Architecture Design

Analyze International Debt Statistics

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Contents :

1. Introduction

a) What is Architecture Design Document ?

Any software needs the architectural design to represents the design of software. It 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 build for computer based systems can exhibit one of these many architectures.

Each style will describe a system category that consist of :

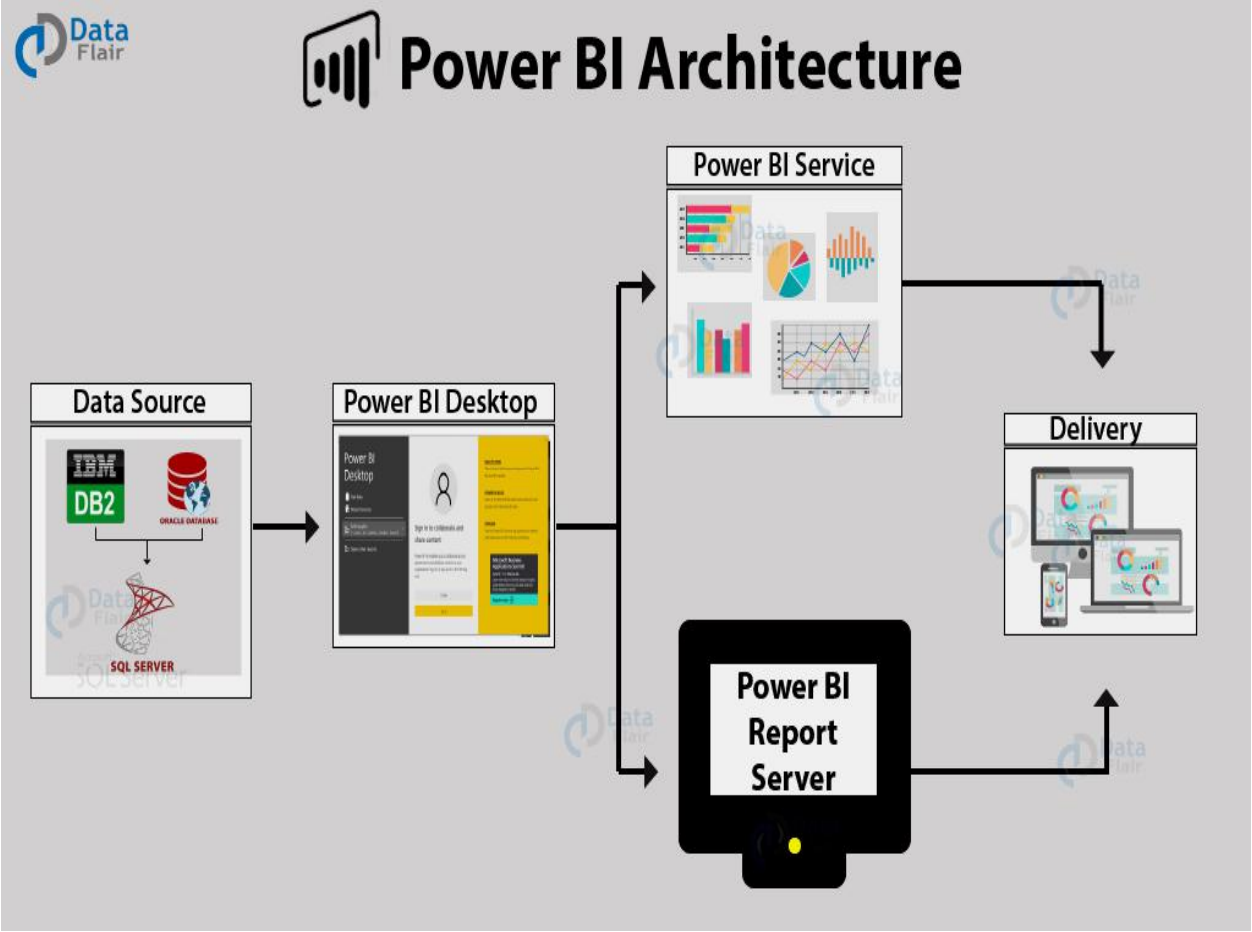
- ✓ A set of components (eg. A database, computational modules, gateways) that will perform a function required by the system.
- ✓ The set of connectors will help in coordination, communications,and cooperation between the components.
- ✓ Conditions that how components can be integrated to form the system.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

