😊 Parameters

In this lab, we are learning to use AWS CloudFormation parameters to create and manage EC2 instances with different configurations. The end goal is to understand how to automate and streamline the creation of AWS resources using CloudFormation templates with customizable parameters such as key pairs, availability zones, and instance types.

Here's a summary of the steps and objectives:

1. **Parameters and Key Pairs:**
    - Define a parameter to select key pairs.
    - Create key pairs in EC2 and obtain the AMI ID for Amazon Linux 2023.
    - Use CloudFormation to create a stack with a template that allows selecting a key pair.
    - Verify the EC2 instance is running and log in using the key pair.
    - Delete the stack once done.
2. **Availability Zone:**
    - Add a parameter for the availability zone in the template.
    - Create a new stack in CloudFormation with the updated template.
    - Choose the key pair and availability zone during stack creation.
    - Verify the instance is up and running.
    - Delete the stack once done.
3. **Instance Type:**
    - Add a parameter for instance type in the template.
    - Create a stack with the updated template.
    - Choose the availability zone, instance type, and key pair during stack creation.
    - Verify the instance type matches the selected type (e.g., t2.small).
    - Delete the stack once done.

By completing these steps, we gain hands-on experience with CloudFormation, parameterized templates, and the flexibility they offer for AWS resource management.

