

AWS PROJECT3

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COURSE: MASTER'S IN DEVOPS ARCHITECT

Project 3 – Publishing Amazon SNS Messages Privately

- **Project:** Publishing Amazon SNS messages privately
- **Industry:** Healthcare
- **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 which 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

1.went to create key pair

The screenshot shows the 'Create key pair' page in the AWS Management Console. The URL in the browser is `us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#CreateKeyPair`. The page title is 'Create key pair'. The 'Name' field contains 'VPCE-Tutorial-KeyPair', which is highlighted with a large red arrow. Below the name field, a tooltip states: 'The name can include up to 255 ASCII characters, including underscores, hyphens, and periods. It cannot contain spaces.' The 'Key pair type' section has 'RSA' selected. Under 'Private key file format', '.ppk' is selected. There are sections for 'Tags - optional' and 'Add new tag'. The bottom of the page includes standard AWS footer links like Feedback, Language, Privacy, Terms, and Cookie preferences, along with system status icons.

created key-pair

Key pairs | EC2 Management Con + us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#KeyPairs:v=3

aws Services Search [Alt+S] N. Virginia gmail.com

EC2

New EC2 Experience Tell us what you think

Key pairs (1/41) Info Actions Create key pair

Name	Type	Created	Fingerprint	ID
ubuntu-ansible	rsa	2022/10/27 17:28 GMT+5:30	97:04:3c:7b:a0:c9:ec:00:26:0f:dd:c1:71:f...	key-03f50db0779422bd4
new-ubuntu-ansi	rsa	2022/10/27 19:03 GMT+5:30	d9:bd:76:f8:87:d8:14:58:92:12:2a:14:13...	key-03a42b3cdc8e6d2b4
migration-key	rsa	2022/10/28 07:20 GMT+5:30	a6:f9:15:c9:4e:79:9c:99:12:b1:c2:f7:ec:0...	key-0f3db3114f826cb7a
jenkins	rsa	2022/11/04 12:36 GMT+5:30	53:92:15:4c:86:1b:27:af:b2:65:11:f0:da:...	key-0a44895505d0afce4
jenkins assignment	rsa	2022/11/07 11:57 GMT+5:30	ef:a3:a9:54:f2:d9:be:23:f9:5e:cd:e4:13:ff...	key-0d774c036e3304541
kubernetes	rsa	2022/11/08 13:27 GMT+5:30	bb:58:45:c7:d2:f5:df:b6:f1:32:3f:70:39:4...	key-0980c9b931386a7aa
linuxnew1	rsa	2022/11/18 13:27 GMT+5:30	24:12:6c:ab:ec:0c:17:8e:ff:49:ac:94:cf:f3...	key-085d3dada3a5100e7
redhat	rsa	2022/11/18 13:26 GMT+5:30	cb:fb:43:42:0d:8b:63:0a:72:6a:f5:f6:23:...	key-0b2de62027df9fe93
lin29nov	rsa	2022/11/29 14:53 GMT+5:30	04:50:5b:aa:36:2d:ad:fa:c4:78:cf:91:32:c...	key-0e6deaa14bc38f143
ubu21	rsa	2022/12/17 08:50 GMT+5:30	b7:25:3a:2a:78:a7:90:e1:fa:3c:61:25:8c:...	key-0d912811d2800ed93
win1	rsa	2022/12/25 12:57 GMT+5:30	35:00:69:64:37:34:23:5e:73:75:6e:5e:22:...	key-026ad66ed2e749267
ubuntu2023	rsa	2023/01/13 09:41 GMT+5:30	c4:8c:7e:05:aa:a1:0b:b5:ea:67:11:83:d0:...	key-0cf4d4c5c2792a10e
nagios key	rsa	2023/01/13 19:43 GMT+5:30	88:56:82:c0:bf:ee:3b:2e:3f:56:0c:42:c7:e...	key-0c1ccdefcb3d3e2ae
tf-key-pair	rsa	2023/02/01 11:58 GMT+5:30	b4:dd:08:b0:e6:d8:78:a4:f7:08:70:80:71:...	key-0e2c18bb8ec95414f
tf-key-pair1	rsa	2023/02/01 12:19 GMT+5:30	ed:18:c5:2f:40:66:54:5d:70:ca:40:ca:6a:...	key-0e1ee9bb1056eba01
VPCE-Tutorial-KeyPair	rsa	2023/02/17 19:31 GMT+5:30	1d:d6:6f:26:d1:67:48:3b:92:35:40:68:9b:...	key-01e9647ffa23f5752

A large orange arrow points to the row for "VPCE-Tutorial-KeyPair".

step 2. went to github to download the template file

The screenshot shows a web browser window with the GitHub interface. The URL in the address bar is github.com/aws-samples/aws-sns-samples/blob/master/templates/SNS-VPCE-Tutorial-CloudFormation.template. The page title is "aws-samples / aws-sns-samples Public". The repository navigation bar includes links for Code, Issues (2), Pull requests, Actions, Projects, Security, and Insights. The main content area displays the CloudFormation template file "SNS-VPCE-Tutorial-CloudFormation.template" from the "master" branch. The file has 239 lines (239 sloc) and is 6.65 KB. The template content is as follows:

```
1 AWSTemplateFormatVersion: 2010-09-09
2 Description: CloudFormation Template for SNS VPC Endpoints Tutorial
3 Parameters:
4   KeyName:
5     Description: Name of an existing EC2 KeyPair to enable SSH access to the instance
6     Type: 'AWS::EC2::KeyPair::KeyName'
7     ConstraintDescription: must be the name of an existing EC2 KeyPair.
8   SSHLocation:
9     Description: The IP address range that can be used to SSH to the EC2 instance
10    Type: String
11    MinLength: '9'
12    MaxLength: '18'
13    Default: 0.0.0.0/0
14    AllowedPattern: '(\d{1,3})\.(\d{1,3})\.(\d{1,3})\.(\d{1,2})'
15    ConstraintDescription: must be a valid IP CIDR range of the form x.x.x.x/x.
16   Mappings:
17     RegionMap:
```

