Experiment: 7

Title : Creating a lambda function in AWS to email daily reports

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- -

Aim : Automate Sending Emails at a Specific Time with AWS Lambda, CloudWatch and SES

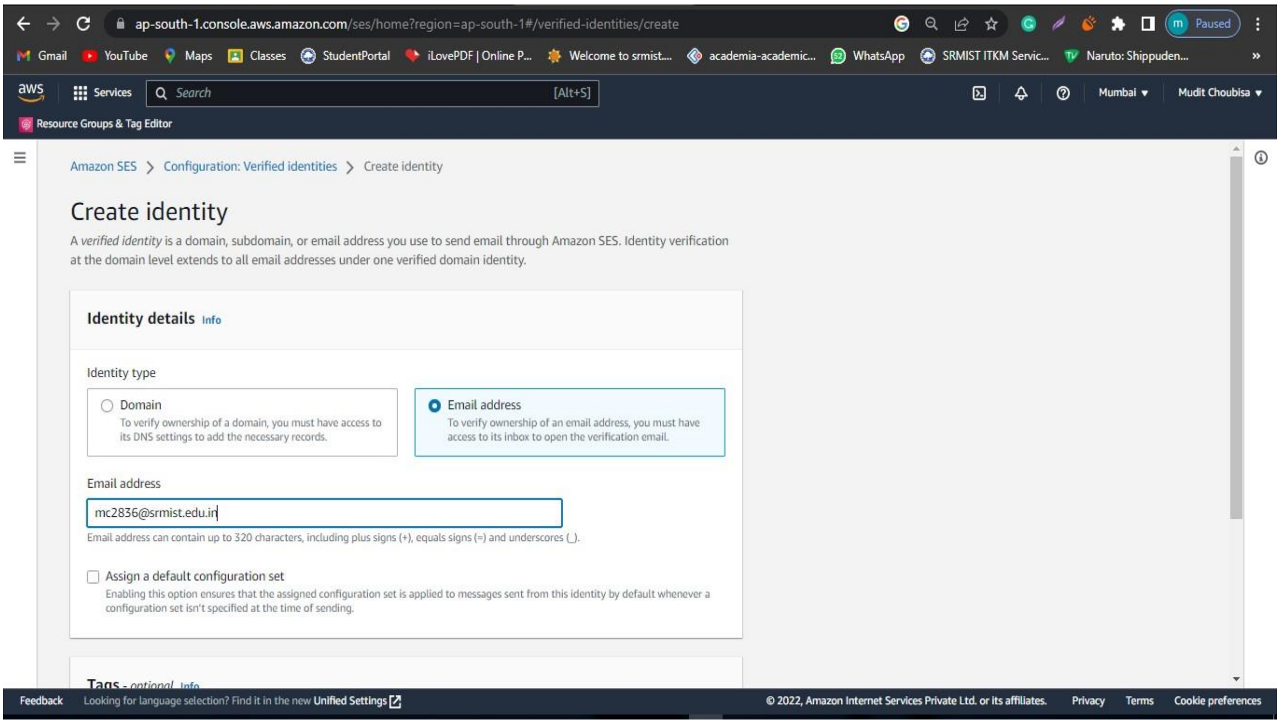
Pre-requisites : AWS Console, Amazon SES, Amazon Lambda, Amazon CloudWatch.

Procedure :

We are going automate sending email to a person or a group of people. AWS **Cloudwatch** is used to setup a schedule to trigger AWS **Lambda** function and then its going to use AWS **SES** (**Simple Email Service**) to send out emails to people.

Steps:

1. Go to AWS SES (Simple email service), click on "Create Identity". Use email address as a type and type the email address.


ap-south-1.console.aws.amazon.com/ses/home?region=ap-south-1#/verified-identities/create

Amazon SES > Configuration: Verified identities > Create identity

Create identity

A *verified identity* is a domain, subdomain, or email address you use to send email through Amazon SES. Identity verification at the domain level extends to all email addresses under one verified domain identity.

Identity details Info

Identity type

○ Domain
To verify ownership of a domain, you must have access to its DNS settings to add the necessary records.

● Email address
To verify ownership of an email address, you must have access to its inbox to open the verification email.

Email address

mc2836@srmist.edu.in

Email address can contain up to 320 characters, including plus signs (+), equals signs (=) and underscores (_).

