Low Level Design

Analyze Debt Statistics

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Last Revised Date	

DOCUMENT CONTROL

Change Record:

VERSION	DATE	AUTHOR	COMMENTS
0.1		Muskan Dubey	Introduction and architecture defined
0.2		Muskan Dubey	Architecture & Architecture description appended and updated.

Reviews:

VERSION	DATE	REVIEWER	COMMENTS
0.2		Muskan Dubey	Unit test cases to be added

Approval Status:

VERSION	REVIEW DATE	REVIEWED BY		APPROVED BY	COMMENTS

Contents

1. Introduction

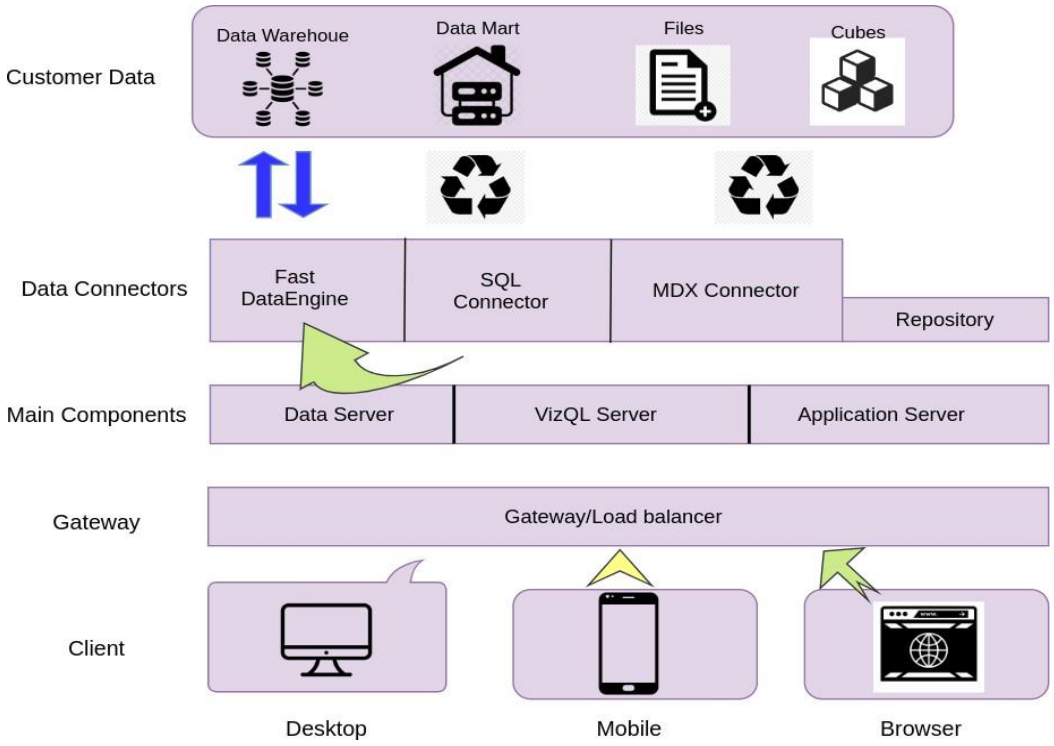
1.1 What is Low-Level design document?

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 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.

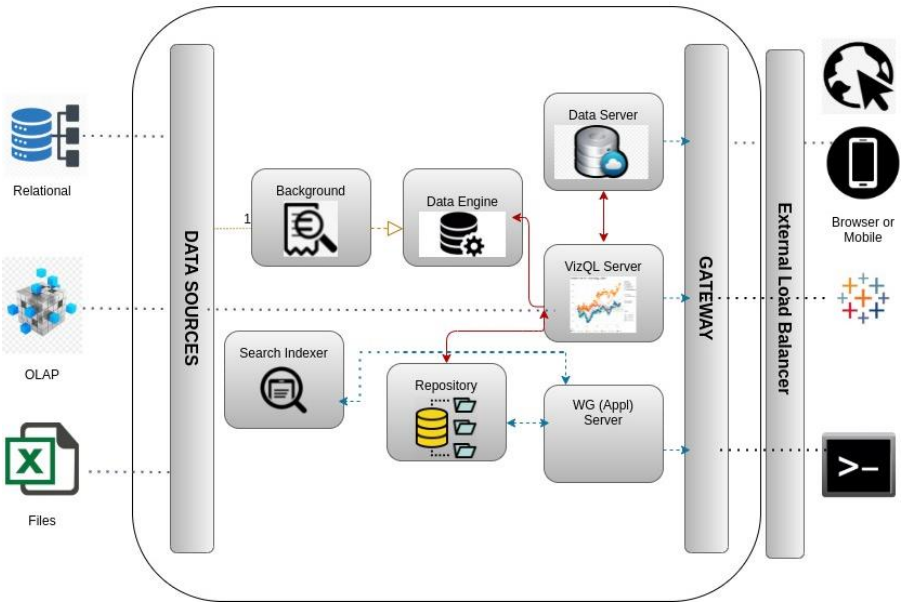
2. Architecture



Power BI Server Architecture

Power BI has a highly scalable, n-tier client-server architecture that serves mobile clients, web clients and desktop-installed software. Power BI Server architecture supports fast and flexible deployments.

