

Assignment3: Deploying AWS EC2 Instance and RDS Instance using CloudFormation

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Requirements

Networking Infrastructure

- Create a VPC, public subnet(s), internet gateway, and route table association.

EC2 Instance

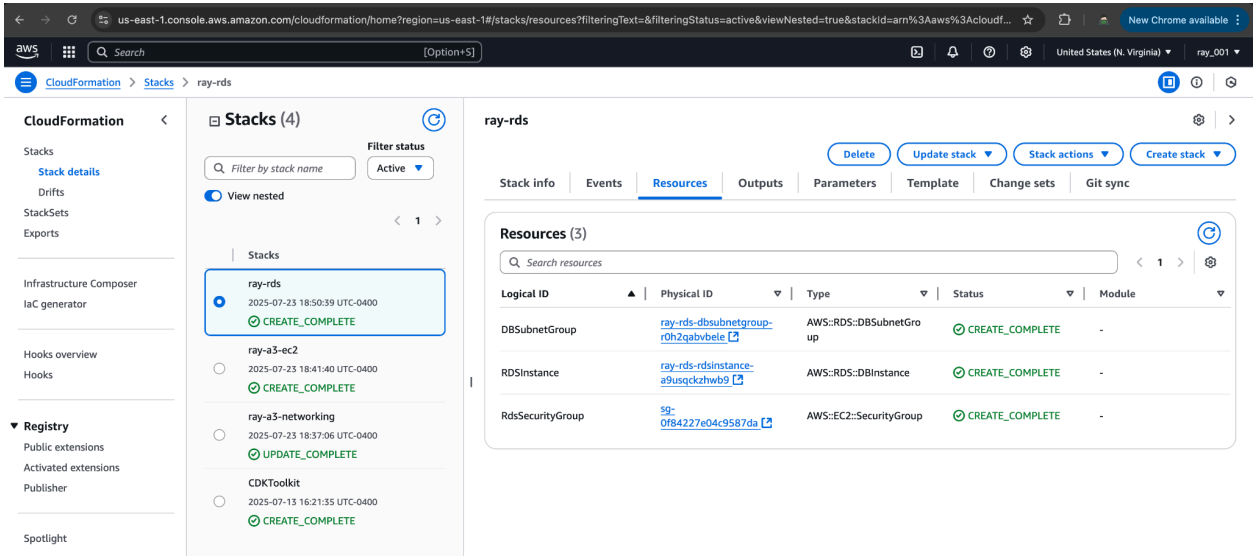
- Launch an EC2 instance using input variables for AMI ID and instance type.
- Attach a security group that allows **inbound SSH traffic on port 22**.

RDS MySQL Instance

- Deploy a publicly accessible RDS instance.
- Create a database named **assignment3**.
- Allow **inbound MySQL traffic on port 3306** through a security group.

Screenshots

1. CloudFormation Stack list



2. Networking with VPC/PublicSubnet/IGW

us-east-1.console.aws.amazon.com/cloudformation/home?region=us-east-1#/stacks/resources?filteringText=&filteringStatus=active&viewNested=true&stackId=arn%3Aaws%3A...

CloudFormation > Stacks > ray-a3-networking

CloudFormation

- Stacks
 - Stack details
 - Drifts
 - StackSets
 - Exports
- Infrastructure Composer
- laC generator
- Hooks overview
- Hooks
- Registry
 - Public extensions
 - Activated extensions
 - Publisher
- Spotlight
- Feedback

Stacks (4)

Filter status: Active

View nested

Stacks

- ray-rds
 - 2025-07-23 18:50:39 UTC-0400
 - CREATE_COMPLETE
- ray-a3-ec2
 - 2025-07-23 18:41:40 UTC-0400
 - CREATE_COMPLETE
- ray-a3-networking**
 - 2025-07-23 18:37:06 UTC-0400
 - UPDATE_COMPLETE
- CDKToolkit
 - 2025-07-13 16:21:35 UTC-0400
 - CREATE_COMPLETE

ray-a3-networking

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

Resources (8)

