



Data Analysis with SQL + Talend + Snowflake + Power BI

www.tariqulismail.com

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Scenario

Walmart Sales Data Transfer from SQL Server to Snowflake with ETL Process by Talend Open Studio, and Building a Sales Analysis Dashboard in Power BI.

Data Analysis with SQL + Talend + Snowflake + Power BI

Step 1: Setting Up the Environment

1. SQL Server Configuration:

- Ensure the SQL Server instance is up and running.
- Verify that the sales data exists in the SQL Server database.
- Create necessary user accounts with appropriate permissions to access the data.

2. Snowflake Configuration:

- Set up a Snowflake account.
- Create a database and schema in Snowflake for storing the sales data.
- Create a user account with permissions to load data into the database.

3. Talend Open Studio Installation:

- Download and install Talend Open Studio for Data Integration.
- Configure the necessary connections to SQL Server and Snowflake.

SQLQuery2.sql - CYGNET.db_fintech (sa (52)) - Microsoft SQL Server Management Studio

File Edit View Query Project Debug Tools Window Help

db_fintech Execute Debug

Object Explorer

Connect +

CYGNET (SQL Server 16.0.1115.1 - sa)

Databases

System Databases

Database Snapshots

db_accident

db_finance

db_fintech

db_food

DWConfiguration

DWDiagnostics

DWQueue

Security

Server Objects

Replication

PolyBase

Always On High Availability

Management

Integration Services Catalogs

SQL Server Agent

XEvent Profiler

SQLQuery2.sql - CYG..b_fintech (sa (52))

```
select * from [db_fintech].[dbo].[WalmartSales]
```