Step3. went to create stack

The screenshot shows the AWS CloudFormation homepage. On the left, there's a sidebar with links for CloudFormation (Stacks, StackSets, Exports), Designer, Registry (Public extensions, Activated extensions, Publisher), Spotlight, and Feedback. The main content area features a large title "AWS CloudFormation" with the subtitle "Model and provision all your cloud infrastructure". Below this, a paragraph explains that CloudFormation provides a common language to describe and provision infrastructure resources. A "Create a CloudFormation stack" section includes a "Create stack" button. To the right, there are sections for "Getting started" (What is AWS CloudFormation, Getting started with CloudFormation, Learn template basics, Quick starts) and "More resources". At the bottom, there's a "How it works" section with a video thumbnail titled "Simplify Your Infrastructure Management Using AWS CloudFormation".

Screenshot of the AWS CloudFormation 'Prerequisite - Prepare template' step.

The page shows the 'Specify stack details' step has been completed, and the 'Configure stack options' step is currently being worked on.

Template Option: A green arrow points to the 'Template is ready' radio button, which is selected. The text 'template option' is overlaid on the arrow.

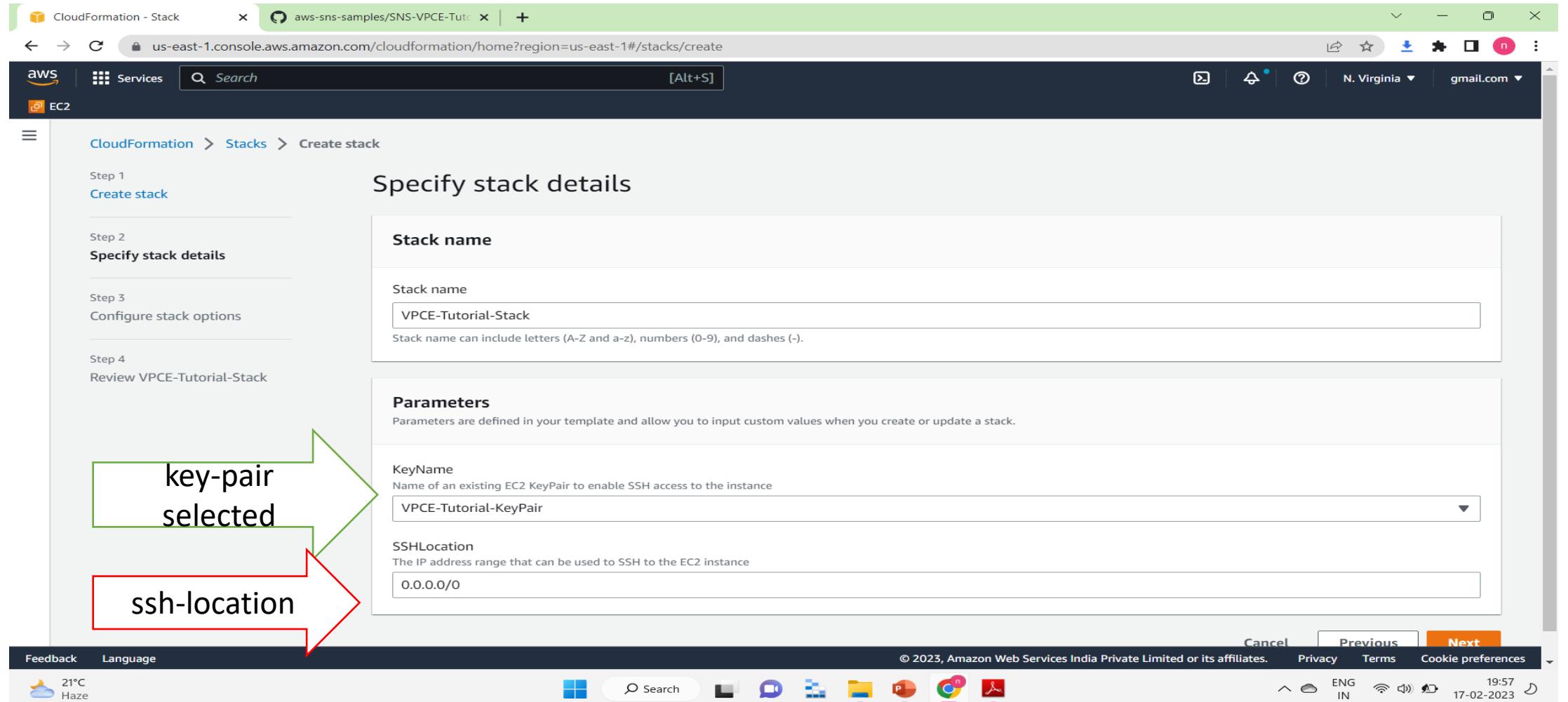
Template Selected: A red arrow points to the 'Upload a template file' radio button, which is selected. The text 'template selected' is overlaid on the arrow.

Template Source: The 'Upload a template file' radio button is selected. Below it, a 'Choose file' button is shown with the file name 'stack.txt'. The file type is specified as 'JSON or YAML formatted file'.

Template URL: An S3 URL is displayed: <https://s3.us-east-1.amazonaws.com/cf-templates-18nqajz58kgev-us-east-1/2023-02-17T142437.695Z4js-stack.txt>

Buttons: 'View in Designer' (button), 'Cancel' (button), and 'Next' (button).

