DEPI

AWS Project Documentation

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Under supervision of / NTI

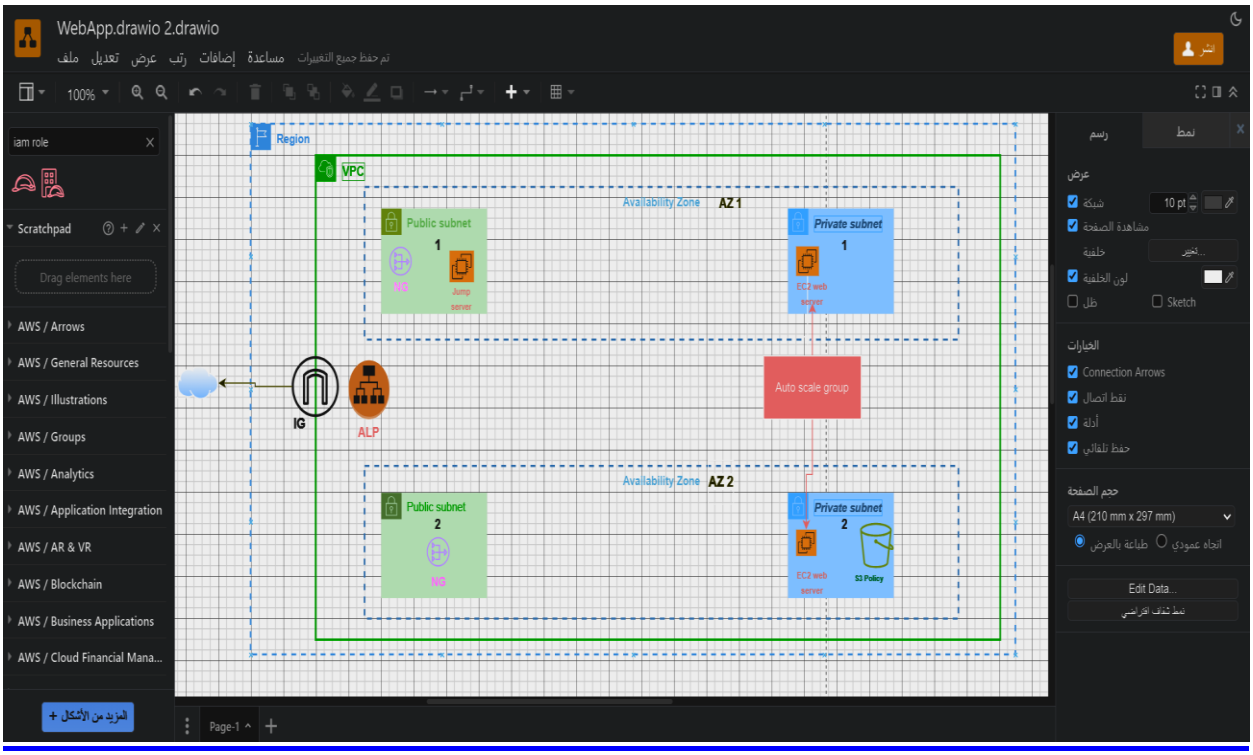
Project Objectives:

• Create Network Environment with Infrastructure as a Code.
• Host your web app on EC2 or using micro services.
• Store App static content on external storage not on EBS.
• Monitoring your servers with integrated notifications while metrics exceed specific limit.
• Automatic remediation if web service disabled.
• Noted that the environment must be [Secure - Highly Available - Scalable - Disaster Recovery needed].
• Design your Architecture on Draw IO.
• Documentation your steps.

Additional Projects:

• Enable Redirection on Load balancer from HTTP to HTTPS.
• Mount S3 on EC2.
• Use API Gateway to view image on S3.

1) Project Architecture using Draw IO



- ## Routing tables

- ## Public Routing Table

Network	Next hop
0.0.0.0	IGW

- ## Private Routing Table

Network	Next hop
0.0.0.0	NAT GW

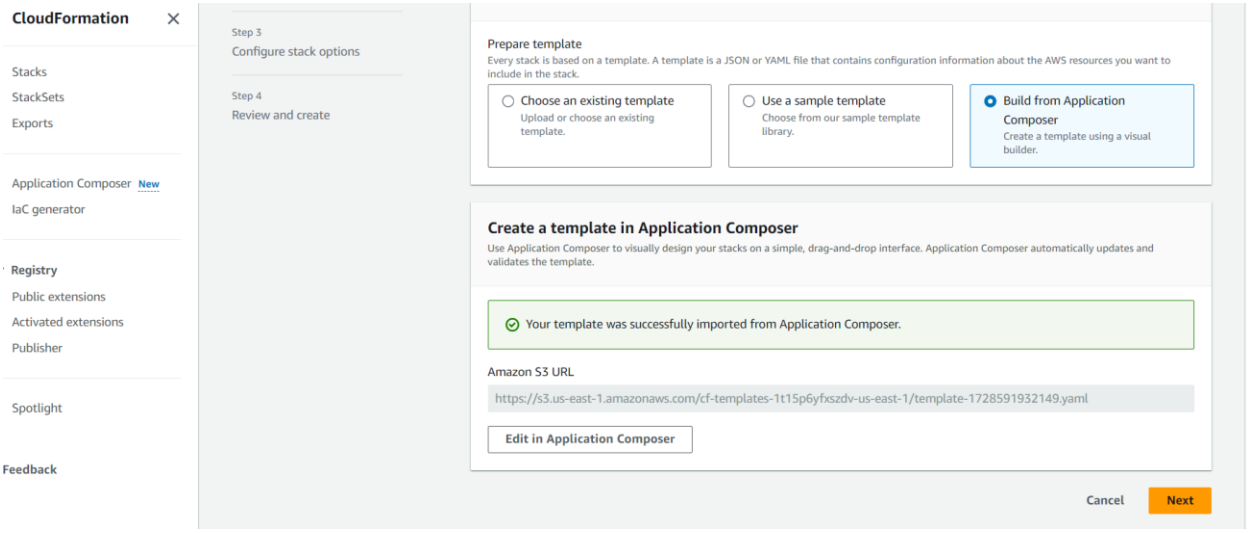
- **Subnets in availability zones**

Public subnet AZ1	Private subnet AZ1	Public subnet AZ2	Private subnet AZ2
10.0.1.0/24	10.0.3.0/24	10.0.2.0/24	10.0.4.0/24

- **Project Steps**

Task 1 : Create Network Environment with Infrastructure as a Code.

CloudFormation console > Create Stack > Build from Application Composer



Template used:

AWSTemplateFormatVersion: "2010-09-09"
Description: CloudFormation Template to Create a VPC with Public and Private Subnets, Internet Gateway, NAT Gateway, and Security Groups

```
Resources:

  # VPC
  MyVPC:
    Type: "AWS::EC2::VPC"
    Properties:
      CidrBlock: "10.0.0.0/16"
      EnableDnsSupport: true
      EnableDnsHostnames: true
      Tags:
        - Key: Name
          Value: MyVPC

  # Internet Gateway
  MyInternetGateway:
    Type: "AWS::EC2::InternetGateway"
    Properties:
      Tags:
        - Key: Name
          Value: MyInternetGateway

  AttachGateway:
    Type: "AWS::EC2::VPCGatewayAttachment"
    Properties:
      VpcId: !Ref MyVPC
      InternetGatewayId: !Ref MyInternetGateway

  # Public Subnet 1 (AZ1)
  PublicSubnet1:
    Type: "AWS::EC2::Subnet"
    Properties:
      VpcId: !Ref MyVPC
      CidrBlock: "10.0.1.0/24"
      AvailabilityZone: !Select [ 0, !GetAZs '' ]
      MapPublicIpOnLaunch: true
      Tags:
        - Key: Name
          Value: PublicSubnet1

  # Public Subnet 2 (AZ2)
  PublicSubnet2:
    Type: "AWS::EC2::Subnet"
    Properties:
      VpcId: !Ref MyVPC
```

```
    CidrBlock: "10.0.2.0/24"
    AvailabilityZone: !Select [ 1, !GetAZs '' ]
    MapPublicIpOnLaunch: true
    Tags:
      - Key: Name
        Value: PublicSubnet2

# Private Subnet 1 (AZ1)
PrivateSubnet1:
  Type: "AWS::EC2::Subnet"
  Properties:
    VpcId: !Ref MyVPC
    CidrBlock: "10.0.3.0/24"
    AvailabilityZone: !Select [ 0, !GetAZs '' ]
    MapPublicIpOnLaunch: false
    Tags:
      - Key: Name
        Value: PrivateSubnet1

# Private Subnet 2 (AZ2)
PrivateSubnet2:
  Type: "AWS::EC2::Subnet"
  Properties:
    VpcId: !Ref MyVPC
    CidrBlock: "10.0.4.0/24"
    AvailabilityZone: !Select [ 1, !GetAZs '' ]
    MapPublicIpOnLaunch: false
    Tags:
      - Key: Name
        Value: PrivateSubnet2

# Public Route Table
PublicRouteTable:
  Type: "AWS::EC2::RouteTable"
  Properties:
    VpcId: !Ref MyVPC
    Tags:
      - Key: Name
        Value: PublicRouteTable

# Route for Public Route Table to Internet Gateway
PublicRoute:
  Type: "AWS::EC2::Route"
  Properties:
```

```
    RouteTableId: !Ref PublicRouteTable
    DestinationCidrBlock: "0.0.0.0/0"
    GatewayId: !Ref MyInternetGateway

# Associate Public Route Table with Public Subnet 1
PublicSubnet1RouteTableAssociation:
  Type: "AWS::EC2::SubnetRouteTableAssociation"
  Properties:
    SubnetId: !Ref PublicSubnet1
    RouteTableId: !Ref PublicRouteTable

# Associate Public Route Table with Public Subnet 2
PublicSubnet2RouteTableAssociation:
  Type: "AWS::EC2::SubnetRouteTableAssociation"
  Properties:
    SubnetId: !Ref PublicSubnet2
    RouteTableId: !Ref PublicRouteTable

# NAT Gateway
EIPForNATGateway:
  Type: "AWS::EC2::EIP"
  Properties:
    Domain: "vpc"

NATGateway:
  Type: "AWS::EC2::NatGateway"
  Properties:
    AllocationId: !GetAtt EIPForNATGateway.AllocationId
    SubnetId: !Ref PublicSubnet1
    Tags:
      - Key: Name
        Value: NATGateway

# Private Route Table
PrivateRouteTable:
  Type: "AWS::EC2::RouteTable"
  Properties:
    VpcId: !Ref MyVPC
    Tags:
      - Key: Name
        Value: PrivateRouteTable

# Route for Private Route Table to NAT Gateway
PrivateRoute:
```

```
  Type: "AWS::EC2::Route"
  Properties:
    RouteTableId: !Ref PrivateRouteTable
    DestinationCidrBlock: "0.0.0.0/0"
    NatGatewayId: !Ref NATGateway

# Associate Private Route Table with Private Subnet 1
PrivateSubnet1RouteTableAssociation:
  Type: "AWS::EC2::SubnetRouteTableAssociation"
  Properties:
    SubnetId: !Ref PrivateSubnet1
    RouteTableId: !Ref PrivateRouteTable

# Associate Private Route Table with Private Subnet 2
PrivateSubnet2RouteTableAssociation:
  Type: "AWS::EC2::SubnetRouteTableAssociation"
  Properties:
    SubnetId: !Ref PrivateSubnet2
    RouteTableId: !Ref PrivateRouteTable

# --- Security Groups ---

# Public Security Group (Web Servers)
PublicSecurityGroup:
  Type: "AWS::EC2::SecurityGroup"
  Properties:
    GroupDescription: Enable inbound traffic for web servers in the public subnet
    VpcId: !Ref MyVPC
    SecurityGroupIngress:
      - IpProtocol: tcp
        FromPort: 80
        ToPort: 80
        CidrIp: 0.0.0.0/0
      - IpProtocol: tcp
        FromPort: 443
        ToPort: 443
        CidrIp: 0.0.0.0/0
    SecurityGroupEgress:
      - IpProtocol: -1
        CidrIp: 0.0.0.0/0
    Tags:
      - Key: Name
        Value: PublicSecurityGroup
```

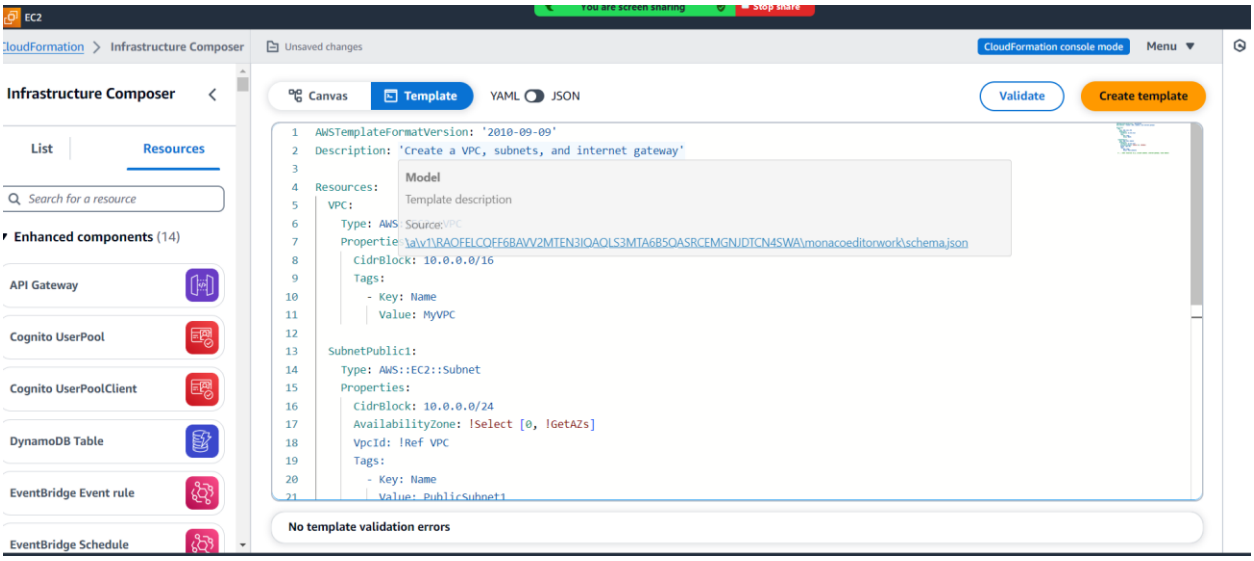
```
  # Private Security Group (Application/DB Servers)
  PrivateSecurityGroup:
    Type: "AWS::EC2::SecurityGroup"
    Properties:
      GroupDescription: Enable inbound traffic for internal resources in private subnet
      VpcId: !Ref MyVPC
      SecurityGroupIngress:
        - IpProtocol: tcp
          FromPort: 3306
          ToPort: 3306
          SourceSecurityGroupId: !Ref PublicSecurityGroup   # Access from web servers
        - IpProtocol: tcp
          FromPort: 22
          ToPort: 22
          CidrIp: 10.0.0.0/16   # Internal SSH access
      SecurityGroupEgress:
        - IpProtocol: -1
          CidrIp: 0.0.0.0/0
      Tags:
        - Key: Name
          Value: PrivateSecurityGroup

Outputs:
  VPCID:
    Description: The VPC ID
    Value: !Ref MyVPC

  PublicSubnet1ID:
    Description: Public Subnet 1 ID
    Value: !Ref PublicSubnet1

  PublicSubnet2ID:
    Description: Public Subnet 2 ID
    Value: !Ref PublicSubnet2

  PrivateSubnet1ID:
    Description: Private Subnet 1 ID
    Value: !Ref PrivateSubnet1

  PrivateSubnet2ID:
    Description: Private Subnet 2 ID
    Value: !Ref PrivateSubnet2

  PublicSecurityGroupID:
```