100 %

Results Messages

	City	Customer_type	Gender	Product_line	Unit_price	Quantity	Tax	Total	Date	Time	Payment	cogs	gross_margin_percentage	gross_income	Rating
1	Yangon	Member	Female	Health and beauty	74.69	7	26.1415	548.9715	2019-01-05	01:08:00.0000000	Ewallet	522.83	4.761905	26.1415	9.10
2	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	3.8200	80.2200	2019-03-08	10:29:00.0000000	Cash	76.40	4.761905	3.8200	9.60
3	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.2155	340.5255	2019-03-03	01:23:00.0000000	Credit card	324.31	4.761905	16.2155	7.40
4	Yangon	Member	Male	Health and beauty	58.22	8	23.2880	489.0480	2019-01-27	08:33:00.0000000	Ewallet	465.76	4.761905	23.2880	8.40
5	Yangon	Normal	Male	Sports and travel	86.31	7	30.2085	634.3785	2019-02-08	10:37:00.0000000	Ewallet	604.17	4.761905	30.2085	5.30
6	Naypyitaw	Normal	Male	Electronic accessories	85.39	7	29.8865	627.6165	2019-03-25	06:30:00.0000000	Ewallet	597.73	4.761905	29.8865	4.10
7	Yangon	Member	Female	Electronic accessories	68.84	6	20.6520	433.6920	2019-02-25	02:36:00.0000000	Ewallet	413.04	4.761905	20.6520	5.80
8	Naypyitaw	Normal	Female	Home and lifestyle	72.56	10	36.7800	772.3800	2019-02-24	11:38:00.0000000	Ewallet	735.60	4.761905	36.7800	8.00
9	Yangon	Member	Female	Health and beauty	36.26	2	3.6260	76.1460	2019-01-10	05:15:00.0000000	Credit card	72.52	4.761905	3.6260	7.20
10	Mandalay	Member	Female	Food and beverages	54.84	3	8.2260	172.7460	2019-02-20	01:27:00.0000000	Credit card	164.52	4.761905	8.2260	5.90
11	Mandalay	Member	Female	Fashion accessories	14.48	4	2.8960	60.8160	2019-02-06	06:07:00.0000000	Ewallet	57.92	4.761905	2.8960	4.50
12	Mandalay	Member	Male	Electronic accessories	25.51	4	5.1020	107.1420	2019-03-09	05:03:00.0000000	Cash	102.04	4.761905	5.1020	6.80
13	Yangon	Normal	Female	Electronic accessories	46.95	5	11.7375	246.4875	2019-02-12	10:25:00.0000000	Ewallet	234.75	4.761905	11.7375	7.10
14	Yangon	Normal	Male	Food and beverages	43.19	10	21.5950	453.4950	2019-02-07	04:48:00.0000000	Ewallet	431.90	4.761905	21.5950	8.20
15	Yangon	Normal	Female	Health and beauty	71.38	10	35.6900	749.4900	2019-03-29	07:21:00.0000000	Cash	713.80	4.761905	35.6900	5.70
16	Mandalay	Member	Female	Sports and travel	93.72	6	28.1160	590.4360	2019-01-15	04:19:00.0000000	Cash	562.32	4.761905	28.1160	4.50
17	Yangon	Member	Female	Health and beauty	68.93	7	24.1255	506.6355	2019-03-11	11:03:00.0000000	Credit card	482.51	4.761905	24.1255	4.60
18	Yangon	Normal	Male	Sports and travel	72.61	6	21.7830	457.4430	2019-01-01	10:39:00.0000000	Credit card	435.66	4.761905	21.7830	6.90
19	Yangon	Normal	Male	Food and beverages	54.67	3	8.2005	172.2105	2019-01-21	06:00:00.0000000	Credit card	164.01	4.761905	8.2005	8.60
20	Mandalay	Normal	Female	Home and lifestyle	40.30	2	4.0300	84.6300	2019-03-11	03:30:00.0000000	Ewallet	80.60	4.761905	4.0300	4.40
21	Naypyitaw	Member	Male	Electronic accessories	86.04	5	21.5100	451.7100	2019-02-25	11:24:00.0000000	Ewallet	430.20	4.761905	21.5100	4.80
22	Mandalay	Normal	Male	Health and beauty	87.98	3	13.1970	277.1370	2019-03-05	10:40:00.0000000	Ewallet	263.94	4.761905	13.1970	5.10
23	Mandalay	Normal	Male	Home and lifestyle	33.20	2	3.3200	69.7200	2019-03-15	12:20:00.0000000	Credit card	66.40	4.761905	3.3200	4.40
24	Yangon	Normal	Male	Electronic accessories	34.56	5	8.6400	181.4400	2019-02-17	11:15:00.0000000	Ewallet	172.80	4.761905	8.6400	9.90
25	Yangon	Member	Male	Sports and travel	88.63	3	13.2945	278.1845	2019-03-02	05:36:00.0000000	Ewallet	265.89	4.761905	13.2945	6.00
26	Yangon	Member	Female	Home and lifestyle	52.59	8	21.0360	441.7560	2019-03-22	07:20:00.0000000	Credit card	420.72	4.761905	21.0360	8.50
27	Mandalay	Normal	Male	Fashion accessories	33.52	1	1.6760	35.1960	2019-02-08	03:31:00.0000000	Cash	33.52	4.761905	1.6760	6.70
28	Yangon	Normal	Female	Fashion accessories	87.67	2	8.7670	184.1070	2019-03-10	12:17:00.0000000	Credit card	175.34	4.761905	8.7670	7.70
29	Mandalay	Normal	Female	Food and beverages	88.36	5	22.0900	463.8900	2019-01-25	07:48:00.0000000	Cash	441.80	4.761905	22.0900	9.60
30	Yangon	Normal	Male	Health and beauty	24.89	9	11.2005	235.2105	2019-03-15	03:36:00.0000000	Cash	224.01	4.761905	11.2005	7.40
31	Mandalay	Normal	Male	Fashion accessories	94.13	5	23.5325	494.1825	2019-02-25	07:39:00.0000000	Credit card	470.65	4.761905	23.5325	4.80
32	Mandalay	Member	Male	Sports and travel	78.07	9	35.1315	737.7615	2019-01-28	12:43:00.0000000	Cash	702.63	4.761905	35.1315	4.50
33	Mandalay	Normal	Male	Sports and travel	83.78	8	33.5120	703.7520	2019-01-10	02:49:00.0000000	Cash	670.24	4.761905	33.5120	5.10
34	Yangon	Normal	Male	Health and beauty	96.58	2	9.6580	202.8180	2019-03-15	10:12:00.0000000	Credit card	193.16	4.761905	9.6580	5.10

Query executed successfully.

