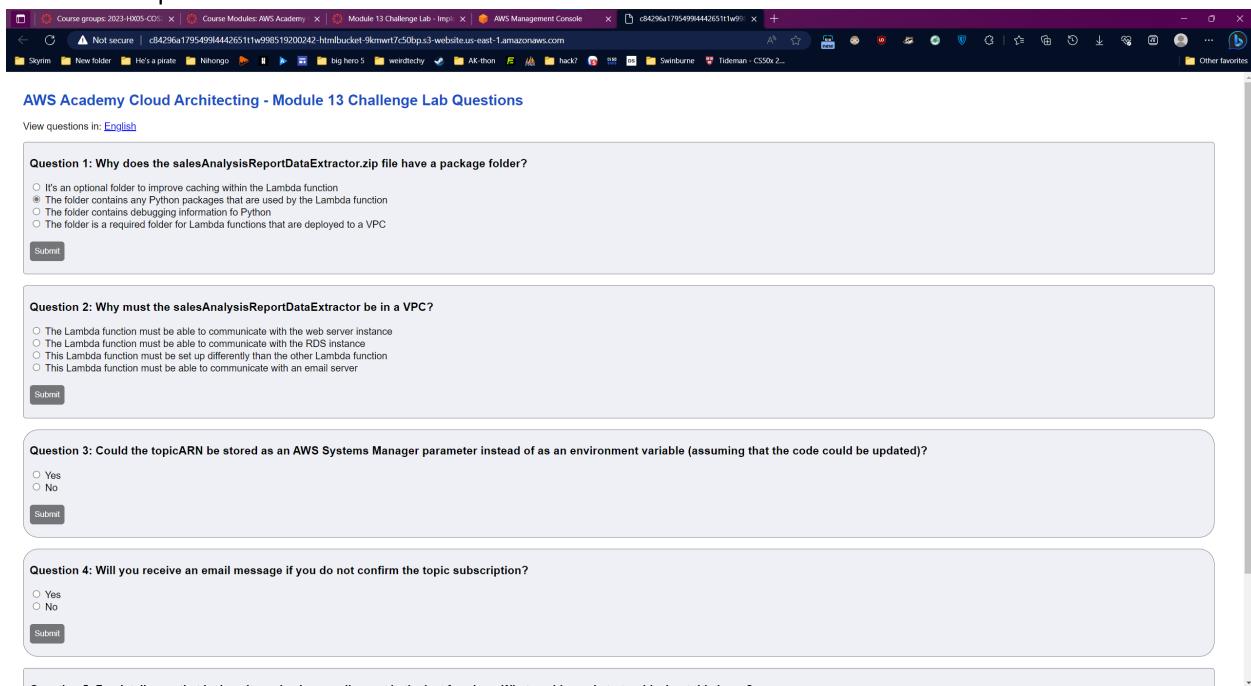


Module 13 – Challenge Lab: Implementing a Serverless Architecture for the Café

Task 1: Downloading the source code

Answer the question



The screenshot shows a web browser window with four tabs open. The active tab is titled "AWS Academy Cloud Architecting - Module 13 Challenge Lab Questions". The page contains four questions with multiple-choice answers and a "Submit" button.

Question 1: Why does the salesAnalysisReportDataExtractor.zip file have a package folder?

It's an optional folder to improve caching within the Lambda function
 The folder contains any Python packages that are used by the Lambda function
 The folder contains debugging information to Python
 The folder is a required folder for Lambda functions that are deployed to a VPC

Question 2: Why must the salesAnalysisReportDataExtractor be in a VPC?

The Lambda function must be able to communicate with the web server instance
 The Lambda function must be able to communicate with the RDS instance
 This Lambda function must be set up differently than the other Lambda function
 This Lambda function must be able to communicate with an email server

Question 3: Could the topicARN be stored as an AWS Systems Manager parameter instead of as an environment variable (assuming that the code could be updated)?

Yes
 No

Question 4: Will you receive an email message if you do not confirm the topic subscription?

