Low Level Design

Customer Lifetime Value Prediction

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Document Control

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VERSION	DATE	AUTHOR	COMMENTS
0.1	22- Jun - 2023	Author 1	Introduction and architecture defined
0.2	23 - Jun - 2023	Author 2	Architecture & Architecture description appended and updated.

Reviews:

VERSION	DATE	REVIEWER	COMMENTS
0.2	23- Jun - 2023	Author 3	Unit test cases to be added

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Contents

1 Introduction

1.1 What is Low-Level Design document?

The Customer Lifetime Value Prediction dashboard's internal logic design is provided in the LDD, or Low-level design document (LLDD). Class diagrams with methods and relationships between classes and program specifications are described using LDD. In order for the programmer to create the program directly from the document, it describes the modules.

1.2 Scope

Low-level design (LLD) is an iterative refinement process that focuses on component-level design. Data structures, necessary software architecture, source code, and ultimately performance algorithms can all be designed using this method. Overall, during requirement analysis, the data organization may be defined, and then refined, during data design work.

2 Architecture

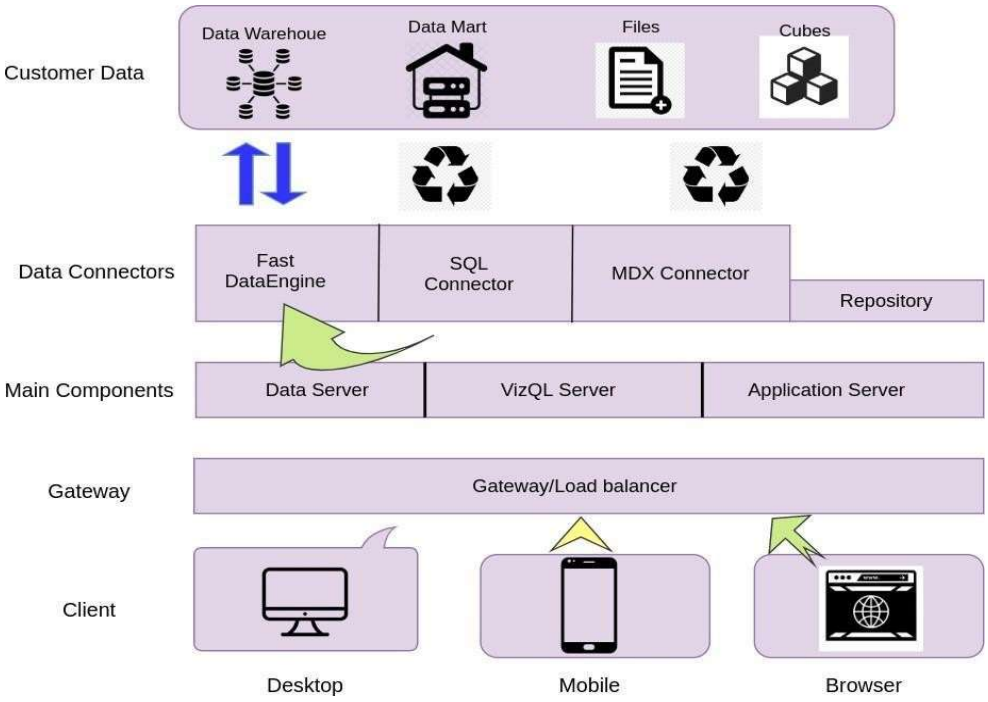

Tableau Server Architecture

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

The following diagram shows Tableau Server's architecture:

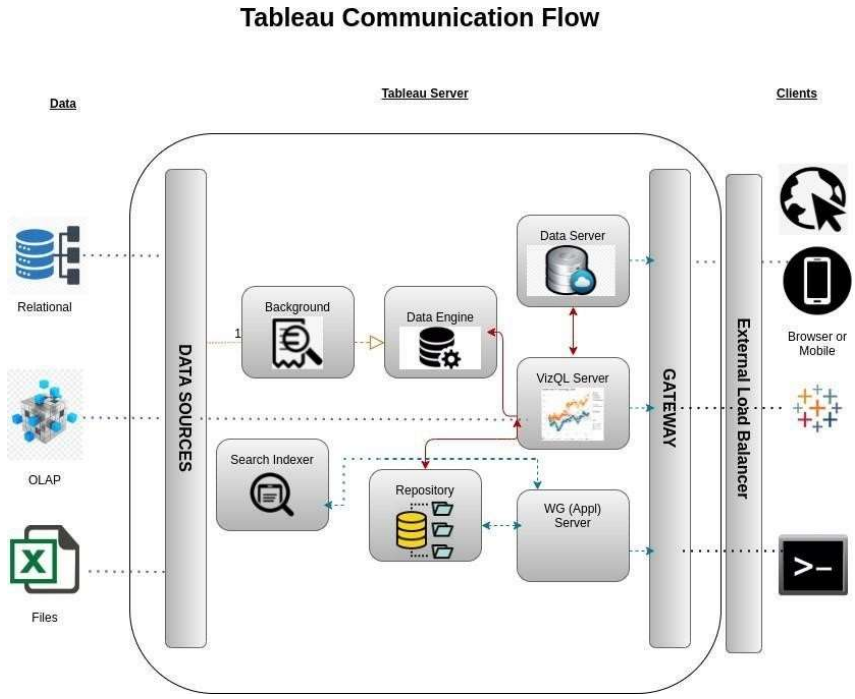

Tableau Server is internally managed by the multiple server processes.

1)Gateway/Load Balancer

If multiple Processes are configured, it serves as an entry point to the Tableau Server and balances the server's load.

3

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

- **Repository:-**

Tableau Server Repository is a PostgreSQL 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.

- **VIZQL Server:-**

- **Data Server:-**

Data Server Manages connections to Tableau Server data sources

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

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

- **Data Engine:-**

It Stores data extracts and answers queries.

- **Backgrounder:-**

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

- **Data Server:-**

Data Server Manages connections to Tableau Server data sources

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

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3)Architecture Description

3.1 Data Description

"Education" refers to the customers' levels of education; "Effective To Date" refers to the day your insurance company will begin helping to pay for it; "Location Code" refers to the segmentation of customers according to location; "Marital Status" refers to Divorced, Married, or Single; "Monthly Premium Auto" refers to the premium paid on a monthly basis; "Months Since Last Claim" refers to the date on which the insurance "Number of Open Complaints" refers to unresolved complaints; "Number of Policies" refers to the number of policies held by customers; "Policy Type" refers to personal, corporate, or special policies; "Policy" refers to "L1, L2, L3 policy under (personal, corporate, or special)policy type; "Renew Offer Type" refers to offer1, offer2, offer3, offer4; and "Sales Channel" refers to the manner in

"Vehicle Class" refers to the class of vehicles owned by customers. "Coverage" refers to the amount of risk or liability that is covered for an individual or entity through insurance services. "Total Claim Amount" refers to the amount that is due at the end of an insurance policy. "Vehicle Class" refers to the class of vehicles owned by customers. "Vehicle Size" refers to the sizes of vehicles. Here, premium, extended, and basic.

"Response" refers to whether or not customers respond to a marketing call.

3.2 Data Insertion into Database

- Database Creation and connection - Create a database with name passed. If the database is already created, open the connection to the database.
- Table creation in the database.
- Insertion of files in the table

3.3 Make the SQL connection and set up the data source

Step 1: configuring Tableau

On your workstation, start Tableau and choose SQL Server from the connect column on the left. This will open a dialog box in which you must enter SQL Server's connection information.

You will need to provide information about the server that houses your database in order to connect with tableau. You can also specify the name of the database if you want to connect to a contained database.