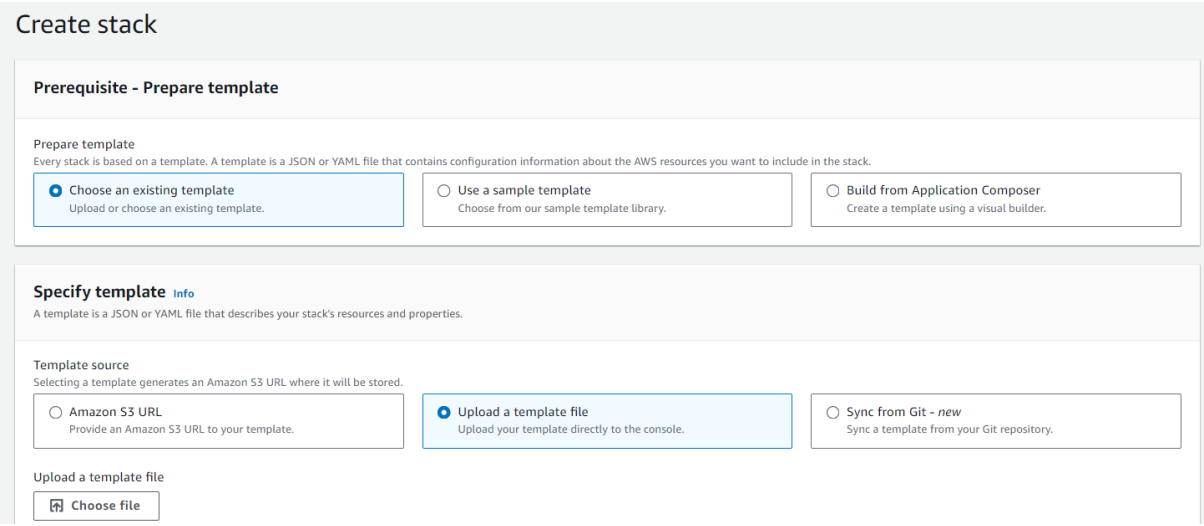
😄 To begin with the lab

😄 Keypair

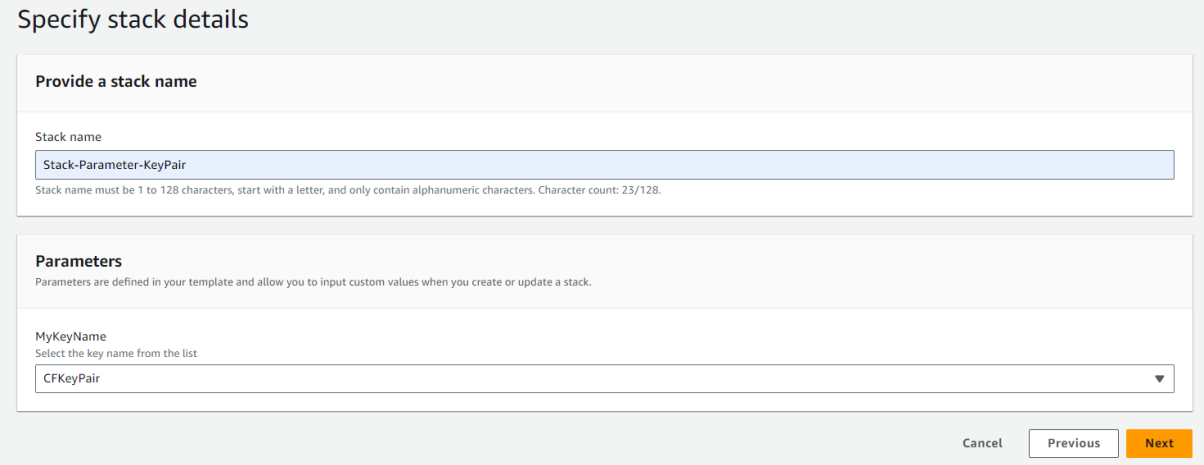
1. Now in this lab we are going to make use of Parameters. So, below is the template which we are going to use.
2. In this code we have defined a Parameter to select Key pairs. So, create some keypairs in EC2.
3. Also take the AMI ID of Amazon Linux 2023. You can get these templates from GitHub.

```yaml
AWSTemplateFormatVersion: 2010-09-09
Description: KeyName Parameter demo

Parameters:
  MyKeyName:
    Description: Select the key name from the list
    Type: AWS::EC2::KeyPair::KeyName

Resources:
  DevEC2Instance:
    Type: 'AWS::EC2::Instance'
    Properties:
      ImageId: ami-0cd3dfa4e37921605
      InstanceType: t2.micro
      KeyName: !Ref MyKeyName
      SecurityGroups:
        - default
        - !Ref SSHSecurityGroup
  SSHSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: my new SSH security group
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: '22'
          ToPort: '22'
          CidrIp: 0.0.0.0/0
```

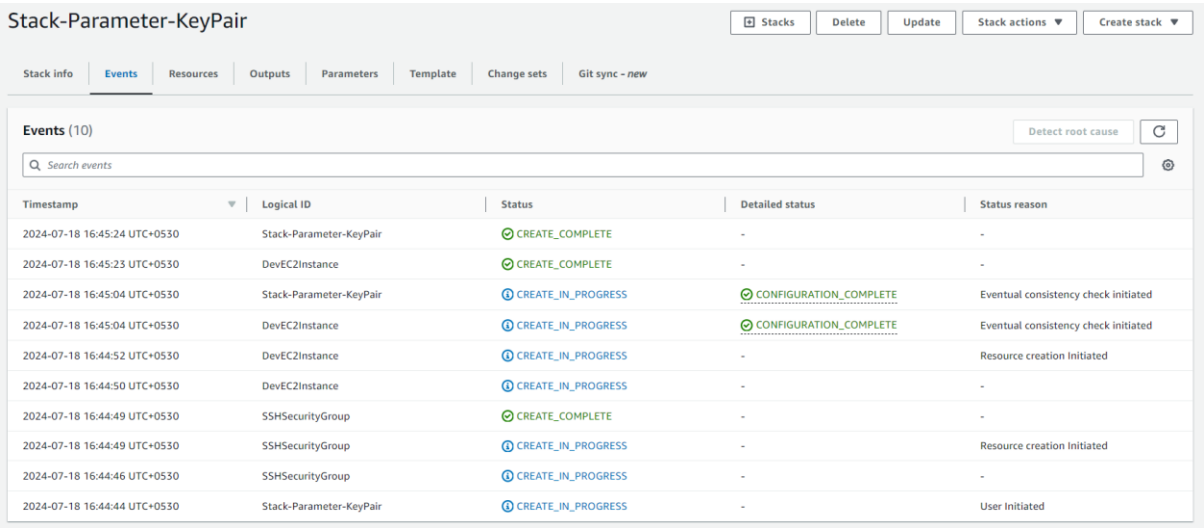
4. Now we need to go to the cloud formation in AWS Console and create a stack. Then you need to click on Choose an existing template, and after that click on upload a template file. Choose the template file from your laptop and then upload it.



