Use Terraform to deploy AWS services, including EKS, EC2, S3, RDS, Load Balancer, Route 53, Private Container Registry, and others

step-by-step guide to deploying AWS services (EKS, S3, RDS, Load Balancer, Route 53, Private Container Registry, EC2, and others) using Terraform. This includes scripting and installation instructions for each step.

Step 1: Set Up Terraform Environment

Prepare your local environment for Terraform scripting in VS Code.

Configure AWS CLI:

Install and configure AWS CLI for authentication.

- sudo apt install awscli -y
- aws configure

Set Up IAM Permissions: Ensure your IAM user/role has appropriate permissions to manage EKS, S3, RDS, EC2, ALB, Route 53, and Elastic Container Registry (ECR).

Step 2: Initialize a Terraform Project

Create and configure a directory for your Terraform project.

- 1. Create a directory:
- mkdir terraform-aws-project
- cd terraform-aws-project
- 2. Initialize Terraform:
- terraform init

Step 3: Define Provider Configuration

Specify AWS as the provider and region for deployment.

Terraform Script:

Provider.tf:

```
terraform {
 required_providers {
  aws = {
   source = "hashicorp/aws"
   version = ">= 4.0.0"
  }
 }
}
provider "aws" {
 region = "ap-south-1" # Change to your desired region
}
provider "kubernetes" {
               = data.aws_eks_cluster.eks.endpoint
 host
 cluster_ca_certificate = base64decode(data.aws_eks_cluster.eks.certificate_authority[0].data)
 token
                = data.aws_eks_cluster_auth.eks.token
}
```

```
Vpc.tf:
```

```
variable "region" {
  default = "ap-south-1"
}
data "aws_availability_zones" "available" {}
locals {
  cluster_name = "clusters"
}
module vpc {
  source = "terraform-aws-modules/vpc/aws"
  name = "Bhargav-EKS-VPC"
  cidr = "10.0.0.0/16"
  azs = data.aws_availability_zones.available.names
  private_subnets = ["10.0.1.0/24", "10.0.2.0/24", "10.0.3.0/24"]
  public_subnets = ["10.0.4.0/24", "10.0.5.0/24", "10.0.6.0/24"]
  enable_nat_gateway = true
  single_nat_gateway = true
 enable_dns_hostnames= true
tags = {
  "Name" = "Bhargav-EKS-VPC"
}
public_subnet_tags = {
  "Name" = "EKS-Public-Subnet"
}
private_subnet_tags = {
  "Name" = "EKS-Private-Subnet"
}
}
```

Ec2.tf:

```
resource "aws_vpc" "main" {
 cidr_block = "10.0.0.0/16"
 tags = {
  Name = "MainVPC"
}
}
resource "aws_subnet" "public" {
 vpc_id
              = aws_vpc.main.id
 cidr_block
               = "10.0.1.0/24"
 availability_zone = "ap-south-1a"
 map_public_ip_on_launch = true
 tags = {
  Name = "PublicSubnet"
}
}
resource "aws_instance" "AWS-Services" {
 ami
          = "ami-053b12d3152c0cc71" # Replace with a region-specific AMI
 instance_type = "t2.micro"
 subnet_id = aws_subnet.public.id
 tags = {
  Name = "AWS-Services"
 }
}
```

eks.tf:

```
module "eks" {
 source = "terraform-aws-modules/eks/aws"
 version = ">= 18.0.0"
 cluster_name = "Bhargav-EKS-Cluster"
 cluster_version = "1.26"
 vpc_id = "vpc-01d65159f5c79b8ff"
 subnet_ids = ["subnet-0ca0ad3708d01ddb6", "subnet-015c73cfce1f416cb"]
}
resource "aws_launch_template" "worker" {
 name_prefix = "Bhargav-EKS-Template"
 image_id = "ami-053b12d3152c0cc71" # Replace with a valid AMI ID
 instance_type = "t3.medium"
 key_name = "Devops"
 tag_specifications {
  resource_type = "instance"
  tags = {
   Name = "Bhargav-EKS-Worker"
 }
 }
}
```

