

Lab 2 - Implement the Medallion Architecture using Microsoft Fabric

Lab Guide

October 2024

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Document Purpose

This document describes the IP named “**Lab 2 - Implement the Medallion Architecture using Microsoft Fabric(Bronze, Silver and Gold layers)**”.

Lab Description

Implement the Medallion Architecture using Microsoft Fabric (Bronze, Silver and Gold layers)

This exercise revolves around implementing the Medallion Architecture utilizing Microsoft Fabric, with a particular emphasis on its Bronze, Silver, and Gold layers.

The Medallion Architecture is a data processing paradigm where raw data is ingested into the Bronze layer, transformed and curated in the Silver layer, and then aggregated and analyzed in the Gold layer.

In this context, Microsoft Fabric serves as the platform for executing data transformations, leveraging its powerful analytics capabilities to process data from the Bronze layer, convert it into a delta format, and subsequently store it in the Silver layer for further refinement and analysis.

Lab Tasks

The lab tasks for "Lab 2 - Implement the Medallion Architecture using Microsoft Fabric (Bronze, Silver, and Gold layers)" involve a series of steps designed to enhance data processing and analytics capabilities.

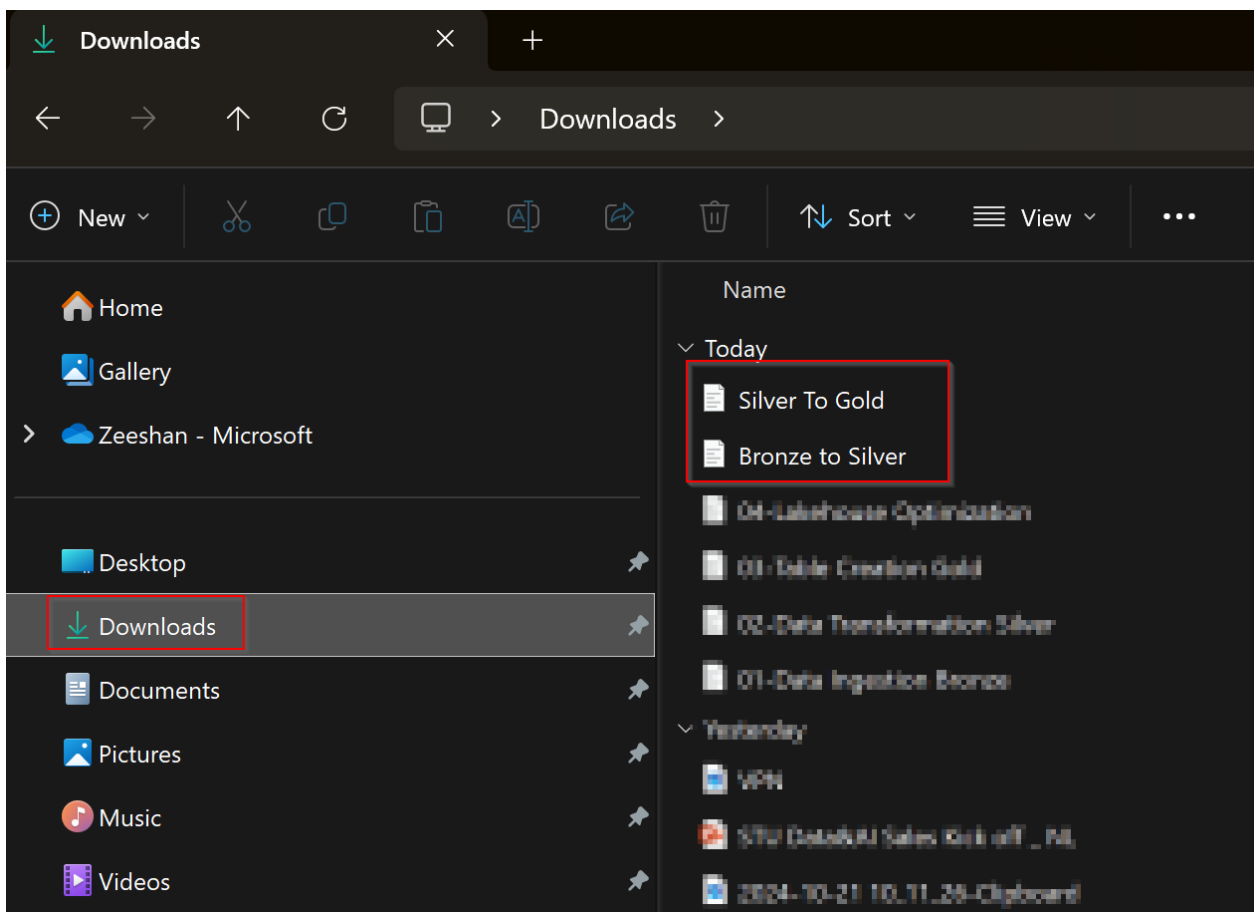
- The first task focuses on reading data from the Bronze layer, converting it into delta format, and writing it to the Silver layer to improve data quality.
- The second task involves verifying that the delta files have been successfully written to the Silver layer.
- In the third task, participants read data from the Silver layer, create a data model, and write the refined data into the Gold layer as tables. Finally, the fourth task requires verifying that the delta files have been successfully written to the Gold layer. These tasks collectively help implement the Medallion Architecture, leveraging Microsoft

