

Deploying a multi-tiered web application in AWS using Terraform

By Vimal Marvaniya

From the book Terraform in Action

File Edit Selection View Go Run Terminal Help

EXPLORER ... Get Started main.tf

OPEN EDITORS Get Started main.tf

TERRAFORMLEARNING... Module04

Module04

modules

 autoscaling

 ! cloud_config.yaml

 main.tf

 outputs.tf

 variables.tf

 database

 main.tf

 outputs.tf

 variables.tf

 networking

 main.tf

 outputs.tf

 variables.tf

main.tf

outputs.tf

providers.tf

terraform.tfvars

variables.tf

versions.tf

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d\$ tree

```
. 
+- Module04
  +- main.tf
  +- modules
    +- autoscaling
      +- cloud_config.yaml
      +- main.tf
      +- outputs.tf
      +- variables.tf
    +- database
      +- main.tf
      +- outputs.tf
      +- variables.tf
    +- networking
      +- main.tf
      +- outputs.tf
      +- variables.tf
    +- outputs.tf
    +- providers.tf
    +- terraform.tfvars
    +- variables.tf
    +- versions.tf
  terraform.tfstate
```

5 directories, 17 files

vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d\$

Ln 8, Col 40 Spaces: 2 UTF-8 LF Terraform

Main.tf containing Autoscaling, Database & Networking Module declaration with Directory Structure

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EXPLORER

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PROBLEMS OUTPUT DEBUG CONSOLE

TERMINAL

bash - terraform.tfstate.d + □ ×



OPEN EDITORS

Get Started

main.tf



TERRAFORMLEARNING (WORKSPACE)

Module04

modules

autoscaling

cloud_config.yaml

main.tf

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database

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networking

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outputs.tf

variables.tf

main.tf

outputs.tf

variables.tf

main.tf

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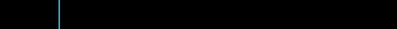
variables.tf

versions.tf

```
vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d$ tree
.
├── Module04
│   ├── main.tf
│   └── modules
│       ├── autoscaling
│       │   ├── cloud_config.yaml
│       │   ├── main.tf
│       │   ├── outputs.tf
│       │   └── variables.tf
│       ├── database
│       │   ├── main.tf
│       │   ├── outputs.tf
│       │   └── variables.tf
│       ├── networking
│       │   ├── main.tf
│       │   ├── outputs.tf
│       │   └── variables.tf
│       └── outputs.tf
│           ├── providers.tf
│           ├── terraform.tfvars
│           ├── variables.tf
│           └── versions.tf
└── terraform.tfstate

5 directories, 17 files
```

```
vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d$
```



> OUTLINE

> TIMELINE

Directory Structure

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EXPLORER

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outputs.tf



TERRAFORMLEARNING (WORKSPACE)



Module04



modules

autoscaling

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variables.tf

networking

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variables.tf

main.tf

outputs.tf

providers.tf

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variables.tf

versions.tf



> OUTLINE

...

> TIMELINE

outputs.tf X

Module04 > outputs.tf > ...

```
1 output "db_password" {
2   value = module.database.db_config.password
3 }
4
5 output "lb_dns_name" {
6   value = module.autoscaling.lb_dns_name
7 }
8 
```

Declaring Output Variables

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EXPLORER

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OPEN EDITORS



terraform.tfvars X

Module04 > terraform.tfvars > namespace

```
1 namespace = "my-cool-project"
2 region    = "us-west-2"
3
```

10K

X terraform.tfvars

TERRAFORMLEARNING ...

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EXPLORER

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variables.tf



TERRAFORMLEARNING ...

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Module04



modules



autoscaling



cloud_config.yaml



main.tf



outputs.tf



variables.tf



database



main.tf



outputs.tf



variables.tf



main.tf



outputs.tf



providers.tf



terraform.tfvars



variables.tf



versions.tf

variables.tf X

Module04 > variables.tf > variable "namespace"

```
1 variable "namespace" {
2   description = "The project namespace to use for unique resource naming"
3   type        = string
4 }
5
6 variable "ssh_keypair" {
7   description = "SSH keypair to use for EC2 instance"
8   default     = null
9   type        = string
10 }
11
12 variable "region" {
13   description = "AWS region"
14   default     = "us-west-2"
15   type        = string
16 }
```

Variables.tf

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EXPLORER

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X versions.tf



TERRAFORMLEARNING ...



Module04

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outputs.tf

variables.tf

main.tf

outputs.tf

providers.tf

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variables.tf

versions.tf

versions.tf X

Module04 > versions.tf > terraform

```
1 terraform {  
2   required_version = ">= 0.15"  
3   required_providers {  
4     aws = {  
5       source  = "hashicorp/aws"  
6       version = "~> 3.28"  
7     }  
8     random = {  
9       source  = "hashicorp/random"  
10      version = "~> 3.0"  
11    }  
12    cloudinit = {  
13      source  = "hashicorp/cloudinit"  
14      version = "~> 2.1"  
15    }  
16  }  
17}  
18
```

Declaring Terraform Version

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EXPLORER

...



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main.tf



TERRAFORMLEARNING (WORKSPACE)



Module04



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variables.tf

main.tf

outputs.tf

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versions.tf

main.tf X

Module04 > main.tf > module "database" > vpc

```
1 module "autoscaling" {
2   source      = "./modules/autoscaling"
3   namespace   = var.namespace
4   ssh_keypair = var.ssh_keypair
5
6   vpc        = module.networking.vpc
7   sg         = module.networking.sg
8   db_config  = module.database.db_config
9 }
10
11 module "database" {
12   source      = "./modules/database"
13   namespace   = var.namespace
14
15   vpc        = module.networking.vpc
16   sg         = module.networking.sg
17 }
18
19 module "networking" {
20   source      = "./modules/networking"
21   namespace   = var.namespace
22 }
23
```

Declaring Modulewise variables

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EXPLORER

...

main.tf x

...

OPEN EDITORS

x main.tf modules/networking

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TERRAFORMLEARNING (WORKSPACE)

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outputs.tf

variables.tf

main.tf

outputs.tf

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terraform.tfvars

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versions.tf

Module04 > modules > networking > main.tf > module "vpc"

```
1  data "aws_availability_zones" "available" {}
2
3  module "vpc" #A {
4    source      = "terraform-aws-modules/vpc/aws"
5    version     = "2.64.0"
6    name        = "${var.namespace}-vpc"
7    cidr        = "10.0.0.0/16"
8    azs         = data.aws_availability_zones.available.names
9    private_subnets = ["10.0.1.0/24", "10.0.2.0/24", "10.0.3.0/24"]
10   public_subnets  = ["10.0.101.0/24", "10.0.102.0/24", "10.0.103.0/24"]
11   database_subnets = ["10.0.21.0/24", "10.0.22.0/24", "10.0.23.0/24"]
12
13   create_database_subnet_group = true
14   enable_nat_gateway          = true
15   single_nat_gateway          = true
16
17
18  module "lb_sg" {
19    source = "terraform-in-action/sg/aws"
20    vpc_id = module.vpc.vpc_id
21    ingress_rules = [
22      {
23        port      = 80
24        cidr_blocks = ["0.0.0.0/0"]
25      }
26    ]
27
28  module "websvr_sg" {
29    source = "terraform-in-action/sg/aws"
30    vpc_id = module.vpc.vpc_id
31    ingress_rules = [
32      {
33        port      = 8080
34        security_groups = [module.lb_sg.security_group.id]
35      },
36      {
37        port      = 22
38        cidr_blocks = ["10.0.0.0/16"]
39      }
40    ]
41
42  module "db_sg" {
43    source = "terraform-in-action/sg/aws"
44    vpc_id = module.vpc.vpc_id
45    ingress_rules = [
46      {
47        port      = 3306
48        security_groups = [module.websvr_sg.security_group.id]
49      }
50    ]
51  }
52}
```

Networking Module

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EXPLORER

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X variables.tf modules/networking



TERRAFORMLEARNING (WORKSPACE)



Module04



modules



autoscaling



! cloud_config.yaml



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> OUTLINE

Timeline

variables.tf X

Module04 > modules > networking > variables.tf > ...

```
1 variable "namespace" {  
2   type = string  
3 }  
4  
5 
```

Networking Module continue...

