HIGH LEVEL DESIGN

EDTECH ANALYSIS

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ABSTRACT

Educational technology (Ed-Tech) refers to a wide range of teaching and learning-related software and hardware that is increasingly being used in college and university classrooms. The ultimate purpose of educational technology, commonly known as Ed Tech, is to provide a better learning environment, which in turn is intended to improve student results. It's also been shown to boost student involvement and participation in class.

1. INTRODUCTION

1.1 What is High Level Document?

The purpose of this High-Level Design (HLD) Document is to add the necessary detail to the current project description to represent a suitable model for coding. This document is also intended to help detect contradictions prior to coding, and can be used as a reference manual for how the modules interact at a high level.

The HLD will:

- Present all of the design aspects and define them in detail
- Describe the user interface being implemented
- Describe the hardware and software interfaces
- Describe the performance requirements
- Include design features and the architecture of the project
- List and describe the non-functional attributes like:
  - Security
  - Reliability
  - Maintainability
  - Portability
  - Reusability
  - Application compatibility
  - Resource utilization
  - Serviceability

1.2. Scope

The HLD documentation presents the structure of the system, such as the database architecture, application architecture (layers), application flow (Navigation), and technology architecture. The HLD uses non-technical to mildly-technical terms which should be understandable to the administrators of the system.

2. GENERAL DESCRIPTION

2.1 Problem Statement

Educational technology (Ed-Tech) refers to a wide range of teaching and learning-related software and hardware that is increasingly being used in college and university classrooms. The ultimate purpose of educational technology, commonly known as Ed Tech, is to provide a better learning environment, which in turn is intended to improve student results. It's also been shown to boost student involvement and participation in class.

Educational technology (Ed-Tech) is a technology that typically aids in the facilitation of cooperation in an active learning setting. Educators can use educational technology to develop digital, interactive textbooks, gamify courses, take attendance, assign homework, hold quizzes and assessments, and receive real-time results linked to teaching subject, style, and format. Traditional education and teaching methods are being disrupted by educational technology, which allows both teachers and students to learn in an environment that makes use of now-common gadgets such as smartphones, computers, and tablets.

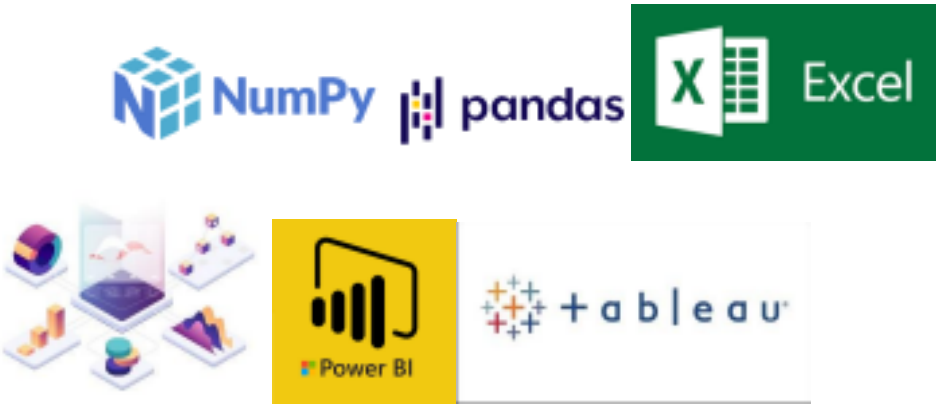
2.2 Proposed Solution

For the problem statement we have decided to make a dashboard which will give us the detail insights of the data we have received. Also it will make the insights better understood by everyone and in an easy manner.

We can also perform EDA on datasets given using Python so that more insights can be gathered for the same.

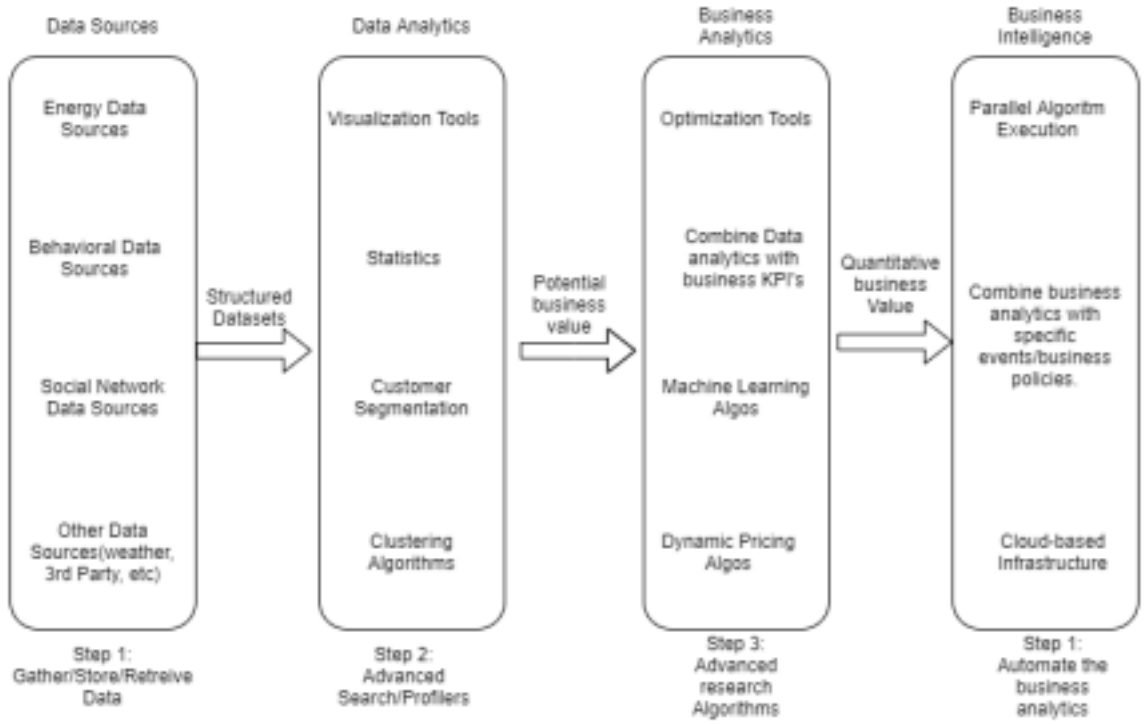
2.3 Tool Used

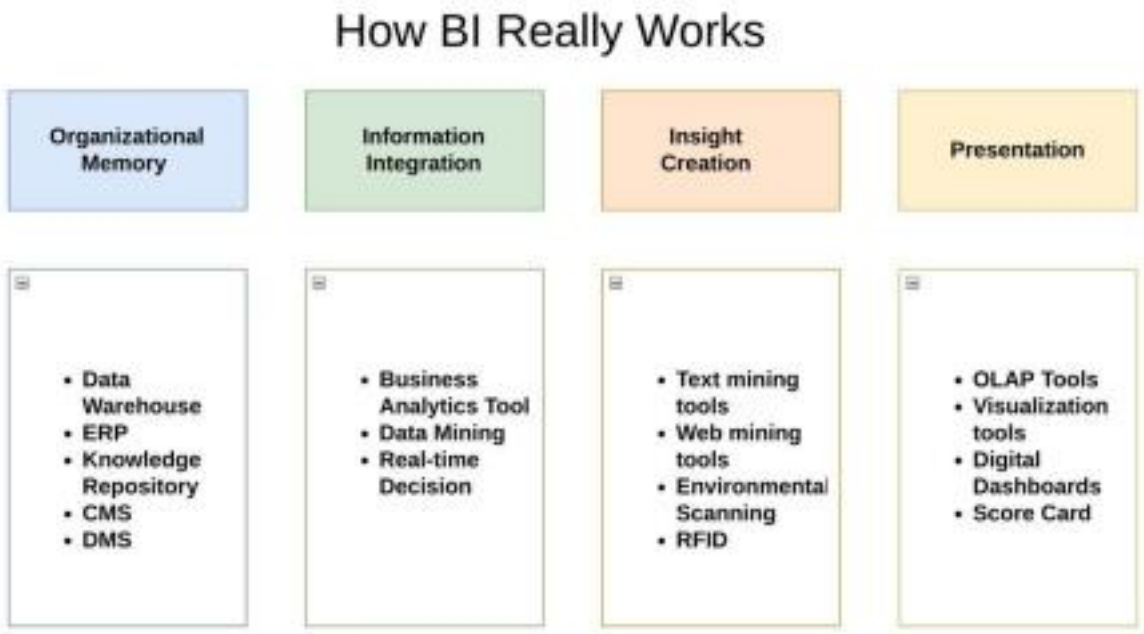
Business Intelligence tools and libraries works such as Numpy, Pandas, Excel, R, Tableau, Power BI are used to build the whole framework.



3. DESIGN DETAIL

3.1 Functional Diagram





3.2 Optimization

Your data strategy drives performance

• Minimize the number of fields

• Minimize the number of records

• Optimize extracts to speed up future queries by materializing calculations, removing columns and the use of accelerated views

Reduce the marks (data points) in your view

• Practice guided analytics. There's no need to fit everything you plan to show in a single view. Compile related views and connect them with action filters to travel from overview to highly-granular views at the speed of thought.

• Remove unneeded dimensions from the detail shelf.

• Explore. Try displaying your data in different types of views.

Limit your filters by number and type

• Reduce the number of filters in use. Excessive filters on a view will create a more complex query, which takes longer to return results. Double-check your filters and remove any that aren't necessary.

• Use an include filter. Exclude filters load the entire domain of a dimension, while include filters do not. An include filter runs much faster than an exclude filter, especially for dimensions with many members.

• Use a continuous date filter. Continuous date filters (relative and range-of-date filters) can take advantage of the indexing properties in your database and are faster than discrete date filters.

• Use Boolean or numeric filters. Computers process integers and Booleans (t/f) much faster than strings.

• Use parameters and action filters. These reduce the query load (and work across data sources).

Optimize and materialize your calculations

• Perform calculations in the database

• Reduce the number of nested calculations.

• Reduce the granularity of LOD or table calculations in the view. The more granular the calculation, the longer it takes.

- LODs - Look at the number of unique dimension members in the calculation.
- Table Calculations - the more marks in the view, the longer it will take to calculate.

• Where possible, use MIN or MAX instead of AVG. AVG requires more processing than MIN or MAX. Often rows will be duplicated and display the same result with MIN, MAX, or AVG. Make groups with calculations. Like include filters, calculated groups load only named members of the domain, whereas Tableau's group function loads the entire domain.

• Use Booleans or numeric calculations instead of string calculations. Computers can process integers and Booleans (t/f) much faster than strings. Boolean>Int>Float>Date>DateTime>String

4. KPI (Key Performance Indicators)

Dashboards will be implemented to display and indicate certain KPIs and relevant indicators for the dashboard.

As and when, the system starts to capture the historical/periodic data for a user, the dashboards will be included to display charts over time with progress on various indicators or factors

4.1 Key Performance Indicators

1) Total Turnover of the companies
2) Counts of companies in various categories
3) Company wise establishment analysis
4) CEO wise analysis
5) Category wise turnover analysis

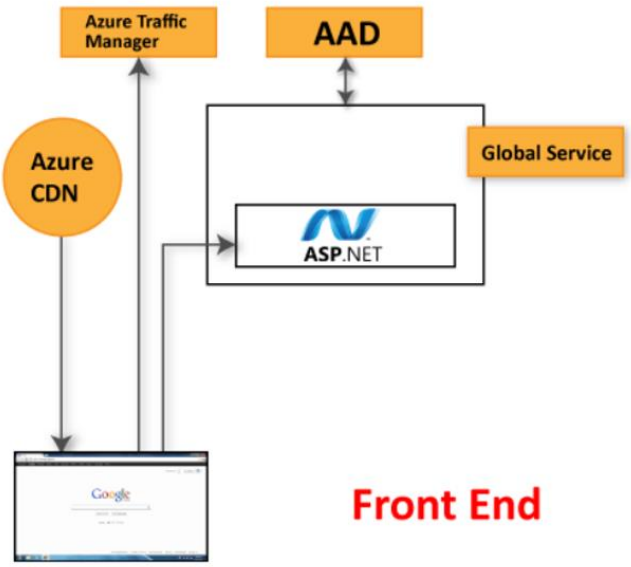
5. DEPLOYMENT

Power BI Service enables the users to create and access the reports, dashboards from the client platforms like mobile devices, websites, etc. User needs to interact with the Power BI Service whenever they want to access the data that is created on the Power BI. So, now, we will learn how the Power BI Service works.

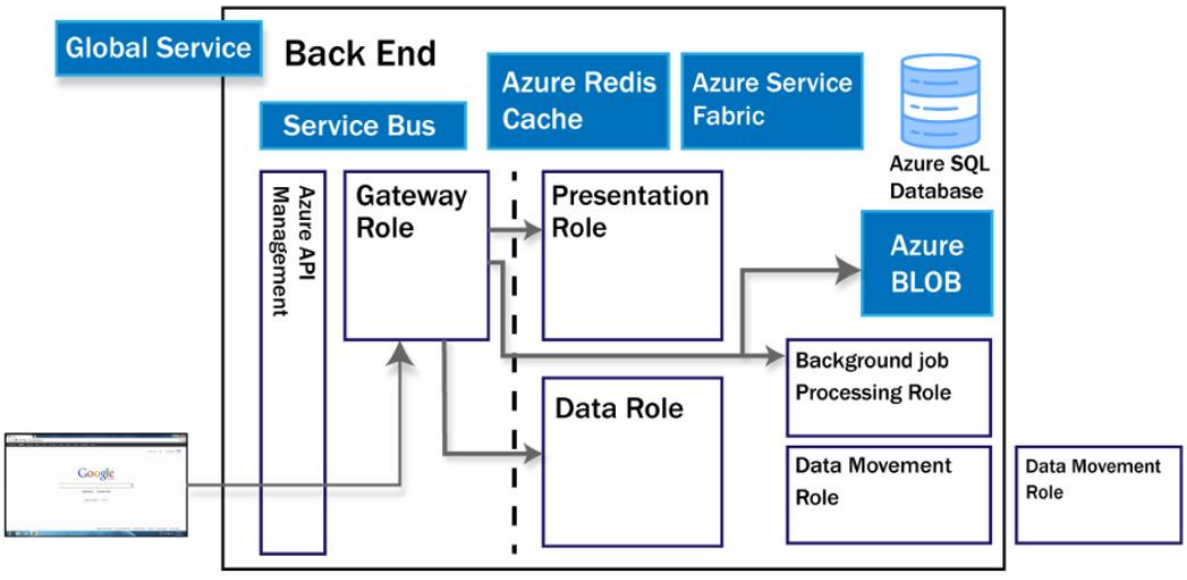
Power BI Service Architecture consists of two clusters. The following are the two clusters.

- Front End Cluster
- Back End Cluster

1. Front End Cluster: Front end cluster acts as an intermediate between the back end cluster and the clients. It is also called a Web Front End Cluster. It establishes the initial connection and authenticates the users or clients using the Azure Active Directory. After user authentication, Azure Traffic Manager directs the user requests to the nearest data centers and Azure Content Delivery Network (CDN) allocates the statice files/content to the users or clients based on the geographical locations.



2. Back End Cluster: It manages the datasets, reports, storage, visualizations, data refreshing, data connections, and other services in the Power BI. At the back end cluster, the web client has only two direct points to interact with the data, i.e., Gateway Role and Azure API Management. These two components are responsible for authorizing, load balancing, routing, authentication, etc.



Working Of Power BI Service

- Power BI stores the data in two leading repositories, i.e., Azure SQL Database and Azure Block Storage. Azure Block Storage enables the users to store the datasets, and all system-related data and metadata are stored in the Azure SQL database.
- It authenticates the user requests and sends them to the Gateway Role. It processes the requests and assigns them to the appropriate components like Background Job Processing Role, Data Movement Role, Presentation Role, and Data Role.
- The presentation role manages all the associated visualization queries like reports and dashboards.
- Presentation Role sends requests to the Gateway Role to the Data Movement Role or Data Role for all relevant datasets.
- Azure Service Bus is used to connect and fetch the data from the On-Premises data sources with the cloud. It sends a request to execute the queries On-Premises data source and retrieve the data from its cloud service.
- The Azure Service Fabric allows all components and microservices which are related to the Power BI Service.
- Azure Cache helps in reporting the data that is stored in the in-memory of the Power BI system.