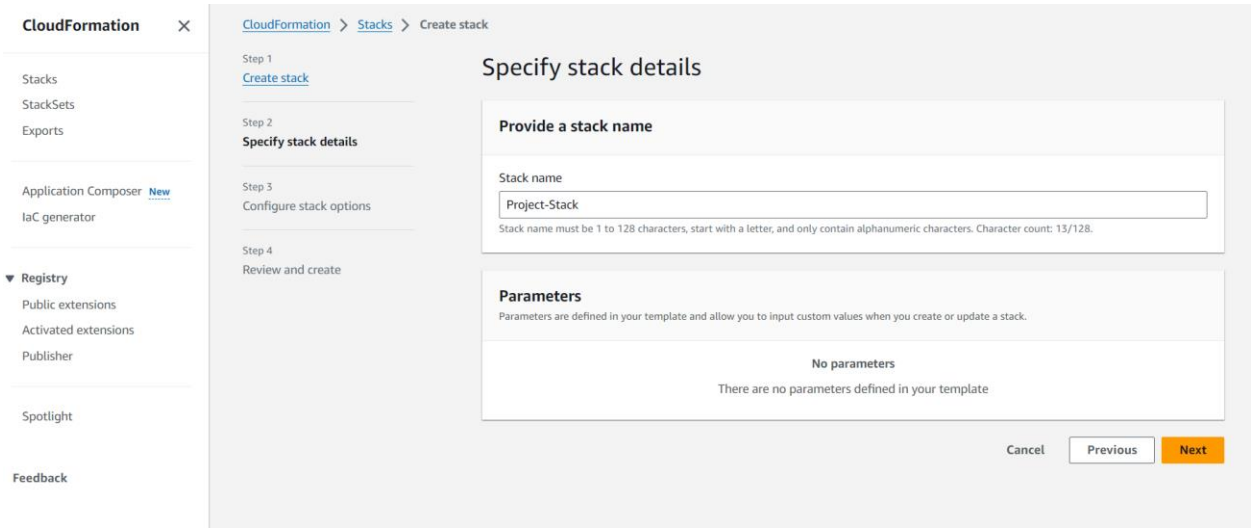
```
  Description: Public Security Group ID
  Value: !Ref PublicSecurityGroup

PrivateSecurityGroupID:
  Description: Private Security Group ID
  Value: !Ref PrivateSecurityGroup
```

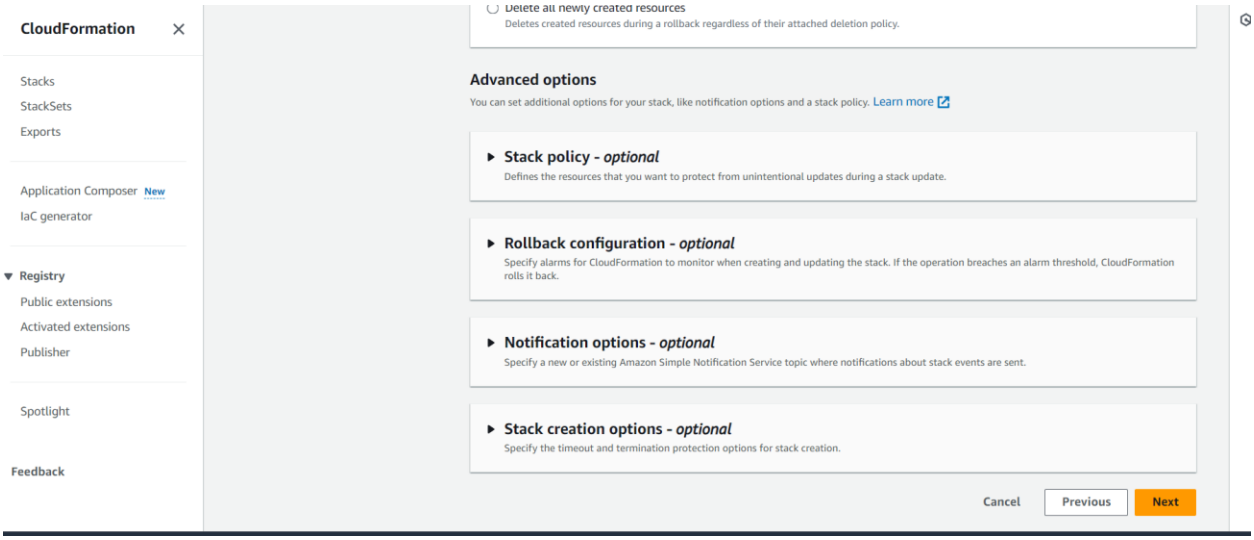
- **Explanation of the Template:**
- **VPC**: A VPC with a CIDR block of `10.0.0.0/16` is created.
- **Subnets**: Two public subnets (`10.0.1.0/24`, `10.0.2.0/24`) and two private subnets (`10.0.3.0/24`, `10.0.4.0/24`) are created, each in different availability zones to ensure high availability.
- **Internet Gateway**: An Internet Gateway is created and attached to the VPC.
- **NAT Gateway**: A NAT Gateway is created in the first public subnet to allow instances in private subnets to access the internet.
- **Route Tables**:
    - A public route table is created and associated with the public subnets, with a route to the Internet Gateway.
    - A private route table is created and associated with the private subnets, with a route to the NAT Gateway for outbound internet access.

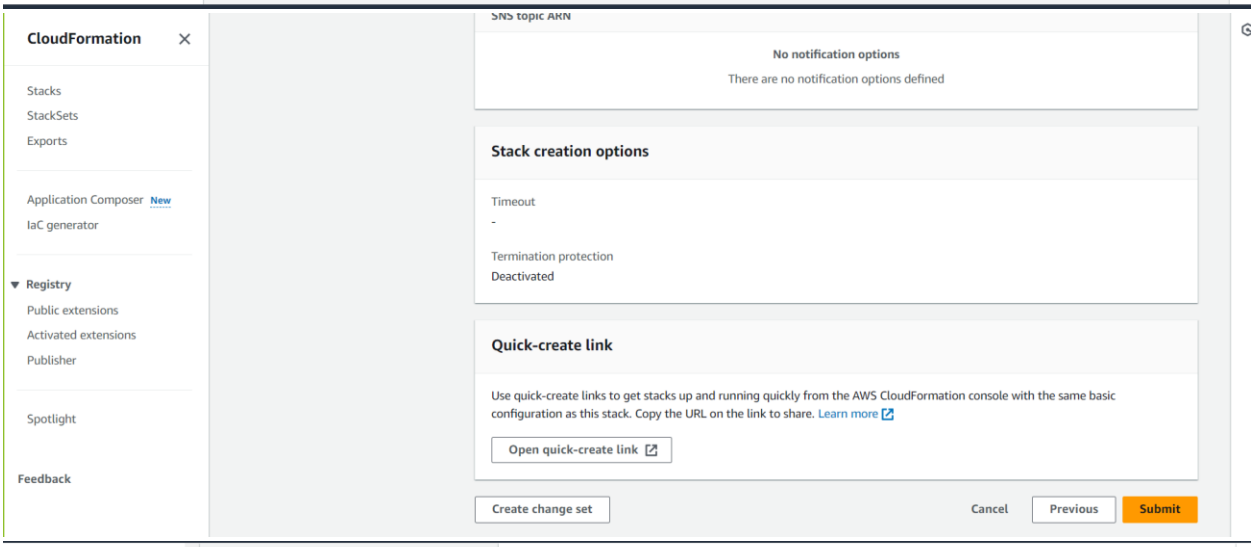
* Explanation of Security Groups:

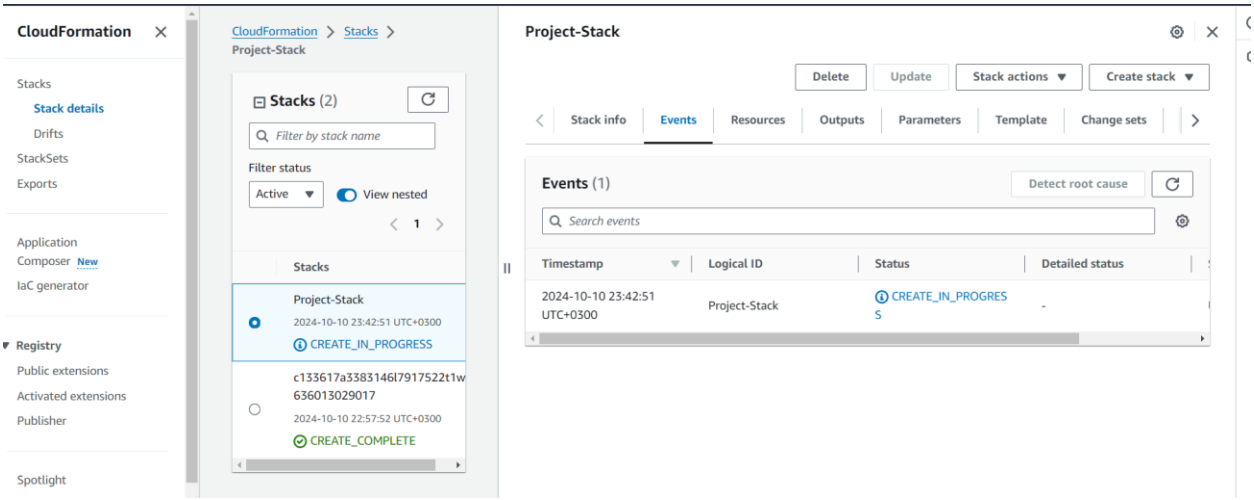
1. **Public Security Group (PublicSecurityGroup)**:
    - Allows inbound HTTP (port 80) and HTTPS (port 443) traffic from any IP (`0.0.0.0/0`).
    - Allows all outbound traffic (`-1` protocol and `0.0.0.0/0` for egress).
    - This is typically used for web servers hosted in public subnets (e.g., EC2 instances running a web application).
2. **Private Security Group (PrivateSecurityGroup)**:
    - Allows inbound MySQL (port 3306) traffic only from instances within the **PublicSecurityGroup**, meaning web servers can communicate with database servers.
    - Allows SSH (port 22) from within the VPC (`10.0.0.0/16`), limiting access to internal users or a bastion host.
    - Allows all outbound traffic (`-1` for egress).
    - This group is typically used for internal resources such as application or database servers hosted in private subnets.
- **Outputs**: The VPC ID, public subnet IDs, and private subnet IDs are output for reference, which can be used when deploying other resources in this network.


EC2
You are screen sharing
Stop share
CloudFormation > Infrastructure Composer
Unsaved changes
CloudFormation console mode
Menu
Infrastructure Composer
List
Resources
Search for a resource
Enhanced components (14)
API Gateway
Cognito UserPool
Cognito UserPoolClient
DynamoDB Table
EventBridge Event rule
EventBridge Schedule
Canvas
Template
YAML
JSON
Validate
Create template
AWSTemplateFormatVersion: '2010-09-09'
Description: 'Create a VPC, subnets, and internet gateway'
Resources:
VPC:
Type: AWS
Properties:
CidrBlock: 10.0.0.0/16
Tags:
- Key: Name
Value: MyVPC
SubnetPublic1:
Type: AWS::EC2::Subnet
Properties:
CidrBlock: 10.0.0.0/24
AvailabilityZone: !Select [0, !GetAZs]
VpcId: !Ref VPC
Tags:
- Key: Name
Value: PublicSubnet1
Model
Template description
Source:VPC
\a\v1\RAOFELCOFF6BAVV2MTEN3IOAOLS3MTA6B5OASRCEMGNJDTCN4SWA\monacoeditorwork\schema.json
No template validation errors


CloudFormation
Stacks
StackSets
Exports
Application Composer New
IaC generator
Registry
Public extensions
Activated extensions
Publisher
Spotlight
Feedback
CloudFormation > Stacks > Create stack
Step 1
Create stack
Step 2
Specify stack details
Step 3
Configure stack options
Step 4
Review and create
Specify stack details
Provide a stack name
Stack name
Project-Stack
Stack name must be 1 to 128 characters, start with a letter, and only contain alphanumeric characters. Character count: 13/128.
Parameters
Parameters are defined in your template and allow you to input custom values when you create or update a stack.
No parameters
There are no parameters defined in your template
Cancel
Previous
Next


CloudFormation
Stacks
StackSets
Exports
Application Composer New
IaC generator
Registry
Public extensions
Activated extensions
Publisher
Spotlight
Feedback
Delete all newly created resources
Deletes created resources during a rollback regardless of their attached deletion policy.
Advanced options
You can set additional options for your stack, like notification options and a stack policy. Learn more
Stack policy - optional
Defines the resources that you want to protect from unintentional updates during a stack update.
Rollback configuration - optional
Specify alarms for CloudFormation to monitor when creating and updating the stack. If the operation breaches an alarm threshold, CloudFormation rolls it back.
Notification options - optional
Specify a new or existing Amazon Simple Notification Service topic where notifications about stack events are sent.
Stack creation options - optional
Specify the timeout and termination protection options for stack creation.
Cancel
Previous
Next

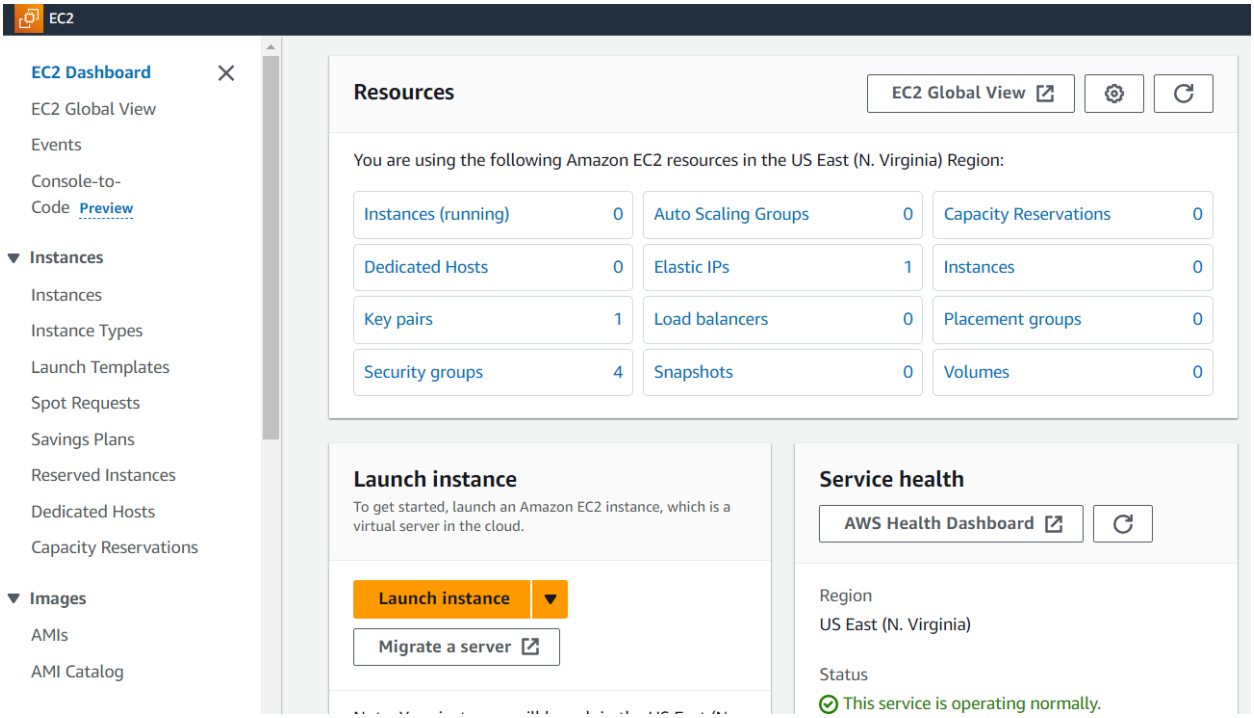

CloudFormation
Stacks
StackSets
Exports
Application Composer New
IaC generator
Registry
Public extensions
Activated extensions
Publisher
Spotlight
Feedback
SNS topic ARN
No notification options
There are no notification options defined
Stack creation options
Timeout
-
Termination protection
Deactivated
Quick-create link
Use quick-create links to get stacks up and running quickly from the AWS CloudFormation console with the same basic configuration as this stack. Copy the URL on the link to share. Learn more
Open quick-create link
Create change set
Cancel
Previous
Submit

