Graduation Project DEPI_1_CAI1_ISS4_G1e AWS Cloud Solution Admin & Architect

Deploying a Highly Available Web Application with Auto Scaling using IAC

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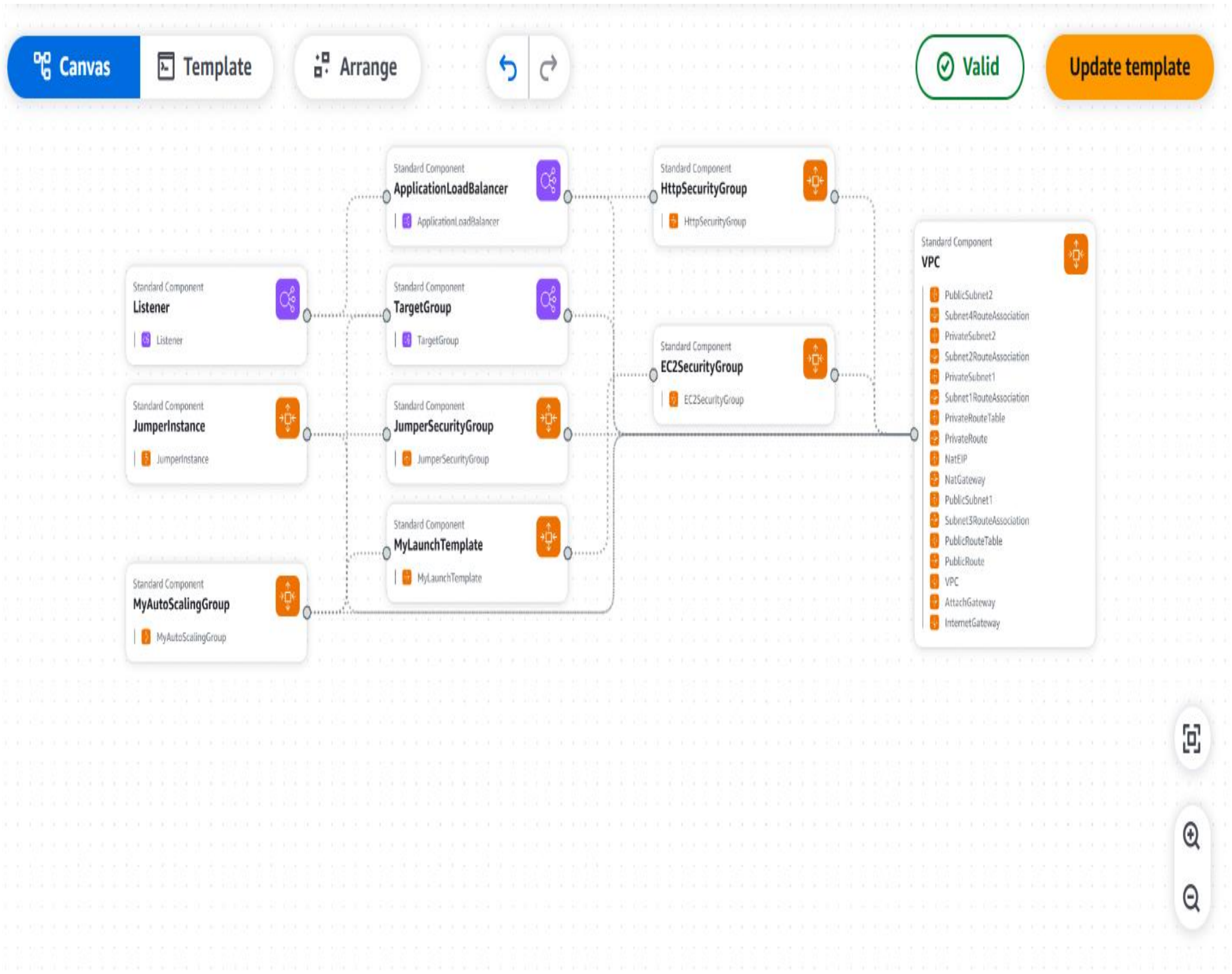
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Cloud Formation template:

```yaml
AWSTemplateFormatVersion: '2010-09-09'
Description: AWS CloudFormation template for VPC, Subnets, ALB, EC2 instances,
  IAM roles, and Auto Scaling Group.

