
AWS
re:Invent
NOV. 28 – DEC. 2, 2022 | LAS VEGAS, NV

DOP204

Provisioning, automating, and orchestrating IaC on AWS

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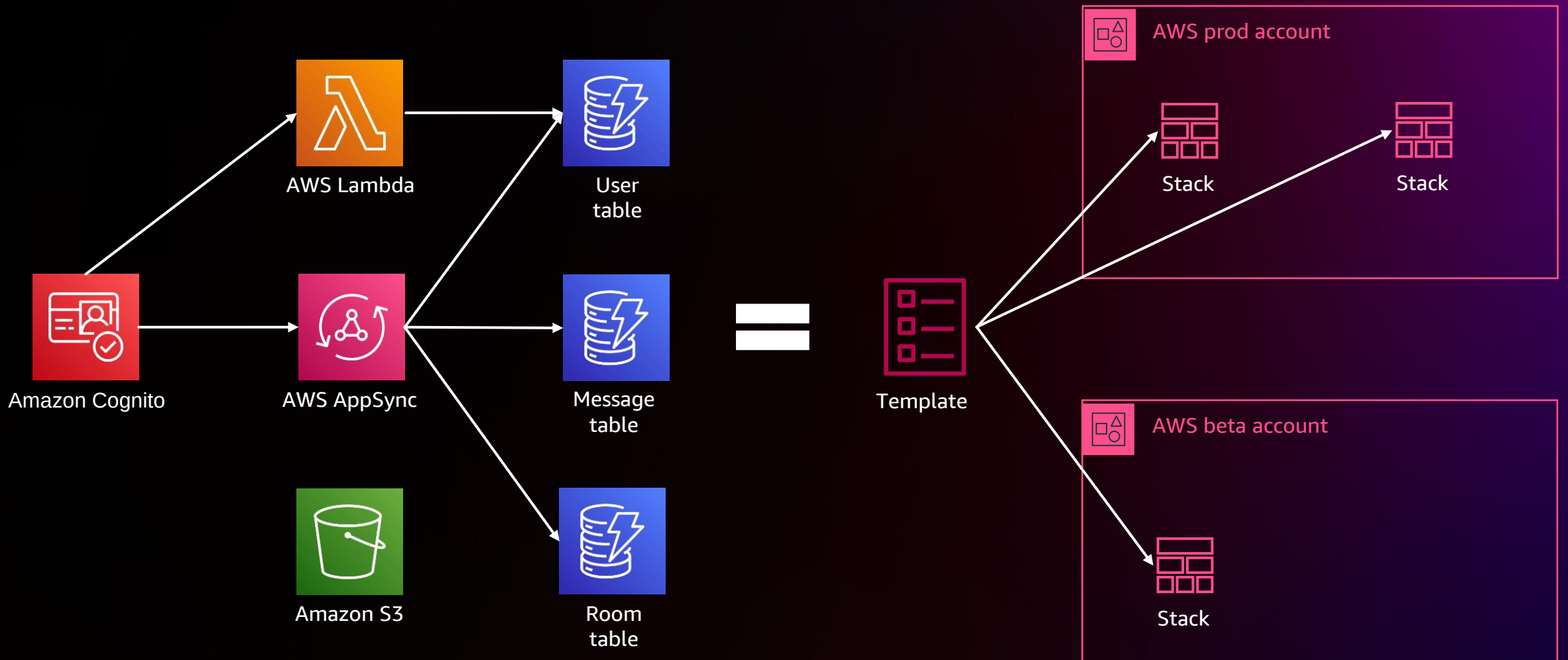
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Evolution of infrastructure as code (IaC)

Abstractions	AWS CDK, Pulumi
Generators	Troposphere, GoFormation
Declarative	CloudFormation, Terraform
Scripted	#!/bin/bash
Manual	Wikis, playbooks, ask-Bob-he-knows

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AWS CloudFormation



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CloudFormation template

```yaml
Parameters:
  DefaultAction:
    Type: String
    AllowedValues:
      - ALLOW
      - DENY
Resources:
  GraphQLApi:
    Type: AWS::AppSync::GraphQLApi
    Properties:
      Name: !Sub "${AWS::StackName}-MyAPI"
      AuthenticationType: "AMAZON_COGNITO_USER_POOLS"
      UserPoolConfig:
        UserPoolId: !Ref UserPool
        AwsRegion: !Ref AWS::Region
        DefaultAction: !Ref DefaultAction
  UserPool:
    UpdateReplacePolicy: Delete
    DeletionPolicy: Delete
    Type: AWS::Cognito::UserPool
    Properties: {}
```

Templates declare the desired state of the resources you want to manage the lifecycle of

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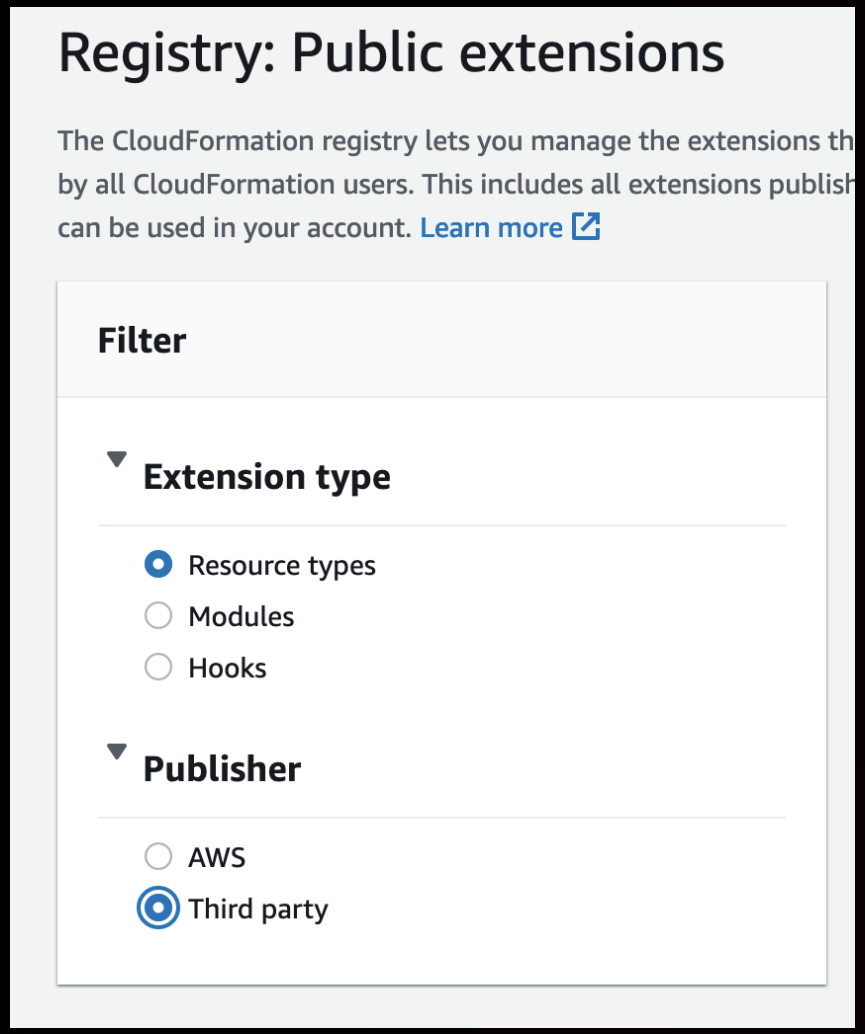
CloudFormation

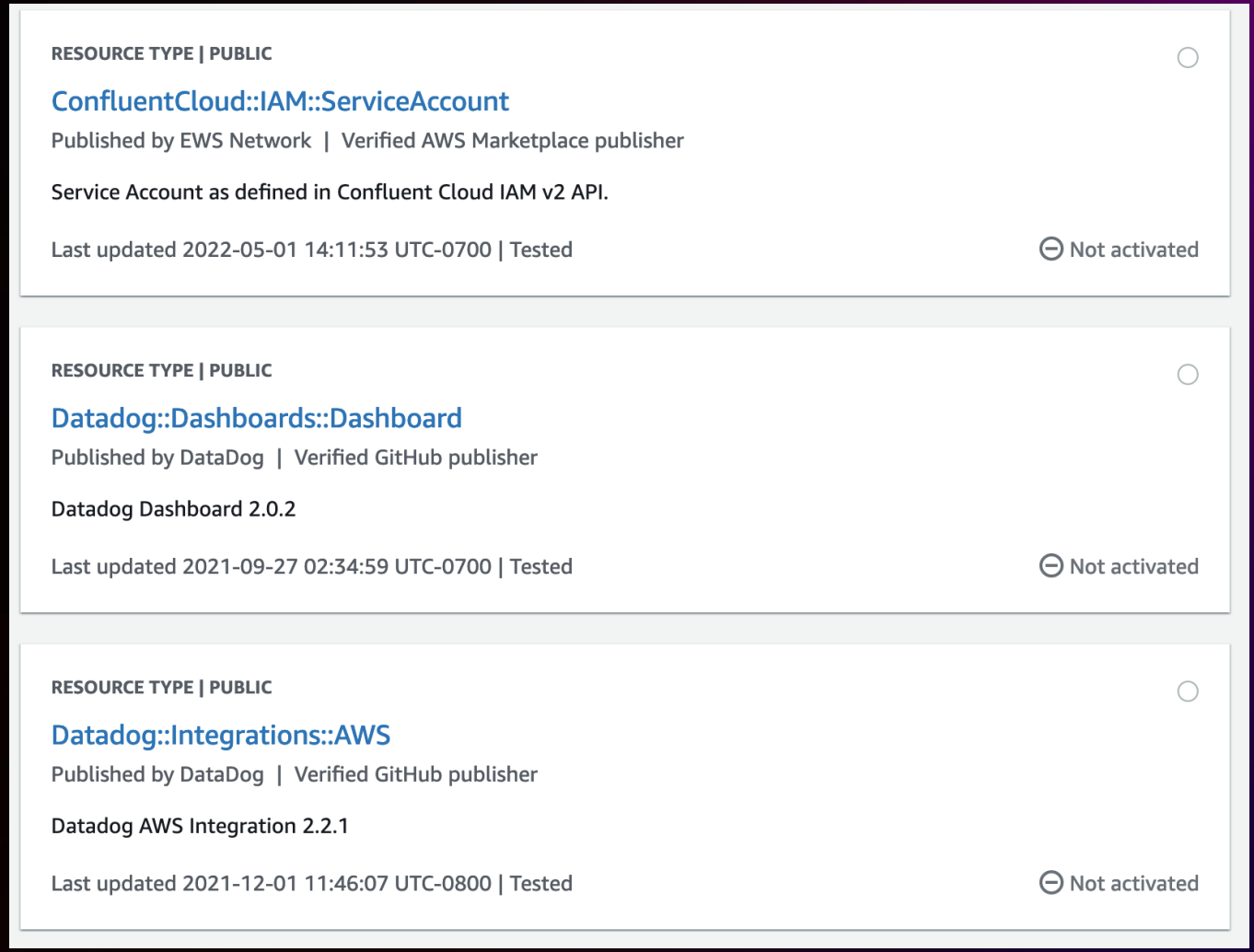
The service will manage resources through the following types of actions

- Create
- Read
- Update
- Delete
- List

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CloudFormation registry extensions





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CloudFormation open source

https://github.com/aws-cloudformation?q=aws-cloudformation-resource-providers&type=all&l

aws-cloudformation-resource-providers-rds Public

The CloudFormation Resource Provider Package For Amazon Relational Database Service

Java 20 Apache-2.0 19 3 4 Updated 4 hours ago

aws-cloudformation-resource-providers-stepfunctions Public

The CloudFormation Resource Provider Package For AWS Step Functions

Java 4 Apache-2.0 4 2 3 Updated 16 hours ago

aws-cloudformation-resource-providers-sns Public

The CloudFormation Resource Provider Package For Amazon Simple Notification Service (Amazon SNS). Amazon SNS is a fully managed messaging service for both application-to-application (A2A) and application-to-person (A2P) communication.

