

Use case

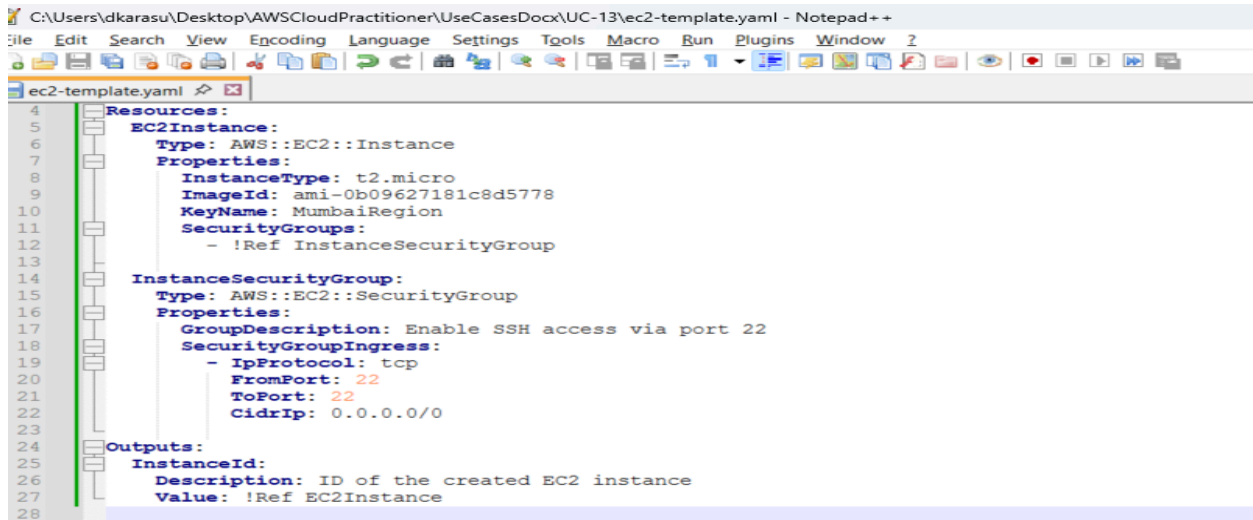
Infrastructure as Code (IaC) with Python + CloudFormation

Use case Description

- Use Python to run CloudFormation templates.
- Deploy EC2/RDS/DynamoDB etc.

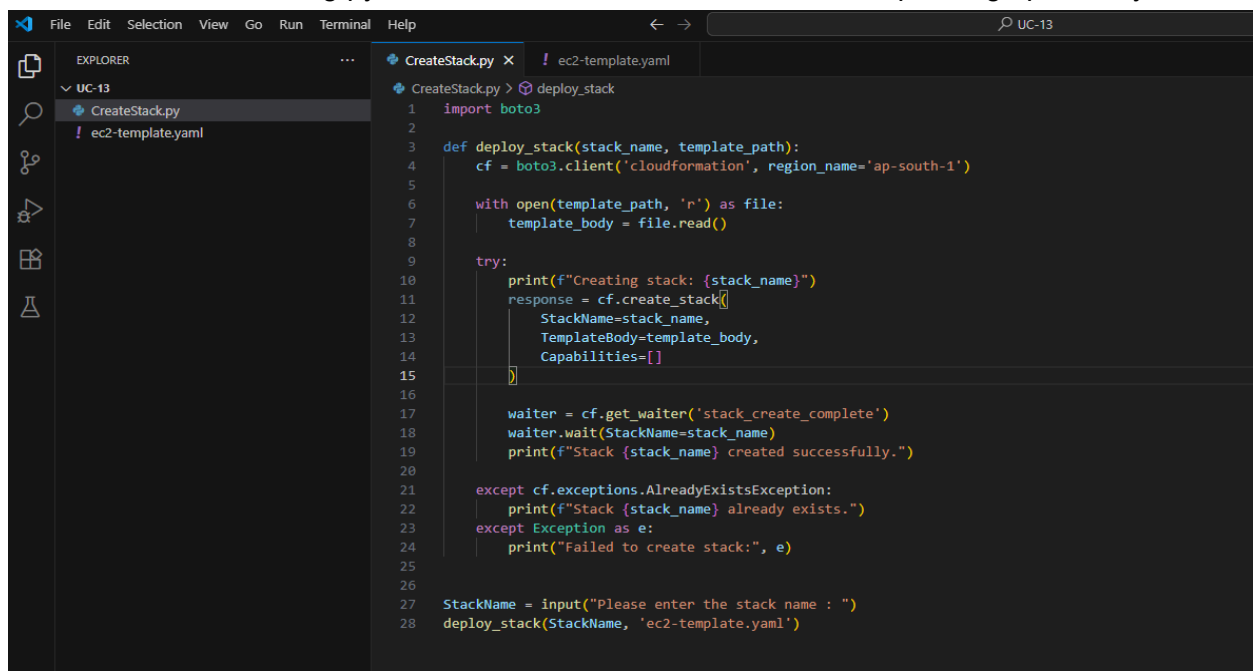
EC2 Instance Creation using CCloud Formation

