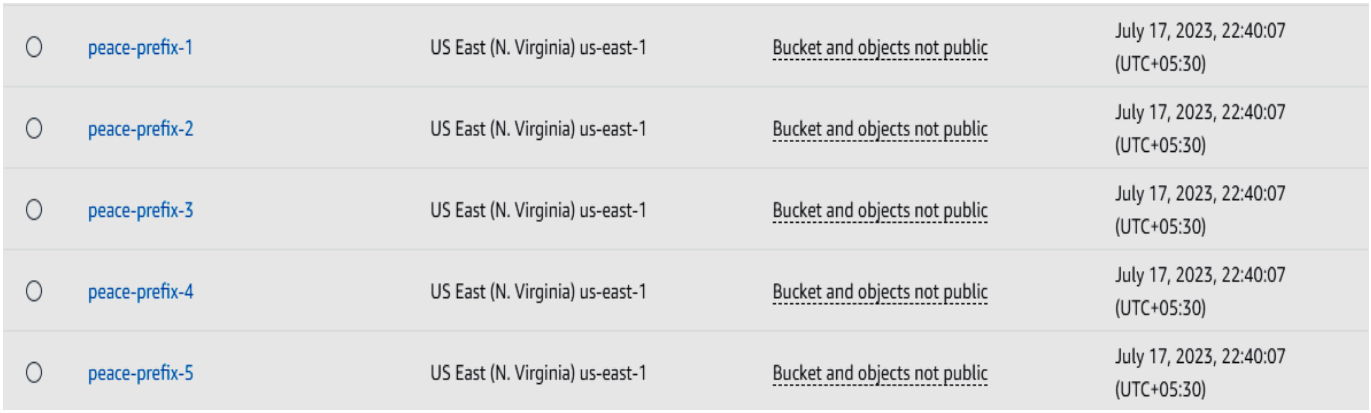
Take Home Assignment

Problem Statement 1

1. Create 5 AWS S3 buckets with a random prefix and should end in bucket number. For example, *bucket-prefix-1, bucket-prefix-2 … bucket-prefix-5.*

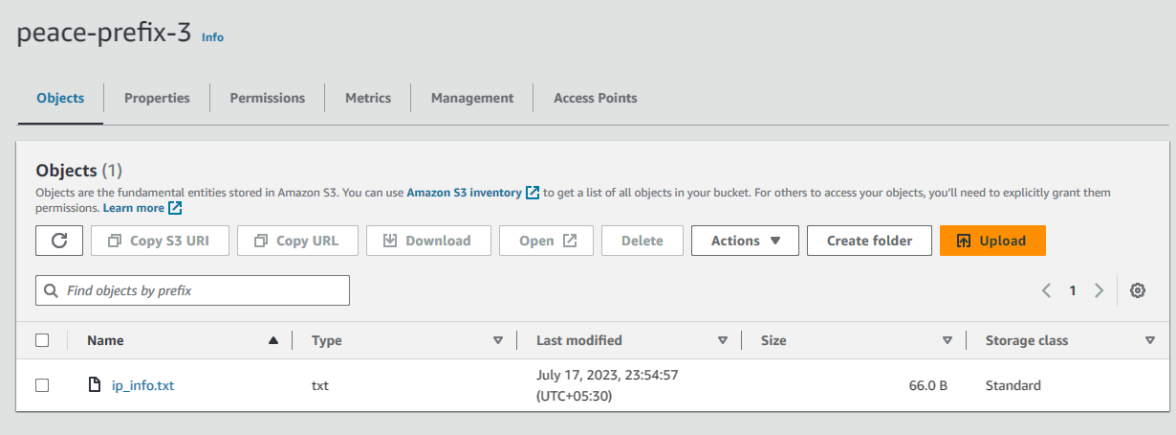
- This section of code is for creating the 5 S3 Buckets (peace-prefix1,2…5)

```
resource "aws_s3_bucket" "bucket" {
  count         = 5
  bucket        = "peace-prefix-${count.index + 1}"
  acl           = "private"
}
```



