Low Level Design

Analyze International Debt Statistics

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# Contents

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1 Introduction

1.1 What is Low -Level Design document ?

The goal of the LDD or Low - Level Design document is to give the internal logic design of the actual plan of action for the Analyze International Debt Statistics. LDD describes the data transformation and data cleaning with data visualization for the required end goal. It describes the overall plan of actions and steps in the project.

1.2 Scope

Low Level Design (LLD) is a component level design process that follows a step by step refinement process. The process used for required data cleaning, data visualization techniques, data transformation techniques , performance optimization, report generation, dashboard publications etc. Overall , the data organization may be defined during requirement analysis and then refined during data design work.

2. Architecture
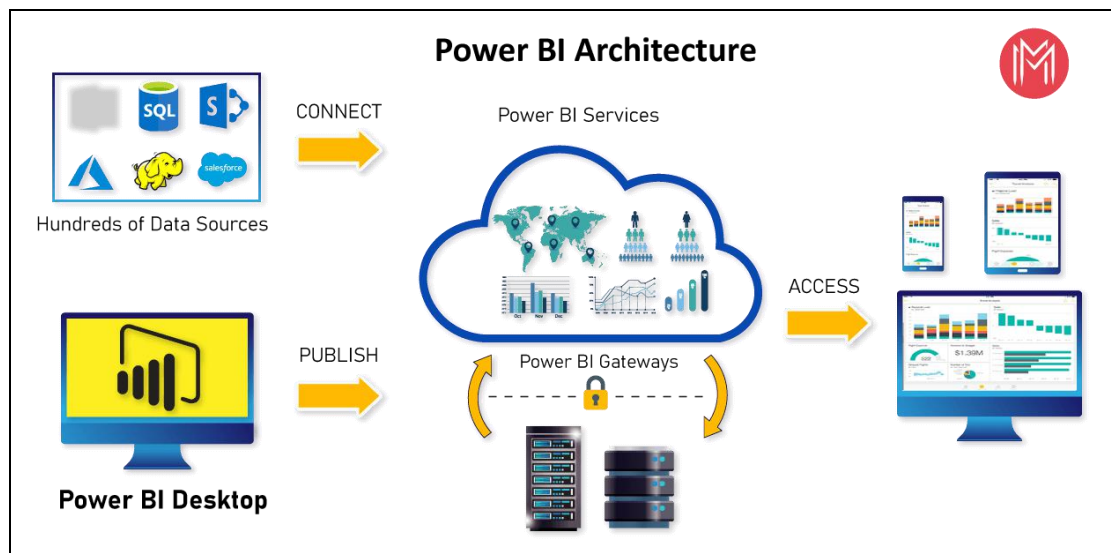
1. Data Sources
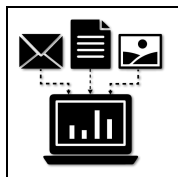
Power Bi can supply information from different online sources and file types.Import the information into the power Bi or establish a live service to receive the information. If you import the file into power bi it compresses the data sets up to 1 GB and uses a direct query if the compressed data sets exceed more than 1 GB. Here is the list of Data Sources supported in Power Bi.

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- **File Types:** Power BI supports XML, txt/CSV, Excel, JSON, and Share point folder type files.
- **Database:** It supports SQL Server Analysis Services Database, SAP HANA Database, SQL Server Database, SAP Business

Warehouse server, Access Database, Google BigQuery (Beta), Amazon Redshift, Snowflake, Impala, Oracle Database, IBM Informix database (Beta), Teradata Database, MySQL Database, IBM Netezza (Beta), Sybase Database, PostgreSQL Database.

- **Azure:** Azure SQL Data Warehouse, Azure Blob Storage, Azure Analysis Services database (Beta), Azure SQL Database, Azure Data Lake Store, Azure Table Storage, Azure HDInsight (HDFS), Azure Cosmos DB (Beta), Azure HDInsight Spark (Beta).

