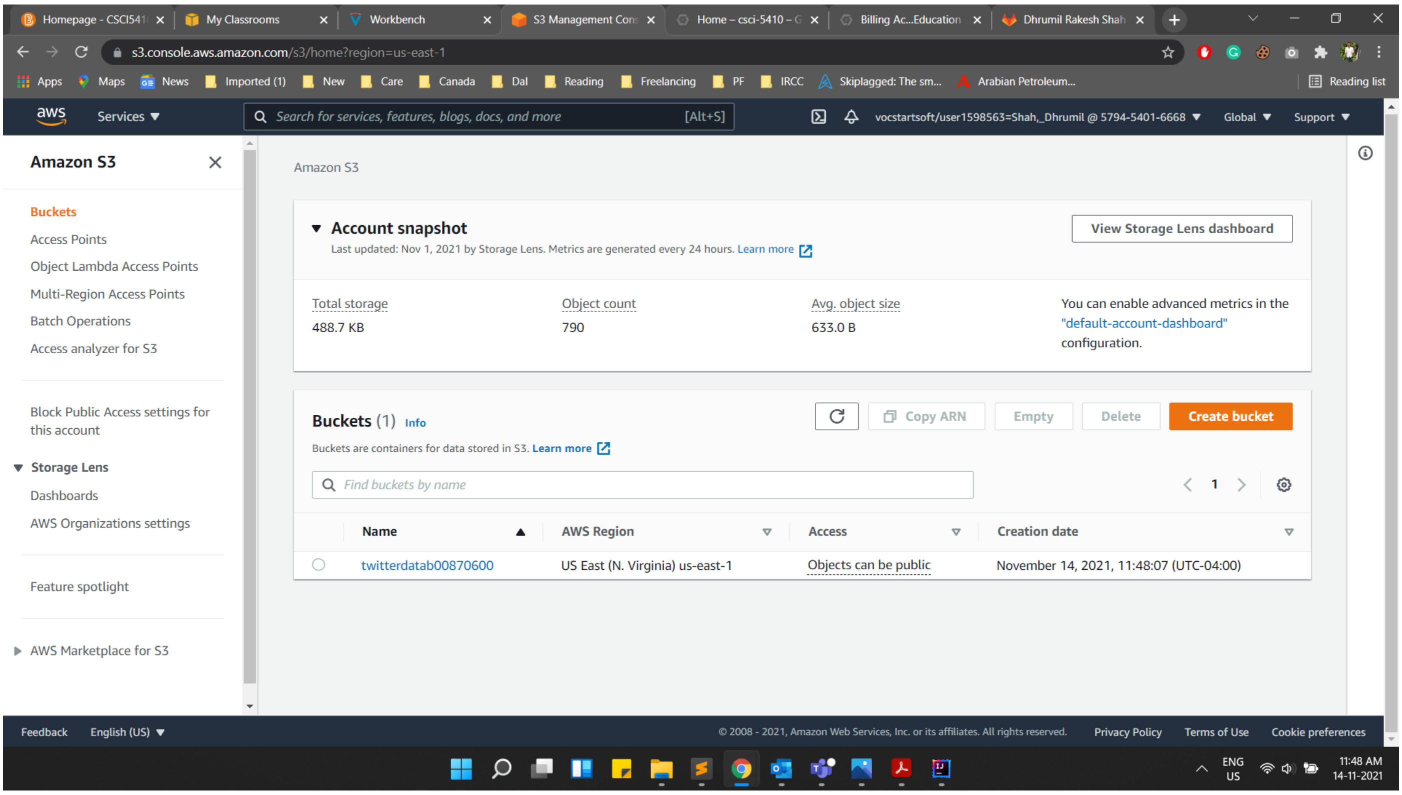
CSCI 5410: Assignment 4

Part C: Build an event-driven serverless application using AWS Comprehend.

GitLab Link: https://git.cs.dal.ca/drshah/dhrumilrakeshshah_csci5410.git



Amazon S3

Account snapshot

Last updated: Nov 1, 2021 by Storage Lens. Metrics are generated every 24 hours. Learn more

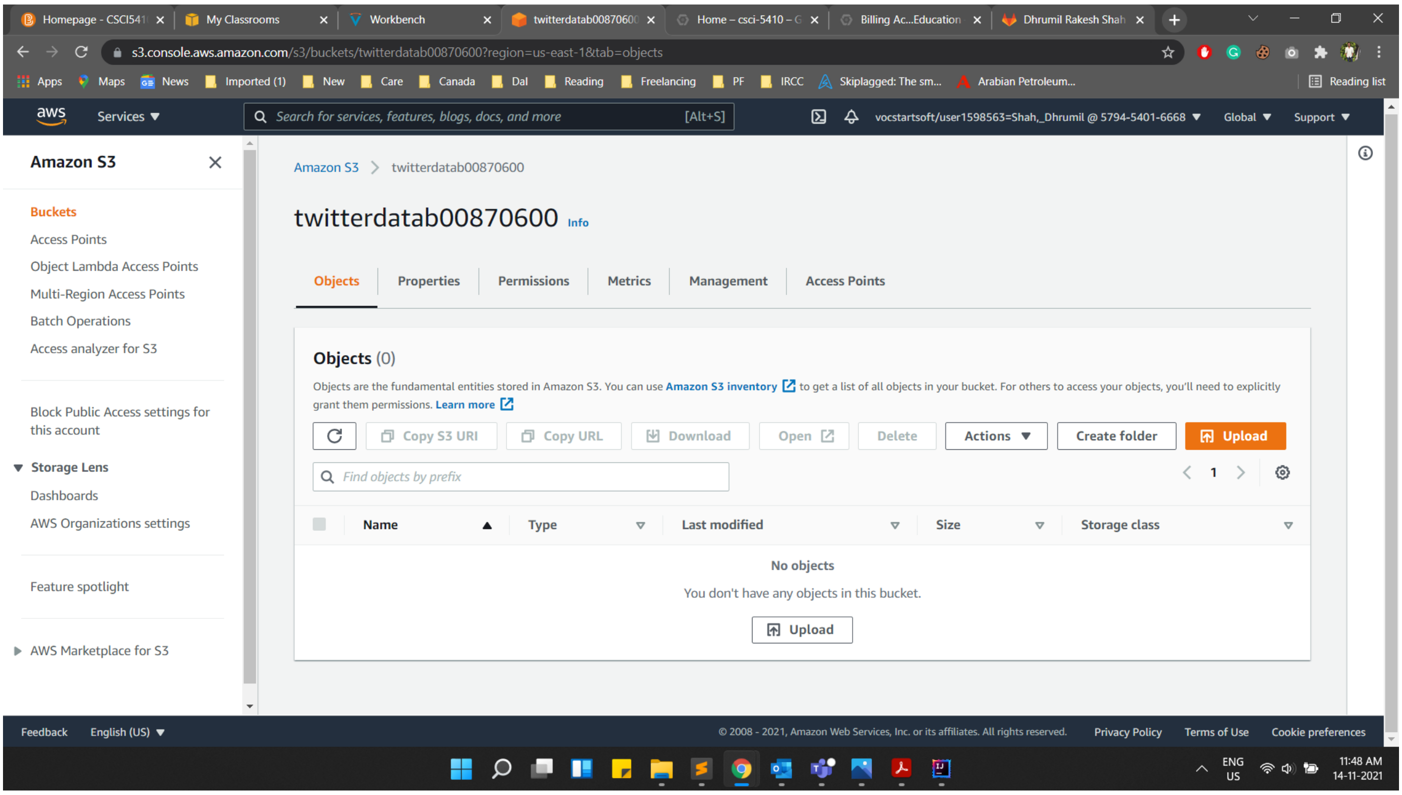
Total storage	Object count	Avg. object size	
488.7 KB	790	633.0 B	You can enable advanced metrics in the "default-account-dashboard" configuration.