Page Footer: Includes links for Feedback, Language, Privacy, Terms, and Cookie preferences. It also shows system status: 21°C Haze, ENG IN, 19:54, and 17-02-2023.



stack creation in progress

The screenshot shows the AWS CloudFormation console interface. On the left, the navigation bar includes 'CloudFormation' and 'Stacks'. Below it, a list of stacks shows one named 'VPCE-Tutorial-Stack' with a status of 'CREATE_IN_PROGRESS'. A large red arrow points to this stack entry. On the right, the main content area is titled 'VPCE-Tutorial-Stack' and displays the 'Events' tab. It shows one event entry:

Timestamp	Logical ID	Status	Status reason
2023-02-17 20:02:52 UTC+0530	VPCE-Tutorial-Stack	CREATE_IN_PROGRESS	User Initiated

The browser address bar shows the URL: `us-east-1.console.aws.amazon.com/cloudformation/home?region=us-east-1#stacks/events?stackId=arn%3Aaws%3Acloudformation%3Aus-east-1%3A582899026069%3Astack%2FVPCE...`

Page footer: © 2023, Amazon Web Services India Private Limited or its affiliates.

stack created

The screenshot shows the AWS CloudFormation console with a stack named "VPCE-Tutorial-Stack" in the "CloudFormation > Stacks" section. A large green arrow points from the left side of the screen towards the "Events" tab in the main content area. The "Events" tab is selected, displaying a list of 59 events. The first event listed is "CREATE_COMPLETE" for the stack itself, occurring at 2023-02-17 20:06:09 UTC+0530. Other events include "CREATE_COMPLETE" for EC2 instances and "CREATE_IN_PROGRESS" for EC2 instance profiles and Lambda permissions.

Timestamp	Logical ID	Status	Status reason
2023-02-17 20:06:09 UTC+0530	VPCE-Tutorial-Stack	CREATE_COMPLETE	-
2023-02-17 20:06:08 UTC+0530	EC2Instance	CREATE_COMPLETE	-
2023-02-17 20:05:36 UTC+0530	EC2Instance	CREATE_IN_PROGRESS	Resource creation Initiated
2023-02-17 20:05:34 UTC+0530	EC2Instance	CREATE_IN_PROGRESS	-
2023-02-17 20:05:32 UTC+0530	EC2InstanceProfile	CREATE_COMPLETE	-
2023-02-17 20:03:54 UTC+0530	LambdaPermission1	CREATE_COMPLETE	-

step4: instance connection establishment

The screenshot shows the AWS EC2 Management Console interface. The top navigation bar includes tabs for CloudFormation - Stack VPCE-Tut, aws-sns-samples/SNS-VPCE-Tut, and Instances | EC2 Management Con. The main URL in the address bar is us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#Instances:instanceState=running. The left sidebar has sections for New EC2 Experience, EC2 Dashboard, EC2 Global View, Events, Tags, Limits, Instances (with sub-options for Instances, Instance Types, Launch Templates, Spot Requests, Savings Plans, Reserved Instances, Dedicated Hosts, Scheduled Instances, Capacity Reservations), and Images (with sub-options for AMIs and AMI Catalog). The main content area displays the 'Instances (1/1) Info' section with a table showing one instance: VPCE-Tutorial-... (Instance ID: i-0e1b2557df302ff9c, State: Running, Type: t2.micro, Status check: 2/2 checks passed, Availability Zone: us-east-1c, Public IPv4 DNS: ec2-54-91-27-13). Below this is the detailed view for the selected instance, titled 'Instance: i-0e1b2557df302ff9c (VPCE-Tutorial-EC2Instance)'. The 'Details' tab is active, showing the following information:

Attribute	Value
Instance ID	i-0e1b2557df302ff9c (VPCE-Tutorial-EC2Instance)
IPv6 address	-
Hostname type	IP name: ip-10-0-0-54.ec2.internal
Answer private resource DNS name	-
Public IPv4 address	54.91.27.132 open address
Instance state	Running
Private IP DNS name (IPv4 only)	ip-10-0-0-54.ec2.internal
Instance type	t2.micro

At the bottom of the page, there are links for Feedback, Language, © 2023, Amazon Web Services India Private Limited or its affiliates., Privacy, Terms, and Cookie preferences. The status bar at the bottom shows weather (21°C Haze), system icons (Search, Chat, File, Power, Google Chrome, PDF), and the date/time (17-02-2023, 20:12).

CloudFormation - Stack VPCE-Tut x aws-sns-samples/SNS-VPCE-Tut x Connect to instance | EC2 Manag x +

← → C 🔒 us-east-1.console.aws.amazon.com/ec2/home?region=us-east-1#ConnectToInstance:instanceId=i-0e1b2557df302ff9c

aws Services Search [Alt+S]

EC2 N. Virginia gmail.com

EC2 > Instances > i-0e1b2557df302ff9c > Connect to instance

Connect to instance Info

Connect to your instance i-0e1b2557df302ff9c (VPCE-Tutorial-EC2Instance) using any of these options

EC2 Instance Connect Session Manager **SSH client** EC2 serial console

Instance ID

i-0e1b2557df302ff9c (VPCE-Tutorial-EC2Instance)

1. Open an SSH client.
2. Locate your private key file. The key used to launch this instance is VPCE-Tutorial-KeyPair.pem
3. Run this command, if necessary, to ensure your key is not publicly viewable.
chmod 400 VPCE-Tutorial-KeyPair.pem
4. Connect to your instance using its Public DNS:
ec2-54-91-27-132.compute-1.amazonaws.com

Example:

ssh -i "VPCE-Tutorial-KeyPair.pem" ec2-user@ec2-54-91-27-132.compute-1.amazonaws.com

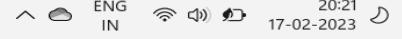
Note: In most cases, the guessed user name is correct. However, read your AMI usage instructions to check if the AMI owner has changed the default AMI user name.

