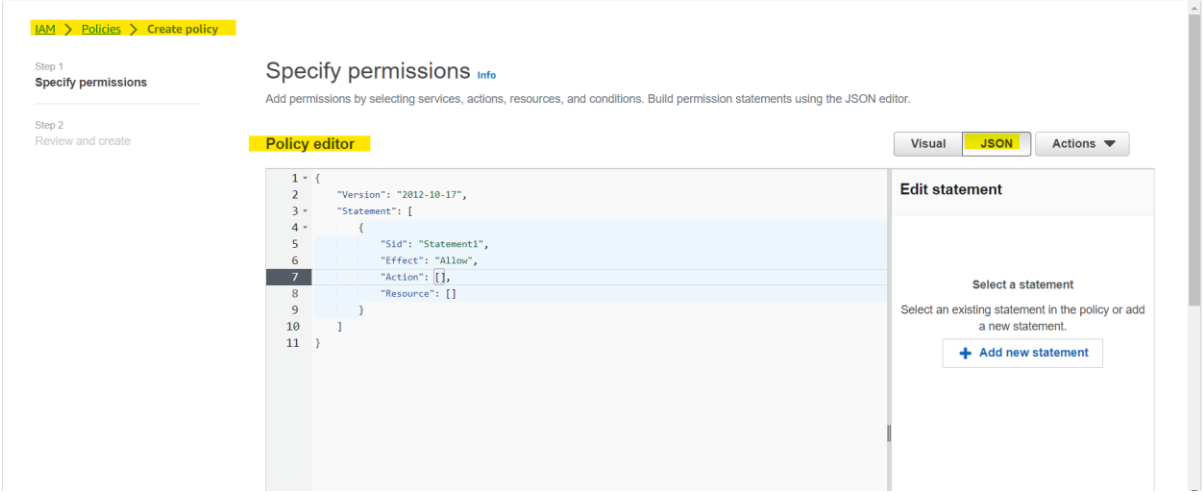
AWS Lambda Function with AWS CloudTrail

What is Lambda in AWS used for?

AWS Lambda is a serverless compute service that runs your code in response to events and automatically manages the underlying compute resources for you. These events may include changes in state or an update, such as a user placing an item in a shopping cart on an ecommerce website.

Create a Custom Managed Policy for AWS Lambda

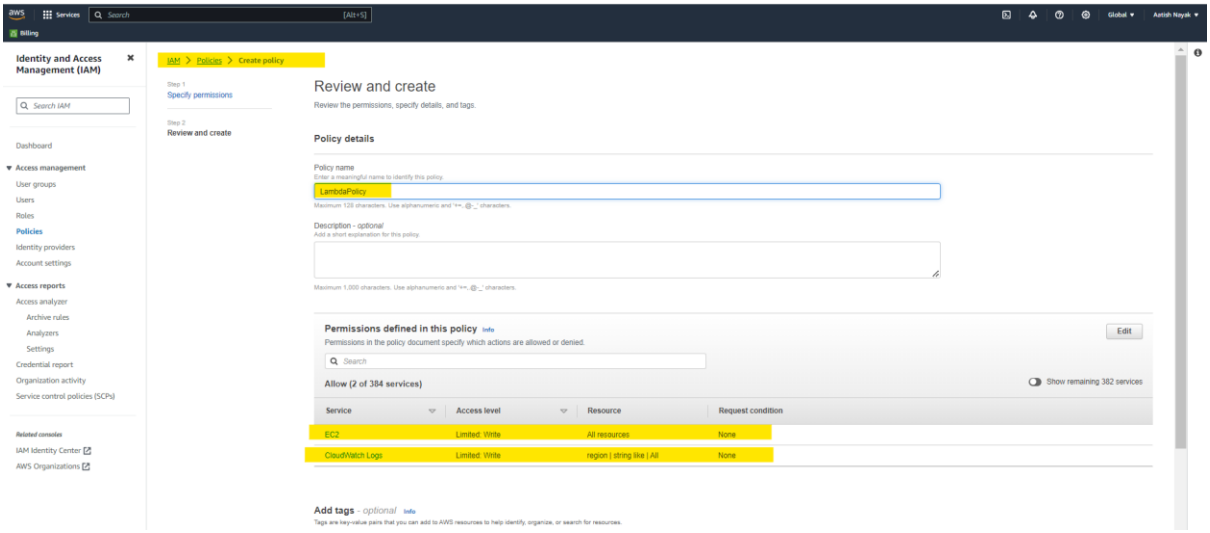
- Create Policy with the Following Permissions
- AWS EC2 and CloudWatch Logs