Sg.tf:

```
resource "aws_security_group" "worker_sg" {
          = "eks-worker-sg"
 name
 description = "Security group for EKS worker nodes"
 vpc_id = aws_vpc.example.id
 ingress {
 from_port = 0
 to_port = 65535
  protocol = "tcp"
 cidr_blocks = ["0.0.0.0/0"] # Update this to a more restrictive rule as needed
 }
 egress {
 from_port = 0
 to_port = 0
  protocol = "-1"
 cidr_blocks = ["0.0.0.0/0"]
}
}
resource "aws_security_group" "worker_group_one" {
 name
          = "worker-group-one-sg"
 description = "Security group for Worker Group 1"
 vpc_id = module.vpc.vpc_id
 ingress {
 from_port = 0
 to_port = 65535
  protocol = "tcp"
```

```
cidr_blocks = ["0.0.0.0/0"]
 }
 egress {
 from_port = 0
  to_port = 65535
  protocol = "tcp"
 cidr_blocks = ["0.0.0.0/0"]
 }
}
resource "aws_security_group" "worker_group_two" {
 name
          = "worker-group-two-sg"
 description = "Security group for Worker Group 2"
 vpc_id = module.vpc.vpc_id
 ingress {
  from_port = 0
  to_port = 65535
  protocol = "tcp"
 cidr_blocks = ["0.0.0.0/0"]
 }
 egress {
  from_port = 0
  to_port = 65535
  protocol = "tcp"
 cidr_blocks = ["0.0.0.0/0"]
 }
}
```

```
resource "aws_lb" "app_lb" {
              = "app-lb"
 name
 internal
             = false
 load_balancer_type = "application"
 security_groups = [aws_security_group.alb_sg.id] # Security group for ALB
 subnets
              = module.vpc.public_subnets # Replace with your public subnets
 tags = {
 Name = "app-lb"
}
}
resource "aws_security_group" "alb_sg" {
 name
          = "alb-sg"
 description = "Security group for ALB"
 vpc_id = module.vpc.vpc_id
 ingress {
 from_port = 80
 to_port = 80
  protocol = "tcp"
 cidr_blocks = ["0.0.0.0/0"]
 }
 ingress {
 from_port = 443
 to_port = 443
  protocol = "tcp"
 cidr_blocks = ["0.0.0.0/0"]
 }
 egress {
```

```
from_port = 0
  to_port = 0
  protocol = "-1"
  cidr_blocks = ["0.0.0.0/0"]
 }
}
S3.tf:
resource "aws_s3_bucket" "example" {
 bucket = "bhargav-eks-bucket-2024"
}
Asg.tf:
data "aws_ami" "eks_optimized" {
 most_recent = true
 owners = ["602401143452"] # Amazon EKS AMI owner ID
 filter {
  name = "name"
  values = ["amazon-eks-node-*-v*"]
 }
}
resource "aws_launch_template" "eks_workers" {
 name_prefix = "eks-workers-"
 instance_type = "t3.micro"
```

```
key_name = "devops" # Replace with your key pair name
 iam_instance_profile {
  name = "eks-node-instance-profile" # Replace with the appropriate IAM role
 }
 network_interfaces {
                       = [aws_security_group.worker_sg.id]
 security_groups
 associate_public_ip_address = true
 }
 block_device_mappings {
  device_name = "/dev/xvda"
  ebs {
  volume_size = 20
  volume_type = "gp2"
 }
 }
 # Reference the user_data template
 user_data = base64encode(data.template_file.user_data.rendered)
 # Use the dynamic AMI ID
 image_id = data.aws_ami.eks_optimized.id
}
```

```
resource "aws_db_instance" "db" {
 allocated_storage = 20
              = "mysql"
 engine
 engine_version = "8.0"
 instance_class = "db.t3.micro"
           = "appdb" # Correct attribute for database name
 db_name
                = "admin"
 username
                = "strongpassword"
 password
 parameter_group_name = "default.mysql8.0"
 skip_final_snapshot = true
}
alb.tf:
# IAM Role for EKS Cluster
resource "aws_iam_role" "eks_role" {
 name = "eks-cluster-role"
 assume_role_policy = jsonencode({
 Version = "2012-10-17"
  Statement = [
  {
    Action = "sts:AssumeRole"
    Principal = {
     Service = "eks.amazonaws.com"
```

Effect = "Allow"

