

Created VPC with 1 public 2 private subnets. 3 EC2 instances(Jenkins,httpd,tomcat) in public subnet. RDS creation in private subnet. Hosted Jenkins,httpd webpage, studentapp. Using Terraform.

Script:-

Resource.tf file

```
resource "aws_vpc" "this_vpc"
{
  cidr_block = "10.0.0.0/16"
  enable_dns_support = true
  enable_dns_hostnames = true
}

resource "aws_security_group" "this_sg"
{
  vpc_id = aws_vpc.this_vpc.id
  name   = "this_sg"

  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"]
  }

  ingress {
    from_port = 22
    to_port   = 22
    protocol  = "TCP"
    cidr_blocks = ["0.0.0.0/0"]
  }

  ingress {
    from_port = 8080
    to_port   = 8080
    protocol  = "TCP"
    cidr_blocks = ["0.0.0.0/0"]
  }

  ingress {
    from_port = 3306
    to_port   = 3306
    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"]
  }
}

resource "aws_subnet" "public" {
  vpc_id            = aws_vpc.this_vpc.id
  cidr_block        = "10.0.1.0/24"
  availability_zone = "ap-southeast-1a"
  tags = {
    Name = "public"
  }
  map_public_ip_on_launch = true
}
```

```

resource "aws_subnet" "private" {
  vpc_id      = aws_vpc.this_vpc.id
  cidr_block  = "10.0.2.0/24"
  availability_zone = "ap-southeast-1b"
  tags = {
    Name = "private"
  }
  map_public_ip_on_launch = false
}

resource "aws_subnet" "private2"
{ vpc_id      = aws_vpc.this_vpc.id
  cidr_block  = "10.0.3.0/24"
  availability_zone = "ap-southeast-1c"
  tags = {
    Name = "private2"
  }
  map_public_ip_on_launch = false
}

resource "aws_internet_gateway" "this_ig"
{vpc_id = aws_vpc.this_vpc.id
  tags = {
    Name = "this_ig"
  }
}

resource "aws_network_interface" "ninter"
{subnet_id = aws_subnet.public.id
  tags = {
    Name = "ninter"
  }
}

resource "aws_route_table" "this_rt"
{vpc_id = aws_vpc.this_vpc.id
  route {
    cidr_block = "0.0.0.0/0"
    gateway_id = aws_internet_gateway.this_ig.id
  }
  tags = {
    Name = "this_rt"
  }
}

resource "aws_route_table_association" "route_association"
{subnet_id      = aws_subnet.public.id
  route_table_id = aws_route_table.this_rt.id
}

resource "aws_instance" "this_instance"
{ami          = var.aws_ami
  instance_type = var.aws_instance_type
  vpc_security_group_ids = [aws_security_group.this_sg.id]
  subnet_id      = aws_subnet.public.id
  tags = {
    Name = "this_instance"
  }
  root_block_device
  { volume_size =
    var.volume_size
  }
  user_data      = <<-EOF
  #!/bin/bash
  sudo yum update -y
  sudo wget -O /etc/yum.repos.d/jenkins.repo \
  https://pkg.jenkins.io/redhat-stable/jenkins.repo
  sudo rpm --import https://pkg.jenkins.io/redhat-stable/jenkins.io-2023.key
}

```

```

        sudo yum upgrade
        sudo dnf install java-17-amazon-corretto -y
        sudo yum install jenkins -y
        sudo systemctl enable jenkins
        sudo systemctl start jenkins
        EOF
    }
}

resource "aws_db_subnet_group" "this_subnet_group"
{
    name      = "this_subnet_group"
    subnet_ids = [aws_subnet.private.id, aws_subnet.private2.id]
    tags = {
        Name = "this_subnet_group"
    }
}

resource "aws_db_instance" "this_db"
{
    allocated_storage = var.volume_size
    instance_class     = var.aws_db_instance_class
    engine             = var.aws_db_engine
    engine_version     = var.aws_db_engine_version
    username           = var.aws_db_master_username
    password           = var.aws_db_master_user_password
    port              = var.aws_db_port
    storage_type       = var.aws_db_storage_type
    tags = {
        Name = var.aws_db_name
    }
    vpc_security_group_ids = [aws_security_group.this_sg.id]
    db_subnet_group_name   = aws_db_subnet_group.this_subnet_group.name
}

resource "aws_instance" "apache"
{
    ami                = var.aws_ami
    instance_type      = var.aws_instance_type
    vpc_security_group_ids = [aws_security_group.this_sg.id]
    subnet_id          = aws_subnet.public.id
    tags = {
        Name = "apache"
    }
    root_block_device
    {
        volume_size =
            var.volume_size
    }
    user_data          = <<-EOF
    #!/bin/bash
    sudo -i
    yum install httpd -y
    echo "hello guys" >> /var/www/html/index.html
    systemctl start httpd
    systemctl enable httpd
    EOF
}

resource "aws_instance" "tomcat"
{
    ami                = var.aws_ami
    instance_type      = var.aws_instance_type
    vpc_security_group_ids = [aws_security_group.this_sg.id]
    subnet_id          = aws_subnet.public.id
    tags = {

```

```

    }
    root_block_device
    {
        volume_size =
            var.volume_size
    }

