

Low Level Design

Bank Marketing Analytics

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Document Version	0.3
Last Revised Date	

DOCUMENT CONTROL

Change Record:

VERSION	DATE	AUTHOR	COMMENTS
0.1	19- Jan - 2022	Pankaj Verma	Introduction and Architecture defined
0.2	20 - Jan - 2022	Saiteja Gummala	Architecture & Architecture description appended and updated.

Reviews:

VERSION	DATE	REVIEWER	COMMENTS
0.2	21- Jan - 2022	Alisha Dcunha	Unit test cases to be added

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

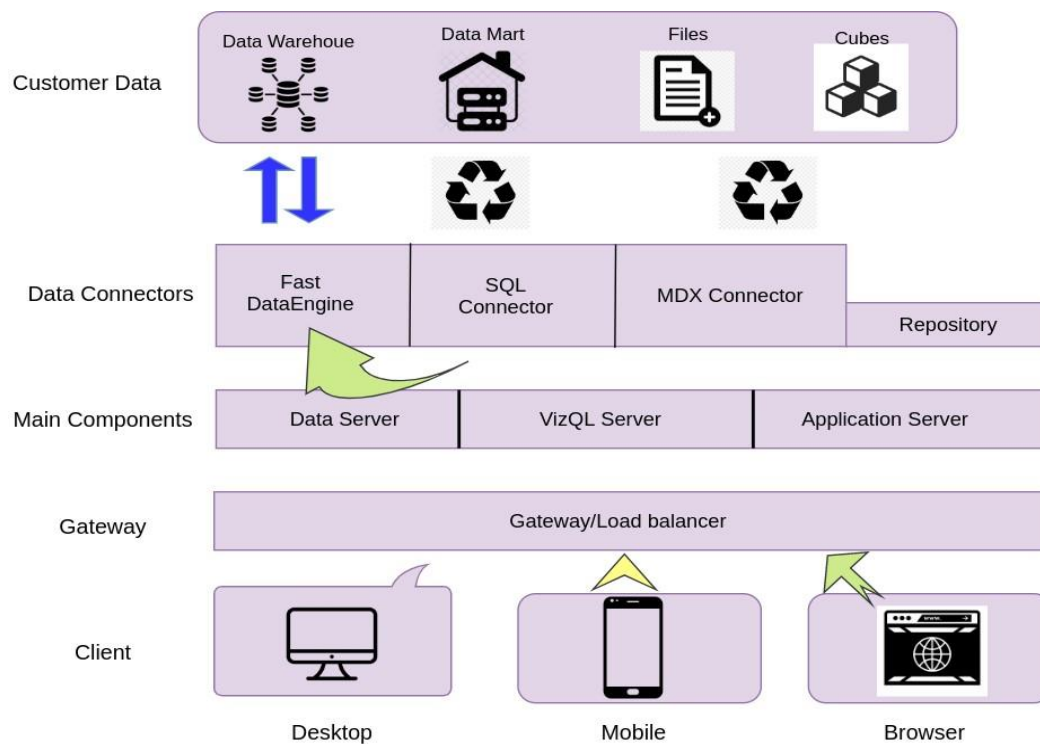


Tableau Server Architecture

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 Communication Flow

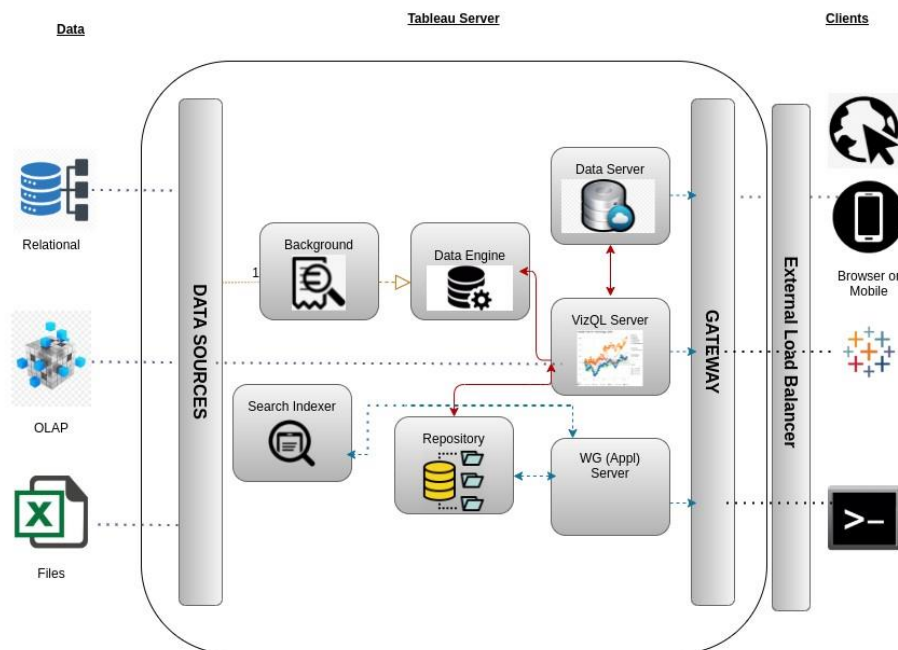


Tableau Server is internally managed by the multiple server processes.