□ Assign a default configuration set
Enabling this option ensures that the assigned configuration set is applied to messages sent from this identity by default whenever a configuration set isn't specified at the time of sending.

Tags - *optional* Info

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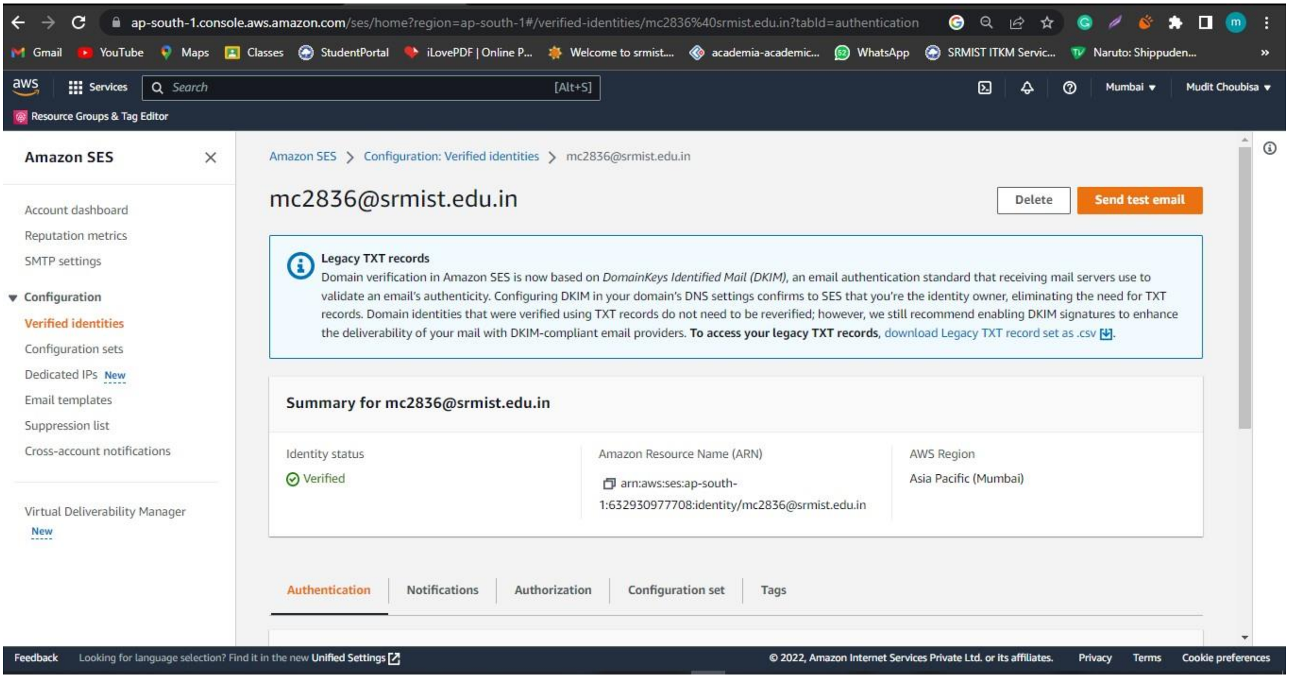
2. Verify the email address that revieved an email from aws to tell you to verify that.


ap-south-1.console.aws.amazon.com/ses/home?region=ap-south-1#/verified-identities/mc2836%40srmist.edu.in?tabId=authentication

Amazon SES > Configuration: Verified identities > mc2836@srmist.edu.in

mc2836@srmist.edu.in

Delete Send test email

Legacy TXT records
Domain verification in Amazon SES is now based on *DomainKeys Identified Mail (DKIM)*, an email authentication standard that receiving mail servers use to validate an email's authenticity. Configuring DKIM in your domain's DNS settings confirms to SES that you're the identity owner, eliminating the need for TXT records. Domain identities that were verified using TXT records do not need to be reverified; however, we still recommend enabling DKIM signatures to enhance the deliverability of your mail with DKIM-compliant email providers. **To access your legacy TXT records,** download Legacy TXT record set as .csv.

Summary for mc2836@srmist.edu.in

Identity status	Amazon Resource Name (ARN)	AWS Region
✓ Verified	arn:aws:ses:ap-south-1:632930977708:identity/mc2836@srmist.edu.in	Asia Pacific (Mumbai)

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3. Create two identities (email address).