Buckets (1) Info

Buckets are containers for data stored in S3. Learn more

	Name	AWS Region	Access	Creation date
○	twitterdatab00870600	US East (N. Virginia) us-east-1	Objects can be public	November 14, 2021, 11:48:07 (UTC-04:00)

Figure 1: twitterdatab00870600 Bucket is created using AWS Java SDK



twitterdatab00870600

Objects (0)

Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more

□	Name ▲	Type	Last modified	Size	Storage class

No objects

You don't have any objects in this bucket.

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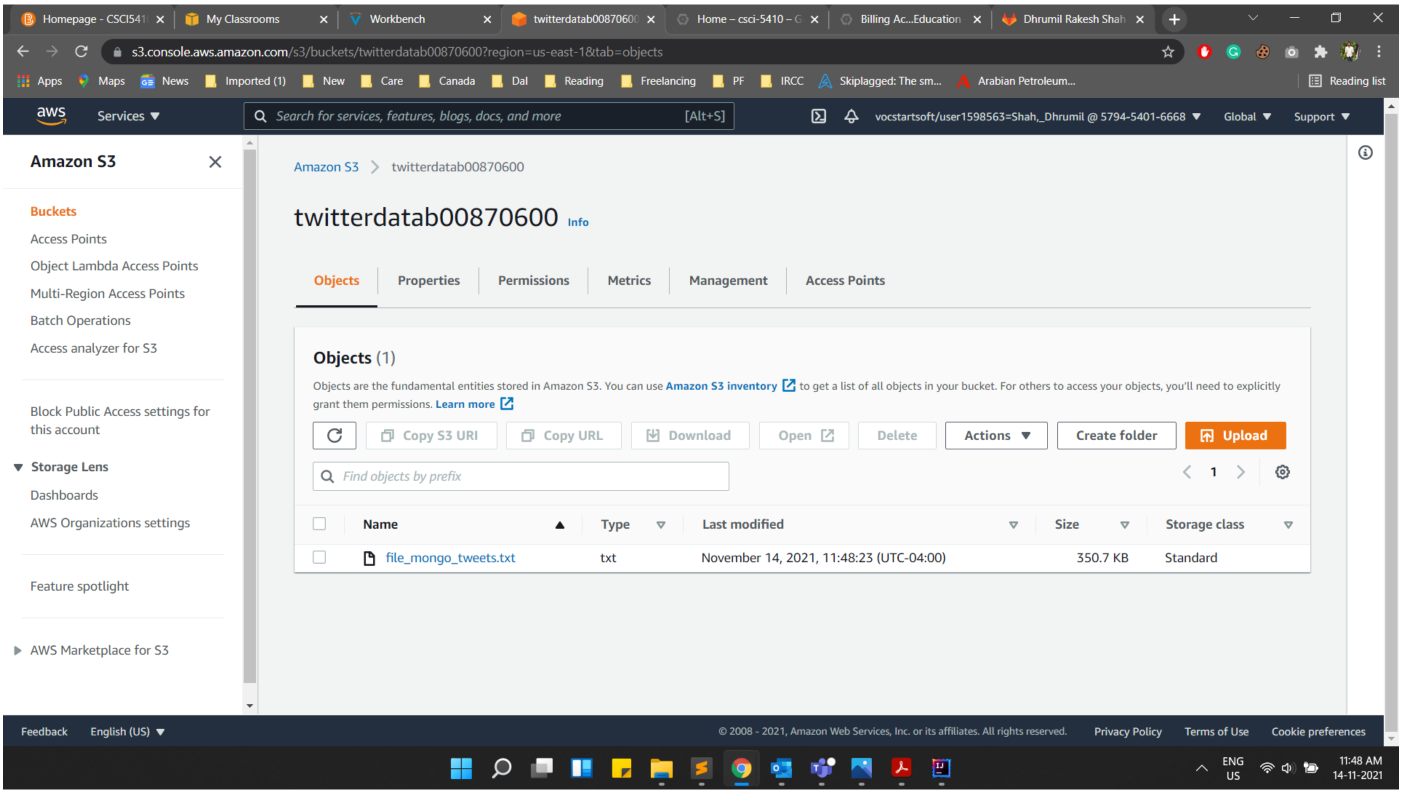
Figure 2: twitterdatab00870600 Empty Bucket



twitterdatab00870600

Objects (1)