1. Gateway/Load Balancer

It acts as an Entry gate to the Tableau 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 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.

3) 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.

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 Tableau Server data sources

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

3. Architecture Description

3.1. Data Description

Dataset Contains 17 attributes including one dependent attribute and there are 45211 instances/datapoints. So, we have 16 predictor/independent attributes and 1 dependent attribute.

Input variables:

1. age (numeric)
2. job: type of job (categorical: "admin.", "unknown", "unemployed", "management", "housemaid", "entrepreneur", "student", "blue-collar", "self-employed", "retired", "technician", "services")
3. marital: marital status (categorical: "married", "divorced", "single")
4. education (categorical: "unknown", "secondary", "primary", "tertiary")
5. default: has credit in default? (Binary: "yes", "no")

6. balance: average yearly balance, in euros (numeric)
7. housing: has housing loan? (Binary: "yes", "no")
8. loan: has personal loan? (Binary: "yes", "no")
9. contact: contact communication type (categorical: "unknown", "telephone", "cellular")
10. day: last contact day of the month (numeric)
11. month: last contact month of year (categorical: "jan", "feb", "mar", ..., "nov", "dec")
12. duration: last contact duration, in seconds (numeric)
13. campaign: number of contacts performed during this campaign and for this client (numeric, includes last contact)
14. pdays: number of days that passed by after the client was last contacted from a previous campaign (numeric, -1 means client was not previously contacted)
15. previous: number of contacts performed before this campaign and for this client (numeric)
16. poutcome: outcome of the previous marketing campaign (categorical: "unknown", "other", "failure", "success")

Output variable (desired target):

1. y - has the client subscribed a term deposit? (Binary: "yes", "no")

3.2. Web Scrapping

Web scrapping 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 BeautifulSoup, 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.



Microsoft SQL Server

Server: jrjpartner.database.windows.net

Database: NYC

Enter information to sign in to the database:

☐ Use Windows Authentication (preferred)

☒ Use a specific username and password:

Username: tableau_user

Password:

☐ Require SSL

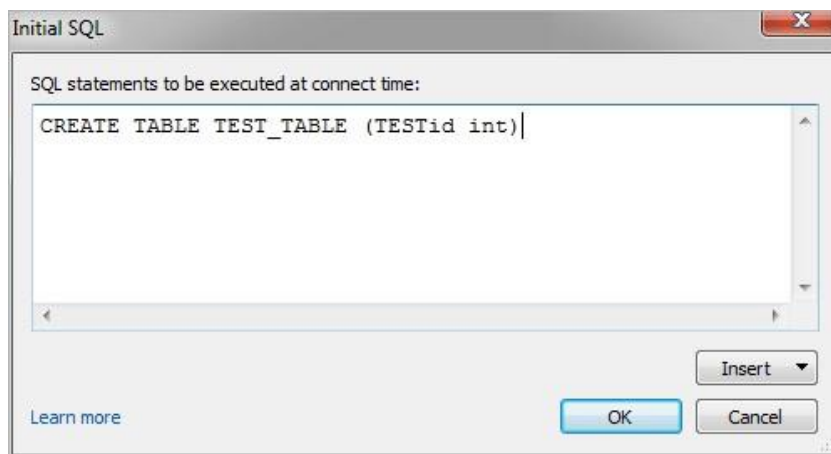
☐ Read uncommitted data

[Initial SQL...](#)

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.

File Name	File Name	File Name	File Name	File Name	File Name	File Name
	Pagepath	IP	Sessionid	Source	Client	Timestamp
	/Index.php/2016/12/	1481368360188.y69	(direct)	821664097.14813	2016-12-28T16:16:12.889+06:00	1
	/Index.php/2016/12/	1481379601122.covr	(direct)	152909776.14813	2016-12-28T20:04:36.000+06:00	1
	/Index.php/2016/12/	1481379601122.covr	(direct)	152909776.14813	2016-12-28T20:11:26.455+06:00	1
	/Index.php/2016/12/	1481379601122.covr	(direct)	152909776.14813	2016-12-28T20:14:00.557+06:00	1
	/Index.php/2016/12/	1481368360246.k3k	(direct)	152909776.14813	2016-12-28T21:19:48.246+06:00	1
	/Index.php/2016/12/	1481379601122.covr	(direct)	152909776.14813	2016-12-28T20:16:18.802+06:00	1
	/Index.php/2016/12/	1481374823776.v6F	(direct)	821664097.14813	2016-12-28T24:00:23.776+06:00	1
	/Index.php/2016/12/	1481379601122.covr	(direct)	152909776.14813	2016-12-28T20:12:10.452+06:00	1

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.