B) Scope

Architecture Design Document is an architecture design process that follows a step- by - step refinement process. The process can be used for designing the 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

A) Power Bi Architecture



➢ Data Sources :

An important component of Power Bi is its vast range of Data sources. Import the information into the power Bi or establish a live service to receive the information. If you import the file into the Power Bi it compresses the data sets up to 1GB and uses a direct query if the compressed data sets exceed more than 1 GB.

➢ Power Bi Desktop:

It is a software that connects to data , transform and visualize the data on your desktop. You can connect to various data sources with the help of Power Bi desktop and combine the data into the data model. It

allows you to create a collection of images and graphics that make you share the information within the organizations as records.

- **Power Bi Service :**

Power Bi service is an On-Cloud service with a web based platform and used to share and publish reports made on power bi desktop. It collaborates the data with other users and creates dashboards. Power Bi service is also called “Power Bi Workspace”, “Power Bi Web Portal”, “Power Bi Site”. It has features like alerts and natural language Q&A.

- **Power Bi Report Server :**

Power Bi report server is similar to power bi service. It is an pn premises server platform. Using Power Bi report server, organizations can secure their data. It enables the users to create reports and dashboards and allows you to share reports with other users or organizations with proper security protocol.

B) Power Bi Service Architecture :

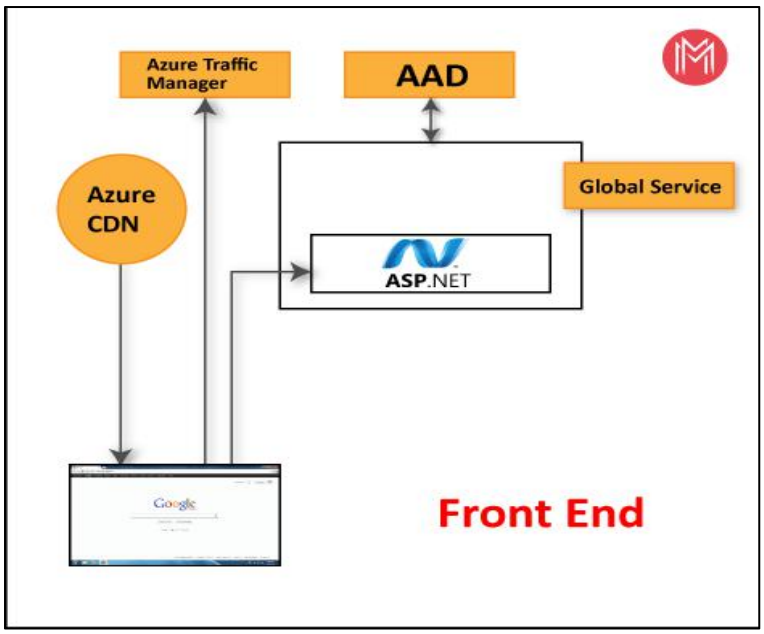
It enables the users to create and access the reports and dashboards from the client platforms like mobile devices, websites, etc. User needs to interact with power Bi service whenever they want to access the data that is created on the power Bi.

It consist of two clusters.

1) Front end Clusters
2) Back end Clusters.