- You can use the following Json or Create your own Json

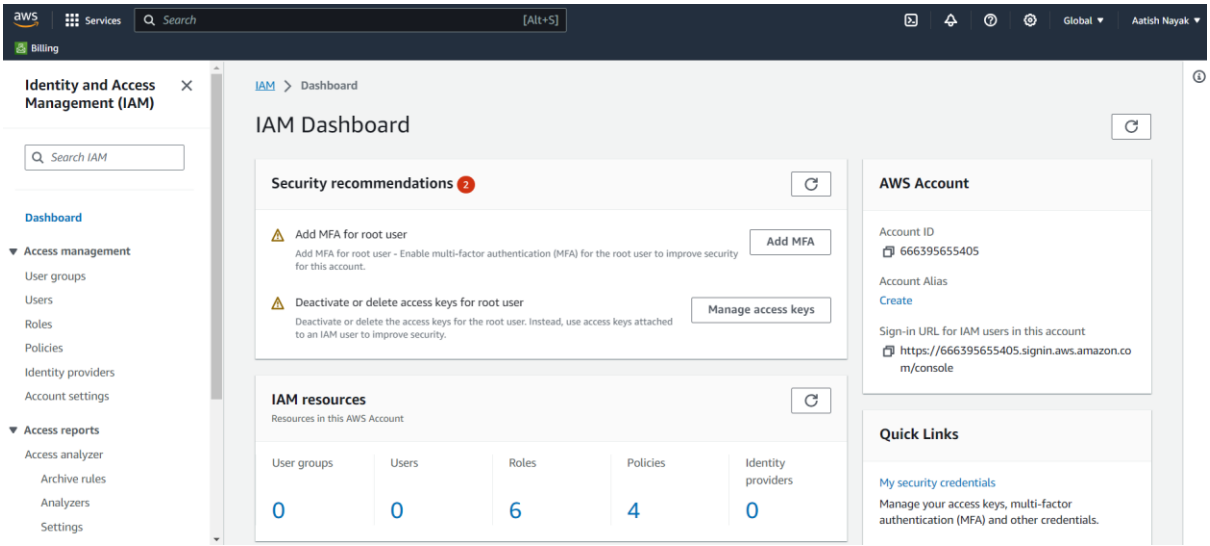
```
{
  "Version": "2012-10-17",
  "Statement": [
    {
      "Effect": "Allow",
      "Action": [
        "logs:CreateLogGroup",
        "logs:CreateLogStream",
        "logs:PutLogEvents"
      ],
      "Resource": "arn:aws:logs:*:*:*"
    },
    {
      "Effect": "Allow",
      "Action": [
        "ec2:Start*",
        "ec2:Stop*"
      ],
      "Resource": "*"
    }
  ]
}
```