Edit Custom SQL

SELECT * FROM [dbo].[Orders]
WHERE [Orders].[Ship Mode] = 'Standard Class'

Preview Results...
Insert Parameter
OK
Cancel

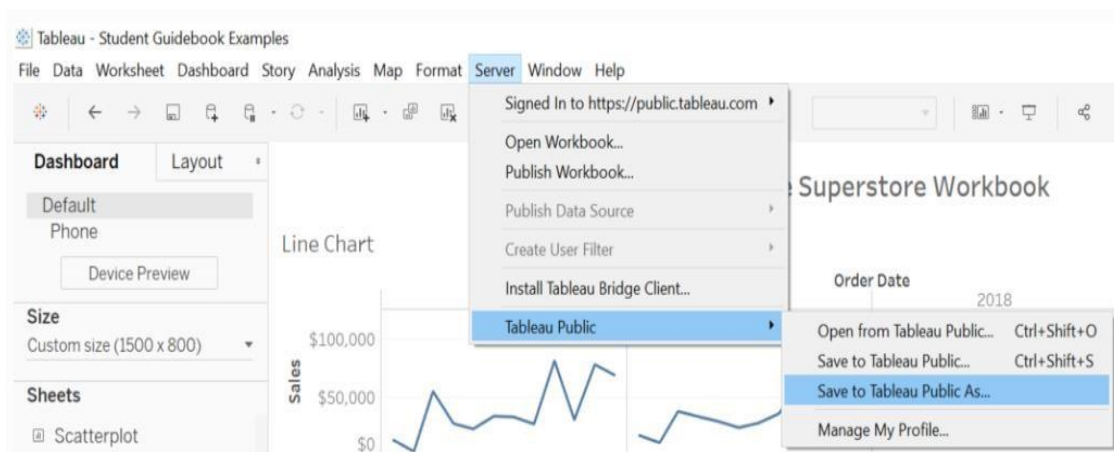
3.5. Export Data from Database

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

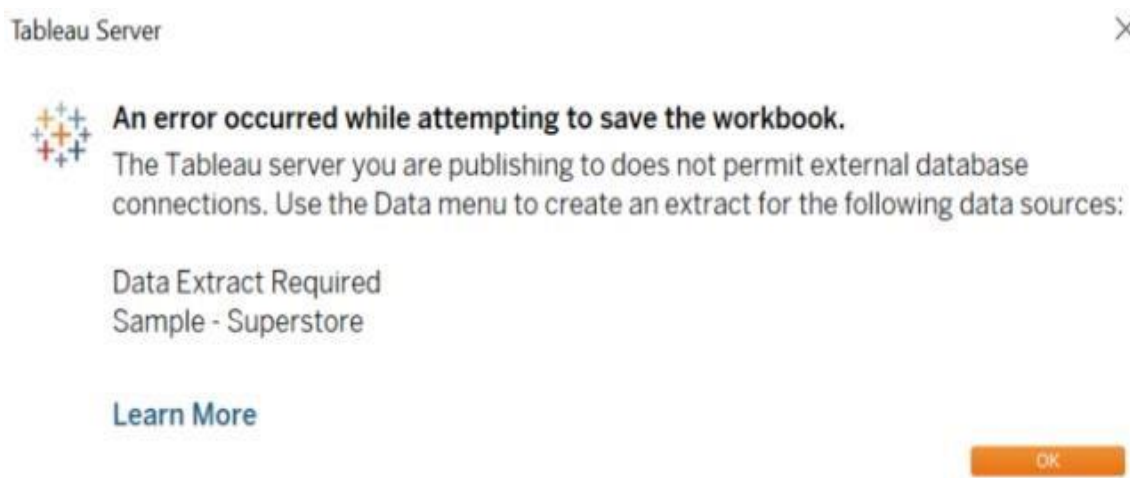
3.6 Deployment.

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”.

