

Problem Statement:

How to secure patient records online and send it privately to the intended party

Topics:

In this project, you will be working on a hospital project to send reports online and develop a platform so the patients can access the reports via mobile and push notifications. You will publish the report to an Amazon SNS keeping it secure and private. Your message will be hosted on an EC2 instance within your Amazon VPC. By publishing the messages privately, you can improve the message delivery and receipt through Amazon SNS.

Highlights:

1. AWS CloudFormation to create a VPC
2. Connect VPC with AWS SNS
3. Publish message privately with SNS.

Procedure: -

- I have the stack which contains the following things:
- <https://github.com/Origamini/YAMLFiles/blob/main/Project3Updated.yaml>
- A VPC and the associated networking resources, including a subnet, a security group, an internet gateway, and a route table.
- An Amazon EC2 instance that is launched into the subnet in the VPC.
- An Amazon SNS topic.
- Two AWS Lambda functions. These functions receive messages that are published to the Amazon SNS topic, and they log events in CloudWatch Logs.
- Amazon CloudWatch metrics and logs.

- An IAM role that allows the Amazon EC2 instance to use Amazon SNS, and an IAM role that allows the Lambda functions to write to CloudWatch logs.
- Upload the stack and let everything be default and click on next and create the stack.

The screenshot shows the AWS CloudFormation console in the 'us-east-1' region. The left sidebar displays a list of stacks under the 'myProject' heading, with 'myProject' selected and showing a 'CREATE_COMPLETE' status. The main panel shows the 'Events' tab for the 'myProject' stack, displaying a list of 59 events. The events table includes columns for Timestamp, Logical ID, Status, and Status reason.

Timestamp	Logical ID	Status	Status reason
2023-08-17 04:37:46 UTC+0530	myProject	CREATE_COMPLETE	-
2023-08-17 04:37:45 UTC+0530	EC2Instance	CREATE_COMPLETE	-
2023-08-17 04:37:13 UTC+0530	EC2Instance	CREATE_IN_PROGRESS	Resource creation Initiated
2023-08-17 04:37:11 UTC+0530	EC2Instance	CREATE_IN_PROGRESS	-
2023-08-17 04:37:11 UTC+0530	EC2InstanceProfile	CREATE_COMPLETE	-

The screenshot shows the 'Specify stack details' step of the AWS CloudFormation 'Create Stack' wizard. The left sidebar shows the progress: Step 1 (Create stack), Step 2 (Specify stack details), Step 3 (Configure stack options), and Step 4 (Review myProject). The main panel contains the following fields:

- Stack name:** A text input field containing 'myProject'. Below it, a note states: 'Stack name can include letters (A-Z and a-z), numbers (0-9), and dashes (-)'.
- Parameters:** A section with a note: 'Parameters are defined in your template and allow you to input custom values when you create or update a stack.'
 - KeyName:** A dropdown menu with the selected value 'keyTextLin'. The description is 'Name of an existing EC2 KeyPair to enable SSH access to the instance'.
 - SSHLocation:** A text input field containing '0.0.0.0/0'. The description is 'The IP address range that can be used to SSH to the EC2 instance'.

At the bottom right, there are three buttons: 'Cancel', 'Previous', and 'Next'.

- ```
CloudFormation - Stack myProj... x | Connect to instance [EC2 Main] x | EC2 Instance Connect x | Start Course | Intellipaat x | Inbox (1,609) - kavithakumar35... x | +
```

us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?region=us-east-1&cornertype=standard&instanceid=i-02032aed41ec543c4&osUser=ec2-user&sshPort=22#

aws Services Search [Alt+S]