- **Name the Policy as LambdaPolicy**
- **Review and Create**

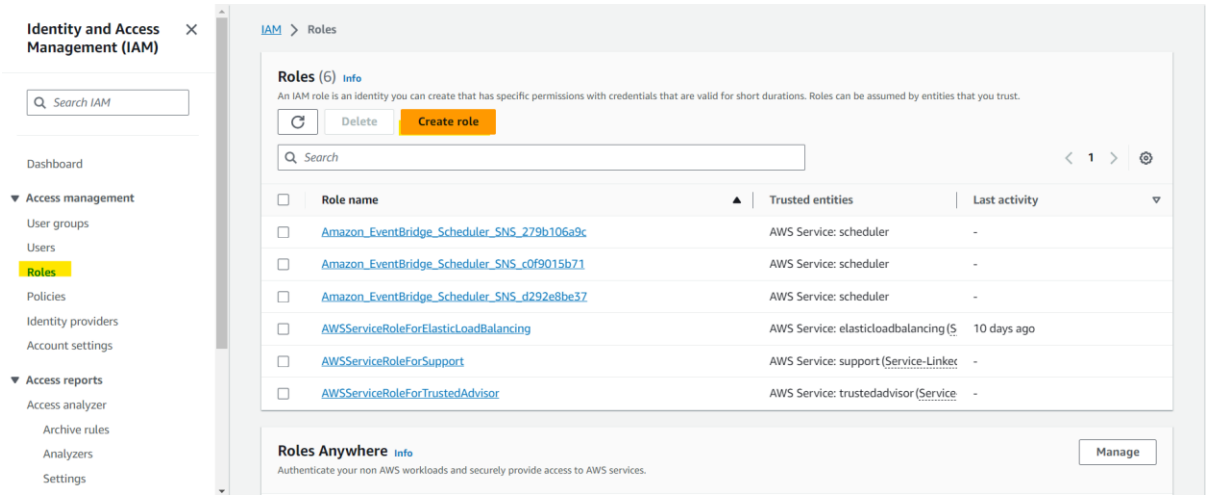


Create an IAM policy and IAM role for your Lambda function

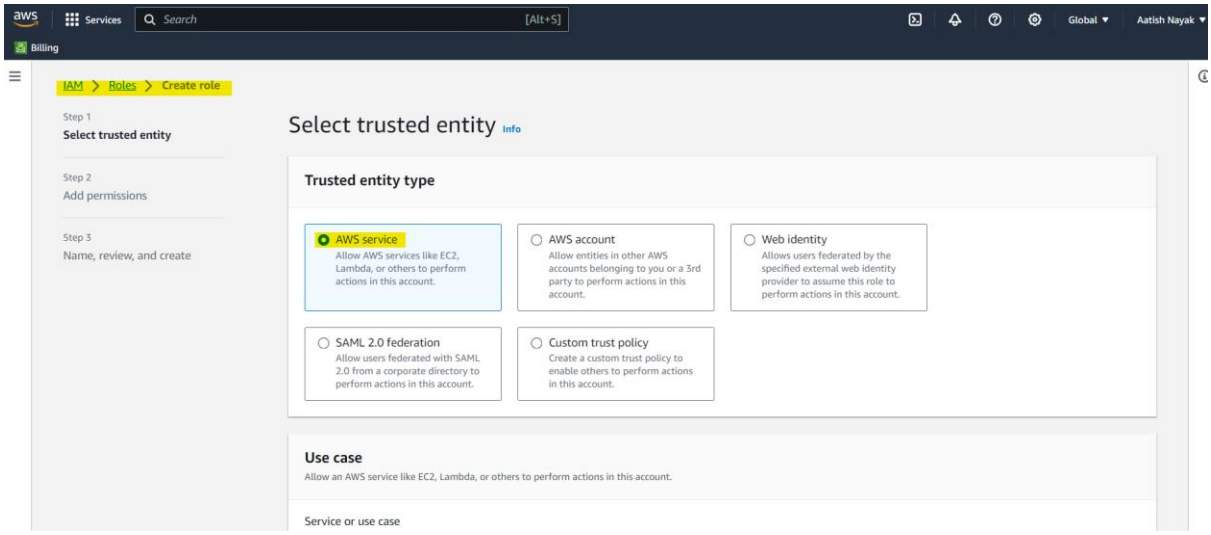
- Create a Role with Identity and Access Management (IAM) and name the role as Lambda Role
- Search IAM in AWS Console

