

# Infrastructure Automation using Terraform

Create VPC using Module



# Table of Contents

Prerequisite:.....	3
Walkthrough: .....	3
Part 1: Initializing Terraform Directory .....	3
Part 2: Creating VPC using Modules .....	5
Part 3: Destroying VPC .....	6

## Infrastructure Automation using Terraform – Lab Guide

This Activity demonstrates the creation of VPC in AWS using Terraform modules. Modules are used for packaging and reusing code in Terraform.

### Prerequisite:

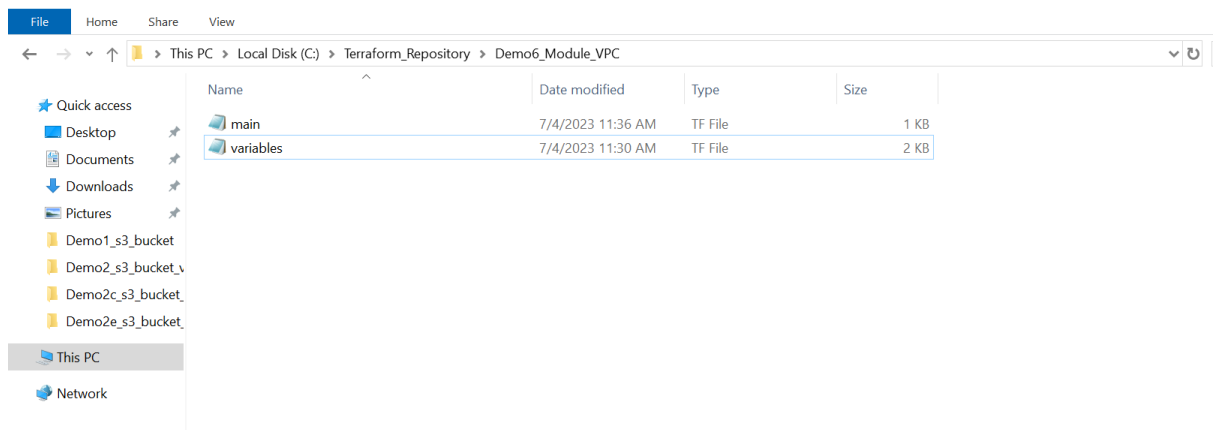
- 1) Download the zip file shared by the trainer and extract it.

### Walkthrough:

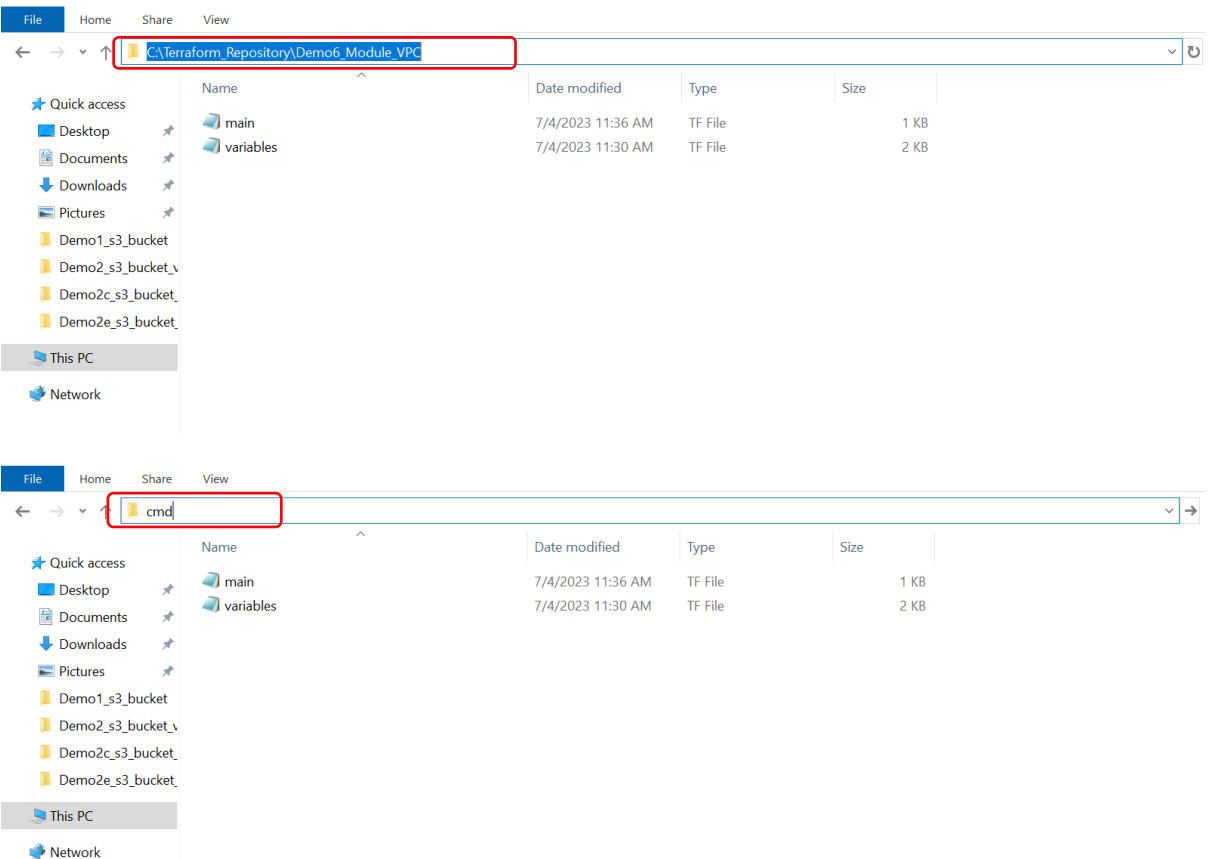
1. Initializing Terraform Directory
2. Creating VPC using Modules
3. Destroying VPC