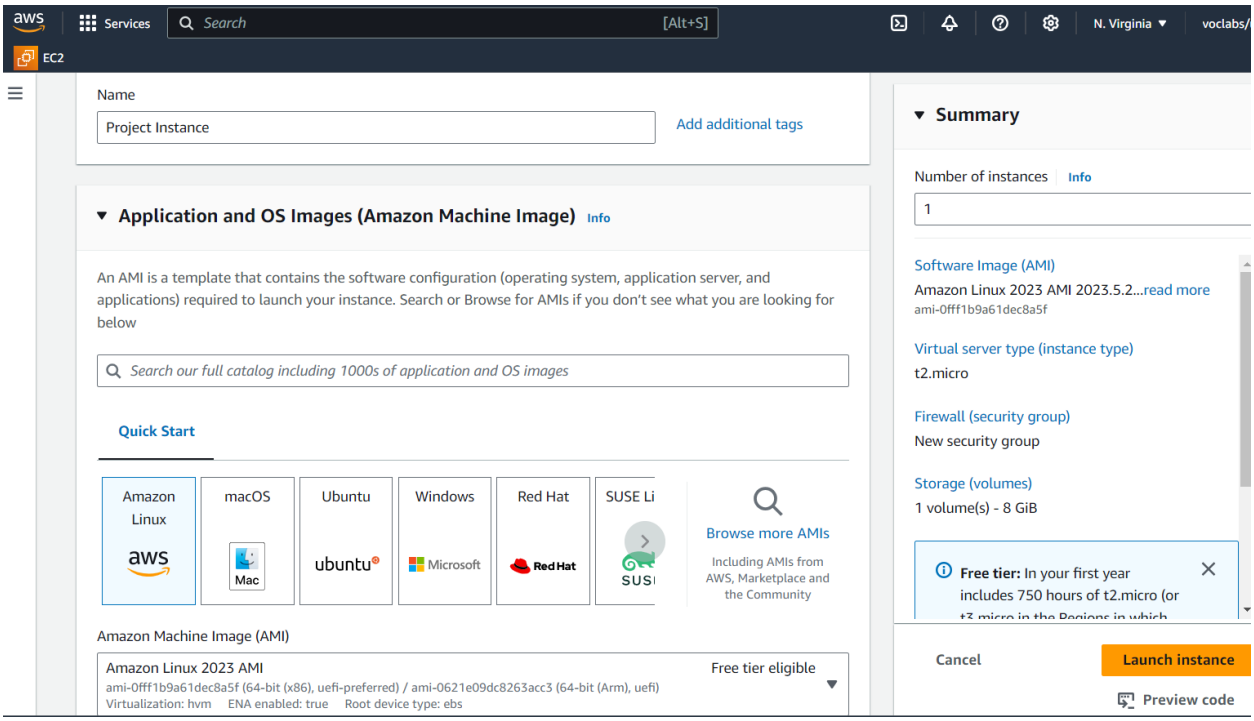

CloudFormation
Stacks
Stack details
Drifts
StackSets
Exports
Application Composer New
IaC generator
Registry
Public extensions
Activated extensions
Publisher
Spotlight
CloudFormation > Stacks >
Project-Stack
Stacks (2)
Filter by stack name
Filter status
Active
View nested
1
Stacks
Project-Stack
2024-10-10 23:42:51 UTC+0300
CREATE_IN_PROGRESS
c133617a3383146l7917522t1w
636013029017
2024-10-10 22:57:52 UTC+0300
CREATE_COMPLETE
Project-Stack
Delete
Update
Stack actions
Create stack
Stack info
Events
Resources
Outputs
Parameters
Template
Change sets
Events (1)
Detect root cause
Search events
Timestamp
Logical ID
Status
Detailed status
2024-10-10 23:42:51 UTC+0300
Project-Stack
CREATE_IN_PROGRES S
-

Timestamp	Logical ID	Status	Detailed status
2024-10-10 23:45:15 UTC+0300	Project-Stack	CREATE_COMPLETE	-
2024-10-10 23:45:14 UTC+0300	PrivateRoute	CREATE_COMPLETE	-

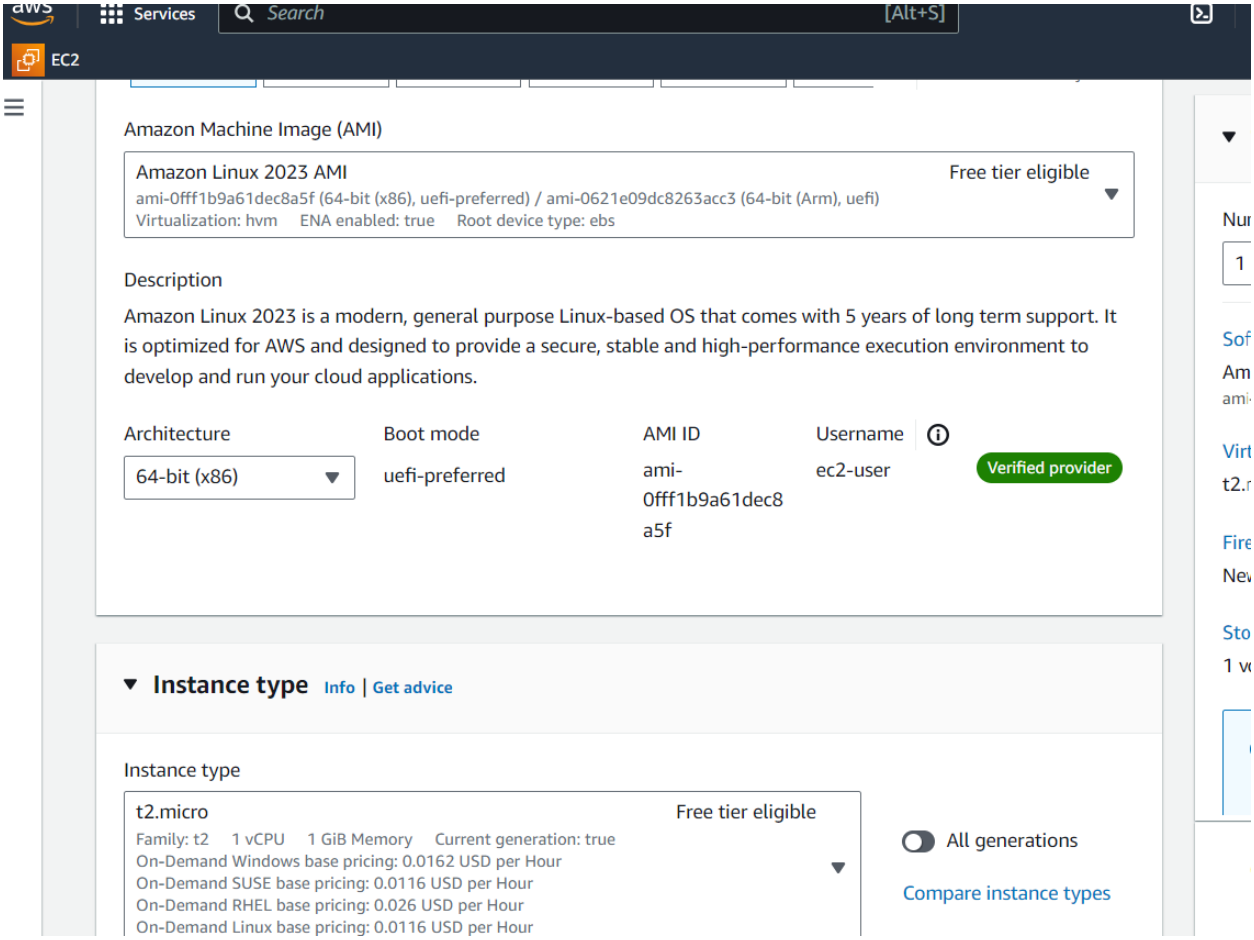
Task 2: Host your web app on EC2 or using micro services.

