Architecture Design

Airport Data Analysis

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1. Introduction

1.1. What is an Architecture design document?

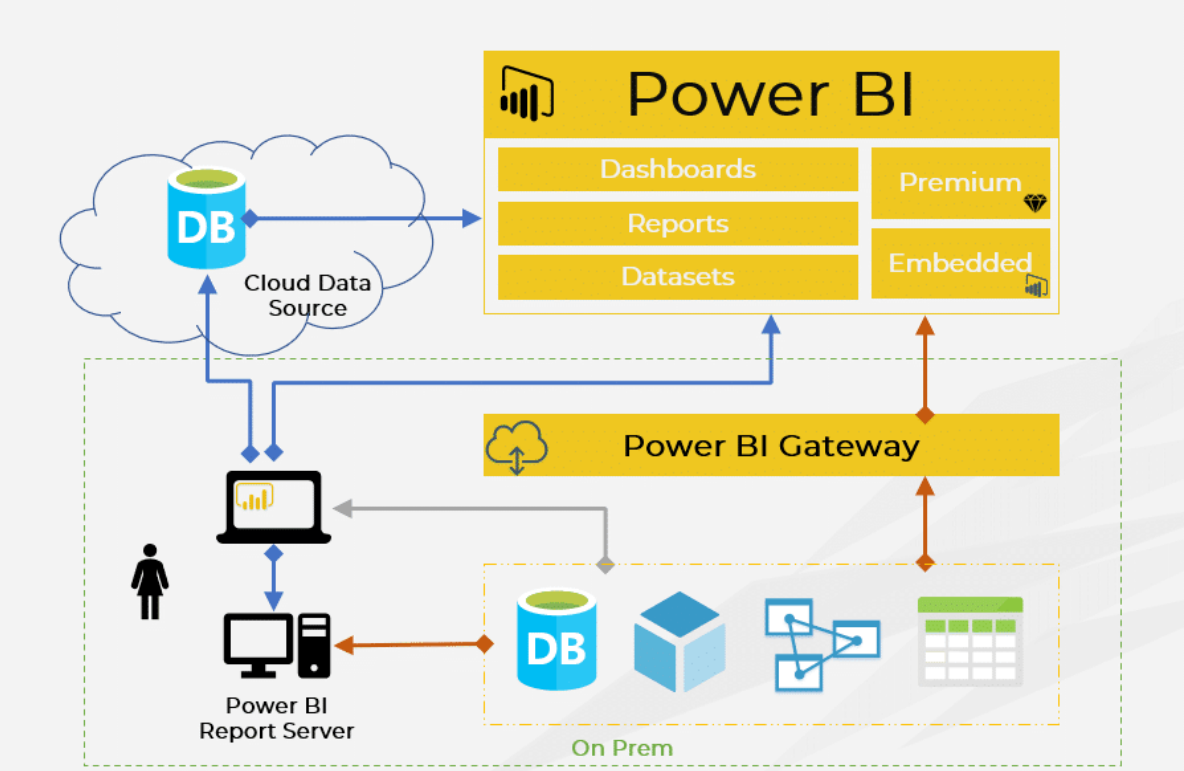
- Any software needs an architectural represent the design of the software. IEEE defines architectural design as “the process of defining a collection of hardware and software components and their interfaces to establish the framework for the development of a computersystem.” The software that is built 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 functionrequired by the system.
- The connectors will help coordinate, communicate, and cooperate betweenthe components.
- Conditions that how components can be integrated to form the system.
- Semantic models help the designer understand the system's overall properties.

1.2. Scope

- Architecture Design Document (ADD) is an architectural design process that follows a step-by-steprefinement 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.

