Low Level Design

Data Analysis

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Contents:

1. Introduction

1.1 What is Low-Level design document?

The goal of the LDD or Low-level design document (LLDD) is to give the internal logic design of the actual program code for the Expenditure Data Analysis dashboard. LDD describes the class diagrams with the methods and relations between classes and programs specs. It describes the modules so that the programmer can directly code the program from the document.

1.2 Scope

Low-level design (LLD) is a component-level design process that follows a step-by step refinement process. The process can be used for designing data structures, required software architecture, source code and ultimately, performance algorithms. Overall, the data organization may be defined during requirement analysis and then refined during data design work.

2. Architecture

Power BI Desktop Architecture

1. Get Power BI Desktop

With Power BI Desktop, you can build advanced queries, models, and reports that visualize data. You can also build data models, create reports, and share your work by publishing to the Power BI service. Power BI Desktop is a free download.

2. BI solution architecture in the Centre of Excellence

BI solution architecture can consist of:

- Data sources
- Data ingestion
- Big data / data preparation
- Data warehouse
- BI semantic models
- Reports

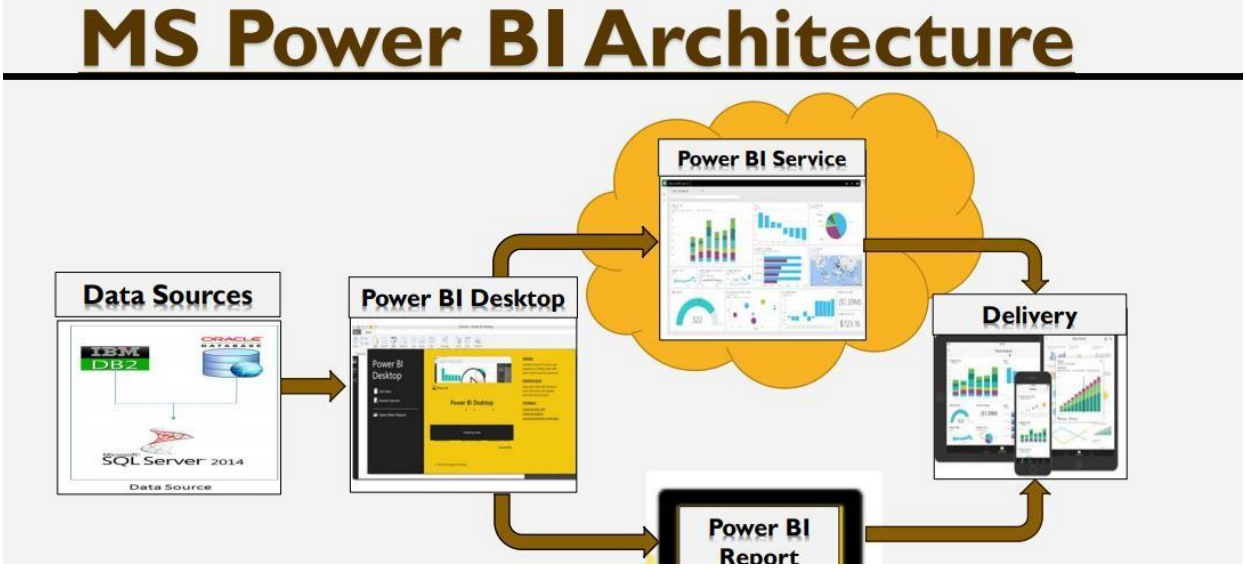


Fig: Power BI Architecture diagram

5 Low Level Design (LLD)

Microsoft Power BI Desktop is a companion desktop application to Power BI.

With Power BI Desktop, you can:

1. **Get data:**

The Power BI Desktop makes discovering data easy. You can import data from a wide variety of data sources. After you connect to a data source, you can shape the data to match your analysis and reporting needs.

2. **Create relationships and enrich your data model with new measures and data formats:**

When you import two or more tables, oftentimes you'll need to create relationships between those tables. The Power BI Desktop includes the Manage Relationships dialog and the Relationships view, where you can use Autodetect to let the Power BI Desktop find and create any relationships, or you can create them yourself. You can also very easily create your own measures and calculations or customize data formats and categories to enrich your data for additional insights.

3. **Create reports:**

The Power BI Desktop includes the Report View. Select the fields you want, add filters, choose from dozens of visualizations, format your reports with custom colours, gradients and several other options. The Report View gives you the same great report and visualizations tools just like when creating a report on PowerBI.com.

4. **Save your reports:**

With the Power BI Desktop, you can save your work as a Power BI Desktop file. Power BI Desktop files have a .pbix extension.

5. **Upload or Publish your reports:**

You can upload the reports you created and saved in the Desktop to your Power BI site. You can also publish them to Power BI right from Power BI Desktop.

3. Architecture Description

3.1. Data Description: The Dataset contains year wise Product sales detailswith the following parameters:

1) Aggregate Sales:

The Total Sales Amount KPI is a pivotal metric that encapsulates the overall revenue generated by a business. It serves as a comprehensive indicator of the company's financial performance, representing the sum of all sales transactions over a specific period.