Logical ID	Physical ID	Type	Status	Module
AttachGateway	IGW/vpc-030129817322a4f14	AWS::EC2::VPCGatewayAttachment	CREATE_COMPLETE	-
InternetGateway	igw-093f71fd70c75014d	AWS::EC2::InternetGateway	CREATE_COMPLETE	-
PublicRoute	rtb-00d1cf12df607a484 0.0.0/0	AWS::EC2::Route	CREATE_COMPLETE	-
PublicSubnet	subnet-0ef65729144bffe9	AWS::EC2::Subnet	CREATE_COMPLETE	-
PublicSubnet2	subnet-0ec43e97e6e8afcbd	AWS::EC2::Subnet	CREATE_COMPLETE	-
RayVPC	vpc-030129817322a4f14	AWS::EC2::VPC	CREATE_COMPLETE	-
RouteTable	rtb-00d1cf12df607a484	AWS::EC2::RouteTable	CREATE_COMPLETE	-
RouteTableAssociation	rtbassoc-0e5f8f05e44b4ceeb	AWS::EC2::SubnetRouteTableAssociation	CREATE_COMPLETE	-

3. Networking with Outputs

us-east-1.console.aws.amazon.com/cloudformation/home?region=us-east-1#/stacks/outputs?filteringText=&filteringStatus=active&viewNested=true&stackId=arn%3Aaws%3A...

CloudFormation > Stacks > ray-a3-networking

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Stacks (4)

Filter status: Active

View nested

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ray-a3-networking

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

Outputs (3)

Key	Value	Description	Export name
SubnetId	subnet-0ef65729144bffe9	-	-
SubnetId2	subnet-0ec43e97e6e8afcbd	-	-
VPCId	vpc-030129817322a4f14	-	-

4. EC2 instance

CloudFormation > Stacks > ray-a3-ec2

CloudFormation

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Stacks (4)

Filter by stack name

Filter status

Active

View nested

Stacks

ray-rds

2025-07-23 18:50:39 UTC-0400

CREATE_COMPLETE

ray-a3-ec2

2025-07-23 18:41:40 UTC-0400

CREATE_COMPLETE

ray-a3-networking

2025-07-23 18:37:06 UTC-0400

UPDATE_COMPLETE

CDKToolkit

2025-07-13 16:21:35 UTC-0400

CREATE_COMPLETE

ray-a3-ec2

Delete

Update stack

Stack actions

Create stack

Stack info

Events

Resources

Outputs

Parameters

Template

Change sets

Git sync

Resources (2)

Search resources

Logical ID

Physical ID

Type

Status

Module

EC2Instance

i-08c895cba03287c15

AWS::EC2::Instance

CREATE_COMPLETE

-

EC2SecurityGroup

sg-030ccc037e3d0e82e

AWS::EC2::SecurityGroup

CREATE_COMPLETE

-

5. RDS Instance

CloudFormation > Stacks > ray-rds

CloudFormation

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Stacks (4)

Filter by stack name

Filter status

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View nested

Stacks

ray-rds

2025-07-23 18:50:39 UTC-0400

CREATE_COMPLETE

ray-a3-ec2

2025-07-23 18:41:40 UTC-0400

CREATE_COMPLETE

ray-a3-networking

2025-07-23 18:37:06 UTC-0400

UPDATE_COMPLETE

CDKToolkit

2025-07-13 16:21:35 UTC-0400

CREATE_COMPLETE

ray-rds

Delete

Update stack

Stack actions

Create stack

Stack info

Events

Resources

Outputs

Parameters

Template

Change sets

Git sync

Resources (3)

Search resources

Logical ID

Physical ID

Type

Status

Module

DBSubnetGroup

ray-rds-dbsubnetgroup-r0h2qabvbele

AWS::RDS::DBSubnetGroup

CREATE_COMPLETE

-

RDSInstance

ray-rds-rdsinstance-a9usqckzhwb9

AWS::RDS::DBInstance

CREATE_COMPLETE

-

RdsSecurityGroup

sg-0f84227e04c9587da

AWS::EC2::SecurityGroup

CREATE_COMPLETE

-

AWS Search [Option+S]

