

Low Level Design (LLD)

ANALYZING EXPENDITURE

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1. Introduction

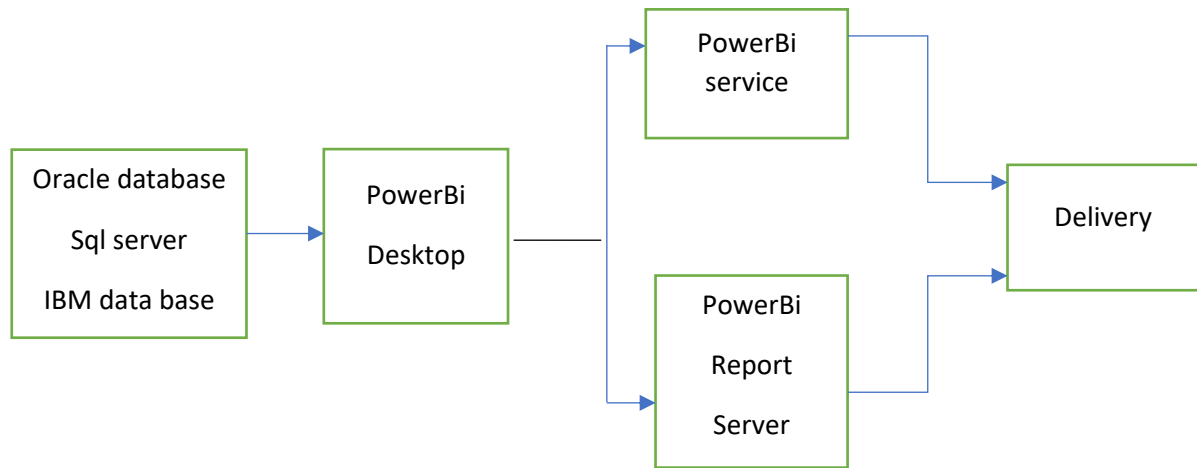
1.1. What is Low-Level design document?

Low Level Design in short LLD is like detailing HLD means it refers to component-level design process. It describes detailed description of each and every module means it includes actual logic for every system component and it goes deep into each modules specification. It is also known as micro level/detailed design. It is created by designers and developers. It converts the High-Level Solution into Detailed solution. It is created second means after High Level Design

1.2. Scope

Purpose. The goal of LLD or a low-level design document (LLDD) is to give the internal logical design of the actual program code. Low-level design is created based on the high-level design. LLD describes the class diagrams with the methods and relations between classes and program specs.

2. Architecture



1. Data Sources

An important component of Power BI is its vast range of data sources. You can import data from files in your system, cloud-based online data sources or connect directly to live connections. If you import from data on-premise or online services there is a limit of 1 GB. Some commonly used data sources in Power BI are:

- Excel
- Text/CSV
- XML
- JSON
- Oracle Database
- IBM DB2 Database
- MySQL Database
- PostgreSQL Database
- Sybase Database
- Teradata Database
- SAP HANA Database
- SAP Business Warehouse server
- Amazon Redshift
- Impala
- Google BigQuery (Beta)
- Azure SQL Database
- Salesforce Reports
- Google Analytics

2. Power BI Desktop

Power BI Desktop is a client-side tool known as a companion development and authoring tool.