1. Create a .yaml file as below



```
4 Resources:
5   EC2Instance:
6     Type: AWS::EC2::Instance
7     Properties:
8       InstanceType: t2.micro
9       ImageId: ami-0b09627181c8d5778
10      KeyName: MumbaiRegion
11      SecurityGroups:
12        - !Ref InstanceSecurityGroup
13
14   InstanceSecurityGroup:
15     Type: AWS::EC2::SecurityGroup
16     Properties:
17       GroupDescription: Enable SSH access via port 22
18       SecurityGroupIngress:
19        - IpProtocol: tcp
20          FromPort: 22
21          ToPort: 22
22          CidrIp: 0.0.0.0/0
23
24 Outputs:
25   InstanceId:
26     Description: ID of the created EC2 instance
27     Value: !Ref EC2Instance
28
```

2. Write the following python code which creates a new stack depending upon the yaml file



```
1 import boto3
2
3 def deploy_stack(stack_name, template_path):
4     cf = boto3.client('cloudformation', region_name='ap-south-1')
5
6     with open(template_path, 'r') as file:
7         template_body = file.read()
8
9     try:
10         print(f"Creating stack: {stack_name}")
11         response = cf.create_stack(
12             StackName=stack_name,
13             TemplateBody=template_body,
14             Capabilities=[]
15         )
16
17         waiter = cf.get_waiter('stack_create_complete')
18         waiter.wait(StackName=stack_name)
19         print(f"Stack {stack_name} created successfully.")
20
21     except cf.exceptions.AlreadyExistsException:
22         print(f"Stack {stack_name} already exists.")
23     except Exception as e:
24         print(f"Failed to create stack: {e}")
25
26
27 StackName = input("Please enter the stack name : ")
28 deploy_stack(StackName, 'ec2-template.yaml')
```