CVGNR

SQL Server Data

Step 2: Designing the ETL Process in Talend Open Studio

1. **Create a New Talend Job:**
 - Open Talend Open Studio and create a new job for the ETL process.
2. **Extract Data from SQL Server:**
 - Use the `tMSSqlInput` component to connect to SQL Server and extract sales data.
 - Configure the component with the SQL Server connection details (host, port, database, user, password).
 - Write a SQL query to select the relevant sales data.
3. **Transform Data (Optional):**
 - If transformation is needed, use Talend components like `tMap`, `tFilterRow`, `tAggregateRow`, etc., to process the data.
 - Perform data cleansing, aggregation, or other transformations as required.
4. **Load Data into Snowflake:**
 - Use the `tSnowflakeOutputBulkExec` component to load data into Snowflake.
 - Configure the component with Snowflake connection details (account, warehouse, database, schema, user, password).
 - Specify the target table where the sales data will be loaded.
 - Optionally, use the `tFileOutputDelimited` component to create a CSV file before loading it into Snowflake.
5. **Job Execution:**
 - Link the components appropriately to define the data flow.
 - Execute the Talend job and monitor for successful data transfer.
6. **Log into Snowflake:**
 - Use the Snowflake web interface or SnowSQL command line tool to log into your Snowflake account.
7. **Verify Data Load:**
 - Query the target table in Snowflake to ensure that the data has been loaded correctly.
 - Perform basic checks such as row count and data integrity checks.

Snowflake

Snowflake Connection Settings

Complete these fields in order to connect to your Snowflake account.

Name

ConnectSnow

*

Account

at09140

*

User Id

TARIQULISMAIL

*

Password

*

Warehouse

DOWNHILL

*

Schema

PUBLIC

*

Database

db_atlantic

*

Authentication Type

Basic

Advanced...