2) Product Margin:

The Total Product Margin KPI is a crucial metric that measures the profitability of a company's entire product line. It calculates the difference between the total revenue generated from product sales and the total cost of producing or procuring those products.

3) Profit Margin %:

The Total Profit Margin Percentage KPI is a vital financial metric that assesses a company's overall profitability. It represents the percentage of revenue that translates into profit after accounting for all costs, including production, operating, and overhead expenses. A high profit margin percentage indicates efficient cost management and strong pricing strategies, reflecting a healthy financial position.

4) Total Discount Amount:

The Total Discount Amount KPI is a critical metric used by businesses to evaluate the effectiveness of their discount strategies. It represents the cumulative value of all discounts applied to products or services within a specific period.

5) Revenue Deficits:

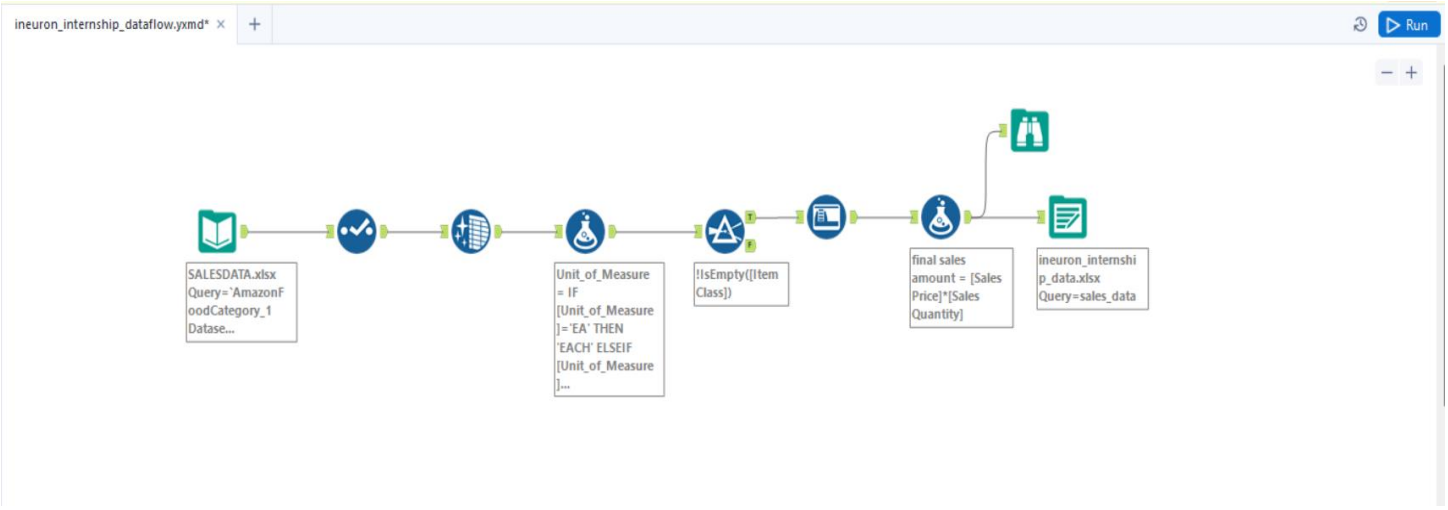
A revenue deficit occurs when realized net income is less than the projected net income. This happens when the actual amount of revenue and/or the actual number of expenditures do not correspond with budgeted revenue and expenditures.

3.2. Alteryx:

Alteryx is a powerful data analytics platform designed to simplify the process of preparing, blending, and analyzing complex datasets. It offers a user-friendly interface that allows data professionals to perform advanced analytics without the need for extensive coding. Alteryx integrates seamlessly with various data sources, enabling users to extract, transform, and load (ETL) data effortlessly. One of its key features is its ability to automate repetitive tasks, saving valuable time and resources. Furthermore, Alteryx provides advanced predictive and spatial analytics capabilities, making it a popular choice for organizations seeking comprehensive solutions for their data analysis needs.

3.3. Data Preparation:

- In the Preparation Process, we will convert our original datasets with other necessary attributes format. And will merge it.
- All the datasets are of same format as shown below: Original dataset.