Yes
 No

Task 2: Creating the *DataExtractor* Lambda function in the VPC

Create a security group for the Lambda function with the following settings:

- **Security group name:** LambdaSG
- **VPC:** Lab VPC
- **Outbound Rules:** All traffic to all addresses

Create security group [Info](#)

A security group acts as a virtual firewall for your instance to control inbound and outbound traffic. To create a new security group, complete the fields below.

Basic details

Security group name [Info](#)
LambdaSG
Name cannot be edited after creation.

Description [Info](#)
Allows SSH access to developers

VPC [Info](#)
vpc-0b6c2ee6b6c1e2bdf

Inbound rules [Info](#)

This security group has no inbound rules.

Add rule

Outbound rules [Info](#)

Type Info	Protocol Info	Port range Info	Destination Info	Description - optional Info
All traffic	All	All	Custom	0.0.0.0/0

Add rule

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Update the DatabaseSG security group.

Edit inbound rules [Info](#)

Inbound rules control the incoming traffic that's allowed to reach the instance.

Inbound rules [Info](#)

Security group rule ID	Type Info	Protocol Info	Port range Info	Source Info	Description - optional Info
sgr-0796c21e8d5320b3a	MySQL/Aurora	TCP	3306	Custom	sg-0427920cb884a6b14
-	MySQL/Aurora	TCP	3306	Custom	sg-0427920cb884a6b14

Add rule

Cancel Preview changes Save rules

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Create Lambda Function

Module 13 Challenge Lab - Imp: Create function - Lambda

https://us-east-1.console.aws.amazon.com/lambda/home?region=us-east-1#/create/function

N. Virginia vocabs/user2555068=104169523@student.swin.edu.au @ 9985-1920...

Services Search [Alt+S]

Author from scratch Start with a simple Hello World example.

Use a blueprint Build a Lambda application from sample code and configuration presets for common use cases.

Container image Select a container image to deploy for your function.

Basic information

Function name Enter a name that describes the purpose of your function.
salesAnalysisReportDataExtractor

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.
Python 3.8

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 [IAM](#).

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.
salesAnalysisReportRole

[View the salesAnalysisReportRole role](#) on the IAM console.

Advanced settings

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Enable tags Info A tag is a label that you assign to an AWS resource. Each tag consists of a key and an optional value. You can use tags to search and filter your resources, track your AWS costs, and enforce attribute-based access control.

Enable VPC Info Connect your function to a VPC to access private resources during invocation.

VPC Choose a VPC for your function to access.

vpc-0dd9f1721b8b2f263 (10.0.0.16)

Subnets Select the VPC subnets for Lambda to use to set up your VPC configuration.

Choose subnets

subnet-0f2bc70d423406ab0 (10.0.1.0/24)
awscloudformation.logical-id: PrivateSubnet1 awscloudformation.stack-id: arn:aws:cloudformation:us-east-1:998519200242:stack/c84296a179549944426511tw998519200242/9978f660-2571-11ee-b800-0a87783b9d6b us-east-1a

awscloudformation.stack-name: c84296a179549944426511tw998519200242 cloudlab: c84296a179549944426511tw998519200242 Name: Private Subnet 1

subnet-0f90842a5dd204b (10.0.2.0/24)
awscloudformation.logical-id: PrivateSubnet2 awscloudformation.stack-id: arn:aws:cloudformation:us-east-1:998519200242:stack/c84296a179549944426511tw998519200242/9978f660-2571-11ee-b800-0a87783b9d6b us-east-1b

awscloudformation.stack-name: c84296a179549944426511tw998519200242 cloudlab: c84296a179549944426511tw998519200242 Name: Private Subnet 2

Security groups Choose the VPC security groups for Lambda to use to set up your VPC configuration. The table below shows the inbound and outbound rules for the security groups that you choose.

