

Architecture Design

Investment Analytics

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Document Version	1.0
Last Revised Date	29-07-22

DOCUMENT CONTROL

Change Record:

VERSION	DATE	AUTHOR	COMMENTS
1.0	29- July - 2022	HILAL P V	Introduction and architecture defined

Reviews:

VERSION	DATE	REVIEWER	COMMENTS

Approval Status:

VERSION	REVIEW DATE	REVIEWED BY		APPROVED BY	COMMENTS

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1. Introduction

1.1 What is Architecture design document?

Any software needs the architectural design to represent 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 :

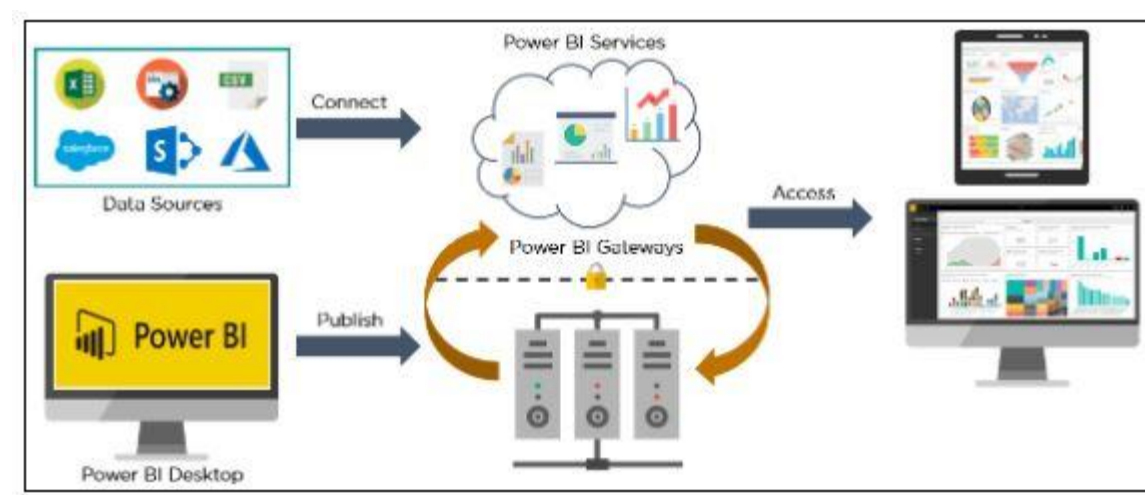
- A set of components (eg: a database, computational modules) that will perform a function required by the system.
- The set of connectors will help in coordination, communication, and cooperation between the components.
- Conditions that how components can be integrated to form the system.
- Semantic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

Power BI is a technology-driven business intelligence tool provided by Microsoft for analyzing and visualizing raw data to present actionable information. It combines business analytics, data visualization, and best practices that help an organization to make data-driven decisions. In February 2019, Gartner confirmed Microsoft as Leader in the "2019 Gartner Magic Quadrant for Analytics and Business Intelligence Platform" as a result of the capabilities of the Power BI platform.



2.1 What is Power BI?

Power BI is a business analytics service provided by Microsoft that lets you visualize your data and share insights. It converts data from different sources to build interactive dashboards and Business Intelligence reports.

2.2 Why Power BI?

Following are the reasons why Power BI is so popular and needed in the BI domain:

1. Access to Volumes of Data from Multiple Sources

Power BI can access vast volumes of data from multiple sources. It allows you to view, analyze, and visualize vast quantities of data that cannot be opened in Excel. Some of the important data sources available for Power BI are Excel, CSV, XML, JSON, pdf, etc. Power BI uses powerful compression algorithms to import and cache the data within the PBIX file.

2. Interactive UI/UX Features

Power BI makes things visually appealing. It has an easy drag and drops functionality, with features that allow you to copy all formatting across similar visualizations.

3. Exceptional Excel Integration

Power BI helps to gather, analyze, publish, and share Excel business data. Anyone familiar with Office 365 can easily connect Excel queries, data models, and reports to Power BI Dashboards.

4. Accelerate Big Data Preparation with Azure

Using Power BI with Azure allows you to analyze and share massive volumes of data. An azure data lake can reduce the time it takes to get insights and increase collaboration between business analysts, data engineers, and data scientists.