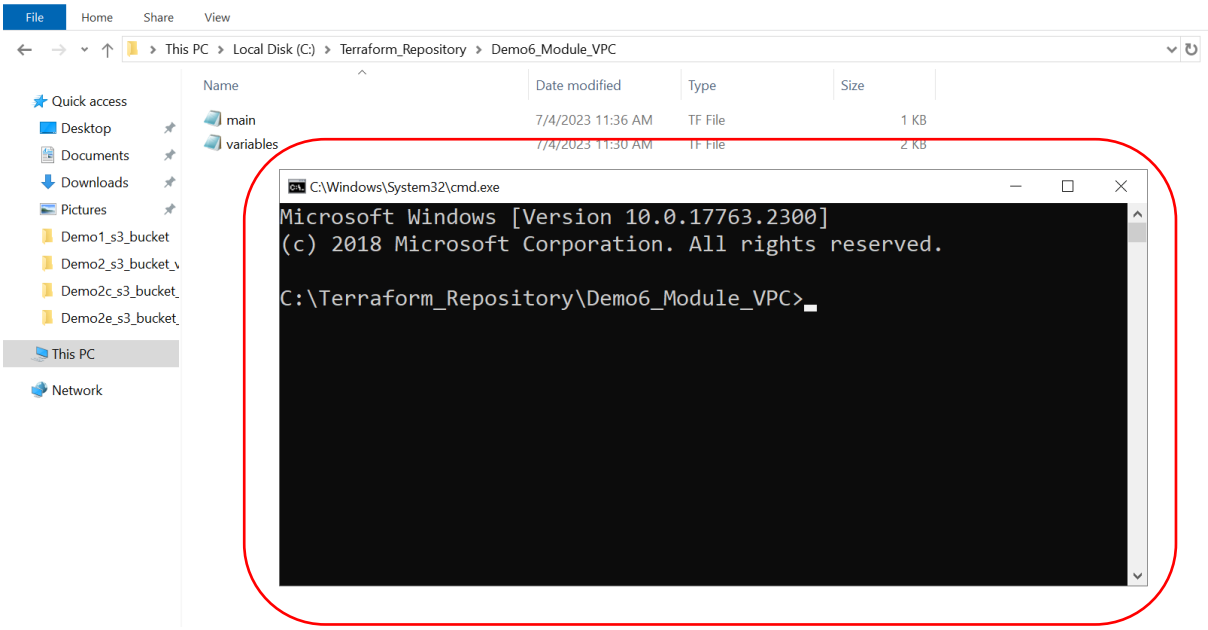
#### Part 1: Initializing Terraform Directory

- 1 Open the extracted folder and navigate to “.tf” files.