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21°C Haze 20:16 17-02-2023

step5. checked permission of connection through ssh , which was denied

```
ec2-user@ip-10-0-0-54:~  
login as: ec2-user  
Authenticating with public key "imported-ssh-key"  
  
Amazon Linux 2 AMI  
  
https://aws.amazon.com/amazon-linux-2/  
[ec2-user@ip-10-0-0-54 ~]$ ssh -i "VPCE-Tutorial-KeyPair.pem" ec2-user@ec2-54-91-27-132.compute-1.amazonaws.com  
Warning: Identity file VPCE-Tutorial-KeyPair.pem not accessible: No such file or directory.  
The authenticity of host 'ec2-54-91-27-132.compute-1.amazonaws.com (10.0.0.54)' can't be established.  
ECDSA key fingerprint is SHA256:ryxnqVgPVRxF32K+byiIfkcMX+SApioITdSQORY+uHA.  
ECDSA key fingerprint is MD5:1e:94:02:6e:0c:0b:66:00:60:9a:1f:a3:0b:11:e7:d2.  
Are you sure you want to continue connecting (yes/no)? yes  
Warning: Permanently added 'ec2-54-91-27-132.compute-1.amazonaws.com,10.0.0.54' (ECDSA) to the list of known hosts.  
Permission denied (publickey,gssapi-keyex,gssapi-with-mic).  
[ec2-user@ip-10-0-0-54 ~]$
```



step 6. Went to SNS

The screenshot shows the AWS Simple Notification Service (SNS) console. The URL in the browser is `us-east-1.console.aws.amazon.com/sns/v3/home?region=us-east-1#/topics`. The left sidebar has a 'Topics' link under the 'Amazon SNS' section. The main content area shows a table titled 'Topics (1)'. The table has columns for 'Name', 'Type', and 'ARN'. One row is listed: 'VPCE-Tutorial-Topic' (Standard type, ARN: arn:aws:sns:us-east-1:582899026069:VPCE-Tut...). There is a 'Create topic' button at the top right of the table. A large blue arrow points upwards from the bottom of the page towards this button. The bottom of the screen shows the Windows taskbar with various pinned icons.

Name	Type	ARN
VPCE-Tutorial-Topic	Standard	arn:aws:sns:us-east-1:582899026069:VPCE-Tut...

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21°C Haze ENG IN 20:24 17-02-2023

copied ARN

The screenshot shows the AWS Simple Notification Service (SNS) console. The URL in the browser is `us-east-1.console.aws.amazon.com/sns/v3/home?region=us-east-1#/topic/arn:aws:sns:us-east-1:582899026069:VPCE-Tutorial-Topic`. The left sidebar has a 'Topics' section selected. The main content area shows the 'VPCE-Tutorial-Topic' details. The ARN field (`arn:aws:sns:us-east-1:582899026069:VPCE-Tutorial-Topic`) is highlighted with a blue selection bar. A large blue arrow points upwards from the 'Subscriptions' tab towards the ARN field. The 'Subscriptions' tab is active, showing 2 subscriptions. The ARN is also listed under the 'Subscriptions' tab.

CloudFormation - Stack VPCE-Tu | aws-sns-samples/SNS-VPCE-Tut | Connect to instance | EC2 Manag | Simple Notification Service | +

us-east-1.console.aws.amazon.com/sns/v3/home?region=us-east-1#/topic/arn:aws:sns:us-east-1:582899026069:VPCE-Tutorial-Topic

aws Services Search [Alt+S] N. Virginia gmail.com

EC2

Amazon SNS X

Amazon SNS > Topics > VPCE-Tutorial-Topic

VPCE-Tutorial-Topic

Details

Name	Display name
VPCE-Tutorial-Topic	VPCE-Tutorial-Topic
ARN	Topic owner
<code>arn:aws:sns:us-east-1:582899026069:VPCE-Tutorial-Topic</code>	582899026069
Type	
Standard	

Subscriptions Edit Delete Publish message

Subscriptions (2)

ID	Endpoint	Status	Protocol

Subscriptions Edit Delete Request confirmation Confirm subscription Create subscription

Subscriptions (2)

ID	Endpoint	Status	Protocol

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21°C Haze ENG IN 20:24 17-02-2023

Search

step 7. checked publish attempt, which failed

step 8: went to vpc → to create Endpoint

The screenshot shows the AWS VPC Management Console with the 'Endpoints' page open. The URL in the browser is `us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#Endpoints:`. The left sidebar is expanded, showing the 'Virtual private cloud' section with options like 'Your VPCs', 'Subnets', 'Route tables', etc., and the 'Endpoints' option is selected. The main content area displays a table titled 'Endpoints' with columns 'Name', 'VPC endpoint ID', 'VPC ID', and 'Service name'. A search bar at the top of the table says 'Filter endpoints'. Below the table, it says 'No endpoint found'. At the bottom of the table, there is a section labeled 'Select an endpoint'. In the top right corner of the main content area, there is an orange button labeled 'Create endpoint'. A large blue arrow points upwards towards this 'Create endpoint' button.

CloudFormation - Stack VPCE-Tut | aws-sns-samples/SNS-VPCE-Tut | Connect to instance | EC2 Manag | Simple Notification Service | VPC Management Console

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#CreateVpcEndpoint:

Services Search [Alt+S]

EC2

AWS services Services provided by Amazon

PrivateLink Ready partner services Services with an AWS Service Ready designation

AWS Marketplace services Services that you've purchased through AWS Marketplace

Other endpoint services Find services shared with you by service name

Services (1/1)

Filter services

Service Name: com.amazonaws.us-east-1.sns Clear filters

Service Name	Owner	Type
com.amazonaws.us-east-1.sns	amazon	Interface

VPC

Select the VPC in which to create the endpoint

VPC

The VPC in which to create your endpoint.

