STEP 1-
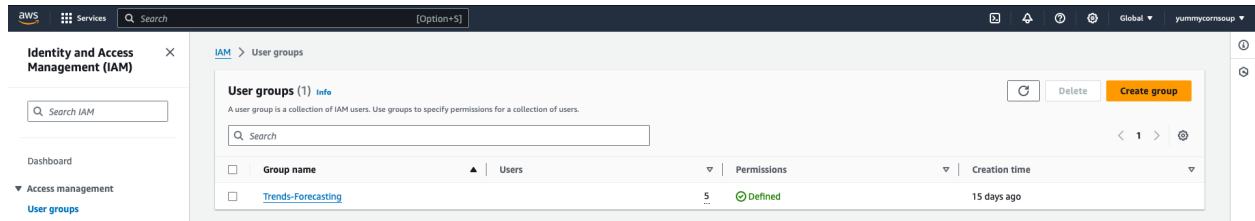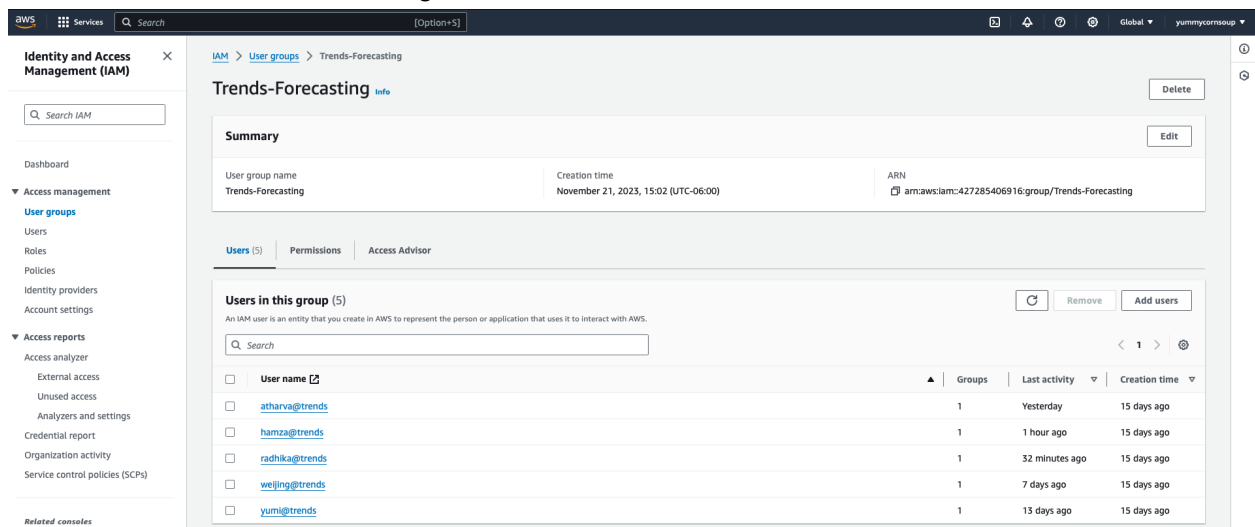**AWS Services and Our Conducting Process**

AWS IAM Services

AWS IAM is used to grant access to each user. It acts as a security guard to make sure users only can reach the data and resources based on their jobs.

1. Create user group for our project

2. Add team members using their email

3. Set up permissions policies for each member based on the services they need
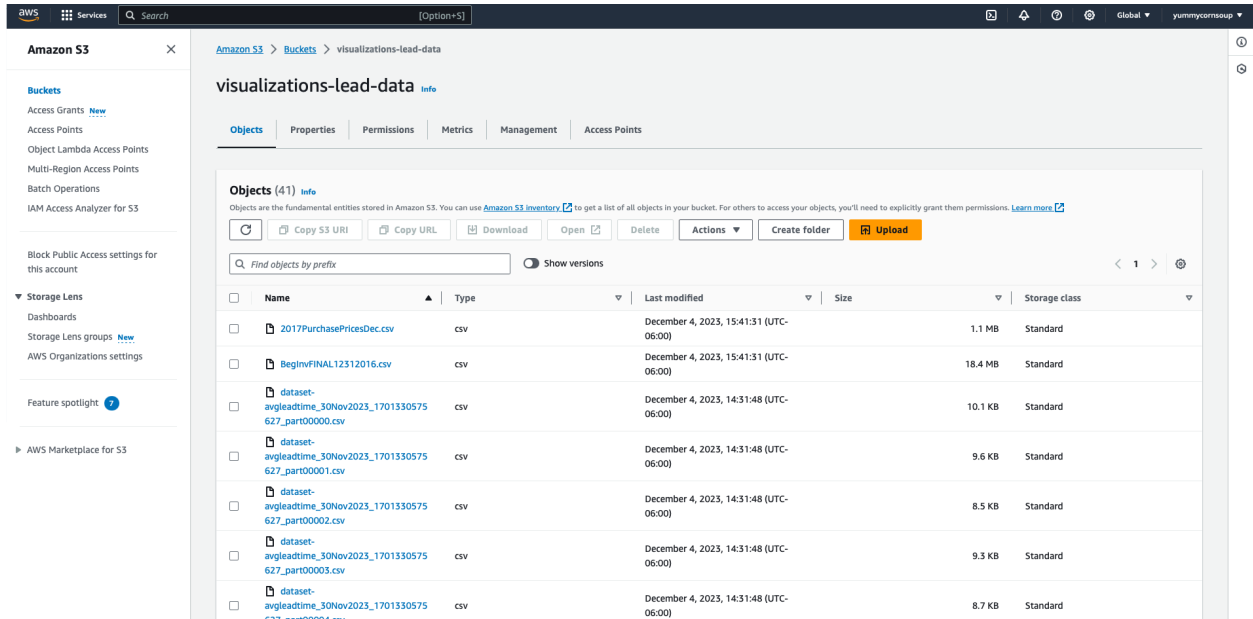
STEP 2-
AWS S3