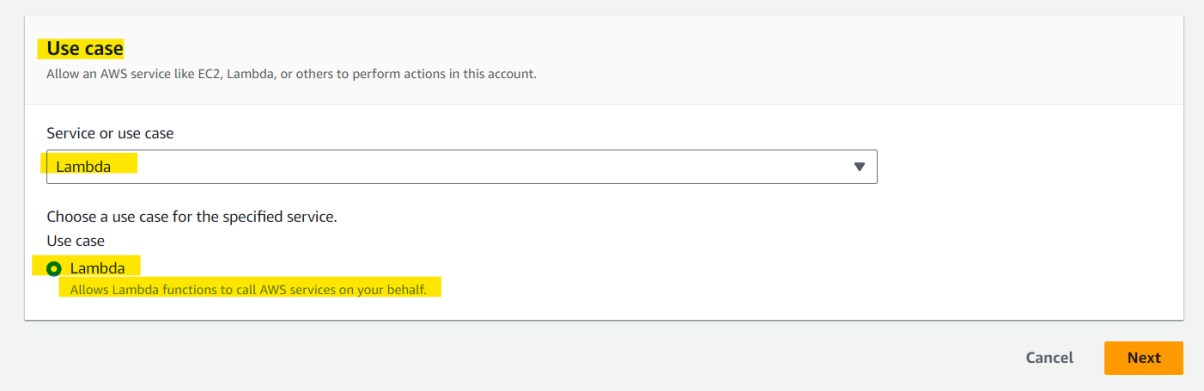


- Click on Roles
- Click on create Role

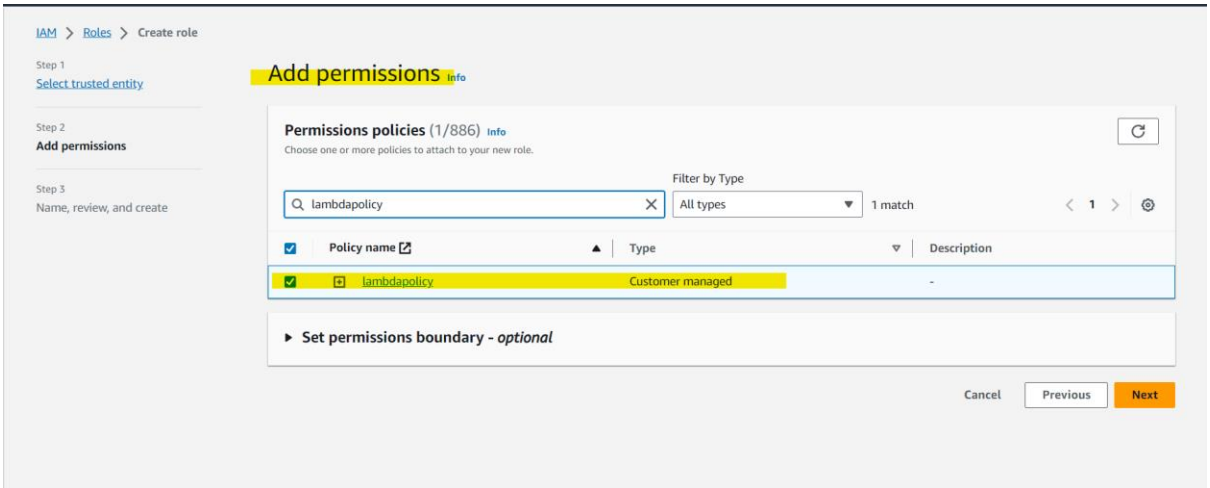


- **Select the Service as AWS Service**
- **Select the case use as Lambda**
- **Click Next Once You Select the Service**

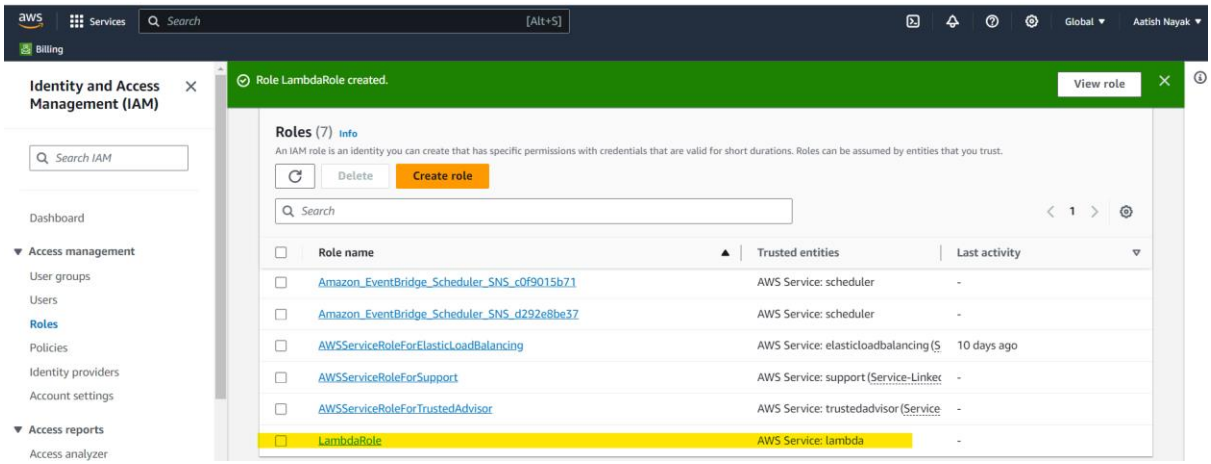




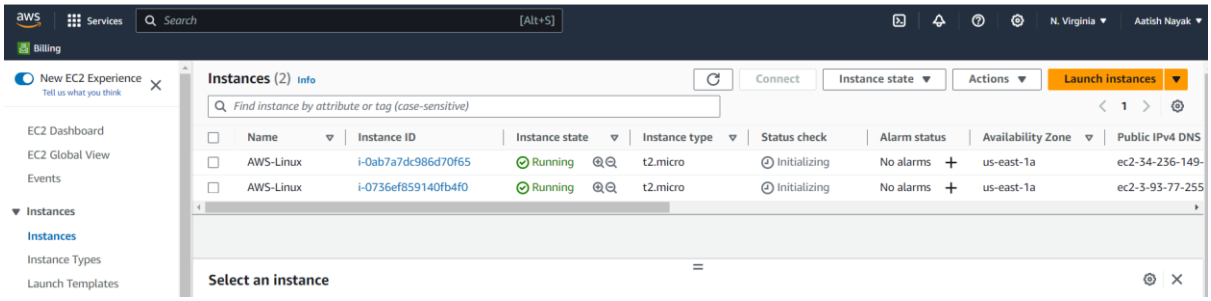
- Select the Custom Managed Policy



- Name, review, and create
- Name the Role as LambdaRole
- Review and Click on Create

