**✅ Snowflake and AWS S3 Integration — Step-by-Step Guide**

**🔐 Principle: Least Privilege Access**

Always follow the **least privilege principle** — provide only the required permissions to AWS resources like S3 buckets.

**🔁 Step 1: Create an IAM Role in AWS**

1. **Go to AWS IAM Console** and create a new role.
2. Select **"Another AWS account"** as the trusted entity.
3. You will define the **trust relationship** later (see Step 3).

**📄 Step 2: Attach S3 Access Policy (Limited Access)**

Attach the following **custom S3 policy** to your IAM role to allow read/write access to specific S3 objects and buckets:

{

"Version": "2012-10-17",

"Statement": [

{

"Effect": "Allow",

"Action": [

"s3:PutObject",

"s3:GetObject",

"s3:GetObjectVersion",

"s3:DeleteObject",

"s3:DeleteObjectVersion"

],

"Resource": "arn:aws:s3:::snowflake-demo-qh/input/\*"

},

{

"Effect": "Allow",

"Action": [

"s3:ListBucket",

"s3:GetBucketLocation"

],

"Resource": "arn:aws:s3:::snowflake-demo-qh"

}

]

}

**🔒 Step 3: Define the Trust Policy for the IAM Role**

Use the following **trust policy**, replacing:

* AWS with the correct Snowflake AWS IAM user/role ARN (from DESC INTEGRATION)
* sts:ExternalId with the actual external ID provided by Snowflake

{

"Version": "2012-10-17",

"Statement": [

{

"Effect": "Allow",

"Principal": {

"AWS": "arn:aws:iam::REPLACE\_WITH\_SNOWFLAKE\_ACCOUNT\_ID:root"

},

"Action": "sts:AssumeRole",

"Condition": {

"StringEquals": {

"sts:ExternalId": "REPLACE\_WITH\_SNOWFLAKE\_EXTERNAL\_ID"

}

}

}

]

}

**🧊 Step 4: Create Snowflake Storage Integration**

In **Snowflake**, run:

CREATE OR REPLACE STORAGE INTEGRATION S3\_INTEGRATION

TYPE = EXTERNAL\_STAGE

STORAGE\_PROVIDER = S3

ENABLED = TRUE

STORAGE\_AWS\_ROLE\_ARN = 'arn:aws:iam::YOUR\_AWS\_ACCOUNT\_ID:role/YOUR\_ROLE\_NAME'

STORAGE\_ALLOWED\_LOCATIONS = ('s3://snowflake-demo-qh/input/');

**🔍 Step 5: Describe the Integration (Get Trust Policy Values)**

DESC INTEGRATION S3\_INTEGRATION;

From the result, copy:

* STORAGE\_AWS\_IAM\_USER\_ARN → Use in the Principal of the trust policy
* STORAGE\_AWS\_EXTERNAL\_ID → Use as the ExternalId in the trust policy

Update the **trust policy** created in Step 3 with these values.

**📦 Step 6: Create External Stage in Snowflake**

CREATE OR REPLACE STAGE S3\_INTEGRATEION\_BULK\_COPY\_TESLA\_STOCKS

STORAGE\_INTEGRATION = S3\_INTEGRATION

URL = 's3://course-practice-kabir/TSLA.csv'

FILE\_FORMAT = (TYPE = 'CSV', FIELD\_DELIMITER = ',', SKIP\_HEADER = 1);

**✅ Step 7: Validate Integration and Stage**

Check the files in the S3 bucket via Snowflake:

LIST @S3\_INTEGRATEION\_BULK\_COPY\_TESLA\_STOCKS;

**📥 Step 8: Copy Data into Snowflake Table**

COPY INTO TESLA\_STOCKS

FROM @S3\_INTEGRATEION\_BULK\_COPY\_TESLA\_STOCKS;