

# CSCI 5401 Assignment 1, Part 2

Submitted by Adesh Nalpet Adimurthy; B00886154

---

## 1. Flow Chart

Flow chart of sequence of operations performed to create a file, bucket and upload the file.

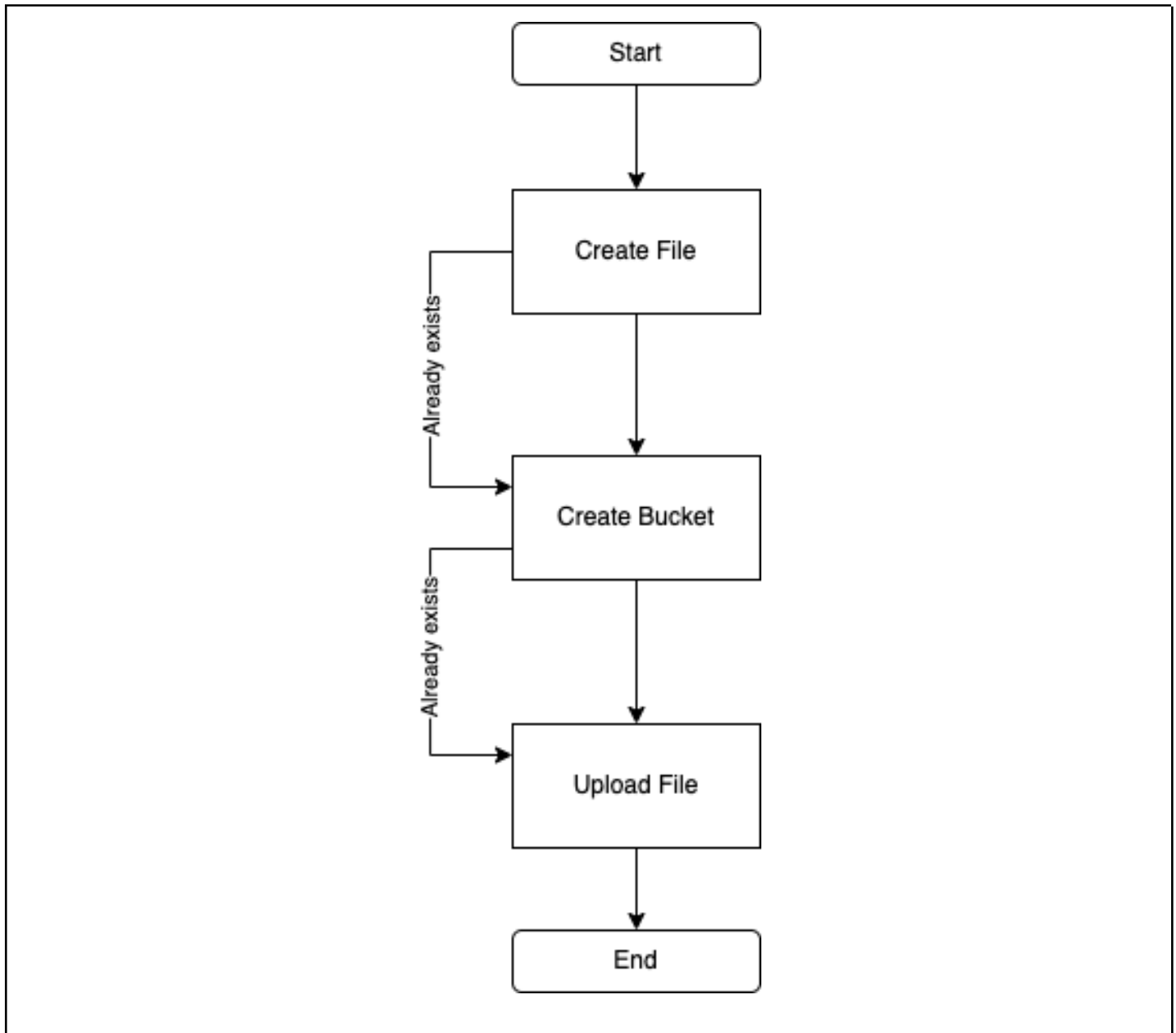


Figure 1: S3 File upload flowchart.

