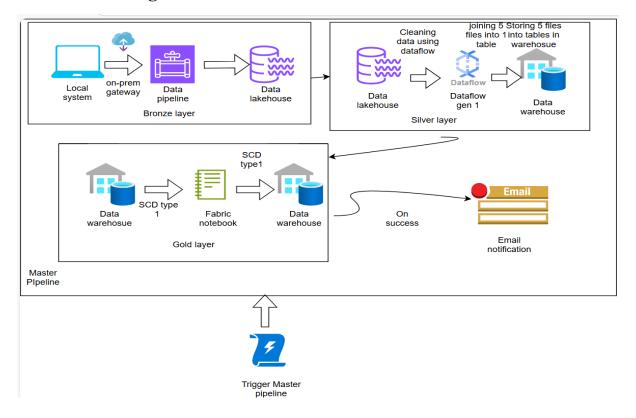
Bootcamp Project 4

Project Title: Incremental Data Loading and Automated Notifications using Microsoft Fabric

Problem Statement:

In modern data ecosystems, organizations need to efficiently ingest, transform, and load data from various sources into centralized platforms for analytics, while also ensuring timely monitoring and notification upon successful data refreshes. This project addresses the challenge of incrementally loading data from on-premises sources to Microsoft Fabric Lakehouse, processing it through a structured transformation pipeline, and triggering automated notifications upon successful execution.

Architecture diagram:

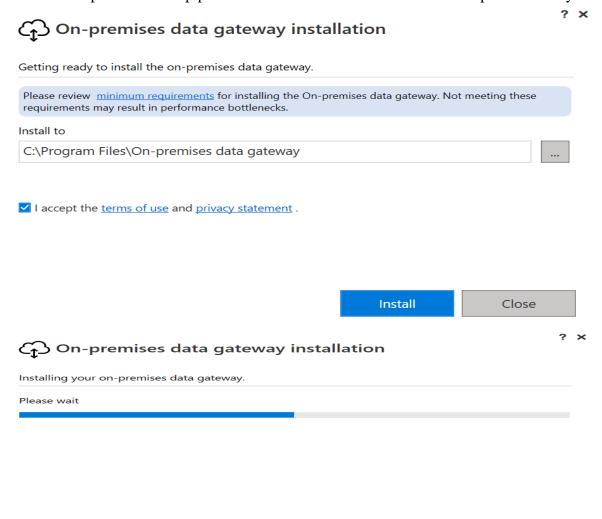


Tools & Technologies:

- Microsoft Fabric
- On-Premises Data Gateway
- Fabric Lakehouse and Warehouse
- Fabric Dataflow Gen 1
- Fabric Notebook
- Email Notification Task (in-built)
- Draw.io / Visio for architecture diagram

Bronze layer:

To connect on-prem to fabric pipeline we need to download and install ON-prem Gateway.



On-premises data gateway

Almost done.

A valid email address must be specified (e.g.: abc@example.com).

Installation was successful!

Email address to use with this gateway*

fabricnisha@nisha1207reddygmail.onmicrosoft.com

Next, you need to sign in to register your gateway.