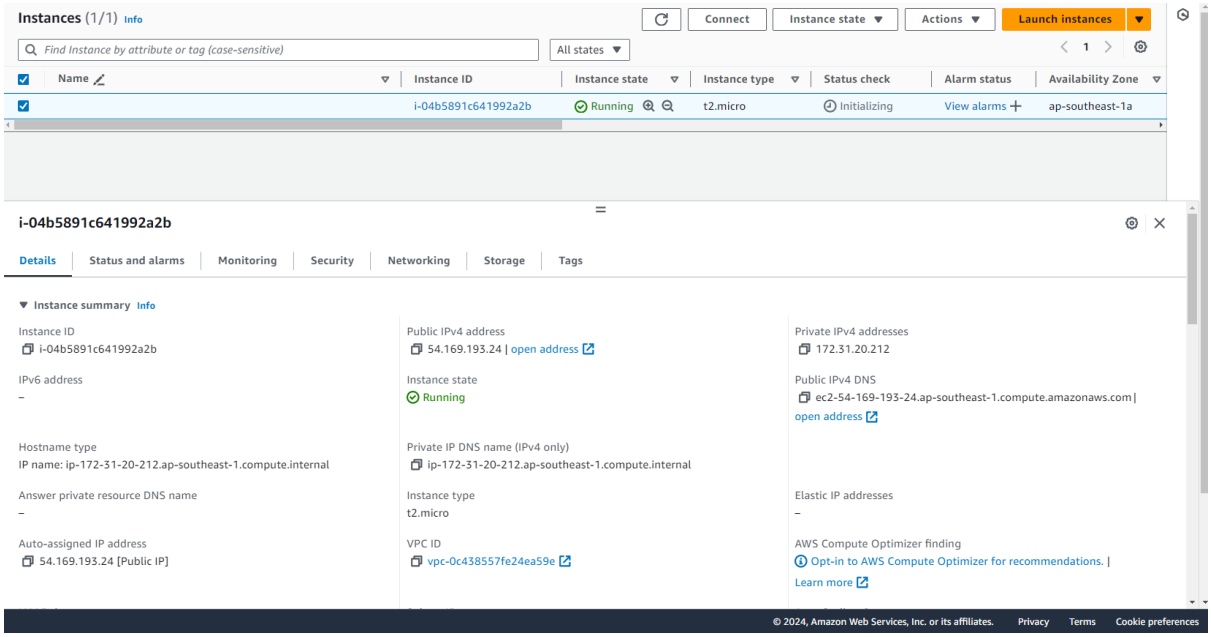
5. Then give your stack a name and you will see that you have a new section of parameters from here you can choose your key pair. Then move to the review page and create your stack.



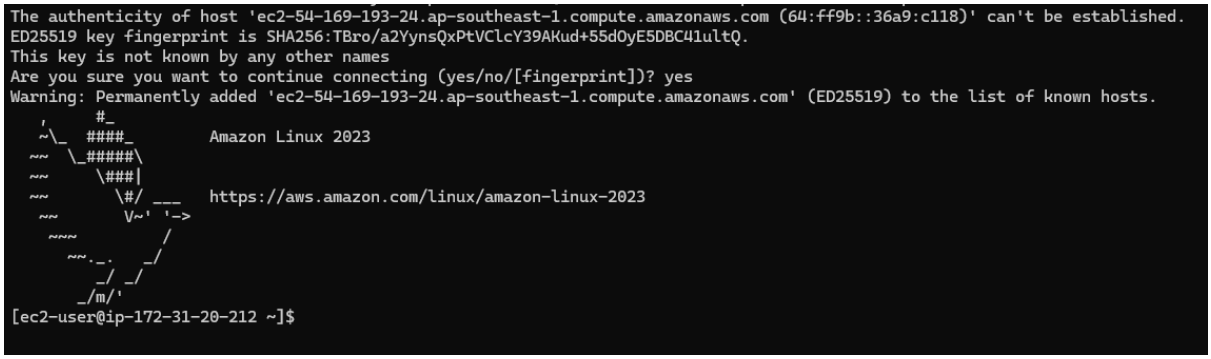
6. And from the events you can see that our stack has been created successfully.



