Configuration files or steps to run on AWS.

Step 1: Setup IoT Core

Create a new thing named ‘dustbin’ and download its SDK package. Go into "Things" and click on your thing and then go into the "Certificates" section. Connect the policy that is under the SDK folder downloaded and edit the active version by adding the following 5 lines in the JSON document of the policy.

Add these 2 lines under publish section:

    "arn:aws:iot:eu-west-3:477201098489:topic/dustbin"

    "arn:aws:iot:eu-west-3:477201098489:topic/dustbin/data"

Add these 2 lines under subscribe section:

    "arn:aws:iot:eu-west-3:477201098489:topicfilter/dustbin"

    "arn:aws:iot:eu-west-3:477201098489:topicfilter/dustbin/data"

Add the following line under Connect section:

    "arn:aws:iot:eu-west-3:477201098489:client/ESP32"

Step 2: Creation of IoT Rule and Dynamo table

Go into the message routing section in the side menu and then into Rules to create a new rule called "dustbinRule" and click on the next button. SELECT * FROM 'dustbin/data'. Choose DynamoDBv2 and then create a new table called "dustbinTable" with "timestamp" as partition key attribute. Go back to the rule settings, select the just created table and create a new IAM role "user" and select it. Complete the rule creation.

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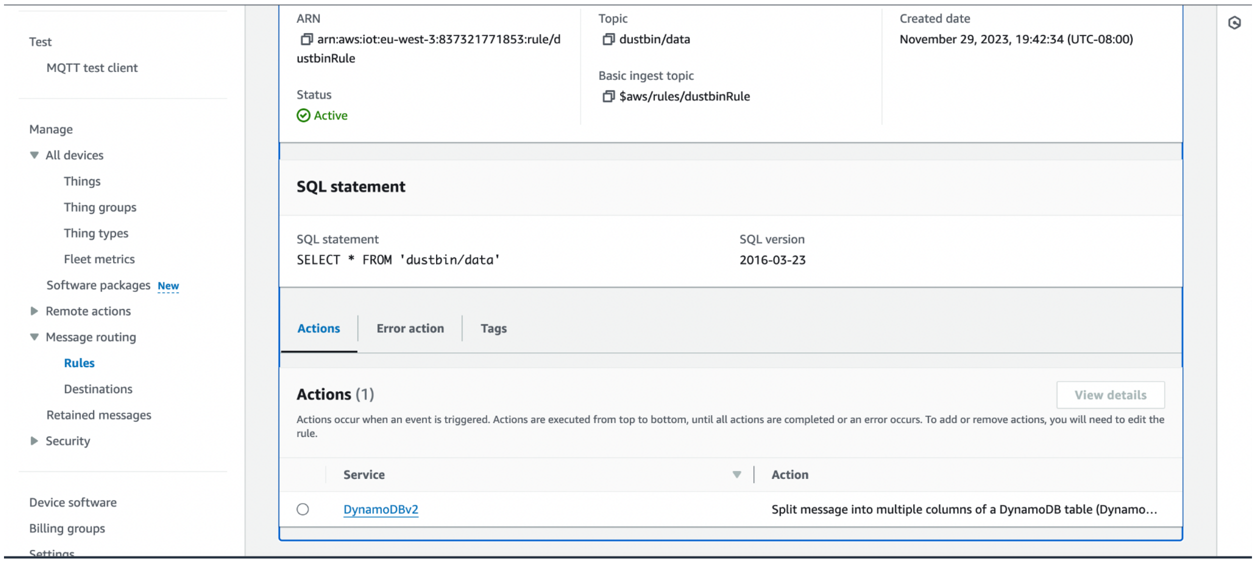


ARN
arn:aws:iot:eu-west-3:837321771853:rule/dustbinRule

Status
Active

Topic
dustbin/data

Basic ingest topic
$aws/rules/dustbinRule

Created date
November 29, 2023, 19:42:34 (UTC-08:00)