AWS S3 allows users to store and retrieve any amount of data from anywhere on the web. It is ideal for backing up and archiving data, including storing processed or cleaned data after computation or analysis using other AWS services.

1. Create a bucket to store all the data we need to process

2. Upload the data file to the bucket

3. After cleaning or processing the data, we can use below code to store the data back to S3. (using boto3 in python)

```python
import boto3

# Initialize a session using AWS credentials
s3 = boto3.client('s3')

# Specify the file path and S3 bucket and key
file_path = 'path/to/cleaned_data.csv'
bucket_name = 's3-bucket'
object_name = 'path/in/bucket/cleaned_data.csv'

# Upload the file
s3.upload_file(file_path, bucket_name, object_name)
```
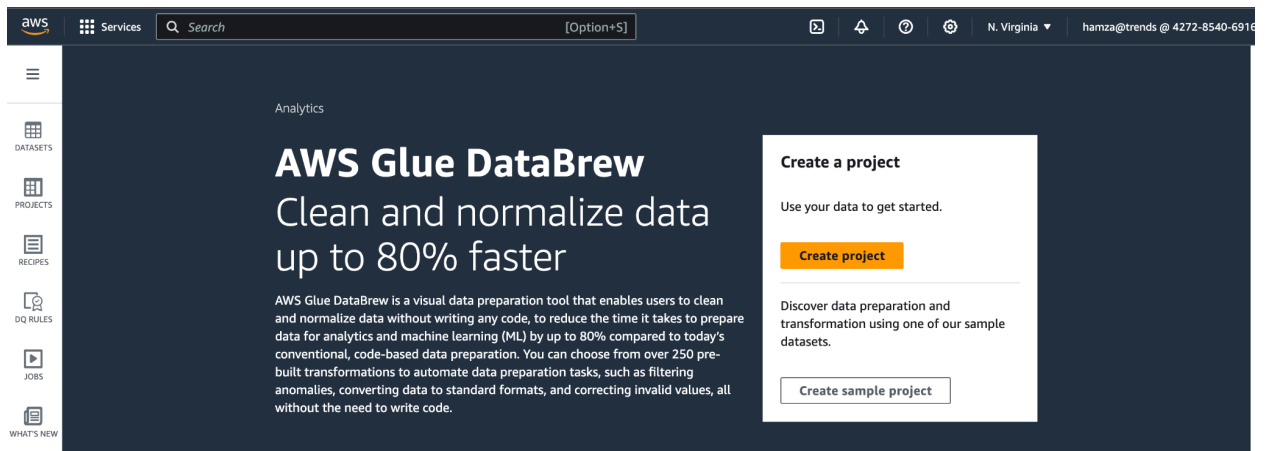
STEP 3-
AWS Glue Databrew

AWS Glue DataBrew is a visual data preparation tool provided by Amazon Web Services (AWS). It simplifies the process of cleaning, enriching, and transforming data for analytics and machine learning. Here's an overview of how to use this tool for our solution:

1. Press 'Create Project' to get started

2. Give your project a name and press on 'My datasets' to choose file you want to work on from AWS S3
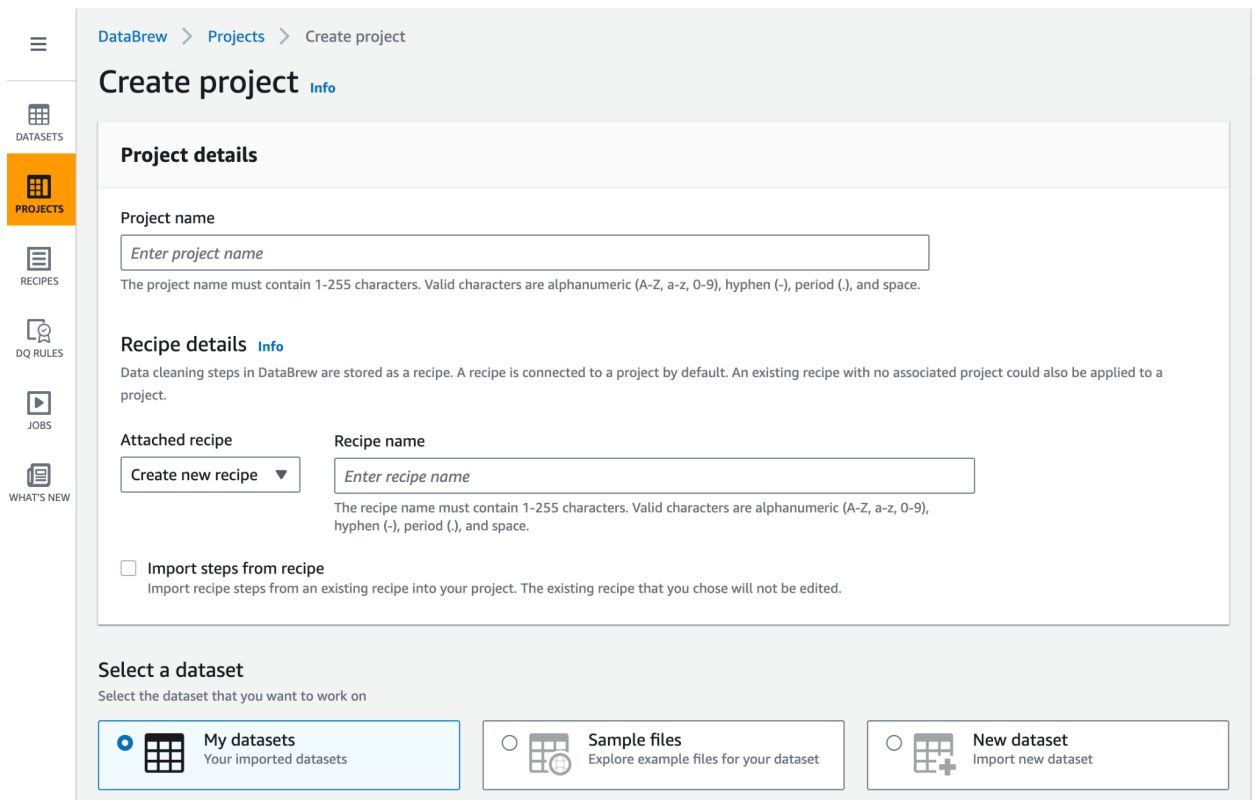
3. Select your role that was created in the first step and create project

Permissions Info

DataBrew needs permission to connect to data on your behalf. Use an IAM role with the **required policy** [↗] attached.

Role name
Choose the role that has access to connect to your data. Refresh to see the latest updates.

| AWSGlueDataBrewServiceRole-trends | ▼ | | C |

By clicking "Create project" you are authorizing DataBrew to add required permissions to access all the datasets in this project to the selected service role.

ⓘ As soon as you create a DataBrew project, the project opens and costs begin to accrue to your AWS account. Pricing details [↗]

Cancel   **Create project**

4. Identify and correct inconsistencies, missing values, and anomalies in the data and perform necessary transformations like normalization, categorization, and aggregation.
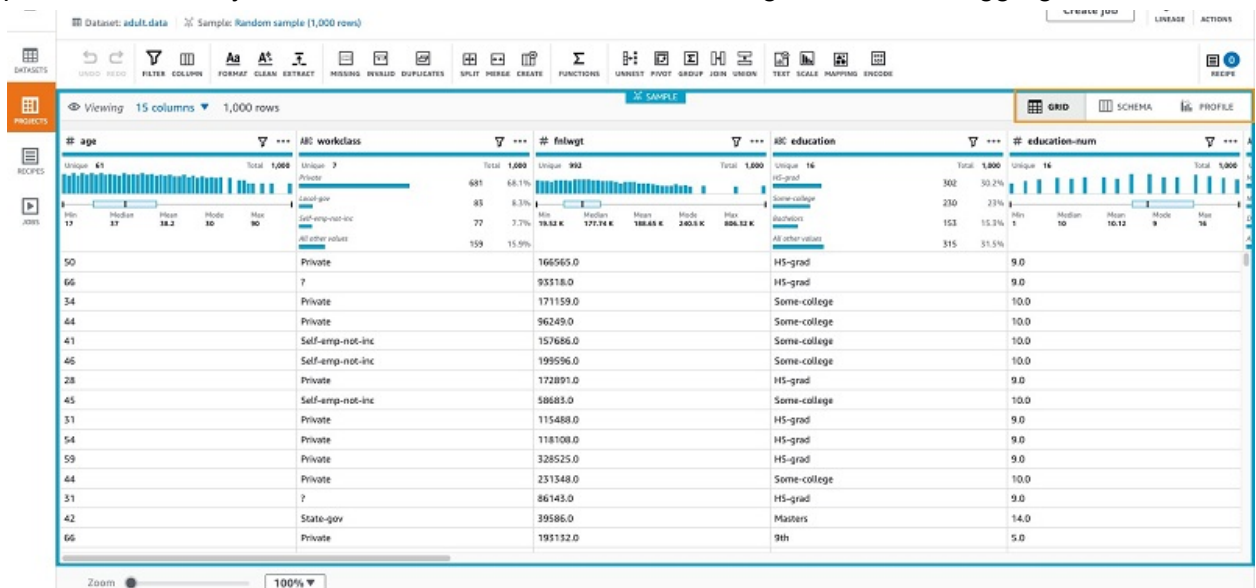
5. Save the cleaned and processed data back to AWS S3 for further analysis

STEP 4-
AWS Forecast
Amazon Forecast is a machine learning service provided by Amazon Web Services (AWS) that helps users generate accurate forecasts for various business use cases.

