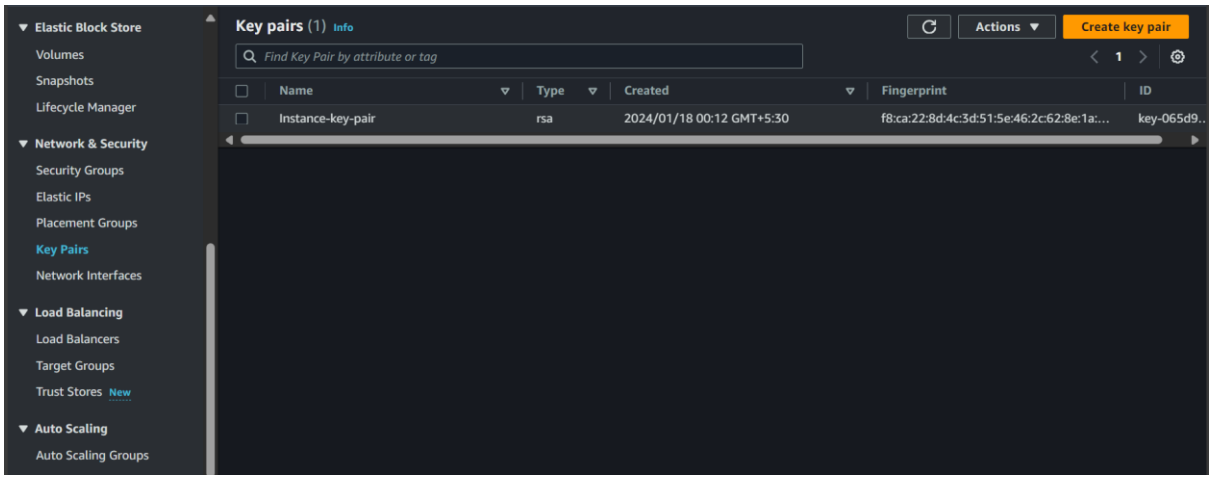
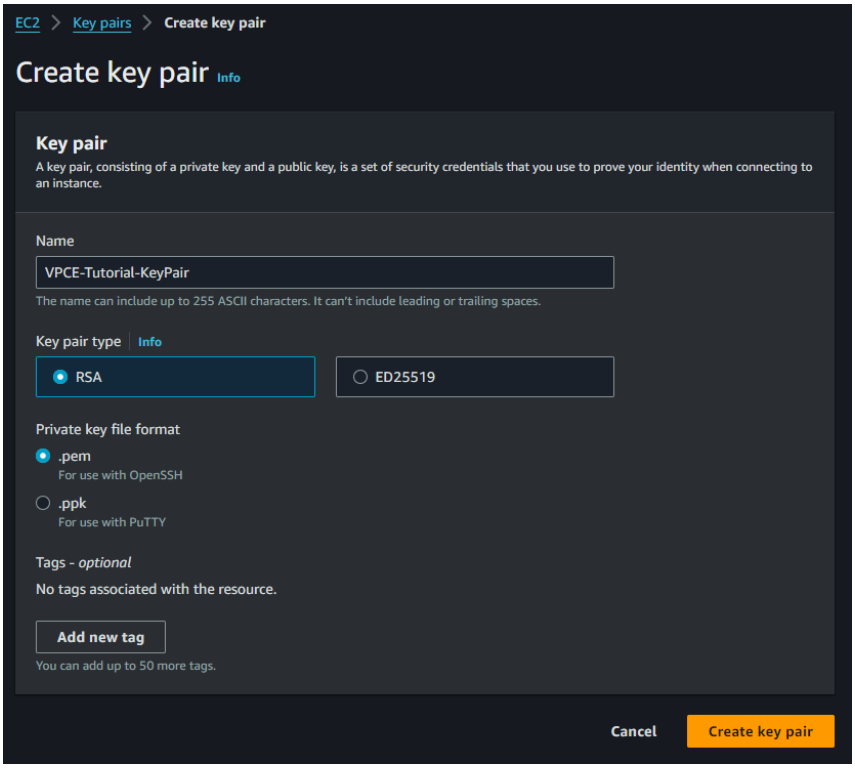
INDEX **Page No**

Step:1 - Creation of KeyPair.

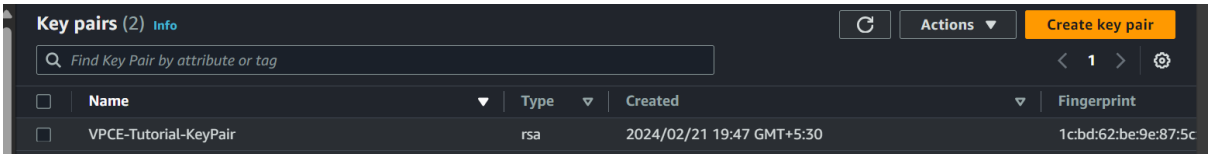
1. Login in to AWS management console by using our credentials.
2. Search the service **EC2**.
3. As we could see below after clicking on **EC2** service, there is dashboard showing for **EC2**. We will scroll down and from the left panel will click on the Key Pairs. And then will click on Create key pair.



4. We have given the name to the key pair is **VPCE-Tutorial-KeyPair**. We will select .pem format. And now will click on Create key pair.

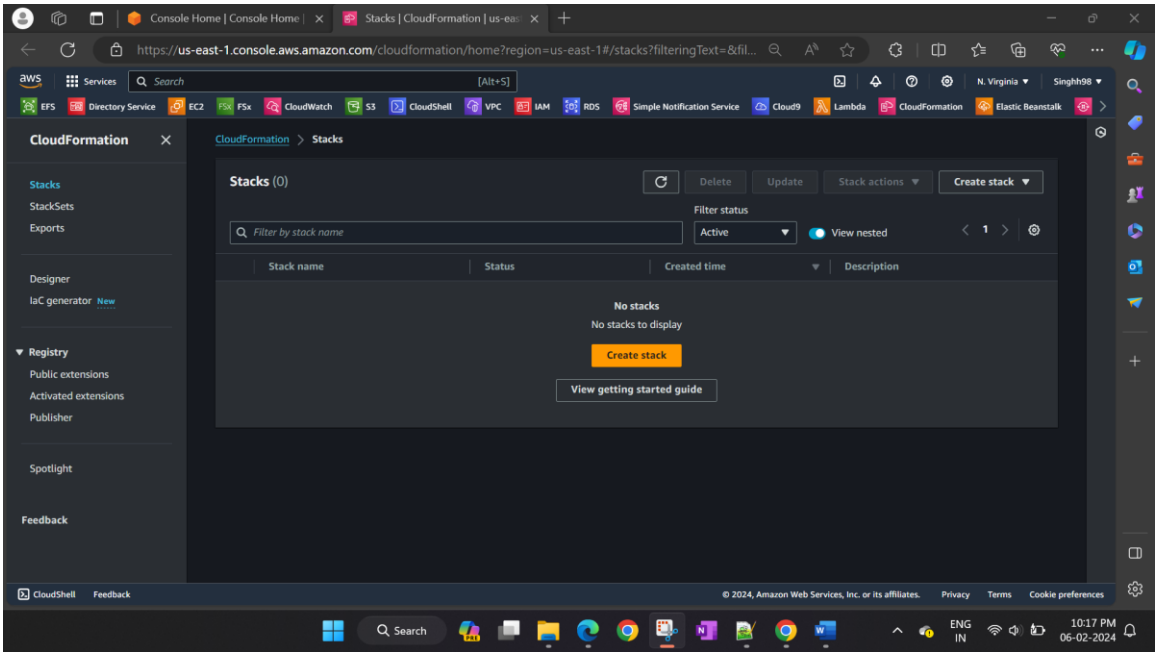


5. Now we could see in the below snip that the KeyPair is created successfully.

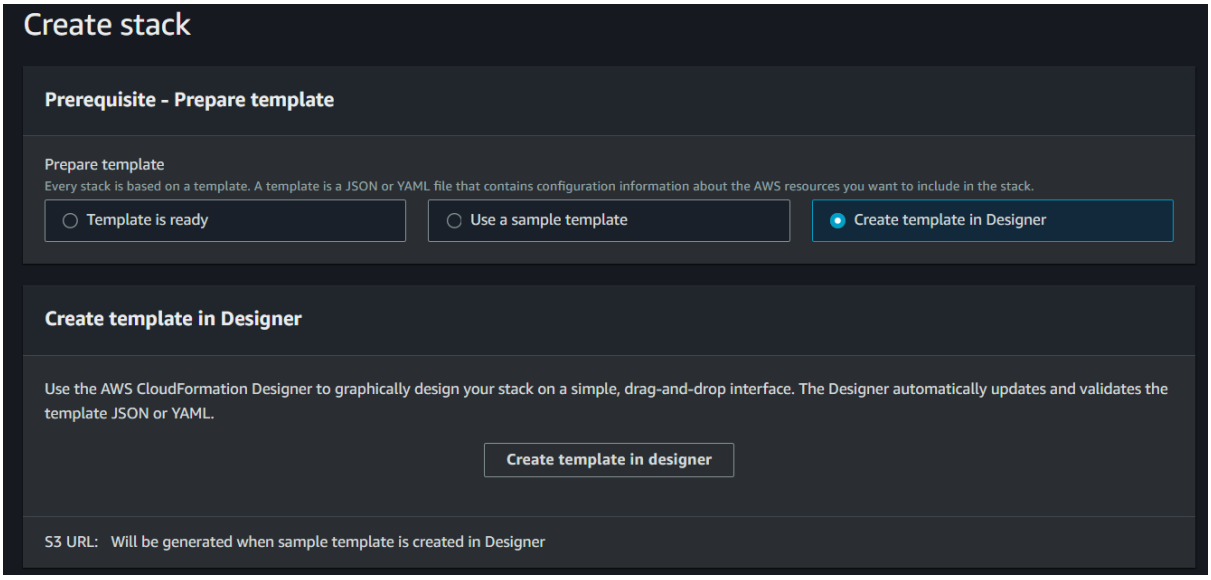


Step:2 - Creation of CloudFormation Stack.

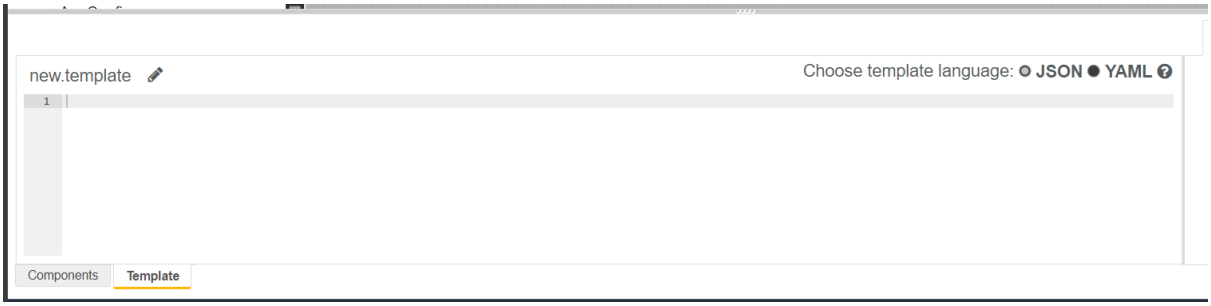
1. From the Search bar we will search the service **CloudFormation**.
2. As we could see below after clicking on **CloudFormation** service, there is dashboard showing for **CloudFormation**. We will click on **Create stack**.