Java 10 Apache-2.0 9 1 0 Updated 19 hours ago

aws-cloudformation-resource-providers-iot Public

The CloudFormation Resource Provider Package For AWS IoT

Java 2 Apache-2.0 16 1 1 Updated 20 hours ago

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CloudFormation testing



Cfn-lint

- Test YAML/JSON CloudFormation templates against the spec
- Rules are created for best practices
- Rules are extendable to include an organization's best practices



CloudFormation Guard

- Validate any YAML/JSON against self-defined rules using the Guard DSL
- Easy to write and create rules to look for an organization's best practices

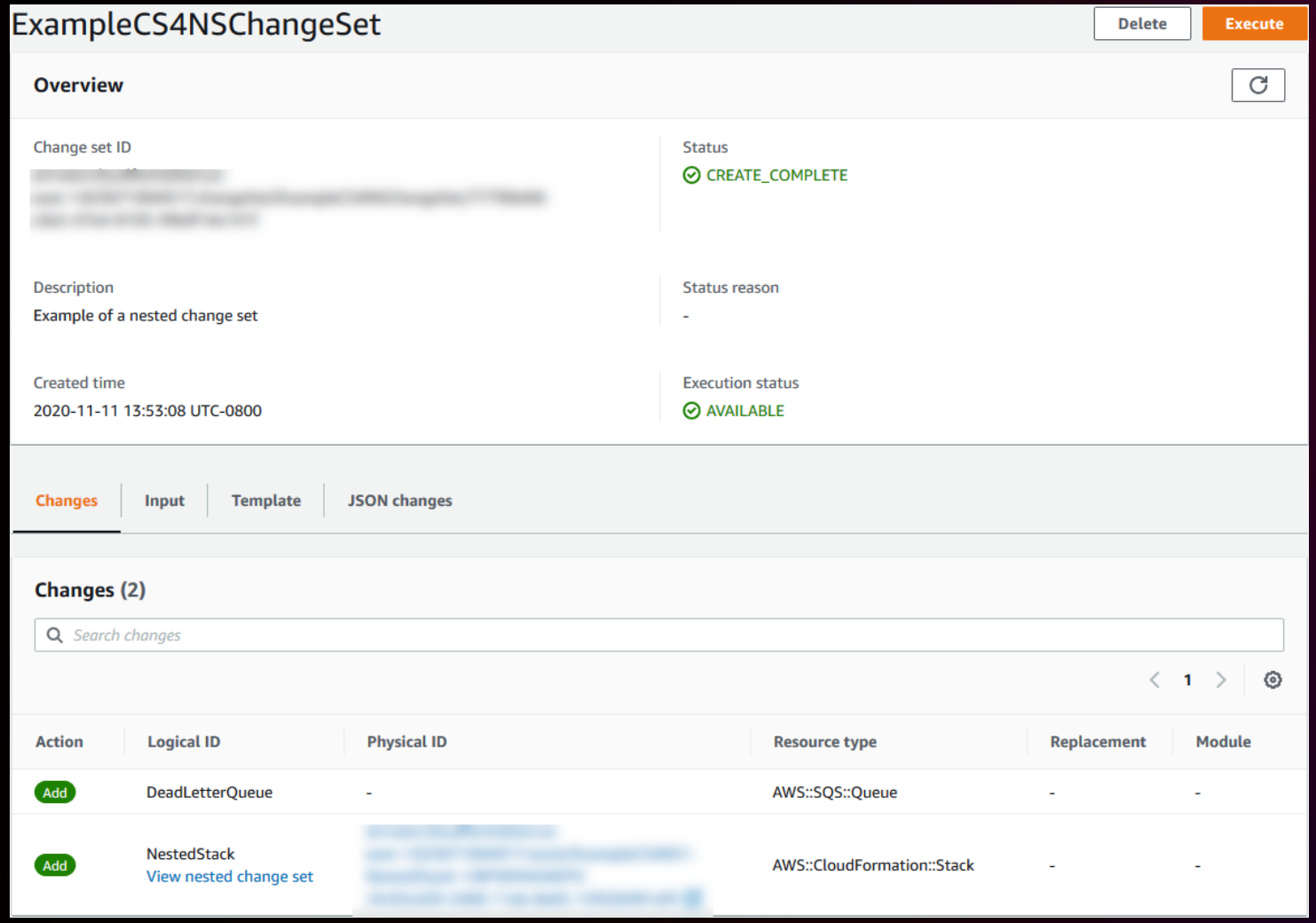


TaskCat

- Facilitates deploying YAML/JSON templates to many regions
- Provides a report based on the success of the deployment

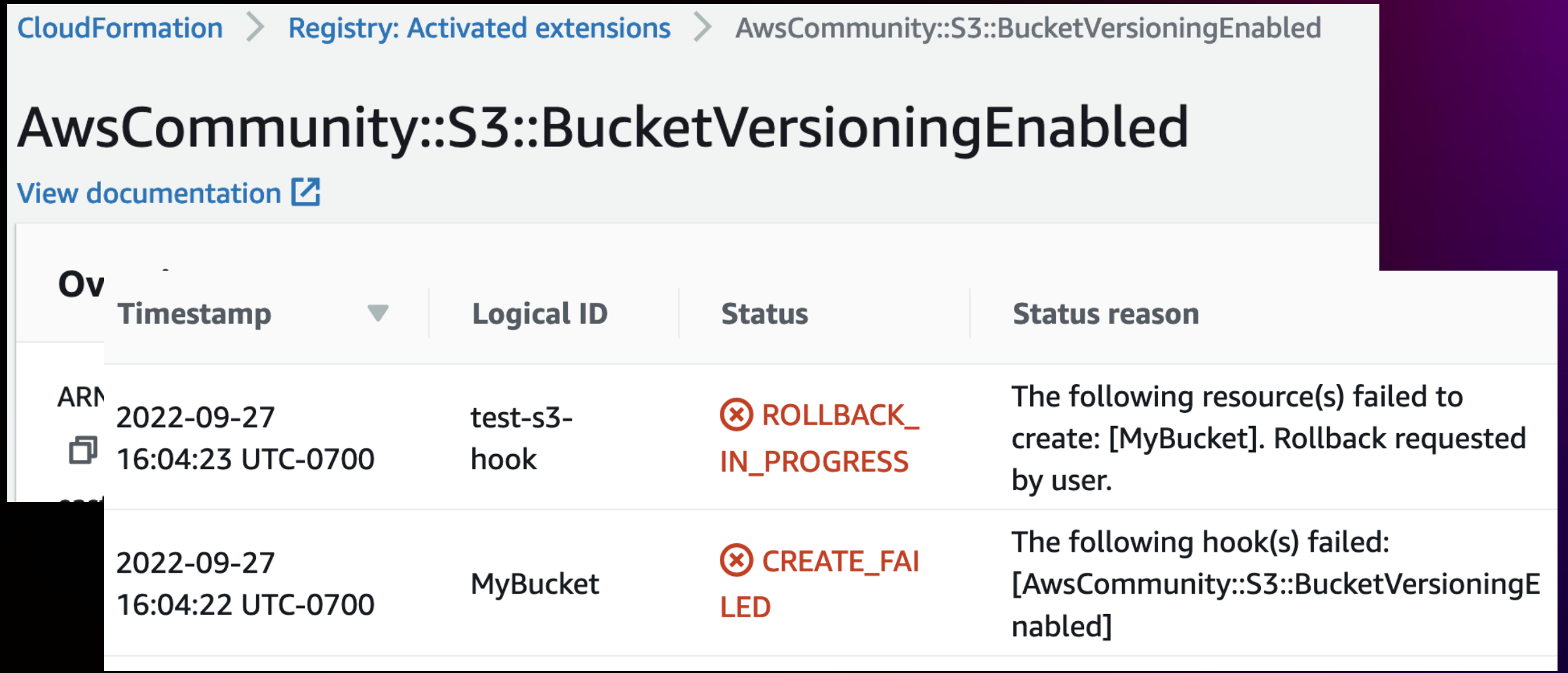
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CloudFormation – Deployment safety



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CloudFormation Hooks



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AWS Cloud Development Kit (CDK)

A MULTI-LANGUAGE SOFTWARE DEVELOPMENT FRAMEWORK FOR MODELING CLOUD INFRASTRUCTURE AS REUSABLE COMPONENTS

```
class UrlShortener extends Stack {
  constructor(scope: App, id: string, props?: UrlShortenerProps) {
    super(scope, id, props);

    const vpc = new ec2.Vpc(this, 'vpc', { maxAzs: 2 });
    const cluster = new ecs.Cluster(this, 'cluster', { vpc: vpc });
    const service = new patterns.NetworkLoadBalancedFargateService(this, 'sample-app', {
      cluster,
      taskImageOptions: {
        image: ecs.ContainerImage.fromAsset('ping'),
      },
      dom
    });
    // Setup AutoScaling policy
    const scaling = service.service.autoScaleTas
    scaling.scaleOnCpuUtilization('CpuScaling',
      targetUtilizationPercent: 50,
      scaleInCooldown: Duration.seconds(60),
      scaleOutCooldown: Duration.seconds(60)
    });
  }
}
```

domainName
domainZone

(property) patterns.NetworkLoadBalancedServiceBaseProps.domainName?: string | undefined

The domain name for the service, e.g. "api.example.com."

@default

- No domain name.