Test connection

Proxy Setting

Export as context

Revert Context

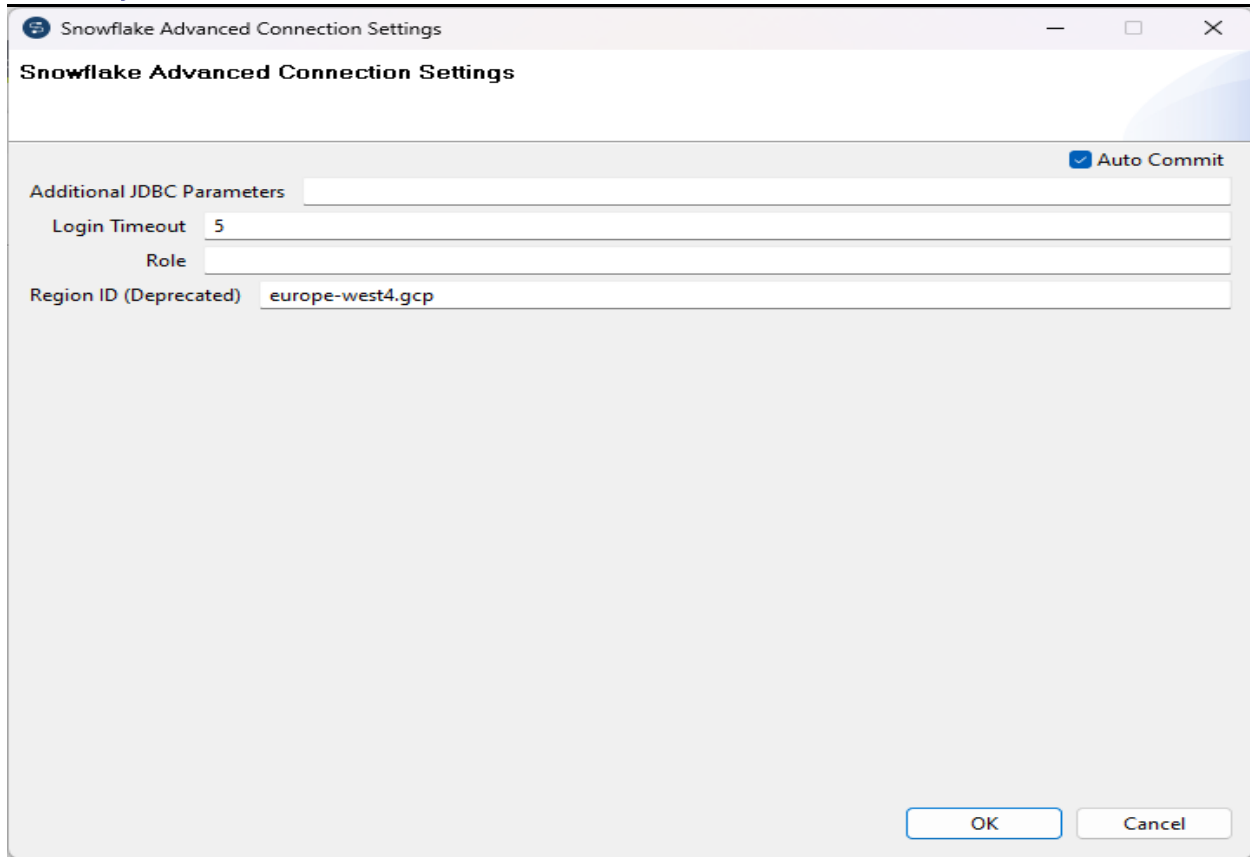
< Back

Next >

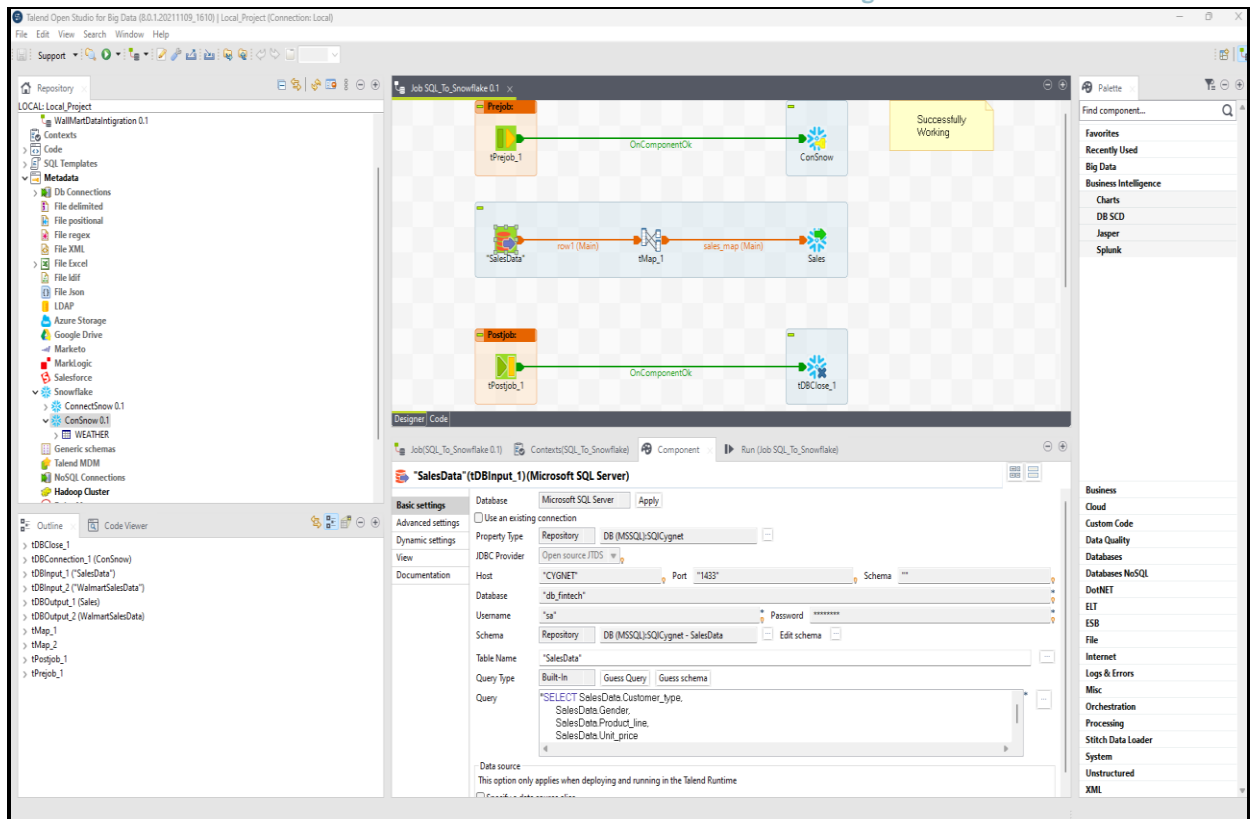
Finish

Cancel

Talend to Snowflake connection settings



Talend to Snowflake connection advance settings

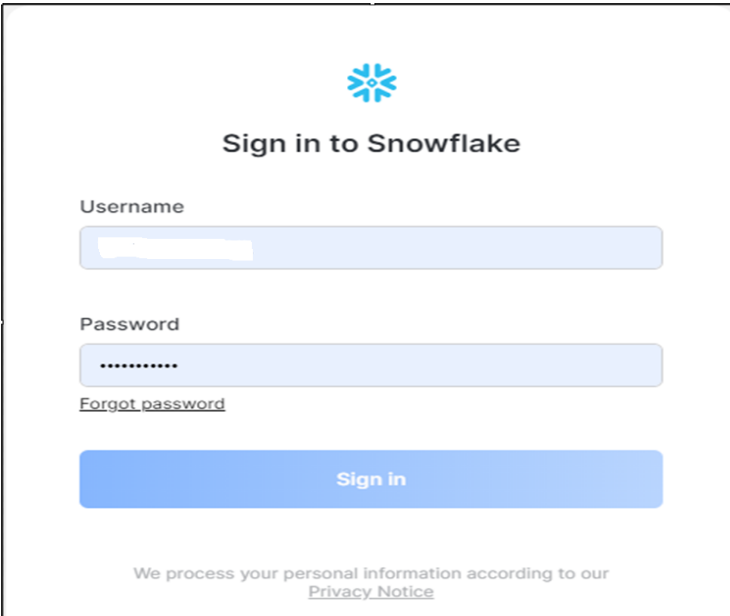



Talend to Snowflake ETL Job



Step 3: Verifying Data in Snowflake

1. **Log into Snowflake:**
 - Use the Snowflake web interface or SnowSQL command line tool to log into your Snowflake account.
2. **Verify Data Load:**
 - Query the target table in Snowflake to ensure that the data has been loaded correctly.
 - Perform basic checks such as row count and data integrity checks.





Sign in to Snowflake

Username

Password

[Forgot password](#)

Sign in

We process your personal information according to our [Privacy Notice](#)

Snowflake Login

app.snowflake.com/xqcpqps/qp79118/#/data/databases/DB_ATLANTIC/schemas/PUBLIC/table/WALMARTSALES/data-preview