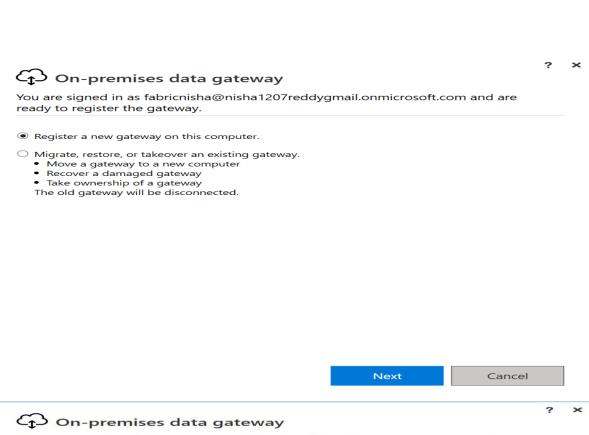
Sign in options

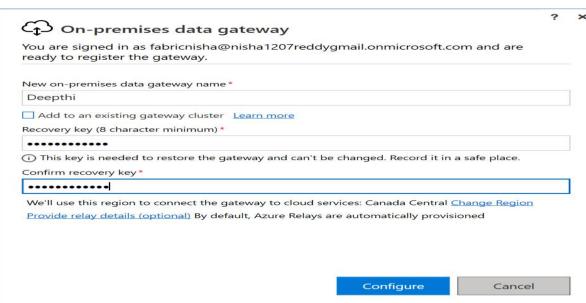
Use my default web browser

Export logs

Sign in Cancel

Cancel



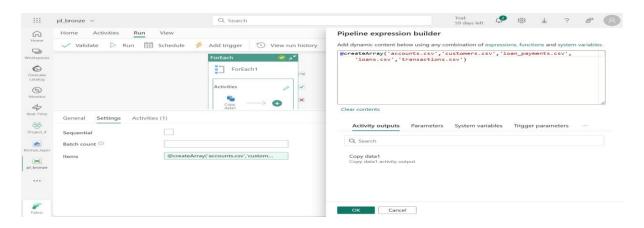




Close

Now we have to create a pipeline with copy data activity to copy data from on-prem to fabric lake house.

First, we will add foreach activity to get all files from on-prem.



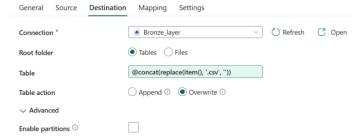
Now add copy activity and connect to on prem gateway.



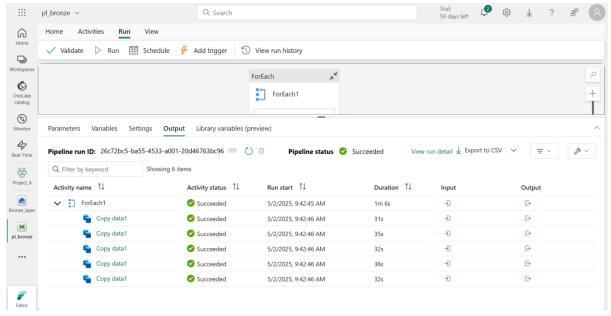
Source:

General Source Destinatio	n Mapping Settings	
Connection *	□ ON-prem-Connection	Edit
File path type	$ \bullet \ File \ path \bigcirc \ File \ filter \bigcirc \ Wildcard \ file \ path \bigcirc \ List \ of \ files \ \bigcirc $	
File path	Directory / @item()	☐ Browse ✓ 60 Preview data
Recursively ①	▼	
File format *	DelimitedText Settings	

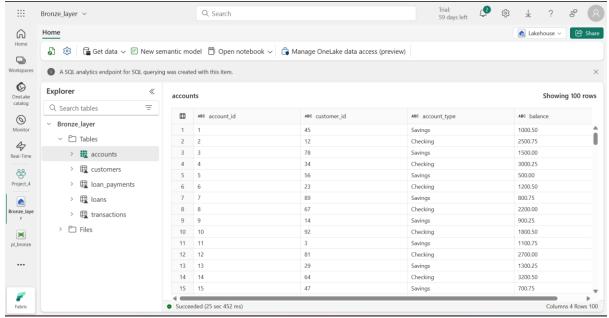
Destination, here we are connecting to lake house and storing data in tables.



Pipeline ran successfully.