Fabric's powerful analytics capabilities to process and refine data across different layers.

Task 01: Read from Bronze layer, convert the data into delta format and write to the Silver layer

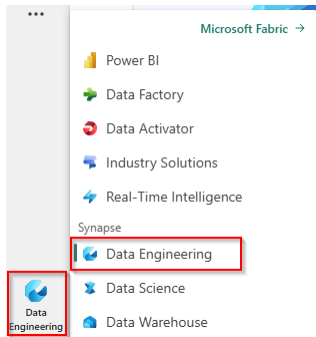
With this move we aim to clean and refine data within the Bronze layer, improving data quality and preparing it for further processing, aligning with Contoso's focus on reliable data foundations.

1. Download the Bronze to Silver and Silver to Gold notebooks under Assets/Day2/Notebooks/ on your local machine.
2. Open **File Explorer** and go to the **Downloads** folder.

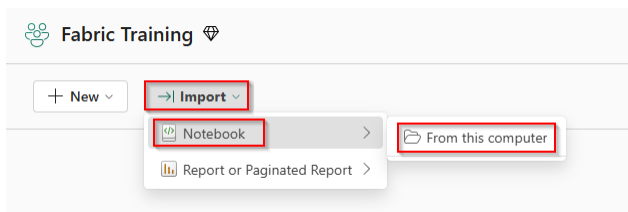


1. The notebooks have been downloaded in the Downloads folder.

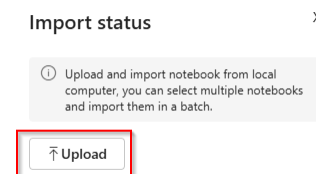
2. Return to the **Fabric Workspace** browser tab.
3. In the bottom navigation pane, select **Data Engineering Experience**.



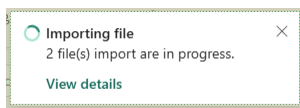
4. In the left navigation pane, select **Workspaces**.
5. In the Workspace pane, select **Workspaces** and then select **Fabric Training**.
6. In the upper-left pane, select **Import**.



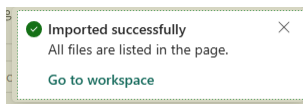
7. In the Import window, select **Notebook** and then select **From this computer**.
8. In the right pane, click on **Upload**.