1. Start by creating a dataset group

2. Give a name to your forecast and select forecast domain based on the industry you are operating in

3. Make sure that the dataset you import has these three columns with the right data type as mentioned here

4. Add the s3 path where you have saved the sales file after cleaning and preprocessing

5. Add the other datasets in item metadata and related time series sections which might be useful for forecasting like price, promotion, brand, category, discounts.

6. Press 'Train Predictor' to start running the forecasting model by adding the relevant details

Predictor settings

Predictor name
The name can help you distinguish this predictor from your other predictors.

my_reinvent_predictor

The predictor name must have 1 to 63 characters. Valid characters: a-z, A-Z, 0-9, and _

Forecast configuration

Forecast frequency
This is the frequency at which your forecasts are generated.

Your forecast frequency is 1   day(s)

Time alignment boundary – *optional*
The time boundary along which data is aligned and forecasts are generated.

Choose a time alignment boundary

Forecast horizon | Info
This number tells Amazon Forecast how far into the future to predict your data at the specified forecast frequency.

10

Forecast dimensions – *optional*
Item id is used in training by default. Select additional keys you would like to use to generate a forecast. These keys are fields in your dataset.

Choose a forecast dimension

Forecast quantiles- *optional* | Info
Specify the quantiles used to create forecasts and evaluate predictors. Choose up to 5 quantiles between 0.01 and 0.99 (by increments of 0.01). You can also include the mean forecast with 'mean'.

Forecast quantile	Value	
Forecast quantile 1	0.10	Remove
Forecast quantile 2	0.50	Remove
Forecast quantile 3	0.90	Remove

