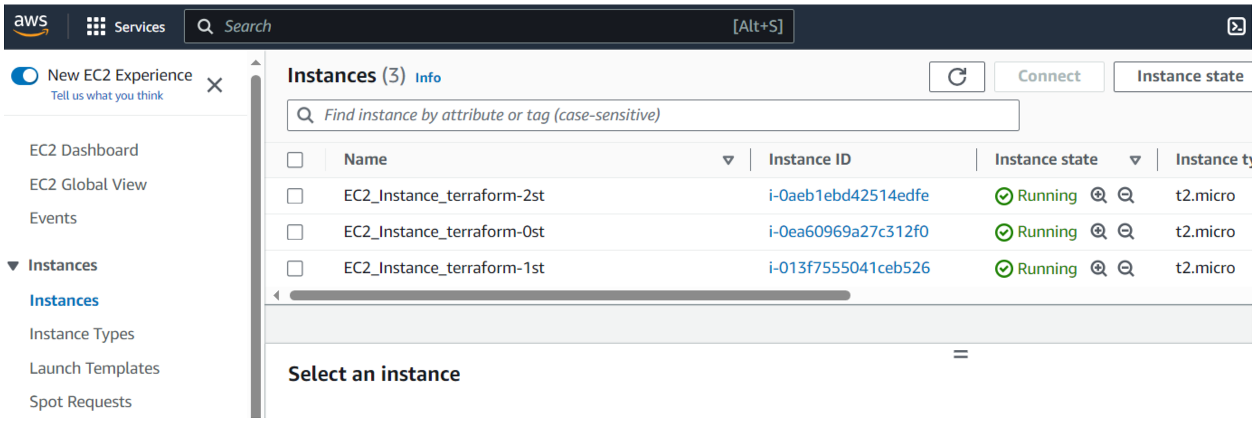
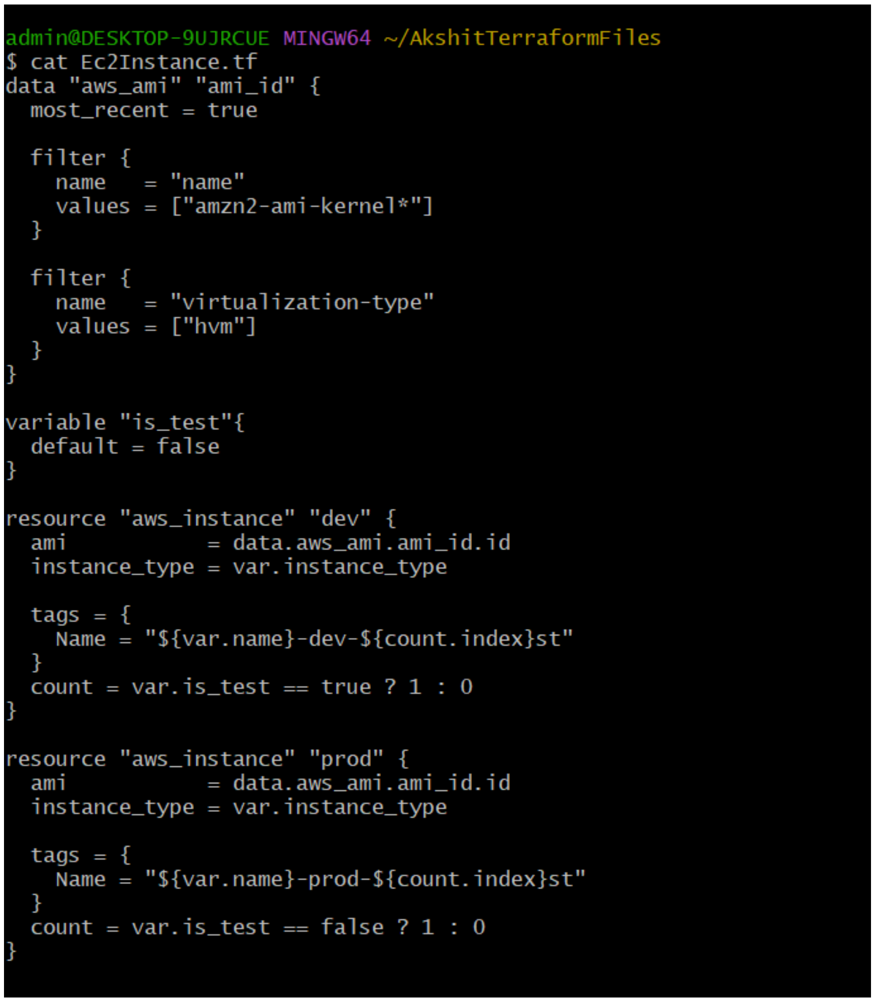