A1 CustKey

Order Numbe	Promised Delive	Sales Amoun	Sales Amount Based on List Price	Sales Cost Amount	Sales Margin Amount	Sales Price	Sales Quantit	Sales Rep	U/M
124295	05-01-17	229.76	502.8	164.36	65.4	11.488	20	166	EA
218219	08-02-17	362.02	754.2	246.54	115.48	12.06733333	30	185	EA
118219	19-02-19	347.54	754.2	246.54	101	11.58466667	30	185	EA
207623	08-08-17	362.02	754.2	246.54	115.48	12.06733333	30	185	EA
107623	20-08-19	347.54	754.2	246.54	101	11.58466667	30	185	EA
213205	22-10-17	239.33	502.8	164.36	74.97	11.9665	20	166	EA
113205	03-11-19	229.76	502.8	164.36	65.4	11.488	20	166	EA
224295	24-12-17	239.33	502.8	164.36	74.97	11.9665	20	166	EA
318219	31-01-18	372.88	754.2	246.54	126.34	12.42933333	30	185	EA
123081	03-01-17	209.08	398	68.78	140.3	104.54	2	143	EA
122025	05-01-17	393.06	796	137.55	255.51	98.265	4	125	EA
123363	06-01-17	211.28	398	68.78	142.5	105.64	2	127	EA
218893	19-02-17	330.12	597	103.16	226.96	110.04	3	157	EA
218640	19-02-17	326.68	597	103.16	223.52	108.8933333	3	175	EA
218625	20-02-17	336.99	597	103.16	233.83	112.33	3	120	EA
118640	02-03-19	313.61	597	103.16	210.45	104.5366667	3	175	EA
118893	02-03-19	316.92	597	103.16	213.76	105.64	3	157	EA
118625	03-03-19	323.51	597	103.16	220.35	107.8366667	3	120	EA
219467	04-03-17	204.72	398	68.78	135.94	102.36	2	167	EA
116162	12-03-19	509.6	995	171.94	337.66	101.92	5	168	EA
119386	12-03-19	407.68	796	137.55	270.13	101.92	4	168	EA
208391	19-08-17	330.12	597	103.16	226.96	110.04	3	157	EA
208100	19-08-17	326.68	597	103.16	223.52	108.8933333	3	175	EA
208084	20-08-17	336.99	597	103.16	233.83	112.33	3	120	EA
208968	29-08-17	424.67	796	137.55	287.12	106.1675	4	168	EA
203762	29-08-17	530.83	995	171.94	358.89	106.166	5	168	EA
108100	31-08-19	313.61	597	103.16	210.45	104.5366667	3	175	EA
108391	31-08-19	316.92	597	103.16	213.76	105.64	3	157	EA
108084	01-09-19	323.51	597	103.16	220.35	107.8366667	3	120	EA
209072	02-09-17	204.72	398	68.78	135.94	102.36	2	167	EA
103762	10-09-19	509.6	995	171.94	337.66	101.92	5	168	EA
108968	10-09-19	407.68	796	137.55	270.13	101.92	4	168	EA
209112	20-10-17	204.72	398	68.78	135.94	102.36	2	139	EA
211734	20-10-17	217.79	398	68.78	149.01	108.895	2	143	EA

U/M = unit of measure

EA = each

SE = some SI unit like kgs or gallons

PR = pair

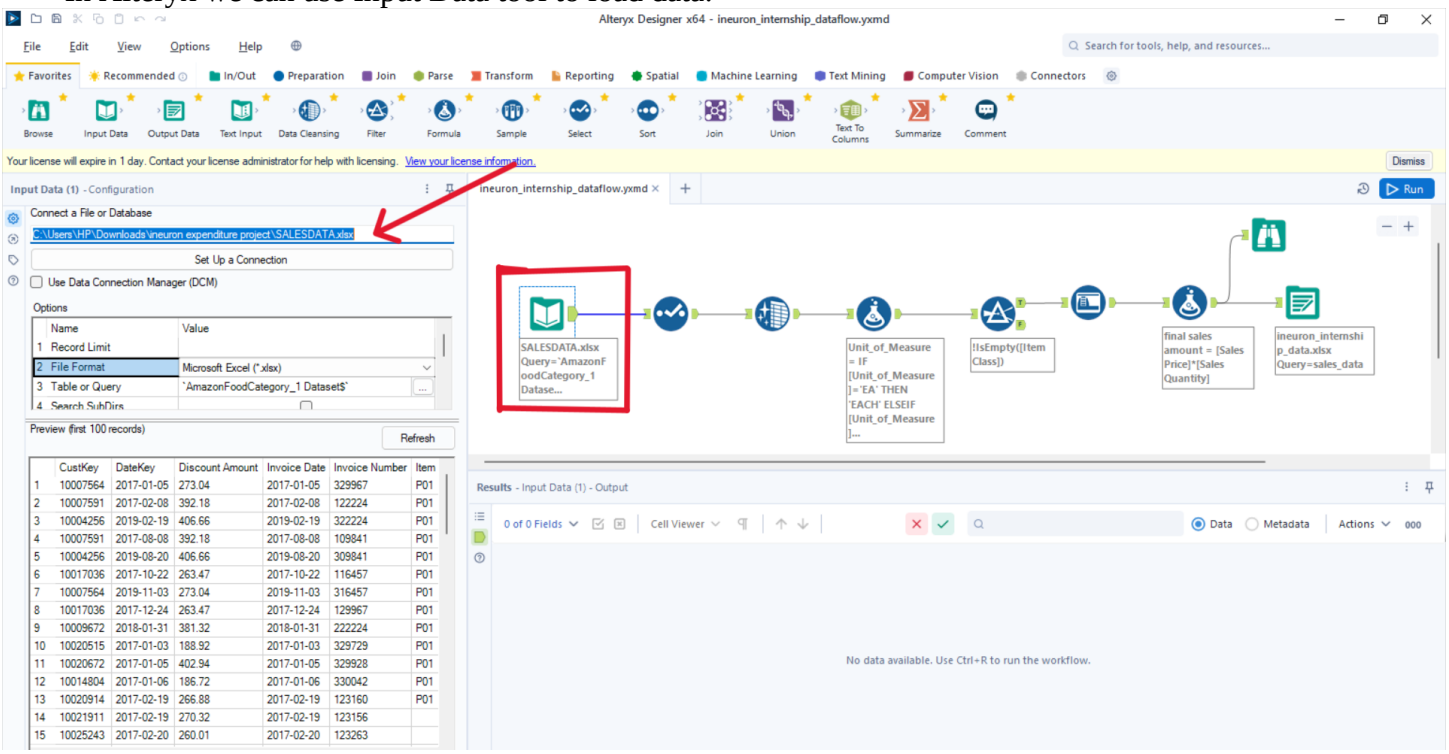
- As you all can notice that format of the data, we have is not good to analyse and visualize. So, we need to reconstruct the structure of the dataset.