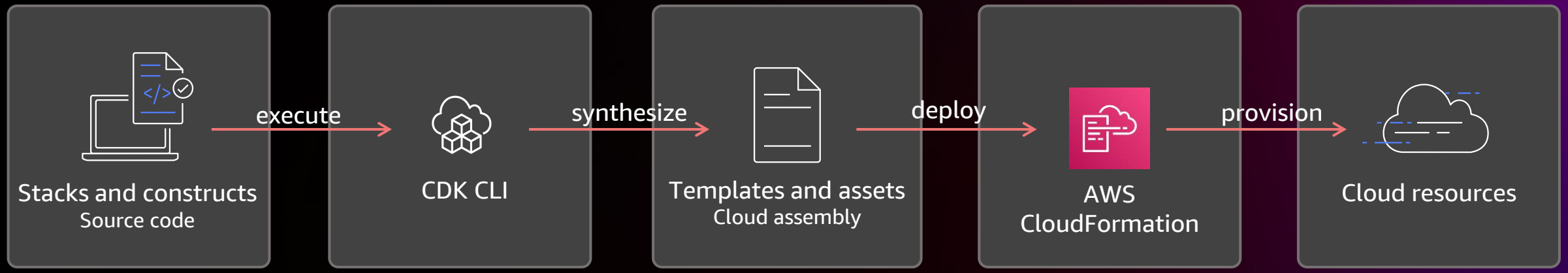
Familiar
Your language
Just code

Tool Support
AutoComplete
Inline documentation

Abstraction
Sane defaults
Reusable classes

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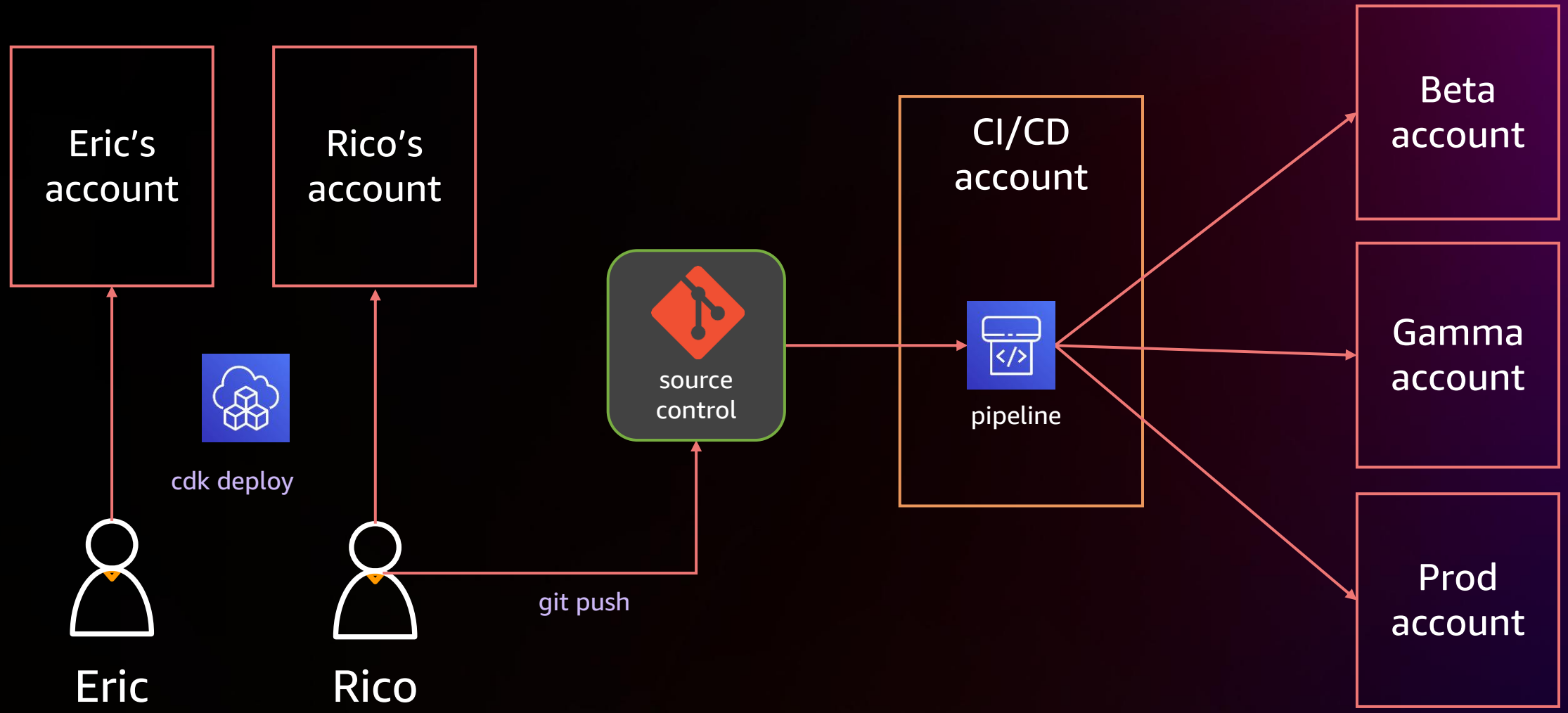
Development workflow




```
cdk init          // create new project
npm run build    //  build project
cdk synth         //  create templates and assets
cdk diff          //  check what will change
cdk deploy        //  push changes to your account
```

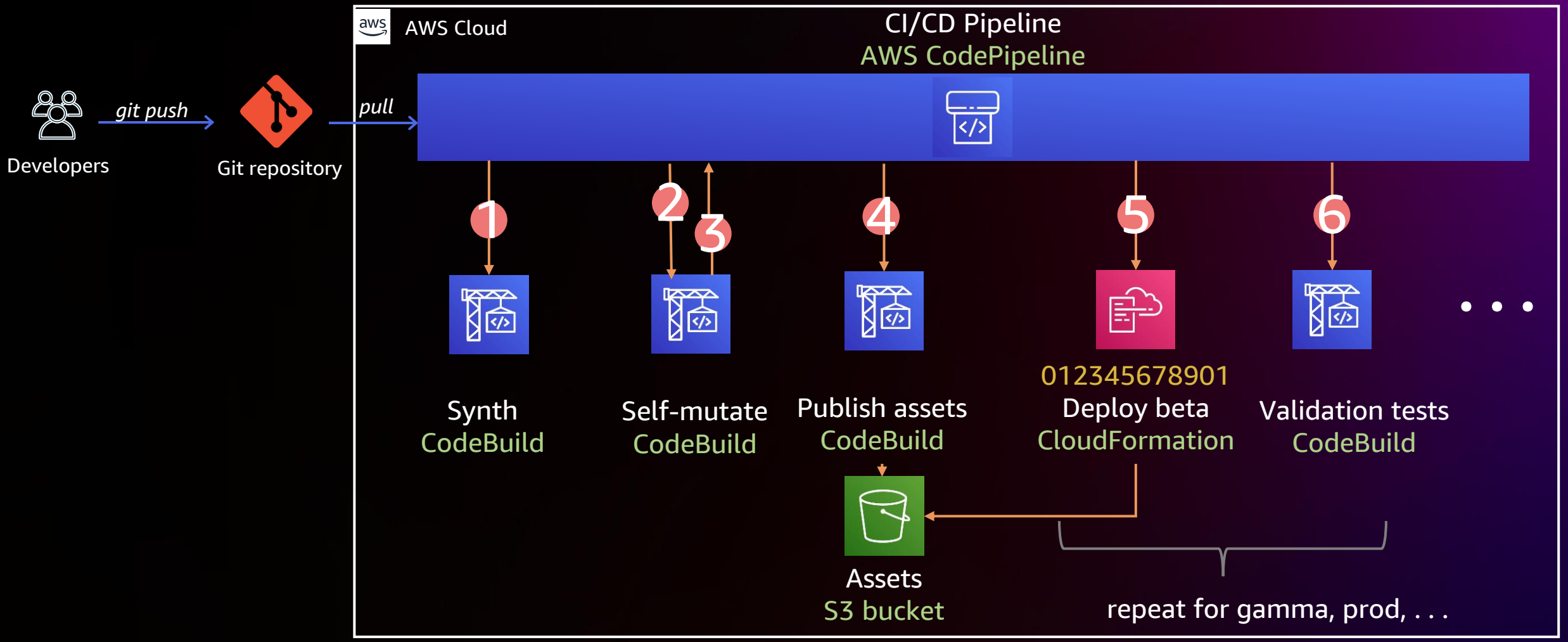
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CDK Pipelines – Multiple account CI/CD



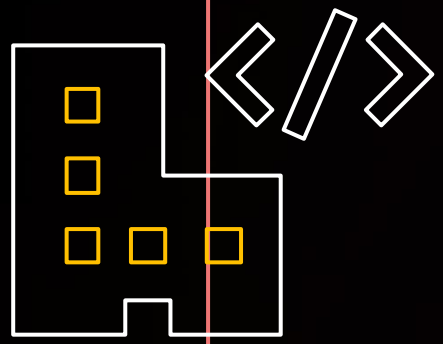
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CDK Pipelines

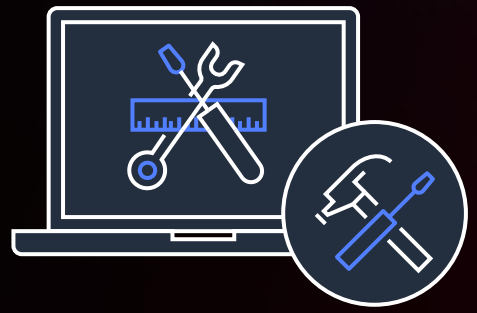


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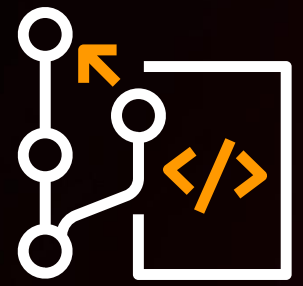
CDK philosophy – Evolution



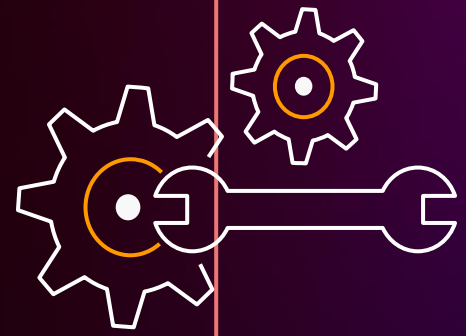
Infrastructure



Runtime code



Source control



Config and deployment

From silos . . .