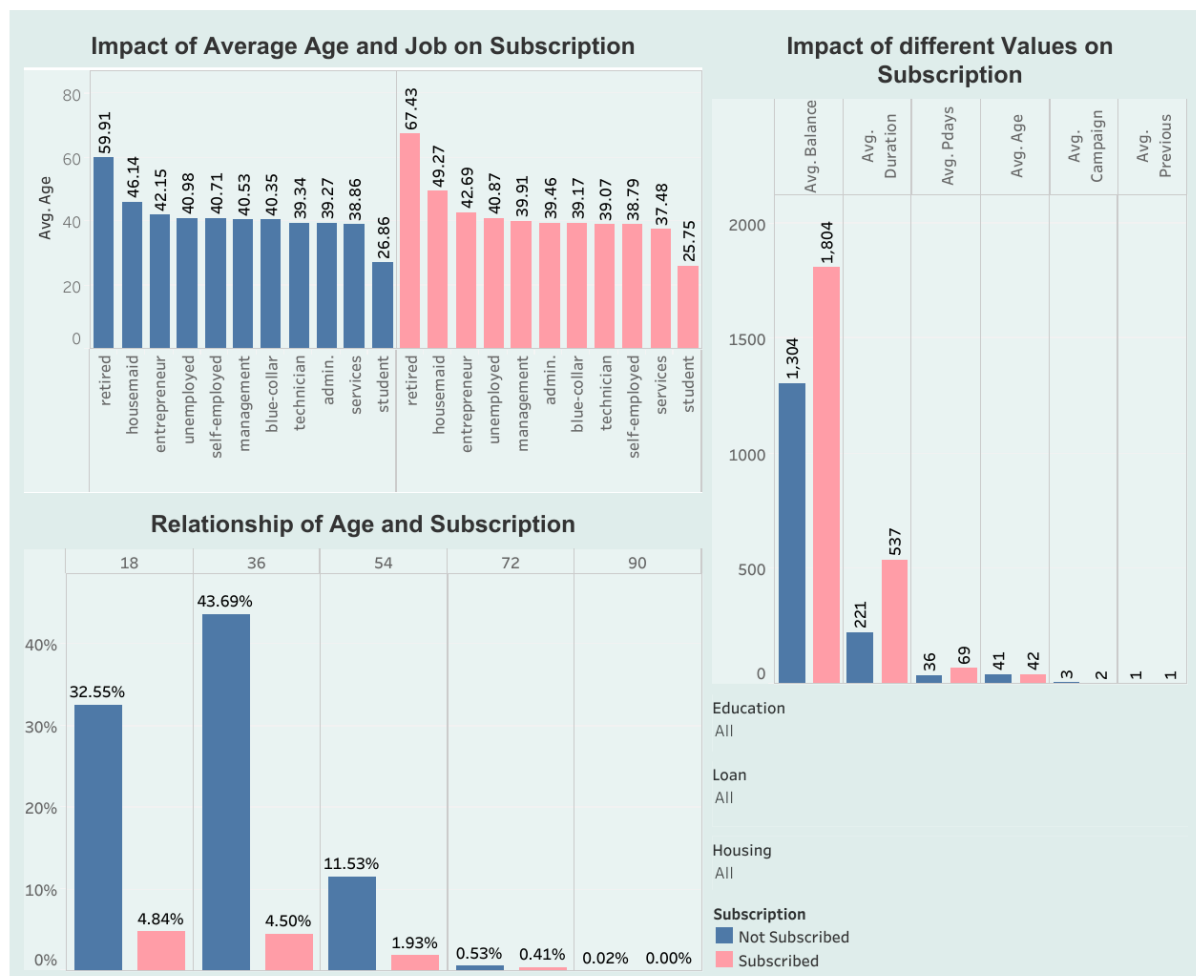


This message means that your connection to the Sample-Superstore data set is a live connection. Tableau Public cannot host live connections, so you'll need to convert your connection to an extract (like a frozen screenshot of your data).

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

BANK MARKETING CAMPAIGN ANALYSIS

Impact of Age on Subscription	Impact of call duration, marital stat..	Impact of previous Campaign	Box Plot	Conclusion
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4. Unit Test Cases

TEST CASE DESCRIPTION	EXPECTED RESULTS
Housing and Personal Loan Filter	When clicked on the slicer, a dropdown should occur which has yes and no value.
Education Filter	When clicked on the slicer, a dropdown should occur which describes the various values of education.
Job Filter	When clicked on the slicer, a dropdown should occur which describes the various values of job.
Relation between Age and Subscription	Here is a bar graph which indicates the relationship of different age group and the subscription.
Relation between Subscription and Contact	The bubble diagram shows the relation between subscription and the mode of contact.
Relation between Subscription and call duration	The bar graph indicates the different interval of call duration and percentage of total count of subscription.
Impact of Marital Status on Subscription	The bar graph shows how marital status plays a role in the subscription.
Relationship between Month and Subscription	The visual represents the total count of subscribed and not subscribed contacts in every month.
Relationship between Previous Campaign and Subscription	The area chart represents the percent of total count of the outcome of previous campaign.