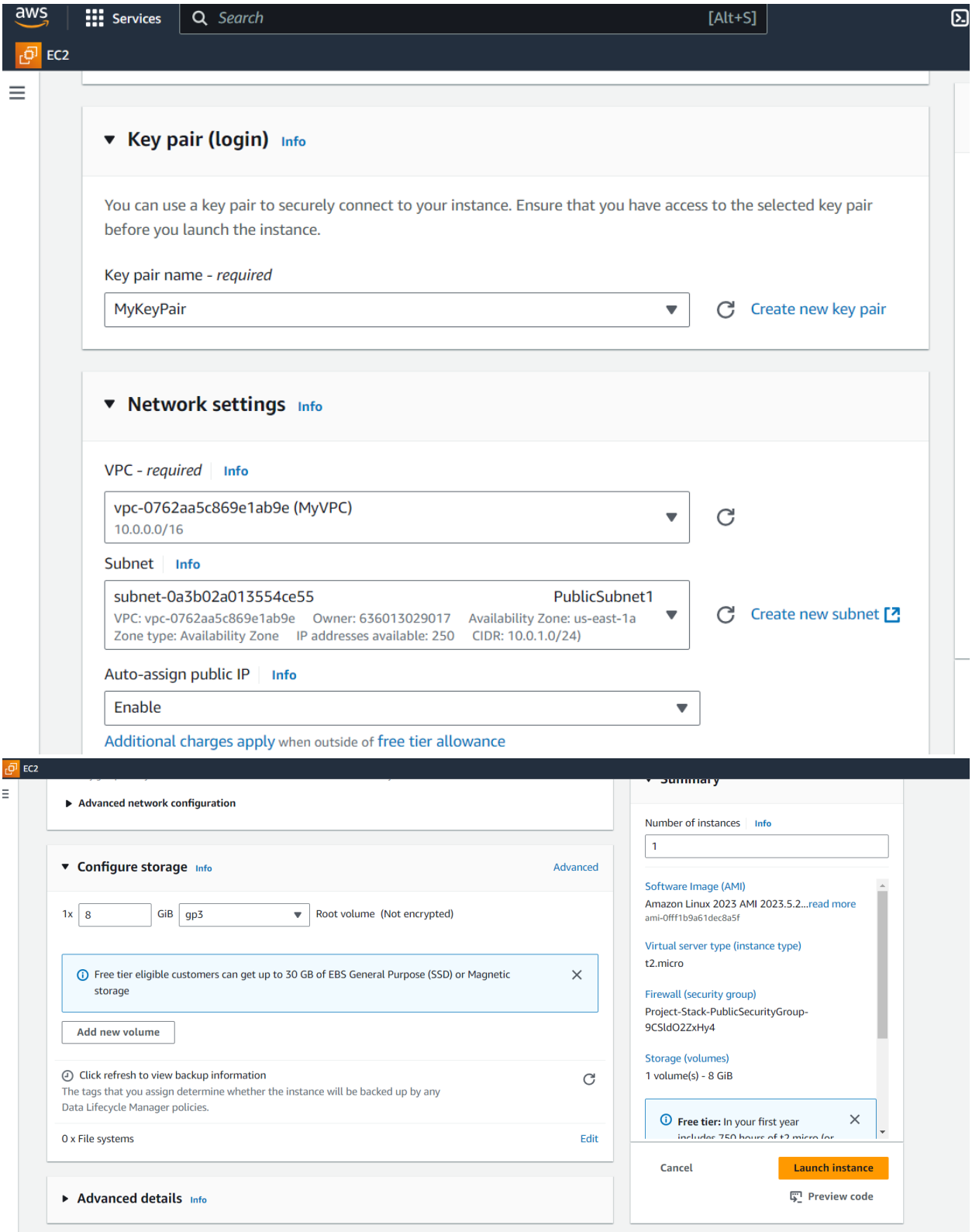
EC2 > Launch Instance

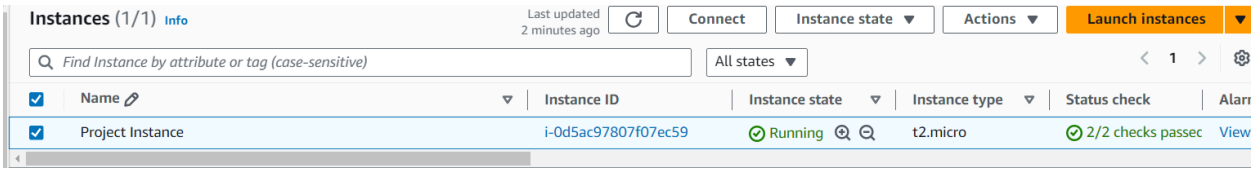


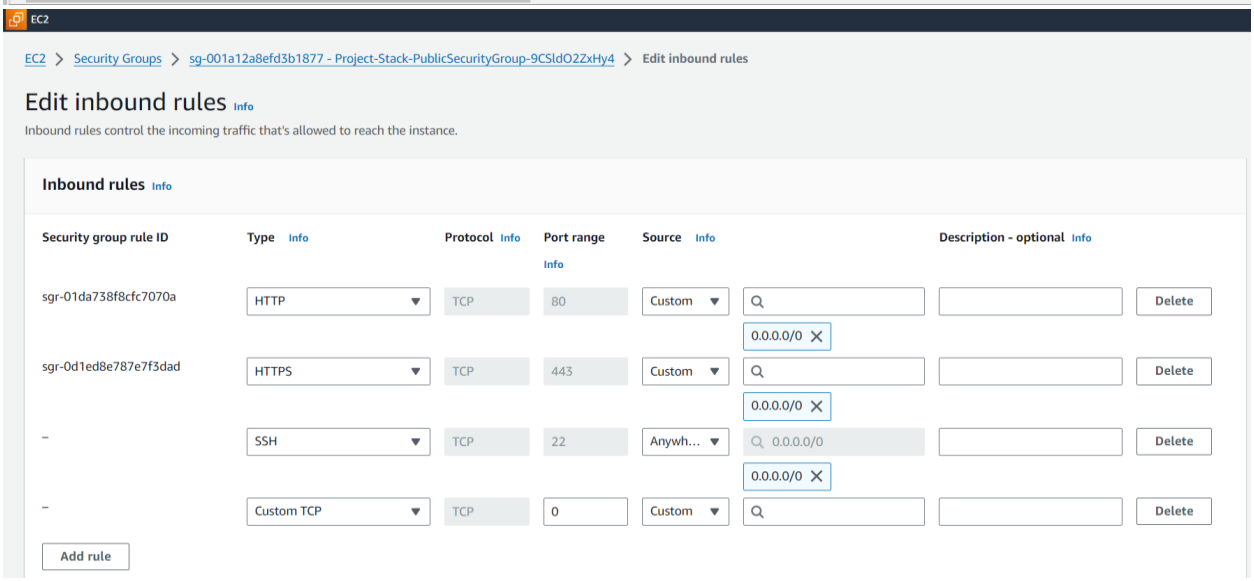


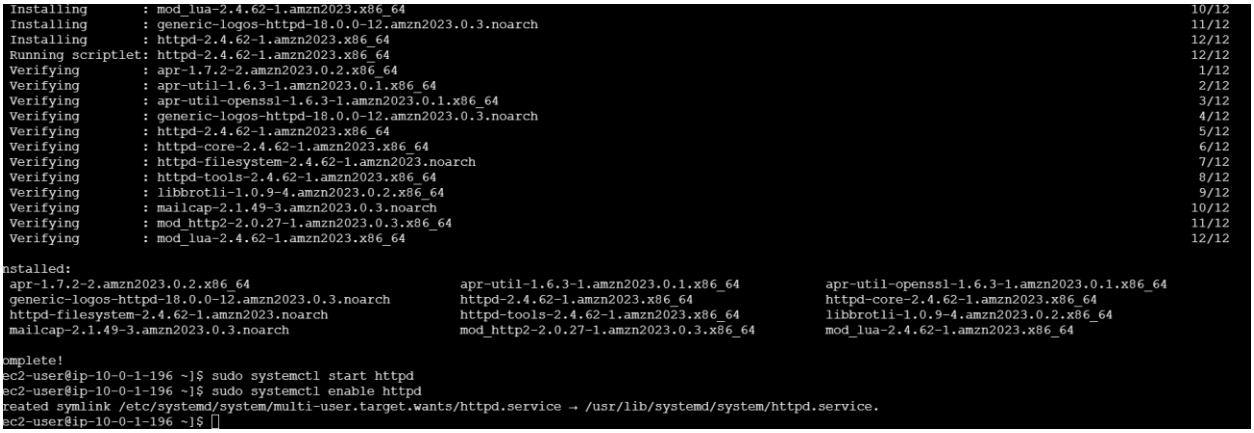
Choosing AMI & Image type




aws
Services
Search
[Alt+S]
EC2
Key pair (login) Info
You can use a key pair to securely connect to your instance. Ensure that you have access to the selected key pair before you launch the instance.
Key pair name - required
MyKeyPair
Create new key pair
Network settings Info
VPC - required Info
vpc-0762aa5c869e1ab9e (MyVPC)
10.0.0.0/16
Subnet Info
subnet-0a3b02a013554ce55 PublicSubnet1
VPC: vpc-0762aa5c869e1ab9e Owner: 636013029017 Availability Zone: us-east-1a
Zone type: Availability Zone IP addresses available: 250 CIDR: 10.0.1.0/24)
Create new subnet
Auto-assign public IP Info
Enable
Additional charges apply when outside of free tier allowance
EC2
Advanced network configuration
Configure storage Info
Advanced
1x 8 GiB gp3 Root volume (Not encrypted)
Free tier eligible customers can get up to 30 GB of EBS General Purpose (SSD) or Magnetic storage
Add new volume
Click refresh to view backup information
The tags that you assign determine whether the instance will be backed up by any Data Lifecycle Manager policies.
0 x File systems
Edit
Advanced details Info
Number of instances Info
1
Software Image (AMI)
Amazon Linux 2023 AMI 2023.5.2...read more
ami-0fff1b9a61dec8a5f
Virtual server type (instance type)
t2.micro
Firewall (security group)
Project-Stack-PublicSecurityGroup-9CSldO2ZxHy4
Storage (volumes)
1 volume(s) - 8 GiB
Free tier: In your first year
Cancel
Launch instance
Preview code

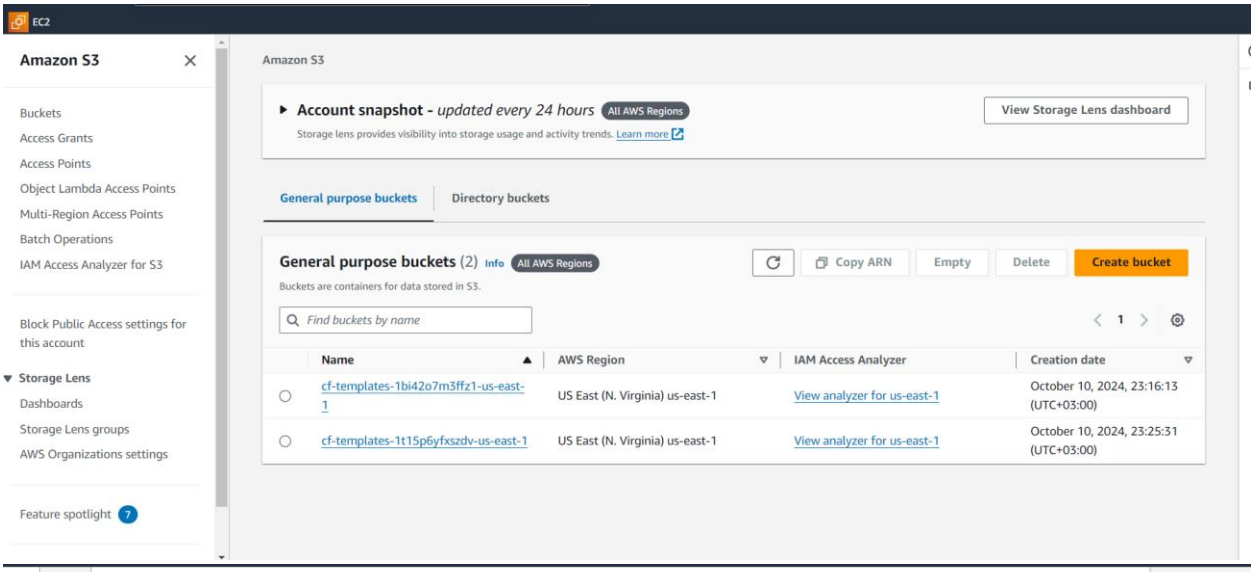






Task 3: Store App static content on external storage not on EBS.

Create an S3 bucket



Bucket type Info

- **General purpose**
  Recommended for most use cases and access patterns. General purpose buckets are the original S3 bucket type. They allow a mix of storage classes that redundantly store objects across multiple Availability Zones.
- **Directory**
  Recommended for low-latency use cases. These buckets use only the S3 Express One Zone storage class, which provides faster processing of data within a single Availability Zone.

Bucket name Info

MyAppStaticContent

Bucket name must be unique within the global namespace and follow the bucket naming rules. See rules for bucket naming

Copy settings from existing bucket - *optional*

Only the bucket settings in the following configuration are copied.

Choose bucket

Format: s3://bucket/prefix

Object Ownership Info

Control ownership of objects written to this bucket from other AWS accounts and the use of access control lists (ACLs). Object ownership determines who can specify access to objects.

- **ACLs disabled (recommended)**
  All objects in this bucket are owned by this account. Access to this bucket and its objects is specified using only policies.
- **ACLs enabled**
  Objects in this bucket can be owned by other AWS accounts. Access to this bucket and its objects can be specified using ACLs.

Object Ownership

Block Public Access settings for this bucket

Public access is granted to buckets and objects through access control lists (ACLs), bucket policies, access point policies, or all. In order to ensure that public access to this bucket and its objects is blocked, turn on Block all public access. These settings apply only to this bucket and its access points. AWS recommends that you turn on Block all public access, but before applying any of these settings, ensure that your applications will work correctly without public access. If you require some level of public access to this bucket or objects within, you can customize the individual settings below to suit your specific storage use cases. Learn more

- ☐ **Block *all* public access**
  Turning this setting on is the same as turning on all four settings below. Each of the following settings are independent of one another.
  - ☐ **Block public access to buckets and objects granted through *new* access control lists (ACLs)**
    S3 will block public access permissions applied to newly added buckets or objects, and prevent the creation of new public access ACLs for existing buckets and objects. This setting doesn't change any existing permissions that allow public access to S3 resources using ACLs.
  - ☐ **Block public access to buckets and objects granted through *any* access control lists (ACLs)**
    S3 will ignore all ACLs that grant public access to buckets and objects.
  - ☐ **Block public access to buckets and objects granted through *new* public bucket or access point policies**
    S3 will block new bucket and access point policies that grant public access to buckets and objects. This setting doesn't change any existing policies that allow public access to S3 resources.
  - ☐ **Block public and cross-account access to buckets and objects through *any* public bucket or access point policies**
    S3 will ignore public and cross-account access for buckets or access points with policies that grant public access to buckets and objects.

⚠ **Turning off block all public access might result in this bucket and the objects within becoming public**
AWS recommends that you turn on block all public access, unless public access is required for specific

Server-side encryption is automatically applied to new objects stored in this bucket.

Encryption type Info

- ◉ Server-side encryption with Amazon S3 managed keys (SSE-S3)
- ○ Server-side encryption with AWS Key Management Service keys (SSE-KMS)
- ○ Dual-layer server-side encryption with AWS Key Management Service keys (DSSE-KMS)
  Secure your objects with two separate layers of encryption. For details on pricing, see **DSSE-KMS pricing** on the **Storage** tab of the Amazon S3 pricing page.

Bucket Key

Using an S3 Bucket Key for SSE-KMS reduces encryption costs by lowering calls to AWS KMS. S3 Bucket Keys aren't supported for DSSE-KMS. Learn more

- ○ Disable
- ◉ Enable

▶ **Advanced settings**

ⓘ After creating the bucket, you can upload files and folders to the bucket, and configure additional bucket settings.

Cancel | **Create bucket**

Static website hosting

Use this bucket to host a website or redirect requests. Learn more

Static website hosting

Enabled

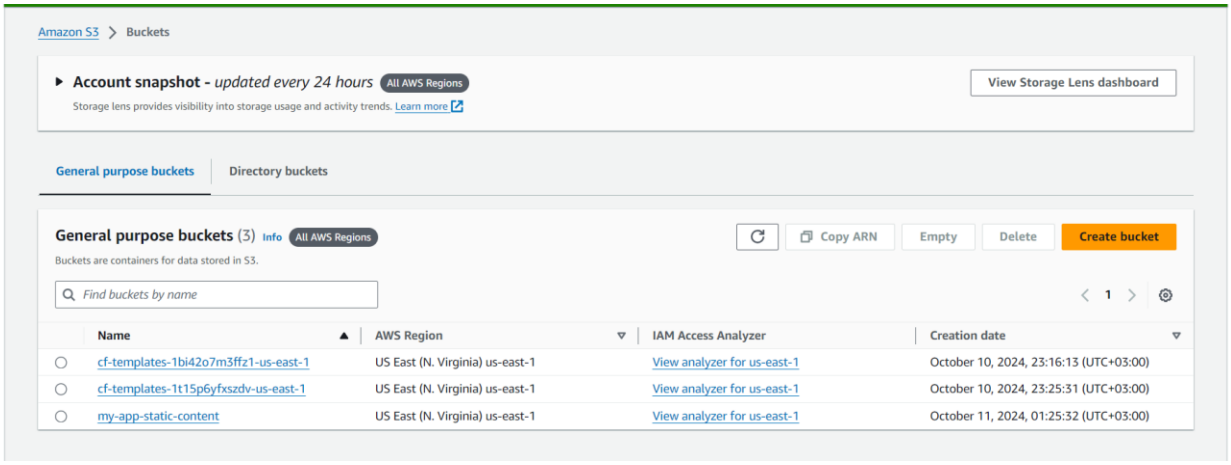
Hosting type

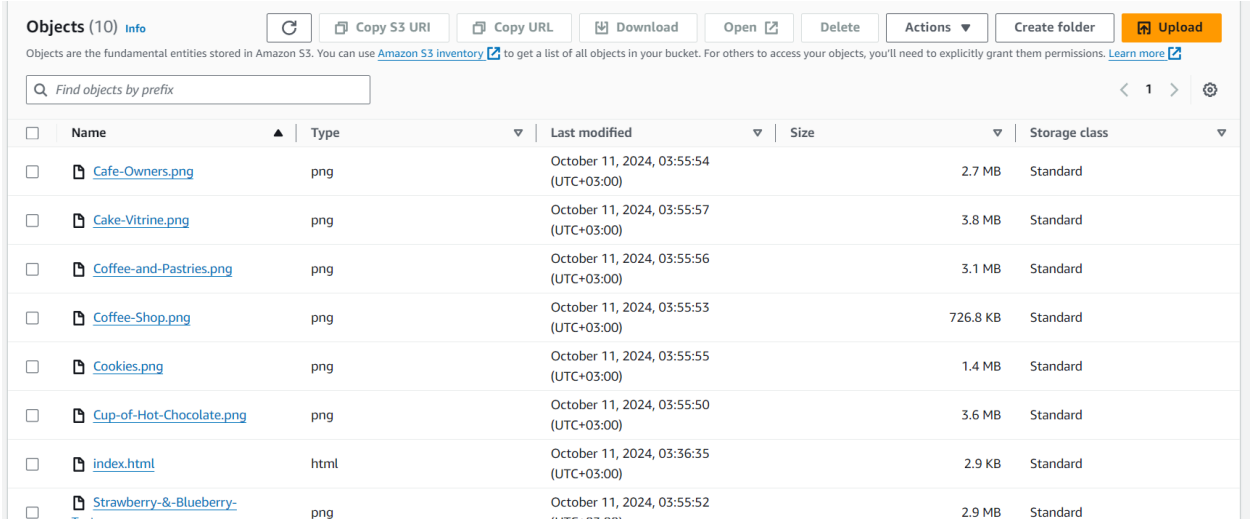
Bucket hosting

Bucket website endpoint

When you configure your bucket as a static website, the website is available at the AWS Region-specific website endpoint of the bucket. Learn more

http://my-app-static-content.s3-website-us-east-1.amazonaws.com





Café

The Café offers an assortment of delicious and delectable pastries and coffees that will put a smile on your face. From cookies to croissants, tarts and cakes, each treat is speciall day!

Frank bakes a rich variety of cookies. Try them all!	Tea Coffee Latte Hot Chocolate Yes, we have it!	Our tarts are always a customer favorite!

About Us

Frank and Martha have been adding sweetness to their customers's lives since 2016. Both of them will personally greet you with a welcoming smile when you visit! Frank's r simple and fresh ingredients to produce delightful flavors.