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

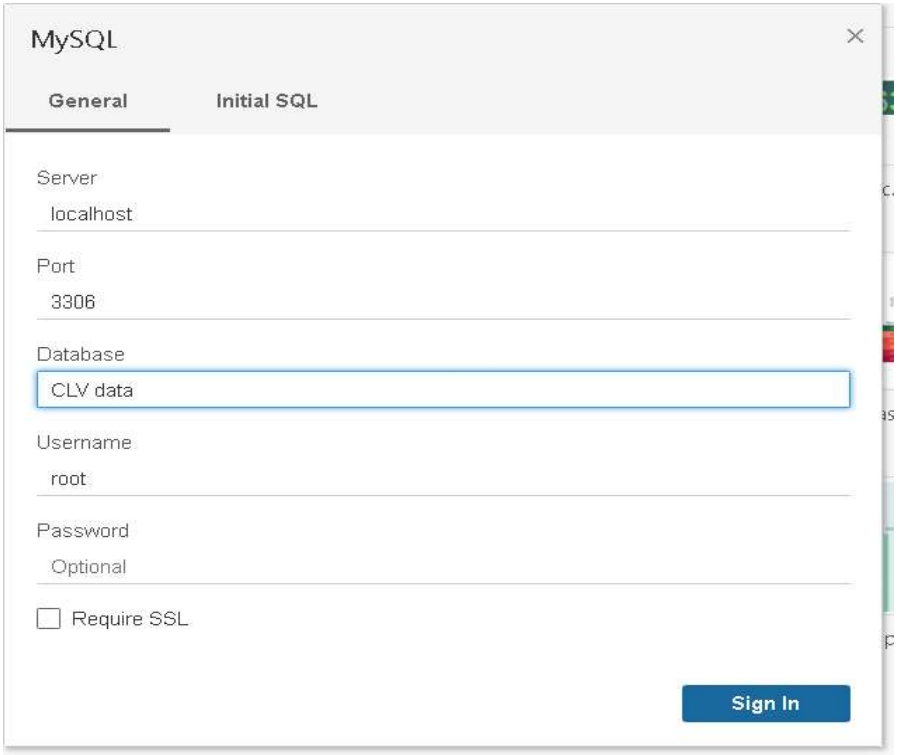
```
<server_name><port_number>
```

Example query: my server 8051

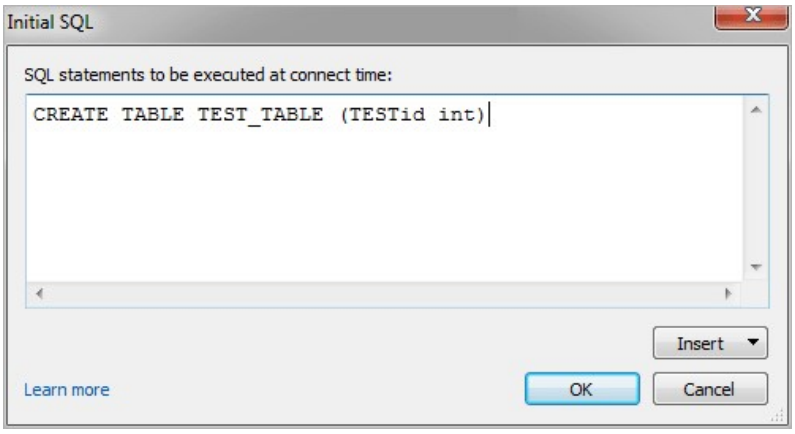
There are two manners by which you can sign-in to the server, either by utilizing Windows confirmation or by utilizing the username and secret key. If you are working with a password-protected server in a non-Kerberos environment, you must use the username and password.

In order to establish a connection, select "Sign in." Using this, you can connect without SSL. Before you sign in, select the Require SSL checkbox to establish a connection with SSL enabled.

The user queries in SQL Server can now access the modified rows before they have been committed. Read Uncommitted data is the name of this option. By stopping complex queries like extract refreshes from locking the database and causing a delay, it saves time. Tableau uses the default isolation levels if this option is unchecked.



You can use the Initial SQL option if you want to execute a specific SQL command each time a new connection is established. This will open a dialog box where you can enter the SQL query you want.

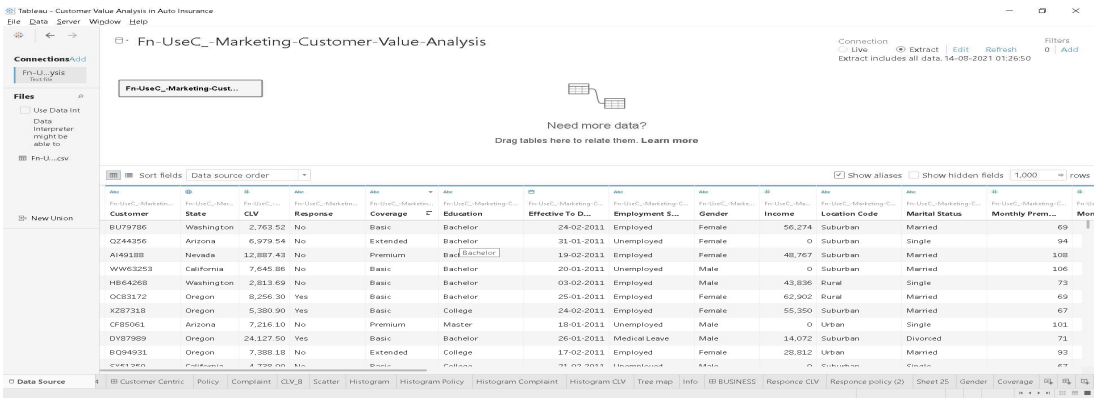


Step 2: Configuring Data Source

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

Give the database you're using a unique name by selecting the data source name option. Because it makes it much simpler for users to identify the database from which the data is being fetched, having a unique name is generally regarded as a good practice.

You can use the schema drop-down list in the column on the left to choose the schema you want. To locate the desired option, you can also conduct a text-based search. Similarly, locate the desired table, select it, and drag it onto the canvas.



This is how to connect Tableau and SQL Server. To begin the analysis, select the sheets tab right now.

Instead of querying the entire database, custom SQL features can focus on specific SQL statements. From the panel on the left, select the Custom SQL choice. You will now see a brand-new dialogue box where you can enter your query.