3. Open windows power shell and change directory to where the python and yaml files are located and run the python code

```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

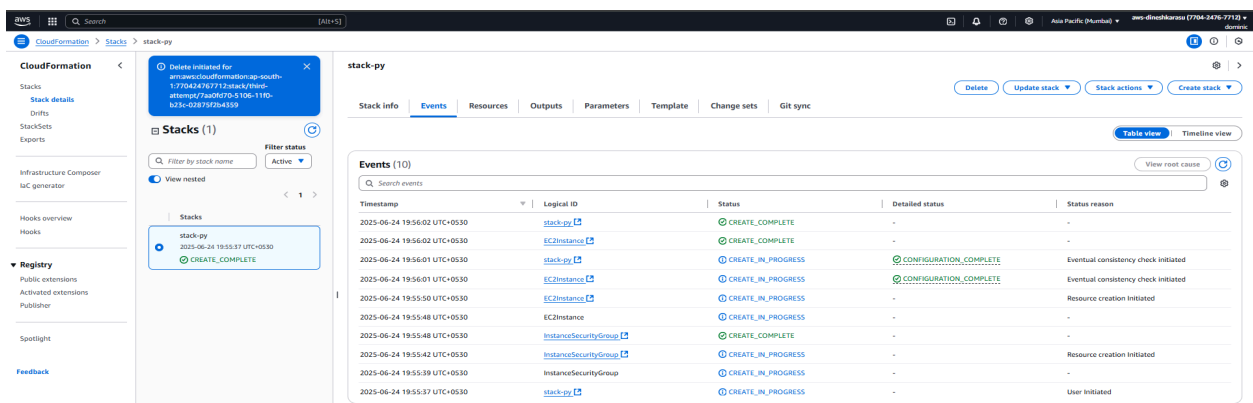
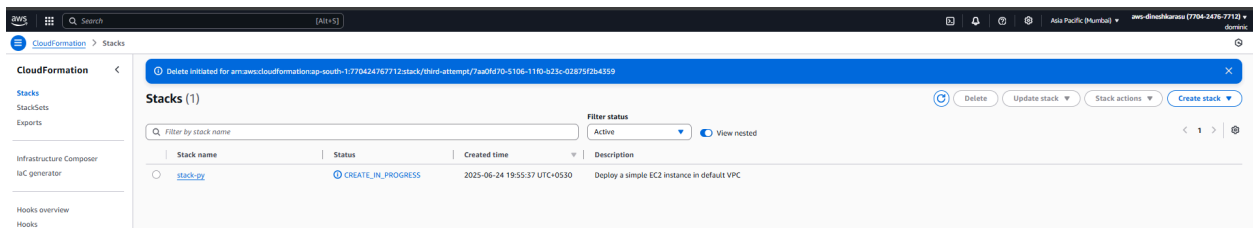
PS C:\Users\dkarasu> cd desktop
PS C:\Users\dkarasu\desktop> cd .\AWScloudPractitioner\
PS C:\Users\dkarasu\desktop\AWScloudPractitioner> cd .\UseCasesDocx\
PS C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx> cd .\UC-13\
PS C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13> ls

Directory: C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13

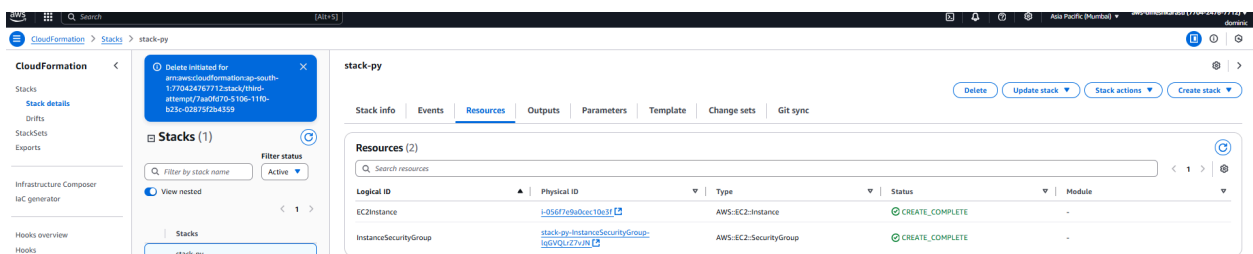
Mode                LastWriteTime         Length Name
----                -
-a-----         24-06-2025   19:49           868 CreateStack.py
-a-----         24-06-2025   19:42           715 ec2-template.yaml

PS C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13> python .\CreateStack.py
Please enter the stack name : stack-py
Creating stack: stack-py
```