Choose security groups

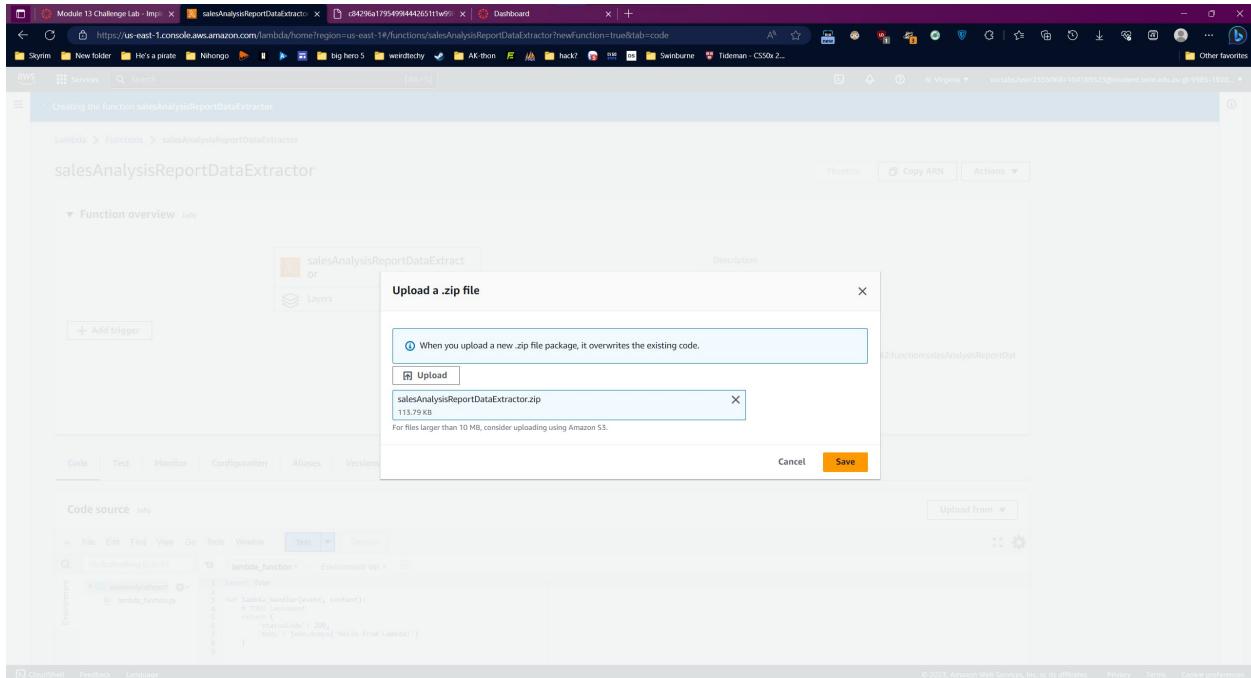
sg-0305c8e550fed1e76 (LambdaSG) X Lambda Name: LambdaSG