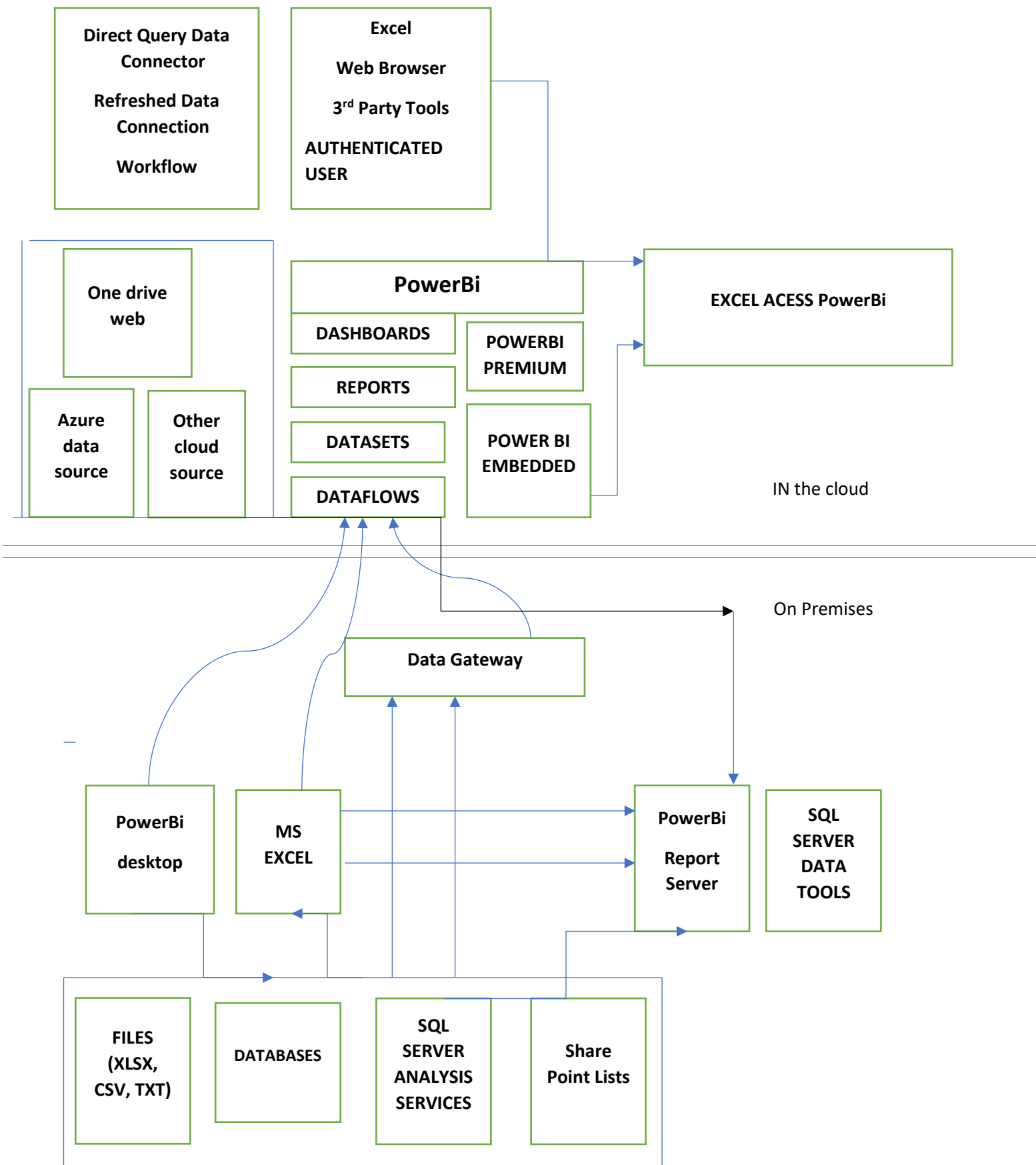
This desktop-based software is loaded with tools and functionalities to connect to data sources, transform data, data modelling and creating reports.

3 Power BI Gateway

This component is used to connect and access on-premise data in secured networks. Power BI Gateways are generally used in organizations where data is kept in security and watch. Gateways help to extract out such data through secure channels to Power BI platforms for analysis and reporting

4 Power BI Embedded

Power BI Embedded offers APIs which are used to embed visuals into custom applications.

PowerBi Server Architecture

If you look closely, the above diagram has numbering done on each component in the architecture. Also, note that the lower half part is the on-premise part and the upper half part depicts the on-cloud services.

To begin with, what forms the starting point or source of all the data flowing into Power BI components are the data sources. Power BI has the get data feature using which you can connect to different kinds of data sources like files, on-premise or on-cloud databases, direct connections, etc. Data connections are established from these data sources to authoring tools such as Power BI Desktop.

On-Premise

Power BI Desktop is a companion development, authoring, and publishing tool. You can import data from data sources to Power BI Desktop and use it to create reports and then publish them on a Power BI Service or Power BI Report Server.

You can also publish Excel workbooks directly using Power BI Publisher for Excel to the Power BI Report Server. The SQL Server Data tools and Report Publisher help in creating datasets, KPIs, mobile reports, paginated reports, etc. The reports from all kinds of reports are published to the Power BI Report Server from where they are distributed to the end-users.

On-Cloud

An important component in Power BI architecture is the Power BI Gateway. The Power BI Gateway acts as a secure channel to transport data from on-premise data sources to on-cloud apps or sites.