Select a VPC

Additional settings

Feedback Language

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Search

20:31 17-02-2023

CloudFormation - Stack VPCE-Tut | aws-sns-samples/SNS-VPCE-Tut | Connect to instance | EC2 Manag | Simple Notification Service | VPC Management Console

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#CreateVpcEndpoint:

AWS Services | PrivateLink Ready partner services | AWS Marketplace services | Other endpoint services

Services (1/1)

Service Name: com.amazonaws.us-east-1.sns

Service Name Owner Type

com.amazonaws.us-east-1.sns amazon Interface

VPC

Select the VPC in which to create the endpoint

VPC

The VPC in which to create your endpoint.

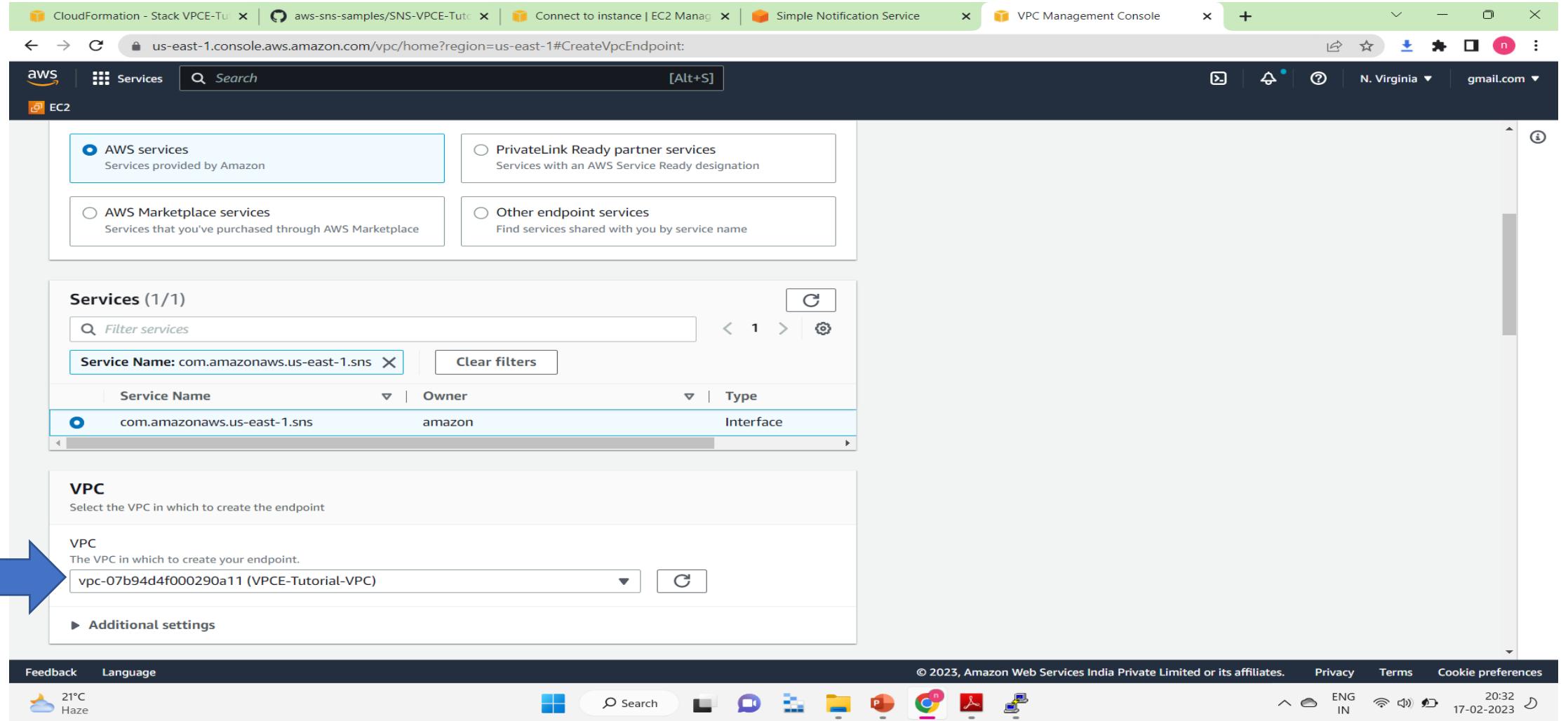
vpc-07b94d4f000290a11 (VPCE-Tutorial-VPC)

Additional settings

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ENG IN 20:32 17-02-2023



The screenshot shows the AWS VPC Management Console interface for creating a VPC endpoint. The browser tab is titled "VPC Management Console". The main content area displays two sections: "Subnets (1/6)" and "Security groups (2)".

Subnets (1/6)