Objects are the fundamental entities stored in Amazon S3. You can use Amazon S3 inventory to get a list of all objects in your bucket. For others to access your objects, you'll need to explicitly grant them permissions. Learn more

□	Name ▲	Type	Last modified	Size	Storage class
□	file_mongo_tweets.txt	txt	November 14, 2021, 11:48:23 (UTC-04:00)	350.7 KB	Standard

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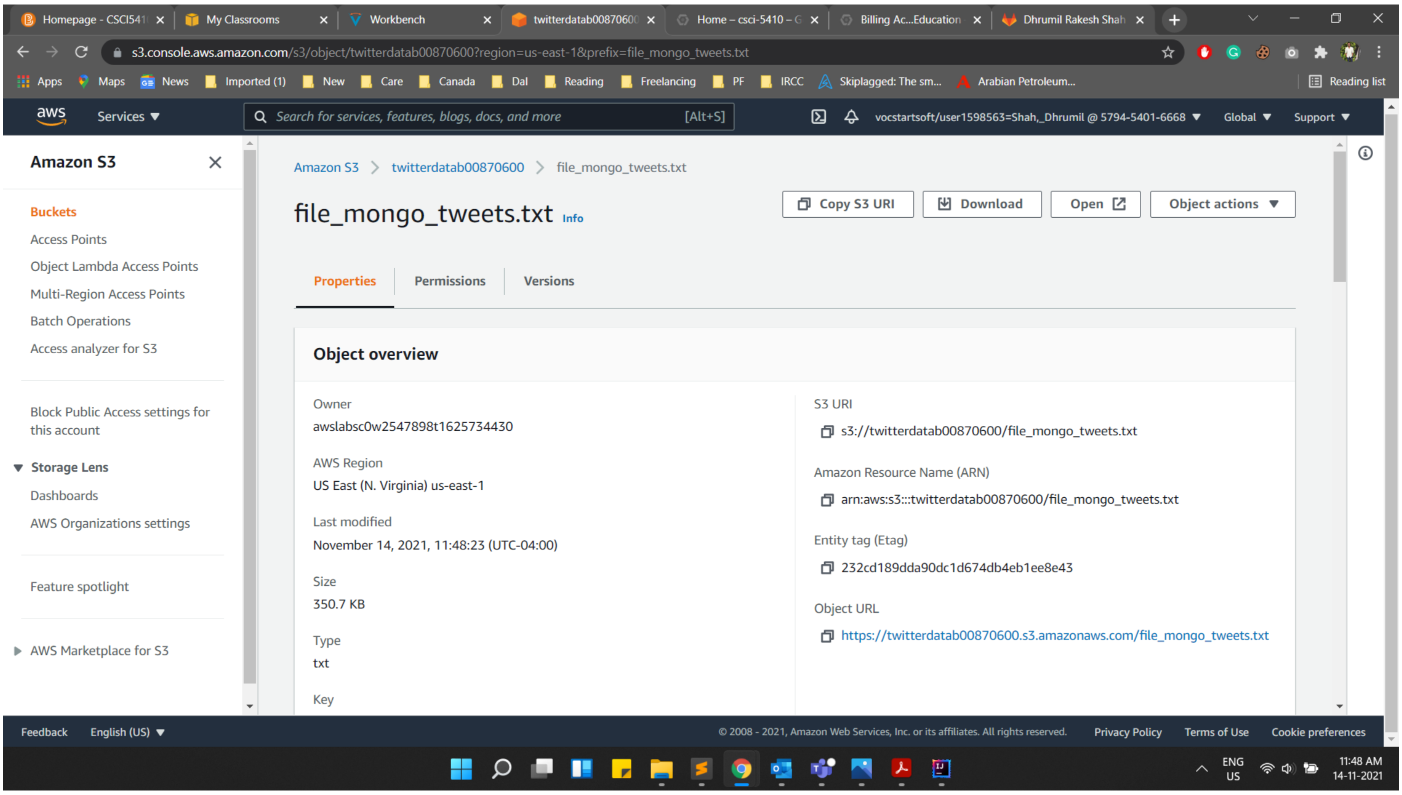
Figure 3: file_mongo_tweets.txt file uploaded to twitterdatab00870600 bucket


s3.console.aws.amazon.com/s3/object/twitterdatab00870600?region=us-east-1&prefix=file_mongo_tweets.txt
Services
Search for services, features, blogs, docs, and more [Alt+S]
vocstartsoft/user1598563=Shah,_Dhrumil @ 5794-5401-6668
Global
Support
Amazon S3
Buckets
Access Points
Object Lambda Access Points
Multi-Region Access Points
Batch Operations
Access analyzer for S3
Block Public Access settings for this account
Storage Lens
Dashboards
AWS Organizations settings
Feature spotlight
AWS Marketplace for S3
Amazon S3 > twitterdatab00870600 > file_mongo_tweets.txt
Copy S3 URI
Download
Open
Object actions
Properties
Permissions
Versions
Feedback
English (US)
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11:48 AM
14-11-2021

file_mongo_tweets.txt Info

Object overview

Owner
awslabsc0w2547898t1625734430

AWS Region
US East (N. Virginia) us-east-1

Last modified
November 14, 2021, 11:48:23 (UTC-04:00)