○	peace-prefix-1	US East (N. Virginia) us-east-1	Bucket and objects not public	July 17, 2023, 22:40:07 (UTC+05:30)
○	peace-prefix-2	US East (N. Virginia) us-east-1	Bucket and objects not public	July 17, 2023, 22:40:07 (UTC+05:30)
○	peace-prefix-3	US East (N. Virginia) us-east-1	Bucket and objects not public	July 17, 2023, 22:40:07 (UTC+05:30)
○	peace-prefix-4	US East (N. Virginia) us-east-1	Bucket and objects not public	July 17, 2023, 22:40:07 (UTC+05:30)
○	peace-prefix-5	US East (N. Virginia) us-east-1	Bucket and objects not public	July 17, 2023, 22:40:07 (UTC+05:30)

After some time File will be pushed to S3 Bucket.

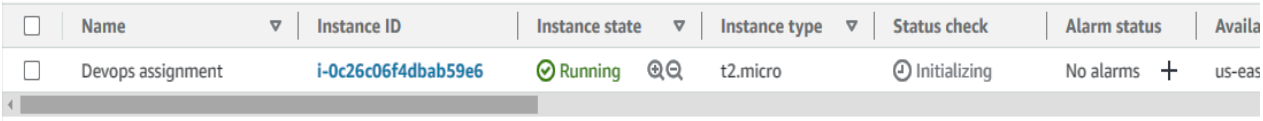


2. Create an EC2 instance with the following specifications:

- OS – Ubuntu 22 LTS

```
resource "aws_instance" "ec2_instance" {
  ami           = "ami-0261755bbcb8c4a84"
  instance_type = "t2.micro"
  availability_zone = "us-east-1a"
  key_name = "Terrform-project"

    iam_instance_profile = aws_iam_instance_profile.instanceprofile.name

    tags = {
        Name="Devops assignment"
    }
```

```
    user_data = file("userdata.sh")
  }
```

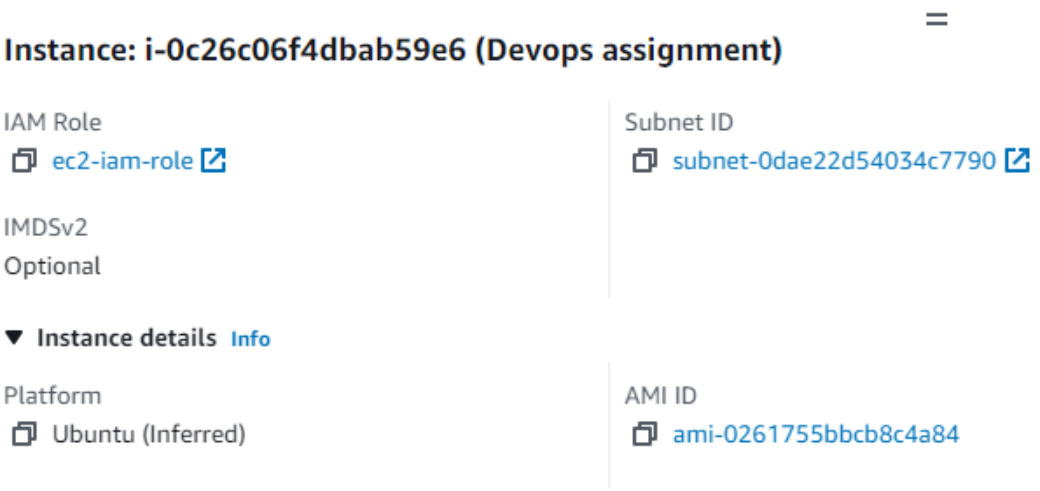


Name	Instance ID	Instance state	Instance type	Status check	Alarm status	Availa
Devops assignment	i-0c26c06f4dbab59e6	Running	t2.micro	Initializing	No alarms	us-eas