Low Level Design (LLD)

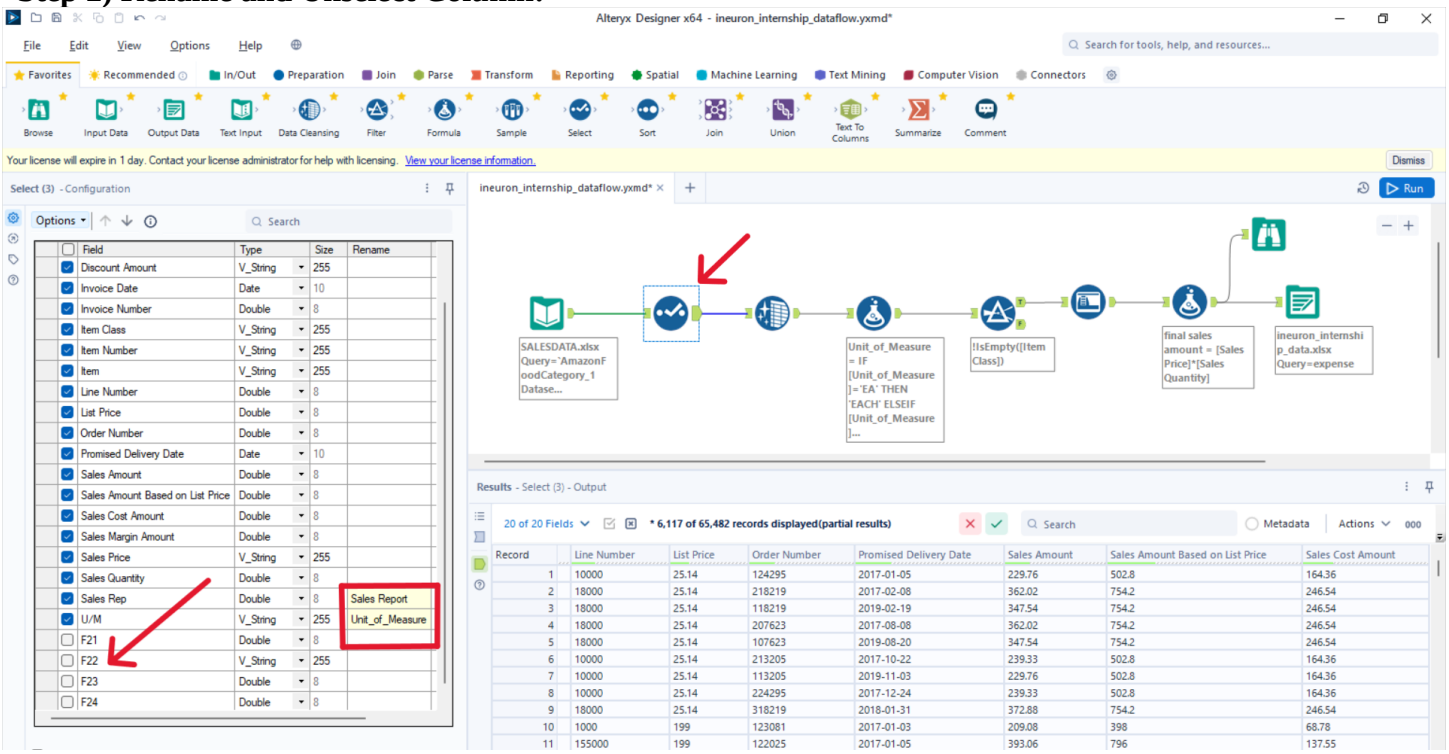
We will be using only Alteryx for data restructuring and cleaning purpose.

