

## Lab Exercise 11– Creating a VPC in Terraform

### Objective:

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Learn how to use Terraform to create a basic Virtual Private Cloud (VPC) in AWS.

### Prerequisites:

- Terraform installed on your machine.
- AWS CLI configured with the necessary credentials.

### Steps:

#### 1. Create a Terraform Directory:

```
mkdir terraform-vpc
```

```
cd terraform-vpc
```

```
(base) → terraform-iam-users-lab10 git:(main) × cd ..  
(base) → MyLab git:(main) × mkdir terraform-vpc-lab11  
(base) → MyLab git:(main) × cd terraform-vpc-lab11  
(base) → terraform-vpc-lab11 git:(main) ×
```

- Create Terraform Configuration Files:
- Create a file named main.tf:

**# vpc.tf**

```
resource "aws_vpc" "gfg-vpc" {
  cidr_block = "10.0.0.0/16"
}

resource "aws_subnet" "gfg-subnet" {
  vpc_id     = aws_vpc.gfg-vpc.id
  cidr_block = "10.0.1.0/24"

  tags = {
    Name = "gfg-subnet"
  }
}

resource "aws_internet_gateway" "gfg-gw" {
  vpc_id = aws_vpc.gfg-vpc.id

  tags = {
    Name = "gfg-IG"
  }
}

resource "aws_route_table" "gfg-rt" {
  vpc_id = aws_vpc.gfg-vpc.id

  route {
    cidr_block = "0.0.0.0/0"
    gateway_id = aws_internet_gateway.gfg-gw.id
  }
}
```

```
tags = {
  Name = "GFG-Route-Table"
}
}

resource "aws_route_table_association" "gfg-rta" {
  subnet_id    = aws_subnet.gfg-subnet.id
  route_table_id = aws_route_table.gfg-rt.id
}

resource "aws_security_group" "gfg-sg" {
  name      = "my-gfg-sg"
  vpc_id    = aws_vpc.gfg-vpc.id

  ingress {
    description      = "TLS from VPC"
    from_port        = 20
    to_port           = 20
    protocol          = "tcp"
    cidr_blocks       = ["0.0.0.0/0"]
    ipv6_cidr_blocks = [":::/0"]
  }

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

  tags = {
    Name = "my-gfg-sg"
  }
}
```

```
}  
}  
  
vpc.tf > ...  
1  resource "aws_vpc" "gfg-vpc" {  
2    cidr_block = "10.0.0.0/16"  
3  }  
4  
5  
6  resource "aws_subnet" "gfg-subnet" {  
7    vpc_id      = aws_vpc.gfg-vpc.id  
8    cidr_block = "10.0.1.0/24"  
9  
10  
11    tags = {  
12      Name = "gfg-subnet"  
13    }  
14  }  
15  
16  
17  resource "aws_internet_gateway" "gfg-gw" {  
18    vpc_id = aws_vpc.gfg-vpc.id  
19  
20  
21    tags = {  
22      Name = "gfg-IG"  
23    }  
24  }  
25  
26  
27  resource "aws_route_table" "gfg-rt" {  
28    vpc_id = aws_vpc.gfg-vpc.id  
29  
30  
31    route {  
32      cidr_block = "0.0.0.0/0"  
33      gateway_id = aws_internet_gateway.gfg-gw.id  
34    }  
35  
36  
37    tags = {  
38      Name = "GFG-Route-Table"  
39    }  
40  }  
41
```

In this configuration, we define an AWS provider, a VPC with a specified CIDR block, and two subnets within the VPC.

## 2. Initialize and Apply:

- Run the following Terraform commands to initialize and apply the configuration:

**terraform init**

**terraform apply**

```
(base) → terraform-vpc-lab11 git:(main) × terraform init
Initializing the backend...
Initializing provider plugins...
- Finding hashicorp/aws versions matching "5.68.0" ...
- Installing hashicorp/aws v5.68.0...
- Installed hashicorp/aws v5.68.0 (signed by HashiCorp)
Terraform has created a lock file .terraform.lock.hcl to record the provider
selections it made above. Include this file in your version control repository
so that Terraform can guarantee to make the same selections by default when
you run "terraform init" in the future.

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.
(base) → terraform-vpc-lab11 git:(main) ×
```

- Terraform will prompt you to confirm the creation of the VPC and subnets. Type yes and press Enter.

