# Architecture Design

## FIFA World Cup

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## Contents



# 1. Introduction

## 1.1 What is Architecture design document?

Any software needs the architectural design to represents the design of software. IEEE defines architectural design as “the process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computer system.” The software that is built for computer-based systems can exhibit one of these many architectures.

Each style will describe a system category that consists of :

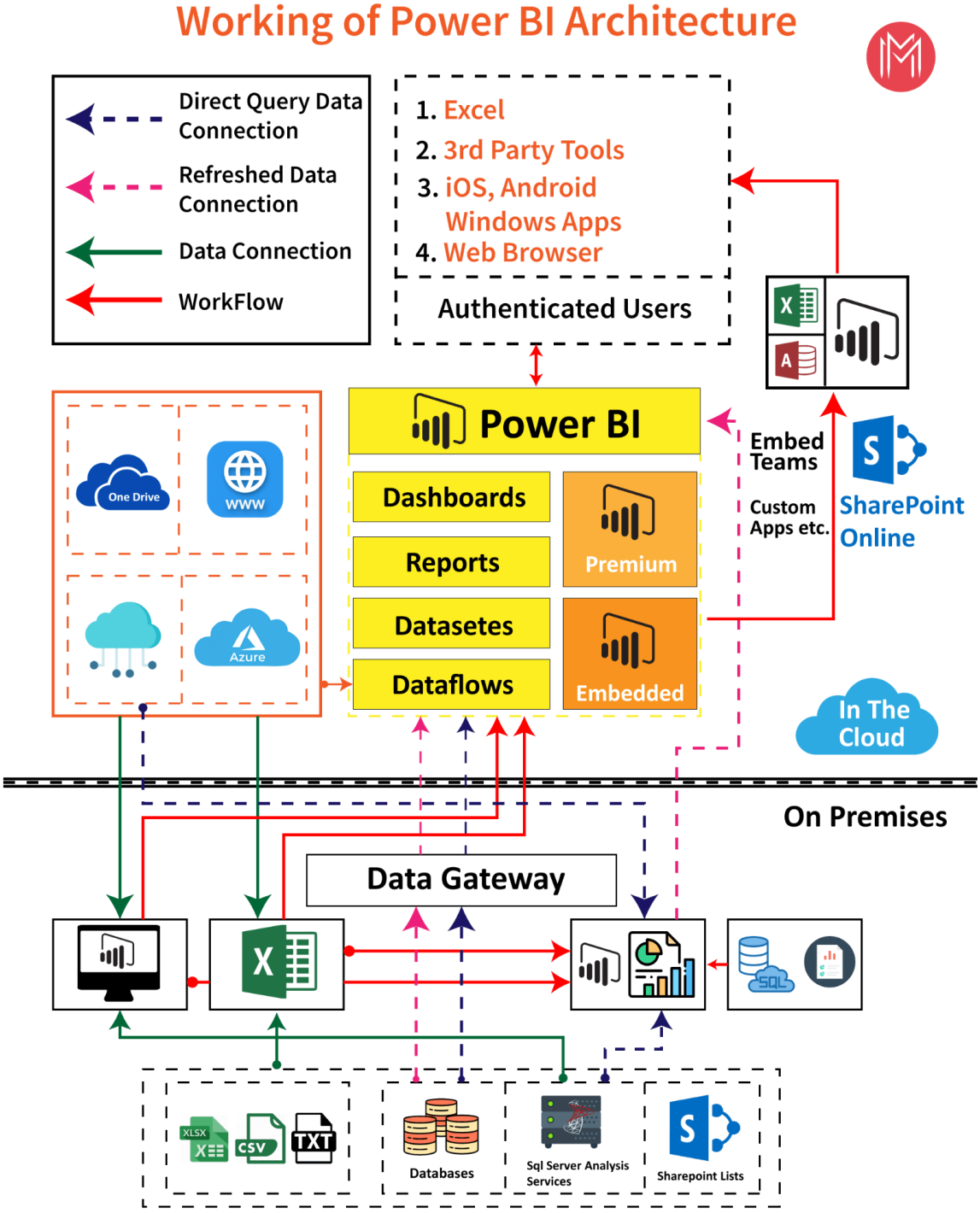
- A set of components (eg: a database, computational modules) that will perform a function required by the system.
- The set of connectors will help in coordination, communication, and cooperation between the components.
- Conditions that how components can be integrated to form the system.
- Semantic models that help the designer to understand the overall properties of the system.