## 2. Java SDK Observations

The Java AWS SDK makes it easy to use AWS services programmatically and offers integration with a wide range of services. Not to mention, the APIs have built-in serialization, retries, credential management, and error handling. The Java SDK also empowers developers to create an abstraction over the library for better flexibility in switching between services. More importantly, the library is open source and has a solid community to enhance, support, and maintain the code-base.

The documentation is precise with code snippets, leading to a low learning curve in using the SDK. The migration across versions is also seamless, and certain scenarios allow hybrid versions. Furthermore, the features do not end with bare bone interaction with AWS services; for instance, when the query result returns a vast dataset, pagination is built-in to use an iterator to get the results in batches with an offset.

The integration with AWS S3 for part-2 of the assignments was easy with the maven project management tool, leading to a time of development of minutes, which otherwise would have taken a lot longer considering the need for API integration and handling edge cases.

Lastly, to give a quick overview of the usage, it's necessary to generate an Access and Secret key or use a role with the required roles (the S3 buckets policy makes it easier for access control of buckets/files), define the region of the service used in the AWS account, and most services offer the builder creational pattern to create the request objects.

### 3. Screenshots of the S3 buckets and operations

The screenshot shows the Amazon S3 Buckets page. At the top, there's a breadcrumb trail: Amazon S3 > Buckets. Below this, there's an 'Account snapshot' section with a 'View Storage Lens dashboard' button. The snapshot text says: 'Last updated: May 4, 2022 by Storage Lens. Metrics are generated every 24 hours. [Learn more](#)'. Below the snapshot, there's a table with four columns: 'Total storage', 'Object count', 'Avg. object size', and a note. The data is: 5.3 MB, 202, 27.0 KB, and 'You can enable advanced metrics in the ["default-account-dashboard"](#) configuration.' Below this, there's a 'Buckets (1)' section with an 'Info' link and a 'Learn more' link. It includes a search bar 'Find buckets by name' and a table with columns: Name, AWS Region, Access, and Creation date. The table has one row for bucket 'a1-5410' in the 'Canada (Central) ca-central-1' region, with access 'Objects can be public' and creation date 'May 26, 2022, 14:32:05 (UTC-03:00)'. Above the table are buttons: Refresh, Copy ARN, Empty, Delete, and Create bucket.

Amazon S3 > Buckets

▼ **Account snapshot** [View Storage Lens dashboard](#)

Last updated: May 4, 2022 by Storage Lens. Metrics are generated every 24 hours. [Learn more](#)

Total storage	Object count	Avg. object size	
5.3 MB	202	27.0 KB	You can enable advanced metrics in the <a href="#">"default-account-dashboard"</a> configuration.

**Buckets (1)** [Info](#) [Learn more](#)

Buckets are containers for data stored in S3. [Learn more](#)

Find buckets by name

	Name ▲	AWS Region ▼	Access ▼	Creation date ▼
<input type="radio"/>	<a href="#">a1-5410</a>	Canada (Central) ca-central-1	<a href="#">Objects can be public</a>	May 26, 2022, 14:32:05 (UTC-03:00)

Figure 2: S3 Bucket creation

The screenshot shows the Amazon S3 bucket 'a1-5410' page. The breadcrumb trail is: Amazon S3 > Buckets > a1-5410. The bucket name 'a1-5410' is at the top with an 'Info' link. Below this, there are tabs: Objects (selected), Properties, Permissions, Metrics, Management, and Access Points. The 'Objects (1)' section has a description: '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](#)'. Below the description, there are buttons: Refresh, Copy S3 URI, Copy URL, Download, Open, Delete, Actions, and Create folder. There's also an 'Upload' button. Below the buttons, there's a search bar 'Find objects by prefix' and a table with columns: Name, Type, Last modified, Size, and Storage class. The table has one row for the file 'adesht.txt' of type 'txt', last modified 'May 26, 2022, 14:37:49 (UTC-03:00)', size '0 B', and storage class 'Standard'.