7. Once the forecast is ready, press 'generate forecasts' and export the results to s3 bucket

STEP 5-
AWS QuickSight

1. For analysis, we need to first connect to datasets in S3. Go to Datasets and click on New Dataset

2. Click on S3, give the data source a name and upload your manifest file
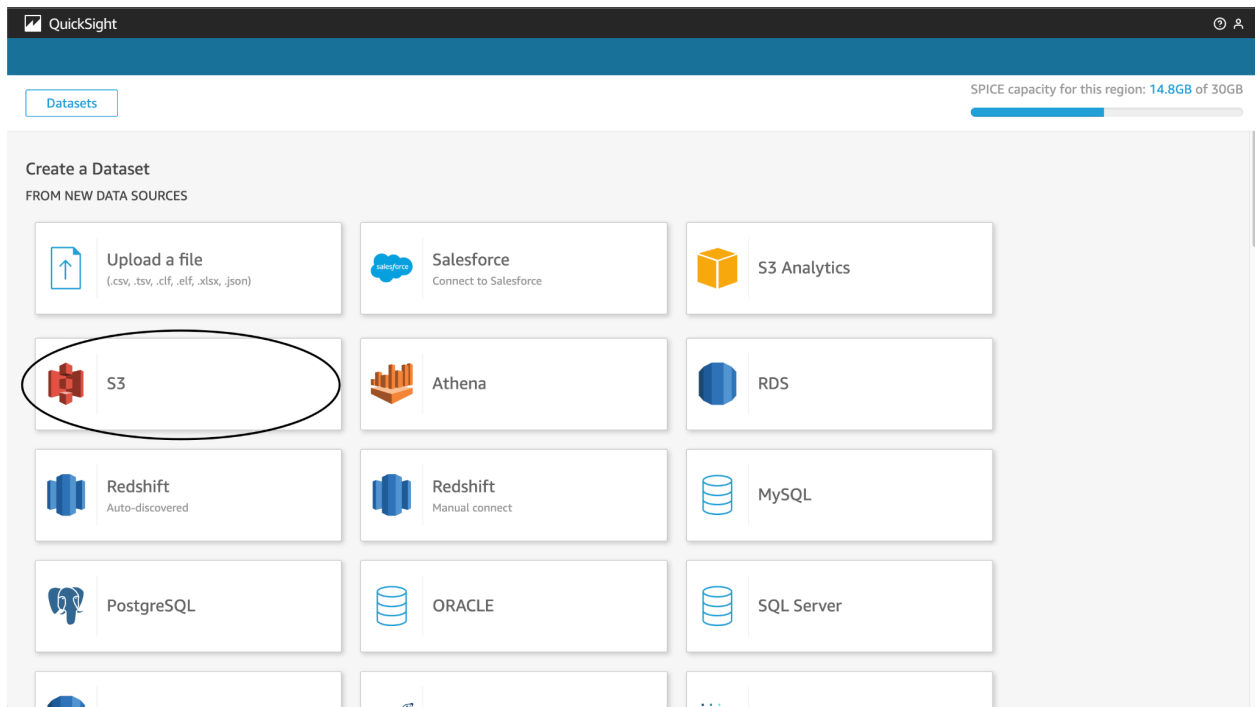
3. After the file is successfully uploaded, you can start your analysis. Go to the Analyses tab and click on your data source name. This is how your dashboard will look:
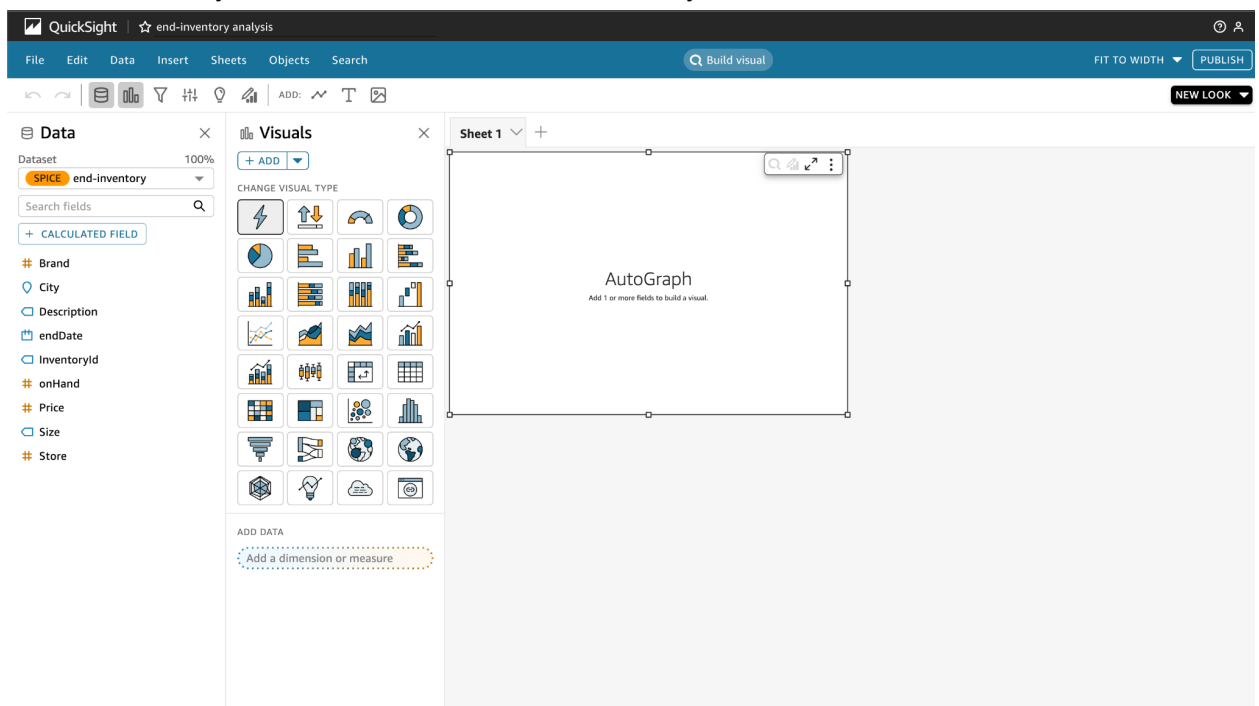