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EXPLORER

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outputs.tf modules/networking



TERRAFORMLEARNING ...

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> OUTLINE



> TIMELINE

outputs.tf X

Module04 > modules > networking > outputs.tf > output "vpc"

```
1 output "vpc" {
2   value = module.vpc
3 }
4
5 output "sg" {
6   value = {
7     lb    = module.lb_sg.security_group.id      #B
8     db    = module.db_sg.security_group.id      #B
9     websvr = module.websvr_sg.security_group.id #B
10  }
11 }
12 }
```

Passing References

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EXPLORER

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X main.tf modules/database



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> OUTLINE

> TIMELINE

main.tf X

Module04 > modules > database > main.tf > resource "random_password" "password"

```
1 resource "random_password" "password" {
2   length      = 16
3   special     = true
4   override_special = "%@/"
5 }
6
7 resource "aws_db_instance" "database" {
8   allocated_storage    = 10
9   engine                = "mysql"
10  engine_version        = "8.0"
11  instance_class        = "db.t2.micro"
12  identifier             = "${var.namespace}-db-instance"
13  name                  = "pets"
14  username               = "admin"
15  password               = random_password.password.result
16  db_subnet_group_name   = var.vpc.database_subnet_group
17  vpc_security_group_ids = [var.sg.db]
18  skip_final_snapshot    = true
19 }
20
21
```

Defining Database

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EXPLORER

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X variables.tf modules/database



TERRAFORMLEARNING (WORKSPACE)



Module04



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> OUTLINE



> TIMELINE

variables.tf X

Module04 > modules > database > variables.tf > ...

```
1 variable "namespace" {
2   type = string
3 }
4
5 variable "vpc" {
6   type = any
7 }
8
9 variable "sg" {
10  type = any
11 }
12
```

Variables for Database

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EXPLORER

...



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X outputs.tf modules/database



TERRAFORMLEARNING (WORKSPACE)



Module04



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> OUTLINE

> TIMELINE

outputs.tf X

Module04 > modules > database > outputs.tf > ...

```
1 output "db_config" {
2   value = {
3     user      = aws_db_instance.database.username
4     password = aws_db_instance.database.password
5     database = aws_db_instance.database.name
6     hostname = aws_db_instance.database.address
7     port     = aws_db_instance.database.port
8   }
9 }
10 }
```

Database Output

EXPLORER

OPEN EDITORS

- GROUP 1
 - main.tf modules/autoscaling
- GROUP 2
 - main.tf modules/autoscaling

TERRAFORMLEARNING (WORKSPACE)

- Module04
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 - main.tf
 - outputs.tf
 - providers.tf
 - terraform.tfvars
 - variables.tf
 - versions.tf

main.tf

```

Module04 > modules > autoscaling > main.tf > ...
1 module "iam_instance_profile" {
2   source = "terraform-in-action/iip/aws"
3   actions = ["logs:*", "rds:*"]
4 }
5
6 data "cloudinit_config" "config" {
7   gzip        = true
8   base64_encode = true
9   part {
10    content_type = "text/cloud-config"
11    content      = templatefile("${path.module}/cloud_cor
12  }
13 }
14
15 data "aws_ami" "ubuntu" {
16   most_recent = true
17   filter {
18     name  = "name"
19     values = ["ubuntu/images/hvm-ssd/ubuntu-bionic-18.04-
20   }
21   owners = ["099720109477"]
22 }
23
24 resource "aws_launch_template" "webserver" {
25   name_prefix  = var.namespace
26   image_id     = data.aws_ami.ubuntu.id
27   instance_type = "t2.micro"
28   user_data    = data.cloudinit_config.config.rendered
29   key_name     = var.ssh_keypair
30   iam_instance_profile {
31     name = module.iam_instance_profile.name
32   }
33   vpc_security_group_ids = [var.sg.websvr]
34 }
35
36 resource "aws_autoscaling_group" "webserver" {
37   name           = "${var.namespace}-asg"
38   min_size       = 1
39   max_size       = 3
40
41   vpc_zone_identifier = var.vpc.private_subnets
42   target_group_arns = module.alb.target_group_arns
43   launch_template {
44     id      = aws_launch_template.webserver.id
45     version = aws_launch_template.webserver.latest_version
46   }
47
48 module "alb" {
49   source          = "terraform-aws-modules/alb/aws"
50   version         = "~> 5.0"
51   name            = var.namespace
52   load_balancer_type = "application"
53   vpc_id          = var.vpc.vpc_id
54   subnets         = var.vpc.public_subnets
55   security_groups = [var.sg.lb]
56
57   http_tcp_listeners = [
58     {
59       port          = 80,
60       protocol      = "HTTP"
61       target_group_index = 0
62     }
63   ]
64
65   target_groups = [
66     {
67       name_prefix    = "websvr",
68       backend_protocol = "HTTP",
69       backend_port    = 8080
70       target_type     = "instance"
71     }
72   ]
73 }
```

Autoscaling Module

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EXPLORER

...

variables.tf X

...

OPEN EDITORS



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X variables.tf modules/autoscaling



TERRAFORMLEARNING ... D+ E+ O+ B+



Module04



modules



autoscaling



cloud_config.yaml



main.tf



outputs.tf



variables.tf



database



networking



main.tf



outputs.tf



providers.tf



terraform.tfvars



variables.tf



versions.tf



Module04 > modules > autoscaling > variables.tf > variable "namespace"

```
1 variable "namespace" {
2   type = string
3 }
4
5 variable "ssh_keypair" {
6   type = string
7 }
8
9 variable "vpc" {
10  type = any
11 }
12
13 variable "sg" {
14  type = any
15 }
16
17 variable "db_config" {
18  type = object(
19    {
20      user      = string
21      password = string
22      database = string
23      hostname = string
24      port     = string
25    }
26  )
27 }
28
```

Autoscaling Variables

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EXPLORER

...

outputs.tf X

□ ...

OPEN EDITORS



X outputs.tf modules/autoscaling



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TERRAFORMLEARNING ...



Module04

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versions.tf



> OUTLINE

> TIMELINE

master*

① 0 △ 0

Module04 > modules > autoscaling > outputs.tf > output "lb_dns_name"

```
1 output "lb_dns_name" {  
2   value = module.alb.this_lb_dns_name  
3 }  
4
```

Autoscaling Outputs

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EXPLORER

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! cloud_config.yaml X

□ ...

OPEN EDITORS



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x ! cloud_config.yaml modules/aut...



TERRAFORMLEARNING ...



Module04



modules



autoscaling



! cloud_config.yaml



main.tf



outputs.tf



variables.tf



> database



> networking



main.tf



outputs.tf



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terraform.tfvars



variables.tf



versions.tf

```
1 #cloud-config
2 write_files:
3   - path: /etc/server.conf
4     owner: root:root
5     permissions: "0644"
6     content: |
7       {
8         "user": "${user}",
9         "password": "${password}",
10        "database": "${database}",
11        "netloc": "${hostname}:${port}"
12      }
13 runcmd:
14   - curl -sL https://api.github.com/repos/scottwinkler/vanilla-webserver-src/releases/latest | jq -r ".assets[].browser_downl
15   - unzip deployment.zip
16   - ./deployment/server
17 packages:
18   - jq
19   - wget
20   - unzip
21
22
```

Cloud Configuration Template

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EXPLORER

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OPEN EDITORS



main.tf



TERRAFORMLEARNING (WORKSPACE)



Module04



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> OUTLINE

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PROBLEMS

OUTPUT

DEBUG CONSOLE

TERMINAL



bash



vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d/Module04\$ tree

```
.
```

- main.tf
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 - outputs.tf
 - variables.tf
 - database
 - main.tf
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 - variables.tf
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 - variables.tf
- outputs.tf
- providers.tf
- terraform.tfvars
- variables.tf
- versions.tf