Amazon S3 > Buckets > a1-5410

**a1-5410** [Info](#)

**Objects** | Properties | Permissions | Metrics | Management | Access Points

**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](#)

[Refresh](#) [Copy S3 URI](#) [Copy URL](#) [Download](#) [Open](#) [Delete](#) [Actions](#) [Create folder](#)

[Upload](#)

Find objects by prefix

	Name ▲	Type ▼	Last modified ▼	Size ▼	Storage class ▼
<input type="checkbox"/>	<a href="#">adesht.txt</a>	txt	May 26, 2022, 14:37:49 (UTC-03:00)	0 B	Standard

Figure 2: File uploaded to S3 Bucket.

[Amazon S3](#) > [Buckets](#) > [a1-5410](#) > [adesh.txt](#)

adesh.txt

Info

Copy S3 URI

Download

Open

Object actions

Properties

Permissions

Versions

Object overview

Owner

f8de34a7227af474b89ee139917a1e67f63155fae5277204e42bc611d751076e

AWS Region

Canada (Central) ca-central-1

Last modified

May 26, 2022, 16:32:51 (UTC-03:00)

Size

-

Type

txt

Key

adesh.txt

S3 URI

s3://a1-5410/adesh.txt

Amazon Resource Name (ARN)

arn:aws:s3:::a1-5410/adesh.txt

Entity tag (Etag)

d41d8cd98f00b204e9800998ecf8427e

Object URL

<https://a1-5410.s3.ca-central-1.amazonaws.com/adesh.txt>

Figure 3: File details in S3 Bucket

Successfully emptied bucket "a1-5410"  
View details below. If you want to delete this bucket, use the [delete bucket configuration](#).

Empty bucket: status

Cancel

Exit

The details below are no longer available after you navigate away from this page.

Summary

Source

s3://a1-5410

Successfully deleted

1 object

Failed to delete

0 objects

Failed to delete (0)

Find objects by name

< 1 >

Name

Prefix

Version ID

Type

Last modified

Size

Error

No failed object deletions

Figure 3: Emptied bucket after completing the assignment, followed by deletion

## 4. Code snippets

A generic S3 Class with public methods to create-file, create-bucket and upload-file to the bucket. The AWS credentials are stored in environment variables instead of a credential file.

```
public class S3 {
    private AmazonS3 s3client;

    public S3() {
        AWSCredentials credentials = new
BasicAWSCredentials(System.getenv("AWS_ACCESS_KEY"), System.getenv("AWS_SECRET_KEY"));
        this.s3client = AmazonS3ClientBuilder
            .standard()
            .withCredentials(new AWSStaticCredentialsProvider(credentials))
            .withRegion("ca-central-1")
            .build();
    }

    public void create(File file) throws IOException {
        file.createNewFile();
    }

    public void create(String bucketName) {
        if (this.s3client.doesBucketExist(bucketName)) {

        } else {
            s3client.createBucket(bucketName);
        }
    }

    public void upload(String bucketName, String filename, File file) {
        s3client.putObject(bucketName, filename, file);
    }

    public static void main(String[] args) throws IOException {
        S3 s3 = new S3();

        String fileName = "adesh.txt";
        String bucketName = "a1-5410";
        File file = new File(fileName);

        s3.create(file);
        s3.create(bucketName);
        s3.upload(bucketName, fileName, file);
    }
}
```

Gitlab Repository:

<https://git.cs.dal.ca/adimurthy/csci5410-b00886154-adesh-nalpet-adimurthy/-/blob/master/src/main/java/A1/S3.java>

## 5. References

[1] “AWS SDK for Java,” Amazon Web Services, Inc. <https://aws.amazon.com/sdk-for-java/> (accessed May 27, 2022).

[2] “Amazon S3 Examples Using the AWS SDK for Java - AWS SDK for Java,”  
[docs.aws.amazon.com](https://docs.aws.amazon.com/sdk-for-java/v1/developer-guide/examples-s3.html).

<https://docs.aws.amazon.com/sdk-for-java/v1/developer-guide/examples-s3.html> (accessed May 27, 2022).

[3] “Maven Repository: com.amazonaws» aws-java-sdk,” [mvnrepository.com](https://mvnrepository.com).

<https://mvnrepository.com/artifact/com.amazonaws/aws-java-sdk> (accessed May 27, 2022).