Size
350.7 KB

Type
txt

Key

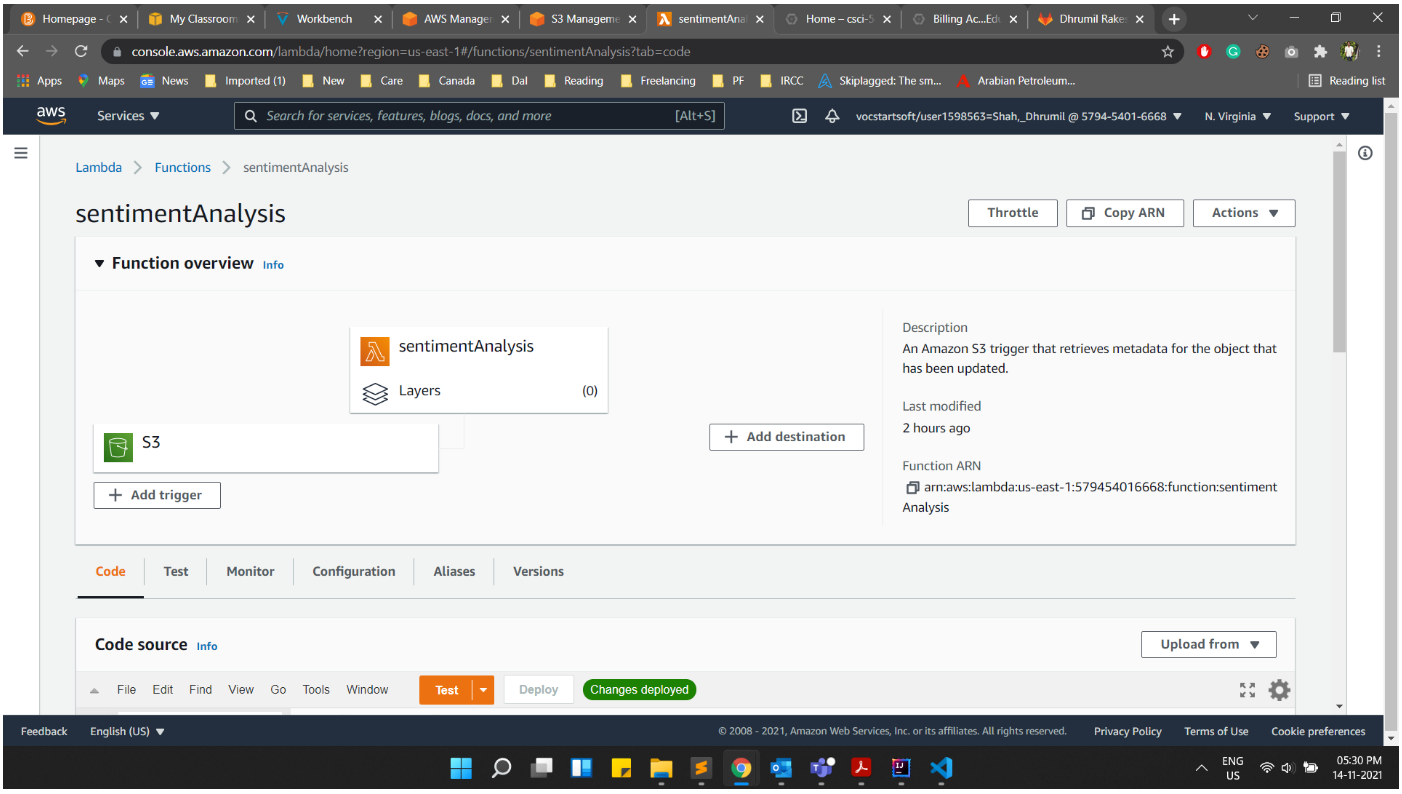
S3 URI
s3://twitterdatab00870600/file_mongo_tweets.txt

Amazon Resource Name (ARN)
arn:aws:s3:::twitterdatab00870600/file_mongo_tweets.txt

Entity tag (Etag)
232cd189dda90dc1d674db4eb1ee8e43

Object URL
https://twitterdatab00870600.s3.amazonaws.com/file_mongo_tweets.txt

Figure 4: file_mongo_tweets.txt file overview uploaded in the twitterdatab00870600 bucket


console.aws.amazon.com/lambda/home?region=us-east-1#/functions/sentimentAnalysis?tab=code
Services
Search for services, features, blogs, docs, and more [Alt+S]
vocstartsoft/user1598563=Shah,_Dhrumil @ 5794-5401-6668
N. Virginia
Support
Lambda > Functions > sentimentAnalysis
Throttle
Copy ARN
Actions
Function overview Info
sentimentAnalysis
Layers (0)
S3
Add trigger
Add destination
Code
Test
Monitor
Configuration
Aliases
Versions
Code source Info
Upload from
File Edit Find View Go Tools Window
Test
Deploy
Changes deployed
Feedback
English (US)
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Privacy Policy
Terms of Use
Cookie preferences
05:30 PM
14-11-2021