4 directories, 16 files

vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d/Module04\$ █

Directory Structure

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EXPLORER

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PROBLEMS OUTPUT DEBUG CONSOLE

TERMINAL

bash + □ ×



OPEN EDITORS

X

main.tf



TERRAFORMLEARNING (WORKSPACE)

Module04

>

.terraform

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≡ .terraform.lock.hcl

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```
vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d/Module04$ terraform init
Initializing modules...
- autoscaling in modules/autoscaling
  Downloading registry.terraform.io/terraform-aws-modules/alb/aws 5.16.0 for autoscaling.alb...
- autoscaling.alb in .terraform/modules/autoscaling.alb
  Downloading registry.terraform.io/terraform-in-action/iip/aws 0.1.0 for autoscaling.iam_instance_profile...
- autoscaling.iam_instance_profile in .terraform/modules/autoscaling.iam_instance_profile
- database in modules/database
- networking in modules/networking
  Downloading registry.terraform.io/terraform-in-action/sg/aws 0.1.0 for networking.db_sg...
- networking.db_sg in .terraform/modules/networking.db_sg
  Downloading registry.terraform.io/terraform-in-action/sg/aws 0.1.0 for networking.lb_sg...
- networking.lb_sg in .terraform/modules/networking.lb_sg
  Downloading registry.terraform.io/terraform-aws-modules/vpc/aws 2.64.0 for networking.vpc...
- networking.vpc in .terraform/modules/networking.vpc
  Downloading registry.terraform.io/terraform-in-action/sg/aws 0.1.0 for networking.websvr_sg...
- networking.websvr_sg in .terraform/modules/networking.websvr_sg
```

Initializing the backend...

Initializing provider plugins...

- Finding hashicorp/cloudinit versions matching "~> 2.1"...
- Finding hashicorp/aws versions matching ">= 2.68.0, >= 3.27.0, ~> 3.28"...
- Finding hashicorp/random versions matching "~> 3.0"...
- Installing hashicorp/random v3.4.3...
- Installed hashicorp/random v3.4.3 (signed by HashiCorp)
- Installing hashicorp/cloudinit v2.2.0...
- Installed hashicorp/cloudinit v2.2.0 (signed by HashiCorp)
- Installing hashicorp/aws v3.75.2...
- Installed hashicorp/aws v3.75.2 (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,

Initializing Terraform Successfully



> OUTLINE



> TIMELINE

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EXPLORER

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PROBLEMS OUTPUT DEBUG CONSOLE

TERMINAL

bash + □ ×



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main.tf



TERRAFORMLEARNING (WORKSPACE)

Module04

> .terraform

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> database

> networking

≡ .terraform.lock.hcl



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> OUTLINE



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```
rerun this command to reinitialize your working directory. If you forget, other  
commands will detect it and remind you to do so if necessary.
```

```
● vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d/Module04$ terraform plan
```

```
module.autoscaling.module.iam_instance_profile.data.aws_iam_policy_document.iam_policy_document: Reading...
```

```
module.networking.data.aws_availability_zones.available: Reading...
```

```
module.autoscaling.data.aws_ami.ubuntu: Reading...
```

```
module.autoscaling.module.iam_instance_profile.data.aws_iam_policy_document.iam_policy_document: Read complete after 0s [id=2717263653]
```

```
module.networking.data.aws_availability_zones.available: Read complete after 1s [id=us-west-2]
```

```
module.autoscaling.data.aws_ami.ubuntu: Read complete after 1s [id=ami-0014615d641e8e15e]
```

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

```
+ create
```

```
<= read (data resources)
```

```
Terraform will perform the following actions:
```

```
# module.autoscaling.data.cloudinit_config.config will be read during apply
```

```
# (config refers to values not yet known)
```

```
<= data "cloudinit_config" "config" {
```

```
    + base64_encode = true
```

```
    + gzip          = true
```

```
    + id            = (known after apply)
```

```
    + rendered      = (known after apply)
```

```
    + part {
```

```
        + content      = (sensitive)
```

```
        + content_type = "text/cloud-config"
```

```
    }
```

```
}
```

```
# module.autoscaling.aws_autoscaling_group.webserver will be created
```

```
+ resource "aws_autoscaling_group" "webserver" {
```

```
    + arn           = (known after apply)
```

```
    + availability_zones = (known after apply)
```

```
    + default_cooldown = (known after apply)
```

```
    + desired_capacity = (known after apply)
```

```
    + force_delete   = false
```

```
    + force_delete_warm_pool = false
```

```
    + health_check_grace_period = 300
```

```
    + health_check_type = (known after apply)
```

```
    + id            = (known after apply)
```

```
    + max_size      = 3
```

```
    + metrics_granularity = "1Minute"
```

```
    + min_size      = 1
```

Initializing continue...

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TERRAFORMLEARNING (WORKSPACE)

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```
+ metrics_granularity          = "1Minute"
+ min_size                      = 1
+ name                          = "my-cool-project-asg"
+ name_prefix                   = (known after apply)
+ protect_from_scale_in        = false
+ service_linked_role_arn      = (known after apply)
+ target_group_arns             = (known after apply)
+ vpc_zone_identifier           = (known after apply)
+ wait_for_capacity_timeout     = "10m"

+ launch_template {
    + id      = (known after apply)
    + name    = (known after apply)
    + version = (known after apply)
  }

# module.autoscaling.aws_launch_template.webserver will be created
+ resource "aws_launch_template" "webserver" {
    + arn                = (known after apply)
    + default_version   = (known after apply)
    + id                = (known after apply)
    + image_id          = "ami-0014615d641e8e15e"
    + instance_type     = "t2.micro"
    + latest_version   = (known after apply)
    + name              = (known after apply)
    + name_prefix       = "my-cool-project"
    + tags_all          = (known after apply)
    + user_data         = (known after apply)
    + vpc_security_group_ids = (known after apply)

    + iam_instance_profile {
        + name = (known after apply)
      }

    + metadata_options {
        + http_endpoint          = (known after apply)
        + http_protocol_ipv6     = (known after apply)
        + http_put_response_hop_limit = (known after apply)
        + http_tokens            = (known after apply)
        + instance_metadata_tags = (known after apply)
      }
}
```

Initializing Continue

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PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
+ http_tokens = (known after apply)
+ instance_metadata_tags = (known after apply)
}

# module.database.aws_db_instance.database will be created
+ resource "aws_db_instance" "database" {
    + address = (known after apply)
    + allocated_storage = 10
    + apply_immediately = (known after apply)
    + arn = (known after apply)
    + auto_minor_version_upgrade = true
    + availability_zone = (known after apply)
    + backup_retention_period = (known after apply)
    + backup_window = (known after apply)
    + ca_cert_identifier = (known after apply)
    + character_set_name = (known after apply)
    + copy_tags_to_snapshot = false
    + db_subnet_group_name = (known after apply)
    + delete_automated_backups = true
    + endpoint = (known after apply)
    + engine = "mysql"
    + engine_version = "8.0"
    + engine_version_actual = (known after apply)
    + hosted_zone_id = (known after apply)
    + id = (known after apply)
    + identifier = "my-cool-project-db-instance"
    + identifier_prefix = (known after apply)
    + instance_class = "db.t2.micro"
    + kms_key_id = (known after apply)
    + latest_restorable_time = (known after apply)
    + license_model = (known after apply)
    + maintenance_window = (known after apply)
    + monitoring_interval = (known after apply)
    + monitoring_role_arn = (known after apply)
    + multi_az = (known after apply)
    + name = "pets"
    + nchar_character_set_name = (known after apply)
    + option_group_name = (known after apply)
    + parameter_group_name = (known after apply)
    + password = (sensitive value)
    + performance_insights_enabled = false
    + performance_insights_kms_key_id = (known after apply)
    + performance_insights_retention_period = (known after apply)
```

