Churn Analytics

Architecture Design

Written By	**POMESH VERMA**
Document Version	0.1
Last Revised Date	

DOCUMENT CONTROL

Change Record:

VERSION	DATE	AUTHOR	COMMENTS
0.1	5 MAY, 2024	Author 1	Architecture Document Designed

Reviews:

VERSION	DATE	REVIEWER	COMMENTS

Approval Status:

VERSION	REVIEW DATE	REVIEWED BY	APPROVED BY	COMMENTS

CONTENTS

1. Introduction

1.1 What is Architecture Design Document?

Any software that depicts software design must have an architectural design. "The process of identifying a collection of hardware and software components and their interfaces to provide the foundation for the creation of a computer system," according to IEEE, is what architectural design is. One of these numerous architectures may be displayed by software created for computer-based systems.

Each style will outline a group of systems that includes:

A collection of parts (such as a database or computing modules) that work together to carry out a specific task for the system.

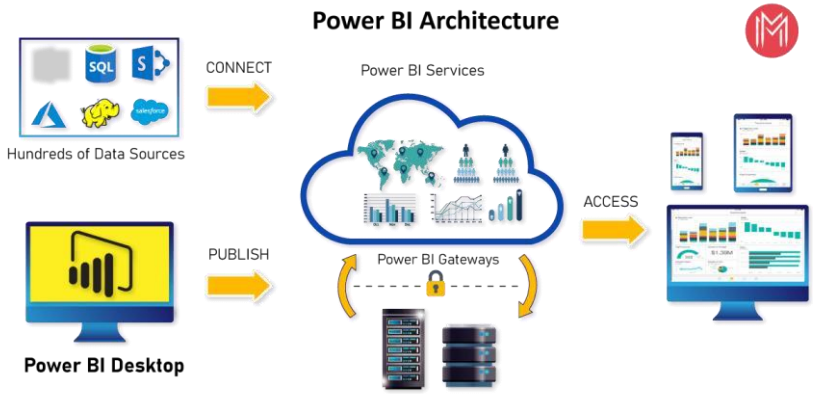
- The set of connectors will support component cooperation, coordination, and communication.
- Requirements for integrating components into the system.
- Semantic models that aid in the designer's comprehension of the system's general characteristics.

1.2 Scope

An architecture design method that incorporates an iterative refinement process is called an Architecture Design Document (ADD). Data structures, necessary software architecture, source code, and finally performance algorithms can all be designed using this method. Overall, during requirement

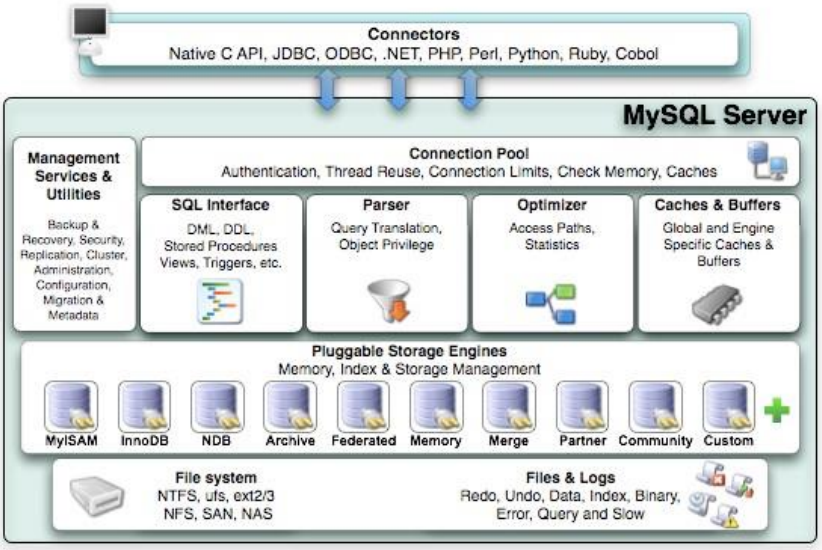
analysis, the design concepts may be established, and then they may be improved upon throughout architectural design work.

2. Architecture



Source: https://mindmajix.com/power-bi-architecture

ARCHITECTURE DESIGN



Source:

http://mysqlinternals.blogspot.com/2014/01/overview-of-mysql-architecture.html

iNeuron

2.1 Power BI

Microsoft Power BI is a business intelligence (BI) platform that offers capabilities for data aggregation, analysis, visualisation, and sharing to nontechnical business users. With its strong interaction with other Microsoft products, Power BI is a versatile self-service tool that requires little initial training. Its user interface is fairly intuitive for Excel users.