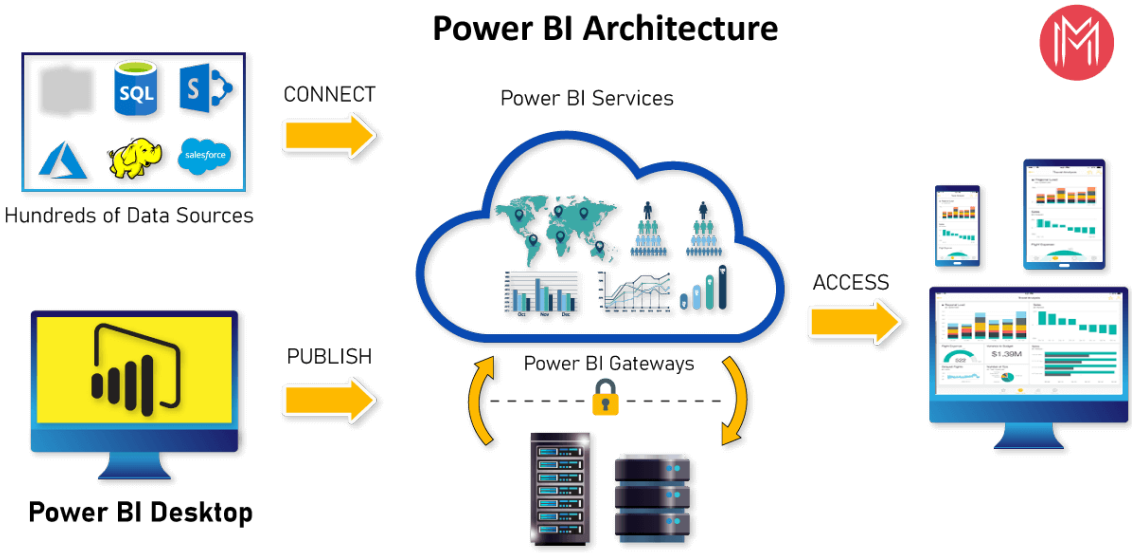
### 1.2 Scope

Architecture Design Document (ADD) is an architecture 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 design principles may be defined during requirement analysis and then refined during architectural design work.

## 2. Architecture

# Working of Power BI Architecture






There is a total of Ten components explained below.

**1. Data Sources**

Power BI's extensive selection of data sources is a key feature. You can connect directly to live connections, import data from files on your computer, or use cloud-based online data sources. There is a 1 GB limit on the amount of data you can import from on-premises or internet sources. In Power BI, a few of the frequently utilized data sources are:

- Excel
- Text/CSV
- XML
- JSON
- Oracle Database
- IBM DB2 Database
- MySQL Database
- PostgreSQL Database
- Teradata Database
- SAP Business Warehouse server
- Amazon Redshift
- Google BigQuery (Beta)
- Azure SQL Database
- Salesforce Reports
- Google Analytics
- Facebook

- GitHub

**2. Power BI Desktop**

You can connect, convert, and view your data on your local desktop using Power BI Desktop, a free software. It has many features and capabilities for connecting to data sources, transforming data, modeling data, and producing reports. Power BI Desktop is available for free download and installation on your computer. One can perform data purification, establish business metrics and data models, specify hierarchies, generate graphics, and publish reports.

**3. Power BI Service**

Power BI Service is a web-based platform where you can collaborate with other users, share reports created in Power BI Desktop, and create dashboards.

It is available in three versions:

- Free version
- Pro version
- Premium version

The names "Power BI.com," "Power BI Workspace," "Power BI Site," and "Power BI Web Portal" are also used to refer to the Power BI Service. Advanced features like notifications and natural language Q&A are also available in this component.

**4. Power BI Report Server**

The Power BI Report Server and the Power BI Service are related. The fact that Power BI Report Server is an on-premise product is the only distinction between these two. Organizations that worry about their data's security and do not want to publish their reports in the cloud use it. Thanks to Power BI Report Server, you may build dashboards and share your findings with other users while adhering to the necessary security rules. You must have a Power BI Premium license to access this service.

**5. Power BI Gateway**

In secured networks, this component is utilized to connect to and access on-premise data. Power BI Gateways are typically used in businesses where data is protected and closely observed. Gateways assist in transferring such data to Power BI solutions for analysis and reporting via secure channels.

**6. Power BI Mobile**

Power BI Mobile is an iOS, Android, and Windows mobile device native Power BI application. These programs are used to see reports and dashboards.

**7. Embedded Power BI**

The APIs provided by Power BI Embedded is used to integrate visualizations into unique applications.

**8. Power Pivot**

This component imports and combines various datasets from various sources to create in-memory data models. Thanks to such integration, functional users can quickly increase the overall value by merging different data sources. The most well-known instance of these integrations is when Power BI is used to examine corporate sales, demographics, and meteorological data.