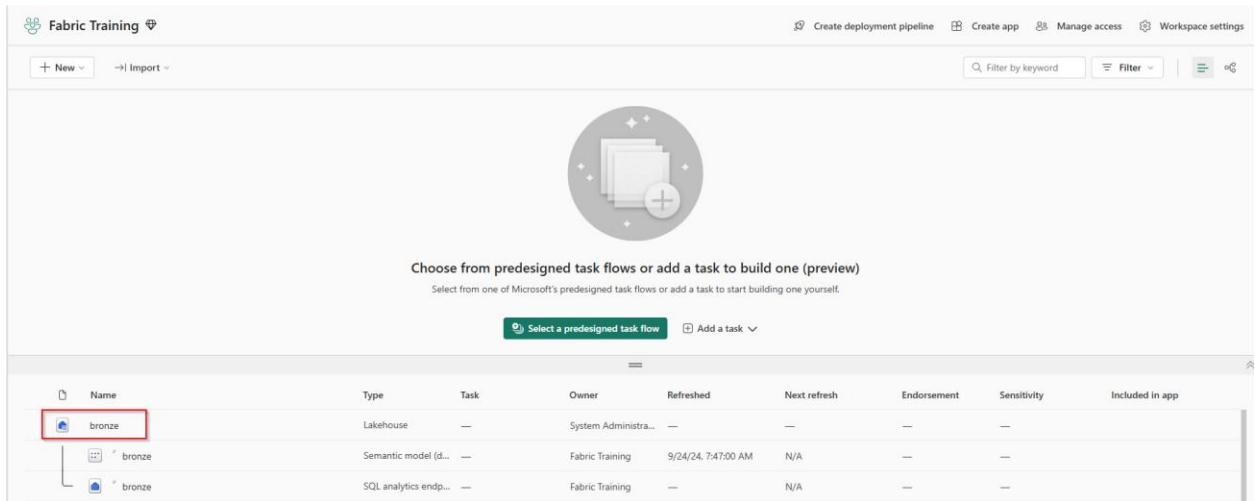
9. In **File Explorer**, go to your **Downloads** folder, then open the **BronzeToSilver.ipynb** and **SilverToGold.ipynb** files.
10. Wait for the Notebooks to imported.



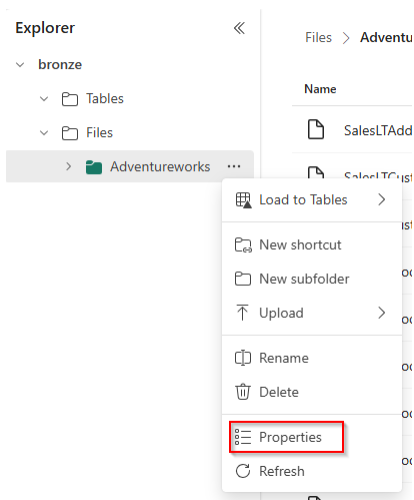
11. Once the notebooks have been imported successfully. You will see this notification.



12. Now open the bronze lakehouse.



13. In the lakehouse explorer, on the left navigation panel right click on Adventureworks folder under Files and select Properties.



14. In the properties section copy the ABFS path of Adventureworks folder in the bronze lakehouse.

Properties

×

Name

Adventureworks

Type

Folder

URL

https://...

Relative path

Files/Adventureworks

ABFS path

abfss://...@onelake.dfs.fabr...

Last modified

9/24/2024 7:48:38 AM

15. Now the notebooks are imported, select the **Bronze to Silver** notebook. We're now getting ready to transform and store processed data in the Silver layer in delta format, enhancing Contoso's data storage efficiency and accessibility for analytical processes.

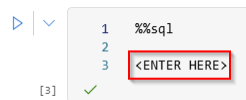
16. In the second code cell,

```
1 from notebookutils import mssparkutils
2 adventureWorksPath = "<ENTER_HERE>"
3
4 file_list = mssparkutils.fs.ls(adventureWorksPath)
5
6 # Read each file and create a DataFrame
7 for file_path in file_list:
8     print(file_path)
9     df = spark.read.format("csv").options(inferSchema="true", header="true").load(path=f"{file_path.path}")
10    # You can process the DataFrame or register it as a table here
11    # For example, to create a temporary table:
12    df.createOrReplaceTempView(file_path.name.removesuffix('.csv'))
```

update the ENTERHERE placeholders with the following information:

Name	Value	Comment
adventureWorksPath	<ENTERHERE>	Paste the path you copied in step 14

17. In the third code cell,



```
1 %%sql
2
3 <ENTER HERE>
```

replace the **<ENTERHERE>** placeholder with the following command.

```
SHOW VIEWS
```

This command displays available views.

18. In the fourth code cell,



```
1 %%sql
2
3 <ENTER HERE>
```

replace the **<ENTERHERE>** placeholder with the following command.

```
SELECT * FROM salesltaddress LIMIT 100
```

This command displays the first 100 rows from salesltaddress.