5. Turn Insights into Action

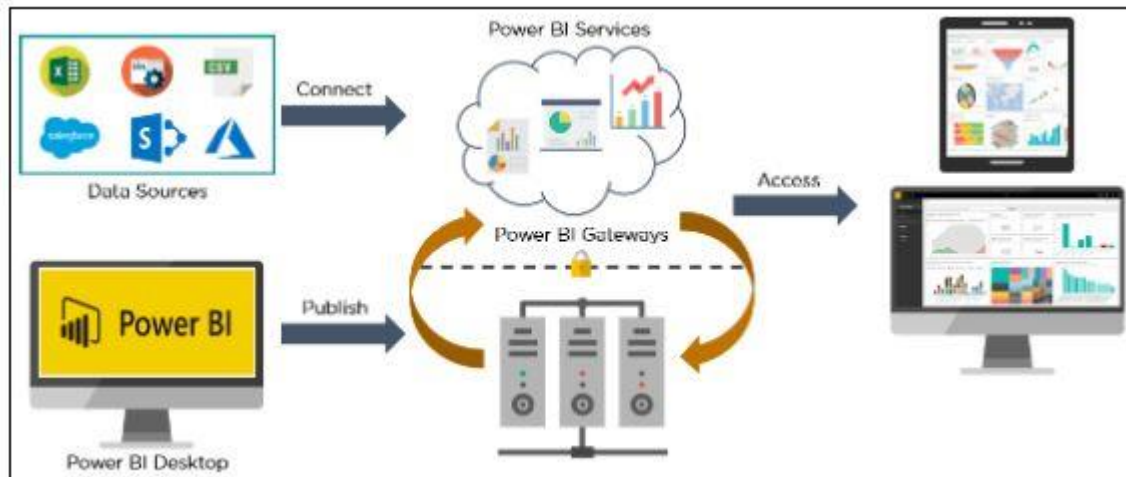
Power BI allows you to gain insights from data and turn those insights into actions to make data-driven business decisions.

6. Real-time Stream Analytics

Power BI will enable you to perform real-time stream analytics. It helps you fetch data from multiple sensors and social media sources to get access to real-time analytics, so you are always ready to make business decisions.

Now, in this what is Power BI article, you will learn about the architecture of Power BI.

2.3 Power BI Architecture

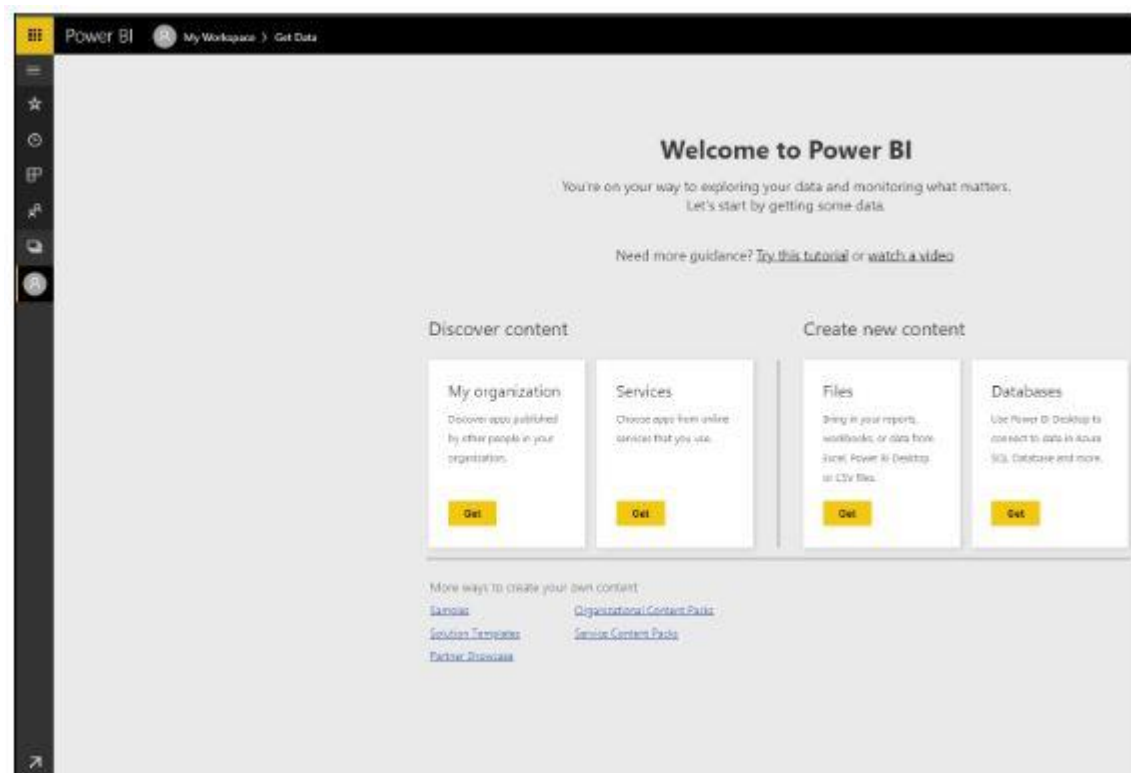


Power BI architecture is a service built on top of Azure. There are multiple data sources that Power BI can connect to. Power BI Desktop allows you to create reports and data visualizations on the dataset. Power BI gateway is connected to on-premise data sources to get continuous data for reporting and analytics. Power BI services refer to the cloud services that are used to publish Power BI reports and data visualizations. Using Power BI mobile apps, you can stay connected to their data from anywhere. Power BI apps are available for Windows, iOS, and Android platforms.

2.4 Power BI Service

Power BI service is the Software as a Service (SaaS) part of Power BI. It is also known as Power BI Online. To access Power BI Service, you need to log in to Power BI service.