❖ Front End Cluster

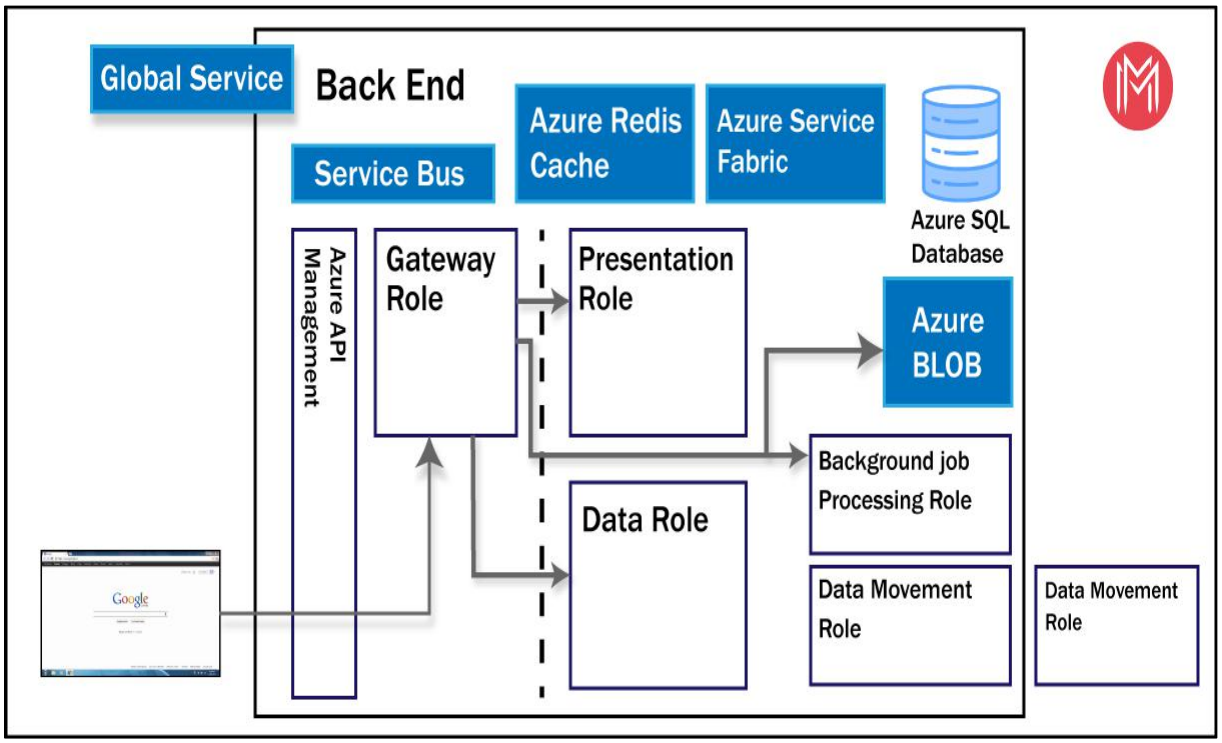
Front end cluster acts as an intermediate between the back end cluster and the clients. It is also called a Web Front End Cluster. It establishes the initial connection and authenticates the users or clients using the Azure Active Directory. After user authentication, Azure Traffic Manager directs the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



❖ 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.



❖ Gateway / Load Balancer

Power BI Gateway is used to maintain fresh information by connecting to your on-site data sources without transferring the data. It provides secure data and allows you to transfer the data between Microsoft cloud services and on-premise services. Microsoft cloud services include Power Apps, Power BI, Azure Analysis Services, Microsoft Flow, and Azure logic apps. By using a gateway, organizations can maintain the databases and other data sources securely in cloud services.