DB_ATLANTIC / PUBLIC / WALMARTSALES

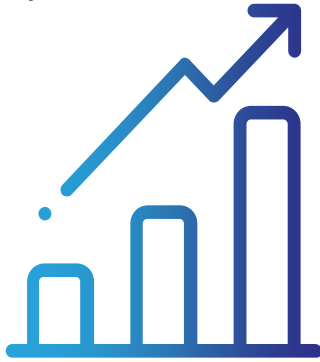
Table ACCOUNTADMIN 1 week ago 1K 32.0KB

Table Details Columns **Data Preview** Copy History

DOWNHILL 100 of 1K Rows • Updated 44 minutes ago

	CITY	CUSTOMER_TYPE	GENDER	PRODUCT_LINE	UNIT_PRICE	QUANTITY	TAX	TOTAL	DATE	TIME	PAYI
1	Yangon	Member	Female	Health and beauty	74.69	7	26.1415	548.9715	2019-01-05	19:08:00	Ev
2	Naypyitaw	Normal	Female	Electronic accessories	15.28	5	3.8200	80.2200	2019-03-08	04:29:00	Cr
3	Yangon	Normal	Male	Home and lifestyle	46.33	7	16.2155	340.5255	2019-03-03	19:23:00	Cr
4	Yangon	Member	Male	Health and beauty	58.22	8	23.2880	489.0480	2019-01-27	02:33:00	Ev
5	Yangon	Normal	Male	Sports and travel	86.31	7	30.2085	634.3785	2019-02-08	04:37:00	Ev
6	Naypyitaw	Normal	Female	Electronic accessories	85.39	7	29.8865	627.6165	2019-03-25	00:30:00	Ev
7	Yangon	Member	Female	Electronic accessories	68.84	6	20.6520	433.6920	2019-02-25	20:36:00	Ev
8	Naypyitaw	Normal	Female	Home and lifestyle	73.56	10	36.7800	772.3800	2019-02-24	05:38:00	Ev
9	Yangon	Member	Female	Health and beauty	36.26	2	3.6260	76.1460	2019-01-10	23:15:00	Cr
10	Mandalay	Member	Female	Food and beverages	54.84	3	8.2260	172.7460	2019-02-20	19:27:00	Cr
11	Mandalay	Member	Female	Fashion accessories	14.48	4	2.8960	60.8160	2019-02-06	00:07:00	Ev
12	Mandalay	Member	Male	Electronic accessories	25.51	4	5.1020	107.1420	2019-03-09	23:03:00	Cr
13	Yangon	Normal	Female	Electronic accessories	46.95	5	11.7375	246.4875	2019-02-12	04:25:00	Ev
14	Yangon	Normal	Male	Food and beverages	43.19	10	21.5950	453.4950	2019-02-07	22:48:00	Ev
15	Yangon	Normal	Female	Health and beauty	71.38	10	35.6900	749.4900	2019-03-29	01:21:00	Cr
16	Mandalay	Member	Female	Sports and travel	93.72	6	28.1160	590.4360	2019-01-15	22:19:00	Cr
17	Yangon	Member	Female	Health and beauty	68.93	7	24.1255	506.6355	2019-03-11	05:03:00	Cr
18	Yangon	Normal	Male	Sports and travel	72.61	6	21.7830	457.4430	2019-01-01	04:39:00	Cr
19	Yangon	Normal	Male	Food and beverages	54.67	3	8.2005	172.2105	2019-01-21	00:00:00	Cr
20	Mandalay	Normal	Female	Home and lifestyle	40.30	2	4.0300	84.6300	2019-03-11	21:30:00	Ev
21	Naypyitaw	Member	Male	Electronic accessories	86.04	5	21.5100	451.7100	2019-02-25	05:24:00	Ev

Walmart sales data transferred to Snowflake



Step 4: Building a Sales Analysis Dashboard in Power BI

1. Connect Power BI to Snowflake:

- Open Power BI Desktop.
- Click on "Get Data" and select "Snowflake" from the list of available connectors.
- Enter the Snowflake connection details (server, warehouse, database, schema, user, password).

2. Import Data from Snowflake:

- Navigate through the Snowflake database and select the tables or views containing the sales data.
- Load the data into Power BI for analysis.

3. Design the Dashboard:

- Create visualizations such as charts, graphs, and tables to represent sales metrics.
- Use Power BI features like slicers, filters, and drill-throughs to enhance the interactivity of the dashboard.

4. Publish the Dashboard:

- Once the dashboard is complete, publish it to the Power BI Service for sharing with stakeholders.
- Set up scheduled data refreshes to keep the dashboard updated with the latest data from Snowflake.

Data source settings

Manage settings for data sources that you have connected to using Power BI Desktop.

☒ Data sources in current file ☐ Global permissions

Search data source settings

at09140.europe-west4.gcp.snowflakecomputing.com;COMPUTE_WH

Change Source...

Export PBIDS

Edit Permissions...

Clear Permissions

Close

Power BI to Snowflake connection settings

WalmartSalesAnalysis • Last saved: Today at 5:24 AM

Search

ABU MOHAMMAD ISMAIL

File Home Help Table tools Column tools

Name: GROSS_MARGIN_P...

Format: General

Σ Summarization: Sum

Data type: Decimal number

Σ % 9 Auto

Data category: Uncategorized

Sort by column: Sort

Data groups: Groups

Manage relationships

New column: Calculations

Structure

Formatting

Properties

DATA

DATA

SEARCH

WALMARTSALES

CITY

COST OF GOODS

CUSTOMER SATISFACTION

CUSTOMER_TYPE

DATE

GENDER

GROSS_INCOME

GROSS_MARGIN_PERCENTAGE

RAVIMENT

PRODUCT_LINE

QUANTITY

RATING

Sales - Tax

TAX

TIME

TOTAL(INC. TAX)