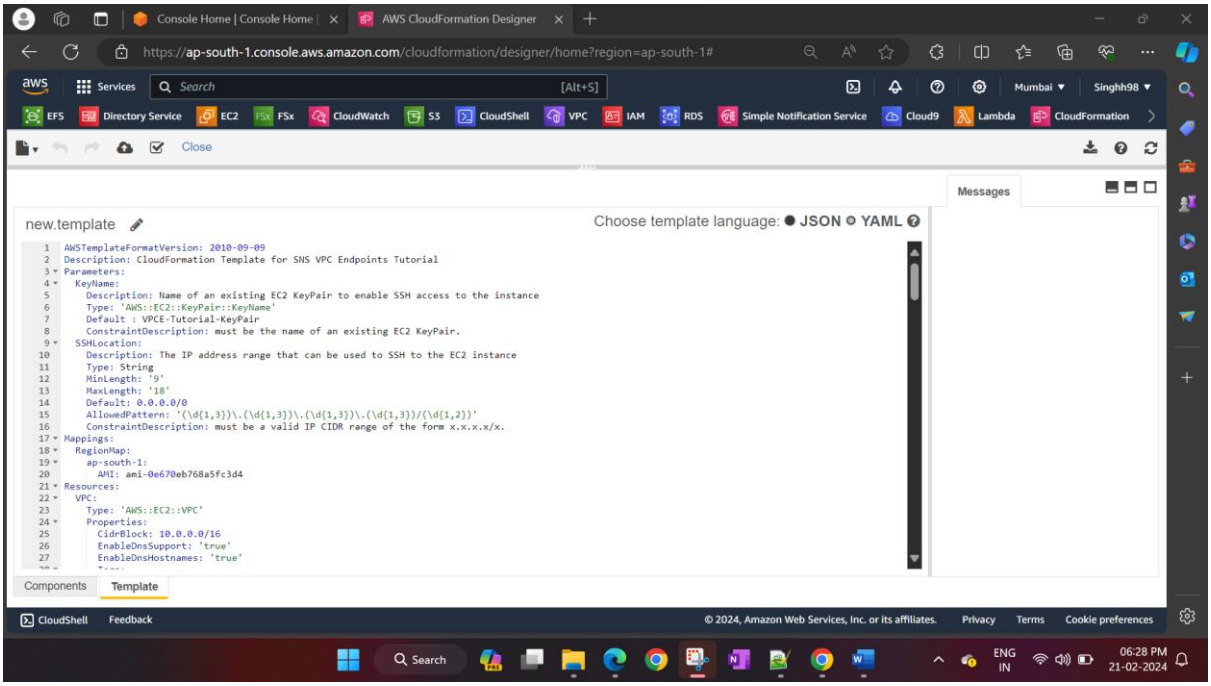
3. After that we will select & then click on the Create template in designer.



4. After that we will click on the Template, and will delete the existing code there.



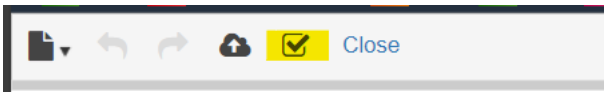
5. Now will paste the code which we have prepared for the launch of the mentioned resources in the assignment.



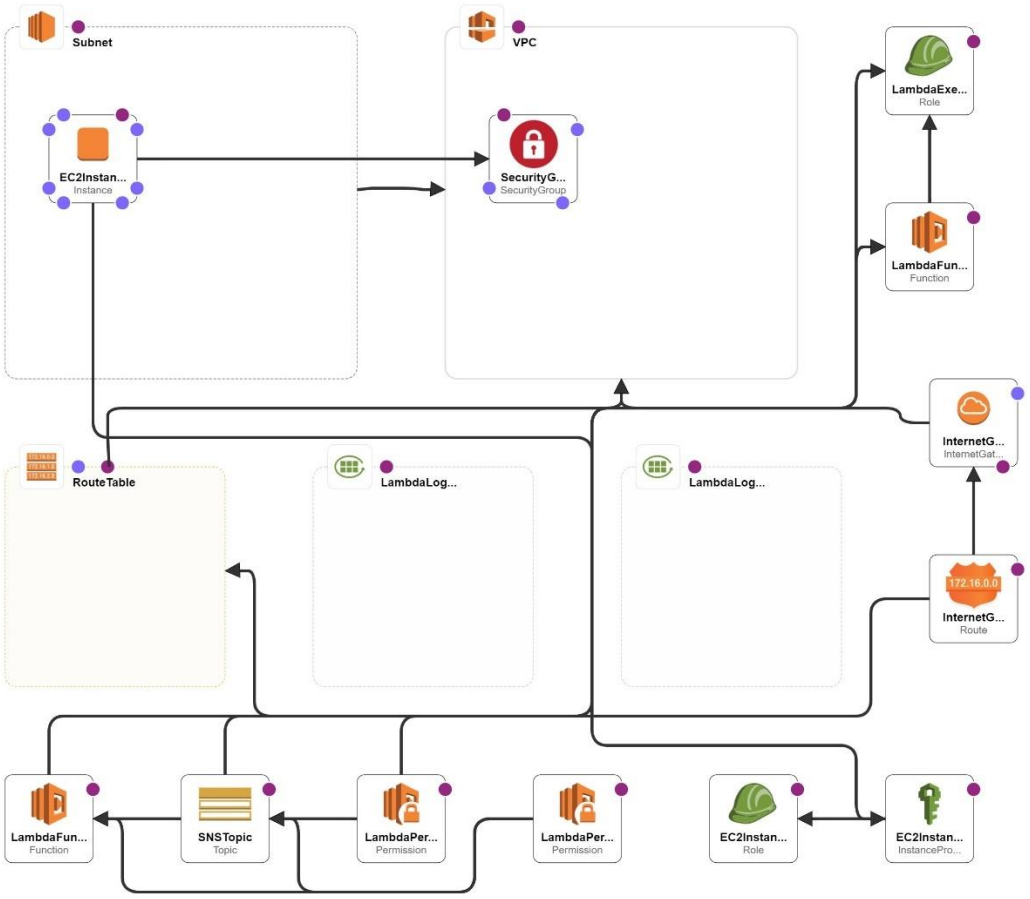
6. Attaching the file here for complete code.

CF-Template.yml

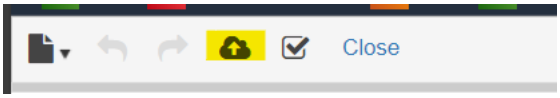
7. After that we will click on the highlighted icon in the below snip to check the template is valid.



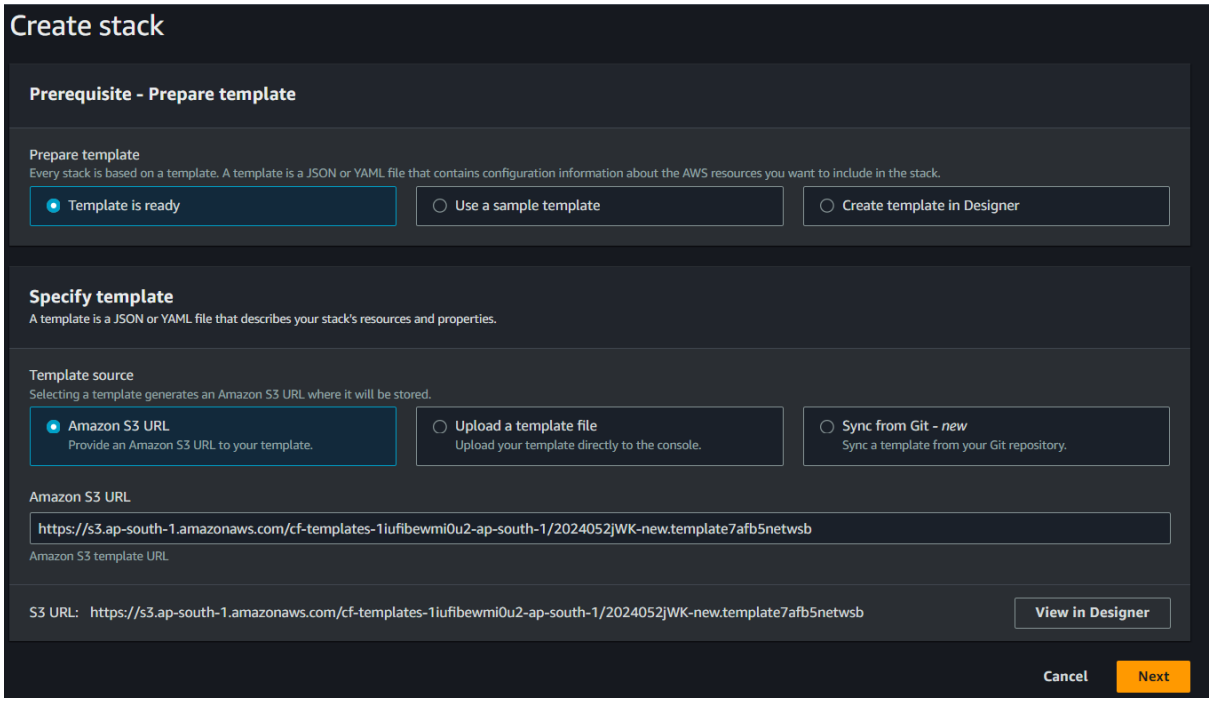
8. Also, when we write the code, the diagram in the designer is also generated for the given template. We can click on the download icon in the right top corner. And we will get the below image.

9. 

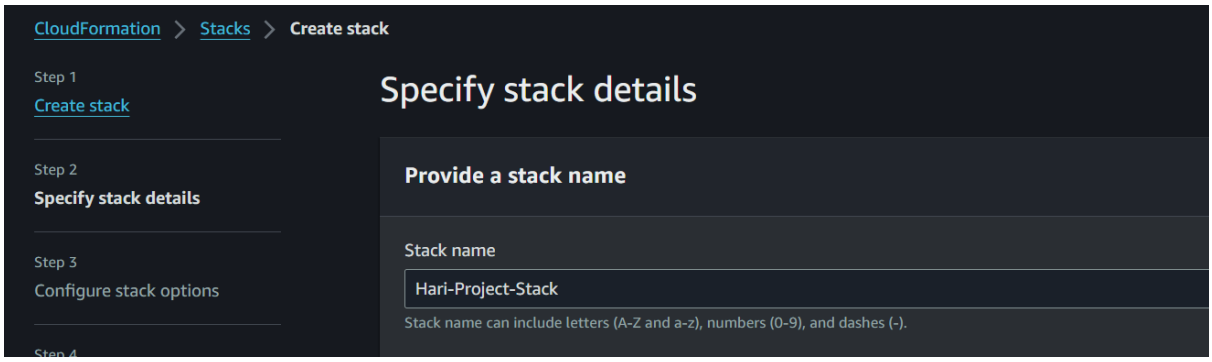
10. Now we will click on the highlighted icon in the below snip to load this as template for creation of stack.