## 3. Verify Resources in AWS Console:

- Log in to the AWS Management Console and navigate to the VPC service.
- Verify that the VPC and subnets with the specified names and settings have been created.

Find resources by attribute or tag							
<input type="checkbox"/>	Name	Subnet ID	State	VPC	Block Public...	IPv4 CIDR	IP
<input type="checkbox"/>	-	<a href="#">subnet-021b466a5152e4cdb</a>	Available	<a href="#">vpc-0aa7c2c88a69a7678</a>	Off	172.31.16.0/20	-
<input type="checkbox"/>	-	<a href="#">subnet-0a6a1d15db6819e97</a>	Available	<a href="#">vpc-0aa7c2c88a69a7678</a>	Off	172.31.0.0/20	-
<input type="checkbox"/>	-	<a href="#">subnet-000e03d7c0fc67cfb</a>	Available	<a href="#">vpc-0aa7c2c88a69a7678</a>	Off	172.31.32.0/20	-
<input type="checkbox"/>	gfg-subnet	<a href="#">subnet-075e4fc94a1265f8d</a>	Available	<a href="#">vpc-066bb20165aea1ebc</a>	Off	10.0.1.0/24	-

## 4. Update VPC Configuration:

- If you want to modify the VPC configuration, update the main.tf file with the desired changes.
- Rerun the terraform apply command to apply the changes:

### terraform apply

```
aws_vpc.gfg-vpc: Creating...
aws_vpc.gfg-vpc: Creation complete after 3s [id=vpc-066bb20165aea1ebc]
aws_internet_gateway.gfg-gw: Creating...
aws_subnet.gfg-subnet: Creating...
aws_security_group.gfg-sg: Creating...
aws_internet_gateway.gfg-gw: Creation complete after 1s [id=igw-028db05c7d2f27b02]
aws_route_table.gfg-rt: Creating...
aws_subnet.gfg-subnet: Creation complete after 1s [id=subnet-075e4fc94a1265f8d]
aws_route_table.gfg-rt: Creation complete after 1s [id=rtb-09fa6a7314daa0716]
aws_route_table_association.gfg-rta: Creating...
aws_route_table_association.gfg-rta: Creation complete after 0s [id=rtbassoc-075b31dd1dab40298]
aws_security_group.gfg-sg: Creation complete after 3s [id=sg-080ac11e08ca12c23]

Apply complete! Resources: 6 added, 0 changed, 0 destroyed.
(base) → terraform-vpc-lab11 git:(main) x
```

## 5. Clean Up:

After testing, you can clean up the VPC and subnets:

### terraform destroy

```
aws_route_table_association.gfg-rta: Destroying... [id=rtbassoc-075b31dd1dab40298]
aws_security_group.gfg-sg: Destroying... [id=sg-080ac11e08ca12c23]
aws_route_table_association.gfg-rta: Destruction complete after 2s
aws_subnet.gfg-subnet: Destroying... [id=subnet-075e4fc94a1265f8d]
aws_route_table.gfg-rt: Destroying... [id=rtb-09fa6a7314daa0716]
aws_security_group.gfg-sg: Destruction complete after 2s
aws_subnet.gfg-subnet: Destruction complete after 0s
aws_route_table.gfg-rt: Destruction complete after 0s
aws_internet_gateway.gfg-gw: Destroying... [id=igw-028db05c7d2f27b02]
aws_internet_gateway.gfg-gw: Destruction complete after 1s
aws_vpc.gfg-vpc: Destroying... [id=vpc-066bb20165aea1ebc]
aws_vpc.gfg-vpc: Destruction complete after 0s

Destroy complete! Resources: 6 destroyed.
(base) → terraform-vpc-lab11 git:(main) x
```

Confirm the destruction by typing yes.

## **6. Conclusion:**

This lab exercise demonstrates how to create a basic Virtual Private Cloud (VPC) with subnets in AWS using Terraform. The example includes a simple VPC configuration with two subnets. Experiment with different CIDR blocks, settings, and additional AWS resources to customize your VPC.