19. In the fifth code cell,

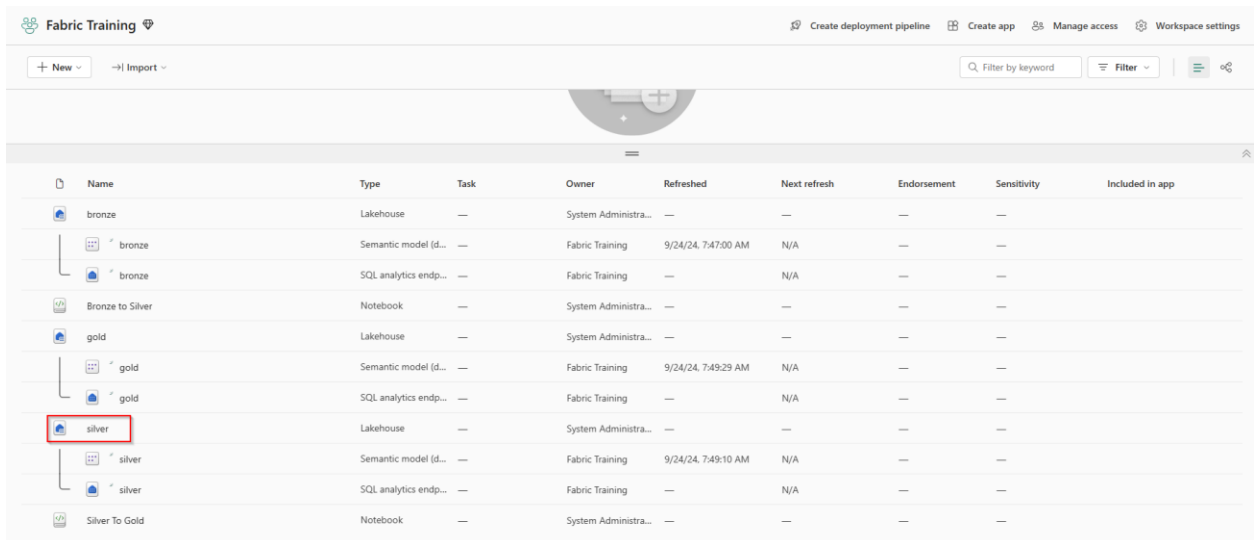


```
1 views = <ENTER HERE>
2 display(views)
```

replace the **<ENTERHERE>** placeholder with the following command.

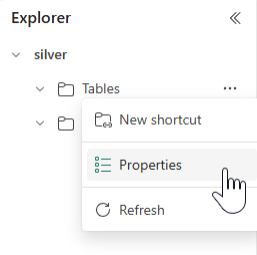
```
spark.sql("SHOW VIEWS")
```

20. Now go to the Fabric Training workspace and open the silver lakehouse.



Name	Type	Task	Owner	Refreshed	Next refresh	Endorsement	Sensitivity	Included in app
bronze	Lakehouse	—	System Administra...	—	—	—	—	
bronze	Semantic model (d...	—	Fabric Training	9/24/24, 7:47:00 AM	N/A	—	—	
bronze	SQL analytics endp...	—	Fabric Training	—	N/A	—	—	
Bronze to Silver	Notebook	—	System Administra...	—	—	—	—	
gold	Lakehouse	—	System Administra...	—	—	—	—	
gold	Semantic model (d...	—	Fabric Training	9/24/24, 7:49:29 AM	N/A	—	—	
gold	SQL analytics endp...	—	Fabric Training	—	N/A	—	—	
silver	Lakehouse	—	System Administra...	—	—	—	—	
silver	Semantic model (d...	—	Fabric Training	9/24/24, 7:49:10 AM	N/A	—	—	
silver	SQL analytics endp...	—	Fabric Training	—	N/A	—	—	
Silver To Gold	Notebook	—	System Administra...	—	—	—	—	

21. In the lakehouse explorer, on the left navigation panel right click on Tables folder and select Properties.



22. In the properties section copy the ABFS path of Tables folder in the silver lakehouse.

Properties

✕

Name

Tables

Type

Folder

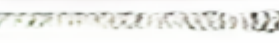
URL

<https://onelake.dfs.fabric.microsoft.com/>📄

Relative path

Tables📄

ABFS path

abfss://@onelake.dfs.fabr...📄

Last modified

N/A

23. In the thirteenth code cell,

```
1 basePathSilverLakeHouse = "<ENTER HERE>"
2 tableName="salesOrderHeader"
3 df_salesltsalesorderheader.write.mode("overwrite").format("delta").save(basePathSilverLakeHouse + '/' + tableName)
```

[13] ✓

update the ENTERHERE placeholders with the following information:

Name	Value	Comment
basePathSilverLakeHouse	<ENTER HERE>	Paste the path you copied in step 22

24. On the left navigation panel of the notebook. Click explorer, check that whether bronze and silver lakehouses are added or not. If bronze and silver lakehouses are not added, click on Lakehouses and add them.