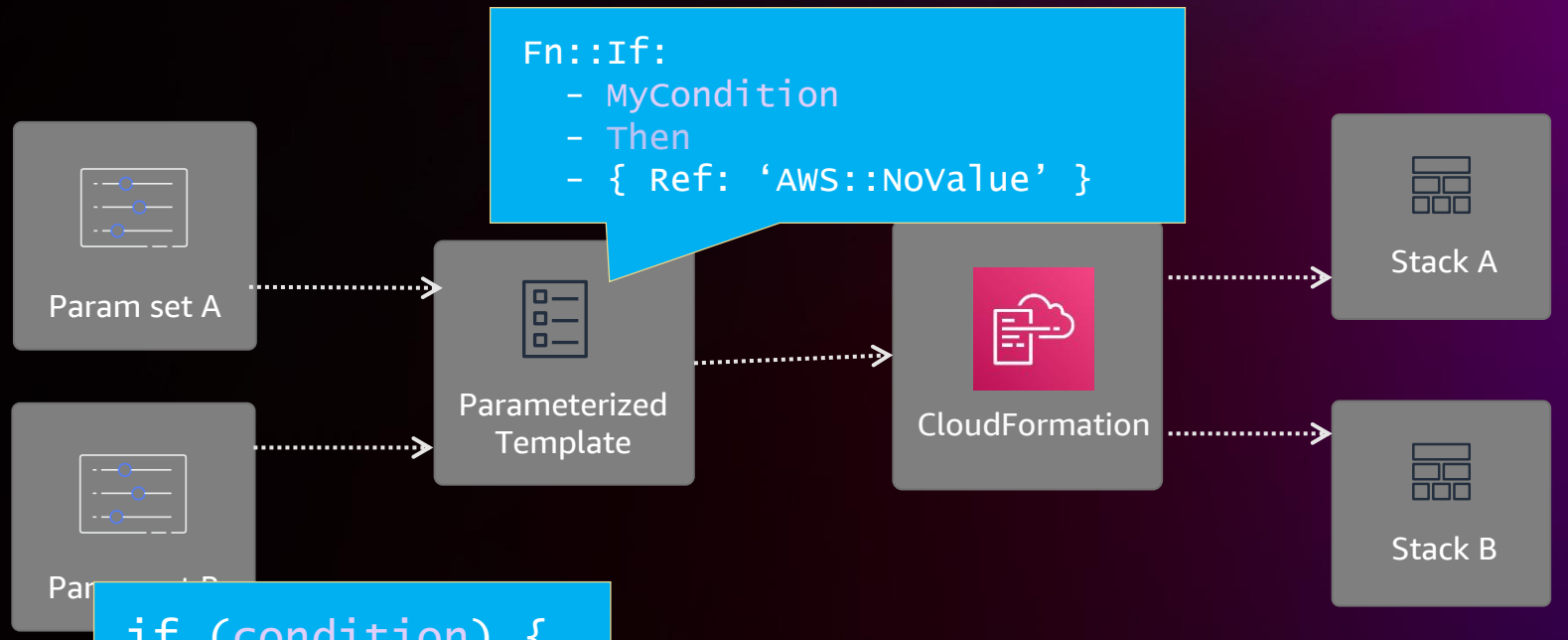
To a single application

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Paradigm shift

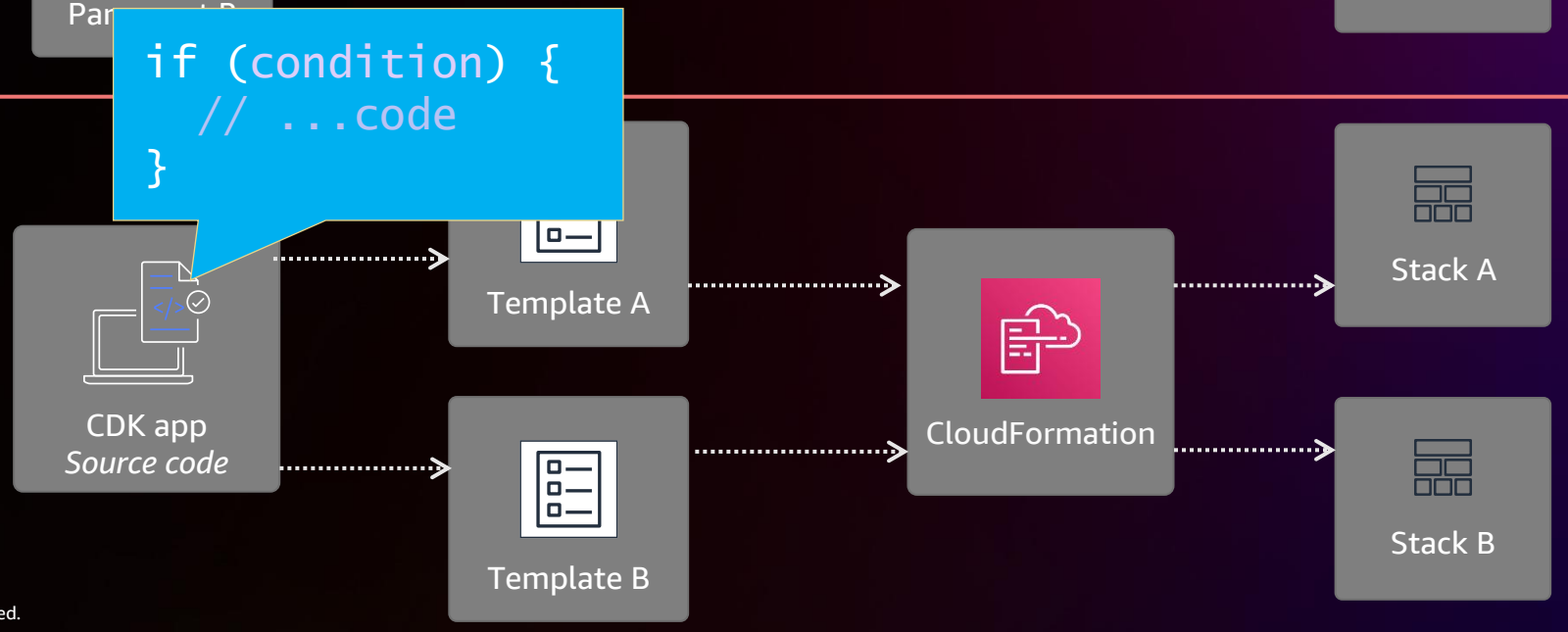
CloudFormation

Parameters and intrinsic functions



CDK

Typed OO language: loops, conditions, inheritance, and so on



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Links



AWS community registry extensions



AWS CloudFormation Discord server

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Thank you!

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Kevin DeJong
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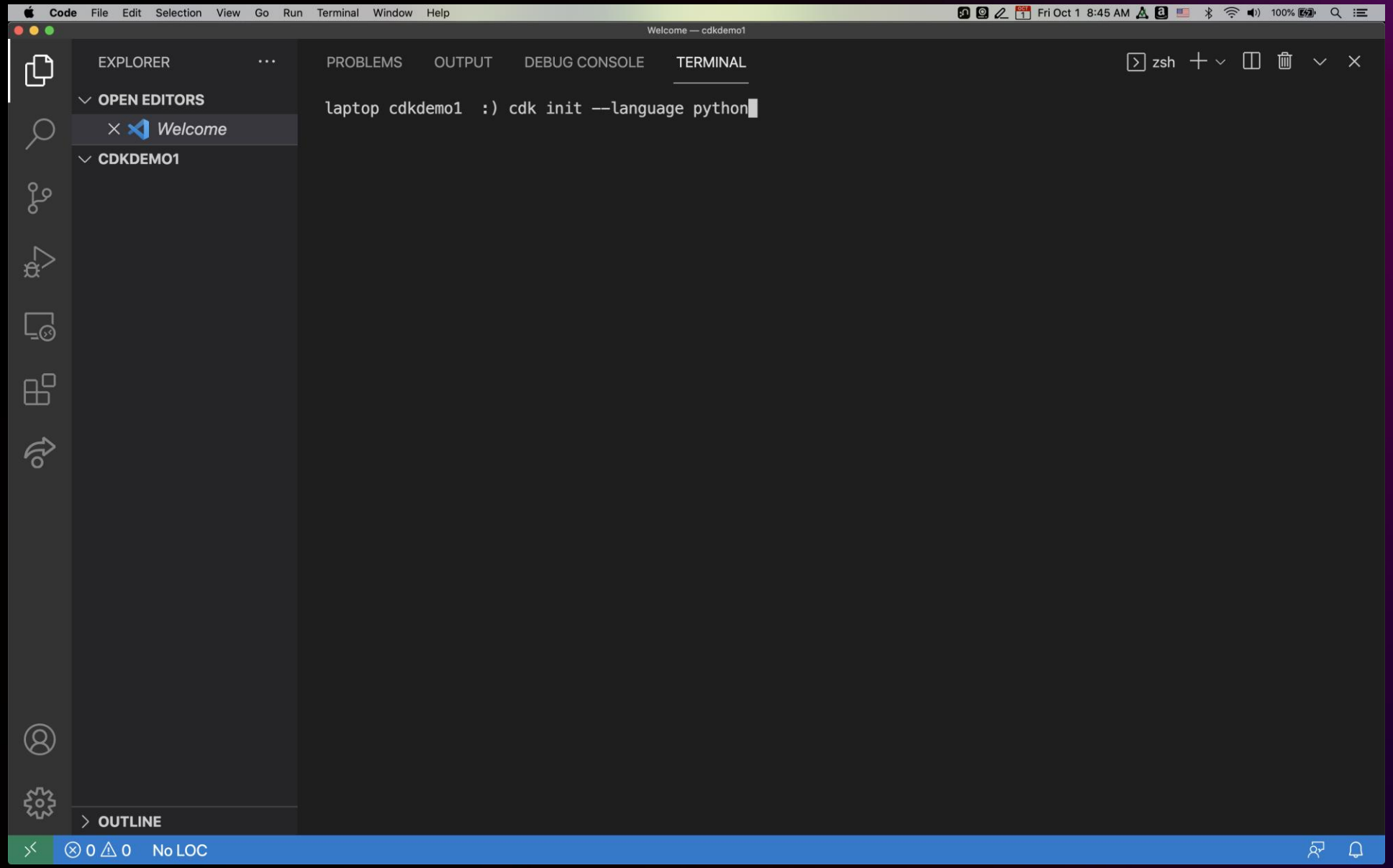
https://cdkworkshop.com