Sid = ""

```
},
  ]
 })
}
# Attach policies to the IAM role for EKS Cluster
resource "aws_iam_role_policy_attachment" "eks_policy_attachment" {
        = aws_iam_role.eks_role.name
 policy_arn = "arn:aws:iam::aws:policy/AmazonEKSClusterPolicy"
}
# Example VPC and Subnets
resource "aws_vpc" "example" {
 cidr_block = "10.0.0.0/16"
}
# Subnet 1 in Availability Zone ap-south-1a
resource "aws_subnet" "example_subnet_1" {
 vpc_id
             = aws_vpc.example.id
 cidr_block
             = "10.0.1.0/24"
 availability_zone = "ap-south-1a"
}
# Subnet 2 in Availability Zone ap-south-1b
resource "aws_subnet" "example_subnet_2" {
 vpc_id
             = aws_vpc.example.id
 cidr_block
             = "10.0.2.0/24"
 availability_zone = "ap-south-1b"
}
variable "cluster_name" {
```

```
description = "Bhargav-EKS-Cluster"
 type
         = string
 default = "my-cluster-name" # Optional: Provide a default value
}
# EKS Cluster
resource "aws_eks_cluster" "eks_cluster" {
 name = var.cluster_name
 role_arn = aws_iam_role.eks_role.arn # Reference the IAM role created above
 vpc_config {
  subnet_ids = [
   aws_subnet.example_subnet_1.id,
   aws_subnet.example_subnet_2.id
  ]
 }
}
# New subnet for Worker Nodes
resource "aws_subnet" "worker_subnet" {
 vpc_id
             = aws_vpc.example.id
 cidr block
            = "10.0.3.0/24"
 availability_zone = "ap-south-1c"
}
variable "subnet_ids" {
 description = "List of subnet IDs to associate with the Auto Scaling group"
 type
         = list(string)
default = ["subnet-0050faad53dcb5fc4", "subnet-0207799ffc86f3680"]
}
```

```
# IAM Role for Worker Nodes
resource "aws_iam_role" "eks_workers_role" {
 name = "eks-workers-role"
 assume_role_policy = jsonencode({
  Version = "2012-10-17"
  Statement = [
   {
    Action = "sts:AssumeRole"
    Principal = {
     Service = "ec2.amazonaws.com"
    }
    Effect = "Allow"
        = ""
    Sid
   },
  ]
 })
}
# Attach policies to the IAM role for Worker Nodes
resource "aws_iam_role_policy_attachment" "eks_workers_policy_attachment" {
        = aws iam role.eks workers role.name
 policy_arn = "arn:aws:iam::aws:policy/AmazonEKSWorkerNodePolicy"
}
resource "aws_iam_role_policy_attachment" "eks_cni_policy_attachment" {
        = aws_iam_role.eks_workers_role.name
 policy_arn = "arn:aws:iam::aws:policy/AmazonEKS_CNI_Policy"
}
resource "aws_iam_role_policy_attachment" "eks_registry_policy_attachment" {
```

```
role = aws_iam_role.eks_workers_role.name
policy_arn = "arn:aws:iam::aws:policy/AmazonEC2ContainerRegistryReadOnly"
}
# IAM Instance Profile for Worker Nodes
resource "aws_iam_instance_profile" "eks_workers_profile" {
    name = "eks-workers-profile"
    role = aws_iam_role.eks_workers_role.name
}
```

Route53.tf:

```
resource "aws_route53_zone" "main" {
    name = "your-custom-domain.com" # Replace with your actual domain name
}

resource "aws_route53_record" "app" {
    zone_id = aws_route53_zone.main.zone_id
    name = "app"
    type = "A"

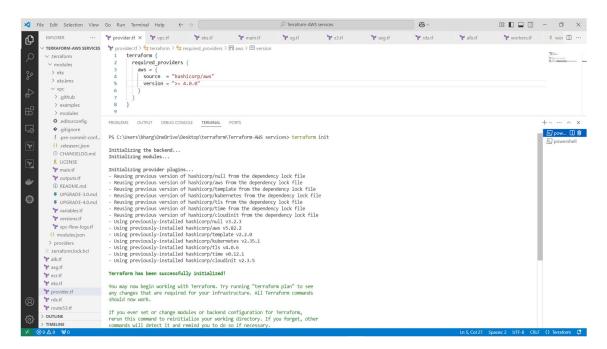
alias {
    name = aws_lb.app_lb.dns_name
    zone_id = aws_lb.app_lb.zone_id
    evaluate_target_health = true
}
```

ecr.tf:

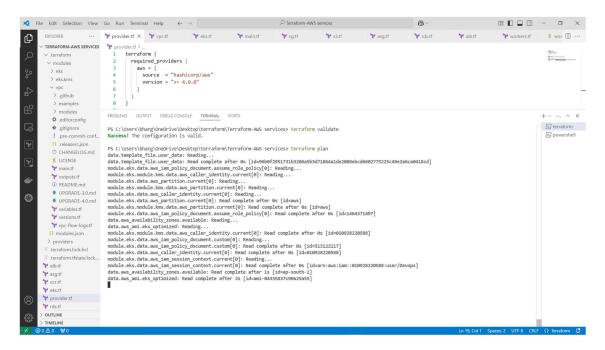
```
resource "aws_ecr_repository" "app_repo" {
  name = "app-repo"
}
```

Step 4: Apply Configuration

- 1. Initialize Terraform:
- terraform init



- 2. Validate configuration:
- · terraform validate
- terraform plan



- 3. Deploy:
- terraform apply

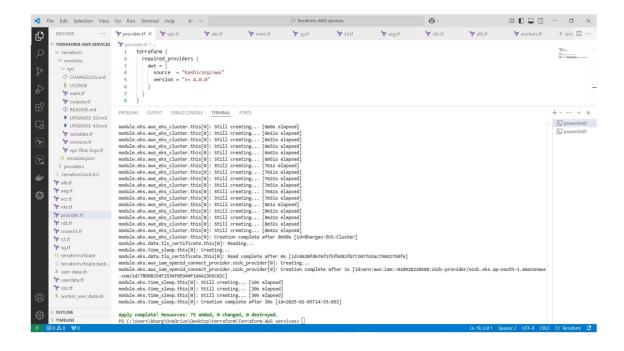
Confirm by typing yes.

```
m{x} | File | Edit | Selection | View | Go | Run | Terminal | Help | \leftarrow \rightarrow | \Box | \Box
Ф
                                              EXPLORER
                                                                                                                             --- PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
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                                              TERRAFORM-AWS SERVICES
                                                                                                                                                                                 }
                                                                                                                                                                             > eks.kms
                                                          > examples
> modules

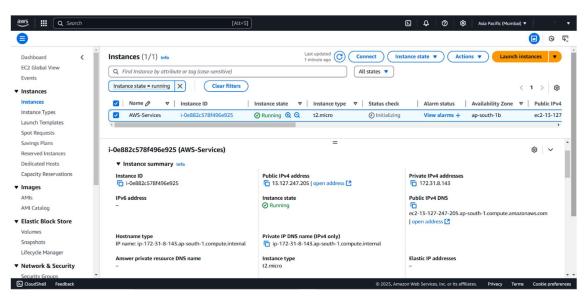
• editorconfig
                                                          • .gitignore
! .pre-commit-conf...
! .releaserc.json
                                                                                                                                                                               O CHANGELOG.md
                                                            € LICENSE

→ main.tf
                                                            ① README md
                                                                                                                                                                                                     is enabled = true | (known after apply) | tell | true | tell | true | tell | te
                                                            ♥ UPGRADE-3.0.md
♥ UPGRADE-4.0.md
        0
                                                          yariables.tf
                                                                                                                                                                                                       } + tags_all = {
+ "terraform-aws-modules" = "eks"
                                                  .terraform.tfstate.lock....
                                                                                                                                                                                       }
                                          > alb tf
                                                                                                                                                       Plan: 73 to add, 0 to change, 0 to destroy.
                                            eks.tf
                                          providentf bo you want to perform these actions?

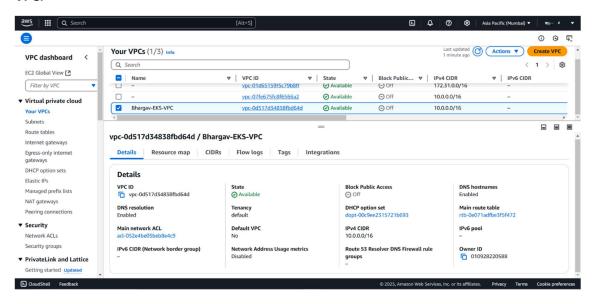
Terraform will perform the actions described above.
Only 'yes' will be accepted to approve.
                                                                                                                                                                                       Enter a value: yes
```