The screenshot shows the Databricks notebook interface. On the left, the 'Explorer' panel is visible, showing a tree view with 'Data sources', 'Resources', and 'Lakehouses'. The 'Lakehouses' section is highlighted with a red box, showing '0 item(s) added'. Below the Explorer panel, the 'All sources' section is visible, showing a 'Lakehouses' section with a '+ Lakehouse' button. At the bottom of the 'All sources' section, there is a large circular button with a checkmark icon and the text 'Add Lakehouse'. Below this button is a green 'Add' button, which is being clicked by a mouse cursor.

OneLake data hub

Discover data from your org and beyond and use it to create reports

☒ All
 ☐ My data
 ☐ Endorsed in your org
 ☐ Favorites

	Name	Owner	Refreshed	Location	Endorsement	Sensitivity
<input checked="" type="checkbox"/>	bronze	System Administrator	—	Fabric Training	—	—
<input type="checkbox"/>	gold	System Administrator	—	Fabric Training	—	—
<input checked="" type="checkbox"/>	silver	System Administrator	—	Fabric Training	—	—
<input type="checkbox"/>	gold	System Administrator	—	Fabric Training	—	—
<input type="checkbox"/>	silver	System Administrator	—	Fabric Training	—	—
<input type="checkbox"/>	bronze	System Administrator	—	Fabric Training	—	—



25. Select **Run**

all.









26. Review the output for each cell.

Task 02: Verify that delta files were written to the silver medallion lakehouse

1. Switch to the browser tab for the Fabric portal. In the left navigation panel, click on Fabric Training workspace.
2. From the center pane, select the silver Lakehouse.

 silver	Lakehouse	—	System Administra...	—	—	—	—
 silver	Semantic model (d...	—	FabricDataEnginee...	8/25/24, 8:53:10 PM	N/A	—	—
 silver	SQL analytics endp...	—	FabricDataEnginee...	—	N/A	—	—

3. Select the Tables. Verify that the delta tables are present in the Tables Folder.

Explorer	«
▼ silver	
▼  Tables	
>  salesCustomer	
>  salesCustomerAddress	
>  salesOrderDetail	
>  salesOrderHeader	
>  salesProduct	
>  salesProductCategory	
>  Files	

Task 03: Read from the Silver layer, create a data model (Facts, Dimensions) on the onelake, and write data into Gold layer as tables.

The last step is to develop and implement a robust data model from the Silver layer, moving critical data into the Gold layer, thus bolstering Contoso's analytics and decision-making capabilities with structured and refined data sets.

This involves creating fact and dimension tables which are essential components of a data warehouse. Fact tables generally contain transactional data such as sales figures, while dimension tables hold descriptive information like product details or customer attributes.

By organizing data in this manner, it becomes easier to perform complex queries and generate insightful reports, significantly enhancing the company's ability to leverage its data for strategic purposes.

1. Switch back to the **Fabric** browser tab.
2. On the **Fabric** page, in the left navigation pane, select **Fabric Training Workspace**.
3. In the **Fabric Training** workspace, select the **Silver to Gold** notebook.

4. In the fourth code cell,

```
1 from pyspark.sql.functions import monotonically_increasing_id
2
3 #Create dimProduct
4 df_dimProduct = <ENTER HERE>
5
6
7
8 #Add surrogate key as the first column
9 df_dimProduct_with_surrogate_key = df_dimProduct.withColumn("ProductIDKey", monotonically_increasing_id())
10 .select(
11     "ProductIDKey", # Select the surrogate key column first
12     *[column for column in df_dimProduct.columns if column != "ProductIDKey" and column!="spc.Name"] # Select the remaining columns in their original order
13 )
```

[4] ✓

replace the <ENTERHERE> placeholder with the following code:

```
spark.sql("select sp.*, spc.ParentProductCategoryID, spc.Name as
ProductCategoryName from silver.salesProduct sp join
silver.salesProductCategory spc on sp.ProductCategoryID =
spc.ProductCategoryID")
```