https://github.com/aws/aws-cdk

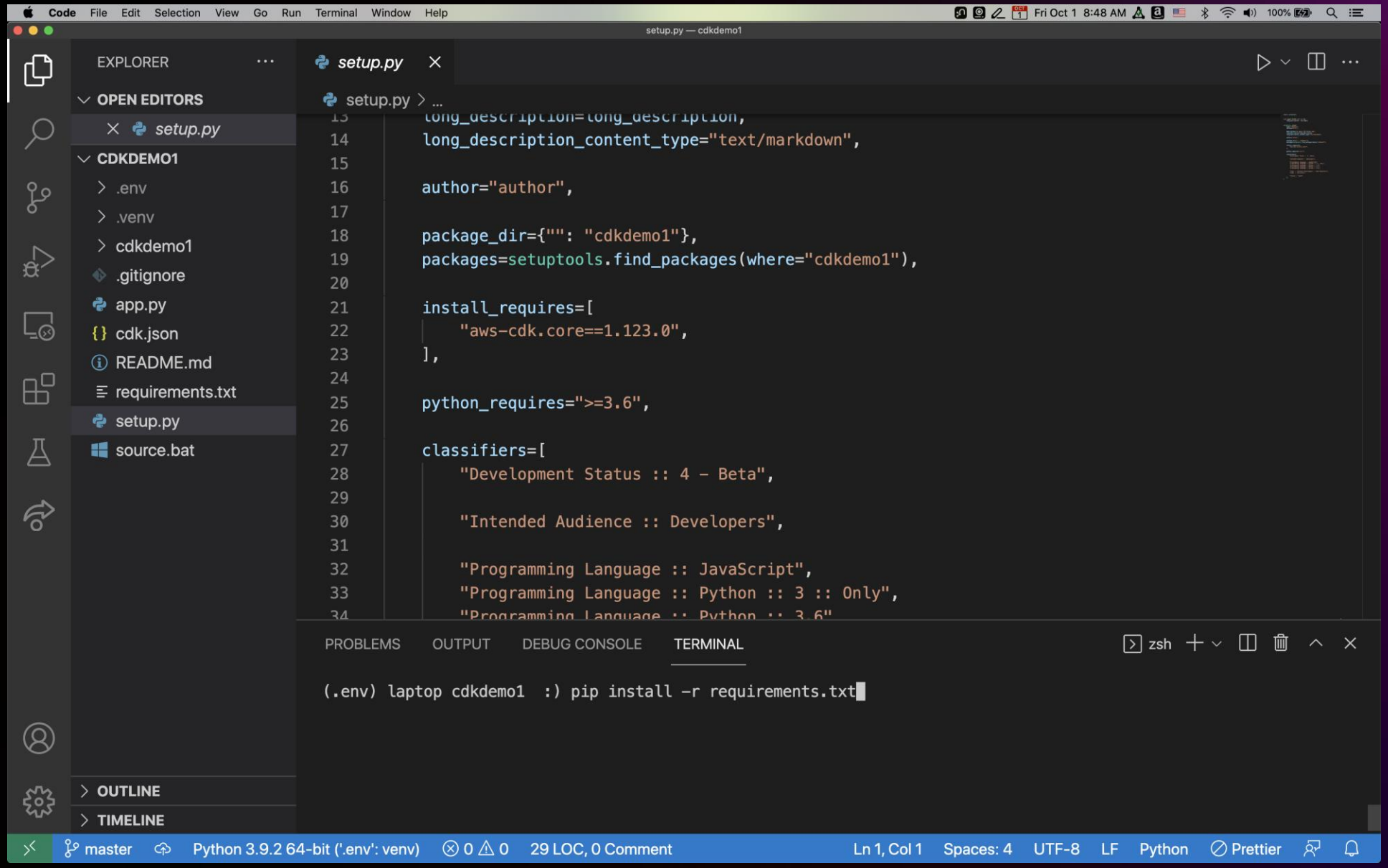


Please complete the session survey in the **mobile app**

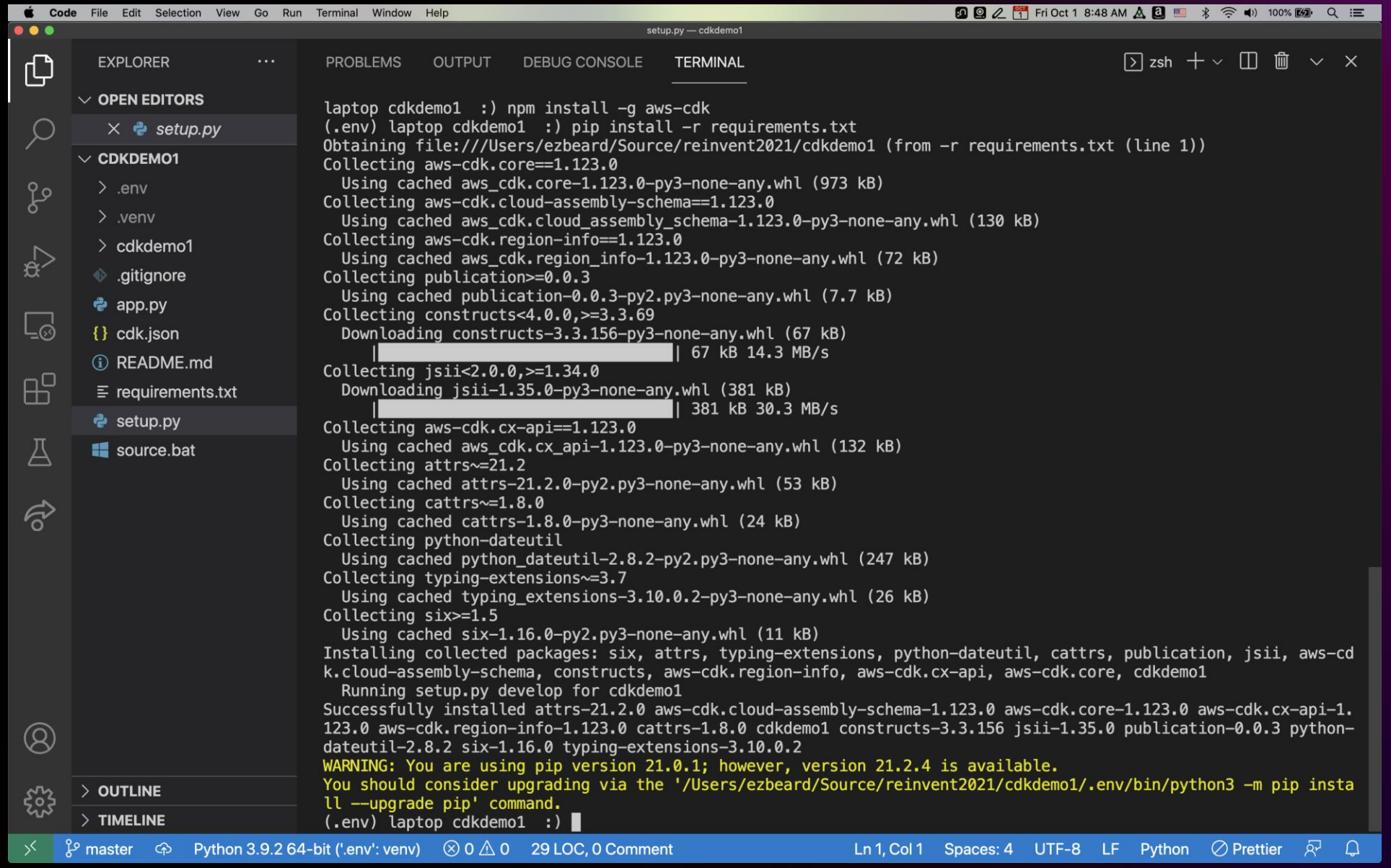
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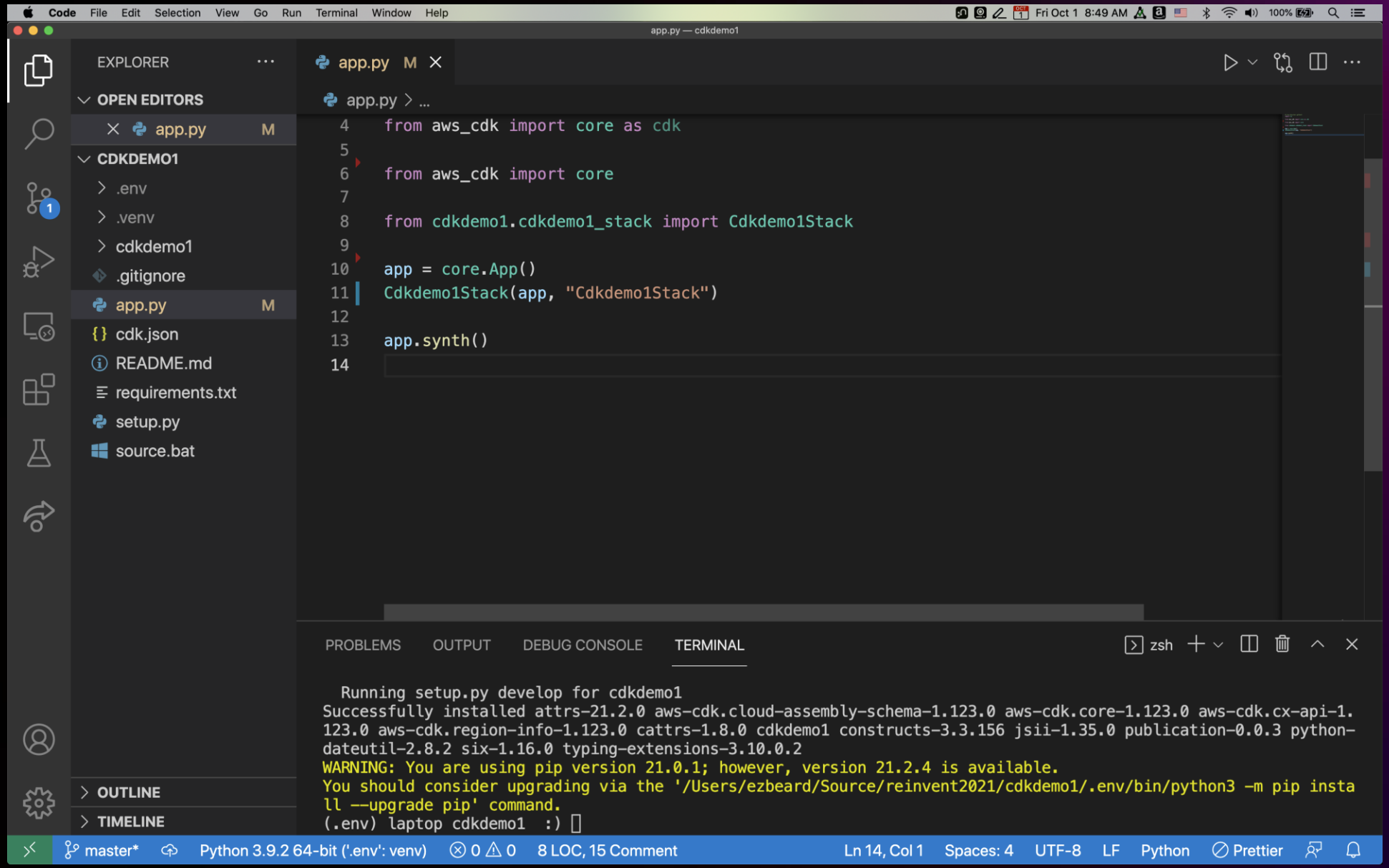