For businesses that must maintain their data and reports on-site, there is also Power BI Report Server. Power BI Desktop for Power BI Report Server is the specific desktop application that is needed for that version of Power BI.

Common applications of Power BI

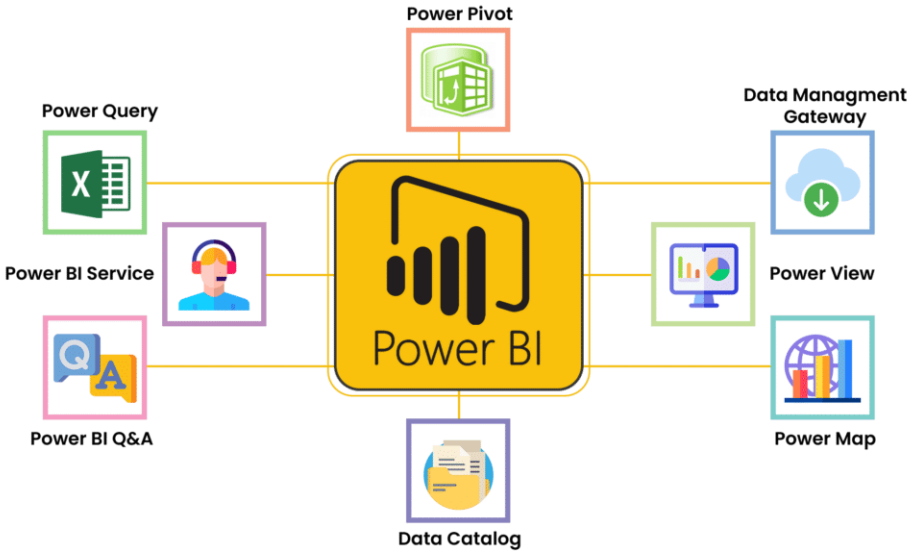
Data from an organization's sources are analysed using Microsoft Power BI. Power BI may assist in fusing separate data sets together, transforming and cleaning the data into a data model, and producing charts or graphs to show the data visually. Other Power BI users within the company can access and use all of this information.

Organizations can use the data models produced by Power BI in a variety of ways, including the following:

In order to ensure that departments achieve business metrics, it is important to tell stories using charts and data visualisations, explore "what if" scenarios within the data, and create reports that may provide real-time answers and assist with forecasting. Executive dashboards from Power BI can also be

provided to administrators or managers, giving management additional understanding of how departments operate.

2.2 Power BI Components



Source:

https://brain-mentors.com/wp-content/uploads/2020/10/Components-of-Power-BI-1024x576.png

Power Query: A tool for searching, gaining access to, and altering internal or external data sources.

Power Pivot: Used to execute analytics on data models retrieved from inmemory.

Power View: A tool for graphical data representation.

Power Map: A tool for geographical visualisation that models geospatial data on a map.

The Power BI Service makes it possible to share workbooks and data visualisations.

Power BI FAQs: This can be used to ask queries and get answers right away with Natural Language Query.

Power BI Data Catalog: It allows for query searching and reuse.

Power BI Data Management: This can be used to inspect data fields, expose tables, and receive recurring data refreshers.

2.3 MySQL

Currently, MySQL is the most widely used database management system for relational databases. The Oracle Company supports this open-source database programme. As compared to Oracle Database and Microsoft SQL Server, it is a database management system that is quick, scalable, and simple to use. For the purpose of developing robust and dynamic server-side or web-based enterprise applications, it is frequently used in conjunction with PHP scripts.

It was created, promoted, and supported by the Swedish corporation MySQL AB. It was written in the C and C++ programming languages. The correct

way to pronounce MySQL is My Ess Que Ell, not My Sequel. Both large and small businesses use MySQL.