Additionally, this component offers intricate calculations, key performance indicators, and other metrics that data analysts can utilize to prototype and analyze various business scenarios.

**9. Power Query**


This function, a game-changer for many analysts, searches for data across various corporate data sources or the internet and then smoothly imports the chosen dataset into an Excel table. This component's native data connectivity functionality makes it possible to retrieve the data more quickly and easily.

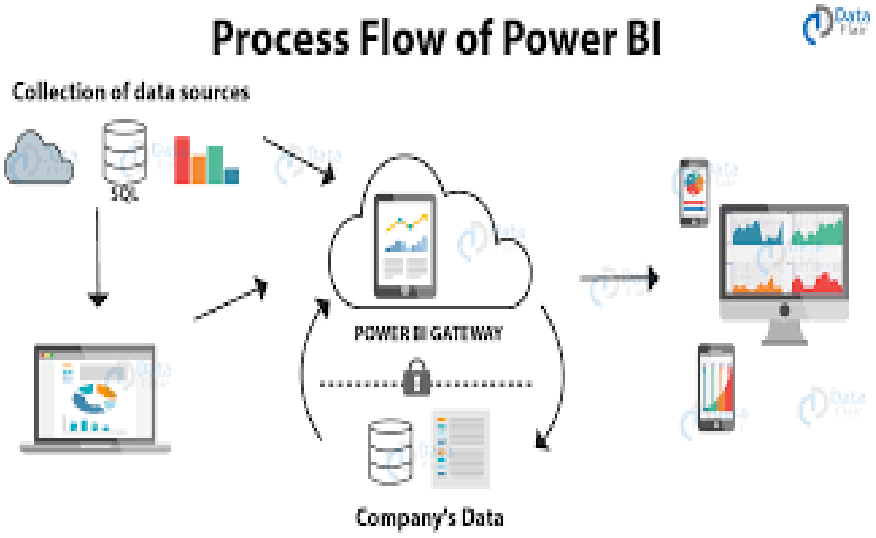
Power query performs crucial data adjustments such as renaming columns, changing values, merging data, and more. This element is vital since it makes data shaping and purification simple.

**10. Power View**

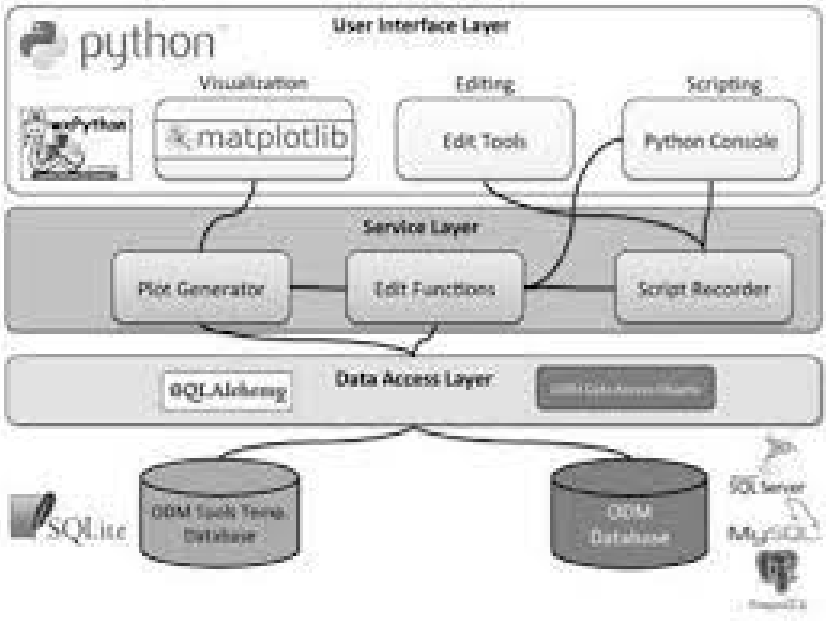
Power View is the preferred component for displaying the data and making it even more dynamic. The data is meant to be cross-filtered and highlighted. It almost seems like using Excel and PowerPoint tools when working with the data in the Power view component.

Power View also offers graphs, tabular data, and charts supporting various maps with zoom and pan features.

## Power Bi Communication Flow



## Python Architecture




# 3. Deployment Description

## 3.1 Deployment options in PowerBi

All reports you build in Power BI Desktop are published on the Power BI Service cloud platform.

Users can use client platforms, including websites, mobile devices, etc., to view the reports and dashboards from the Power BI Service. As a result, each client wishing to access content generated by Power BI must engage with the Power BI Service. Therefore, we must examine the inner workings of Power BI Service to understand how it functions.