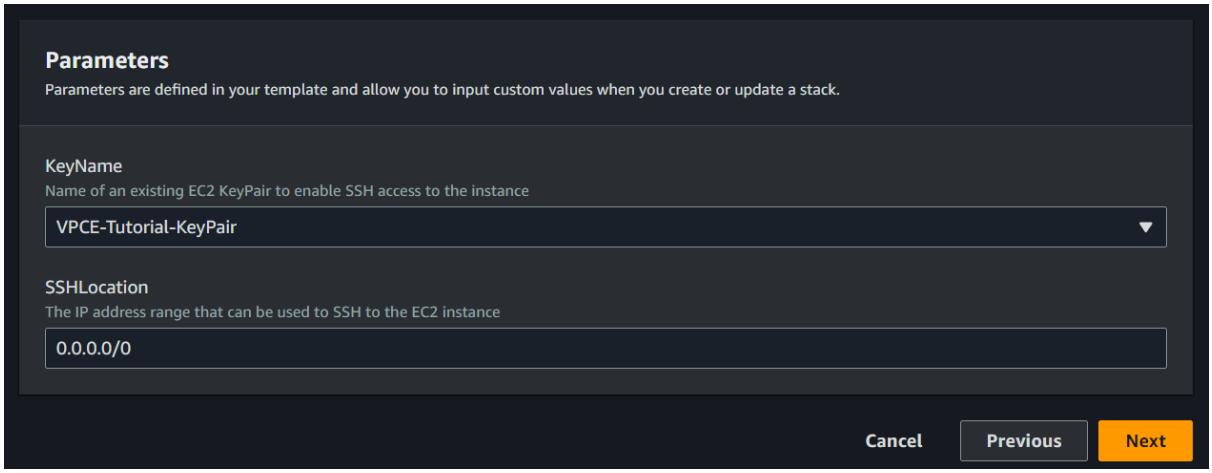
11. Now we could see that the template is ready, we will click on Next.



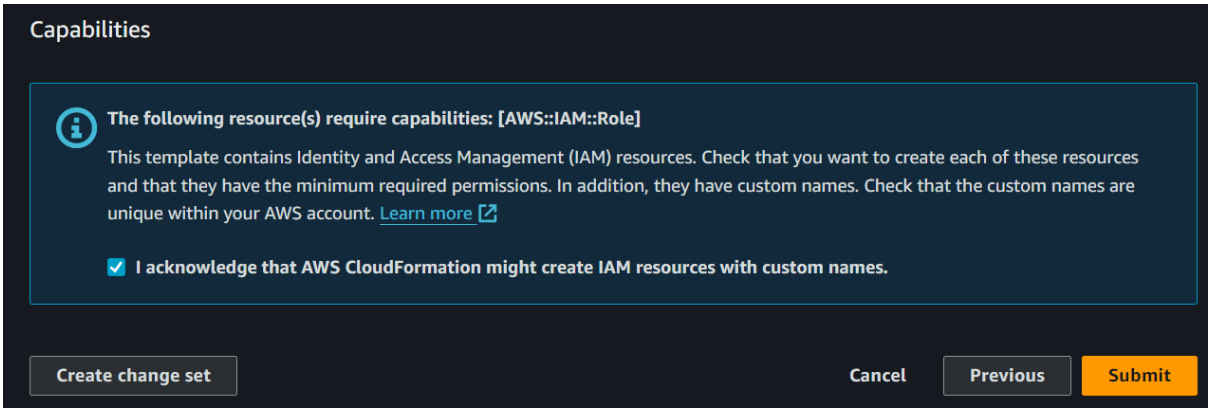
12. We have given name to the stack is **Hari-Project-Stack.**



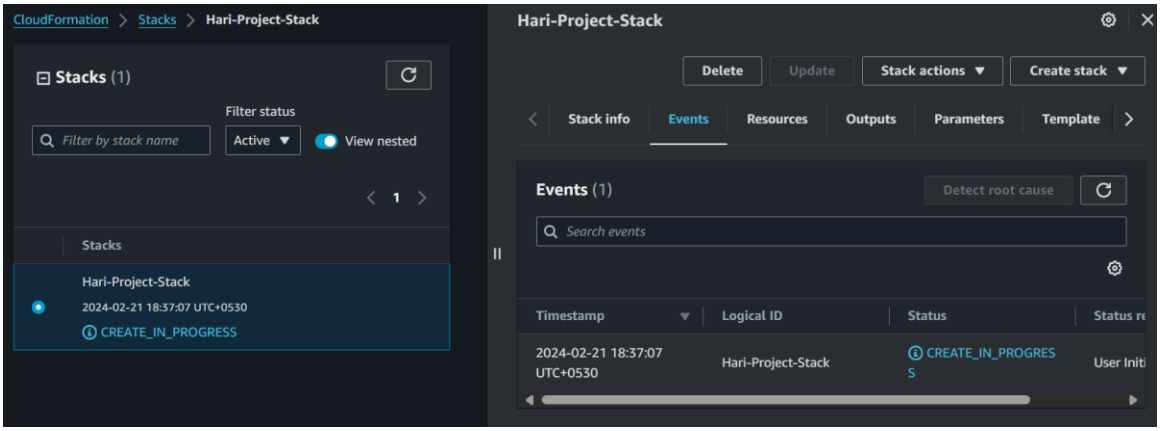
13. Parameter is showing the same which we had given in the code. Now we will click on Next.



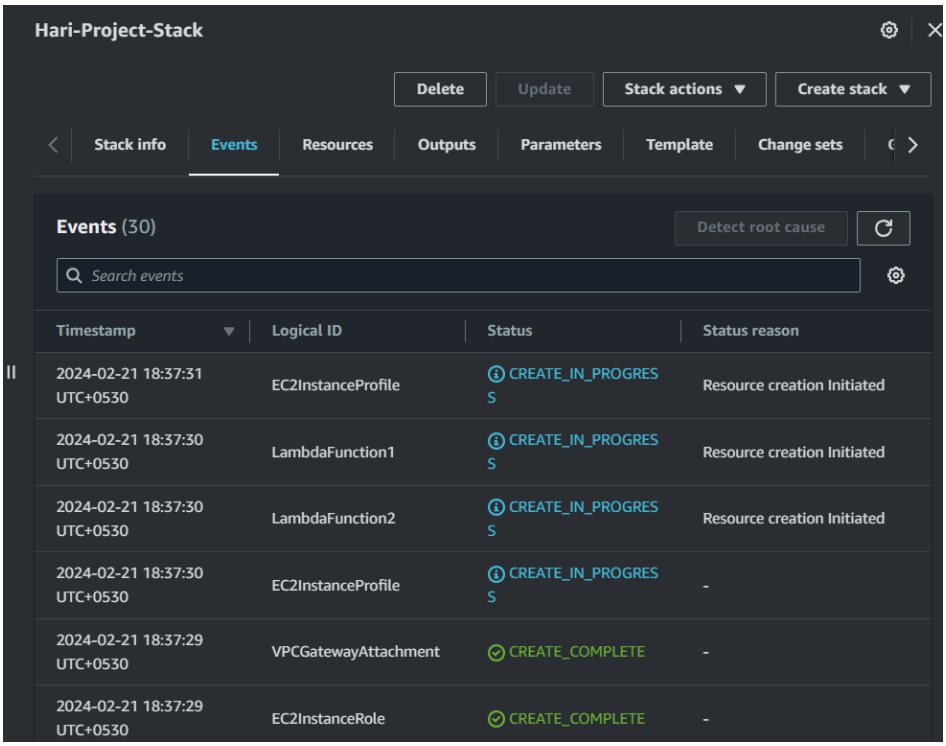
14. Configuration stack options page we will leave default & will click on Next.
15. On Review and create page will check all the things and will click on Submit if all fine.



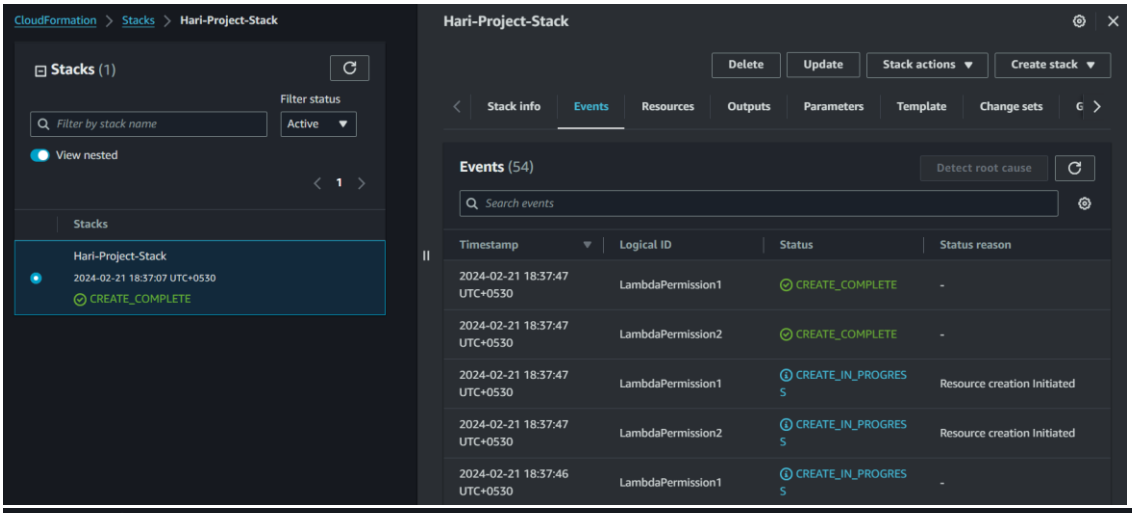
16. Now we could see that the Stack is in progress state and started creating.



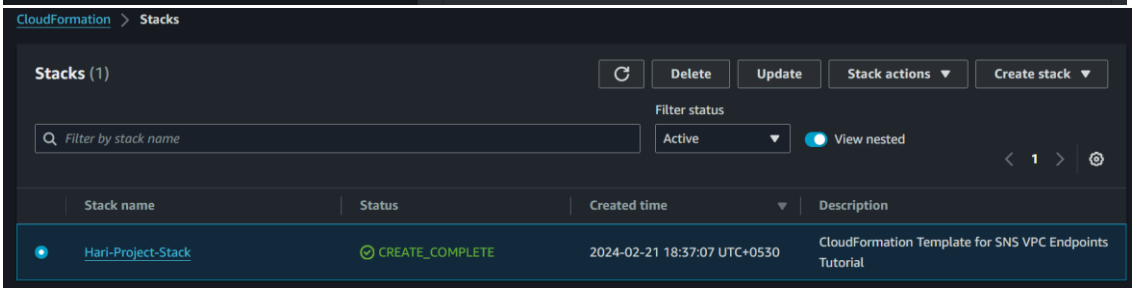
17. In the Event section we could see all steps for creation of stack.