```

```
user_data      = <<-EOF
#!/bin/bash
sudo -i
curl -O https://d1cdn.apache.org/tomcat/tomcat-8/v8.5.99/bin/apache-tomcat-8.5.99.tar.gz
tar -xzf apache-tomcat-8.5.99.tar.gz
yum install git -y
git init
git clone https://github.com/PratikBorge/Webapps.git
mv Webapps/student.war /apache-tomcat-8.5.99/webapps
mv Webapps/mysql-connector.jar /apache-tomcat-8.5.99/lib
yum install java -y
bash /apache-tomcat-8.5.99/bin/catalina.sh start
EOF
}
output "creations"
{value = [
    aws_instance.this_instance.id,
    aws_db_instance.this_db.id,
    aws_instance.apache.id,
    aws_instance.tomcat.id,
    aws_internet_gateway.this_ig.id,
    aws_route_table.this_rt.id,
    aws_security_group.this_sg.id,
    aws_subnet.public.id,
    aws_subnet.private.id,
    aws_vpc.this_vpc.id,
    aws_db_subnet_group.this_subnet_group.id
  ]
}
```

Var.tf file

```
variable "aws_instance_type"
{
  type    = string
  default = "t2.micro"
}
variable "aws_ami"
{
  type    = string
  default = "ami-07a6e3b1c102cdba8"
}
variable "volume_size"
{
  type    = number
  default = 10
}
variable "aws_db_engine"
{
  type    = string
  default = "mysql"
}
variable "aws_db_engine_version"
{
  type    = string
  default = "5.7"
}
variable "aws_db_instance_class"
{
  type    = string
  default = "db.t2.micro"
}
variable "aws_db_master_user_password" {
```

```
type = string
default = "12345678"
}
variable "aws_db_master_username"
{
  type = string
  default = "prat"
}
variable "aws_db_name"
{
  type = string
  default = "pratik"
}
variable "aws_db_port"
{
  type = string
  default = "3306"
}
variable "aws_db_storage_type"
{
  type = string
  default = "gp2"
}
```

Resources Created:-

The screenshot displays the AWS Management Console interface. The top navigation bar shows the user is logged in as 'pratikborge' from 'Singapore'. The left sidebar contains various service categories like EC2 Dashboard, IAM, Elastic Block Store, and Network & Security. The main content area is divided into two sections.

The upper section, titled 'Instances (5/7)', shows a table of EC2 instances. The table includes columns for Name, Instance ID, Instance state, Instance type, Status check, Alarm status, Availability Zone, Public IPv4 DNS, and Elastic IP. The instances listed are 'Master-jenkins', 'tomcat', 'apache', 'this_instance', and 'tomcat'. The 'apache' instance is highlighted, and its details are shown in a sub-section below the table. This sub-section includes a 'Monitoring' tab with several graphs for CPU utilization, Network in/out, and Disk reads/writes.

The lower section, titled 'sg-0d17263d427a47f91 - this_sg', shows the details of a Security Group. It includes a 'Details' tab with fields for Security group name, ID, Description, VPC ID, Owner, Inbound rules count, Outbound rules count, and Permission entries. Below this, the 'Inbound rules (5)' tab is active, showing a table of inbound rules. The table includes columns for Name, Security group rule, IP version, Type, Protocol, Port range, Source, and Description. The rules listed are for MySQL/Aurora, Custom TCP, SSH, HTTPS, and HTTP.

The image displays a series of screenshots from an AWS management console and a Jenkins web interface.

Top Screenshot: AWS VPC Console

- Page Title:** vpc-0c940dc381806e5ba
- Details:**
 - VPC ID: vpc-0c940dc381806e5ba
 - State: Available
 - DNS hostnames: Enabled
 - DNS resolution: Enabled
 - Tenancy: Default
 - Default VPC: No
 - Network Address Usage metrics: Disabled
 - Route 53 Resolver DNS Firewall rule groups: -
 - Main route table: rtb-00f83867a5a6c996f
 - Main network ACL: acl-0116632693c8bf18
 - IPv6 pool: -
 - Owner ID: 471112957025
- Resource map:** A diagram showing the VPC connected to three subnets (ap-southeast-1a, ap-southeast-1b, ap-southeast-1c) and two route tables (rtb-00f83867a5a6c996f, this_rt). It also shows a network connection to this_ig.

Second Screenshot: AWS RDS Console

- Page Title:** terraform-20240302174937816700000002
- Summary:**
 - DB identifier: terraform-20240302174937816700000002
 - Status: Available
 - Role: Instance
 - Engine: MySQL Community
 - Class: db.t2.micro
 - Current activity: -
 - Region & AZ: ap-southeast-1c
- Connectivity & security:**
 - Endpoint: terraform-20240302174937816700000002.ct88c4e2032.ap-southeast-1.rds.amazonaws.com
 - Port: 3306
 - Availability Zone: ap-southeast-1c
 - VPC: vpc-0c940dc381806e5ba
 - Subnet group: this_subnet_group
 - Subnets: subnet-d0d2a616c6a1f6b178, subnet-d12af616c6a1f6b178
 - VPC security groups: this_ig (sg-0d17263d427a479f1)
 - Publicly accessible: No
 - Certificate authority: rds-ca-rsa2048-g1
 - Certificate authority date: May 22, 2061, 04:09 (UTC-05:00)

Third Screenshot: Jenkins Web Interface

- Page Title:** Getting Started
- Section:** Unlock Jenkins
- Text:** To ensure Jenkins is securely set up by the administrator, a password has been written to the log (not sure where to find it?) and this file on the server:
`/var/lib/jenkins/secrets/initialAdminPassword`
- Text:** Please copy the password from either location and paste it below.
- Form:** Administrator password (input field)
- Button:** Continue

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