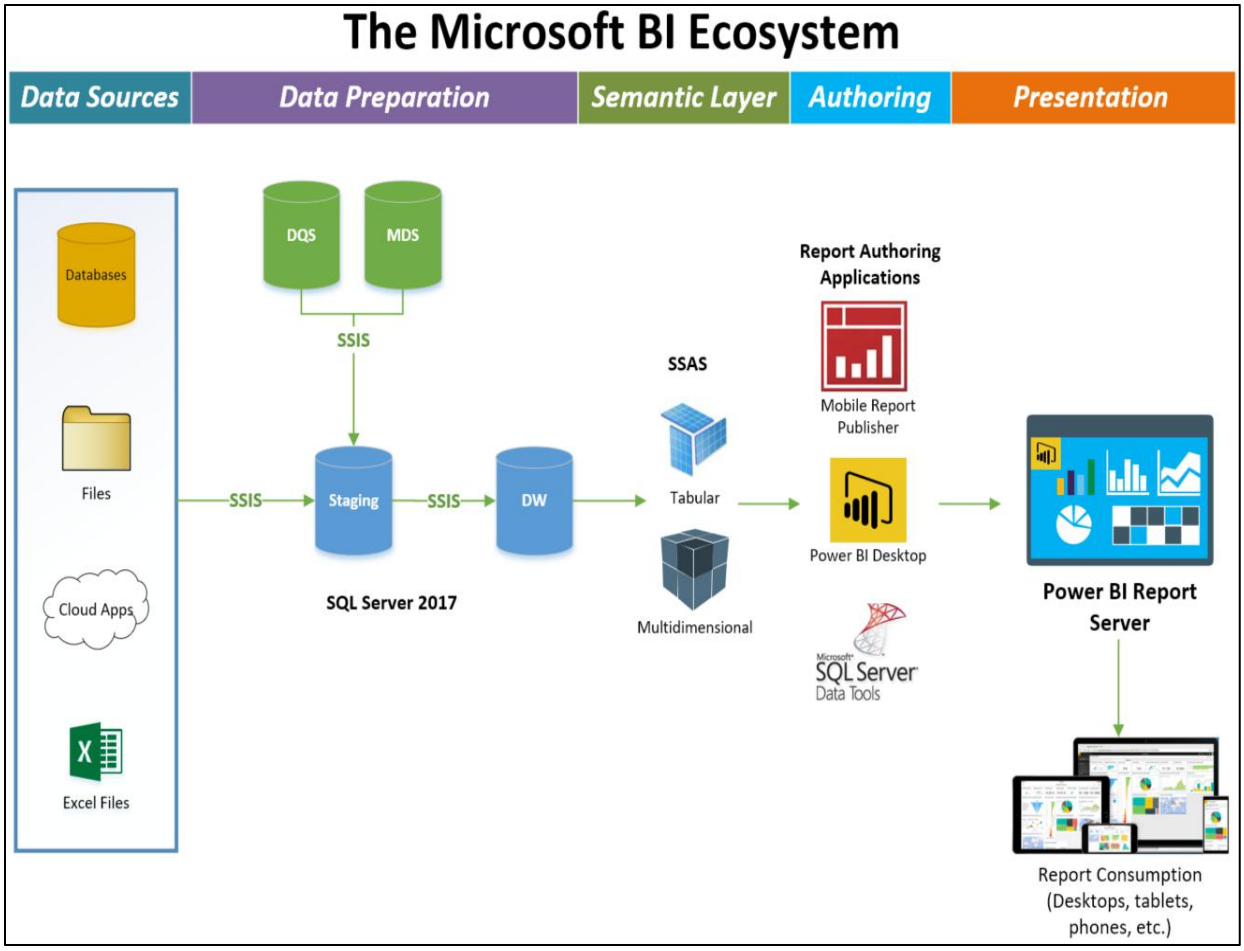
❖ Application Server

Using Power BI Mobile Apps, you can stay connected with on-premises data from anywhere. Power BI apps are available for iOS, Windows, and Android platforms.

❖ Data Engine

Power BI uses the x-velocity, columnar database engine. This is an in-memory database so data is loaded to memory for quick processing. In-memory data is volatile.

❖ Power BI Communication Flow



3 Deployment

There are mainly 3 types of deployment in Power Bi.

- **On-Premises:** Refers to data, applications and infrastructure entirely owned by client at client data center and client has complete control over it.
- **Cloud**: Refers to data, infrastructure and/or services residing in a public cloud environment and completely managed /controlled by third party. Microsoft Azure and web based Power BI service are examples of the cloud offerings.