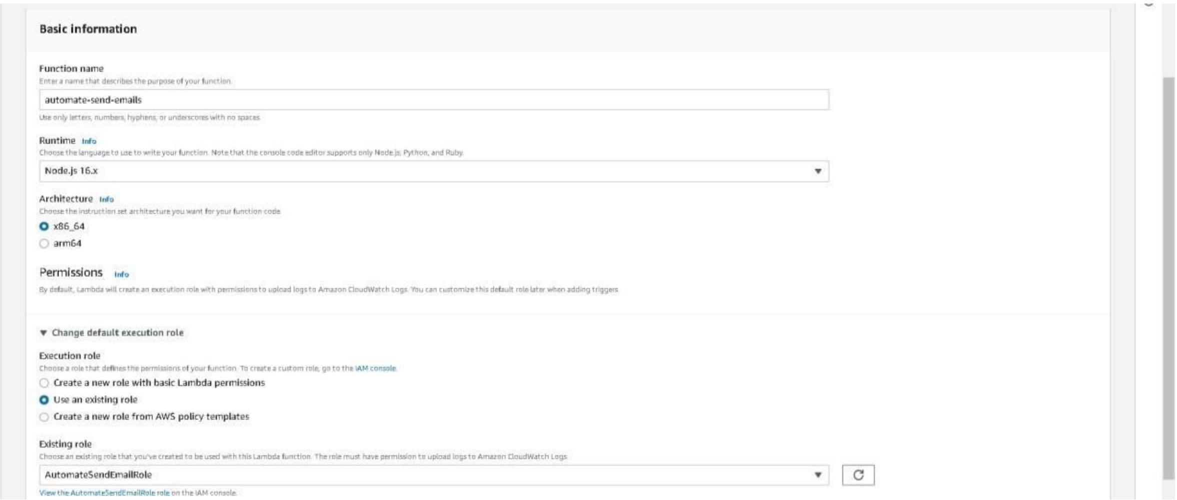
One for sending emails and another for receiving.

4. Create an IAM role.

   Give Use case as lambda and give full access to cloudwatch, SES.

5. Go to Lambda Service, create a lambda function.

   Give name, runtime as NodeJS, execution role as created IAM role previously.



Basic information

Function name
Enter a name that describes the purpose of your function.
automate-send-emails
Use only letters, numbers, hyphens, or underscores with no spaces.

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 16.x

Architecture Info
Choose the instruction set architecture you want for your function code.
● x86_64
○ arm64

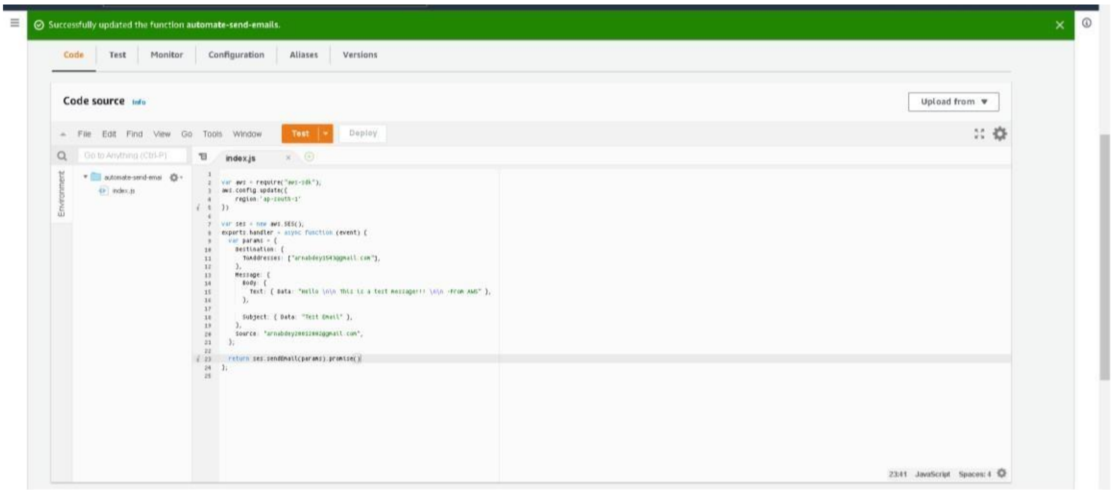
Permissions Info
By default, Lambda will create an execution role with permissions to upload logs to Amazon CloudWatch Logs. You can customize this default role later when adding triggers.