Instances (3)

Name	Instance ID	Instance state	Instance ty
EC2_Instance_terraform-2st	i-0aeb1ebd42514edfe	Running	t2.micro
EC2_Instance_terraform-0st	i-0ea60969a27c312f0	Running	t2.micro
EC2_Instance_terraform-1st	i-013f7555041ceb526	Running	t2.micro

Select an instance

2. If condition in Terraform:
   Scenario- we are giving 2 EC2 resources configurations, one for dev, one for prod. And setting a variable named “is_test” which is by default set to be false, means it is for production env. When working on the dev environment EC2 resource, its value is set to be true, stating that the instance environment is test environment and the count is set to be 0. When working on prod EC2 resource, it is set to be false, stating it is production environment instance and its count is set to be 1.
   Along with that we gave else condition in test resource stating if the condition is not matched, the count should be 0 and vice versa for prod resource.
   As you can see in the AWS output, the prod instance is created cause the condition met for is_test variable in Prod resource config.



```
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$ cat Ec2Instance.tf
data "aws_ami" "ami_id" {
  most_recent = true

  filter {
    name   = "name"
    values = ["amzn2-ami-kernel*"]
  }

  filter {
    name   = "virtualization-type"
    values = ["hvm"]
  }
}

variable "is_test"{
  default = false
}

resource "aws_instance" "dev" {
  ami           = data.aws_ami.ami_id.id
  instance_type = var.instance_type

  tags = {
    Name = "${var.name}-dev-${count.index}st"
  }
  count = var.is_test == true ? 1 : 0
}

resource "aws_instance" "prod" {
  ami           = data.aws_ami.ami_id.id
  instance_type = var.instance_type

  tags = {
    Name = "${var.name}-prod-${count.index}st"
  }
  count = var.is_test == false ? 1 : 0
}
```
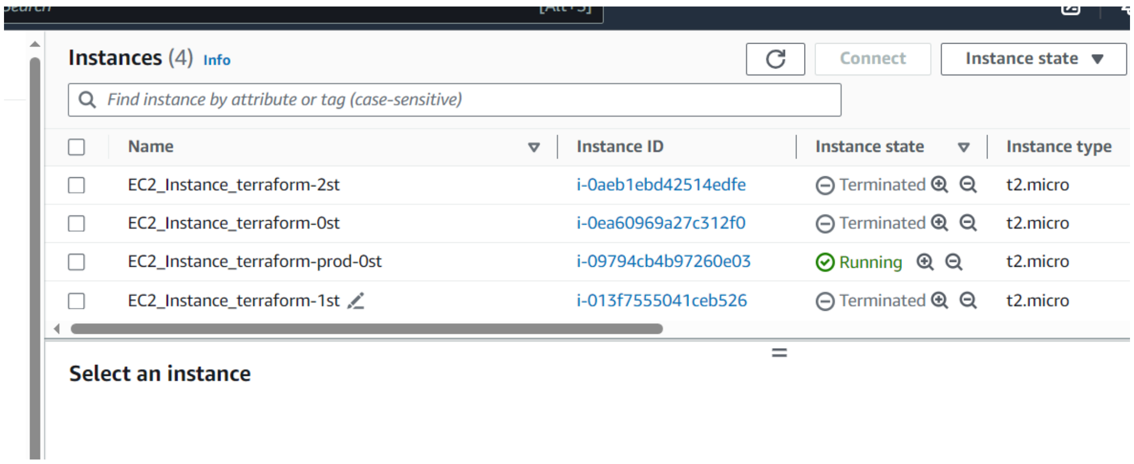



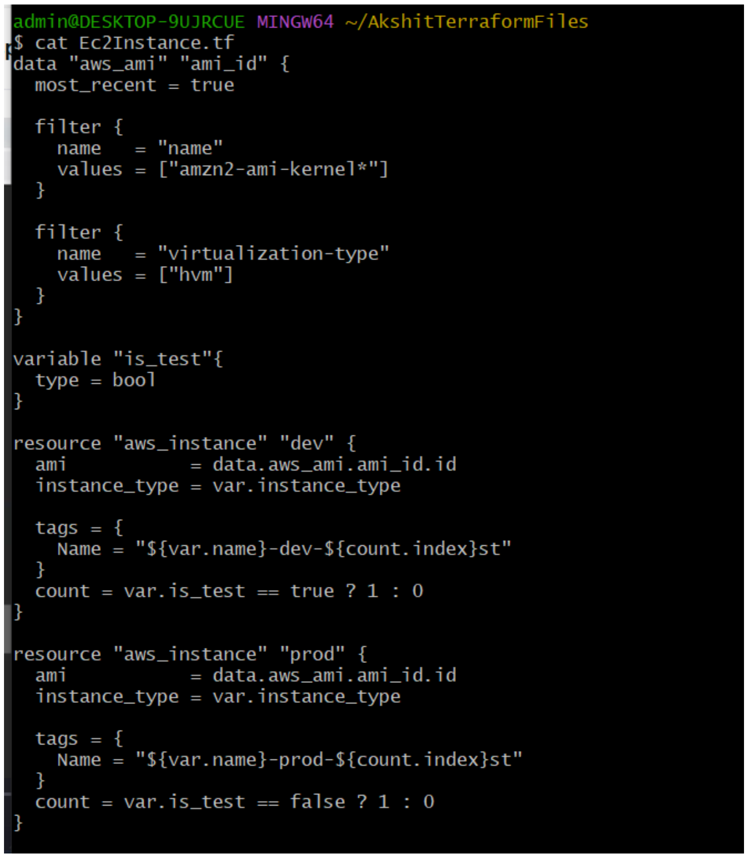
Instances (4) Info

Name	Instance ID	Instance state	Instance type
EC2_Instance_terraform-2st	i-0aeb1ebd42514edfe	Terminated	t2.micro
EC2_Instance_terraform-0st	i-0ea60969a27c312f0	Terminated	t2.micro
EC2_Instance_terraform-prod-0st	i-09794cb4b97260e03	Running	t2.micro
EC2_Instance_terraform-1st	i-013f7555041ceb526	Terminated	t2.micro

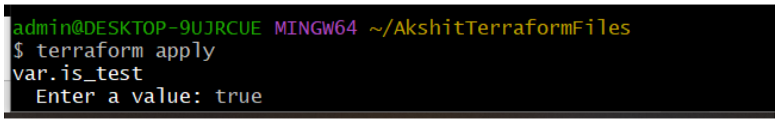
Select an instance

3. You can also give type bool in place of default value in the is_test variable. This will allow the user to set the value of true/false at run time, so that accordingly the AWS resource block can be called out and accordingly the dev or prod environment instance will be generated. This is