5. Now go to the Fabric Training workspace and open the gold lakehouse.

Fabric Training

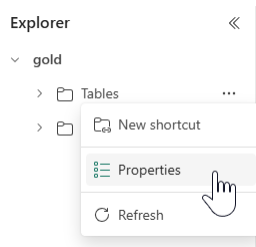
Create deployment pipeline Create app Manage access Workspace settings

+ New -> Import

Filter by keyword Filter

Name	Type	Task	Owner	Refreshed	Next refresh	Endorsement	Sensitivity	Included in app
bronze	Lakehouse	—	System Administra...	—	—	—	—	—
bronze	Semantic model (d...	—	Fabric Training	9/24/24, 7:47:00 AM	N/A	—	—	—
bronze	SQL analytics endp...	—	Fabric Training	—	N/A	—	—	—
Bronze to Silver	Notebook	—	System Administra...	—	—	—	—	—
gold	Lakehouse	—	System Administra...	—	—	—	—	—
gold	Semantic model (d...	—	Fabric Training	9/24/24, 7:49:29 AM	N/A	—	—	—
gold	SQL analytics endp...	—	Fabric Training	—	N/A	—	—	—
silver	Lakehouse	—	System Administra...	—	—	—	—	—
silver	Semantic model (d...	—	Fabric Training	9/24/24, 7:49:10 AM	N/A	—	—	—
silver	SQL analytics endp...	—	Fabric Training	—	N/A	—	—	—
Silver To Gold	Notebook	—	System Administra...	—	—	—	—	—

6. In the lakehouse explorer, on the left navigation panel right click on Tables folder and select Properties.



7. In the properties section copy the ABFS path of Tables folder in the gold lakehouse.

Properties ✕

Name

Tables

Type

Folder

URL

https://onelake.dfs.fabric.microsoft.com/... 📄

Relative path

Tables 📄

ABFS path

abfss://[...]/@onelake.dfs.fabr... 📄

Last modified

N/A

8. In the seventh code cell, update the ENTERHERE placeholders with the following information:

Name	Value	Comment
basePathGoldLakeHouse	<ENTER HERE>	Paste the path you copied in step 7

9. In the ninth code cell,

```
1 #Create factSales
2 df_factSales = <ENTER HERE>
3 display(df_factSales)
```

[9] ✓

populate the **ENTERHERE** placeholder to create the df_factSales dataframe:

```
spark.sql("select      dp.ProductIDKey,      ds.CustomerIDKey,      soh.*,
sod.OrderQty,      sod.ProductID,      sod.UnitPrice,      sod.UnitPriceDiscount,
sod.LineTotal      from      silver.salesOrderHeader      soh      join
silver.salesOrderDetail sod on soh.SalesOrderID = sod.SalesOrderID LEFT
JOIN gold.dimProduct dp ON sod.ProductID = dp.ProductID LEFT JOIN
gold.dimCustomer ds ON soh.CustomerID = ds.CustomerID")
```

10. Select **Run all**.

11. Review the output for each cell.

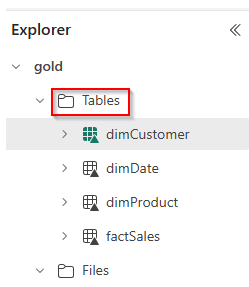
Task 04: Verify that delta files were written to the gold medallion container

1. Switch to the browser tab for the Fabric portal. In the left navigation panel, click on **Fabric Training** workspace.

2. From the center pane, select the gold Lakehouse.

gold	Lakehouse	—	System Administra...	—	—	—	—
gold	Semantic model (d...	—	FabricDataEnginee...	8/25/24, 8:53:20 PM	N/A	—	—
gold	SQL analytics endp...	—	FabricDataEnginee...	—	N/A	—	—

3. Select the Tables. Verify that the delta tables are present in the Tables Folder.



Summary:

The lab tasks for "Lab 2 - Implement the Medallion Architecture using Microsoft Fabric (Bronze, Silver, and Gold layers)" are designed to enhance data processing and analytics capabilities through a series of steps. Participants start by reading data from the Bronze layer, converting it into delta format, and writing it to the Silver layer to improve data quality.

They then verify the successful writing of delta files to the Silver layer. The next step involves reading data from the Silver layer, creating a data model, and writing the refined data into the Gold layer as tables. Finally, participants verify that the delta files have been successfully written to the Gold layer. These tasks collectively help implement the Medallion Architecture, leveraging Microsoft Fabric's powerful analytics capabilities to process and refine data across different layers.