- At least one IAM Role attached that has the permissions to upload files to the 3rd bucket created in Problem 1.

```
resource "aws_iam_instance_profile" "instanceprofile" {
  name = "ec2-iam-instanceprofile"
  role = aws_iam_role.ec2role.name
}

resource "aws_iam_role" "ec2role" {
  name = "ec2-iam-role"
  assume_role_policy = <<EOF
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "Service": "ec2.amazonaws.com"
      },
      "Action": "sts:AssumeRole"
    }
  ]
}
EOF
}
```

```
resource "aws_iam_role_policy_attachment" "policyattach" {
  role       = aws_iam_role.ec2role.name
  policy_arn = "arn:aws:iam::aws:policy/AmazonS3FullAccess"
}
```

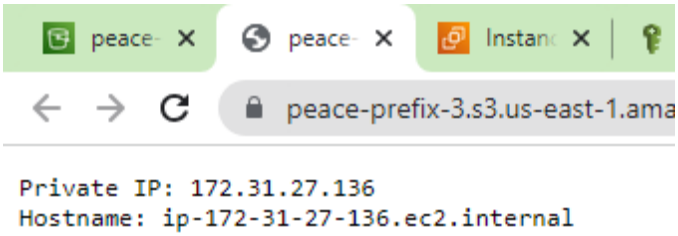


- User Data – A script that should upload a text file with instance's Private IP Address and Hostname to the S3 Bucket

```
#!/bin/bash

# here we are featching Private IP & Hostname.
private_ip=$(curl -s http://169.254.169.254/latest/meta-data/local-ipv4)
hostname=$(curl -s http://169.254.169.254/latest/meta-data/hostname)

# here we are creating the file and storing the above ip and hostname.
filename="ip_info.txt"
echo "Private IP: $private_ip" >> "$filename"
echo "Hostname: $hostname" >> "$filename"
```

```
# Here we are installing AWS CLI in ubuntu
if ! command -v aws &> /dev/null; then
    echo "Installing AWS CLI..."
    curl "https://awscli.amazonaws.com/awscli-exe-linux-x86_64.zip" -o
"awscliv2.zip"
    sudo apt install unzip -y
    sudo unzip awscliv2.zip
    sudo ./aws/install
fi


# Uploading the file to our 3rd S3 bucket
bucket_name="peace-prefix-3"
aws s3 cp "$filename" "s3://$bucket_name/$filename"
```

OUTPUT

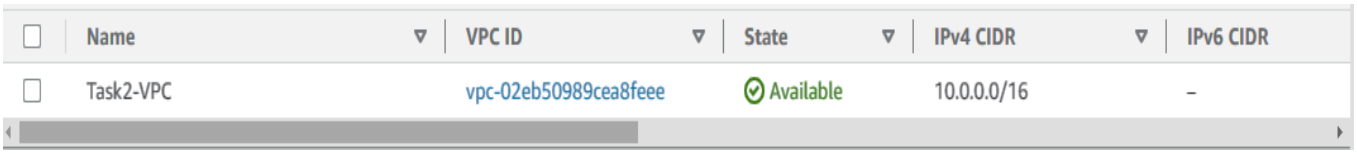


Problem Statement 2

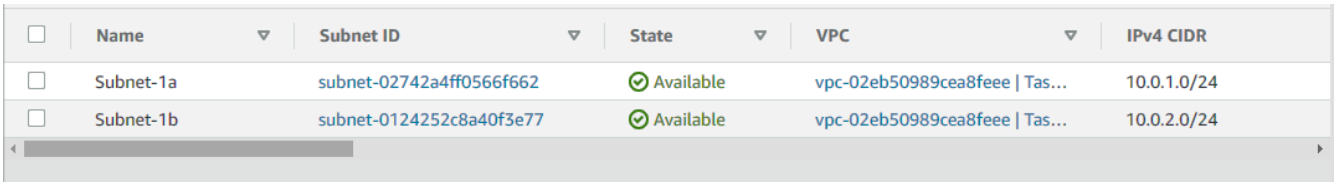
Deploy a simple HTTP Server hosted in a Docker image to AWS ECS (Fargate deployment) fronted by an Application Load Balancer.