4. On the left, you can click on the data variables and select your visual. Here, for example, I have selected variables 'Description' and 'Price' to be on Horizontal bar chart
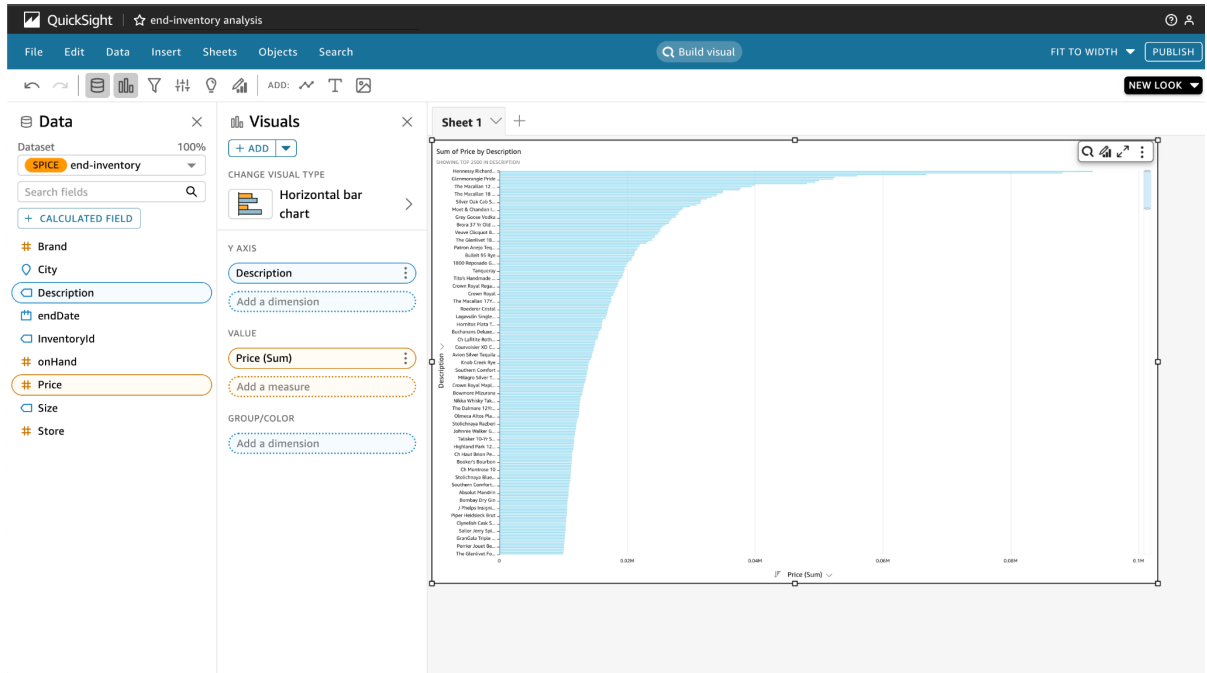
5. You can format your graph by clicking on the format visual icon on the right upper-corner of the chart. In this, you can also give your chart interaction capabilities so that it can interact with other charts in the sheet
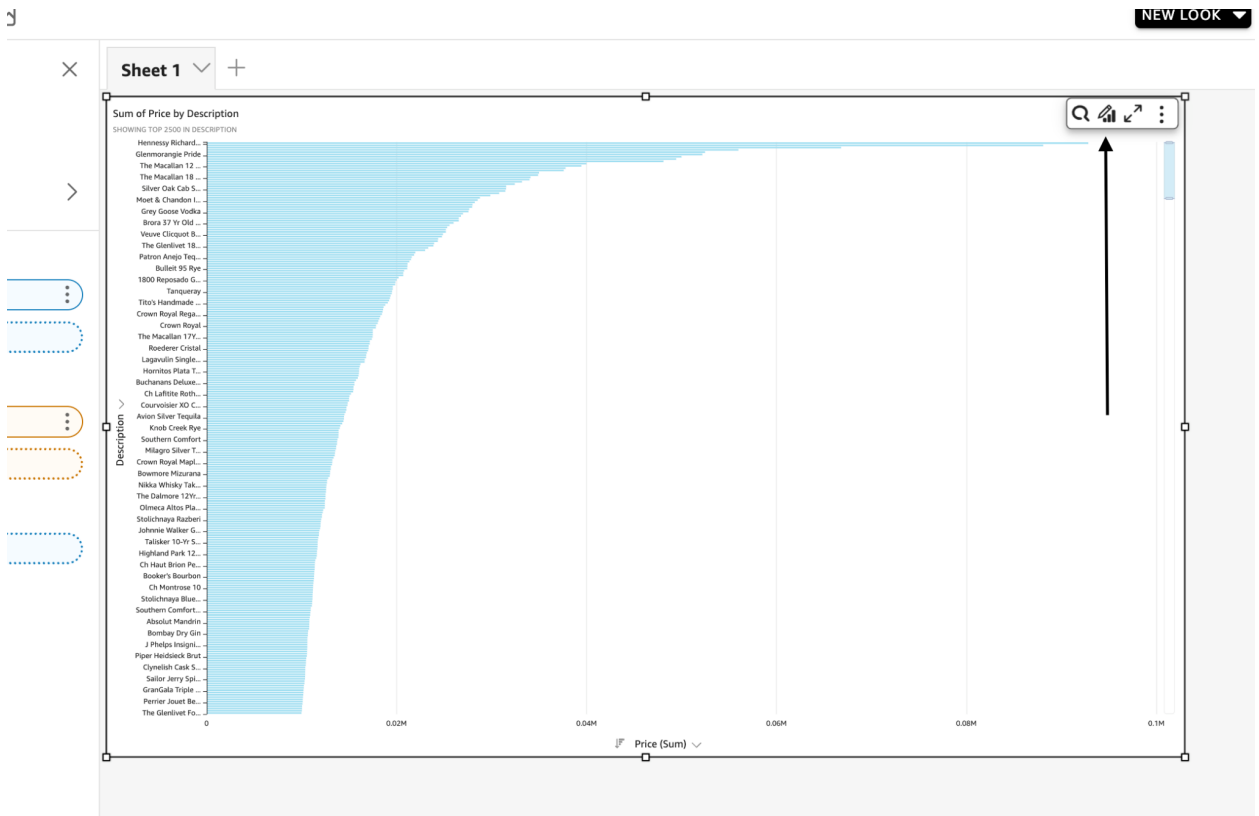
6. Similarly, by adding multiple graphs, you can create a dashboard
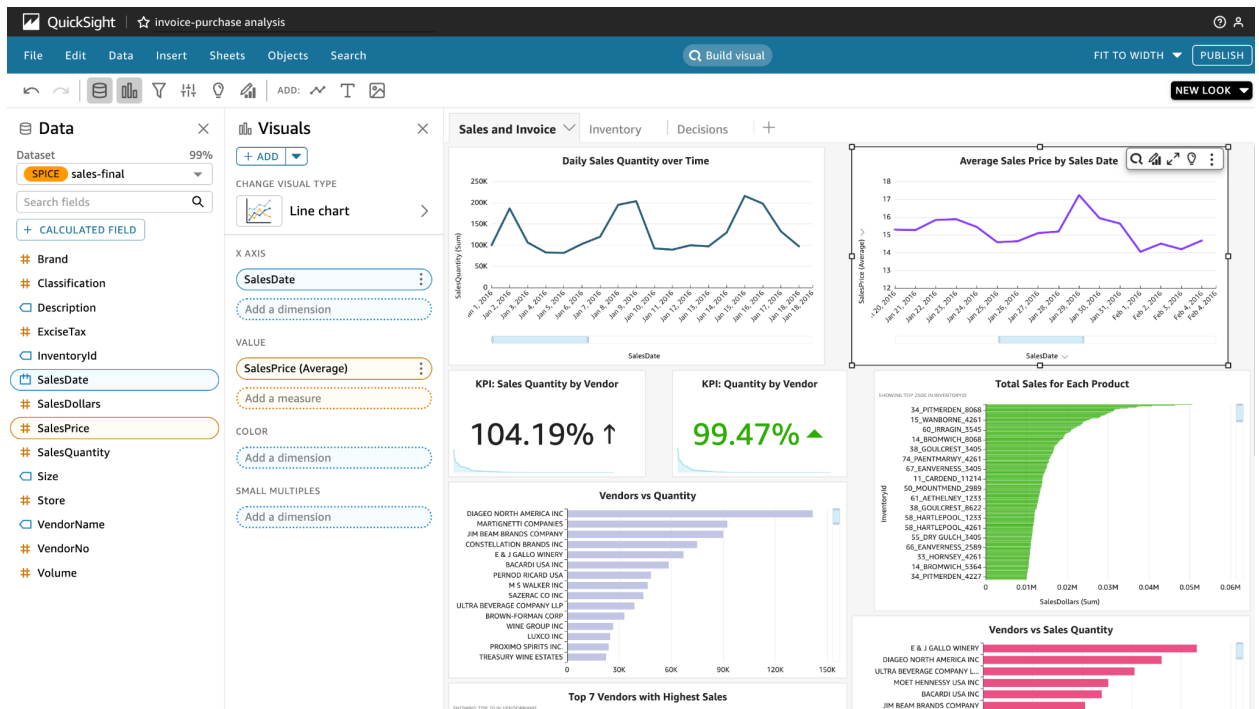
STEP 6-
AWS Lambda