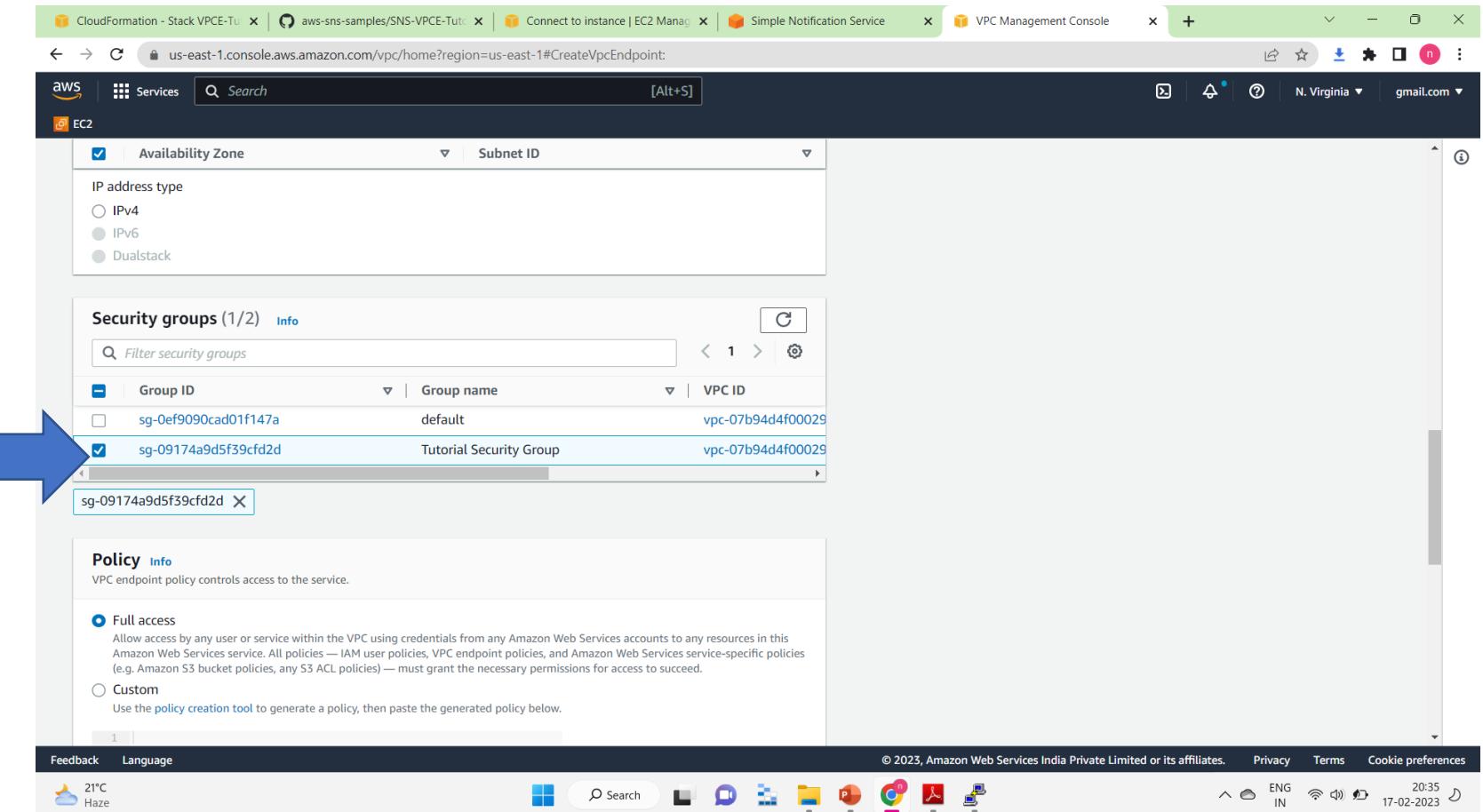
Availability Zone	Subnet ID
us-east-1a (use1-az1)	No subnet available
us-east-1b (use1-az2)	No subnet available
us-east-1c (use1-az4) <input checked="" type="checkbox"/>	
us-east-1d (use1-az6)	No subnet available
us-east-1e (use1-az3)	No subnet available
us-east-1f (use1-az5)	No subnet available

Security groups (2)

Group ID	Group name	VPC ID
sg-0ef9090cad01f147a	default	vpc-07b94d4f00029
sg-0017410ddef30fd2d	Tutorial Security Group	vpc-07b94d4f00029

A large blue arrow points to the "us-east-1c (use1-az4)" row in the Subnets table.

At the bottom of the page, there are links for "Feedback", "Language", "Privacy", "Terms", and "Cookie preferences". The footer also includes weather information ("21°C Haze") and system status icons.



The screenshot shows the AWS VPC Management Console interface for creating a VPC endpoint. The URL in the browser is `us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#CreateVpcEndpoint`.

The top navigation bar includes tabs for CloudFormation, AWS SNS, Connect to instance, Simple Notification Service, and VPC Management Console.

The main interface shows configuration options for the VPC endpoint:

- Availability Zone**: Selected checkbox.
- Subnet ID**: dropdown menu.
- IP address type**:
 - IPv4
 - IPv6
 - Dualstack

Security groups (1/2):
A table showing security groups assigned to the endpoint:

Group ID	Group name	VPC ID
sg-0ef9090cad01f147a	default	vpc-07b94d4f00029
sg-09174a9d5f39cf2d	Tutorial Security Group	vpc-07b94d4f00029

A blue arrow points to the row for the 'Tutorial Security Group'.

Policy:
VPC endpoint policy controls access to the service.
 Full access: Allow access by any user or service within the VPC using credentials from any Amazon Web Services accounts to any resources in this Amazon Web Services service. All policies — IAM user policies, VPC endpoint policies, and Amazon Web Services service-specific policies (e.g. Amazon S3 bucket policies, any S3 ACL policies) — must grant the necessary permissions for access to succeed.
 Custom: Use the [policy creation tool](#) to generate a policy, then paste the generated policy below.

At the bottom, there are links for Feedback, Language, and a footer with copyright information and system status.

VPC Endpoint created

The screenshot shows the AWS VPC Management Console with a success message: "Successfully created VPC endpoint vpce-0dc292d686695c2df". The console lists one endpoint with the ID vpce-0dc292d686695c2df. A status message indicates "Update in progress" and "Endpoint is in pending state, information might be out of date". The endpoint details show an Endpoint ID of vpce-0dc292d686695c2df, a Status of Pending, a Creation time of Friday, February 17, 2023 at 20:37:30 GMT+5:30, and an Endpoint type of Interface.

CloudFormation - Stack VPCE-Tut | aws-sns-samples/SNS-VPCE-Tut | Connect to instance | EC2 Manag | Simple Notification Service | Endpoints | VPC Management Co | +

us-east-1.console.aws.amazon.com/vpc/home?region=us-east-1#Endpoints:vpcEndpointId=vpce-0dc292d686695c2df

aws Services Search [Alt+S] N. Virginia gmail.com

EC2

Successfully created VPC endpoint vpce-0dc292d686695c2df

Endpoints (1/1) Info

Filter endpoints

VPC endpoint ID: vpce-0dc292d686695c2df X Clear filters

Name VPC endpoint ID VPC ID Service name

Update in progress

Endpoint is in pending state, information might be out of date.

vpce-0dc292d686695c2df / endpoint21

Details Subnets Security Groups Notification Policy Tags

Details

Endpoint ID	Status	Creation time	Endpoint type
vpce-0dc292d686695c2df	Pending	Friday, February 17, 2023 at 20:37:30 GMT+5:30	Interface

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21°C Haze ENG IN 20:37 17-02-2023

Screenshot of the AWS VPC Management Console showing the Endpoints page.