- Here we are creating a AWS VPC, IGW and Subnets.

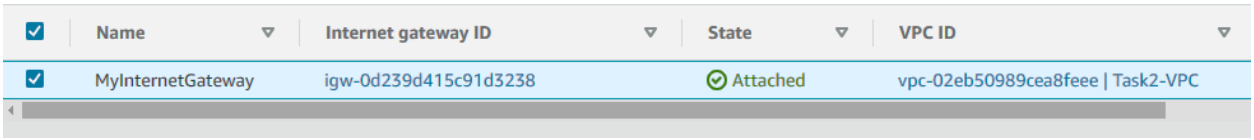
```
resource "aws_vpc" "task2_vpc" {
  cidr_block = "10.0.0.0/16"
}

resource "aws_internet_gateway" "igw" {
  vpc_id = aws_vpc.task2_vpc.id
}
resource "aws_subnet" "subnet1" {
  vpc_id     = aws_vpc.task2_vpc.id
  cidr_block = "10.0.1.0/24"
  availability_zone = "us-east-1a"
}

resource "aws_subnet" "subnet2" {
  vpc_id     = aws_vpc.task2_vpc.id
  cidr_block = "10.0.2.0/24"
  availability_zone = "us-east-1b"
}
```



Name	VPC ID	State	IPv4 CIDR	IPv6 CIDR
Task2-VPC	vpc-02eb50989cea8feee	Available	10.0.0.0/16	–



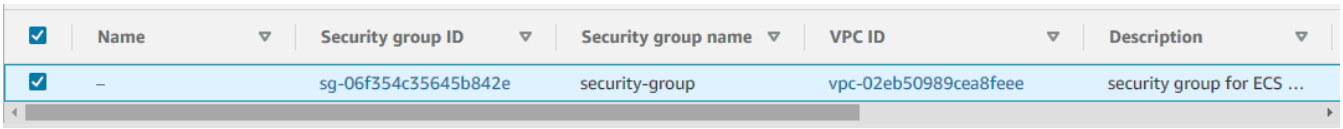
Name	Subnet ID	State	VPC	IPv4 CIDR
Subnet-1a	subnet-02742a4ff0566f662	Available	vpc-02eb50989cea8feee | Tas...	10.0.1.0/24
Subnet-1b	subnet-0124252c8a40f3e77	Available	vpc-02eb50989cea8feee | Tas...	10.0.2.0/24



Name	Internet gateway ID	State	VPC ID
MyInternetGateway	igw-0d239d415c91d3238	Attached	vpc-02eb50989cea8feee | Task2-VPC

- In this part of code, we are creating Security Group.

```
resource "aws_security_group" "sg" {
  name        = "security-group"
  description = "security group for ECS service"
  vpc_id      = aws_vpc.task2_vpc.id


  ingress {
    from_port   = 80
    to_port     = 80
    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"]
  }
}
```

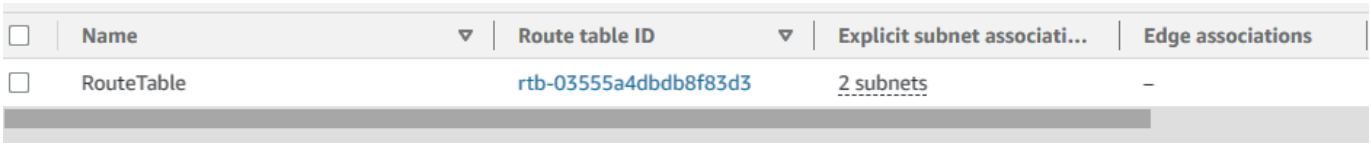


Name	Security group ID	Security group name	VPC ID	Description
–	sg-06f354c35645b842e	security-group	vpc-02eb50989cea8feee	security group for ECS ...