18. Now we could see that the stack creation has been completed.

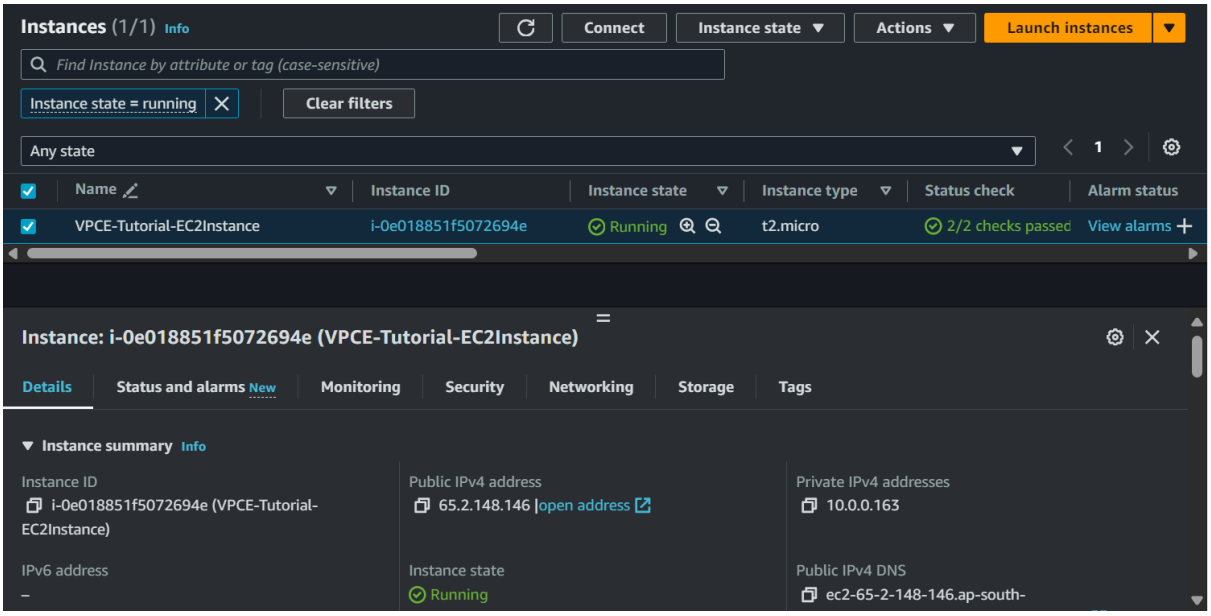


19.

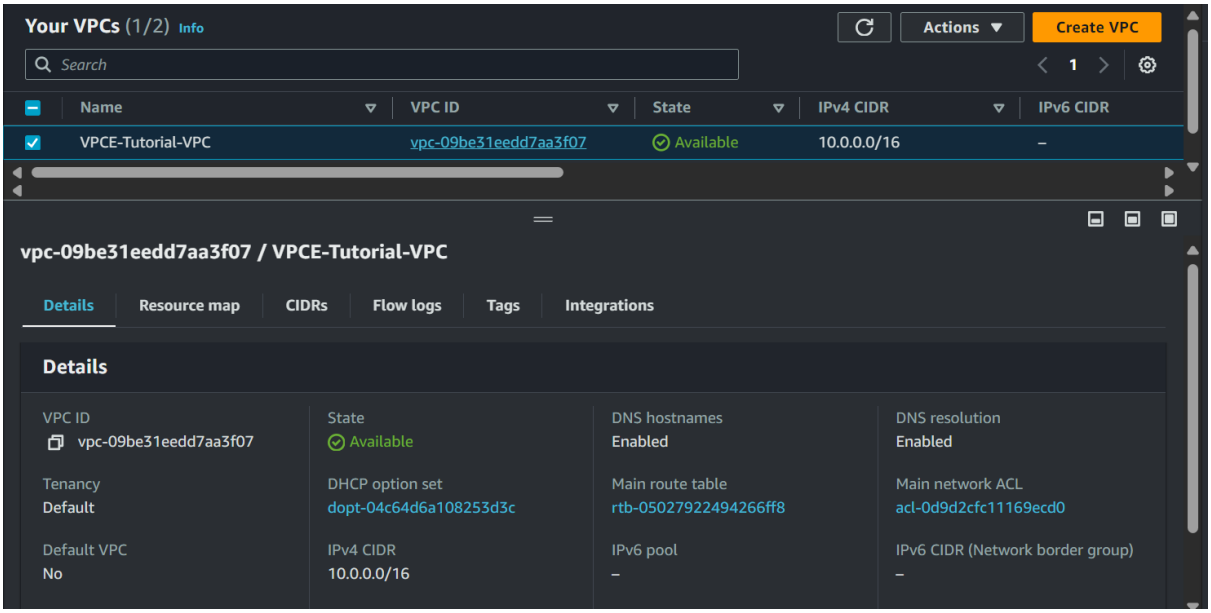


Step:3 - Verifying resources created under stack.

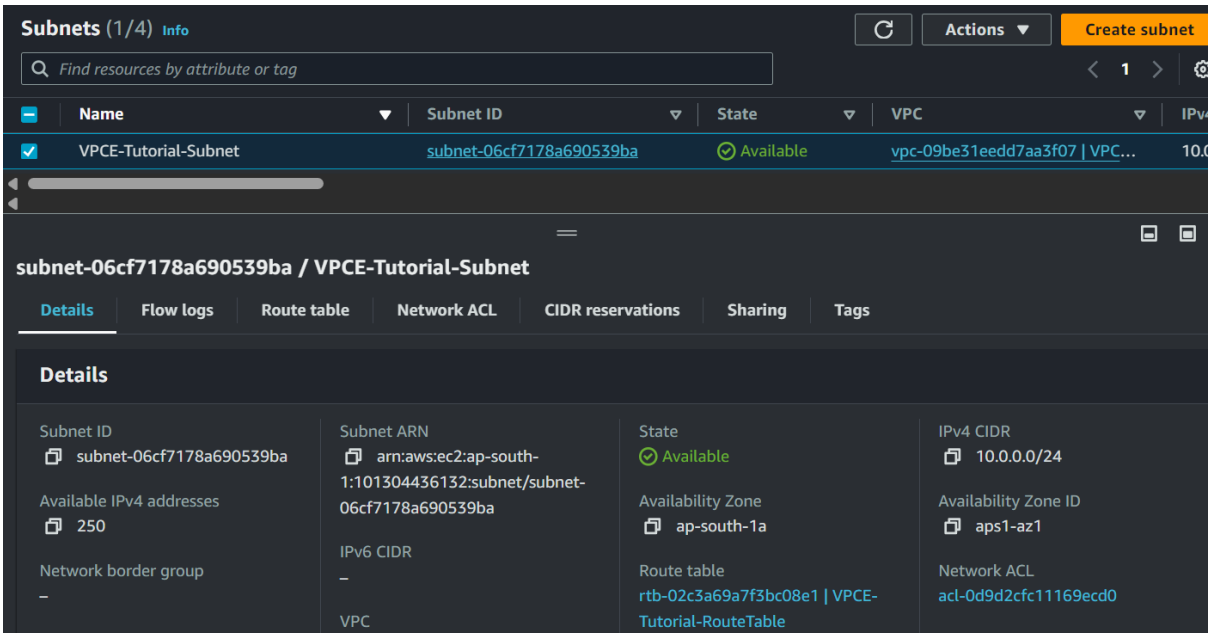
1. The Instance VPCE-Tutorial-EC2Instance has been created.



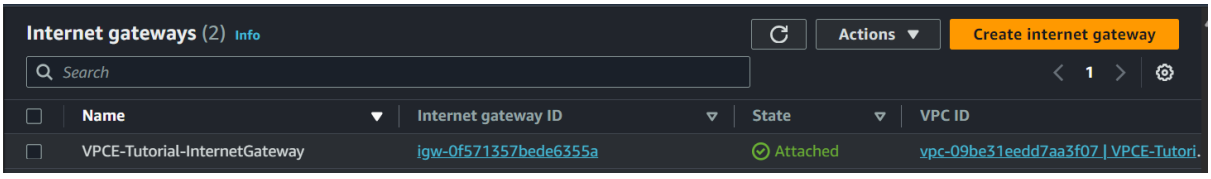
2. VPC has been created.



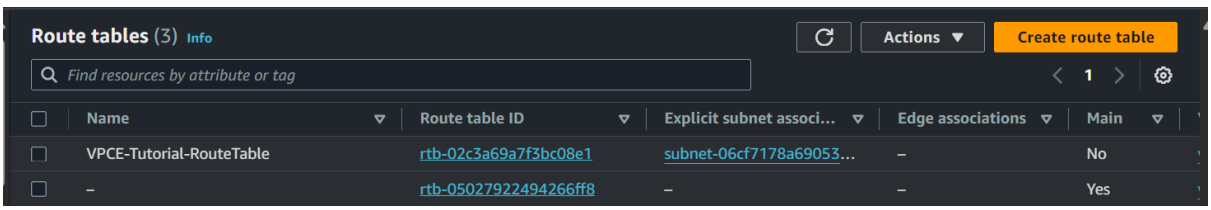
3. The subnet has been created.



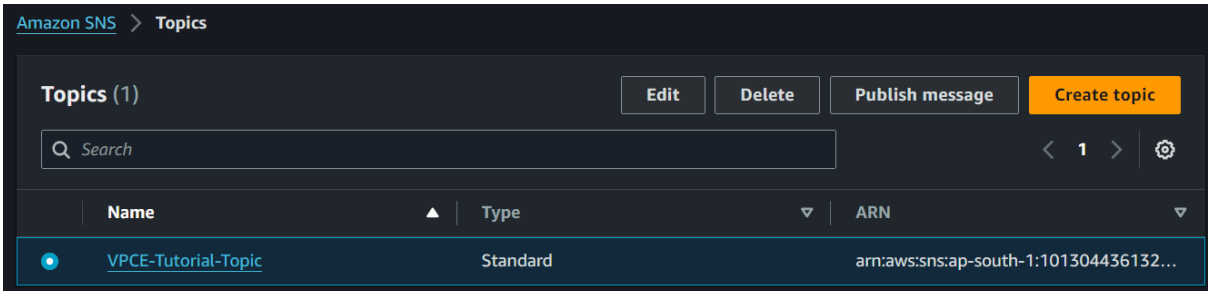
4. Internet-Gateway has been created.



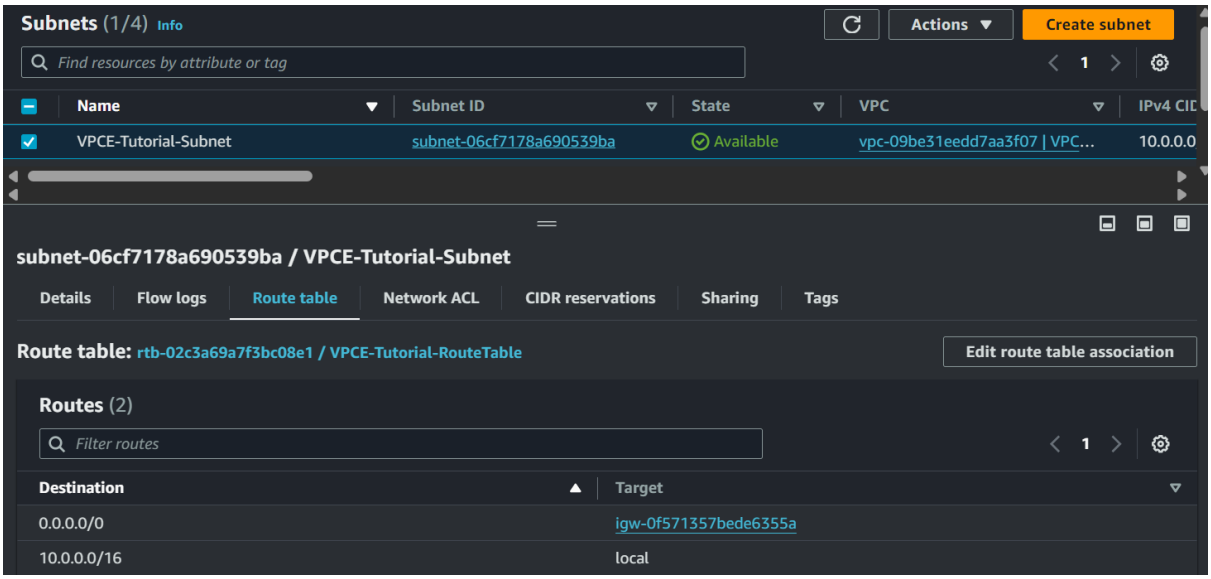
5. Route table has been created.