7. Also, you can see that you have the EC2 instance running. Now just to make things more promising you can also login to your instance using the key pair.



8. Below you can see that we have successfully logged in to our instance.



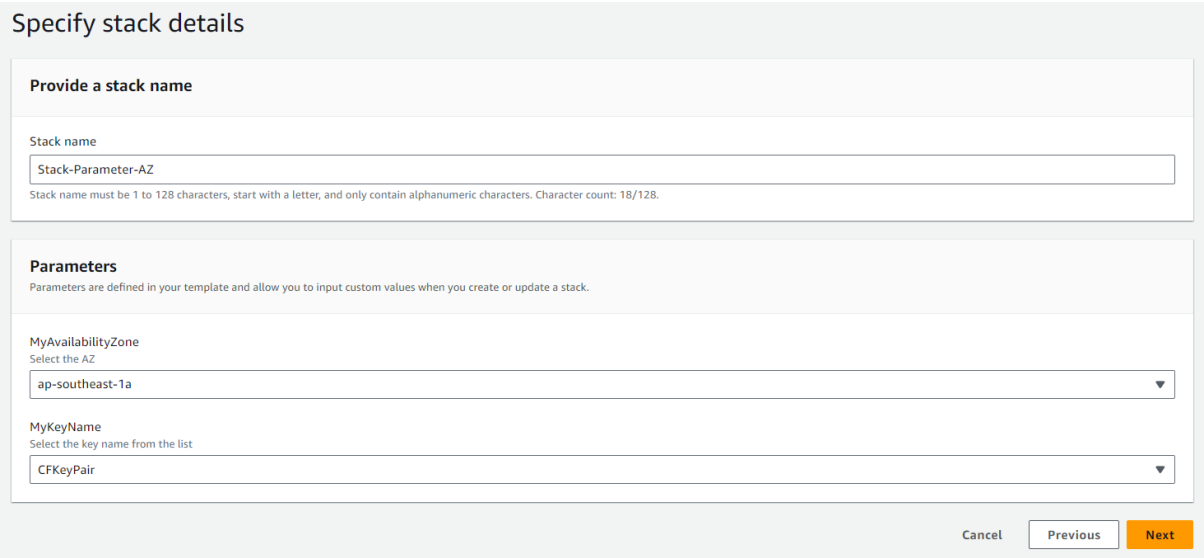
9. Once you are done delete your stack.

😄 Availability Zone

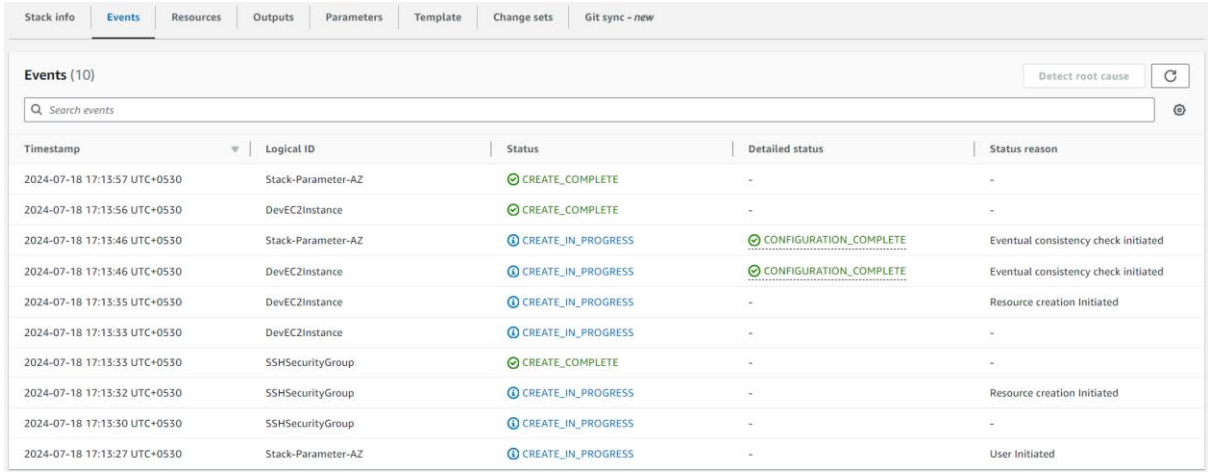
1. Now we are going to add a parameter for the Availability zone. Below is the code where you can see that in the parameters, we have added a section for the availability zone.

```yaml
AWSTemplateFormatVersion: 2010-09-09
Description: AZ Parameter demo

Parameters:
  MyKeyName:
    Description: Select the key name from the list
    Type: AWS::EC2::KeyPair::KeyName
  MyAvailabilityZone:
    Description: Select the AZ
    Type: String
    Default: ap-southeast-1
    AllowedValues:
      - ap-southeast-1a
      - ap-southeast-1b
      - ap-southeast-1c
```

