Low Level Design

Fortune 500 Analysis

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Document Version	0.1
Last Revised Date	

DOCUMENT CONTROL

Change Record:

VERSION	DATE	AUTHOR	COMMENTS
0.1	01- Oct - 2023	Sajan Oberoi	

Reviews:

VERSION	DATE	REVIEWER	COMMENTS

Approval Status:

VERSION	REVIEW DATE	REVIEWED BY		APPROVED BY	COMMENTS

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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 House Price Prediction 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

PowerBI Server Architecture

Power BI Server, previously known as Power BI Report Server, is an on-premises solution provided by Microsoft that allows organizations to host and share Power BI reports within their own network. Below is an overview of the architecture of Power BI Server:

1. **Client Applications**:
    - **Power BI Desktop**: This is where report creators design and build Power BI reports. They can connect to various data sources, create visuals, and define data models.
    - **Web Browser**: Users can access and view Power BI reports published to Power BI Server through a web browser. They can interact with the reports, apply filters, and explore data.
2. **Power BI Gateway (Optional)**:
    - In some cases, organizations use the Power BI Gateway to establish a connection between Power BI Server and external data sources. This gateway can be used for refreshing data in reports and dashboards hosted on Power BI Server. It's essential for reports that rely on live or scheduled data refresh from on-premises data sources.
3. **Power BI Report Server**:
    - The core of the Power BI Server architecture is the Power BI Report Server itself, which is installed on a dedicated server within the organization's network. This server hosts Power BI reports and dashboards.

- It provides services for rendering reports, managing security, and delivering reports to client applications.
- It also manages data source connections, allowing reports to connect to on-premises and cloud-based data sources.

4. **SQL Server Database (Catalog Database)**:
   - Power BI Report Server relies on a SQL Server database, often referred to as the "catalog database," to store report metadata, security information, snapshots of reports, and other configuration data.
   - The catalog database plays a crucial role in managing report versions, permissions, and user access.
5. **Data Sources**:
   - Reports hosted on Power BI Server can connect to various data sources, including SQL Server databases, Excel files, cloud-based sources, and more.
   - Data source connections are configured within Power BI Desktop during report creation.
6. **Security and Authentication**:
   - Power BI Server integrates with an organization's existing security infrastructure, such as Active Directory (AD). This allows administrators to manage user access to reports and dashboards based on AD user accounts and groups.
   - Users need appropriate permissions to view and interact with reports.
7. **Load Balancing and High Availability (Optional)**:
   - For organizations with high user loads and a need for fault tolerance, load balancing and high availability configurations can be implemented to ensure uninterrupted access to reports and dashboards.
8. **Backup and Restore**:
   - Power BI Server includes mechanisms for regularly backing up the catalog database and the content (reports and dashboards). This is essential for disaster recovery and preserving report versions.

9. **Updates and Maintenance**:
   - Organizations need to plan for routine maintenance, updates, and patches to keep Power BI Server running smoothly and securely.
10. **Monitoring and Logging**:
    - Power BI Server provides monitoring and logging capabilities, which administrators can use to track usage, performance, and errors. This information helps in troubleshooting and optimizing the environment.

3. Architecture Description

3.1. Data Description

The Dataset contains Fortune 500 companies in the United States for a specific year. It encompasses a broad array of financial metrics, including market capitalization, 52-week high and low prices, dividends, earnings per share (EPS), EBITA, and various price ratios.

1. Symbol: Symbol of the companies.
2. Name: Name of the companies.
3. Sector: Sector to which company belong.
4. Price: Stock price of the company.
5. Price/Earnings: Ratio is the ratio for valuing a company that measures its current share price relative to its earnings per share.
6. Dividend Yield: Dividend Yield by company in year.
7. Earnings/Share: Earnings per Share of the company.
8. 52 Week Low: Lower limit of stock price of company in a year.
9. 52 Week Low: Upper limit of stock price of company in a year.
10. Market Cap: The total value of all a company's shares of stock.
11. EBITDA: Earnings Before Interest, Taxes, Depreciation, and Amortization..
12. Price/Sales: The Price-to-Sales ratio of the company stock.
13. Price/Book: Type of car parking available with the property

3.2. Data Transformation

In the Transformation Process, we will convert our original datasets with other necessary attributes format.

3.3. Data Insertion into PowerBI

Importing CSV data into Power BI is a straightforward process.