Inbound rules | Outbound rules

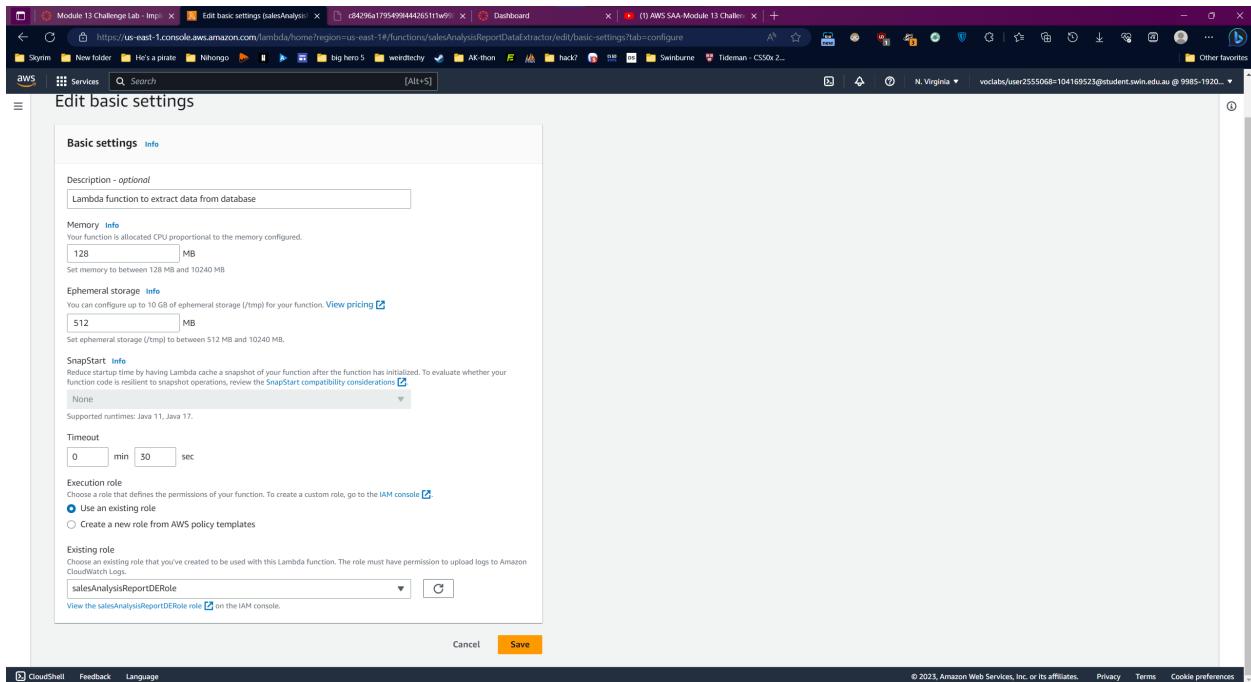
Security group ID	Protocol	Ports	Source
There is no data to display.			