The following diagram shows Tableau Server's architecture:



Power BI Server is internally managed by the multiple server

1. Gateway/Load Balancer

It acts as an Entry gate to the Power BI Server and also balances the load to the Server if multiple Processes are configured.

2) Application Server:-

Application Server processes (wgserver.exe) handle browsing and permissions for the Power BI Server web and mobile interfaces. When a user opens a view in a client device, that user starts a session on Power BI Server. This means that an Application Server thread starts and checks the permissions for that user and that view.

3) Repository:-

Power BI Server Repository is a database that stores server data. This data includes information about Tableau Server users, groups and group assignments, permissions, projects, data sources, and extract metadata and refresh information.

4) VIZQL Server:-

Once a view is opened, the client sends a request to the VizQL process (vizqlserver.exe). The VizQL process then sends queries directly to the data source, returning a result set that is rendered as images and presented to the user. Each VizQL Server has its own cache that can be shared across multiple users

5) Data Engine:-

It Stores data extracts and answers queries.

6) Backgrounder:-

The backgrounder Executes server tasks which includes refreshes scheduled extracts, tasks initiated from tabcmd and manages other background tasks.

7) Data Server:-

Data Server Manages connections to Power BI Server data sources

It also maintains metadata from Power BI Desktop, such as calculations, definitions, and groups.

3. Architecture Description

3.1. Data Description

The dataset provided by The World Bank contains comprehensive information on international debt owed by developing countries. This data spans from 1970 to 2015 and includes both national and regional debt statistics. The dataset is organized into several categories or indicators that track different aspects of debt owed by countries**.**

Data Features

Time Period: The dataset covers the years from 1970 to 2015.

Countries: It includes data from multiple developing countries across various regions.

Debt Indicators: There are several categories or indicators that classify the types of debt and their purposes, such as principal repayments, interest payments, total debt outstanding, etc.

Debt Amounts: The debt amounts are reported in USD (United States Dollars).

3.2. Web Scrapping

Web scraping is a technique to automatically extract content and data from websites using bots. It is also known as web data extraction or web harvesting. Web scrapping is made simple now days, many tools are used for web scrapping. Some of python libraries used for web scrapping are Beautiful Soup, Scrapy, Selenium, etc.

3.3. Data Transformation

In the Transformation Process, we will convert our original datasets with other necessary attributes format. And will merge it with the Scrapped dataset.

3.4. Data Insertion into Database

a. Database Creation and connection - Create a database with name passed. If the database is already created, open the connection to the database.

b. Table creation in the database.

c. Insertion of files in the table

3.5 Make the SQL connection and set up the data source

Step 1: Configuring Tableau

Launch Tableau on your workstation and select SQL Server from the connect column on the left. This will open a dialogue box where you need to provide the connection details for SQL Server.

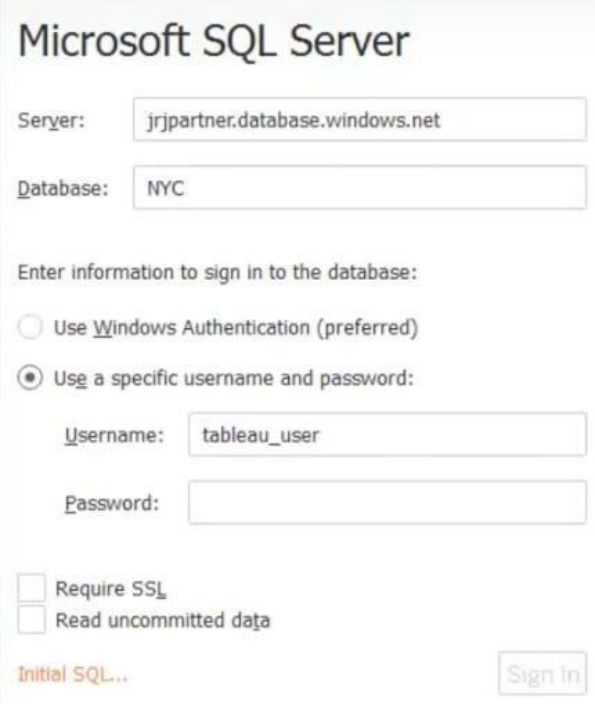
To connect with tableau, you will need to provide information about the server which hosts your database. If you want to connect to a contained database, you can also specify the name of the database.