- 2 Click on the Address bar and type cmd. Press Enter ( It will open a command prompt from that location ).



	
3	<p>Execute below command to initialize the current directory as Terraform directory which enables us to run terraform commands to manage Infrastructure.</p> <p><b>Command :</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform init</pre> <p><b>Result :</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform init Initializing modules... Downloading terraform-aws-modules/vpc/aws 5.0.0 for vpc... - vpc in .terraform\modules\vpc  Initializing the backend...  Initializing provider plugins... - Finding hashicorp/aws versions matching "&gt;= 5.0.0"... - Installing hashicorp/aws v5.9.0... - Installed hashicorp/aws v5.9.0 (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.  C:\Terraform_Repository\Demo6_Module_VPC&gt;</pre>
4	<p>Next execute below command to validate syntax and configuration of terraform configuration files. If everything is proper, it will return a success message otherwise it will display the errors.</p>

	<p><b>Command :</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform validate</pre> <p><b>Result :</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform validate Success! The configuration is valid.  C:\Terraform_Repository\Demo6_Module_VPC&gt;_</pre>
5	<p>Next run below command and observe the output. The output contains information depicting all the changes which will happen in the AWS cloud. It is like dry-run to ensure whatever we are trying to do using terraform commands is what we want.</p> <p><b>Command :</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform plan -out "module_vpc.tfplan"</pre> <p><b>Result :</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform plan -out "module_vpc.tfplan"  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:  # module.vpc.aws_default_network_acl.this[0] will be created + resource "aws_default_network_acl" "this" {   + arn                = (known after apply)   + default_network_acl_id = (known after apply)   + id                 = (known after apply)   + owner_id           = (known after apply)   + tags               = {     + "Environment" = "dev"     + "Name"        = "example-vpc-default"     + "Terraform"   = "true"   }   + tags_all           = {     + "Environment" = "dev"     + "Name"        = "example-vpc-default"     + "Terraform"   = "true"   }   + vpc_id              = (known after apply)    + egress {     + action      = "allow"     + from_port   = 0     + ipv6_cidr_block = ":::/0"     + protocol    = "-1"   } }</pre>