- In this part of code, we are creating the Route Table and associate it with subnets & IGW.

```
resource "aws_route_table" "routetable" {
```

```
  vpc_id = aws_vpc.task2_vpc.id

tags = {
    Name = "RouteTable"
  }
}

resource "aws_route" "my_route" {
  route_table_id         = aws_route_table.routetable.id
  destination_cidr_block = "0.0.0.0/0"
  gateway_id             = aws_internet_gateway.igw.id
}

resource "aws_route_table_association" "subnet1_association" {
  subnet_id      = aws_subnet.subnet1.id
  route_table_id = aws_route_table.routetable.id
}
resource "aws_route_table_association" "subnet2_association" {
  subnet_id      = aws_subnet.subnet2.id
  route_table_id = aws_route_table.routetable.id
}
```

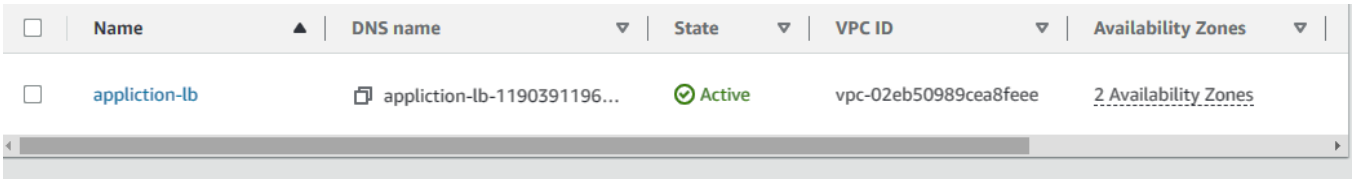


Name	Route table ID	Explicit subnet associati...	Edge associations
RouteTable	rtb-03555a4dbdb8f83d3	2 subnets	–

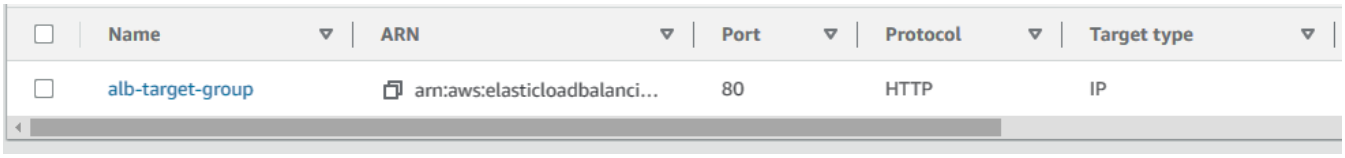
- In this part of code, we are creating ELB & Target Group.

```
resource "aws_lb" "alb" {
  name               = "appliction-lb"
  internal           = false
  load_balancer_type = "application"
  subnets            = [aws_subnet.subnet1.id,
aws_subnet.subnet2.id]
  security_groups = [aws_security_group.sg.id]
}

resource "aws_lb_listener" "lb_listener" {
  load_balancer_arn = aws_lb.alb.arn
  port              = 80
```

```
  protocol          = "HTTP"

  default_action {
    type             = "forward"
    target_group_arn = aws_lb_target_group.lb_tg.arn
  }
}

resource "aws_lb_target_group" "lb_tg" {
  name     = "alb-target-group"
  port     = 80
  protocol = "HTTP"
  target_type = "ip"
  vpc_id   = aws_vpc.task2_vpc.id
}
```



Name	DNS name	State	VPC ID	Availability Zones
appliction-lb	appliction-lb-1190391196...	Active	vpc-02eb50989cea8feee	2 Availability Zones