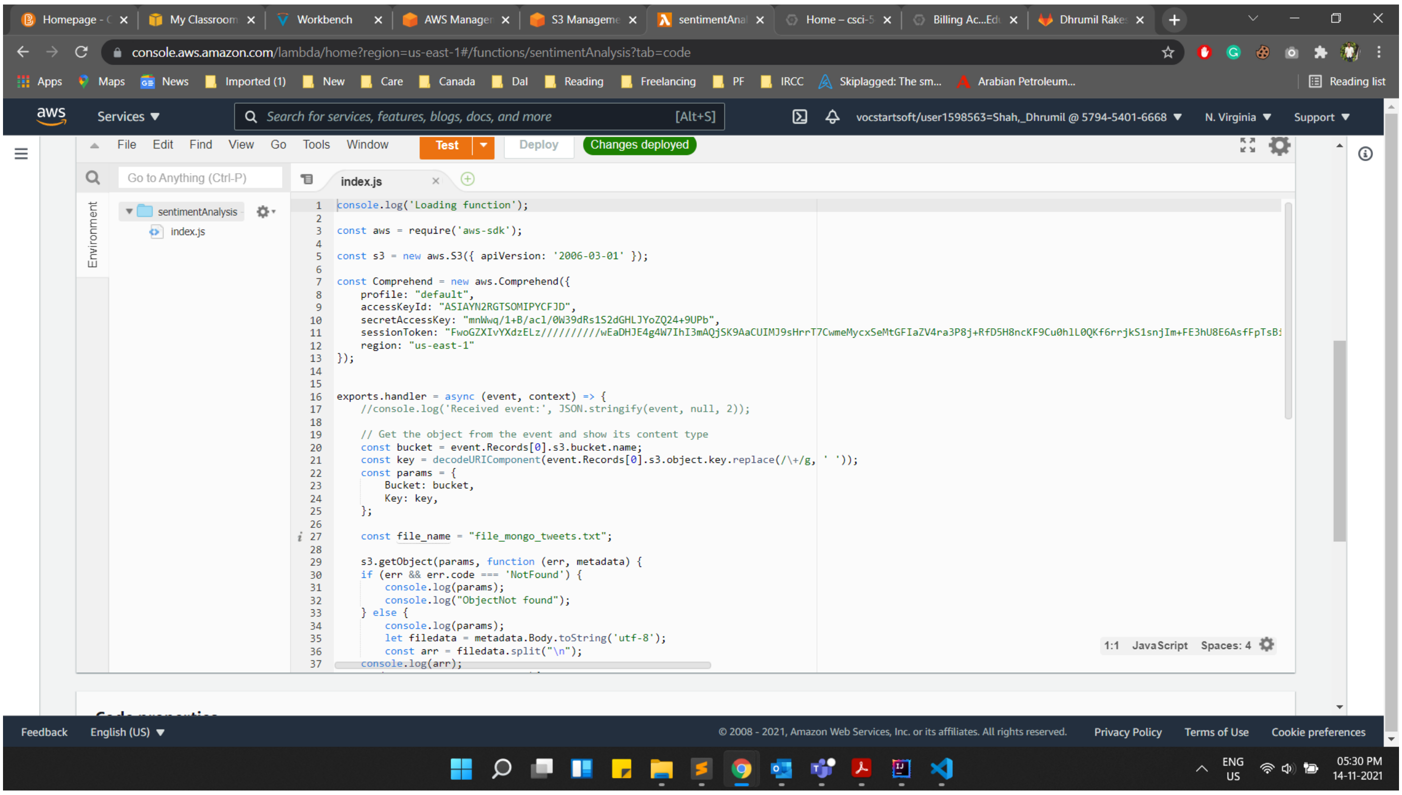
sentimentAnalysis

Description
An Amazon S3 trigger that retrieves metadata for the object that has been updated.

Last modified
2 hours ago

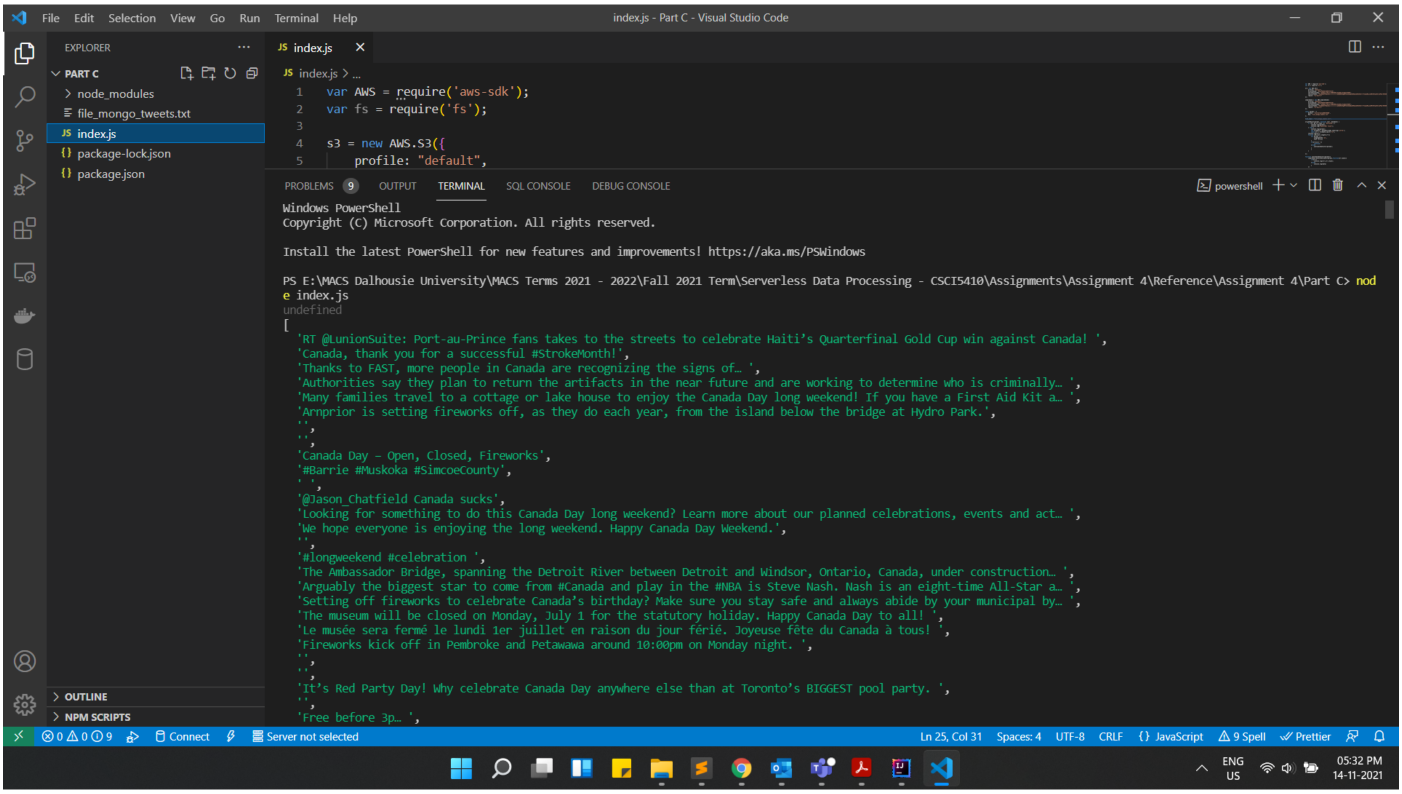
Function ARN
arn:aws:lambda:us-east-1:579454016668:function:sentimentAnalysis