To connect with a port other than the default port, you need to specify the port and server as follows:

```
<server_name><port_number>
```

Example query: my_server 8051

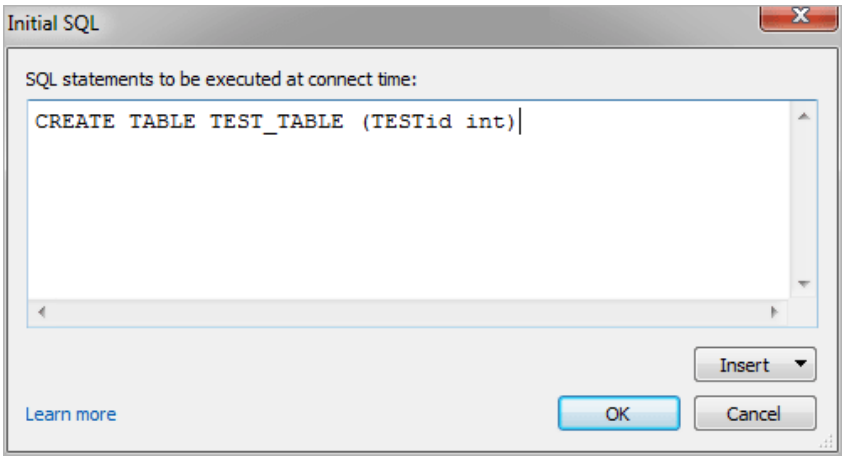
There are two ways in which you can sign-in to the server, either by using Windows authentication or by using the username and password. Using the username and password becomes a must if you're working with a password-protected server in a non-Kerberos environment.



Click on Sign in to establish a connection. This will enable a connection without SSL. To establish an SSL enabled connection, click the Require SSL checkbox before you sign in.

SQL Server provides an option to let the user queries access the modified rows even before they have been committed. This option is called Read Uncommitted data. It saves time by preventing complex queries such as extract refreshes from locking the database and causing a delay. If this option is unchecked, Tableau makes use of default isolation levels.

If you want to run a specific SQL command every-time a new connection is established, you can use the Initial SQL option. This will open a dialogue box, where you can specify your desired SQL query.

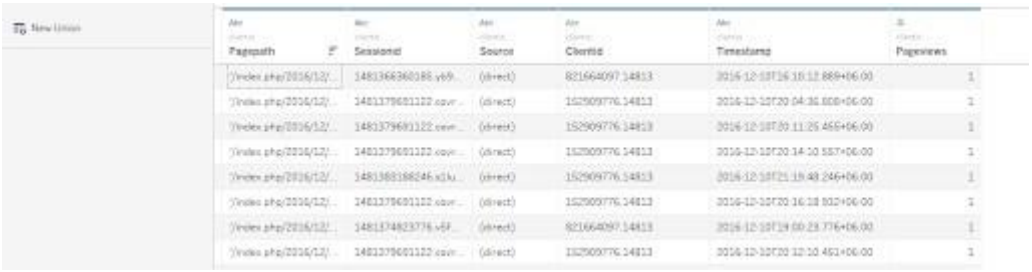


Step 2: Configuring Data Source

The data source page loads up after configuring the Tableau connector and successfully signing in. This is how the page looks like:

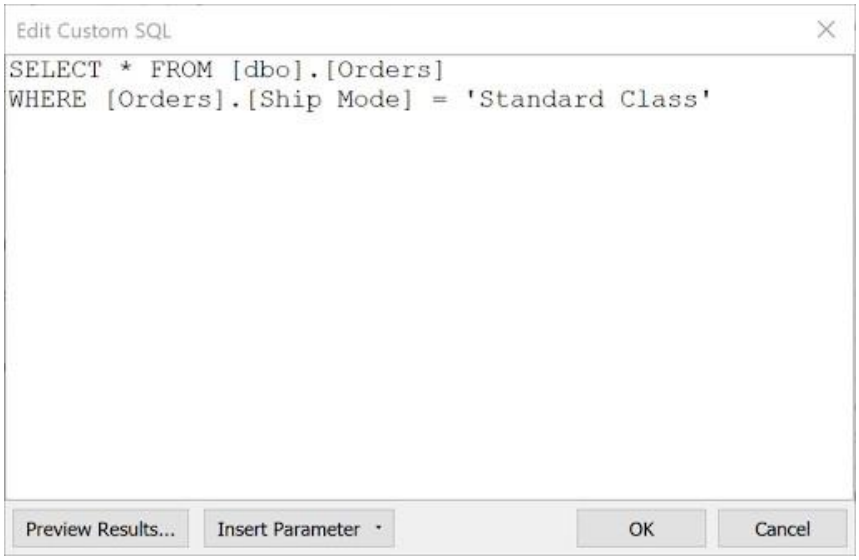
Select the data source name option and give a unique name to the database you are using. It's considered a good practice to have a unique name as it makes it much easier for users to identify the database from which data is being fetched.