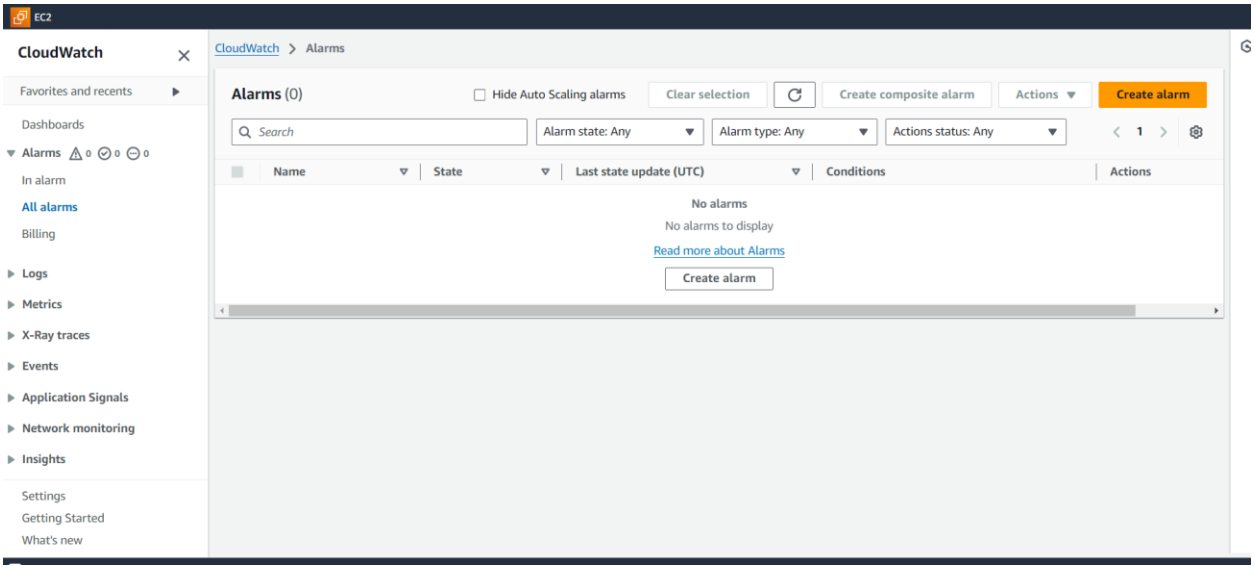
Contact Us

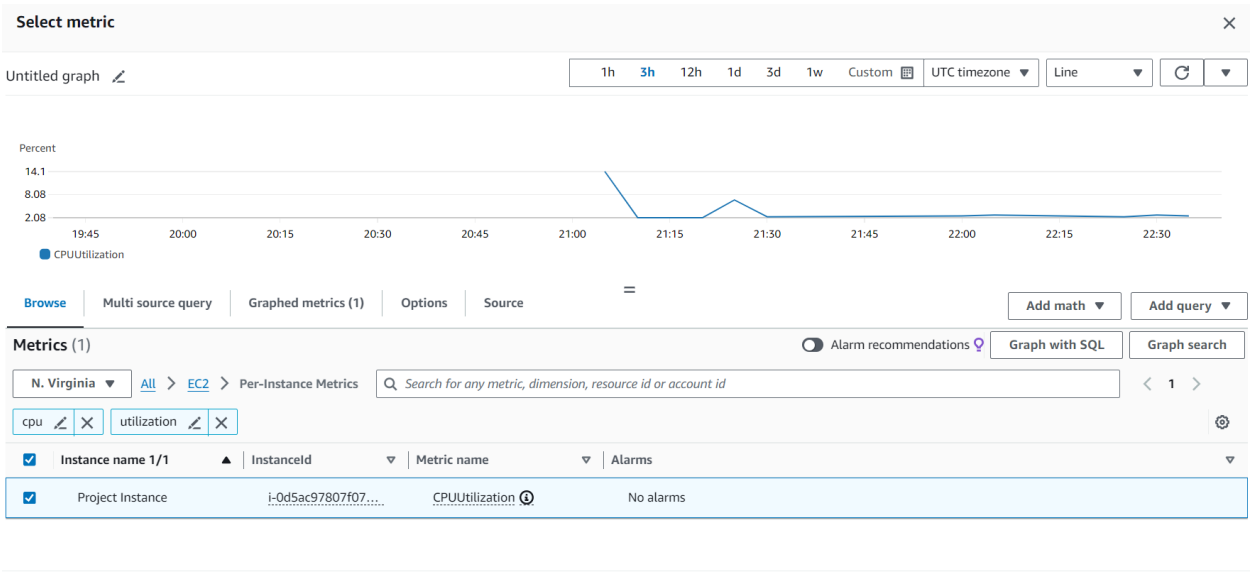
123 Sweet Tooth St.
London SW1A 0AA, UK
Tel: +44-12-12345678

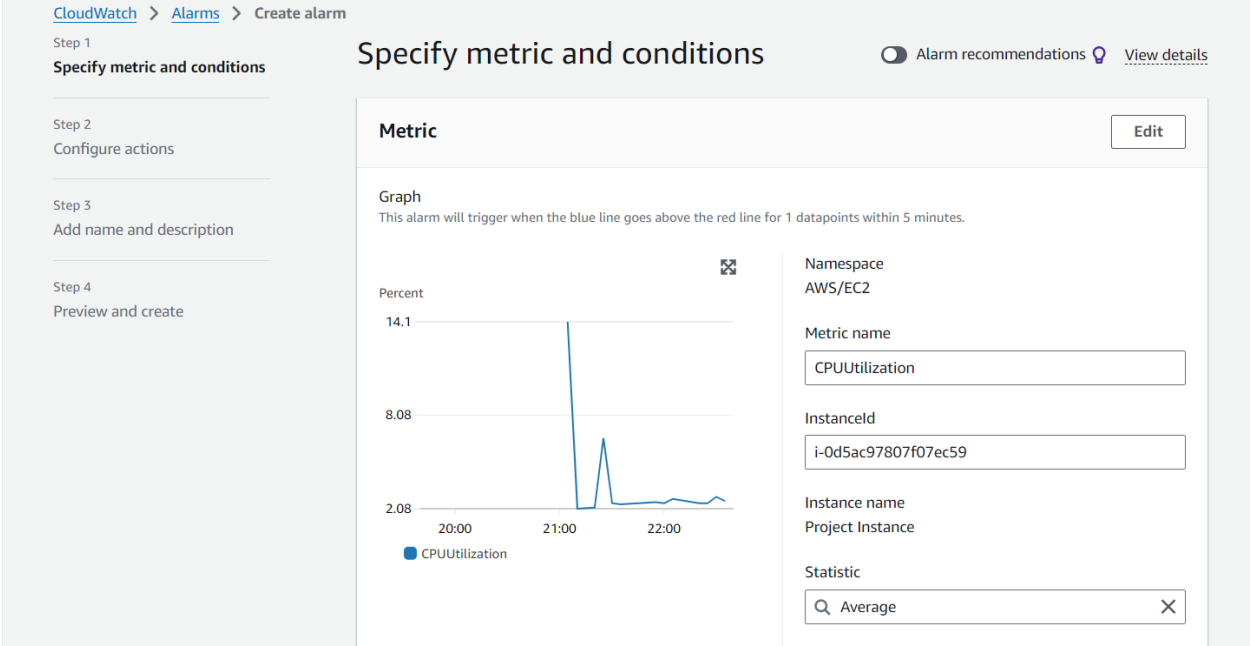
Hours

Task 4: Monitoring your servers with integrated notifications while metrics exceed specific limit.

Create an alarm on Cloud Formation to monitor CPU utilization




Select metric
Untitled graph
1h 3h 12h 1d 3d 1w Custom UTC timezone Line
Percent
14.1
8.08
2.08
19:45 20:00 20:15 20:30 20:45 21:00 21:15 21:30 21:45 22:00 22:15 22:30
CPUUtilization
Browse Multi source query Graphed metrics (1) Options Source
Add math Add query
Metrics (1)
Alarm recommendations Graph with SQL Graph search
N. Virginia All EC2 Per-Instance Metrics
Search for any metric, dimension, resource id or account id
cpu utilization
Instance name 1/1 InstanceId Metric name Alarms
Project Instance i-0d5ac97807f07... CPUUtilization No alarms
Cancel Select metric


CloudWatch > Alarms > Create alarm
Step 1
Specify metric and conditions
Step 2
Configure actions
Step 3
Add name and description
Step 4
Preview and create
Specify metric and conditions
Alarm recommendations View details
Metric
Edit
Graph
This alarm will trigger when the blue line goes above the red line for 1 datapoints within 5 minutes.
Percent
14.1
8.08
2.08
20:00 21:00 22:00
CPUUtilization
Namespace
AWS/EC2
Metric name
CPUUtilization
InstanceId
i-0d5ac97807f07ec59
Instance name
Project Instance
Statistic
Average

Conditions

Threshold type

- (●) Static — Use a value as a threshold
- ( ) Anomaly detection — Use a band as a threshold

Whenever CPUUtilization is...

Define the alarm condition.

- (●) Greater — > threshold
- ( ) Greater/Equal — >= threshold
- ( ) Lower/Equal — <= threshold
- ( ) Lower — < threshold

than...

Define the threshold value.

80

Must be a number

▶ Additional configuration

Cancel | Next

Step 2
Configure actions

Step 3
Add name and description

Step 4
Preview and create

Notification

Alarm state trigger

Define the alarm state that will trigger this action.

Remove

- ( ) In alarm — The metric or expression is outside of the defined threshold.
- ( ) OK — The metric or expression is within the defined threshold.
- (●) Insufficient data — The alarm has just started or not enough data is available.

Send a notification to the following SNS topic

Define the SNS (Simple Notification Service) topic that will receive the notification.

- ( ) Select an existing SNS topic
- (●) Create new topic
- ( ) Use topic ARN to notify other accounts

Create a new topic...

The topic name must be unique.

Default_CloudWatch_Alarms_Topic

SNS topic names can contain only alphanumeric characters, hyphens (-) and underscores (_).

Email endpoints that will receive the notification...

Add a comma-separated list of email addresses. Each address will be added as a subscription to the topic above.

noha.ashraf171@gmail.com

user1@example.com, user2@example.com

Create topic

Add name and description

Name and description

Alarm name

CPUutilization

Alarm description - *optional* View formatting guidelines

Edit | Preview

CPU utilization is in alarm or insufficient data

Up to 1024 characters (48/1024)

Markdown formatting is only applied when viewing your alarm in the console. The description will remain in plain text in the alarm notifications.

Cancel | Previous | Next

Notification

When Insufficient data, send a notification to "Default_CloudWatch_Alarms_Topic"

Step 3: Add name and description — Edit

Name and description

Name

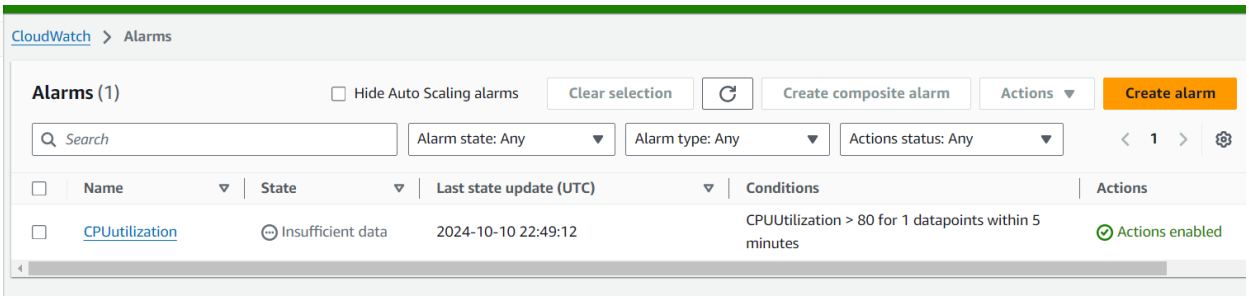
CPUutilization

Description

CPU utilization is in alarm or insufficient data

Markdown formatting is only applied when viewing your alarm in the console. The description will remain in plain text in the alarm notifications.

Cancel | Previous | Create alarm



Sample of the alarm notification received

INSUFFICIENT_DATA: "CPUutilization" in US East (N. Virginia) Inbox ×

AWS Notifications <no-reply@sns.amazonaws.com>
to me

You are receiving this email because your Amazon CloudWatch Alarm "CPUutilization" in the US East (N. Virginia) region has en
datapoint was unknown." at "Friday 11 October, 2024 00:11:50 UTC".

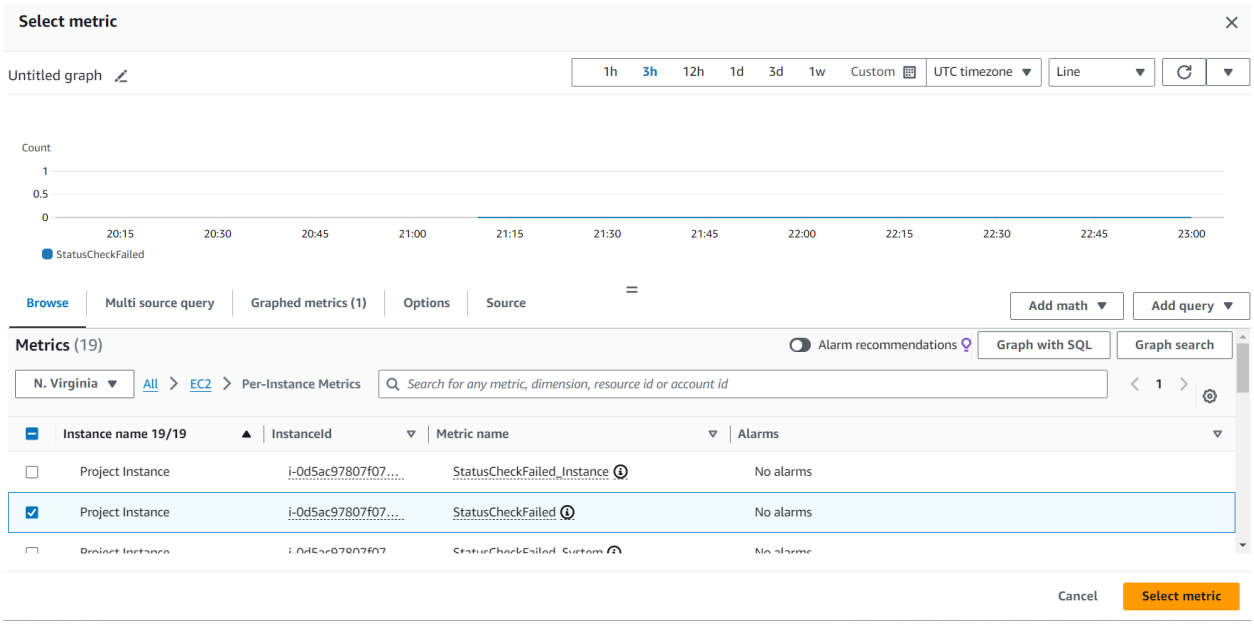
View this alarm in the AWS Management Console:
https://us-east-1.console.aws.amazon.com/cloudwatch/deeplink.js?region=us-east-1#alarmsV2:alarm/CPUutilization

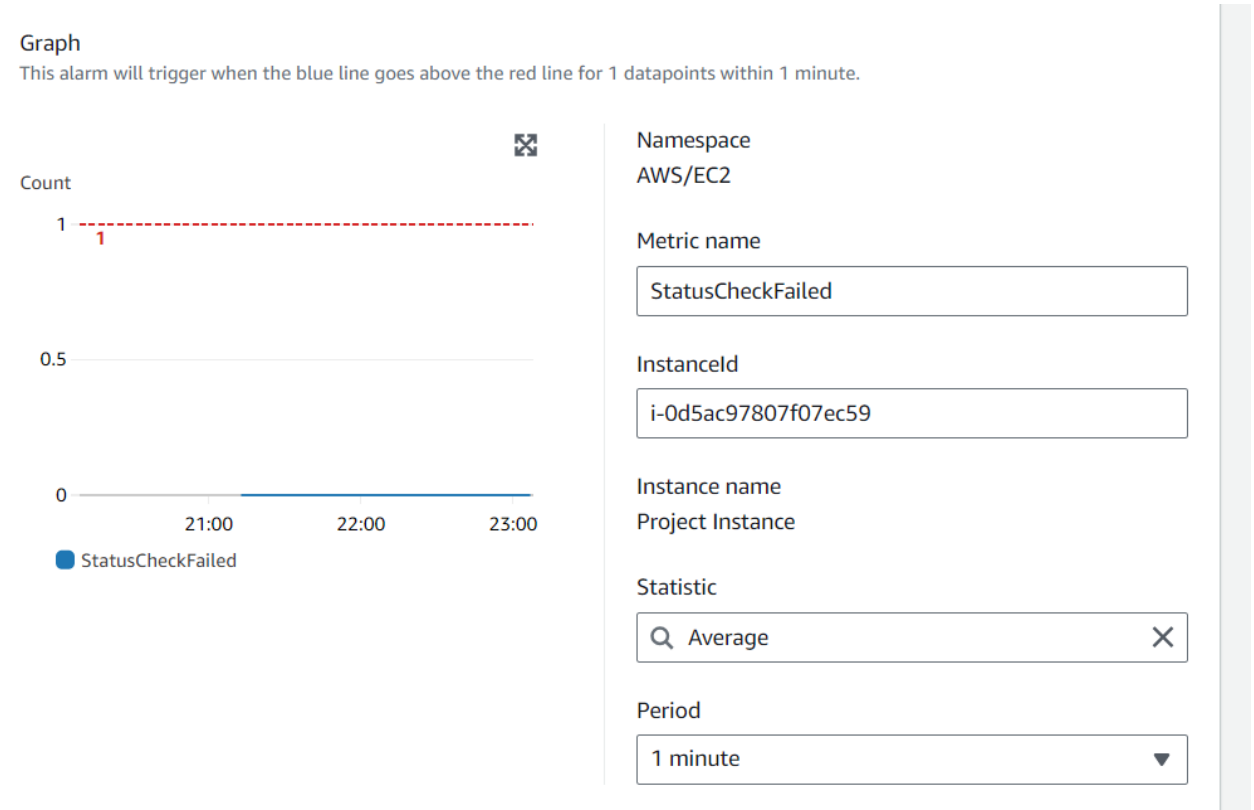
Alarm Details:
- Name: CPUutilization
- Description: CPU utilization is in alarm or insufficient data
- State Change: OK -> INSUFFICIENT_DATA
- Reason for State Change: Insufficient Data: 1 datapoint was unknown.
- Timestamp: Friday 11 October, 2024 00:11:50 UTC
- AWS Account: 636013029017
- Alarm Arn: arn:aws:cloudwatch:us-east-1:636013029017:alarm:CPUutilization

Threshold:
- The alarm is in the ALARM state when the metric is GreaterThanThreshold 80.0 for at least 1 of the last 1 period(s) of 300 secc

Monitored Metric:
- MetricNamespace: AWS/EC2
- MetricName: CPUUtilization
- Dimensions: [InstanceId = i-0d5ac97807f07ec59]
- Period: 300 seconds
- Statistic: Average
- Unit: not specified

Task 5: Automatic remediation if web service disabled.