## Part 2: Creating VPC using Modules

1	<p>For creating VPC , execute below command and observe the actions performed by the command.</p> <p><b>Command :</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform apply "module_vpc.tfplan"</pre> <p><b>Result :</b></p>
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	<pre> C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform apply "module_vpc.tfplan" module.vpc.aws_vpc.this[0]: Creating... module.vpc.aws_vpc.this[0]: Still creating... [10s elapsed] module.vpc.aws_vpc.this[0]: Creation complete after 13s [id=vpc-0f3a87641cf2ac6d0] module.vpc.aws_default_security_group.this[0]: Creating... module.vpc.aws_subnet.private[1]: Creating... module.vpc.aws_route_table.private[0]: Creating... module.vpc.aws_subnet.public[1]: Creating... module.vpc.aws_subnet.private[0]: Creating... module.vpc.aws_route_table.private[1]: Creating... module.vpc.aws_route_table.public[0]: Creating... module.vpc.aws_default_route_table.default[0]: Creating... module.vpc.aws_subnet.public[0]: Creating... module.vpc.aws_default_network_acl.this[0]: Creating... module.vpc.aws_subnet.private[1]: Creation complete after 1s [id=subnet-00d50e1178fed6627] module.vpc.aws_internet_gateway.this[0]: Creating... module.vpc.aws_default_route_table.default[0]: Creation complete after 1s [id=rtb-0d0f90e08b2fd08a3] module.vpc.aws_subnet.private[0]: Creation complete after 1s [id=subnet-0d7746651ab6c5f2c] module.vpc.aws_subnet.public[1]: Creation complete after 1s [id=subnet-04713a4af875ec105] module.vpc.aws_subnet.public[0]: Creation complete after 1s [id=subnet-0faac4ad8b42b8906] module.vpc.aws_route_table.private[1]: Creation complete after 1s [id=rtb-066a9fd1b61c691be] module.vpc.aws_route_table.public[0]: Creation complete after 1s [id=rtb-0262895d1173dc81d] module.vpc.aws_route_table_association.public[0]: Creating... module.vpc.aws_route_table_association.public[1]: Creating... module.vpc.aws_route_table.private[0]: Creation complete after 1s [id=rtb-06716626f8941a959] module.vpc.aws_route_table_association.private[1]: Creating... module.vpc.aws_route_table_association.private[0]: Creating... module.vpc.aws_internet_gateway.this[0]: Creation complete after 1s [id=igw-039ed3fbf7bd56110] module.vpc.aws_route.public_internet_gateway[0]: Creating... module.vpc.aws_eip.nat[1]: Creating... module.vpc.aws_eip.nat[0]: Creating...  module.vpc.aws_route_table_association.private[0]: Creation complete after 1s [id=rtbassoc-01631238ffbb46341] module.vpc.aws_eip.nat[1]: Creation complete after 0s [id=eipalloc-0eec91771f59564cf] module.vpc.aws_default_network_acl.this[0]: Creation complete after 2s [id=acl-02de522ea4767aa28] module.vpc.aws_eip.nat[0]: Creation complete after 0s [id=eipalloc-0c8b525b5027bfff6] module.vpc.aws_nat_gateway.this[0]: Creating... module.vpc.aws_nat_gateway.this[1]: Creating... module.vpc.aws_route.public_internet_gateway[0]: Creation complete after 0s [id=r-rtb-0262895d1173dc81d1080289494] module.vpc.aws_nat_gateway.this[1]: Still creating... [10s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [10s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [20s elapsed] module.vpc.aws_nat_gateway.this[1]: Still creating... [20s elapsed] module.vpc.aws_nat_gateway.this[1]: Still creating... [30s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [30s elapsed] module.vpc.aws_nat_gateway.this[1]: Still creating... [40s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [40s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [50s elapsed] module.vpc.aws_nat_gateway.this[1]: Still creating... [50s elapsed] module.vpc.aws_nat_gateway.this[1]: Still creating... [1m0s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [1m0s elapsed] module.vpc.aws_nat_gateway.this[1]: Still creating... [1m10s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [1m10s elapsed] module.vpc.aws_nat_gateway.this[1]: Still creating... [1m20s elapsed] module.vpc.aws_nat_gateway.this[0]: Still creating... [1m20s elapsed] module.vpc.aws_nat_gateway.this[0]: Creation complete after 1m26s [id=nat-0a0f04a11db6a49e0] module.vpc.aws_nat_gateway.this[1]: Still creating... [1m30s elapsed] module.vpc.aws_nat_gateway.this[1]: Creation complete after 1m36s [id=nat-069c6e66c54b97661] module.vpc.aws_route.private_nat_gateway[1]: Creating... module.vpc.aws_route.private_nat_gateway[0]: Creation complete after 1s [id=r-rtb-06716626f8941a9591080289494] module.vpc.aws_route.private_nat_gateway[1]: Creation complete after 1s [id=r-rtb-066a9fd1b61c691be1080289494]  Apply complete! Resources: 23 added, 0 changed, 0 destroyed. </pre>
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### Part 3: Destroying VPC