The browser tab bar shows multiple open tabs, including CloudFormation, AWS SNS samples, EC2 Management, Simple Notification Service, and Endpoints.

The AWS navigation bar shows the EC2 service selected.

The left sidebar menu includes:

- VPC dashboard
- EC2 Global View (New)
- Filter by VPC: Select a VPC
- Virtual private cloud
 - Your VPCs
 - Subnets
 - Route tables
 - Internet gateways
 - Egress-only internet gateways
 - Carrier gateways
 - DHCP option sets
 - Elastic IPs
 - Managed prefix lists
- Endpoints
 - Endpoint services
 - NAT gateways
 - Peering connections
- Security

The main content area displays the "Endpoints (1/1)" section. A blue arrow points upwards from the table header towards the "Actions" dropdown menu.

VPC ID	Service name	Endpoint type	Status
vpc-07b94d4f000290a11 VPCE-Tutori...	com.amazonaws.us-east-1.sns	Interface	Available

Below the table, the endpoint details for "vpce-0dc292d686695c2df / endpoint21" are shown. The "Details" tab is selected.

Details			
Endpoint ID: vpce-0dc292d686695c2df	Status: Available	Creation time: Friday, February 17, 2023 at 20:37:30 GMT+5:30	Endpoint type: Interface
VPC ID: vpc-07b94d4f000290a11 (VPCE-Tutorial-VPC)	Status message: -	Service name: com.amazonaws.us-east-1.sns	Private DNS names enabled: Yes
DNS record IP type: ipv4	IP address type: ipv4	DNS names: vpce-0dc292d686695c2df-fhy3c4l.sns.us-east-1.vpce.amazonaws.com	Private DNS names: sns.us-east-1.amazonaws.com

At the bottom of the page, there are links for Feedback, Language, and a footer with copyright information and system status.

Step 9. on terminal, tried to publish a message to SNS topic.

- aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:582899026069:VPCE-Tutorial-Topic --message "Hello"

publish attempt succeeded, and Amazon SNS returned a message ID

```
ec2-user@ip-10-0-0-54:~$ login as: ec2-user
[ec2-user@ip-10-0-0-54 ~]$ Authenticating with public key "imported-openssh-key"
Last login: Fri Feb 17 18:23:02 2023 from ip-10-0-0-54.ec2.internal

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https://aws.amazon.com/amazon-linux-2/
[ec2-user@ip-10-0-0-54 ~]$ aws sns publish --region us-east-1 --topic-arn arn:aws:sns:us-east-1:582899026069:VPCE-Tutorial-Topic --message "Hello"
{
    "MessageId": "385ac704-41a8-5223-a546-9b6d8e8472ff"
}
[ec2-user@ip-10-0-0-54 ~]$ █
```

Step 10. Verified Message Deliveries: went to VPCE-Tutorial_lambda-1

Screenshot of the AWS Lambda Functions page showing two functions: VPCE-Tutorial-Lambda-2 and VPCE-Tutorial-Lambda-1.

The Lambda Functions page displays two entries:

Function name	Description	Package type	Runtime	Last modified
VPCE-Tutorial-Lambda-2	SNS VPC endpoint tutorial lambda function 2	Zip	Python 3.9	5 hours ago
VPCE-Tutorial-Lambda-1	SNS VPC endpoint tutorial lambda function 1	Zip	Python 3.9	5 hours ago

A blue arrow points to the first function entry, VPCE-Tutorial-Lambda-2.

Page navigation and search bar are visible at the top.

Footer includes links for Feedback, Language, Privacy, Terms, and Cookie preferences, along with system status icons.

in log ,selected VPCE-Tutorial-Lambda1

The screenshot shows the AWS CloudWatch Log Groups page. The left sidebar has sections for Alarms, Logs (with Log groups selected), Metrics, X-Ray traces, Events, and Application monitoring. The main area displays five log groups:

Log group	Data protection	Sensitive data	Retention	Metric filters	Contributor
/aws/codebuild/projet21	Inactive	-	Never expire	-	-
/aws/fsx/lustre	Inactive	-	Never expire	-	-
/aws/lambda/VPCE-Tutorial-Lambda-1	Inactive	-	1 week	-	-
/aws/lambda/VPCE-Tutorial-Lambda-2	Inactive	-	1 week	-	-
RDSOSMetrics	Inactive	-	1 month	-	-

A large blue arrow points to the log group `/aws/lambda/VPCE-Tutorial-Lambda-1`.

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Page bottom: 64°F Haze Search ENG IN 00:36 18-02-2023