UNIT_PRICE

	CITY	CUSTOMER_TYPE	GENDER	PRODUCT_LINE	UNIT_PRICE	QUANTITY	TAX	TOTAL(INC. TAX)	DATE	TIME	PAYMENT	COST OF GOODS	GROSS_MARGIN_PERCENTAGE	GROSS_INCOME	RATING	Customer Satisfaction
Mandalay	Member	Male	Electronic accessories	25.51	4	5	107	Saturday, March 9, 2019	11:03:00 PM	Cash	102.04	4.761905	5.102	6.8	Good	
Yangon	Normal	Female	Health and beauty	71.38	10	36	749	Friday, March 29, 2019	12:10:00 AM	Cash	713.8	4.761905	35.69	5.7	Good	
Mandalay	Normal	Male	Fashion accessories	33.52	1	2	35	Friday, February 8, 2019	9:31:00 PM	Cash	33.52	4.761905	1.676	6.7	Good	
Yangon	Normal	Male	Health and beauty	24.89	9	11	235	Friday, March 15, 2019	9:36:00 PM	Cash	224.01	4.761905	11.2005	7.4	Good	
Mandalay	Normal	Male	Sports and travel	82.78	8	34	704	Thursday, January 10, 2019	8:49:00 PM	Cash	670.24	4.761905	20.512	5.1	Good	
Naypyitaw	Member	Male	Home and lifestyle	56.11	2	6	118	Saturday, February 2, 2019	4:11:00 AM	Cash	112.22	4.761905	5.611	6.3	Good	
Mandalay	Member	Female	Sports and travel	69.12	6	21	435	Friday, February 8, 2019	7:03:00 PM	Cash	414.72	4.761905	20.736	5.6	Good	
Naypyitaw	Member	Male	Health and beauty	15.37	2	2	32	Saturday, March 16, 2019	1:47:00 AM	Cash	30.74	4.761905	1.537	7.2	Good	
Yangon	Member	Male	Home and lifestyle	44.34	2	4	93	Wednesday, March 27, 2019	5:26:00 AM	Cash	88.68	4.761905	4.434	5.8	Good	
Yangon	Member	Female	Home and lifestyle	72.35	10	36	760	Sunday, January 20, 2019	9:55:00 PM	Cash	723.5	4.761905	36.175	5.4	Good	
Yangon	Member	Male	Health and beauty	15.87	10	8	167	Wednesday, March 13, 2019	10:40:00 AM	Cash	158.7	4.761905	7.935	5.8	Good	
Yangon	Normal	Male	Sports and travel	78.77	10	39	827	Thursday, January 24, 2019	4:04:00 AM	Cash	787.7	4.761905	39.885	6.4	Good	
Naypyitaw	Normal	Male	Fashion accessories	62.12	10	31	652	Monday, February 11, 2019	10:19:00 PM	Cash	621.2	4.761905	31.06	5.9	Good	
Naypyitaw	Normal	Female	Health and beauty	20.38	5	5	107	Tuesday, January 22, 2019	12:56:00 AM	Cash	101.9	4.761905	5.095	6	Good	
Naypyitaw	Member	Male	Sports and travel	48.91	5	12	257	Saturday, March 9, 2019	4:17:00 AM	Cash	244.55	4.761905	12.2275	6.6	Good	
Yangon	Normal	Male	Sports and travel	42.47	1	2	45	Wednesday, January 2, 2019	10:57:00 PM	Cash	42.47	4.761905	2.1225	5.7	Good	
Mandalay	Normal	Female	Health and beauty	76.99	6	23	485	Wednesday, February 27, 2019	1:55:00 PM	Cash	461.94	4.761905	23.097	6.1	Good	
Naypyitaw	Member	Female	Home and lifestyle	47.38	4	9	199	Wednesday, January 23, 2019	4:25:00 AM	Cash	189.52	4.761905	9.476	7.1	Good	
Mandalay	Normal	Male	Home and lifestyle	82.7	6	25	521	Tuesday, March 5, 2019	12:14:00 AM	Cash	496.2	4.761905	24.81	7.4	Good	
Naypyitaw	Normal	Male	Fashion accessories	78.55	9	35	742	Friday, March 8, 2019	7:22:00 PM	Cash	706.95	4.761905	35.3475	7.2	Good	
Yangon	Normal	Male	Sports and travel	62.13	6	19	391	Friday, March 22, 2019	2:19:00 AM	Cash	372.78	4.761905	18.639	7.4	Good	