Resources:
  # VPC
  VPC:
    Type: AWS::EC2::VPC
    Properties:
      CidrBlock: 192.168.0.0/16
      EnableDnsSupport: true
      EnableDnsHostnames: true
      Tags:
        - Key: Name
          Value: DEPI-VPC

  # Subnet 1 (Private Subnet)
  PrivateSubnet1:
    Type: AWS::EC2::Subnet
    Properties:
      VpcId: !Ref VPC
      CidrBlock: 192.168.1.0/24
      AvailabilityZone: us-east-1a
      MapPublicIpOnLaunch: false
      Tags:
        - Key: Name
          Value: priv_subnet-1

  # Subnet 2 (Private Subnet)
  PrivateSubnet2:
    Type: AWS::EC2::Subnet
    Properties:
      VpcId: !Ref VPC
      CidrBlock: 192.168.2.0/24
      AvailabilityZone: us-east-1b
      MapPublicIpOnLaunch: false
      Tags:
```

```yaml
      - Key: Name
        Value: priv_subnet-2

# Subnet 3 (Public Subnet)
PublicSubnet1:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId: !Ref VPC
    CidrBlock: 192.168.3.0/24
    AvailabilityZone: us-east-1a
    MapPublicIpOnLaunch: true
    Tags:
      - Key: Name
        Value: pub_subnet-1

# Subnet 4 (Public Subnet)
PublicSubnet2:
  Type: AWS::EC2::Subnet
  Properties:
    VpcId: !Ref VPC
    CidrBlock: 192.168.4.0/24
    AvailabilityZone: us-east-1b
    MapPublicIpOnLaunch: true
    Tags:
      - Key: Name
        Value: pub_subnet-2

# Internet Gateway
InternetGateway:
  Type: AWS::EC2::InternetGateway
  Properties:
    Tags:
      - Key: Name
        Value: main-gateway

AttachGateway:
  Type: AWS::EC2::VPCGatewayAttachment
  Properties:
    VpcId: !Ref VPC
    InternetGatewayId: !Ref InternetGateway

# Elastic IP for NAT Gateway
NatEIP:
  Type: AWS::EC2::EIP
  Properties:
    Domain: vpc
    Tags:
      - Key: Name
        Value: nat-eip

# NAT Gateway
NatGateway:
  Type: AWS::EC2::NatGateway
  Properties:
    AllocationId: !GetAtt NatEIP.AllocationId
    SubnetId: !Ref PublicSubnet1
    Tags:
      - Key: Name
        Value: nat-gateway

# Route Tables
PublicRouteTable:
  Type: AWS::EC2::RouteTable
  Properties:
    VpcId: !Ref VPC
    Tags:
      - Key: Name
        Value: public_RT

PrivateRouteTable:
  Type: AWS::EC2::RouteTable
  Properties:
    VpcId: !Ref VPC
    Tags:
      - Key: Name
        Value: private_RT

# Routes
```

```yaml
PublicRoute:
  Type: AWS::EC2::Route
  Properties:
    RouteTableId: !Ref PublicRouteTable
    DestinationCidrBlock: 0.0.0.0/0
    GatewayId: !Ref InternetGateway

PrivateRoute:
  Type: AWS::EC2::Route
  Properties:
    RouteTableId: !Ref PrivateRouteTable
    DestinationCidrBlock: 0.0.0.0/0
    NatGatewayId: !Ref NatGateway

# Route Table Associations
Subnet1RouteAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId: !Ref PrivateSubnet1
    RouteTableId: !Ref PrivateRouteTable

Subnet2RouteAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId: !Ref PrivateSubnet2
    RouteTableId: !Ref PrivateRouteTable

Subnet3RouteAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId: !Ref PublicSubnet1
    RouteTableId: !Ref PublicRouteTable

Subnet4RouteAssociation:
  Type: AWS::EC2::SubnetRouteTableAssociation
  Properties:
    SubnetId: !Ref PublicSubnet2
    RouteTableId: !Ref PublicRouteTable
```

```yaml
# Security Group for HTTP
HttpSecurityGroup:
  Type: AWS::EC2::SecurityGroup
  Properties:
    GroupDescription: HTTP Security Group
    VpcId: !Ref VPC
    SecurityGroupIngress:
      - IpProtocol: tcp
        FromPort: 80
        ToPort: 80
        CidrIp: 0.0.0.0/0
      - IpProtocol: tcp
        FromPort: 22
        ToPort: 22
        CidrIp: 0.0.0.0/0
    SecurityGroupEgress:
      - IpProtocol: -1
        FromPort: 0
        ToPort: 0
        CidrIp: 0.0.0.0/0
    Tags:
      - Key: Name
        Value: HttpSecurityGroup

# Load Balancer (ALB)
ApplicationLoadBalancer:
  Type: AWS::ElasticLoadBalancingV2::LoadBalancer
  Properties:
    Name: ALB-DEPI