- **Hybrid**: This denotes to the implementation which spans both on premises and cloud sources which can be services, infrastructure and data sources

➢ On-Premises Deployment :

Option 1 : File Share

The first on-premises option involves usage of a file share:

- Data preparation and report creation is done in client tools: Power BI Desktop and/or Excel.
- The completed Power BI Desktop and/or Excel file is published to a file share or a document collaboration area / repository.
- To view the reports, Excel or Power BI desktop has to be installed on the viewer's machine

Option 2 : SharePoint

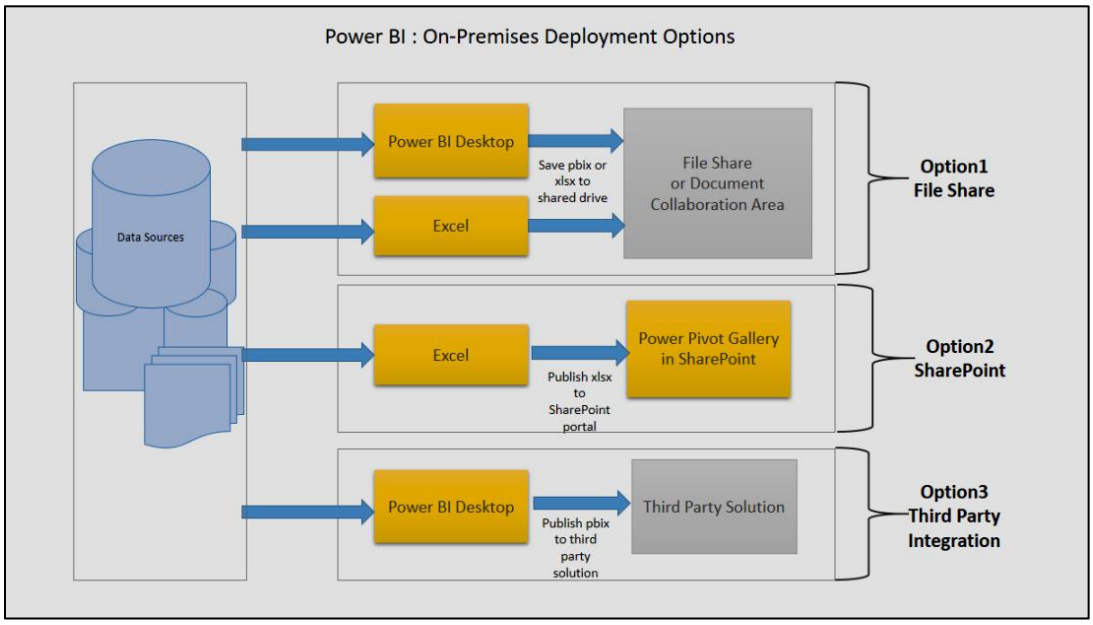
The second on-premises option involves a specialized document library in SharePoint called the Power Pivot Gallery. Due to my limited knowledge, I am not going in details of this option

- Data preparation and report creation occurs in Excel.
- The completed Excel file is published to SharePoint within a Power Pivot Gallery.

Option 3: Third Party Integration

The third on-premises option involves a third party which integrates with Power BI.

- Data preparation and report creation occurs in Power BI Desktop.
- The completed Power BI Desktop file is published to the third party server



➢ Hybrid Deployment :

Option 1: Power BI Service

- Data is either from the on premises corporate applications or it might be born in cloud. It can even mix of these two
- Data preparation and report creation occurs in Power BI Desktop or excel
- Completed Power BI reports are then published to Power BI service

- Report consumption, sharing, security, collaboration, data refresh happens in Power BI service
- Dashboards are created in Power BI service and reports can also be edited or created in Power BI service

Option 2: Custom Application Integration

- Data is either from the on premises corporate applications or it might be born in cloud. It can even mix of these two
- Data preparation and report creation occurs in Power BI Desktop or excel
- Completed Power BI reports are then published to Power BI service
- With Power BI API , these reports can be published in custom web application or mobile app within iFrame
- If user interacts with this report, he/she will be redirected to Power BI service
- Application can be on premise or cloud application

Option 3: Public Website

- Data is either from the on premises corporate applications or it might be born in cloud. It can even mix of these two
- Data preparation and report creation occurs in Power BI Desktop
- Completed Power BI reports are then published to Power BI service
- An embed code is generated by Power BI service for selected report and this code can be embedded in web page of the website within iFrame.

- Here no security is maintained as its public website, hence suitable for the data which can be made publicly available