Aurora and RDS > Databases > ray-rds-rdsinstance-a9usqckzhwb9

Aurora and RDS

- Dashboard
- Databases
- Query editor
- Performance insights
- Snapshots
- Exports in Amazon S3
- Automated backups
- Reserved instances
- Proxies

- Subnet groups
- Parameter groups
- Option groups
- Custom engine versions
- Zero-ETL integrations [New](#)

- Events
- Event subscriptions

- Recommendations **0**
- Certificate update

ray-rds-rdsinstance-a9usqckzhwb9

[Modify](#) [Actions](#)

Summary	Status	Role	Engine	Recommendations
DB identifier ray-rds-rdsinstance-a9usqckzhwb9 CPU 4.89%	Status ✔ Available Class db.t3.micro	Role Instance Current activity 0 Connections	Engine MySQL Community Region & AZ us-east-1a	

[Connectivity & security](#)
[Monitoring](#)
[Logs & events](#)
[Configuration](#)
[Zero-ETL integrations](#)
[Maintenance & backups](#)
[Data migrations - new](#)
[Ta](#)

Connectivity & security

Endpoint & port	Networking	Security
Endpoint ray-rds-rdsinstance-a9usqckzhwb9.cozaqo ges4eb.us-east-1.rds.amazonaws.com Port 3306	Availability Zone us-east-1a VPC RayVPC (vpc-030129817322a4f14) Subnet group ray-rds-dbsubnetgroup-r0h2qabvbele Subnets subnet-0ef65729144bffe9 subnet-0ec43e97e6e8afcbd Network type IPv4	VPC security groups ray-rds-RdsSecurityGroup-td7I9OWNyZWq (sg-0f84227e04c9587da) ✔ Active Publicly accessible Yes Certificate authority Info rds-ca-rsa2048-g1 Certificate authority date May 25, 2061, 19:34 (UTC-04:00) DB instance certificate expiration date July 23, 2026, 18:53 (UTC-04:00)

6.CLI commands

```
A3 aws cloudformation create-stack \
  --stack-name ray-a3-networking \
  --template-body file://networking.yaml \
  --capabilities CAPABILITY_NAMED_IAM
A3 aws cloudformation update-stack \
  --stack-name ray-a3-networking \
  --template-body file://networking.yaml \
  --capabilities CAPABILITY_NAMED_IAM
A3 aws cloudformation create-stack \
  --stack-name ray-a3-ec2 \
  --template-body file://ec2.yaml \
  --parameters ParameterKey=AmiId,ParameterValue=ami-0c94855ba95c71c99 \
  ParameterKey=InstanceType,ParameterValue=t2.micro
A3 aws cloudformation create-stack \
  --stack-name ray-rds \
  --template-body file://rds.yaml \
  --parameters ParameterKey=DBUsername,ParameterValue=rayRds \
  ParameterKey=DBPassword,ParameterValue=rayRdsPassword
```

Yaml configuration

Networking.yaml

```
AWSTemplateFormatVersion: '2010-09-09'  
Description: 'Networking Infrastructure'
```

```
Resources:
```

```
  RayVPC:
```

```
    Type: AWS::EC2::VPC
```

```
    Properties:
```

```
      CidrBlock: 10.0.0.0/16
```

```
      EnableDnsSupport: true
```

```
      EnableDnsHostnames: true
```

```
    Tags:
```

```
      - Key: Name
```

```
        Value: RayVPC
```

```
  PublicSubnet:
```

```
    Type: AWS::EC2::Subnet
```

```
    Properties:
```

```
      VpcId: !Ref RayVPC
```

```
      CidrBlock: 10.0.1.0/24
```

```
      AvailabilityZone: us-east-1a
```

```
      MapPublicIpOnLaunch: true
```

```
    Tags:
```

```
      - Key: Name
```

```
        Value: PublicSubnet
```

```
  PublicSubnet2:
```

```
    Type: AWS::EC2::Subnet
```

```
    Properties:
```

```
      VpcId: !Ref RayVPC
```

```
      CidrBlock: 10.0.2.0/24
```

```
      AvailabilityZone: us-east-1b
```

```
      MapPublicIpOnLaunch: true
```

```
    Tags:
```

```
      - Key: Name
```

```
        Value: PublicSubnet2
```

```
  InternetGateway:
```

```
    Type: AWS::EC2::InternetGateway
```

```
    Properties:
```

```
    Tags:
```

```
      - Key: Name
```

```
        Value: RayIGW
```