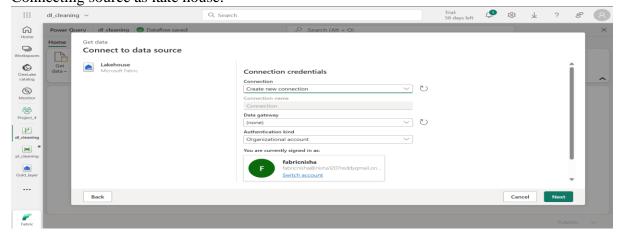


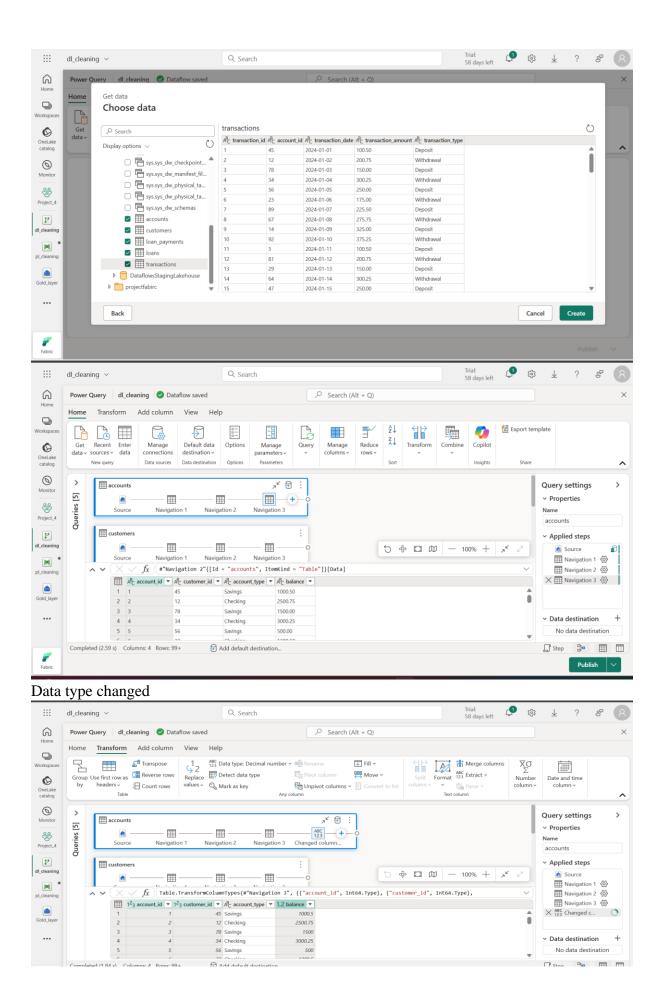
Data is loaded successfully into lake house:

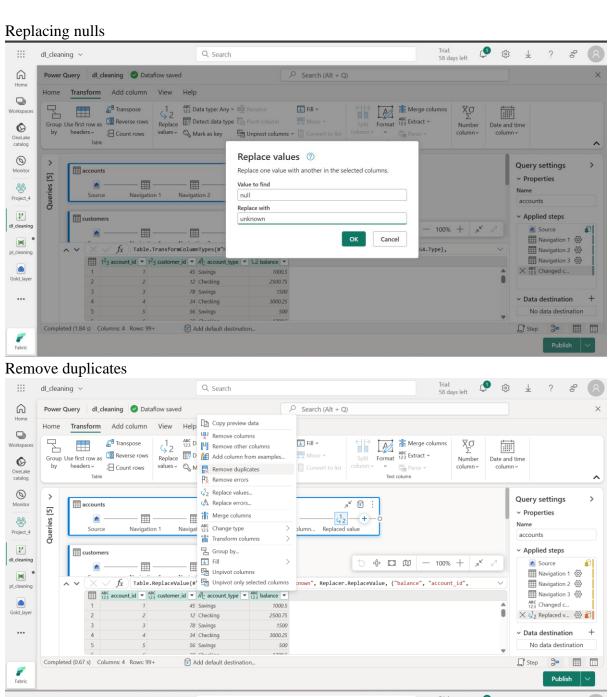


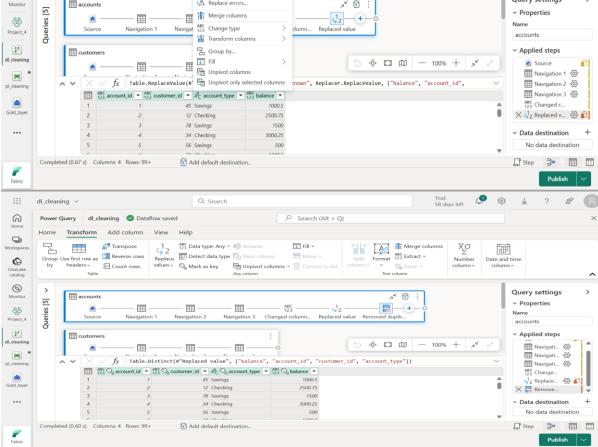
Silver Layer:

Using Dataflow to clean data (Removing duplicates, correcting data types, Replacing nulls). Connecting source as lake house.