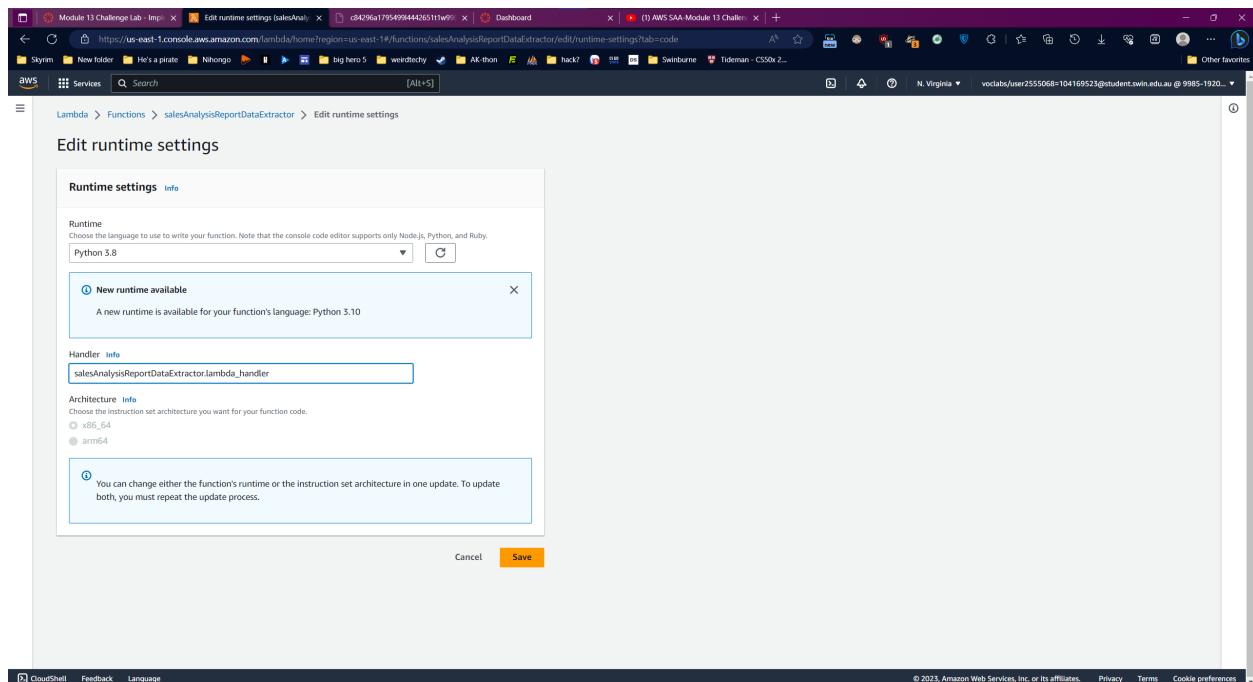
Cancel **Create function**

Upload Code



Edit settings





Question 2:

The folder contains debugging information for Python

The folder is a required folder for Lambda functions that are deployed to a VPC

Submit

Question 2: Why must the salesAnalysisReportDataExtractor be in a VPC?

The Lambda function must be able to communicate with the web server instance

The Lambda function must be able to communicate with the RDS instance

This Lambda function must be set up differently than the other Lambda function

This Lambda function must be able to communicate with an email server

Submit

Question 3: Could the topicARN be stored as an AWS Systems Manager parameter instead of an environment variable (assuming that the code could be updated)?

Yes

No

Submit

Question 4: Will you receive an email message if you do not confirm the topic subscription?

Yes

No

Submit

Question 5: Frank tells you that he hasn't received an email report in the last few days. What could you do to troubleshoot this issue?

Restart the Lambda function because it might be stuck

Update the Python version

Use the logs from Amazon CloudWatch Logs and review them for errors

Use the AWS CloudTrail logs and review them for errors

Submit

Task 3: Creating the *salesAnalysisReport* Lambda function

Create another function

The screenshot shows the 'Create function - Lambda' wizard. In the 'Basic information' section, the function name is set to 'salesAnalysisReport'. The runtime is chosen as 'Python 3.7'. The architecture is set to 'x86_64'. Under 'Permissions info', the default execution role 'salesAnalysisReportRole' is selected. In the 'Advanced settings' section, there are tabs for 'Code source', 'Test', 'Monitor', 'Configuration', 'Aliases', and 'Versions'. The 'Code source' tab is active, showing a code editor with a single line of code: `print("Hello, world!")`.

Upload code

The screenshot shows the AWS Lambda function configuration page for 'salesAnalysisReport'. A green banner at the top indicates that the function was successfully created. Below, the 'Code source' tab is selected, showing the uploaded code. The code editor displays the same single line of Python code: `print("Hello, world!")`. The 'Code properties' tab is also visible at the bottom.

Change settings

Screenshot of the AWS Lambda console showing the "Edit basic settings" page for the "salesAnalysisReport" function.

The "Basic settings" tab is selected. The function description is "Lambda function to generate and send the daily sales report".

Memory: 128 MB (Set memory to between 128 MB and 10240 MB)

Ephemeral storage: 512 MB (You can configure up to 10 GB of ephemeral storage (/tmp) for your function. View pricing)

SnapStart: None (Reduce startup time by having Lambda cache a snapshot of your function after it has initialized. To evaluate whether your function code is resilient to snapshot operations, review the SnapStart compatibility considerations.)

Timeout: 30 sec (Supported runtimes: Java 11, Java 17.)

Execution role: Use an existing role (salesAnalysisReportRole) (Choose a role that defines the permissions of your function. To create a custom role, go to the IAM console.)

Existing role: salesAnalysisReportRole (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.)

Save button at the bottom right.

Screenshot of the AWS Lambda console showing the "Edit runtime settings" page for the "salesAnalysisReport" function.

The "Runtime settings" tab is selected. The runtime is set to Python 3.7.

New runtime available: A new runtime is available for your function's language: Python 3.10.

Handler: salesAnalysisReport.lambda_handler

Architecture: x86_64 (You can change either the function's runtime or the instruction set architecture in one update. To update both, you must repeat the update process.)

Save button at the bottom right.