Global Accelerator EC2 RDS IAM Elastic Beanstalk CloudFormation VPC

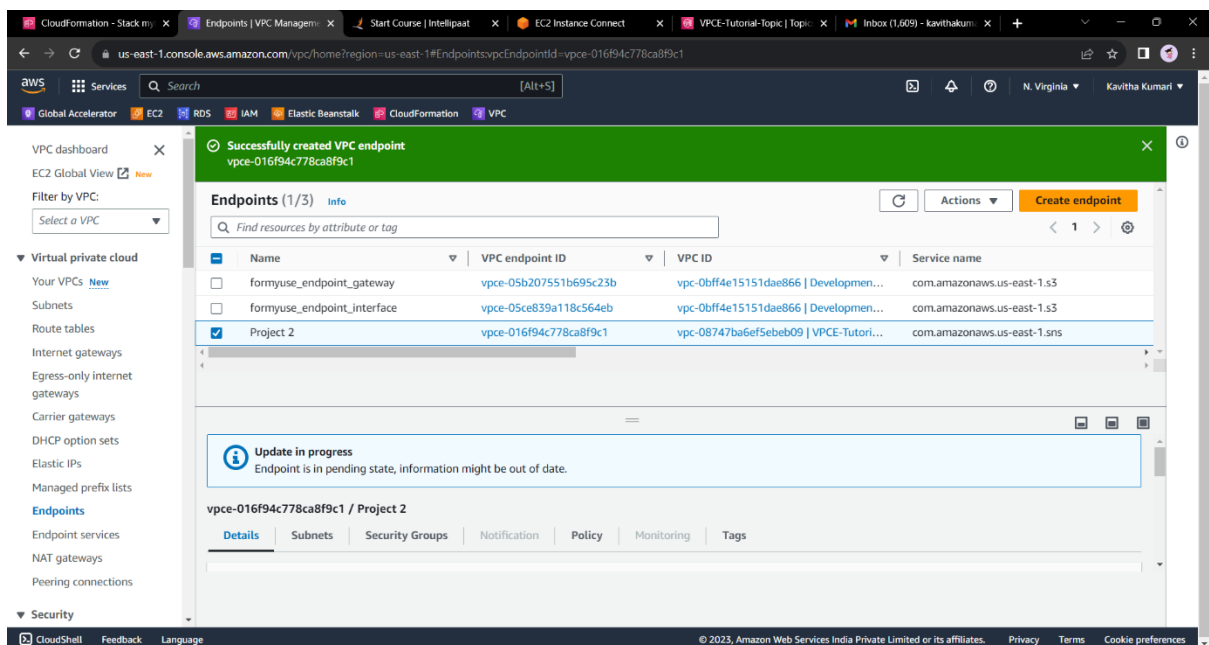
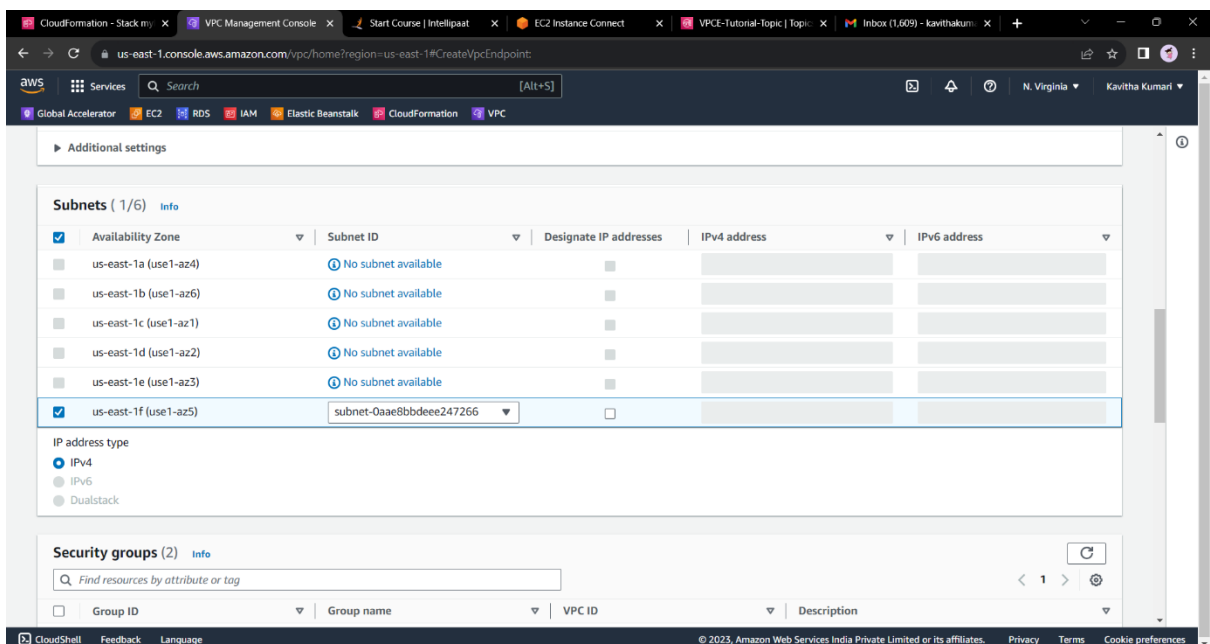
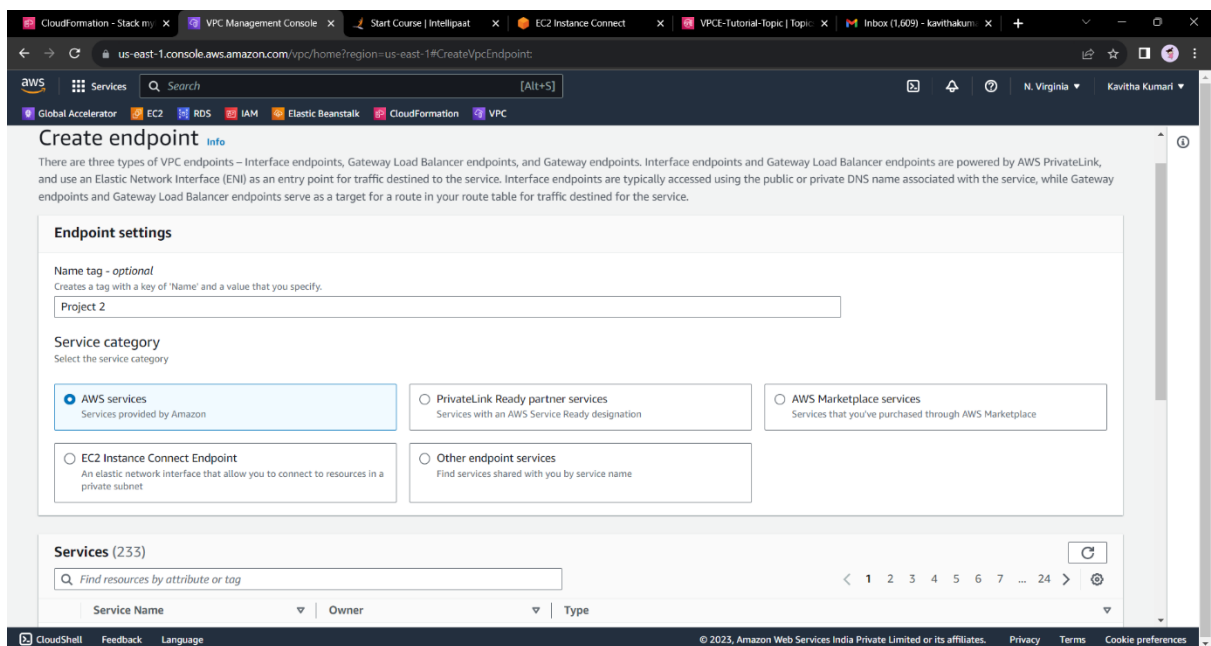
```
The authenticity of host 'ec2-100-26-135-115.compute-1.amazonaws.com (10.0.1.237)' can't be established.
ECDSA key fingerprint is SHA256:3NmKw2QLkSN5xWeDAaiUorIYorjIEJTBGASQJVBS.
ECDSA key fingerprint is MD5:f8:7c:c6:66:0a:30:c9:12:d1:16:eb:80:e0:fe:35:e8.
Are you sure you want to continue connecting (yes/no)? no
Host key verification failed.
[ec2-user@ip-10-0-1-237 ~]$ sudo nano keyTextLin.pem
[ec2-user@ip-10-0-1-237 ~]$ ls
keyTextLin.pem
[ec2-user@ip-10-0-1-237 ~]$ ssh -i "keyTextLin.pem" ec2-user@ec2-100-26-135-115.compute-1.amazonaws.com
The authenticity of host 'ec2-100-26-135-115.compute-1.amazonaws.com (10.0.1.237)' can't be established.
ECDSA key fingerprint is SHA256:3NmKw2QLkSN5xWeDAaiUorIYorjIEJTBGASQJVBS.
ECDSA key fingerprint is MD5:f8:7c:c6:66:0a:30:c9:12:d1:16:eb:80:e0:fe:35:e8.
Are you sure you want to continue connecting (yes/no)? yes
Warning: Permanently added 'ec2-100-26-135-115.compute-1.amazonaws.com,10.0.1.237' (ECDSA) to the list of known hosts.
Last login: Wed Aug 16 23:11:12 2023 from ec2-18-206-107-29.compute-1.amazonaws.com

 _ _
|_| |_|
 _ \|_ \|_ \|
 Amazon Linux 2 AMI

https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-0-1-237 ~]$ ping google.com
PING google.com (142.251.163.100) 56(84) bytes of data.
^C
--- google.com ping statistics ---
43 packets transmitted, 0 received, 100% packet loss, time 43010ms

[ec2-user@ip-10-0-1-237 ~]$
```