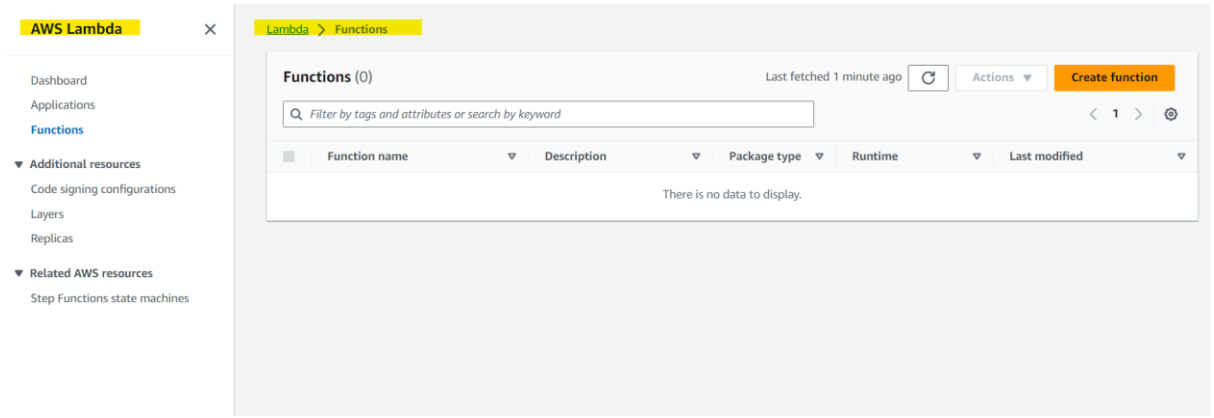


- Create two Ec2 instance
- You can create two Ec2 instance with operating System RedHat or AWS Linux

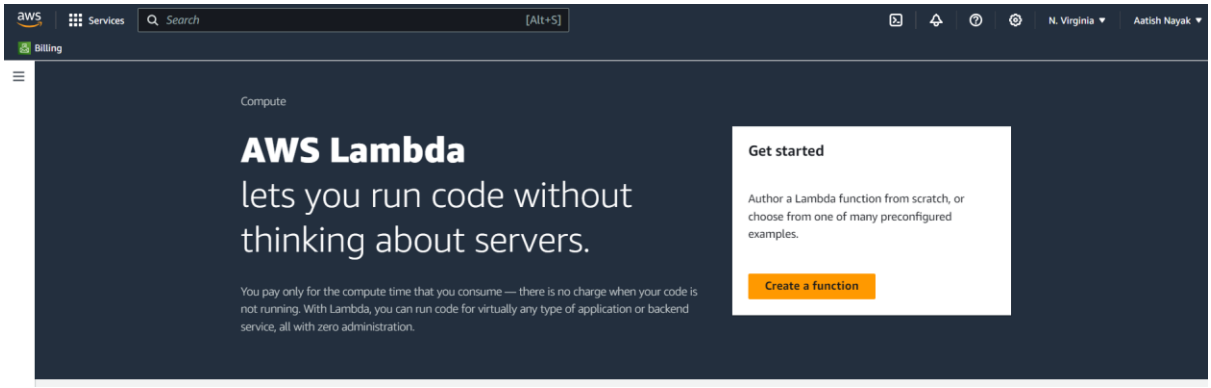


Create Lambda functions that stop and start your EC2 instances

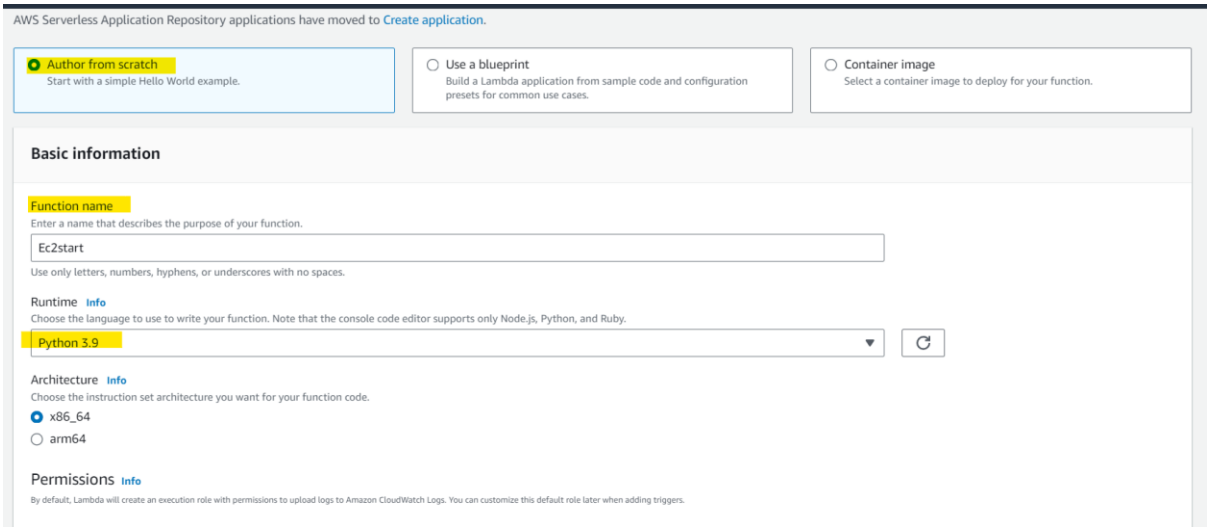
- Open the Lambda console, and then choose Create function