The architecture of Power BI Service is divided into two sections:

1. Front End cluster
2. Back End cluster

**1. Front End Cluster**

Clients and the back end are connected by the front end, commonly known as the web front-end cluster. The front-end services handle the initial connection and Azure Active Directory client authentication. User IDs are kept in the Azure Active Directory. After authentication, user requests are routed through Azure Traffic Manager to the closest data center. The Azure Content Delivery Network (CDN) makes static Power BI content and files available to users when a client or user has been authorized.

**2. Back End Cluster**

Visualizations, datasets, storage, reports, data connections, data updating, and other Power BI interactions are handled by the Power BI services on the back end. A web client can only directly interface with Azure API Management and Gateway Role on the backend. These two parts are in charge of routing, load balancing, authentication, and authorization.

## Power BI Desktop

Power BI Desktop is free software that enables you to connect to, convert, and visualize your data on your local desktop. With Power BI Desktop, you can connect to various information sources and combine them (commonly referred to as modeling) into a data model that enables you to produce graphics and collections of images that you can share with other people in your organization as records. Most users working on business intelligence projects create their reports using Power BI Desktop, then share those reports with others using Power BI.

## Power BI Gateway

Power BI Gateway software is needed to access data in an on-premises network. For the data source, the gateway serves as a gatekeeper. The gateway responds to requests, and access is allowed according to users' authentication needs.

Data from the on-premises source is not transferred through gateways to the client platform. It establishes a direct link between the platform and the on-site data source. The client can directly access data from the customer's location for usage in reports, dashboards, and data analysis. A gateway is utilized to make

possible connections between a single or multiple data sources.

**There are two types of Power BI Gateway :**

1. **On-premises Data Gateway (Standard Mode)**

This mode of on-premises data gateway enables connectivity with several on-premises data sources for more than one user. The data can be used in Microsoft Flow, Power BI, Azure Analysis Services, Azure Logic Apps, and other applications. By establishing this kind of data gateway simply once, you can create direct links to numerous data sources. This data gateway is advised for complicated scenarios where several users must access various data sources.

2. **On-premises Data Gateway (Personal Mode) :**

Only one user connects to several data sources using the on-premises data. Gateway's person mode. It is advised whenever only one person needs to access the data sources. The user cannot grant other users access to their Power BI account to produce reports and dashboards.

## Power BI Mobile Apps

For iOS, Android, and Windows mobile devices, Power BI provides a selection of mobile apps. You may connect to and interact with your on-premises and cloud data through mobile apps.

Power BI Desktop allows you to produce reports. The Power BI report service will enable you to create and examine dashboards and reports. Power BI Report Server is where you may access on-premises Power BI reports. Whether on-premises or in the cloud, all these reports and dashboards are accessible through the Power BI mobile apps; try viewing and engaging with them on your mobile device, whether an Android phone or tablet, a Windows device, or an iOS device (iPad, iPhone, iPod Touch, or Apple Watch).

## Power BI Service

The user can get information anytime and anywhere by using these mobile applications. It supports several platforms, including iOS, Windows, Android, and others. Additionally, these tools are helpful for quickly seeing different dashboards and information.

Power BI has created a variety of mobile app layouts for various devices. It provides different designs and

services for multiple device types and applications. Each service updates often and is compatible with every device. Customized solutions that offer better engagement and service can be configured for these apps. Many apps are also available for these devices, including iOS, Android, tablets, etc.

## Features of Power BI

**Three key features make Power BI an excellent data visualization tool:**

**1. Interactive Power BI desktop**

With the help of this interactive Power BI desktop tool, you can easily access the data and create reports. With this robust tool, one doesn't need to be an expert to make a report; it is quick to learn and simple to use. The best part about his application is that you can create reports using it without having any technical skills, and it is free to download.

**2. Customized Dashboard Visualization**

Due to complex data, the Power Bi tool has a default standard that is occasionally insufficient for companies. In such cases, businesses can efficiently utilize the custom visualization library and create visualizations that meet their requirements.

**3. Visibility**

Data is at the core of every business, and today's most significant problem for enterprises is combining data with other datasets to provide meaningful information. Well, one efficient approach is to compile numerous datasets and arrange them aesthetically for easier comprehension. With this form, firms can gain a competitive edge over rivals by having a deeper grasp of the data. These were a handful of Power BI's features. Let's go on and examine what enables Power BI to provide insights that can be put to use.

Power BI makes it possible for data analysis to be speedy, flexible, and user-generated. It makes the process of sharing, collaborating, and analyzing data simpler and advances it.