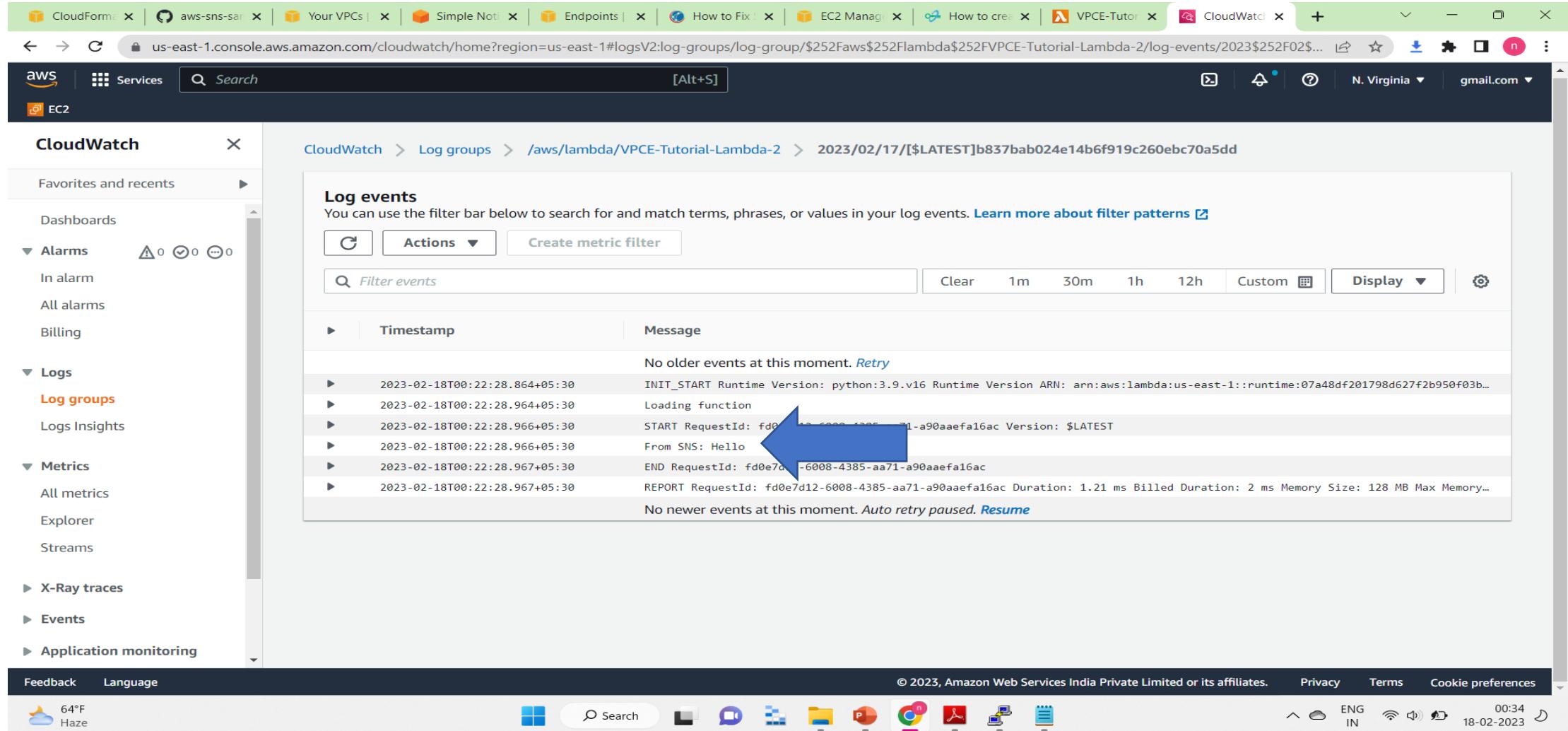
verified that the CloudWatch logs updatation : VPCE-Tutorial-Lambda-1

The screenshot shows the AWS CloudWatch Log Events interface for the log group `/aws/lambda/VPCE-Tutorial-Lambda-1`. The log entries are as follows:

Timestamp	Message
2023-02-18T00:22:28.828+05:30	INIT_START Runtime Version: python:3.9.v16 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:07a48df201798d627f2b950f03b...
2023-02-18T00:22:28.925+05:30	Loading function
2023-02-18T00:22:28.927+05:30	START RequestId: 148fb4bc-d7db-4794-97c5-67883398a866 Version: \$LATEST
2023-02-18T00:22:28.927+05:30	From SNS: Hello
2023-02-18T00:22:28.928+05:30	END RequestId: 148fb4bc-d7db-4794-97c5-67883398a866
2023-02-18T00:22:28.928+05:30	REPORT RequestId: 148fb4bc-d7db-4794-97c5-67883398a866 Duration: 1.19 ms Billed Duration: 2 ms Memory Size: 128 MB Max Memory...

A blue arrow points to the "hello message" entry, which is the fourth log entry from the top.

VPCE-Tutorial-Lambda-2



The screenshot shows the AWS CloudWatch Log Events interface. The left sidebar is titled "CloudWatch" and includes sections for Favorites and recents, Dashboards, Alarms (0), Logs (Log groups, Logs Insights), Metrics (All metrics, Explorer, Streams), X-Ray traces, Events, and Application monitoring. The main area shows a log group path: CloudWatch > Log groups > /aws/lambda/VPCE-Tutorial-Lambda-2 > 2023/02/17/[&LATEST]b837bab024e14b6f919c260ebc70a5dd. The "Log events" section displays the following log entries:

Timestamp	Message
2023-02-18T00:22:28.864+05:30	INIT_START Runtime Version: python:3.9.v16 Runtime Version ARN: arn:aws:lambda:us-east-1::runtime:07a48df201798d627f2b950f03b...
2023-02-18T00:22:28.964+05:30	Loading function
2023-02-18T00:22:28.966+05:30	START RequestId: fd0e7d12-6008-4385-aa71-a90aaefaf16ac Version: \$LATEST
2023-02-18T00:22:28.966+05:30	From SNS: Hello
2023-02-18T00:22:28.967+05:30	END RequestId: fd0e7d12-6008-4385-aa71-a90aaefaf16ac
2023-02-18T00:22:28.967+05:30	REPORT RequestId: fd0e7d12-6008-4385-aa71-a90aaefaf16ac Duration: 1.21 ms Billed Duration: 2 ms Memory Size: 128 MB Max Memory...

A blue arrow points to the second log entry: "Loading function".

At the bottom of the page, there are links for Feedback, Language, Privacy, Terms, and Cookie preferences. The footer also includes weather information (64°F Haze), a search bar, and system status icons.