▼ Change default execution role

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

Existing role
Choose an existing role that you've created to be used with this Lambda function. The role must have permission to upload logs to Amazon CloudWatch Logs.
AutomateSendEmailRole
View the AutomateSendEmailRole role on the IAM console.

6. Use this template for the code:



Successfully updated the function automate-send-emails.

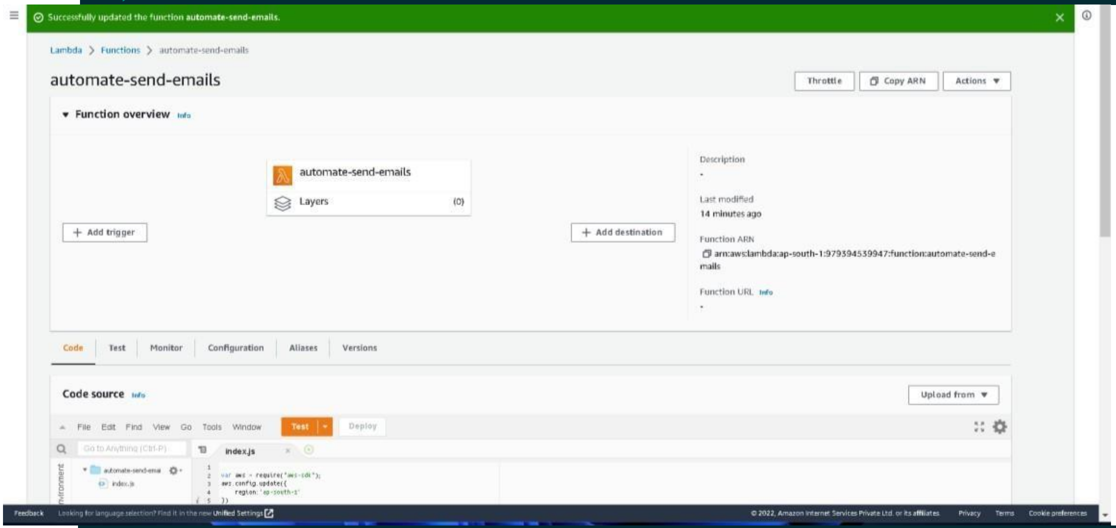
```
var aws = require("aws-sdk");
aws.config.update({
    region:'ap-south-1'
})

var ses = new aws.SES();
exports.handler = async function (event) {
  var params = {
    Destination: {
      ToAddresses: ["arnabdey1543@gmail.com"],
    },
    Message: {
      Body: {
        Text: { Data: "Hello \n\n This is a test message!! \n\n -From AWS" },
      },

      Subject: { Data: "Test Email" },
    },
    Source: "arnabdey20012002@gmail.com",
  };

  return ses.sendEmail(params).promise()
};
```

```
1)
2) var aws = require("aws-sdk");
3)   var ses = new aws.SES({ region: "us-west-2" });
4)      exports.handler = async function (event) {
5)      var params = {
6)      Destination: {
7)      ToAddresses: ["RecipientEmailAddress"], 8)       },
9)            Message: {
10)           Body: {
11)           Text: { Data: "Test" },
12)          },
13)
14)          Subject: { Data: "Test Email" },
15)        },
16)        Source: "SourceEmailAddress",
17)      };
18)
19)      return ses.sendEmail(params).promise()
20)    };
```