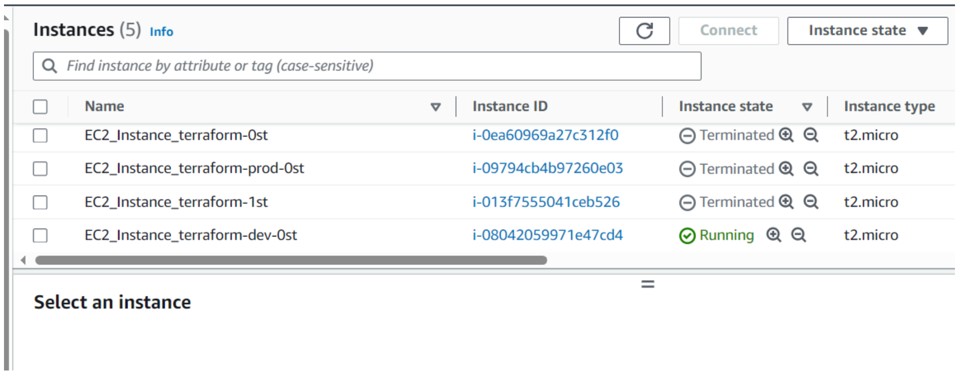
the real time used case.



```
admin@DESKTOP-9UJRCUE MINGW64 ~/AkshitTerraformFiles
$ cat Ec2Instance.tf
data "aws_ami" "ami_id" {
  most_recent = true

  filter {
    name   = "name"
    values = ["amzn2-ami-kernel*"]
  }

  filter {
    name   = "virtualization-type"
    values = ["hvm"]
  }
}

variable "is_test"{
  type = bool
}

resource "aws_instance" "dev" {
  ami           = data.aws_ami.ami_id.id
  instance_type = var.instance_type

  tags = {
    Name = "${var.name}-dev-${count.index}st"
  }
  count = var.is_test == true ? 1 : 0
}

resource "aws_instance" "prod" {
  ami           = data.aws_ami.ami_id.id
  instance_type = var.instance_type

  tags = {
    Name = "${var.name}-prod-${count.index}st"
  }
  count = var.is_test == false ? 1 : 0
}
```



```
admin@DESKTOP-9UJRCUE MINGW64 ~/AkshitTerraformFiles
$ terraform apply
var.is_test
  Enter a value: true
```