1	<p>Execute below command to destroy the VPC which we have created in previous step. After you execute below command, it will show you what changes will be done and before doing those changes it will ask for your approval. So, if you want to proceed with destroying VPC, provide “yes”.</p> <p><b>Command:</b></p> <pre>C:\Terraform_Repository\Demo6_Module_VPC&gt;terraform destroy</pre> <p><b>Result:</b></p>
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```
C:\Terraform_Repository\Demo6_Module_VPC>terraform destroy
module.vpc.aws_vpc.this[0]: Refreshing state... [id=vpc-0f3a87641cf2ac6d0]
module.vpc.aws_default_network_acl.this[0]: Refreshing state... [id=acl-02de522ea4767aa28]
module.vpc.aws_internet_gateway.this[0]: Refreshing state... [id=igw-039ed3fbf7bd56110]
module.vpc.aws_route_table.private[1]: Refreshing state... [id=rtb-066a9fd1b61c691be]
module.vpc.aws_default_route_table.default[0]: Refreshing state... [id=rtb-0d0f90e08b2fd08a3]
module.vpc.aws_route_table.private[0]: Refreshing state... [id=rtb-06716626f8941a959]
module.vpc.aws_default_security_group.this[0]: Refreshing state... [id=sg-0ccf4d7ee898180b7]
module.vpc.aws_subnet.public[1]: Refreshing state... [id=subnet-04713a4af875ec105]
module.vpc.aws_subnet.private[0]: Refreshing state... [id=subnet-0d7746651ab6c5f2c]
module.vpc.aws_subnet.public[0]: Refreshing state... [id=subnet-0faac4ad8b42b8906]
module.vpc.aws_subnet.private[1]: Refreshing state... [id=subnet-00d50e1178fed6627]
module.vpc.aws_route_table.public[0]: Refreshing state... [id=rtb-0262895d1173dc81d]
module.vpc.aws_eip.nat[0]: Refreshing state... [id=eipalloc-0c8b525b5027bffff6]
module.vpc.aws_eip.nat[1]: Refreshing state... [id=eipalloc-0eec91771f59564cf]
module.vpc.aws_route.public_internet_gateway[0]: Refreshing state... [id=r-rtb-0262895d1173dc81d1080289494]
module.vpc.aws_route_table_association.public[0]: Refreshing state... [id=rtbassoc-03eb567dd8447e6c6]
module.vpc.aws_route_table_association.public[1]: Refreshing state... [id=rtbassoc-0867c5e70f9344097]
module.vpc.aws_route_table_association.private[1]: Refreshing state... [id=rtbassoc-079b23ddaf964b8d1]
module.vpc.aws_route_table_association.private[0]: Refreshing state... [id=rtbassoc-01631238ffbb46341]
module.vpc.aws_nat_gateway.this[1]: Refreshing state... [id=nat-069c6e66c54b97661]
module.vpc.aws_nat_gateway.this[0]: Refreshing state... [id=nat-0a0f04a11db6a49e0]
module.vpc.aws_route.private_nat_gateway[0]: Refreshing state... [id=r-rtb-06716626f8941a9591080289494]
module.vpc.aws_route.private_nat_gateway[1]: Refreshing state... [id=r-rtb-066a9fd1b61c691be1080289494]
```

Plan: 0 to add, 0 to change, 23 to destroy.

Changes to Outputs:

```
- vpc_public_subnets = [
  - "subnet-0faac4ad8b42b8906",
  - "subnet-04713a4af875ec105",
] -> null
```

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:

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