AttachGateway:

Type: AWS::EC2::VPCGatewayAttachment

Properties:

VpcId: !Ref RayVPC

InternetGatewayId: !Ref InternetGateway

RouteTable:

Type: AWS::EC2::RouteTable

Properties:

VpcId: !Ref RayVPC

Tags:

- Key: Name

Value: PublicRouteTable

PublicRoute:

Type: AWS::EC2::Route

DependsOn: AttachGateway

Properties:

RouteTableId: !Ref RouteTable

DestinationCidrBlock: 0.0.0.0/0

GatewayId: !Ref InternetGateway

RouteTableAssociation:

Type: AWS::EC2::SubnetRouteTableAssociation

Properties:

SubnetId: !Ref PublicSubnet

RouteTableId: !Ref RouteTable

Outputs:

VPCId:

Value: !Ref RayVPC

SubnetId:

Value: !Ref PublicSubnet

SubnetId2:

Value: !Ref PublicSubnet2

Ec2.yaml

AWSTemplateFormatVersion: '2010-09-09'

Description: 'EC2 Instance Deployment'

Parameters:

Amild:

Type: String

Description: AMI ID for EC2 instance

InstanceType:

Type: String

Default: t2.micro

AllowedValues:

- t2.micro
- t2.small
- t2.medium

Resources:

EC2SecurityGroup:

Type: AWS::EC2::SecurityGroup

Properties:

GroupDescription: Allow SSH

VpcId: 'vpc-030129817322a4f14'

SecurityGroupIngress:

- IpProtocol: tcp
- FromPort: 22
- ToPort: 22
- CidrIp: 0.0.0.0/0

EC2Instance:

Type: AWS::EC2::Instance

Properties:

InstanceType: !Ref InstanceType

ImageId: !Ref AmiId

SubnetId: 'subnet-0ef65729144bffce9'

SecurityGroupIds:

- !Ref EC2SecurityGroup

Rds.yaml

AWSTemplateFormatVersion: '2010-09-09'

Description: 'RDS MySQL Instance'

Parameters:

DBUsername:

Type: String

Default: rayRds

DBPassword:

Type: String

NoEcho: true

Default: rayRdsPassword

Resources:

RdsSecurityGroup:

Type: AWS::EC2::SecurityGroup

Properties:

GroupDescription: Allow MySQL access

VpcId: vpc-030129817322a4f14

SecurityGroupIngress:

- IpProtocol: tcp
- FromPort: 3306
- ToPort: 3306
- CidrIp: 0.0.0.0/0

DBSubnetGroup:

Type: AWS::RDS::DBSubnetGroup

Properties:

DBSubnetGroupDescription: RDS Subnet Group

SubnetIds:

- subnet-0ef65729144bffce9
- subnet-0ec43e97e6e8afcbd

Tags:

- Key: Name
Value: RayDBSubnetGroup

RDSInstance:

Type: AWS::RDS::DBInstance

Properties:

DBName: assignment3

AllocatedStorage: 20

DBInstanceClass: db.t3.micro

Engine: mysql

EngineVersion: '8.0'

MasterUsername: !Ref DBUsername

MasterUserPassword: !Ref DBPassword

PubliclyAccessible: true

VPCSecurityGroups:

- !Ref RdsSecurityGroup

DBSubnetGroupName: !Ref DBSubnetGroup