Successfully updated the function **automate-send-emails.**

Lambda > Functions > automate-send-emails

automate-send-emails

Function overview

Description: -

Last modified: 14 minutes ago

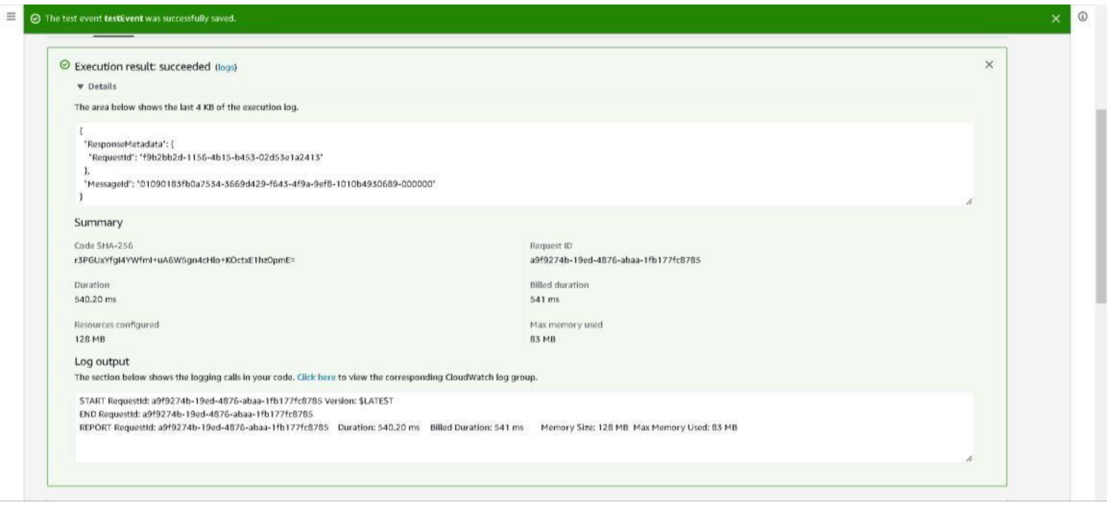
Function ARN: arn:aws:lambda:ap-south-1:979394539947:function:automate-send-emails

Function URL: -

Code source — index.js

```
var aws = require('aws-sdk');
aws.config.update({
  region: 'ap-south-1'
})
```

7. Click on Deploy and then TEST, you wil receive the message in your mentioned emails.



The test event **testEvent** was successfully saved.

Execution result: succeeded (logs)

▼ Details

The area below shows the last 4 KB of the execution log.

```
{
 "ResponseMetadata": {
  "RequestId": "f9b2bb2d-1156-4b15-b453-02d53e1a2413"
 },
 "MessageId": "01090183fb0a7534-3669d429-f643-4f9a-9ef8-1010b4930689-000000"
}
```

Summary

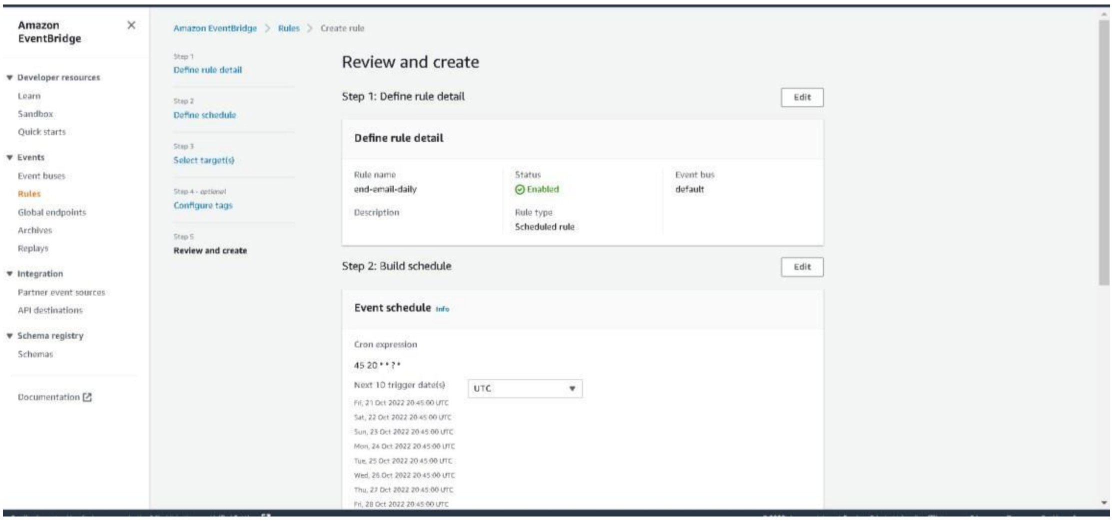
Code SHA-256 r3PGUxYfgl4YWfml+uA6W5gn4cHlo+KOctxE1hzOpmE=	Request ID a9f9274b-19ed-4876-abaa-1fb177fc8785
Duration 540.20 ms	Billed duration 541 ms
Resources configured 128 MB	Max memory used 83 MB

Log output

The section below shows the logging calls in your code. Click here to view the corresponding CloudWatch log group.

```
START RequestId: a9f9274b-19ed-4876-abaa-1fb177fc8785 Version: $LATEST
END RequestId: a9f9274b-19ed-4876-abaa-1fb177fc8785
REPORT RequestId: a9f9274b-19ed-4876-abaa-1fb177fc8785   Duration: 540.20 ms   Billed Duration: 541 ms    Memory Size: 128 MB  Max Memory Used: 83 MB
```