Figure 5: sentimentAnalysis Lambda Function



```
console.log('Loading function');

const aws = require('aws-sdk');

const s3 = new aws.S3({ apiVersion: '2006-03-01' });

const Comprehend = new aws.Comprehend({
    profile: "default",
    accessKeyId: "ASIAYN2RGTSOMIPYCFJD",
    secretAccessKey: "mnWwq/1+B/acl/0W39dRs1S2dGHLJYoZQ24+9UPb",
    sessionToken: "FwoGZXIvYXdzELz//////////wEaDHJE4g4W7IhI3mAQjSK9AaCUIMJ9sHrrT7CwmeMycxSeMtGFIaZV4ra3P8j+RfD5H8ncKF9Cu0hlL0QKf6rrjkS1snjIm+FE3hU8E6AsfFpTsBi
    region: "us-east-1"
});


exports.handler = async (event, context) => {
    //console.log('Received event:', JSON.stringify(event, null, 2));

    // Get the object from the event and show its content type
    const bucket = event.Records[0].s3.bucket.name;
    const key = decodeURIComponent(event.Records[0].s3.object.key.replace(/\+/g, ' '));
    const params = {
        Bucket: bucket,
        Key: key,
    };

    const file_name = "file_mongo_tweets.txt";

    s3.getObject(params, function (err, metadata) {
    if (err && err.code === 'NotFound') {
        console.log(params);
        console.log("ObjectNot found");
    } else {
        console.log(params);
        let filedata = metadata.Body.toString('utf-8');
        const arr = filedata.split("\n");
    console.log(arr);
```

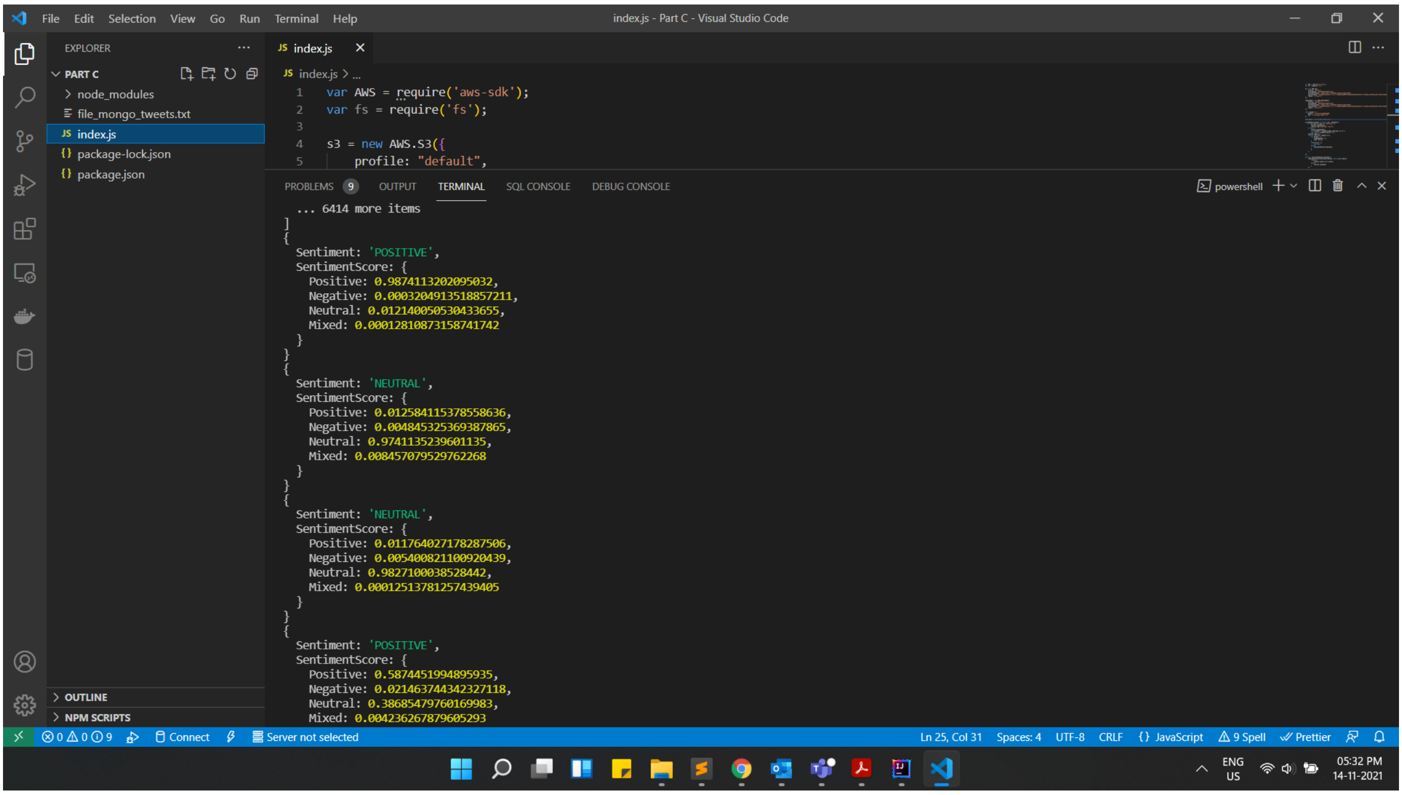
Figure 6: sentimentAnalysis Lambda Function Code



```
var AWS = require('aws-sdk');
var fs = require('fs');

s3 = new AWS.S3({
    profile: "default",
```

```
Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.

Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

PS E:\MACS Dalhousie University\MACS Terms 2021 - 2022\Fall 2021 Term\Serverless Data Processing - CSCI5410\Assignments\Assignment 4\Reference\Assignment 4\Part C> nod
e index.js
undefined
[
  'RT @LunionSuite: Port-au-Prince fans takes to the streets to celebrate Haiti’s Quarterfinal Gold Cup win against Canada! ',
  'Canada, thank you for a successful #StrokeMonth!',
  'Thanks to FAST, more people in Canada are recognizing the signs of… ',
  'Authorities say they plan to return the artifacts in the near future and are working to determine who is criminally… ',
  'Many families travel to a cottage or lake house to enjoy the Canada Day long weekend! If you have a First Aid Kit a… ',
  'Arnprior is setting fireworks off, as they do each year, from the island below the bridge at Hydro Park.',
  ''
   ,
  ''
   ,
  'Canada Day – Open, Closed, Fireworks',
  '#Barrie #Muskoka #SimcoeCounty',
  ' '
    ,
  '@Jason_Chatfield Canada sucks',
  'Looking for something to do this Canada Day long weekend? Learn more about our planned celebrations, events and act… ',
  'We hope everyone is enjoying the long weekend. Happy Canada Day Weekend.',
  ''
   ,
  '#longweekend #celebration ',
  'The Ambassador Bridge, spanning the Detroit River between Detroit and Windsor, Ontario, Canada, under construction… ',
  'Arguably the biggest star to come from #Canada and play in the #NBA is Steve Nash. Nash is an eight-time All-Star a… ',
  'Setting off fireworks to celebrate Canada’s birthday? Make sure you stay safe and always abide by your municipal by… ',
  'The museum will be closed on Monday, July 1 for the statutory holiday. Happy Canada Day to all! ',
  'Le musée sera fermé le lundi 1er juillet en raison du jour férié. Joyeuse fête du Canada à tous! ',
  'Fireworks kick off in Pembroke and Petawawa around 10:00pm on Monday night. ',
  ''
   ,
  ''
   ,
  'It’s Red Party Day! Why celebrate Canada Day anywhere else than at Toronto’s BIGGEST pool party. ',
  ''
   ,
  'Free before 3p… ',
```