- **Online Services:** Power BI service, Dynamics 365 (online), Microsoft Exchange Online, Common Data Service (Beta), SharePoint Online List, Visual Studio Team Services (Beta), Dynamics 365 for Financials (Beta), Microsoft Azure Consumption Insights (Beta), Salesforce Objects, Salesforce Reports, Google Analytics, Dynamics 365 for Customer Insights (Beta), GitHub (Beta), appFigures (Beta), comScore Digital Analytix (Beta), Facebook, Kusto (Beta), Planview Enterprise (Beta), MailChimp (Beta), Mixpanel (Beta), QuickBooks Online, Projectplace (Beta).

- **Other Services:** Hadoop File (HDFS), Vertica (Beta), Web, OData Feed, SharePoint List, Microsoft Exchange, Active Directory, R Script, ODBC, Spark (Beta), Blank Query, OLE DB.

2. Power BI Desktop
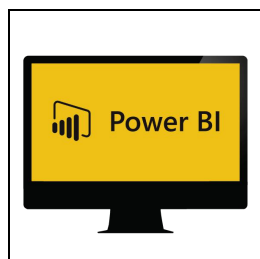
It is a free software that enables you to connect , transform and visualize the data on your desktop .You can connect to various data sources with the help of power BI desktop and combine the data into a data model. This data model allows you to create a collection of images and graphics that make you share the information within the organization as records. The majority of users who work on Business Intelligence projects use Power Bi Desktop to create and share their report with others.

3. Power Bi Service

Power Bi service is an On-Cloud service with a web-based platform and used to share and publish the reports made on Power Bi Desktop. It collaborates the data with other users and created dashboards. Power Bi service is also called power bi workspace, Power Bi Web Portal and Power Bi Site. Power Bi service offers wonderful features like alerts and natural language Q&A.

It is available in 3 versions.

4 Power Bi Report Server

Power Bi Report server is similar to the Power Bi Service. It is an On Premises server platform. Using Power BI Report Server , organizations can secure their data. It enables the users to create reports and dashboards and allow to you to share the reports with other users or organizations with the proper security protocols. To use this service , you need to have premium power bi license.

5 Power Bi Gateway

It is used to maintain fresh information by connecting to your on - site data sources without transferring the data. It provides secure data and allows you to transfer the data between Microsoft cloud services and on premises services. Microsoft cloud services include PowerApps, Power Bi, Azure analysis services, Microsoft Flow and Azure logic apps. By

using a gateway, organizations can maintain the databases and other data sources securely in cloud services.

3 Power Bi Architecture

Power Bi is a business platform that includes several technologies to work together . It delivers outstanding business intelligence solutions. Power Bi Architecture contains five steps.

3.1 Data Description

The data set contains data of world bank consist of records of debt of world bank with other countries.

It has following columns.

- ◆ Country Name - It describes the name of the country.

- ◆ Country Code - It describes the country code of the country.

- ◆ Counterpart Area Name - It describes the counterpart area.

- ◆ Counterpart Area Code - It describes the counter part area code.

- ◆ Series Name - It describes the name of series

- ◆ Series code - It describes the code of the series name

- ◆ Rest are the years in which different countries take loans from world bank.

3.2 Data Insertion

Data is extracted from different sources which can be different servers or databases. Here data is inserted from excel sheets directly.If you import the file into the Power Bi , it compresses the data sets up to 1 GB, and it uses direct query if the compressed data is more than 1 GB.

3.3 Data Transformation

Integrated data is not ready to visualize because the data should be transformed. To transform the data , it should be cleaned or pre processed. For example, missing values are removed from the data sets. After processing the data it is loaded into data warehouse.

3.4 Data Visualization

The cleaned and transformed data is now ready to visualize. According to the business scenario and requirements the visualization of data is done. Various KPIs are introduced into the visualization to make the visualization interactive.

3.5 Report and Dashboard Creation

We can create dashboards after publishing reports to Power Bi services, by holding the individual elements. The visual retains the filter when the report is holding the individual elements to save the report.