- **Open Power BI Desktop:** Launch Power BI Desktop on your computer. If you don't have Power BI Desktop installed, you can download it from the official Microsoft website.
- **Get Data:** On the Power BI Desktop home screen, click on the "Get Data" button, which is usually represented by an icon that looks like a computer monitor with a database symbol.
- **Choose Data Source:** In the "Get Data" window, you'll see a list of data source options. Select "Text/CSV" since you want to import data from a CSV file.
- **Navigate to CSV File:** A file dialog will open, allowing you to navigate to and select the CSV file you want to import. Locate the CSV file on your computer and click "Open."
- **CSV Import Options:** After selecting the CSV file, you'll see the "Navigator" window. Here, you can preview the data in your CSV file. You can also choose to load the entire file or perform data transformations.
- **Load:** If you want to load the entire CSV file as it is, click the "Load" button. This will import the data directly into Power BI.

- **Transform Data:** If you need to perform data transformations, click the "Transform Data" button. This opens the Power Query Editor, where you can clean, shape, and transform your data before importing it into Power BI. You can apply filters, remove columns, rename columns, and perform other data manipulation tasks.

- **Data Transformations (Optional):** In the Power Query Editor, perform any necessary data transformations to prepare your data for analysis. You can use the various tools and functions available in Power Query to clean and shape your data.

- **Load Data:** Once you have completed the data transformations (if any), click the "Close & Apply" button in the Power Query Editor to load the data into Power BI.

- **Data Imported:** Your CSV data is now imported into Power BI. You can see it in the "Fields" pane on the right-hand side of the Power BI Desktop interface.

- **Create Visualizations:** To start analyzing and visualizing your data, drag and drop fields from the "Fields" pane onto the canvas area. You can create tables, charts, graphs, and other

visualizations to gain insights from your data.

3.5 Deployment.

- **Save and Publish:** After creating your report and visualizations, save your Power BI Desktop file. If you want to share your report with others, you can publish it to the Power BI service or export it to various formats for distribution.

- **Sign in to Power BI Service**: To publish a report or dashboard, you need to have a Power BI account. If you don't have one, you can sign up for a Power BI Pro or Premium Per User (PPU) account.

- **Publish to Power BI Service:**

  a. In Power BI Desktop, go to the "File" menu.

  b. Select "Publish" and choose "To Power BI."

  c. You'll be prompted to sign in with your Power BI account if you have not already.

  d. Choose the workspace (group) where you want to publish your report. You can select an existing workspace or create a new one.

  e. Click the "Select" button.

  f. Power BI will begin publishing your report to the selected workspace. This may take a moment, depending on the size of your report and the speed of your internet connection.

- **Access Your Report in Power BI Service:**

  a. Once the report is successfully published, you'll receive a notification.

  b. Open your web browser and navigate to the Power BI Service (https://app.powerbi.com).

  c. Sign in with your Power BI account if you're not already signed in.

  d. In the Power BI Service, go to the workspace where you published your report. You will find your report listed there.

- **Share and Collaborate (Optional):** In Power BI Service, you can share your report with

others, set up access permissions, and collaborate on the report with your team. You can share the report link, embed it in a website, or invite specific users or groups to access the report.

- **Schedule Data Refresh (If Necessary):** If your report relies on data from external sources, you may need to set up a data refresh schedule to keep the data up to date. This is important for ensuring that your report always reflects the latest data.
- **View and Interact with Your Report:** Users with access to the report can view and interact with it in the Power BI Service. They can apply filters, drill down into data, and explore the report's visuals and insights.
- **Monitor Usage and Performance:** In the Power BI Service, you can monitor the usage and performance of your report through various tools and dashboards. This helps you understand how your report is being used and make improvements as needed.
- **Update and Republish (If Necessary):** If you make changes to your report in Power BI Desktop, you can update and republish it to the Power BI Service. Follow similar steps as mentioned in Step 4 to replace the existing report with the updated version.

4. Unit Test Cases

TEST CASE DESCRIPTION	EXPECTED RESULTS
KPI Bar	KPI Bar showing 4 most important factors of stocks i.e., Market Cap, Average Earning, Average Dividend and Average Movement
Revenue And Price/Book for Different Sectors	Line and Stacked Column Chart Showing relation between Earning per Share, Dividend and Price per Book for different sectors.
Market Share of Different Cap Size by Market Capital	A simple yet insightful Doughnut chart showing spread of Market Capital with Different Cap Size
52 Week High & Low and EBITDA by Sector	Line Chart Showing constant relation between High & Low Price of share with Different EBITDA for different sectors.
Insight With Magic Button	A horizontal Bar chart showing Market capital of 10 Companies with a twist of a switch button with which one can check for Top 10 Companies and Once switched Bottom 10 Companies with lowest Market Capital.
Comparison (Second Page)	As an investor one can always look for more detailed and comprehensive report of any stock or a sector to invest in. And better if can be compared to another one.
Filter by Sector slicer	When clicked on the slicer, a dropdown should occur which has various Sectors of the fortune 500 companies.
Filter by Company Name slicer	When clicked on the slicer, a dropdown should occur which has various Company Names of the fortune 500 companies.