Conditions

Threshold type

- (●) Static
  Use a value as a threshold
- ( ) Anomaly detection
  Use a band as a threshold

Whenever StatusCheckFailed is...

Define the alarm condition.

- ( ) Greater
  > threshold
- (●) Greater/Equal
  >= threshold
- ( ) Lower/Equal
  <= threshold
- ( ) Lower
  < threshold

than...

Define the threshold value.

1

Must be a number

Notification

Alarm state trigger

Define the alarm state that will trigger this action.

Remove

- (●) In alarm
  The metric or expression is outside of the defined threshold.
- ( ) OK
  The metric or expression is within the defined threshold.
- ( ) Insufficient data
  The alarm has just started or not enough data is available.

Send a notification to the following SNS topic

Define the SNS (Simple Notification Service) topic that will receive the notification.

- ( ) Select an existing SNS topic
- (●) Create new topic
- ( ) Use topic ARN to notify other accounts

Create a new topic...

The topic name must be unique.

StatusCheckFailed

SNS topic names can contain only alphanumeric characters, hyphens (-) and underscores (_).

Email endpoints that will receive the notification...

Add a comma-separated list of email addresses. Each address will be added as a subscription to the topic above.

noha.ashraf171@gmail.com

user1@example.com, user2@example.com

Create topic

Add name and description

Name and description

Alarm name

UnhealthyInstance

Alarm description - *optional* View formatting guidelines

Edit | Preview

Status Check Failed

Up to 1024 characters (19/1024)

Markdown formatting is only applied when viewing your alarm in the console. The description will remain in plain text in the alarm notifications.

Cancel | Previous | Next

Actions

Notification
When In alarm, send a notification to "StatusCheckFailed"

Step 3: Add name and description

Edit

Name and description

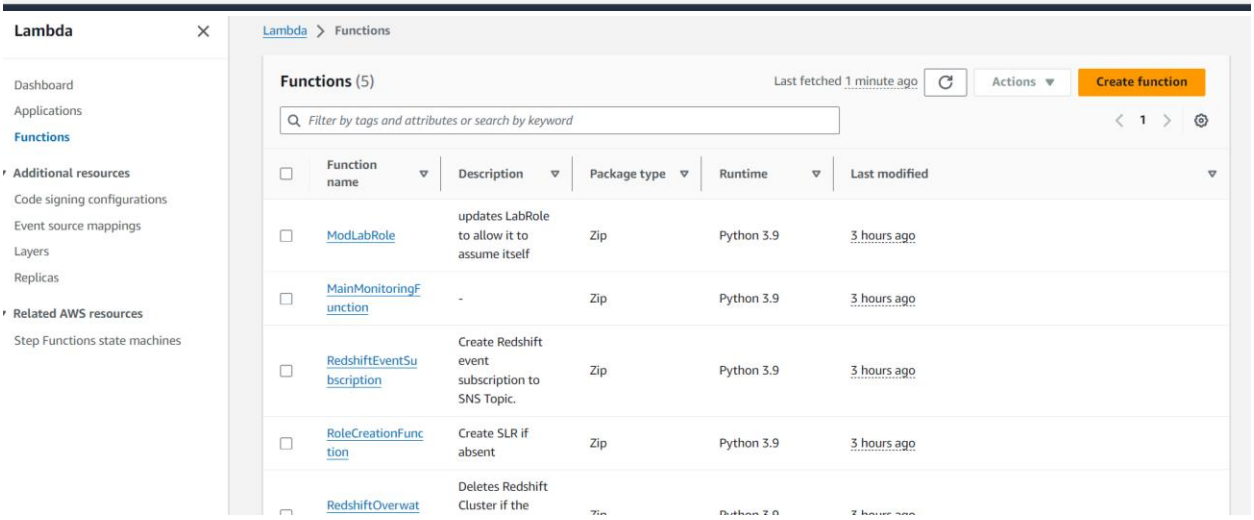
Name
UnhealthyInstance

Description

Status Check Failed

Markdown formatting is only applied when viewing your alarm in the console. The description will remain in plain text in the alarm notifications.

Cancel | Previous | Create alarm



Basic information

Function name

Enter a name that describes the purpose of your function.

AutomaticRemediationForWebService

Function name must be 1 to 64 characters, must be unique to the Region, and can't include spaces. Valid characters are a-z, A-Z, 0-9, hyphens (-), and underscores (_).

Runtime Info

Choose the language to use to write your function. Note that the console code editor supports only Node.js, Python, and Ruby.

Node.js 20.x

Architecture Info

Choose the instruction set architecture you want for your function code.

- (•) x86_64
- ( ) arm64

Permissions Info

By default, Lambda will create an execution role with permissions to upload logs to Amazon CloudWatch Logs. You can customize this default role later when adding triggers.

▼ **Change default execution role**

Choose a role that defines the permissions of your function. To create a custom role, go to the IAM console.

- (•) Create a new role with basic Lambda permissions
- ( ) Use an existing role
- ( ) Create a new role from AWS policy templates

ⓘ Role creation might take a few minutes. Please do not delete the role or edit the trust or permissions policies in this role.

Lambda will create an execution role named AutomaticRemediationForWebService-role-qjomgr6t, with permission to upload logs to Amazon CloudWatch Logs.

▼ Additional Configurations

Use additional configurations to set up code signing, function URL, tags, and Amazon VPC access for your function.

- [ ] **Enable Code signing** Info

Use code signing configurations to ensure that the code has been signed by an approved source and has not been altered since signing.

- [ ] **Enable function URL** Info

Use function URLs to assign HTTP(S) endpoints to your Lambda function.

- [ ] **Enable tags** Info

A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources, track your AWS costs, and enforce attribute-based access control.

- [ ] **Enable VPC** Info

Connect your function to a VPC to access private resources during invocation.

Additional Configurations

Use additional configurations to set up code signing, function URL, tags, and Amazon VPC access for your function.

Enable Code signing Info

Use code signing configurations to ensure that the code has been signed by an approved source and has not been altered since signing.

Enable function URL Info

Use function URLs to assign HTTP(S) endpoints to your Lambda function.

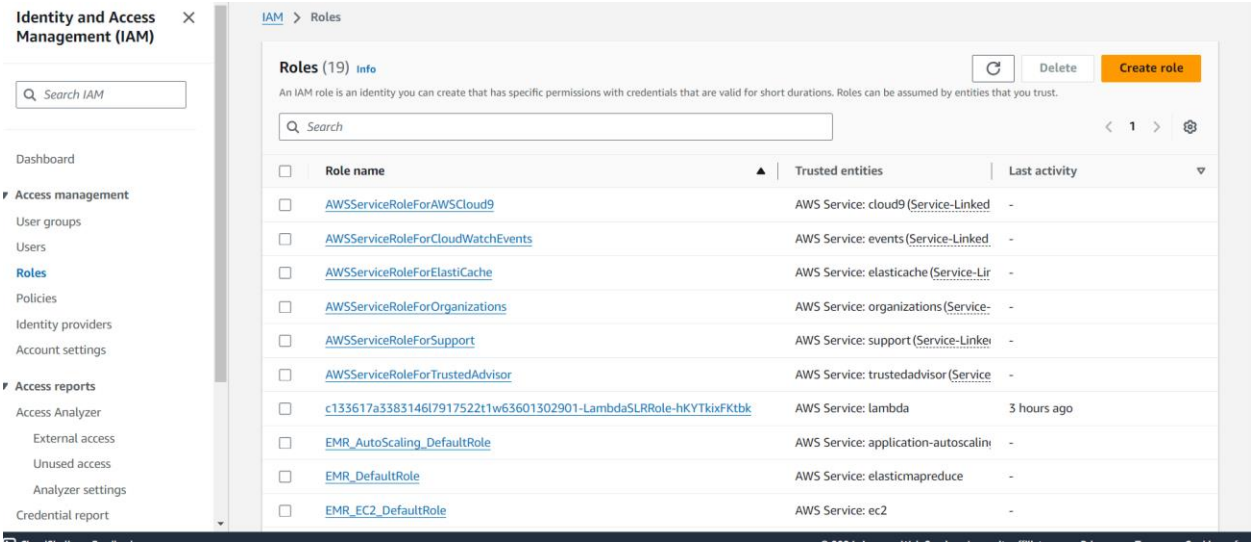
Enable tags Info

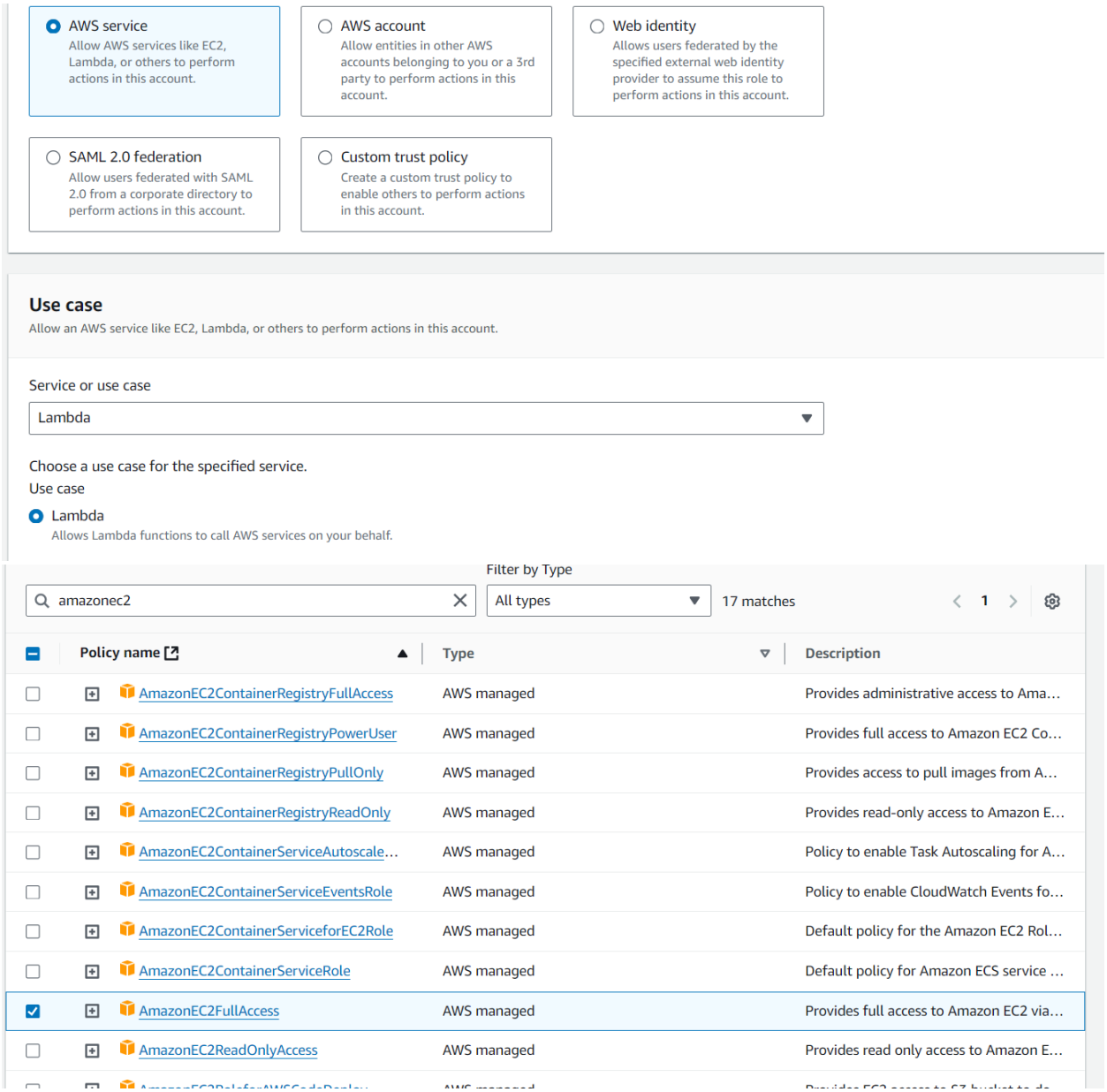
A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources, track your AWS costs, and enforce attribute-based access control.

Enable VPC Info

Connect your function to a VPC to access private resources during invocation.

Cancel **Create function**





Role details

Role name

Enter a meaningful name to identify this role.

LambdaEC2AccessRole

Maximum 64 characters. Use alphanumeric and '+=,.@-_' characters.