SQL statement

SQL statement
`SELECT * FROM 'dustbin/data'`

SQL version
2016-03-23

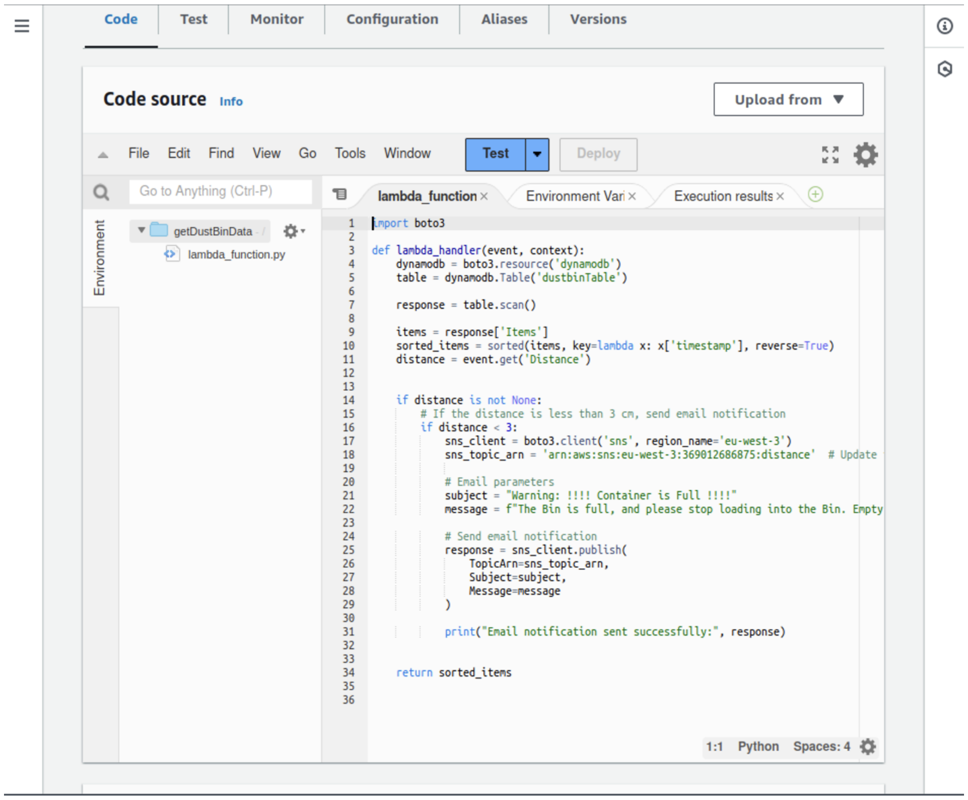
Actions (1)

Actions occur when an event is triggered. Actions are executed from top to bottom, until all actions are completed or an error occurs. To add or remove actions, you will need to edit the rule.

Service	Action
DynamoDBv2	Split message into multiple columns of a DynamoDB table (Dynamo…

Step 3: Lambda and SNS

Create a lambda function named ‘getDustBinData’ and paste code from ‘getDustBinData.py’.Save changes and deploy the function.



```python
import boto3

def lambda_handler(event, context):
    dynamodb = boto3.resource('dynamodb')
    table = dynamodb.Table('dustbinTable')

    response = table.scan()

    items = response['Items']
    sorted_items = sorted(items, key=lambda x: x['timestamp'], reverse=True)
    distance = event.get('Distance')


    if distance is not None:
        # If the distance is less than 3 cm, send email notification
        if distance < 3:
            sns_client = boto3.client('sns', region_name='eu-west-3')
            sns_topic_arn = 'arn:aws:sns:eu-west-3:369012686875:distance'  # Update

            # Email parameters
            subject = "Warning: !!!! Container is Full !!!!"
            message = f"The Bin is full, and please stop loading into the Bin. Empty

            # Send email notification
            response = sns_client.publish(
                TopicArn=sns_topic_arn,
                Subject=subject,
                Message=message
            )

            print("Email notification sent successfully:", response)


    return sorted_items
```

Now, to give the lambda function the permission to access a dynamoDB table, search "IAM" in the AWS research bar, go into the "Policy" settings and search "dynamoDB".

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Click on the first result (It should be something like "amazonDynamoDBFullAccess"), and then in the "Entities attached" section, click on "Attach" in order to attach the policy to your lambda function.

Search SNS in the AWS research bar and go to topics. Create a topic with the name ‘distance’. Scroll down and select subscriptions. Click on ‘create subscription’ and add email address. Copy the ARN of distance topic and paste it in the above code.To add SNS feature, go to the function overview of lambda function and select add trigger. Search SNS in trigger configuration and select it. Come back to the lambda function and deploy the function. This ensures that the lambda function and SNS are integrated and whenever the bin level raises above 97%, the email provided in the subscriptions tab will receive notification email stating that the bin is full.