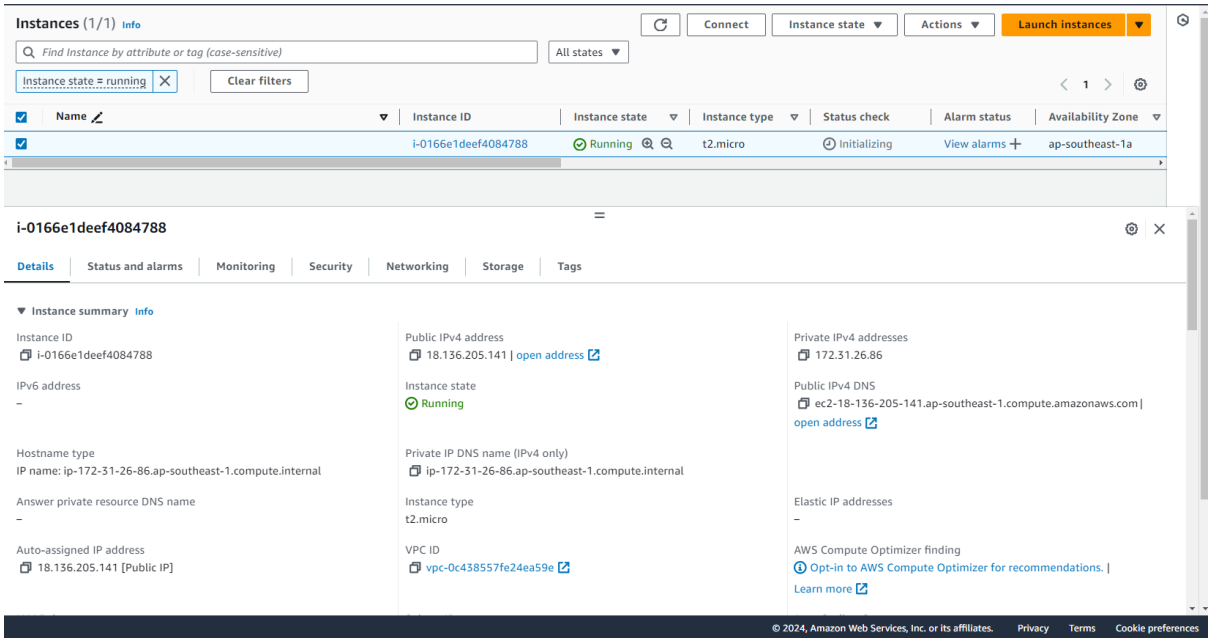
2. Now go to the console and create a new stack in cloud formation. Then upload your template.
3. In step 2 you will see that you can give your template a name and with that, you can choose your key pair and the availability zone.
4. After that just move to the review page and create your stack.