8. For scheduled daily report, go to AWS Cloudwatch , navigate to rule section (now called as eventBridge).



Review and create

Step 1: Define rule detail

Define rule detail

Rule name
end-email-daily

Description

Status
Enabled

Rule type
Scheduled rule

Event bus
default

Step 2: Build schedule

Event schedule

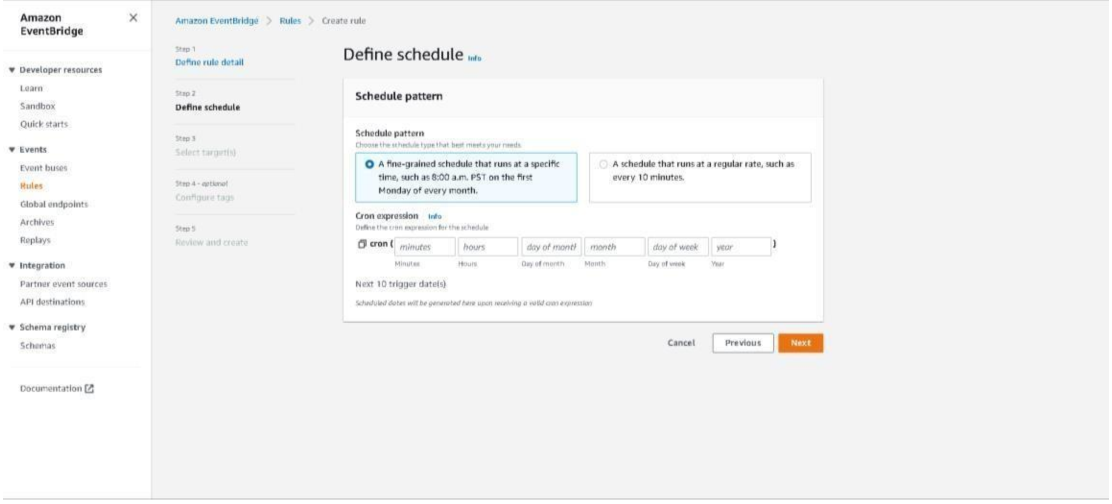
Cron expression

45 20 * * ? *

Next 10 trigger date(s) UTC

Fri, 21 Oct 2022 20:45:00 UTC
Sat, 22 Oct 2022 20:45:00 UTC
Sun, 23 Oct 2022 20:45:00 UTC
Mon, 24 Oct 2022 20:45:00 UTC
Tue, 25 Oct 2022 20:45:00 UTC
Wed, 26 Oct 2022 20:45:00 UTC
Thu, 27 Oct 2022 20:45:00 UTC
Fri, 28 Oct 2022 20:45:00 UTC

9. Create rule- give name, ruletype- schedule, use cron expression for schedule pattern . For e.g. : 15 19 * * ? *



Amazon EventBridge

- Developer resources
  - Learn
  - Sandbox
  - Quick starts
- Events
  - Event buses
  - Rules
  - Global endpoints
  - Archives
  - Replays
- Integration
  - Partner event sources
  - API destinations
- Schema registry
  - Schemas

Documentation

Amazon EventBridge > Rules > Create rule

Step 1 Define rule detail
Step 2 Define schedule
Step 3 Select target(s)
Step 4 - optional Configure tags
Step 5 Review and create

Define schedule Info

Schedule pattern

Schedule pattern
Choose the schedule type that best meets your needs

● A fine-grained schedule that runs at a specific time, such as 8:00 a.m. PST on the first Monday of every month.

○ A schedule that runs at a regular rate, such as every 10 minutes.