To select the desired schema, you can use the schema drop-down list from the column on the left. You can also perform a text-based search to find the desired option. Now similarly find and select the desired table and drag it onto the canvas.



This is how you can connect SQL Server with Tableau. Now click on the sheets tab to begin the analysis.

Custom SQL features can be used to focus on specific SQL statements, rather than querying the entire database. Click on the Custom SQL option from the panel on the left. A new dialogue box will now open up, where you can provide the query you want to execute.



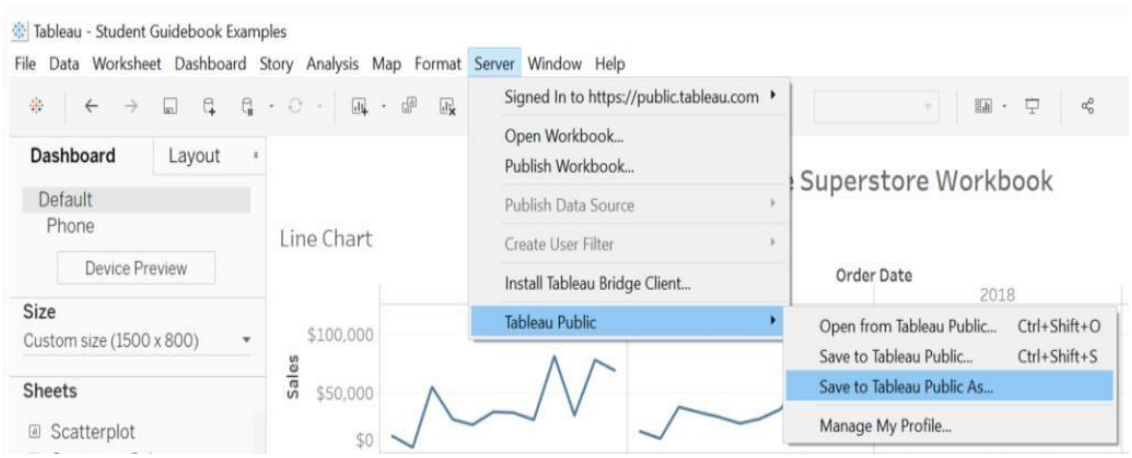
3.5. Export Data from Database

Data Export from Database - The data in a stored database is exported as a CSV file to be used for Data Pre-processing.

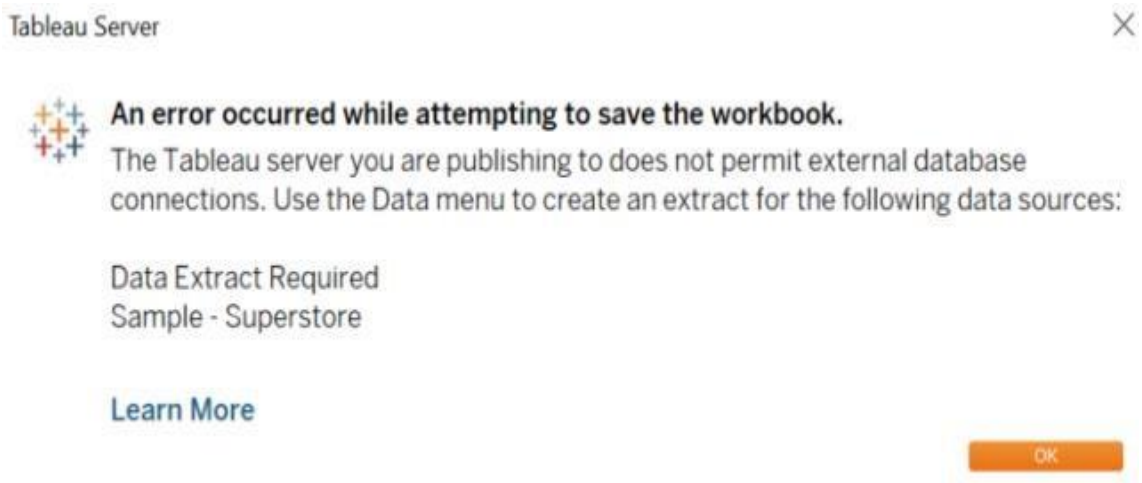
3.6 Deployment.