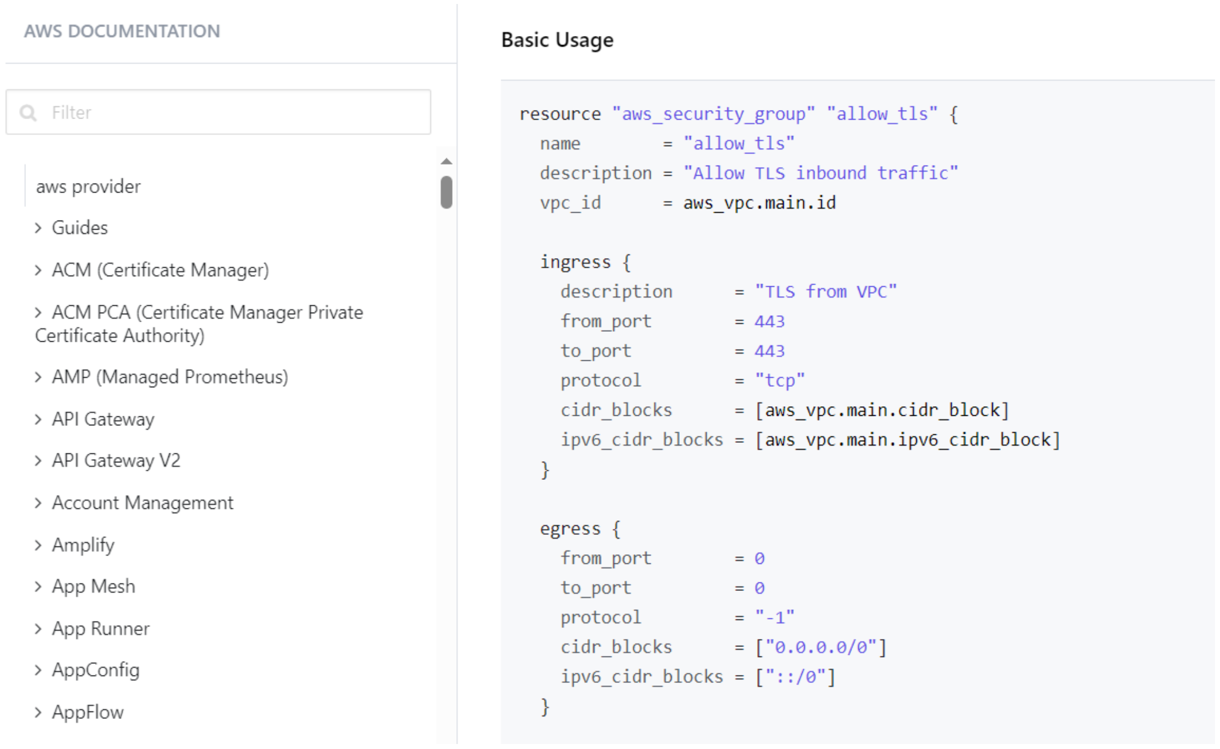
Instances (5) Info

Name	Instance ID	Instance state	Instance type
EC2_Instance_terraform-0st	i-0ea60969a27c312f0	Terminated	t2.micro
EC2_Instance_terraform-prod-0st	i-09794cb4b97260e03	Terminated	t2.micro
EC2_Instance_terraform-1st	i-013f7555041ceb526	Terminated	t2.micro
EC2_Instance_terraform-dev-0st	i-08042059971e47cd4	Running	t2.micro

Select an instance

4. Now let us learn about creating the multiple security groups in AWS through Terraform using ForEach function.

We will also see how to define the List and values in the terraform file
Refer to the AWS documentation-
aws_security_group | Resources | hashicorp/aws | Terraform | Terraform Registry
KeyTerms-:
ingress refers to the incoming network traffic
egress refers to the Outgoing network traffic



Basic Usage

```
resource "aws_security_group" "allow_tls" {
  name        = "allow_tls"
  description = "Allow TLS inbound traffic"
  vpc_id      = aws_vpc.main.id

  ingress {
    description      = "TLS from VPC"
    from_port        = 443
    to_port          = 443
    protocol         = "tcp"
    cidr_blocks      = [aws_vpc.main.cidr_block]
    ipv6_cidr_blocks = [aws_vpc.main.ipv6_cidr_block]
  }

  egress {
    from_port        = 0
    to_port          = 0
    protocol         = "-1"
    cidr_blocks      = ["0.0.0.0/0"]
    ipv6_cidr_blocks = ["::/0"]
  }
```

First, we will perform the ingress networks creation
You may delete the aws_instance resources config files for this scenario because we are just setting up the inbound networking ports and rules right now.
We have set up the variable named portList in which we have defined the list of different port numbers which we need for inbound network.
*please note, these are just demo port numbers for the practice
In the ingress function, we have opened the for each loop, in which we have defined the list variable of ports which is called through the iterator in the content section, which defines the port numbers
You will be needing the cidr_blocks section to be filled to see the all 4 inbound networks in AWS.
After executing the code, you will be able to see the new network added in the security networks section, with all 4 port sections in the inbound rules.