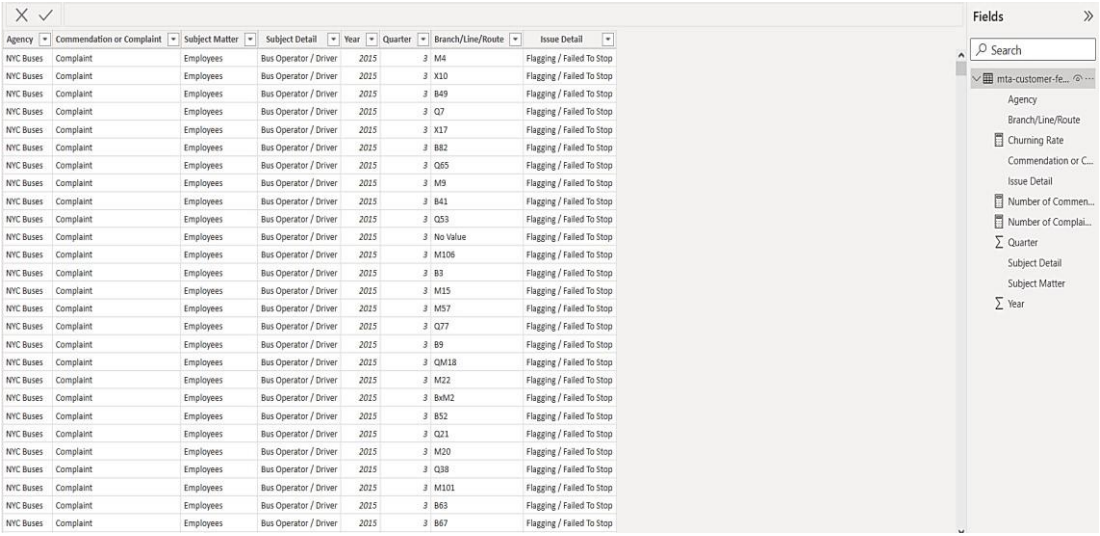
MySQL works with C, C++, and Java to support a wide range of operating systems, including Windows, Linux, MacOS, and others.

A Relational Database Management System (RDBMS) called MySQL offers a number of features, including the following:

- It enables us to carry out operations on tables, rows, columns, and indexes in relation to databases.
- Tables, which are collections of rows and columns and are also referred to as relations, are used to define the database relationship.
- It gives different tables' rows or columns referential integrity.

- We can automatically update the table indexes in MySQL database.
- For the benefit of the end users, it integrates important data from numerous tables using numerous SQL queries.

3. Deployment



Agency	Commendation or Complaint	Subject Matter	Subject Detail	Year	Quarter	Branch/Line/Route	Issue Detail
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M4	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	X10	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B49	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	Q7	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	X17	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B82	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	Q65	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M9	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B41	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	Q53	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	No Value	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M106	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B3	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M15	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M57	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	Q77	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B9	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	QM18	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M22	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	BxM2	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B52	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	Q21	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M20	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	Q38	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	M101	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B63	Flagging / Failed To Stop
NYC Buses	Complaint	Employees	Bus Operator / Driver	2015	3	B67	Flagging / Failed To Stop

Power BI

ARCHITECTURE DESIGN

```
16
17 • LOAD DATA LOCAL INFILE "D:/Churn_analytics_intern/mta-customer-feedback-data-beginning-2014-1.csv"
18   INTO TABLE CHURN_TABLE
19   FIELDS TERMINATED BY ','
20   ENCLOSED BY '"'
21   LINES TERMINATED BY '\n'
22   IGNORE 1 ROWS;
23
24 • show global variables like 'local_infile';
25 • SET GLOBAL local_infile=1;
26
27 • SELECT * FROM CHURN_TABLE;
28   -- The dataset is successfully loaded.
29
30   -- Data Cleaning
31   -- Handling null values in the Issue Detail Column
32 • UPDATE CHURN_TABLE
33   SET Issue_Detail = CASE WHEN Issue_Detail = '' THEN 'Unspecified' ELSE Issue_Detail END;
```

Result Grid

Agency	Commendation_or_Complaint	Subject_Matter	Subject_detail	Issue_Detail	Year	Quarter	Branch_line_Route
Long Island Rail Road	Commendation	Buses	Bus / Vehicle - General	Other	2015	3	Port Jefferson
Long Island Rail Road	Commendation	Employees	CSR - Ambassador	Unspecified	2016	3	No Value
Long Island Rail Road	Commendation	Employees	CSR - Ambassador	Very Helpful/Friendly	2015	2	No Value
Long Island Rail Road	Commendation	Employees	CSR - Ambassador	Very Helpful/Friendly	2015	2	Port Jefferson
Long Island Rail Road	Commendation	Employees	CSR - Ambassador	Very Helpful/Friendly	2015	3	No Value
Long Island Rail Road	Commendation	Employees	CSR - Ambassador	Very Helpful/Friendly	2016	2	No Value
Long Island Rail Road	Commendation	Employees	CSR - Ambassador	Very Helpful/Friendly	2016	3	No Value
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Honesty/Integrity	2015	4	City Terminal Zone
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Other	2015	2	Far Rockaway
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Performance Under Stress	2016	1	No Value
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Unspecified	2015	1	No Value
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Very Helpful / Friendly	2014	3	No Value
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Very Helpful / Friendly	2015	1	No Value
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Very Helpful / Friendly	2015	2	No Value
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Very Helpful / Friendly	2015	3	No Value
Long Island Rail Road	Commendation	Employees	CSR - Customer Service Office	Very Helpful / Friendly	2015	4	Babylon

CHURN_TABLE 15

MySQL