Description

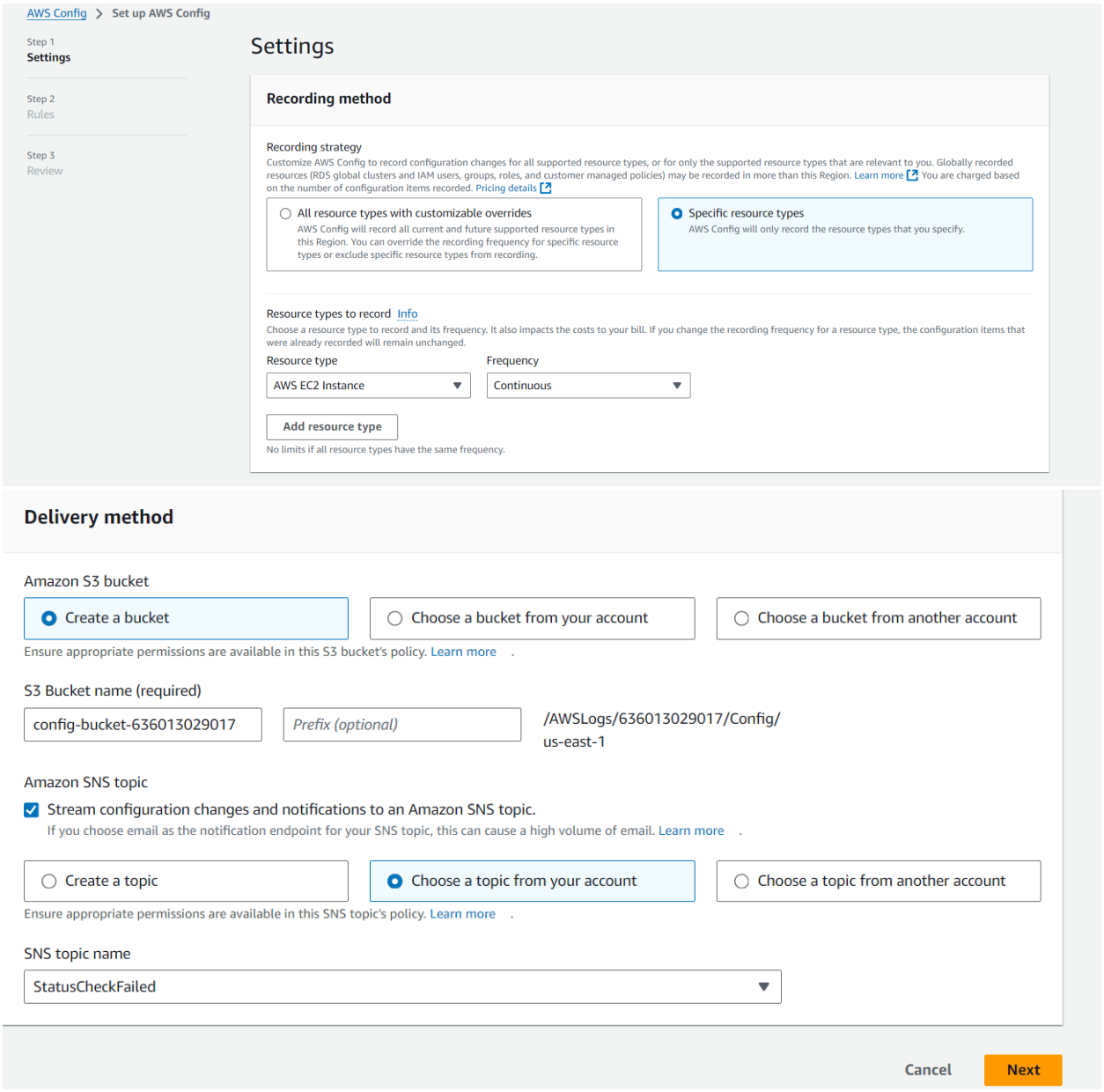
Add a short explanation for this role.

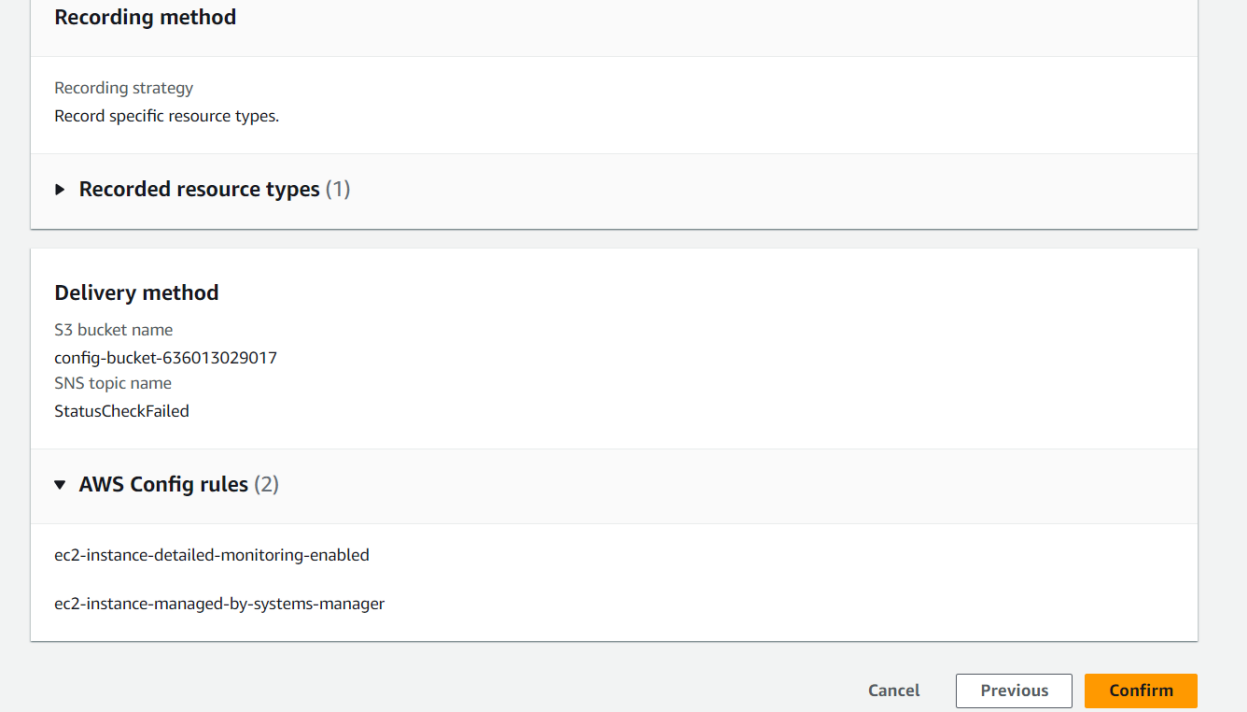
Allows Lambda functions to call AWS services on your behalf.

Maximum 1000 characters. Use letters (A-Z and a-z), numbers (0-9), tabs, new lines, or any of the following characters: _+=,. @-/\[{}]!#$%^*();:"'`

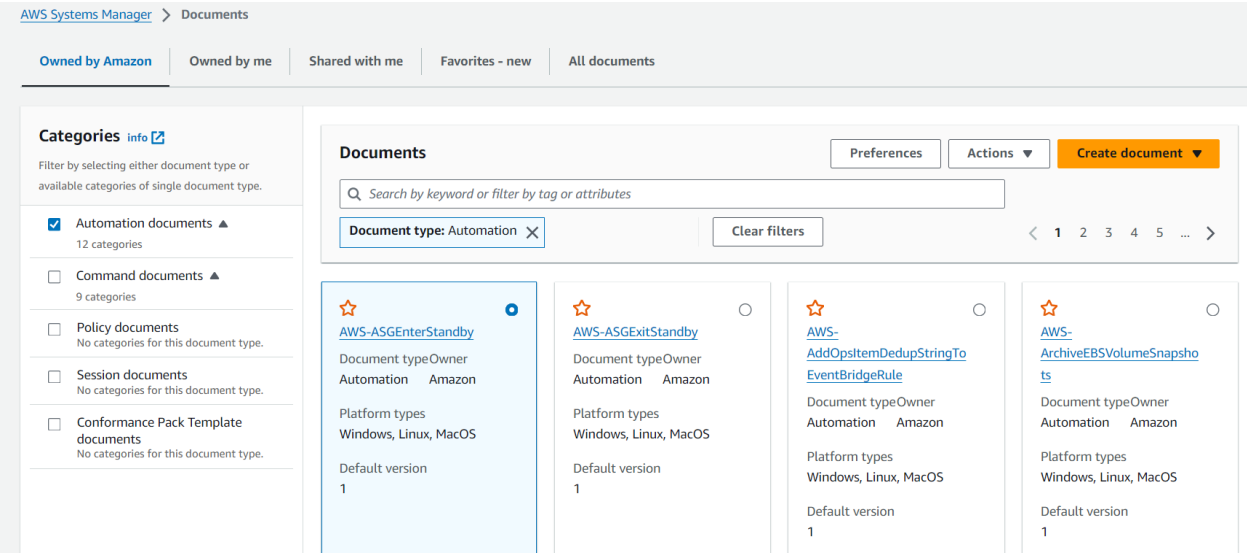
Not authorized to create an IAM role

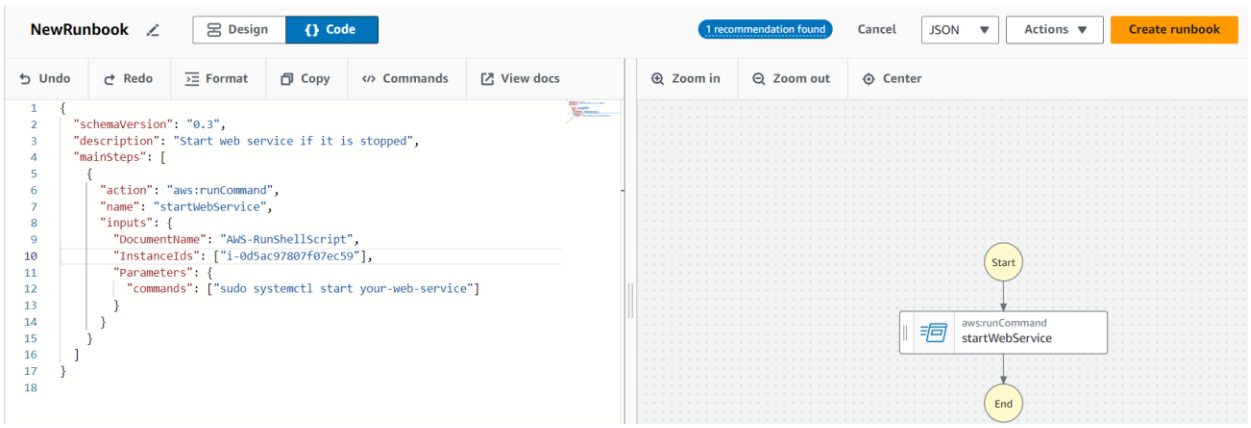
Option # 2 on AWS config



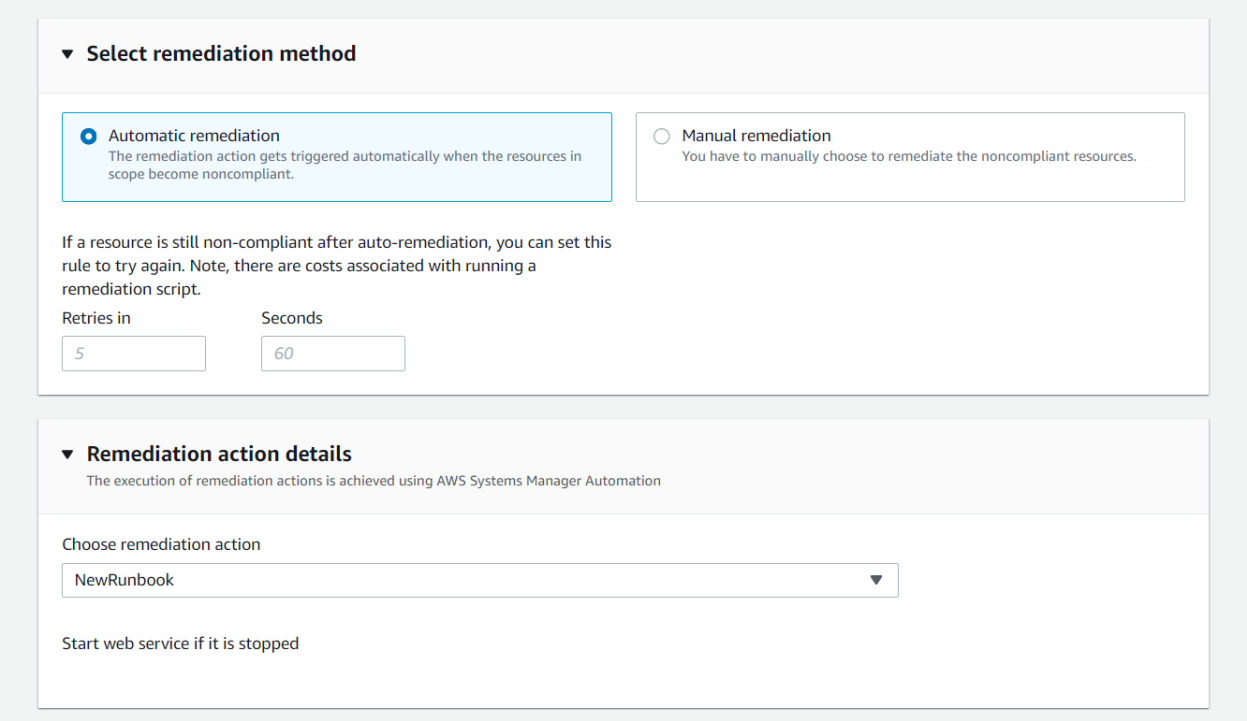


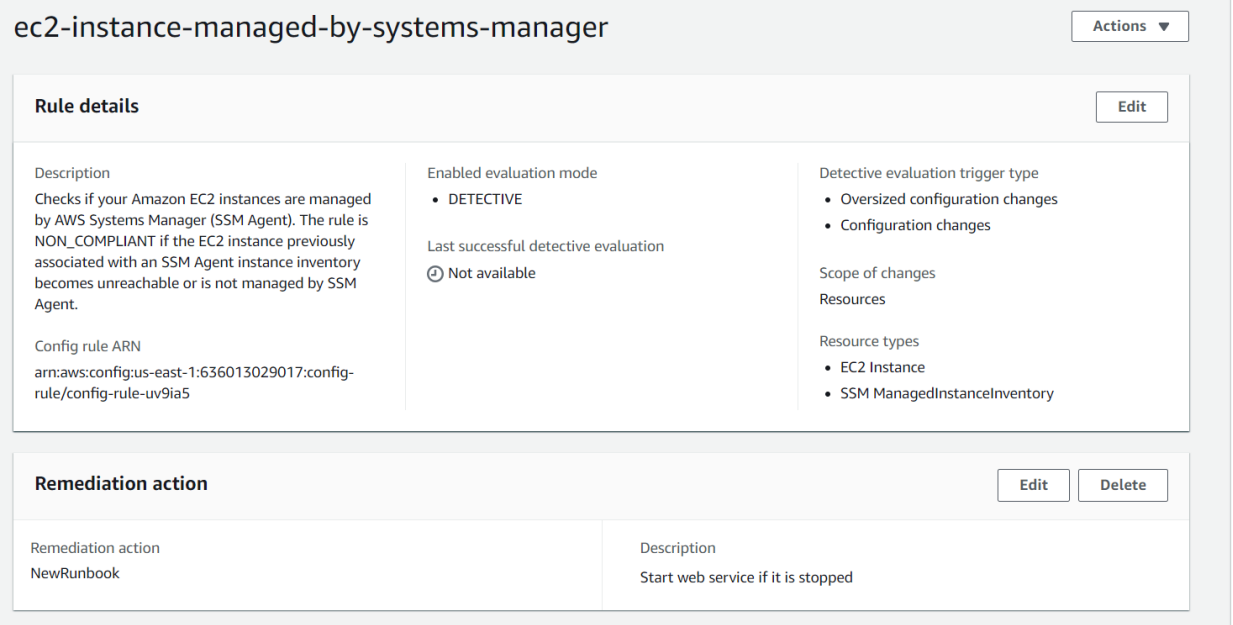
Create an Automation Document in AWS System Manager



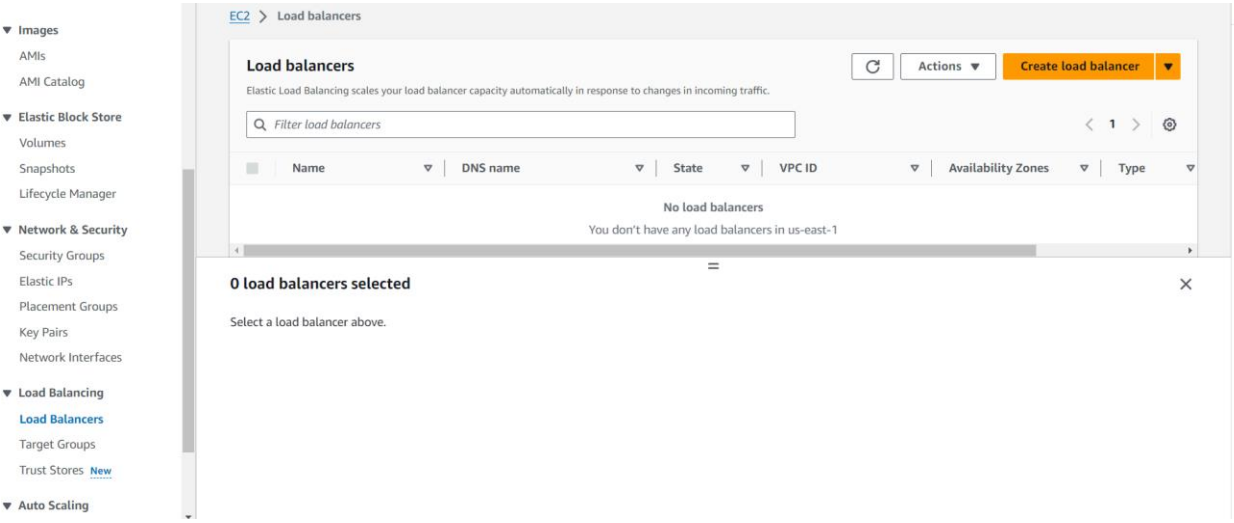


Manage remediation in AWS Config





Extra Task:Enable Redirection on Load balancer from HTTP to HTTPS.