On the cloud side of the architecture, resides a lot of components. Like a complete Power BI suite having dataflows, datasets, dashboards, reports, Power BI Embedded, Power BI Premium, etc. You can embed your reports and dashboards into Teams, SharePoint, custom applications, etc. There are on-cloud data sources as well that connects to Power BI tools via direct connections.

At last, there is a layer of authenticated users who share the published reports and dashboard and collaborate with one another to make educated decisions based on the insights. There are different kinds of users who consume Power BI reports and dashboards and connect through web browsers, Excel, third-party tools, and mobile devices (iOS, Windows, Android apps).

3. Architecture Description

3.1. Data Description

The Dataset contains year wise distribution of all the states of India for the following parameters:

1) **Aggregate Expenditure:**

Aggregate expenditure is a measure of national income. Aggregate expenditure is defined as the current value of all the finished goods and services in the economy. The Aggregate expenditure is thus the sum total of all the expenditures undertaken in the economy by the factors during a given time period

2) **Capital Expenditure:**

Capital expenditure or capital expense is the money an organization or corporate entity spends to buy, maintain, or improve its fixed assets, such as buildings, vehicles, equipment, or land.

3) **Gross Fiscal Deficits:**

The gross fiscal deficit (GFD) is the excess of total expenditure including loans net of recovery over revenue receipts (including external grants) and non-debt capital receipts. Generally fiscal deficit takes place either due to revenue deficit or a major hike in capital expenditure.

4) **Nominal GDP Series:**

Nominal GDP is an assessment of economic production in an economy that includes current prices in its calculation. In other words, it doesn't strip out inflation or the pace of rising prices, which can inflate the growth figure.

5) **Own Tax Revenues:**

The income generated by states for various activities include revenue receipts like taxes & grants and capital receipts like loans. States which are able to generate more revenue on their own are less dependent on the devolution & central grants.

6) **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 amount of expenditures do not correspond with budgeted revenue and expenditures.

7) **Revenue Expenditure:**

Revenue expenditures are short-term expenses used in the current period or typically within one year. Revenue expenditures include the expenses required to meet the ongoing operational costs of running a business, and thus are essentially the same as operating expenses (OPEX).

8) **Social Sector Expenditure:**

Social sector expenditure has been defined as the total of all expenditures incurred by the central and the state governments on promotional and protective measures.

3.2. Web Scrapping

Web scraping refers to the extraction of data from a website. This information is collected and then exported into a format that is more useful for the user. Be it a spreadsheet or an API.

Although web scraping can be done manually, in most cases, automated tools are preferred when scraping web data as they can be less costly and work at a faster rate. But in most cases, web scraping is not a simple task. Websites come in many shapes and forms, as a result, web scrapers vary in functionality and features.

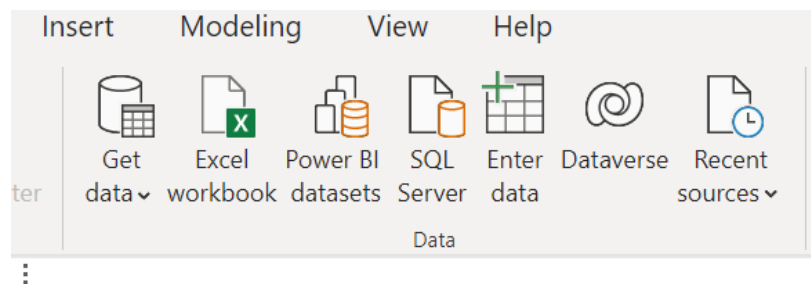
3.3. Data Transformation

Data transformation is the process of converting data from one format or structure into another format or structure. It is a fundamental aspect of most data integration and data management tasks such as data wrangling, data warehousing, data integration and application integration.