Lambda job is triggered whenever a new forecast file is posted in the s3 bucket by AWS Forecast. This job is responsible for checking the products which are going to go below the set threshold and trigger an email to the concerned stakeholders reminding them to take necessary actions to restock those products.
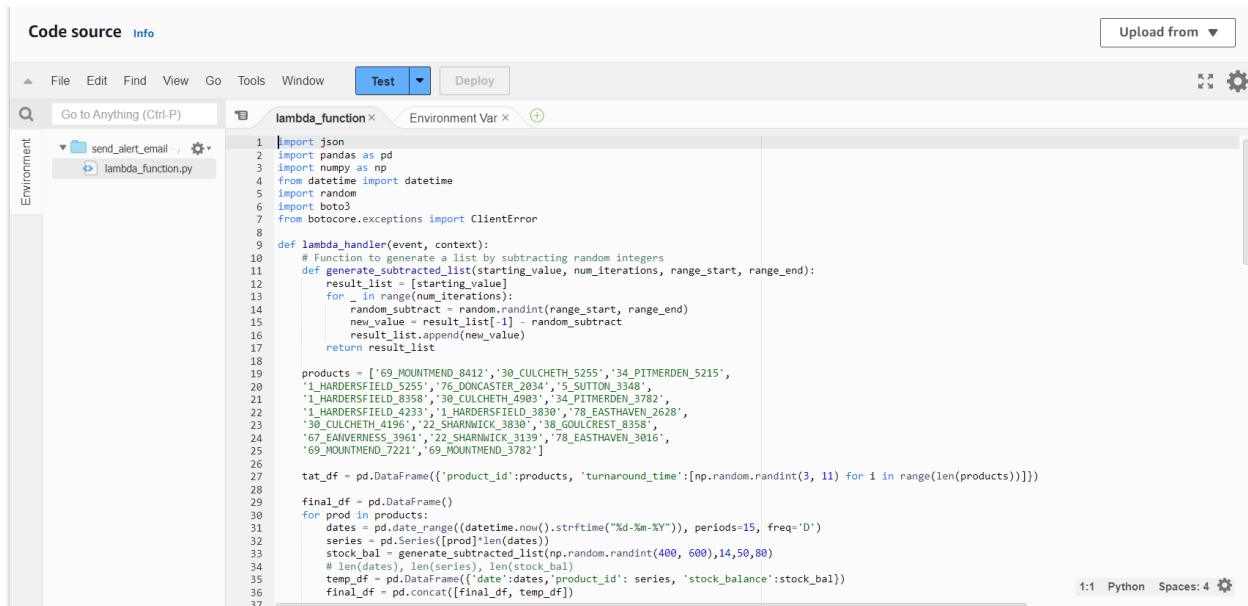
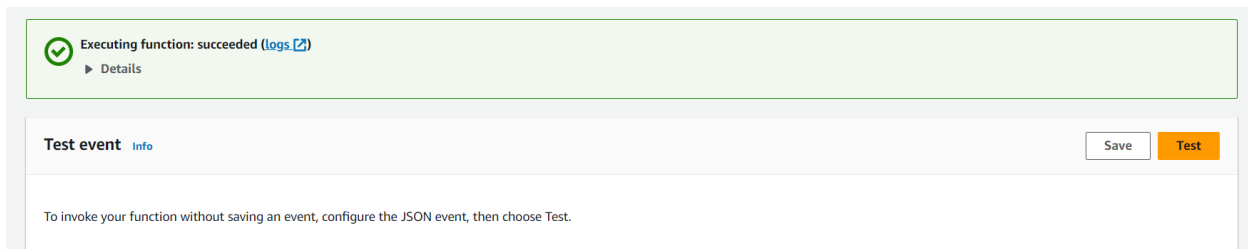1: Go to AWS Lambda Dashboard and click on functions.