▶ **How Application Load Balancers work**

Basic configuration

Load balancer name

Name must be unique within your AWS account and can't be changed after the load balancer is created.

NewLoadBalancer

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Scheme | Info

Scheme can't be changed after the load balancer is created.

- (●) Internet-facing
  An internet-facing load balancer routes requests from clients over the internet to targets. Requires a public subnet. Learn more
- ( ) Internal
  An internal load balancer routes requests from clients to targets using private IP addresses. Compatible with the **IPv4** and **Dualstack** IP address types.

Load balancer IP address type | Info

Select the front-end IP address type to assign to the load balancer. The VPC and subnets mapped to this load balancer must include the selected IP address types. Put an additional cost.

- (●) IPv4
  Includes only IPv4 addresses.
- ( ) Dualstack
  Includes IPv4 and IPv6 addresses.
- ( ) Dualstack without public IPv4

Security groups

Select up to 5 security groups

Project-Stack-PublicSecurityGroup-9CSldO2ZxHy4
sg-001a12a8efd3b1877 VPC: vpc-0762aa5c869e1ab9e

Listeners and routing Info

A listener is a process that checks for connection requests using the port and protocol you configure. The rules that you define for a listener determine how the load balancer routes requests to its registered targets.

▼ Listener **HTTP:80** Remove

Protocol	Port	Default action Info
HTTP	80 (1-65535)	Forward to *Select a target group*

Create target group

Basic configuration

Settings in this section can't be changed after the target group is created.

Choose a target type

- (•) Instances
  - Supports load balancing to instances within a specific VPC.
  - Facilitates the use of Amazon EC2 Auto Scaling to manage and scale your EC2 capacity.
- ( ) IP addresses
  - Supports load balancing to VPC and on-premises resources.
  - Facilitates routing to multiple IP addresses and network interfaces on the same instance.
  - Offers flexibility with microservice based architectures, simplifying inter-application communication.
  - Supports IPv6 targets, enabling end-to-end IPv6 communication, and IPv4-to-IPv6 NAT.

Target group name

NewTargetGroup

A maximum of 32 alphanumeric characters including hyphens are allowed, but the name must not begin or end with a hyphen.

Protocol : Port

Choose a protocol for your target group that corresponds to the Load Balancer type that will route traffic to it. Some protocols now include anomaly detection for the targets and you can set mitigation options once your target group is created. This choice cannot be changed after creation

HTTP | 80

1-65535

IP address type

Only targets with the indicated IP address type can be registered to this target group.

- (•) IPv4
  Each instance has a default network interface (eth0) that is assigned the primary private IPv4 address. The instance's primary private IPv4 address is the one that will be applied to the target.
- ( ) IPv6
  Each instance you register must have an assigned primary IPv6 address. This is configured on the instance's default network interface (eth0). Learn more

VPC

Select the VPC with the instances that you want to include in the target group. Only VPCs that support the IP address type selected above are available in this list.

MyVPC
vpc-0762aa5c869e1ab9e
IPv4 VPC CIDR: 10.0.0.0/16

Protocol version

Register targets

This is an optional step to create a target group. However, to ensure that your load balancer routes traffic to this target group you must register your targets.

Available instances (1)

Filter instances

1

Instance ID	Name	State	Security groups
i-0d5ac97807f07ec59	Project Instance	Running	Project-Stack-PublicSecurityGroup-9C…

EC2 > Target groups > NewTargetGroup

NewTargetGroup

Actions

Details

arn:aws:elasticloadbalancing:us-east-1:636013029017:targetgroup/NewTargetGroup/b45083f8b9a2c3ca

Target type	Protocol : Port	Protocol version	VPC
Instance	HTTP: 80	HTTP1	vpc-0762aa5c869e1ab9e
IP address type	**Load balancer**		
IPv4	None associated		

0	0	0	0	0	0
Total targets	Healthy	Unhealthy	Unused	Initial	Draining
	0 Anomalous				

EC2 > Load balancers > NewLoadBalancer

NewLoadBalancer

Actions

Details

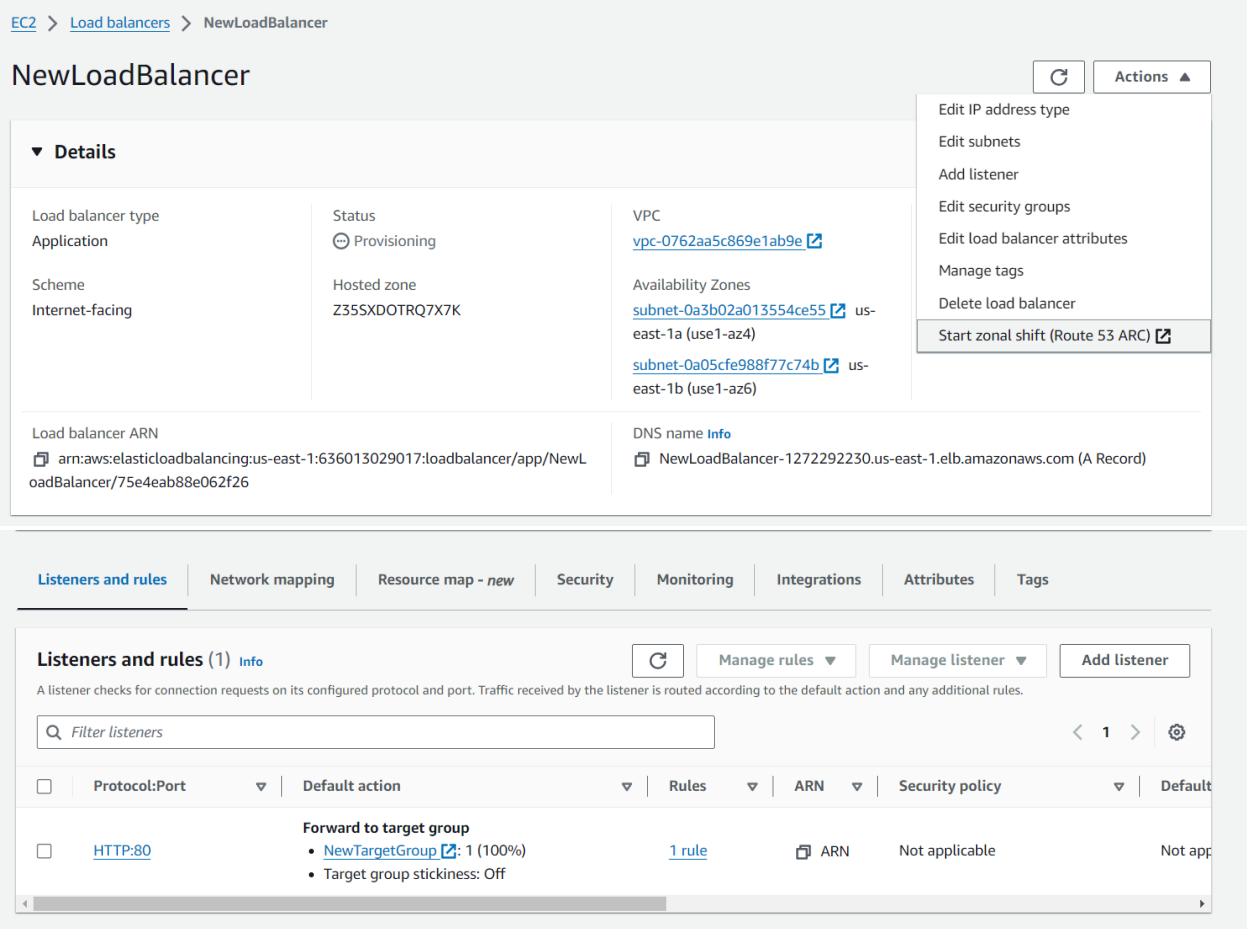
Load balancer type	Status	VPC	Load balancer IP address type
Application	Provisioning	vpc-0762aa5c869e1ab9e	IPv4
Scheme	**Hosted zone**	**Availability Zones**	**Date created**
Internet-facing	Z35SXDOTRQ7X7K	subnet-0a3b02a013554ce55 us-east-1a (use1-az4) subnet-0a05cfe988f77c74b us-east-1b (use1-az6)	October 11, 2024, 04:47 (UTC+03:00)

Load balancer ARN

arn:aws:elasticloadbalancing:us-east-1:636013029017:loadbalancer/app/NewLoadBalancer/75e4eab88e062f26

DNS name Info

NewLoadBalancer-1272292230.us-east-1.elb.amazonaws.com (A Record)


EC2 > Load balancers > NewLoadBalancer
NewLoadBalancer
Actions
Edit IP address type
Edit subnets
Add listener
Edit security groups
Edit load balancer attributes
Manage tags
Delete load balancer
Start zonal shift (Route 53 ARC)
Details
Load balancer type
Application
Status
Provisioning
VPC
vpc-0762aa5c869e1ab9e
Scheme
Internet-facing
Hosted zone
Z35SXDOTRQ7X7K
Availability Zones
subnet-0a3b02a013554ce55 us-east-1a (use1-az4)
subnet-0a05cfe988f77c74b us-east-1b (use1-az6)
Load balancer ARN
arn:aws:elasticloadbalancing:us-east-1:636013029017:loadbalancer/app/NewLoadBalancer/75e4eab88e062f26
DNS name Info
NewLoadBalancer-1272292230.us-east-1.elb.amazonaws.com (A Record)
Listeners and rules
Network mapping
Resource map - new
Security
Monitoring
Integrations
Attributes
Tags
Listeners and rules (1) Info
Manage rules
Manage listener
Add listener
A listener checks for connection requests on its configured protocol and port. Traffic received by the listener is routed according to the default action and any additional rules.
Filter listeners
1
Protocol:Port
Default action
Rules
ARN
Security policy
Default
HTTP:80
Forward to target group
NewTargetGroup: 1 (100%)
Target group stickiness: Off
1 rule
ARN
Not applicable
Not app

Listener details: HTTPS:443

A listener checks for connection requests using the protocol and port that you configure. The default action and any additional rules that you create determine how the Application Load Balancer routes requests to its registered targets.

Listener configuration

The listener will be identified by the protocol and port.

Protocol

Used for connections from clients to the load balancer.

HTTPS

Port

The port on which the load balancer is listening for connections.

443

1-65535

Default actions | Info

The default action is used if no other rules apply. Choose the default action for traffic on this listener.

Authentication | Info

Authentication requires IPv4 connectivity to authentication endpoints. Learn more

☐ Use OpenID or Amazon Cognito

Include authentication using either OpenID Connect (OIDC) or Amazon Cognito.

Routing actions

◉ Forward to target groups ○ Redirect to URL ○ Return fixed response

Forward to target group | Info

Choose a target group and specify routing weight or Create target group.

Target group	Weight	Percent

Security policy | Info

Your load balancer uses a Secure Socket Layer (SSL) negotiation configuration called a security policy to manage SSL connections with clients. Compare security policies

Security category: All security policies

Policy name: ELBSecurityPolicy-TLS13-1-2-2021-06 (recommended)

Default SSL/TLS server certificate

The certificate used if a client connects without SNI protocol, or if there are no matching certificates. You can source this certificate from AWS Certificate Manager (ACM), Amazon Identity and Access Management (IAM), or import a certificate. This certificate will automatically be added to your listener certificate list.

Certificate source

- (•) From ACM
- ( ) From IAM
- ( ) Import certificate

Certificate (from ACM)

The selected certificate will be applied as the default SSL/TLS server certificate for this load balancer's secure listeners.

Select a certificate

Request new ACM certificate

Client certificate handling | Info

Client certificates are used to make authenticated requests to remote servers. Learn more

- [ ] Mutual authentication (mTLS)

  Mutual TLS (Transport Layer Security) authentication offers two-way peer authentication. It adds a layer of security over TLS and allows your services to verify the client that's making the connection.

Request public certificate

Domain names

Provide one or more domain names for your certificate.

Fully qualified domain name | Info

NewLoadBalancer-1272292230.us-east-1.elb.amazonaws.com

Add another name to this certificate

Validation method Info

Select a method for validating domain ownership.

- ○ DNS validation - recommended
  Choose this option if you are authorized to modify the DNS configuration for the domains in your certificate request.
- ◉ Email validation
  Choose this option if you do not have permission or cannot obtain permission to modify the DNS configuration for the domains in your certificate request.

Validation domains

The validation domain will act as the email address suffix that will receive validation emails for the requested certificate domain name. This must be the same as the domain name or a superdomain of the domain name.

Domain name	Validation domain - *optional*
NewLoadBalancer-1272292230.us-east-	*NewLoadBalancer-1272292230.us-east-*

Listener details: HTTP:80

A listener checks for connection requests using the protocol and port that you configure. The default action and any additional rules that you create determine how the Application Load Balancer routes requests to its registered targets.

Listener configuration

The listener will be identified by the protocol and port.

Protocol	Port
Used for connections from clients to the load balancer.	The port on which the load balancer is listening for connections.
HTTP ▼	80
	1-65535

Default actions Info

The default action is used if no other rules apply. Choose the default action for traffic on this listener.

Routing actions

- ○ Forward to target groups
- ◉ Redirect to URL
- ○ Return fixed response

Redirect to URL Info

Redirect client requests from one URL to another. You cannot redirect HTTPS to HTTP. To avoid a redirect loop, you must modify at least one of the following components: protocol, port, hostname or path. Components that you do not modify retain their original values.

URI parts | Full URL

Protocol	Port
Used for connections from clients to the load balancer.	The port on which the load balancer is listening for connections.
HTTPS ▼	443
	1-65535 or to retain the original port enter #{port}

Protocol

Used for connections from clients to the load balancer.

HTTPS

Port

The port on which the load balancer is listening for connections.

443

1-65535 or to retain the original port enter #{port}

☑ Custom host, path, query

Select to modify host, path and query. If no changes are made, settings from the request URL are retained.

Host

Specify a host or retain the original host by using #{host}. Not case sensitive.

#{host}

Maximum 128 characters. Allowed characters are **a-z**, **A-Z**, **0-9**; the following special characters: **-.**; and wildcards (* and ?). At least one "." is required. Only alphabetical characters are allowed after the final "." character.

Path

Specify a path or retain the original path by using #{path}. Case sensitive.

/#{path}

Maximum 128 characters. Allowed characters are `a-z`, `A-Z`, `0-9`; the following special characters: `_-.$/~"'@:+`; `&` (using `&`); and wildcards (`*` and `?`).

Query - *optional*

Specify a query or retain the original query by using #{query}. Not case sensitive.

#{query}

Maximum 128 characters.

Status code

301 - Permanently moved

Thank you