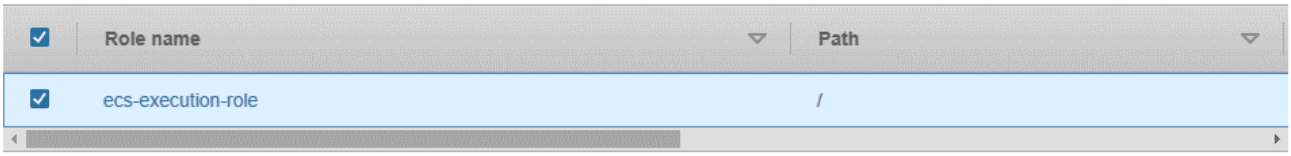


Name	ARN	Port	Protocol	Target type
alb-target-group	arn:aws:elasticloadbalanci...	80	HTTP	IP

- Here we are creating the IAM Role for ECS.

```
resource "aws_iam_role" "ecs_execution_role" {
  name = "ecs-execution-role"

  assume_role_policy = <<POLICY
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Principal": {
        "Service": "ecs-tasks.amazonaws.com"
      },
```

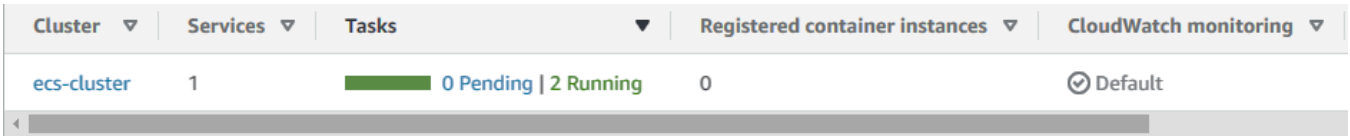
```
      "Action": "sts:AssumeRole"
    }
  ]
}
POLICY
}

resource "aws_iam_role_policy_attachment"
"ecs_execution_role_policy" {
  policy_arn = "arn:aws:iam::aws:policy/service-
role/AmazonECSTaskExecutionRolePolicy"
  role       = aws_iam_role.ecs_execution_role.name
}
```

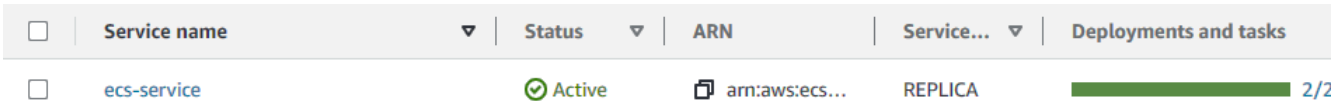


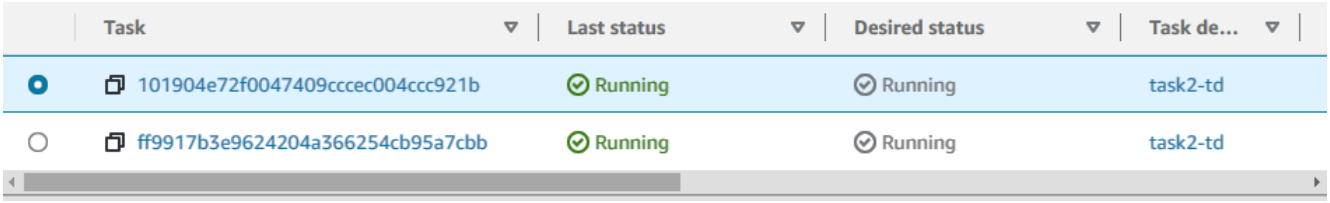
- Here we are creating ECS Cluster and ECS Service.

```
resource "aws_ecs_cluster" "ecscluster" {
  name = "ecs-cluster"
}

resource "aws_ecs_service" "ecs" {
  name            = "ecs-service"
  cluster         = aws_ecs_cluster.ecscluster.id
  task_definition = aws_ecs_task_definition.taskdefinition.arn
  desired_count   = 2
  launch_type     = "FARGATE"

  network_configuration {
```

```
    subnets         = [aws_subnet.subnet1.id , aws_subnet.subnet2.id]
    security_groups = [aws_security_group.sg.id]
    assign_public_ip = true
  }

  load_balancer {
    target_group_arn = aws_lb_target_group.lb_tg.arn
    container_name   = "ecs-container"
    container_port   = 80
  }
}
```