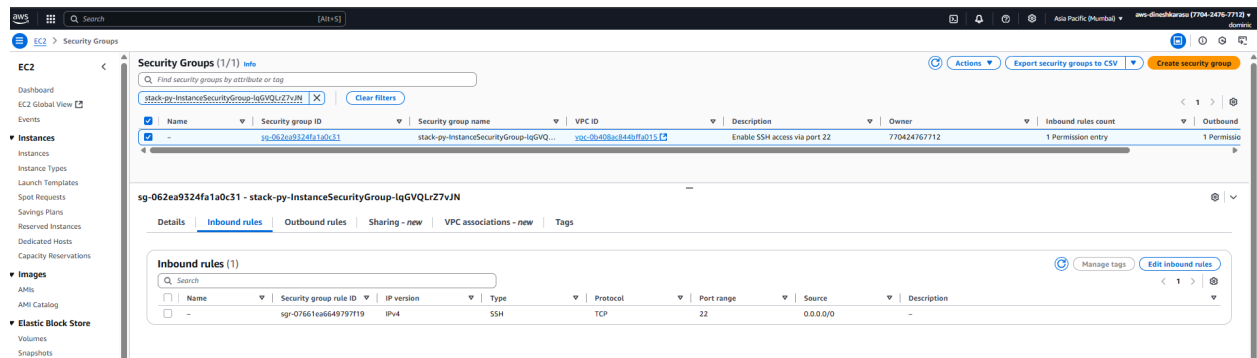
4. Observe in Cloud formation



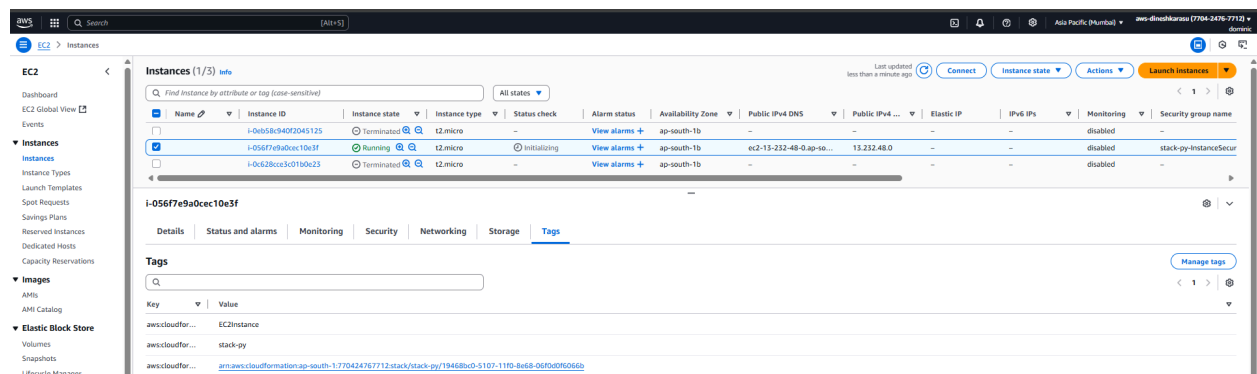
Resources Created



Security group created

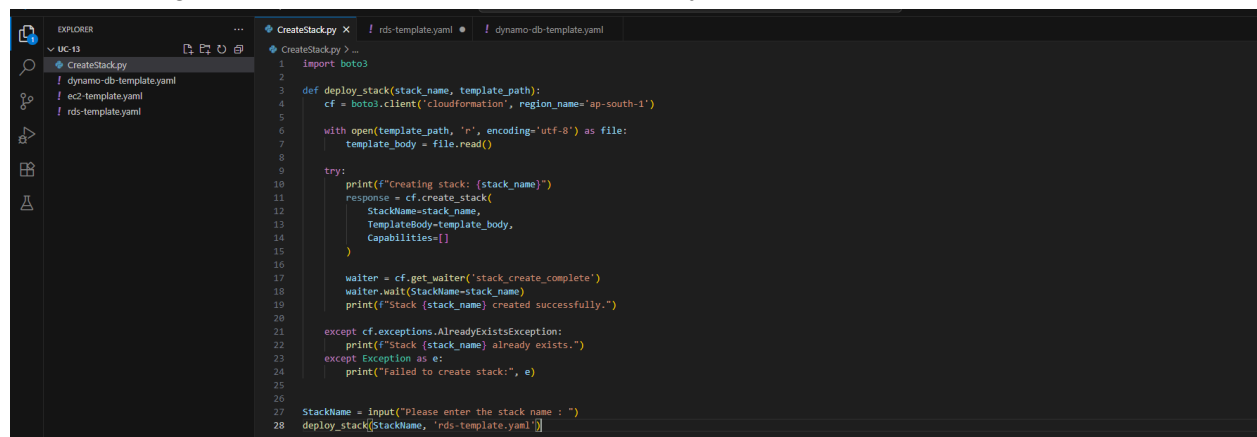


Instance created



RDS DB Instance Creation using CCloudFormation

1. Change the file name to rds-template in the python code



2. Run the python script from CLI

```
PS C:\Users\dkarasu\desktop\AWSCLoudPractitioner\UseCasesDocx\UC-13> python .\CreateStack.py
Please enter the stack name : cf-rds-2
Creating stack: cf-rds-2
```

CloudFormation > **Stacks** > cf-rds-2

Stacks (1)

Filter by stack name: Filter status: **Active**

View nested

Stacks

- cf-rds-2
2025-06-25 12:20:56 UTC+0530
CREATE_IN_PROGRESS

cf-rds-2

Stack info | **Events** | Resources | Outputs | Parameters | Template | Change sets | Git sync

Events (6)

Timestamp	Logical ID	Status	Detailed status	Status reason
2025-06-25 12:21:08 UTC+0530	MyDBInstance	CREATE_IN_PROGRESS	5	Resource creation initiated
2025-06-25 12:21:07 UTC+0530	MyDBInstance	CREATE_IN_PROGRESS	5	-
2025-06-25 12:21:06 UTC+0530	DBSecurityGroup	CREATE_COMPLETE	-	-
2025-06-25 12:21:00 UTC+0530	DBSecurityGroup	CREATE_IN_PROGRESS	5	Resource creation initiated
2025-06-25 12:20:58 UTC+0530	DBSecurityGroup	CREATE_IN_PROGRESS	5	-
2025-06-25 12:20:56 UTC+0530	cf-rds-2	CREATE_IN_PROGRESS	5	User initiated

Aurora and RDS

cf-rds-2-mydbinstance-k3kndxlzicgm

Summary