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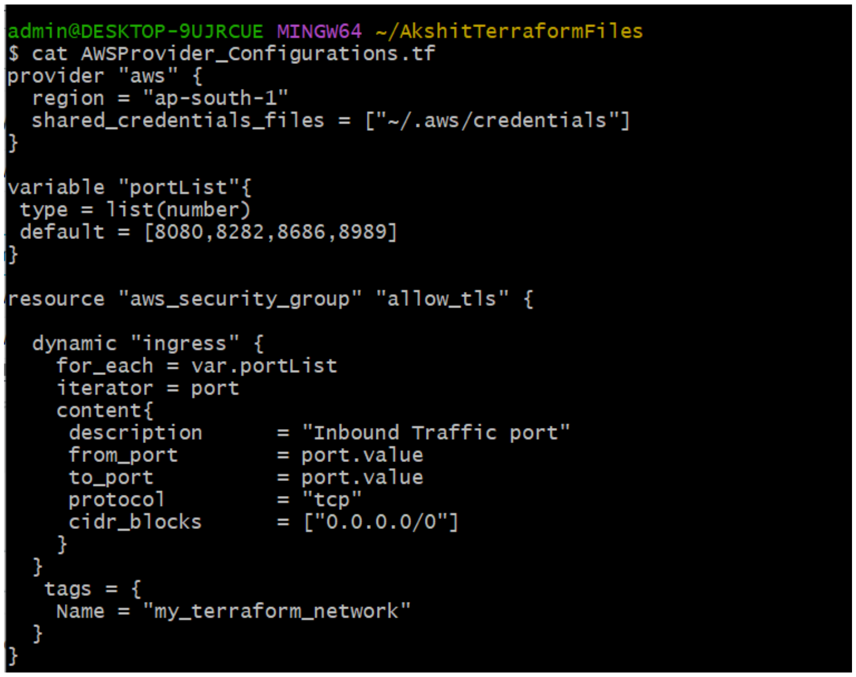
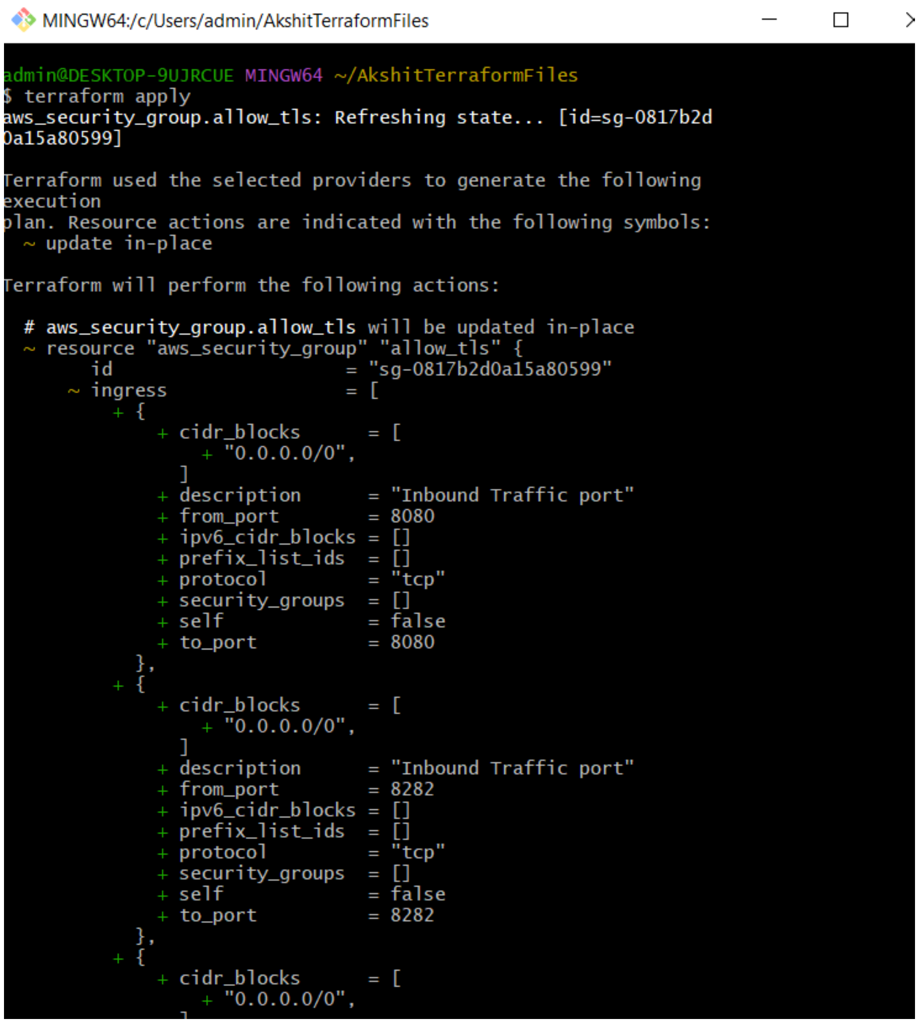


```
admin@DESKTOP-9UJRCUE MINGW64 ~/AkshitTerraformFiles
$ cat AWSProvider_Configurations.tf
provider "aws" {
  region = "ap-south-1"
  shared_credentials_files = ["~/.aws/credentials"]
}

variable "portList"{
 type = list(number)
 default = [8080,8282,8686,8989]
}

resource "aws_security_group" "allow_tls" {

  dynamic "ingress" {
    for_each = var.portList
    iterator = port
    content{
     description       = "Inbound Traffic port"
     from_port         = port.value
     to_port           = port.value
     protocol          = "tcp"
     cidr_blocks       = ["0.0.0.0/0"]
    }
  }
   tags = {
    Name = "my_terraform_network"
  }
}
```