```
module.vpc.aws_route.private_nat_gateway[0]: Destroying... [id=r-rtb-06716626f8941a9591080289494]
module.vpc.aws_route.public_internet_gateway[0]: Destroying... [id=r-rtb-0262895d1173dc81d1080289494]
module.vpc.aws_route_table_association.public[0]: Destroying... [id=rtbassoc-03eb567dd8447e6c6]
module.vpc.aws_default_network_acl.this[0]: Destroying... [id=acl-02de522ea4767aa28]
module.vpc.aws_default_route_table.default[0]: Destroying... [id=rtb-0d0f90e08b2fd08a3]
module.vpc.aws_route_table_association.private[0]: Destroying... [id=rtbassoc-01631238ffbb46341]
module.vpc.aws_default_security_group.this[0]: Destroying... [id=sg-0ccf4d7ee898180b7]
module.vpc.aws_route_table_association.public[1]: Destroying... [id=rtbassoc-0867c5e70f9344097]
module.vpc.aws_route_table_association.private[1]: Destroying... [id=rtbassoc-079b23ddaf964b8d1]
module.vpc.aws_route.private_nat_gateway[1]: Destroying... [id=r-rtb-066a9fd1b61c691be1080289494]
module.vpc.aws_default_network_acl.this[0]: Destruction complete after 0s
module.vpc.aws_default_route_table.default[0]: Destruction complete after 0s
module.vpc.aws_default_security_group.this[0]: Destruction complete after 0s
module.vpc.aws_route_table_association.public[0]: Destruction complete after 1s
module.vpc.aws_route_table_association.private[0]: Destruction complete after 1s
module.vpc.aws_route_table_association.public[1]: Destruction complete after 1s
module.vpc.aws_route_table_association.private[1]: Destruction complete after 1s
module.vpc.aws_subnet.private[0]: Destroying... [id=subnet-0d7746651ab6c5f2c]
module.vpc.aws_subnet.private[1]: Destroying... [id=subnet-00d50e1178fed6627]
module.vpc.aws_route.private_nat_gateway[0]: Destruction complete after 1s
module.vpc.aws_route.public_internet_gateway[0]: Destruction complete after 1s
module.vpc.aws_route.private_nat_gateway[1]: Destruction complete after 1s
module.vpc.aws_nat_gateway.this[0]: Destroying... [id=nat-0a0f04a11db6a49e0]
module.vpc.aws_route_table.private[1]: Destroying... [id=rtb-066a9fd1b61c691be]
module.vpc.aws_nat_gateway.this[1]: Destroying... [id=nat-069c6e66c54b97661]
module.vpc.aws_route_table.public[0]: Destroying... [id=rtb-0262895d1173dc81d]
```



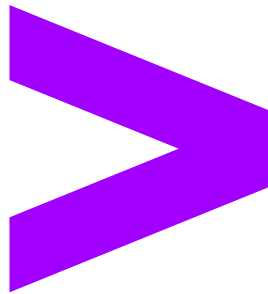
```
module.vpc.aws_nat_gateway.this[0]: Still destroying... [id=nat-0a0f04a11db6a49e0, 10s elapsed]
module.vpc.aws_nat_gateway.this[1]: Still destroying... [id=nat-069c6e66c54b97661, 10s elapsed]
module.vpc.aws_nat_gateway.this[0]: Still destroying... [id=nat-0a0f04a11db6a49e0, 20s elapsed]
module.vpc.aws_nat_gateway.this[1]: Still destroying... [id=nat-069c6e66c54b97661, 20s elapsed]
module.vpc.aws_nat_gateway.this[0]: Still destroying... [id=nat-0a0f04a11db6a49e0, 30s elapsed]
module.vpc.aws_nat_gateway.this[1]: Still destroying... [id=nat-069c6e66c54b97661, 30s elapsed]
module.vpc.aws_nat_gateway.this[0]: Still destroying... [id=nat-0a0f04a11db6a49e0, 40s elapsed]
module.vpc.aws_nat_gateway.this[1]: Still destroying... [id=nat-069c6e66c54b97661, 40s elapsed]
module.vpc.aws_nat_gateway.this[0]: Destruction complete after 41s
module.vpc.aws_nat_gateway.this[1]: Still destroying... [id=nat-069c6e66c54b97661, 50s elapsed]
module.vpc.aws_nat_gateway.this[1]: Destruction complete after 51s
module.vpc.aws_eip.nat[0]: Destroying... [id=eipalloc-0c8b525b5027bfff6]
module.vpc.aws_subnet.public[0]: Destroying... [id=subnet-0faac4ad8b42b8906]
module.vpc.aws_subnet.public[1]: Destroying... [id=subnet-04713a4af875ec105]
module.vpc.aws_eip.nat[1]: Destroying... [id=eipalloc-0eec91771f59564cf]
module.vpc.aws_subnet.public[1]: Destruction complete after 1s
module.vpc.aws_subnet.public[0]: Destruction complete after 1s
module.vpc.aws_eip.nat[0]: Destruction complete after 1s
module.vpc.aws_eip.nat[1]: Destruction complete after 2s
module.vpc.aws_internet_gateway.this[0]: Destroying... [id=igw-039ed3fbf7bd56110]
module.vpc.aws_internet_gateway.this[0]: Destruction complete after 0s
module.vpc.aws_vpc.this[0]: Destroying... [id=vpc-0f3a87641cf2ac6d0]
module.vpc.aws_vpc.this[0]: Destruction complete after 1s

Warning: EC2 Default Network ACL (acl-02de522ea4767aa28) not deleted, removing from state

Destroy complete! Resources: 23 destroyed.

C:\Terraform_Repository\Demo6_Module_VPC>
```





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