3.4 Export Data from Database

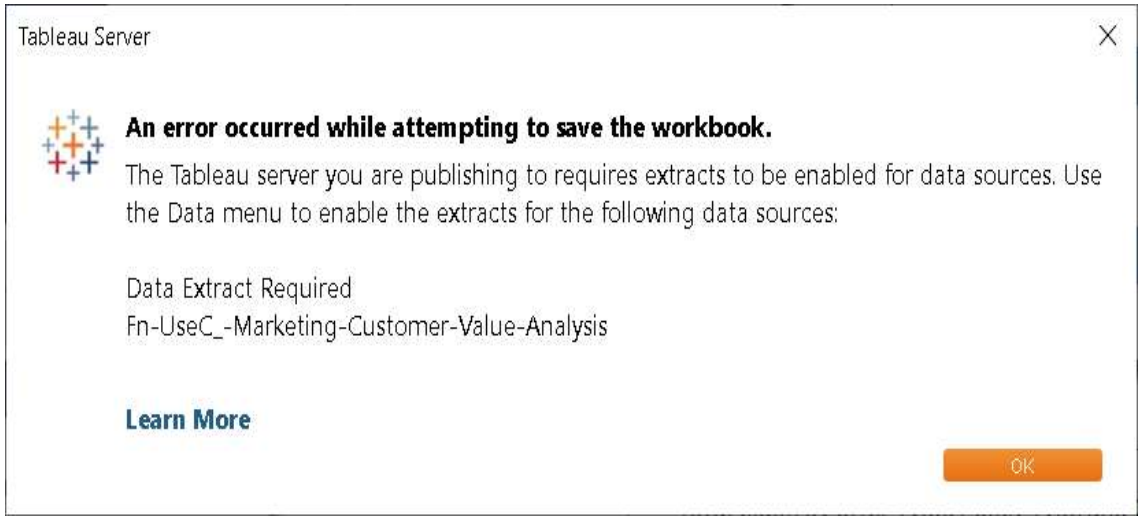
Data Export from Database - The data in a stored database is exported as a CSV file to be used for Data Pre-processing.

3.5Deployment

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.

Customer Lifetime Value Analysis

Basic	Extended	Premium
5,568	2,742	824

Business Centric Dashboard

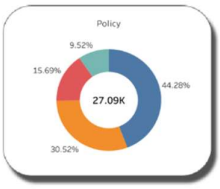
Demographic Dashboard

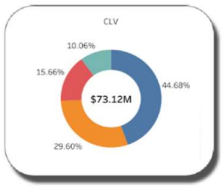
Customer Centric Dashboard

Business CENTRIC

Select Business Centric
All

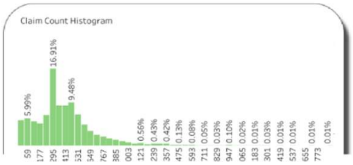
Response
All

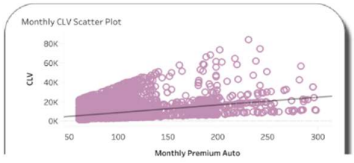




Total Claim by offer Type, Policy Type and Coverage

		Renew Offer Type			
Coverage	Policy Type	Offer1	Offer2	Offer3	Offer4
Basic	Corporate Auto	42.80%	29.79%	14.37%	13.04%
	Personal Auto	42.25%	31.64%	15.89%	10.21%
	Special Auto	41.00%	32.16%	15.19%	11.66%
Extended	Corporate Auto	44.47%	28.82%	17.19%	9.52%
	Personal Auto	44.10%	30.86%	15.01%	10.03%
	Special Auto	48.62%	31.09%	12.73%	7.57%
Premium	Corporate Auto	54.21%	22.86%	12.49%	10.44%
	Personal Auto	52.78%	25.58%	14.15%	7.49%
	Special Auto	40.06%	30.50%	23.42%	6.02%





4.Unit Test Cases

TEST CASE DESCRIPTION	EXPECTED RESULTS
Business centric parameter	When clicked on the slicer, a drop down should occur which has various parameters of the business centric factors.
Customer centric Parameter	When clicked on the slicer, a drop down should occur which describes the parameters of the customer engagement factors.
Demographic Parameter	When clicked on the slicer, a drop down should occur which describes the parameters of the demographic factors.
CLV and Monthly Premium Auto	Scatter plot which shows the CLV and Monthly Premium Auto relation
Histogram of variables	The visual should show histograms of all variables when hover in the tooltip.
information and navigation button	The information button shows the insights and the navigation button navigates to the dashboards.
Min, Max & Avg. CLV Comparison by categories	This is an important visual in bar-graph which shows the category of Max, Mini and Avg. CLV across Built-up parameters and categories.