- For VPC, choose the VPC that has the name VPCE-Tutorial-VPC



```
CloudFormation - Stack my | Endpoints | VPC Manager | EC2 Instance Connect | Start Course | Intellipast | VPC-Tutorial-Topic | Topic | Inbox (1,609) - kavithakum | +
us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?region=us-east-1&connType=standard&instanceId=i-02032aed41ec543c4&osUser=ec2-user&sshPort=22#/
AWS Services Search [Alt+S]
Global Accelerator EC2 RDS IAM Elastic Beanstalk CloudFormation VPC
Instructions at: https://docs.aws.amazon.com/cli/latest/userguide/install-cliv2.html
usage: aws [options] <command> [<subcommand> ...] [parameters]
To see help text, you can run:
aws help
aws <command> help
aws <command> <subcommand> help
aws: error: argument --message is required
[ec2-user@ip-10-0-1-237 ~]$ aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:049198078472:VPCE-Tutorial-Topic
Note: AWS CLI version 2, the latest major version of the AWS CLI, is now stable and recommended for general use. For more information, see the AWS CLI version 2 installation instructions at: https://docs.aws.amazon.com/cli/latest/userguide/install-cliv2.html
usage: aws [options] <command> [<subcommand> ...] [parameters]
To see help text, you can run:
aws help
aws <command> help
aws <command> <subcommand> help
aws: error: argument --message is required
[ec2-user@ip-10-0-1-237 ~]$ aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:049198078472:VPCE-Tutorial-Topic --message "hello"
Connect timeout on endpoint URL: "https://sns.us-east-1.amazonaws.com/"
[ec2-user@ip-10-0-1-237 ~]$ aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:049198078472:VPCE-Tutorial-Topic --message "hello"
{
 "MessageId": "d9dc8ec9-99a8-5cac-a6cd-d39ec6798daa"
}
[ec2-user@ip-10-0-1-237 ~]$
i-02032aed41ec543c4 (VPCE-Tutorial-EC2Instance)
PublicIPs: 100.26.135.115 PrivateIPs: 10.0.1.237
CloudShell Feedback Language © 2023, Amazon Web Services India Private Limited or its affiliates. Privacy Terms Cookie preferences
```

```
CloudFormation - Stack my | Connect to instance | EC2 | Start Course | Intellipast | EC2 Instance Connect | VPC-Tutorial-Topic | Topic | Inbox (1,609) - kavithakum | +
us-east-1.console.aws.amazon.com/ec2-instance-connect/ssh?region=us-east-1&connType=standard&instanceId=i-02032aed41ec543c4&osUser=ec2-user&sshPort=22#/
AWS Services Search [Alt+S]
Global Accelerator EC2 RDS IAM Elastic Beanstalk CloudFormation VPC
~C
--- google.com ping statistics ---
43 packets transmitted, 0 received, 100% packet loss, time 43010ms
[ec2-user@ip-10-0-1-237 ~]$ aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:049198078472:VPCE-Tutorial-Topic
Note: AWS CLI version 2, the latest major version of the AWS CLI, is now stable and recommended for general use. For more information, see the AWS CLI version 2 installation instructions at: https://docs.aws.amazon.com/cli/latest/userguide/install-cliv2.html
usage: aws [options] <command> [<subcommand> ...] [parameters]
To see help text, you can run:
aws help
aws <command> help
aws <command> <subcommand> help
aws: error: argument --message is required
[ec2-user@ip-10-0-1-237 ~]$ aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:049198078472:VPCE-Tutorial-Topic
Note: AWS CLI version 2, the latest major version of the AWS CLI, is now stable and recommended for general use. For more information, see the AWS CLI version 2 installation instructions at: https://docs.aws.amazon.com/cli/latest/userguide/install-cliv2.html
usage: aws [options] <command> [<subcommand> ...] [parameters]
To see help text, you can run:
aws help
aws <command> help
aws <command> <subcommand> help
aws: error: argument --message is required
[ec2-user@ip-10-0-1-237 ~]$ aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:049198078472:VPCE-Tutorial-Topic --message "hello"
i-02032aed41ec543c4 (VPCE-Tutorial-EC2Instance)
```