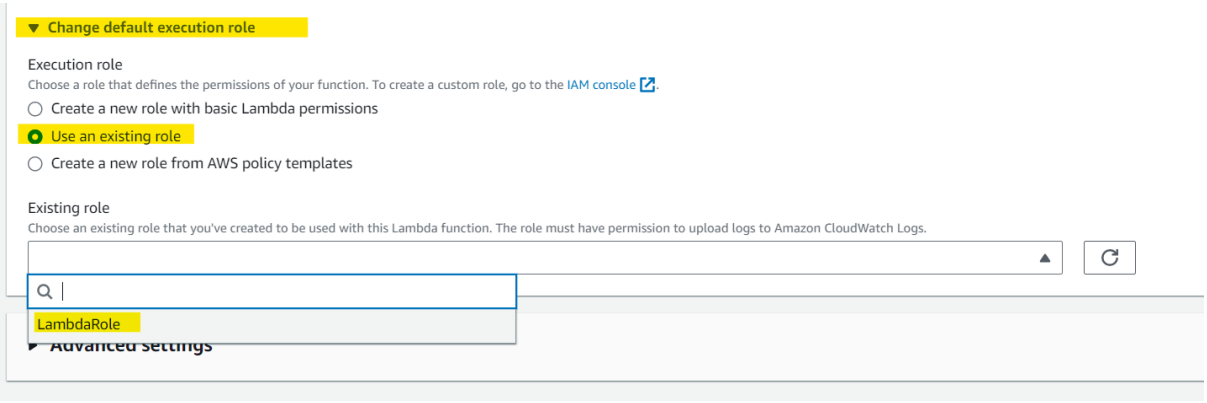


- Click on Create function (Step1)
- Choose Author from scratch
- Under Basic information, enter the following information



- For **Function name**, enter a name that identifies it as the function that's used to stop your EC2 instances. For example, " Ec2start".
- For **Runtime**, choose **Python 3.9**.
- Under **Permissions**, expand **Change default execution role**.
- Under **Execution role**, choose **Use an existing role**.
- Under **Existing role**, choose the IAM role that you created.
- Choose **Create function**.



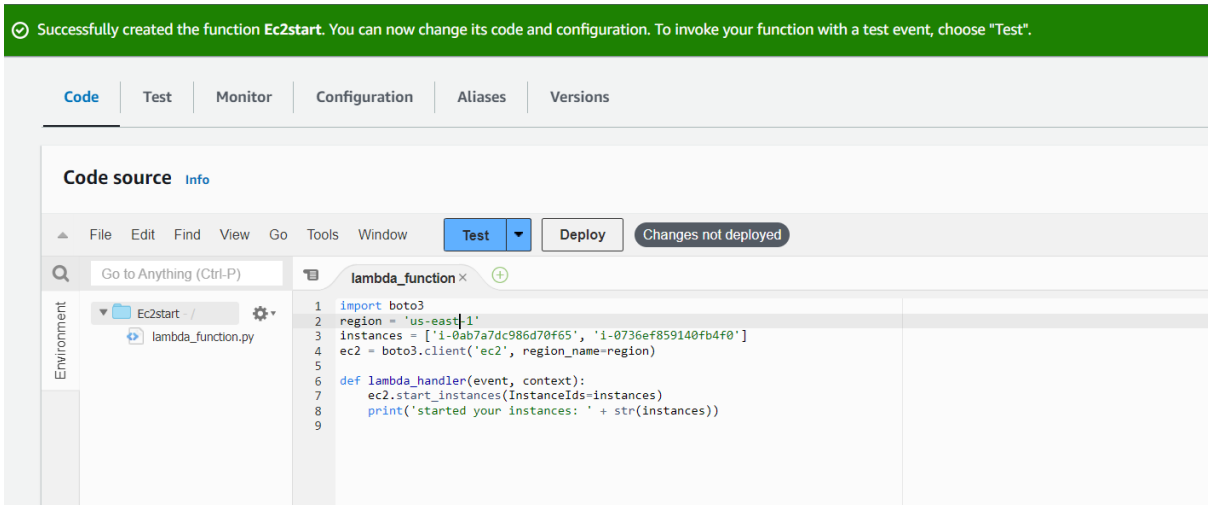


- On the Code tab, under Code source, paste the following code into the editor pane in the code editor on the lambda_function tab. This code starts the EC2 instances that you identify.