    Subnets:
      - !Ref PublicSubnet1
      - !Ref PublicSubnet2 # Public subnets for ALB
    SecurityGroups:
      - !Ref HttpSecurityGroup
    Scheme: internet-facing
    LoadBalancerAttributes:
      - Key: deletion_protection.enabled
        Value: false
    Tags:
      - Key: Name
        Value: DEPI

# Target Group
TargetGroup:
  Type: AWS::ElasticLoadBalancingV2::TargetGroup
  Properties:
    Name: DEPI-TG
    Protocol: HTTP
    Port: 80
    VpcId: !Ref VPC
    HealthCheckPath: /
    HealthCheckProtocol: HTTP
    Tags:
      - Key: Name
        Value: DEPI

# Listener for ALB
Listener:
  Type: AWS::ElasticLoadBalancingV2::Listener
  Properties:
    LoadBalancerArn: !Ref ApplicationLoadBalancer
    Protocol: HTTP
    Port: 80
    DefaultActions:
      - Type: forward
        TargetGroupArn: !Ref TargetGroup

# Security Group for Jumper EC2
JumperSecurityGroup:
  Type: AWS::EC2::SecurityGroup
  Properties:
    GroupDescription: Jumper Security Group
    VpcId: !Ref VPC
    SecurityGroupIngress:
      - IpProtocol: tcp
        FromPort: 22
        ToPort: 22
        CidrIp: 0.0.0.0/0
    SecurityGroupEgress:
      - IpProtocol: -1
        FromPort: 0
        ToPort: 0
        CidrIp: 0.0.0.0/0
    Tags:
      - Key: Name
        Value: JumperSecurityGroup

# EC2JumpKey:
#   Type: AWS::EC2::KeyPair
#   Properties:
#     KeyName: EC2JumpKey

JumperInstance:
  Type: AWS::EC2::Instance
  Properties:
    ImageId: ami-0866a3c8686eaeeba
    InstanceType: t2.micro
    SubnetId: !Ref PublicSubnet1
    KeyName: vockey
    SecurityGroupIds:
      - !Ref JumperSecurityGroup
    Tags:
      - Key: Name
        Value: JumpServer

# Auto Scaling Group
MyAutoScalingGroup:
  Type: AWS::AutoScaling::AutoScalingGroup
  Properties:
    LaunchTemplate:
      LaunchTemplateId: !Ref MyLaunchTemplate
      Version: !GetAtt MyLaunchTemplate.LatestVersionNumber
    MinSize: 1
    MaxSize: 3
    DesiredCapacity: 1
    VPCZoneIdentifier:
      - !Ref PrivateSubnet1
```

```yaml
        - !Ref PrivateSubnet2
      TargetGroupARNs:
        - !Ref TargetGroup
      Tags:
        - Key: Name
          Value: ASG_Instance
          PropagateAtLaunch: true

  EC2SecurityGroup:
    Type: AWS::EC2::SecurityGroup
    Properties:
      GroupDescription: EC2 Security Group
      VpcId: !Ref VPC
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 80
          ToPort: 80
          CidrIp: 0.0.0.0/0
        - IpProtocol: tcp
          FromPort: 22
          ToPort: 22
          CidrIp: 0.0.0.0/0
      SecurityGroupEgress:
        - IpProtocol: -1
          FromPort: 0
          ToPort: 0
          CidrIp: 0.0.0.0/0
      Tags:
        - Key: Name
          Value: EC2SecurityGroup

  MyLaunchTemplate:
    Type: AWS::EC2::LaunchTemplate
    Properties:
      LaunchTemplateName: MyLaunchTemplate
      LaunchTemplateData:
        ImageId: ami-0866a3c8686eaeeba
        InstanceType: t3.micro
        # IamInstanceProfile:
```

```
        #   Name: !Ref S3InstanceProfile
        SecurityGroupIds:
          - !Ref EC2SecurityGroup
        UserData: !Base64
          Fn::Sub: |
            #!/bin/bash
            echo "Hello, World from ASG, $(hostname -f)" > /home/ec2-
user/index.html
  # S3InstanceRole:
  #   Type: AWS::IAM::Role
  #   Properties:
  #     RoleName: InstanceRole
  #     AssumeRolePolicyDocument:
  #       Version: '2012-10-17'
  #       Statement:
  #         - Effect: Allow
  #           Principal:
  #             Service:
  #               - ec2.amazonaws.com
  #           Action:
  #             - sts:AssumeRole
  #     ManagedPolicyArns:
  #       - arn:aws:iam::aws:policy/AmazonS3FullAccess

  # S3InstanceProfile:
  #   Type: AWS::IAM::InstanceProfile
  #   Properties:
  #     Path: '/'
  #     Roles:
  #       - !Ref S3InstanceRole
```