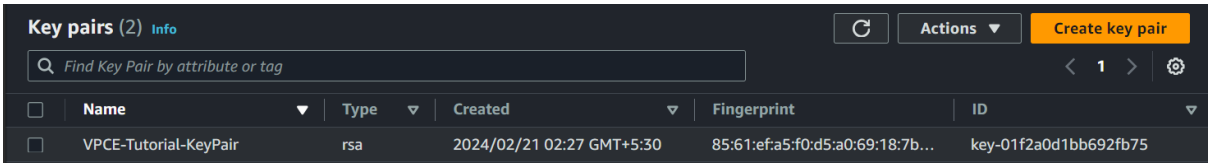
6. SNS Topic has been created.



7. Inter-Gateway is attached with the Subnet.

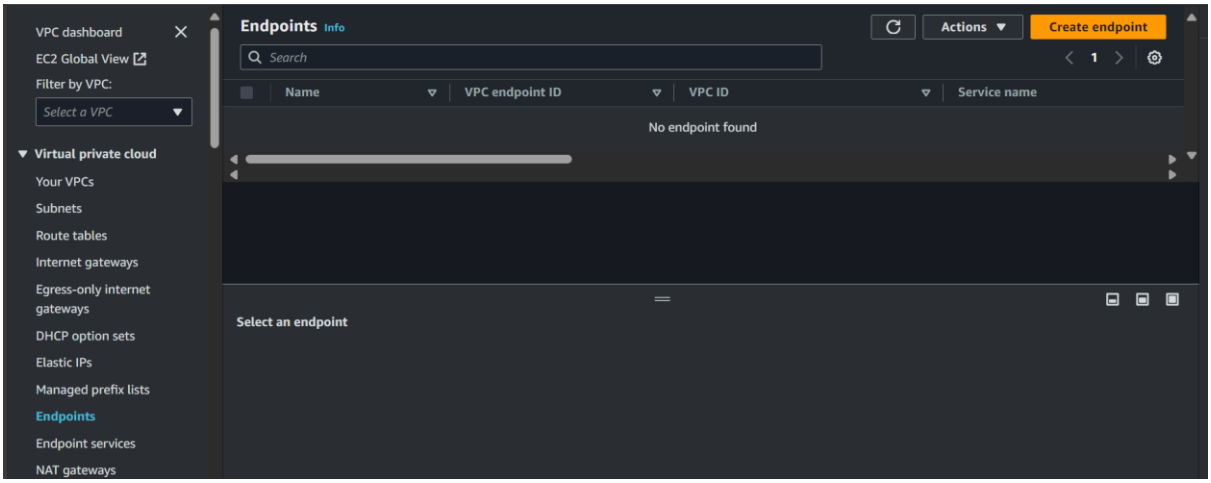


8. Key Pair is available for the connection which is used in the code.

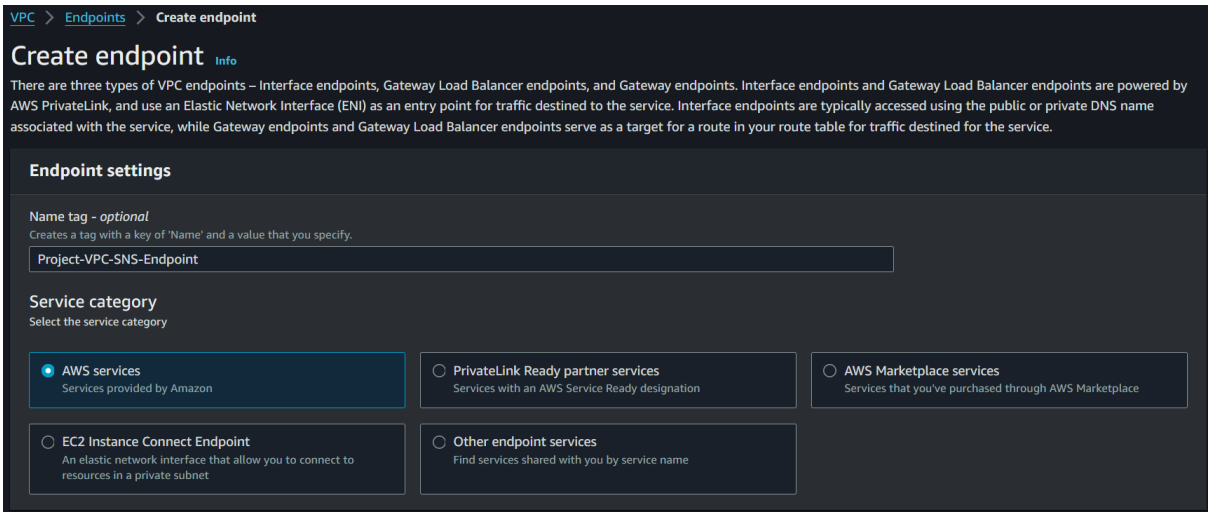


Step:4 - Create an Amazon VPC Endpoint for Amazon SNS.

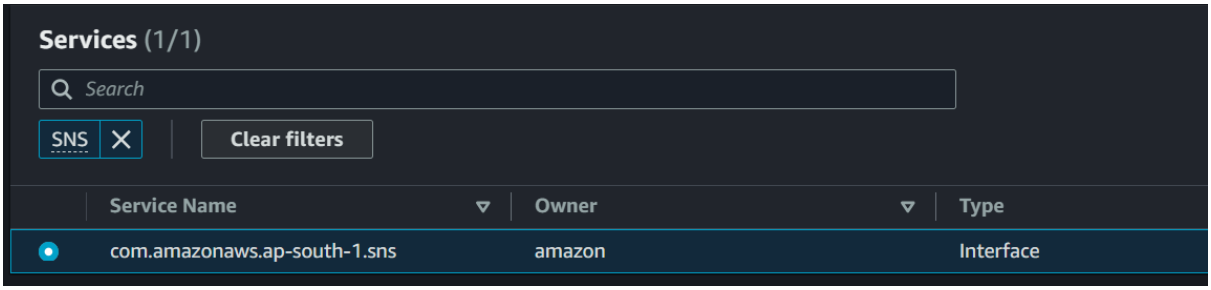
1. From the Search bar we will search the service VPC.
2. As we could see below after clicking on VPC service, there is dashboard showing for VPC. In the navigation menu on the left, choose **Endpoints**. We will click on Create endpoint.



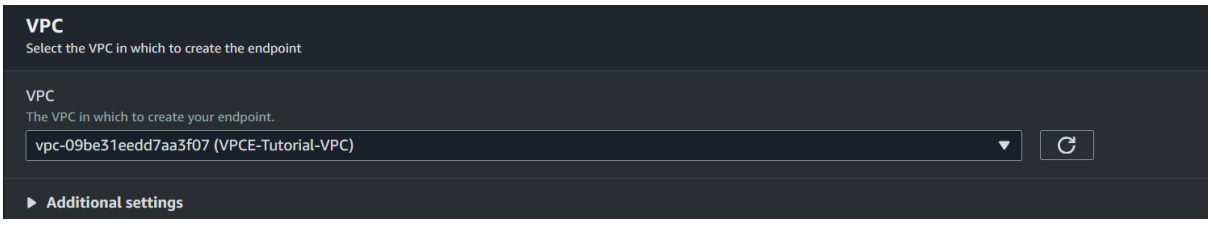
3. We have given name to the VPC is **Project-VPC-SNS-Endpoint.**



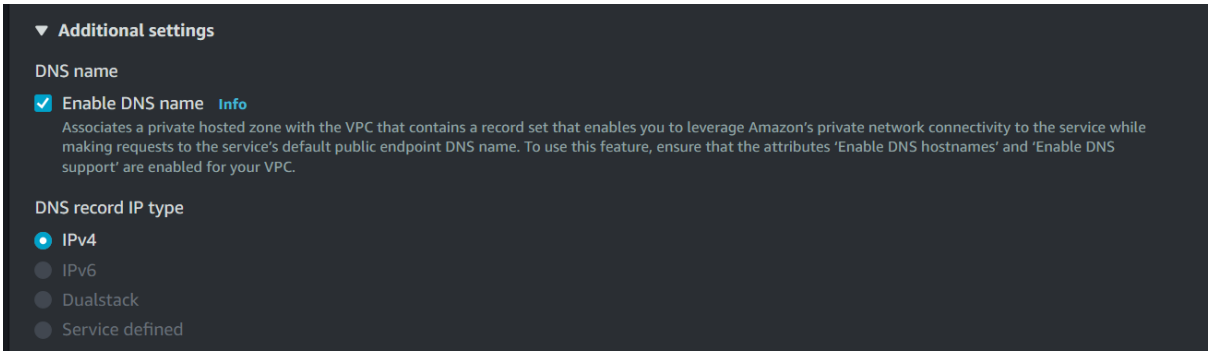
4. We will select the service com.amazonaws.ap-south-1.sns from the services dropdown.



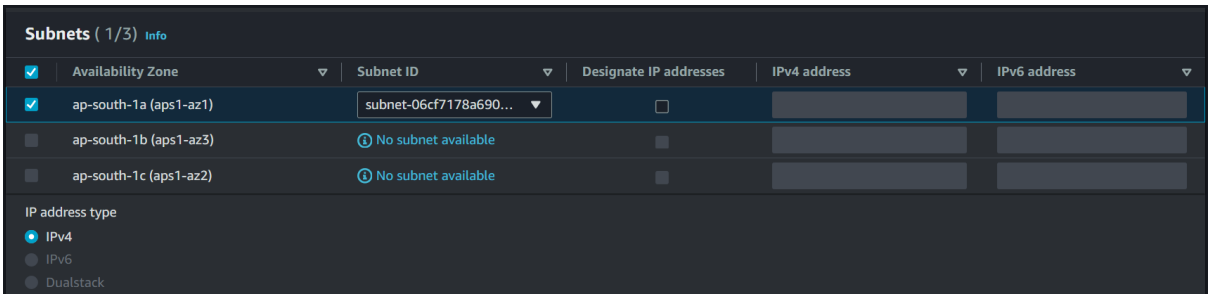
5. VPC we will select the above one which is created under the stack for this project.



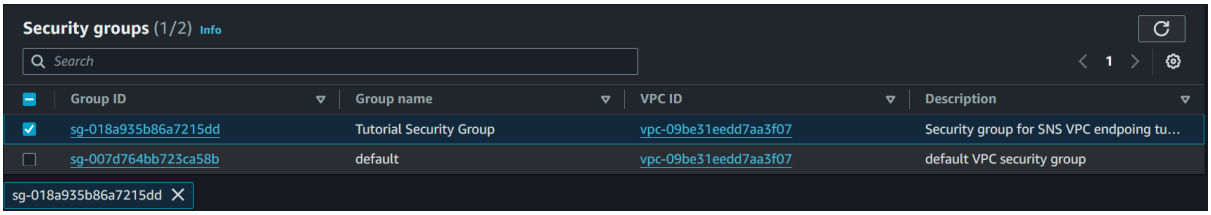
6. We will enable the DNS name.