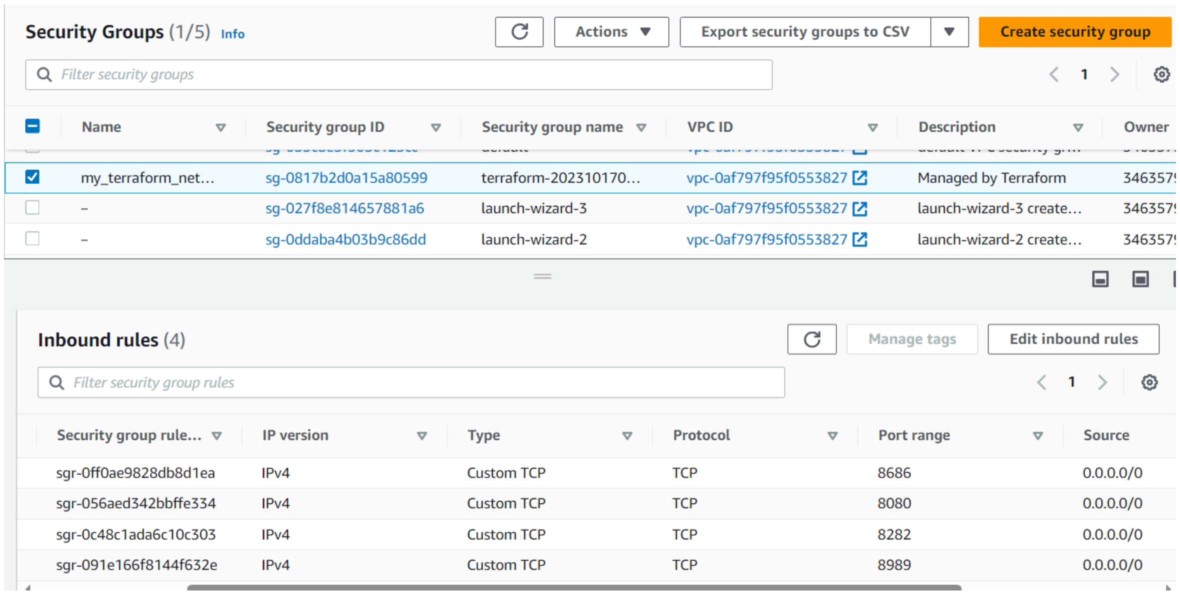
MINGW64:/c/Users/admin/AkshitTerraformFiles

```
admin@DESKTOP-9UJRCUE MINGW64 ~/AkshitTerraformFiles
$ terraform apply
aws_security_group.allow_tls: Refreshing state... [id=sg-0817b2d
0a15a80599]

Terraform used the selected providers to generate the following
execution
plan. Resource actions are indicated with the following symbols:
  ~ update in-place

Terraform will perform the following actions:

  # aws_security_group.allow_tls will be updated in-place
  ~ resource "aws_security_group" "allow_tls" {
        id                     = "sg-0817b2d0a15a80599"
      ~ ingress                = [
          + {
              + cidr_blocks      = [
                  + "0.0.0.0/0",
                ]
              + description      = "Inbound Traffic port"
              + from_port        = 8080
              + ipv6_cidr_blocks = []
              + prefix_list_ids  = []
              + protocol         = "tcp"
              + security_groups  = []
              + self             = false
              + to_port          = 8080
            },
          + {
              + cidr_blocks      = [
                  + "0.0.0.0/0",
                ]
              + description      = "Inbound Traffic port"
              + from_port        = 8282
              + ipv6_cidr_blocks = []
              + prefix_list_ids  = []
              + protocol         = "tcp"
              + security_groups  = []
              + self             = false
              + to_port          = 8282
            },
          + {
              + cidr_blocks      = [
                  + "0.0.0.0/0",
```