Figure 7: sentimentAnalysis Lambda Function Output 1



```
var AWS = require('aws-sdk');
var fs = require('fs');

s3 = new AWS.S3({
    profile: "default",
```

```
  ... 6414 more items
]
{
  Sentiment: 'POSITIVE',
  SentimentScore: {
    Positive: 0.9874113202095032,
    Negative: 0.0003204913518857211,
    Neutral: 0.012140050530433655,
    Mixed: 0.00012810873158741742
  }
}
{
  Sentiment: 'NEUTRAL',
  SentimentScore: {
    Positive: 0.012584115378558636,
    Negative: 0.004845325369387865,
    Neutral: 0.9741135239601135,
    Mixed: 0.008457079529762268
  }
}
{
  Sentiment: 'NEUTRAL',
  SentimentScore: {
    Positive: 0.011764027178287506,
    Negative: 0.005400821100920439,
    Neutral: 0.9827100038528442,
    Mixed: 0.00012513781257439405
  }
}
{
  Sentiment: 'POSITIVE',
  SentimentScore: {
    Positive: 0.5874451994895935,
    Negative: 0.021463744342327118,
    Neutral: 0.38685479760169983,
    Mixed: 0.004236267879605293
```

Figure 8: sentimentAnalysis Lambda Function Output 2 in JSON Format

index.js script (sentimentAnalysis Lambda Function Code Snippet)

```
var AWS = require('aws-sdk');
var fs = require('fs');

s3 = new AWS.S3({
    profile: "default",
    accessKeyId: "ASIAYN2RGTSOMIPYCFJD",
    secretAccessKey: "mnWwq/1+B/acl/0W39dRs1S2dGHLJYoZQ24+9UPb",
    sessionToken:
"FwoGZXIvYXdzELz//////////wEaDHJE4g4W7IhI3mAQjSK9AaCUIMJ9sHrrT7CwmeMycxSeMtGFIaZV4ra3P8j+R
fD5H8ncKF9Cu0hlL0QKf6rrjkS1snjIm+FE3hU8E6AsfFpTsBiiieRtIVtmcZh+3oIT0ncUfLNRXW9eaQusTAeokEW
gJBaJh0FjFM4NTsKotTAr7zHJ3l8nYYgWIEFchLpx3FTRY+BvHmo9kO4hQQruuRrw2MgMCq280dwCCOuJ9r5B5ZNJv
+mNIsPeVZHeCSzcHLaN+0k25jxC9af8WCjYr8WMBjItBS05TjaD5g4JrBLdJBM5eNssaO3GHAt5Qf4GKAxKw/tdWAC
FeyAigPvErx4a",
    region: "us-east-1"
});

comprehend = new AWS.Comprehend({
    profile: "default",
    accessKeyId: "ASIAYN2RGTSOMIPYCFJD",
    secretAccessKey: "mnWwq/1+B/acl/0W39dRs1S2dGHLJYoZQ24+9UPb",
    sessionToken:
"FwoGZXIvYXdzELz//////////wEaDHJE4g4W7IhI3mAQjSK9AaCUIMJ9sHrrT7CwmeMycxSeMtGFIaZV4ra3P8j+R
fD5H8ncKF9Cu0hlL0QKf6rrjkS1snjIm+FE3hU8E6AsfFpTsBiiieRtIVtmcZh+3oIT0ncUfLNRXW9eaQusTAeokEW
gJBaJh0FjFM4NTsKotTAr7zHJ3l8nYYgWIEFchLpx3FTRY+BvHmo9kO4hQQruuRrw2MgMCq280dwCCOuJ9r5B5ZNJv
+mNIsPeVZHeCSzcHLaN+0k25jxC9af8WCjYr8WMBjItBS05TjaD5g4JrBLdJBM5eNssaO3GHAt5Qf4GKAxKw/tdWAC
FeyAigPvErx4a",
    region: "us-east-1"
});

const params = {
    Bucket: 'twitterdatab00870600',
    Key: 'file_mongo_tweets.txt'
};

file_name = "file_mongo_tweets.txt";

s3.getObject(params, function (err, metadata) {
    if (err && err.code === 'NotFound') {
        console.log(params);
        console.log("ObjectNot found");
    } else {
        console.log(params);
        let filedata = metadata.Body.toString('utf-8');
        const arr = filedata.split("\n");
    console.log(arr);
    for(let i=0;i<arr.length;i++){
        var params = {
            LanguageCode:'en',
            Text: arr[i]
        }
        if(arr[i]==''){
            continue;
        }else{
            sentimentdetector(params);
        }
        }
    }

});

function sentimentdetector(params){
    comprehend.detectSentiment(params,function(err,data){
        if(err){
            console.log(err,err.stack);
        }else{
            console.log(data)
        }
    })
}
```