Working of Power BI Architecture
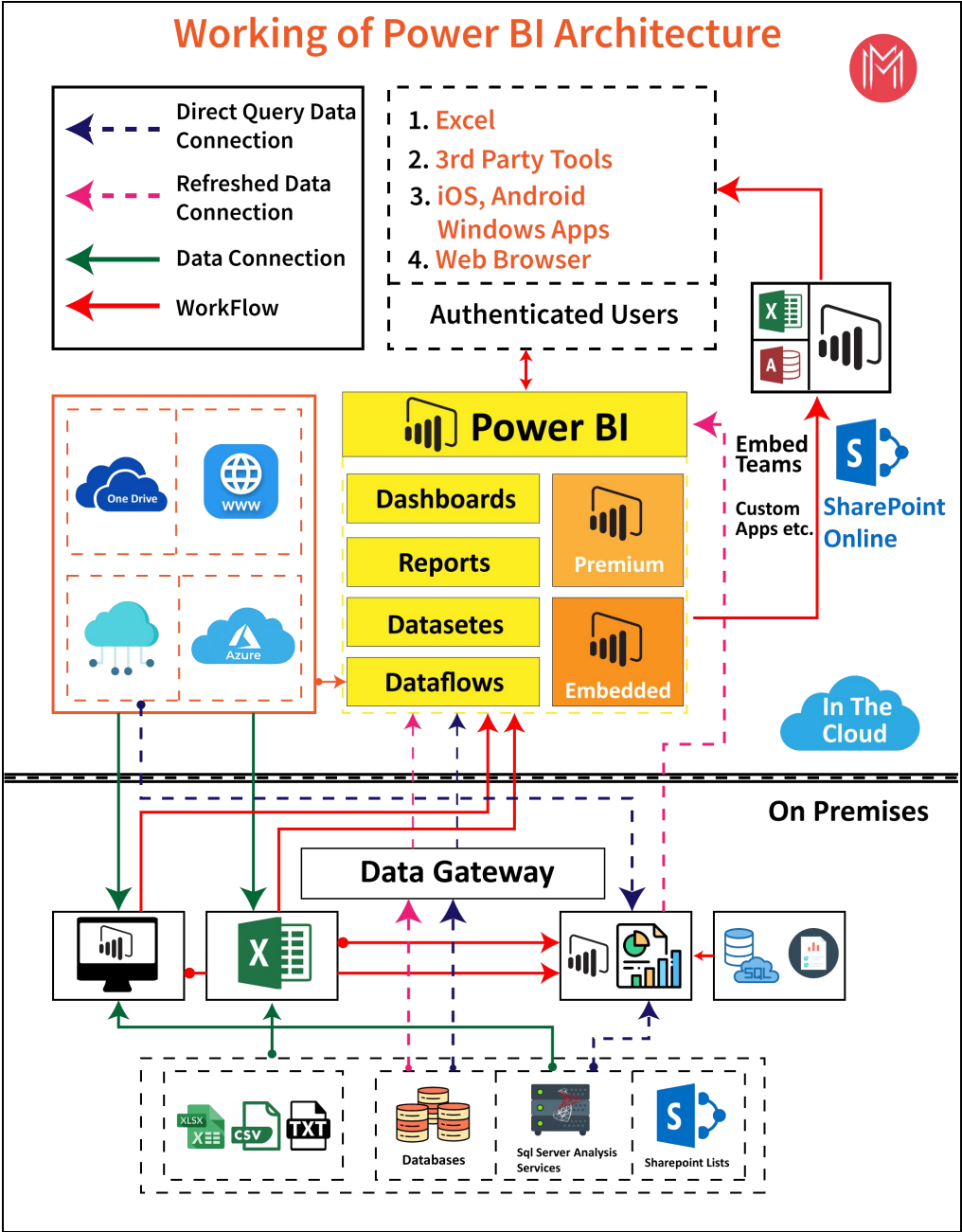
4 Unit Test Cases

Test Case Description	Expected Result
Finding number of Distinct countries	The result can be a KPI with card visual .
Finding out Distinct Debt Indicators	It can be a filter of distinct debt indicators.
Total Amount of Debt owed by countries	It can be a bar chart of countries with their total debt amount
Country with highest debt	It can also be a card visual.
Average amount of debt across indicators	It can be a table or a horizontal bar chart visual
Highest amount of principal repayments	It can be a card visual or a pie chart
Most common debt indicators	It can be visualize with the pie chart.
Conclusion	It can be a text box.