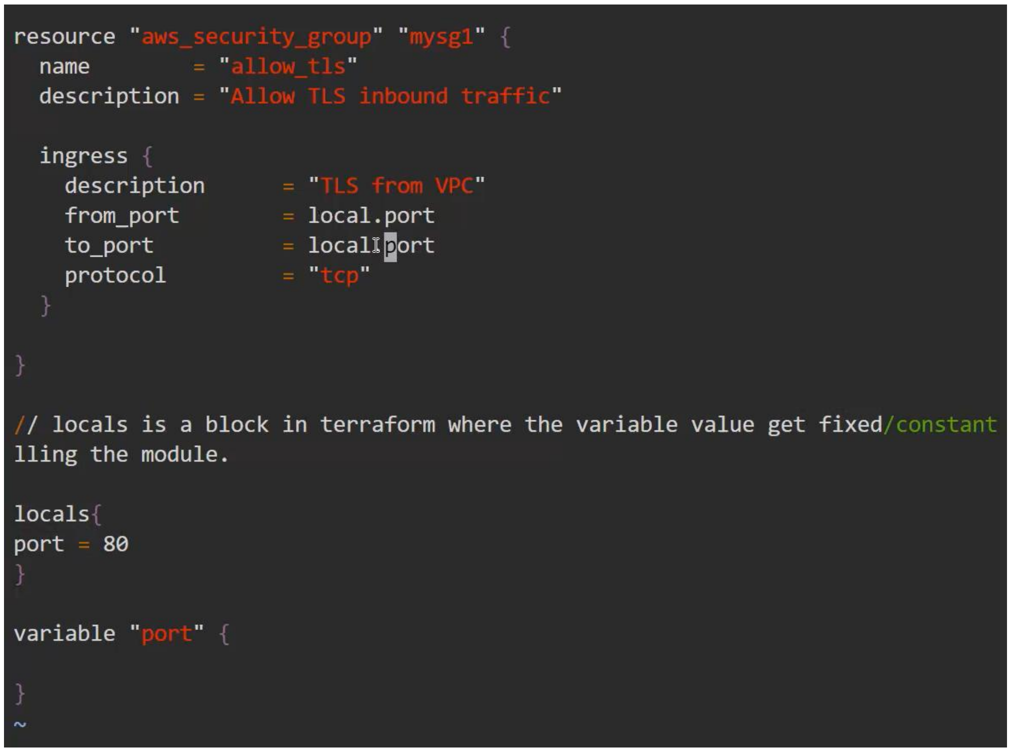
Security Groups (1/5) Info

	Name	Security group ID	Security group name	VPC ID	Description	Owner
☑	my_terraform_net…	sg-0817b2d0a15a80599	terraform-202310170…	vpc-0af797f95f0553827	Managed by Terraform	346357
☐	–	sg-027f8e814657881a6	launch-wizard-3	vpc-0af797f95f0553827	launch-wizard-3 create…	346357
☐	–	sg-0ddaba4b03b9c86dd	launch-wizard-2	vpc-0af797f95f0553827	launch-wizard-2 create…	346357

Inbound rules (4)

Security group rule…	IP version	Type	Protocol	Port range	Source
sgr-0ff0ae9828db8d1ea	IPv4	Custom TCP	TCP	8686	0.0.0.0/0
sgr-056aed342bbffe334	IPv4	Custom TCP	TCP	8080	0.0.0.0/0
sgr-0c48c1ada6c10c303	IPv4	Custom TCP	TCP	8282	0.0.0.0/0
sgr-091e166f8144f632e	IPv4	Custom TCP	TCP	8989	0.0.0.0/0

5. You may also use "locals" function with variable to fix the value of a particular variable which cannot be changed at run time by the user or by any other config file.
In this scenario, local function will set the port number constantly to 80.



```
resource "aws_security_group" "mysg1" {
  name        = "allow_tls"
  description = "Allow TLS inbound traffic"

  ingress {
    description      = "TLS from VPC"
    from_port        = local.port
    to_port          = local.port
    protocol         = "tcp"
  }

}

// locals is a block in terraform where the variable value get fixed/constant
lling the module.

locals{
port = 80
}

variable "port" {

}
~
```