Database Instance Creation

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```
+ performance_insights_kms_key_id      = (known after apply)
+ performance_insights_retention_period = (known after apply)
+ port                                    = (known after apply)
+ publicly_accessible                   = false
+ replicas                                = (known after apply)
+ resource_id                            = (known after apply)
+ skip_final_snapshot                   = true
+ snapshot_identifier                   = (known after apply)
+ status                                  = (known after apply)
+ storage_type                           = (known after apply)
+ tags_all                               = (known after apply)
+ timezone                               = (known after apply)
+ username                               = "admin"
+ vpc_security_group_ids                = (known after apply)
}
```

module.database.random_password.password will be created

```
+ resource "random_password" "password" {
    + bcrypt_hash      = (sensitive value)
    + id               = (known after apply)
    + length           = 16
    + lower             = true
    + min_lower         = 0
    + min_numeric       = 0
    + min_special       = 0
    + min_upper          = 0
    + number            = true
    + numeric           = true
    + override_special  = "%@/"
    + result            = (sensitive value)
    + special            = true
    + upper              = true
}
```

module.autoscaling.module.alb.aws_lb.this[0] will be created

```
+ resource "aws_lb" "this" {
    + arn                  = (known after apply)
    + arn_suffix           = (known after apply)
    + desync_mitigation_mode = "defensive"
    + dns_name              = (known after apply)
    + drop_invalid_header_fields = false
    + enable_deletion_protection = false
    + enable_http2           = true
    + enable_waf_fail_open     = false
}
```

Deploying Database & Autoscaling

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TERRAFORMLEARNING (WORKSPACE)



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TERMINAL

```
+ enable_http2          = true
+ enable_waf_fail_open   = false
+ id                     = (known after apply)
+ idle_timeout           = 60
+ internal               = false
+ ip_address_type        = "ipv4"
+ load_balancer_type     = "application"
+ name                   = "my-cool-project"
+ security_groups         = (known after apply)
+ subnets                = (known after apply)
+ tags                   = {
    + "Name" = "my-cool-project"
  }
+ tags_all               = {
    + "Name" = "my-cool-project"
  }
+ vpc_id                 = (known after apply)
+ zone_id                = (known after apply)

+ subnet_mapping {
    + allocation_id      = (known after apply)
    + ipv6_address       = (known after apply)
    + outpost_id         = (known after apply)
    + private_ipv4_address = (known after apply)
    + subnet_id          = (known after apply)
  }

+ timeouts {
    + create = "10m"
    + delete = "10m"
    + update = "10m"
  }
}

# module.autoscaling.module.alb.aws_lb_listener.frontend_http_tcp[0] will be created
+ resource "aws_lb_listener" "frontend_http_tcp" {
    + arn                  = (known after apply)
    + id                   = (known after apply)
    + load_balancer_arn    = (known after apply)
    + port                 = 80
    + protocol             = "HTTP"
    + ssl_policy            = (known after apply)
    + tags_all              = (known after apply)
```

Autoscaling Module

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> OUTLINE

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PROBLEMS OUTPUT DEBUG CONSOLE

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```
+ tags_all          = (known after apply)

+ default_action {
    + order           = (known after apply)
    + target_group_arn = (known after apply)
    + type             = "forward"
}

# module.autoscaling.module.alb.aws_lb_target_group.main[0] will be created
+ resource "aws_lb_target_group" "main" {
    + arn               = (known after apply)
    + arn_suffix        = (known after apply)
    + connection_termination = false
    + deregistration_delay = "300"
    + id                = (known after apply)
    + lambda_multi_value_headers_enabled = false
    + load_balancing_algorithm_type      = (known after apply)
    + name               = (known after apply)
    + name_prefix         = "websvr"
    + port               = 8080
    + preserve_client_ip   = (known after apply)
    + protocol           = "HTTP"
    + protocol_version    = (known after apply)
    + proxy_protocol_v2    = false
    + slow_start          = 0
    + tags               = {
        + "Name" = "websvr"
    }
    + tags_all           = {
        + "Name" = "websvr"
    }
    + target_type         = "instance"
    + vpc_id              = (known after apply)

    + health_check {
        + enabled            = (known after apply)
        + healthy_threshold  = (known after apply)
        + interval           = (known after apply)
        + matcher             = (known after apply)
        + path                = (known after apply)
        + port                = (known after apply)
        + protocol            = (known after apply)
        + timeout             = (known after apply)
    }
}
```

Autoscaling Module

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TERRAFORMLEARNING (WORKSPACE)

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```
+ protocol          = (known after apply)
+ timeout           = (known after apply)
+ unhealthy_threshold = (known after apply)
}

+ stickiness {
    + cookie_duration = (known after apply)
    + cookie_name     = (known after apply)
    + enabled          = (known after apply)
    + type              = (known after apply)
}
}

# module.autoscaling.module.iam_instance_profile.aws_iam_instance_profile.iam_instance_profile will be created
+ resource "aws_iam_instance_profile" "iam_instance_profile" {
    + arn          = (known after apply)
    + create_date = (known after apply)
    + id          = (known after apply)
    + name        = (known after apply)
    + path        = "/"
    + role        = (known after apply)
    + tags_all    = (known after apply)
    + unique_id   = (known after apply)
}

# module.autoscaling.module.iam_instance_profile.aws_iam_role.iam_role will be created
+ resource "aws_iam_role" "iam_role" {
    + arn          = (known after apply)
    + assume_role_policy = jsonencode(
        {
            + Statement = [
                {
                    + {
                        + Action    = "sts:AssumeRole"
                        + Effect   = "Allow"
                        + Principal = {
                            + Service = "ec2.amazonaws.com"
                        }
                    },
                ],
                + Version   = "2012-10-17"
            ]
        }
    )
    + create_date      = (known after apply)
    + force_detach_policies = false
}
```

Instance Profile & IAM Role in
Autoscaling

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TERRAFORMLEARNING (WORKSPACE)

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```
+ create_date          = (known after apply)
+ force_detach_policies = false
+ id                  = (known after apply)
+ managed_policy_arns = (known after apply)
+ max_session_duration = 3600
+ name                = (known after apply)
+ name_prefix         = (known after apply)
+ path                = "/"
+ tags_all            = (known after apply)
+ unique_id           = (known after apply)

+ inline_policy {
    + name   = (known after apply)
    + policy = (known after apply)
  }
}

# module.autoscaling.module.iam_instance_profile.aws_iam_role_policy.iam_role_policy will be created
+ resource "aws_iam_role_policy" "iam_role_policy" {
    + id      = (known after apply)
    + name    = (known after apply)
    + policy  = jsonencode(
        {
          + Statement = [
              + {
                  + Action   = [
                      + "rds:*,",
                      + "logs:*,"
                    ]
                  + Effect   = "Allow"
                  + Resource = "*"
                  + Sid     = ""
                },
              ]
            + Version   = "2012-10-17"
          }
        )
    + role    = (known after apply)
  }

# module.networking.module.db_sg.aws_security_group.security_group will be created
+ resource "aws_security_group" "security_group" {
    + arn               = (known after apply)
    + description       = "Managed by Terraform"
```