Java Code to Create the S3 Bucket and Upload the File

Main.java

```java
import com.amazonaws.services.s3.AmazonS3;

import java.util.Scanner;

/**
 * Author: Dhrumil Rakesh Shah
 * Version: 1.0
 * Class: The Main class containing the boilerplate code of AWS SDK for Java
 * for Assignment 4
 */
public class Main {
  // The driver method
  public static void main(String[] args) {

    try {
      // Instantiating the Scanner object to read user input
      Scanner sc = new Scanner(System.in);

      // Declaring & Initializing the choice to 0 that stores the
      // choice made by the user
      int choice = 0;

      String fileName = "file_mongo_tweets.txt";

      S3Task s3TaskObject = new S3Task();

      AmazonS3 s3Object = s3TaskObject.getConnection();

      // Looping through the menu
      while (choice != -1) {
        System.out.println("Choose any of the below tasks.");
        System.out.println("1. Create a new bucket.");
        System.out.println("2. Upload the tweets file to the " +
            "twitterdatab00870600 bucket.");
        System.out.println("3. Exit.");

        // Reading the user entered choice
        choice = sc.nextInt();

        // Switching through the different choices
        switch (choice) {
          // Creating a new bucket
          case 1:
            s3TaskObject.createBucket("twitterdatab00870600", s3Object);
            break;
          case 2:
            // Uploading the file to the created bucket
            s3TaskObject.fileUploadToS3Bucket(s3Object, fileName,
                "twitterdatab00870600");
            break;
          case 3:
            // Exiting the application
            System.exit(0);
          default:
            // Default switch case
            System.out.println("Enter a valid option.");
            break;
        }
      }
    } catch (Exception e) {
      System.out.println(e.getMessage());
    }
  }
}
```

S3Task.java

```
import com.amazonaws.auth.AWSStaticCredentialsProvider;
import com.amazonaws.auth.BasicSessionCredentials;
import com.amazonaws.regions.Regions;
import com.amazonaws.services.s3.AmazonS3;
import com.amazonaws.services.s3.AmazonS3ClientBuilder;

import java.io.File;

/**
 * Author: Dhrumil Rakesh Shah
 * Version: 1.0
 * Class: The AWS SDK for Java helper class
 */
public class S3Task {

  // The method to get connection object of the AWS account
  public AmazonS3 getConnection() {

    // Storing the AWS credentials to establish the connection
    BasicSessionCredentials sessionCredentials = new BasicSessionCredentials(
        "ASIAYN2RGTSOCFYC5PB7",
        "ECRW41KLbKOJCisVIJGJ7gRO3MqRjj7MCYTPvNG6",
        "FwoGZXIvYXdzEL7//////////wEaDAPLDINS8X9b3Yl2kiK9AfBQe8LP" +
            "1e/v7N9QRogfsC9khyBL5vvLuXqo66Ye3tBpMfs916BrOmvkWnP3a57liTkxY4g" +
            "bQF4NLUpDTUnKtXnvk8XIkb886FfFeRAjIACvsmELndeBR74X2csdS0wuo3kXY/" +
            "RPVF/0reWIKFlORqVDk57DZP8h4Fca5/NB8xKk3lO4U9f4otkJw1l0PPdwkwGyqF" +
            "3GD/kwM4TQOnJWpb1lRqICCl/wMdm6otBZnF2N46iDOR/3hFJCC84yWyjP4sWMBj" +
            "ItmmHhhBaw9yHv1HWzF0LLXMYcP93uQEIts3gwkeyhkqivRRoDEs0E6mkiOOy+");

    // Establishing connection with the Amazon S3 service
    // and storing it in the s3Object
    AmazonS3 s3Object = AmazonS3ClientBuilder.standard().withCredentials(
            new AWSStaticCredentialsProvider(sessionCredentials))
        .withRegion(Regions.US_EAST_1)
        .build();

    // Returning the s3Object
    return s3Object;
  }

  // The public method to create a new S3 bucket
  public void createBucket(String bucketName, AmazonS3 s3Object) {
    try {
      // Creating a new S3 bucket using the s3Object
      s3Object.createBucket(bucketName);

      // Printing to the console
      System.out.format("A new bucket '%s' is created.\n", bucketName);

      // Catching the exception
    } catch (Exception e) {
      System.err.println(e.getMessage());
    }
  }

  // The public method to upload multiple files to a S3 bucket
  public void fileUploadToS3Bucket(AmazonS3 s3Object, String fileName,
                                   String bucketName) {
    try {
      // Creating a new file with the passed fileName
      File file = new File(fileName);

      // Uploading the file to the S3 bucket
      s3Object.putObject(bucketName, fileName, file);

      // Printing to the console
      System.out.format("The file '%s' is pushed to the '%s' bucket \n",
          fileName, bucketName);

      // Catching the exception
    } catch (Exception e) {
      System.err.println(e.getMessage());
    }
  }
}
```

pom.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0
http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>

    <groupId>org.example</groupId>
    <artifactId>a4serverless</artifactId>
    <version>1.0-SNAPSHOT</version>
    <dependencies>
        <dependency>
            <groupId>com.amazonaws</groupId>
            <artifactId>aws-java-sdk-core</artifactId>
            <version>1.12.107</version>
        </dependency>
        <dependency>
            <groupId>com.amazonaws</groupId>
            <artifactId>aws-java-sdk-s3</artifactId>
            <version>1.12.107</version>
        </dependency>
    </dependencies>

    <properties>
        <maven.compiler.source>8</maven.compiler.source>
        <maven.compiler.target>8</maven.compiler.target>
    </properties>

</project>
```