Here is how the home page of Power BI Service looks like once you log in:

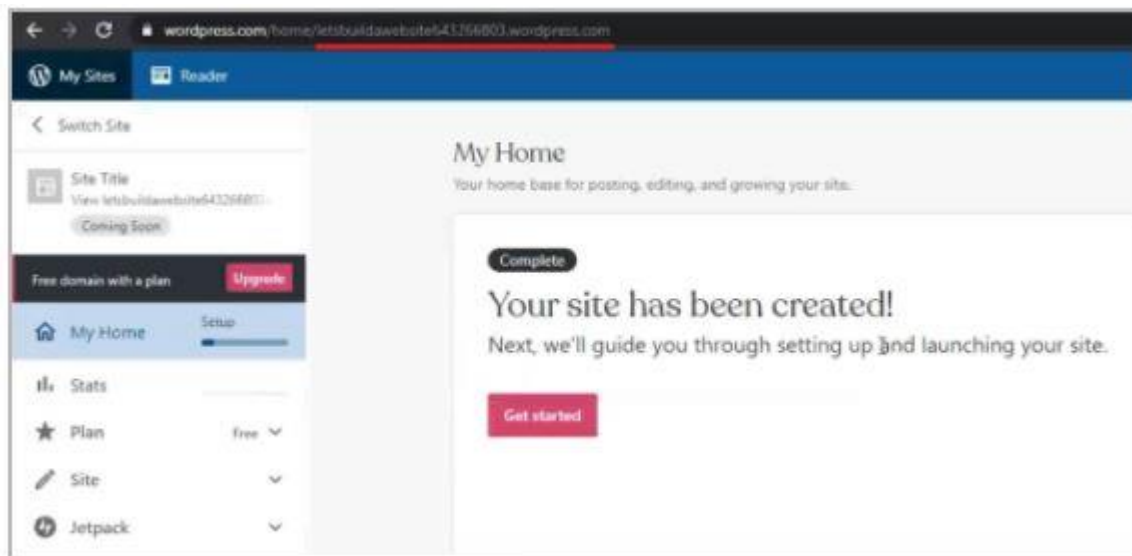


It allows you to connect to data, create reports and dashboards, and ask questions about your data.

Now, as you have understood what is Power BI, its architecture, and services, let us now understand about Dashboards in Power BI.

2.5 Power BI Dashboard

Power BI Dashboard is a single page visualization to tell a story. The visualizations on a dashboard are generated from reports, and each report is based on one dataset. A single page dashboard is known as a Canvas. Below is a Finance Dashboard published on Power BI Service.



Power BI allows you to create different reports on Power BI Desktop. These reports can be published on the Power BI dashboard using the Power BI service. A Power BI report created on Power BI Desktop can be published on to Power BI Service by clicking on the Publish button.

Let us now jump into learning the various components of Power BI.

2.6 Components of Power BI

1. Power Query

Power Query is the data transformation and mash up the engine. It enables you to discover, connect, combine, and refine data sources to meet your analysis need. It can be downloaded as an add-in for Excel or can be used as part of the Power BI Desktop.

2. Power Pivot

Power Pivot is a data modeling technique that lets you create data models, establish relationships, and create calculations. It uses Data Analysis Expression (DAX) language to model simple and complex data.

3. Power View

Power View is a technology that is available in Excel, Sharepoint, SQL Server, and Power BI. It lets you create interactive charts, graphs, maps, and other visuals that bring your data to life. It can connect to data sources and filter data for each data visualization element or the entire report.

4. Power Map

Microsoft's Power Map for Excel and Power BI is a 3-D data visualization tool that lets you map your data and plot more than a million rows of data visually on Bing maps in 3-D format from an Excel table or Data Model in Excel. Power Map works with Bing maps to get the best visualization based on latitude, longitude, or country, state, city, and street address information.

5. Power BI Desktop

Power BI Desktop is a development tool for Power Query, Power Pivot, and Power View. With Power BI Desktop, you have everything under the same solution, and it is easier to develop BI and data analysis experience.

6. Power Q&A

The Q&A feature in Power BI lets you explore your data in your own words. It is the fastest way to get an answer from your data using natural language. An example could be what was the total sales last year? Once you've built your data model and deployed that into the Power BI website, then you can ask questions and get answers quickly.

2.7 Features of Power BI

Following are some of the features of Power BI -

1. Power BI Desktop

Power BI Desktop is free software that you can download and install, and it allows you to build reports by accessing data easily. For using Power BI desktop, you do not need advanced report designing, or query skills to build a report.

2. Stream Analytics

Power BI's primary advantage is its support stream analytics. From factory sensors to social media sources, Power BI assists in real-time analytics to make timely decisions.

3. Multiple Data Sources

Support for various data sources is one of the vital features of Power BI. You can access various sources of data such as Excel, CSV, SQL Server, Web files, etc. to create interactive visualizations.

4. Custom Visualization

While dealing with complex data, Power BI's default standard might not be enough in some cases. In that case, you can access the custom library of visualization that meets your needs.

Now, to better understand what is Power BI, and how does it helps, let us look at a case study on how Meijer, which is one of the United States' largest supermarket chains, used Power BI to solve its business problems.