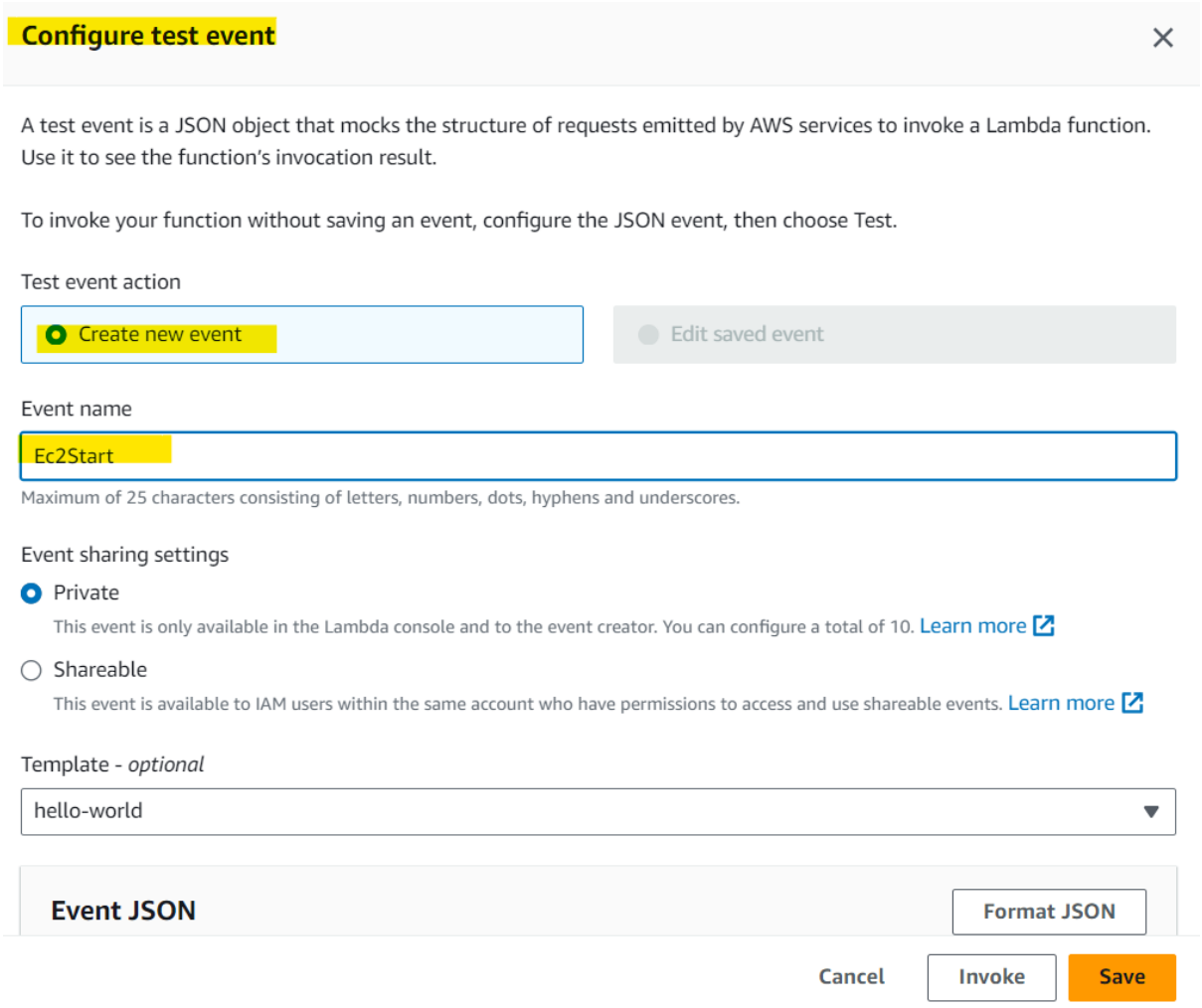
```
import boto3
region = 'us-west-1'
instances = ['i-12345cb6de4f78g9h', 'i-08ce9b2d7eccf6d26']
ec2 = boto3.client('ec2', region_name=region)

def lambda_handler(event, context):
    ec2.start_instances(InstanceIds=instances)
    print('started your instances: ' + str(instances))
```