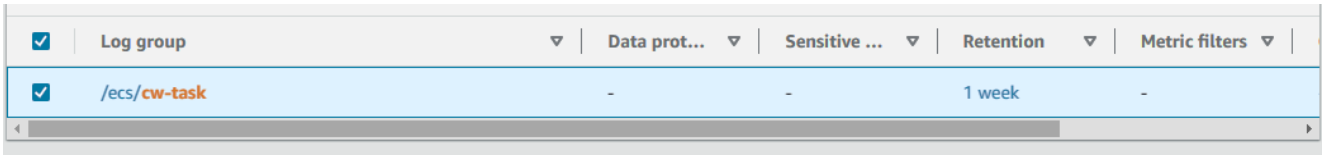






- In this part of code, we are creating CloudWatch log group.

```
resource "aws_cloudwatch_log_group" "cw_loggroup" {
  name              = "/ecs/cw-task"
  retention_in_days = 7
}
```



- In this part of code, we are creating ECS Task Definition.

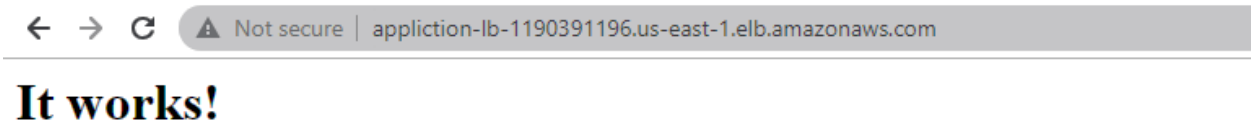
```
resource "aws_ecs_task_definition" "taskdefinition" {
  family                   = "task2-td"
  network_mode             = "awsvpc"
  cpu                      = 256
  memory                   = 512
  requires_compatibilities = ["FARGATE"]

  execution_role_arn = aws_iam_role.ecs_execution_role.arn

  container_definitions = <<DEFINITION
  [
    {
      "name": "ecs-container",
      "image": "httpd:2.4",
      "portMappings": [
        {
          "containerPort": 80,
          "protocol": "tcp"
        }
      ],
      "essential": true,
      "logConfiguration": {
        "logDriver": "awslogs",
        "options": {
          "awslogs-group": "/ecs/cw-task",
          "awslogs-region": "us-east-1",
          "awslogs-stream-prefix": "ecs"
        }
      }
    }
  ]
  DEFINITION
}
```

	Task definition	Status of last revision
○	task2-td	ACTIVE

	Task definition: revision	Status
☐	task2-td:4	ACTIVE

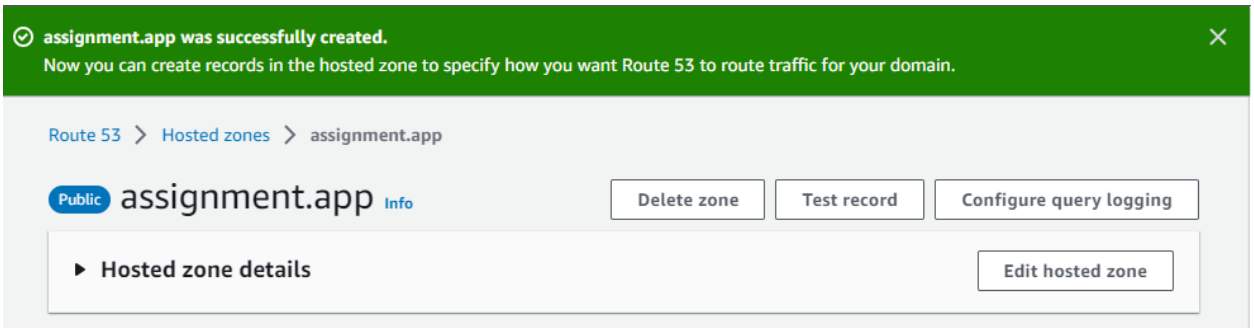
Container n...	Image	Private regi...	Essential	CPU	Memory	GPU
ecs-container	httpd:2.4	-	Yes	0	-	-