CloudFormation x VPCE-Tutorial-L... Endpoints | VPC | EC2 Instance Co... Start Course | Ini... Functions - Lam... VPCE-Tutorial-T... Inbox (1,609) - k... +

us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions/VPCE-Tutorial-Lambda-2?tab=monitoring

aws Services Search [Alt+S]

Global Accelerator EC2 RDS IAM Elastic Beanstalk CloudFormation VPC

### AWS Lambda

- Dashboard
- Applications
- Functions
  - VPCE-Tutorial-Lambda-2
- Additional resources
  - Code signing configurations
  - Layers
  - Replicas
- Related AWS resources
  - Step Functions state machines

Code | Test | **Monitor** | Configuration | Aliases | Versions

Metrics | **Logs** | Traces

View CloudWatch logs View X-Ray traces View Lambda Insights View CodeGuru profiles

#### CloudWatch Logs

Lambda logs all requests handled by your function and automatically stores logs generated by your code through Amazon CloudWatch Logs. To validate your code, instrument it with custom logging statements. The following tables list the most recent and most expensive function invocations across all function activity. To view logs for a specific function version or alias, visit the **Monitor** section at that level.

1h 3h 12h 1d 3d 1w Custom

##### Recent invocations

| # | Timestamp                | RequestID                            | LogStream                                             | DurationInMs | Errors |
|---|--------------------------|--------------------------------------|-------------------------------------------------------|--------------|--------|
| 1 | 2023-08-16T23:36:49.659Z | 6b5dda89-95b0-47f5-80ef-7b6c3b04af53 | 2023/08/16/[\$LATEST]2368e7d5a2004c91b013a736bc5ecdce | 1.9          | 2      |

Most expensive invocations in GB-seconds (memory assigned \* billed duration)

CloudShell Feedback Language © 2023, Amazon Web Services India Private Limited or its affiliates. Privacy Terms Cookie preferences

CloudFormation x VPCE-Tutorial-L... Endpoints | VPC | EC2 Instance Co... Start Course | Ini... Functions - Lam... VPCE-Tutorial-T... Inbox (1,609) - k... +

us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions/VPCE-Tutorial-Lambda-2?tab=monitoring

aws Services Search [Alt+S]

Global Accelerator EC2 RDS IAM Elastic Beanstalk CloudFormation VPC

### AWS Lambda

- Dashboard
- Applications
- Functions
  - VPCE-Tutorial-Lambda-2
- Additional resources
  - Code signing configurations
  - Layers
  - Replicas
- Related AWS resources
  - Step Functions state machines

Lambda sends runtime metrics for your functions to Amazon CloudWatch. The metrics shown are an aggregate view of all function runtime activity. To view metrics for the unqualified or \$LATEST resource, choose **Filter by**. To view metrics for a specific function version or alias, choose **Aliases** or **Versions**, select the alias or version, and then choose **Monitor**.

1h 3h 12h 1d 3d 1w Custom

#### Invocations

Count

2

1

0 21:30 22:30 23:30

Invocations

#### Duration

Milliseconds

2

1.9

1.8 21:30 22:30 23:30

Duration minimum Duration average Duration maximum

#### Error count and success rate (%)

Count

1

No unit

100

99.5

99

0 21:30 22:30 23:30

Errors Success rate (%)

#### Throttles

Count

1

0.5

#### Total concurrent executions

Count

2

1

#### Recursive invocations dropped

No unit

1

No data available. Try adjusting the dashboard time range.