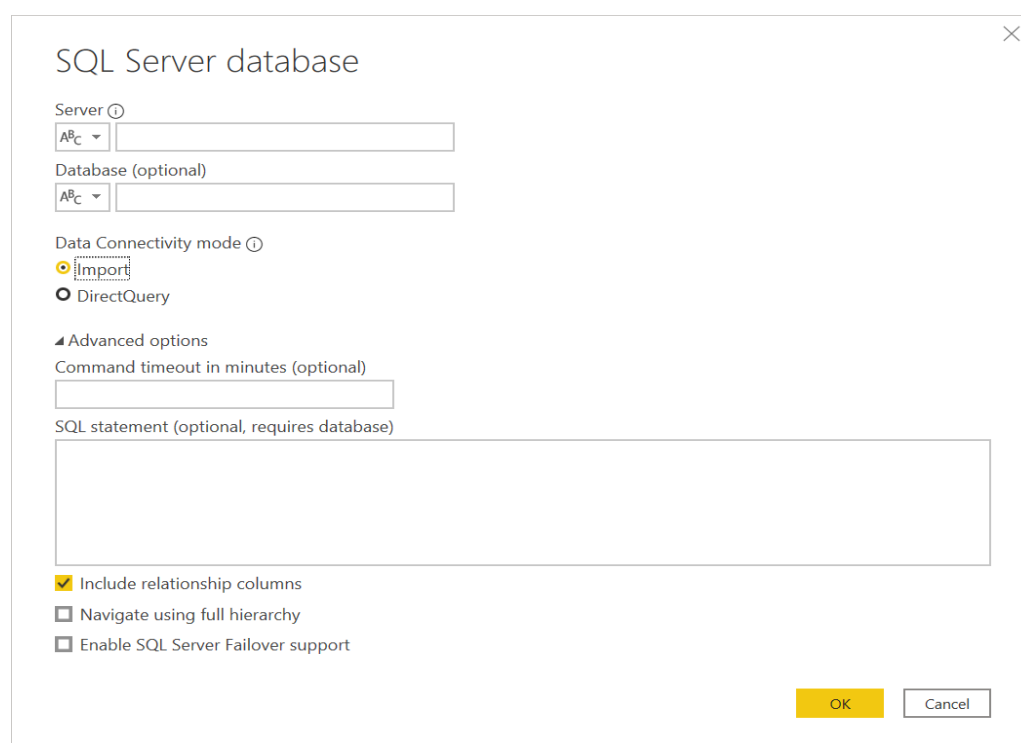
3.4. SQL connection and setting up the data source

Configuring PowerBi

Step 1: Either click on 'Get Data' or select 'SQL Server' in home ribbon.

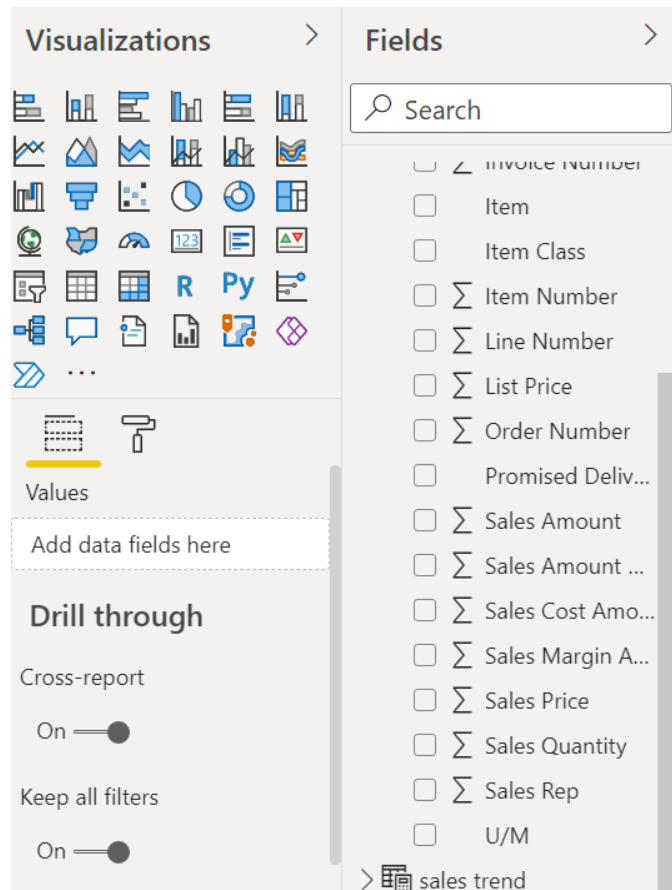


Step 2: In the SQL Server database dialog, write the name of your server, and select 'DirectQuery'. You can also specify the name of your database. Click 'Ok'.



Step 3: In the navigation panel, select your data which you want to analyze and visualize. Click 'Load'.

Step 4: On the right-hand side of your screen, you will get your table data. Now you can visualize it, according to your need.



This is how you connect SQL SERVER with PowerBi, now we can start analysis.