IAM & Networking Module

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```
+ arn                      = (known after apply)
+ description              = "Managed by Terraform"
+ egress
+ {
+   cidr_blocks            = [
+     + "0.0.0.0/0",
+   ]
+   description             = ""
+   from_port               = 0
+   ipv6_cidr_blocks       = []
+   prefix_list_ids        = []
+   protocol                = "-1"
+   security_groups         = []
+   self                    = false
+   to_port                 = 0
},
+ id                      = (known after apply)
+ ingress
+ {
+   cidr_blocks            = []
+   description             = ""
+   from_port               = 0
+   ipv6_cidr_blocks       = []
+   prefix_list_ids        = []
+   protocol                = "-1"
+   security_groups         = []
+   self                    = true
+   to_port                 = 0
},
+ {
+   cidr_blocks            = []
+   description             = ""
+   from_port               = 3306
+   ipv6_cidr_blocks       = []
+   prefix_list_ids        = []
+   protocol                = "tcp"
+   security_groups         = (known after apply)
+   self                    = false
+   to_port                 = 3306
},
]
+ name                   = (known after apply)
+ name_prefix            = (known after apply)
```

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Networking Module

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```
+ name          = (known after apply)
+ name_prefix   = (known after apply)
+ owner_id      = (known after apply)
+ revoke_rules_on_delete = false
+ tags_all      = (known after apply)
+ vpc_id        = (known after apply)
}
```

module.networking.module.lb_sg.aws_security_group.security_group will be created

```
+ resource "aws_security_group" "security_group" {
    + arn           = (known after apply)
    + description   = "Managed by Terraform"
    + egress        = [
        + {
            + cidr_blocks = [
                + "0.0.0.0/0",
            ]
            + description   = ""
            + from_port     = 0
            + ipv6_cidr_blocks = []
            + prefix_list_ids = []
            + protocol      = "-1"
            + security_groups = []
            + self          = false
            + to_port       = 0
        },
    ],
    + id           = (known after apply)
    + ingress      = [
        + {
            + cidr_blocks = [
                + "0.0.0.0/0",
            ]
            + description   = ""
            + from_port     = 80
            + ipv6_cidr_blocks = []
            + prefix_list_ids = []
            + protocol      = "tcp"
            + security_groups = []
            + self          = false
            + to_port       = 80
        },
        + {
            + cidr_blocks = []
        }
    ]
}
```

Networking Module cont...

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```
+ {  
+   cidr_blocks      = []  
+   description       = ""  
+   from_port         = 0  
+   ipv6_cidr_blocks = []  
+   prefix_list_ids  = []  
+   protocol          = "-1"  
+   security_groups   = []  
+   self               = true  
+   to_port            = 0  
},  
]  
+ name           = (known after apply)  
+ name_prefix     = (known after apply)  
+ owner_id        = (known after apply)  
+ revoke_rules_on_delete = false  
+ tags_all        = (known after apply)  
+ vpc_id          = (known after apply)  
}  
  
# module.networking.module.vpc.aws_db_subnet_group.database[0] will be created  
+ resource "aws_db_subnet_group" "database" {  
+   arn           = (known after apply)  
+   description  = "Database subnet group for my-cool-project-vpc"  
+   id           = (known after apply)  
+   name         = "my-cool-project-vpc"  
+   name_prefix  = (known after apply)  
+   subnet_ids   = (known after apply)  
+   tags          = {  
+     "Name" = "my-cool-project-vpc"  
+   }  
+   tags_all     = {  
+     "Name" = "my-cool-project-vpc"  
+   }  
}  
  
# module.networking.module.vpc.aws_eip.nat[0] will be created  
+ resource "aws_eip" "nat" {  
+   allocation_id    = (known after apply)  
+   association_id   = (known after apply)  
+   carrier_ip       = (known after apply)  
+   customer_owned_ip = (known after apply)  
+   domain           = (known after apply)  
+   id               = (known after apply)
```

Networking Module cont...



> OUTLINE

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```
+ domain          = (known after apply)
+ id              = (known after apply)
+ instance        = (known after apply)
+ network_border_group = (known after apply)
+ network_interface = (known after apply)
+ private_dns     = (known after apply)
+ private_ip      = (known after apply)
+ public_dns      = (known after apply)
+ public_ip       = (known after apply)
+ public_ipv4_pool = (known after apply)
+ tags            = {
    + "Name" = "my-cool-project-vpc-us-west-2a"
  }
+ tags_all        = {
    + "Name" = "my-cool-project-vpc-us-west-2a"
  }
+ vpc             = true
}
```

```
# module.networking.module.vpc.aws_internet_gateway.this[0] will be created
+ resource "aws_internet_gateway" "this" {
  + arn      = (known after apply)
  + id       = (known after apply)
  + owner_id = (known after apply)
  + tags     = {
    + "Name" = "my-cool-project-vpc"
  }
  + tags_all = {
    + "Name" = "my-cool-project-vpc"
  }
  + vpc_id   = (known after apply)
}
```

```
# module.networking.module.vpc.aws_nat_gateway.this[0] will be created
+ resource "aws_nat_gateway" "this" {
  + allocation_id   = (known after apply)
  + connectivity_type = "public"
  + id              = (known after apply)
  + network_interface_id = (known after apply)
  + private_ip      = (known after apply)
  + public_ip       = (known after apply)
  + subnet_id       = (known after apply)
  + tags            = {
    + "Name" = "my-cool-project-vpc-us-west-2a"
  }
}
```

Networking Module Cont...



> OUTLINE



> TIMELINE

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EXPLORER

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PROBLEMS

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DEBUG CONSOLE

TERMINAL

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main.tf



TERRAFORMLEARNING (WORKSPACE)

Module04

>.terraform

modules

> autoscaling

> database

> networking

≡ .terraform.lock.hcl

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variables.tf

versions.tf



> OUTLINE

> TIMELINE

```
+ tags_all = {
+   "Name" = "my-cool-project-vpc-us-west-2a"
}

# module.networking.module.vpc.aws_route.private_nat_gateway[0] will be created
+ resource "aws_route" "private_nat_gateway" {
+   destination_cidr_block = "0.0.0.0/0"
+   id                      = (known after apply)
+   instance_id              = (known after apply)
+   instance_owner_id        = (known after apply)
+   nat_gateway_id           = (known after apply)
+   network_interface_id     = (known after apply)
+   origin                  = (known after apply)
+   route_table_id           = (known after apply)
+   state                   = (known after apply)

+   timeouts {
+     create = "5m"
   }
}

# module.networking.module.vpc.aws_route.public_internet_gateway[0] will be created
+ resource "aws_route" "public_internet_gateway" {
+   destination_cidr_block = "0.0.0.0/0"
+   gateway_id              = (known after apply)
+   id                      = (known after apply)
+   instance_id              = (known after apply)
+   instance_owner_id        = (known after apply)
+   network_interface_id     = (known after apply)
+   origin                  = (known after apply)
+   route_table_id           = (known after apply)
+   state                   = (known after apply)

+   timeouts {
+     create = "5m"
   }
}

# module.networking.module.vpc.aws_route_table.private[0] will be created
+ resource "aws_route_table" "private" {
+   arn                    = (known after apply)
+   id                     = (known after apply)
+   owner_id               = (known after apply)
```

Networking Module cont...

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EXPLORER

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PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

```
+ id          = (known after apply)
+ owner_id    = (known after apply)
+ propagating_vgws = (known after apply)
+ route       = (known after apply)
+ tags        = {
    + "Name" = "my-cool-project-vpc-private"
}
+ tags_all    = {
    + "Name" = "my-cool-project-vpc-private"
}
+ vpc_id      = (known after apply)
```

module.networking.module.vpc.aws_route_table.public[0] will be created

```
+ resource "aws_route_table" "public" {
    + arn      = (known after apply)
    + id       = (known after apply)
    + owner_id = (known after apply)
    + propagating_vgws = (known after apply)
    + route    = (known after apply)
    + tags     = {
        + "Name" = "my-cool-project-vpc-public"
    }
    + tags_all = {
        + "Name" = "my-cool-project-vpc-public"
    }
    + vpc_id   = (known after apply)
}
```

module.networking.module.vpc.aws_route_table_association.database[0] will be created

```
+ resource "aws_route_table_association" "database" {
    + id      = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id   = (known after apply)
}
```

module.networking.module.vpc.aws_route_table_association.database[1] will be created

```
+ resource "aws_route_table_association" "database" {
    + id      = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id   = (known after apply)
}
```

module.networking.module.vpc.aws_route_table_association.database[2] will be created

Networking Module Cont...