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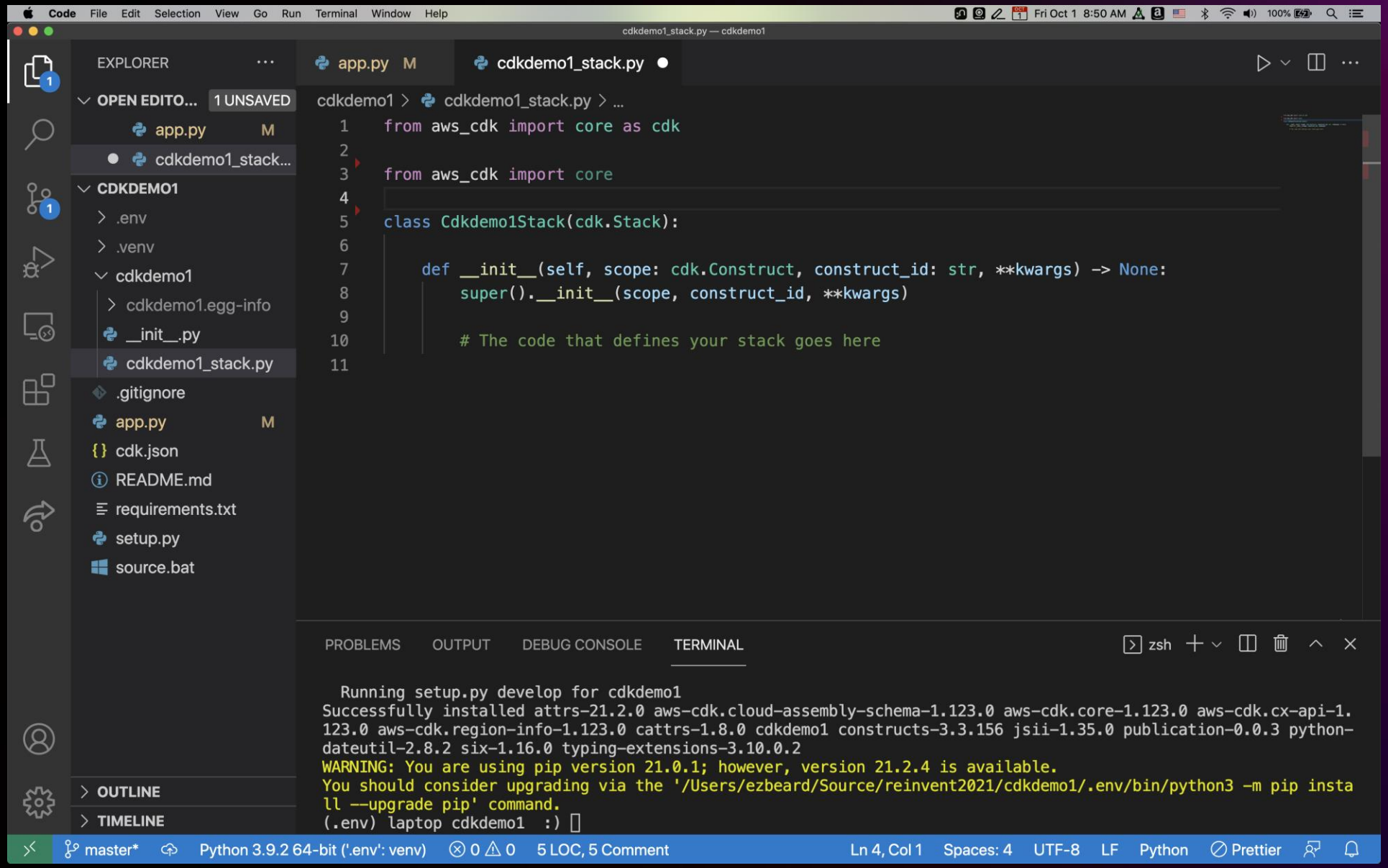
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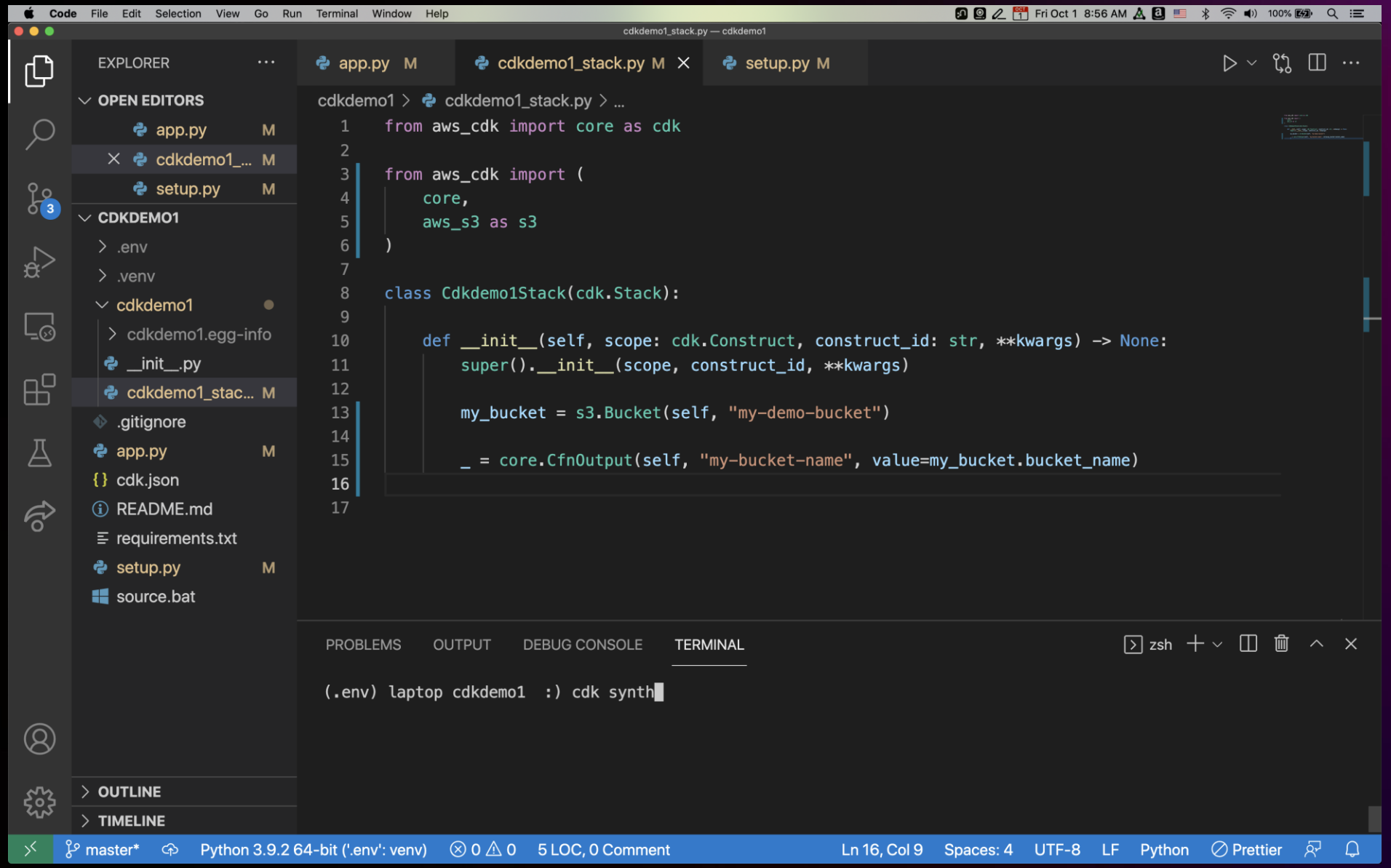
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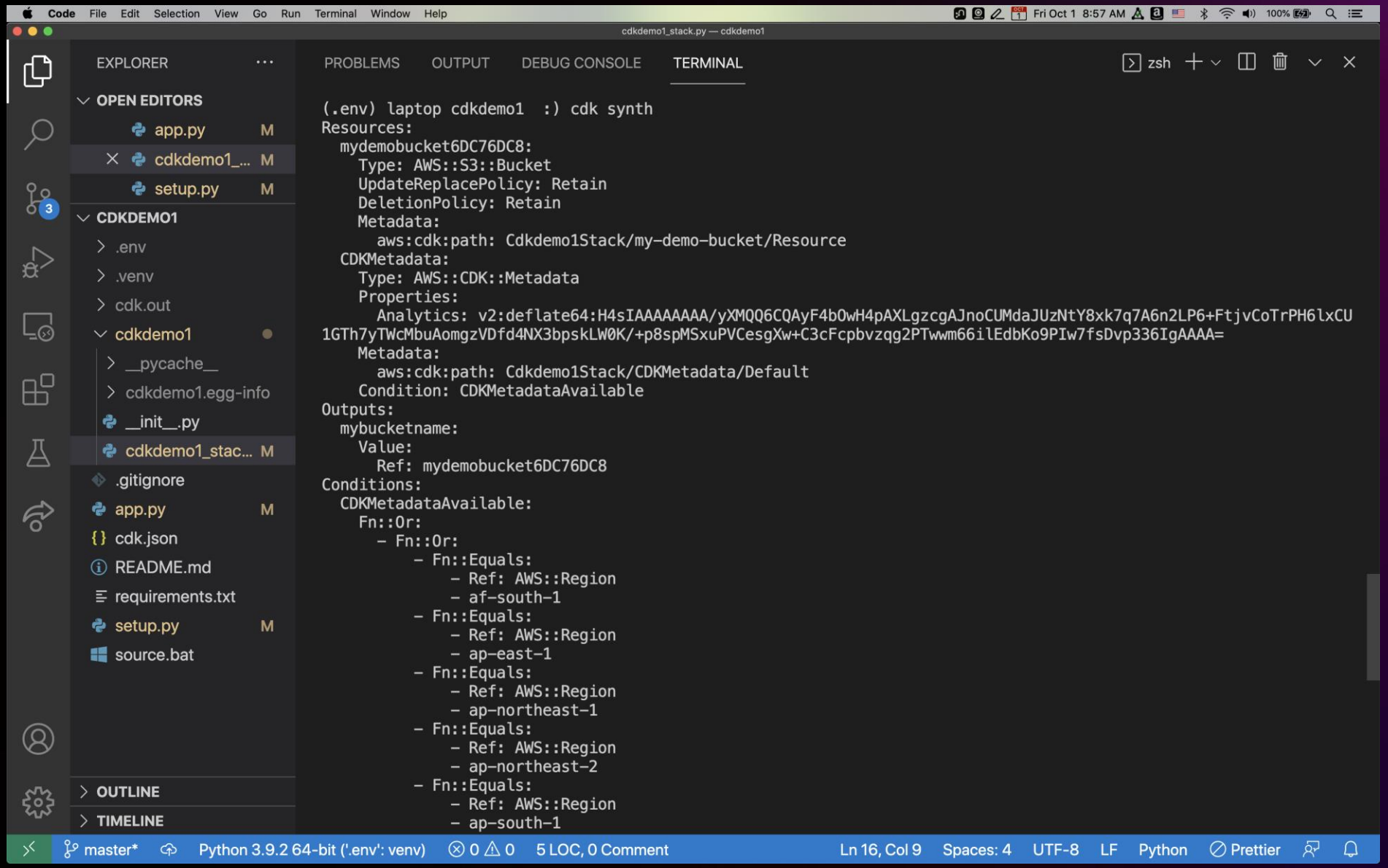