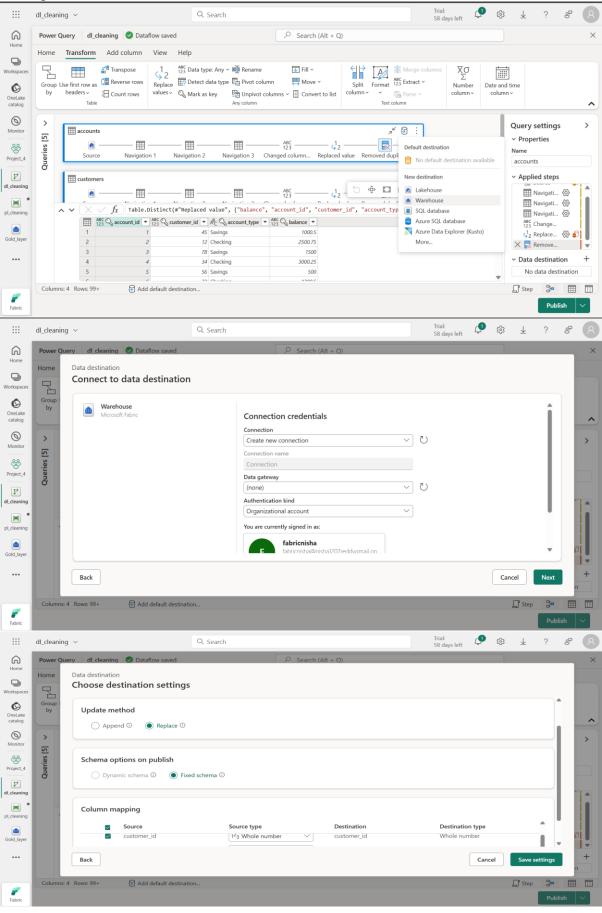




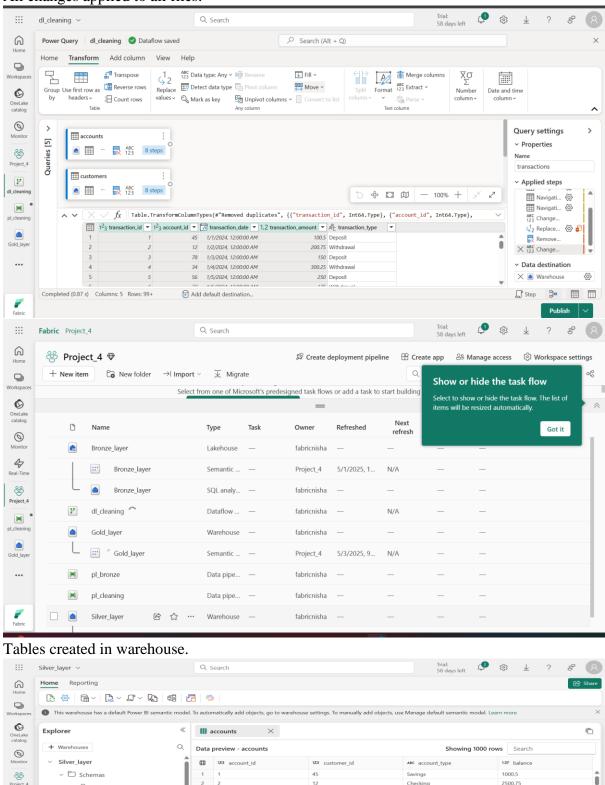


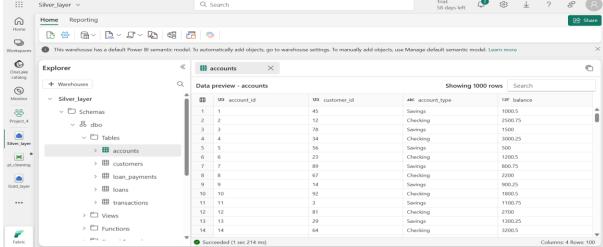


Adding destination:

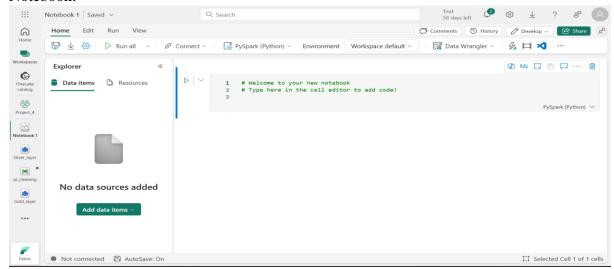


All changes applied to all files.





Notebook:



creating short cut



Code:

```
df_source.createOrReplaceTempView("source_view")
src_path="Tables/dbo/accounts"
create_table_query = """
CREATE TABLE Account_SCD (
  account_id int,
  customer_id int,
  account_type string,
  balance float,
  hash_key BIGINT,
  created_by STRING,
  created_date TIMESTAMP,
  updated_by STRING,
  updated_date TIMESTAMP
)
USING DELTA
LOCATION 'Tables/Gold_layer/Account_SCD'
```

df_source = spark.read.format("delta").load("Tables/dbo/accounts")