Step 1) Input Data:

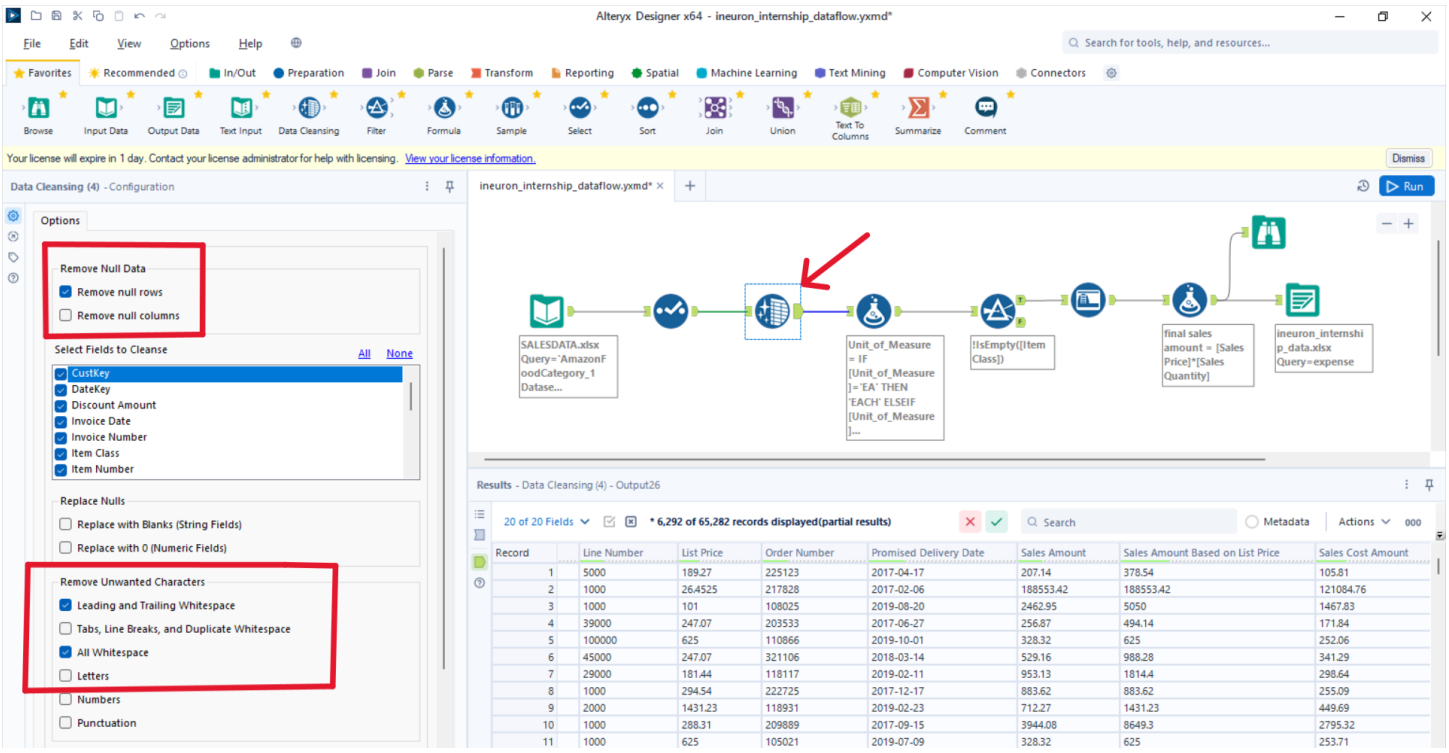
In Alteryx we can use Input Data tool to load data.