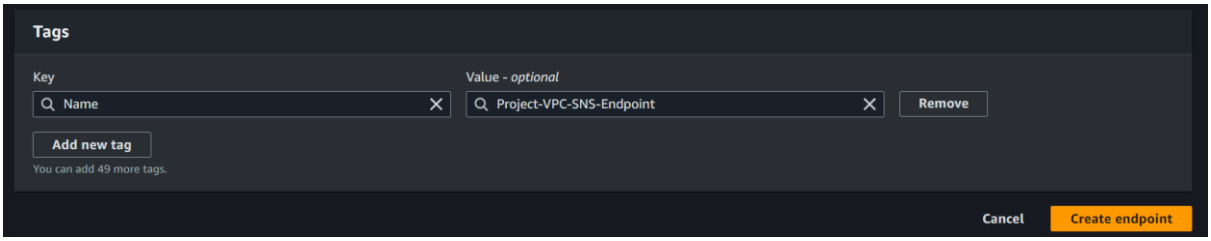
7. Subnet we will select VPCE-Tutorial-Subnet of same region.



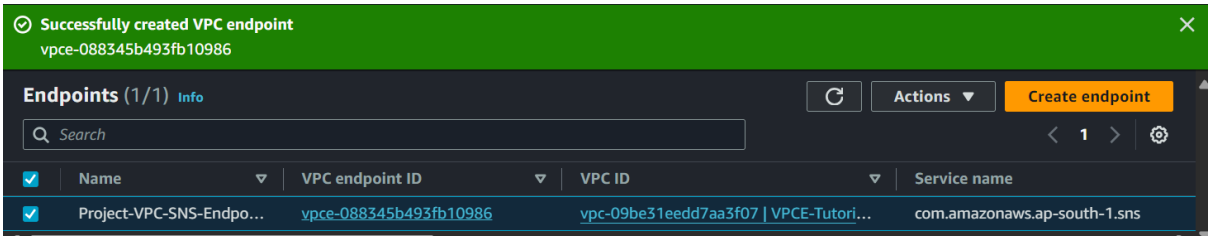
8. Security group we will select which is created under the stack for this project.



9. Now will scroll down, and will give the tags and will click on Create endpoint.

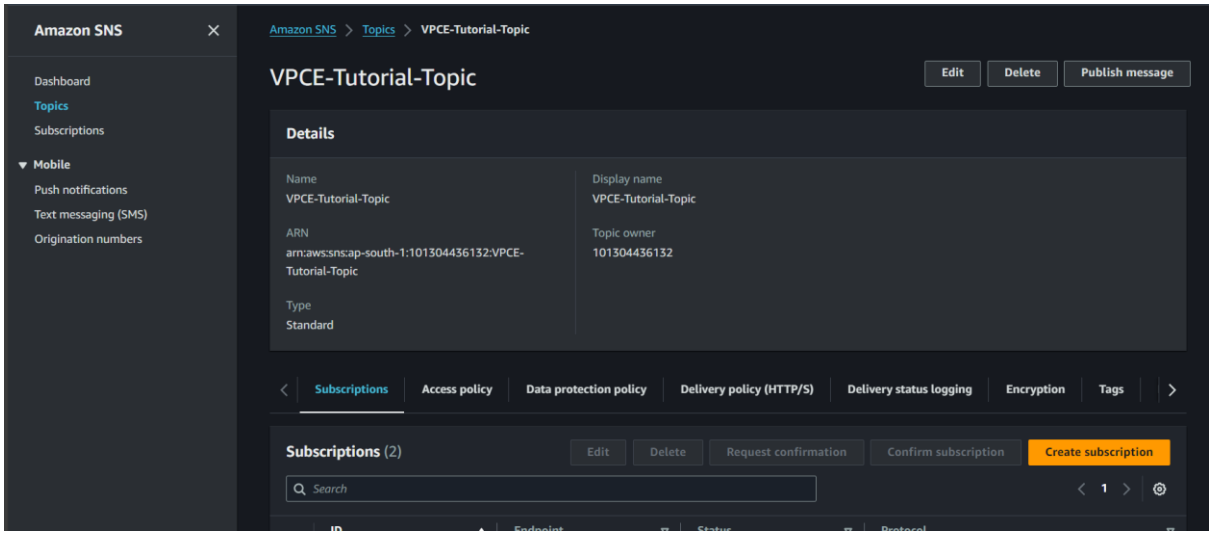


10. We could see in the below snip that the endpoint has created successfully.

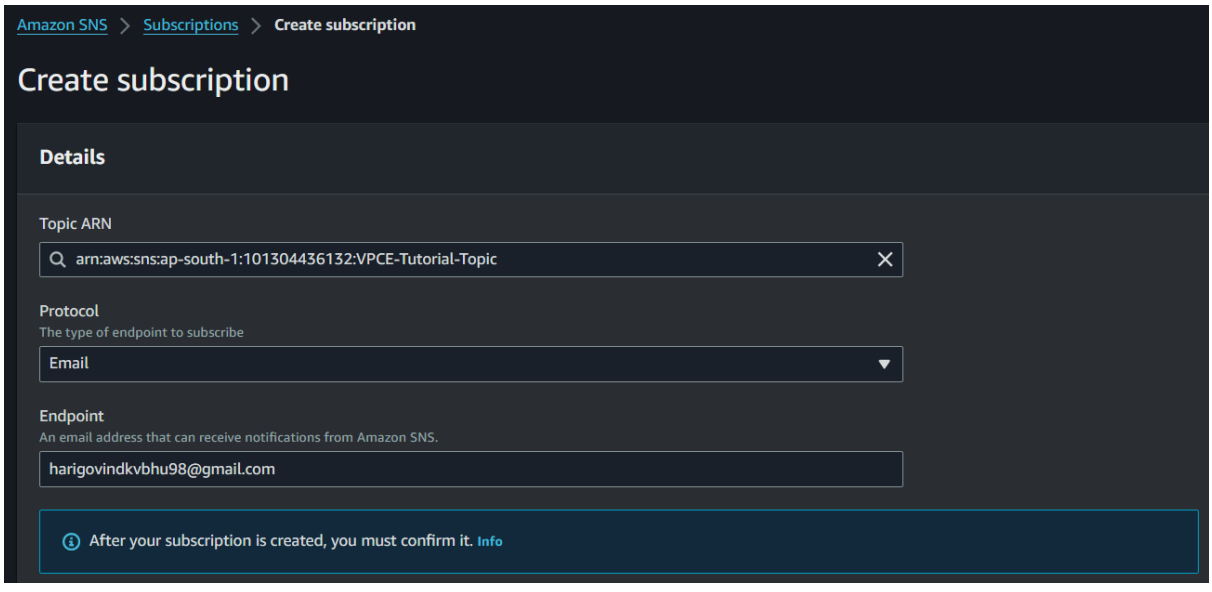


Step:5 - Subscribing Amazon SNS.

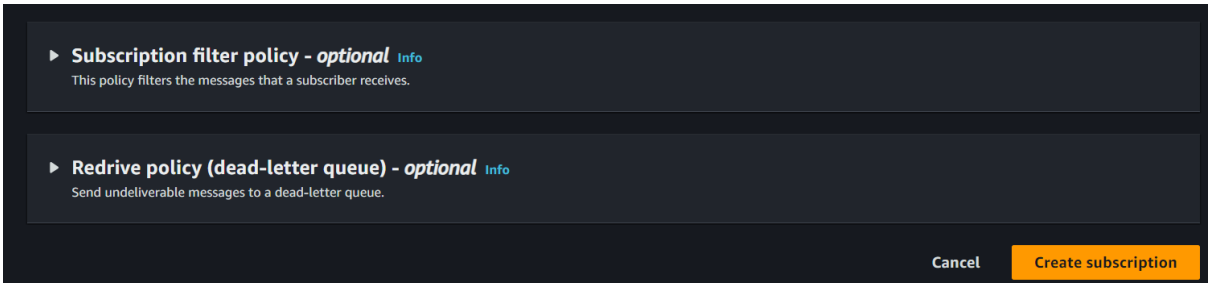
1. From the Search bar we will search the service SNS.
2. And from the left panel we will click on the Topics and could see the sns topic **VPCE-Tutorial-Topic** which is created under the stack. Now will click on the sns topic.
3. Now will click on the Create subscription.



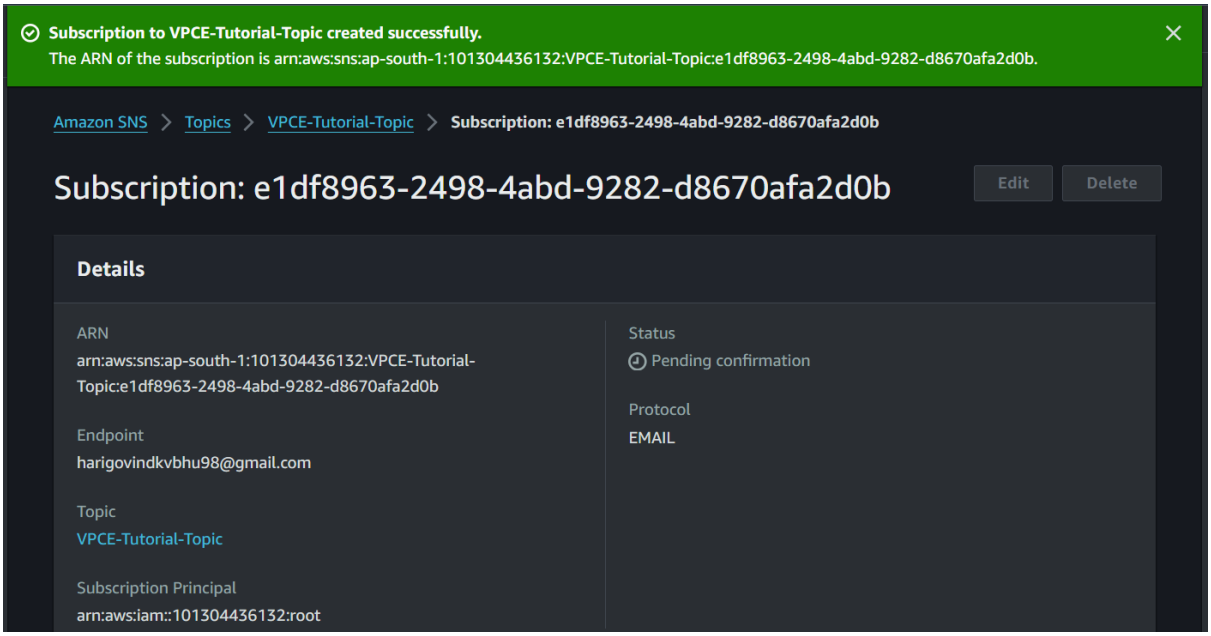
4. Then in Topic ARN we will take the arn of the sns topic, in protocol we will select the Email and will give the email address on which we want the notification.



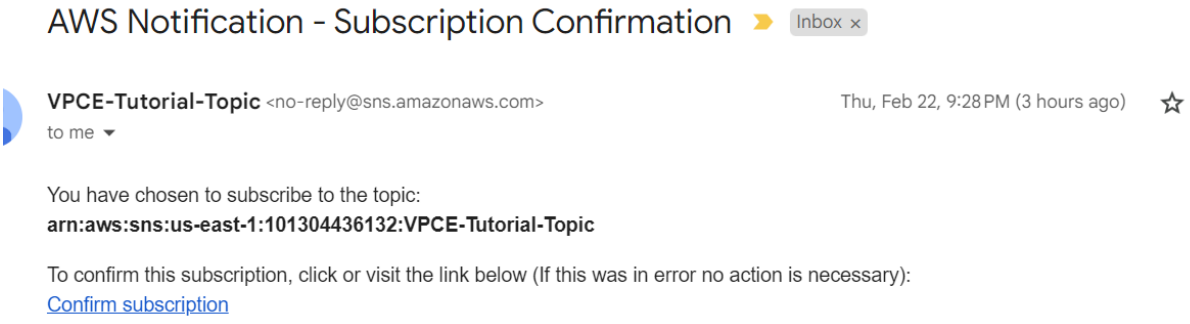
5. Now will scroll down and will click on the Create subscription.