5. In the events you can check the whole process.



6. In EC2 you can see your instance is up and running.



7. Once you are done just delete your stack.

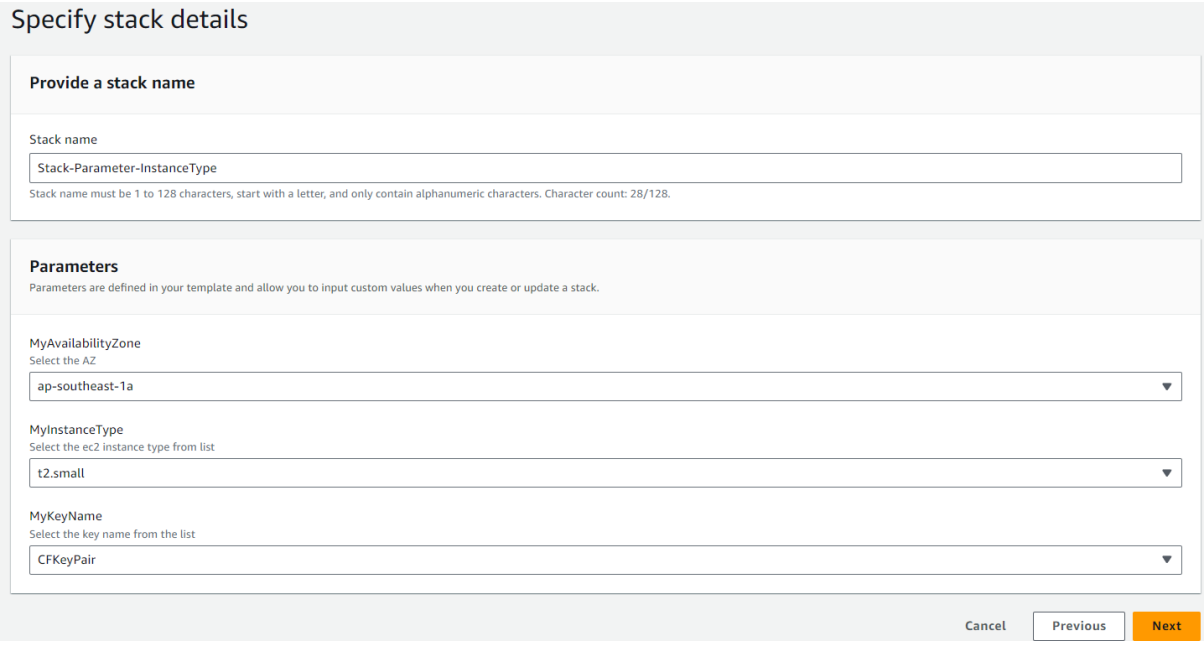
😄 Instance type

1. Now we are going to add a parameter for instance type. By this we'll have the option to choose between the instance type.

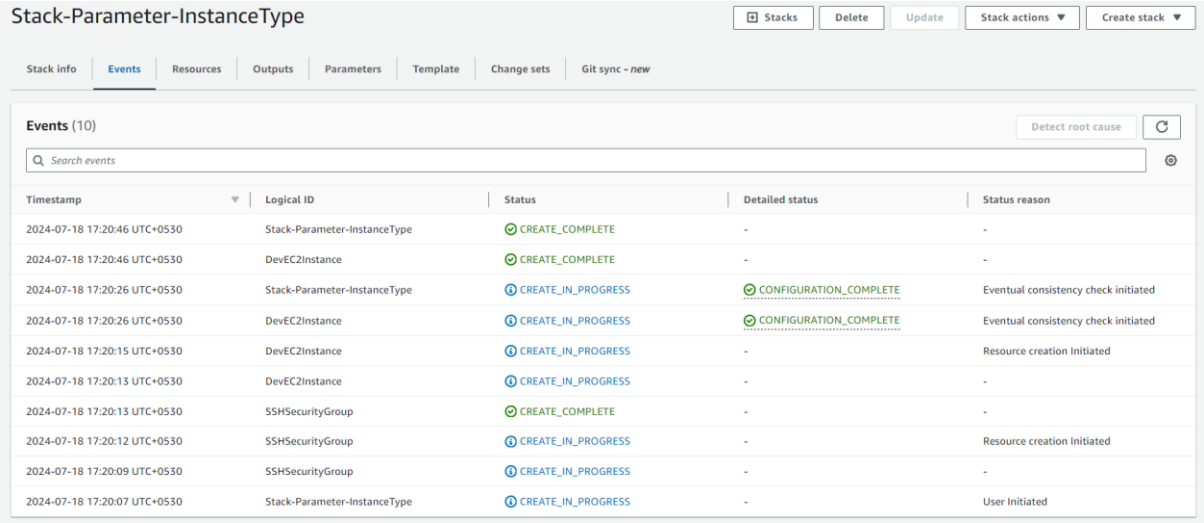
```yaml
AWSTemplateFormatVersion: 2010-09-09
Description: AZ Parameter demo

Parameters:
  MyKeyName:
    Description: Select the key name from the list
    Type: AWS::EC2::KeyPair::KeyName
  MyAvailabilityZone:
    Description: Select the AZ
    Type: String
    Default: ap-southeast-1a
    AllowedValues:
      - ap-southeast-1a
      - ap-southeast-1b
      - ap-southeast-1c
  MyInstanceType:
    Description: Select the ec2 instance type from list
    Type: String
    Default: t2.micro
    AllowedValues:
      - t2.micro
      - t2.small

Resources:
  DevEC2Instance:
    Type: 'AWS::EC2::Instance'
    Properties:
      ImageId: ami-0e97ea97a2f374e3d
      InstanceType: !Ref MyInstanceType
      KeyName: !Ref MyKeyName
      SecurityGroups:
        - !Ref SSHSecurityGroup
        - default
      AvailabilityZone: !Ref MyAvailabilityZone

  SSHSecurityGroup:
    Type: 'AWS::EC2::SecurityGroup'
    Properties:
      GroupDescription: my new SSH security group
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: '22'
          ToPort: '22'
          CidrIp: 0.0.0.0/0
```