CloudShell Feedback Language © 2023, Amazon Web Services India Private Limited or its affiliates. Privacy Terms Cookie preferences

CloudFormation x VPCE-Tutorial-L... Endpoints | VPC | EC2 Instance Co... Start Course | Ini... Functions - Lam... VPCE-Tutorial-T... Inbox (1,609) - k... +

us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/functions

aws Services Search [Alt+S]

Global Accelerator EC2 RDS IAM Elastic Beanstalk CloudFormation VPC

### AWS Lambda

- Dashboard
- Applications
- Functions**
- Additional resources
  - Code signing configurations
  - Layers
  - Replicas
- Related AWS resources
  - Step Functions state machines

Lambda > Functions

Functions (2) Last fetched 2 minutes ago Actions Create function

Filter by tags and attributes or search by keyword

|                          | Function name          | Description                                 | Package type | Runtime    | Last modified  |
|--------------------------|------------------------|---------------------------------------------|--------------|------------|----------------|
| <input type="checkbox"/> | VPCE-Tutorial-Lambda-1 | SNS VPC endpoint tutorial lambda function 1 | Zip          | Python 3.9 | 37 minutes ago |
| <input type="checkbox"/> | VPCE-Tutorial-Lambda-2 | SNS VPC endpoint tutorial lambda function 2 | Zip          | Python 3.9 | 37 minutes ago |

CloudShell Feedback Language © 2023, Amazon Web Services India Private Limited or its affiliates. Privacy Terms Cookie preferences

**CloudWatch Logs** [Info](#)

Lambda logs all requests handled by your function and automatically stores logs generated by your code through Amazon CloudWatch Logs. To validate your code, instrument it with custom logging statements. The following tables list the most recent and most expensive function invocations across all function activity. To view logs for a specific function version or alias, visit the **Monitor** section at that level.

1h 3h 12h 1d 3d 1w Custom [Refresh](#) [Filter](#)

|     | Timestamp                | RequestID                            | LogStream                                           | DurationInMS | BilledDurationInMS | MemorySize |
|-----|--------------------------|--------------------------------------|-----------------------------------------------------|--------------|--------------------|------------|
| ▼ 1 | 2023-08-16T23:36:49.659Z | 6b5dda89-95b0-47f5-80ef-7b6c3b04af53 | 2023/08/16/[LATEST]2368e7d5a2004c91b013a736bc5ecdce | 1.9          | 2.0                | 128        |

Most expensive invocations in GB-seconds (memory assigned \* billed duration)

Click on the log stream to get the below data.

**CloudWatch** [Log groups](#) > [/aws/lambda/VPCE-Tutorial-Lambda-2](#) > 2023/08/16/[LATEST]2368e7d5a2004c91b013a736bc5ecdce

**Log events**  
You can use the filter bar below to search for and match terms, phrases, or values in your log events. [Learn more about filter patterns](#)

[Refresh](#) [Actions](#) [Start tailing](#) [Create metric filter](#)

[Clear](#) [1m](#) [30m](#) [1h](#) [12h](#) [Custom \(3h\)](#) [Display](#) [Settings](#)

| Timestamp                                                                                             | Message                                                                                                                             |
|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| No more records within selected time range <a href="#">Retry</a>                                      |                                                                                                                                     |
| 2023-08-17T05:06:49.550+05:30                                                                         | INIT_START Runtime Version: python:3.9.v27 Runtime Version ARN: arn:aws:lambda:us-east-1:runtime:8b2da41983f6d685974eb4c51b1e1...   |
| 2023-08-17T05:06:49.655+05:30                                                                         | Loading function                                                                                                                    |
| 2023-08-17T05:06:49.657+05:30                                                                         | START RequestId: 6b5dda89-95b0-47f5-80ef-7b6c3b04af53 Version: \$LATEST                                                             |
| 2023-08-17T05:06:49.657+05:30                                                                         | From SNS: hello                                                                                                                     |
| 2023-08-17T05:06:49.659+05:30                                                                         | END RequestId: 6b5dda89-95b0-47f5-80ef-7b6c3b04af53                                                                                 |
| 2023-08-17T05:06:49.659+05:30                                                                         | REPORT RequestId: 6b5dda89-95b0-47f5-80ef-7b6c3b04af53 Duration: 1.90 ms Billed Duration: 2 ms Memory Size: 128 MB Max Memory Us... |
| No more records within selected time range <a href="#">Auto retry paused</a> . <a href="#">Resume</a> |                                                                                                                                     |

---End---