2: Click on "Create Function"

3: Name the Lambda function and paste the code you want to run via the lambda function in the Code Section:

4: Go to Test section and click the Test button to test the code if it runs correctly.

STEP 7-
SES

This service is used to send emails from a registered email to other recipient emails that were registered to receive updates regarding out of stock / low-products.

1: Go to AWS SES Dashboard and click on verified identities.
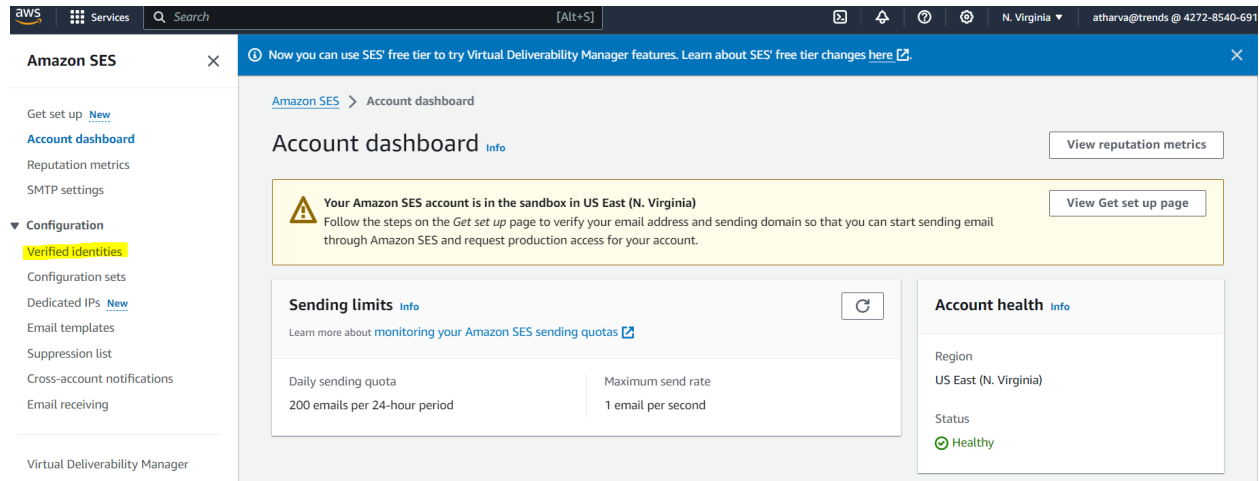
2: Click on Create Identity to register new sender/receiver email ids.
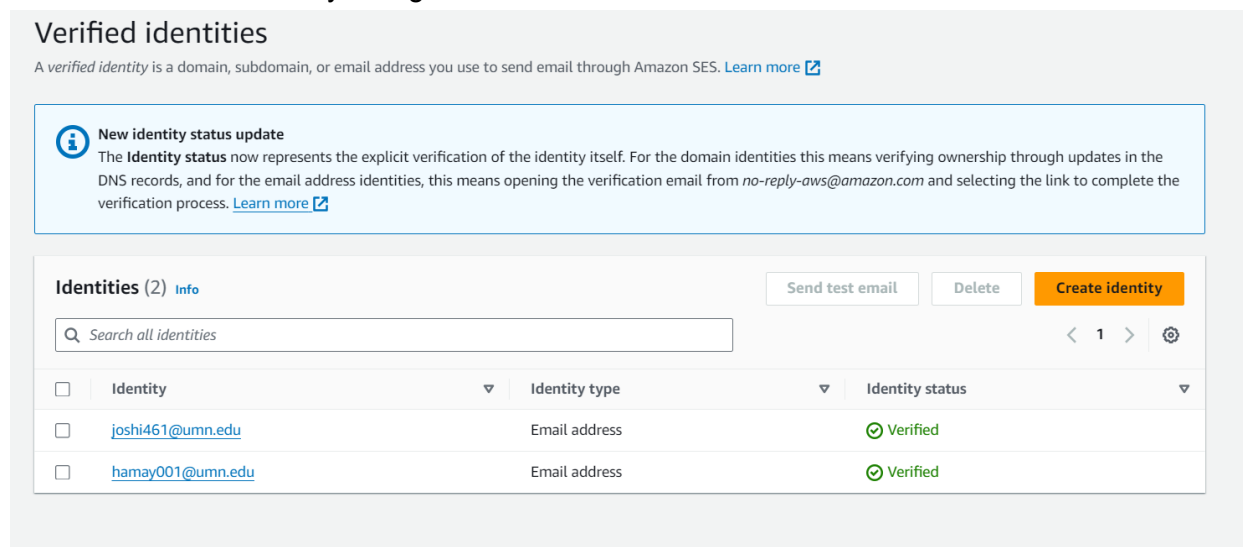
3: Click on Email Address and specify an email ID to register. Click on Create Identity. Once you click it, a confirmation email will be sent by AWS. Go to the link sent in the email to register this

email address.

Identity details Info

Identity type

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

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

Email address

Enter an email address

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

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

Tags - *optional* Info

You can add one or more tags to help manage and organize your resources, including identities.

No tags associated with the resource.

Add new tag

You can add 50 more tags.

Cancel   **Create identity**

4: Your email is registered.