2. So, go to your cloud formation and create a stack, then choose your template and move forward to the next page.
3. Now you need to give your stack a name and choose your Availability zone then choose the instance type, after that choose your key pair.

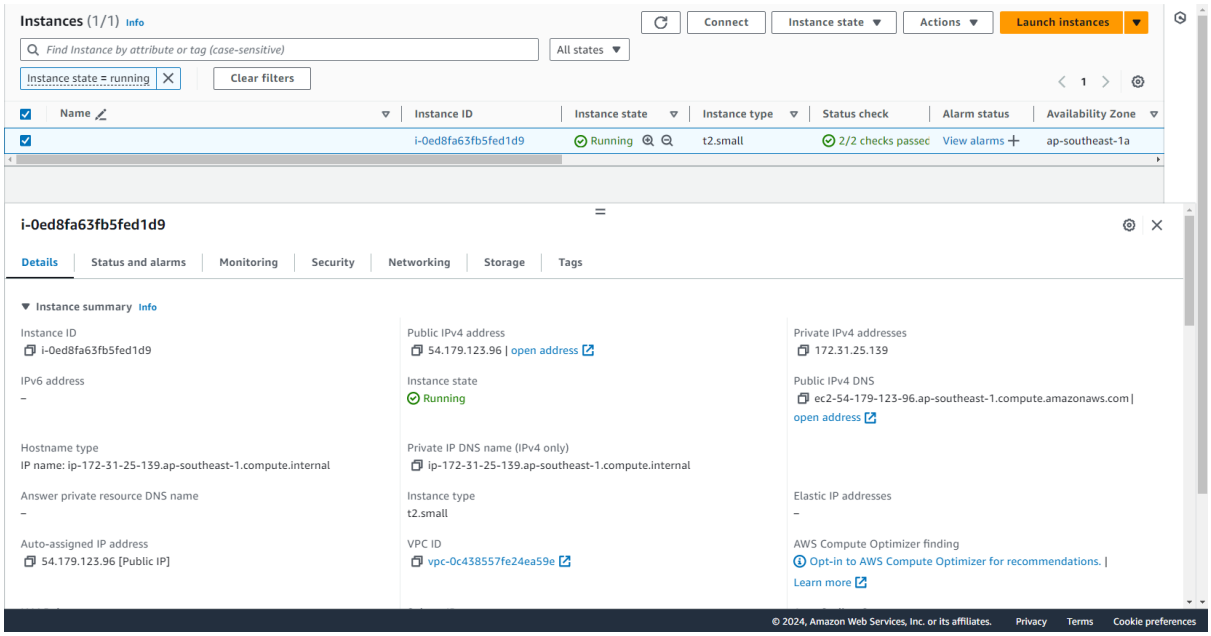
4. Then just move to the review page and create your stack.



5. Below you can see that in the events our stack got created successfully.



6. Then we went to see our instance and its type is t2.small which we choose earlier.



7. Once you are done delete your stack.