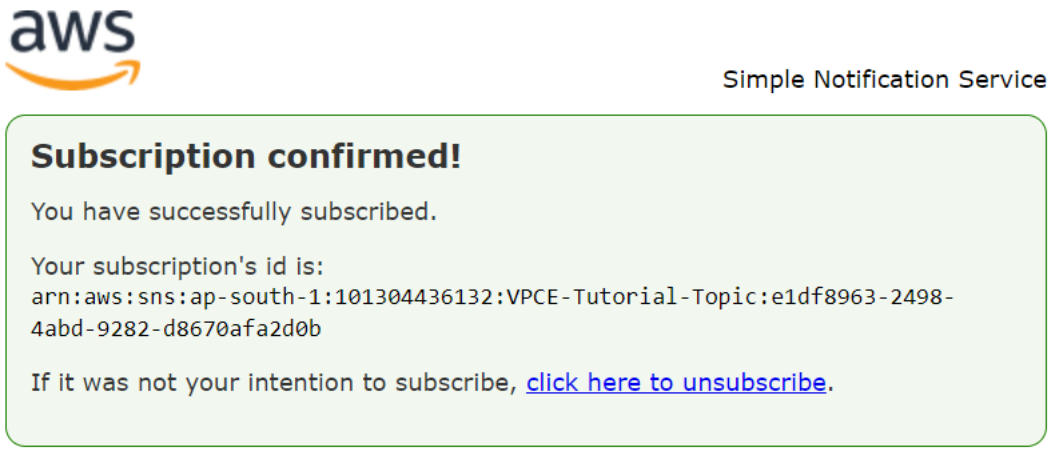
6. Now with a highlighted popup we could see that subscription has been created successfully, but the status is pending confirmation.



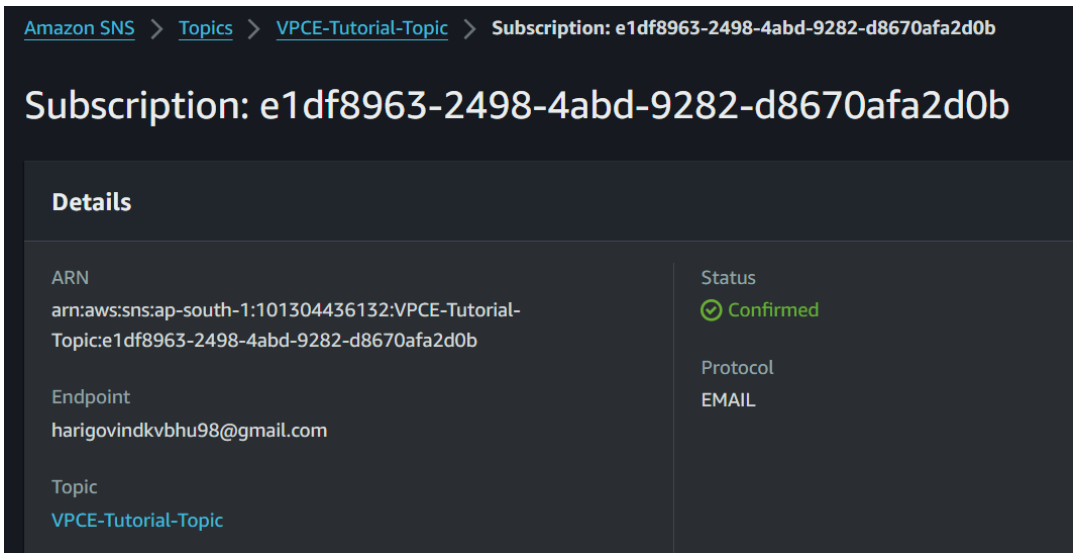
7. Now will login to the mail which is given for the subscription, and will confirm the link which we got on the mail.



8.

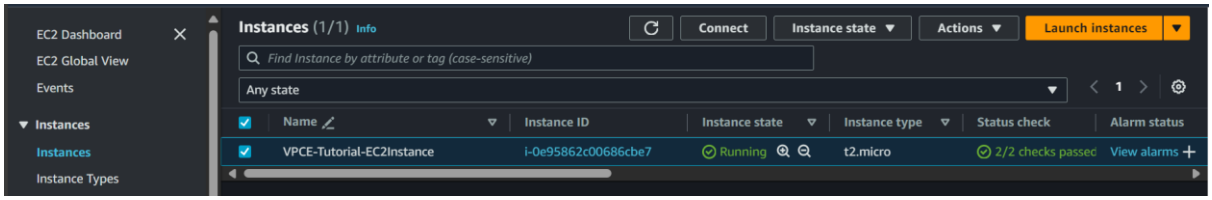


9. Now we will reload the sns topic page and could see that the Status has been confirmed.

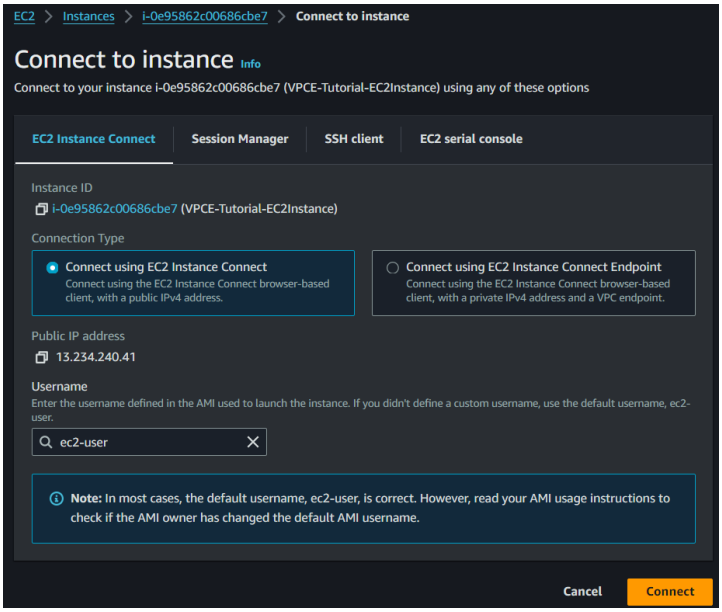


Step:6 - Checking lack of EC2 instance internet connectivity.

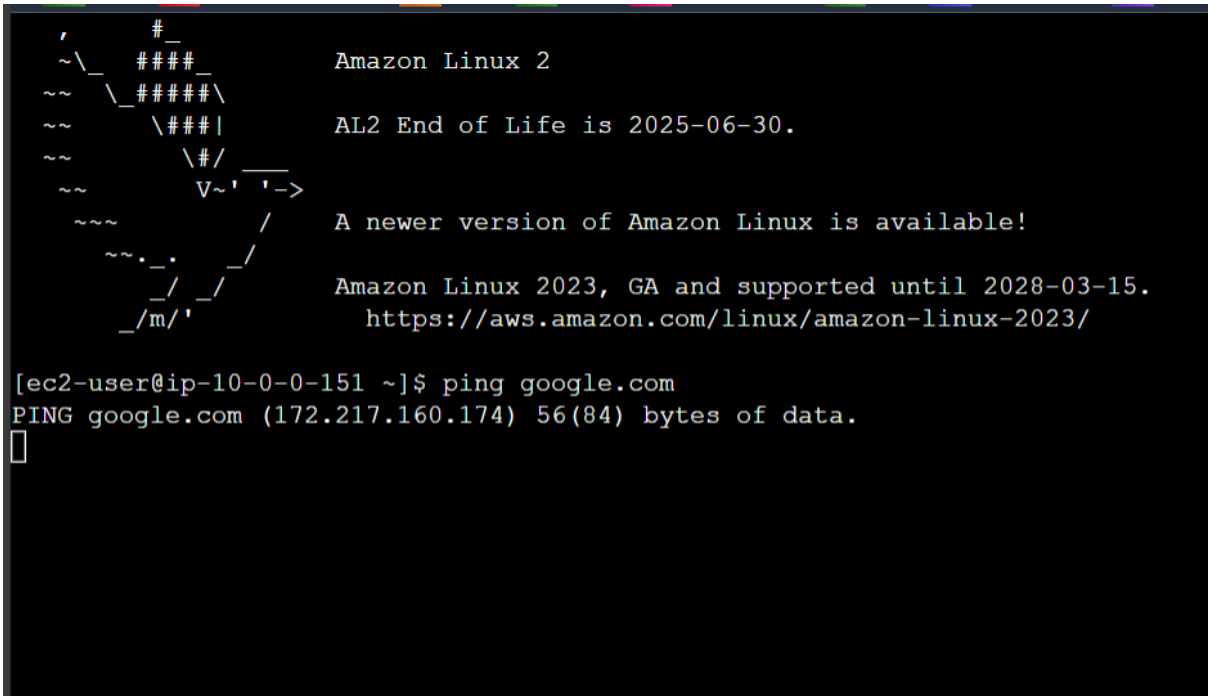
1. From the Search bar we will search the service EC2.
2. And from the left panel we will click on Instances and could see the instance **VPCE-Tutorial-EC2Instance** which is created under the stack. Now will select the instance and will click on Connect.



3. Now we will again click on Connect.

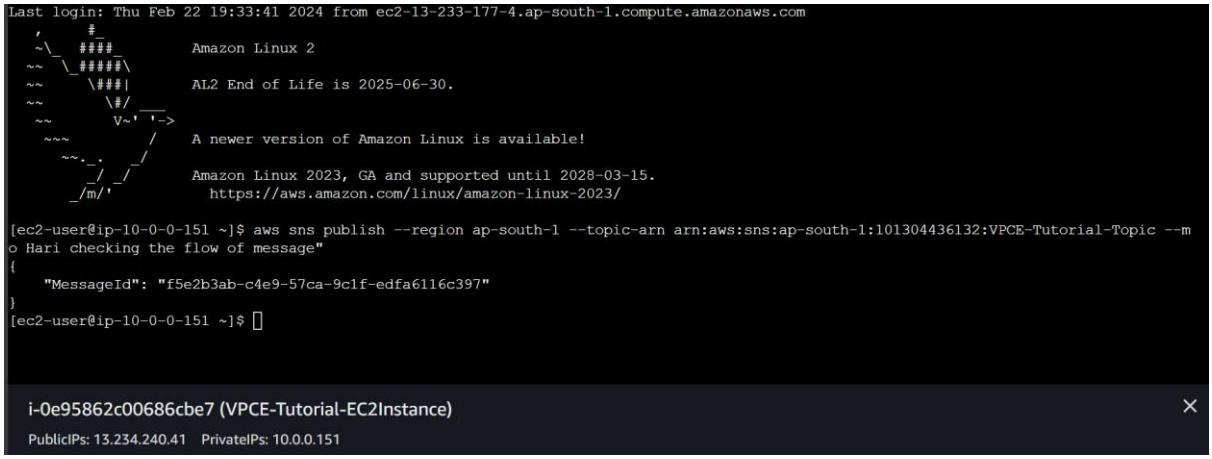


4. Now we will ping the google.com and could see that it is not pinging that means the instance has lack of internet connectivity.