DB identifier cf-rds-2-mydbinstance-k3kndxlzicgm	Status Creating	Role Instance	Engine MySQL Community	Recommendations
CPU -	Class db.t3.micro	Current activity	Region & AZ ap-south-1b	

Connectivity & security | Monitoring | Logs & events | Configuration | Zero-ETL integrations | Maintenance & backups | Data migrations - new | Tags | Recommendations

Connectivity & security

Endpoint & port

Endpoint: -

Port: -

Networking

Availability Zone
ap-south-1b

VPC
vpc-0b408ac8446df015

Subnet group
default

Subnets
subnet-0b6e0751c9d5a969
subnet-0462d7300506a2959
subnet-0c746c4414955655

Network type
IPv4

Security

VPC security groups
cf-rds-2-DBSecurityGroup-tGScXUDkHdU (sg-0827cdf7c7a1dbf49)

Active

Publicly accessible
Yes

Certificate authority
info
rds-ca-rsa2048-g1

Certificate authority date
May 20, 2061, 00:10 (UTC+05:30)

EC2 > **Security Groups** > sg-0827cdf7c7a1dbf49 - cf-rds-2-DBSecurityGroup-tGScXUDkHdU

sg-0827cdf7c7a1dbf49 - cf-rds-2-DBSecurityGroup-tGScXUDkHdU

Details

Security group name cf-rds-2-DBSecurityGroup-tGScXUDkHdU	Security group ID sg-0827cdf7c7a1dbf49	Description Allow RDS access	VPC ID vpc-0b408ac8446df015
Owner 770424767712	Inbound rules count 1 Permission entry	Outbound rules count 1 Permission entry	

Inbound rules | Outbound rules | Sharing - new | VPC associations - new | Tags

Inbound rules (1)

Name	Security group rule ID	IP version	Type	Protocol	Port range	Source	Description
-	sgr-0B8181ead0bc7c300	IPv4	MYSQL/Aurora	TCP	3306	0.0.0.0/0	-