Task 4: Creating an SNS topic

Create a topic

The screenshot shows the AWS SNS Topics page. A green banner at the top indicates that the 'SalesReportTopic' was created successfully. The main area displays the 'SalesReportTopic' details, including its name, ARN, and type. The 'Subscriptions' tab is selected, showing a table with one row: 'Create subscription'. The table has columns for ID, Endpoint, Status, and Protocol.

ID	Endpoint	Status	Protocol
		No subscriptions found	You don't have any subscriptions to this topic.

Add an environment variables

The screenshot shows the AWS Lambda 'Edit environment variables' page for the 'salesAnalysisReport' function. It displays a table with one row: 'topicARN'. The table has columns for Key, Value, and Actions (Edit, Remove). Below the table is an 'Encryption configuration' section. At the bottom are 'Cancel' and 'Save' buttons.

Key	Value	Action
topicARN	arn:aws:sns:us-east-1:998519200242:SalesReportTopic	Edit Remove

Question 3

The screenshot shows a web-based challenge interface with four questions:

- Question 1:** A multiple-choice question about a folder required for Lambda functions deployed to a VPC. Options include:
 - The folder contains debugging information for Python
 - The folder is a required folder for Lambda functions that are deployed to a VPCA "Submit" button is present.
- Question 2:** A multiple-choice question asking why the salesAnalysisReportDataExtractor must be in a VPC. Options include:
 - The Lambda function must be able to communicate with the web server instance
 - The Lambda function must be able to communicate with the RDS instance
 - This Lambda function must be set up differently than the other Lambda function
 - This Lambda function must be able to communicate with an email serverA "Submit" button is present.
- Question 3:** A multiple-choice question asking if the topicARN can be stored as an AWS Systems Manager parameter instead of an environment variable. Options include:
 - Yes
 - NoA "Submit" button is present.
- Question 4:** A multiple-choice question asking if you will receive an email message if you do not confirm the topic subscription. Options include:
 - Yes
 - NoA "Submit" button is present.

Task 5: Creating an email subscription to the SNS topic

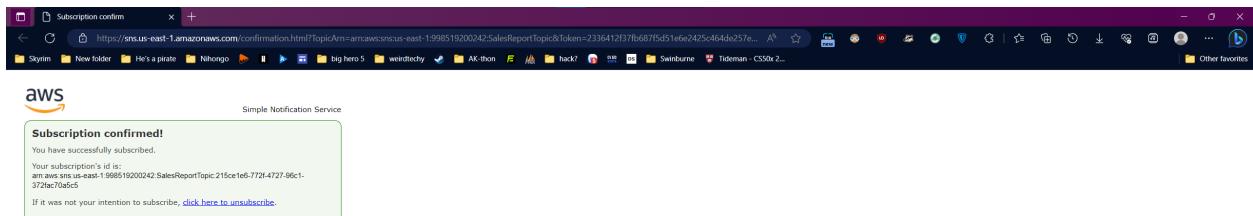
Create Subscription

The screenshot shows the AWS SNS console with a topic named "SalesReportTopic". The "Subscriptions" tab is selected, showing one pending confirmation subscription:

ID	Endpoint	Status	Protocol
Pending confirmation	104169523@student.swin.edu.au	Pending confirmation	EMAIL

Buttons for "Edit", "Delete", "Request confirmation", "Confirm subscription", and "Create subscription" are visible at the top of the subscription list.

Confirm



Question 4:

The screenshot shows a browser window with several tabs open, including "Module 13 Challenge Lab - Imp...", "Details | Topics | Amazon SNS", "salesAnalysisReport - Lambda", and "Dashboard". The main content area displays five questions:

- Question 1:** The folder contains debugging information for Python
The folder is a required folder for Lambda functions that are deployed to a VPC
 The folder contains debugging information for Python
 The folder is a required folder for Lambda functions that are deployed to a VPC
 This Lambda function must be able to communicate with a VPC
 This Lambda function must be able to communicate with an email server
Submit
- Question 2: Why must the salesAnalysisReportDataExtractor be in a VPC?**
 The Lambda function must be able to communicate with the web server instance
 The Lambda function must be able to communicate with the RDS instance
 This Lambda function must be set up differently than the other Lambda function
 This Lambda function must be able to communicate with an email server
Submit
- Question 3: Could the topicARN be stored as an AWS Systems Manager parameter instead of as an environment variable (assuming that the code could be updated)?**
 Yes
 No
Submit
- Question 4: Will you receive an email message if you do not confirm the topic subscription?**
 Yes
 No
Submit
- Question 5: Frank tells you that he hasn't received an email report in the last few days. What could you do to troubleshoot this issue?**
 Restart the Lambda function because it might be stuck
 Update the Python version
 Use the logs from Amazon CloudWatch Logs and review them for errors
 Use the AWS CloudTrail logs and review them for errors
Submit

Task 6: Testing the salesAnalysisReport Lambda function

Create a Test:

The screenshot shows the AWS Lambda console interface. A green banner at the top indicates "Successfully updated the function salesAnalysisReport." Below this, the "Test" tab is selected. The main area displays the logs of the function execution, which show a successful response with status code 200 and body "Sale Analysis Report sent." The logs also provide detailed metrics like Request ID, Duration, and Memory usage.

Email notification:

The screenshot shows an Outlook inbox. An email from "Sales Report Topic <no-reply@sns.amazonaws.com>" is open, titled "Daily Sales Analysis Report". The email contains a table showing product group pastries with their respective quantities. Below the table, there's a section for product group drinks with another table showing coffee, hot chocolate, and latte quantities. At the bottom of the email, there are links for unsubscribe and support.

Item Name	Quantity
Croissant	29
Doughnut	23
Chocolate Chip Cookie	18
Muffin	6
Strawberry Blueberry Tart	34
Strawberry Tart	33

Item Name	Quantity
Coffee	33
Hot Chocolate	17
Latte	24

Task 7: Setting up an Amazon EventBridge event to trigger the Lambda function each day

Create a rule

The screenshot shows the 'Define rule detail' step of the AWS Lambda 'Create rule' wizard. On the left, a sidebar lists steps: Step 1 (selected), Step 2 (Define schedule), Step 3 (Select target(s)), Step 4 - optional (Configure tags), and Step 5 (Review and create). The main area has a 'Rule detail' section with fields for 'Name' (set to 'module13') and 'Description - optional' (also set to 'module13'). A dropdown 'Event bus' is set to 'default'. Under 'Rule type', the 'Schedule' option is selected. A note about 'EventBridge Scheduler' is present, mentioning it's a new feature. At the bottom are 'Continue to create rule' and 'Continue in EventBridge Scheduler' buttons.

Pattern

The screenshot shows the 'Define schedule' step of the AWS Lambda 'Create rule' wizard. The sidebar shows Step 1 (selected) and Step 2 (Define schedule). The main area has a 'Schedule pattern' section with two options: 'A fine-grained schedule that runs at a specific time, such as 8:00 a.m. PST on the first Monday of every month.' (selected) and 'A schedule that runs at a regular rate, such as every 10 minutes.' Below is a 'Cron expression' input field with the value 'cron(0 15 * * ? *)' and a dropdown for 'Next 10 trigger date(s)' set to 'UTC'. A list of dates from 'Tue, 18 Jul 2023 15:00:00 UTC' to 'Thu, 27 Jul 2023 15:00:00 UTC' follows. At the bottom are 'Cancel', 'Previous', and 'Next' buttons.