Cron expression Info
Define the cron expression for the schedule

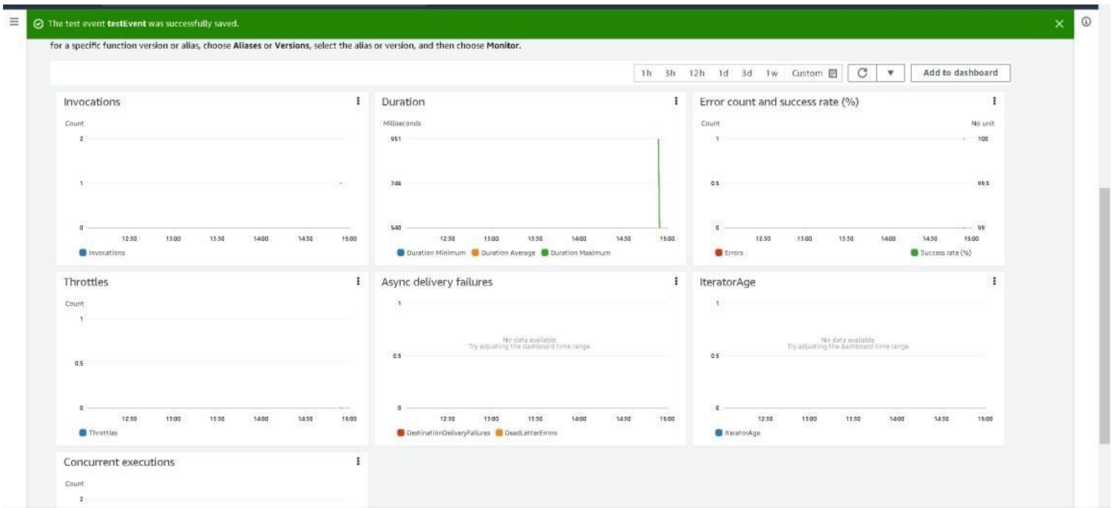
cron (minutes hours day of month month day of week year)
Minutes Hours Day of month Month Day of week Year

Next 10 trigger date(s)

Scheduled dates will be generated here upon receiving a valid cron expression

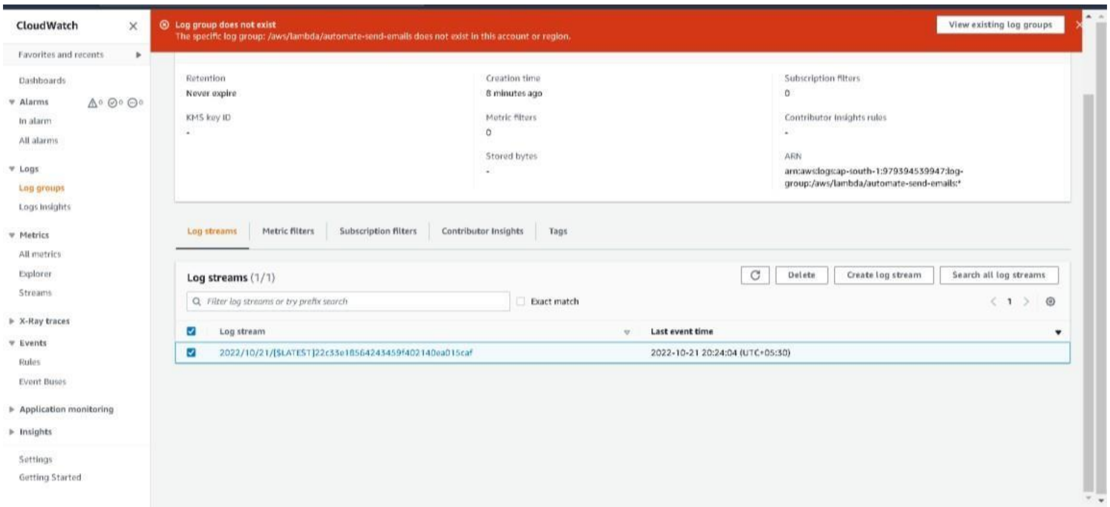
10.Select Targets as lambda function, and use the above defined function.

11.Go to monitoring in Lambda service, click on View logs in cloudWatch and check your mail inbox .



The test event **testEvent** was successfully saved.

for a specific function version or alias, choose **Aliases** or **Versions**, select the alias or version, and then choose **Monitor**.



Log group does not exist
The specific log group: /aws/lambda/automate-send-emails does not exist in this account or region.

Retention
Never expire

KMS key ID
-

Creation time
8 minutes ago

Metric filters
0

Stored bytes
-

Subscription filters
0

Contributor Insights rules
-

ARN
arn:aws:logs:ap-south-1:979394539947:log-group:/aws/lambda/automate-send-emails:*

Log streams (1/1)

□ Exact match

☑	Log stream	Last event time
☑	2022/10/21/[$LATEST]22c33e18564243459f402140ea015caf	2022-10-21 20:24:04 (UTC+05:30)

Result:

Hence, the lambda function is created and also implemented using SES, CloudWatch to schedule daily reports.