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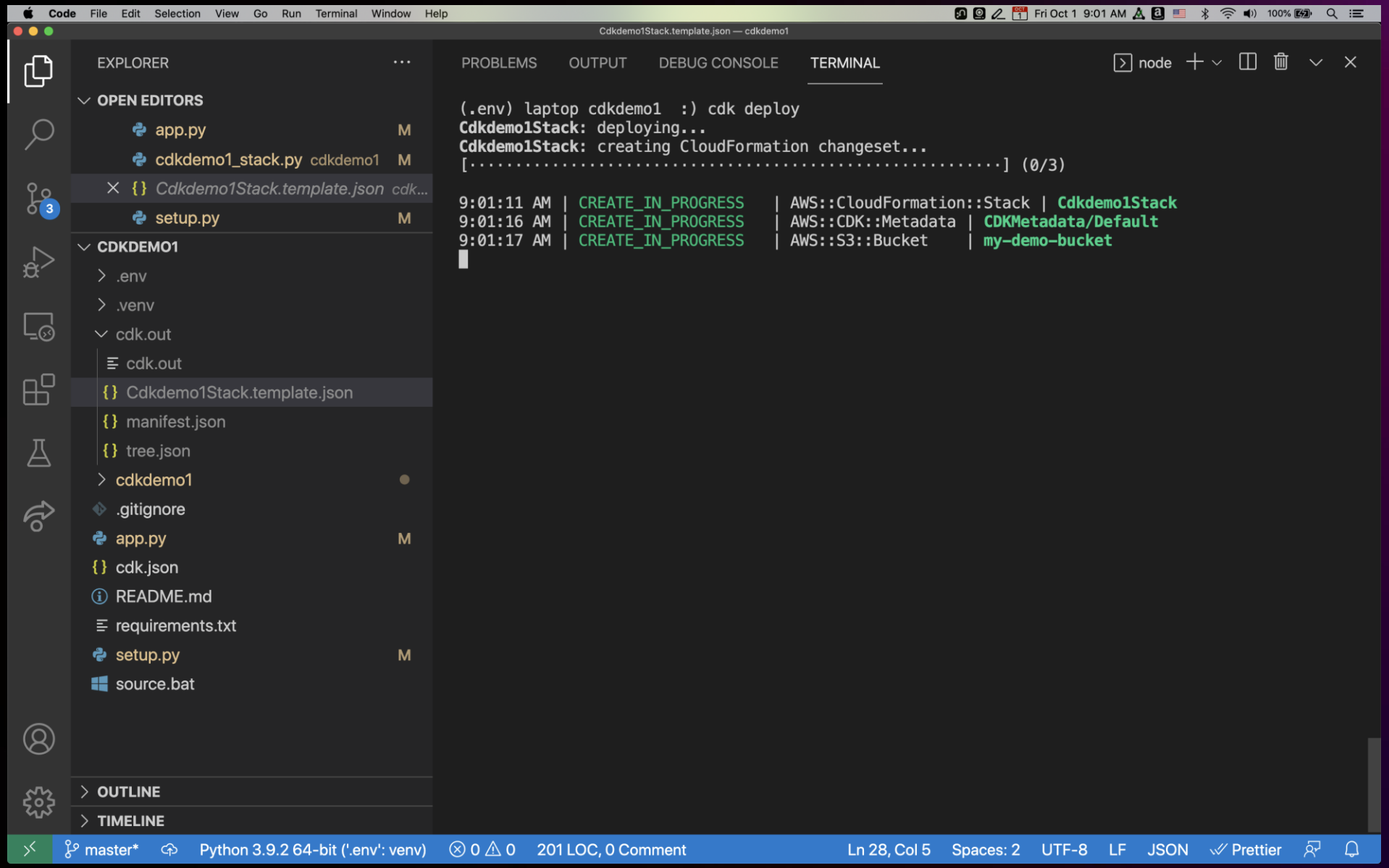
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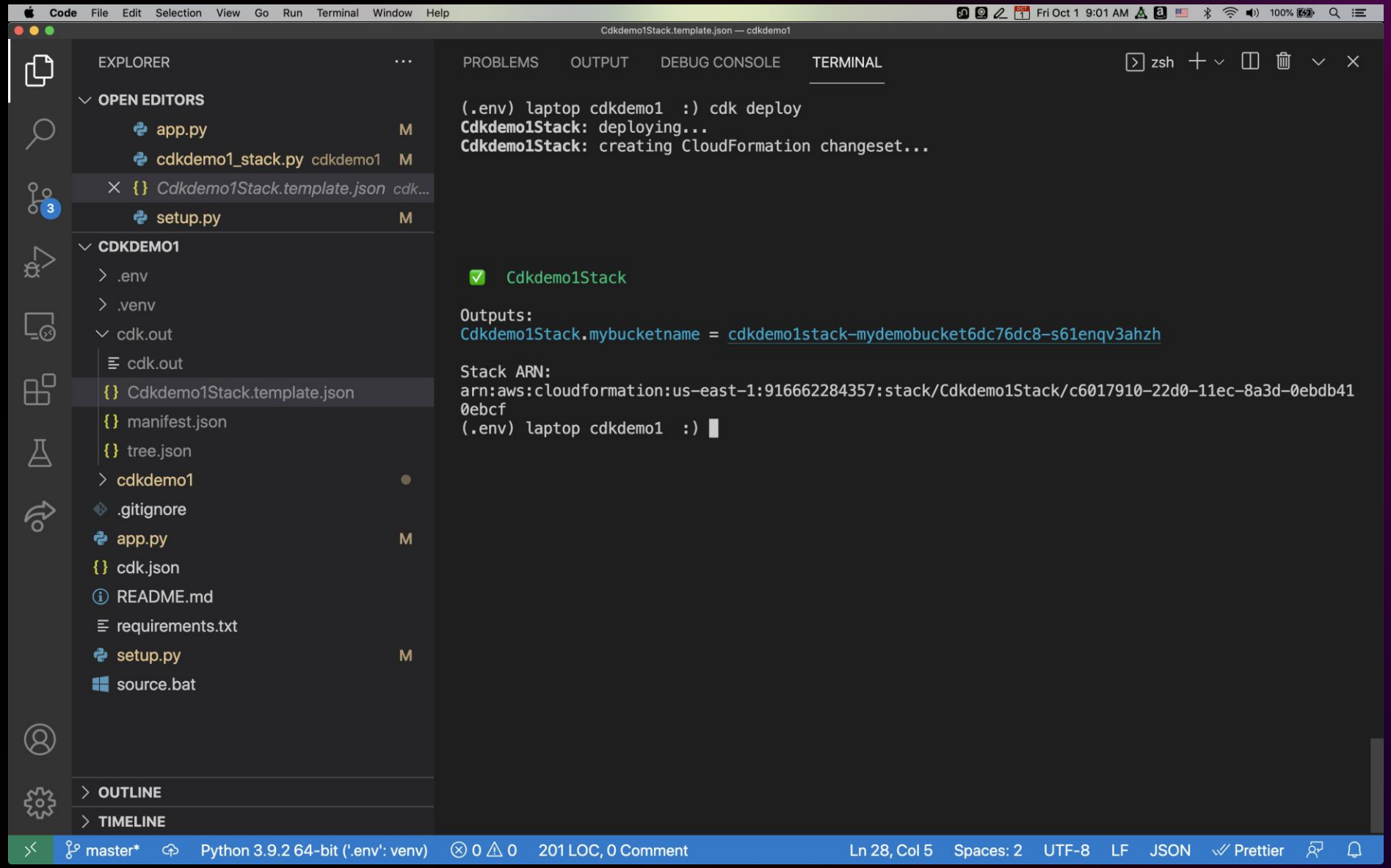
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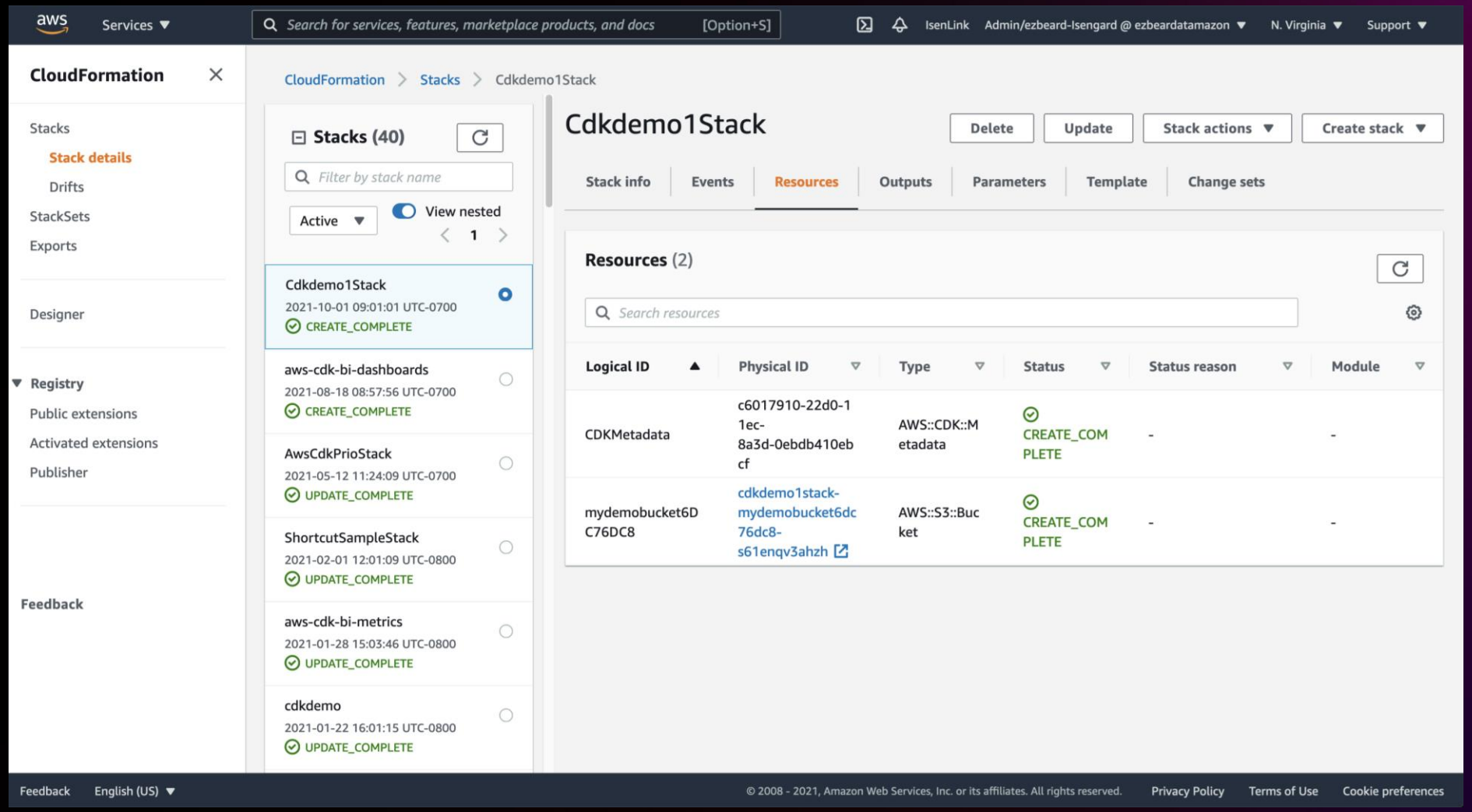