Execute the query to create the table spark.sql(create_table_query)

from delta.tables import DeltaTable target_path = "Tables/Gold_layer/Account_SCD" delta_target = DeltaTable.forPath(spark, target_path)

from pyspark.sql.functions import * df_src1= df_source.withColumn("hash_key",crc32(concat(*df_source.columns))) display(df_src1)

df_src1=df_src1.alias("src").join(delta_target.toDF().alias("tgt"),((col("src.account_id")==col ("tgt.account_id"))&(col("src.hash_key")==col("tgt.hash_key"))),"anti").select(col("src.*")) df_src1.show()

from pyspark.sql.functions import col

delta_target.alias("tgt").merge(df_src1.alias("src"),"tgt.account_id = src.account_id")\
.whenMatchedUpdate(set={"tgt.account_id":"src.account_id","tgt.customer_id":"src.customer_id","tgt.account_type":"src.account_type","tgt.balance":"src.balance","tgt.hash_key":"src.hash_key","tgt.updated_date":current_timestamp(),"tgt.updated_by":lit("databricks_Updated")

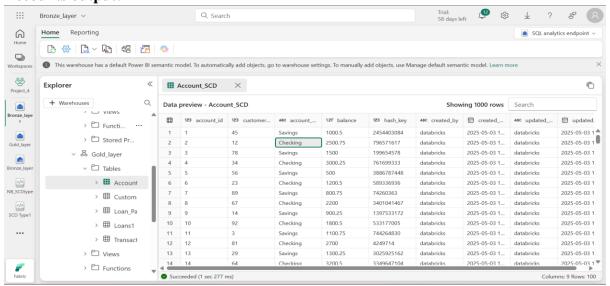
})\
.whenNotMatchedInsert(values={"tgt.account_id":"src.account_id","tgt.customer_id":"src.cu
stomer_id","tgt.account_type":"src.account_type","tgt.balance":"src.balance","tgt.hash_key":

"src.hash_key","tgt.created_date":current_timestamp(),"tgt.created_by":lit("databricks"),"tgt.updated_date":current_timestamp(),"tgt.updated_by":lit("databricks")}).execute()

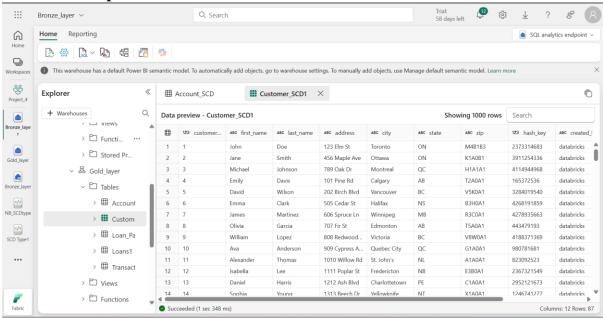
display(spark.read.format("delta").option("header","true").load(target_path))

Output:

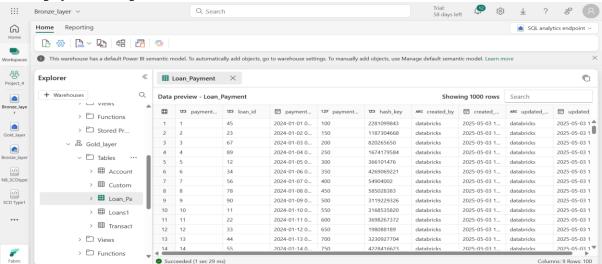
Accounts output:



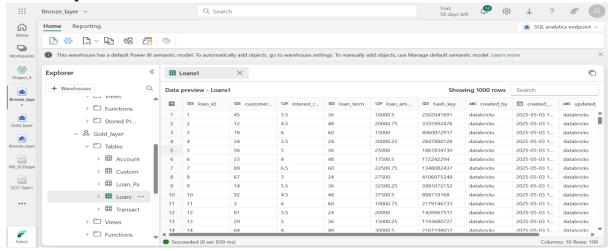
Customers Output:



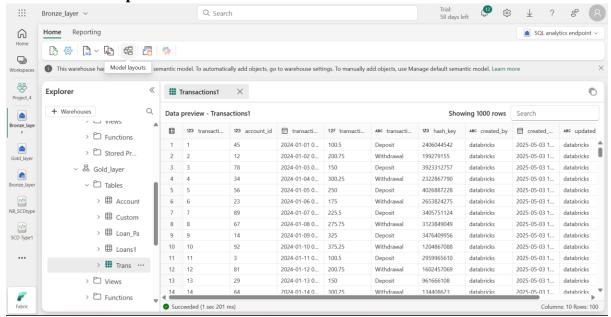
Loan_payment output:



Loans output:



Transactions Output:



Creating Master pipeline.