Target

The screenshot shows the 'Create rule' wizard in the AWS EventBridge console. The current step is 'Step 3: Select target(s)'. A note at the top states: 'If you have existing cross account event bus targets that do not have an IAM role configured, we recommend adding IAM roles to grant users access to resources in another account and set organization boundaries using Service Control Policies (SCPs) to determine who can send and receive events from accounts in your organization. You can attach IAM roles using EventBridge PutTarget calls. To learn more about permissions for cross account event bus targets, please refer to our documentation.' Below this, there's a 'Permissions' section with a note: 'Note: When using the EventBridge console, EventBridge will automatically configure the proper permissions for the selected targets. If you're using the AWS CLI, SDK, or CloudFormation, you'll need to configure the proper permissions.' The 'Target types' section shows three options: 'EventBridge event bus' (radio button), 'EventBridge API destination' (radio button), and 'AWS service' (radio button, which is selected). Under 'Select a target', there is a dropdown menu set to 'Lambda function' and a text input field containing 'salesAnalysisReport'. There are also 'Configure version/alias' and 'Additional settings' buttons. At the bottom are 'Add another target', 'Cancel', 'Skip to Review and create', 'Previous', and 'Next' buttons.

Success:

The screenshot shows the 'Rules' page in the AWS EventBridge console. On the left, there's a navigation sidebar with sections like 'Developer resources', 'Buses', 'Pipes', 'Scheduler', 'Integration', and 'Schema registry'. The main area displays a table for the 'module13' rule. The table includes columns for 'Rule name' (module13), 'Status' (Enabled), 'Event bus name' (default), 'Type' (Scheduled Standard), 'Description' (module13), 'Rule ARN' (arn:aws:events:us-east-1:998519200242:rule/module13), and 'Event bus ARN' (arn:aws:events:us-east-1:998519200242:event-bus/default). Below the table, there are tabs for 'Event schedule', 'Targets', 'Monitoring', and 'Tags'. The 'Event schedule' tab is active, showing the cron expression '0 15 * * ?' and a list of 'Next 10 trigger dates' from July 18, 2023, to July 27, 2023. At the top right of the main area, there are buttons for 'Edit', 'Disable', 'Delete', and 'CloudFormation Template'. The bottom of the page includes standard AWS footer links for 'CloudShell', 'Feedback', 'Language', and copyright information.

Mail:

Daily Sales Analysis Report

Sales Report Topic <no-reply@sns.amazonaws.com>
To: XUAN NHAT LE
[You don't often get email from no-reply@sns.amazonaws.com. Learn why this is important at <https://aka.ms/LearnAboutSenderIdentification>]

Sales Analysis Report
Date: 2023-07-18

Product Group: Pastries

Item Name	Quantity
Croissant	29
Donut	23
Chocolate Chip Cookie	18
Muffin	6
Strawberry Blueberry Tart	34
Strawberry Tart	33

Product Group: Drinks

Item Name	Quantity
Coffee	33
Hot Chocolate	17
Latte	24

If you wish to stop receiving notifications from this topic, please click or visit the link below to unsubscribe:
<https://sns.us-east-1.amazonaws.com/unsubscribe.html?SubscriptionArn=arn:aws:sns:us-east-1:988519200242:SalesReportTopic215ce1e6-772f-4727-96c1-372fac70a5c5&EndpointId=104169532@student.swin.edu.au>

Please do not reply directly to this email. If you have any questions or comments regarding this email, please contact us at <https://aws.amazon.com/support>

Question 5:

The folder contains debugging information for Python
The folder is a required folder for Lambda functions that are deployed to a VPC

Submit

Question 2: Why must the salesAnalysisReportDataExtractor be in a VPC?

The Lambda function must be able to communicate with the web server instance
 The Lambda function must be able to communicate with the RDS instance
 This Lambda function must be set up differently than the other Lambda function
 This Lambda function must be able to communicate with an email server

Submit

Question 3: Could the topicARN be stored as an AWS Systems Manager parameter instead of as an environment variable (assuming that the code could be updated)?

Yes
 No

Submit

Question 4: Will you receive an email message if you do not confirm the topic subscription?

Yes
 No

Submit

Question 5: Frank tells you that he hasn't received an email report in the last few days. What could you do to troubleshoot this issue?

Restart the Lambda function because it might be stuck
 Update the Python version
 Use the logs from Amazon CloudWatch Logs and review them for errors
 Use the AWS CloudTrail logs and review them for errors

Submit