Mandalay	Normal	Female	Fashion accessories	39.62	7	14	291	Friday, January 25, 2019	7:18:00 PM	Cash	277.34	4.761905	13.867	7.5	Good	
Mandalay	Normal	Female	Sports and travel	34.84	4	7	146	Sunday, February 10, 2019	12:36:00 AM	Cash	139.36	4.761905	6.968	7.4	Good	
Naypyitaw	Normal	Male	Fashion accessories	90.22	3	14	284	Monday, February 18, 2019	1:39:00 AM	Cash	270.66	4.761905	13.533	6.2	Good	
Mandalay	Member	Male	Electronic accessories	72.17	1	4	76	Friday, January 4, 2019	1:40:00 AM	Cash	72.17	4.761905	3.6085	6.1	Good	
Yangon	Normal	Male	Sports and travel	63.69	1	3	67	Monday, February 25, 2019	10:21:00 PM	Cash	63.69	4.761905	3.1845	6	Good	
Yangon	Normal	Male	Food and beverages	51.28	6	15	323	Saturday, January 19, 2019	10:31:00 PM	Cash	307.68	4.761905	15.384	6.5	Good	
Naypyitaw	Normal	Male	Electronic accessories	20.85	8	8	175	Sunday, March 3, 2019	1:17:00 AM	Cash	166.8	4.761905	8.34	6.3	Good	
Naypyitaw	Normal	Male	Fashion accessories	64.26	7	22	472	Saturday, February 9, 2019	4:00:00 AM	Cash	449.62	4.761905	22.491	5.7	Good	
Mandalay	Member	Male	Home and lifestyle	46.47	4	9	195	Friday, February 8, 2019	4:53:00 AM	Cash	185.88	4.761905	9.294	7	Good	
Mandalay	Member	Female	Electronic accessories	57.49	4	11	241	Friday, March 15, 2019	5:57:00 AM	Cash	229.96	4.761905	11.498	6.6	Good	
Mandalay	Member	Female	Sports and travel	29.61	7	10	218	Monday, March 11, 2019	9:53:00 PM	Cash	207.27	4.761905	10.2635	6.5	Good	
Yangon	Member	Female	Electronic accessories	94.64	3	14	298	Thursday, February 21, 2019	10:55:00 PM	Cash	283.92	4.761905	14.196	5.5	Good	
Yangon	Normal	Male	Food and beverages	43.25	2	4	91	Wednesday, March 20, 2019	8:56:00 PM	Cash	86.5	4.761905	4.325	6.2	Good	
Mandalay	Member	Female	Electronic accessories	90.7	6	27	571	Tuesday, February 26, 2019	4:52:00 AM	Cash	544.2	4.761905	27.21	5.3	Good	
Mandalay	Normal	Female	Fashion accessories	81.37	2	8	171	Sunday, January 26, 2019	12:80:00 AM	Cash	162.74	4.761905	8.137	6.5	Good	
Mandalay	Member	Male	Fashion accessories	73.82	4	15	310	Thursday, February 21, 2019	12:31:00 AM	Cash	295.28	4.761905	14.764	6.7	Good	

Table: WALMARTSALES (1,000 rows) Column: GROSS_MARGIN_PERCENTAGE (1 distinct values)

Data Transferred to Power BI from Snowflake



Power BI Dashboard

Step 5: Best Practices and Considerations



- **Data Quality:**
 - Ensure data quality checks are in place both in Talend during the ETL process and in Snowflake after loading.
- **Performance Optimization:**
 - Optimize SQL queries in SQL Server for efficient data extraction.
 - Use Snowflake's clustering and partitioning features to enhance query performance.
- **Monitoring:**
 - Set up monitoring and alerting for ETL jobs in Talend to promptly address any failures or issues.
 - Use Snowflake's monitoring tools to keep track of data usage and performance.

By following these detailed steps, you can effectively transfer Walmart sales data from SQL Server to Snowflake using Talend Open Studio and create a comprehensive sales analysis dashboard in Power BI.