Step:7 - Sending messages from EC2 to Amazon SNS.

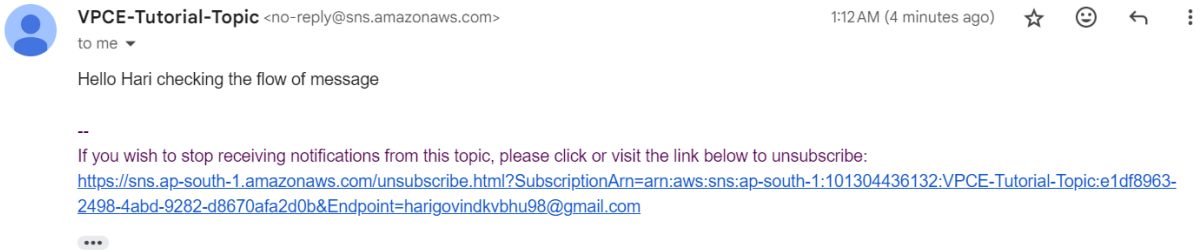
1. Now we will connect to the EC2 instance and will give the below command:
2. **aws sns publish --region ap-south-1 --topic-arn arn:aws:sns:ap-south-1:101304436132:VPCE-Tutorial-Topic --message "Hello Hari checking the flow of message".**



3. Now we could see in the above snip that the messageId has been generated and it has been sent through sns.

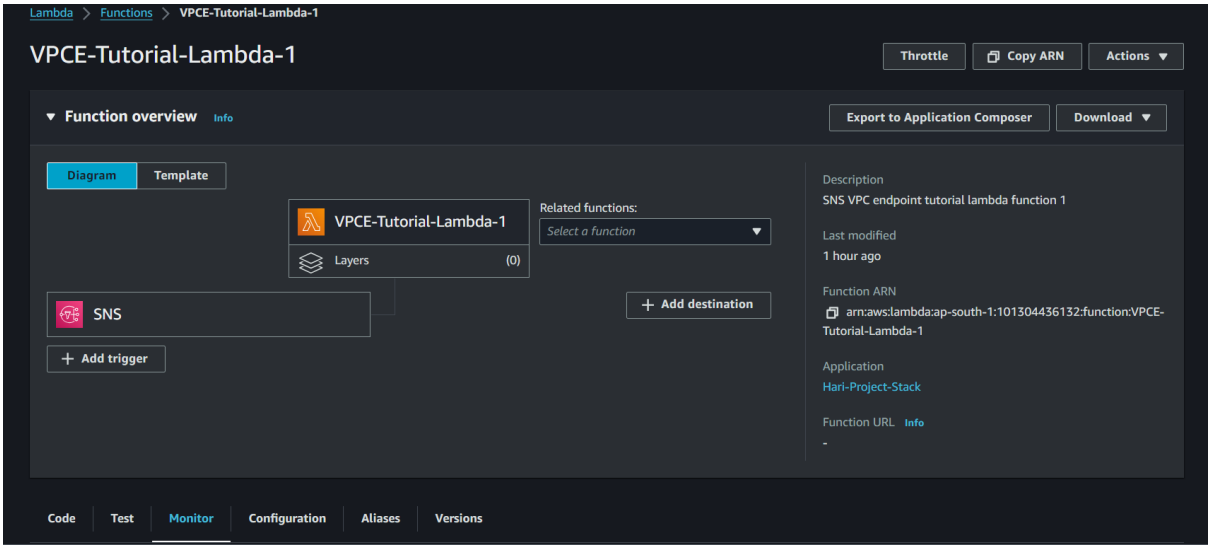
Step:8 - Checking messages on subscribed email.

1. Now will login to the email and could see in the below snip that the message has been received successfully.

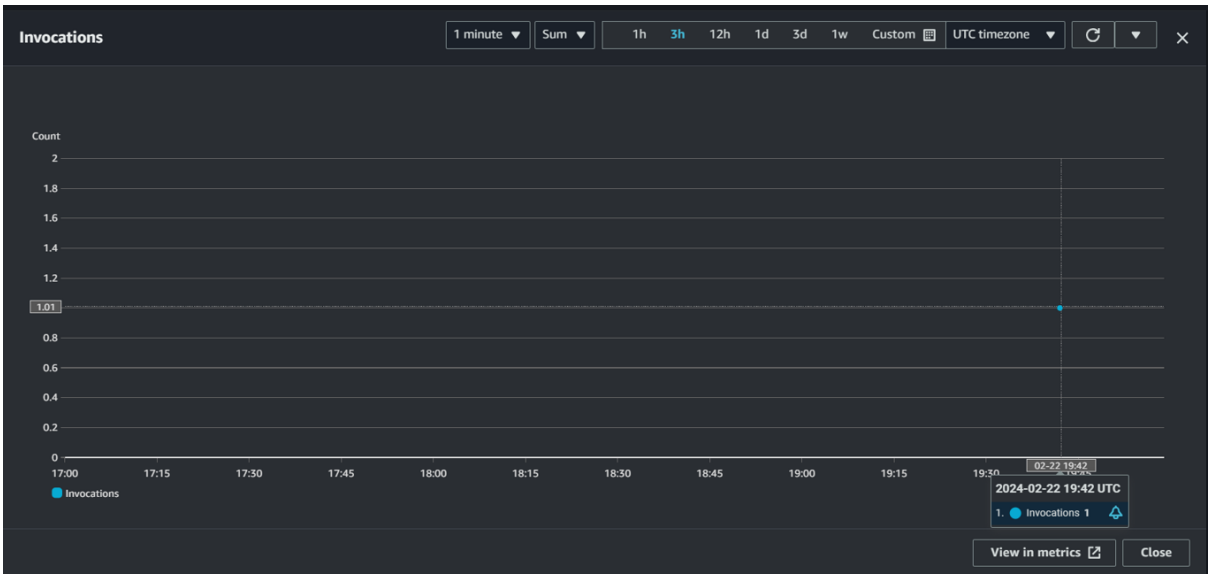


Step:9 - To verify that the Lambda functions were invoked.

1. From the Search bar we will search the service Lambda.
2. And from the left panel we will click on Functions and could see the functions that has been created.
3. Now will click on the function **VPCE-Tutorial-Lambda-1.**
4. And will go to the monitoring section.

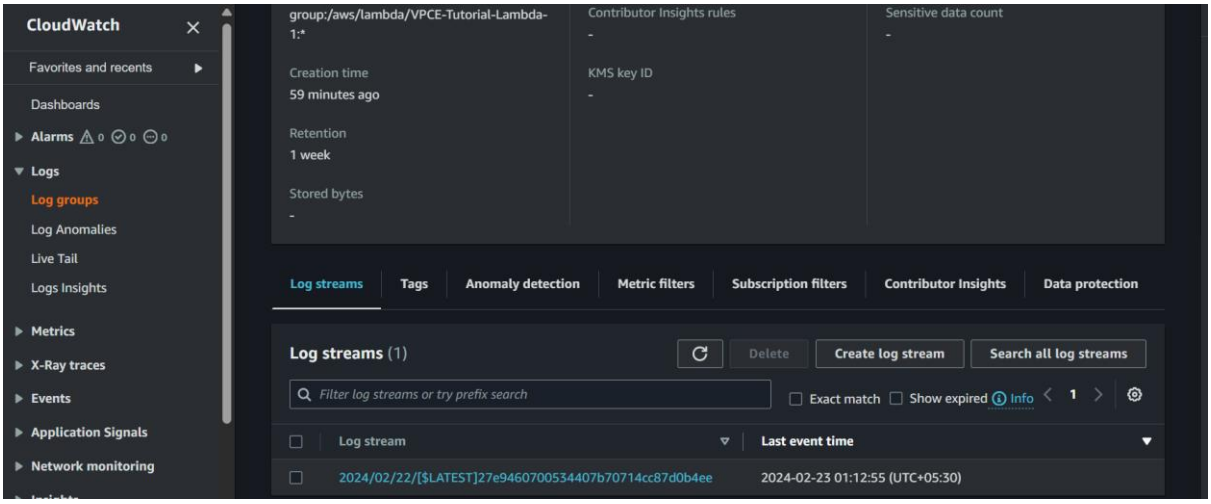


5. In Monitoring section, we will check the count of invocation graph.
6. We will Check the Invocation count graph. This graph shows the number of times that the Lambda function has been run.
7. As of now we have published one message only so the count could see as one. Now we will maximize the graph of the Invocations and will hover the arrow on the count and could see that the timing of the lambda trigger.

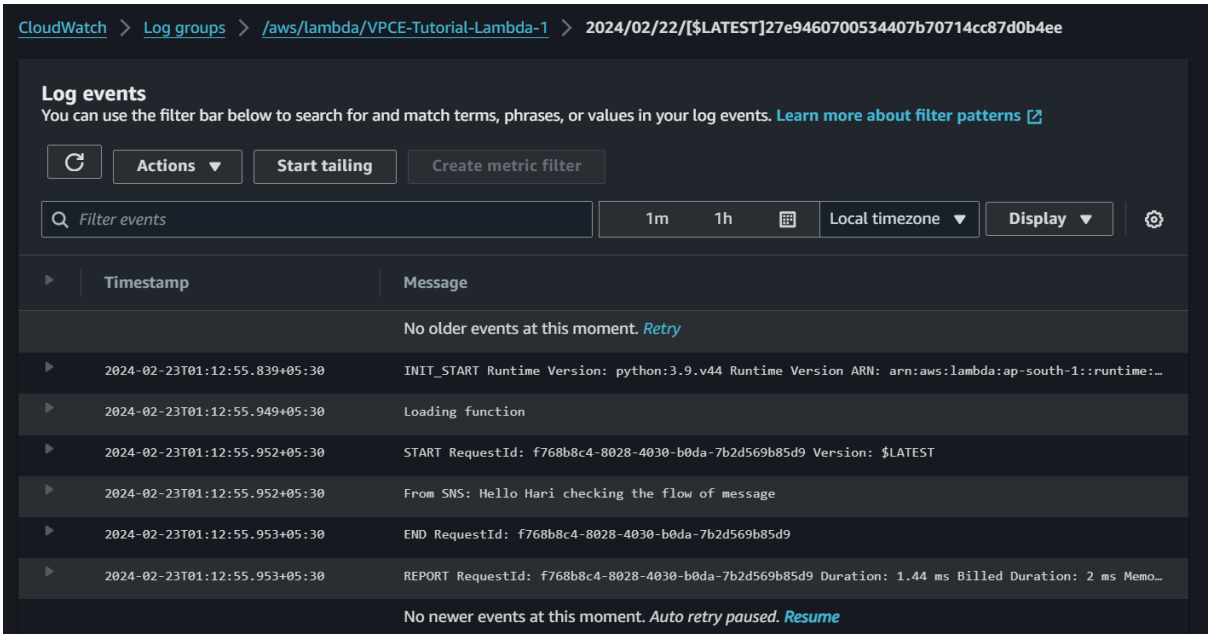


Step:10 - To verify that the CloudWatch logs were updated.

1. From the Search bar we will search the service CloudWatch.
2. And from the left panel we will click on Logs → Log groups → /aws/lambda/VPCE-Tutorial-Lambda-1.
3. Then we will scroll down and will click on the log stream that has been generated. Like in this case it is 2024/02/22/[$LATEST]27e9460700534407b70714cc87d0b4ee.



4. Now we could see the CloudWatch logs that has been generated with the same publish message.



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