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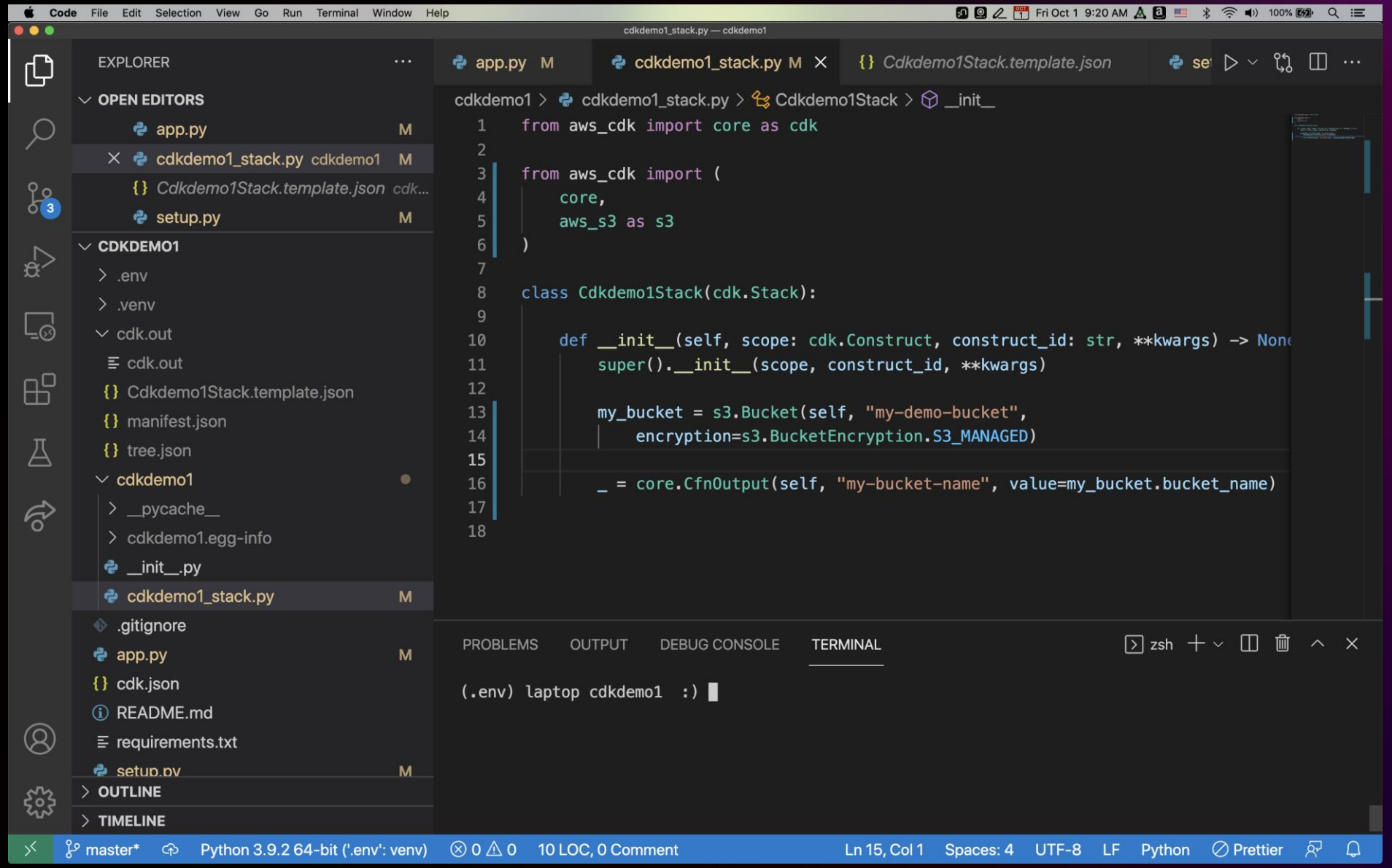
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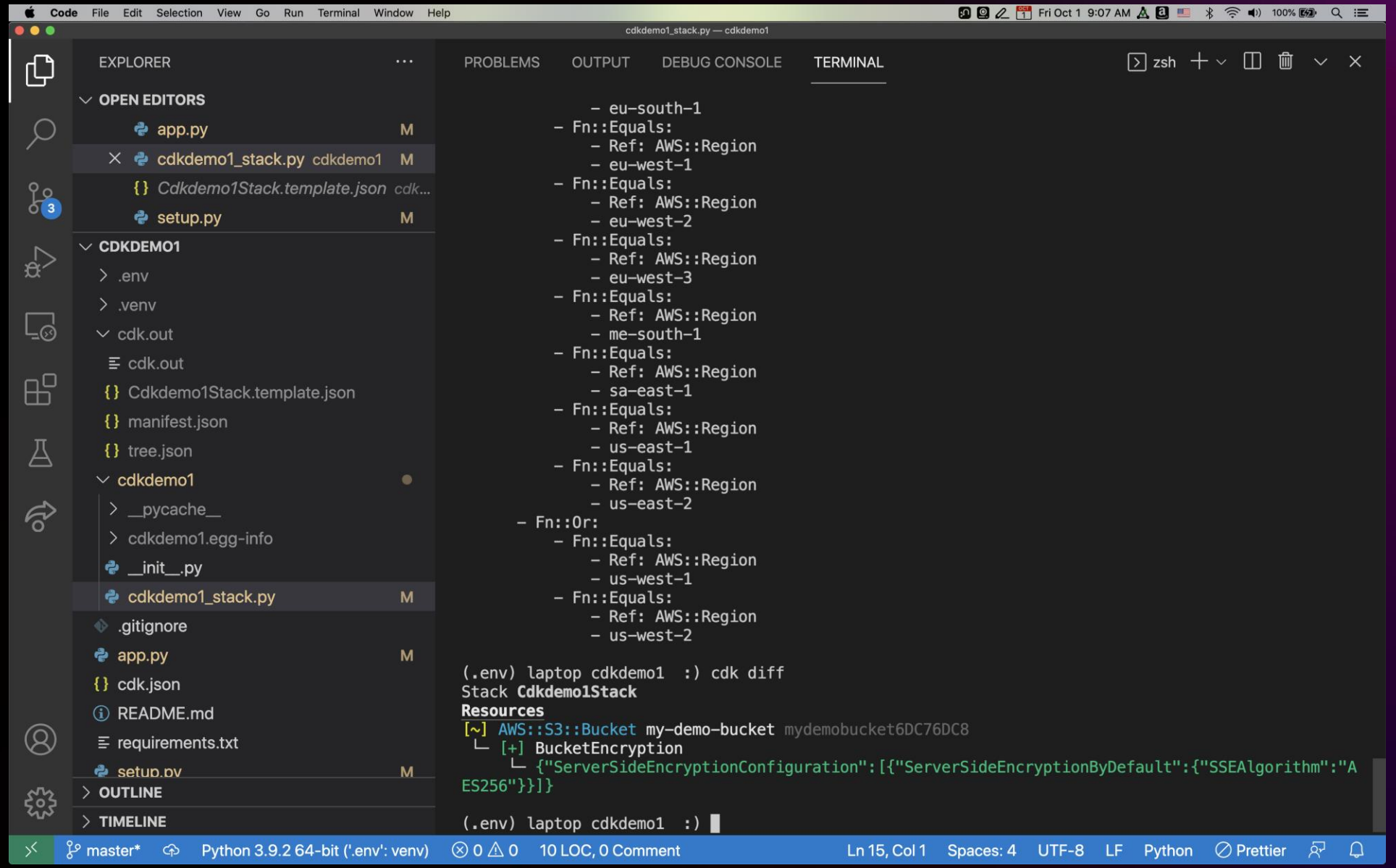
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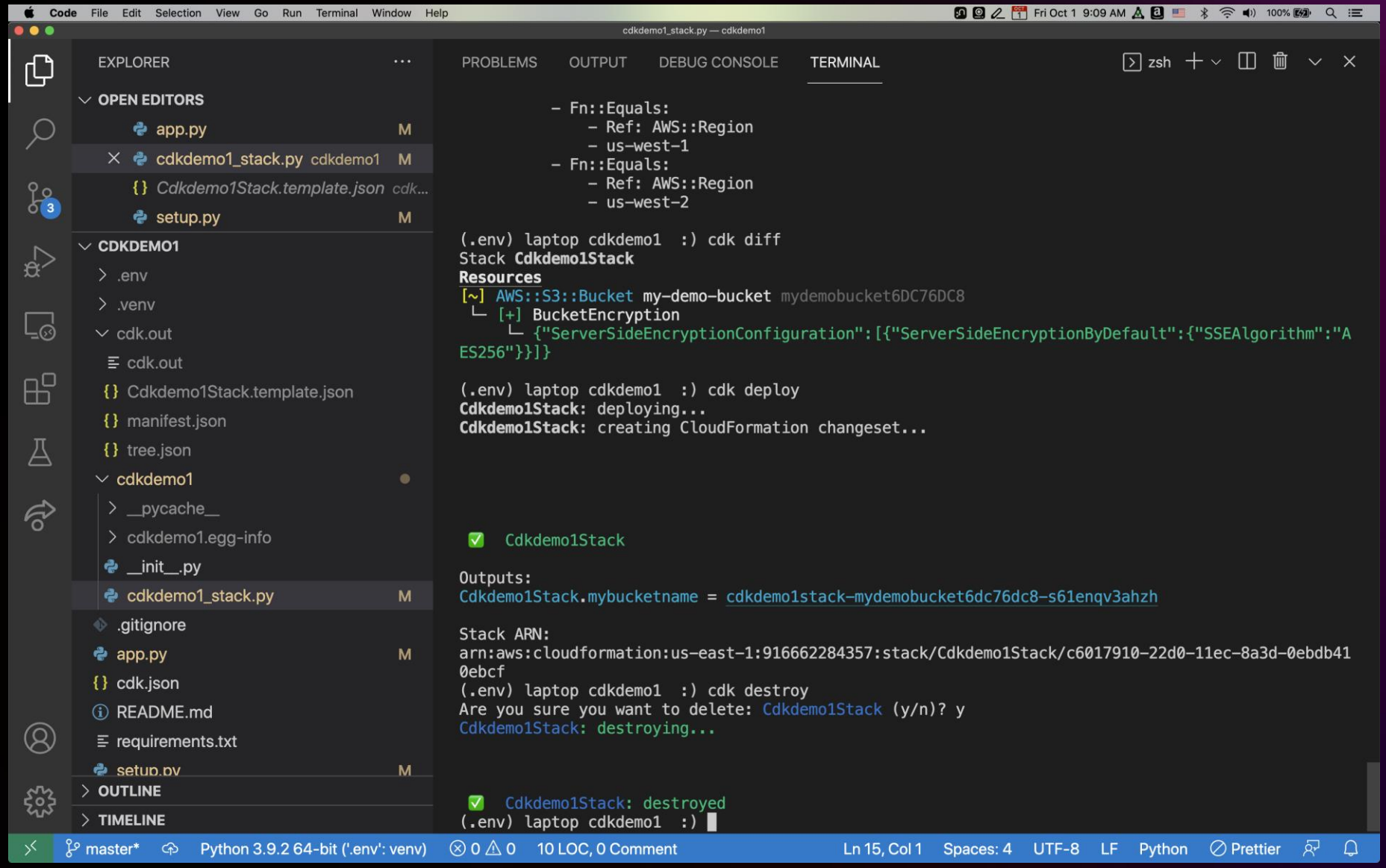
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