CloudFormation > **Stacks** > cf-rds-2

Stacks (1)

Filter by stack name: Filter status: **Active**

View nested

Stacks

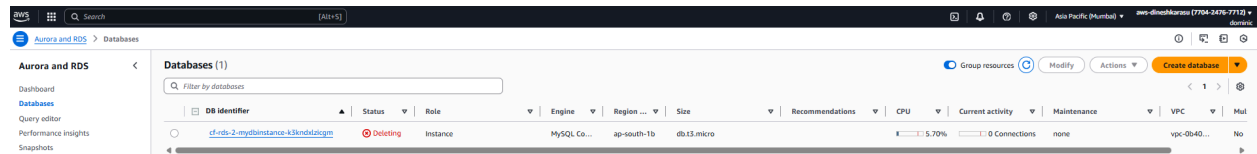
- cf-rds-2
2025-06-25 12:20:56 UTC+0530
DELETE_IN_PROGRESS

cf-rds-2

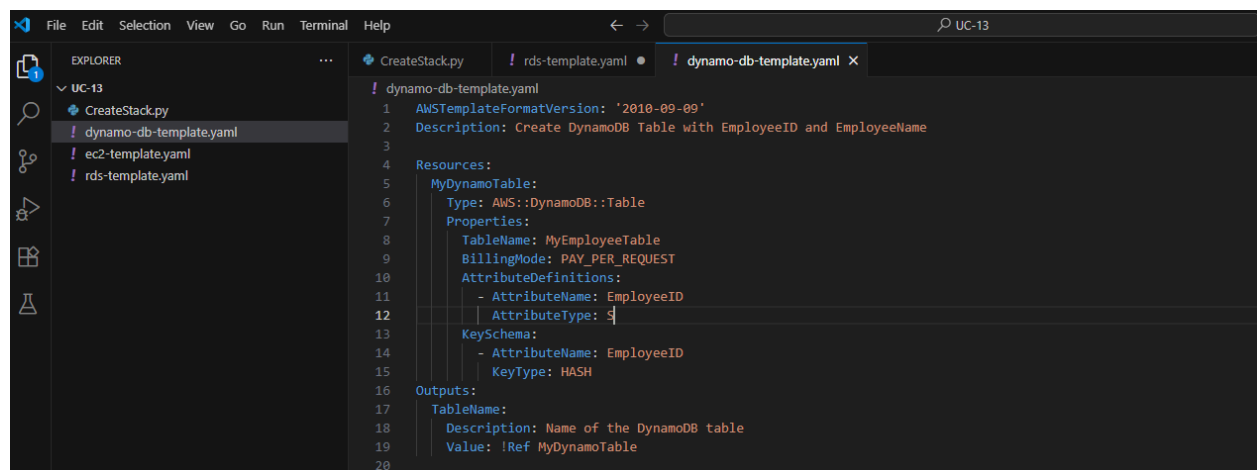
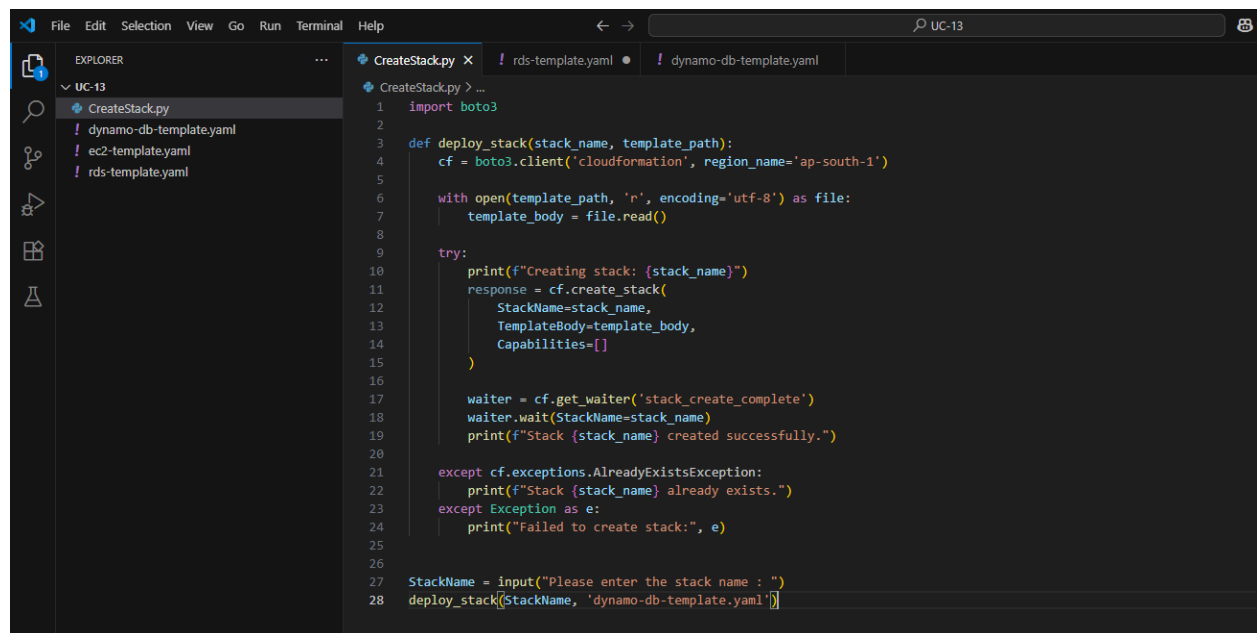
Stack info | **Events** | Resources | Outputs | Parameters | Template | Change sets | Git sync