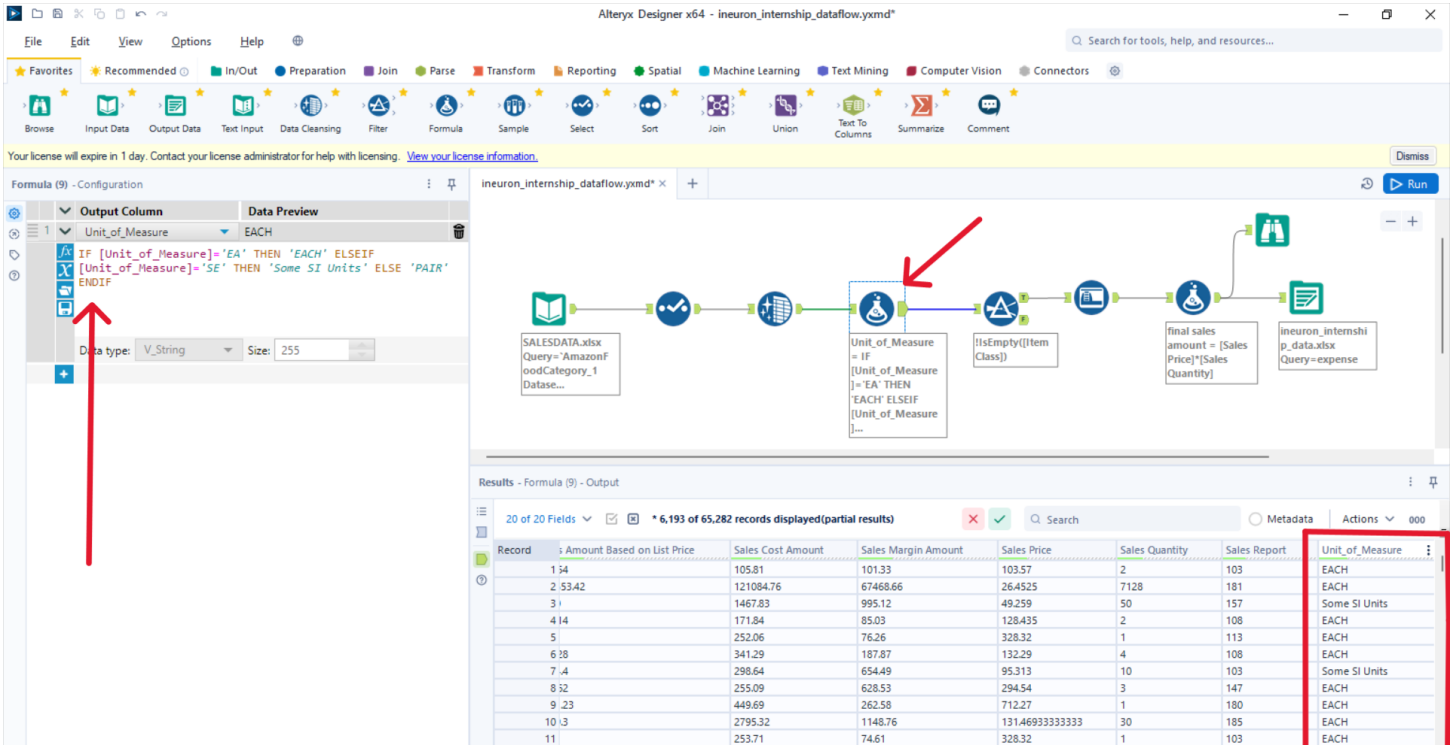
Step 2) Rename and Unselect Column:



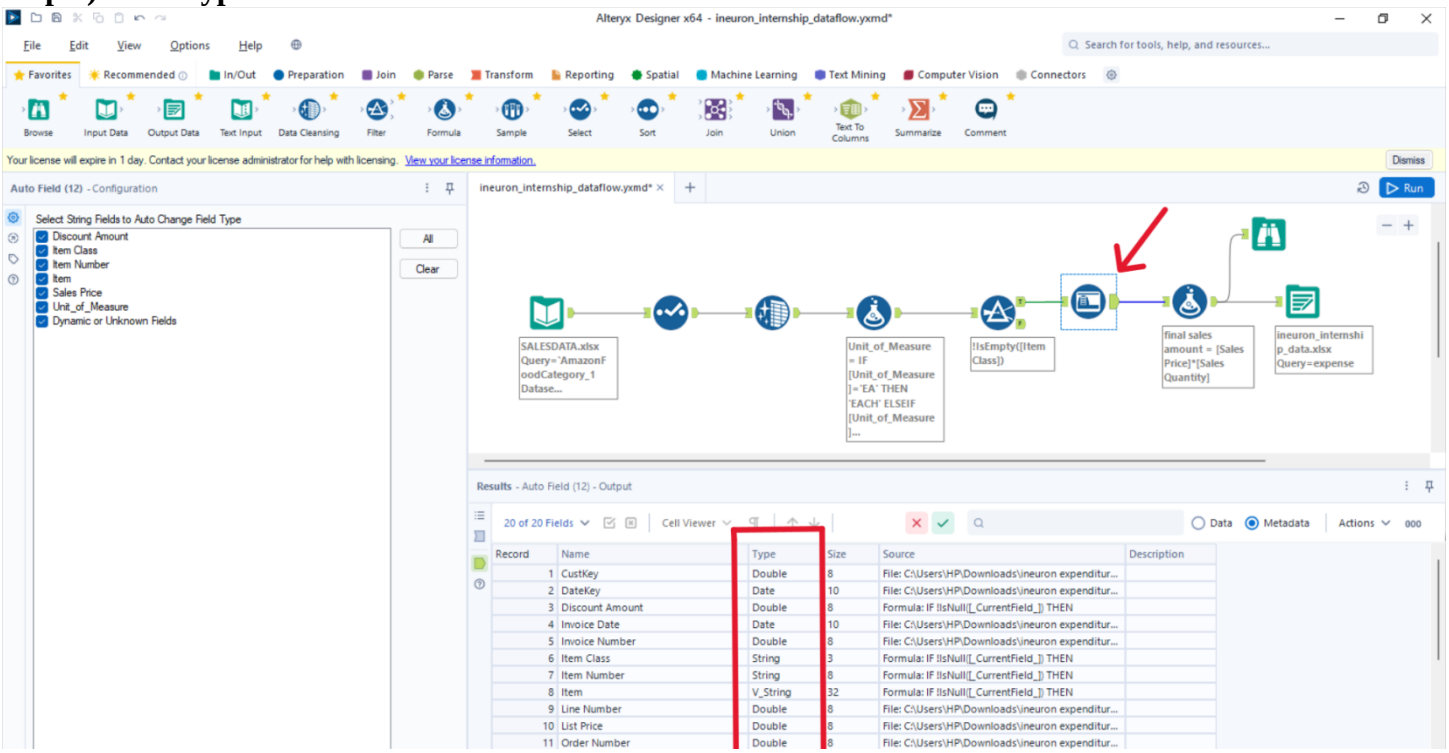
Step 3) Remove NULLs:



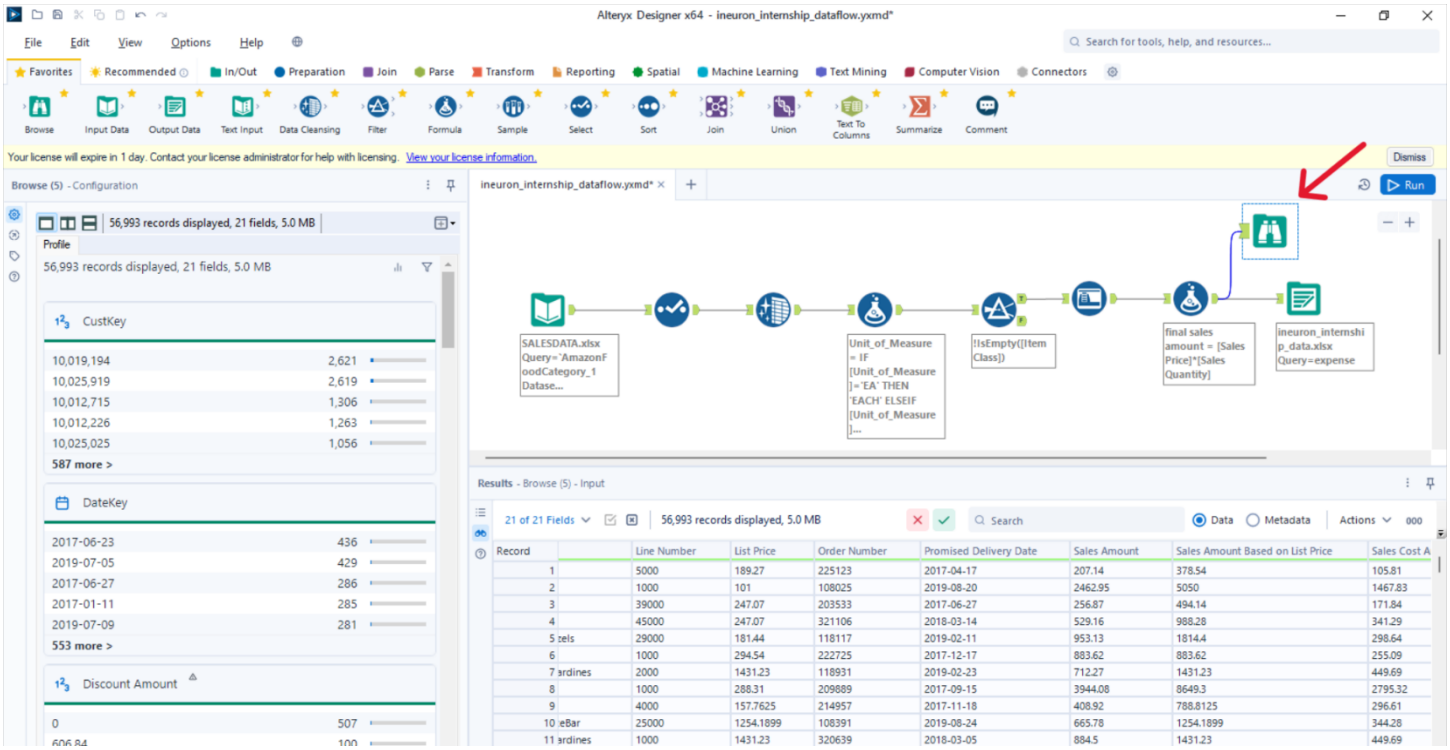
Step 4) Column Data Correction:



Step 5) Data Type Correction:



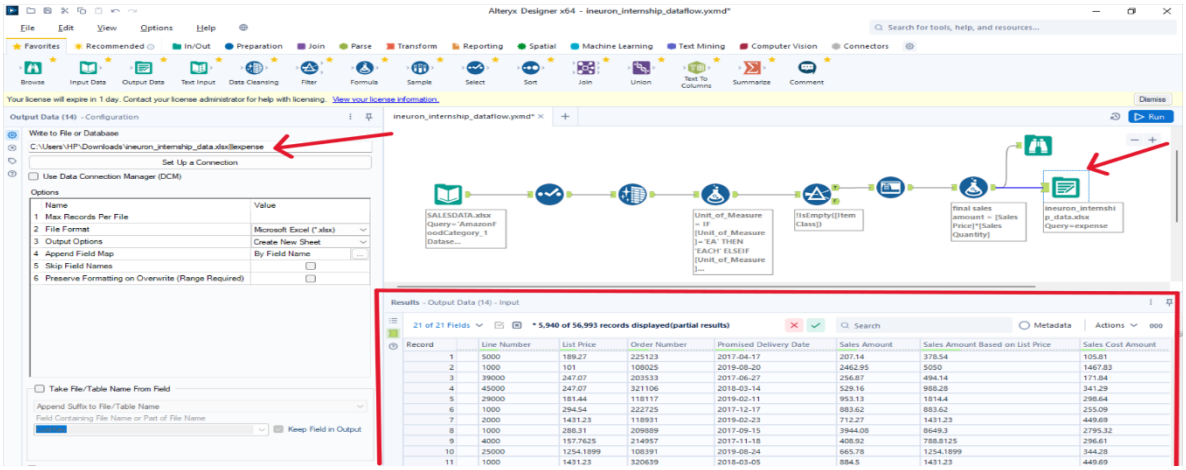
Step 6) Final dataset:



3.4 Export Data:

1. **Load Dataset**
2. **Data Preparation**
3. **Data Visualization**

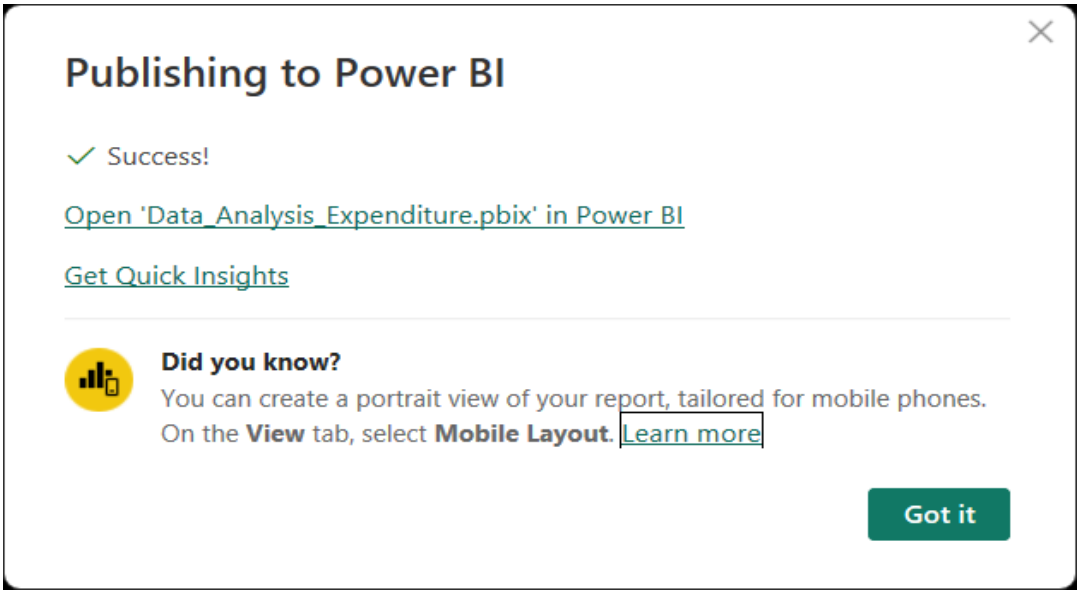
- After performing Pre-processing and cleaning dataset.
- After cleaned data, its exported into csv as sales_data.csv.
- Now this cleaned dataset uses for creating dashboard in Power BI.



4. Deployment:

Once you've completed your dashboard, follow these steps:

1. Load dataset on Power BI in csv formats and creates visuals for dashboard.
2. After creating all visual, create insightful dashboard.
3. Then Login into Power BI Service by using Microsoft developer account.
4. Then create new project workspace for uploading dashboard and reports into this workspace.



5. Cases Study:

CASE DESCRIPTION	CONCLUSIONS
Examining past expenditure records enables the identification of trends and patterns, facilitating the prediction of future costs and enhancing resource distribution efficiency.	The data analysis revealed significant interconnections between cost factors and key business variables like revenue, customer satisfaction, and employee productivity. This indicates that implementing cost management strategies that account for these connections can lead to comprehensive optimizations, positively impacting various aspects of the business.
Exploring potential interconnections between cost factors and various business variables like revenue, customer satisfaction, or employee productivity can reveal opportunities to enhance cost management strategies.	The data analysis unveiled substantial links between cost factors and crucial business variables such as revenue, customer satisfaction, and employee productivity. This underscores the importance of implementing cost management strategies that consider these connections, leading to holistic optimizations that positively influence different aspects of the business.
Efforts to reduce costs will enhance overall profitability.	Upon analyzing the data, it was observed that businesses implementing cost reduction strategies saw a concurrent rise in profitability. This reinforces the theory that adept cost management significantly enhances the bottom line.

Low Level Design (LLD)