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TERRAFORMLEARNING (WORKSPACE)



Module04



.terraform



modules



autoscaling



database



networking



.terraform.lock.hcl

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> OUTLINE



> TIMELINE

PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

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```
# module.networking.module.vpc.aws_route_table_association.database[2] will be created
+ resource "aws_route_table_association" "database" {
    + id          = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id    = (known after apply)
}

# module.networking.module.vpc.aws_route_table_association.private[0] will be created
+ resource "aws_route_table_association" "private" {
    + id          = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id    = (known after apply)
}

# module.networking.module.vpc.aws_route_table_association.private[1] will be created
+ resource "aws_route_table_association" "private" {
    + id          = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id    = (known after apply)
}

# module.networking.module.vpc.aws_route_table_association.private[2] will be created
+ resource "aws_route_table_association" "private" {
    + id          = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id    = (known after apply)
}

# module.networking.module.vpc.aws_route_table_association.public[0] will be created
+ resource "aws_route_table_association" "public" {
    + id          = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id    = (known after apply)
}

# module.networking.module.vpc.aws_route_table_association.public[1] will be created
+ resource "aws_route_table_association" "public" {
    + id          = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id    = (known after apply)
}

# module.networking.module.vpc.aws_route_table_association.public[2] will be created
```

Networking Module Cont...

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TERRAFORMLEARNING (WORKSPACE)

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TERMINAL

bash + v x

```
# module.networking.module.vpc.aws_route_table_association.public[2] will be created
+ resource "aws_route_table_association" "public" {
    + id          = (known after apply)
    + route_table_id = (known after apply)
    + subnet_id     = (known after apply)
}

# module.networking.module.vpc.aws_subnet.database[0] will be created
+ resource "aws_subnet" "database" {
    + arn                               = (known after apply)
    + assign_ipv6_address_on_creation   = false
    + availability_zone                 = "us-west-2a"
    + availability_zone_id              = (known after apply)
    + cidr_block                       = "10.0.21.0/24"
    + enable_dns64                     = false
    + enable_resource_name_dns_a_record_on_launch = false
    + enable_resource_name_dns_aaaa_record_on_launch = false
    + id                                = (known after apply)
    + ipv6_cidr_block_association_id    = (known after apply)
    + ipv6_native                       = false
    + map_public_ip_on_launch           = false
    + owner_id                          = (known after apply)
    + private_dns_hostname_type_on_launch = (known after apply)
    + tags
        + "Name" = "my-cool-project-vpc-db-us-west-2a"
    }
    + tags_all                         = {
        + "Name" = "my-cool-project-vpc-db-us-west-2a"
    }
    + vpc_id                           = (known after apply)
}

# module.networking.module.vpc.aws_subnet.database[1] will be created
+ resource "aws_subnet" "database" {
    + arn                               = (known after apply)
    + assign_ipv6_address_on_creation   = false
    + availability_zone                 = "us-west-2b"
    + availability_zone_id              = (known after apply)
    + cidr_block                       = "10.0.22.0/24"
    + enable_dns64                     = false
    + enable_resource_name_dns_a_record_on_launch = false
    + enable_resource_name_dns_aaaa_record_on_launch = false
    + id                                = (known after apply)
}
```

Networking Module cont...

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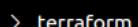
x

main.tf



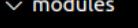
TERRAFORMLEARNING (WORKSPACE)

Module04



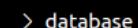
.terraform

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autoscaling

database



networking

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> OUTLINE

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PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

bash + v x

```
+ enable_resource_name_dns_aaaa_record_on_launch = false  
+ id = (known after apply)  
+ ipv6_cidr_block_association_id = (known after apply)  
+ ipv6_native = false  
+ map_public_ip_on_launch = false  
+ owner_id = (known after apply)  
+ private_dns_hostname_type_on_launch = (known after apply)  
+ tags = {  
    + "Name" = "my-cool-project-vpc-db-us-west-2b"  
}  
+ tags_all = {  
    + "Name" = "my-cool-project-vpc-db-us-west-2b"  
}  
+ vpc_id = (known after apply)  
  
# module.networking.module.vpc.aws_subnet.database[2] will be created  
+ resource "aws_subnet" "database" {  
    + arn = (known after apply)  
    + assign_ipv6_address_on_creation = false  
    + availability_zone = "us-west-2c"  
    + availability_zone_id = (known after apply)  
    + cidr_block = "10.0.23.0/24"  
    + enable_dns64 = false  
    + enable_resource_name_dns_a_record_on_launch = false  
    + enable_resource_name_dns_aaaa_record_on_launch = false  
    + id = (known after apply)  
    + ipv6_cidr_block_association_id = (known after apply)  
    + ipv6_native = false  
    + map_public_ip_on_launch = false  
    + owner_id = (known after apply)  
    + private_dns_hostname_type_on_launch = (known after apply)  
    + tags = {  
        + "Name" = "my-cool-project-vpc-db-us-west-2c"  
    }  
    + tags_all = {  
        + "Name" = "my-cool-project-vpc-db-us-west-2c"  
    }  
    + vpc_id = (known after apply)  
  
# module.networking.module.vpc.aws_subnet.private[0] will be created  
+ resource "aws_subnet" "private" {  
    + arn = (known after apply)
```

Networking Module Cont...

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bash + ↻

```
+ resource "aws_subnet" "private" {
    + arn
    + assign_ipv6_address_on_creation
    + availability_zone
    + availability_zone_id
    + cidr_block
    + enable_dns64
    + enable_resource_name_dns_a_record_on_launch
    + enable_resource_name_dns_aaaa_record_on_launch
    + id
    + ipv6_cidr_block_association_id
    + ipv6_native
    + map_public_ip_on_launch
    + owner_id
    + private_dns_hostname_type_on_launch
    + tags
        + "Name" = "my-cool-project-vpc-private-us-west-2a"
    }
    + tags_all
        + "Name" = "my-cool-project-vpc-private-us-west-2a"
    }
    + vpc_id
}
```

module.networking.module.vpc.aws_subnet.private[1] will be created

```
+ resource "aws_subnet" "private" {
    + arn
    + assign_ipv6_address_on_creation
    + availability_zone
    + availability_zone_id
    + cidr_block
    + enable_dns64
    + enable_resource_name_dns_a_record_on_launch
    + enable_resource_name_dns_aaaa_record_on_launch
    + id
    + ipv6_cidr_block_association_id
    + ipv6_native
    + map_public_ip_on_launch
    + owner_id
    + private_dns_hostname_type_on_launch
    + tags
        + "Name" = "my-cool-project-vpc-private-us-west-2b"
    }
    + tags_all
}
```

Networking Module Cont...

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> OUTLINE

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PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL

bash + v x

```
        }
+ tags_all = {
+   "Name" = "my-cool-project-vpc-private-us-west-2b"
}
+ vpc_id = (known after apply)

# module.networking.module.vpc.aws_subnet.private[2] will be created
+ resource "aws_subnet" "private" {
    + arn = (known after apply)
    + assign_ipv6_address_on_creation = false
    + availability_zone = "us-west-2c"
    + availability_zone_id = (known after apply)
    + cidr_block = "10.0.3.0/24"
    + enable_dns64 = false
    + enable_resource_name_dns_a_record_on_launch = false
    + enable_resource_name_dns_aaaa_record_on_launch = false
    + id = (known after apply)
    + ipv6_cidr_block_association_id = (known after apply)
    + ipv6_native = false
    + map_public_ip_on_launch = false
    + owner_id = (known after apply)
    + private_dns_hostname_type_on_launch = (known after apply)
    + tags = {
        + "Name" = "my-cool-project-vpc-private-us-west-2c"
    }
    + tags_all = {
        + "Name" = "my-cool-project-vpc-private-us-west-2c"
    }
    + vpc_id = (known after apply)
}

# module.networking.module.vpc.aws_subnet.public[0] will be created
+ resource "aws_subnet" "public" {
    + arn = (known after apply)
    + assign_ipv6_address_on_creation = false
    + availability_zone = "us-west-2a"
    + availability_zone_id = (known after apply)
    + cidr_block = "10.0.101.0/24"
    + enable_dns64 = false
    + enable_resource_name_dns_a_record_on_launch = false
    + enable_resource_name_dns_aaaa_record_on_launch = false
    + id = (known after apply)
    + ipv6_cidr_block_association_id = (known after apply)
```

Networking Module cont...

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TERRAFORMLEARNING (WORKSPACE)



Module04



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bash + ↻