Events (10)

Timestamp	Logical ID	Status	Detailed status	Status reason
2025-06-25 12:27:44 UTC+0530	MyDBInstance	DELETE_IN_PROGRESS	-	-
2025-06-25 12:27:42 UTC+0530	cf-rds-2	DELETE_IN_PROGRESS	-	User Initiated
2025-06-25 12:24:46 UTC+0530	cf-rds-2	CREATE_COMPLETE	-	-
2025-06-25 12:24:45 UTC+0530	MyDBInstance	CREATE_COMPLETE	-	-
2025-06-25 12:21:08 UTC+0530	MyDBInstance	CREATE_IN_PROGRESS	-	Resource creation initiated
2025-06-25 12:21:07 UTC+0530	MyDBInstance	CREATE_IN_PROGRESS	-	-
2025-06-25 12:21:06 UTC+0530	DBSecurityGroup	CREATE_COMPLETE	-	-
2025-06-25 12:21:00 UTC+0530	DBSecurityGroup	CREATE_IN_PROGRESS	-	Resource creation initiated
2025-06-25 12:20:58 UTC+0530	DBSecurityGroup	CREATE_IN_PROGRESS	-	-
2025-06-25 12:20:56 UTC+0530	cf-rds-2	CREATE_IN_PROGRESS	-	User Initiated



Dynamo DB Table Creation using CCloudFormation



```
Windows PowerShell
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PS C:\Users\dkarasu> cd desktop
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PS C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13> ls

Directory: C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13

Mode                LastWriteTime         Length Name
----                -
-a-----         25-06-2025   12:33           892 CreateStack.py
-a-----         25-06-2025   12:31           601 dynamo-db-template.yaml
-a-----         24-06-2025   19:42           715 ec2-template.yaml
-a-----         24-06-2025   20:01           937 rds-template.yaml

PS C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13> python .\CreateStack.py
Please enter the stack name : cf-dynamo-db-1
Creating stack: cf-dynamo-db-1
Failed to create stack: Waiter StackCreateComplete failed: Waiter encountered a terminal failure state: For expression "Stacks[
].StackStatus" we matched expected path: "ROLLBACK_COMPLETE" at least once
PS C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13> python .\CreateStack.py
Please enter the stack name : cf-dynamo-db-2
Creating stack: cf-dynamo-db-2
Stack cf-dynamo-db-2 created successfully.
PS C:\Users\dkarasu\desktop\AWScloudPractitioner\UseCasesDocx\UC-13> |
```