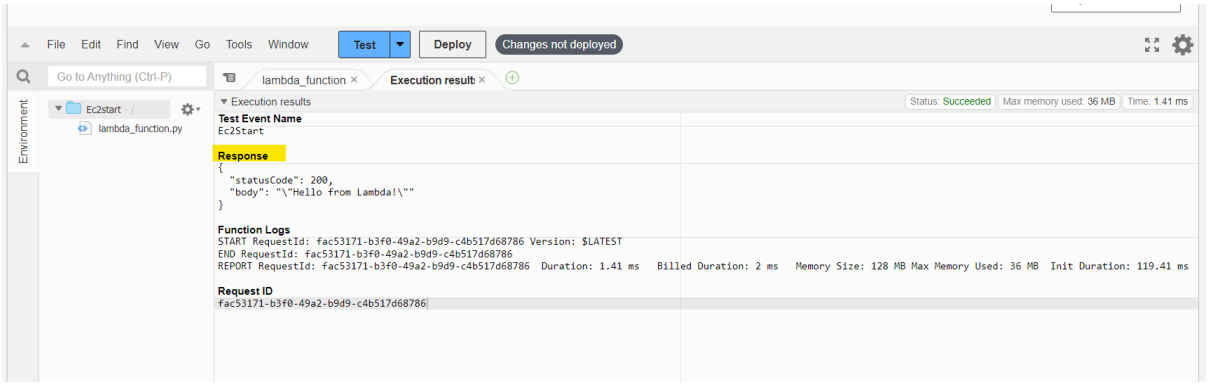
- **Important**: For region, **replace** "us-east-1" with the AWS Region that your instances are in. For instances, replace the example EC2 instance IDs with the IDs of the specific instances that you want to stop and start.



- Click on Test Code
- Configure test event



- Click on Save option to save the Event Created (Step7)
- Once the Event is created click on Test Code to get the Response



- Click on Deploy if you want to start the Instance which is Stopped
- **Successfully updated the function Ec2start.** (Results After Deploying)

- On the **Configuration** tab, choose **General configuration**, and then choose **Edit**. Set **Timeout** to 10 seconds, and then choose **Save**.
- **Note: Configure the Lambda function settings** as needed for your use case. For example, to stop and start multiple instances, you might use a different value for **Timeout** and **Memory**.
- Repeat steps 1-7 to create another function. Complete the following steps differently so that this function starts your EC2 instances.

Python Code to Stop Ec2 Instance

```
import boto3
region = 'us-west-1'
instances = ['i-12345cb6de4f78g9h', 'i-08ce9b2d7eccf6d26']
ec2 = boto3.client('ec2', region_name=region)

def lambda_handler(event, context):
    ec2.stop_instances(InstanceIds=instances)
    print('stopped your instances: ' + str(instances))
```

AWS CloudTrail

CloudTrail enables auditing, security monitoring, and operational troubleshooting by tracking user activity and API usage. CloudTrail logs, continuously monitors, and retains account activity related to actions across your AWS infrastructure, giving you control over storage, analysis, and remediation actions.

Note: You can use CloudTrail to check for events to confirm that the Lambda function stopped or started the EC2 instance.

1. Open the CloudTrail console.
2. In the navigation pane, choose **Event history**.
3. Choose the **Lookup attributes** dropdown list, and then choose **Event name**.
4. In the search bar, enter **StopInstances** to review the results. Then, enter **StartInstances** in the search bar to review the results.

If there are no results, then the Lambda function didn't stop or start the EC2 instances.

Create EventBridge rules that run your Lambda functions

1. Open the EventBridge console.
2. Select **Create rule**.
3. Enter a **Name** for your rule, such as "StopEC2Instances". (Optional) Enter a description for the rule in **Description**.
4. For **Rule type**, choose **Schedule**, and then choose **Continue in EventBridge Scheduler**.
5. For Schedule pattern, choose **Recurring schedule**.
6. Under **Schedule pattern**, for **Occurrence**, choose **Recurring schedule**.
7. For **Schedule type**, choose the type that's right for your need and complete the following steps:
   When **Schedule type** is **Rate-based schedule**, for **Rate expression**, enter a rate value and choose an interval of time in minutes, hours, or days.
   -or-
   When **Schedule type** is **Cron-based schedule**, for **Cron expression**, enter an expression that tells Lambda when to stop your instance. For information on expression syntax, see Schedule expressions for rules.

   Note: Cron expressions are evaluated in UTC. Make sure that you adjust the expression for your preferred time zone.
8. In **Select targets**, choose **Lambda function** from the **Target** dropdown list.

9. For **Function**, choose the function that stops your EC2 instances.

10. Choose **Skip to review and create**, and then choose **Create**.

11. Repeat steps 1-10 to create a rule to start your EC2 instances. Complete the following steps differently:
    Enter a name for your rule, such as "StartEC2Instances".
    (Optional) In **Description**, enter a description for your rule, such as "Starts EC2 instances every morning at 7 AM."
    In step 7, for **Cron expression**, enter an expression that tells Lambda when to start your instances.
    In step 9, for **Function**, choose the function that starts your EC2 instances.

Note: Sometimes, a Lambda function can stop an Amazon EC2 instance and not be able to start it again. This can occur when an Amazon Elastic Block Store (Amazon EBS) volume is encrypted and the Lambda role isn't authorized to use the encryption key. For more information, see Required AWS KMS key policy for use with encrypted volumes and Key policies in AWS KMS.