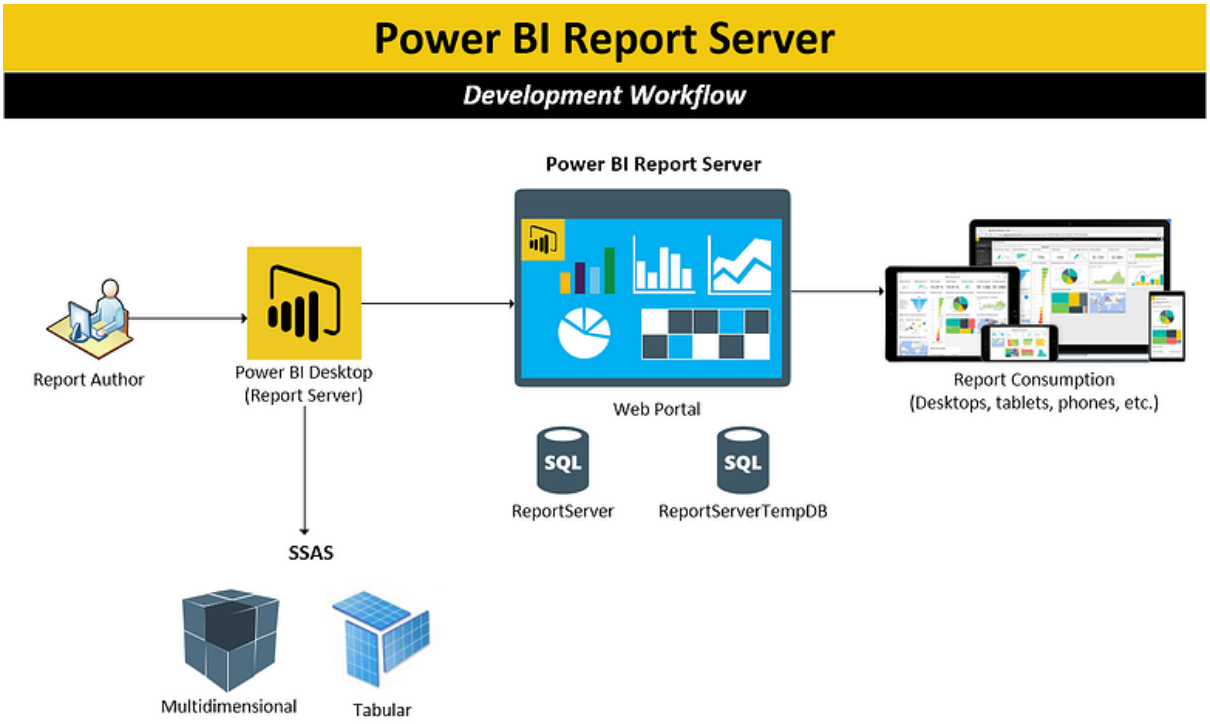
2. Architecture

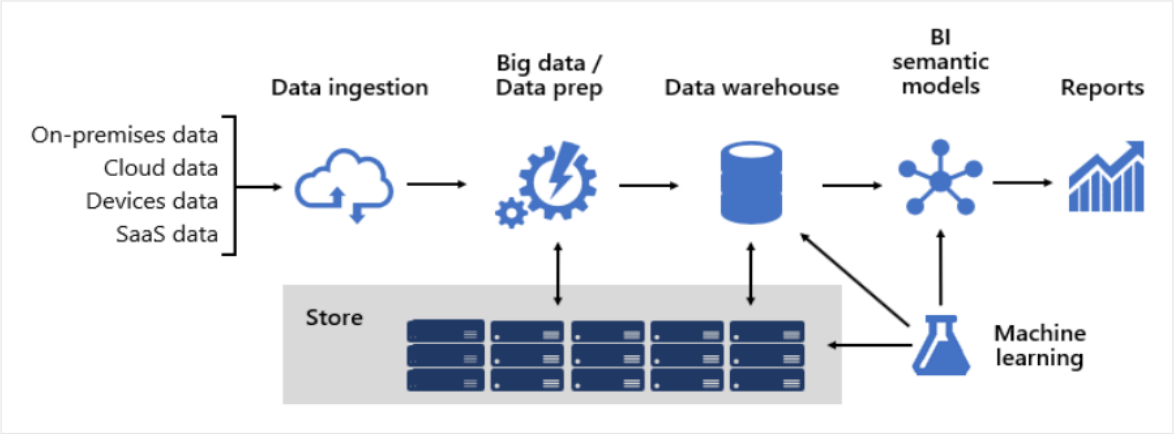


Power Bi Server Architecture

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.

ARCHITECTURE DESIGN





2.1 Power BI Report Server

The Power BI Report Server is similar to the Power BI Service. The only difference between these two is that Power BI Report Server is an on-premise platform. It is used by organizations who do not want to publish their reports on the cloud and are concerned about the security of their data.

Power BI Report Server enables you to create dashboards and share your reports with other users following proper security protocols. To use this service, you need to have a Power BI Premium license.

2.2 Power BI Gateway

This component is used to connect and access on-premise data in secured networks. Power BI Gateways are generally used in organizations where data is kept in security and watch. Gateways help to extract such data through secure channels to Power BI platforms for analysis and reporting.

2.3 Data Sources

An important component of Power BI is its vast range of data sources. You can import data from files in your system, cloud-based online data sources, or connect directly to live connections. If you import from data on-premise or online services there is a limit of 1 GB.

2.4 Power BI Desktop

Power BI Desktop is a client-side tool known as a companion development and authoring tool.

This desktop-based software is loaded with tools and functionalities to *connect to data sources, transform data, data modeling, and create reports.*
You can download and install Power BI Desktop in your system for free. Using Power BI Desktop features, one can do *data cleansing, create business metrics and data models, define the relationship between data, define hierarchies, create visuals, and publish reports.*

2.5 Power BI Service

Power BI Service is a web-based platform from where you can *share reports made on Power BI Desktop, collaborate with other users, and create dashboards.*
It is available in three versions:

- Free version
- Pro version
- Premium version

2.6 Power BI Mobile

Power BI Mobile is a native Power BI application that runs on iOS, Android, and Windows mobile devices. For viewing reports and dashboards, these applications are used.

2.7 Power BI Embedded

Power BI Embedded offers APIs that are used to embed visuals into custom applications.

3. On-Premise

Power BI Desktop is a companion development, authoring, and publishing tool. You can import data from data sources to Power BI Desktop and use it to create reports and then publish them on a Power BI Service or Power BI Report Server.

You can also publish Excel workbooks directly using Power BI Publisher for Excel to the Power BI Report Server. The SQL Server Data tools and Report Publisher help in *creating datasets, KPIs, mobile reports, paginated reports,* etc. The reports from all kinds of reports are published to the Power BI Report Server from where they are distributed to the end-users.

4. On-Cloud

An important component in Power BI architecture is the Power BI Gateway. The Power BI Gateway acts as a secure channel to transport data from on-premise data sources to on-cloud apps or sites.

On the cloud side of the architecture, resides a lot of components. Like a complete Power BI suite having *dataflows, datasets, dashboards, reports, Power BI Embedded, Power BI Premium,* etc. You can embed your reports and dashboards into *Teams, SharePoint, custom applications,* etc. There are on-cloud data sources as well that connects to Power BI tools via direct connections.
At last, there is a layer of authenticated users who share the published reports and dashboard and collaborate with one another to make educated decisions based on the insights. There are different kinds of users who consume Power BI reports and dashboards and connect through *web browsers, Excel, third-party tools, and mobile devices* (iOS, Windows, Android apps).