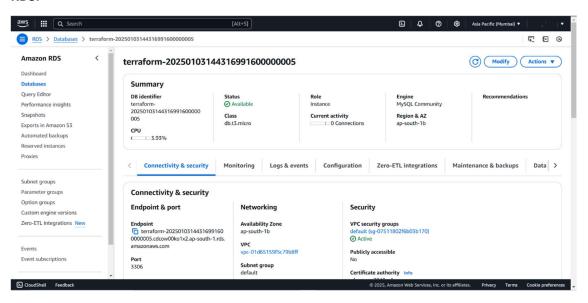
EC2:



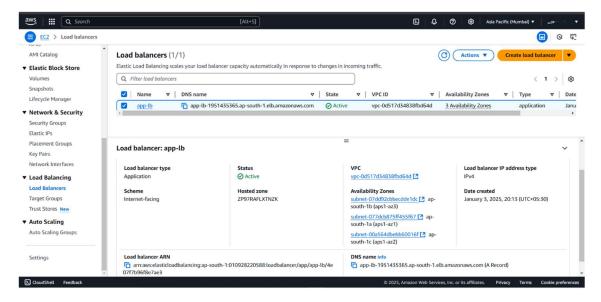
VPC:



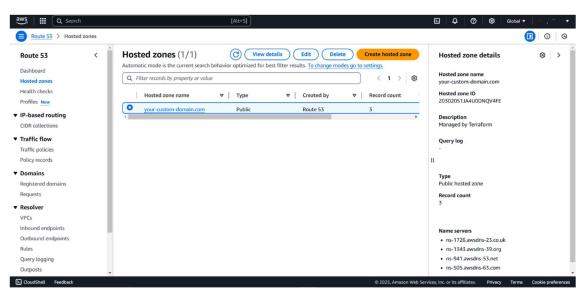
RDS:



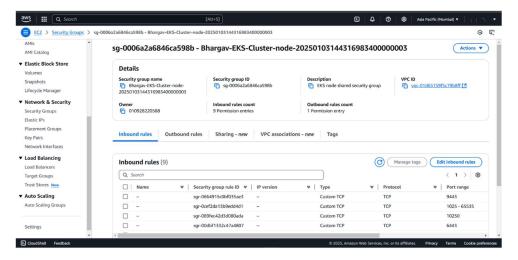
ALB:

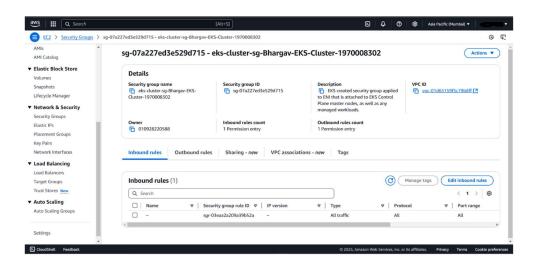


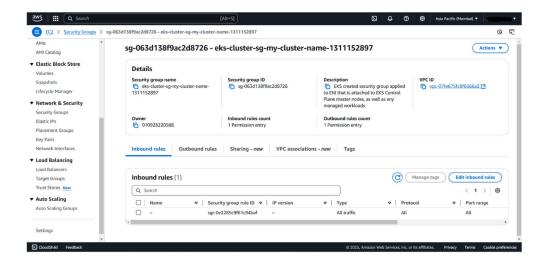
Route53:



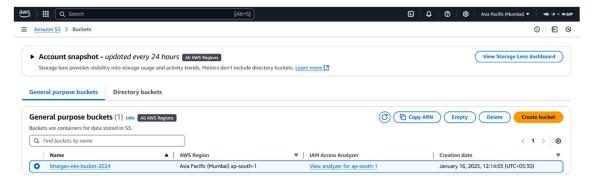
Security Groups:







S3:



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ECR:

