ARCHITECTURE DOCUMENT

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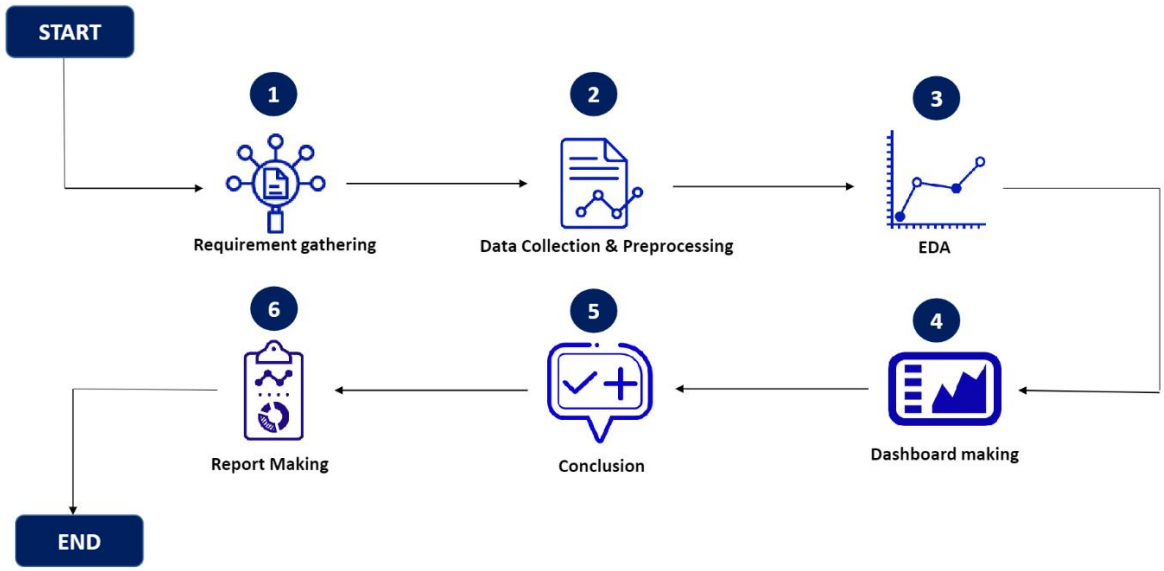
PROJECT FLOW



Requirement Gathering : In this we understand the problem statement where and gather various Resources which are required for the development of the project. Requirement Gathering is the initial stage where data understanding also take place.

Data Collection & Preprocessing: Data is collected and whenever we see the data it is in raw format, hence it is necessary to be processed and to be cleaned. In this process Data Cleaning and pre-processing takes place.

Exploratory Data Analysis (EDA): Here we gather insights from the data. Exploratory Data Analysis is quite self sufficient where we explore the data to gain insights from it.

Dashboard making: We use different tools like Power BI and Tableau to make dashboards that can be used for business decisions.

Report Making: Documenting the project is necessary. In this step we document the finding of the project**.**

POWER BI

Power BI is a cloud-based business analysis and intelligence service by Microsoft. It is a collection of business intelligence and data visualization tools such as software services, apps and data connectors.

We can use the datasets imported in Power BI for data visualization and analysis by making sharable reports, dashboards, and apps. Power BI is a user-friendly tool offering impressive drag-and-drop features and self-service capabilities.

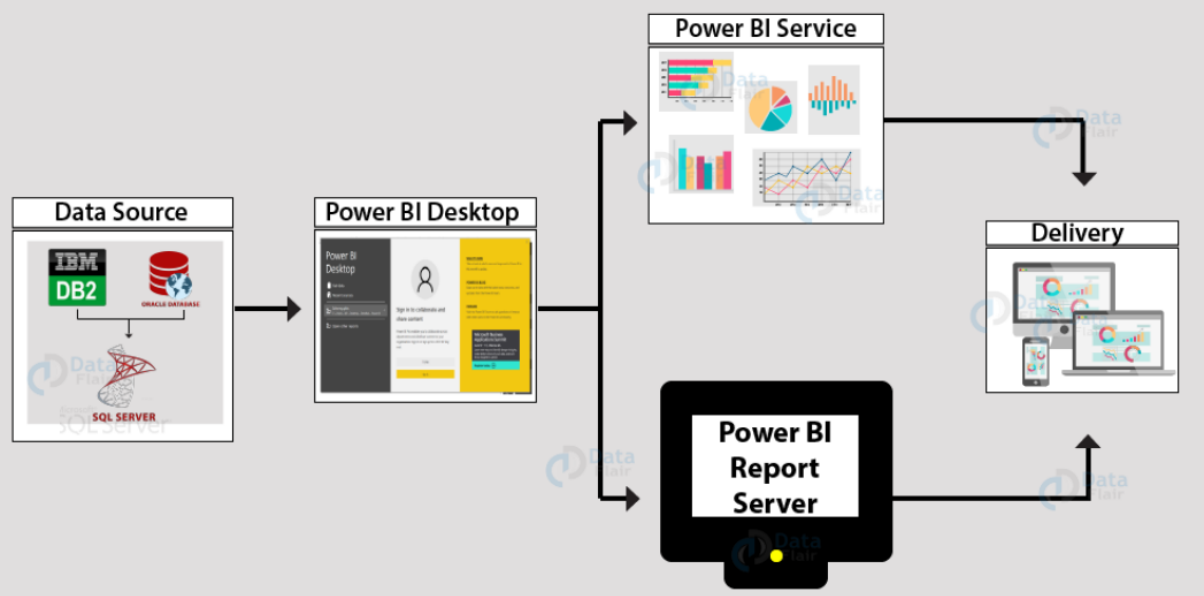
Microsoft offers three types of Power BI platforms:

- Power BI Desktop (A desktop application)
- Power BI Service (SaaS i.e., Software as a Service)
- Power BI Mobile (For iOS and Android devices)

Also, we can deploy Power BI on both on-premise and on-cloud platforms.

POWER BI ARCHITECTURE

Power BI is a business intelligence and data mining software suite which is a collection of different kinds of services by Microsoft. These services play a specific role and work in coordination with each other, to make Power BI function as a whole.



Power Query: We use this service to access, search and transform data from public or local/internal data sources.

Power Pivot: This service provides tools to model data taken from the in-memory data source to use it for analytics.

Power View: This service has many tools to graphically represent data using visuals and use them for analysis.

Power Map: It comes with tools and capabilities to visualize Geo-spatial data or information in the 3D model in a map. You can use these maps in a Power BI report.

Power BI Desktop: It is a companion development tool for Power View, Power Query, and Power Pivot. You can import data from a data source, prepare and transform it and use it in visualizations to create reports in Power BI Desktop.

Power BI Website: It is a web platform to view and share Power BI apps or solutions. Using Power BI Website, you can create dashboards from reports, share the dashboards with other Power BI users and slice and dice data within a report.

Power Service: The Power Service enables the sharing of workbooks and data views with other users. The data gets refreshed at regular intervals from the on-premises or/and cloud-based data sources.

Power Q&A: Using the Power Q&A option, you can search for your data or discover insights by entering queries in natural language. It instantly understands your query and returns relevant results.

Power BI Mobile apps: Business users view and interact with the reports and dashboards published on a cloud service through mobile hosted Power BI instances. Android, Windows and iOS mobile devices support the Power BI mobile apps.

Data Catalog: The Data Catalog option offers the capability to search and reuse queries.

Data Management Gateway: This component manages the periodic data refreshes, data feed viewing and table exposing**.**

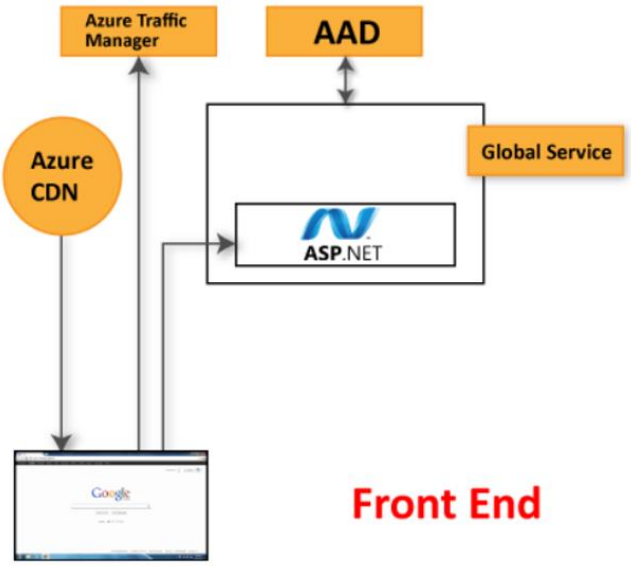
POWER BI SERVICE

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.

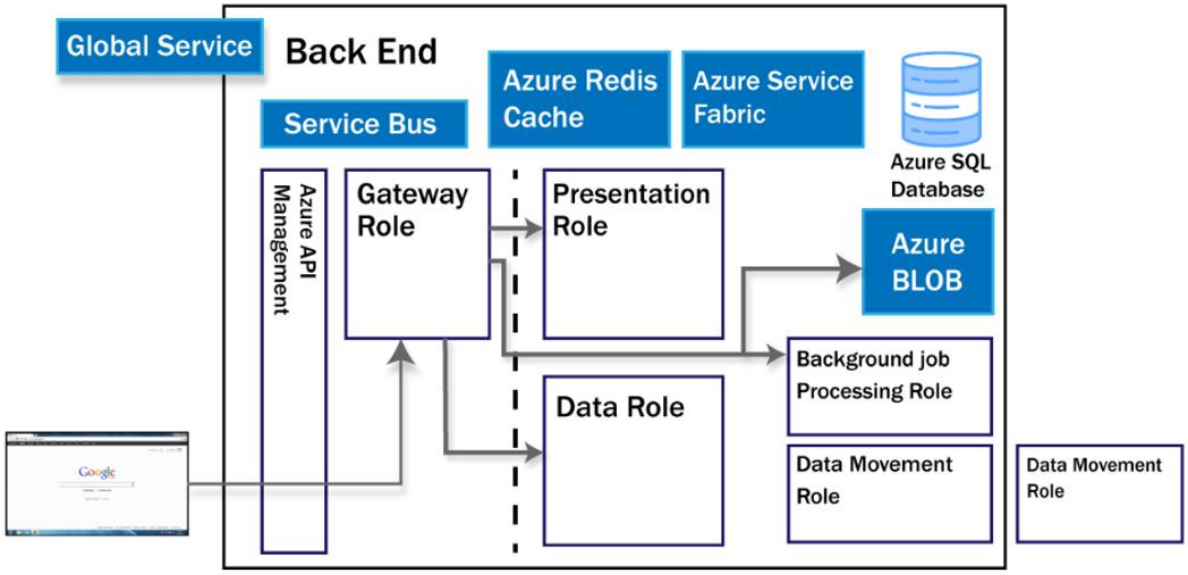
- Front End Cluster
- Back End Cluster

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.