```

+ id                               = (known after apply)
+ ipv6_cidr_block_association_id   = (known after apply)
+ ipv6_native                      = false
+ map_public_ip_on_launch          = true
+ owner_id                         = (known after apply)
+ private_dns_hostname_type_on_launch = (known after apply)
+ tags
  + "Name" = "my-cool-project-vpc-public-us-west-2a"
}
+ tags_all                         = {
  + "Name" = "my-cool-project-vpc-public-us-west-2a"
}
+ vpc_id                            = (known after apply)

}

# module.networking.module.vpc.aws_subnet.public[1] will be created
+ resource "aws_subnet" "public" {
  + arn                                = (known after apply)
  + assign_ipv6_address_on_creation     = false
  + availability_zone                   = "us-west-2b"
  + availability_zone_id                = (known after apply)
  + cidr_block                          = "10.0.102.0/24"
  + enable_dns64                       = false
  + enable_resource_name_dns_a_record_on_launch = false
  + enable_resource_name_dns_aaaa_record_on_launch = false
  + id                                 = (known after apply)
  + ipv6_cidr_block_association_id     = (known after apply)
  + ipv6_native                         = false
  + map_public_ip_on_launch            = true
  + owner_id                           = (known after apply)
  + private_dns_hostname_type_on_launch = (known after apply)
  + tags
    + "Name" = "my-cool-project-vpc-public-us-west-2b"
}
+ tags_all                         = {
  + "Name" = "my-cool-project-vpc-public-us-west-2b"
}
+ vpc_id                            = (known after apply)

}

# module.networking.module.vpc.aws_subnet.public[2] will be created
+ resource "aws_subnet" "public" {
  + arn                                = (known after apply)
  + assign_ipv6_address_on_creation     = false

```

Networking Module Cont...

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≡ .terraform.lock.hcl

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Y outputs.tf

Y providers.tf

Y terraform.tfvars

Y variables.tf

Y versions.tf

```
+ arn = (known after apply)
+ assign_ipv6_address_on_creation = false
+ availability_zone = "us-west-2c"
+ availability_zone_id = (known after apply)
+ cidr_block = "10.0.103.0/24"
+ enable_dns64 = false
+ enable_resource_name_dns_a_record_on_launch = false
+ enable_resource_name_dns_aaaa_record_on_launch = false
+ id = (known after apply)
+ ipv6_cidr_block_association_id = (known after apply)
+ ipv6_native = false
+ map_public_ip_on_launch = true
+ owner_id = (known after apply)
+ private_dns_hostname_type_on_launch = (known after apply)
+ tags = {
    + "Name" = "my-cool-project-vpc-public-us-west-2c"
  }
+ tags_all = {
    + "Name" = "my-cool-project-vpc-public-us-west-2c"
  }
+ vpc_id = (known after apply)
}
```

module.networking.module.vpc.aws_vpc.this[0] will be created

```
+ resource "aws_vpc" "this" {
  + arn = (known after apply)
  + assign_generated_ipv6_cidr_block = false
  + cidr_block = "10.0.0.0/16"
  + default_network_acl_id = (known after apply)
  + default_route_table_id = (known after apply)
  + default_security_group_id = (known after apply)
  + dhcp_options_id = (known after apply)
  + enable_classiclink = (known after apply)
  + enable_classiclink_dns_support = (known after apply)
  + enable_dns_hostnames = false
  + enable_dns_support = true
  + id = (known after apply)
  + instance_tenancy = "default"
  + ipv6_association_id = (known after apply)
  + ipv6_cidr_block = (known after apply)
  + ipv6_cidr_block_network_border_group = (known after apply)
  + main_route_table_id = (known after apply)
  + owner_id = (known after apply)
  + tags = {
```

Networking Module Cont...

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PROBLEMS OUTPUT DEBUG CONSOLE

TERMINAL

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```
+ owner_id          = (known after apply)
+ tags              = {
+   "Name" = "my-cool-project-vpc"
}
+ tags_all          = {
+   "Name" = "my-cool-project-vpc"
}

# module.networking.module.websvr_sg.aws_security_group.security_group will be created
+ resource "aws_security_group" "security_group" {
+   arn           = (known after apply)
+   description   = "Managed by Terraform"
+   egress        = [
+     {
+       cidr_blocks = [
+         "\"0.0.0.0/0\"",
+       ]
+       description = ""
+       from_port   = 0
+       ipv6_cidr_blocks = []
+       prefix_list_ids = []
+       protocol    = "-1"
+       security_groups = []
+       self        = false
+       to_port     = 0
+     },
+   ],
+   id            = (known after apply)
+   ingress        = [
+     {
+       cidr_blocks = [
+         "10.0.0.0/16",
+       ]
+       description = ""
+       from_port   = 22
+       ipv6_cidr_blocks = []
+       prefix_list_ids = []
+       protocol    = "tcp"
+       security_groups = []
+       self        = false
+       to_port     = 22
+     },
+   ],
+ }
```

Networking Module Cont...

master*

%

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EXPLORER

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```
+ to_port          = 22
},
+
+ cidr_blocks      = []
+ description       =
+ from_port         = 0
+ ipv6_cidr_blocks = []
+ prefix_list_ids  = []
+ protocol          = "-1"
+ security_groups   =
+ self               = true
+ to_port            = 0
},
+
+ cidr_blocks      = []
+ description       =
+ from_port         = 8080
+ ipv6_cidr_blocks = []
+ prefix_list_ids  = []
+ protocol          = "tcp"
+ security_groups   = (known after apply)
+ self               = false
+ to_port            = 8080
},
]
+ name              = (known after apply)
+ name_prefix        = (known after apply)
+ owner_id           = (known after apply)
+ revoke_rules_on_delete = false
+ tags_all           = (known after apply)
+ vpc_id              = (known after apply)
}
```

Plan: 40 to add, 0 to change, 0 to destroy.

Changes to Outputs:

```
+ db_password = (sensitive value)
+ lb_dns_name = (known after apply)
```

Initializing Completed

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.

vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d/Module04\$ exit

terraform-in-action/main	Resource Groups Manager	screenshot in ubuntu 22.	+				
←	→	C	https://us-west-2.console.aws.amazon.com/resource-groups/tag-editor/find-resources?region=us-west-2#query=regions:!us-west-2,resourceTypes:!AWS::AllSupported,tagFilters:(),type:Subnet	star	?	Oregon	Vimal Marvaniya
aws	Services	Search for services, features, blogs, docs, and more	[Alt+S]				
AWS Resource Groups		Filter resources					
	Identifier	Tag: Name	Service	Type	Region	Tags	
	<input checked="" type="checkbox"/> Identifier	<input checked="" type="checkbox"/> Tag: Name	<input checked="" type="checkbox"/> Service	<input checked="" type="checkbox"/> Type	<input checked="" type="checkbox"/> Region	<input checked="" type="checkbox"/> Tags	
	<input checked="" type="checkbox"/> dopt-d96a3da1	(not tagged)	EC2	DHCPOptions	us-west-2		
	<input checked="" type="checkbox"/> elpalloc-0827d67d2ed57529b	my-cool-project-vpc-us-west-2a	EC2	EIP	us-west-2	1	
	<input checked="" type="checkbox"/> igw-0b7147869d4f0899a	my-cool-project-vpc	EC2	InternetGateway	us-west-2	1	
	<input checked="" type="checkbox"/> igw-25c6455c	(not tagged)	EC2	InternetGateway	us-west-2	-	
	<input checked="" type="checkbox"/> nat-0c416685a5199691a	my-cool-project-vpc-us-west-2a	EC2	NatGateway	us-west-2	1	
	<input checked="" type="checkbox"/> acl-7535830e	(not tagged)	EC2	NetworkAcl	us-west-2	-	
	<input checked="" type="checkbox"/> acl-05d208a7a9fe99327	(not tagged)	EC2	NetworkAcl	us-west-2	-	
	<input checked="" type="checkbox"/> eni-0d64a51ef126912c0	(not tagged)	EC2	NetworkInterface	us-west-2	-	
	<input checked="" type="checkbox"/> eni-0e966d04cc245a8b8	(not tagged)	EC2	NetworkInterface	us-west-2	-	
	<input checked="" type="checkbox"/> rtb-068227d0718298016	my-cool-project-vpc-public	EC2	RouteTable	us-west-2	1	
	<input checked="" type="checkbox"/> rtb-06a77d8e3c3568b59	my-cool-project-vpc-private	EC2	RouteTable	us-west-2	1	
	<input checked="" type="checkbox"/> rtb-09a1c970de4c1a26d	(not tagged)	EC2	RouteTable	us-west-2	-	
	<input checked="" type="checkbox"/> rtb-a85e65d3	(not tagged)	EC2	RouteTable	us-west-2	-	
	<input checked="" type="checkbox"/> sg-86fd75a1	(not tagged)	EC2	SecurityGroup	us-west-2	-	
	<input checked="" type="checkbox"/> sg-0e1931a20b1d52713	(not tagged)	EC2	SecurityGroup	us-west-2	-	
	<input checked="" type="checkbox"/> sg-023371c7375be7374	(not tagged)	EC2	SecurityGroup	us-west-2	-	
	<input checked="" type="checkbox"/> sg-03d63ae800177242f	(not tagged)	EC2	SecurityGroup	us-west-2	-	
	<input checked="" type="checkbox"/> sg-092ee89c0a08348b1	(not tagged)	EC2	SecurityGroup	us-west-2	-	
	<input checked="" type="checkbox"/> subnet-05a833222cf8a5367	my-cool-project-vpc-db-us-west-2c	EC2	Subnet	Resources Created		
	<input checked="" type="checkbox"/> subnet-0b79222762c26ca00	my-cool-project-vpc-public-us-	EC2	Subnet			

AWS Resource Groups						
Resources	Resource Type	Name	Type	Status	Last Update	Actions
Create Resource Group						
Saved Resource Groups						
Tagging						
Tag Editor						
Tag Policies						
What's new						
		subnet-076fd2f2d54a75ad8	EC2	Subnet	us-west-2	(1)
		subnet-0b1e43d94a0075102	EC2	Subnet	us-west-2	(1)
		subnet-0a27b7471fb25c909	EC2	Subnet	us-west-2	(1)
		subnet-975a8fdd	(not tagged)	EC2	Subnet	us-west-2
		subnet-924ff5cf	(not tagged)	EC2	Subnet	us-west-2
		subnet-0ae9e2b9389dad0f6	EC2	Subnet	us-west-2	(1)
		subnet-0ebd8c153ab45a519	EC2	Subnet	us-west-2	(1)
		vpc-082855c8e200d4a59	EC2	VPC	us-west-2	(1)
		vpc-566e302e	(not tagged)	EC2	VPC	us-west-2
		app/my-cool-project/ada28a536e8cc3cf	ElasticLoadBalancingV2	LoadBalancer	us-west-2	(1)
		AppLBTarget/6f67575697d41831	(not tagged)	ElasticLoadBalancingV2	TargetGroup	us-west-2
		websvr202210061158565894000000...	ElasticLoadBalancingV2	TargetGroup	us-west-2	(1)
		3206c724-81e0-4d0f-8c03-87013d271...	(not tagged)	KMS	Key	us-west-2
		e708f452-2107-4d65-8f68-b54ebf2e9...	(not tagged)	KMS	Key	us-west-2
		default.mysql8.0	(not tagged)	RDS	DBParameterGroup	us-west-2
		default	(not tagged)	RDS	DBSecurityGroup	us-west-2
		default-vpc-0ad237d95e2ea7e4c	(not tagged)	RDS	DBSubnetGroup	us-west-2
		default-vpc-566e302e	(not tagged)	RDS	DBSubnetGroup	us-west-2
		my-cool-project-vpc	(not tagged)	RDS	DBSubnetGroup	us-west-2
		default:mysql-8-0	(not tagged)	RDS	OptionGroup	us-w
					Resources Created	

File Edit Selection View Go Run Terminal Help



EXPLORER

...

PROBLEMS

OUTPUT DEBUG CONSOLE

TERMINAL

bash + □ ×

OPEN EDITORS
x main.tf

TERRAFORMLEARNING (WORKSPACE)
Module04
> .terraform
> modules
≡ .terraform.lock.hcl
Y main.tf
Y outputs.tf
Y providers.tf
{} terraform.tfstate
≡ terraform.tfstate.backup
Y terraform.tfvars
Y variables.tf
Y versions.tf

```
module.database.aws_db_instance.database: Still creating... [2m40s elapsed]
module.database.aws_db_instance.database: Still creating... [2m50s elapsed]
module.database.aws_db_instance.database: Still creating... [3m0s elapsed]
module.database.aws_db_instance.database: Still creating... [3m10s elapsed]
module.database.aws_db_instance.database: Still creating... [3m20s elapsed]
module.database.aws_db_instance.database: Still creating... [3m30s elapsed]
module.database.aws_db_instance.database: Still creating... [3m40s elapsed]
module.database.aws_db_instance.database: Still creating... [3m50s elapsed]
module.database.aws_db_instance.database: Still creating... [4m0s elapsed]
module.database.aws_db_instance.database: Still creating... [4m10s elapsed]
module.database.aws_db_instance.database: Still creating... [4m20s elapsed]
module.database.aws_db_instance.database: Still creating... [4m30s elapsed]
module.database.aws_db_instance.database: Still creating... [4m40s elapsed]
module.database.aws_db_instance.database: Still creating... [4m50s elapsed]
module.database.aws_db_instance.database: Still creating... [5m0s elapsed]
module.database.aws_db_instance.database: Creation complete after 5m9s [id=my-cool-project-db-instance]
module.autoscaling.data.cloudinit_config.config: Reading...
module.autoscaling.data.cloudinit_config.config: Read complete after 0s [id=361867458]
module.autoscaling.aws_launch_template.webserver: Creating...
module.autoscaling.aws_launch_template.webserver: Still creating... [10s elapsed]
module.autoscaling.aws_launch_template.webserver: Creation complete after 11s [id=lt-00fbcde5863e5696b]
module.autoscaling.aws_autoscaling_group.webserver: Creating...
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [10s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [20s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [30s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [40s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [50s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [1m0s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [1m10s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [1m20s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [1m30s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [1m40s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [1m50s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Still creating... [2m0s elapsed]
module.autoscaling.aws_autoscaling_group.webserver: Creation complete after 2m9s [id=my-cool-project-asg]
```

Apply complete! Resources: 40 added, 0 changed, 0 destroyed.

Outputs:

```
db_password = <sensitive>
lb_dns_name = "my-cool-project-1445515419.us-west-2.elb.amazonaws.com"
vimal@vimal-All-Series:~/TerraformLearning/terraform.tfstate.d/Module04$
```

Resources Created

Activities

Firefox Web Browser

Oct 7 11:24

Power



Terraform in Action



my-cool-project-1445515419.us-west-2.elb.amazonaws.com

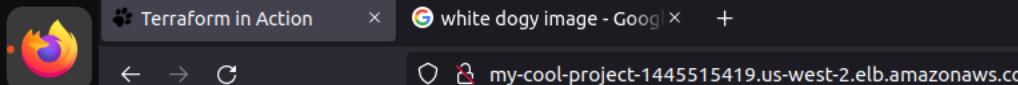


My Pets!

Click the "+" button to add pets



App Running Successfully



My Pets!

+ C

Add Pet



Sex

Breed

Color

Male

white

App running Successfully



Terraform in Action

white dogy image - Google



my-cool-project-1445515419.us-west-2.elb.amazonaws.com



My Pets!

Tomy
Dog

Sex Breed Color

Male white

Add Pet

Fill out this form to add a new pet to the database

Name

Sex

Female

Male

Species

Color

Breed

Pet Image URL
e.g. <https://www.example.com/cat.jpg>

[CANCEL](#) [CONFIRM](#)

App Running Successfully