Once you've completed your dashboard, follow these steps:- **Server, Tableau Public, Save to Tableau Public As**

You may be prompted to log into your Tableau Public profile first if this is your first time publishing.

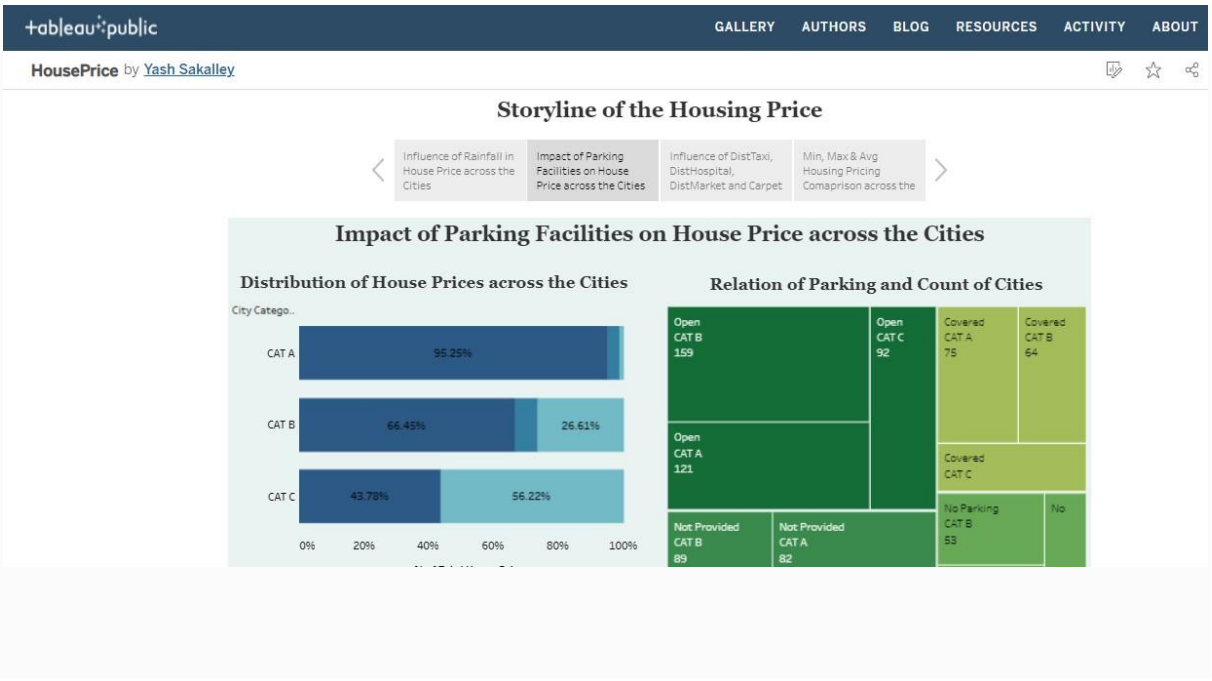


Next, fill out the title you want your viz to have and click “save”.



This message means that your connection to the Sample-Superstore data set is a live connection. Tableau Public cannot host live connections, so you’ll need to convert your connection to an extract (like a frozen screenshot of your data).

Here in the below screenshot, we can see that out workbook has been published to tableau public.



4. Unit Test Cases

TEST CASE DESCRIPTION	EXPECTED RESULTS
Rainfall parameter slicer	When clicked on the slicer, a dropdown should occur which has various parameters of the rainfall.
House Price Parameter	When clicked on the slicer, a dropdown should occur which describes the parameters of the House Prices.
Relation Between Rainfall and Average Housing Price	Here a time series graph is shown of Rainfall VS Average House Price data.
Rainfall and Average House Price across the cities	Various city category is shown and a visualization is created which shows the City Category and Avg. House Price and relation.
Relation between Rainfall and Built-up Parameters across the Cities	The visual should show a bubble diagram of relation between various built-up parameters across various cities.
Min, Max & Avg. Housing Price Comparison by categories	This is an important visual in bar-graph which shows the category of Max Housing Price, Mini Housing price and Avg. housing price across Built-up parameters and City categories.