OUTPUT:

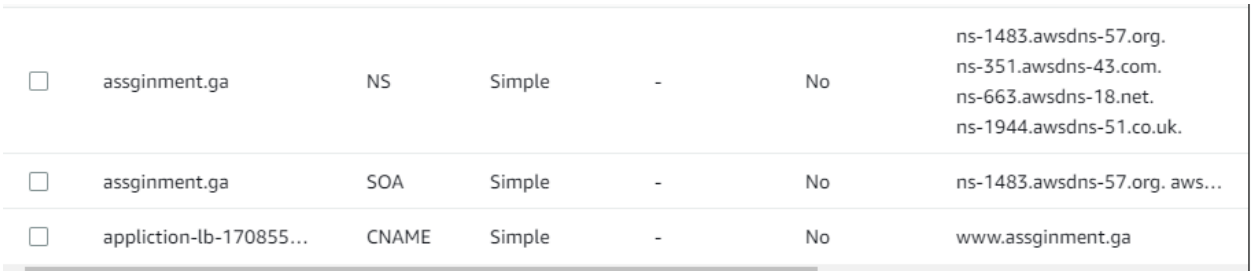


- Describe the further steps to map a Custom Domain / Sub-domain name for this application.

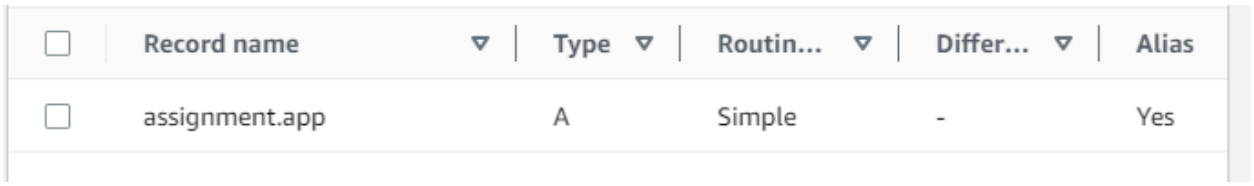
  - First we need to have any domain(.com, .in, .io etc) .
  - After that we can create one host zone.



  - Then let's create a records for our ALB.

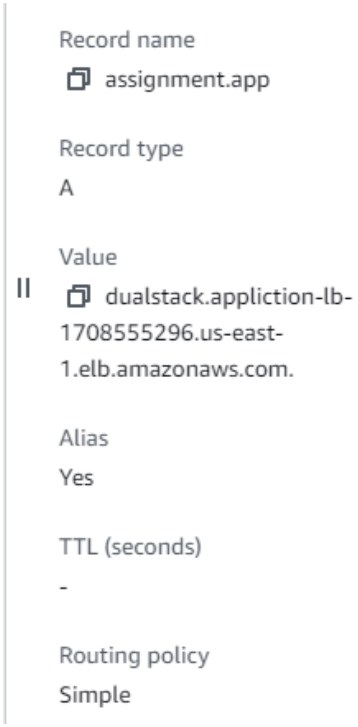


☐	assginment.ga	NS	Simple	-	No	ns-1483.awsdns-57.org. ns-351.awsdns-43.com. ns-663.awsdns-18.net. ns-1944.awsdns-51.co.uk.
☐	assginment.ga	SOA	Simple	-	No	ns-1483.awsdns-57.org. aws...
☐	appliction-lb-170855...	CNAME	Simple	-	No	www.assginment.ga



☐	Record name	Type	Routin...	Differ...	Alias
☐	assignment.app	A	Simple	-	Yes

- After add the records and choosing the alias as ALB.



- Requests for that domain name will be forwarded to our site with.